

**SAVIAC**  
Shock and Vibration Information Analysis Center

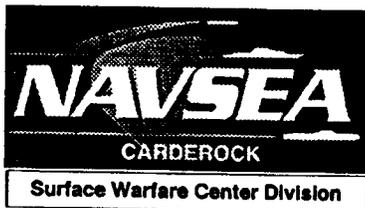


**CURRENT  
AWARENESS**

*July 2000*

# The 71st Shock & Vibration Symposium

*Preliminary Program*



**November 6-9, 2000  
Arlington, Virginia**

## **Introduction**

Since the first meeting in 1947, the Shock and Vibration Symposium has become the oldest, continual meeting dealing with specialized engineering problems and effects of dynamic environments on vehicles, structures, equipment, components and humans. 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 NSWC-Carderock and Enidine, Inc. Representing these organizations on the TAG are Ms. Fran Rasmussen and Ms. Mary Kerns respectively.

## **Program Committee Members**

**Co-Chair: Ms. Fran Rasmussen - NSWC/Carderock Division**

**Co-Chair: Ms. Mary Kerns - Enidine, Inc.**

Mr. Edward Alexander - United Defense LP

Mr. Austin Alvarez - Electric Boat Corp.

Mr. Kevin Arden - Newport News Shipbuilding

Mr. Jeff Blankenship - NSWC/Coastal Systems Station

Dr. Richard Crowther - Ingalls Shipbuilding

Dr. Ray Daddazio - Weidlinger Associates, Inc.

Dr. Howard Gaberson - Naval Facilities Engineering Center

Dr. Michael Hale - Redstone Technical Test Center

Mr. Jack Halpin - MTS Systems Corporation

Mr. Dana Johansen - NAVSEA

Mr. Eric Kathe - US Army Benet Labs

Mr. Bob Krezel - NSWC/Carderock UERD

Mr. Joel Leifer - SAVIAC/Booz, Allen & Hamilton

Mr. Michael Riley - NSWC/UERD

Mr. David Smallwood - Sandia National Laboratories

Mr. William Yancey - Hi-Test Laboratories

Mr. David Watts - Air Force Research Laboratory

Dr. Charles R. Welch - USAE Research and Development Center

Mr. Dan Worth - NASA/Goddard

## **Classified Sessions**

The classified sessions are divided into three categories: confidential, secret and NATO. A secret clearance allows attendance to confidential and secret sessions. Attendance to a special briefing is required in order to enter the NATO sessions. These sessions will be held at NAVSEA/Carderock. A properly completed clearance form, included in this program, and a photo ID will be required 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://saviac.xservices.com>.

## **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 Marcy Birch (703) 289-5133 for further information.

## **Information Numbers**

Joel Leifer, Technical	(703) 289-5516
Nora Thompson, Tutorials	(703) 289-5135
Marcy Birch, Exhibits	(703) 289-5133
Tabatha Spitzer, Program	(703) 289-5134

SAVIAC Fax:	(703) 289-580
Hyatt Regency Hotel:	(703) 418-123
Hotel Fax:	(703) 418-128

## Schedule of Events

\*This program is preliminary and is subject to modification. Check the SAVIAC website at <http://saviac.xservices.com> for up-to-date program status.

### Hotel Tutorials

**Monday 8:00 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)*

#### Tuesday Afternoon

Beyond Goodness of Fit  Beyond Goodness of Fit Discussion  Pyroshock Discussion Group	Human Response to Shock  Human Factors in Shock Panel  SD2000 Discussion Group	Facilities and Products    Manufacturer's Panel	Vibration I	NATO    AMMS
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#### Wednesday Morning

UNDEX Testing    Isolation I	COTS Panel	Data Analysis	Numerical Methods	Terrorist Threat Protection    Blast
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#### Wednesday Afternoon

Modeling and Simulation of Structures with Joint Interfaces  Modeling and Simulation of Structures with Joint Interfaces Discussion	Space Standardization    Standards	Terrorist Threat Protection Panel    Terrorist Threat Protection		LWWAA    Isolation
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**\* Wednesday Night: Social Event**

#### Thursday Morning

Vibration II    Data Analysis Discussion Group	NATO Life Panel	Blast    Seismic		UNDEX    Shock Eval Advanced C Material Sy Class Bow
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#### Thursday Afternoon

Test Methods	Isolation II	UNDEX	UNDEX Simulation	
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**\* Guest Tour**

# 71st Shock and Vibration Symposium

## Preliminary Program

Monday, November 6 - Tutorials

<i>Tutorial</i>	<i>Instructor</i>	<i>Time</i>
<i>Introduction to Vibration Testing</i>	<b>Jon Wilson</b>	8-11:00 a.m.
<i>Substructure Coupling and Structural Modification for Shock &amp; Vibration</i>	<b>Joshua Gordis</b>	8-11:00 a.m.
<i>Wavelet Applications in Shock and Vibration</i>	<b>Dan Worth</b>	8-11:00 a.m.
<i>Dynamic Testing: Transient and Steady State</i>	<b>Pete Stein</b>	8-11:00 a.m.
<i>Overview of Underwater Shock and DDAM</i>	<b>Young Shin</b>	8-11:00 a.m.
<i>The Measurement of Meaningful Shock &amp; Vibration Data</i>	<b>Patrick Walter</b>	12-3:00 p.m.
<i>Data Acquisition for Shock &amp; Vibration Measurements</i>	<b>Strether Smith</b>	12-3:00 p.m.
<i>Shock Waves and the Modeling of Solid Materials</i>	<b>Ernie Dunn</b>	12-3:00 p.m.
<i>Overview of Explosive Effects and Blast Resistant Design</i>	<b>Tom Carroll</b>	12-3:00 p.m.
<i>Application of the USA Code to Underwater Shock Problems</i>	<b>John DeRuntz</b>	12-3:00 p.m.
<i>Using Temporal Moments to Characterize Shock</i>	<b>Dave Smallwood</b>	4-7:00 p.m.
<i>Validation and Editing of Shock &amp; Vibration Data</i>	<b>Allan Piersol</b>	4-7:00 p.m.
<i>Empirical Mode Decomposition and Time-Frequency Analysis</i>	<b>Liming Salvino</b>	4-7:00 p.m.
<i>Verification and Validation in Computational Mechanics</i>	<b>William Oberkamp</b>	4-7:00 p.m.
<i>Shock Design in the Plastic Regime</i>	<b>Rudy Scavuzzo</b>	4-7:00 p.m.

Tuesday Morning, November 7

<i>Opening Session</i>
8:30 a.m. - Call to Order: <i>Joel Leifer</i> , SAVIAC Program Manager
8:35 a.m. - Welcome: <i>Captain Steven Petri</i> , NSWC/Carderock
8:45 a.m. - Welcome: <i>Dr. Edward Krasnicki</i> , President, Enidine Inc.
8:55 a.m. - Symposium Highlights: <i>Joel Leifer</i> , SAVIAC Program Manager
9:15 a.m. - Henry Pusey Award Presentation: <i>Fran Rasmussen</i> , NSWC/Carderock, <i>Mary Kerns</i> , Enidine, Inc.
9:25 a.m. - Mel Baron Award: <i>Dr. Dan Inman</i> , Professor, Virginia Polytechnic & State University
9:35 a.m. - Life Time Achievement Award: TBD
9:45 a.m. - Director's Remarks: <i>Dr. Charles Welch</i> , USAE Research and Development Center
9:55 a.m. - Break
10:15 a.m. - Keynote Address: <i>RADM (SEL) Charles Hamilton</i> , NAVSEA
11:00 a.m. - Elias Klein Memorial Lecture: <i>Dr. John DeRuntz</i> , President USA; "Music-The Art of Good Vibrations"
11:30 a.m. - Break

Tuesday Afternoon, November 7

### *Track One*

<i>Beyond Goodness of Fit</i>	<i>Chair: Timothy Hasselman, ACTA Inc.</i>
<i>User Friendly Error Measures</i> - <b>Thomas Geers</b> , University of Colorado	
<i>The Use of Temporal Moments in Simulation and Validation Programs</i> - <b>David Smallwood</b> , Sandia National Laboratories	
<i>A Comprehensive Multi-Point Data Analysis Methodology Using Spatial Response Patterns</i> - <b>David Russell</b> , Electric Boat Corporation	
<i>Issues of Data Cleansing and Feature Extraction for Transient Dynamic Model Updating</i> - <b>Scott Doebling, Francois Hemez, Amanda Wilson and Hoon Sohn</b> , Los Alamos National Laboratory	
<i>On Going Efforts in Statistical Model Updating and Validation for Transient Structural Dynamics</i> - <b>Scott Doebling, Francois Hemez and Amanda Wilson</b> , Los Alamos National Laboratory	
<i>Modal Metrics for Model Test Correlation, Model Updating and Total Uncertainty Qualification</i> - <b>Mark Anderson and Timothy Hasselman</b> , ACTA Inc.	

*Beyond Goodness of Fit Discussion*

*Details of the Beyond Goodness of Fit Discussion are currently unavailable.*

*Pyroshock Discussion Group*

*Chair: Vesta Bateman, Sandia National Laboratories*

*The Pyroshock Working Group will meet to discuss topics such as concepts of near-field, mid-field and far-field pyroshock, pyroshock specifications and instrumentation, and simulation of near-field, mid-field and far-field pyroshocks. Group members are encouraged to participate in a general discussion of recent experiences and problems in pyroshock testing.*

**Track Two**

*Human Response to Shock*

*Optimal Isolation of Biodynamic Response to the Underwater Shock - Zhi Zong, KY Lam, SC Ngiam and Tessa Gan, Institute of High Performance Computing*

*Study of MR Damper for Semi-Active Vibration Control of Human Powered Vehicle - Guo Zhi Yao, Soon Liang Seow, Fook Fah Yap and Guang Chen, Nanyang Technological University*

*Modeling and Simulation of Human Body Response to Ship Shock Motion - Kin Chew Hung, Zhi Zong and Khin Yong Lam, Institute of High Performance Computing*

*Human Factors in Shock Panel*

*Chair: Walter Pilkey, UVA*

*Details of the Human Response to Shock Panel are currently unavailable.*

*SD2000 Discussion Group*

*Chair: Dr. Dan Inman, Virginia Polytechnic and State University*

*In April of 1999, Los Alamos National Laboratories along with David Ewins of Imperial College and Dan Inman, held a week long workshop to help determine the way forward in structural dynamics. The basic objectives of the original program were to: determine future directions of structural dynamics, define/develop a strategic plan to advance the discipline and overview the state of the art in structural dynamics. These broad and simply stated objectives were expanded on and developed by the group as the week unfolded. The very nature of the forum dictated a fluid and open definition of determining the best path forward for the structural dynamics community. To further lend direction to the forum the following goals were outlined: determine what Structural Dynamics is expected to do for the engineering community, determine how effective structural dynamics is in meeting these expectations and determine what structural dynamics should do differently. This discussion session will briefly review the outcome of the SD2000 Forum and then open the floor for similar discussions on how the SAVIAC community might add to thoughts on the way forward for the next 20 years.*

**Track Three**

*Facilities and Products*

*Chair: Thurston Brooks, Wilcoxin Research*

*Underwater Shock Analysis on Windows NT - Rick Coffman, Northrop Grumman Corporation*

*15 Year Service Interval - New Isolator Technologies - Tom Miller, Enidine Inc.*

*System Level Naval Isolation Approach - Mike Latvis, Enidine Inc.*

*Testing Capabilities - Tom Miller, Enidine Inc.*

*Manufacturer's Panel*

*Chair: Jon Wilson, The Dynamic Consultant LLC*

*Instrumentation manufacturers will present different aspects of shock and/or vibration measurement, control or analysis.*

*Audience participation will be encouraged, allowing customers an opportunity to air their problems and possibly receive answers from knowledgeable technical representatives. Panel members will include representatives from Spectral*

*Dynamics, PCB Peizotronics and DERA. Please contact the chair if your firm would like to participate.*

**Track Four**

*Vibration I*

*Chair: Richard Crowther, Ingalls Shipbuilding*

*Simultaneous Health Monitoring and Control of Panels - Daniel Inman, M. Ahmadian and R.O. Claus, Center for Intelligent Intelligent Material Systems and Structures*

*Overview of Smart Materials for Vibration Session - Daniel Inman, Center for Intelligent Material Systems Structures*

*Simulation of the Response of Particulate Filled Beams Due to Shock Excitation - Raymond Daddazio, Mohammed Ettoruney, Ka Kin Chan and Ivan Sandler, Weidlinger Associates, Inc.*

*Tuned Support Structure for Structure-Borne Noise Reduction of Inertial Navigator with Dithered Ring Laser Gyros (RLG) - Jamil Lahham, Donald Wigent and Albert Coleman, Litton Marine Systems, Inc.*

*Thermally Induced Vibrations of a Flexible Solar Array - Xiang An, Northwest Polytechnical University*

### *Track Five (Classified)*

#### **NATO**

*Chair: Dr. Fred Fisch, NSWC/Carderock*

- Report on a Niag Pre-Feasibility Study on Naval Ship Design for Improved Fire Resistance - **Thomas Carroll**, Center for Blast Resistant Design
- Benchmark Experiments for Evaluation of Internal Airblast Models - **Alan Ohrt and Edward Blaney**, Air Force Research Laboratory
- On TNO-PML Developments of Blast Resistant Structures for the Royal Netherlands Navy - **Leon Galle and Andre van Erkel**, Royal Netherlands Navy, TNO-PML

#### **AMMS**

*Chair: William Martin, NSWC/Carderock*

- Overview of the Advanced Machinery Support Shock Demonstration - **William Martin**, NSWC/Carderock
- Assist Threat-Based Study of Shock Isolation Mount Performance on the LPD 17 and the DDG 51 Flight IIA - **John Przybysz, Jr., Roy Javier and Fred Costanzo**, NSWC/Carderock
- Development of a Characterization for the DT227 Mount - **David Russell**, General Dynamics, Electric Boat Corporation
- Heavy Machinery Parametrics for Engine Room Cradle Insertion -- **Ruby-Lynn Delaune**, Newport News Shipbuilding
- Advanced Machinery Support System (AMSS) Underwater Explosion Test Series - **William Gottwald III**, Naval Surface Warfare Center, Carderock Division
- Advanced Machinery Support System (AMSS) Underwater Analysis (ETC)--**Tom Littlewood**, Engineering Technology Center

Wednesday Morning, November 8

### *Track One*

#### **UNDEX Testing**

- UNDEX Testing of a Submerged Pressure Hull, Simulation, and Measurement - **Jan Stenvall**, Kockums AB
- Shipboard Modular Arrangement Reconfiguration Technology (SMART) Foundation - **J.P. Christein**, Newport News Shipbuilding
- AAAV Shock Analysis - **Paul Mantz**, Naval Surface Warfare Center/Carderock Division
- MK 45 62 Cal Gun Structural Test Firing Responses vs. UNDEX Responses - **Michael Winnette and Whitney Roberts**, Naval Surface Warfare Center/Carderock Division
- Commercial Switchboard Shock Tests - **Michael Winnette**, Naval Surface Warfare Center/Carderock Division

#### **Isolation I**

*Chair: Doug Taylor, Taylor Devices, Inc.*

- A Numerical Investigation of Combined Shock and Vibration Isolation through the Semi-Active Control of a Magnetorheological Fluid Damper in Parallel with an Air Spring - **Troy Tanner and Michael Mosher**, Newport News Shipbuilding, Taylor Devices, Inc.
- Developing a Functional Representation of an Isolation Mount from Parsing Data - **Troy Tanner**, Newport News Shipbuilding
- Shock Design for COTS Electronics - **Mark Campbell and Ed Brennan**, Lockheed Martin
- Aluminum Honeycomb Characteristics in Dynamic Crush Environments - **Vesta Bateman, Fred Brown, Michael Nusser, and Lloyd Swanson**, Sandia National Laboratories
- Double Acting Mechanical Shock Isolator (DAMSI) - **Dan Radice**, Enidine, Inc.

### *Track Two*

#### **COTS Panel**

*Chair: Mary Kerns, Enidine Inc.*

- The concept of utilizing commercial, off the shelf, electronics and equipment has created the need for a re-evaluation of the analytical foundation utilized to characterize shock. What are the implications, and what do we need to do as a community to spearhead this change. **Dana Johansen** - NAVSEA, **William Gottwald** - NSWCCD, **Fred Costanzo** - UERD, **Rick Griffen** - Newport News Shipbuilding, **Rick Dugan** - Electric Boat, **Ray Daddazio** - Weidlinger Associates

### **Track Three**

#### **Data Analysis**

*Chair: David Smallwood, Sandia National Laboratories*

- Evaluating Vibration Environments Using the Shock Response Spectrum - Allan Piersol and George Henderson, Piersol Engineering Company, GHI Systems, Inc.*
- A Practical Method for Acquiring Uncertainty Estimates for Test System Measurements - Donald Chandler and Alex Specker, Precision Filters, Inc.*
- Does High Reliability Equal Zero Defects? - Alex Porter, Entela, Inc.*
- The Analysis of Nonstationary Multiple Output Data - Ronald Merritt, Naval Air Warfare Center Weapons Division*
- Uncertainties of Shock Response Spectrum Measurements for Complex Shocks - Andrey Smirnov, METRON Ltd. Research and Development Company*
- The Synthesis of Structural Responses Using Experimentally Measured Frequency Response Functions and Field Test Data - Jerome Cap and Curtis Nelson, Sandia National Laboratories*
- Representation of Random Shock via the Karhunen Loeve Expansion - Thomas Paez and Norman Hunter, Sandia National Laboratories, Los Alamos National Laboratory*
- Shock Response Spectrum Calculation - Using Waveform Reconstruction to Improve the Results - David Smallwood, Sandia National Laboratories*

### **Track Four**

#### **Numerical Methods**

*Chair: Ray Daddazio, Weidlinger Associates*

- A Novel Finite Element Approach to Dynamic Analysis of Large Structures with Cyclic Symmetry Boundary Conditions - Joseph Amorosi, Adapco*
- Rheological Modeling of Viscoelastic Dampers for Structural and Vibration Control - Sunwoo Park and W.P. Yen, Federal Highway Administration*
- Use of Wavelet Denoising for Analysis of Snubbing and Gap Opening/Closing Responses of Certain Mounts Installed on a Flexible Structure - Ken Tomita, Jerry Spyche, Mary Kerns and Benjamine Houghton, Enidine, Inc.*
- Progressive Failure Simulation of Composite Laminates - Gerard Vanderborck and Amine Hassim, Thomas Marconi Sonar*
- Validation of Frequency Response Synthesis for Large-Scale Structural - Joshua Gordis, Fotis Papoulias, and Frank Leban, Naval Postgraduate School, Naval Surface Warfare Center/Carderock*

### **Track Five (Classified)**

#### **Terrorist Threat Protection - Classified**

*Chair: David Coltharp, ERDC*

- Methodologies for Predicting Post-Crack Behavior of Architectural Glazing Subjected to Explosive Airblast - Steve Lofton and Thomas Slawson, US Army Engineer Research and Development Center*
- Program for Developing Composite Wrap Retrofits for Reinforced Concrete Columns - Kenneth Morrill, L. Javier Malvar, and John Crawford, Karagozian and Case, Structural Engineers*
- Wall Retrofits for Close-in Car Bombs, Design and Test - John Crawford, Anthony Ronca, Daniele Pelessone, and Brian Dunn, Karagozian and Case, Structural Engineers*
- Measuring and Predicting the Response of Humans in a Typical Office Environment to Blast Loads - David Bogosian and Hrire Der Avanesian, Karagozian & Case, Biodynamic Engineering, Inc.*

#### **Blast (Classified)**

*Chair: Alan Obrt, AFRL/MNAL*

*Co-Chair: Reed Mosher, ERDC*

- Response of Hot-Rolled I-Beams to Conventional Weapons - James Baylot, US Army Engineer Research and Development Center*
- Correcting Transient Data Defects - Russell Garner and David Bittle, US Army AMCOM RDEC*
- Engineering Model for the Collapse of an Explosively Loaded Thick Plate - Kent Goering, Applied Research Associates*
- A Simplified Model of Airblast Propagation in Tunnels - J.R. Britt, C.E. Joachim and G.W. McMahon, Science Applications International, Inc., U.S. Army Engineer Research and Development Center*
- Comparisons of Airblast Pressure and Impulse Produced by High Explosive and Fuel-Air Explosive Detonations - C.E. Joachim and G.W. McMahon, U.S. Army Engineer Research and Development Center*

### **Track One**

#### **Modeling and Simulation of Structures with Joint Interfaces** *Chair: Jeffrey Dohner, Sandia National Laboratory*

**Damping Investigations of a Simplified Frictional Shear Joint - David Smallwood, Danny Gregory and Ronald Coleman, Sandia National Laboratories**

**A Study of Frictional Velocity Effects on Structural Interfaces - Tarabay Antoun, Sandia National Laboratories**

**A Reduced Order, One Dimensional Model of Joint Response - Jeffrey Dohner, SRI International**

**IWAN Modeling of Mechanical Joints via Results from Contact Mechanics -Daniel Segalman and Martin Heingstein, Sandia National Laboratories**

#### **Modeling and Simulation of Structures with Joint Interfaces Discussion**

**Details on the Modeling and Simulation of Structures with Joint Interfaces Discussion are currently unavailable.**

### **Track Two**

#### **Space Standardization** *Chair: Steve Schultz, AIAA*

**Commercialization is one of the strongest driving forces for current and future space development. Along with commercialization comes a need to develop and maintain valued space standards. Past experience proved these standards provide cost savings. Likewise, government organizations, such as NASA, the Department of Defense and the NRO, also benefit from standardization and applying commercial techniques.**

**During this discussion, panelists will present and discuss strategies for standardizing space, the political and technological challenges in doing so and the possible collaboration between industry and government. The panel will also discuss projects being pursued to meet the need for space standardization.**

#### **Standards**

**The Case for Tailoring MIL-S\_901 as a Tailoring Test Case - Andy Anderson and Kenneth Lussky, UDLP**

**Ballistic Shock Simulation and Measurement - Mike Clark, U.S. Army Aberdeen Test Center**

**TBD Standards Paper - TBD**

### **Track Three**

#### **Terrorist Threat Protection Panel**

**Details for the Terrorist Threat Protection Panel are currently unavailable.**

#### **Terrorist Threat Protection** *Chair: Dr. James Baylot, ERDC*

**Scaled Building Responses Due to an Internal Detonation - Paul Graham, Vincent Chiarito, and Craig Lamarche, U.S. Army Engineer Research and Development Center, Defense Threat Reduction**

**Retrofits for Existing Windows to Protect Occupants from Injurious Debris Due to a Bombing - John Crawford, Anthony Ronca, Daniele Pelessone and Brian Dunn, Karagozian and Case, Structural Engineers**

**Reliability of Dam Systems Subjected to Underwater Shock Using Finite-Element High-Performance Fragility Analysis - Luis de Bejar and Robert Hall, U.S. Army Engineer Research and Development Center**

**\*\*\*\*\*Track Four - Under Development\*\*\*\*\***

### **Track Five (Classified)**

#### **LWWAA - Classified** *Chair: Austin Alvarez, Electric Boat Corp.*

**Bounding Approach to Estimating and Evaluating Composite Damage Potential of the Light Weight Wide Aperture Ray (LWWAA) - Thomas Walther, General Dynamic, Electric Boat Corporation**

**Simplified Physics Based Analysis Methods for Bounding Shock Response - Gale Mulligan and Christopher Abate, General Dynamics, Electric Boat Corporation**

**Taking Advantage of Material Non-Linearity to Prepare for COTS Insertion - Josh Jackson, Newport News Shipbuilding A/B-1 Correlation/Bounding Analysis - Steve Ollhoff and Earnest Shen, Electric Boat Corporation**

**Underwater Shock Analysis of the VIRGINIA Class Light Weight Wide Aperture Array (LWWAA) System - Thomas Walther, General Dynamics, Electric Boat Corporation**

**Isolation - Classified**

*Chair: Kevin Arden, Newport News Shipbuilding*

- Development of a Characterization for the DT227 Mount - David Russell, General Dynamics, Electric Boat Corp.**
- Mitigation of Military High Shock Transients for Shipboard Inertial Navigator with Dithered Ring Laser Gyros (RLG) - Jamil Lahham and Michael Mosher, Litton Marine Systems, Inc., Taylor Devices, Inc.**
- Shock Performance of a Semi-Active Isolation Drive - David Russell, Richard Dugan and James Rivers, General Dynamics, Electric Boat Corp.**
- Application of the CHIRP Machine to COTS Testing for CVN Decks - Kevin Arden, Newport News Shipbuilding**
- High-Impact Shock Capabilities for Characterizing Shock Mounts - Kevin Gould, Newport News Shipbuilding**
- Assist Threat-Based Study of Shock Isolation Mount Performance on the LPD 17 and the DDG 51 Flight IIA - John Przybysz, Jr., Roy Javier and Fred Costanzo**

**Thursday Morning, November 8**

**Track One**

**Vibration II**

- Cavitation Swirl Pulsation in the Intake Pipe of Radical Pumps - Andrej Predin, Ignacijo Bilus, and Roman Kalsinc, University of Maribor, Faculty of Mechanical Engineering, Graz Technology University**
- Vibration Characteristics of a Large Ship Engine Room Inner Bottom - Kelly Topp and Dr. Jay Warren, Newport News Shipbuilding**
- Dynamic Stiffening of a Cantilever Circular Arch: Exact Solution - Ekrem Tufekci, Istanbul Technical University**
- Statistical Analysis Modeling for the International Space Station US Laboratory Module - Wei-Joe Sun, Boeing International Space Station**

**Data Analysis Discussion Group**

*Chair: Stretcher Smith, DSPCon*

The Data Acquisition Discussion Group will meet to discuss successes and horror stories from the digital data acquisition and experimental data analysis world. First, the data acquisition vendors represented at the symposium will be invited to make short presentations describing advances in their products. Then there will be a general discussion soliciting war stories from the participants. Primary emphasis will be placed on the pros and cons of the various technologies and practices available for structural-dynamic testing.

**Track Two**

**NATO Life Extension Panel**

*Chair: Skip Connon, Aberdeen Test Center*

Details on the NATO Life Extension Panels are currently unavailable.

**Track Three**

**Blast**

*Chair: Dr. Michael Hale, Redstone Technical Test Center*

- Smart Target Model Generator - Russell Dukes, David Watts, and Diane Verner, AFRL, Applied Research Associates**
- Finite Element Computation of the Mighty North Event - David Steedman and Robert Swift, Los Alamos National Laboratory**
- Hybrid Discrete Element/Smooth Particle Hydrodynamic Modeling of the Mighty North Event - Robert Swift, David Steedman, and Ted Carney, Los Alamos National Laboratory**
- Impact Dynamics on Composite Material - Photios Papados and Raju Namburu, US Army Research Laboratory**
- Modeling and Analysis of a 3-D Asymmetric Mine-Soil-Structure Interaction Problem with Mine Buried in Dry Sand - Aaron Gupta, US Army Research Laboratory**

**Seismic**

*Chair: Jack Halpin, MTS*

- A Method for Calculating the Seismic Effect in Rock Slope - Yun-long He, Wuhan University of Hydraulic & Electric Engineering**
- Structural Control of High Rise Building Using a Tuned Mass with Integral Hermetically Sealed, Frictionless Hydraulic Dampers - Alan Klembczyk and Brian Breukelman, Taylor Devices, Inc. Rowan Williams Davies & Irwin Inc.**
- Dynamic Behavior of Reinforced-Concrete Columns with Growing Damage Under Earthquake Ground Motion - Sunwoo Park, W.P. Yen, J.D. O'Fallon and J.D. Cooper, Federal Highway Administration, PSI.**

\*\*\*\*\*Track Four - Under Development\*\*\*\*\*

Thursday Morning, Track Five

### **Track Five**

#### **UNDEX**

*Chair: Mark Hoffman, NSWCCD*

*Comparison of Shock Factors Calculated from Similitude Equations and Shock Trials - Warren Reid, Defense Science and Technology Organization and Frederick Costanzo, NSWC/Carderock*  
*Close-in UNDEX Response Simulations Using Fully Coupled Hydrocodes - Stephen Poy, Naval Surface Warfare Center*  
*Analysis of the Shock Response of a CVN Type Surface Ship - Kevin Arden, Newport News Shipbuilding*  
*Correlation of USA Results to the SMTV Test Fore/Aft Direction - Kevin Arden, Newport News Shipbuilding*  
*Ship Responses to Large and Small Charges - Michael Winnette, Michael Riley, and Frederick Costanzo, Naval Surface Warfare Center*  
*Application of Charge Standoff Envelope Concept to Underwater Explosion Shock Qualification Tests of Submarine Hull Equipment - Roy Javier, Naval Surface Warfare Center/Carderock Division and Vernon Bloodgood, Engineering Technology Center*

*Shock Evaluation of Advanced Composite Material Systems for the Virginia Class Bow Dome*

*Chair: Eric Rasmussen, NSWC/Carderock*

*Details on the Shock Evaluation of Advanced Composite Material Systems for the VA Class Bow Dome are currently unavailable.*

### **Thursday Afternoon, November 8**

#### **Track One**

##### **Test Methods**

*Chair: Jeff Blankenship, NSWC/Coastal Systems Station*

*A Force Measuring Device for Barge-Impact Experiments - Vincent Chiarito, U.S. Army Engineer Research and Development Center*  
*Balanced Constant Current Excitation for Dynamic Strain Measurements - Douglas Firth and Alan Szary, Precision Filters, Inc.*  
*Results of the Hessi Test Mishap Investigation - Daniel Worth and Rodney Phillips, NASA Goddard Space Flight Center, NASA Marshall Space Flight Center*  
*Floating Shock Platform Characterization Study - Robert Handleton, Naval Surface Warfare Center*  
*Lightweight Shock Machine Calibration Using Modern Instrumentation - Eric Luft, Shahram Kazemzadeh, Leon Rennebaum and James Howell, III*  
*On the Adequacy of Sequentially Applied Uniaxial Vibration Testing - Wayne Whiteman, U.S. Army*  
*Return to the Flight of the Delta III - Robert Bridges, Wyle Laboratories*

#### **Track Two**

##### **Isolation II**

*Underwater Explosions Tests of LPD-17 SSES Compartment: Assist Program 3 Kip, Enidine, Herm, and NNS Industrial C-Worthy Mounts - Rhonda Ingler, Curtis Annibale, Michael Campbell, Frederick Costanzo, Eric Luft, John Przybysz, Richard Sasse, and Douglas Lesar, Naval Surface Warfare Center/Carderock Division*  
*Analysis of Isolated Raft Systems Using a 2DOF Nonlinear Spring-Mass System - Curtis Annibale and Frederick Costanzo, Naval Surface Warfare Center/Carderock Division*  
*Lightweight Rafting Concepts Using Semi-Active Shock Isolator - Kevin O'Neal, Newport News Shipbuilding*  
*Use of the Fire Out of Battery System to Reduce Shock Induced Loads on Vehicles - Ronald Gast and Matthew Tedesche, Benet Laboratories*  
*TOSA Shock Isolated Chiller Raft - Michael Campbell, Naval Surface Warfare Center/Carderock Division*

#### **Track Three**

##### **UNDEX**

*Chair: Rick Griffen, Newport News Shipbuilding*

*Two-Phase CFD Simulation of the collapse of Underwater Explosion Bubble Under a Circular Plate - Kit-Keung Kan, Philemon Chan and James Stuhmiller, Jaycor*  
*A Computational Study of Bubble-Structure Interaction - Philemon Chan, Kit-Keung Kan and James Stuhmiller, Jaycor*  
*Test and Analysis of Shock and Bubble Loading and Target Response from Close-Proximity Underwater Explosions - John Slater, Gerry Rude, Paul Thibault and Merv Norwood*  
*An Application of the Multivariate Data Reduction Technique to a Floating Shock Platform Test - Whitney Roberts and Eric Luft, Naval Surface Warfare Center/Carderock Division*  
*Structural Response of a Thin Plate Due to Underwater Explosion Loading - Miki Arami, Tadashi Shibue and Tsutomu Kakinouchi, Marine United Inc., Ishikawajima-Harima Industries, Ltd.*  
*Numerical Simulation of Cavitation - Zhi Zong and Khin Yong Lam, Institute of High Performance Computing*  
*Underwater Shock Analysis on Windows NT - Rick Coffman, Northrop Grumman Corporation*

## *Track Four*

### *UNDEX Simulation*

*Details on UNDEX Simulation are currently unavailable.*

*\*\*\*\*\*Track Five - Under Development\*\*\*\*\**

## *Activities*

### *The Tour of NSWC/Carderock*

*Participants and attendees of the Symposium will have the opportunity to tour Naval Surface Warfare Center at Carderock on Thursday at 1:00 p.m.*

### *Guest Program*

*A tour of Washington, DC is scheduled for Tuesday and Thursday. The tour will include historical areas of Washington, DC such as, Capitol Hill, the Lincoln Memorial and lunch along the Mall.*

### *Social Event*

*The Shock and Vibration Symposium Social Event will take place on Wednesday night. The event will have a patriotic theme to celebrate Election Day and will include food, a limbo contest and pinatas.*

# Registration Form

71st Shock and Vibration Symposium  
November 6-9  
Arlington, VA



Name \_\_\_\_\_  
Organization \_\_\_\_\_  
Address \_\_\_\_\_  
Phone \_\_\_\_\_ Fax \_\_\_\_\_ Email \_\_\_\_\_

**REGISTRATION FEE: \$745 (Discounted price of \$695 granted to registrations received by SAVIAC prior to October 27, 2000)**

**I WILL BE ATTENDING (Check all that apply)**

Unclassified       Confidential       Secret       NATO

**TUTORIALS: \$150 each (You must pay the Symposium registration fee in order to take tutorials)**

**TIME**

- |  |         |
|--|---------|
| <input type="checkbox"/> Introduction to Vibration Testing - Jon Wilson  | 8-11 AM |
| <input type="checkbox"/> Substructure Coupling and Structural Modification for Shock & Vibration - Joshua Gordis | 8-11 AM |
| <input type="checkbox"/> Wavelet Applications in Shock and Vibration - Dan Worth                                 | 8-11 AM |
| <input type="checkbox"/> Dynamic Testing: Transient and Steady State - Pete Stein                                | 8-11 AM |
| <input type="checkbox"/> Overview of Underwater Shock and DDAM - Young Shin                                      | 8-11 AM |
| <input type="checkbox"/> The Measurement of Meaningful Shock & Vibration Data - Patrick Walter                   | 12-3 PM |
| <input type="checkbox"/> Data Acquisition for Shock & Vibration Measurements - Strether Smith                    | 12-3 PM |
| <input type="checkbox"/> Shock Waves and the Modeling of Solid Materials - Ernie Dunn                            | 12-3 PM |
| <input type="checkbox"/> Overview of Explosive Effects and Blast Resistant Design - Tom Carroll                  | 12-3 PM |
| <input type="checkbox"/> Application of the USA Code to Underwater Shock Problems - John DeRuntz                 | 12-3 PM |
| <input type="checkbox"/> Using Temporal Moments to Characterize Shock - Dave Smallwood                           | 4-7 PM  |
| <input type="checkbox"/> Validation and Editing of Shock & Vibration Data - Allan Piersol                        | 4-7 PM  |
| <input type="checkbox"/> Empirical Mode Decomposition and Time-Frequency Analysis - Liming Salvino               | 4-7 PM  |
| <input type="checkbox"/> Verification and Validation in Computational Mechanics - William Oberkampf              | 4-7 PM  |
| <input type="checkbox"/> Shock Design in the Plastic Regime - Rudy Scavuzzo                                      | 4-7 PM  |

**SOCIAL EVENT:** Wednesday evening, 11/8- 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 11/7      A Special Look at Washington, DC       guest attending Tuesday: \$24  
Thur 11/9      A Day in Middleburg, VA       guest attending Thursday: \$32

**TOUR:** Thur 11/9, 1 PM NSWC/ Carderock       yes (indicate # of persons)\_\_\_\_       not attending

*(Tours restricted to U.S. citizens only)* Names: \_\_\_\_\_

**PAYMENT INFORMATION:** Please provide complete payment information. Check should be made payable to SAVIAC/Booz-Allen. Payment may also be made by Visa, or Master Card. Government credit cards will not be processed until after the symposium. Purchase orders are not accepted.

Visa       Master Card      Card # \_\_\_\_\_ - \_\_\_\_\_ - \_\_\_\_\_

Exp. Date \_\_\_\_\_      Cardholder Name (print) \_\_\_\_\_

AMOUNT PAID \_\_\_\_\_      Cardholder Signature \_\_\_\_\_

PLEASE FAX FORM & CREDIT CARD INFO TO (703) 289-5801 BY OCTOBER 27, 2000 TO RECEIVE DISCOUNT



## ***IMPORTANT INSTRUCTIONS***

1. This Security Certification must be mailed or faxed to:

Address: NSWCCD  
Attn: Mary Collard  
Industrial Security Specialist  
9500 MacArthurther Blvd  
W. Bethesda, MD 20817-5700

Fax: (301) 227-4621  
Verification Number: (301) 227 1455

2. TELEPHONE REQUESTS WILL NOT BE ACCEPTED.
3. GOVERNMENT ATTENDEES: Send clearances directly to NSWCCD.  
CONTRACTORS: Send clearances through your user agency for need-to-know verification and forward to NSWCCD.
4. **Clearance certifications must be received no later than October 27, 2000.**
5. If you wish to receive the CLASSIFIED Proceedings and/or the *Critical Technologies Journal*, you must send a copy of the completed Security Certification to:

SAVIAC/Booz Allen & Hamilton Inc.  
3190 Fairview Park Dr. - 8th Floor  
Falls Church, VA 22042

Fax number: (703) 289-5801

NOTE: Part III of this form requires certification by a Contracting Officer that you have a "need to know." There may be circumstances where otherwise eligible persons do not have a Government Contracting Officer or where the Symposium subject matter may differ from your current contract area. If these circumstances pertain to you, leave Part III blank and use the space below to cite your justification to attend the classified sessions. NSWCCD will verify your "need to know."

## **DIRECTIONS TO THE HYATT REGENCY CRYSTAL CITY**

### **FROM GEORGETOWN:**

Take M Street across Key Bridge  
Turn left at second light (Lee Hwy)  
Go through light to I-66 East, take exit 75 for Rt 110 South  
Rt 110 south for 4 miles, tuns into Rt 1 South  
Turn right onto 27<sup>th</sup> Street, Hotel is on left

### **FROM DULLES AIRPORT:**

Take I-66 East  
Take Exit 75 for Rt 110 South  
Rt 110 south for 4 miles, tuns into Rt 1 South  
Turn right onto 27<sup>th</sup> Street, Hotel is on left

### **FROM RICHMOND & POINTS SOUTH:**

Take I-95 North to I-395 North  
Exit 7A (Glebe Road South)  
Glebe Road South to the 5<sup>th</sup> stop light (2 miles)  
Turn right onto Jefferson Davis Highway (Rt 1 North)  
Turn right onto 27<sup>th</sup> Street, Hotel is on left

### **FROM BALTIMORE & POINTS NORTH:**

Take I-95 South over Woodrow Wilson Bridge into VA  
First exit off bridge Exit 1, take middle exit (RT 1 North)  
Travel 5 miles North  
Turn right onto 27<sup>th</sup> Street, Hotel is on left

### **FROM MARYLAND & I-270 NORTH:**

Take I-495 South across American Legion Bridge in VA  
Exit onto George Washington Pkwy  
Travel 10 miles South  
Exit at National Airport, stay in right lane, follow signs to RT 1 South, Crystal City  
Take Rt 1 South exit  
Turn right onto 27<sup>th</sup> Street, Hotel is on left

### **FROM METRO:**

Take the Blue or Yellow Line to the Crystal City Stop  
Go out of the station and turn right  
Follow Clark St for 9 blocks and you will see the Hyatt on the right  
The Hyatt can also send a shuttle to pick you up if you call the main number:  
703 418 1234.

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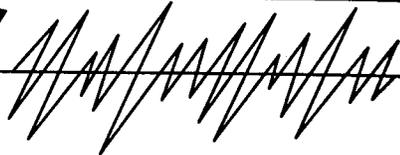
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