IEEE National Capital Area scanner

A Joint Publication of the Washington and Northern Virginia Sections
www.ieee.org/escanner

Volume 23, No. 1
January–February 2008

EVs, HEVs and PHEVs: Plug-in Vehicles and the Electric Grid

By Monica Mallini and Wally Lee

The electric car is an idea whose time has come—again. Battery powered cars were ready to take off in 1912. Then Cadillac invented the electric starter, and internal combustion engines (ICE) have ruled ever since. Until now.

IEEE-USA sponsored a symposium, "Plug-in Hybrids: Accelerating Progress 2007," in September in Washington, D.C. The one-day conference presented a broad range of technological advances that support the current commercialization of hybrid vehicles and future challenges and opportunities.

Today's electric vehicles (EVs) are adaptations of the traditional gasoline-powered car. Hybrid electric vehicles (HEVs) use an electric motor drive to supplement the ICE. Plug-in hybrids (PHEVs) are the special case of hybrid electric vehicles that have the means to charge the batteries externally and are capable of all-electric operation. Pure electric vehicles are powered solely by an electrically driven motor. All types of electric vehicles and hybrids offer the advantage of high efficiency compared to pure ICE automobiles. The efficiency advantage is due partly to regenerative braking, which recaptures energy from deceleration to charge the batteries.

The potential uses for EVs do not stop at efficient transportation. Electric car batteries are a valuable energy storage resource to displace power produced by a utility's generators. This is called "vehicle to grid" power, or V2G. For example, an EV used for daily commuting consumes some fraction of its total battery capacity for the round trip. In the evening, the car is garaged with a partial charge remaining. The owner plugs it in and sells energy back to the electric utility, then recharges the battery overnight. In this way, the energy storage capacity of the car's batteries benefits the electrical grid.

What are the benefits? First, there is an immediate benefit to the electric grid, provided the electric utility or an intermediary can control the dispatch of the battery-stored energy. Early evening is a time when electrical load ramps up to a peak. The utility serves

See **ELECTRIC CARS,** *p. 6*

Capital Science 2008 Offers "Straight Talk" on Today's Science and Technology Issues

The Washington Academy of Sciences and its affiliates, including the Northern Virginia and Washington Sections of IEEE, will meet for their biennial Conference on Saturday and Sunday, March 29-30.

Capital Science 2008 is a forum of scientific presentations and talks by local scientists and engineers. About 20 professional societies and institutions affiliated with the Washington Academy of Sciences are participating.

Plenary Sessions include *Human Tissue Ownership: Ethical, Legal, & Policy Considerations* led by Dr. William Gardner, executive director of the American Registry of Pathology; *International Polar Research* led by the Office of Polar Programs, National Science Foundation; and *Science and Engineering in the Courtroom: Ethics and the Expert Witness* led by Mark S. Frankel from the American Association for the Advancement of Science.

Featured speakers include Arden L. Bement, Jr., director of the National Science Foundation; Mario Livio, senior astrophysicist at the Space Telescope Science Institute; and Maxine Singer, a scientist emeritus of the National Cancer Institute.

Capital Science 2008 is being hosted by the National Science Foundation at their Arlington, Va. office near the Ballston Metro station. The registration fee is $50, or free for students. For more information and online registration, see ***www.washacadsci.org/capsci08***.

IEEE Fellow Gives Seminar on MIMO Radar

by Jeff Poston

The Northern Virginia chapter of the IEEE Signal Processing Society hosted a technical seminar entitled "Radar Horizons" by Dr. Joseph R. Guerci in November at Mitre Corp. in McLean, Va.

Dr. Guerci is a recognized authority in next generation sensor systems and adaptive signal processing, and his contributions to the field have been recognized by IEEE with the Warren D. White award in addition to the distinction of IEEE Fellow.

His talk covered both theoretical advances in radar as well as new systems and applications enabled by those advances. The theoretical portion reviewed optimization of Multiple Input Multiple Output (MIMO) radar. He explained how multipath and clutter factor into MIMO radar design and noted why relying upon orthogonal transmit waveforms for MIMO may not be a prudent choice. Also, he noted that the real world differs from the assumption of a homogeneous, stationary envi-

See **RADAR,** *p. 6*

Radar Horizons—*A seminar by Dr. Joseph Guerci (center), former director of DARPA's Special Projects Office, drew more than 50 attendees in November. He is pictured with (left to right) Scott Goldstein, Lee Moyer, Jeff Poston and Greg Schoenig. (Photo by Dan Schwed)*

IEEE GLOBECOM Celebrates 50th Anniversary

More than 2,000 people from 54 countries attended the 50th Anniversary IEEE GLOBECOM 2007 conference in Washington in late November.

The Northern Virginia, Washington and Baltimore Sections joined the IEEE Communications Society in hosting the conference, which included 22 tutorials and nine workshops. More than 1,000 technical papers were accepted from more than 2,500 submissions.

The successful conference was a result of the time invested by IEEE volunteers and the Patron support from Alcatel-Lucent, AT&T, Broadcom, JDSU, NEC, NSF, Telcordia, Dubai Silicon Oasis Authority, and the Institute for Information Industry Taiwan.

Photographic highlights of the conference appear on pages 4-5.

WASHINGTON SECTION
www.ieee.org/washsec

Chair
Gerard J. Christman
703-697-8195
gerard.christman@ieee.org

Vice Chair
Richard Benjamin
301-788-2616
rbenjamin@ieee.org

Treasurer
Raj Madhavan
301-975-2865
raj.madhavan@ieee.org

Secretary
Tim Weil
301-452-3641
trweil@ieee.org

Past Chair
Kiki Ikossi
703-960-0261
ikossi@ieee.org

Directors

James Christian
jchristian@wmata.com

Doug Holly
dougholly@ieee.org

Kiki Ikossi
ikossi@ieee.org

Harry Sauberman
hsauberman@ieee.org

Fari Schlake
fschlake@gmail.com

Debi Siering
siering@ieee.org

Mary S. Tobin
mtobin@ieee.org

Steve Weiss
sweiss@arl.army.mil

NORTHERN VIRGINIA SECTION
http://ieee-nova.org

Chair
Syed F. Ahmed
703-298-5235
syed.f.ahmed@ieee.org

Vice Chair (Chair Elect)
Monica A. Mallini, P.E.
703-765-6303
m.a.mallini@ieee.org

Treasurer
Kerry Hartman
703-623-1432
hartman_k@computer.org

Secretary
Chuck Baldi
703-675-0678
cbaldi@ieee.org

Past Chair
Chuck Sisung
703-267-9524
sisung@ieee.org

Directors

Seddik Benhamida
sbenhamida@dc.devry.edu

Laura J. Black
astarte@ieee.org

Dan Cross-Cole
dcrosscole@dc.devry.edu

Hameed Jamarussadiq

Afzal Khan
afzalis@ieee.org

Diba Khan
dkhan1@gmu.edu

Danielle Obuchon
dobuchon@gmail.com

Barry Tilton
barrytilton@ieee.org

NATIONAL CAPITAL AREA

Office Manager
Debra Meale
P.O. Box 6814
Woodbridge, VA 22195-6814
703-492-0047(voice and fax)
nca-admin@ieee.org

IEEE REGION 2 SOUTH AREA*

Chair
Murty Polavarapu
703-367-1497
murtyp@ieee.org

*Including Washington, Northern Virginia, and Baltimore Sections and Annapolis Subsection

ON THE WEB

eScanner Calendar of Events
The calendar is available at ***www.ieee.org/escanner***. Check here for events submitted too late for print publication.

IEEE National Capital Area Virtual Community
Exchange ideas and participate in discussions with local IEEE members at ***www.ieeecommunities.org/nca***.

TECHNICAL SOCIETY CHAPTERS AND AFFINITY GROUPS

Technical Society Chapters

Aerospace and Electronic Systems Society (W/NV)
Mr. Roger Oliva
703-573-6887
roger.oliva@ieee.org
http://ewh.ieee.org/r2/wash_nova/aess

Antennas and Propagation Society (W/NV)
Ms. Monica Taysing-Lara
202-725-2225
m.taysinglara@ieee.org

Communications Society (NV)
Mr. Vinod Mishra
908-616-3022
vkmishr@ieee.org

Communications Society (W)
Mr. Roger Hardwicke
703-818-5221
rogerchmd@gmail.com

Computer Society (NV/W)
Dr. Tirumale K. Ramesh
703-923-5380
tkramesh@ieee.org
or
Mr. Shahid Shah
703-475-6146
shahid.shah@ieee.org
http://ewh.ieee.org/r2/wash_nova/computer/

Control Systems Society (NV)
Mr. Seddik Benhamida
703-414-4082
sbenhamida@dc.devry.edu

Control Systems Society (W)
Dr. Haik Biglari, P.E.
301-228-3538
hbiglari@comcast.net

Education Society (W/Baltimore)
Dr. Charles Kim
202-806-4821
ckim@howard.edu

Education Society (NV/Central VA/Hampton Roads/Richmond)
Ms. Jennifer Polack-Wahl
540-654-1318
polack@umw.edu

Electromagnetic Compatibility Society (W/NV)
Mr. Greg Snyder
301-417-0220
gregs@wll.com

Electron Devices Society (NV/W)
Dr. Dimitrios E. Ioannou
703-993-1580
dioannou@gmu.edu
www.ieee.org/eds_nova

Engineering in Medicine and Biology (W/NV)
Ms. Fari Schlake
703-473-7883
fschlake@gmail.com
http://ewh.ieee.org/r2/no_virginia/embs

Engineering Management Society (W/NV)
Mr. Doug Holly
240-404-1601
dougholly@ieee.org

Geoscience and Remote Sensing Society (W/NV)
Dr. James C. Tilton
301-286-9510
james.c.tilton@nasa.gov
http://ewh.ieee.org/r2/no_virginia/grss

Industry Applications Society (W/NV)
Mr. Fred Pearson
571-227-3259
fred.pearson@unisys.com

Information Theory Society (W/NV)
Mr. Greg Strutt
301-645-0380
gstrutt@ieee.org

Lasers and Electro-optics Society (W/NV)
Dr. Mario Dagenais
301-405-3684
dage@ece.umd.edu
http://ewh.ieee.org/r2/wash_nova/leos/

Magnetics Society (W/NV)
Dr. Can E. Korman
202-994-4952
korman@gwu.edu

Microwave Theory and Techniques Society (W/NV)
Mr. Bruce J. Levine
410-953-7549
bruce.levine@ieee.org
www.ieee.org/mtt-wnva

Nuclear and Plasma Sciences Society (W/NV)
Mr. Harry Sauberman, P.E.
301-443-8879
hsauberman@ieee.org

Oceanic Engineering Society (W/NV)
Mr. Mike Goldberg
703-610-1717
mgoldber@noblis.org

Power Engineering Society (NV/W)
Mr. Jeff McWhirt
703-983-1410
jmcwhirt@mitre.org

Reliability Society (W/NV)
Mr. Dev Raheja
301-483-4525
draheja@aol.com

Robotics and Automation Society (W)
Dr. Raj Madhavan
301-975-2865
raj.madhavan@ieee.org
http://ewh.ieee.org/r2/washsec/ras/

Signal Processing Society (NV)
Dr. Timothy Settle
703-814-8247
settlet@saic.com
http://ewh.ieee.org/r2/no_virginia/sps

Signal Processing Society (W)
Dr. Min Wu
301-405-0401
minwu@umd.edu

Society for Social Implications of Technology (NV/W/Baltimore)
Ms. Tesa Leon
202-326-6582
t.leon@ieee.org

Vehicular Technology Society, Land Transportation Committee
Mr. Karl W. Berger, P.E.
703-803-7917
kwb@dcm-va.com

Southern Maryland Communication, Computer and EMC Chapter
Mr. Fred Heather
301-342-6975
heatherf@navair.navy.mil

Affinity Groups

Graduates of the Last Decade (NV)
Mr. Chuck Baldi
703-675-0678
cbaldi@ieee.org

Life Members (W/NV)
Mr. Amarjeet S. Basra
703-324-2821
amarjeet.basra@ieee.org

National Capital Area Consultants' Network (W/NV)
Ms. Monica A. Mallini, P.E.
703-765-6303
m.a.mallini@ieee.org

Women in Engineering (W/NV)
Ms. Charity Burd
202-231-1451
charity.burd@ieee.org

SCANNER STAFF

Editor-in-Chief
Pete Sypher
703-216-3203
p.sypher@ieee.org

Managing Editor
Elsie Grant
301-661-5921
ncac-scanner@ieee.org

Northern Virginia Section Editor
Chuck Baldi
703-675-0678
cbaldi@ieee.org

Washington Section Editor
Wally Lee
301-468-2418
w.h.lee@ieee.org

Webmaster
Rex Klopfenstein
703-610-1534
r.klopfenstein@ieee.org

Advertising Manager
Dave Booth
540-364-1350
dbooth@ieee.org

EDITORIAL POLICIES AND PROCEDURES

Calendar Announcements
Please submit calendar items in the format used in the Calendar of Events. You can send email to ***ncac-scanner@ieee.org***. If possible, include a synopsis of the event and a biographical sketch of the presenter including academic background, current position, notable achievements, and IEEE and other professional affiliations.

Articles
Other contributions, such as reports on chapter events and other member activities, are most welcome. Please submit articles to the managing editor at ***ncac-scanner@ieee.org***.

Advertising
Contact the advertising manager about ad rates and to place advertising orders. Ads must be submitted by the deadline below.

Deadlines
The editor reserves the right to set policies and procedures necessary to provide members with a newsletter that is informative and timely. Deadlines must be strictly observed to keep the publication on schedule. If you are planning an event and have insufficient information by the deadline, please contact the managing editor. The deadline for the upcoming issue will always be published on this page.

March–April issue deadline: February 1, 2008

IEEE National Capital Area Scanner is published bimonthly by The Institute of Electrical and Electronics Engineers, Inc. Corporate Office: 3 Park Avenue, 17th Floor, New York, NY 10016-5997. It is sent automatically at a cost of $1.00 per member per year (included in annual dues) to each member of the Washington and Northern Virginia Sections. Periodicals postage paid at New York, NY, and at additional mailing offices.

Postmaster: Send address changes to *IEEE National Capital Area Scanner,* 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331. (ISSN 0894-0452)

calendar of events

Monday, January 7, 2008

EMBS Officer Elections

Sponsor: Engineering in Medicine and Biology Society

Time: 7:00-8:00 pm

Place: Mitre Corporation, Building 2, Conference Room 1N100, 7515 Colshire Drive, McLean, VA

Directions: See ***www.mitre.org/about/locations/mitre2_map.html***.

More Info: Officers for 2008 will be elected, and pizza and light refreshments will be served.

Contact: Please RSVP by Sunday, Jan. 6 to Paul Otto at ***potto@ieee.org***.

Tuesday, January 8, 2008

Indian Railways

Sponsors: Vehicular Technology Society, Land Transportation Committee; American Society of Mechanical Engineers

Speaker: Dinesh Bansal

Time: 11:30 am

Place: American Public Transportation Association, Conference Room, 11th Floor, 1666 K Street NW, Washington, DC

Directions: Take the Metro to Farragut North station (Red Line, use K Street exit) or Farragut West station (Orange & Blue lines, use 17th Street exit).

More Info: All interested persons are invited.

Cost: $15 cash at the door for lunch.

Contact: Please make reservations by 4:00 pm on Friday, Jan. 4 by contacting Ken Briers at ***ken.briers@parsons.com*** or 202-775-3397, or Karl Berger at ***karl.berger@dcm-va.com*** or 703-803-7917.

Tuesday, January 8, 2008

Washington Section Administrative Committee Meeting

Time: 6:45 pm

Place: American Association for the Advancement of Science (AAAS), 1200 New York Avenue NW, Washington, DC

Directions: Use the 12th Street entrance. The AAAS building is one block from the Metro Center station (Red, Orange and Blue lines).

Street parking is free after 6:30 pm (no parking 4:00-6:30 pm). There is a pay parking lot at the intersection of 9th St. and New York Ave., and an underground parking garage at 14th St. and New York Ave.

See map at ***www.aaas.org/dcwest.pdf***.

Save the Date

The IEEE National Capital Area Awards Banquet will be held on Saturday, April 12 at the Grand Hyatt Washington. Details will be published in the March-April *Scanner*.

More Info: The meeting will start with a reception to welcome new chapter chairs and officers. Refreshments will be served. All interested IEEE members are welcome.

Cost: Free

Contact: Please RSVP to Debra Meale at 703-492-0047 or ***nca-admin@ieee.org***.

Wednesday, January 9, 2008

Northern Virginia Section Administrative Committee Meeting

Time: 6:30 pm

Place: Olive Garden Restaurant, 12980 Fair Lakes Shopping Center, Fairfax, VA

Directions: Take I-66 to Fairfax County Pkwy., Route 7100 (Exit 55B towards Reston–Herndon). Turn left onto Fair Lakes Pkwy. Turn left at Fair Lakes Shopping Center, and left again to stay on Fair Lakes Shopping Center to the Olive Garden.

More Info: All interested IEEE members are invited to attend.

Contact: Please RSVP to Debra Meale at 703-492-0047 or ***nca-admin@ieee.org***.

Tuesday, January 22, 2008

♦ Building Services for the VII Environment – Use of the WAVE Networking Standard for In-Vehicle Communication

Sponsor: Communication Society, Northern Virginia Chapter

Speaker: Tim Weil, Booz Allen Hamilton

Time: Dinner at 6:00 pm; speaker at 6:30 pm

Place: Mitre Corporation, Building 2, Conference Room 1N100, 7515 Colshire Drive, McLean, VA

Directions: See ***www.mitre.org/about/locations/mitre2_map.html***.

More Info: See Diamond story below.

Cost: Free for IEEE members.

Contact: Please RSVP by Monday, Jan. 21 to Vinod Mishra at ***vkmishr@gmail.com***.

Tuesday, February 5, 2008

Washington Section Administrative Committee Meeting

Time: 6:45 pm

Place: American Association for the Advancement of Science (AAAS), 1200 New York Avenue NW, Washington, DC

Directions: Use the 12th Street entrance. The AAAS building is one block from the Metro Center station (Red, Orange and Blue lines).

Street parking is free after 6:30 pm (no parking 4:00-6:30 pm). There is a pay parking lot at the intersection of 9th St. and New York Ave., and an underground parking garage at 14th St. and New York Ave.

See map at ***www.aaas.org/dcwest.pdf***.

More Info: All interested IEEE members are welcome.

Contact: Please RSVP to Debra Meale at 703-492-0047 or ***nca-admin@ieee.org***.

Tuesday, February 12, 2008

National Railroad Passenger Service

Sponsors: Vehicular Technology Society, Land Transportation Committee; American Society of Mechanical Engineers

Speaker: Ross Capon

Time: 11:30 am

Place: American Public Transportation Association, Conference Room, 11th Floor, 1666 K Street NW, Washington, DC

Directions: Take the Metro to Farragut North station (Red Line, use K Street exit) or Farragut West station (Orange & Blue lines, use 17th Street exit).

More Info: All interested persons are invited.

Cost: $15 cash at the door for lunch.

Contact: Please make reservations by 4:00 pm on Friday, Feb. 8 by contacting Ken Briers at ***ken.briers@parsons.com*** or 202-775-3397, or Karl Berger at ***karl.berger@dcm-va.com*** or 703-803-7917.

Wednesday, February 13, 2008

Northern Virginia Section Administrative Committee Meeting

Time: 6:30 pm

Place: Olive Garden Restaurant, 12980 Fair Lakes Shopping Center, Fairfax, VA

Directions: Take I-66 to Fairfax County Pkwy., Route 7100 (Exit 55B towards Reston–Herndon). Turn left onto Fair Lakes Pkwy. Turn left at Fair Lakes Shopping Center, and left again to stay on Fair Lakes Shopping Center to the Olive Garden.

More Info: All interested IEEE members are invited to attend.

Contact: Please RSVP to Debra Meale at 703-492-0047 or nca-admin@ieee.org.

diamond♦story

Tuesday, January 22, 2008

♦ Building Services for the VII Environment – Use of the WAVE Networking Standard for In-Vehicle Communication

The U.S. Department of Transportation's Vehicle Infrastructure Integration (VII) project promises a wide convergence of emerging technologies to enable safer and smarter travel on the national roadways. The VII architecture integrates IPv6 networks, Dedicated Short Range Communications (DSRC) wireless channels, and a new IEEE 1609 family of standards for Wireless Access in Vehicular Environments (WAVE).

See **DIAMOND**, *p. 8*

IEEE GLOBECOM 2007 Highlights

The IEEE Communications Society celebrated the 50th Anniversary of GLOBECOM on Nov. 26-30 in Washington.

1 *Communications Society President Nim Cheung (right) honors Jerry Gibbon with a plaque recognizing his role as General Chair and his many hours of service to bring the conference together.*

2 *Fred Seelig (left) and Doug Holly, members of the Organizing Committee, reminisce about GLOBECOM 2003 where they pitched Washington, D.C. as the site for GLOBECOM 2007.*

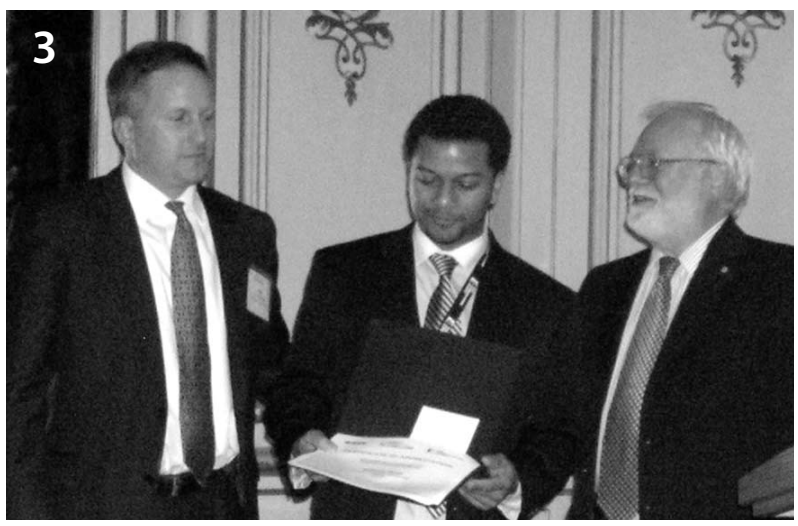
3 *Dr. Karl Rauscher (left) and Jerry Gibbon (right) recognize Anthony Scott for his efforts as the Co-Location Coordinator Chair. Scott handled the challenge of finding time and space for many of the activities at the conference.*

4 *Recipients of Best Technical Paper Awards are recognized.*

5 *The Howard University Showtime Marching Band provides music for the 50th Anniversary Celebration.*

6 *Dr. Irwin Jacobs, 50th Anniversary Celebration Master of Ceremonies, kicks off the festivities.*

7 *Technical Program Chair Sherman Shen (front row, fourth from left) from the University of Waterloo and his team of program chairs put together the outstanding technical program.*



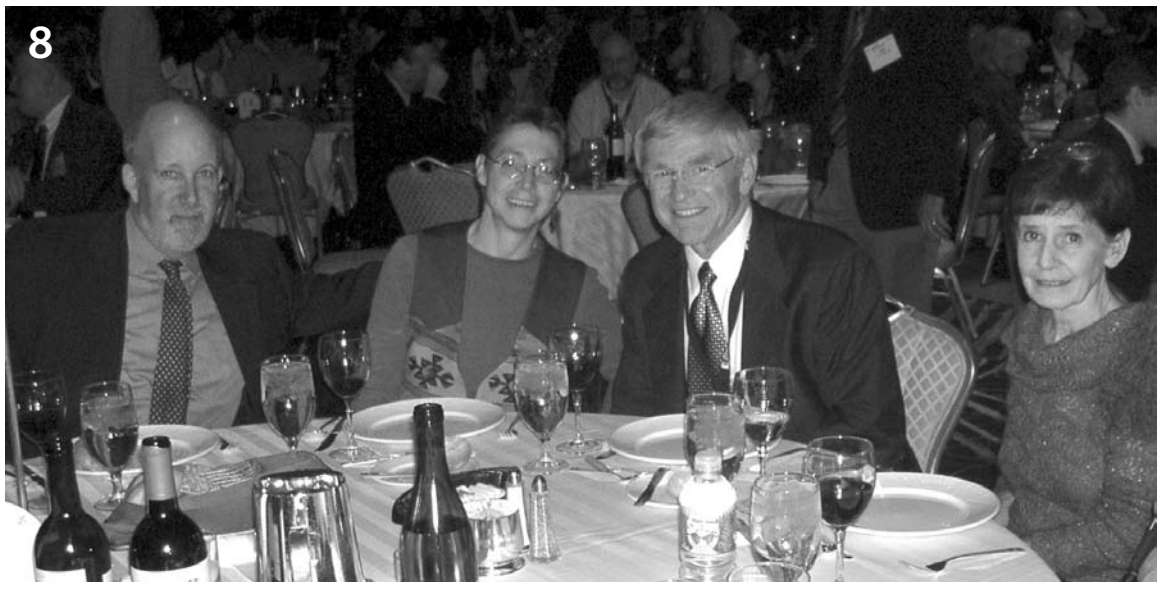
Representing the Washington, Northern Virginia and Baltimore Sections at the Banquet:

8 *Tim Weil, Secretary of the Washington Section and GLOBECOM Patron Chair; Nancy Weil; Dennis Moen, Chair of the Northern Virginia Chapter of the Communications Society and GLOBECOM Marketing Chair; and Nancy Moen.*

9 *Jeff Friedhoffer, Chair of the GLOBECOM Design & Developers Forum and former Chair of the Baltimore Chapter of the Communications Society; Richard Benjamin, Treasurer of the Washington Section; and Debi Siering, Director of the Washington Section.*

Representing the New Orleans Section, host of next year's IEEE GLOBECOM 2008 conference:

10 *Richard Miller, General Chair of GLOBECOM 2008; Doug Lattner, GIMS Advisor for New Orleans; and Thomas Slack, Local Arrangements Co-Chair for New Orleans.*



GLOBECOM hosted the 2007 Mobile Ad Hoc Networking Interoperability And Cooperation (MANIAC) Challenge, a competition designed by two Virginia Tech faculty, Dr. Luiz DaSilva and Dr. Allen MacKenzie, and funded by the National Science Foundation. **11** *A team from the University of North Carolina at Charlotte won both the Performance Award and an award from the IEEE Professional Communication Society (PCS) for the best presentation. PCS President Luke Maki presents certificates to (left to right) Dr. Yu Wang and undergraduates Lin Li and Fan Li.* **12** *The Strategy Award is presented to (left to right) Ivan Klimek and Vladimir Sidimak of the Technical University of Kosice by DaSilva and MacKenzie.*

13 *Dr. Robert Miller of Trace Systems, Inc. explains the benefits of membership in the National Capital Area Consultants' Network. The Northern Virginia, Washington and Baltimore sections and their participating chapters set up displays in the IEEE Pavilion booth at the IEEE Communications Expo to showcase their programs and recruit new members.*

14 *Incoming Communications Society President Doug Zuckerman (left) accepts the COMSOC Globe from outgoing President Nim Cheung.*

Credits

Photos 1, 3, 8, 9, 14 by Tim Weil. Photos 2, 4, 5, 6, 7, 10 by Doug Holly. Photos 11, 12 by Eileen Baumann. Photo 13 by Monica Mallini.

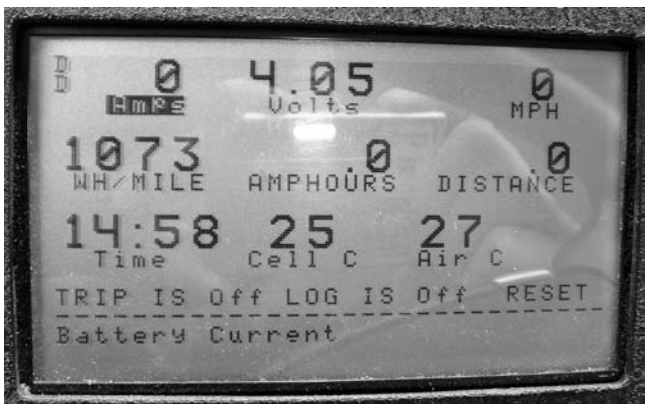
ELECTRIC CARS, *from p. 1*

the peak load with relatively costly "peaking units," high-cost generators designed for intermittent service. If the utility can serve the peak load partly through stored energy, the use of peaking units is reduced. The batteries in EVs can function as a power system energy storage resource if they are connected to the grid and made available to the utility to dispatch in response to electrical load. As the number of hybrid vehicles grows, the aggregate storage capacity of the batteries can markedly change the shape of the daily load curve, smoothing out the peaks and valleys and avoiding excessive electricity demand that may lead to blackouts. This will improve the economics of the power system operation, resulting in cost savings that can be passed on to the consumer. Moreover, the purchase of additional peaking units can be avoided. The utility's cost of meeting its peak load demand is reduced, and the capital cost of new generation is avoided. Customers ultimately benefit from both of these savings.

Greater awareness of energy consumption motivates individuals to take an active role in energy conservation. A coming trend is the variable pricing of electricity, which is implemented in its simplest form as fixed time-of-use rates. Variable pricing smooths out peaks in consumption that may lead to blackouts. Variable pricing will enable EV owners to exploit the price differential by recharging their vehicle batteries with inexpensive power off-peak and selling it back to the utility at a higher peak price. A more advanced scheme is real-time pricing, whereby the price of electricity varies throughout the day in response to current load demand.

Effective use of real-time pricing requires some degree of information, control and coordination between the utility and the customer. This coordination may take the form of a comprehensive energy management scheme, including a customer energy meter, to capture energy consumption and report current and historical energy use, switches to operate individual appliances, and a control scheme with preferences that can be updated by the user. Consumers will receive the current price information, allowing them to tailor their energy use to the price of electricity. For example, the EV may be set up to offer power back to the grid whenever the price exceeds some threshold and to charge its batteries overnight or whenever the price is low.

Plugging Into the Grid—*Someday electric vehicles may feed stored power to the electric grid during peak demand periods, then recharge during the night.*



As EVs enter the mainstream, there is concern over what market penetration the present electric power grid can support without an extensive infrastructure rebuild. This question was answered at the IEEE-USA symposium. The consensus is that the present electrical grid can support about 70 percent of the current number of automobiles in the U.S. if they are replaced by EVs. Hence, overloading the electrical grid is not a near-term concern. However, there are some issues that must be addressed before V2G becomes widespread. For example, distribution transformers are designed to operate with a daily loading cycle. It is not known how the equipment will perform when the base load is increased.

Quiet Operation—*The authors noted the quietness of this all-electric vehicle. The photo above shows the car's display while stationary. (Photos by Monica Mallini)*

The high point in the symposium for the authors was the opportunity to actually ride in one of the cars. The first thing we noticed is the quiet operation. I first noticed this when someone had to tell me that I was standing in the path of a car that was backing up. You also notice the quietness when you are riding in the EV. There is no change in engine noise during acceleration like there is in a conventional vehicle; the car has constant acceleration from the constant torque. You do feel the pressure on your back when the EV accelerates, which was impressively demonstrated on a steep incline. These cars are amazingly quick and will only get better as the technology matures.

The EV and hybrid vehicle revolution will involve electrical engineers in many ways. In recognition of these changes, the IEEE Power Engineering Society is modifying its name to become the Power and Energy Society.

EVs are not the exclusive domain of the automobile industry and the power industry. We must design new power stations that function as charging facilities. There must be methods of connecting EVs to charging stations. Automotive mechanics must learn new repair techniques.

Our cars will need IP addresses and software. Engineers will develop power electronics circuitry, user friendly interfaces, communications schemes and software to drive us to the future.

Hybrids and electric cars will influence us in ways we have only begun to dream.

The authors wish to convey their thanks to IEEE-USA for sponsoring their attendance at the symposium.

Member-Get-a-Member Campaign Continues

IEEE has renewed its popular member recruitment campaign for the 2007-08 year. The program features $15 credit rewards, which IEEE members can apply toward their dues or any other IEEE product or service. Rewards can also be donated to the IEEE Foundation.

Here's how it works. You, the recruiter, write your name and IEEE member number on a special business card. Carry a supply of these cards so you will be ready when you meet a prospect. Prospective members enter the information in their IEEE membership applications, and incentives accrue to the recruiter. In October, when the program ends, IEEE will notify you of your reward balance, and you can designate where your credit dollars will go. With a little diligence, you can pay your IEEE dues with recruitment rewards.

There is a parallel Student-Get-a-Student campaign with a different reward structure. Only IEEE student members are eligible to receive reward incentives for recruiting other student members. However, student members can recruit professional members and receive the same $15 credits.

The Member-Get-a-Member business cards will be available at section and chapter meetings. Get yours now, and don't forget to invite colleagues to IEEE meetings and events so they can experience the membership benefits.

RADAR, *from p. 1*

ronment commonly assumed in many textbook treatments of the subject. To overcome this discrepancy, Dr. Guerci explained how knowledge-aided processing could apply techniques matched to the actual environment.

In reviewing new systems and applications enabled by these theoretical advances, Dr. Guerci shared his experiences gained as director of the Special Projects Office at the Defense Advanced Research Projects Agency. He described how DARPA's Knowledge Aided Sensor Signal Processing and Expert Reasoning (KASSPER) program successfully incorporated knowledge-based processing in radar processing by means of a "look-ahead" interrupt scheduler.

He also showed how advances in device technology and a novel approach to radar system design opened new possibilities with low power density antenna apertures. Finally, he closed with a discussion of how intelligent exploitation of multipath via MIMO and knowledge-based processing could facilitate radar in urban areas.

There were over 50 attendees at the seminar. This strong showing was assisted by co-sponsorship from local chapters of other IEEE Societies. The co-sponsoring societies included Geoscience and Remote Sensing, Aerospace and Electronic Systems, Reliability, Antennas and Propagation, and Engineering in Medicine and Biology.

2008 Northern Virginia Chair's Message

Opportunities for Participation are Limitless

By Syed F. Ahmed

It is an honor to serve as the Chair of the Northern Virginia Section for 2008. I am humble, gracious and appreciative to all the volunteers who have served before me.

Seven years ago after completing my master's degree at George Mason University, I joined the IEEE Northern Virginia Section to network and give back to my community. However, what I found was a room full of friendly, smart and proactive volunteers ready to help me. I became part of their family right away and not only gained new friends but also professional and life mentors.

As the years progressed, I have begun to mentor new volunteers and help others become part of our family. This section is full of enthusiastic and energetic engineers and professionals from all walks of life. Whether you want to learn about power engineering, computer networks or biomedical engineering, we have it all.

The Northern Virginia Section has a great relationship and successful collaboration with the Washington Section. Over the years, I have also gained new friends and professional mentors from that section. Currently, there are about two dozen active joint society chapters that hold regular meetings free and open to all IEEE members. All current and new members have the opportunity to get involved with various technical society chapters and keep up with the latest developments in all areas of electrical engineering.

Both sections are involved with high school science fairs and local college activities.

We also support IEEE affinity groups such as Women in Engineering (WIE), the Life Members chapter, the National Capital Area Consultants' Network, and Graduates of the Last Decade (GOLD). I myself had the opportunity to start the GOLD affinity group for the Northern Virginia Section in 2002. All members have the same opportunity to form a new chapter or affinity group.

By volunteering for IEEE you gain experience in public speaking, presentation skills, team work and management skills. The opportunities are limitless.

On behalf of the IEEE Northern Virginia Section, I would like to invite and welcome all current and new members to become active within the section this year. There are many activities that will enhance one's capabilities both professionally and personally.

The other section officers and I are looking forward to providing a broad spectrum of member programs in 2008. Together we will make 2008 the most successful and brilliant experience the section has ever seen. Please visit our website at ***http://ieee-nova.org*** and view the calendar of events at ***www.ieee.org/escanner*** for upcoming activities. Our next section meeting will be on Wednesday, January 9 (see Calendar of Events, p. 3, for details).

IEEE Foundation Announces 2008 Deadlines

The IEEE Foundation, the philanthropic arm of IEEE, is committed to improving the technological literacy of society from childhood through adulthood. One way the Foundation achieves this goal is by awarding grants to new and innovative projects.

Unsolicited applications are accepted from IEEE units and other organizations working in areas of relevance and importance to IEEE and its membership. Projects should achieve one or more of the following objectives:

- Improve primary and secondary science, technology, and math learning.
- Encourage pre-university students to consider engineering as a career path.
- Increase the public's understanding of the role of engineers and technology in society.
- Preserve the history of IEEE associated technologies.
- Tap the technological expertise of IEEE members.
- Demonstrate ability to be replicated.

The IEEE Foundation board will meet three times in 2008 to review applications. The deadlines are Jan. 4 (March meeting), April 18 (June meeting), and Sept. 5 (November meeting).

Before submitting the online application, please review "How to Apply for a Grant" at ***www.ieee.org/organizations/foundation/grants.html***.

All applications will be considered for funding by both the IEEE Foundation Board of Directors and the IEEE Life Members Committee. Questions should be directed to the IEEE Foundation Administrator at 732-981-3435 or ***foundation-office@ieee.org***.

Senior Members

Congratulations to the following new Senior Members in the Northern Virginia (NV) and Washington (W) Sections:

Hoda El-Sayed (NV)
Matthew Fisher (NV)
Kenneth Kempner (W)
Kang Liu (NV)
Thomas Potter (W)
Mulpuri Rao (NV)
David Streight (NV)
Hongbo Su (W)
Michael Violette (W)

If you are interested in becoming a Senior Member, please consult ***www.ieee.org/seniormember*** for qualification requirements. For help with references, contact Monica Mallini at ***m.a.mallini@ieee.org*** for Northern Virginia Section members, or Kiki Ikossi at ***ikossi@ieee.org*** for Washington Section members.

C. Raymond Knight, IEEE Life Fellow

C. Raymond Knight, 88, prominent in the fields of reliability and sustainability, died September 19, 2007 in Charlottesville. He chaired the Washington Section's Reliability Society Chapter in the 1970s.

Born in Salt Lake City, he earned a bachelor's degree in engineering from the University of Utah and a M.S. in physics from George Washington University. He was involved in radar applications at General Electric during World War II.

After the war, he was a pioneer in the development of reliability engineering. He became manager of electron tube application engineering at GE.

He moved to Washington and developed an engineering services business serving the defense industry, NASA, FAA, the transportation industry, and others while employed at ARINC. He retired in 1979 as Executive Vice President and General Manager of ARINC.

He married the former Louise Murray in 1944. She died in 1994. Surviving are a daughter, Cynthia Knight of Annapolis, and a sister, Norma Swigart of Salt Lake City.

Washington Academy of Sciences Seeks *Journal* Submissions

Members of the IEEE Washington and Northern Virginia Sections may submit articles and news items to the *Journal*, the official periodical of the Washington Academy of Sciences. Both sections are affiliates of the academy.

The peer reviewed *Journal* publishes original scientific research, critical reviews, historical articles, proceedings of scholarly meetings of its affiliated societies, reports of the academy, news about members (awards, significant accomplishments, promotions, deaths, etc.) and other items of interest to academy members.

The *Journal* appears four times a year. The Winter issue contains a directory of the current membership of the academy. Instruction for authors can be found at ***www.washacadsci.org***. There are no page charges and submissions from non-members are welcome.

Life Members Review History of Hughes Aircraft Company

On September 28, the Life Members Group was treated to a fascinating saga of the rise and fall of Hughes Electronics, a precursor of Hughes Aircraft Company, and its parent, Hughes Tool Company. Life Member Bob Strauss based his talk on a book by Simon Ramo, *The Business of Science: Winning and Losing in the High-Tech Age*.

Strauss talked about Dr. Ramo's career progression from General Electric Schenectady to Hughes Electronics to the founding of TRW. He also shared his own career history and knowledge of Bell Labs, Sperry Rand, and Hughes Satellite Division. Old newspaper clippings added interesting details. You won't find this stuff on the Internet!

A New Generation of Engineers—*Officers of the IEEE student branch at George Mason University for 2007 are (left to right) Danesh Esteki, vice president; Neda Behrooz, secretary; Brigette Grubbs, program chair; Chris Twombly, treasurer; Farid Hussaini, president; and (foreground) Ekawat "Ice" Homsirikamol, webmaster. Elections for 2008 officers were held after this photo was taken.*

GMU Students Analyze Ethical Issues

George Mason University's second annual Student Ethical Awareness Conference (SEAC), sponsored by the IEEE Student Branch, was a huge success in November. The 65 attendees included both faculty and students.

Arthur Schwartz, deputy executive director and general counsel of the National Society of Professional Engineers, was the keynote speaker. He writes ethics and legal columns for professional society and trade magazines.

As part of the SEAC program, the student branch held an IEEE Student Ethics Competition with 44 participants. Students worked in teams of three to apply the IEEE Code of Ethics to three case studies.

Each team presented its recommendations and decisions in writing and defended its analysis of one case orally. There was lively back-and-forth debate on many of the topics, and the students reported that they found the conference and Student Ethics Competition valuable.

The free event included refreshments and each attendee received an IEEE GMU Student Branch T-shirt.

DIAMOND, *from p. 3*

This talk will describe the recently published WAVE networking standard (IEEE 1609.3) and the impact on Intelligent Transportation Systems. Essential aspects of the 1609.3 networking model will be reviewed, including a Proof of Concept VII Service Oriented Architecture, WAVE Networking Stack, and the Real-Time Messaging VII model. This program will also include a detailed description of the Publish / Subscribe MQ Architecture developed to support collection/parsing of vehicle probe data and the scheduling/delivery of standard SAE J2735 messages to vehicles in a limited connectivity environment.

Tim Weil is a Booz Allen Hamilton security architect working on the VII Project. With more than 20 years experience in data processing, communications engineering, and information assurance, Weil's technical areas of expertise include enterprise security architecture, FISMA compliance, identity management, and network engineering. He is a senior member of IEEE and serves as secretary of the IEEE Washington Section. He has also been a technical reviewer for several IEEE publications. His degrees include an M.S. in computer science from Johns Hopkins University and a B.A. in sociology from Immaculate Heart College. He is a Certified Information Systems Security Professional (CISSP) and Certified Information Systems Auditor (CISA).