SAVIAC
Shock and Vibration Information Analysis Center

Current Awareness

August 2004

The 75th Shock & Vibration Symposium

Preliminary Program

NAVSEA WARFARE CENTERS DAHLGREN

NORTHROP GRUMMAN Newport News

PCB PIEZOTRONICS INC

October 17-22, 2004
Virginia Beach, VA

US Army Corps of Engineers
Engineer Research and Development Center

Introduction

Since the first meeting in 1947, the Shock and Vibration Symposium has become the oldest, continual meeting dealing with the transient 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 provides a valuable opportunity for the technical community in government, private industry and academia to meet and discuss problems of mutual interest. This year's symposium features the Naval Surface Warfare Center Dahlgren Division, Northrop Grumman Newport News and PCB Piezotronics, Inc. Representing these organizations are our Co-Chairs.

Program Committee Members

Co-Chair: Mr. James Howell III - Naval Surface Warfare Center, Dahlgren Division
Co-Chair: Mr. Travis Kerr - Northrop Grumman Newport News
Co-Chair: Prof Patrick Walter - PCB Piezotronics Inc./TCU

Mr. Austin Alvarez - General Dynamics Electric Boat
Mr. Andy Anderson - United Defense LP
Mr. Jeff Blankenship - NSWC/Panama City
Dr. Dale Bloodgood - CDSA-Dam Neck (NAVSEA)
Mr. Skip Connon - US Army Aberdeen Test Center
Mr. Frederick Costanzo - NSWCCD/UERD
Dr. Raymond P. Daddazio - Weidlinger Associates
Mr. Sal Detruit - National Technical Systems
Mr. Tim Edwards - NSWC DD
Mr. Bill Forehand - HI-TEST Laboratories
Dr. Howard Gaberson - Consultant MFPT/SAVIAC
Mr. Kurt Hartsough - NSWCCD-SSES
Mr. Joel Leifer - SAVIAC
Dr. Chris Merrill - CMLA Engineering, PLC
Dr. Paul Mlakar - ERDC
Mr. Jeffery Morris - HI-TEST Laboratories
Dr. Alan Ohrt - AFRL/MNAL
Mr. Don Peckinpaugh - NSWC Crane
Mr. Drew Perkins - HI-TEST Laboratories
Mr. Henry Pusey - MFPT/SAVIAC
Dr. Rudy Scavuzzo - University of Akron
Dr. Young Shin - Naval Postgraduate School
Mr. Jim Sullivan - PCB Piezotronics
Dr. Bob Welch - SAVIAC/USACE ERDC
Mr. George White - Army AMSAA, APG
Mr. Mike Winnette - NAVSEA 05P3
Mr. Dan Worth - NASA/GSFC
Mr. Bill Yancey - HI-TEST Laboratories
Mr. Gary Zook - NUWC Keyport

Classified Sessions

A SECRET-level clearance is required to attend the Limited/Classified Sessions held at NSWCDD/Dam Neck. A visit request form (included in this program) must be sent to ERDC by October 1, 2004. Please bring a photo ID for admittance.

Note to Speakers

Please be aware this is a preliminary program. We have tried to arrange the presentations to minimize conflicts. If you have a conflict resulting from the arrangements as presented here, please contact us for possible changes. For up-to-date program status, check the SAVIAC website at http://www.saviac.org.

Exhibitors

There will be an area for table-top and/or booth exhibits at the hotel. We will be having an Exhibitor's Luncheon on Tuesday for all attendees and exhibitors. In addition, all session breaks will be held in the exhibit area. Please call Lauren Yancey (703) 892-0060 for further information.

Information Numbers

Joel Leifer (General Info)	(301) 596-0100
Lauren Yancey (Registration)	(703) 892-0060
Jenny Hamby (Registration)	(434) 581-3204
FAX	(301) 596-6400
website	www.saviac.org

The Cavalier Hotel Reservations:	(800) 446-8199
	(757) 425-8555
	(888) since27
Hotel Website	www.cavalierhotel.com

Schedule of Events

This program is preliminary and is subject to modification. Check the SAVIAC website at http://www.saviac.org for up-to-date program status.

Tutorials

Sunday and Monday 7:00 a.m. - 7:00 p.m.

Sessions

Tuesday Morning

* * * * * * * * ***Opening Session*** * * * * * * * *

Track One *(Unclassified)*	***Track Two*** *(Unclassified)*	***Track Three*** *(Unclassified)*	***Track Four*** *(Unclassified)*	***Track Five*** *(Classified)*	***Track Six*** *(Classified)*

Tuesday Afternoon

Building Code Panel ASCE Standard Mtg	Vibration Modeling Vibration Testing I	Products & Facilities Navy Shock Qual Panel	Training	VIRGINIA Advanced Sail DYSMAS	

Wednesday Morning

Progressive Collapse Data Analysis DG	Blast Modeling Isolation	Acoustics Blast Overpressure	Training	SSN 774	Shipboard Isolation UNDEX Applications

Wednesday Afternoon

UNDEX Design Damping	Repeated Mech Shock UNDEX Num Methods	SRS	Training	Protective Design Explo Char Testing in Tunnels	

Wednesday Night: SAVIAC Community Feedback Social Event

Thursday Morning

Vibration Testing II Random Vibration	Test Method Design & Validation	MIL-DTL-901E	Training	Air Blast	

Thursday Afternoon:

Blast Experiments Blast Design	UNDEX Ship Shock UNDEX Simulation	ANSI Shock Weapon Target Interaction	Pyroshock Vibration - Num Methods		

Friday: Tour of NSWCDD/Dam Neck

75th Shock and Vibration Symposium
Preliminary Program

Sunday, October 17

Tutorials	*Instructor*	*Time*
Elementary Shock Isolation System Design	Dr. D. Christopher Merrill	8-11 AM
Introduction to DDAM Analysis Using NE/Nastran	Mr. Tony Abbey	8-11 AM
Substructure Coupling and Structural Modification for Shock & Vibration	Dr. Joshua Gordis	8-11 AM
The Navy Shock Qualification Process	Mr. Hartsough	9-12 AM
Performing DDAM Analysis Using MSC.Software Products	Mr. Bart McPheeters	12-3 PM
Beyond the Shock Spectrum Temporal & Frequency Moments, the Product Model, & Uncertainty	Mr. Dave Smallwood	12-3 PM
An Introduction to ABAQUS	Dr. Jeff Cipolla	12-3 PM
MIL-S-901D Shock Qualification Testing	Mr. Kurt Hartsough & Mr. Domenic Urzillo	1-5 PM
Navy Weapons Systems Safety Program	Mr. James Howell III	4-7 PM
Productive DDAM Analysis Using ABAQUS	Dr. David Winkler & Mr. David Woyak	4-7 PM
Wavelets	Mr. Tim Edwards	4-7 PM
Structural Detailing for Blast Resistance	Dr. Ted Krauthammer	4-7 PM

Monday, October 18

Tutorials	*Instructor*	*Time*
Basic Concepts of Digital Data Acquisition for Shock and Vibration Testing	Mr. Strether Smith	8-11 AM
Calibration, Maintenance and Operation of the LWSM & MWSM	Mr. Chris Grunau & Mr. Jeff Morris	8-12 PM
UNDEX and Acoustic Analysis Using ABAQUS	Dr. Jeff Cipolla	8-11 AM
Naval Shock Analysis & Design	Dr. Rudy Scavuzzo	8-11 AM
Damping	Dr. Jack Henderson, Dr. Peter Torvik & Dr. Ahid Nashif	8-11 AM
Validation and Editing of Shock & Vibration Data	Mr. Allan Piersol	12-3 PM
Introduction to Non-Linear Methods in Shock and Vibration using NE/Nastran	Mr. Tony Abbey	12-3 PM
Overview of Underwater Shock and DDAM	Dr. Young Shin	12-3 PM
MIL-S-901D Shock Qualification Extensions	Mr. Kurt Hartsough & Mr. Domenic Urzillo	12-3 PM
The Measurement and Utilization of Valid Shock and Vibration Data	Dr. Patrick Walter	4-8 PM
Shock Response Spectrum	Mr. Wayne Tustin	4-7 PM
Application of the USA Code to Underwater Shock Problems	Dr. John DeRuntz	4-7 PM
Navy Shock Database User Certification	Mr. Paul Medeiros & Mr. Kurt Hartsough	4-7 PM

ASCE Standard fo Blast Protection of Buildings — **Chair: Mr. Don Dusenberry, Simpson Gumpertz & Heger Inc.**

The American Society of Civil Engineers Standards Committee preparing a standard for blast protection of buildings will hold its second meeting today from noon to 6 p.m. and tomorrow from 3 p.m. to 7 p.m. The meeting will include presentations and discussions of early drafts of several sections of this new document. Visitors and persons interested in joining the committee are welcome to attend.

Tuesday Morning, October 19

Chair/Presenter Meeting (All Tuesday Chairs & Presenters Must Attend)
7:00 - 7:30 a.m. Location TBA

Opening Session

Call to Order: *Mr. Joel Leifer*, *SAVIAC Program Manager*	8:30 am
Welcome: *TBD Naval Surface Warfare Center, Dahlgren Division*	8:35 am
Welcome: *Mr. Irwin F. Edenzon, Vice President, Technology Development & Fleet Support, Northrup Grumman Newport News*	8:40 am
Welcome: *Mr. Jim Lally, CEO, PCB Piezotronics, Inc.*	8:45 am
Symposium Highlights: *Mr. Joel Leifer*, SAVIAC Program Manager	8:50 am
Henry Pusey Award Presentation: *Mr. James Howell II, Naval Surface Warfare Center Dahlgren Division, Mr. Travis Kerr, Northrop Grumman Newport News, Dr. Patrick Walter, PCB Piezotronics, Inc.*	9:10 am
Mel Baron Award Presentation: *TBD*	9:20 am
SAVIAC Supporters Recognition - *Mr. Joel Leifer, SAVIAC Program Manager*	9:40 am
Director's Remarks: *Dr. Charles Robert Welch*, *USAE Research and Development Center*	9:50 am
Break	10:00 am
Keynote Address: Mrs. Mary Lacey, PEO, National Security Personnel System	10:15 am
Elias Klein Memorial Lecture: ***"If Newton Had a Laptop"*** - *Prof Alfred Wicks, Virginia Tech*	11:00 am
Break	11:30 am

Tuesday Afternoon, October 19

Exhibitors Luncheon

Tour the exhibits as you enjoy lunch in the exhibit area from 11:30 - 1:00

Track One

Building Code Panel — Chair: Dr. Paul Mlakar, ERDC

ASCE Standard for Blast Protection of Buildings — Chair: Mr. Dan Dusenberry, Simpson Gumpertz & Heger Inc.

The American Society of Civil Engineers Standards Committee is preparing a standard for blast protection of buildings. The committee meeting, which will include presentations and discussions of early drafts of several sections of this new document, is scheduled for noon to 6 p.m. on October 18, with a second session scheduled for 3 p.m. to 7 p.m. on October 19. Visitors and persons interested in joining the committee are welcome to attend.

Vibration - Modeling — Chair: Mr. John Zinskie, NGNN

Track Two

Two-Dimensional Iwan Model for Joints and Comparison with Smallwood Joint Model ~ Dr. G. Wije Wathugala, & Dr. Timothy Hasselman, ACTA Inc.

Compliance To MIL-STD-167 By Analysis ~ Mr Craig Miller & Mr. Jeffrey Saccani, John J McMullen & Associates

Dynamic Analysis of Support-Structure for Multi-Ordered Rotary Printing-Press ~ Mr. Jaswant Arlekar & Mr. Ravindra Mandrekar

Structural Modeling and Seismic Analysis for an Instrumented 20-story Building in Anchorage Alaska ~ Dr. He Liu University of Alaska, Anchorage & Mr. William N. Scott, VECO Alaska

Identification and Simulation Study of a Soil-Structure System under Earthquake Excitation ~ Mr. Yibin Zheng, University of Virginia, Mr. He Liu, University of Alaska Anchorage, Mr. Mansheng Wang, & Professor Xiyuan Zhou, Beijing University of Technology

Development of an Actively-Stabilized Sensor Mast with a Pitch Disturbance Isolation Platform ~ Mr Peter Fazio, US Army Research Laboratory

Track Two (Continued)

Vibration - Testing I — ***Chair: Mr. Eric Wheater, NSWCDD***

Condition Diagnostic Rules for Hot Strip Mill Using Vibration Signals ~ Jih-Jau Jeng, China Steel Corporation

Using Terrain Mechanic Modeling Tools to Define Ground Vehicle Mission Scenarios for the Purpose of Laboratory Vibration Schedule (LVS) Development ~ Mr. Jesse Porter & Mr. Randy Jones, Army Redstone Technical Test Center (RTTC)

Laboratory Vibration Scheduled Development Procedures ~ Jesse Porter, Army Redstone Technical Test Center (RTTC)

Development of a Six-Degree-of-Freedom (6-DOF) Motion Replication Based Production Acceptance Test (PAT) ~ Dr. Mike Hale & Mr. Chuck Freeman, Army Redstone Technical Test Center (RTTC)

Transient Dynamic Response of Delaminated Composite Rotating Shallow Shells Subjected to Impact ~ Prof Amit Karmakar, Tokyo Institute of Technology & Prof Kikuo Kishimoto

Application of Output-Only Prediction Error Feature Classification in the Detection of Airframe Damage ~ Mr. Tim Edwards

Track Three

Product/Facilities — ***Co-Chair: Mr. Jeff Weisbeck, Enivate, Inc.***
Co-Chair: Mr. Barry Mohle, NSWCDD

Improved Shock, Vibration, and Acoustic Isolator for Shipboard Applications, (HERM - High Energy Rope Mount) *~ Mr. Jeff Weisbeck, Enivate, Inc.*

Navy Shock Qualification Perspective Panel — **Co-Chair: Mr. James Howell, NSWCDD**
Co-Chair: Mr. Kurt Hartsough, NSWCCD

Representatives from SEA 05P3, INSURV, COMOPTEVFOR, OPNAV, PEO Ships, OSD, NSWC, ASN, WSESRB, and SUP-SHIP Norfolk Naval Shipyard will brief you on their roles and responsibilities in the Navy Shock Qualification Process. The floor will then be opened for questions and comments from the audience.

Track Four

Education Committee — **Chair: Mr. Andy Anderson, Unted Defense LP**

Training — **Chair:**

Fatigue of Metals *~ Dr. Rudy Scavuzzo, Univeristy of Akron*

Adaptive Systems for Machinery Health Monitoring *~ Mr. Rick Lally, Oceana Sensor/PCB Piezotronics Inc.*

Evolution of Piezoresistive MEMS Shock Accelerometers *~ Mr. Robert Sill, PCB Piezotronics Inc.*

Track Five (CLASSIFIED)

VIRGINIA Advanced Sail **Chair: Mr. Tom Walther, Electric Boat**

Overview of Development of Analytical Methodology for Shock Qualification of VIRGINIA Class Composite Advanced Sail *~ Mr Thomas Walther Electric Boat Corporation UNDEX Simulation*
Investigation into CAS Coating Modeling Parameters *~ Jeffrey O'Brien & Mr. William Gregory, Anteon Corporation*
Fluid Modeling and Physics Sensitivity of the Composite Advanced Sail *~ Dr. Gale Mulligan, Electric Boat Corporation*
Composite Advanced Sail Combined Loading Studies *~ Mr. Christopher Abate, Electric Boat Corporation*
Comosite Advnaced Sail Internal Equipment Modeling Studies *~ Mr. Christopher Abate & Mr. James Rivers, Electric Boat Corporation*
Overview of Advanced Sail Physics Sensitivity and Modeling Issues Studies *~ Mr. Christopher Abate, Electric Boat Corporation*
Underwater Shock Failure Modes Analysis of the VIRGINIA Class Composite Advanced Sail *~ Mr Thomas Walther, Mr. Stephen Mann, & Mr. James Rivers Electric Boat Corporation,*

DYSMAS ***Chair: Mr. Greg Harris, NSWC/IH***

An Engineering Approach to the Simulation of Ship Structural Response to Proximity Underwater Attack *~ Dr Mark Z. Vulitsky, Northrop Grumman Newport News*
Simulation of Full Ship Response To Far-Field Underwater Explosions Using the DYSMAS Hydrocode *~ Mr. Kenneth Kiddy & Mr. Roger Ilamni, Naval Surface Warfare Center, Indian Head Division, Mr. Peter Loeffler, Naval Surface Warfare Center, Carderock Division*
Simulation of Full Ship Response To Close-In Underwater Explosions Using the DYSMAS Hydrocode *~ Mr. Kenneth Kiddy, Naval Surface Warfare Center, ndian Head Division & Dr. Georges Chahine, Dynaflow, Inc.*
Simulation of Surfaced Vessel Hull Whipping Response Using Fully-Coupled Hydrocodes *~ Dr. J. Alan Luton & Dr. Andrew Wardlaw, Jr., Naval Surface Warfare Center, Indian Head Division, Dr. Georges Chahine & Mr. Chao-Tsung Hsiao, Dynaflow, Inc.*

Wednesday Morning, October 20

Chair/Presenter Meeting (All Wednesday Chairs & Presenters Must Attend)
7:00 - 7:30 a.m. Location TBA

***Track* One**

Guidelines for the Design to Prevent Progressive Collapse ***Chair: Prof Ted Krauthammer, PSU***
Co-Chair: Dr. Bob Smilovitz, Weidlinger Ass.

GSA Guidelines to Mitigate Progressive Collapse *~ Bruce Hall,*
DoD Guidelines to Mitigate Progressive Collapse *~ Edward Conrath, US Army Corps of Engineers*
DTRA and AISC R&D Programs Related to Progressive Collapse *~ Mr. Douglas Sunshine, Defense Threat Reduction Agency & Reed Mosher, US Army Engineer Research & Development Center*
Progressive Collapse Studies in Multi-Story Steel Frame Buildings *~ Prof. Ted Krauthammer, Penn State University*
Observations on Progressive Collapse *~ Dr. Mohammed Ettouney, Weidlinger Associates, Inc.*

Data Acquisition Discussion Group **Leader: Mr. Strether Smith, DSPCon**

The data acquisition and signal conditioning vendors will be invited to describe what is new and wonderful in their product lines. Then, the vendors and attendees will participate in a discussion of these developments and what the users would like to see in future offerings.

Track Two

Blast Modeling — Chair: Mr. Ami Frydman, ARL

Modeling Blast Loading on Buried Reinforced Concrete Structures with Zapotec *~ Dr Greg Bessette, Sandia National Laboratories*

Modelling of Human Response in Vehicle Exposed to Mineblast *~ Dr. Kin Chew Hung, Institute of High Performance Computing & Dr. Peter Lee, Defence Medical & Environmental Research Institute*

AGS Barrel Motion During Firing: Experimental and Modeling Results *~ Dr. Eric Petersen, United Defense, L.P.*

Validated Pressure-Impulse Diagrams for E-glass Retrofitted Walls *~ Mr. James Wesevich, Wilfred Baker Engineering*

Coupled Approach to Simulations of Fluid-Structure Interaction Problems *~ Dr. James O'Daniel, US Army Engineer Research & Development Center*

Large-Scale Finite Element Modeling of Reinforced Concrete Structures Subjected to Explosive Detonations *~ Mr. Kent Danielson, Dr. Stephen Akers, Dr. James O'Daniel, & Dr. Mark Adley, US Army Engineer Research & Development Center*

Feasibility evaluation of element elimination techniques for progressive collapse analysis *~Dr. Hyung-Jin Choi, Karagozian & Case & Theodor Krauthammer, Penn State University*

Isolation — Chair: Mr. Brian Detwiler, BIW

Characterization of Affordable High Performance Shock and Vibration Mitigating Mounts *~ Dr. David Russell, Electric Boat Corporation*

Effectiveness of Damping over Spring Rate in Selecting Shock Isolation Means for Ship Board Equipment Subjected to MIL-S-901D Shock and MIL-STD-167 Vibration Tests *~ Mr. D. Christopher Merrill, CM&A Engineering, PLC*

Characteristics of Deformable Cylindrical Beams Filled with a Shock Absorbing Composite *~ Dr S. Olutunde Oyadiji, Dr. George Georgiades, Prof Jan Wright, University of Manchester School of Engineering, & Dr. Xinqun Zhu, Hong Kong Polytechnic University*

Core Property Characterisation for a Shock Absorbing Composite *~ Dr S. Olutunde Oyadiji, Dr. George Georgiades, Prof Jan Wright, University of Manchester School of Engineering, & Dr. Xinqun Zhu, Hong Kong Polytechnic University*

Track Three

Acoustics — Chair: Mr. Rick Lally, Oceana Sensors/PCB

Fragment Residual Velocity Experiments Using Mortars *~ Lebron Simmons, The US Army Engineer Research & Development Center*

Elastoacoustic Response of Layered Composite Plates Under Acoustic Loadings *~ Dr Ramesh Kolar, Naval Postgraduate School*

LMS PolyMAX: A Revolution in Modal Parameter Estimation *~ Jan Debille & Steven Pauwels, LMS International NV*

Application of Non-Linear Ultrasonic Spectroscopy to Health Monitoring and Damage Detection in Structures *~ Mr. Gerard Vanderborck, Thales Underwater Systems & Michel Lagier, Actea*

Blast Overpressure Measurements — *Chair: Dr. Patrick Walter, TCU*, *Co-Chair: Mr. W. Scott Walton, ATC*

Challenges in Blast Overpressure Measurement for Military Environments *~ Mr. Scott Walton, US Army Aberdeen Test Center*

Development of a Pressure Transducer Installation for Improved Measurement Performance in a Severe Blast and Fragmentation Environment *~ George D. Hill & Dr. Daniel Curtis, John J McMullen Associates, Inc*

Experimental and CFD Blast Measurement - Validation of CFD and Experimental Measurement Techniques *~ Mr. John McNeil & Mr Daniel Cler, US Army Benet Laboratory*

Field Testing of a New Blast Over Pressure Probe to Measure Direction and Strength of Blast Waves *~ Prof Yiannis Andreopoulos, Dr. Savvas Xanthos, & Mr. Minwei Gong, City College of New York*

Blast Measurement: Selecting the Appropriate Pressure Transducer and Managing Its Interfaces *~Dr. Patrick Walter, Texas Christian University*

Track Four

Training - Chair:

Using The Velocity Shock Spectrum For Shock Damage Potential Part I *~ Dr. Howard Gaberson, Consultant*
Using The Velocity Shock Spectrum For Shock Damage Potential Part II *~ Dr. Howard Gaberson, Consultant*
Shock & Vibe From A to Z *~ Mr. Daniel Worth, NASA/Goddard Space Flight Center Training*
Introduction to Data Acquisition Part I *~ Dr. Josh Gordis, The Naval Postgraduate School*

Track Five (CLASSIFIED)

VIRGINIA (SSN 774) Class Weapon Stowage and Handling System Shock Analysis and Testing
Chair: Mr. Joe Venne, NSWCCD/UERD
Co-Chair: Mr. Roland Tailor, EB

Shock Testing of the VIRGINIA (SSN 774) Class Weapon Stowage and Handling System (WSHS) - History, Overview and Objective *~ Mr. Alan Nordquist, General Dynamics Electric Boat Corp, & Joseph Venne, Naval Surface Warfare Center, Carderock Division*
Video and Photographic Highlights from the VIRGINIA (SSN 774) Class Weapon Stowage and Handling System Shock Test Series *~ Ms Rhonda Ingler, Steven Rutgerson, & Brian Lang, Naval Surface Warfare Center, Carderock Division*
Development of the VIRGINIA (SSN 774) Class Weapon Stowage and Handling System (WSHS) Test Fixture, for Heavyweight Shock Qualification Testing, Using Static Analysis Methods *~ Mr. Peter Fricano, General Dynamics Electric Boat Corp.*
VIRGINIA (SSN 774) Class Weapon Stowage and Handling System (WSHS) Shot Geometry Selection *~ Mr. Roland Trailor, Jr., Electric Boat Corporation*
Overview of the VIRGINIA (SSN 774) Class Weapon Stowage and Handling System Shock Test Instrumentation and Response Assessments *~ Ms Rhonda Ingler, Steven Rutgerson, Brian Lang, Naval Surface Warfare Center CD, & Vernon Bloodgood, Anteon Corporation*
A Finite Element Comparison of the VIRGINIA (SSN 774) Class and SSN 688 Inboard Environments *~ Mr Robert Doleski, Naval Undersea Warfare Center*
Practical Application for Assessing Weapon Systems Stowed on the VIRGINIA (SSN 774) Class Submarine Weapon Stowage and Handling System Subjected to High Impact Shock Environment *~ Mr. Peter Hulton, Naval Undersea Warfare Center*
Analytical Evaluations of the Redesigned VIRGINIA (SSN 774) Class Weapon Stowage and Handling System (WSHS) Cradle Lashing Strap *~ Mr. Roland Trailor, Jr. & Richard Dugan, Electric Boat Corporation*
Response of the VIRGINIA (SSN 774) Class Submarine Weapon Cradle and Vehicle Using a Finite Element Model with a Simplified Handling Strap and Comparing Results to Test Data *~ Mr. Dave Ruggeri, Naval Undersea Warfare Center, Newport*
A Finite Element Analysis of the Improved VIRGINIA (SSN 774) Class Submarine Weapons Cradle and Handling Strap When It Is Subjected to High Impact Shock Environment *~ Mr. Jeffery Milburn, Naval Undersea Warfare Center*
Shock Test Program and Results of the VIRGINIA (SSN 774)Class Weapon Stowage and Handling System (WSHS) *~ Mr. Roland Trailor, Jr., Richard Dugan, Electric Boat Corporation, & Joseph Venne, Naval Surface Warfare Center, Carderock*

Track Five (CLASSIFIED)

Shipboard Isolation
Chair: Mr. John Przybysz, NSWCCD/UERD

Snubbing a Dual Isolated Inertial Unit *~ Mr. Lawrence Rainey, Northrop Grumman Sperry Marine*
Tailored Shipboard Vibration Requirement for a VLS Encanistered Missile *~ Mr. Kenneth Lussky, United Defense, L.P.*
Use of Large FEA Models to Determine Local and Global Vibration Modes to Aid Design of COTS Equipment on Ships *~ Mr. Alec Clark, Northrop Grumman Newport News*
Human Survivability of the ASSIST ULG Raft Environment Under UNDEX Loading *~ Mr Eric Luft & Mr. Jay Collars, Naval Surface Warfare Center, Carderock Division*

Track Five (CLASSIFIED) continued

UNDEX Applications — ***Chair: Mr. Mike Winnette, NAVSEA 05P3***
Co-Chair: Mr. Rick Griffen, NGNN

Explosion Resistant Coating *~ Dr. Roshdy Barsoum, Office of Naval Research*
An Evaluation of Bubble Models for Submarine Applications *~ Mr. Christopher Abate, Electric Boat Corporation*
Effect On Low-Frequency Whipping Response Due to Insertion of Multi-Mission Module Into the VIRGINIA Class Submarine *~ Ms. Dawn Barrasso, Electric Boat Corporation*
A Balanced Shock Plan for the Insertion of a Multi-Mission Module in VIRGINIA Class Submarines *~ Mr. Austin Alvarez, Mr. Terrence Danielson, Electric Boat Corporation, & Mr. Robert Bowser, NAVSEA 05P3*
Material Requirements for Critical Applications in US Navy Combatant Ships *~ Mr. Ernest Czyryca, Naval Surface Warfare Center, Carderock Division*
Constitutive Modeling of AL6XN Dynamic Tensile Tests *~ Kevin Behan & Dr. Robert Goldman, Naval Undersea Warfare Center Newport*

Wednesday Afternoon, October 20

***Track* One**

UNDEX Design — ***Chair: Mr. Bob Marshall, NGNN***
Co-Chair: Ms Shannon Weimart, NSWCCD/UERD

DDAM Analysis of a Platform Using a Finite Element Model that Includes a Substructure *~ Mr Michael Cooper, Mr. John Cioffi, & Mr. Kevin Roscoe, Northrop Grumman Newport News*
Modeling of Composite Hat Stiffeners for the Virginia Class Composite Advanced Sail *~ Mr. Bill Gregory & Dr. Richard Cobb, Anteon Corporation*
Dynamic Modeling Comparison of a Power Conversion Module *~ Mr. John Stock & Mrs. Maria Koploy, General Atomics*
Improved Design of an Internally Isolated Electronic Enclosure *~ Mr. Herbert LeKuch, Shock-Tech, Inc.*
Naval Ship Bolting for Shock Loads - A Review of How We Got Where We Are, and Some Thoughts About Where We Go From Here *~ James Jennings, Naval Surface Warfare Center, Carderock Division*

Damping — ***Chair: Mr. Jack Henderson, UTC***

A New Approach To Temperature Shift Functions In Modeling Complex Modulus Damping Data *~ Dr. Lynn Rogers, USAF/AFRL/VASM & Bryce Fowler, CSA Engineering, Inc.*
How to Predict the Effects of Aging on the Dynamic Properties of Viscoelasic Mateials *~ Mr. Ahid Nashif, Consultant*
On the Application of the Method of Modal Strain Energy to the Determination of Loss Factors for Damped Sandwich Beams *~ Prof. Peter J Torvik, Air Force Institute of Technology & Brian Runyon, Air Force Research Laboratory*
Modified Plasma Sprayed Coatings for the Damping of Titanium Turbine Engine Airfoils *~ John P. Henderson, Universal Technology Corporation, Robert M. Willson, APS Materials Inc., Donald W. Zabierek and John A. Justice, Universal Technology Corporation*

***Track* Two**

Repeated Mechanical Shock — ***Co-Chair: Dr. Tim Coats, NSWCCD***
Co-Chair: Dr. Ron Peterson, NSWCDD

Human Performance-Based Assessment of High Speed Craft within the Acquisition T&E Process *~ Mr. Eric Pierce, Naval Surface Warfare Center, Panama City & Dr. Dale Hyde, Naval Experimental Dive Unit*
Dynamic Exposure Measurements for Assessing High Speed Craft Impact Injury: Lessons Learned *~ Mr. Jeff Blankenship & Mr. Joseph Labrecque, Naval Surface Warfare Center, Panama City*
Applying Shock Mitigation Technology for Human Performance on Board High Speed Combatant Craft *~ Dr. Timothy Coats, Naval Surface Warfare Center, Carderock Division, Norfolk*
Shock Mitigation through Motion Control *~ Mr. Chris Swanton, Maritime Dynamics*
Seakeeping and Dynamic Characterization of Slamming Effects on High-Speed Combatant Craft *~ Dr. Timothy Coats, Ms. Jennifer Speirs, & Mr. Kelly Haupt, Naval Surface Warfare Center, Carderock Division, Norfolk*

Track Two

UNDEX Numerical Methods — *Chair: Mr. Fred Costanzo, NSWCCD/UERD* — *Co-Chair: Mr. George Camp, BIW*

The Effect of Internal Fluid on Pressure Vessel and Piping Shock Stresses and Dynamic Pressures *~ Dr. Thomas O'Donnell, Mr. Aaron Pavkov, O'Donnell Consulting Engineers, & Dr. Rudy Scavuzzo, Univeristy of Akron*

Underwater Explosion Damage Of Thin Rectangular Plates *~ Dr. Kashi Ramajeyathilagam, Mr. K. Daniel Prasad, & Mr. M. Suryanarayana, NSTL*

Loading and Response of Plate Target from Close-Proximity Underwater Explosions: Comparison of Test Data and Numerical Analyses Results *~ Dr. John Slater, Mr. Gerry Rude, Defense Research Establishment Suffield, Mr. Merv Norwood, & Mr. Jim D. Covill, MARTEC, Ltd*

Numerical Simulation of the Loading and Response of Flat Plate Targets subjected to Close-Proximity Underwater Explosions *~ Dr Richard Link, Ms. Laura Donahue, MARTEC, Ltd., & Dr. John E. Slater, Defense Research Establishment Suffield*

Track Three

Shock Representation (SRS) — *Chair: Mr. Tim Edwards, NSWCDD*

Effect of Time on Shock Spectra and System Dynamic Response *~ Dr. Rudy Scavuzzo, Univeristy of Akron*

A Procedure for the Generation of Statistically Significant Transient Signals *~ Mr. Jerome Cap & Dr. Thomas Paez, Sandia National Laboratories*

Energy Distribution Analysis of Impact Signals Based on Wavelet Decompositions *~ Dr. Zhiqing Cheng, AIES, A General Dynamics Company, Dr. Joseph Pellettiere, AFRL/HEPA & Dr. Walter Pilkey, Univeristy of Virginia*

Quasi-Analytical Determination of Shock Response Spectra, for an Impulse-loaded Proportionally Damped System *~ Dr. R. David Hampton, MAJ Nathan S. Wiedenman, U.S. Military Academy, & Mr. Ting H. Li, US Army Research Laboratory*

Quasi-Analytical Shock Response Spectra, for Proportionally Damped Systems, with Remote Shock-Loading *~ Dr. R. David Hampton, U.S. Military Academy & Mr. Ting H. Li, US Army Research Laboratory*

Shock Response Spectrum Committee Special Presentation — *Chair: Mr. Tim Edwards, NSWCDD*

The SAVIAC Technical Committee on the Shock Response Spectrum is sponsoring a discussion of the new ISO standard for SRS calculation. Kjell Ahlin, project leader for the new ISO standard on SRS calculation, ISO 18431-4, Mechanical vibration and shock - Signal processing - Part 4: Shock response spectrum analysis will be presenting the latest draft version. Following the presentation, the floor will be opened for discussion.

Shock Response Spectrum Committee Meeting — *Chair: Mr. Tim Edwards, NSWCDD*

The Technical Committee on the Shock Response Spectrum was recently organized to serve the SAVIAC community as a central point of contact for shock representation issues. The committee's duties include: organizing symposium discussion groups and dedicated paper sessions, acting as a forum for introducing new and related procedures for shock representation, producing best practices guidelines for validation & implementation of SRS algorithms, interfacing with standards organizations (ISO, IEC & others) on standards for calculation of a SRS, assembling landmark papers on SRS and related procedures and producing a compilation or compendium, and acting as a repository for representative digitized data sets (naval shock, El Centro earthquake, pyro-shock, classical, etc.). Join us as we discuss SRS committee business such as shaping the committee's interfacing role with standards organizations and beginning the assembly of important works for a compendium on shock representation.

Don't forget about the Social Event tonight,
Wednesay October 20, 7 - 9 PM!
Enjoy great refreshments while touring the Exhibit Area!

Track Four

Training *Chair:*

***Introduction to Data Acquisition Part II**, Dr. Joshua Gordis, The Naval Postgraduate School*
***Underwater Explosion Bubble Analysis**, Mr. Gregory Harris, Naval Surface Warfare Center, Indianhead Division*
***Practical Random Vibration Analysis** ~ Dr. Thomas Paez, Mr. Angel Urbina, & Dr. Todd Simmermacher, Sandia National Laboratories*
***Overview of Hazard Assessment Testing (HAT) per MIL-STD-2105** ~ Mr. Dave Houtchins, Naval Surface Warfare Center, Dahlgren Division*

Track Five (CLASSIFIED)

Protective Design *Chair:*

***Concrete Masonry Unit Walls Retrofitted with Fiber Reinforced Elastomeric Systems for Blast Loads** ~ Ms. Carol Johnson & Dr. Thomas Slawson, US Army Engineer Research & Development Center*
***ARCWall: Fast Running Model For Predicting Reinforced Concrete Wall Response To Cased Weapons** ~ Dr. G. Wije Wathugala, Dr. Timothy Hasselman, ACTA Inc., & Mr. David Bogosian, Karagozian & Case*
***Shielding and Confinement Effects of Neighboring Structures on Airblast Loads on a Structure** ~ Dr. James Baylot & Mr. Byron Armstrong, US Army Engineer Research & Development Center*

Explosive Characterization *Chair:*

***Characterization of Multiple-Phase Blast Explosive Formulations** ~ Dr. Richard Ames, Naval Surface Warfare Center Dahlgren Division, Dr. Michael Murphy, Lawrence Livermore National Lab, & Dr. Donald Cunard, Air Force Research Labs, Eglin*
***Computational Analysis of Buried Mk-82 Bomb** ~ Mr. Michael Hopson, Naval Surface Warfare Center Dahlren Division*
***Mid-Scale Experimental And Theoretical Analysis Of Em Emissions From Cased Explosives** ~ Mr. William Brown, Dr. Julian Lee, & Mr. Mark Schmidt, Applied Research Associates Inc.,*
***Simulation of Flight Timeline History Environment at Minuteman Missile Guidance Section with Multi-Axis Shaker and Pyroshock** ~ Mr. Delbert Wilson, Cody Hill, & Mohsen Khatiblou, Boeing Defense & Space*

Testing in Tunnels *Chair: Dr. Eric Rinehart, DTRA*

***MIDWAY INDIGO Full Scale Tunnel Tests: Stagnation and Dynamic Pressure Environments** ~ Mr. Jim Rocco, Dr. Noel Ethridge, & Dr. John Keefer, Applied Research Associates*
***MIDWAY INDIGO Full Scale Tunnel Tests: Static Environments** ~ Mr. Jeffrey M Thomsen, Mr. Jim Rocco, Mr. Thomas Wofford, & Mr. Jon Orphal, Applied Research Associates*
***Summary of Weapons Effects Testing in Structures and Rock Targets** ~ Mr. Jeffery Duray, Mr. Robert Cilke, Applied Research and Associates, Dr. Eric Rinehart, & Dr. Robert Henny, Defense Threat Reduction Agency*
***Use of Scaled Tunnel Airblast Data in Development of Tunnel AirBlast (TAB) Code Source Pills** ~ Mr. Barry Bingham, Mr. John Finch, & Mr. Shuichi Hikida, Applied Research Associates Inc*
***Development of a Useful Criteria and Figure of Merit for Thermobaric High Explosive Fills** ~ Dr. Eric Rinehart, Defense Threat Reducton Agency, & Mr. Jeffrey Thomsen, Applied Research Associates*

Wednesday Evening, October 20

SAVIAC Community Feedback Town Hall Meeting

This is your opportunity to provide feedback to the SAVIAC leadership on items of importance to you. Whether you have an idea of a new product or service SAVIAC should provide, or just want to comment on the Symposium programming, you will find a platform here. Join us prior to the Social event for an hour of spirited discussion.

Social Event - All are invited

Thursday Morning, October 21

Chair/Presenter Meeting (All Thursday Chairs & Presenters Must Attend)
7:00 - 7:30 a.m. Location TBA

Track One

Vibration Testing II ***Chair: Dr. Mike Hale, RTTC***

High G Testing of MEMS Devices *~ Mr. Robert O'Reilly, Analog Devices Inc.*
Upper Suspension Frame Configuration for Vibration Test of External Airborn Stores *~ Mr. Eliahu Elmalah, Rafael*
Using Measured Flight Test Vibration in an Airborne Store for the Re-evaluation of Existing Vibration Testing Specifications *~ Mr. Zeev Sherf, Rafael*
Aspects of Strain-Acceleration Relations for Data Measured During Flight Tests on an Airborne Store, with Reference to Applications for the Planing and Performance of Laboratory Vibration Tests *~ Mr. Zeev Sherf, Rafael*
Qualification Testing of Navy Shipboard Equipment using Harmonically Driven Large Mass Platforms *~ Mr. George Genneken, Consultant*
Dynamics Of Object And 'Extrem' Or 'Normal' Loading, The Different Response Of Very Same Object And Testing/Calibration *~ Dr. George Abramchuk & Mrs. Kristina Abramchuk*

Random Vibration ***Chair:***

Generation of Time Histories with a Specified Spectrum, Skewness, and Kurtosis *~ Mr. David Smallwood Consultant*
An Automated Approach to Identifying Sine-on-Random Content from Short Duration Aircraft Flight Operating Data *~ Mr. Dan Hensley ATA Engineering, Inc., Mr. Jerome Cap, Sandia National Laboratories*
Excitation of the Duffing Oscillator by Random Noise *~ Dr. Hans Gruenberger Consultant*
Probabilistic Model Update and Error Estimation in Model Based Predictions *~ Prof Nickolas Vlahopoulos and Mr. Jiulong Sun, University of Michigan*

Track Two

Test Method Design & Validation **Chair: Mr. James Howell, MSWCDD**

Track Three

MIL-DTL-901E Review/Reading Session **Chair: Mr. Dana Johansen, NAVSEA 05P3**
Co-Chair: Mr. Stan Herman, CSC

This special session is a review and reading session for the first draft of MIL-DLT-901E and Slant Sheets. NAVSEA, via CSC will be providing a preliminary draft of the replacement for MIL-S-901D to interested parties and will conduct a review and reading session for the documents.

Track Four

Training **Chair:**

Shock & Vibration Isolation *~ Mr. Jeff Weisbeck, Enivate, Inc.*
High Speed Craft Impact Injury *~ Dr. Ron Peterson, NSWCDD/CSS*
Human Systems Integration as Applied to Shock Mitigating Technologies *~ Mr. Eric Pierce, NSWCDD/CSS*
Tutorial on Ballistic Shock in Armored Vehicles *~ Mr. W. Scott Walton, US Army Aberdeen Test Center*

Track Five (CLASSIFIED)

Air Blast **Chair: Dr. Al Ohrt, AFRL**

In-Tunnel Airblast in Subscale Tunnel *~ Dr. Susan Babcock, Applied Research Associates, Inc., & LtCol Jose Colon, Defense Threat Reduction Agency*
An Engineering-Level Model of Airblast from Cased Munitions *~ Mr. James Britt, Science Applications International Corp, & Dr. Alan P. Ohrt, Air Force Research Laboratory*
An Improved Methodology for Prediction of the Effect of Pressure Relief on Reflected Impulse *~ Mr. Denis Rickman, US Army Engineer Research & Development Center & Mr. Donald Murrell, Northwind Consulting*
Results of Baseline Experiments: Breaching of Reinforced Concrete walls with C-4 *~ Mr. Denis Rickman & Mr. David Couch, US Army Engineer Research & Development Center*
Airblast Behavior of Metal Cased Charges with Annular Liners of Reactive Materials *~ Mr. Roosevelt Davis, AFRL*
Evaluation Of The Airblast Vulnerability Of Army Expeditionary Structures *~ Mr Steve Lofton & Mr. James Davis, US Army Engineer Research & Development Center*
Enhanced Blast Standardized Test Program *~ LtCol Jose Colon, Dr. Timithoy Kreitinger, Dr. William Wilson, Defense Threat Reduction Agency, & Dr. Susan Babcock, Applied Research Associates, Inc.*
Measurements of Reflected Airblast Pressure and Impulse From a Tungsten-Laden Explosive *~ Dr. Alan Ohrt, Air Force Research Laboratory*

Thursday Afternoon, October 21

Track One

Blast Experiments **Chair: Mr. Dan Cler, US Army Benet Labs**

Fragment Velocities and Distribution for Scaled Charges: Experimental Data and CONWEP Predictions *~ Mr. Paul Graham & Ms Gayle E. Albritton, US Army Engineer Research & Development Center, Dr. Leo W. Stockham, Northrop Grumman Information Technology, MAJ Dirk Plante, Defense Threat Reduction Agency*
Blast Impact on Composite Material Structures *~ Prof Yiannis Andreopoulos & Mr. Minwei Gong, City College of New York*
Light Initiated High Explosive Driven Flyer Plate Design, Implementation, and Performance *~ Mr. Wayne Gary Rivera, Sandia National Laboratories*
Light Initiated High Explosive Impulse Load Calibration *~ Mr. Wayne Gary Rivera, Sandia National Laboratories*
Dynamic Pressure Loading on a Flat Plate Due to Detonation of an Explosive Buried in Soil *~ Dr. Aaron Gupta, US Army Research Laboratory*
Mechanical Properties of Fine Aggregate Cementitious Material *~ Ms. Erin Williams, Dr. Stephen Akers & Mr. Paul Reed, US Army Engineer Research & Development Center*

A reminder to fill out and turn in your Symposium evaluation forms
Evaluation forms will also be available on the web at
www.saviac.org/75th_symposium.htm

Track One Continued

Blast Design — Chair:

Development of Mineblast Attenuating Seat for Military Ground Vehicle Applications *~ Dr. Ken-An Lou, Mr. Dick Zimmermann, & Mr. William Perciballi, ArmorWorks, Inc.*

Development of Mortar Training Equipment With Shell-in-Shell System *~ Prof Algimantas Fedaravicius, LTC, Vaclovas Jonevicius, & Prof. Minvydas Ragulskis, Kaunas University of Technology*

Implications of Steel Frame Connection behavior in the Development and Implementation of GSA Progressive Collapse Guidelines *~ Mr. Jesse Karns Myers & Mr. David Houghton, Houghton & Partners, Inc.*

Blast Design of Curtain Wall *~ Mr Matthew Edel and Dr. Charles Oswald, Baker Engineering & Risk Consultants*

Design and Test of a Blast Shield for Commercial Aircraft Overhead Bin Compartment *~ Mr. Phileman Chan & Dr. Xinglai Dang, Titan*

Comparison of the Erosion Applied Blast Analysis for Reduced R. C. Slab Model *~ Dr. Hyung-Jin Choi & John Crawford, Karagozian & Case*

Proposal for a Safe Means to Use and Transfer DOD Weapons Effects Information to Civilian Activities Engaged in Developing Design Codes for Protection of Civil Structures in Public Use from Terrorist Deployed Explosives *~ Dr. D. Christopher Merrill, CM&A Engineering, PLC*

Track Two

UNDEX Ship Shock — Chair: Mr. Eric Luft, NSWCCD/UERD; Co-Chair: Mr. Mark Brown, NAVSEA 07T

Design Level Ship Shock Simulation of USS Winston S. Churchill (DDG-81) *~ ENS William Fensterer, US Navy & Dr. Young Shin, Naval Postgraduate School*

Elastoplastic Analysis for Severe Underwater Explosions Using Dynamic Finite Element Modeling *~ ENS Sunny Lau, US Navy & Dr. Young Shin, Naval Postgraduate School*

Evaluation and Analysis of DDG-81 Simulated Athwartship Shock Response *~ LT Douglas Petrusa, US Coast Guard, Dr. Young Shin & Jarema Didoszak, , Naval Postgraduate School*

Proposal of Whipping Factor as a Measure of the Damage Potential of an UNDEX Bubble Pulse *~ Dr. Jung-Hoon Chung, Korea Institute of Machinery and Materials, Mr. Jeong Il Kwon, & Prof Sang Gab Lee Korea Maritime University*

UNDEX Whipping Response Analysis and Longitudinal Strength Evaluation of a Naval Surface Ship *~ Dr. Jung-Hoon Chung, Korea Institute of Machinery and Materials, Jeong Il Kwon, & Prof Sang Gab Lee, Korea Maritime University*

Experimental and Numerical Investigations on Whipping Motion of a Floating Model Structure Induced by a Close-in Underwater Explosion *~ Dr. Akihiro Yasuda & Mr. Akihiko Imakita, Mitsui Engineering & Shipbuilding Co, Ltd.*

UNDEX Simulation — Chair: Ms Rhonda Ingler, NSWCCD/UERD; Co-Chair: Mr. Sean Murphy, NGSS

Predicting Surf Zone Obstacle Displacement *~ Dr. Andrew Wardlaw Naval Surface Warfare Center Indian Head Division*

A Ship Shock Analysis Method with Surface Cut-off and Applications *~ Mr. Chin Woo An, Dr. Du Ki Kim, Dr. Byung Wook, Dr. Il Bae Ham, Agency for Defense Development*

Shock Assessment of a Marine Reduction Gear by an Integrated FEM/Multibody Model *~ Dr. Matteo Codda, Dr. Raffaele Iaccarino, Dr. Andrea Nicora, CETENA S.p.A. - Italian Ship Research Centre*

Simulation of Underwater Explosion using MSC.Dytran *~ Mr. Peiran Ding MSC.Software Corp.*

UNDEX Analysis of a Kilo-Type Submarine *~ Dr. Christian Ianculescu, Karl D'Souza, Dr. Jeffrey Cipolla, ABAQUS, Inc.*

Track Three

Working Group 13 ~ ANSI Accredited Standards Committee S2 — Chair: Ms Jennifer Marr, NSWCCD/UERD

Working Group 13 of ANSI Accredited Standards Committee S2, Mechanical Vibration and Shock, has made progress over the past year in developing a standard dealing with shock test requirements for equipment, electronic and non-electronic. The goal of this standard is to define minimum qualification test requirements for rack and shelf mounted electronic systems and other systems such as personal computers, data analyzers, and similar equipment purchased by industrial and government customers who require a predefined level of shock ruggedness for their applications. This standard is to be widely applicable; therefore, experts from all related fields are encouraged to participate in the working group. This session will 1) review the progress made to date of the ANSI standard, 2) recruit those interested in contributing to the standard development, and 3) provide an open forum to discuss ideas and gather suggestions about the potential applications of the standard.

Weapon Target Interaction — Chair: Dr. Tim Hasselman, ACTA

Finite Element Calculations Of Reinforced Concrete Wall Response In Support Of Fast-Running Model Development *~ Mr. David Bogosian, Karagozian & Case, Dr. Timothy K. Hasselman, ACTA Inc.*

ARCWALL: Fast Running Model For Predicting Reinforced Concrete Wall Response To Cased Weapons *~ Dr. G. Wije Wathugala & Dr. Timothy K. Hasselman, ACTAnc., . Mr. David Bogosian, Karagozian & Case*

Analytical Predictions of Fragment Penetration through Concrete Masonry Units *~ Mr. David D. Bogosian, Karagozian & Case, Mr. Bence Gerber, Century Dynamics, Inc.*

Application Of A Flip-MPM-MFM Method For Simulating Weapon-Target Interaction *~ Q. Zou, D. Z. Zhang, and W. B. VanderHeyden, Los Alamos National Laboratory, Dr. G. Wije Wathugala & Dr. Timothy K. Hasselman, ACTA Inc.*

Track Four

Pyroshock — Chair:

A Near-Field Mechanical Pyroshock Simulation *~ Dr. Vesta Bateman, Mr. Lawrence Carlson, Mr. Michael Nusser, Sandia National Laboratories*

Pyrotechnic Shock Test Specification Creation: Guidelines for Testability and Test Article Protection *~ Mr Wesley Tyler Ramm & Mr. Sean Keon, Ensign-Bickford Aerspace & Defense*

V-band Separation Shock Characteristics *~ Dr. Kurng Y Chang Jet Propulsion Laboratory*

Attenuation of Shock Levels Through Tri-Axial Accelerometer Mounting Blocks *~ Mr Wesley Tyler Ramm, Ensign-Bickford Aerspace & Defense*

Errors in Numerical Integration Due to Band Limiting and Sampling Rate *~ Mr. Tim Edwards*

Vibration - Numerical Methods — Chair: Dr. Paul Franklin, BIW

Parallel Finite Element Domain Decomposition: Free Vibration *~ Prof Duc Nguyen, Old Dominion University, Prof S. Rajan, arizona State University, Mr. Sohui Yu & Mr. James St. Ville, HYI Ltd.*

Continuum Interpolation of Dynamic Response of Structures through Spatio-Temporal Filtering *~ Dr. Havard Vold, Dr. Gareth Thomas, ATA Engineering, Inc.*

Examples of Basic Nonlinear System Identification *~ Mr. Ronald Merritt Naval Air Warfare Center*

Modal Characteristics of Clamped-Clamped Beams and Plates: A study of Transition from Beam-like to Plate-like Behaviour *~ Dr S. Olutunde Oyadiji, Dr. Raad Ali, University of Manchester*

Experimenta Modal Analysis: Efficient Geometry Model Creation Using Optical Techniques *~ Jan Debille, Steven Pauwels, LMS International NV*

Energy Finite Element and Boundary Element Formulations for Computing High Frequency Vibration and Noise of Submersible Structures *~ Mr Nickolas Vlahopoulos & Aimin Wang, University of Michigan, Kuangcheng Wu, Northrop Grumman Newport News*

Friday Morning, October 22

Tour of NSWCDD/Dam Neck

Tour will last from 8 a.m. - 2 p.m, including travel time. Details will be available shortly at www.saviac.org. Pre-registration is required to assure space, so please sign up for this tour on your Registration Form. Tour is restricted to US citizens only.

Tutorial Descriptions

Sunday, October 17

Elementary Shock Isolation System Design **Dr. D. Christopher Merrill**

Shock isolation system design is sometimes performed by persons that have not had the opportunity to design shock isolation systems for the various types of shock tests and inputs encountered in today's DOD environment. This course is intended to provide a framework that the designer can use to direct a shock isolation design with minimum false starts. Explanations are provided for the basic engineering issues and terminology encountered in shock isolation system design problems. Possible selection criteria that the designer may encounter during design of a shock isolation system are identified. Two design examples are provided that demonstrate incompatibilities sometimes encountered. Finally, the basic steps of the design process algorithm are reviewed. This course is directed at the design or analytical professional that has limited experience with shock isolation system design or the design professional with major expertise in a specialized area of shock isolation that wants to investigate more global excitations (i.e. vehicular shock expert that is interested in parallels with marine or seismic shock).

Introduction to DDAM Analysis Using NE/Nastran **Mr. Tony Abbey**

A technical discussion reviewing normal modes analysis, modal effective mass, traditional shock spectrum methods, and background to Dynamic Design Analysis Method. Simple and complex examples will be covered.

Substructure Coupling and Structural Modification for Shock & Vibration **Dr. Joshua Gordis**

Substructure coupling and structural modification refer to techniques for the efficient analysis of large and/or complex structural dynamics, vibration and shock. By treating structural systems as assemblages of components or substructures, structural design "what if" calculations can be performed quickly. This tutorial will review the background necessary in order to introduce several general approaches to substructuring and modification, in modal and physical coordinates and in the frequency and time domains. Included will be Component Mode Synthesis (e.g. NASTRAN superelements), model modifications, frequency domain coupling/modifications and time domain coupling/modification. The background review will include finite element structural matrices, decoupling, mode superposition (mode displacement and mode acceleration data recovery), frequency and impulse response functions and model reduction. Examples will be used throughout to illustrate the concepts covered.

The Navy Shock Qualification Process **Mr. Kurt Hartsough**

The Naval Surface Warfare Center Carderock Division Philadelphia (NSWCCD SSES) Code 623 is NAVSEA 05P3's Delegated Approval Authority (DAA) for MIL-S-901D Surface Ship Shock. As the DAA, Code 623 is responsible for review and approval of all Government Furnished Equipment and all Heavyweight tested equipment. In addition, NSWCCD SSES Code 6202 is the NAVSEA 05P3 DAA for all analysis and DDAM approvals. NSWCCD SSES Codes 623 and 6202 will be presenting the Navy's Shock Qualification Process as detailed in NAVSEAINST 9072.1A. This course will cover in detail the responsibilities of all Navy organization. It will cover in detail the documentation requirements for a successful shock qualification program. This includes technical policy requirements, the requirements for waivers, deviations and deficiencies and a detailed explanation of the shock qualification approval process. This is an expanded version of what was covered in the Navy Shock Qualification Approval Process course last year without covering MIL-S-901D. Who should attend? 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 and maintenance of shock hardened Navy ships and shock qualification test facilities.

Performing DDAM Analysis Using MSC.Software products **Mr. Bart McPheeters**

A short primer showing both the basics and advanced procedures for using MSC.Nastran to perform DDAM analyses. This will include basic run procedures and setting up an input deck, Nastran options, and more advanced capabilities such as mode-by-mode output, specific modal selection, and single run capability. We will talk about using the intermediate Fortran program, and some of the options available there, including metric units and user-defined spectra. There will be a discussion of post-processsing Nastran results, including some of the common pitfalls, and ways to effectively visualize the output data. It will also include a section on setting up the model to run using the new MSC.FEA+DDAM capability.

Beyond the Shock Response Spectrum - Temporal & Frequency Moments, the Product Model, & Uncertainty **Mr. Dave Smallwood**

The tutorial will show how the first few bandlimited temporal moments can be used to characterize shock. This information can be used independently of the Shock Response Spectrum (SRS), or used to supplement the SRS of a shock. The tutorial will introduce the temporal moments and discuss the theoretical implications. The uncertainty theorem will be discussed, and it will be shown how this theorem limits the available information about a shock. For a shock with a given rms duration, defined by the temporal moments, the uncertainly theorem limits the frequency resolution, as defined by the rms bandwidth. A demonstration will be given on how the product model can be used to synthesize realizations of a shock, which match the temporal moments. Examples will be provided which suggest, if the bandlimited temporal moments are matched, the SRS will also be matched. The realizations can be used for some tests, for example, shaker shock, or can be used as inputs to analytical models to estimate response. It will also be shown if the product model is assumed, that for estimates of the temporal moments, estimates of the mean is unbiased and estimates of the variance of the mean estimate can be found. This is useful in establishing the uncertainty in moment estimates from measured data. Several examples using real data will be used to illustrate the moments and the application.

An Introduction to ABAQUS **Dr. Jeff Cipolla**

ABAQUS is a family of general purpose finite element analysis tools for the analysis of complex engineering problems. ABAQUS/CAE is an interactive application for constructing, analyzing, and visualizing finite element models and results. ABAQUS/Standard is a general purpose finite element code, which handles a wide variety of linear and nonlinear analyses. ABAQUS/Explicit uses explicit time integration for linear and nonlinear problems, and is especially suited for modeling transient effects. This tutorial provides an overview of ABAQUS, its capabilities, and examples of applications. The tutorial is suitable for beginners in finite element analysis, experienced users of other software, and those interested in a survey of recently added features.

MIL-S-901D Shock Qualification Testing and Extensions **Mr. Kurt Hartsough & Mr. Domenic Urzillo**

The Naval Surface Warfare Center Carderock Division Philadelphia (NSWCCD SSES) Code 623 is NAVSEA 05P3's Delegated Approval Authority (DAA) for MIL-S-901D Surface Ship Shock. As the DAA, Code 623 is responsible for review and approval of all Government Furnished Equipment and all Heavyweight tested equipment. In addition, NSWCCD SSES Code 6202 is the NAVSEA 05P3 DAA for all analysis and DDAM approvals. NSWCCD Codes 623 and 6202 will be presenting the requirements for Shock Qualification Testing and Analysis as detailed in NAVSEAINST 9072.1A, MIL-S-901D and NAVSEA 0908-LP-000-3010 Rev 1. This course will concentrate on MIL-S-901D test requirements and how the DDAM requirements in NAVSEA 0908-LP-000-3010 fit into the shock qualification process of equipment. This course will include a detailed explanation of the test requirements as stated in MIL-S-901D and as interpreted by NAVSEA 05P3. Shock qualification testing of principal units, shock qualification by extension of principal units and shock testing of subsidiary components will be covered. This is an expanded version of what was covered in the Navy Shock Qualification Approval Process course last year without covering NAVSEAINST 9072.1A. Who should attend? 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.

Navy Weapons Systems Safety Program **Mr. Jamie Howell**

Description was not available at time of printing. Please check the SAVIAC web-site, www.saviac.org, for further information.

Wavelets **Mr. Tim Edwards**

Wavelets are a relatively new tool for signal representation in the field of signal processing. Wavelets offer some significant advantages compared to traditional methods such as compact representation and localized support. These characteristics of wavelets lend themselves to the processing of shock data. This tutorial will give participants a basic understanding of wavelet theory from both the basis function and filter bank perspectives. Application of wavelets will be demonstrated through time-scale analysis, signal de-noising, and accelerometer zero shift correction. Although wavelet theory is by nature math intensive, every effort will be made to reduce complex concepts to pictorial examples that can be understood by those without a formal background in signal processing.

Productive DDAM Analysis Using ABAQUS **Dr. David Winkler and Mr. David Woyak**

A new approach to performing DDAM analysis is available using Version 6.5 of the ABAQUS linear and nonlinear FEA program. Developed as a free add-on module called DDAM-for-ABAQUS, it allows DDAM-specific input through graphical and non- graphical user interfaces. Emphasis has been made on providing the Navy with ease- of-use, standardization of output results, and a high degree of automation. Many features have been incorporated to help enhance the productivity of any DDAM practitioner. For example, a key component to the application is a modular library of shock spectra calculation constants. DDAM users may readily generate and share site specific libraries. This approach provides flexibility and reliability while also avoiding the problem of classified information becoming part of the application. As an add-on module that is separate from the core ABAQUS program, the application can be rapidly enhanced to meet special needs of the shock community. This tutorial will teach the proper usage of DDAM-for-ABAQUS and will highlight particular features and advantages of the capability as illustrated by examples. The material is suitable for both managers and analysts.

Structural Detailing for Blast Resistance **Dr. Ted Krauthammer**

This tutorial will build on the material presented in the “Explosion Effects and Blast Resistant Structural Design” tutorial. The issue of structural design and the critical importance of paying attention to structural details will be discussed. How this has been studied, what the observations are, and recommended implementation in practice will be presented.

Monday, October 18

Basic Concepts of Digital Data Acquisition for Shock and Vibration Testing **Mr. Strether Smith**

Digital data acquisition has become the standard method of recording the shock and vibration measurements. The advantages of this approach in cost, accuracy, and convenience are enormous but there are traps set to catch the unwary investigator. One of the worst "features" of digital data acquisition is, if the system is not properly designed, it may produce data that looks good but is completely wrong. The primary aim of the course is to avoid this fatal result. The three-hour course discusses the hardware and software strategies required to assure good data is acquired. Sampling (aliasing) and digitalizing theory are emphasized and modern hardware solutions are discussed. The reasons for using, or not using, the new generation of sigma-delta data acquisition systems is featured and a fast and easy method of evaluating candidate hardware systems is described. This course is a must for those who want to assess the quality of the data they are acquiring or those who are fortunate enough to be buying/building a new system.

Calibration, Maintenance, and Operation of the Lightweight and Medium Weight Shock Machines **Mr. *B. Christopher Grunau* & Mr. *Jeffery A. Morris***

This course provides a detailed, hands-on overview of the calibration, maintenance, and operation of the Lightweight Shock Machine and

the Medium Weight Shock Machine. This class is tailored for those who are technical operators of the lightweight and medium weight shock machines. The course covers the rules and guidelines of machine operation, according to MIL-S-901D(NAVY) standards, routine maintenance procedures, and required machine calibration procedures.

UNDEX and Acoustics Analysis Using ABAQUS **Dr. Jeff Cipolla**

This tutorial describes the analysis of problems of particular interest to the Shock and Acoustics community using the general purpose finite element code, ABAQUS. In shock and acoustic analysis, it is useful to distinguish between 'heavy fluid' problems, in which the mass and stiffness of the fluid is an important factor in the structural motion, and 'light fluid' problems, in which parts of the fluid-solid interaction effect may be neglected. 'Heavy fluid' applications include underwater shock and acoustics, and some geotechnical problems. 'Light fluid' problems include metal structures in air. In either case, modal analysis, steady-state dynamic (time-harmonic) analysis, and transient problems are of interest. The use of ABAQUS/Standard for general steady state and modal acoustic analysis is described, including problems with heavy fluid, light fluid, solid structures, and infinite exteriors. ABAQUS/Explicit is particularly well-suited to UNDEX problems, which are characterized by rapid transient loads due to incident waves, as well as fluids of infinite extent. Modeling issues for each class of problem will be discussed.

Naval Shock Analysis and Design **Dr. Rudy Scavuzzo**

First an overview of content of SVM-17, Naval Shock Analysis and Design, by Rudy Scavuzzo and Henry Pusey will be presented. The monograph briefly covers naval shock testing machines and vehicles, a detailed treatment of normal mode theory and its relationship to the Dynamic Design Analysis Method (DDAM); special considerations of DDAM including allowable stresses are covered in Chapter 3. Whole ship shock analyses including fluid-structure interaction and shock analyses in the plastic regime are presented in Chapters 4 and 5, respectively. Emphasis in the tutorial will be made on Chapter 5, shock analyses in the plastic regime. Energy in the modes of vibration can be directly related to the shock spectrum. This concept is very important because it means the energy in a system is bounded. Thus, plastic deformation or plastic work from shock in an equipment structure is also bounded. After considering the energy in shock, plastic analyses in piping and foundations from shock inputs will be presented. Analytical results will be compared to test data.

Damping **Mr. Jack Henderson, Dr. Peter Torvik, Dr. Ahid Nashif**

Damping is first discussed as a material property, and such measures of material damping as the unit damping, the material loss factor and the complex modulus are introduced and discussed. The different classes of materials with high inherent damping properties are introduced and the characteristics of each are described. Damping is then discussed as a system property with such system level measures as the fraction of critical damping, the logarithmic decrement, the resonant amplification factor (quality factor), bandwidth, Nyquist plot, hysteresis area, and complex stiffness introduced. The limitations of each are discussed, and relationships between various measures are given. The relationship between material damping and system damping, the challenges in extracting material properties from the system response, and the influence of nonlinearities on the measurement of damping are also given. The critical role of damping in the reduction of vibratory amplitudes at resonance is emphasized.

Validation and Editing of Shock & Vibration Data **Mr. Allan Piersol**

This short course surveys the most common errors that occur during the acquisition of shock and vibration data, including signal clipping, transducer and/or amplifier saturation, excessive background noise, intermittent noise spikes and wild points, power line pickup, spurious trends and signal dropouts. Practical procedures to detect such errors and wild points, power line pickup, spurious trends and signal dropouts. Practical procedures to detect such errors by visual inspections of the data signals and/or simple analysis of the signals are detailed. For those cases where the resulting anomalies can be removed from the data, appropriate data editing techniques are discussed. Emphasis is given to pyroshock dat, which is particularly vulnerable to data acquisition errors. The presentation concentrates on graphical illustrations of the detection and editing procedures rather than an analytical treatment of the problem. This short course is intended for all engineers and scientists that are engaged in the acquisition and analysis of all types of analog data. The material is presented at a level appropriate for entry level engineers and technicians, but should also be beneficial to more experienced laboratory engineers and managers of data acquisition and analysis facilities.

Introduction to Non-Linear Methods in Shock and Vibration using NE/Nastran **Mr. Tony Abbey**

A technical discussion on advantages of general 3D contact, general background to surface contact in NE/Nastran, setup of simple contact analysis in NE/Nastran and FEMAP, impact analysis using contact, forming analysis using contact, and usage of contact surfaces in static analysis.

Overview of Underwater Shock and DDAM **Dr. Young Shin**

This three hour short course on naval ship shock analysis and design will be presented by Dr. Young Shin, Professor of Mechanical Engineering at the Naval Postgraduate School. It will provide engineers, scientists, and naval architects a general overview of underwater explosion phenomena, structural response analysis, fluid-structure interaction, shock spectrum and the Dynamic Design Analysis Method. It will cover the free-field problem, the drystructure problem, the fluid-structure interaction and shock spectra problem, shock qualification of internal equipment using DDAM and Hopkinson's scaling problem.

MIL-S-901D Shock Qualification Testing and Extensions **Mr. Kurt Hartsough & Mr. Domenic Urzillo**

The Naval Surface Warfare Center Carderock Division Philadelphia (NSWCCD SSES) Code 623 is NAVSEA 05P3's Delegated Approval Authority (DAA) for MIL-S-901D Surface Ship Shock. As the DAA, Code 623 is responsible for review and approval of all Government Furnished Equipment and all Heavyweight tested equipment. In addition, NSWCCD SSES Code 6202 is the NAVSEA 05P3 DAA for all analysis and DDAM approvals. NSWCCD Codes 623 and 6202 will be presenting the requirements for Shock Qualification Testing and Analysis as detailed in NAVSEAINST 9072.1A, MIL-S-901D and NAVSEA 0908-LP-000-3010 Rev 1. This course will concentrate on MIL-S-901D test requirements and how the DDAM requirements in NAVSEA 0908-LP-000-3010 fit into the shock qualification process of equip-

ment. This course will include a detailed explanation of the test requirements as stated in MIL-S-901D and as interpreted by NAVSEA 05P3. Shock qualification testing of principal units, shock qualification by extension of principal units and shock testing of subsidiary components will be covered. This is an expanded version of what was covered in the Navy Shock Qualification Approval Process course last year without covering NAVSEAINST 9072.1A. 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 and maintenance of shock hardened Navy ships and shock qualification test facilities.

The Measurement and Utilization of Valid Shock and Vibration Data **Dr. Patrick Walter**

Significant focus is often provided to applying sophisticated analysis techniques to the data resulting from shock and vibration tests. However, inadequate focus is often provided to assuring that valid shock and vibration data are acquired in the first place. This tutorial attempts to correct this deficiency. For the instrumentation novice it will provide an introduction to shock and vibration measurements, the physics of piezoelectric and silicon based accelerometers, and motion characterization. For the experienced test technician or engineer it will provide additional insight into topics such as optimized measurement system design, accelerometer and measurement system calibration, accelerometer mounting effects, analog filtering, data validation, data utilization, and more. For the analyst or designer it will provide a series of simple observations and back of the envelope calculations that he/she can make on data to validate its credibility before using it in product design.

SRS - The Shock Response Spectrum **Dr. Wayne Tustin**

Most engineers think about mechanical shock in the "time domain", as some kind of an acceleration or force pulse shape that reaches some peak value and that lasts for some time interval. That's fine. But it is often more useful to think about mechanical shock in the "frequency domain". Designers try to avoid placing their product resonances in frequency regions where mechanical shock creates severe responses. SRS gives designers that information. SRS guided the development, many years ago, of MIL-S-901 hammers. SRS is used nowadays to specify shocks that will be created by electrodynamic shakers.

Application of the USA Code to Underwater Shock Problems **Dr. John DeRuntz**

The purpose of this course is to provide engineers, scientists and naval architects a working knowledge of the theoretical foundations and practical details of the Underwater Shock Analysis code for usage in design and analysis problems of submerged and semisubmerged structures in an explosive environment. The tutorial will include an introduction and brief history of USA, the physics of underwater shock, fluid-structure interaction, fluid mass matrix development, overview of the USA Code, cavitating fluid analysis, recent enhancements and work in progress, problem areas where scientists and naval architects working on the design and analysis of submerged and semisubmerged structures in an explosive environment.

Navy Shock Database User Certification **Mr. Paul Medeiros & Mr. Kurt Hartsough**

The Navy Shock Data Base (NSDB) is mandated by NAVSEAINST 9072.1A. In accordance with NAVSEAINST 9072.1A, it is managed by NAVSEA 05P3 and maintained by Naval Surface Warfare Center Carderock Division Philadelphia (NSWCCD SSES) Code 623. The NSDB is a compilation of shock hardness requirement by ship or ship class and a compilation of equipment shock qualification status for both Contractor Furnished Equipment and Government Furnished Equipment. Recent security issues and data integrity issues were the caused of a major overhaul of the NSDB. In order to maintain security and data integrity of the NSDB, this course will be required by any persons requesting read/write access to the NSDB. Those persons requiring read/write access include PARM/LCMs, NAVSEA PEOs, ship builders and contractor support for those activities. Although this course is not required for persons requesting read only access, it is recommended so that they fully understand the working of the data base and can take full advantage of the data in the data base. This will be the first time this course has been offered and it is expected that additional course offerings will be made as the need arises.

75th Current Exhibitors

ABAQUS Inc
Bruel & Kjaer
DaqScribe
Data Physics Corporation
Enivate
General Dynamics Electric Boat
HI-TEST Laboratories
Kistler Instrumental
LMS North America
m + p international
MFPT
National Technical Systems
Newport News Industrial
Noran Engineering
Northrop Grumman Newport News
NSWC Carderock
NSWC Dahlgren
NSWC Indianhead
PCB Piezotronics
Precision Filters
PROSIG USA
Society for Experimental Mechnics
Spectra Quest
Taylor Devices
TEAC America
TEAM Corporation
US Army Aberdeen Test Center

Additional exhibiting opportunities are still available! Please contact Lauren Yancey at 703.892.0060 or by e-mail at lauren.yancey@saviac.org.

Guest Program

WILLIAMSBURG, VA - Tuesday, 9:00 AM - 5:00 PM, Cost $50.00 - Listen to the tour guide narrate the history of Norfolk, Hampton and the Colonial Capital during the trip to Williamsburg. As you walk through the historic streets and exhibits, you will be given an in-depth narration Of the beginning of Williamsburg and the work that continues today. You will tour the Governor's Palace, Bruton Parish Church, The Courthouse of 1776 and the Colonial Tavern. Lunch will be at the King's Arm Tavern where the staff will be dressed in colonial attire and you will be introduced to dining in the historical days. After lunch you may continue the tour or walk two blocks to Merchant's Square for shopping.

A TASTE OF HAMPTON ROADS - Wednesday, 9:00 AM - 3:00 PM, Cost $30.00 - See the historic lighthouses and the First Landing Cross at Cape Henry where the British colonists first came ashore in 1607. Visit the Hermitage Foundation Museum, a Tudor style mansion built in 1908 featuring an outstanding collection of eastern and western art. Learn about Norfolk's colorful history as you ride the the historic district and restored areas. Enjoy lunch at the Painted Lady, a restored turn of the century Victorian home. Visit the Norfolk Botanical Gardens where you can enjoy a trackless train ride.

SEAFOOD COOKING CLASS - Thursday, TBD time, Cost $10.00 - Learn how to cook seafood from the Cavalier Hotel's chef. Afterward, you will have the opportunity to ejoy your efforts.

75th S&V Symposium Registration Form

The standard registration form for a single attendee is on the following page. This year SAVIAC has introduced new options and expanded options introduced last year. These include Corporate Sponsorships for those companies sending multiple attendees as well as a tutorial only option. To find out more and get the forms please go to our web site at www.saviac.org/registration_options1.htm. Questions should be directed to Lauren Yancey, 703 892-0060, lauren.yancey@saviac.org.

75th S&V Symposium Clearance Form Instructions

IMPORTANT INSTRUCTIONS

1. **This Security Certification must be faxed to:**

   Address: **US Army Engineer Research and Development Center**
   ATTN: Linda McGowan

   Fax: **(601)-634-3897 or 2995**
   Verification Number: **(601)-634-4218, 3527, or 2776**

2. **TELEPHONE REQUESTS WILL NOT BE ACCEPTED.**

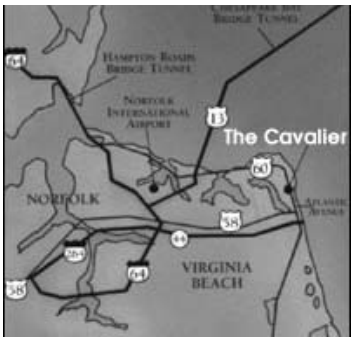
3. **GOVERNMENT ATTENDEES: Send clearances directly to ERDC.**
   CONTRACTORS: Send clearances through your user agency for need-to-know verification and forward to ERDC.

4. **Clearance certifications must be received no later than October 1, 2004.**

5. **If you wish to receive the CLASSIFIED Proceedings and/or the Critical Technologies Journal, you must check the appro priate box(es) at the top of the form**

Hotel Accommodations

The Symposium, including the unclassified sessions, will be held at the Cavalier Hotel. A block of rooms have been reserved at the rate of $109.00 per night. Reservations must be made by October 1st. Rooms not reserved by October 1st will be released to the public by the hotel. After that date you will no longer be eligible to receive the negotiated rate and you may not be able to reserve a room. When making your reservation identify yourself as an attendee of the Shock and Vibration Symposium. The room rate is the same for US Government and private sector employees. For reservations, please contact:



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Oceanfront at 42nd Street
Virginia Beach, VA 23451
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Registration Form

75th Shock and Vibration Symposium
October 17-22, 2004
Virginia Beach, VA

return to:
SAVIAC/ HI-TEST Labs
PO Box 87
Arvonia, VA 23004
(434) 581-3204
fax: (509) 351-9733

Name: _____

Organization: _____

Address: _____

_____

Phone: _____ Fax: _____ Email: _____

REGISTRATION FEE: $795 (Discounted price of $695 granted to registrations, INCLUDING PAYMENT INFORMATION, if received by SAVIAC by September 26, 2004.)

I WILL BE ATTENDING (Check all that apply, send appropriate clearance form to NSWC/DD/Dam Neck)
❑ Unclassified ❑ Classified

TUTORIALS: $250 each/$350 if not attending Symposium (See the policy on Symposium attendance prior to registering) **Sunday, Oct 17**

❑	Elementary Shock Isolation System Design – D. Christopher Merrill	8-11 AM
❑	Introduction to DDAM Analysis Using NE/Nastran – Tony Abbey	8-11 AM
❑	Substructure Coupling and Structural Modification for Shock & Vibration - Joshua Gordis	8-11 AM
❑	The Navy Shock Qualification Process - Kurt Hartsough	9-12 AM
❑	Performing DDAM Analysis Using MSC.Software products - Bart McPheeters	12-3 PM
❑	Beyond the Shock Spectrum - Temporal & Frequency Moments, the Product Model, & Uncertainty - Dave Smallwood	12-3 PM
❑	An Introduction to ABAQUS - Jeff Cipolla	12-3 PM
❑	MIL-S-901D Shock Qualification Testing - Kurt Hartsough & Domenic Urzillo	1-5 PM
❑	Navy Weapons Systems Safety Program – Jamie Howell	4-7 PM
❑	Wavelets – Tim Edwards	4-7 PM
❑	Productive DDAM Analysis Using ABAQUS – David Winkler & David Woyak	4-7 PM
❑	Structural Detailing for Blast Resistance - Ted Krauthammer	4-7 PM

Monday, Oct 18

❑	Basic Concepts of Digital Data Acquisition for Shock and Vibration Testing - Strether Smith	8-11 AM
❑	Calibration, Maintenance and Operation of the LWSM & MWSM – Chris Grunau & Jeff Morris	8-12 PM
❑	UNDEX and Acoustic Analysis Using ABAQUS - Jeff Cipolla	8-11 AM
❑	Naval Shock Analysis & Design - Rudy Scavuzzo	8-11 AM
❑	Damping – Jack Henderson, Peter Torvik & Ahid Nashif	8-11 AM
❑	Validation and Editing of Shock & Vibration Data - Allan Piersol	12-3 PM
❑	Introduction to Non-Linear Methods in Shock and Vibration using NE/Nastran – Tony Abbey	12-3 PM
❑	Overview of Underwater Shock and DDAM - Young Shin	12-3 PM
❑	MIL-S-901D Shock Qualification Extensions - Kurt Hartsough & Domenic Urzillo	12-3 PM
❑	The Measurement and Utilization of Valid Shock and Vibration Data - Patrick Walter	4-8 PM
❑	Shock Response Spectrum - Wayne Tustin	4-7 PM
❑	Application of the USA Code to Underwater Shock Problems - John DeRuntz	4-7 PM
❑	Navy Shock Database User Certification - Paul Medeiros & Kurt Hartsough	4-7 PM

SOCIAL EVENT: Wednesday evening, Registered attendee: no charge/Guest charge: $10
❑ yes, I will attend ❑ yes, I will attend with 1 guest ❑ no, I will not attend

GUESTS' PROGRAM:

Tues	WILLIAMSBURG, VA	❑ guest attending Tues (10/19): $50
Wed	HISTORIC NORFOLK	❑ guest attending Wed (10/20): $30
Thur	GOURMET COOKING	❑ guest attending Thur (10/21): $10

TOUR: Friday 10/22 NSWCDD/Dam Neck ❑ yes (indicate # of persons) ___ Names: _____

TOUR RESTRICTED TO US CITIZENS AND SYMPOSIUM ATTENDEES

By registering for the Symposium you are agreeing to abide by the rules and regulations of Symposium conduct set by SAVIAC. These rules are available for viewing at www.saviac.org

PAYMENT INFORMATION: Please provide complete payment information. Checks should be made payable to SAVIAC/HI-TEST. Payment may also be made by AMEX, Visa, or Master Card. Purchase orders are not accepted. **A $50 administrative fee will be charged to ALL cancellations received after September 26, 2004. Substitutions are accepted.**

❑ Check ❑ AMEX ❑ Visa ❑ Master Card Card # _ _ _ _ - _ _ _ _ - _ _ _ _ - _ _ _ _

Exp. Date _____ Cardholder Name (print): _____

AMOUNT PAID _____ Cardholder Signature: _____

PLEASE FAX FORM & CREDIT CARD INFO TO (509) 351-9733 BY SEPTEMBER 26, 2004 TO RECEIVE DISCOUNT

YOU MAY ALSO REGISTER ON THE WEB AT www.saviac.org/75_symposium.htm

CLEARANCE FORM FOR CLASSIFIED SESSIONS
75th Shock & Vibration Symposium
Virginia Beach, VA

FAX Copy To:		ERDC Security ATTN: Linda McGowan (601)-634-3897 or 2995 (FAX) (601)-634-4218, 3527, or 2776 (Verification)

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Limited Proceedings **Critical Technologies Journal**

PART I: PERSONAL DATA (To Be Completed By Attendee)

Name: _____ **Social Security No** _____
(Last) (First) (Initial)

Place of Birth: _____ **Citizenship:** _____ **Date of Birth:** _____

Employer (Company/Gov't Agency/Military): _____

Employer's Address: _____

Classified Mailing Address: _____

Email: _____ **Phone No:** ( ) - _____ **Fax No:** ( ) - _____

Signature of Attendee: _____

PART II: SECURITY CLEARANCE INFORMATION (To Be Completed By The Attendee's Security Officer)
By signing below, I certify the attendee meets the requirements for access to classified material in accordance with Executive Order 12958, DoDR 5200.1 -R, and DoDM 5220.22M (as applicable).

Clearance Level: _____ **Investigation Type:** _____

Date Clearance Granted: _____ **Date of Investigation:** _____

Granted By: _____ **Authorized NATO Access:** _____
(Yes / No)

Security Officer
Name (Print): _____
(Last) (First) (Initial)

Title: _____ **Organization:** _____

Phone No: ( ) - _____ **Fax No:** ( ) - _____

_____
Signature of Security Officer **Date**

PART III: NEED -TO-KNOW (Contractors Only) (To Be Completed By The Government Contracting Activity Officer)
By signing below, I certify the attendee has the NEED -TO-KNOW to attend the classified portions of this symposium in accordance with Executive Order 12958, DoDR 5200.1 -R, and DoDM 5220.22M (as applicable).

Name (Print): _____
(Last) (First) (Initial)

Title: _____ **Organizati on:** _____

Phone No: ( ) - _____ **Fax No:** ( ) - _____

_____
Signature of Contracting Activity Officer **Date**

PRIVACY ACT STATEMENT

***AUTHORITY**: DoD 5200.1 -R, para 6 -202*
***PRINCIPAL PURPOSE** : To identify persons seeking approval t o attend classified meetings during the symposium lsited above.*
***ROUTINE USES** : Information contained hereon is used for reviewing the request to attend the classified briefings during the symposium. Also used to certify the individual attendee's security clearance and access authorization.*
***DISCLOSURE IS VOLUNTARY** : Failure to provide the information will result in disapproval of the request to attend classified briefings.*

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In the August 2004 Current Awareness Newsletter

75th Shock & Vibration Symposium Preliminary Program

New This Year

Tutorials on Sunday, Monday

New Registration Options

The Current Awareness newsletter is published by the Shock and Vibration Information Analysis Center, which is operated by HI-TEST Laboratories, Inc., under contract to the U.S. Army Engineer Research and Development Center.

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