Measurements in the World at Large

From the Editor's Bench
Shlomo Engelberg

We Are All in It for the Long Haul

There are seemingly harmless decisions that I made and habits I got into years ago that I now regret. It seems like every year I work a bit more. You wouldn't think that adding five or ten minutes to your workday would be a big problem, but if you add a few minutes about once a year, over the course of twenty years, those minutes easily become a couple of hours added to your workday. Over the years, I seem to have gone from being someone who works reasonable hours to being a bit of a work-aholic. Many people, engineers and scientists included, find it hard to make long term decisions that take into account the very long term consequences of their actions. It is important to remember that we, our children, and our grandchildren are all in it for the long haul.

Over the years, I have gotten into the habit of eating a few more calories each day than I should. On any given day, the few calories do not seem like a big problem, but over the years those few calories sure add up. It's hard to keep in mind that an extra thirty calories a day lead to a weight gain of about a pound every few months. A couple of pounds are not that big a deal, but over the years, the pounds add up.

On a societal level, we seem to have a hard time dealing with the fact that a little bit of pollution each year over a period of many years leads to all sorts of problems. We ought to be more careful about polluting, and if we were really capable of thinking in terms of how things will look in another hundred years, I think that many of us would be more careful about the small injuries we inflict upon the environment.

There are also good habits that we do not get into because we are not good enough at understanding the long-term benefits those habits will have for us. I know that I should be exercising more; for a variety of reasons, I find it hard to do so. We all know that it is important to set aside some time each week to keep up to date technically. How many of us see the long term consequences of our continuing-education decisions sufficiently to set aside enough time for this activity?

At the magazine, we hope that by providing you with a range of columns, articles, tutorials, and other features that we help you achieve your long term goals by making keeping current a pleasant task.

In this issue of the magazine, we have an article that considers a method for automating the measurement of compli-ance with hand- hygiene procedures in a medical setting; the second part of a series on MEMS sensors; the first of a two part series that looks at issues that pertain to high

voltage systems; an article about environmental sensor networks; and an article that describes ways of allowing "edge" devices to abstract information from incoming signals. As always, we have a nice selection of columns as well. Enjoy!

A New Addition to the Magazine's Staff

Dr. Michael Gard was recently appointed the associate editor-in-chief of this magazine. Mike comes to the magazine with a wealth of experience. He is a registered professional engineer, registered patent agent, inventor, author, senior member of the IEEE, and he has been adjunct faculty in Electrical and Computer Engineering at Oklahoma State University. He is currently employed by the Charles Machine Works, Inc., of Perry, Oklahoma, where his work includes low-power precision analog and analog/digital systems for hostile environments. Welcome aboard Mike!

Shlomo

President's Perspectives
Jorge Fernández Daher

Developments in Relevant Activities

In this column, I would like to comment on some improvements and ideas we are working on in the Instrumentation and Measurement Society's Administrative Committee (AdCom). The IEEE uses several metrics to evaluate the performance of all relevant activities. One of the metrics used in publications is the average time in months from submission to publication. I remember some years ago when colleagues complained about how long they had to wait to see their papers published in our Transactions. Two years ago, the members of the Publications Committee established a goal of publishing in print within twelve months of submission. Last year, when we saw the values, we were very satisfied since the time to print went down from more than thirteen months in 2009 to less than ten months in 2011. The goal was achieved, and the time-to-print is even better than expected.

When I started working in the Membership Development Committee, there were 32 Chapters, mainly in Regions 1 to 8. Our membership was split pretty evenly between North America and Europe. By the end of 2011, there were 41 Chapters which means an increase of 28% in four years. In 2011 alone, the increase was 10%. There was an increase both in numbers and in world coverage. New Chapters were created in Asia and Latin America, and in 2011, a Student Chapter was created in Russia.

During the last four years, the Society has been funding chapter activities all over the world to promote the value of each chapter to their current or future members. Funding request forms and the relevant rules may be down-loaded from our web site at http:// ieee-ims.org/sites/ieee-ims.org/files/ documents/Chapter_Funding_2012.pdf. We welcome you to investigate how your chapter might broaden its membership.

We have also developed the Outstanding Chapter Award. The criteria used to determine the winning chapter relate to the number of activities, membership increase and membership advancement/senior member increase. At this time, we are evaluating proposals, and the award will be announced at the I2MTC in May in Graz, Austria. You can download the rules from our web site at http://ieee-ims.org/sites/ieee-ims.org/ files/documents/Chapter_Award_2011.pdf.

When talking about conferences, I think we have also been successful on that front. The attendance has been high for all of our main sponsored conferences. In addition, we have decided to hold our conferences in other regions of the world, and in 2010 we held the I2MTC in Hangzhou, China. That was the first time we went out of Regions 1 to 8, and we are now exploring other regions for future conferences.

During 2011, we redesigned our web site. It has been modified to make it easier to use and to include as much information as possible. Please visit it regularly at http://ieee-ims.org/.
As you see, we have been working on several plans to improve the Society's utility to its members; in order to continue, we need your input. Send us your ideas, and tell us what you would like to receive from your Society. If there is a local Chapter in your area, talk to the officers on a regular basis. If not, feel free to contact me or any of our Administrative Committee members to share your ideas.

Jorge

Article Summaries

Continuous and Automated Measuring of Compliance of Hand-Hygiene Procedures Using Finite State Machines and RFID

(Summary)

Ryan Johnson, Gill R. Tsouri and Edward Walsh

The authors present a novel method and prototype system developed for measuring hand-hygiene compliance in hospitals. The system was developed in a joint one-year project between Rochester Institute of Technology and Rochester General Health System in the framework of the RIT-RGHS Alliance. It makes use of low-cost radio frequency identification technology coupled with data processing using a finite state machine. The system was tested and validated in a patient room, and a pilot study measured compliance of staff members on the floor. The method proved to be reliable and provided interesting insights on the probability and trends of compliance.

This summary includes text from the article.

Recent Advances in MEMS Sensor Technology- Mechanical Applications

(Summary)

Farbod Khoshnoud and Clarence W. de Silva

This is the second of a three-part series on micro-electromechanical systems (MEMS) sensor technology. Mechanical sensors for displacement, acceleration, impact, vibration, force and torque, and stress and strain are discussed, and various applications of these sensors are presented. Some related technologies of MEMS sensors are included, such as compensation for environmental effects, the Casimir effect, and harvesting of energy for self-powered sensors. Also, the subject of sensor selection is addressed.

This summary includes text from the article.

The Reality of Generating and Transmitting Ultrahigh Voltage Power, Part 1

Alex Hebra

(Summary)

This article is the first of two that introduces the concepts behind generating, propagating and measuring ultrahigh voltages from various energy sources. Characteristics of materials, cables, and spacers are presented and the effects of resulting vibration and dampening on the conduction and transmission of electricity over distances is discussed.

Summary prepared by K. Virostek

Environmental Sensor Networks Using Existing Wireless Communication Systems for Rainfall and Wind Velocity Measurements

(Summary)

Hagit Messer, Artem Zinevich, and Pinhas Alpert

The microwave links that form a wireless communication network (WCN) for a cellular network infrastructure can be considered for an environmental sensor network (ESN). Every radio link that connects a base station to the core network is a sensor. For such an ESN, the key challenge is to develop algorithms to estimate the intensity of weather effects that impair communication performance – first rainfall and wind, and then, humidity, fog, and snow.

This summary includes text from the article.

Learning-from-Signals on Edge Devices

(Summary)

Michael R. Moore and Mark A. Buckner

Machine learning tools are being developed that support increasingly complex learning-from-signals on "edge" devices to meet the challenges of decentralized decision making. Edge devices in this context include any electronically enabled device that can sense, process and make decisions based on locally integrated information. Component systems that use algorithms and other technologies are required to provide sensing, signal processing, learning (model selection) and classification functions for edge devices. This article focuses on the algorithms and technologies for the component systems. It includes an introductory description of the

architectures that enable these functions to be ported to edge devices which have limited resources so they can execute some machine learning processes.

Columns

Instrumentation Notes

Noise and Visual Perception

(Summary)

Bruno Ando

In this column, the author presents basic research activity that focused on computer-based enhancement of simple and complex images. The results obtained are intended as an embryonic proof-of-concept of the idea that the Stochastic Resonance phenomenon (SR) may be used to enhance the visual detection capability of high threshold preceptors. The goal of this research is to exploit the emerging idea of improving visual perception by moving bio-receptors into the SR regime, while reinforcing the knowledge about mechanisms ruling "noise-induced perception in bio-systems".

Recalibration

The Evolution of Time Measurement, Part 5:
Radio Controlled Clocks

(Summary)

Michael Lombardi

This article is the final installment of a discussion on the measurement of time throughout history. In this article, the author discusses the early development of wireless telegraphy devices and presents the progression of this technology into current radio-controlled clocks and their sub-section accuracy.

Departments

New Products

Robert Goldberg

Debug Tool for DDR3 Memory Systems

The complex nature of DDR3 signaling has long been a problem for engineers attempting to validate and debug DDR3 implementations. The traditional approach for debug is to use a general purpose logic analyzer with dedicated probes or interposers to tap the necessary signals. Signal Calibration with a Logic Analyzer has become a significant hurdle for engineers involved in system-level verification. It requires that the engineer spend long periods of time setting up the logic analyzer to capture a clean and valid signal. Users must manually calculate the appropriate V_{ref} as well as the "Setup" and "Hold" time for proper sampling of the signal eye. This signal "calibration" must be done for all signals being captured. Calibration of the data lines represents an added burden for logic analyzers as data is clocked on both the rising and falling edge of the differential signaling.

LeCroy has developed a new low-cost approach to System Level debug of DDR3 memory systems. The LeCroy Kibra™ 380 is a stand-alone DDR3 protocol analyzer that provides DDR3 bus and JEDEC timing analysis with the goal of fast setup and short learning curve. This new system relies on a passive probing method which eliminates the need for calibration and training of test equipment. With LeCroy's Kibra 380 DDR3 system, signal sampling is done directly on the Interposer rather than at the analyzer. This close proximity to the actual DDR signals allows for capture of a cleaner signal eye without calibration.

The Kibra interposer uses an extender design and does not require a dedicated DIMM slot. It provides a quick and easy connection between the DIMM slot and the DIMM mod-ule under test. Each Kibra protocol analyzer monitors a single memory channel and can support up to two DIMM slots per channel via the DIMM slot interposers. The Kibra analyzer supplies power to the interposers via the Slot One interposer. The interposers are powered from a power connection on the analyzer rather than taking power from the DIMM slot. This allows the components on the interposer to be powered on and available to capture traffic during the boot process.
Find more information at www.lecroy.com.

Subminiature Surface Mountable Shock Accelerometers

Meggitt Sensing Systems has introduced the Endevco® model 71M series, a family of rugged undamped subminiature, surface mountable piezoresistive accelerometers, designed to support a variety of high-g shock measurement requirements.

With available g ranges of 2-K, 6-K, 20-K and 60-K, the design of the Endevco model 71M series features a patented, monolithic, four-active arm bridge circuit design (U.S.

patent numbers 4,498, 229, 4,605,919 and 4,689,600) incorporating the use of Meggitt's own proprietary sensing element, machined in-house from a single piece of silicon at its ISO9001 certified MEMS facility in Sunny-vale, California, USA. This etched silicon chip includes both the inertial mass and strain gages arranged in an active four-arm Wheatstone bridge circuit, complete with a novel on-chip zero balance network. The element is housed within a low-profile, miniature, epoxy sealed, subminiature, surface mountable package, weighing just 0.06-g for minimized mass loading effects.

The high resonance frequency of the Endevco 71M series permits their survival in the presence of high-frequency components in a shock pulse that could otherwise shatter the seismic system of accelerometers having lower resonance frequencies. Because they are undamped, the accelerometers can also accurately re-spond to fast rise times and short duration shock motion. With a frequency response extending down to dc (steady state), they are ideal for measuring long

duration transient shocks while integrating critical acceleration data for velocity and displacement.

Recommended accessories include the model 126 three-channel dc bridge amplifier, the model 136 three-channel signal conditioner, and the model 436 dc differential voltage amplifier. Please note: global sale of this product is subject to International Traffic in Arms Regulations, and as such, a license is required for all non-US shipments, and the product is also potentially subject to other restrictions on its sale and use. Consult factory for details.

For additional information, visit www.meggittsensingsystems.com.

Triple-Output Power Supplies with Front-Panel Programming
Agilent Technologies, Inc. introduces the U8030 Series of dc power supplies, the only triple-output power supplies in their class with front-panel programming. In bench or industrial settings, front-panel analog programming saves time and reduces complexity by allowing the user to set and control key output pa-rameters without extensive programming knowledge. With this function and many other enhanced capabilities, the U8030 series dc power supplies are suitable for margin tests, burn-in or reliability tests and general electronics manufacturing.

With its intuitive user interface, all three channels of the power supply can be controlled individually or simultaneously with just the press of a button (all on/off), delivering up to 375 W (total) to multiple devices or points.

To help users easily observe the total power drawn by a device-under-test, U8030 Series models include a screen that shows voltage and current readings simultaneously. This is especially helpful to users trying to verify proper design and operation of electronic components and subsystems.

The U8030 Series also includes over-voltage and over-current protection to help ensure the integrity of the device-under-test and also protect the power supply. For added flexibility, overload limits are user-selectable.

Information about Agilent and the U8030 is available at www.agilent.com.

Industrial Application Provides Faster Real-Time Measurements
As the focus on costs continues throughout industry, there is a growing need to provide faster real-time measurements in industrial applications. There are already a number of different systems that use a standard Ethernet connection, familiar to all because of its use in office based settings, but these are often inefficient since a large proportion of the available bandwidth is unavailable. One cause of the problem is that only small amounts of data are being transmitted at any one time. In addition, the messages originate when the client or master device in the system requests the data. This means that standard Ethernet operates as a half-duplex in-formation system.

To overcome the problem, Beckhoff Automation GmbH developed a fieldbus system that could operate in real-time by challenging the low bandwidth of standard Ethernet protocols. The outcome was EtherCAT (Ethernet Control Au-tomation Technology), a high-performance, industrial communication protocol that extends the IEEE 802.3 Ethernet standard and enables data to be transferred with predictable timing and precise synchronization.

The development of EtherCAT means that Ethernet packets are no longer received, interpreted, processed and copied at every device. The EtherCAT protocol still transports data directly within a standard Ethernet frame without changing its basic structure. However, EtherCAT slave devices can read the data addressed to them while the frame passes through the device node. Input data can also be inserted at the same time resulting in delays of only a few nanoseconds. Because EtherCAT frames comprise data from many devices that are operating in both send and receive modes, the usable data rate increases to over 90%. This enables the full-duplex features of 100BaseTX to be fully utilized with effective data rates of >100 Mbit/s being achieved.

EtherCAT is a very high performance, easy to deploy, open application layer protocol for Ethernet applications, and its inclusion in HBM's CX27 ensures that users can take full ad-vantage of the synchronization capabilities while using the complete bandwidth for any suitable application.

Find more information at www.hbm.com.

Thermocouple/Voltage Input USB Data Acquisition Module

Omega's new OM-DAQ-USB-2401 series of USB 2.0 full speed thermocouple/voltage input data acquisition modules are fully compatible with both USB 1.1 and USB 2.0 ports. This module is user programmable for type J, K, T, E, R, S, B, N thermocouples or voltage input and features eight differential or sixteen single-ended analog inputs, 24 bit resolution with up to 1000 samples/s throughput. This module is powered directly by the USB port or an external dc power supply. The module includes Windows software, drivers for custom programming, and hardware for bench, DIN Rail or Wall Mounting.

For a specifications sheet or more information, please visit http://www.omega.com/pptst/OM-DAQ-USB-2400.html.

Sunlight Readable, Rugged Handheld Displays

IEE, Inc. offers a line of rugged, military-qualified handheld control display units (CDUs) that are sunlight readable, withstand harsh conditions in the field, and are combat proven. The wide range of display sizes and resolutions from 4-line 2.8 in (7.1 cm) character displays up to full graphic displays and from 3.5 in (8.9 cm) QVGA to 7.0 in (17.8 cm)-wide SVGA, provides exceptional design flexibility for the system engineer. Typical equipment that uses IEE's rugged CDUs includes soldier and vehicle-mount equipment, as well as manpack, hand-held use.

The units feature integrated multi-mode backlighting that provides sunlight readability and NVIS (Night Vision) compatibility for enhanced viewing no matter how dim or bright the lighting may be. This enables precise visual access to critical data.

In addition to the line's standard products, IEE offers fully-customized CDUs based on user requirements. Functions such as an integrated touch screen interface can be provided in resis-tive, IR, SAW or multi-touch technologies.

The CDUs feature a temperature range of -20 °C to + 70° C, with some units operating down to -40 °C. The units withstand transit shock and ground mobile vibration.

IEE's handheld devices meet a variety of military standards including: MIL-STD-461/462 for EMI/EMC requirements; MIL-STD-810, MIL-S-901and MIL-STD-167 for environmental

factors; MIL-P-7788 for panel construction and lighting; MIL-STD-3009 for NVIS and MIL-STD-704; and MIL-STD-1275 for power.

For more information, visit www.ieeinc.com/ handheld-devices.

Industrial Interval Timer
Marsh Bellofram Corporation has announced the introduction of the 405AR series, an economical industrial timer family with instantaneous relay and twelve timing ranges in a single unit designed for a variety of daily-use OEM and control package timing applications.

The Marsh Bellofram 405AR series features twelve individual timing ranges within a single unit, packaged within a highly compact 8-pin 48 mm2 standard DIN housing. The housing is watertight when panel mounted with an 8-pin round (octal) socket. The timer operates from an industry standard 24-240 Vac or 24 Vdc power supply and features a large and easy-to-read display dial with decimal points and 10A DPDT output contacts. Mode and range select switches are located on the side of the unit, so that when panel mounted, they are not operator accessible, a tamper-proof feature that prevents unauthorized or hazardous changes to the timing mode and range. A special LED indicator provides a unique and effective flashing method of cycle progress indication. Units are CE marked and UL-recognized as well as CSA and FM approved, facilitating their use across a variety of industrial environments including OEM equipment, packaging and plastics machinery, machinery monitoring and control, material handling, conveyor control, motors and pumps and process industries. Units may be effectively used as drop-in replacements for most 8-pin on-delay and interval timing applications.

For more information about the model 405AR series eco-nomical industrial timer, please visit www.marshbellofram.com.

Lightweight 400 Hz Power Transformers
Bridgeport Magnetics introduces its new LW series of custom designed power and isolation transformers for 400 Hz fre-quency operation up to 600 Vac onboard aircraft, shipyards, seaborne, and other marine applications. Compared to conventional C-core transformer designs, the LW series typically offers a 50% weight reduction by using copper clad aluminum (CCA) wire windings and low profile torroidal cores utilizing 4 mm thick grain oriented silicon steel. The custom designed power and isolation transformers are available up to a 10 KVA power rating for single phase or 30 KVA for three-phase systems. As is the case with all torroidal core transformers, lower no-load losses, quiet operation, and lack of hot spots are other benefits. With in-house core production, dimen-sions of OD and height are flexible to suit the customer's requirements. For three-phase systems, each phase is served by a separate transformer, allowing better weight distribution inside low profile cabinets as an alternative to stacking the transformers on top of each other or vertically side by side. The weight of single phase transformers ranges from 4.5 lb (2.04 kg) for 1000 VA to 28 lb (12.7 kg) for 10 KVA and for three phase systems from 13.5 lb (6.1 kg) for 3 KVA to 84 lb (38.1 kg) for 30 KVA.

For more information, please visit the website www.bridgeportmagnetics.com.

Microwave PXI Switch Solutions
Pickering Interfaces is expanding its range of 3U PXI Micro-wave switch solutions with the introduction of the 40 -784. The 40 -784 supports one or two microwave switches in just 2 slots of 3U PXI and is available in two configurations and three frequency ranges. The available

configurations are unterminated 4 way (SP4T) and 6 way (SP6T) multiplexers. Each configuration is available with a 6 GHz, 26.5 GHz or 40 GHz specified frequency range.

All versions offer excellent VSWR and insertion loss performance. The 6 GHz/26.5 GHz configura-tions feature extended life of 10 million operations per position.

The two slot PXI occupancy allows test system designers to solve high density microwave switching problems. The 40 -784 can be supported by any PXI compliant 3U PXI chassis and is supported by Pickering Interfaces Modular LXI chassis for applications requiring Ethernet based control.

Please visit www.pickeringtest.com for more information.

Low-g Accelerometer Series
Silicon Designs, Inc. has announced the global market introduction of its new LG Series, a dedicated product family of low-g range chips and modules designed to support of a variety of zero-to-medium frequency aerospace, automotive, defense, energy, industrial, and general test and measurement requirements.

The LG Series provides high-drive, low-impedance buff-ering for high-reliability performance at temperatures up to +125°C in a rugged anodized aluminum housing. Series accelerometer modules produce two analog voltage outputs which vary with acceleration and feature a four-wire con-nection, in support of both single ended and differential modes. The sensitive axis is perpendicular to the bottom of the package, with positive acceleration defined as the acceleration that would result from applying force to the bottom of the package. Signal outputs are fully differential about a common mode voltage of approximately 2.5 V and may be powered with a 9-V battery. Sensitivity is independent from the +8 to +32 V supply voltage. At zero acceleration, output differential voltage is nominally 0 Vdc and is ±4 Vdc at full-scale acceleration. On-board voltage regulation and an internal voltage reference eliminate precision power supply requirements. The LG Series is also relatively insensitive to temperature changes with quick, easy self-calibration.

For additional information about new LG Series and other products available from Silicon Designs, visit www.silicondesigns.com.

Digital High-Speed Cameras
Vision Research unveils its new line of Phantom® Miro M-Series digital high-speed cameras, which includes the M110, M310 and M120. With a compact, simple design, these flexible, easy-to-use cameras contain all the high-performance features that science, engineering and research professionals expect from Vision Research.

Vision Research designed the Phantom Miro M-Series cameras with flexibility, versatility and accessibility in mind. The 1-megapixel Miro M110 and M310 include a Vision Research custom-designed 1280 x 800 CMOS sensor, with a widescreen format that allows users to keep objects in the frame longer and see more of the event they are recording. The M110 has a 1.6 Gigapixel/second (Gpx/s) throughput, making possible image capture up to 1600 frames-per-second (fps) at full resolution. The M310 has a 3.2 Gpx/s throughput and can capture up to 3200 fps at full resolution. If higher speeds are needed, reduced resolution images are available up to 400,000 fps for the M110 and 650,000 for the M310. Both models feature high-light sensitivity

and great dynamic range for superior low-light images, which are often a problem with high-speed imaging.

The 2 Megapixel (Mpx) M120 also includes a Vision Re-search-designed CMOS sensor with a 1.6 Gpx/s throughput, resulting in capture rates of 730 fps at 1920 x 1200, 800 fps at 1920 x 1080, or 1200 fps at 1152 x 1152. If a higher speed is needed, the M120 can deliver reduced resolution images at up to 200,000 fps. The M120 uses microlenses on its sensor to achieve high-light sensitivity and offers high-dynamic range for excellent image quality.

Key Features of the Phantom Miro M-Series Cameras:
. 1 Mpx and 2 Mpx custom-designed CMOS sensors
. Up to 3.2 Gpx/s throughput
. High-light sensitivity
. 3 GB, 6 GB, or 12 GB memory configurations
. Phantom CineFlash™ Storage System
. Extreme Dynamic Range function
. Compact, rugged design

For more information, please visit www.visionresearch.com.

Tight Offset, Low-Power Current-Sense Amplifiers
Touchstone Semiconductor announces the TS1100 family of 1µA current-sense amplifiers. Touchstone claims that the off-set of 30 µV is over 3X tighter than the closest competitor. The tight offset allows users to not have to increase power consumption to achieve improved accuracy. This is something that cannot be done with any other low power current sense amplifier. The TS1100 is available in four gain options from 25 V/V to 200 V/V, so customers can choose the ideal gain op-tion for their unique application.

The TS1100 family's combination of small form factor (SOT23-5), low supply current operation, and variety of fixed gain options make it an ideal choice for low current, high-side current-sensing amplification. The TS1100 is particularly suitable for use in all battery-powered, remote, or hand-held portable instruments including power management applications, motor control, power management and fixed-platform telecom boxes.

A datasheet, product brief and application note are available at www.touchstonesemi.com.

Compact Next-Generation Fiber Lasers
The FemtoFiber smart family is TOPTICA's new series of ultrafast fiber lasers. These systems are dedicated to applications ranging from biophotonics to terahertz generation and two-photon polymerization. Optimized for a compact footprint that unites optics and electronics in one box, these robust all-fiber lasers are the perfect choice for flexible OEM integration. The lasers of the new FemtoFiber smart family transfer the concept of the successful FemtoFiber pro into compact systems, designed for specific ultrafast applications. Based on polarization-maintaining fibers and saturable absorber (SAM) mode locking technology, TOPTICA's FemtoFiber lasers offer reliable performance and hands-off operation.

The new FemtoFiber smart lasers are optimized regarding footprint and pricing to meet the key requirements of OEM in-tegrators. Including all optics and control electronics in one single box, the lasers of the FemtoFiber smart family are the most compact ultrafast lasers available on the market. All models with wavelength above 1000 nm have fiber coupled outputs and offer either

FC/APC receptacles or fiber pigtails. The models of the FemtoFiber pro family are suited for a variety of applications. The FemtoFErb 1560 with pulses below 100 fs (10-15s), for example, is ideally suited for THz generation with InGaAs antennae. The frequency-doubled version, the FemtoFErb 780, on the other hand, is a perfect match for non-linear microscopy or micro-lithography. For seeding high power ps/fs-amplifiers, the Ytterbium-based PicoFYb/Fem-toFYb lasers operating at 1030 nm or 1064 nm are reliable seed lasers.

Find more information at www.toptica.com.

Society News

Report on IMCCC 2012

Fu Li

The Beijing and Harbin I&M Chapter hosted the First International Conference on Instrumentation & Measurement: Computer, Communication and Control (IMCCC 2011) on Oct. 21-23, 2011 in Beijing, China. The technical sponsors of the conference were the IEEE Harbin Section (Beijing and Harbin Chapter) and the IEEE Beijing Section (Heilongjang Instrumentation Society). The conference was organized by the Harbin Institute of Technology, Beijing University of Posts & Telecommunications, and National Key Laboratory of Science and Technology on Information System Security.

The conference received 387 paper submissions, and 250 papers were accepted into the final program. The IEEE I&M Society Distinguished Lecturer Professor Reza Zoughi delivered the first keynote speech on "Microwave and Millimeter Wave Imaging for NDE Applications – Past, Present and Future," and he also spoke in-depth on the IEEE and the I&M Society. Three other plenary speakers were: Professor David Zhang who spoke on "Biometrics: New Developments and Applications," Professor P. Takis Mathiopoulos who presented "Wireless Digital Communications over Fading Channels," and Victor Mieres who discussed "Advance Research Applications based on next generation ATE system architecture." All of the speakers are internationally recognized leading technical or industrial experts in the related research areas and have demonstrated outstanding performance in their profession. IMCCC 2011 brought together researchers, engineers, users, and students from Instrumentation & Measurement, Computer, Communication, and Control fields to discuss related projects and exchange research ideas.

This was the second major event organized by the Beijing and Harbin Chapter. In its first year of formation, the chapter organized a conference in August which emphasized instrumentation and measurement: pervasive computing and signal processing, which was also attended by hundreds of people.