SAVIAC
Shock and Vibration Information Analysis Center
Current Awareness
July 2006

Simulation Capabilities for Underwater Explosions, Shock, Acoustics and More

Editor's Note: This article was contributed by Tim Webb, ABAQUS, Inc. ABAQUS, Inc. is one of this year's featured organizations. This article is intended to educated the community on the capabilities of our featured organizations.

Founded in 1978, ABAQUS, Inc. a provider of advanced Finite Element Analysis software and services for the physically-accurate solution of product performance problems, such as static or dynamic stress and displacement, viscoelastic and viscoplastic response, as well as coupled field analysis involving thermo-mechanical, structural acoustics, and the effects of shock and underwater explosions.

In October 2005, ABAQUS was acquired by Dassault Systèmes (DS), a leader in 3-D and Product Lifecycle Management (PLM) solutions. With the acquisition, DS announced SIMULIA, as the brand that encompasses all DS simulation solutions including ABAQUS and CATIA Analysis applications. SIMULIA offers a range of simulation products including: ABAQUS/CAE, an interactive environment for modeling, visualization, and process automation; ABAQUS/Explicit, an explicit FEA product for quasi-static and transient dynamic analysis which include the ability to simulate transient coupled fluid-structural phenomena such as the response of a submarine to shock loads, including bubble loading, fluid cavitation, and surface/seabed effects; ABAQUS/Standard, an implicit FEA product for solving a wide range of problems, from nonlinear static and dynamic analyses to eigen and modal analyses. This latter capability has been combined with ABAQUS/CAE to create a fully interactive shock analysis tool, DDAM for ABAQUS.

DDAM Capabilities

The Dynamic Design Analysis Method (DDAM) is a regimented collection of response spectra procedures that is used by the U.S. Navy to estimate the peak linear response of shipboard equipment when a ship is subjected to an underwater explosion. Using DDAM, a practitioner can evaluate the shock resistance of a candidate design and can understand how to modify the design to increase its shock resistance.

DDAM for ABAQUS provides an interactive user interface for input, as well as specialized features, output data and tables to allow end-users to complete DDAM projects more effectively. Equipment orientation is defined with respect to any ship coordinate system. Oblique shocks can be defined and operational loads are incorporated into the DDAM analysis. All user-selected options and data are recorded in a well-defined set of standard output tables. This eliminates the uncertainty in understanding the basis of the shock calculation when reviewing analysis results. DDAM for ABAQUS can be executed in "batch mode" which allows the automatic creation of the DDAM output reports needed for design review.

A standard set of output tables and plots is generated for every DDAM analysis and the results can be quickly incorporated directly into analysis reports.

This product also enables the user to manage multiple shock spectra and compare the response of the equipment across more than one shock analysis. Shock spectra can be defined in a number of ways such as: shock spectrum calculation constants, shock parameters, and through an external shock spectra library which allows the user to include proprietary or classified shock spectra in the analysis. Special mode index plots allow the user to visualize which shock spectra has the most or least impact on the model.

DDAM for ABAQUS automates the standard NAVSEA modal selection criteria (with user override) including the ability to select modes by individual modal weight as well as by use of the nodal acceleration criteria. DDAM for ABAQUS also incorporates technology improvements allowing the user to handle "closely spaced modes", out-of-phase modes and repeated modes much more effectively than standard procedures.

Underwater Shock Analysis

To understand the behavior of ship structures when exposed to a nearby non-contact underwater explosion (UNDEX), high-resolution numerical simulations are rapidly supplanting many live-fire tests, either at the full-ship level or for individual pieces of equipment. Nevertheless, numerical analysis presents a significant challenge in terms of accurately representing the governing physics, modeling the structure in sufficient detail, and completing the analysis in a reasonable amount of time.

An example of such a model is known as the Benchmark Target Strength Simulation (BeTSSi) submarine, based on specifications provided by the Forschungsanstalt der Bundeswehr für Wasserschall und Geophysik (FWG) (Ref. 1). This detailed model features a double-hull design with a pressure hull aligned with the hydrodynamic hull, side fins and a sail structure. The bow section comprises bulkheads, torpedo tubes, and a sonar chamber. The structure is composed of a single material (steel) with isotropic elastic mechanical behavior, but the section thicknesses are position-dependent.

To study either shock or acoustic radiation, the structural model must be encapsulated in a fluid zone that mimics the acoustic behavior of the surrounding water. Typically, analysts are in possession of only the structural geometry and employ time-consuming techniques to create the fluid zone. The Boolean operation in ABAQUS/CAE provides a simple and efficient alternative. In this example, a region of fluid with a simple outer boundary was creat-

ed as a "solid" part. The Boolean subtraction feature was then used to subtract the volume of the "solid" submarine from that of the "solid" fluid region, creating the required fluid zone surrounding the structure. The fluid was then rapidly and automatically meshed with acoustic tetrahedra. This tetrahedral fluid mesh was then coupled to the quadrilateral shell mesh of the submarine using the automatic "tied coupling" feature in ABAQUS.

Loading of the Submarine

The effect of the UNDEX event is transferred to the structure by means of the incident wave loading feature. ABAQUS offers both a scattered wave formulation (typically employed when the fluid behavior is linear) and a total wave formulation (which becomes necessary if cavitation is of concern). The user identifies the location of the charge and the location of the standoff point. A pressure or acoustic particle acceleration history is specified at the standoff point, and a choice is made between a planar and spherical wave front. ABAQUS then automatically calculates the spatial and temporal distribution of the load and applies it accordingly. In addition, ABAQUS also provides the Geers-Hunter bubble formulation, wherein the pressure amplitude is calculated automatically from the physical properties of the charge.

The BeTSSI shock response model has approximately 10 million degrees of freedom and was run using ABAQUS/Explicit for a step time of 10 ms, which is sufficient to establish peak velocity at the standoff point. The analysis was run using double precision, as is typically the case with shock analyses. Besides a small amount of numerical damping, no additional damping was added to the model.

Results and Conclusions

Figure 1 shows the position of the shock front at the end of 10 ms. The shock has been scattered from the starboard side, while the fluid in the vicinity of the port side has also experienced the passage of the shock front. The contours of the shock front are not altered by the presence of the terminating fluid boundary. This indicates that the fluid zone is sufficiently large, so there are no significant spurious reflections from the boundary. Since the effect of hydrostatic pressure is neglected and there are no constraints on the motion of the submarine, we see high tensile (negative) pressures in the vicinity of the boat (blue). If these negative pressures are of concern, the cavitation effect in the model could be included.

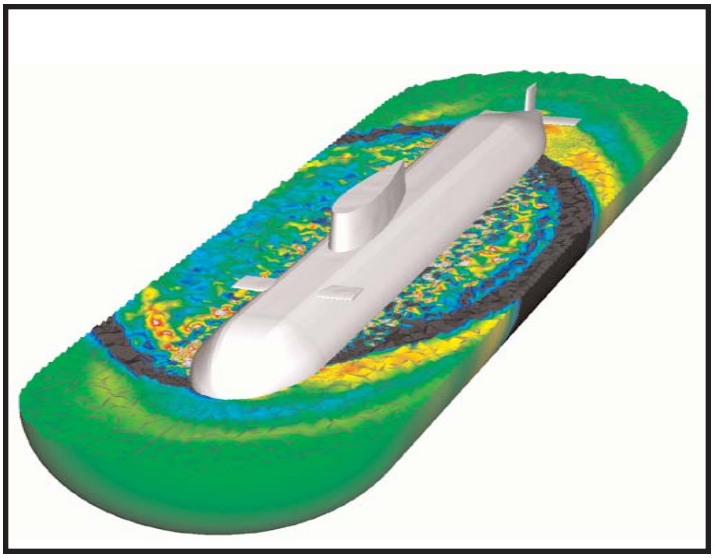

Figure 1: Acoustic pressure distribution in the outer water after 10 ms.

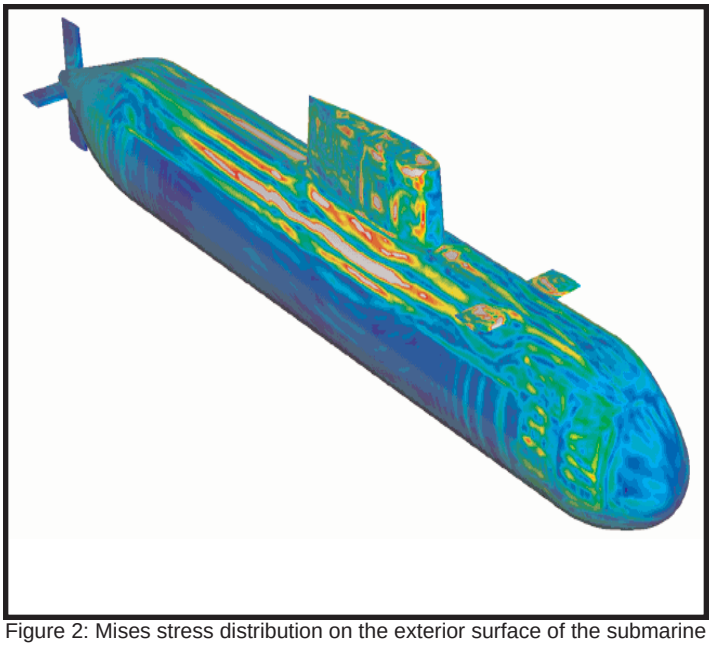

Figure 2: Mises stress distribution on the exterior surface of the submarine after 10 ms.

Figure 2 indicates that the stresses are notably lower in the areas where the hulls overlap, which could be expected due to the enhanced thickness in the area.

Additional Simulation Capabilities

Besides shock survivability, a critical consideration in submarine design is the ability to operate as quietly as possible to avoid detection and to reduce interference with onboard sonar equipment. For this class of problems, ABAQUS/Standard is used to perform fully-coupled structural acoustic analysis in the frequency domain. Both forced response and eigenanalysis ("wet modes") include the effects of coupling to an acoustic fluid, not merely "added mass". The coupled eigenanalysis includes the effect of radiation, using absorbing boundary conditions and/or acoustic infinite elements. ABAQUS/Explicit and ABAQUS/Standard share the same basic finite element formalism which enables UNDEX and acoustic models to be shared between analysts.

The capabilities in ABAQUS also make it useful to perform simulations of drop tests, vehicle collisions, and ballistic tests. It provides an extensive material library, such as elastic-plastic, hyperelastic, viscoelastic, creep, piezoelectric, and hydrostatic fluid materials. ABAQUS can be extended with user-defined subroutines and scripts, which allow flexibility in modeling advanced materials, complex surface and contact behaviors, proprietary post-processing metrics, and other user-specific features. Robust and efficient solver technologies take advantage of high-performance computing and parallel processing to allow efficient solution of large models.

Technology briefs on ABAQUS for DDAM and Shock and Acoustics visit: http://www.abaqus.com/ solutions/tech_briefs.html

References

1. Schneider, H. G., Ch. Fiedler, "Benchmark Target Strength Simulation Workshop" Conference
Proceedings UDT EUROPE 2003, Malmo, Sweden, June 2003.

2nd Meeting of the

New Engineers Forum

to be held at the 77th Shock and Vibration Symposium

By Margaret Tang, *Weidlinger Associates, Inc*

Being only three years removed from my first SAVIAC symposium, I remember the experience vividly. I remember being a little intimidated by the way everyone seemed to know each other, and I spent a fair amount of my free time waiting around for my co-workers so that I would have someone to talk to. The technical sessions were interesting and educational, but a little over my head in many cases. And I was uncomfortable asking questions in a room where everyone knew each other and seemed to have a full understanding of the topics that were being presented.

Last year, while discussing this predicament with some people within SAVIAC, the idea for the New Engineers Forum was born. Wouldn't it be great if there was some way that engineers new to the field, or even just new to SAVIAC, could meet fellow new engineers, and comfortably talk about technical issues among their peers, without feeling like outsiders? It could be a chance to gain some "big picture" perspective on the world of shock and vibration, as compared to the very focused nature of the technical sessions.

This past Symposium included the inaugural meeting of the New Engineers Forum. Speakers included Mr. Austin Alvarez of General Dynamics Electric Boat, who presented an overview of construction of a submarine, and Professor Sam Kiger of the University of Missouri, who discussed the fundamentals of designing a building for blast loads. In addition, there was a short introduction of the SAVIAC mentor program.

This year will be the second meeting of the New Engineers Forum, and we will have two short presentations on "big picture" topics, an open discussion on any other issues that may be of concern to new engineers, as well as a discussion on how this forum can continue to grow and develop for future symposia.

We'll have more details as we get closer to the Symposium. If you have any questions or comments, please feel free to contact me at tang@wai.com. I look forward to seeing you in October!

Editor's note: During the 76th S&V Symposium, the time-slot designated for "The New Engineer's Forum" overlapped with other Symposium activities. We do apologize for this oversight, and have designated a new time-slot this year for the 2nd Meeting of the New Engineers Forum. We hope to see you there!

77th Shock and Vibration Symposium

Registration

Registration for this year's 77th Shock and Vibration Symposium will be available starting July 14, 2006 at www.saviac.org

Individual, Group (Corporate Supporter), and Exhibitor registration forms can be found by clicking on "77th Shock and Vibration Symposium" from the main SAVIAC page.

Abstracts

SAVIAC is continuing to accept abstracts for the symposium. The program is filling fast, so please get them in as soon as possible.

Program Outline

In order to peak interest in the symposium and insure SAVIAC has received your abstract, our website will begin posting a program outline starting in mid to late July. This outline will list all of the papers to be presented as well as tutorials, training, etc. We hope this will generate more papers and attendees!

2007 SAVIAC Calendar

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$850 will pay for a full page (10"x8") ad for the month of your choice, as well as your company's logo displayed on each page throughout the entire year of 2007. Conference dates and/or short courses that your company is involved in may also be included. Reserve your month today. Contact Darnise Johnson at darnise.johnson@saviac.org or call (804) 282-5570.

Space is Limited, Sign-upNow!

SAVIAC welcomes

The Naval Postgraduate School

as our 5th Featured Organization for the 77th Symposium

The Naval Postgraduate School (NPS) will be facilitating this year's 77th S&V Symposium's Classified Sessions. Professor Young Shin of NPS, and esteemed long-time SAVIAC community member, has tenaciously spearheaded this effort. This was announced recently at the Summer Seminar and TAG in Monterey,CA.

The Naval Postgraduate School is an academic institution whose emphasis is on study and research programs relevant to the Navy's interests, as well as to the interests of other arms of the Department of Defense. The programs are designed to accommodate the unique requirements of the military. NPS' accredited degree programs are structured to help win the war against terrorism, from Afghanistan and Iraq to Hometown, USA.

Their mission is "To provide relevant and unique advanced education and research programs that increase the combat effectiveness of United States and Allied armed forces and enhance the security of the United States."

The idea for a graduate education program for naval officers first emerged in the late 19th century but, initially, the concept found few advocates. Eventually, on June 9, 1909, Secretary of the Navy George von L. Meyer signed General Order No. 27, establishing a school of Marine Engineering at Annapolis. This small program, consisting of 10 officer students and two Navy instructors, would later become today's Naval Postgraduate School. The Navy Secretary's order placed the fledgling school under the direction of the Naval Academy superintendent, who was charged with "securing ample use of the educational plant of the Naval Academy to students and instructors of the school without interfering with the instruction of midshipmen." This translated into two attic rooms being set aside for classroom and laboratory space for the school.

Now located in Monterey, California on the Pacific Ocean, 120 miles south of San Francisco, the Naval Postgraduate School campus covers 627 acres of land. The site, which has been home to NPS since 1947, houses state-of-the-art laboratories, numerous academic buildings, a great library, government housing and impressive recreational facilities.

The student population at the Postgraduate School has grown to 1,800, with students coming from all service branches of the U.S. defense community, as well as from the Coast Guard, the National Oceanic and Atmospheric Administration, and the services of more than 25 allied nations. Selection of officers for fully funded graduate education is based upon outstanding professional performance as an officer, promotion potential and a strong academic background. The school provides more than 40 programs of study, ranging from the traditional engineering and physical sciences to the rapidly evolving space science programs.

The faculty, the majority of whom are civilians, are drawn from a broad diversity of educational institutions and represent a prestigious collection of scholars. Faculty/student interaction is high. Every class is taught directly by a faculty member--over 99% of whom have a Ph.D.

The Naval Postgraduate School (NPS) as the Navy's Corporate University is essential to Navy and DoD for ensuring combat effectiveness, integral to joint and combined professional military education, linked to the Unified Combatant Commanders and their requirements, vital to other national security organizations, agenies & nations for national security, and is the nation's national security research university.

NPS is essential to the Navy and DoD for ensuring combat effectiveness in that NPS offers education in Monterey and around the world with Masters and PhD degrees, and a full array of short courses, certificates, executive education, and mobile education, NPS provides engineering, technical, analytical, managerial, and national security education and research programs not available at civilian institutions to the Department of the Navy, DoD, or the national security organizations, The DoD Office of Force Transformation sponsors a NPS chair and course development in one of the first programs in Transformation Education and Research through the NPS Cebrowski Institute of Information Innovation & Superiority.

NPS works closely with the Unified Combatant Commanders providing relevant education and research critical to their combat missions. NPS faculty works with the UCC's on real world problems, on-site and with students back on the main campus. NPS faculty provides about $75 million of research to the Navy, Unified Combatant Commanders and the Services.

SAVIAC welcomes the Naval Postgraduate School as a featured organization for our 77th symposium. We offer our sincerest gratitude to Professor Young Shin for his continued support to SAVIAC.

2006 SUMMER SEMINAR AND TAG MEETING SUMMARY

2006 Summer Seminar
June 28, 2006

The Shock and Vibration Summer Seminar was held at the Hyatt Regency Monterey in conjunction with the SAVIAC TAG meeting. There were nine 45-minute presentations/tutorials given to twenty-two attendees. National Technical Systems sponsored the seminar lunch.

SAVIAC thanks our instructors for volunteering their time and knowledge in order to educate the shock and vibration community. We also thank NTS for their continued support of this seminar.

SAVIAC's next free shock and vibration seminar will be in February, 2007. The exact time and location will be disclosed by September, 2006.

TAG Program Committee
June 29, 2006

Each year before the symposium, the TAG (technical advisory group) for SAVIAC meets to review and sort abstracts in order to build a strong symposium/conference program. This meeting also serves to review the hotel amenities, hotel meeting space, and classified meeting space for the fall symposium.

At the time of this meeting in late June, SAVIAC had received in excess of 125 paper abstracts for review. The content of these papers was quite varied, and a few new contributing authors were discovered. As SAVIAC continues to accept abstracts for a few more weeks, we can expect the technical content of the 77th symposium to be high in quantity, quality, and diversity.

The Hyatt Regency Monterey Hotel is well equipped for the SAVIAC community's conference and personal needs. The unlimited and limited sessions will be held at the Hyatt in very spacious and well-appointed meeting rooms. The exhibitor's hall will be in the center of the action as it is surrounded by the technical session tracks. For personal enjoyment, the hotel offers two outdoor pools with jacuzzis, tennis courts, and Pebble Beach's Del Monte golf course on their property.

The Naval Postgraduate School will be hosting the classified sessions for the symposium (see page 4). After walking to the NPS from the Hyatt, the TAG was taken on an extensive tour of the school hosted by Dr. Young Shin (TAG member and NPS professor). Dr. Shin has reserved very accommodating auditorium space for these sessions and it is within walking distance of the Hyatt!

SAVIAC wishes to thank the TAG for their continued service and contributions to the shock and vibration community.

SAVIAC Staff Visits and Tours Spectral Dynamics, Inc. Facility in San Jose, CA

Spectral Dynamics, Inc. is one of our 77th S&V Symposium's Featured Organizations, and was highlighted in the April "Current Awareness" Newsletter. While in California for our Summer Seminar and TAG, SAVIAC staff members Drew Perkins, Henry Pusey, and Darnise Johnson visited and toured SD's Corporate Headquarters facility in San Jose. We were greeted and led on the facility tour by George Hamma, Sr. Member Technical Staff.

Headquarters is where high quality Vibration Control and Data Acquisition systems are manufactured. Orders placed with Spectral Dynamics are processed on site, which means matching SD's innovative products to the specific configuration specified by company placing the order. Spectral Dynamics produces Data Acquisition and Analysis (only) products, which are SigLab (entry level) and VIDAS (very high sample rate). They also manufacture groundbreaking systems that perform both Data Acquisition, Analysis, and Vibration Control functions, including Cougar, Puma, and Jaguar.

We watched as a robotics system automatically placed components on a printed circuit board prior to the solder reflow and aqueous cleaning processes. Assemblies were then routed to a test area where each system component is confirmed to be fully operational, and the final test area where assembled systems matching customer orders were running tests that the systems must successfully complete before being shipped out to customers. We also saw a Jaguar development laboratory with a four-shaker testing system. From start to finish the attention to detail is obvious, but it's extremely gratifying to know that a client can have confidence in their ability to custom build a Data Analysis and/or Vibration Control product.

After the tour we were joined in the Conference Room by additional Spectral Dynamics leaders including: John Arbuckle, Director of Operations, Dr. Marcus Underwood, Staff Scientist, and Kenneth Bosin, Engineering Manager, Jaguar Systems. Thank you SD-San Jose for taking time out of your busy day, and away from your meticulous process.....to share with us.

The "Final Test Area" at Spectral Dynamic, Inc's San Jose facility.

Conference & Short Course Announcements

US Army Corps of Engineers
The North Atlantic Division

The Security Engineering Design Class (21 - 25 Aug 06) and Electronic Security Systems Design Class (28 Aug - 1 Sep 06) are scheduled to take place at the Hilton Sandestin Beach Golf Resort & Spa, 4000 Sandestin Boulevard, South Destin, Florida 32550 during the dates identified above in a back-to-back format.
(Please see course info below - course 1 and course 2).

Personnel attending either course will be required to arrive no later than the Sunday prior to the class commencement. Arrival date for the Security Engineering Design Class is 20 Aug 06. Arrival date for the Electronic Security Systems Design Class is 27 Aug 06. Personnel attending both classes should simply remain on-site through the weekend.

All attendees and instructors in a TDY status must stay at the training site (identified above). The aforementioned hotel is honoring the government per diem rate for all attendees in both classes. The per diem rate for lodging is $139.00 per night.

Conference Registration Fee: There is a Mandatory Conference Registration Fee of $125.00 per class to help defray costs associated with putting these programs on. Please insure your TDY orders reflect same so you can be reimbursed. This fee can be paid in cash, check or money order (made payable to the hotel). Receipts will be provided.

If you would like to register, or for more information, call Gary Kehoe (718-765-7020 or cell 347-739-7923 - *best option of 2 phones).

Course 1: Security Engineering Design
August 21-25, 2006
Sandestin, FL

Purpose: To provide a basic understanding of security engineering principles so that security and engineering personnel can work together more effectively to address security and antiterrorism/force protection issues at the inception of a construction project for new or upgraded facilities.

Scope: This course covers the information contained in Technical Manual (TM) 5-853-1/AFMAN 32-1071, Vol. 1, "Security Engineering - Project Development" and TM 5-853-2/AFMAN 32-1071, Vol. 2, "Security Engineering - Concept Design." s are an updated and expanded version of the "Security=These TM Engineering Manual" (January 1990), published by the U.S. Army Corps of Engineers Protective Design Mandatory Center of Expertise. These manuals present a process by which a planning team consisting of provost marshal, engineer, and other appropriate personnel, along with the ultimate facility user, can formulate security-related design criteria for a facility. The design criteria consists of the assets to be protected, the threat to those assets in terms of specific aggressor tactics, the degree to which the asset will be protected against the threat, and any user-imposed design constraints. The manuals further provide a process by which protective measures to counter the threats to assets can be determined and integrated into a total protective system. They also provide a means to estimate a preliminary cost for the system. The course consists of formal instructional periods in applying the manual with interspersed sample problem exercises. The course also includes a comprehensive practical problem solved and presented by students divided into interdisciplinary groups. In addition, the course provides information on how risk analysis and regulatory requirements for physical security and antiterrorism/force protection are incorporated into facility planning.

Performance Objective: Students will learn the concepts and philosophies of security engineering. Engineers and security personnel will gain a better understanding of each others' different needs and approaches. This understanding will enable them to work together more effectively to address security problems. Students should be able to apply the concepts and philosophies of security engineering sufficiently to put together preliminary solutions to real security problems and work as partners on an interdisciplinary planning team.

Who Should Attend: Civilian and military (commissioned officer, warrant officer, and enlisted) personnel involved in security or engineering support of security. Security personnel may include people from provost marshal or other security and law enforcement offices, especially those personnel involved in physical security. Engineer personnel may include planners and designers from Corps of Engineers offices and Directorates of Public Works. In addition, emergency management personnel and those responsible for key asset protection will benefit from this course. Personnel from installation level, IMA region level, major command level, and Corps of Engineers district and division levels are encouraged to attend. Representatives from other government agencies may also attend.

Course 2: Electronic Security Systems Design
Aug 28 - Sep 1, 06
Sandestin, FL

Purpose: This course provides a basic understanding of the theory and operation of electronic security systems. The course is recommended for personnel who are involved with force protection, design, or construction of military or civil facilities which require electronic security systems.

Description: This course covers intrusion detection systems, interior and exterior intrusion detection sensors, closed circuit alarm assessment television, and electronic entry control systems. The course covers basic system description and operational theory, application for physical security and force protection, system design information, use of Corps of Engineers criteria documents, and discussion of evaluating and testing installed systems prior to acceptance. Some basic design calculations are included. After completing this course, the student should be conversant in basic interior and exterior sensor application, and have a good understanding of the overall design philosophy and application limitations of electronic security systems.

Prerequisites: Grade: GS-07 (or Military E-5) or higher involved with using, planning, designing, or managing electronic security systems.

7th Annual BlazeTech Course
Aircraft Fire and Explosion Protection Against Accidents and Combat/Terrorist Attacks
August 21st – 24th, 2006
Cambridge, MA

BlazeTech will offer a professional course on aircraft fire and explosion in commercial and military aircraft. The course will be given August 21st – 24th, 2006, in Cambridge, MA. The course is organized into four one-day modules that are standalone yet complementary: Day 1- Vulnerability to Combat and Terrorist Attacks, Day- 2: Fuel-Related Fires and Explosions, Day 3-Polymeric Material Fires, Day 4-Aircraft Accident Investigation, Depending on your needs you may register for any or all days. Depending on your needs you may register for any or all days. The course will provide a cohesive integrated presentation of fundamentals, test design, interpretation of test data, computer modeling, protection systems and standards. It will benefit professionals concerned with all aspects of aircraft safety and vulnerability including design, engineering, operation, management and accident investigation. For further information and an outline of the course, clickon:
http://www.blazetech.com/Course_Listings/Aircraft_Fire_and_Explosions_Course/aircraft_fire_and_explosions_course.html. To be removed from our mailing list, send an email to firecourse@blazetech.com with “remove” in the subject line. Please feel free to contact: Albert Moussa, Ph.D., P.E.-617-661-0700 x 10, ax 617-661-9242, www.blazetech.com, firecourse @blazetech.com.

Industry News

Vibration Signal Conditioner
VIP SENSORS
San Juan Capistrano, CA

VIP SENSORS introduces the new Model 5005, a three-channel, low-noise signal conditioner that accepts three channels of Piezoelectric, Piezoelectric with Integral Electronics (IEPE) or Voltage transducer types. A double integration stage allows the output voltage to be proportional to Acceleration, Velocity or Displacement. Model 5005 is also capable of reading the Transducer Electronic Data Sheet (TEDS) provided by an IEPE transducer that is compliant to IEEE 1451.4. Transducer output data is displayed on the front panel LED display and can also be controlled via the RS-232 communication interface utilizing your computer and VIP5005 control software. The input signals of Model 5005 are processed through low-noise amplifiers with programmable gains for different sensitivities and full scale settings. Low-pass and high-pass filters with programmable corners suppress spurious signals. VIP Sensors offers a range of piezoelectric and voltage mode accelerometers, signal conditioners, cable assemblies and accessories. Shock and vibration calibration services are also available for all types of accelerometers. The company's strength is in its technical expertise in sensor and electronics design. VIP Sensors provides state-of-the-art, quality products at a very competitive price. For more information, contact: Danny Uehara, VIP SENSORS, 27128A Paseo Espada, Suite 1523, San Juan Capistrano, CA 92675, Phone: 949-429-3558,E-mail: danny@vipsensors.com; Web site: www.vipsensors.com

Differential Remote Charge Converters for Aerospace Applications
PCB® Piezotronics, Inc.-Vibration Division
Depew, NY

Series 495B10 differential remote charge converters, for use with differential charge output piezoelectric accelerometers was recently introduced. Differential sensors and signal conditioning electronics are widely used in flight test applications due to their common mode noise rejection, which greatly reduces noise in the measurement signal. These rugged, low noise units not only convert a transducer's differential high impedance charge input signal to a low impedance voltage output and supplies the normal acceleration output, but also supplies a separate integrated output for velocity. Series 495B10 charge converters operate from 10 to 32 VDC power, over a temperature range of -13° F to +185° F (-25° C to +85° C) and are packaged in a lightweight aluminum housing. They are available in charge sensitivities of either 2 mV/pC or 10 mV/pC. In addition, the user can specify a low frequency roll off of 10, 15, 20 or 25 Hz. The input is a two-pin, 7/16 inch threaded connector and the output is a six-pin bayonet-style connector. For additional information, contact the Vibration Division of PCB Piezotronics, Inc. at (888) 684-0013 (U.S. and Canada); E-mail: vibration@pcb.com; or fax at (716) 685-3886. For other PCB products, contact PCB directly at 716-684-0001, or visit our web site at www.pcb.com.

New Features for Norsonic N-121 Sound & Vibration Analyzer
Scantek, Inc.
Columbia, MD

Scantek is pleased to announce the availability of the latest version of software/upgrade for the Norsonic N-121 Noise and Vibration analyzer. Some of the features of the existing versions of software are to: trigger measurements in many ways, such as level above an ambient, audio record more than 24 hours of data,trigger to change analysis, record event, or start and stop measurement,or all three, single or dual channel measurement, all parameters measured simultaneously, pure tone detection and FFT analyzer, annoyance monitoring, months of data at 4ms resolution with v.4 software the meter now has the following features; Pre weighting of spectra, NC, NR, and RC curves measured and calculated from 1/1 octave or , derived from measured 1/3rd octave spectra, reference tone in audio recordings, preset standards in the pure tone mode including ISO 1996-2, Nordic method, among others, equalizer built in to adjust noise generator for optimum output, the new swept sine technique for fast and accurate building acoustics, broadband impulse response, an ISO 17025 NIST accredited Calibration Laboratory, is a distributor for multiple sound and vibration lines, including Norsonic, RION, CESVA Acoustical Instrumentation, Castle Group, KCF Technologies, Metra Vibration Transducers, DataKustik, RTA Technologies, BSWA Transducers, and Extech Sound and Vibration. Scantek is committed to providing quality sales, customer repair, service, and calibration of sound & vibration instrumentation. For more information, call Richard Peppin at (800) 224-3813 or visit www.scantek-inc.com.

LMS SCADAS Mobile Front-Ends & LMS Test.Xpress Analyzer
LMS
Leuven, Belgium

The LMS SCADAS family has been extended with a new LMS SCADAS Mobile series of mobile and ultra-portable data acquisition front-ends. LMS Test.Lab is tightly integrated with the new SCADAS Mobile front-end and gains a new solution for mobile noise and vibration testing, which is extensively tuned for optimal productivity and operator convenience during in-vehicle testing. LMS also strengthens its offering in the areas of qualification, and troubleshooting testing with LMS Test.Xpress, a powerful sound and vibration analyzer and data recording solution, based on the same LMS SCADAS Mobile front-end. LMS also introduced LMS Test.Xpress, a no-compromise sound and vibration analyzer that combines the operation simplicity of the traditional analyzer with the high-speed performance and measurement quality of an advanced noise & vibration measurement system. LMS, a Dassault Systèmes Gold Partner, is certified to ISO9001:2000 quality standards and operates through a network of subsidiaries and representatives in key locations around the world. Visit www.lmsintl.com for more information on LMS.

Triaxial Force Sensors Ideal for Aerospace Vibration Testing
PCB Piezotronics, Inc.-Force/Torque Division
Depew, NY

The 261A Series Triaxial Force Link Sensors from the Force/Torque Division of PCB Piezotronics, Inc. simultaneously measure dynamic and quasi-static forces in three orthogonal directions (X, Y, and Z-axes). The sensors are used during vibration testing of aerospace structures to match the mechanical impedance of shaker inputs and may be used to force limit the shaker controller to prevent damage to expensive structures. Other applications include cutting tool monitoring, biomechanics feedback, and automobile chassis dynamics. Series 261A comes preloaded between two plates, with a four-screw mounting pattern to allow easy installation and feature full-scale measuring ranges from 500 lb to 4,000 lb (2.2 kN to 18 kN) in the X and Y directions, and from 1,000 lb to 10,000 lb (4.5 kN to 45 kN) in the Z direction. Single axis models are also available. For additional information, contact the Force/Torque Division of PCB Piezotronics, Inc. toll-free at 888-684-0004 (in the U.S. and Canada) or 716-684-0001; e-mail: force@pcb.com; fax 716-684-8877; or visit PCB's web site at www.pcb.com.

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In the July 2006 "Current Awareness" Newsletter

"Industry Leading Solution for Provides Simulation Capabilities for Underwater Explosions, Shock, Acoustics and More" from ABAQUS

Welcome Naval Postgraduate School - 77th S&V Symposium's 5th Featured Org

An Invitation- 2nd Meeting of the Engineers Forum

2006 Summer Seminar and TAG Summary

SAVIAC Staff Visits and Tours Spectral Dynamics, Inc's Facility in San Jose, CA

People in the News

Industry News

Conference & Short Course Announcements

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