



NCSLI MEETING ANNOUNCEMENTS

Northwestern US Region

ncli.org | 303-440-3339 | 2995 Wilderness Place, Suite 107 | Boulder, CO 80301

MEASUREMENT TRAINING SUMMIT

AND World Metrology Day Celebration!

Tuesday, May 20 and Wednesday, May 21, 2014

\$75 1 Day / \$150 2 Day

Bring your oldest metrology artifact!

Join us for this two-day Measurement Training Summit! Offering White Papers, Tutorials, Hands-on Measurement Training Demonstrations, Exhibitors and more! On Tuesday, May 20th and Wednesday, May 21st NCSLI in conjunction with Fluke Calibration, Vaisala Inc., Canada and The Boeing Company will provide two-days filled with high quality and low cost training for laboratory and test engineers, technicians, personnel, trainers, lab supervisors, inspectors, technical writers and quality professionals. During this two-day training summit attendees will have the opportunity to attend tutorials, hands-on training demonstrations or white paper presentations.

Many measurements are made either in the field or outside the controlled calibration laboratory environment. Variables can potentially arise that create false acceptance or false rejection situations which can lead to unnecessary rework, increased cost and the passing of faulty products. This two-day summit will reveal and discuss many of the critical variables that can negatively impact product development, production and testing.

The tutorials will provide in-depth presentations of various measurement and metrology practices and principles. The white paper presentations will introduce new and intriguing concepts. The "hands-on" demonstrations will provide an insightful look at some of the factors hidden in a "measurement loop" that produce headaches, heartbreaks and cost overruns.

NCSLI Coordinator:

Tony Reed, The Boeing Company
Seattle, WA 98108
206-544-7976 anthony.p.reed@boeing.com

Meeting Location:

Seattle Museum of Flight
9404 East Marginal Way S. Seattle, WA 98108
Directions: [Seattle Museum of Flight](#)

Meeting Hosts:

Tony Reed and Mons Lee, The Boeing Company
Martin Kidd, Fluke Calibration
Michael Boetzkes, Vaisala, Inc., Canada

Meeting Sponsors:

The Boeing Company
Fluke Calibration
Vaisala, Inc., Canada

EXHIBITORS:

Agilent Technologies, Dytran Instruments Inc., Eustis Pyrocom, Fluke Calibration, Hexagon Metrology, Kistler, Mensor, Sartorius, Starrett, Tegam, The Modal Shop, Tool & Gage Associates, Inc., Vaisala, Inc.,

DAY 1 / Tuesday, May 20, 2014

8:00 AM - 4:30 PM

“HANDS ON” TRAINING DEMONSTRATIONS – See list below

WHITE PAPER PRESENTATIONS

11:00 AM

“Maximizing Machine Volumetric Performance by Minimizing Plane Squareness Error”

Mike Fink, The Boeing Company

Abstract: In a 3 axis orthogonal machine frame, there are 21 parametric error sources: 3 linear positioning, 6 straightness, 9 angular, and 3 plane Squareness errors. Of all the sources of error, the Squareness errors can quickly dominate the volumetric performance of the machine. In industry, the existing traditional methods of evaluating Squareness errors typically do a poor job of evaluating this critical error. This paper will describe a simple robust method for evaluating plane Squareness error by effectively averaging multiple Squareness measurements using linear laser interferometer measurement and the law of cosines for data evaluation. The net effect has been an improvement of volumetric performance on every machine where this process has been implemented.

1:00 PM

“The Cost of Quality”

Brian Parry, The Boeing Company

Abstract: The cost of quality may be defined as the total cost associated with poor quality or product failure and is a frequently used (and in many cases misunderstood) term, often used to define the cost of creating a quality product, whereas in reality the reverse is actually true.

An overall approach for estimating the cost has been formulated for some time, but in general ignores a number of metrological considerations, primarily the cost of misclassification. In this presentation, misclassification is rejecting conforming parts while at the same time accepting non-conforming parts.

Some of the many influencing cost factors are discussed, which it is proposed can be minimized by using a standardized measurement inspection plan, decision rule and risk analysis assessment. Learning Objectives: To understand the elements of the cost of quality, to recognize some of the methodology to reduce the cost of inspection, to understand the basics and benefits of using a dimensional inspection plan, to understand how decision rules can impact cost and to understand a risk analysis assessment.

2:15 PM

“The Science Behind WiFi Connectivity Onboard Aircraft”

Dennis Lewis, The Boeing Company

Abstract: Electromagnetic reverberation chambers have been used for many years by the Electromagnetic Compatibility (EMC) community to measure the susceptibility and emissions for various electronic components and systems. This presentation describes how statistical processes were used to reduce the uncertainty of these chambers to a level necessary for precision metrology applications. These processes were applied to the calibration of electromagnetic field probes and the assessment of antenna efficiencies. A brief comparison of

traditional calibration methods employing transverse electromagnetic (TEM) cells and anechoic chambers to the new statistical reverberant environment will be shown.

With the proliferation of wireless devices it is important to understand how they behave in complex electromagnetic environments and how they interact with other devices and systems they are collocated with. Aircraft environments have been shown to behave similar to reverberation chambers and therefore these techniques can be employed to study propagation environments and system interactions. This presentation will give examples of how these techniques were employed to measure bulk absorption used to simulate passenger loading of aircraft, Field mapping which is useful for the evaluation of signal coverage and channel interference as well as signal propagation characteristics. Utilizing this same approach, it is possible to assess the shielding of large structures such as commercial aircraft. These aircraft shielding measurements are necessary for High Intensity Radiated Field Susceptibility (HIRF) certifications.

TUTORIALS

9:00 AM-12:00 PM /1:00 PM-2:00 PM

“The Basics of Humidity Measurements”

Michael Boetzkes, Vaisala Inc., Canada

2:00 PM-4:00 PM

“Introduction into Electrical Measurements and Metrology”

Jack Somppi, Fluke Calibration

DAY 2 / Wednesday, May 21, 2014

8:00 AM - 4:30 PM

“HANDS ON” TRAINING DEMONSTRATIONS – See list below

WHITE PAPER PRESENTATIONS

9:00 AM

“New Optical Primary Pressure Standard”

Jay Hendricks, National Institute of Standards and Technology (NIST)

Abstract Pending

10:00 AM

“Practical Uncertainty Estimation in Load Cell Calibration”

LaVar Clegg, Engineering Consultant, Interface, Inc.

Abstract: Relating the calibration uncertainty of force transducers to the varied end use of transducers is an interesting science. Here we examine the factors that contribute to measurement uncertainty of both the absolute force measurement and the relative force measurement.

11:00 AM

“Cal PODs and the Elimination of Errors”

Gary Lewendowski, Agilent Technologies

Abstract: Due to cable or test system stability and operate end-to-end on very long cables simplifying the process of recalibrating the PNA without requiring the removal of the Device Under Test (DUT) or the physical connection of standards.

1:00 PM

“Reading and Writing Calibration Information into a Load Cell with TEDS (Transducer Electronic Datasheet)”

Andrew Hickson, Western Region Strain Gage Committee

TEDS circuits to be inserted into our transducers will be displayed. We will also demonstrate our software application to read and write transducer calibration to a Tovey load cell modified with TEDS.

2:30 PM

“Effective Calibration Lab Management – In Brief”

Jesse Morse, Morse Metrology

Abstract: The task of supervising a calibration function within an organization can be one of the most challenging jobs there is in maintaining the overall day-to-day quality of that organization’s products. This session examines the uniqueness of the cal lab management function relative to more generic production supervisor jobs, and it presents some thoughts relating to the measurement of how effective the lab is in meeting its customer expectations. Some ideas and benchmark information on measurement of productivity and affectivity are also presented.

TUTORIALS**9:00 AM -12:00 PM / 1:00 PM -2:00 PM**

“Types and Theories of Accelerometers, Dynamic Sensor Types; the Use and Calibration of Each”

Stephen Bill, Support Engineer, The Modal Shop

2:00 PM-4:00 PM

“Geometric 3D Coordinate Measurement Techniques in the Testing and Manufacturing Environments”

Doug Klein, Product Support Engineer, Hexagon Metrology

“HANDS-ON” TRAINING DEMONSTRATIONS

Attendees will be divided into several groups. Each group will rotate through the different demonstrations in small groups. The subject matter expert will lead the attendees through the demonstration then assist with the measurements and discussions. While these rotations are occurring through the day attendees may break out to attend a tutorial or white paper presentation then return to the rotation. After rotating through all the demonstrations the attendees will then discuss their results with the rest of the groups near the end of the day.

SUBJECT MATTER EXPERT DEMONSTRATION - 1

Topic: Fiber Optic Strain Gages with a Micro Optics interrogator Measurement

Andy Hickson, Western Strain Gage Committee

Abstract: This hands-on demonstration will be a demonstration of fiber optic strain gages using a Micron Optics sm130 interrogator. Attendees will test a metal bar and composite panel with FBG (fiber Bragg grating) strain gages installed. These gages will respond to changes in both temperature and bending strain. Testing software will display the wavelength spectrum and numerical strain readings.

Learning Objectives: To properly quantify the effects of temperature and bending on steel and composite materials.

SUBJECT MATTER EXPERT DEMONSTRATION - 2

Topic: Fluid Flow Measurement

James Whitley and Shawn Snell, Metrology Technicians, The Boeing Company

Abstract: This hands-on Demonstration will demonstrate a liquid non-intrusive method of calculating and calibrating in-line flow meters using sound waves to calculate flow.

Learning Objectives: To calculate fluid flow using sound waves.

SUBJECT MATTER EXPERT DEMONSTRATION - 3

Topic: Thermocouple Measurements within a Laboratory Environment and potential errors

Iv Martchev & Bill LeMesurier, Eustis Co., Inc.

Abstract: Demonstration of basic thermocouple calibration using calibration software within a lab setting, and the potential for error in the results. An experiment will be conducted and variables will be introduced to demonstrate the possibility of errors in the readings.

Learning Objectives: To show using calibration software can simplify the process, but there are still elements to be aware of which can introduce error into the results.

SUBJECT MATTER EXPERT DEMONSTRATION - 4

Topic: Testing Methods using 3D Coordinate Articulated Measurement Arms

Douglas Klein, Regional Sales Engineer, Hexagon Metrology Inc.

Abstract: Measuring the physical geometrical characteristics of an object using a portable arm CMM (PCMM) has become an important quality control tool at many manufacturing companies. This “Hands-On demonstration will have the attendees perform various tests and measurements using an articulated arm, discuss testing techniques and the variables that can cause test data to be non-repeatable.

Learning Objectives: To learn proper measurements and testing techniques; the software used with 3D measurement arms and possible applications of this technology in the testing world.

SUBJECT MATTER EXPERT DEMONSTRATION - 5 (Day 2 only)

Topic: False Accept/False Reject – Examples of each and what they mean.

Jeff Gust, Chief Corporate Metrologist, Fluke Calibration

Abstract: Falsely accepting a calibration as in-tolerance or falsely rejecting a calibration as out-of-tolerance, otherwise known as “Decision Risk”, can negatively Metrology Labs and the users of Metrology products and services.

Learning Objectives: This hands-on demo will give the attendees an opportunity to identify each, learn its impact and how to account for “Decision Risk.”

SUBJECT MATTER EXPERT DEMONSTRATION - 6

Topic: Axial Loading Errors and the Impact to Force Measurements

Ron Clinkenbeard and Mike Spanier, Metrology Technicians, The Boeing Company

Abstract: Errors in force measurements can be introduced through improper axial loading. Understanding the possible loading condition variables can help to avoid errors in force measurements.

Learning Objectives: Load Cell measurement techniques and the variables that affect those measurements.

SUBJECT MATTER EXPERT DEMONSTRATION - 7

Topic: Reducing Signal Loss in Very Long Cables While Making RF Measurements

Gary Lewendowski, Application Engineer, Agilent Technologies

Abstract: While performing RF testing the path between the test system and the unit under test (UUT) can present several problems which impact test cost including removing the DUT, changes in reflection coefficients, environmental conditions, long test times or re-connecting calibration standards.

Learning Objectives: Learn how to eliminate testing variables with the use of calibration verification technology.

SUBJECT MATTER EXPERT DEMONSTRATION - 8

Topic: Increasing Pressure Stabilization and Accuracy in Field Calibrations of Hydraulic Gauges by Introducing Vacuum Backfill of Fluids in Hydraulic Test Circuits.

Daniel Suh, Support Engineer, King Nutronics Corporation

Abstract: Using handheld pressure standards can provide very accurate pressures for testing but knowledge of the variables that can affect your measurements is crucial. Learning Objectives: Apply best practices for evacuating and backfilling hydraulic test circuits to obtain better stability and accuracy when calibrating hydraulic test circuits.

SUBJECT MATTER EXPERT DEMONSTRATION - 9

Topic: Low Level Resistance Measurement Fundamentals (Insights and Challenges)

Michael Sciulli, Western Region Sales Manager, TEGAM

Abstract: Resistance measurements made at low level have a unique set of variables that can reduce the accuracy and precision of your results. This hands-on demonstration will reveal those variables and how to account for them.

Learning Objectives: Proper measurement techniques for making low level resistance measurements.

MEETING AGENDA:

DAY 1 / Tuesday, May 20, 2014

8:00 AM: Networking and Continental Breakfast
8:20 AM: Welcome / NCSLI Board of Directors Report
8:35 AM: Demonstrations Begin
9:00 AM: Tutorials
10:05 AM: First Break/Exhibitors and Networking
10:20 AM: Demonstrations Continue
11:00 AM: White Paper Presentations
12:00 PM: Lunch/World Metrology Day Recognition and Metrology Artifact Recognition
12:45 PM: Group Photo
1:00 PM: White Papers/Tutorials/Demonstrations
2:30 PM: Second Break/Exhibitors and Networking
2:45 PM: Demonstrations Continue
4:15 PM: Group Discussion/Closing Remarks/Feedback
4:30 PM: Close
Museum of Flight Access until 6:00 PM

DAY 2 / Wednesday, May 21, 2014

8:00 AM: Networking and Continental Breakfast
8:20 AM: Welcome / NCSLI Board of Directors Report
8:35 AM: Demonstrations Begin
9:00 AM: White Papers/Tutorials
10:05 AM: First Break/ Exhibitors and Networking
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Museum of Flight Access until 6:00 PM

REGISTRATION INCLUDES:

Cost 1-Day \$75 / Cost 2-Day \$150

- Entrance into *Seattle Museum of Flight*
- Continental Breakfast and Lunch
- White Papers, Tutorials and Hands-on Training Demonstrations
- Networking with Exhibitors
- **Bring your oldest metrology artifact! (take a photo if too large)**

[Register Here](#)

Having problems registering online? Please call the business office at 303-440-3339 and we will register you!