Turbulent Pressure Signature Reduction Using Turbulent Boundary Layer Suction Control

Friday, January 28, 2011 4:00 p.m. in ETC 4.120

Craig Dolder
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Turbulent boundary layers exert a dynamic pressure signal on nearby surfaces which can adversely affect the performance of sonar arrays. These pressure fluctuations contain a broad spectrum of scales that convect downstream at different speeds. The method of removing energy from the large scale structures through the use of boundary layer suction is experimentally investigated at Reynolds numbers based on the momentum thickness ranging from 2000 to 4000. A facility for capturing both the velocity and pressure fields was developed and evaluated for the purpose of this study. Experimental results from water tunnel testing including the characteristic scales, convective speeds and pressure signatures of turbulence in the boundary layer are presented before and after the application of suction.

Improvement of Vibro-Acoustic Belt Tension Monitoring in a Belt-Driven Automated Material Handling System

Friday, February 11, 2011 4:00 p.m. in ETC 4.120

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Belt-driven automated material handling systems are ubiquitous in modern semiconductor manufacturing systems. The current vibro-acoustic technique used to monitor belt tension and misalignment yields low precision relative to the acceptable range of belt tensions. In pursuit of higher belt tension monitoring precision, two 3-factor, 3-level experiments were designed to study how belt vibration characteristics depend on changes in belt length, belt tension, belt misalignment, and initial location of the excitation of belt vibration. Dependent variables in each of the experiments were drawn from a denoised frequency spectrum calculated from an autoregressive model of the belt vibration time-series. A feature vector was developed from the autoregressive features via variance-based sensitivity analysis. Results showed that belt vibration characteristics were sensitive to changes in all of the independent variables examined. These results motivated the design of a device to improve the standardized technique widely used to monitor belt tension in belt-driven material handling systems. Reducing variance in the belt length and the location of the initial excitation of belt vibration yielded a reduction of tension estimate standard deviation by an order of magnitude, as compared to a human performing the standardized technique. Thus, the use of this device provided higher belt tension estimate resolution. Furthermore, a design for a less intrusive technique is presented.

Parametric Acoustic Arrays: Reflections on the Formative Science and Technology Evolution at the University of Texas at Austin

Friday, February 18, 2011 4:00 p.m. in ETC 4.120

Dr. Thomas G. Muir
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The nonlinear interaction of two high frequency acoustic waves can generate a highly directive, wideband sound at their difference frequency and this fascinating radiation has had significant engineering applications. First discovered at Brown University in the 1960's, a veritable renaissance in research, discovery and engineering applications began in the 1970s at U.T.'s Applied Research Laboratories, in close association with the Mechanical and Electrical Engineering Departments, and has involved a host of professors and graduate students producing theses and dissertations. The early days of parametric and nonlinear acoustics research and development are reviewed in this talk, describing the original concepts, discoveries, and research tools that were utilized. Applications to underwater sound are illustrated, including parametric sonar transmitting and receiving, sub-bottom profiling, detection of buried targets, focusing, imaging, sound propagation in the littorals, as well as an atmospheric application. Anecdotes from the past, involving some of the original participants, are offered, with audience participation. The truly rewarding and enjoyable aspects of research and development in nonlinear acoustics is emphasized. The University's first parametric source (used by the presenter in 1969) will be displayed.

Studio Classroom Design for Education in Audio Technology

Friday, February 25, 2011 4:00 p.m. in ETC 4.120

Prof. Mark J. Sarisky
The Art Institute of Austin
Austin, TX, USA
http://www.artinstitutes.edu/austin/media-arts/audio-production-bs-167312.aspx

The design of a studio classroom facility for education in the fields of applied audio and recording technology must address a number of unique challenges. These include both visual and auditory considerations that will allow the students to fully realize the examples and demonstrations of various techniques being taught. Traditionally, whiteboard discussions are supplemented with audio examples and hands-on experiences, often requiring the use of multiple environments and a significant time lag between events. Most recording studio control rooms are limited to a very small number of students due to simple size considerations, making them primarily useful as laboratory settings. Also, they are often coupled to a single recording space or "live room", limiting the types of recording situations that can be addressed. Critical listening in the teaching environment can provide a better understanding of the subtleties that make for great audio recordings. By integrating the most modern of smart classroom technologies and audio recording control room environments, an interactive and efficient teaching facility can be achieved. This also provides an environment that allows for hands-on demonstrations with critical listening. Coupling the teaching studio to a variety of recording spaces can provide the students with wide-ranging recording situations, simulating the real world of audio engineering. In addition, the design must balance the use of "industry standard" equipment with "state-of-the-art" technologies in order to

prepare the student for what they will find in the workplace today and tomorrow. The goal of this work is to develop a template for a pragmatic design that can be customized for a variety of audio and recording technology pedagogical experiences.

Multi-Modal Acoustics-Based Imaging of Atherosclerosis

Friday, March 4, 2011 4:00 p.m.

Dr. Iulia M. Graf
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The University of Texas at Austin
http://www.bme.utexas.edu

Despite the advancements in diagnosis and treatment of atherosclerosis, the risk of plaque rupture cannot be accurately assessed with current ultrasound imaging techniques. The combination of ultrasound, strain rate and photoacoustic imaging may improve the timely diagnosis of plaque status and risk of rupture, by simultaneously assessing the arterial morphology, biomechanics and tissue composition. In this study we tested the feasibility of diagnosing atherosclerosis with the proposed imaging technique, using excised atherosclerotic rabbit aortas with inner diameters of 6 to 8 mm. The imaging was performed first by using a noninvasive Vevo 2100 ultrasound system (40 MHz linear array transducer), and secondly by using an intravascular ultrasound system (40 MHz single element catheter) in combination with an external irradiation (7 mJ/cm2, 5 ns pulsed laser light in the 650 to 1230 nm range). Ultrasound B-mode images reflect plaque existence through inhomogeneities in echogenicity, strain rate 2D mapping illustrates the atherosclerotic regions exposed to maximum stress, while spectroscopic photoacoustic imaging in the region 1210 to 1230 nm, indicate the location of lipids and macrophages. The results were validated through histology. In conclusion, the study demonstrates that the integration of multiple imaging modalities can be used to improve the characterization of atherosclerotic plaques.

Demystifying the Success of Cochlear Implants

Friday, March 11, 2011 4:00 p.m. in ETC 4.120

Professor Douglas P. Sladen
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csd.utexas.edu/faculty/doug-sladen

Cochlear implants are an effective means of treatment for individuals with severe-to-profound sensorineural hearing loss. The implant system is comprised of an externally worn sound processor and a surgically implanted internal device. The internal device bypasses the outer, middle and inner ear and stimulates residual auditory nerve endings located within the modiolus of the inner ear. Compared to a functional auditory system, the implant provides limited speech information, yet implant listeners do remarkable well on measures of speech perception. The success of cochlear implantation for adults is likely a combination of adequate technology coupled to a developed and adult-like auditory system. This talk will review the technology of cochlear implants and offer new data on how implant users achieve high levels of speech perception. Specifically, this talk will present the findings of a recent study at UT Austin that separates signal clarity and auditory processing, and how they both contribute to speech understanding in noise.

The Challenges and Possibilities of a Truly Quiet Helicopter

Thursday, March 24, 2011 3:30 p.m. in WRW 113

Professor Frederic H. Schmitz
Department of Aerospace Engineering
The University of Maryland
http://www.aero.umd.edu/facstaff/fac-profiles/schmitz-fredric.html

A short history of the successes and the failings of Vietnam era efforts to reduce helicopter noise are briefly reviewed and the major sources of noise ranked. A movie showing the typical in-flight far-field time histories of impulsive noise along with the measured sounds is presented to give the audience an appreciation for the basic directionality and character of the noise. Using a fixed space analysis, the wave physics of the most important noise sources, Thickness noise (that becomes High Speed Impulsive noise at high advancing tip Mach numbers) and Blade-Vortex Interaction (BVI) noise are developed using simple animations that explain the major directivity patterns of the radiated noise. A blade-fixed analysis is then used to represent both Thickness and BVI noise and a comparison with experimental data is presented. Thickness noise is shown to be well-predicted by theory (at moderate advancing tip Mach numbers) while BVI noise is less so. BVI's strong dependence upon details of the rotor's wake structure—especially the number, location, and strength of the tip vortices at the time of BVI—make reducing it at the source, without reducing helicopter performance, very difficult. In addition, the interdependency of the governing parameters, make predicting the effect of parametric design changes on radiated noise on a one-to-one basis problematic. A simulation of BVI called "Blade Controlled-Disturbance Interaction" (BCDI) is introduced as an alternative experimental method of isolating the important parameters of BVI noise and used to evaluate current theories and computational approaches. CFD methods are shown to be necessary to capture the detailed physics of BVI that affect the measured shape and levels of the radiated noise. Flight path control of main rotor inflow is presented as another way of mitigating BVI noise and shown to be very effective when used to position the rotor's shed wake at large distances from the rotor blades. Substantial ground noise reductions are demonstrated when the helicopter pilots use these flying techniques. A new method of reducing Thickness noise by creating anti-noise sources on the blade is introduced and shown to be very effective at chosen target positions. The physics behind anti-noise is explained through animations as well as the limitations of the method. Finally, the promise of using widely spaced leading-edge serrations to reduce BVI noise through phase cancellation is discussed. A summary of future noise reduction challenges and possibilities closes out the lecture.

The Effect of Heat on Turbulent Mixing Noise in Supersonic Jets

Friday, March 25, 2011 4:00 p.m. in ETC 4.120

Woutijn Baars
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The University of Texas at Austin
http://tinyurl.com/WBaars

The most prominent component of turbulent mixing noise in jets is associated with Mach wave radiation. Large-turbulence structures in the jet flow radiate Mach waves efficiently when they convect at supersonic speeds relative to ambient conditions. An experimental study is conducted on an unheated (T₀ = 286.6 K) and heated (T₀ = 1020.6 K) fully expanded Mach 1.553 jet to investigate the effect of heat on this radiation process. The acoustic near-field was captured using a line array that comprised ten microphones situated in the hydrodynamic periphery of the dominant sound producing region, which is located downstream of the collapse of the potential core. Space-time correlations revealed a convective speed of the pressure signatures that was slightly larger than sonic, relative to the ambient, for the unheated jet, while being around M = 1.48 for the heated jet; Mach wave radiation occurred in both cases. A far-field circular arc array with a radius of 58.5 jet exit diameters was centered at the jet exit and consisted of twelve microphones ranging from 20 degrees to 135 degrees relative to the jet axis. A linear coherence and temporal correlation study unveiled mechanisms by which the near- and far-field pressures are coupled. From arrival times of the acoustic disturbances traveling from the near- to far-field it was found that propagation speeds were uniform in the heated case, while variations in speed, up to 15% above the ambient sound speed, were found for the unheated case.

Performance and Modeling of a Fully Packaged MEMS Optical Microphone

Friday, April 8, 2011 4:00 p.m. in ETC 4.120

Michael Kuntzman
Department of Electrical and Computer Engineering
The University of Texas at Austin
http://www.ece.utexas.edu

A microelectromechanical systems (MEMS) optical microphone that measures the interference of light resulting from its passage through a diffraction grating and reflection from a vibrating diaphragm (JASA, v. 122, no. 4, 2007) is described. In the present embodiment, both the diffractive optical element and the sensing diaphragm are micromachined on silicon. Additional system components include a semiconductor laser, photodiodes, and required readout electronics. Advantages of this optical detection technique have been demonstrated with both omnidirectional microphones and biologically inspired directional microphones. In efforts to commercialize this technology for hearing aids and other applications, a goal has been set to achieve a microphone contained in a small surface mount package (2 mm x 2 mm x 1 mm), with ultralow noise (20 dBA), and a broad frequency response (20 Hz–20 kHz). Such a microphone would be consistent in size with the smallest MEMS microphones available today, but would have noise performance characteristics of professional audio microphones significantly larger in size and more expensive to produce. The unique challenges in our effort to develop the first surface mount packaged optical MEMS microphone will be presented. Dynamic models used for simulating frequency response and noise spectra of fully packaged microphones will be presented and compared with measurements performed on prototypes.

Time Reversal Acoustics

Tuesday, April 12, 2011 9:00 a.m. in ETC 4.120

Professor Brian E. Anderson
Acoustics Research Group
Department of Physics and Astronomy
Brigham Young University
http://www.physics.byu.edu/faculty/anderson

Time Reversal (TR) is a method, applicable to classical wave systems of physics, used to locate and reconstruct unknown wave sources or to locate and image target scatterers. TR relies on the principle of spatial reciprocity, i.e. the ray paths that a wave pulse will travel from a source to a receiver will be the same ray paths that the same wave pulse will travel if the source and receiver positions are interchanged. The only major limitation is that TR relies on the invariance of the wave equation to the transform of t to -t for lossless media, thus the system (propagation medium and measurement apparatus) must not change in time. The basics of TR and its applications will be presented. TR applications include noise source characterization, speech communication privacy, earthquake source localization and characterization, ground-based nuclear explosion monitoring, non-destructive evaluation of mechanical parts, and biomedical imaging.

Three-Dimensional Sound Field Visualization in a Moving Fluid Medium

Friday, April 15, 2011 4:00 p.m. in ETC 4.120

Professor Yong-Joe Kim
Director, Acoustics and Signal Processing Laboratory
Department of Mechanical Engineering
Texas A&M University
http://tinyurl.com/YJKim

Recently, many ground and air vehicles operate at high speeds, which results in high-level noise. Acoustic measurements made on the high-speed vehicles also require considering significant airflow effects. One major difficulty to understand the noise characteristics of the high-speed vehicles is associated with economical/physical restrictions that make it only possible to perform measurements on a small number of measurement points. Acoustical information obtained on the restricted measurement points is generally not enough to completely understand the noise characteristics. Thus, it has been investigated to analyze the noise characteristics by applying Nearfield Acoustical Holography (NAH) to reconstruct acoustical information in a three-dimensional space projected from two-dimensional measurement data. However, the conventional NAH procedures are only valid in a “static” fluid medium. Here, improved NAH procedures including mean flow effects of a moving fluid medium are introduced that are derived from a “generalized” NAH description. Through monopole simulations and experiments with two loudspeakers in a wind tunnel, it is shown that the improved NAH procedures can reconstruct sound source locations and radiation patterns accurately. In addition, the proposed procedures are successfully applied to visualize fan and jet noise fields.

Modeling Three-Dimensional Rough Surface Scattering Using Numerical Methods

Friday, April 29, 2011 4:00 p.m. in ETC 4.120

Sumedh Joshi
Applied Research Laboratories
The University of Texas at Austin
http://www.arlut.utexas.edu

Understanding the scattering of sound energy from rough surfaces is important in modeling sound propagation underwater. The rough boundaries at the air-water and water-sediment interfaces randomly scatter incident sound energy in all directions; over sufficiently long propagation ranges, several reflections from these boundaries are possible, so to accurately predict sound propagation these interactions must be well understood. The problem considered here is the modeling of a single such scattering event from a rough patch of an interface. The general modeling methodology is to: generate an ensemble of rough surfaces; calculate the scattered field from each of these by various numerical techniques; ensemble average the scattered fields in order to estimate the mean effect of roughness. The roughness studied here has the characteristics of the water-sediment boundary, and the boundary condition is pressure-release (homogenous Dirichlet). The motivation of this work is to compare finite element modeling (which is presumed to be an exact solution to the scattering problem) via COMSOL with approximate models such as perturbation theory and the Kirchhoff approximation to the Helmholtz-Kirchhoff integral in order to ascertain the validity of the approximations in three dimensional models. The finite element model is also compared with a boundary element model which is an exact numerical solution to the Helmholtz-Kirchhoff integral. Future applications of these models, including scattering from penetrable interfaces (i.e. not pressure-release surfaces) as well as backscattering (where the source and receiver are collocated) will be discussed.

A Homemade Edison Tinfoil Phonograph

Friday, September 2, 2011 4:00 p.m. in ETC 4.150

Andrew R. McNeese and Jason D. Sagers
Applied Research Laboratories
The University of Texas at Austin
http://www.arlut.utexas.edu

In 1877 Thomas Edison invented the phonograph, a device capable of recording and reproducing sound. The original design used the sound-induced vibrations of a stylus to etch a time-locked copy of the acoustic wave onto a rotating, foil-covered cylinder. Playback was made possible by reading the etched signal with a second stylus attached to a transmitting diaphragm. The transparency of Edison's original design makes the phonograph a useful tool to demonstrate and discuss the concepts of acoustic waves and sound-structure interaction. A short history of the invention is given and a homemade version of

Edison's original phonograph is demonstrated. An acousto-mechanical model which predicts the frequency-dependent vibration of the phonograph diaphragm due to an acoustic input is presented. The model predictions are compared with laboratory measurements of the diaphragm vibration, and potential solutions for optimizing the device are discussed. A prerecorded demonstration of the phonograph can be viewed at: http://www.texasacoustics.org/resources/edison-tinfoil-phonograph.

Design of Hydrophone Acoustic Baffles and Supporting Materials

Friday, September 9, 2011 4:00 p.m. in ETC 4.150

Steven T. Embleton
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The University of Texas at Austin
http://www.me.utexas.edu

One key element of SONAR transducer design is the acoustic baffle. Acoustic baffles isolate noise and vibration produced by a structure, such as a submarine hull, from the sound sensing and radiating elements of the transducer and vice versa. One key challenge in designing an acoustic baffle is the need for materials used to meet many conflicting acousto-mechanical requirements. Example requirements include the need to be lightweight with minimum hydrostatic compressibility while providing high acoustic isolation and enabling broadband operation. Currently, Syntactic Acoustic Damping Material (SADM) is widely used as the primary acoustic baffle material. However, SADM baffles have many undesirable characteristics such as high density, poor machinability, high lead content, and depth dependent acoustical behavior. This seminar presents analytical and experimental work to design an acoustic baffle for a receiving transducer. First, analytical models of a 1D multi-layered piezoelectric transducer are presented and benchmarked with experimental measurements. The validated model is then used in a scheme inspired by Ashby's materials selection for mechanical design to determine the appropriate baffle materials in order to tailor the receive response according to customer needs. Models of transducer designs resulting from two different customers are presented and discussed.

Acoustic Modeling of the Southeast Florida Continental Shelf and Slope in Three Dimensions

Friday, September 16, 2011 4:00 p.m. in ETC 4.150

Dr. Megan S. Ballard
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The University of Texas at Austin
www.arlut.utexas.edu

An acoustic propagation model is applied to predict measurements of three-dimensional (3-D) effects recorded off the southeast coast of Florida. The measured signal is produced by a low frequency source which is towed north parallel to the shelf from a fixed receiving array. The acoustic data show the direct path arrival at the bearing of the tow ship and a second refracted path arrival as much as 30 degrees inshore of the direct arrival. Notably, the refracted arrival has a received level more than 25 dB greater than that of the direct arrival. A geoacoustic model of the environment is created to explain the data. It is

shown that the topography of the seafloor plays the largest role in controlling horizontal refraction effects, while the range-dependent sediment properties have the most influence on the received level. The modeling approach is based on a 3-D adiabatic mode technique in which the horizontal refraction equation is solved using a parabolic equation in Cartesian coordinates. A modal decomposition of the field provides insight into the variability in the arrival angle and received level of the measured signal.

Harnessing the Power of Bubbles in Biomedical Ultrasound

Friday, September 23, 2011 3:30 p.m. in ETC 4.150

Professor Tyrone M. Porter
Department of Mechanical Engineering
Associate Director, Center for Nanoscience and Nanobiotechnology
Boston University
http://www.bu.edu/me/people/faculty/pz/porter

In the Nanomedicine and Medical Acoustics Laboratory (MedAL) at Boston University, we are engineering gas- and liquid-based particles for biomedical ultrasound applications. First, we are using microfluidic technology to produce monodispersions of ultrasound contrast agents. Using these contrast agents, we can quantify the viscoelastic properties of outer shells more accurately with acoustic techniques and theoretical models. By controlling the bubble radii and shell parameters, we can vary the resonance frequency and frequency-dependent scattering cross-section, thus optimizing contrast for a specific imaging frequency. Second, we are engineering nanoemulsions that can accumulate in solid tumors and serve as cavitation nuclei. Once in the tumor interstitium, the nanoemulsions can be vaporized, thus providing bubbles to enhance ultrasound-mediated heating and reducing the time required for tissue coagulation and lesion formation. In this talk I will present preliminary results for these two projects, outline future studies, and discuss potential impact of these technologies.

Measurement of Peak Insertion Loss of Hearing Protection Systems

Friday, October 7, 2011 4:00 p.m. in ETC 4.150

Jeff G. Schmitt, P.E.
President, ViAcoustics
Austin, Texas
http://www.viacoustics.com

The measurement of the peak insertion loss of hearing protection systems, when exposed to impulsive acoustic events, is of interest to manufacturers and users of hearing protection systems employed in industrial applications, while using firearms, or when exposed to explosions. The latter applications have become increasingly important because of the recent wars and the exposure of many troops to gunshot and IED explosions. Many hearing protection systems are designed to provide very little attenuation at low sound pressure levels in order to facilitate good communication and directional hearing, but to provide increasing amounts of attenuation as sound pressure levels increase to hazardous levels. Until recently, there was no standardized method for testing and evaluating the performance of these nonlinear hearing protection systems. The recently adopted standard ANSI S12.42-2010 defines a test method and analysis

procedure for evaluating the impulsive peak insertion loss of a hearing protection system using an impulsive stimulus, a test fixture, and a series of recorded time waveforms. This presentation will provide an overview of the Impulsive Peak Insertion Loss test method, including information on the shock tube and exponential horn used to generate the impulses, the transducers needed to measure the high sound levels, the mannequin test fixture developed to support the test method, data acquisition and sampling requirements, and the signal processing needed to generate the IPIL rating for the protector.

Environmental Noise from Wind Turbines

Friday, October 14, 2011 4:00 p.m. in ETC 4.150

David A. Nelson, INCE Bd. Cert., PE
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Elgin, Texas
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Wind turbines are prominent visible symbols of renewable energy. In the last few years Texas has become a world leader in wind energy and has more installed capacity than most countries. With increasing numbers comes a greater likelihood that they are sited near rural residences and more populated areas. Wind energy planners make efforts to manage the noise impact, which they maintain compares favorably with various benign noise sources. Some wind farm neighbors however find the noise highly objectionable, some claim loss of sleep, and a few allege catastrophic medical complications. During the talk I will briefly compare wind turbines to other environmental noise sources, examine the unique factors affecting wind turbine sound levels and annoyance, review actual data and audio, and explore reasons that otherwise well-planned wind farms may still disturb nearby residents.

Development of a Large-Scale Microphone Array for Aircraft Jet Plume Noise Source Characterization

Friday, October 21, 2011 4:00 p.m. in ETC 4.150

Kurt Veggeberg
Business Development Manager, Sound and Vibration
National Instruments
Austin, Texas
http://www.ni.com/soundandvibration

Military jet aircraft expose both ground maintenance personnel and the community to high levels of noise. A large-scale microphone array for portable near-field acoustic holography (NAH) and data acquisition system was created for this purpose. The system was designed for measuring high-amplitude jet noise from current and next-generation military aircraft to provide model refinement and benchmarking, evaluate performance of noise control devices, and predict ground maintenance personnel and community noise exposure. The acoustical instrumentation system was designed to be easy to use with scalable data processing as the primary focus. The data acquisition system allowed up to 152 channels simultaneously sampled at a rate of 96 kHz. The application of NAH processing to the characterization of a full-scale jet plume environment and the development of an appropriate measurement array poses

several technical and logistical challenges. Accurate characterization of the near field of a military jet aircraft requires the ability to record sound pressure levels up to 170 dB and frequencies from 5 Hz to 30 kHz. In addition, measurements needed to be made along the entire length of the plume. The NAH system needs to be semi-portable because of the limited number of locations where military jets can perform static high-power engine run-ups. The data collected demonstrated that this system can be used to obtain near-field acoustic data of jet plumes from high-power aircraft.

Mitigation of Highway Traffic Noise with “Quieter” Pavements

Friday, October 28, 2011 4:00 p.m. in ETC 4.150

Dr. Manuel Trevino
Center for Transportation Research
The University of Texas at Austin
http://www.utexas.edu/research/ctr/research/bios/trevino.html

Traffic noise has become an important concern for many citizens in urban, suburban and even rural areas, as well as for authorities. As public awareness about traffic noise increases, transportation agencies search for mitigation solutions, especially along urban highways. Noise barriers can be effective, but only for receivers in the “acoustical shadow” of the wall. Among the many drawbacks of noise barriers, the most notable is that they do not eliminate the noise, they only create small areas of noise reduction. Concentrating on the source of the noise is a sensible approach for finding a solution. Noise generated at the tire/pavement interface predominates over other sources of traffic noise at highway speeds. Tire/pavement noise is related to the pavement surface characteristics, such as texture, stiffness, and void content. By modifying some of its properties, pavements have been shown to produce lower tire/pavement noise levels than the “average” pavements. There are various methods for measuring highway noise, including measurements from a vehicle, roadside and residential measurements, as well as absorption testing of the pavement by means of impedance tube tests. Their application is showcased in this presentation of the results from a five-year study of traffic noise mitigation using “quieter” pavements on Interstate Highway 30, in Dallas.

Submarine Sonar

Friday, November 11, 2011 4:00 p.m. in ETC 4.150

Dr. F. Michael Pestorius
Independent Research and Development Coordinator
Applied Research Laboratories
The University of Texas at Austin

Modern submarines use sonar almost exclusively for ship navigation, obstacle avoidance, contact detection and warfare missions. Rudimentary sonars were first developed in World War I and they reached fairly high levels of sophistication in World War II. However, submarines up to about 1960 were basically surface craft that could submerge for relatively short periods of time. The marrying of nuclear power to the submarine created a true undersea capable ship. With this development came a major improvement in submarine sonars. The development of the US submarine force since the advent of nuclear power with emphasis on the continuing development of active and passive sonar will be

addressed in this seminar. The Applied Research Laboratories at UT Austin have long been involved in sonar research and development. General information about submarine sonars will be outlined.

Dr. Mike Pestorius, a UT graduate (PhD EE), is a retired submariner who spent close to 27 years in the Navy. He served on several submarines and commanded a ballistic missile submarine, the USS Mariano G. Vallejo (SSBN 658), for 4 years. After retiring from the Navy, he served 12 years as director of Applied Research Laboratories at UT and then 4 years as technical director of the international office in the London office of the Office of Naval Research.

Sound Quality and Vibration of Server and Storage Products

Friday, November 18, 2011 4:00 p.m. in ETC 4.150

Chris E. Peterson, Tony Nava, and Ken Schaff
Dell Enterprise Acoustical, Structural Vibration, and Thermal Engineering
Dell, Inc.
Round Rock, Texas
www.dell.com

Sources of noise and vibration in server and storage products include fans, hard disk drives, and electrical components. In the seminar, members of the Dell Enterprise Acoustical, Structural Vibration, and Thermal Engineering team will discuss sound quality, noise features, underlying mechanisms, customer experience thresholds, noise control approaches, and impacts of vibration and acoustics on hard disk drive performance.