

SCANFAX

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— Chicago Section —

Augmented reality coming

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Chicago Section Executive Committee Meeting
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DeVry DuPage, Room TBA, 1221 N. Swift Rd., Addison, IL
No Registration Needed

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Augmented Reality Could Soon Enhance Work and Everyday Life

By Paul Zukowski

Long the stuff of science fiction films and military use, augmented reality – superimposing data and graphics over what we see – could soon become a part of driving to the grocery store or repairing a home appliance. Special heads-up displays already project certain information on the windshields of some luxury cars, and Wi-Fi enabled goggles could one day identify parts and give instructions as you view the insides of a clothes dryer.

As opposed to virtual reality, which seeks to replace the outside world with a simulation, augmented or mixed reality adds graphics, sounds, tactile sensations and even smells to the natural world as it exists. Augmented-reality displays, which now involve special headsets or helmets, will eventually become indistinguishable from regular eyeglasses. Everyone from tourists to military troops will benefit from the ability to view computer-generated graphics in their field of vision, constantly refreshed to track head and eye movements.

Superimposing graphics over a real-world environment in real-time may sound fairly simple as a concept, but the engineering will depend on advancements in the three main components of an augmented-reality system: the head-mounted display, positioning technology, and mobile computing power. Let's look at them one at a time.

HMDs

There are two basic types of head-mounted displays (HMDs): video see-through and optical see-through.

Video see-through displays were originally created for virtual reality applications, so they block the wearer's direct view of the surrounding environment and substitute images captured by small video cameras attached to goggles that have video displays inside. The video image is played in real-time and graphics are superimposed on the video. One problem to overcome here is image-adjustment lag from the video cameras when the viewer moves his or her head.

Optical see-through displays, as the name implies, allow the user an unrestricted view of the environment with graphics somehow superimposed on the lenses, or even directly on the retina. Sony makes a see-through display called the Glasstron that some researchers use. Microvision makes a Virtual Retinal Display that uses light to paint images onto the retina with a rapidly moving light source that is projected from the sides of the glasses.

Positioning

There are two major positioning considerations for portable augmented reality. The first is knowing where the user is located in reference to his or her surroundings.

The second is tracking the movement of users' eyes and heads within that environment.

The best tracking technology now available for large open areas is the Global Positioning System, a satellite-based navigation system made up of a network of 24 satellites placed into orbit by the U.S. Department of Defense. At one point the best that civilian GPS receivers could do was an accuracy limit of about 15 meters. Newer GPS receivers with Wide Area Augmentation System capability can improve accuracy to less than three meters on average. Users can also get better accuracy with Differential GPS (DGPS), which corrects GPS signals to within an average of three to five meters. The U.S. Coast Guard operates the most common DGPS correction service. This system consists of a network of towers that receive GPS signals and transmit a corrected signal by beacon transmitters. In order to get the corrected signal, users must have a differential beacon receiver and beacon antenna in addition to their GPS.

A more accurate system being developed, known as real-time kinematic GPS, can achieve centimeter-level accuracy. Tracking is easier in small spaces than in large spaces. Researchers at the University of North Carolina-Chapel Hill have developed a very precise system that works within 500 square feet. The HiBall

continued on page 4...

Tracking System is an optoelectronic tracking system with six optical sensors mounted on the user that respond to infrared-light-emitting diodes embedded in special ceiling panels. The system uses the known location of the LEDs, the known geometry of the user-mounted optical sensors and a special algorithm to compute and report the user's position and orientation. The system resolves linear motion of less than .2 millimeters, and angular motions less than .03 degrees. It has an update rate of more than 1500 Hz, and latency is kept at about one millisecond. While it is unrealistic to expect such a system to be installed anywhere but in labs and special workplaces, later generations that are able to map interiors could provide the same degree of accuracy.

Mobile computing power

If all the computing power has to reside on the user, wearable augmented reality systems would remain bulky and power-hungry in the near term. Adapting a lap-

top computer or video game console to create a wearable system may provide some useful systems for experimentation or controlled work environments. Until computer processors and drives go through another generation or two of miniaturization, a more likely avenue for augmented reality would involve some combination of cellular and Wi-Fi reception to transmit information to the user rather than having it be computed on site.

Cell phones can already pick up real-time mapping information, and it would not be a great leap to have wireless headsets that communicate with the cell phone through Bluetooth technology and project information to the users eyes.

Now you see it

Whatever the technological solutions that are developed, the use of augmented reality could enter into nearly every industry as well as into personal use.

The U.S. military is already using augmented reality for training and for combat. Attack helicopter pilots, for instance, have heads-up displays to aim their

weapons with. Both the Office of Naval Research and the Defense Advanced Research Projects Agency has funded augmented reality research. A DARPA project developed a head-mounted display coupled with a portable information system that provides troops with vital information such as where entrances are on the opposite end of a building.

A similar system could be used in maintenance and construction. Markers could be attached to a part of a building as it went up, and the augmented-reality system could show the plans to the crew working on that part of the building.

Augmented reality will also be useful in museums and historical sites, and could be tracked and triggered very easily. Computer gaming could also take on the third dimension as people move about a real environment with augmented reality projected over it.

Delivering instant information real time to people that helps them deal with traffic, directions, instructions, or other information will have hundreds of uses. ■

Lunch Meeting

Chicago Chapter of the IEEE Power Engineering Society Power System Analysis and Design Software

Wednesday, February 8, 2006

Ken Agent, P.E.
Square D/Schneider Electric

About the Topic:

Ken will demonstrate a typical series of engineering studies on a theoretical power system. The studies will include a short-circuit, time-current coordination, and arc-flash hazard analysis. They will be demonstrated on a representative electrical engineering software program. He will explain how to use the results of these studies to improve the safety and reliability of a power system. Ken will also explain all the steps and information necessary to complete these studies from start to finish on an existing facility.

About the Speaker:

Ken is currently a Senior Power Systems Engineer in the Engineering Services division of Square D/Schneider Electric. His

office is located in the Chicago District Services Shop in Crown Point, IN. His current responsibilities include: engineering studies (short-circuit, time-current coordination, arc-flash hazard, etc.), electrical distribution equipment modification, turn-key design projects, and power quality evaluations. He also provides the Services Shop with engineering support. Ken graduated from the University of Kentucky in 1998 with a Bachelor of Science degree in Electrical Engineering.

Location:

Chicago Bar Association, 321 South Plymouth Court, Chicago, IL (near the intersection of Jackson and Dearborn)

Time:

11:30 Social
12:00 Lunch (optional)
12:00 Presentation
1:00 Adjourn

Continuing Education:

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

Reservations:

Please call the IEEE Business Office by noon on Monday 6 Feb 2006 at (630) 493-4333 or (800) 898-IEEE to make your reservation. Or, submit your data via the Online Reservation Form.

Cost:

Lunch tickets can be purchased in the lobby bookstore (\$13.00)

For more information:

For more information, including the Online Reservation Form, please visit the IEEE PES Chicago Chapter web site: <http://peschicago.org>

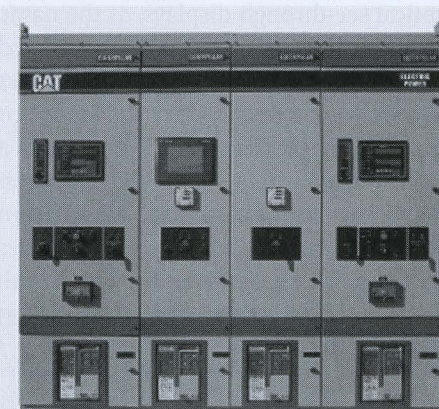
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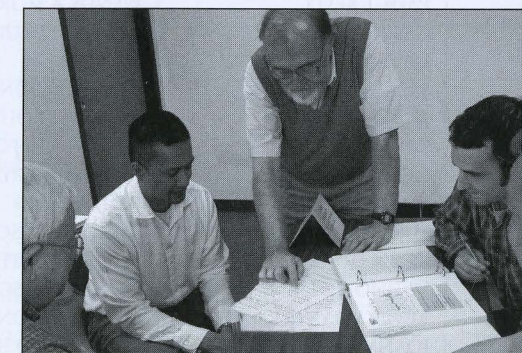
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knowledge to immediate use in an optional free 45-minute design evaluation of their own product. To register call Carol at 847-537-6400 or email her at cgorowski@dlsemc.com. For more information click on www.dlsemc.com.

EMC Practical Applications
Seminar/Workshop
April 27-28 and May 1-2, 2006
Hilton Hotel, Northbrook, IL ■

Evening Meeting

IEEE EMC Society Chicago Chapter

ANSI IEEE C63.5 – The Standard for Calibration of EMC Antennas Wednesday, February 15, 2006

Bob Hofmann
Hofmann EMC Engineering

About the Topic:

Mr. Hofmann will present information on ANSI C63.5 which is the standard for determination of free-space antenna factors and the calibration methods for antennas used in EMC testing. His presentation will cover the various calibration methods, i.e. Standard Site Method, Reference Antenna Method, and Equivalent Capacitance Substitution Method. He will also provide information on the most recent document revision and the significance of the updates to EMC testing.

About the Speaker:

Bob Hofmann is a member of several ANSI C63 subcommittees and led the 1987 and 1999 revisions of ANSI/IEEE C63.12 on Electromagnetic Compatibility Limits. He worked on the 1991, 1992, 2001, and 2003 revisions of C63.4 on

Methods of Measurement of Emissions. Bob is a past President and a Life Member of the IEEE EMC Society and a Senior Member of the IEEE. Bob retired from Bell Laboratories/Lucent Technologies after 44 years of service. He represented Bell Labs as chairman of the Information Technologies Industries Council (ITI) TC-5 EMC Committee from 1990 to 1999. He is a NARTE registered engineer. He has a BSEE degree from the University of Florida and an MSEE degree from New York University.

Location:

Elite Electronic Engineering, Inc.
1516 Centre Circle
Downers Grove, IL 60515

Time:

6:30 PM Social Hour
7:00 PM Meeting Start

Reservations:

Steve Laya
Phone: 630-495-9770 x 119

Continuing Education:

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.

For more information:

IEEE EMC Society www.ewh.ieee.org/soc/emcs/chicago/

Other Important Meeting Dates for the IEEE EMC Society Chicago Chapter:

February 15th
2006ANSI C63.4 Antenna Calibration Elite

March 21st, 2006
EMC Modeling
DLS

April 19th, 2006
Broadband Over Power Lines
Elite

May 16th, 2006
Annual EMC Mini Symposium
Holiday Inn Itasca

We congratulate our colleagues who have earned the distinction of Senior Member.

We responded to the IEEE Membership Development and the IEEE Women in Engineering initiatives sent to Society, Subsection, and Section Officers to identify members who, based on their acquired skills, meet an established set of characteristics. This activity will continue into 2006 and beyond.

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Technical Seminar

IEEE-IAS Chicago Chapter

ARC Flash Safety NFPA 70E Saturday, February 18, 2006

About the Topic:

Policy and procedures for an electrical safety program in the work place including how to identify and classify electrical safety hazards and apply Code-compliant safety techniques. Presented by 2 NFPA Certified and Recognized Instructors.

Agenda:

- Registration and Continental Breakfast (7:30 a.m.)
- Introduction to Electrical Safety (8 a.m.)
- Identifying the Hazards
- Break
- OSHA Requirements
- Lunch
- Working on or near live parts
- Personal Protective Equipment
- Break
- Safety Related Work Practices
- Conclusion (4p.m.)

Location:

Midwest Conference Center - 401 West Lake Street, Northlake, Illinois 60164

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Fees:

IEEE Member Registration \$175.00

(To receive the member rate, provide your IEEE member No. _____)

IEEE Non-Member Registration \$225.00

TOTAL \$ _____ .00

Please make checks payable to "IEEE-IAS Chicago Chapter," and mail with this completed registration form to IEEE-IAS Chicago Chapter Attn: David Mertz, Burns & McDonnell, 1431 Opus Place, Suite 400, Downers Grove, IL 60515. Registrations will not be accepted without payment. Attendance limited to the first 100 registrants.

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1/3 Page	505	435	380
1/4 Page	375	315	270
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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"
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EMPLOYMENT OPPORTUNITY ADS

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PROFESSIONAL CARDS

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*

2006 January Issue
Editorial Focus: Circuits and Devices
Space Reservations and Camera Ready
Materials Due: Nov. 25, 2005

February Issue
Editorial Focus: Industrial Applications
Space Reservations and Camera Ready
Materials Due: Dec. 25, 2005

March Issue
Editorial Focus: Communications
Technology
Space Reservations and Camera Ready
Materials Due: Jan. 25, 2006

April Issue
Editorial Focus: Electromagnetics
and Radiation
Space Reservations and Camera Ready
Materials Due: Feb. 25, 2006

May Issue
Editorial Focus: Education/
Universities
Space Reservations and Camera Ready
Materials Due: March 25, 2006

September Issue
Editorial Focus: Energy and
Power Engineering
Space Reservations and Camera Ready
Materials Due: July 25, 2006

October Issue
Editorial Focus: Computers
Space Reservations and Camera Ready
Materials Due: Aug. 25, 2006

November Issue
Editorial Focus: Signals and Applications
Space Reservations and Camera Ready
Materials Due: Sept. 25, 2006

December Issue
Editorial Focus: Systems and Control
Space Reservations and Camera Ready
Materials Due: Oct. 25, 2006

*Features subject to change without notice

Conference

IEEE Communications Society, IEEE Fox Valley,

IIT's Center for Professional Development-Rice Campus and UniForum

NetSecure 06 – 4th Annual Computer and Network Security Conference and Expo (This Year: An Increased Focus on Digital Forensics)

Wednesday, March 8, 2006

We invite you and your organization to participate at the 4th Annual Computer and Network Security Conference and Expo on Wednesday, March 8, 2006. The event will be held at Illinois Institute of Technology's (IIT) campus in Wheaton, Illinois and will be co-hosted by IIT's Center for Professional Development, the IEEE Communications Society, IEEE Fox Valley and UniForum Chicago.

About the Conference:

The conference will bring together knowledgeable security practitioners and responsible executives from organizations such as computer and network technology providers and manufacturers, digital forensic practitioners, scientific laboratories, law enforcement, healthcare, and legal organizations to discuss and share their security needs, problems, technologies, security systems, plans and much more. Subject matter experts will offer technical sessions, tutorials and vendor sessions. Businesses will have the opportunity to exhibit. The event is open to the public.

Advance registration is required and can be completed online at <http://cpd.iit.edu/netsecure06/>.

This year features an added focus on digital forensics. An entire digital forensics track to the program is currently in development.

Other topic areas include but are not limited to computer and network security including spam & phishing prevention, privacy, regulations (e.g., HIPAA and Sarbaines-Oxley), computer and network crime investigation and forensics including chain of evidence, steganography, criminal and civil concerns. We welcome additional topic suggestions.

The last conference, held in April 2005 was attended by nearly 200 people with representatives from many organizations, such as Avaya, Beyond If Technologies, Checkpoint Software, Cisco, College of DuPage, CompTIA, Fermi National Accelerator Lab, IEEE, Illinois Institute of Technology, IP3 Inc, IT Outpost, INAR-MA, Kane County Government, Kent College of Law, KPMG, Modularis, NCSA, Novell, Rosetta Wireless, UniForum, Wheaton College, and many more.

Location:

IIT's Rice Campus, 201 East Loop Road, Wheaton, Illinois.

Take Rt.56/Butterfield Rd. to first stoplight east of intersection of Butterfield & Naperville roads. Turn north onto East Loop Road (Charlie's Ale House Restaurant and Phillip's 66 Gas Station on the corners); the campus will be on your right about a block north of Butterfield Road.

More detailed directions and a map are available at www.rice.iit.edu/directions.html.

Time:

7:30–8:30 a.m.

Registration and Networking
8:30 a.m. Conference and Expo
5:00–6:00 p.m.

Wine and Cheese Social Hour

Registration:

Advance registration is required and is available at <http://cpd.iit.edu/netsecure06/>.

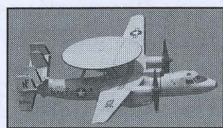
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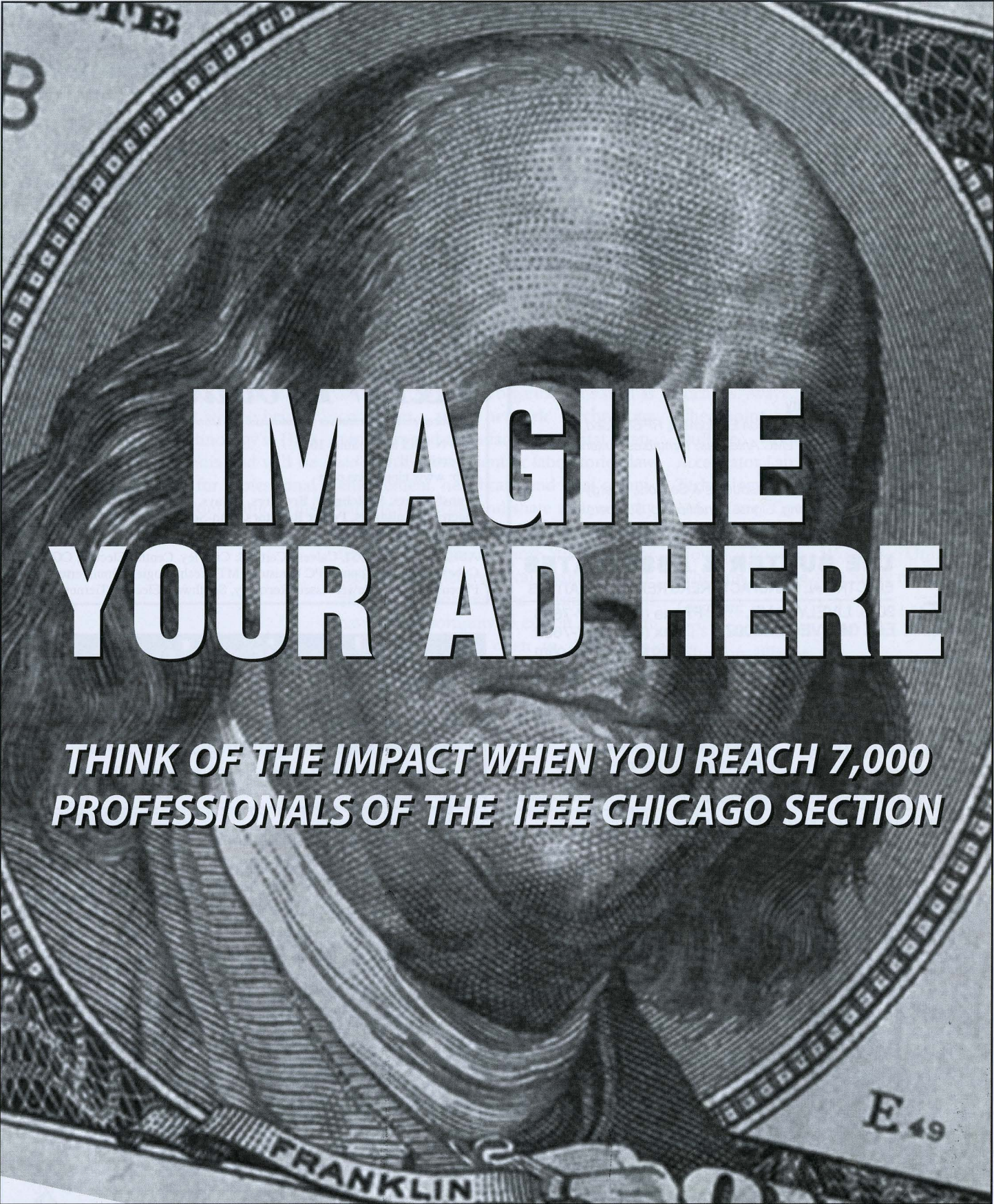
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