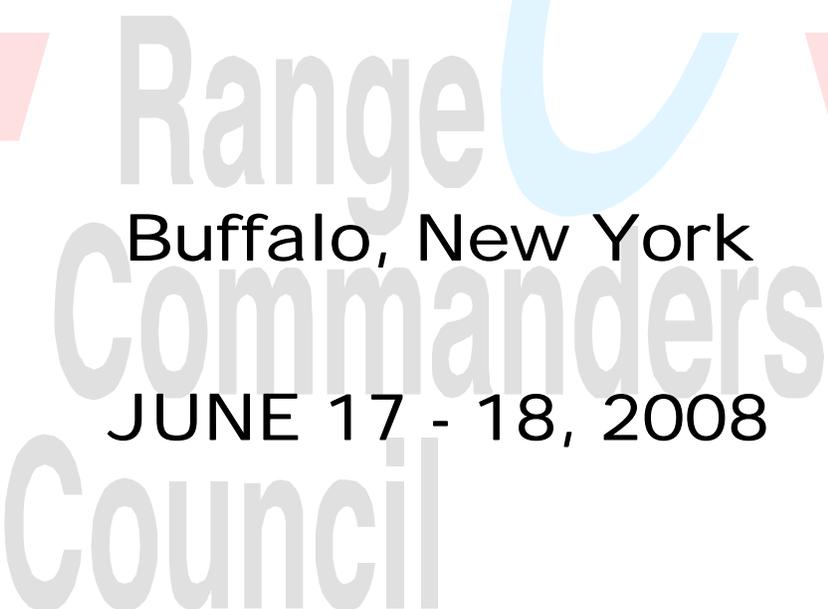


TWENTY-THIRD  
TRANSDUCER WORKSHOP



Buffalo, New York

JUNE 17 - 18, 2008

Sponsored by  
Vehicular Instrumentation/  
Transducer Committee of the  
Range Commanders Council  
Telemetry Group

# Definition of the Transducer Workshop

## History

The Vehicular Instrumentation/Transducer Committee, Telemetry Group, of the Range Commanders Council, sponsors the Workshop. This committee develops and implements standards and procedures for instrumentation applications. The previous workshops, beginning in 1960, were held at two-year intervals at or near various U.S. Government installations around the country.

## Attendees

Attendees are working-level people who must solve real-life hardware problems and are strongly oriented to the practical approach. Their field is making measurements of physical parameters using transducers. Test and project people who attend will benefit from exposure to the true complexity of transducer evaluation, selection, and application.

## Subjects

Practical problems involving transducers, signal conditioners, and read-out devices will be considered as separate components and in systems. Engineering tests, laboratory calibrations, transducer developments, and evaluations represent potential applications of the ideas presented. Measurands include force, pressure, flow, acceleration, velocity, displacement, temperature, and many others.

## Emphasis – The Workshop

1. Is a practical approach to the solution of measurement problems,
2. Strongly focuses on transducers and related instrumentation used in measurements engineering,
3. Has a high ration of discussion to presentation of papers, and
4. Attendees share knowledge and experience through open discussion and problem solving.

## Goals

The workshop brings together those individuals who use transducers to identify problems and to suggest solutions, identifies areas of common interest, and provides a communication channel within the community of transducer users. The primary goals are to:

1. Improve the coordination of information regarding transducer standards, test techniques, evaluations, and application practices among the national test ranges, range users, range contractors, other transducers users, and transducer manufacturers;
2. Encourage the establishment of special sessions so that attendees with measurement problems in specific areas can form subgroups and remain to discuss these problems after the workshop concludes; and
3. Solicit suggestions and comments on past, present, and future Vehicular Instrumentation/Transducer Committee efforts.

## Format and Background

Workshops are just what the name implies: everyone should come prepared to contribute something from their knowledge and experience. In a workshop, the attendees become the program in the sense that the extent and enthusiasm of their participation determine the success of the workshop. Participants will have the opportunity to hear what their colleagues have been doing and how it went; to explore areas of common interest and common problems, and to offer ideas and suggestions about what's needed in transducers, techniques, and applications.

# Program Schedule (times subject to change)

## Monday, June 16, 2008

1900 **Welcome and Social Hour** – hosted at PCB Piezotronics Corporate Headquarters, 3425 Walden Avenue, Depew, NY 14043 (located 3.5 miles from the Holiday Inn and Buffalo Niagara International Airport) ALL are welcome; spouses and guests, too!

## Tuesday, June 17, 2008

0700 **REGISTRATION**

0800 **General Chairman**, Lorin Klein, Air Armament Center, Eglin Air Force Base, FL  
*Transducer Workshop Welcome and brief history of the TWS and RCC*

**Session Chair:** Mike Mando, Army Aviation Technical Test Center, Ft. Rucker, AL

0815 **Miniature, High-Speed, Data Acquisition Systems**,  
Larry Brown, Applied Research Associates, Inc.  
*Miniature hardened, data acquisition systems (DAS) are increasingly required for high-speed, high-resolution measurements of explosive events, and in particular, human injury studies. This presentation will describe current capabilities and on-going efforts for advanced, ultra-miniaturized DAS.*

0845 **Primary Calibration of Accelerometers using Laser Interferometry**  
Jeff Dosch, PCB Piezotronics  
*Presentation will provide an overview of PCB Piezotronic's experience using laser interferometry for the primary calibration of accelerometers.*

0915 **The Use of Telemetry Data in an Air Data System**  
Thomas M. Morrison, JT3, Edwards Air Force Base  
*The selection, calibration, and data from the different sensors that are used for the air data parameters become very important if they are used by the flight crew as their primary source. What methods were used to make this reliable will be covered.*

0945 **BREAK**

1000 **A Wireless, Non-Intrusive, Network Based Instrumentation System**  
Steve Musteric, 46th Test Systems Squadron, Eglin Air Force Base  
*The ASMT system has the potential to support a wide variety of test and training needs. Features include non-intrusive installation of sensors, commercial wireless technologies, and a variety of sensor types.*

1030 **Temperature Compensating MEMS Accelerometers with Programmable Signal Conditioners**  
Bjorn Ryden, Measurement Specialties, Inc.  
*On-board programmable signal conditioners enable MEMS accelerometers to incorporate active temperature compensation. The on-board microprocessor allows thermal errors to be reduced by significant orders of magnitude over conventional MEMS accelerometers.*

1100 **A Multi-channel Smart Strain Sensor with IEEE 1451 Protocol**  
Darold Wobschall, Esensors Inc.  
*A high speed data acquisition system for strain gages and other transducers was developed which uses the IEEE 1451 smart transducer standard. Advantages are automatic configuration, precision timing, and standard data formats.*

1130 **LUNCH**

- 1230 **Design and Development of Wireless Acceleration Sensor Chip**  
Navid Yazdi, Evigia Systems  
*This presentation provides an overview of a new class of wireless acceleration sensor chips being developed by Evigia Systems and Air Force Research Laboratory that can record the magnitude and duration of exposure to external impact without requiring any battery or any other external power source.*
- 1300 **Wireless Measurement System for an Aerial Refueling Force Gauge**  
Brian Keating, NAVAIR, Patuxent River  
*This paper discusses the design and challenges associated with performing a force measurement on a KC-130 Refueling Basket using a commercial off the shelf wireless measurement system.*
- 1330 **IEEE 1588 Precision Clock Synchronization Standard Update**  
Kang Lee, National Institute of Standards and Technology  
*The IEEE 1588 standard defines a precision time protocol enabling precise synchronization of clocks in networked measurement and control systems. This standard is applicable to transducer networks which require precise mapping of the transducer data with the time of the events in applications such as tracking and surveillance.*
- 1400 **BREAK**
- 1415 **TUTORIAL: Introduction to Piezoelectric Sensors**  
Dave Change, Dytran Instruments  
*An Introduction to Piezoelectric Sensors. Topics to include: A discussion on vibration, Principles of Operation, Charge Mode and Voltage (IEPE) Sensor Designs, Mounting Considerations, Frequency Response Affects, and Modal Analysis Sensors.*
- 1530 **Transducer Workshop Technical Outing** –Glenn H. Curtiss Museum, Hammondsport, NY  
(Departure will be adjusted to allow participants time to get ready for the outing following the day's work)

## Wednesday, June 18, 2008

**Session Chair:** Robert Neufeld, Air Force Flight Test Center, Edwards Air Force Base

- 0800 **Intentional Electromagnetic Interference (IEMI): Principles, Effects, and Test Techniques**  
Dr. Maqsood Mohammed, Jacobs Technology, Eglin AFB  
*This tutorial explores the current understanding about effects, test techniques, and salient features of intentional electromagnetic interference (IEMI) and will cover the following topics:*
- *Introduction and Demonstration of EMI/EMC*
  - *Principles of Intentional EMI and its effects*
  - *Exploring Test and Evaluation Techniques for IEMI*
  - *Question and Answer session*
- 1130 **LUNCH**
- 1230 **Uncertainty Analysis Using ISG's Uncertainty Analyzer 3.0**  
Ken Miller, NAVAIR, Patuxent River  
*This tutorial will step through the process of performing an uncertainty analysis utilizing ISG's Uncertainty Analyzer software. An example uncertainty analysis of an accelerometer connected to a data system will serve as the means of presenting this subject. The presentation will illustrate the up-front work that needs to be done, and the use of the software tool through screen captures.*
- 1530 **Workshop Wrap-up**  
Lorin Klein, Workshop General Chairman

## General Information

**All attendees and participants are required to register.** The registration consists of a completed registration form and a fee of \$100.00 to:

Ray Faulstich, Treasurer  
Transducer Workshop  
44195 Steele Lane  
Leonardtown, MD 20650

Advance registration is desirable, even without prepayment. Please use the registration form, include a check or money order (payable to the Transducer Workshop) for \$100.00, and mail to the Workshop Treasurer. **Purchase orders, training forms, and Credit Cards cannot be accepted.** Register by phone at 301-737-8129, FAX at 301-863-7759 or by email to rfaulstich@csc.com. Late registration or payment will be at the Workshop registration desk in the conference center.

### Hotel Accommodations / Conference Facility

Holiday Inn – Buffalo Airport (located 0.6 miles from the airport)  
4600 Genesee Street  
Cheektowaga, NY 14225  
716-634-6969

**Group Code: Transducer Workshop**

Early hotel reservations are strongly encouraged, as a fixed block of rooms is reserved for the Transducer Workshop thru May 19, 2008, at a rate of \$78.00 per night. Reservations booked after that date may not be available at that rate. A shuttle is available from the Buffalo Niagara International Airport to the hotel.

### Tuesday Evening Technical Tour



Flying reproduction world's first multi-engine flying boat "America."  
Circa 1914, powered by original Curtiss OXX-6 100 hp V-8 Engines

Spouses and guests welcome. Buses will transport guests to/from the Glenn H. Curtiss Museum in Hammondsport, located in the world-renowned Finger Lakes Region of New York State, where Curtiss built and flew his planes 100 years ago. Hammondsport is approximately 135 miles from Buffalo, and is known for this historic museum and its celebrated wineries. Prior sign-up for the tour is strongly encouraged (a dinner count is required prior to the Workshop). The group will depart the hotel at approximately 3:30 pm and return sometime after 11:00 pm. The outing will include transportation, museum tour, and dinner.

Guests will visit the Restoration Shop and see "flying" reproductions of several early Curtiss aero planes, including the first US Navy aero plane, the 1911 Curtiss A-1 Amphibian, powered by an original Curtiss OX-5, 90 hp, overhead valve, V-8 engine. You will see a flying reproduction of the world's first multi-engine flying boat, the 1914 Curtiss Flying Boat, "America," being readied for flight in September, 2008, as well as a flying reproduction of the 1910 "Albany Flyer," presently under construction. In 2010, plans are to repeat the historic 150-mile flight from Albany to New York City, which won Curtiss permanent possession of the Scientific American Trophy. There are a wide variety of exhibits of interest to all, including motorcycles, bicycles, boats, cars, engines, artwork, and aero planes. Please indicate your interest in tour participation on the registration form.

# Twenty-Third Transducer Workshop

The Twenty-Third Transducer Workshop, sponsored by the Vehicular Instrumentation / Transducer Committee, Telemetry Group, of the Range Commanders Council, will be held June 17-18, 2008 at the Buffalo Airport Holiday Inn, Buffalo, NY. This committee develops and implements standards and procedures for transducer applications. Attendees are working level people who must solve real-life hardware problems and are strongly oriented to the practical approach. Test and project people who attend will benefit from exposure to the true complexity of transducer evaluation, selection, and application. Since there is limited seating available at the Transducer Workshop, attendees are encouraged to register as early as possible. With your registration please include a \$100.00 registration fee payable to the Transducer Workshop, and mail to the Workshop Treasurer by June 1, 2008.



## Twenty-Third Transducer Workshop Registration Form



Name \_\_\_\_\_ Title \_\_\_\_\_  
Organization \_\_\_\_\_  
Mailing Address \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
Phone \_\_\_\_\_  
Email \_\_\_\_\_

### TUESDAY EVENING OUTING AT THE CURTISS RESTORATION MUSEUM -

I will participate:             YES   How Many? \_\_\_\_    NO  
I would like to ride the bus:    YES   How Many? \_\_\_\_    NO

### WORKSHOP REGISTRATION FEE is \$100.00

- Check or money order (no credit cards) payable to **Transducer Workshop** is enclosed
- Register now, pay at the Workshop (cash/check/money order; no credit cards)

Mail Registration by June 1, 2008 to: Ray Faulstich  
Transducer Workshop  
44195 Steele Lane  
Leonardtown, MD 20650

Register by email: [rfaulstich@csc.com](mailto:rfaulstich@csc.com)  
Register by phone: 301-737-8129  
Register by FAX: 301-863-7759