

The IEEE Instrumentation & Measurement Magazine
February 2010 issue

Our Wireless World

From the Editor's Bench

Shlomo Engelberg

We Can, but Should We?

I am approaching my mid-forties. As a young child, I used to speak to my dad and to my uncle Stevie about computers. As a twelve year old, I went to work with my dad and learned to program a computer. (I used a TRS-80 Model I, Level II at Queensborough Community College.) I went to college and studied engineering and learned more about science and technology. I have been teaching engineering full-time since the late nineties, and I enjoy it at least as much now as I did twenty years ago. I enjoy engineering – both the theory and the practice – but I often wonder about the wisdom of many of the behaviors that are facilitated by the products that we create.

For several years I owned and used a cell phone. After become a department chairperson, I found that, even though my school did not reimburse me for cell phone use, I was using my phone a lot. Though this allowed me to be a more efficient and effective worker, it also meant that even walks and bus rides stopped being relaxing times in which I could work quietly, think quietly, or just look out the window and watch the scenery go by. About a year ago, I lost my cell phone. I decided to stop carrying a cell phone on a regular basis, and I have been pretty happy with that decision. You have to wonder: Are we really doing ourselves a favor by being available 24/7?

I feel that in many ways I have won the cell phone war. I have been less successful on another front. I have a computer at home, and, of course, I have a high-speed internet connection. As those who know me know, you can contact me at almost any time of the day or night by sending me email. Even while on vacation, I usually respond quickly to business or private emails. It would probably be better to get rid of my ADSL and deal with email when at the office. It is very hard for me to limit my emailing to reasonable times and to tell people that they will have to wait for a while to get an answer to something, and this inability also means that I never get a proper vacation, and I often get less sleep than I should.

The 24/7 availability of the World Wide Web seems to encourage irresponsible behavior too. It is true that I can now easily look at the *New York Times* at 2:00 A.M. It is equally true, but harder to internalize, that I should not be looking at anything at that hour. Two in the morning is a time for sleeping and not for surfing.

I love the theory and practice of engineering, but I need to learn how to use the products we can now design wisely. Cell phones are wonderful when you need them, but you do not need to be

available all the time. Email is great, but there is no reason to feel that every email must be responded to instantaneously. The web is amazing, but you need to use it with care. It often seems that the products that we engineers create are helping drive society in unhealthy directions.

Thankfully, this magazine is an alternative to the dangers posed by our online-all-the-time society. In this month's issue we have articles describing a wireless distributed system for water quality assessment, provisional patents, using load cells in force sensing analysis, and a tutorial that deals with software defined radio. We also have a short article about the world-wide recognition of national measurement standards by Dr. Terry Quinn, formerly the director of the International Bureau of Weights and Measures (BIPM), and we have our usual columns. Pull up a chair, and sit down with the latest issue of the magazine. Turn off your phone's ringer, have your computer hibernate, and read this month's tutorials, articles, and columns without interruptions.

Enjoy!

Shlomo

President's Perspectives

Kim Fowler

Greetings

I am honored to serve as president of the IEEE Instrumentation and Measurement (I&M) Society. I follow in the giant footsteps of very capable presidents, vice presidents, and members of the Administrative Committee. I count the recent past presidents as mentors and friends: Alessandro Ferrero, Steve Dyer, Bob Rassa, and Brian Wadell. They represent just a few of the folks that I highly esteem as insightful, caring, and dedicated volunteers within our society. Our society has a storied past, a vibrant present, and a hopeful future. I am delighted to have been and to be involved with you in all three eras.

Past

The I&M Society was one of the first technical groups when IEEE formed in 1963; it became a society in 1970. Since the late-1970s, many people have helped transform the society into an active professional organization. You can read a brief overview of the society's history in a paper on the society's website at <http://www.ieee-ims.org/main/> in the "About the IMS" link under "Useful Documents," which is under the "About IMS" tab.

My involvement in the I&M Society began more than 20 years ago when Mike Lucas asked me to give a lecture at Kansas State University. (While I was born in Manhattan, Kansas, I never attended university there; I am not part of the "Kansas State Mafia," as they are fondly called even though I wish I were - hmm . . . a "Kansas State Mafia wannabe," bet you haven't heard that very often!) This brief lecture opportunity with Mike Lucas eventually led me to the 1989 IMTC in Washington, D.C.; where I chaired a session that rejected a paper by several of Steve Dyer's students. Years later I had hoped that Steve had forgotten this incident, but he had not; Steve did forgive me and then exacted his revenge by involving me in several conferences in the 1990s. My involvement in conferences continues to this day. In 1998, Steve asked me to be the editor of the I&M Magazine, which I edited for 9 years. During my tenure as editor, I worked closely with the I&M Administrative Committee or AdCom, to which you elected me in 2005.

Present

The I&M Society has many current activities and programs, some prominent examples are:

- technical publication through the Transactions on Instrumentation and Measurement and the I&M Magazine.
- 37 active Technical Committees that consider and develop technical standards and technical activities for the engineering profession.
- sponsoring or co-sponsoring more than 11 yearly conferences, symposia, and workshops.
- education through the International Measurement University (IMU), conference tutorials, and web tutorials.
- membership efforts through its Distinguished Lecturer Program, chapter functions, and the website.

Future

The future of the I&M Society looks bright. Recent discussions in the AdCom pointed us to publicize society operations more fully, which should encourage greater participation. We plan to enhance the society's current activities and programs and provide more educational and technical materials. Among these efforts, we are preparing one or more book proposals on instrumentation fundamentals, expanding the scope of the conference tutorials, and developing more free web tutorials. Your thoughts and suggestions are most welcome. I look forward to collaborating with you in the year to come!

Kim

Article Summaries

Spread Spectrum Techniques in Wireless Communication Part 2: Transmission Issues in Free Space

Miguel Pereira

(Summary)

The second part of a discussion on Spread Spectrum Techniques in Wireless Communication, this article focuses on wireless transmission issues and implementation of a water quality assessment wireless system. Concepts of electromagnetic propagation and free space electromagnetic transmission are presented. Common occurrences that impair the transmission's quality or can even block the communication between network nodes are discussed, and primary techniques to mitigate propagation problems are offered.

This summary includes text from the article.

Load Cells in Force Sensing Analysis—Theory and a Novel Application

Ivan Muller, Renato Machado de Brito, Carlos Eduardo Pereira,
and Valner Brusamarello

(Summary)

This paper describes some of the theory and practice of load cells, including their basic elements and the electronics necessary for measurement. As an application example, the development of a 3-ring spherical load cell which can be used to measure compression forces on fruit during storage and transportation is presented.

This summary includes text from the article.

A Do-It-Yourself Approach to Securing Patent Protection

Part 1 in a Series on Protecting Your Inventions with Limited Resources

Reuven K. Mouallem

(Summary)

Part 1 of the series explores the issues involved in securing provisional patent protection at the nascent stage of invention. This is a way to defer costs for inventors and entrepreneurs. The Provisional Patent Application (PPA) is explained, including the patentability requirements, what defines a patentable invention, how to search for patentability, and a suitable PPA disclosure.

This summary includes text from the article.

Software Defined Radio

Tutorial 22

fred harris and Wade Lowdermilk

(Summary)

This article presents an overview of the driving forces and environment that have facilitated the development of software defined radio systems (SDR) and the levels of signal processing involved in their performance. When compared to DSP-based radio, SDR and its embedded software-controlled DSP engines can expand utility, extend operating regime, reduce cost and impress users by its enhanced capabilities.

This summary was written by Kristy Virostek,

Column Summaries

Instrumentation Notes

Andrzej Michalski and Bogdan Dziadak

Quality Engineering Tools used to Design & Optimize a Mobile Measurement Station

(Summary)

Implementing the Quality Function Deployment method during the design process can focus the attention of the designer on the most important elements of reliability and work quality. The Analytic Hierarchy Process helps the engineer make complex decisions in designing today's

measurement systems that have many extreme optimization problems. Using these methods should decrease the cost of manufacturing and maintenance of measurement systems. This paper explains these methods and then shows how they work in designing a distributed system for a mobile measurement station.

This summary contains text from the column.

My Favorite Experiment

John Witzel

Magnetic Levitation

(Summary)

Most materials can be recognized with respect to magnetic properties as diamagnetic, paramagnetic or ferromagnetic. In our everyday world, we are familiar with ferromagnetic materials and how they react within the influence of a magnetic field, but diamagnetic and paramagnetic effects are more subtle. This month's experiment in magnetic levitation demonstrates the magnetic properties of two diamagnetic materials: water and pyrolytic graphite.

This summary includes text from the column.

Recalibration

Terry Quinn

World-wide Recognition of National Measurement Standards: Ten Years of the CIPM MRA

(Summary)

In 1999, the Directors of the National Metrology Institutes signed a mutual recognition agreement (MRA) for their national measurement standards, a document that had been drawn up by the International Committee for Weights and Measures (CIPM). Now ten years later, the CIPM MRA covers some 200 institutes in 72 countries as well as two international organizations. This paper overviews the importance of this standardization in the past decade as technical services and expertise is increasingly shared among countries and lab standards are critical.

This summary includes text from the column.

Departments

Membership Notes

Jorge Daher

Student Ambassadors

Since 2005, the Instrumentation & Measurement Society (IMS) has been designating the title of "Student Ambassador" to the winners of the Societies' Best Paper and Travel awards at the three main IMS conferences each year: AUTOTESTCON, I²MTC, and SAS. Recently, our Student

Ambassadors from 2005-2007 were contacted with a short survey to allow IMS to follow up on the path that our Student Ambassadors have taken since their involvement with one of the IMS conferences. I would like to share their response to the survey.

The IMS had 9 Student Ambassadors in 2005.

- In 2005, Dr. Tariq Assaf of the University of Virginia was pursuing his PhD in the area of Reliability Engineering and Probabilistic Analysis. Dr. Assaf is now employed at CadenceQuest as Senior Consultant for Predictive Business Intelligence. The Palestine native now makes his home in the Washington, DC Metro area.
- Dr. Abhinav Saxena was pursuing his PhD degree at Georgia Tech in Electrical Engineering with an emphasis on Prognostics and Health Monitoring in 2005. He is now employed by the NASA Ames Research Center and works in the Prognostics Center of Excellence as a Staff Scientist.

In 2006, the IMS was pleased to designate 13 Student Ambassadors.

- Dr. Justyna Zander-Nowicka was attending the Technical University of Berlin, Berlin, Germany. She graduated in 2008 and is now employed by Fraunhofer Institute for Open Communication Systems (FOKUS) as a Senior Scientist.
- Mr. N. Madhu Mohan also became an Ambassador in 2006 and is presently finishing his doctoral degree in Instrumentation at the Indian Institute of Technology. His research interests include non-invasive biomedical instrumentation: in particular a non-invasive (non-contact) methodology for the assessment of wound recovery.

2007 proved to be another successful year for student involvement in the IMS with 21 new Student Ambassadors.

- Mr. Tokoh Nishikubo, a doctoral candidate at Kinki University in Higashi-Osaka City, Japan, became a Student Ambassador at IMTC 2007. As an IMS Student Ambassador, he completed a unique activity by holding an exchange event between his University and Stanford University. This event was a wonderful way to share technical knowledge as well as personal fellowship in the Instrumentation and Measurement community.
- Dr. Alaeddin AbuAbed, an attendee of SAS 2007, was a PhD candidate in the Department of Electrical and Computer Engineering at the University of Alabama at Huntsville (UAH) at the time. He completed his graduate research in the Micro and Nano Devices Center (NMDC). Following his doctoral studies, Dr. AbuAbed served as a visiting assistant professor at UAH and is now an assistant professor at the University of Central Oklahoma.
- Dr. Lingfeng Wang served as a Student Ambassador for 3 consecutive years, his last year being 2007. He received his Ph.D. from Texas A&M University in College Station, Texas, and is now employed by California ISO.
- Dr. Seokjin Kim was a Ph. D. candidate at the University of Maryland, College Park when he won the Best Paper award at AUTOTESTCON in 2007. He is now a faculty research associate in the Department of Electrical and Computer Engineering at the University of Maryland, College Park. Dr. Kim's current research interests include design and characterization of high-speed mixed-signal system-on-chip devices, as well as high-speed mixed-signal system verification methodologies. Clearly, the Student Ambassadors of the IMS represent a wide range of instrumentation and measurement applications and careers. We thank all of our Student Ambassadors for their efforts at our conferences and beyond!

Analog Module Connects Signal Conditioned Sensor Data from 8B Modules to Ethernet Networks

Acromag has released another BusWorks Ethernet I/O module to simplify the task of interfacing data from virtually any analog sensor to a Modbus TCP/IP network. The new 958EN model has 16 analog input channels and a quick-connect DB25 port to capture isolated and amplified sensor signals directly from a full panel of industry-standard 8B signal conditioners. This analog input module performs fast, 16-bit A/D conversions to make the temperature, frequency, strain gauge or other sensor data available to any control device via Ethernet. Typical applications involve processes requiring high voltage isolation or a mix of signal types (power generation, glass/metal processing, test/measurement instrumentation, and SCADA systems).

The 958EN has 16 analog voltage inputs to accept $\pm 5V$ and $\pm 10V$ signals from 8B or legacy 7B signal conditioning modules through a DB25 port. 8B modules support over 100 analog input types. Fast scanning updates all 16 channels in just 8mS. Dual-format data registers support 16-bit integer and 32-bit floating point formats. Users can read raw channel data based on 16-bit signed integer or 32-bit scaling registers, configurable on a per-channel basis, to minimize CPU or HMI software processing time. Surge protection and 3-way 1500V isolation between I/O, power, and network circuits increase reliability.

A sample averaging function is user-configurable and improves performance in noisy or fluctuating environments. On industrial-grade units, an integration function can totalize inputs with non-volatile counter registers on all channels.

Acromag makes the Modbus C Library software available to greatly simplify the development of custom programs to interface with Acromag's BusWorks and EtherStax Ethernet I/O products. The library, Model ESW-MBLIB, also supports any standard Ethernet Modbus slave device communicating via Modbus TCP/IP or UDP/IP protocol. This utility is ideal for developers that are unfamiliar with Modbus protocol or the framing of TCP/IP or UDP/IP messages.

For more information about Acromag products, please visit www.acromag.com.

Measurement & Verification Logging System

Onset has announced the HOBOR[®] Measurement & Verification System, a portable energy logging system for measuring, analyzing and documenting building energy performance.

The self-contained system makes it convenient and economical for energy performance contractors, energy consultants, and building energy managers to track the performance of building systems, such as chillers and packaged HVAC units, and verify the impact of energy efficiency improvements.

The system, which is housed in a rugged, heavy-duty carrying case, provides pre-wired sensors for quick set up, and includes magnetic mounting feet for fast, secure placement in electrical panels.

Users can plot and analyze energy performance data with the accompanying HOBOWare[®] software. HOBOWare provides an intuitive, graphical user interface that enables users to quickly and easily graph, analyze and print data files, as well as export the data to Microsoft Excel and other spreadsheet programs.

The HOBO Measurement & Verification System is available in both single-phase and three-phase models. Both models include a 4-channel HOBO Micro Station data logger, energy sensors, software, and associated cables and accessories.

Please visit <http://www.onsetcomp.com> for complete product details.

Registration Mark Sensors Provide Easy-To-Use, Low-Cost Registration Mark Detection

Banner Engineering Corp. introduces their R58A Series Registration Mark Sensors for detecting registration marks in printing and material registration applications. The R58A features simplified setup via potentiometer adjustment of the switching threshold and switch-selectable light/dark operate. The sensor's short warm-up period, fast 10 kHz switching frequency and 15 μ s repeatability ensure reliable detection in high-speed printing and web processing applications, where timing is critical.

The R58A's contrast sensitivity, coupled with its small 1.2 x 3.8mm sensing image, enables the sensor to detect subtle registration marks on high-gloss and other challenging materials, as well as in low-contrast applications. Additionally, the rugged metal housing and high-quality acrylic lens are designed to handle ambient electrical noise and vibration.

A single emitter color—red or green, specified by model number—ensures that the customer's preferred light source is used every time. Banner also offers the more advanced R58E Expert Series Registration Mark Sensors with comprehensive TEACH options and three LED sensing colors—red, green and blue—in one sensor, allowing the user to optimize contrast based on the application.

Learn more about R58A Series Registration Mark Sensors at www.BannerEngineering.com.

Ultra Low-Noise Remote Charge Converter

Endevco Corporation has announced the launch of new model 2771C-XX, an ultra-low noise remote charge converter (RCC), designed for use with charge output piezoelectric sensors within mechanical system health monitoring and environmental testing applications.

Model 2771C-XX offers a rugged two-wire single ended design that operates from constant current power (4-20 mA). Both RCC signal output and current to the RCC are carried along the same wire. Housed in a rugged, small package, the charge converter offers broadband noise range down to 5 μ Vrms, with a frequency response of 0.4 to 50 kHz. Units are designed to withstand shock loads of up to 100g peak and are radiation tested to 1.0Mrads. With availability in three different fixed gains of 0.1mV/pC, 1.0mV/pC and 10mV/pC, model 2771C-XX can also support TEDS (per IEEE P1451.4) for smart sensor and larger channel count applications and also includes an available M1 Version with male BNC, to facilitate easy panel mounting.

Because of its low impedance voltage, signal output from model 2771C-XX is less susceptible to noise pick-up. Also, shunt capacitance of the cable connecting model 2771C-XX to the main signal conditioner does not significantly affect system noise or sensitivity. Because model 2771C-XX has the same envelope size as the Endevco model 2771B remote charge converter, it may also be used as a drop-in replacement, for legacy applications where lower noise is required.

For detailed specifications, drawings or additional information about the model 2771C-XX in-line charge converter or other Endevco® products, visit www.endevco.com.

Beta Edition of COMSOL Multiphysics Version 4.0 Released

COMSOL has released the beta edition of COMSOL Multiphysics 4.0, its multiphysics modeling and simulation environment. Version 4.0 delivers the COMSOL Desktop™, an all-new user interface that makes it easy for users to build and run simulations. COMSOL Desktop's sleek design and graphical programming utility combine unprecedented power, ease of use, and flexibility into a single application. With version 4.0, COMSOL will give users a competitive edge in product innovation throughout their development departments.

The COMSOL Desktop™ makes it easy to organize the work flow and gives a clean overview of the modeling process. Users can set up the desktop's appearance easily using its docked window placement capabilities that include the Main menu, Model Builder, and a Help Desk as well as Settings, Messages, and Graphics windows.

The Model Builder brings a dynamic model configuration approach to simulations. Building a model is a straight-forward process of following along the model features. Users just right-click to perform common tasks such as importing CAD, meshing, specifying material properties, solving, and plotting results. If changes need to be made, the Model Builder provides unobstructed access to any part of the model settings. Moreover, users can record and save the steps of the set-up to use sequentially as a model is automatically re-evaluated and refined. Dynamically updated context-dependent help enables easy browsing and extends the search functionality. This makes the Model Builder more than a workspace; it is graphical programming at your fingertips.

CAD interoperability remains a top priority to provide the very best path for CAD users to connect to COMSOL Multiphysics for their simulations. To this end, COMSOL now releases the LiveLink for PTC Pro/ENGINEER®. By establishing an association between the two geometry representations, changing a feature in the CAD model automatically updates the COMSOL geometry accordingly. This enables multiphysics simulation involving parametric sweeps and design optimization directly from within Pro/ENGINEER. Versions of LiveLink for SolidWorks and Autodesk Inventor are already available as optional add-ons to COMSOL Multiphysics.

Full details about COMSOL Multiphysics and related products are available at www.comsol.com.

Universal Circular Chart Superecorder™

Omega's new series of microprocessor based portable universal circular chart superecorders™ comes in 4 different models, temperature and relative humidity, dual thermocouple, dual process, and pH and (RTD) temperature models. Located on the front panel is a convenient keypad for programming and a large, bright, dual backlit display. The RS232 PC interface allows the user to download recorded data. The patented features include double-sided chart paper and the magnetic hub. The temperature/ relative humidity model (CTXL-TRH) also comes with a Windows based PC application software to log data in real time, download recorded data, or re-scale chart paper. There is also a wireless temperature/ relative humidity probe that is offered as an option, perfect for EPA requirements.

Please visit www.omega.com for more information.

Expanded Geotest Basic Automated Test System (GBATS) Line

Expanding on its line of application-ready military and commercial avionics test platforms,

Geotest now offers preconfigured modular test platforms that address a range of analog, digital, mixed-signal, and avionics test needs. The GBATS TS-700 family of testers offers test engineers preconfigured, compact, 3U / 6U PXI systems that include all of the resources required to support a wide range of functional test applications including a system self-test and a high pin count mass interconnect tester interface.

The GBATS system is “application ready,” allowing users to focus on developing the application rather than developing the test system - which means less time creating and deploying the application. The platform is also available with Geotest’s ATEasy software, which provides an integrated and complete test executive and test development environment, allowing users to quickly develop and easily maintain test applications. Systems can also be preconfigured with other popular software development platforms.

The high-performance GBATS tester family now offers 6 models covering commercial and military avionics, boundary scan, mixed-signal, and digital test configurations.

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

Low Profile Stubby GPS Antennas

Radiall USA, Inc. expands its extensive range of tactical antenna products with stubby GPS passive and active L1 band antennas. The passive EPL 09-13 and active EPL 09-14 antennas are enclosed in a miniature robust package requiring little space on crowded handheld equipment with GPS L1 band connectivity. Offered with a standard SMA coaxial connector interface, these low profile antennas can be easily customized to meet the needs of the application. The stubby GPS antennas are designed for handheld GPS receivers, handheld tactical radios with GPS capabilities and sensors.

The EPL 09-13 passive GPS antenna features a GPS L1 (1575.42MHz) frequency, 50 Ohm nominal impedance, 3:1 max VSWR, -4dBi +/-1dB gain, an operating temperature of -40 to +70 degrees C and a max water immersion in mated condition of 65.6167 ft. (20 meters). In addition, it has an overall length of 1.75 inches and weighs 1.05 ounces (30 grams).

The EPL 09-14 Active GPS antenna features a GPS L1 (1575.42 MHz) frequency, 50 Ohm nominal impedance, 3:1 max VSWR, -3 dBi +/-1dB gain, 16 dB active gain, an operating temperature of -40 to +70°C and a max water immersion in mated condition of 65.6167 ft (20m). In addition, it has an overall length of 1.75 in (4.4cm) and weighs 1.05 oz (30g).

For more information about Radiall’s low profile stubby GPS antennas and other antennas, please visit www.radiall.com.

Improved Test Times of RF Communications Devices

Aeroflex has announced that it will deliver a non-signaling PXI solution customized for RF production line test of Infineon’s second generation ultra low-cost mobile phone platform. The solution, based on the Aeroflex PXI 3000 Series, will test Infineon’s second-generation ultra low-cost chipset (XGOLD™101).

The primary challenges facing mobile phone handset manufacturers today are getting to market first, lowering the cost of manufacturing test and optimizing valuable engineering resources.

Aeroflex's PXI accelerates the development of a customized RF test solution to meet these needs.

The key advantage of Aeroflex's PXI solution is its flexibility, which contributes to lower test costs and faster test times. The PXI 3000 Series is able to test many more standards (such as WLAN, CMA2000/1xEVDO, WiMAX, UMTS, GSM/EDGE, Bluetooth and LTE) than previous "one-box solutions" could. This is important because today's design engineers and manufacturers are developing sophisticated cell phones that require cellular handset developers to test one device for compliance with many, if not all, of these standards. With the PXI 3000 Series, the same flexible high-performance Aeroflex Improves Test Times of RF Communications Devices ... high-speed hardware tests all the 2G, 3G and 4G and wireless data standards. Furthermore, the user can add software modules to customize the solution to meet their current and future RF testing needs.

The PXI 3000 Series achieves up to five times higher throughput than conventional instrumentation and is leading the market in terms of test speed. Its performance is the result of very fast responding hardware and the use of multi-core processors. Multi-core processing through the inherently open software architecture helps the engineer to perform multiple simultaneous measurements and multi-device testing.

For more information visit the company's web site www.aeroflex.com.

Dual Rate Meter Monitors Two Signal Inputs at Once and Performs Application-Specific Calculations

Red Lion Controls, Inc. introduces the PAXDR Dual Rate Meter, providing real-time viewing of dual input rates, paired with sophisticated math functions to measure and display the sum, difference, ratio, draw or percentage of total between the two rates. PAXDR is a 5-digit dual rate indicator and 6-digit dual totalizer that monitors mission-critical factors such as inflow and outflow, unwind and rewind wire tension, feed and tension roll speed, and other pivotal production rates.

Within its industry-standard 1/8 DIN housing, PAXDR simplifies dual rate applications as a single, easy-to-use device—without the need for any complex programming that would otherwise be required to perform application-specific calculations. Six values are viewable on the meter's 0.56 in (1.4cm) LED display: one each for rates A and B, totalizers for A and B, and the rate and totalizer for calculation C. These readings improve production quality and reduce rejects by ensuring a parameter such as feed rate, line speed, flow rate or tension is properly maintained throughout processing.

Users can simply select the desired scale for each of the two signal inputs using PAXDR's programmable function keys, with independent scaling provided for A and B totalizers. This capability makes PAXDR ideal for applications such as flow measurement, where both flow rate and volume must be monitored and scaled to a common unit of measure. Plus, 10-point scaling for both input rates is provided for challenging non-linear processes.

To further expand the PAXDR's capabilities, users may select from several field-installable plug-in option cards, providing features such as:

- Four set point outputs, assigned to any rate or totalizer value and configured to suit varying control and alarm requirements
- Retransmitted analog output, scaled independently of the input range

- Communication and bus capabilities, including RS232, RS485, Modbus, DeviceNet™ and Profibus-DP

PAXDR is available with a standard green or sunlight-readable red LED display, with variable intensity for easy readability in conditions ranging from low light to bright sun. Its NEMA 4X/IP65 sealed bezel ensures PAXDR withstands harsh plant floor conditions to deliver dependable, long-lasting operation.

For more information please go to www.redlion.net.

Linear Encoders with Rugged Die Cast Housing and Built-In Led For Set Up and Diagnostics

TURCK introduces a new line of Kübler by TURCK robust magnetic linear encoders. Utilizing A and B output voltage channels plus a periodic index with the corresponding inverted channels, these encoders achieve high accuracy in a broad range of linear motion applications. The T8.LI20 and T8.LI50 linear encoders are available with either a push-pull output or an RS422 interface and provide a voltage range from 4.8 to 30V-DC.

The linear encoders are used with magnetic bands that are attached to the mounting surface and protected by a stainless-steel cover. The encoder's resolution is up to 5µm with quadruple evaluation, and its repeat accuracy is +/- one increment with a measuring speed up to 82ft/s, depending on the resolution.

Kübler by TURCK encoders use non-contact technology and can survive environments with high vibration (30g/10-2,000 Hz) and shock (500g's/ms). The products can also be used outdoors, due to an IP 67 protection rating, wide temperature range and the weatherproof die-cast housing. The metal housing also offers improved shielding against electromagnetic interference.

A built-in LED provides a warning signal or an index pulse, allowing for simple set-up and diagnostics. Connections are made via a high-grade shielded PUR cable that is also suitable for cable track installations.

Find TURCK product or technical information at www.turck.us.

New Family of Reduced-Price Traveling Wave Tube Amplifiers

AR RF/Microwave Instrumentation has introduced the "TR" Family of traveling wave tube amplifiers. Designed for 19in (48.3cm) rack mounting, these new TWTAs are priced less than AR's full-featured TWTAs.

The "TR" Family includes six models that cover the following frequency ranges:

- Model 250TR1G2z5: 1 – 2.5GHz (250W)
- Model 300TR2z5G7z5: 2.5 – 7.5GHz (300W)
- Model 250TR7z5G18: 7.5 – 18GHz (250W)
- Model 300TR7z5G18: 7.5 – 18GHz (300W)
- Model 200TR4G8: 4 – 8GHz (200W)

Each model comes with 4 side-mounted carry handles and non-slip feet for benchtop use.

Find more information at www.ar-worldwide.com.

Safety Testing Family Additions

Global Test Solutions (GTS), a supplier of high-performance test and measurement instrumentation, and Sefelec, a leader in safety and hipot testing, announced the completion of its safety testing family, the XS Series; the CXS40 milliohm meter and the MXS1000 megohm meter.

The CXS40 verifies ground bonds with measurement capability ranges from 1 m Ω to 1.5 Ω with test currents from 5A to 40A-AC with regulation, and test voltages from 6V-AC to 12V-AC. The CXS40 complies with the first of the four tests required by the Electrical Safety Testing standard. With accuracy of 2.5%, it is suitable for testing any electronic device.

The MXS1000 performs insulation resistance testing ranging from 50k Ω to 200 G Ω (optionally to 2 T Ω) with accuracy of 1.5% and applied DC voltage up to 1000V, which can be ramped in 1V steps from 0 to 999s. The MXS1000 is highly efficient, maximizing its use in laboratories and on production lines.

For more information, go to www.sefelec.com.

Society News

Alexandru Nechifor

“Powerhouse” Team Report

Congratulations to the “Powerhouse” team! The extreme 24hr programming competition IEEEExtreme organized by IEEE took place on October 24, 2009 and brought together more than 700 teams from more than 40 countries. Team "powerhouse" composed of the IEEE student members Alexandru Nechifor, Dan Spatarel and Mihai Ciucu took 4th place after 24 challenging hours of non-stop coding. They were proctored by Professor Mihaela Albu, who helped them organize the competition under the umbrella of the student branch "Politehnica" University of Bucharest. The whole team is involved in the IEEE Instrumentation and Measurement Society.

The performance of the three Romanians from the "powerhouse" team is even greater considering that they came in fourth after three teams ("Mora Seekers", "Citrus Celebration" and "Amobear") from Sri Lanka, New Zealand and Thailand, respectively - and therefore they were the best outside region 10. We are proud to have such a competitive team and obtain such an extraordinary result! Congratulations, "Powerhouse"! You can also see the results on the official website of the competition: www.ieee.org/web/membership/students/xtreme/2009results.html and www.ieeextreme.org.

Jim Leonard

IEEE AUTOTESTCON Frank McGinnis Professional Achievement Award

The IEEE AUTOTESTCON Frank McGinnis Professional Achievement Award is given in the memory of the late Frank McGinnis of the Sperry Corporation, who was instrumental in bringing

military automated test to the forefront of visibility for government and industry alike. Mr. McGinnis founded the Navy Ad Hoc ATE Project for the Navy in 1975, under National Security Industrial Association (NSIA) leadership, to examine and recommend to the Navy a program of research and development to help increase the competency levels of automated test. This led to a Joint Services ATE Project that started in 1978 and had a similar purpose, except the focus was tri-service. The culmination was the formation in late 1980 of the NSIA Automated Test Committee, a permanent activity to maintain a focus on military automated test. This activity is still vibrant and functioning, as a Committee of the National Defense Industrial Association (NDIA, successor to the NSIA) Systems Engineering Division. The Professional Achievement Award was established in Frank McGinnis' memory and honor to recognize managers or professionals in the ATE industry who have demonstrated long-term leadership in the field. The Award is a renaming of the former AUTOTESTCON "Man of the Year" Award. The award is presented at the AUTOTESTCON awards luncheon by the AUTOTESTCON Board Chair or Vice-Chair. The Award includes a check in the amount of \$2,000.00 and an award item.

Sponsorship

The McGinnis Leadership Award is sponsored by the Board of Directors of IEEE AUTOTESTCON.

Award Criteria

- Nominees must have clearly demonstrated outstanding professional leadership in the ATE field spanning a career
- Nominees should have visibility to the outside world, beyond the normal functional duties of his/her organization
- Demonstrated accomplishments should have significant impact across the automated test community
- Nominees should have visible participation in IEEE AUTOTESTCON
- Nominations may be submitted by any individual, regardless of affiliation
- Nominations should be accompanied by a short biographical sketch, along with a short (300-500) word summary
- Recommendation

Nomination & Balloting Process

- Nominations are solicited each year by the AUTOTESTCON Board of Directors via a variety of means, including AUTOTESTCON attendees, AUTOTESTCON exhibitors, AUTOTESTCON Board Sponsoring Societies (I&M, AESS) and their magazines, various technical publications, AUTOTESTCON mailing and e-mail lists, personal contacts, etc.
- Once nominations are received and screened to assure compliance with the established Criteria and Eligibility regulations, a final slate is prepared and submitted to the Board members for balloting.
- Selection and notification of the award winner is completed in time to meet the AUTOTESTCON Proceedings publication deadline.

Eligibility

- The McGinnis Award may only be received once by the same individual. The former "AUTOTESTCON Man of the Year" is considered the predecessor award to the McGinnis award, and recipients of this award are included in this eligibility determination. Prior recipients are listed below.
- Only those individuals who have been active within the past two years shall be eligible for the award.
- Current members of the Board of Directors are not eligible for this award.

Award Notification

The Agent of the Board informs the AUTOTESTCON Board Chairman of balloting results, and in turn the awardee is notified to help assure his/her attendance at the current AUTOTESTCON. The awardee will be asked to submit a current photograph and biographical sketch to the Agent by 1 July of the current AUTOTESTCON year to allow publication in the Proceedings and the Conference Program.

Entry

A nomination form for the Frank McGinnis award is at http://autotestcon.com/main/index.php?option=com_content&view=article&id=22&Itemid=75

Please return it to: Jim Leonard at j.leonard@ieee.org or Judy Scharmann at j.scharmann@conferencecatalysts.com

Jim Leonard

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Deadlines

- Nomination package: 31 May 2010
- Biographical Sketch and Photo (winners only): 1 July 2010

Frank McGinnis Award Winners

2009 – Leslie A. Orlidge
2008 – Peter H. Williamson
2007 – John W. Sheppard
2006 – Joseph C. O’Connell, Jr.
2005 – Donald Kump
2004 – William Ross
2001 – John Roche
1999 – Fred Liguori
1998 – Howard Savage
1997 – Robert G. Mager
1996 – Wright A. “Andy” Nodine
1995 – Milton G. Slade
1994 – Michael T. Ellis
1993 – John Colgan
1992 – Robert C. Rassa
1991 – Charles Scaturro
1990 – James A. (Bert) Houston
1989 – Oscar W. Sepp
1988 – Bernard P. Gollomp

1987 – Lee C. Paulson

1986 - Paul Giordano

1985 – Oliver T. Carver

Man of the Year

1984 – Patrick M. Toscano

1981 – Bernard P. Gollomp

1980 – David M. Goodman

1979 – Fred Liguori