NIST History and Robotics

From the Editor's Bench

Shlomo Engelberg

Instrumentation and Measurement in the Service of Mankind

In mid-September my family became the foster parents of one of the most advanced instrumentation and measurement systems in existence: a seeing-eye dog in training.   As we learned, the majority of a seeing-eye dog's formal training takes place when the dog is about one year old. From the age of about two months the dogs are given over to the care of a "foster family." The foster family is given some instruction about how to raise the dog. Most of the instructions are designed either to get the dog ready to learn how to help its end user or to make sure that the dog does not learn any behaviors that the end user may not appreciate. (You are not allowed to give the dog table scraps, for example.)

My wife grew up with pets; I did not. My wife has always wanted to have a pet. I have never really wanted a pet. Raising children and students has always been enough for me. My kids, and in particular my daughters, also decided that they wanted a dog. In a moment of weakness, I agreed to foster a seeing-eye dog. I figured that it would allow me to see what having a pet was like while helping raise a dog who would help someone. Also the commitment was for ten months and not for the dog's lifetime. This made it a reduced-risk way of learning about pets.

The dog, named Alpha, has been a great hit with my wife and kids; though I enjoy walking the dog, I have not made it anywhere near their level of enthusiasm. Sometimes, however, Alpha helps remind me that it is important to choose to help people and to try to make the world a better place. For most people this is easier to do in their private lives than at work. In your private life, you can decide to foster a dog—even if it means devoting resources to the dog that could otherwise be used for something else.

For some reason, most bosses are less enthusiastic about using resources in ways that *appear* to be inefficient. The bottom line often seems to be the only factor considered before deciding whether or not to do something.

Sometimes it takes fostering a seeing-eye dog in training to remind us that everything we do should, optimally, be helping someone. When we design a measurement system, it should serve to make the world a (perhaps only slightly) better place. When we work with a student on a senior project, we should be working to help the student learn about the design, analysis, and implementation of a system, and, if possible, we should be showing the students how to build systems that help make the world a better place.

One way we help improve the world is by taking the time to share our knowledge with our colleagues. In this issue of the magazine, we have a nice set of articles written by colleagues who have decided to spend some time to help educate us about their work. We have the first in a series of articles about the history of the National Institute of Standards and Technology (NIST), an article in which simple sensors provide inputs for cognitive robots, the second part of the flow meter tutorial, and, of course, our regularly scheduled columns.
Enjoy!

Shlomo

President's Perspectives
Alessandro Ferrero

How are we Fostering Innovation?

This year, the IEEE celebrates its 125th anniversary. This is a great achievement, as no other global technical society has been active for this long. While reading the IEEE press release about this celebration, I was attracted to IEEE President Dr. John Vig's comment: "For the last 125 years, IEEE has fostered technological innovations." My natural reflex is ask myself if I fully perceive his meaning, especially when I feel somehow involved – as the President of one of the IEEE Societies. In which way has IEEE fostered innovations? Is the I&M Society contributing, and in which way?.

When pondering the way research and innovation are fostered on a global scale, like the scale on which IEEE operates, we think of large, strategic research programs that are directly supported by significant financial investments. However, this model doesn't fit with IEEE activity. To my knowledge, IEEE is not directly involved in any specific research program nor does it finance any specific research team. On the other hand, direct involvement is not the only way to sustain research and innovation. IEEE is the world's largest technical professional society. During its history, IEEE has become the largest archive of technical and scientific knowledge in the field of electrical and electronic engineering. Knowledge is the starting point of innovation, and disseminating it is an extremely important, though indirect way of fostering innovation.

Although our society is much younger than the IEEE – it was founded in 1950 – the Transactions on Instrumentation and Measurement, this Magazine, and the Proceedings from the Conferences, Symposia and Workshops we have sponsored over 60 years represent an impressive database of knowledge in the I&M field. There is, however, something that still puzzles me. My department maintains a full collection of our Transactions, back to the first issue from 1952. If I compare that first issue with the most recent, the only perceivable difference is the printing lay-out. If I compare photographs from old conferences with those of our last I^{2}MTC, the atmosphere is pretty much the same, except for the audio-visual equipment. How is it that the impressive evolution of Information and Communication Technology during the last decades does not reflect more distinctive evidence of our dissemination of knowledge? Are we so outdated that we should worry about our capacity to foster future innovations, or is there something in those old journals and conferences that new technology can't replace yet? Shouldn't we build a new scenario, where new and old technologies mix to optimize knowledge dissemination?

Here is my experience: The IMS is investigating new ways to disseminate knowledge in the I&M field and started a web tutorial program, since making videos accessible through a simple click of the mouse is the most efficient and inexpensive way to reach interested people all around

the world. The first short tutorials on some basic topics are already available on our web site (www.ieee-ims.org).

While I was recording a few of the tutorials myself, I realized how different looking into the cold eye of a camera is from looking into the eyes of students in a regular class! Its camera eye's dull expression doesn't help me. When I realize that my students, instead of wearing their usual bright glance, start glaring at me, I can immediately find the right words to make them understand what I'm explaining. If I put myself in their shoes, I see a tremendous difference between listening to a live speaker and watching a video!

Clearly, traditional conferences, tutorials and classes are still attractive: interaction is the keyword. Attendees can ask questions to speakers, they can exchange ideas, and from this interaction they can find new important suggestions for their activity. Obviously, face-to-face events and remote, web-based events are complementary, and a leading technical professional society like ours should pursue both strategies and offer its membership the advantages of both.

Our web tutorial program aims to provide answers to specific problems in a cost-effective way, and with limited finances, it is probably, the best "learning tool" we can offer. But this program may also trigger curiosity and interest for a deeper investigation. Our publications offer the best of scientific and technical investigation. Our conferences offer opportunities for scientists to meet speakers and interact with each other. And let's not forget our Distinguished Lectures Program: one of the institutional tasks of our local Chapters is to organize Distinguished Lectures on topics of interest its membership. We're renovating the tools that allow us to pursue our mission of fostering innovations, adding new, more modern ones to the old ones, and trying to find the optimal mix.

Alessandro

Article Summaries

First in a Series:
The Early Years of the National Bureau of Standards:
Born to Measure

(Summary)

James F. Schooley, Sr.

This is the first of 4 articles about the early history of the National Bureau of Standards (NBS), which in 1988 became the National Institute of Standards and Technology (NIST). An overview of the state of standards in America during the first decades of its existence, some of the origins of the scientific approach to metrology, and the growth of the NBS through the contributions of some of the outstanding people who participated in metrology are included. Highlights of this article include the outstanding progress in standardization forged by Ferdinand Hassler for the Coast Survey of the early 1800s.

This summary was written by Kristy Virostek.

Simple Sensors Provide Inputs for Cognitive Robots

(Summary)

Paolo Arena and Luca Patanè

"Machines and robots that have the ability to solve an ever increasing number of tasks will continue to be integrated into our everyday lives. What is still lacking for a real breakthrough is a suitable degree of flexibility and adaptability that will allow a cognitive robot to deal with dynamically changing environments and situations that cannot be designed a priori.

In this paper, we review a series of "show-case cognitive robots" in which sensors measure distance, contact, or visual data to provide a suitable input for emergent behaviors that will provide solutions to specific goals. In most of our simulations or experiments, we created models that follow biological principles found in insects. First, we review two paradigms for animal locomotion: the Central Pattern Generator (CPG) and a reflex based approach. We show how simple, contact sensors are able to provide efficient feedback for sophisticated and adaptive locomotion strategies. Next, we show how some simple (lower level) sensors can be used to train more complex (higher level) ones with data (which are at the beginning nothing more than clusters of pixels) that associate "meanings" to visual details by using bioinspired processing algorithms. The last example shows the emergence of cognitive schemes in spatial-temporal nonlinear neural lattices that are induced by sensory events."

This summary includes text from the first two paragraphs of the article.

Tutorial 20:
Flow Meters: Part 2

(Summary)

Miguel Pereira

As follow-up to an earlier overview of the basic principles of volumetric and mass flow meters, error compensation techniques and an introduction of smart flow meters, this article explains the working principles, advantages and disadvantages of four specific types of inferential flow meters: differential pressure, variable area, target, and velocity flow. Some experimental results are presented from a linearization technique using a nonlinear A/D converter to linearize a differential flow meter's square root characteristic.

This summary was written by Kristy Virostek.

Column Summaries

Instrumentation Notes

(Summary)

Andrzej Michalski

Computer-Aided Design Tool for Electromagnetic Sensors

Numerical simulation is an invaluable tool for the designer of any device. By providing a model of the sensor within the design parameters, simulation can substantially speed up and simplify the design process and give a reliable estimation. The use of optimization algorithms can lead to much better sensor characteristics and reduce sensor costs and operation.

As an alternative to commercial electromagnetic simulation software packages on the market, this article proposes that lightweight, problem-oriented computer-aided design (CAD) systems that can be used to design and test sensor prototypes. These systems are easy to develop and are faster, more precise and demand less hardware. Since they can completely hide the numerical model, the user can learn to use the system quickly without a sophisticated math background. A case study using CAD of an electromagnetic flow meter for open channels with a Flow Meter Design Tool is presented.

This summary includes text from the column.

Tried and True
(Summary)

Kim Fowler

The Reality: Academic Research to Commercial Product, Part 2

This column gives two examples of bringing products from technical design to market, including a fictitious parking indicator system for large car parking garages and an implantable medical device. Each presents the estimated non-recurring engineering (NRE) costs of product development and how these factors relate to the final costs of bringing the product to market through installation or implantation. The potential costs of company infrastructure, quality testing, manufacturing, and distribution demonstrate that proof-of-concept development is just a fraction of the cost and effort required to market a commercial product.

This summary was written by Kristy Virostek.

A Look Back
(Summary)

Bernie Gollomp

Material Properties Influence Performance, Quality and Cost

Until the 18th Century emergence of the Industrial Revolution, locally produced metallic and non-metallic raw materials influenced societal and economic advances. Communities and regions acquired reputations for the quality of their products based significantly on the raw materials' quality. The Industrial Revolution fostered the transformation from small, guild-governed enterprises to increasingly larger manufacturing enterprises. As manufacturing enterprises grew, the need increased for raw materials with known and assured properties. Over the past century, advancing and disseminating scientific and technical knowledge has been crucial to commercial and industrial growth.

This summary includes text from the column.

New Products
Robert Goldberg

Interface Virtually Any Sensor or Instrument to a Control Network with Ethernet I/O

Acromag further extends their EtherStax™ line of rugged, high-density Ethernet I/O blocks for distributed I/O and SCADA applications with the release of new combination analog input/output models. The ES2151 and ES2152 feature 16 DC current inputs, 16 voltage inputs, and either 16 current or voltage output signals, respectively, to interface sensors and actuators to an Ethernet control network. Modbus TCP/IP and UDP/IP protocol communication, as well as peer-to-peer messaging are supported. A DB25 input port connects a rack of 7B or 8B signal conditioning modules to monitor a wider variety of sensors including temperature, frequency, and load cells. ES2152 models also have a DB25 output port to control 7B/8B analog output modules. Fast, high-resolution 16-bit A/D and D/A scanning updates all channels in under 10ms.

Two models, both with 16 analog current and 16 voltage inputs, support a variety of I/O ranges. The current inputs accept ±20mA, 0-20mA, or 4-20mA ranges. Voltage inputs handle ±5V and ±10V ranges. A DB25 port allows alternate voltage inputs from a 7B or 8B signal conditioning module rack supporting nearly 100 additional input types with channel-to-channel isolation. Dual-format data registers support 16-bit integer and 32-bit floating point formats. Scaling registers are configurable on a per-channel basis. The ES2151 has 16 analog current outputs while the ES2152 provides 16 voltage outputs and an alternate DB25 interface for use with isolated 7B/8B analog output modules.

EtherStax I/O units are designed for high-reliability operation. Numerous features help prevent downtime, improve performance, and withstand harsh industrial environments. Some examples of this are:
Dual network ports provide a redundant communication path for critical applications with support of 100Base-FX fiber-optic and/or 10/100Base-TX copper connections.
Dual DC power terminals permit redundant power sources. Internal diode coupling delivers a "bump-less" transfer to the backup power source.

For more information please visit http://www.acromag.com.

High Speed Bit Error Ratio Receiver Reference Platform

Inphi ® Corporation introduces a 28G Bit Error Ratio (BER) Receiver reference design. The 28G BER Receiver is for R&D or production testing of emerging high speed protocols from 13 to 28 Gbps, including 100 Gb Ethernet, 40G Differential Quadrature Phase Shift Keying (DQPSK), 14G Fiber Channel, and 100G Dual-Polarization Quadrature Phase Shift Keying (DP-QPSK).

The reference design helps to accelerate time-to-market for Test & Measurement vendors designing next generation 28G test platforms.

For high speed data links, BER testing is the most fundamental test at the physical layer, as it measures whether the data bits are correctly transmitted across the link. Bit Error Rate Tester (BERT) systems for speeds up to 12.5 Gbps are well established. However, with the emergence of networking standards such as 40G SONET, 100G Ethernet, and 14G Fiber Channel, design

and test engineers require BERTs with high speed front-ends above 12.5 Gbps, up to 28 Gbps. The Inphi 28G BER Receiver reference design addresses the challenge of designing a high speed front-end at 28 Gbps, and integrates an Inphi chipset in a proven, high performance, and reliable design.

The reference design, together with a 12.5G BERT and a 28G high speed test pattern generator, comprise a complete 28 Gbps test solution. For test applications requiring clock recovery, the 28G BER Receiver reference design provides a buffered copy of the high speed input data stream, which can be supplied to an optional Clock Recovery Unit to generate a recovered clock.

The 28G BER Receiver reference design is based on an Inphi chipset of a 5081DX 50 Gbps 1:4 Demultiplexer, 25717CF 25 Gbps 1:2 Fanout, and 20709SE 20 Gbps 2:1 Selector.

Learn more about Inphi Corporation and this product by visiting www.inphi-corp.com.

LXI Function Card Carrier

Bustec, Inc. launches its new ProDAQ 6100 series product line to extend its cost- effective, high performance range of data acquisition and I/O (input/output) products to a LAN (local area network) platform. LXI (LAN extension for Instrumentation) defines a uniform, interoperable LAN implementation, allowing measurement and data acquisition functions to be integrated easily into modular test systems.

Bustec's first release based on LXI is the ProDAQ Model 6100 LXI function card carrier. The 6100 series provides access for up to four Bustec ProDAQ function cards through a standard Gigabit LAN interface. The 6100's small form factor and connectivity, combined with the flexibility of the ProDAQ function cards, allows users to create multifunction instruments wherever the application requires them.

The ProDAQ 6100 is a Class B LXI device that takes full advantage of both the synchronization of the data acquisition and Ethernet clocks to an accuracy of 20 ns. Its half-rack, 1 unit size allows two carriers to be mounted in a rack with, for example, up to eight function cards, or as many as 192 channels. With its LAN control and browser software, operators can be remotely located for data collection and analysis.

Find more information at www.bustec.com.

New Low-Cost Temperature/Relative Humidity Logger with LCD Display

Measurement Computing Corporation announces the addition of a new LCD temperature/ humidity logger to its growing line of data loggers. The USB-502-LCD is a perfect, cost-effective solution for long- or short-term logging applications, and features an LCD window for quick-look temperature and humidity information.

The USB-502-LCD standalone data logger measures and stores up to 16,379 relative humidity and 16,379 temperature readings over the 0 to 100% RH and -35 to +80 °C (-31 to +176 °F) measurement ranges, and calculates dew point.

The high-contrast LCD shows a variety of temperature and humidity measurements as well as logger status information. At the touch of a button, users can turn on the LCD display, and cycle

through the most recent, the maximum, and the minimum logged temperatures and relative humidity readings. Flashing LEDs indicate logging status, and a user-replaceable long-life lithium battery is included, which can typically allow up to one full year of logging.

The USB-502-LCD logger is supported by USB-500 Series Data Logging Application software, included with the package. This user-friendly, intuitive software is used initially to configure the logger, program alarm thresholds, logging rates, start times, and measurement units, etc. When the logger is retrieved from the field, the software provides simple one-click access to download, display, and export the data.

More information is available on the Web at www.mccdaq.com.

New CompactPCI/PXI ADC Module

KineticSystems announces its new CompactPCI/PXI Bridge Signal Conditioning module with on-board ADCs. This single-width CompactPCI/PXI module incorporates 8 signal conditioning channels and 8 independent 16-bit ADCs as well as 16 multi-function digital I/O channels.

Since all of these functionalities are available in a single module instead of 2 or 3 separate modules, the CP246 eliminates the need for complex field wiring. As a result, system noise is reduced and overall accuracy of the data measured is increased. Since the number of modules required in the system is also reduced, the size and number of chassis required is also minimized.

Installing the CP246 is quick and easy as well. Plug and Play drivers for configuring and using the device and application examples to illustrate its basic functionality are included. Application programming is also simplified, since you only need to communicate with one API for all of the functionality of the module.

In addition, the CP246 includes a copy of SoftView, KineticSystems' powerful out-of the-box solution for card identification, configuration and operation. SoftView also integrates KineticSystems' entire line of cPCI/PXI instruments under a single software package to allow multiple instruments to be managed simultaneously.

Typical applications fatigue testing, RTD temperature measurements, vibration and torque measurements, compression and tension measurements, industrial monitoring and control, automated test equipment and general-purpose digital control or monitoring.

The flexibility of the CP246 allows it to be used to measure data from different sensor inputs of various applications as the need arises. The bridge signal conditioning or the ADC functionalities can be used independent of one another, adding to the flexibility of the device.

For more information please visit
http://www.kscorp.com/Products/pxi/analog_digital/CP246/index.htm.

Family of High Efficiency Intelligent Transformers (15 - 750 kVA)

Power Distribution Inc (PDI) announces the release of the Powercube™ family of high efficiency transformers for data center, industrial, and commercial applications. These transformers are designed to drive energy costs down in existing installations and help facilitate LEED certification points for new installations. PDI's standard units include their proprietary

high efficiency (TP-1 compliant) transformers, which improve power quality and reduce the energy footprint of any installation. PDI's optional award winning intelligent Wavestar™ monitors with PDI Q can be factory of field installed for a best in class monitoring system that seamlessly integrates to the building management system. The PDI Q system helps calculate real time efficiency savings for improved reliability and energy management.

This new addition to the PDI family of products build upon the successful release of the Wavestar™ static transfer switch, the Wavestar™ power distribution system, and the PDI Q intelligent monitoring systems.

For more information about Power Distribution Incorporated and their complete line of power distribution and power conditioning equipment, please visit the PDI website at www.pdicorp.com.

Mobile Equipment Vehicle Proximity Sensors Provide Rugged, Dependable Operation

TURCK introduces its new family of robust inductive proximity sensors for use on mobile vehicle systems. Designed to reliably detect the position of doors, ladders, outriggers, gates and booms, the Mobile Equipment Sensor Series delivers rugged sensing solutions for agriculture, construction, commercial and utility industry mobile equipment applications. The sensors are available in five styles—M12, M18 and M30 barrel sensors, along with Q14 and Q20 rectangular versions—to easily install on a wide range of mobile vehicles. By incorporating advanced technology and enhanced electronics, the sensors provide an extended sensing range while resisting the high levels of EMC often found with mobile vehicle electric systems.

The Mobile Equipment Sensor Series is constructed of robust PBT housings and durable materials, such as stainless steel, to resist stones, salt spray and extreme shock and vibration. To ensure dependable operation in the broadest range of environments, the sensors deliver IP 68 and IP 69k protection and a temperature range of -40 to 85° C. In addition, the sensors series offers load dump compensation to withstand electrical pulses and provide reliable operation.

With quick-disconnect or potted-in cable connections, as well as optional mounting accessories, the sensor series is quickly simply integrated into mobile vehicle systems. Optional pigtail versions with standard automotive connections are also available.

For more technical information please visit http://www.turck.us

Complete Jitter Tolerance Characterization, Compliance Testing for PCI Express® and More

Agilent Technologies Inc. announces that its new J-BERT N4903B high-performance serial BERT (Bit Error Rate Tester) offers the only complete jitter tolerance testing for high-speed digital interfaces operating up to 12.5 Gb/s. Design and test engineers can now accurately characterize and test compliance of next generation multi-gigabit serial bus devices, such as PCI Express (PCIe) 2.0, USB 3, QuickPath Interconnect (QPI), Hypertransport 3 and fully-buffered DIMM 2 (FB-DIMM 2), receiving the most integrated and accurate characterization to enable more robust designs.

Forward clocking architectures, such as QPI, Hypertransport, and FB-DIMM 2, operate with forwarded clocks running at half the data rate. This causes additional test challenges to the

design teams when characterizing these receivers under real-world stress conditions. Agilent's J-BERT N4903B characterizes the jitter tolerance and margins of such receivers by providing half-rate clocks with variable duty-cycle distortion to emulate effects of non-ideal clocking.

Higher data rates of next-generation high-speed embedded clocked computer and video buses, such as PCI Express 2.0, USB 3, DisplayPort and SATA 6G, require sophisticated jitter injection and signaling during the test-and-validation phase. The new Agilent N4903B addresses these needs by offering even more calibrated and built-in jitter injection and signaling capabilities.

Benefits of the Agilent J-BERT N4903B High-Performance Serial BERT include:
- the ability to emulate worst-case conditions by generating half-rate clocks with variable duty cycle and jitter for forward-clocked devices;
- most integrated and calibrated jitter sources, with selectable random jitter with PCIe 2.0-compliant spectral distribution, single- and two-tone periodic jitter, spread spectrum clock (SSC) and residual SSC, BUJ, built-in ISI, and sinusoidal interference;
- easier adoption to the device under test by emulating electrical idle conditions and offering variable output voltage levels on supplementary outputs (trigger output and aux data output);
- faster execution of long test sequences with 60 block pattern sequencer; and
- an upgrade path from Agilent's N4903A to N4903B, protecting investments.

Additional information about Agilent's J-BERT N4903B is available at
www.agilent.com/find/jbert.

High Resolution, Low Noise, Data Recorders Ideal for Research Applications

iWorx Systems, Inc. has expanded its 400 Series line of high performance, research grade recorders with 8 and 16 channel models. The recorders offer 16-bit resolution and low noise performance making them ideal for most research applications. Built-in LabScribe2 Data Acquisition and Analysis software allows "one-click" control of the entire acquisition process, plus includes a large library of standard analytical functions to process data. The 400 Series data recorders are plug and play compatible with any analog amplifiers, probes, transducers, or other accessories.

iWorx 400 Series recorders use a 16b ADC to sample data over its full input range of ±10V at speeds from 10 to 100 kHz (depending upon model). The low noise (<1mV) greatly reduces the need for gain and offset. The recorders are powered via a USB interface to any Macintosh or PC and provide turnkey continuous recording without the complexity associated with systems requiring PCI bus plug-in cards.

Built-in LabScribe2 Data Acquisition and Analysis software is easy and straightforward. It supports real units and a time based display that is not coupled to sample rate. The display can be configured to allow viewing of as many data points as the user desires. Scrolling, zoom-in and zoom-out tools, together with a searchable list of user interventions, make finding important areas of data easy. LabScribe2 provides a powerful array of built-in data analysis tools. It strikes a balance between the straightforward, general operations that everyone uses and the vertical, complex routines that only you use. The result is a powerful analytical tool that can go to work on your data right away, or be customized to do very specific and complex analyses.

Please visit www.iworx.com for more information.

Digital High-Speed Camera Family

Vision Research extends its Phantom® family of digital high‑speed cameras with the introduction of the v310. Featuring a custom-designed, high-performance CMOS sensor, the Phantom v310 offers users a wide aspect ratio and a top speed of 3,400 frames‑per‑second (fps) at the camera's maximum resolution of 1280x800. At reduced resolution, the v310 can record at speeds up to 500,000 fps.

Ideally suited for a number of applications, including scientific research, product development, and ballistics and explosions testing, the v310 offers an impressive price/performance ratio that sets a new industry standard for one-megapixel digital high-speed cameras. The v310 is also as stylish as it is advanced, boasting a new camera architecture and design first introduced in the Phantom v12.1.

Compared to traditional square imaging sensors, the wide aspect ratio afforded by v310's proprietary CMOS sensor allows users to keep moving subjects in-frame longer and see more of the event being recorded. Available in color or monochrome, the v310's CMOS sensor outperforms comparable imaging systems in terms of light sensitivity, as it features an active pixel size of 20 microns coupled with improved quantum efficiency. To eliminate blur and accentuate detail, users can take advantage of short exposure times - as fast as one microsecond.

The Phantom v310 supports both 8- and 12b pixel depth for maximum detail and clarity and also incorporates Vision Research's Extreme Dynamic Range (EDR) technology. EDR is a useful feature which allows users to capture two different exposures within one single frame. Furthermore, Vision Research adds to the overall ease of use and flexibility of the new Phantom v310 thanks to auto exposure, which automatically adjusts the camera to adapt to changing lighting conditions.

For additional information regarding Vision Research, please visit www.visionresearch.com.

Handheld Spectrum Analyzers Meet All Requirements for Field Use

Rohde & Schwarz is presenting two truly all-purpose instruments for mobile spectrum analysis: the R&S FSH4 and the R&S FSH8. Both analyzers are rugged, handy and lightweight. They also come equipped with a powerful battery pack. The R&S FSH4 and R&S FSH8 cover the frequency range from 9 kHz to 3.6 GHz or 8 GHz. Depending on the options installed, they can also be used as two-port vector network analyzers, as cable and antenna testers or as power meters. This means that they support almost all RF measurement tasks encountered in service, installation and maintenance applications.

Mobility, ease of operation, superior measurement characteristics and versatility are the assets that make it possible for the new R&S FSH analyzers to simplify and facilitate daily work. Their low weight of only 3 kg (including battery) and their compact size make them ideal for mobile use. The battery can power up to 4.5 hours of operation. If the field work takes longer, on-site replacement of the battery poses no problem. Since the R&S FSH analyzers conform to protection class IP51 and feature splash-proof, dust-protected connectors, they are reliable tools even under adverse ambient conditions.

In addition to their low weight and compact size, their vertical design makes the analyzers

extremely handy. The user can easily reach all keys without having to put down the instrument. Flat menu structures and separate keys for frequently used functions help ensure efficient work. The large, high-contrast VGA color display is easy to read even under difficult lighting conditions.

Besides the base models, Rohde & Schwarz offers models with built-in tracking generator as well as models with an integrated VSWR bridge for vector network analysis. Sensors that are also available from Rohde & Schwarz convert the R&S FSH4 and the R&S FSH8 into high-precision power meters. This means that the analyzers provide all the functions for the installation and maintenance of radio transmitter systems in a single box.

For more information please visit www.rohde-schwarz.com.

New Ultra High-Speed Laser Scanner

Leica Geosystems announces the Leica HDS6100, an improved, ultra-high speed laser scanner for many as-built survey applications. The Leica HDS6100 features several key enhancements over its predecessor, the Leica HDS6000 scanner, which has been the laser scanning industry's most popular phase-based scanner.

Compared to its popular predecessor the new Leica HDS6100 scanner features:
▪ 37% increase in the operating temperature range (now -10ºC to +45ºC)
▪ 67% increase in battery life of the internal, removable battery (now 2.5 h)
▪ New, integrated wireless LAN (WLAN) scanner control option
▪ Reduced range noise at longer ranges (e.g. 25m and 50m)

Leveraging the phase-based engine's inherent ultra-high scan speed (up to 508,000 pts/sec) and full field-of-view (360º x 310º) design, advances in the Leica HDS6100 let users take advantage of the benefits of ultra-high speed High-Definition Surveying™ (HDS™) in more conditions and locations with less hassle.

Likewise, the new Leica HDS6100's longer battery life and convenient wireless LAN control make ultra-high speed scanning more productive and more hassle-free, while less range noise in the scan data provides more accurate survey results and increased application versatility.

For more information please go to http://www.leica-geosystems.com/us/en/lgs_64228.htm

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Technical Committee News

Kang Lee

Reports on Technical and Standards Activities
Fall 2008

TC-2 DC-LF Measurement: by **Yicheng Wang**

- TC-2 has received positive feedback for the tutorials on quantum-based electrical standards, which the committee helped to organize for the I^{2}MTC 2008. This is a part of TC-2 effort to collect ideas to guide future TC-2 activities."

TC-3 Frequency and Time: by **Eva Ferre-Pikal**
- As a part of the SCC 27, the TC-3 worked jointly with the UFFC to revise the IEEE Std. 1139 Standard Definitions of Physical Quantities for Fundamental Frequency and Time Metrology - Random Instabilities. The revision was finished earlier this year. The draft went through balloting in July and has been submitted to RevCom for approval as a standard."

TC-4 High Frequency Measurement: by **Yeou-Song (Brian) Lee**
- Activities Reported:
    - Continued close reports with the MTT-11, NCSLI, MSC, and ARFTG
    - Working group and members for IEEE 378, which was approved in June, 2008, are formed. The first meeting will be held in conjunction with the ARFTG.
- Future Plans:
    - Continue to recruit members for this committee.
    - Liaison with other professional societies in the high frequency measurement.
    - Draft a proposal and form a working group for the IEEE microwave and RF power measurement standards by early 2009.

TC-5 Connectors in Measurements: by **Harman Banning**
- No additional information as just received their updated Standard.

TC-6 Emerging Technologies in Measurements: by **Vincenzo Piuri**
- The committee searches for promising technological areas in which measurement technologies and applications are relevant and beneficial.
- In particular the attention has been focused on:
    - biometrics
    - quantum technologies
    - bioinformatics
    - molecular structures
    - organic structures
- The activities concerned the analysis of the field and the identification of potentials for our technologies and knowledge.
- The TC promoted the special issue on "Biometric Instrumentation and Measurement" in the IEEE Transactions on Instrumentation and Measurement, and the special issue on "Biometric Systems" in the IEEE Systems Journals.
- In the last semester the committee strictly cooperated in creating and starting up the IEEE Biometrics Council, in which the IMS is one of the founding member societies.
- Vincenzo Piuri has been elected Vice President for Education of the Council, also recognizing the relevance of measurement and intelligent measurement analysis in this application area.

TC-7 Signals & Systems in Measurement: by **Laszo Sujbert**
- The activity of the TC-7 in the last period was moderated. We have continued working on our testbed for testing signal processing algorithms in sensor networks.
- Another issue is the I^{2}MTC possibly held in Budapest in 2011. We have started with the first discussions at the Dept. of Measurement and Instrument Engineering, Budapest University of Technology.

TC-9 Sensor Technology: by **Kang Lee**
- Activities in the last six months
    - The Technical Committee on Sensor Technology TC-9 sponsored the following working group (WG) activities for standards development.
- IEEE 1451.7 – Sensor and RFID Integration Working Group

- o The working group conducted weekly teleconference meetings preparing a final draft of the IEEE 1451.7 Standard for Transducers to Radio Frequency Identification (RFID) Systems Communication Protocols and Transducer Electronic Data Sheet Formats. The sponsor has worked with IEEE to form a balloting group. The aim is to start balloting by the end of 2008.
- IEEE 1451.1 - Network Capable Application Processor Information Model Working Group
  - o Jonathan Morris of NASA was named the new working group chair.
- IEEE 1588 - Precise Networked Clock Synchronization Working Group
  - o The IEEE 1588-2008 standard has been released by IEEE for purchase. The standard can be purchased at the IEEE Xplore web site.
- Contributed in ISO/IEC/JTC1/SGSN meeting
  - o The Joint Technical Committee I (JTC1) of ISO/IEC has been made aware of the importance of sensor networks in the society of the future. It has formed a Study Group on Sensor Networks (SGSN). Kang made a presentation on the IEEE 1451 smart sensor interface and networking standards at the SGSN meeting held in June in Shanghai, China. The SGSN is working to define sensors, sensor networks, and use cases in order to investigate the need for additional standards to fill the gaps among existing sensor and sensor network related standards. It will make recommendations to JTC1 for future standards development. Kang has made contributions in the draft document. Since then, SGSN held another meeting in September in Germany.
- 2008 International IEEE ISPCS
  - o The 2008 International IEEE Symposium on Precision Clock Synchronization (ISPCS) for Measurement, Control, and Communication was held on September 22-26 at the University of Michigan in Ann Arbor, Michigan. Over a hundred international attendees participated in the symposium. A Plugfest was organized to test the interoperability of the IEEE 1588 standard-based prototype hardware and software. Twenty-six companies and universities participated in the Plugfest event. An industrial exhibit and reception provided an excellent opportunity for sponsors to present their latest IEEE 1588-based products and for attendees to learn about these products for their time synchronization applications. See web site for more detail: http://www.ispcs.org.
- Planned activities for the next six months:
  - o The IEEE 1451.7 Working Group will submit the final draft for balloting and resolve comments as a result of the ballot.
  - o The 2009 International IEEE Symposium on Precision Clock Synchronization (ISPCS) for Measurement, Control, and Communication is planned to be held on September 28 to Oct 2, 2009 at the University of Brescia in Brescia, Italy. See web site: http://www.ispcs.org for the call for papers and further development.

TC-10 Waveform Generation, Measurement, and Analysis: by **Thomas Linnenbrink**
- TC-10 is actively developing and/or promoting five major standards: The revision of IEEE Std 181-2003 (Standard on Transitions, Pulses, and Related Waveforms); the promotion of IEEE Std 1057-2007 (Standard for Digitizing Waveform Recorders); the revision of IEEE Std 1241-2000 (Standard for Terminology and Test Methods for Analog-to-Digital Converters); the development of IEEE Std P1658 (Standard for Terminology and Test Methods for Digital-to-Analog Converter Devices; and, the development of IEEE Std P1696 (Standard for Terminology and Test Methods for Electronic Probes). The committee members reviewed work in progress on 1241, 1658, and 1696 at our May 2008 meeting in Beaverton, OR sponsored by Tektronix. Plans were made to start revising 181 and to coordinate it with the IEC. Ways to promote the new 1057 were discussed. A potential new standard addressing jitter was considered.

The committee will present a TC-10 overview paper to the 16th IMEKO TC4 Symposium/13th Workshop on ADC Modeling and Testing in Florence, IT, September 22 - 24, 2008.   An abbreviated TC-10 meeting will be held on September 24, 2008 in Florence, IT in conjunction with the symposium and workshop noted above. At this time, nearly one third of the TC-10 membership lives in Europe. The winter meeting will be held on the East Coast in February 2009. Specific actives of the five subcommittees are described below.

- **Subcommittee on Pulse Techniques (SCOPT) (181) (Nick Paulter, Chair):**
  The IEEE-SA Standards Board approved a PAR to revise Std 181-2003 on May 19, 2008. Work is to be completed by December 31, 2012. Revisions will include correcting errors, adding information on impulse-like waveforms and, developing reference waveforms for comparison and evaluation of algorithm performance. The chairman is hoping to coordinate this revision process with that of similar IEC documents, namely, the IEC 60469-1 and -2. Nick Paulter, the SCOPT chairman, is also the convener of IEC MT 18 of its TC-85 which is responsible for these two IEC standards.

- **Waveform Measurement Subcommittee (1057) (Bill Boyer, Chair):**
  IEEE Std 1057-2007 was published April 18, 2008. The subcommittee will now focus their attention on promoting awareness of the new standard. Since this standard contains the latest TC-10 definitions and test techniques, it will influence ongoing work on related standards.

- **ADC Subcommittee (1241) (Steve Tilden, Chair):**
  The committee continued aggressive editing and re-writing the maintenance draft update at its May 2008 meeting in Beaverton, Oregon and it will meet next in September in Florence, Italy at the IMEKO 2008 conference on the 24th where further progress will be made on the draft. The subcommittee also participates in I^2MTC quite widely and ADC Forum conferences. Further publication is planned for future conferences and publications as well as the next ADC Forum to spread the word about the standard and solicit input from non-members. This subcommittee recently grew its working membership to speed the process. The deadline for ballot completion and approval for this maintenance cycle is December 31, 2009. One major accomplishment, which was a major reason for this maintenance cycle, was to add an annex on ADC architectures, which has now been drafted. To meet the PAR deadline, further additions cannot be accepted after the upcoming meeting in Florence.

- **DAC Subcommittee (P1658) (Steve Tilden, Chair):**
  The subcommittee made significant progress towards creating the initial draft at its May 2008 meeting in Beaverton, Oregon. It will meet again on 24 September in Florence to continue that work toward creating an initial draft for ballot before the PAR deadline. This subcommittee is still aggressively recruiting new working members to gain momentum toward draft completion. Several of our European colleagues were recently recruited and joined the subcommittee. On 27 March 2008 the IEEE NesCom approved our request for a PAR extension from December 31, 2008 to December 31, 2010 which will allow us to complete the draft and ballot the standard without compromising its depth of coverage or details.

- **Subcommittee on Probe Standards (SCOPS) (P1696) (Robert Graham, Chair):**
  The subcommittee met in Beaverton, Oregon, on May 22nd. At that meeting, all members were briefed on the IEEE patent policy, including the 'Duty to Inform,' using the official briefing material from the IEEE web site. The chair announced that he would have to step down due to a job change, and was unsure if he could attend future meetings. All members were encouraged to recommend membership in P1696 to any interested parties. Efforts are underway to recruit a new subcommittee chairman.

TC-11 SCC-20 Coordinators: by **Joe Stanco**

- Since the last report the SCC20 organization / committees met twice; the first meeting was held in St. Louis, MO on April 22nd through the 24th 2008.
- The second was held in conjunction with AUTOTESTCON 2008 in September in Salt Lake City Utah. In addition, a number of the ATML 1671 dot standards were demonstrated at AUTOTESTCON.
- The Overview and Architecture for exchanging automatic test equipment and test information via XML, IEEE Std 1671-2006 has been published. The ATML companion or dot standards have been through or are in the ballot process.
- The Diagnostic and Maintenance Control (DMC) subcommittee's Standard for Software Interface for Maintenance Information Collection and Analysis IEEE P 1636 (SIMICA), as well as its companion dot standards are in or have been through the ballot process. Demonstrations' involving information exchanges for IEEE P 1636.1 and 2 and AI-ESTATE – 1232 was conducted.

TC-13 Wireless and Telecommunications in Measurement: by **Reiner S Thomä**
- Activities Report:
  - Continue close reports with the MTT-11, NCSLI, MSC, and ARFTG
  - Working group and members for IEEE 378, which was approved in June, 2008, are formed. The first meeting will be held in conjunction with the ARFTG.
- Future Plans:
  - Continue recruiting members to join this committee.
  - Liaison with other professional societies in the high frequency measurement
  - Draft a proposal and form a working group for the IEEE microwave and RF power measurement standards by early 2009.

TC-15 Virtual Systems in Measurements by **Emil Petriu**
- Activities:
  - Organization, in collaboration with TC-27 Human-Computer Interfaces and Interaction and TC-28 Instrumentation and Measurement for Robotics and Automation, of the ***2008 IEEE International Conference on Virtual Environments, Human-Computer Interface, and Measurement Systems - VECIMS'2008***, Istanbul, Turkey, 14-16 July 2008.
- Ongoing:
  - Organization, in collaboration with TC-27 Human-Computer Interfaces and Interaction, TC-28 Instrumentation and Measurement for Robotics and Automation, and TC-37 Measurements and Networking of the ***HAVE'2008 - IEEE International Workshop on Haptic Audio Visual Environments and Games***, Ottawa, ON, Canada, 18-19 October 2007.
  - Organization, in collaboration with TC-22 Intelligent Measurement Systems, TC-27 Human-Computer Interfaces and Interaction, TC-28 Instrumentation and Measurement for Robotics and Automation, and TC-30 "Security and Contraband Detection" Technical Committee of the ***ROSE 2008 - IEEE International Workshop on Robotic and Sensors Environments***, Ottawa, ON, Canada, 17-18 October 2008.

TC-17 Materials in Measurements: by **Jacob Scharcanski**
- We currently are a small group within TC 17, and I am going to have a meeting with the 2009 Workshop organizers in October.

TC-18 Environmental Measurements: by **Michael Gard** and **Gabriele D'Antona**
- This year the TC-18 (environmental measurements) has not been active.

TC-19 Imaging Measurements: by **George Giakos**
- No new activities to report at this time.

TC-20 Transportation Systems: by **Frans C.A. Groen** and **Georg Brasseur**
- The Committee is promoting:
  - basic research on instrumentation and measurement in transportation systems

- o sensor data processing, interpretation and fusion in intelligent transportation systems
    - o Instrumentation and measurement in alternative energies vehicles and driver assist systems.
    - o Incorporating instrumentation, measurement and sensor data interpretation in curricula for automotive and transportation systems.
- Completed:
    - o Organization of a tutorial on "Different measurement issues and how they are solved in transportation systems" at **I²MTC 2008**
    - o Supporting Okyay Kaynak, and Emil Petriu as a member of the Technical Program Committee of VECIMS 2008-International Conference on Virtual Environments, Human-Computer Interfaces, and Measurement Systems, to be held in Istanbul, Turkey, 14-16 July, 2008
    - o The establishment of a "technical co-sponsorship" for the 6th International Conference for Conveying and Handling of Particulate Solids (CHoPS) between IEEE I&M and the Conference organizer. The Conference will be held in Brisbane, Australia on the 3rd - 7th August 2009 (http://www.chops2009.org.au/index.html).
- Ongoing:
    - o TC-20 will organize a special track at CHoPS for sensors usable for the materials the conference is focused at.
    - o Supporting the program Co-Chairs SH Choi, Abdulmotaleb El Saddik, and Stefano Ferrari as a member of the Technical Program Committee of VECIMS 2009 -International Conference on Virtual Environments, Human-Computer Interfaces, and Measurement Systems).

TC-21 Built in Test (BIT): by **Robert Gao** and **Dennis Hecht**
- Initiating a new project with a manufacturer of oil drilling equipment on real-time, in-process condition monitoring, failure diagnosis, and remaining service life prognosis for drilling equipment.
- Participated in an international conference on production engineering and presented a paper on embedded sensing for manufacturing process monitoring.
- Continued activities of the NDIA Integrated Diagnostic Committee, including follow-on work in the area of Electronic Prognostic, for which workshops were held in previous years. A request was received from the JSF Program for helping identify a process by which new technologies can more rapidly find their way onto existing and new platforms (aircraft, tanks, vehicles, etc.). This workshop is tentatively set for January 2009 in New Orleans.
- Initiating changes in the vision statement of diagnosis related activities. One of the results is the changing the name of the NDIA Integrated Diagnostic Committee to Enterprise Health Management Committee. This change was deemed necessary in order to better serve the needs of the sponsors. The ID Committee is expanding its scope to view the ID Process end to end or (in today's vernacular) as an Enterprise. EHM in the Committee name implies a willingness to address the needs of the Sponsor community better because it encompasses the whole Enterprise rather than PHM which implies a focus more on technology than on the broader transition and use (Enterprise) issues.
- Continued discussion on Health Management related activities. It was decided that the task force and future workshop should look at the current practice in health management to identify lessons learned, existing gaps, organization structure, acquisition strategy, and how to address them in the task force's output. The discussion will continue to address all related issues such that HM will be continually funded and grow.

TC-22 Intelligent Measurement Systems: by **Cesare Alippi** and **Mel Siegel**
- The Committee is promoting:

- o basic research on computational intelligence (soft computing and composite technologies) in instrumentation and measurement systems and their applications;
  - o research on intelligent distributed sensing networks based on soft-computing components;
  - o research on computational intelligence methodologies and techniques for adapting processing systems;
  - o the use of computational intelligence technologies in instrumentation and measurement for intelligent manufacturing applications, homeland protection and personal safety.
- The Committee has organized and coordinated
- 2008 IEEE International Conference on Computational Intelligence for Measurement Systems and Applications, July 14-16, 2008, Istanbul, Turkey. Sponsored by the IEEE IMS and the IEEE NNS Society. The committee has also collaborated to the organization of the co-located IEEE VECIMS, 14-16 July, 2008
- The Committee is organising the ROSE 2008 workshop: IEEE International Workshop on Robotic and Sensors Environments, Ottawa, Ontario, Canada, 17-18 October 2008, sponsored by the IEEE IMS.
- TC-22 has provided the technical cooperation to the highly successful special session (two sessions) Energy Harvesting and Management: towards credible deployments in wireless sensor networks and systems, I^2MTC 2008 to promote the use of intelligent techniques in the field of energy harvesting and WSNs.

TC-23 Education for Instrumentation and Measurements: by **Theodore Laopoulos**

- A working group on "Web-Laboratories and E-learning Tools" is currently active and open to interested persons. The group examines the experience of the e-learning in the education on Instrumentation and Measurement (I&M) at different levels, degree courses or long life learning, in relation with the modern capabilities of remote teaching and the use of multimedia communication tools. Those interested please contact Prof. D. Grimaldi, email: grimaldi@deis.unical.it
- TC members are engaged in the organization of the 5th International Workshop on "Intelligent Data Acquisition and Advanced Computing Systems" – IDAACS'09, to be held in Italy next year (September 2009). A special session is planned devoted to educational issues focusing in software tools for practicing on the use of electronic instruments.

TC-25 Medical and Biological Measurements: by **Marco Parvis**

- The third edition of MEMEA (MEMEA-2008 in Ottawa) had a good success with nearly 30 papers and good participation. The financial situation is still not available but it should be with an interesting surplus. The next MEMEA edition is being organized in Cetrara, Italy for 2009.
- The TC Subcommittee on Blood Pressure Measurement (Dr Voicu Groza) after approval on 27 March 2008 by IEEE-SA Standards Board of the PAR "Standard for Objective Measurement of Systemic Arterial Blood Pressure in Humans" is working to produce the first documents so that the work should be completed by the deadline, which has been set for Dec 31, 2012.

TC-26 Radar Cross-Section Measurements: by **Mark Yeary**

- Committee Focus Areas of Research:
  - o Preparation for a new C-band radar at the University of Oklahoma
  - o Design phase of a new mobile X-band weather radar at the Univ. of Oklahoma
  - o Innovative Algorithm Development for Severe Weather Detection and Warning
  - o Hardware Development and Upgrades for Radar Systems
- Specific Committee Activities:
  - o Beginning preparations for I^2MTC 2009
  - o Served on the Technical Program Committee (TPC) for I^2MTC 2008
  - o Reviewing papers for the I&M Transactions

- o Continued interactions with the National Severe Storms Laboratory
- o Working with NASA to measure and characterize airborne hazards
- o Working with Raytheon for innovative radar developments
- o Working to promote the national Multi-Function Phased Array Radar (MPAR) initiative. This is in collaboration with NOAA, ONR, Lockheed-Martin, and the FAA.

TC-28 Instrumentation and Measurement for Robotics and Automation: by Mel Siegel and Emil Petriu

- Activities:
  - o Organization, in collaboration with TC-15 "Virtual Systems in Measurements" Technical Committee and TC-27 Human-Computer Interfaces and Interaction of the **2008 IEEE International Conference on Virtual Environments, Human-Computer Interface, and Measurement Systems - VECIMS'2008**, Istanbul, Turkey, 14-16 July 2008.
  - o Organization, in collaboration with TC6 - Emerging Technologies, TC22 - Intelligent Measurement Systems, and the TC on Industrial Systems Applications - Task Force on Intelligent Measurement Systems of the IEEE Computational Intelligence Society, of the **2008 IEEE International Conference on Computational Intelligence for Measurement Systems and Applications CIMSA'2008**, Istanbul, Turkey, 14-16 July 2008.
- Ongoing:
  - o Organization, in collaboration with TC-15 Virtual Systems, TC-27 Human-Computer Interfaces and Interaction, and TC-37 Measurements and Networking of the *HAVE'2008 - IEEE International Workshop on Haptic Audio Visual Environments and Games*, Ottawa, ON, Canada, 18-19 October 2007.
  - o Organization, in collaboration with TC-15 Virtual Systems, TC-22 Intelligent Measurement Systems, TC-27 Human-Computer Interfaces and Interaction, and TC-30 "Security and Contraband Detection" Technical Committee of the *ROSE 2008 - IEEE International Workshop on Robotic and Sensors Environments*, Ottawa, ON, Canada, 17-18 October 2008

TC-30 "Security and Contraband Detection": by Emil Petriu, Vincenzo Piuri, and Mel Siegel:

- Ongoing:
  - o Organization, in collaboration with TC-15 Virtual Systems, TC-22 Intelligent Measurement Systems, TC-27 Human-Computer Interfaces and Interaction, and TC-28 Instrumentation and Measurement for Robotics and Automation of the *ROSE 2008 - IEEE International Workshop on Robotic and Sensors Environments*, Ottawa, ON, Canada, 17-18 October 2008.

TC-31 I&M for Homeland Security: by **Kang Lee** and **Brian Wadell**

- Sensor Standards Harmonization meetings
  - o Kang Lee organized and conducted a Sensor Standards Harmonization working group meeting on September 9, 2008 at NIST. The purpose of meeting was to coordinate sensor-related standards activities in industry and government in support of homeland defense. The meeting also provided an excellent opportunity for standards development organizations (SDO) to learn of each others sensor-related standards development activities, to avoid the development of duplicated standards, and to fill the gaps with complimentary standards to serve the communities.
- Participated in the 3rd Annual Border Management Summit
  - o Kang Lee participated in the 3rd Annual Border Management Summit, which provides a comprehensive update on border security initiatives including SBI

(Secure Border Initiative), SBInet, US-Visit, US Coastguard program and interoperability issues, etc.
- Planned Activity for the next 6 months:
    o The next Sensor Standards Harmonization meeting is planned to be held in Dec, 2008 at NIST. A white paper on sensor standards suitable for homeland security will be discussed. Party interested to participate in the meeting can contact Kang Lee at kang.lee@nist.gov.

TC-33 Characterization of Electrical HF and Optical Nonlinear Components: by **Marc Vanden Bossche**

and Yves Rolain

- Co-organization of a series of special sessions at I^{2}MTC 08 entitled: "Advances in microwave measurements**"** in 2 sessions, attendance was in line with the rest of the conference. We would like to make it a tradition to organize these sessions at I^{2}MTC. Co-organization of a 3-hour tutorial workshop at I^{2}MTC 08: "Measurement and Modeling of Nonlinear Systems"**.** The 3-hour tutorial attendance was low, but not lower than in many other tutorials. Evaluations were good
- Liaison function to the MTT-11 TC on microwave measurements, to try to bridge the gaps!

TC-34 Nanotechnology in Instrumentation and Measurement:
    New Chair: Cindy Harnett

TC-35 Net-centric Operations Interoperability
    New Chair Needed

TC-36 Industrial Inspection by **Zheng Liu and David Forsyth**
- A survey on data standard for non-destructive inspection is being prepared and will be available online next month.

TC-39 Measurements in Power Systems
    New Chair: Lorenzo Peretto

Membership Notes

Jorge Fernández Daher

I would like to remind you that the half-year dues period starting March 1st is a peak recruitment time. It allows people to test IEEE membership for a smaller initial fee. New members pay half-year dues when they sign up between March 1-August 31. Services commence immediately upon joining and continue through December 31. This is a good time to join IEEE and our Society. If you want to need more information, visit:
http://www.ieee.org/web/membership/join/join.html

All Chapters interested in submitting a proposal for the Outstanding Chapter 2008 Award need to follow the guidelines listed on the IMS website: http://www.ieee-ims.org/site/membership/chapter/Chapter_Award_Form%20and%20Guidelines_2007.doc

If you want to learn more of our society go to:
http://www.ieee-ims.org/site/index.php

Outstanding Chapter Award 2007

Ukraine Chapter has been selected for the Outstanding Chapter Award for 2007.   All four of the applications our committee received were highly commendable, including ones from Italy, New Delhi and Cleveland. We would like to congratulate Professor Anatoly Sachenko and his officers for being so active. The award includes a Certificate and cash award of USD 1000. The criteria adopted are based on membership increase, membership advancement/Senior member increase and technical or societal activities. We are including some information on the activities of Ukraine's Chapter.

The Instrumentation & Measurement / Computational Intelligence (I&M/CI) Societies Chapter of IEEE Ukraine Section was established on June 7, 2005. The Chapter consists of 15 active members from Lviv, Ternopil, Khmelnytskyy, Kyiv, Kharkiv, Zaporozhye. The Chairman of the Chapter is Prof. Anatoly Sachenko. Although members are not numerous, it is a team of highly qualified researchers capable of solving tasks in computing and modern information technologies on the level of international projects and inventions. High-level research and technological activities is proved by Chapter members receiving international grants such as INTAS, CRDF, STCU, NSF, and NATO. These grants are awarded for development of devices, systems and software in measurement, computing, robotics and image processing for security systems. Most of the Chapter Members helped organize or presented at the International Intelligent Data Acquisition and Advanced Computing Systems (IDAACS) Conference. IDAACS provides a forum for high quality reports on the state-of the-art Theory, Technology and Applications of Intelligent Data Acquisition and Advanced Computer Systems used in different areas. The Workshop is supported by IEEE and has been held every two years since 2001. Previous IDAACS Workshops were held in Foros, Ukraine (2001), Lviv, Ukraine (2003), Sofia, Bulgaria (2005), and Dortmund, Germany (2007). Some of the Chapter Members are currently preparing the fifth IDAACS Workshop to be held in Rende (Cosenza), Italy, September 21-23, 2009.

Chapter Activities During the Previous Calendar Year: The 4th Chapter Meeting
On January 24th, 2007, a joint meeting of the IEEE Ukraine Section - I&M/CIS Chapter and the IEEE Student Branch of Ternopil National Economic University (TNEU) was held.   There was discussion about: recruiting new senior and student members involved in different research areas; keeping current members active; providing members with practical and useful information about IEEE events and conferences; IEEE conference attendance; and VCF support for members for 2007 year. There were 14 participants at this meeting.

All Student Branch members and some of the Chapter members are from the Faculty of Computer Information Technologies of TNEU . Some of the Student Branch and Chapter members are involved in international projects that are conducted by the Research Institute of Intelligent Computer Systems (ICS) of the University. The Institute has several Research Groups, that include students from Student Branch as well as Chapter members. These are the Intelligent Sensor DAQ Group, Group of Web-based Systems, Intelligent Robotic Systems Group, Intelligent DAQ & Measurement Systems Group, Group of Knowledge Base and Ontology, Intelligent Distributed & Cyber Security Systems Group, Metrology and Standardization Group, and the NN and Parallel Computing Group.

The 5th Chapter Meeting
The IEEE Fourth International IDAACS 2007 was held in Dortmund, Germany on September 6-8, 2007. The workshop was organized by the Research Institute of CS and TNEU, in collaboration with University of Applied Sciences, Fachhochschule Dortmund, (UASFD). Co-chairmen of the Symposium were Prof. Anatoly Sachenko, IEEE I&M/CIS Chapter Chair, Scientific supervisor of ICS and Head of the Department of ICS and Control of TNEU, and Prof. Peter Reusch, UASFD. The IDAACS Workshop gathered 120 participants from 36 countries.

The Meeting of IEEE I&M/CI joint societies chapter members, conference participants and IEEE Student members was held the final day of the workshop. Prof. Anatoly Sachenko, Chapter Chair acquainted the audience with: key aspects of the IEEE organization; professional and technical benefits of IEEE membership; awards and contests; and potential venues for IDAACS 2009. He recognized that the IDAACS Workshop is a good way to establish new research and research links between participants.

Summary of Significant Chapter Accomplishments:
One of the Chapter accomplishments is that it uses different kinds of meeting preparation, in particular:
- During the First Chapter Meeting held on December 19-20, 2005 at Ternopil State Economic University (TSEU), Ternopil, Ukraine (supported by IEEE I&M/CI Society and TSEU) invited speakers made presentations together with regular presentors. Also, there was a Software engineering competition among the TSEU Faculty of Computer Information Technologies students. The winners received $25 each for IEEE annual membership.
- The third Chapter Technical Quasi-virtual Meeting held at TNEU, Assembly Hall of Building #11, on December, 22, 2006 included two virtual presentations:
  - "User authentication based on behavioral patterns" delivered by Dr. Adrian Kapczynski, Silesian University of Technology, Zabrze, Poland, and
  - "Ontology as the way of knowledge base creation for computer systems" delivered by Academician Oleksandr Palagin, Glushkov Institute of Cybernetics, National Academy of Science NAS) of Ukraine, Kiev. Participants were able to ask questions to the remote speakers in real-time. There were also presentations of three invited speakers.

The Chapter successfully held the 8th IEEE Ukraine Section I&M/CI Joint Societies Chapter Meeting at the end of 2008. There were 51 Meeting participants from universities and industry. They represented four Regions of Ukraine, among them: Ternopil, Odessa, Lviv and Chernivtsi Regions.

More information can be found at
http://www.tneu.edu.ua/?page=news&op=detail&uid=1440&lang=en

Contact us! I would like to encourage all of our members to participate and suggest new ideas so that our Society can better serve your needs. I may be contacted by email at j.daher@ieee.org , or you may contact our Chapter liaison John L. Schmalzel, j.schmalzel@ieee.org.