

SCANFAX

April 2003

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— Chicago Section —

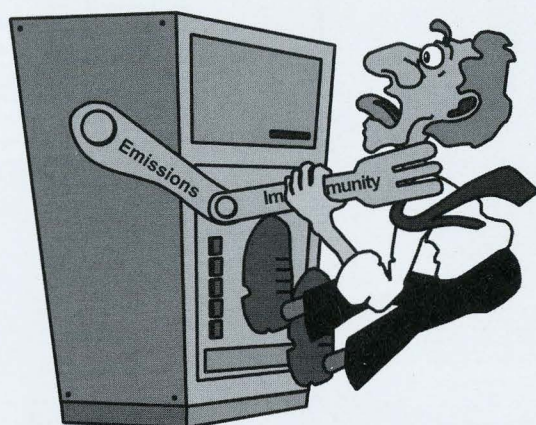
Electromagnetics and Radiation

Wi-Fi — REVOLUTIONIZING THE WAY
PEOPLE ACCESS COMPUTER NETWORKS
AND THE INTERNET. . .

AND *IEEE* IS SETTING THE STANDARDS.

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Introduction to Electromagnetic Compatibility Design Practices* - May 1-2
Design Techniques for Controlling Radiated Emissions* - May 5-6



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Donald L. Sweeney, with 15 years experience teaching EMC design classes and 30 years experience in the EMC & Electrical Engineering fields, will be offering two courses at the Hilton in Northbrook, IL May 1-2 and 5-6, 2003.

For students to apply what they have learned from the classes to their specific products, they are encouraged to bring a product, or a schematic, to a free personal consultation offered by the instructor or his associate on May 3 or 7. Classes will also be offered July 24-25 and July 28-29 as well as in October and January.

For more information or to receive a brochure,
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*These are the same classes formerly offered by Don through the University of Wisconsin.



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— Chicago Section —

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SCANFAX

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Volume 55, Issue 4

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CHICAGO SECTION EXECUTIVE COMMITTEE MEETING

Tuesday, April 8, 6:30 p.m.
DeVry DuPage, Room TBA, 1221 N. Swift Rd., Addison, IL
No Registration Needed

ATTENTION

NEW BUSINESS OFFICE LOCATION:

The Institute of Electrical and Electronics Engineers Business Office has moved.
The new address and phone number are as follows:

Western Society of Engineers
28 East Jackson, Suite 1320
Chicago, IL 60604
312-253-4333 — 800-898-4333

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Electromagnetics and Radiation

Wi-Fi — REVOLUTIONIZING

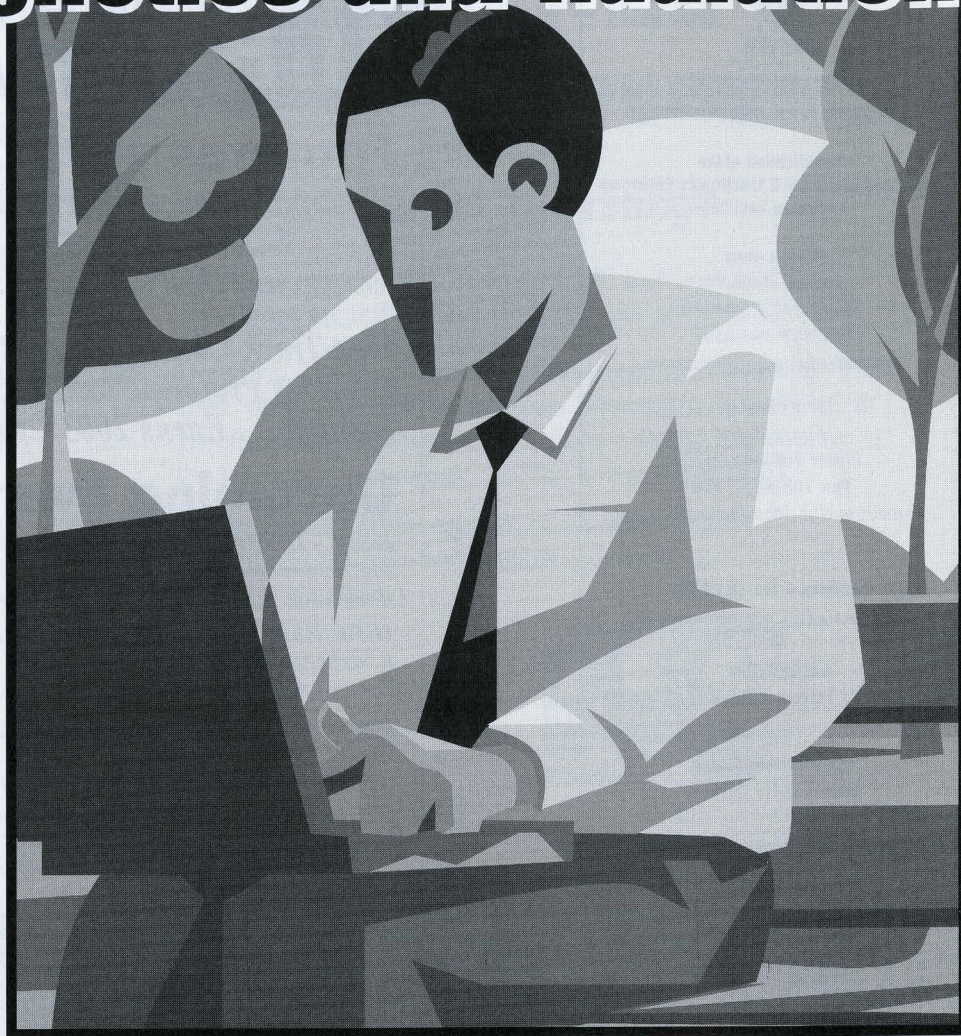
THE WAY PEOPLE ACCESS

COMPUTER NETWORKS AND

THE INTERNET. . .

AND IEEE IS SETTING

THE STANDARDS.



by Paul Zukowski

Wireless computing or Wi-Fi is one of the hottest frontiers in electronics spawning hundreds of new products. Cutting the cable and being able to take your laptop to the conference room, to a colleague's office, to the lunchroom and still be online is liberating. Being able to go to a coffee shop, airport, or hotel and surf the Internet, exchange e-mail, or access your company's network is revolutionary.

With many new laptops, you don't have to install anything -- the wireless capability is built right in. You can set up your own wireless broadcasting point with equipment available at any large office supply store or computer store for under \$200.

Wireless networks -- also called wireless LANs or WLANs for "wireless local-area networks" -- all use a radio broadcasting technology called Wi-Fi (wireless fidelity), a catchy brand name created by the Wi-Fi Alliance (formerly the Wireless Ethernet Compatibility Alliance). The technical standard behind Wi-Fi is IEEE 802.11, just like the older wired

network called Ethernet is the marketing name for IEEE 802.3.

IEEE leads the way in developing open consensus standards for wireless LANs, wireless personal area networks (PANs) and wireless metropolitan area networks (MANs). The Wi-Fi Alliance then certifies that products meet the IEEE standards. The Wi-Fi interoperability certification program has become the international standard for providing high-quality interoperability testing for 802.11-based products.

Currently the Wi-Fi Alliance has 205 member companies from around the world, and 611 products have received Wi-Fi certification since certification began in March of 2000. The goal of the Wi-Fi Alliance's members is to enhance the user experience through product interoperability. Testing done at four labs around the world approved two new categories of products -- Wi-Fi cable modems and Wi-Fi DSL modems. Another trend was an increase in mPCI cards (cards that go inside laptops and PDAs) while insertable PC cards

declined slightly. In addition, Wi-Fi Compact Flash card certifications increased as Wi-Fi is used in smaller devices.

Not only are there more products using the Wi-Fi name, there is also potential confusion over which of the standards products are compatible with, such as 802.11a, 802.11b or 802.11g, etc. The Wi-Fi Alliance plans to implement a new way of certifying that wireless LANs based on the various 802.11 standards can work with each other.

Then there is the frequency crunch. Nearly 30 million of these networks are expected to be in place by 2005, all using the same crowded swath of spectrum. The hunt is on for new areas that Wi-Fi can operate in as well as increasing the bandwidth on present frequencies.

In February, the IEEE 802.11 Working Group approved a new 802.11g standard for wireless local area networks (LANs), that extends the data rate of the IEEE 802.11b (TM)-1999 to 54 Mbps from its current level of 11 Mbps. Two approval steps remain within the consensus process followed by the Institute of Electrical and Electronics Engineers before IEEE 802.11g is completed. Final approval is expected in mid-June 2003 with publication in late July 2003.

The 802.11g Task Group, which is

developing this standard, was formed in September 2000. It is a diverse body containing representatives from well over 100 computer, networking and software companies, as well as those from consultant organizations and academic institutions.

"By extending the IEEE 802.11b PHY to 54 Mbps, IEEE 802.11g will create data-rate parity at 2.4 GHz with IEEE standard 802.11a (TM), which allows for a 54 Mbps rate at 5 GHz," said Stuart Kerry, Chair of the IEEE 802.11 Working Group, in a press release. "Given the large installed base of commercial 802.11b-based WLANs, there is a strong market demand for this extension to 54 Mbps so existing WLANs can operate more efficiently."

"Now that we have a complete draft of the IEEE 802.11g standard, some manufacturers are beginning to release products in accordance with it. While the IEEE is pleased to see early development of product based on our work, it is quite speculative to release products at this time."

"The IEEE P802.11g draft had technical changes made to it at the January 2003 session, and further changes are expected starting in March 2003 based on comments received from the sponsor organization of IEEE 802.11," said Brian Mathews, IEEE

802.11 publicity chair. He added, "The only sure way to guarantee compliance and avoid potential interoperability problems is to wait for final ratification of 802.11g, which is highly likely in June 2003."

By using an enhanced protocol, 802.11g enables mixed network operation. This mixed operation allows legacy 802.11b devices to operate at 11Mbps while new 802.11g devices operate at 54Mbps on the same network. This simultaneous operation capability will give consumers a clean path to upgraded performance without having to be tethered to 802.11b performance when in a mixed network. The extension will improve access to fixed-network LANs and internetwork infrastructures and will also create higher-performing ad-hoc networks. IEEE 802.11g maintains the spectral mask and carrier frequencies of the IEEE 802.11b standard.

IEEE P802.11g, which is being developed by the IEEE 802.11 Working Group for Wireless LANs, is sponsored by the IEEE 802 LAN/MAN Standards Committee of the IEEE Computer Society. For further information, visit: <http://www.ieee802.org>. ■

Paul Zukowski is a freelance writer based in Madison, Wis., who frequently covers technology.

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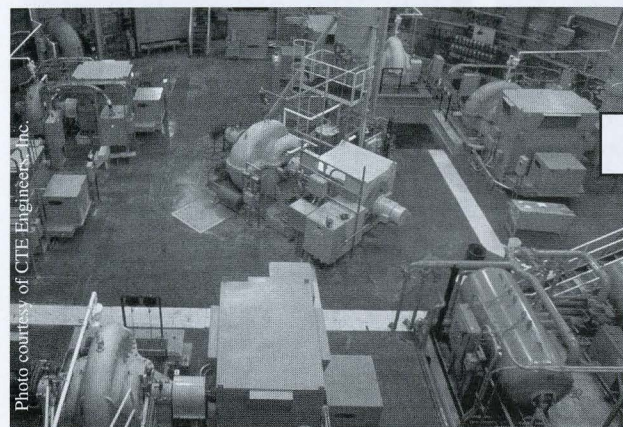
Emergency/Standby
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Cogeneration
Peak Shaving

Fast-Track Conversion of Roseland Pumping Station Provides Prototype for Chicago's Aging Steam Powered Stations. . .

Earns 2003 CECI Honor Award

by Irwin Smiley, P.E., F.NSPE and Lori Veit



In use since 1911, Roseland Pumping Station is one of 12 water pumping stations in the city of Chicago. It is the only provider of municipal drinking water to 750,000 people on the city's south side and to six suburban communities.

Originally fired by coal, then later retrofitted for oil and natural gas to produce steam, it was discovered during unusually high demands in the summer of 1995 that the aging system, with many parts no longer even manufactured, was due for a major overhaul. The time was right to install a system that would reduce operating costs and increase efficiency.

The Chicago Department of Water initiated a fast-track program to upgrade the station, and selected Consoer Townsend Envirodyne Engineers (CTE) to provide design and engineering construction services. Through regular workshop meetings and onsite evaluations the project team streamlined the design period from the usual three to four years to less than 18 months.

The project was a success. Phased in over 3.5 years and completed in June 2002, it is now being used as a prototype for the conversion of the city's four remaining steam pumping stations. The project is estimated to reduce operating and maintenance costs by \$2 million annually, while increasing the reliability and flexibility of the operation. Through proper planning, 300 million gallons of water a day were served without interruption during the conversion, and the project earned CTE a 2003 CECI Honor Award.

The scope and complexity of the project was obviously immense, beginning with the design and construction of a building to house the new electrical equipment, matching the existing pump building facade, complying with zoning requirements, and minimizing noise and security concerns in the residential neighborhood.

Roseland serves two separate water distribution systems — a low pressure zone supplies water at a nominal 40 pounds-per-square-inch gauge (psig) pressure to the low elevation areas

of the south and southeast sides of the city and adjacent suburbs; a high pressure zone supplies the high elevation areas of the city and suburbs to the west of the station, at a nominal 70 psig pressure.

Unlike smaller systems that use elevated storage to maintain water pressure during a station outage, the city's pump stations are directly connected to a water distribution grid. These logistics and demands necessitate some serious infrastructure themselves, including three 3,750 horse-power (HP) and two 2,250 HP motors with variable frequency drive motors; 28 miles of conduit; 199 miles of electric cable; and 141 feet of 5 KV medium voltage metal clad switchgear.

To serve the new electric loads for this large pumping station, ComEd provided four 12-kilovolt (KV) incoming service lines from two substations to cover each other in case of an interruption of power. This required the city's medium voltage metal clad switchgear to have four main circuit breakers and three tie circuit breakers. The electrical service comes from two different TSSs, which are out of phase to each other and cannot be connected to each other. The design challenge was to allow the two TSSs to support the power system without being connected to each other. The design operates with the tie breakers normally closed between the two services from the same TSS.

Separate variable frequency drives (VFD) for each pump motor provides power savings by meeting the varying demands on each pump for either of the water distribution systems. Each VFD is also equipped with a bypass feature to allow for constant speed operation should the VFD require maintenance. The VFDs allow the pumps to maintain a relatively constant water pressure in each system, therefore reducing the hydraulic shock to aging water mains.

To minimize possible power interruption each pump's electrical retrofitting was "pre-installed" so that only the new electric motors needed to be installed during individual conversion. Once the electrical service, VFDs, and generators were ready, work began on converting the five pumps from steam to electric, each of which took up to six months. The original pumps were removed and sent to the factory for overhaul, all piping was removed, asbestos abatement completed, and steam lines carefully shut down without hindering plant operations. Then the new motors were installed. Electrical

power and automated instrumentation/supervisory control and data acquisition (SCADA) systems were installed, rebuilt pumps reinstalled, and the entire system tested.

Due to an increasing number of electrical power outages in the area, CTE designed the electrical system with eight 2,000-KW standby generators (five diesel-fueled and three natural gas-fueled) with paralleling equipment. With the standby generator system, Roseland can continue full operation through brownouts or complete power outages. These units will also be used for short-term standby service while the natural gas units are installed. (The rising cost of natural gas stopped the natural gas cogeneration system from being implemented immediately. When economically feasible these generators can be installed to reduce electrical costs by paralleling with ComEd for peak shaving.)

An operating sequence for the standby generators enhances the reliability of the electrical system. On loss of ComEd power, the standby generators immediately start and connect to the power system. On return of ComEd power, the main and tie circuit breakers and generator circuit breakers operate in a "closed transition on return to normal" status. This permits any operating pump from shutting down on restoration of ComEd power.

CTE also designed a dewatering control system, including six water pumps, that shuts down the electrical system on the lower level of the pump station in the event of a water main rupture.

Load banks test the entire generator system weekly, ensuring reliability without disturbing operations.

To streamline operations, CTE required all equipment manufacturers to utilize standardized components to ease system integration and minimize maintenance issues.

The conversion from steam to electric power is estimated to reduce personnel and maintenance costs to the tune of \$2 million annually.

The old steam station required boiler operating engineers, steam turbine operating engineers, and steam maintenance personnel to be present 24/7, whereas the electric station requires only one operator to monitor the system, largely through SCADA system.

The most dramatic savings of the new system will be realized through reduced maintenance costs required by the electrical components themselves. ■

EVENING MEETING

IEEE - IAS/IES Dinner Presentation Maintenance and Testing of Distribution Systems Wednesday, April 9, 2003 (Non-Standard Date)

Thomas Nine, P.E. Cutler-Hammer Engineering Services

About the Topic:

Thomas will present on distribution maintenance issues from the owner's perspective and highlight:

- Factors that effect the operating life of electrical equipment
- Typical maintenance tests and practice on various types of distribution equipment
- Frequency of maintenance procedures
- Emergency testing and equipment failure under service conditions

About the Speaker:

Education: BSME, Purdue University, MBA, University of Maryland.

Mr. Nine is an applications engineer with 18 years of experience applying field support to various types of distribution equipment including low and medium voltage switchgear, low

and medium voltage motor control centers, oil and dry type transformers and relays. Services include relay testing, acceptance testing, maintenance and field modification services. He has worked as a Field Service Engineer, Field Sales Engineer and Engineering Team Leader.

Location:

Costa's (Greektown)

340 S. Halsted St.

Chicago, IL 60661

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

Time:

5:30 PM Social

6:00 PM Dinner

7:00 PM Presentation

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 (312) 253-4333 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.

EVENING MEETING

IEEE EMC Society Chicago Chapter Reverberation Chambers Tuesday, April 22, 2003

Garth D'Abreu, ETS-Lindgren

About the Topic:

The reverb chamber (RC) is gaining widespread acceptance in the EMC community as a viable tool for performing Immunity and Emission tests. Some of the common guidelines and specifications used to define site performance are equally valid for reverb chambers.

The main advantage over anechoic chambers is that most of the energy fed into an RC can be used to develop fields as opposed to anechoic chambers where, depending on the antenna pattern, more than 50% of the transmit power can be dissipated in the absorber lining.

The purpose of this paper is to demonstrate the efficiency and repeatability of performing immunity and emission measurements in reverb chambers of greatly different sizes. The larger chamber has a lowest useable frequency (LUF) of 80 MHz and the smaller chamber a LUF of

1000MHz. The characterization data for both chambers will be presented in addition to the results of an emission measurement in the frequency band known to coincide with the emissions from the device. Some data will also be presented from tests done in a tapered chamber for reference.

About the Speaker:

Garth D'Abreu is the Technical Manager of the Field Generation group at ETS-Lindgren, with responsibility for TEM devices and reverberation chambers. Garth has been with ETS Lindgren for the past two years but held similar posts with Lindgren RF Enclosures, Ray Proof Limited and Belling Lee Intec in the UK for the past 12 years before their respective mergers. Garth has a BSc, 1985, from the University of North London and is a member of the IEE.

Location:

ETS-Lindgren

400 High Grove Blvd.

Glendale Heights, IL 60139

Time:

6:30 PM Social

7:00 PM Meeting

Reservations/Directions:

Steve Laya (Elite)

Phone: 630-495-9770

For More Information:

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

EVENING MEETING

Electronics in Medicine and Biology Society Dealing with HIPAA Security Monday, April 28, 2003

About the Topic:

The Center for Medicare and Medicaid has just released its final privacy rules. The effects on non-medical staff can be as traumatic as its effects on health care professionals. Is there a double standard for medical data with the paper vs. electronic provisions causing confusion in facilities across the country? Join us for a discussion of how the new rules affect everyone from programmers to data entry clerks to equipment technicians.

Location:

DeVry Institute
Addison Campus
1221 N. Swift Road
Addison, IL 60101

(Swift Road between Lake and Army Trail)

Time:

7:00 PM Presentation

For More Information:

Call (847) 297-6610 or e-mail ckelly@ieee.org

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EVENING MEETING

IEEE Chicago Section (Joint with all its chapters and subsections) Technology Goes Along for the Ride Inside the IDOT District One Communications Center Thursday, May 1, 2003

Stephen Peters, IL Dept. of Transportation

About the Topic:

During the summer and fall of 2002, Stephen Peters spearheaded a million-dollar upgrade to the IL Dept. of Transportation District One Communications Center located in Schaumburg, IL. The State of the Art Center handles over 12,000 radio transmissions as well as 2,000 phone daily and monitors video from over 2,250 miles of Interstate Highways in the Northeastern Illinois Area. Mr. Peters will give us a first hand look at how IDOT is using technology to make driving Illinois highways safe and efficient. Anyone who has watched the lanes on the Kennedy reverse, had a Minuteman assist with a roadside problem, or who has listened to travel times on local radio and TV will be interested in how IDOT is improving its data collection and delivery of services.

Steve Peters, an Electrical Engineer, is the Communications and Operations Center Manager for the Illinois Department of Transportation, District One. With over 30 years experience in the Communications and Electronics field, he

holds an FCC General Radiotelephone Operator License and a General Class Amateur Radio License. In addition he holds FAA Commercial Pilot and Flight Instructor ratings, and an Airframe and Powerplant License.

Awards Recognition:

The Chicago Section will be using this occasion to recognize the 2003 Fellow Award Recipients.

Location:

Wilton Manor
2200 N. Main St.
Wheaton, IL 60187

Northwest corner of Geneva Rd. and Main St. (Schmale Rd.) From I355, west on North Avenue, Rt 64, to Schmale Rd. Turn left on Schmale and continue south to Geneva Rd. and Main St. (Schmale). From I88, north on

Naperville Rd. to Roosevelt Rd., Rt 38. West on Roosevelt to Main St. Turn right on Main and continue north to Geneva and Main.

Time:

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

Cost:

\$25 per person which includes rolls, salad, family style dinner (sirloin of beef, roast chicken, sausage, pasta, whipped potatoes, and vegetable), and dessert.

For Reservations:

Please call the IEEE Message Center at (800) 898-4333 by 1PM Monday, April 29th. For information, call Norm Phoenix at (847)523-1078 or Connie Kelly at (847)670-4630.

EVENING MEETING

IEEE EMC Society Chicago Chapter 5th Annual Chicago EMC MiniSymposium Tuesday, May 20, 2003

About the Topic:

Now in its fifth year, the IEEE EMC Society Chicago Chapter MiniSymposium offers engineers, managers and project supervisors an excellent opportunity to receive world-class EMC training locally and at a very reasonable cost. The MiniSymposium is an all-day event with topics ranging from EMC design principles and regulations to test methods and test equipment.

This year's event will feature a variety of speakers covering:

- EMC Regulatory Fundamentals
- Conducted & Radiated RF Emissions
- Conducted & Radiated RF Immunity
- EMC Design: Software & Hardware

In addition to the various technical presenta-

tions, there will be over 20 vendor exhibits highlighting EMC related products, test equipment and services. Exhibitors include technical representatives, test laboratories, test equipment manufacturers, component suppliers, EMC modeling vendors and consultants.

Location:

Holiday Inn
860 West Irving Park Road
Itasca, IL 60143
TEL: 630-773-2340

Time:

8:00 AM - 5:30 PM

Cost:

Admission for IEEE members is \$35 (\$45 non-members, \$15 students) and includes breakfast rolls and coffee, lunch, and entry into several door prize raffles.

Reservations:

RSVP to attend the MiniSymposium by contacting Ray Klouda or Steve Laya at Elite Electronic Engineering (630-495-9770) to receive a registration form. Additional information on the Symposium and a copy of the registration form is available on the Chapter website.

For More Information:

<http://www.ewh.ieee.org/soc/emcs/chicago/>

CHAIRMAN'S MESSAGE

Your Chicago Section's Program Chair would like to call your attention to our new Webmaster's endeavor to update and enhance our Section's Web site at <http://ewh.ieee.org/R4/Chicago>. You are urged to send a copy of your announcement for any local IEEE-related event to our Webmaster [Carol.Davids@ieee.org] when you submit it to SCANFAX.

In addition, this site may also include some pictures: look for those showing our Section's representatives at the February 22nd, 2003 Engineers Week activities at IIT's Rice Campus.

This Section site will try to include a "hot link" to each web site operated by our local Society and Student Chapters, as well as to the Fox Valley Sub-Section.

Please help us make our Section's Web site a welcome addition so we can communicate more quickly with you, our members.

-Joe Feitler Section Program Chair (j.feitler@ieee.org)



EMPLOYMENT OPPORTUNITIES

Nationwide engineering firm is expanding its Chicago office. We are seeking both entry level and experienced **ELECTRICAL ENGINEERS** to assist us in our growth. Must have BSEE and excellent communication skills. PE or EI would be a plus.

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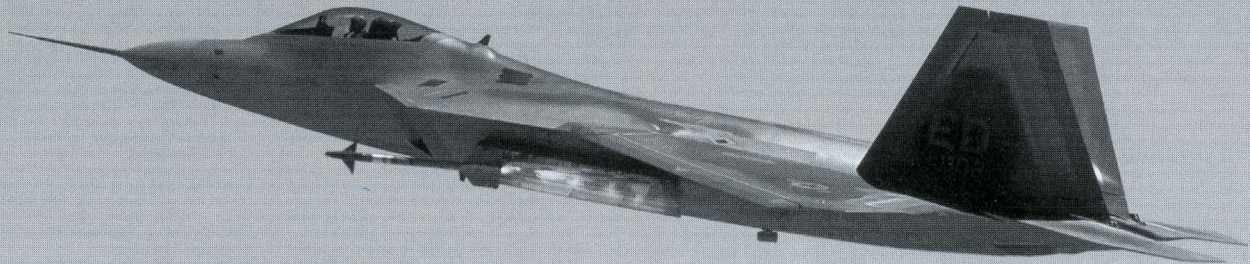
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