

SCANFAX

November 2003

Volume 55, Issue 9



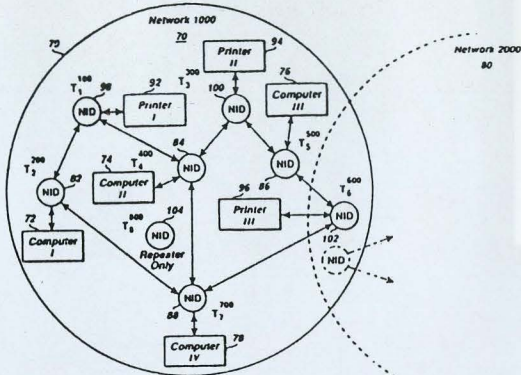
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A publication of the
Institute of Electrical & Electronics Engineers
— Chicago Section —

Medical Device Communications Standards

Great success for
IEEE and ISTO

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A publication of the
Institute of Electrical & Electronics Engineers
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Chairman

Angeline Schaefer
Phone: 312-960-8329
Fax: 312-827-8329
E-mail: aschaefer@owpp.com

Editor

Gerry Ryan
Phone: 708-445-7537
Fax: 708-445-7538
E-mail: gerryr_idcs@ameritech.net

Published for IEEE by
Slack Attack Communications

Publisher

Barbara Slack

Advertising Sales

Beth Vander Grinten
Phone: 608-222-7630
E-mail: bethv@slackattack.com

Printed By

Town & Country Printers
Columbus, WI

SCANFAX (ISSN #0018-1297) is a monthly publication (except June, July and August) of the Chicago Section Institute of Electrical and Electronics Engineers, Business Office, c/o Western Society of Engineers, 28 East Jackson, Suite 1320, Chicago, IL 60604, (800) 898-4333 or (312) 253-4333. It is published by Slack Attack Communications, 5113 Monona Drive, Madison, WI 53716, (608) 222-7630. Printing is by Town & Country Printers, Columbus, WI 53925. For advertising information, contact Slack Attack Communications.

Subscriptions included in IEEE membership dues; non-member subscriptions: \$25 per year.

Address corrections should be sent to: IEEE Membership, 440 Hoes Lane, Piscataway, NJ 08854-1331 or by phone (800) 678-4333.

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CHICAGO SECTION EXECUTIVE COMMITTEE MEETING

Tuesday, November 11, 7:00 p.m.

DeVry DuPage, Room TBA, 1221 N. Swift Rd., Addison, IL

No Registration Needed

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Medical Device Communications Standards

Great success for IEEE and ISTO

By Paul Zukowski

It is always important that the output of one electronic device doesn't interfere with any other devices nearby. This becomes of critical importance in medical settings such as operating rooms or intensive care suites.

It is also of great advantage that all the devices hooked up to a critically ill patient be able to communicate with each other and with any centralized computer control and monitoring functions.

These are among the reasons that the continuing success of the IEEE 1073 Standard for Medical Device Communications is to be celebrated, and its origins studied. Also known as the Medical Information Bus Standard, IEEE 1073 allows clinicians to link bedside medical and patient monitoring device or a computer network in a simple fashion. This permits comprehensive data capture from devices such as infusion pumps, ventilators, and patient monitors.

Among recent extensions of 1073 was the Infrared Wireless transport draft standard (P1073.3.3) approved on the first ballot at the IEEE 1073 Working Group/ISO TC215 WG2.1 Meetings in Atlanta in May of 2002.

In order to provide the communications appropriate for a given device, the 1073 standards are partitioned into layers that may be combined as needed to create a full seven-layer communications stack that provides plug-and-play interoperability.

These standards are generally broken into three key areas:

1. Device data/semantics (ISO/IEEE 11073-1xxxx series)
2. General communication services (ISO/IEEE 11073-2xxxx series)
3. Transports (ISO/IEEE 11073-3xxxx series)

The adoption of the IEEE 1073 family of standards by medical device vendors and healthcare providers was aided by the formation of the Medical Device Communications Industry Group (MDCIG) in 1999. And forming MDCIG was one of the first acts of the services group called the Industry Standards and Technology Organization (IEEE-ISTO).

According to news reports from 1999, IEEE set up ISTO because consortia and other working groups had begun to usurp its time-honored job of creating standards and marketing them. Previous examples cited standards that had come from IEEE but were then being handled by independent groups were 1394 and Gigabit Ethernet.

Today, of course, ISTO has an impressive roster of seven initiatives organized as programs in addition to MDCIG: 1355 Association; Broadband Wireless Internet Forum; Customized Learning Experience Online (CLEO) Lab; Liberty Alliance Project; Nexus 5001 Forum; Printer Working Group; and VoiceXML Forum. But back in 1999, forming MDCIG was a coup.

Signing on to the new group were Hewlett-Packard (now Agilent), Siemens Medical Systems and GE Marquette Medical Systems. Today, a wide number of medical device manufacturers and users belong to MDCIG, including Abbott, Alaris Medical Systems, Oxford Instruments Medical Ltd., and Philips, in addition to many healthcare providers.

The first public demonstration of the complete IEEE 1073 Standard was facilitated by the MDCIG at the Massachusetts General Hospital in 1999. This led to the approval of a new transport profile standard for medical devices in 2000, IEEE 1073.3.2, to enable networking of bedside medical devices. This transport profile used PC industry IrDA standards along with existing RS-232 and RJ-45 cable connectors to enable cost-effective, rapid, firmware upgrades to existing medical devices. This meant there was no need for extensive device re-designs to implement IEEE 1073. The adoption of IEEE 1073.3.2

was actively supported by industry leading manufacturers of both patient monitors and infusion devices.

In a January 2002 article in *Health Management Technology* magazine, Ahmad Hasehm and Roberto Ruggeri point out that healthcare IT professionals, as much or more than any other IT group, have had to deal with the challenges of integrating disparate systems.

Their article, "Infrastructural Considerations for Supporting POC Devices," dealt with mobile and wireless point-of-care (POC) devices that had already begun appearing in clinical settings, ranging from e-prescription pads to electronic stethoscopes to tablet PCs that display everything from patient records to radiology images.

The authors write that it should be a given that a POC device supports HL7 mes-

It is also of great advantage that all the devices hooked up to a critically ill patient be able to communicate with each other and with any centralized computer control and monitoring functions.

saging, the IEEE 1073 Standard for Medical Device Communications, and the CCOW standard for context management.

They add, "The IEEE 1073 family of standards has evolved as an important adjunct to HL7, defining communication standards between POC medical devices (such as vital signs monitors, electrocardiographs, infusion devices and pulse oximeters) and the devices or systems that monitor and manage their operation. Adherence to the IEEE 1073 standard helps achieve plug-and-play operations, in which systems automatically negotiate and configure their connections."

The authors point out that Internet-based standards are revolutionizing how information is exchanged. While today approximately 70 percent of healthcare transactions are

paper-based and the yearly cost of processing and administering claims is about \$90 billion, this could be slashed to \$5 billion or less by moving from a paper-based system to a coordinated and integrated digital system where POC devices play a key role.

They conclude, "Creating an integration-friendly infrastructure is the best way to prepare for current as well as next-generation POC devices." So when considering deployment of POC devices, they recommend adherence to open industry standards. "In this way, these important devices won't add to the problem of disparate systems, but will contribute to the solution. Fortunately, hassle-free system integration is needed throughout healthcare today for reasons beyond the domain of POC devices, so integration progress already made in other areas helps pave the way for POC devices." And the IEEE 1073 Standard for Medical Device Communications is an important part of that process.

According to the IEEE 1073 Web site, participation in IEEE 1073 standards development is open to all interested, with a majority of the work being accomplished electronically and in conference calls. Membership in the IEEE 1073 General Committee, which allows formal voting on all 1073 business (e.g., project approvals, creating of working groups, etc.), is offered upon attendance to your second Working Group meeting. Typically, the General Committee meets three times a year, alternating between eastern, central, and western locations in the U.S.

In order to formally vote during IEEE standard balloting, you have to be an IEEE Standards Association member. There is a nominal cost for IEEE members to join the Standards Association, but non-IEEE members may also join (though the fee is higher). All balloting is accomplished electronically. Learn more at www.ieee1073.org. Information about the Medical Device Communications Industry Group can be accessed at www.mdcig.org

The IEEE 1073 and MDCIG groups are also interested in working with biomedical engineering departments at universities and hospitals that have an interest in advancing standards-based medical device connectivity

For additional information regarding the IEEE-ISTO and its industry programs visit <http://www.ieee-isto.org>, or e-mail info@ieee-isto.org. ■

AFTERNOON EVENT

IEEE's Communications Society and IEEE's Fox Valley Subsection IIT Student Colloquium - Voice over Internet Protocols Saturday, November 8, 2003

About the Topic:

Voice over IP - the use of IP networks to provide telephone service - is a topic attracting more and more attention - not only among network engineers - but in the business and consumer community as well. Two key factors are driving this integration: First, the increasing availability of broadband access to the public switched telephone network and to internet service providers. Second, the maturation of open Voice over IP standards and protocols and the equipment that implements them. Today Voice over IP deployments exist in both private enterprise and public offerings.

Students at IIT's Rice campus have created two feasibility studies describing ways to

integrate the voice and data networks at the IIT Rice Campus. They will present their solutions in a public forum co-sponsored by the IEEE's Communications Society and the IEEE's Fox Valley Subsection. The public is invited to join us in this informative discussion of a current technology and its application.

Two different approaches to the integration of the campus networks will be presented. One uses the existing Avaya PBX as the key component. The other centers on the use of existing Cisco Routers. Following the students' presentation there will be time for questions, answers and discussion.

Location:

Illinois Institute of Technology's
Rice Campus
201 East Loop Road, Wheaton, IL 60187

Time:

1:00 PM to 4:00 PM

Sponsorship:

IEEE's Communications Society
IEEE's Fox Valley Subsection

For more information:

Contact Carol Davids at carol.davids@ieee.org

EVENING MEETING

Chicago Chapter of the IEEE Power Engineering Society The Northeastern Regional Blackout of 14 August 2003 Wednesday, November 12, 2003

Damir Novosel, PhD, KEMA Consulting

About the Topic:

The recent regional power outage in the northeastern US and southeastern Canada has again focused attention on the stability and reliability of the electric power transmission "grid," and on how dependent our society has become on continuously available electric power. Dr. Novosel will review the technological, economic, and political factors that have created the conditions that permit minor events to snowball into major outages, and then describe the particular conditions and events that resulted in the 14 August 2003 outage. He will then describe and critique the methods available to reduce the probability of recurrences of this and other outages. A time for questions will follow.

About the Speaker:

Damir Novosel is Senior Vice President and General Manager for T&D Consulting in KEMA. Prior to joining KEMA in 2003, he has held various positions in ABB including VP of global product management for automation products and Manager of a power system consulting group.

Dr. Novosel has 21 years of experience working with electric utilities and vendors. He received his Ph.D. in electrical engineering from Mississippi State University, where he was a Fulbright scholar.

He has contributed to a large number of IEEE and CIGRE tutorials, guides, standards, reports and other publications in the areas of power systems. Damir is the vice-chair of the IEEE Power System Relaying Committee Subcommittee on system protection and adjunct professor at North Carolina State University.

His work earned him international recognition and reputation and was elected IEEE Fellow. He presently holds 16 U.S. and international patents. He also published over 60 publications in Refereed Journals and Conference Proceedings. His major contribution has been in the area of preventing power system blackouts.

Location:

ComEd Commercial Center, 1919 Swift Dr. (access from Cermak Rd. (22nd St.) via Wind-
sor Dr.), Oak Brook, IL (near the I-290 and I-294 interchange).

Time:

5:30 PM Social
6:00 PM Dinner
7:00 PM Presentation
8:30 PM Adjourn

Cost:

The cost of the optional box-lunch style dinner is \$15.00 for IEEE members, \$20.00 for non-members, payable at the event. Checks payable to "IEEE-PES Chicago Chapter" and cash are accepted, and receipts will be provided.

Reservations:

Please call the IEEE Business Office by noon on Wednesday 5 November 2003 at (312) 253-4333 or (800) 898-IEEE to make your reservation.

For more info, please visit the Chicago Chapter IEEE PES web site: <http://peschicago.org>

IEEE technical meetings are acceptable as continuing education for maintenance of professional engineering licensure. Refer to the individual state's requirements for details.

EVENING MEETING

AP/MTT Societies (Antennas and Propagation/Microwave Theories and Techniques) Microstrip Antennas with Reduced Surface & Lateral-Wave Excitation Thursday, November 13, 2003

Dr. David Jackson, University of Houston (AP Distinguished Lecturer)

About the Topic:

Surface-wave and lateral-wave excitation from microstrip antennas result in undesirable mutual coupling between antenna elements, and also in undesirable edge diffraction of these fields from the edges of the substrate and ground plane. The mutual coupling due to the surface waves and lateral waves causes variations in the scan impedance, including effects such as scan blindness. The edge diffraction of the surface waves and lateral waves may result in significant degradation of the radiation pattern, including front-side pattern rippling and back-side fields.

New types of microstrip antenna designs, called "reduced surface wave" microstrip antennas, have been developed to reduce the undesirable excitation of surface waves and lateral waves. The design of these antennas will be discussed, and results obtained from numerical calculations as well as measurements will be presented to verify the improved behavior. The reduced surface wave antennas have much cleaner radiation patterns due to the reduced edge diffraction, and also exhibit much less mutual coupling as the separation between antennas increases. They also have a higher directivity than conventional microstrip antennas, due to their larger size. A challenge for the

future will be to make these antennas smaller, while still keeping the improved performance.

About the Speaker:

David R. Jackson was born in St. Louis, MO on March 28, 1957. He obtained the B.S.E.E. and M.S.E.E. degrees from the University of Missouri, Columbia, in 1979 and 1981, respectively, and the Ph.D. degree in electrical engineering from the University of California, Los Angeles, in 1985. From 1985 - 1991 he was an Assistant Professor in the Department of Electrical and Computer Engineering at the University of Houston, Houston, TX. From 1991 to 1998 he was an Associate Professor in the same department, and since 1998 he has been a Professor in this department.

He is a Fellow of the IEEE, and is presently serving as the Chapter Activities Coordinator for the AP-S Society of the IEEE. He is on the Editorial Board for the IEEE Transactions on Microwave Theory and Techniques. He is presently the Vice Chair of URSI, U. S. Commission B. He is also an Associate Editor for the International Journal of RF and Microwave Computer-Aided Engineering.

He is a past Associate Editor for the IEEE Transactions on Antennas and Propagation, and has also served as a past member of

AdCom for AP-S. He is also a past Associate Editor of the journal Radio Science.

His research interests at present include microstrip antenna analysis and design, computer-aided design of microstrip antennas and circuits, periodic structures, leaky-wave antennas, and leakage effects in microwave integrated circuits.

Location:

University of Illinois at Chicago
750 S. Halsted, Chicago
Building & Room TBA

Time:

6:30 PM Social (Free snack and beverages)
7:00 PM Presentation

Cost:

There is no charge for attending the seminar.

Reservations:

Please call the IEEE Message Center at (800)898-IEEE or (312)253-4333 by 1:00 PM Tues., Nov. 11th or E-mail apmttchicago@yahoo.com with your name and date of attendance. For info about the meeting visit <http://ewh.ieee.org/r4/chicago/ap-mtt-chicago/>.

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EVENING MEETING

IEEE Communication Society - Distinguished Lecturer Tour Future of Wireless Communications Trends, Technologies, Services, and Landscape for Innovations Monday, November 17, 2003

Javan Erfanian, Bell Mobility, Canada

About Topic:

This talk outlines how the technologies will evolve to enable new services and new experience for the mobile society. It will first outline radio/wireless systems in general, to stage mobility, and discusses the building blocks, technologies and services existing today, emerging tomorrow, or expected thereafter.

The generations of mobile systems and the key attributes of evolution will be discussed, keeping the user experience in perspective. The talk will highlight the partnership of a broad number of players, the activities of the standards bodies, and the global industry. It wraps-up by outlining the vision of the future technologies, trends, and key research topics, driving innovations and serving the users and communities, in the next 5-8 years.

About the Speaker:

Javan Erfanian has been involved in telecommunications research and industry for the past 15 years. He did his undergraduate university education at the University of Calgary, in Electrical Engineering, and graduate studies at the University of Toronto, in Telecommunications. He has been a speaker

in many international events and has taught many academic and industry courses and programs. Most recently he has been teaching Radio Systems at U of Toronto.

In his IEEE roles, he has been Chair of Communications Chapter in Toronto (1995-1999), Program Manager for several Conferences, Canadian Correspondent for Communications Magazine Newsletter, Communications Society Expert Lecturer, and a recipient of IEEE Millennium Medal.

Javan is currently Senior Associate Director at Bell Mobility. In this role, he conducts research, and charts strategy for wireless technology evolution, while working with the global industry and academia on research, innovations and standards for the enablers of the future mobile service environment.

Location:

IIT Rice Campus, (Room TBD)

Directions:

The IIT Rice campus is on the northeast corner of the junction of East Loop Road at Butterfield Rd. The intersection is about 3

miles west of IL 355 and IL 53. Map: <http://www.rice.iit.edu/directions.html>

Time:

6:30 PM Social (Free snack and beverages)
7:00 PM Presentation

Sponsorship:

IEEE Communication Society Chicago Chapter

Cost:

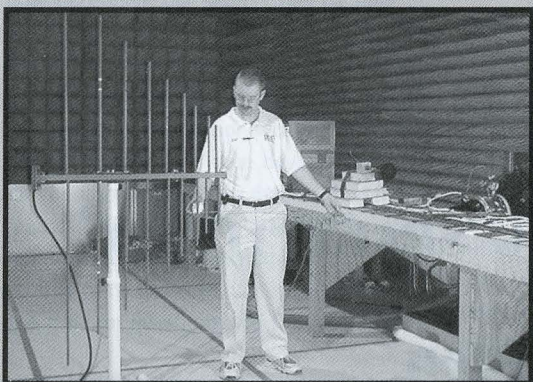
There is no charge for attending the seminar.

Reservations:

Reservations are not required, but registering your intent of attendance at: ieechi@yahoo.com is greatly appreciated.

For More Information:

Visit IEEE Chicago Section website at: <http://www.ewh.ieee.org/r4/chicago/>, or contact: Yigang Cai ycai@ieee.org or Jack Sherman j.sherman@ieee.org.



More information can be found at www.dlsemc.com or by calling Jack Black at D.L.S. Electronic Systems, Inc. at 847-537-6400.

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On August 31, 2003, the National Association of Radio and Telecommunications Engineers bestowed upon D.L.S. Electronic Systems, Inc. the rare accreditation of NARTE Certified Organization. To achieve this accreditation, 70-100% of all engineers and technicians must be NARTE certified. To become certified, engineers and technicians must meet rigid educational, experience, testing, peer and supervisory endorsements. D.L.S. currently has 16 NARTE certified engineers.

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EVENING MEETING

IEEE - ED/CAS/SSC Extraordinary Advantages of Migrating from Discrete to Integrated Optical and Opto-electronic Components Tuesday, November 18, 2003

Craig Miller, PhD, Director of Technical Business Development with Somers-Stanton

About Topic:

We are several decades into the progression of Moore's Law, and we are still seeing improvements in cost and reliability for higher levels of integration. Opto-Electronic Systems, in particular, are typically showing dramatic and unexpected improvements at higher levels of integration. An actual test case will be presented illustrating the noteworthy improvement in cost which are now possible. The test vehicle we will study is an Optical Networking product. One version, realized from mostly discrete optical technology, will be compared to a concept version implemented from advanced integrated optical, opto-electronic and hybrid components. The presentation includes the tradeoffs made to achieve the advantages, while addressing the impact of component availability, tight performance specifications, preserving archi-

tectural features already attractive to customers and establishing manufacturing capability.

About the Speaker:

Craig Miller has Ph.D. and Masters Degrees from Northwestern University, specializing in the areas of Semiconductor Physics and OPTO-Electronics. He has served as Technology Manager, Project Manager and Director of Advanced Manufacturing Technology at TELLABS, after serving as a Distinguished Member of Technical Staff at Bell Labs in Naperville, Illinois. He is currently Director of Technical Business Development with Somers-Stanton in Lake Zurich, IL.

Location:

DeVry DuPage
1221 N. Swift Road, Addison, Illinois

Park in the visitors parking area. Enter at the Main entrance, sign the visitor's log and the room number is 266.

Time:

7:00 PM Social (Free Sandwiches, Snacks, and Beverages)
7:30 PM Presentation

Reservations:

Please call the IEEE Message Center at (800) 898-IEEE or (312) 253-4333 by 1:00 PM Monday, November 17.

For More Information:

For information about the meeting see the ED/CAS/SSC website at <http://ewh.ieee.org/r4/chicago/ed-cas-ssc/>.

EVENING MEETING

IEEE EMC Society Meeting Conducted Immunity Transient Testing for CE Marking Wednesday, November 19, 2003

Thomas C. Moyer

About Topic:

This seminar will provide a background knowledge of the IEC and EN standards used for EMC conducted transient immunity testing for CE marking of electrical and electronic products. The phenomena behind the transients plus verification techniques for the transient pulses will be discussed.

Special emphasis will be given to the requirements for EN 60601-1-2, the Medical Electrical Equipment EMC requirements and tests as related to conducted immunity. Pending changes to the conducted immunity requirements for medical equipment are out-

lined so that the EMC engineer can be prepared to implement these new requirements in a timely manner.

About the Speaker:

Thomas Moyer graduated from Drexel University in Philadelphia with a BSEE degree. He has worked for Ford Motor Company designing automotive electronics systems and for Ametek U.S. Gauge designing aircraft engine instruments. More recently, Moyer has been a sales engineer and regional sales manager. He joined Amplifier Research in 1996 as a product line marketing specialist.

Location:

DLS Electronics
1250 Peterson Drive
Wheeling, IL 60090

Time:

6:30 PM Social Hour
7:00 PM Presentation

Directions:

www.ewh.ieee.org/soc/emcs/chicago

Reservations:

RSVP Jack Black 847-537-6400

EVENING MEETING

IEEE-IAS/IES Dinner Presentation

Grounding of Generator Sets and Transferring of the Neutral Conductor Wednesday, November 19, 2003

Russelectric

About Topic:

Russelectric will provide a speaker that will give a presentation pertaining to one of the most misunderstood installation practices in our industry, the proper grounding of a generator set in conjunction with the transferring of the neutral conductor of an automatic transfer switch. The presentation will cover the proper grounding of a generator set per the National Electric Code, the topic of separately derived systems and the impact of switching the neutral conductor.

Location:

Costa's (Greektown)
340 S Halsted St.
Chicago, IL

Time:

5:30 PM Social
6:00 PM Dinner
7:00 PM Presentation

Directions:

Costa's is located in Greektown on the corner of Van Buren and Halsted. See www.iaschicago.com for detailed directions and a map.

Cost:

Your cost includes the presentation and a four-course dinner with a choice of the main entry - Roast lamb, Chicken, or Fish. (Vegetarian or special dietary meals available upon request). Cost is \$25 IEEE Member and \$30 non-member. Valet parking is included with your meal.

Reservations:

Please call the IEEE Business Office at (800) 898-IEEE or (630) 493-4333 with your reservation. Please note any special meal requests at the time of the reservation. You can also make your reservations on line at www.iaschicago.com

Note: For P.E. licenses that require continuing education for renewal, attendance at IEEE Technical Meetings is acceptable as one Professional Development Hour (PDH) per meeting.

EVENING MEETING

IEEE Chicago/Rockford Consultant's Network Business Structures for the Engineering Consultant Monday, November 24, 2003

Mr. Gillette, RF Gillette, Inc.

About the Topic:

In addition to networking and sharing leads and referrals, there is usually a guest speaker. Many different business structures are possible when working as an engineering consultant: corporation, sole proprietor, limited liability corporation (LLC), and others. Richard Gillette, vice-chair of the Chicago-Rockford consultants' network will present a brief introduction to the steps and associated costs required to incorporate in the state of Illinois. An open discussion will follow the presentation, with members contributing ideas and experiences, advantages and disadvantages regarding the various business structures. If you are thinking about becoming an independent consultant, or are already engaged in independent business, please join us for this lively discussion. Members and non-members are invited to both the meeting and the optional dinner.

About the Speaker

Mr. Gillette is President of RF Gillette, Inc., a consulting engineering firm. He is retired from Northrop-Grumman, where he held many positions, including Vice President of Engineering. In addition to his 30 years at Northrop, he has successfully operated a number of small businesses. He holds a BSEE (RF Communications) from the Illinois Institute of Technology ('66) and an MBA (Operations Research) from Loyola University of Chicago ('69). He is both a Licensed Professional Engineer and a Licensed Real Estate Broker. He is a member of the William Rainey Harper College Board. He also serves as Vice Chair of the Institute of Electrical and Electronics Engineers, Chicago and Rockford, Consultants Network and as Director of the Village of Tower Lakes Emergency Services and Disaster Agency.

Location:

Palatine Public Library
700 North Court, Palatine, IL
847-358-1216

Dinner Location:

Bakers Square, 270 E. Northwest Highway (at the corner of North Court St.), just south of the library

Time:

6:15 PM Optional Dinner at Bakers Square
(Order off the menu - reservations not required)
7:30 PM Meeting -
Presentation and Open Discussion
9:00 PM Adjourn

Information:

E-mail to either benmiller@worldnet.att.net or JAuerConsulting@worldnet.att.net, or visit our web site at <http://www.drblank.com/coaction.htm>



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SCANFAX magazine is the official publication of the Institute of Electrical and Electronics Engineers (IEEE) Chicago Section. Those in the Chicago area who are influential in the electrical, electronics, and computer industry receive SCANFAX each month (except July and August). It provides a forum for manufacturers, consultants, sales representatives, universities, and colleges to exchange ideas and information.

READERSHIP

Approximately 7,000 professionals are members of IEEE Chicago Section. These members represent more than 200 companies in the Chicago area. You can reach this targeted audience with your advertisement in SCANFAX.

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MECHANICAL REQUIREMENTS

SUBMISSION REQUIREMENTS (Traditional): Camera-ready reflective art (100 line screen) or negative film (right-reading, emulsion down, not to exceed 150 line screen). It is suggested that any ads containing halftone photos or screens be supplied as negative film. Provide print proof with all film (matchprint for 4/c process ads required). **(Electronic):** Platform: Macintosh (preferred) or Windows. Disk Format: 3-1/2, Zip (100MB), or CD. File Format: QuarkXPress (or Illustrator if saved as .eps). **Unsupported Formats:** Due to software limitations for production efficiency, we are **NOT** able to accept the following programs: PageMaker, WordPerfect, Microsoft Word, Microsoft Publisher, Harvard Graphics, PowerPoint, Excel, Corel Draw. **Electronic Ad Submission Checklist:** Verify ad dimensions. Don't use color if ad is black-only. Copy all materials to disk (include all placed graphics, scans, logos). Include all fonts on disk. Provide laser print of ad.

NOTE: Any ads not supplied camera-ready could incur additional charges. We prefer that 4-color ads be submitted as negative film with match print. If a four-color ad can only be sent on disk, there will be an output charge as our printer requires film and matchprints for all four-color ads.

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The official publication of the INSTITUTE OF ELECTRICAL &
ELECTRONICS ENGINEERS — CHICAGO SECTION

ADVERTISING RATES

AD SIZE	1X	5X	10X
Back Cover, 4/c	\$1,600	\$1,400	\$1,215
IBC or IFC, 4/c	1,390	1,270	1,165
Full Page	890	770	665
1/2 Page	650	560	490
1/3 Page	505	435	380
1/4 Page	375	315	270
1/6 Page	260	230	205

Professional Card	\$330
One color (PMS) plus black	\$300
Four color inside pages	\$500

10% premium on b/w position requests, 1/2 page or larger.

15% to recognized advertising agencies on space only.

For information on inserts, contact your account representative.

DIMENSIONS

(Dimensions are width by height)

Full Page 8-3/8" x 10-7/8"

(7-3/8" x 9-7/8" recommended print area)

1/2 Page	Horizontal.....	7-3/8" x 4-7/8"
	Vertical	4-7/8" x 7-3/8"
1/3 Page	Horizontal.....	4-7/8" x 4-7/8"
	Vertical	2-3/8" x 9-7/8"
1/4 Page	Horizontal.....	4-7/8" x 3-5/8"
	Vertical	2-3/8" x 7-3/8"
1/6 Page	Horizontal.....	4-7/8" x 2-3/8"
	Vertical	2-3/8" x 4-7/8"

EMPLOYMENT OPPORTUNITY ADS

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Include your business in the "Professional Card" section of each issue of SCANFAX throughout the year, for the low cost of \$330.00 (includes production). Dimensions of a Professional Card are 3-5/8" wide x 7/8" high. Your advertisement can include your logo, slogan and key information about your business. Ads will be listed alphabetically. Sign up today!

EDITORIAL SCHEDULE*

2004 January Issue

EDITORIAL FOCUS: Circuits and Devices
SPACE RESERVATIONS AND CAMERA READY
MATERIALS DUE: Nov. 25, 2003

February Issue

EDITORIAL FOCUS: Industrial Applications
SPACE RESERVATIONS AND CAMERA READY
MATERIALS DUE: Dec. 25, 2003

March Issue

EDITORIAL FOCUS: Communications
Technology
SPACE RESERVATIONS AND CAMERA READY
MATERIALS DUE: Jan. 26, 2004

April Issue

EDITORIAL FOCUS: Electromagnetics
and Radiation
SPACE RESERVATIONS AND CAMERA READY
MATERIALS DUE: Feb. 25, 2004

May Issue

EDITORIAL FOCUS: Education/
Universities
SPACE RESERVATIONS AND CAMERA READY
MATERIALS DUE: March 25, 2004

September Issue

EDITORIAL FOCUS: Energy and
Power Engineering
SPACE RESERVATIONS AND CAMERA READY
MATERIALS DUE: July 26, 2004

October Issue

EDITORIAL FOCUS: Computers
SPACE RESERVATIONS AND CAMERA READY
MATERIALS DUE: Aug. 25, 2004

November Issue

EDITORIAL FOCUS: Signals and Applications
SPACE RESERVATIONS AND CAMERA READY
MATERIALS DUE: Sept. 27, 2004

December Issue

EDITORIAL FOCUS: Systems and Control
SPACE RESERVATIONS AND CAMERA READY
MATERIALS DUE: Oct. 25, 2004

*Features subject to change without notice

PROFESSIONAL AND BUSINESS DIRECTORY

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- IEC/EN 61000-4-11 Voltage Dips/
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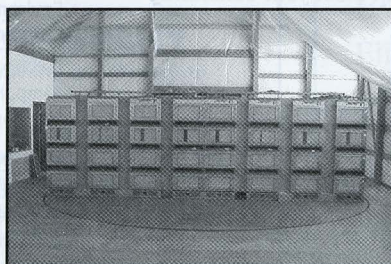
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