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Collaboration—*Pictured (left to right) are Ernest Ambrose, Alfred Kromholz, guest speaker Nelson Perez, Scott Ankrum, and Tom Starai, Chair of the Computer Society chapter.*

Computer Society Considers Agile Techniques at First Joint Meeting with ASQ, SSQ Chapters

By Scott Ankrum and Debi Siering

On March 25, the Northern Virginia and Washington Chapter of the IEEE Computer Society kicked off its first spring meeting by collaborating with the American Society for Quality (ASQ) Section 509 Software SIG, and the Society for Software Quality (SSQ).

Nelson Perez of Sierra's Edge, Inc. presented "Agile Techniques to Process Development: Lessons Learned." The joint meeting was held at the Mitre Corp. in McLean, Va. with a live video cast to sites in Silver Spring and Gaithersburg, Md., and Bedford, Mass.

Once the video cast was established, Perez began his presentation by providing an overview of agile development and the life cycle process. He cited real world examples and lessons learned on projects.

After defining and explaining the major principles of agile development, he stated that the next crucial step is to have a process development plan in place. "You need insight to create and implement plans but at the same time allow for flexibility while still staying on schedule and within budget," Perez said. A key to obtaining insight is to reach out to the experts on the project. Identify the experts who know the process and get them to write it down so that you can improve upon the process.

Assuming that the Capability Maturity Model Integration (CMMI) is in place, the process assessment can be staged or continuous or a combination of the two. Perez stated that one of the disadvantages of using the staged approach is that it can be restrictive, while continuous assessment allows for agile changes.

In conclusion, take a step back and look at the big picture. Give consideration to how everything integrates and works together. Utilize technology to reduce manually intensive processes. Ensure that everyone on the team is properly trained in the process. Be proactive, monitor and manage the process to ensure success of the project.

Perez was scheduled to give part two of this presentation on April 22 with Ernest Ambrose. Additional joint meetings with ASQ and SSQ are planned for May 27 and June 24 (see Calendar of Events, pp. 3-4).

For more information about agile development techniques, go to ***www.agilemanifesto.org.***

Attention Soccer Fans!

See the D.C. United vs. New York Red Bulls game on Saturday, June 14 at RFK Stadium with members of the Women in Engineering and the Graduates of the Last Decade (GOLD) affinity groups. Ticket price TBD. For details, contact Katie Schaffold at ***katie.schaffold@ieee.org.***

Robotics Technology to Assist Elderly is Focus of May 10 Spring Symposium

An interdisciplinary symposium exploring how technologies such as robotics and telemedicine can assist an aging population in their professional and personal lives is being offered on Saturday, May 10.

"Technology for the Golden Years: Leading an Independent Life in the 21st Century" will be held from 9:00 a.m. to 4:00 p.m. at the Jeong H. Kim Engineering Building, Room 1110, on the University of Maryland College Park campus (see Calendar of Events, p. 3).

The event coincides with Older Americans Month and is suited for both professionals and students who are interested in the use of technology to improve disability and elder care.

Speakers from industry, academia and research will address a wide range of topics including robotic assistive technology, personal automobility, the next generation of sensors for remote monitoring, robotic exoskeleton rehabilitation, and product development challenges. Descriptions of these topics are provided below.

The symposium is being hosted by the Washington and Northern Virginia Chapter of the Engineering in Medicine and Biology Society, and by the Northern Virginia and Washington sections.

Society chapters cosponsoring the event are Antennas and Propagation, Communications (Washington chapter), Computer, Information Theory, Nuclear and Plasma Sciences, Reliability, Robotics and Automation, Signal Processing (Northern Virginia chapter), and Social Implications of Technology.

The Student Branches at Capitol College, George Mason University, and the University of Maryland College Park are also cosponsors.

Robotics as a Technology for Elderly Assistance

As the population ages significantly during the next two decades, the desire of most people to stay in their homes and communities will create an increasing demand for assisted care. Technology can compensate for limited workforce growth through the use of robots to support basic mobility, prosthetic devices, and semi-autonomous assistance with daily functions such as bathing, cooking and driving.

Dr. Henrik Christensen will discuss a number of robotic technologies and present a variety of examples with a focus on current methods and how today's research will lead to sustainable technologies that allow people to maintain their autonomy as they grow old. He will also offer some challenges for the future.

Dr. Christensen is the KUKA Chair of Robotics and Intelligent Machines at the Georgia Institute of Technology's College of Computing and Interactive Computing. He does research on mapping, estimation, systems integration and human-robot interaction, and has published more than 230 papers on vision, robotics and artificial intelligence.

He earned M.Sc. and Ph.D. degrees in electrical engineering from Aalborg University in Denmark, and served as founding chair of the European Network of Excellence in Robotics, which involves more than 200 universities.

Innovative Next-Generation Remote Health Monitoring & Alerting

Wearable wireless monitors, combined with powerful analysis software and global networks, are showing enormous potential to improve the lives of the aging and other high-risk populations. Continuous remote monitoring of patients in the home, outpatient rehabilitation, and institutional long term care will fill the gaps between office visits and provide a true safety net for individuals with chronic issues.

Practitioners have raised a number of practical questions. Can a monitor be designed that is effective, non-intrusive and attractive so that patients will want to wear it continuously? Can a monitor be incorporated into a therapy program as a real-time feedback loop? These and other questions are being addressed in two studies sponsored by the Defense Advanced Research Projects Agency (DARPA) and the National Institutes of Health (NIH).

Cindy Crump, founder and CEO of AFrame Digital, Inc., will discuss these studies and her company's research and development work on novel wireless remote health monitoring applications to address the needs of elders and other at-risk populations.

AFrame Digital is conducting the DARPA study, Non-Intrusive Health Monitoring for Post-Battle Wellness Management. Phase I showed that advanced analysis of multiparameter time-

See **SYMPOSIUM,** *p. 7*

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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***.

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Calendar Announcements

Please submit calendar items in the format used in the Calendar of Events. You can send email to ***ncac-scanner@ieee.org***. Events must have an IEEE or affiliate sponsor.

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.

July-August issue deadline: June 1, 2008

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calendar of events

Tuesday, May 6, 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 Metro Center (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: RSVP to Tim Weil at ***trweil@ieee.org*** or 301-452-3641.

Saturday, May 10, 2008

2008 Spring Symposium

Technology for the Golden Years: Leading an Independent Life in the 21st Century

Sponsor: Northern Virginia Section, Washington Section, Engineering in Medicine and Biology Society

Cosponsors: Antennas and Propagation Society, Communications Society (Washington chapter), Computer Society, Information Theory Society, Nuclear and Plasma Sciences Society, Reliability Society, Robotics and Automation Society, Signal Processing Society (Northern Virginia chapter), Society for Social Implications of Technology, and the IEEE Student Branches at Capitol College, George Mason University, and University of Maryland College Park.

Speakers: Dr. Henrik Christensen, Georgia Institute of Technology; Cindy Crump, AFrame Digital; Dr. John Spletzer, Lehigh University; Dr. S.K. Gupta, University of Maryland; and Dr. Craig Carignan, Georgetown University.

Time: 9:00 am to 4:00 pm

Place: University of Maryland, Kim Engineering Building, Room 1110, College Park, MD

Directions: From I-495, exit at Route 1 South, proceed approx. 2 miles, turn right onto Campus Drive, then immediately turn right onto Paint Branch Drive and the Kim Engineering Building will be on the left (after a stop sign). Free parking on weekends in Lots XX1-5 and 11b-c (read signs carefully). See ***www.parking.umd.edu/themap***.

From the College Park Metro Station (Green line), take the C8 Metrobus to campus. See schedule at ***www.wmata.com/timetables/md/c8.pdf.***

More Info: See story, p.1.

Cost: Registration prior to Tuesday, May 6 is $25 for IEEE members, $10 for IEEE student members, $50 for non-members, free for Life Members. After May 6 it is $45 for IEEE members, $20 for IEEE student members, $75 for non-members.

Contact: Register for the 2008 Spring Symposium at ***https://icm3.ieee.org/eventmanager/onlineregistration.asp?eventcode=ock,*** or contact Kerry Hartman at ***khartman@ieee.org*** to register by mail. For more information about the symposium, contact Debi Siering at ***siering@ieee.org.***

Tuesday, May 13, 2008

The Air Interface for Sprint WiMax from an Operations Perspective

Sponsor: Microwave Theory and Techniques Society

Speaker: Shervin Gerami, Sprint Nextel

Time: Reception 5:30 pm, dinner 6:00 pm, lecture 7:00 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: See ***http://ewh.ieee.org/r2/wash_nova/mtt.***

Cost: Lecture free; $15 for dinner (reservation required).

Contact: Please RSVP for dinner only by Wednesday, May 7 to Roger Kaul at ***r.kaul@ieee.org*** or 301-394-4775, or to Bruce Levine at ***bruce.levine@ieee.org.***

Wednesday, May 14, 2008

Northern Virginia Section Administrative Committee Meeting

Time: 6:30 pm

Place: Olive Garden Restaurant, 8133 Leesburg Pike (Tysons Corner), Vienna, VA

Directions: From I-495, take Route 7 West (Exit 47A) toward Tysons Corner. Turn left at Gallows Road. Parking garage is behind the restaurant.

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

Contact: Chuck Baldi at ***cbaldi@ieee.org*** or 703-675-0678.

Tuesday, May 20, 2008

♦ Design for Reliability: Uncovering Elegant Solutions

Sponsors: Women in Engineering, Engineering in Medicine and Biology Society, Reliability Society

Speaker: Dev Raheja

Time: Refreshments 6:30 pm, presentation 7:00 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: See Diamond story, p. 4. All are welcome to attend!

Contact: Please RSVP by Sunday, May 18 to Katie Schaffold at ***katie.schaffold@ieee.org.***

Tuesday, May 27, 2008

♦ Protecting Your Business from Liability

Sponsor: National Capital Area Consultants' Network

Speaker: Mr. Christopher Moody II, Moody Insurance Worldwide, Clarksburg, MD

Time: 6:00 pm

Place: Olive Garden Restaurant, 8133 Leesburg Pike (Tysons Corner), Vienna, VA

Directions: From I-495, take Route 7 West (Exit 47A) toward Tysons Corner. Turn left at Gallows Road. Parking garage is behind the restaurant.

More Info: See Diamond story, p. 4. Future NCA-CN activities and upcoming officer elections will be discussed in a brief business meeting preceding dinner and Mr. Moody's presentation. For 2008 Consultants' Network dues, bring a $50 check payable to "IEEE NCA-CN."

Cost: $25 cash for dinner.

Contact: Monica Mallini at ***m.a.mallini@ieee.org.***

Tuesday, May 27, 2008

An SQA Sojourn: Lessons Learned from 6 Appraisals

Sponsors: IEEE Computer Society; American Society for Quality (ASQ) Section 509 Software SIG; and the Society for Software Quality (SSQ)

Time: 6:30 pm

Speaker: Lenny Eng

Place: Video teleconference with sites in McLean, Silver Spring and Gaithersburg. Addresses are provided at the registration link below (rooms subject to change).

More Info: All interested IEEE members and guests are invited to attend. Pizza will be served. Advance registration is required to enter the facilities. See ***www.asq509.org/ht/d/sp/i/2499/pid/2499*** for details and to register.

Cost: Free

Contact: Tom Starai at ***starai@ieee.org.***

Tuesday, June 3, 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 Metro Center (Red, Orange and Blue lines).

Street parking is free after 6:30 pm

See **CALENDAR,** *p. 4*

CALENDAR, *from p. 3*

(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: RSVP to Tim Weil at ***trweil@ieee.org*** or 301-452-3641.

Wednesday, June 4, 2008

♦ Earth's Changing Climate

Sponsor: Geoscience and Remote Sensing Society

Speaker: Dr. Robert F. Cahalan, NASA Goddard Space Flight Center

Time: Refreshments 3:00 pm; seminar 3:30 pm

Place: Visitor Center, NASA Goddard Space Flight Center, Greenbelt, MD

Directions: See ***www.nasa.gov/centers/goddard/visitor/directions/index.html.***

More Info: See Diamond story, p. 5, and ***http://ewh.ieee.org/r2/no_virginia/grss*** for updated information.

Contact: RSVPs by Tuesday, June 3 to James Tilton at ***j.tilton@ieee.org*** are appreciated, but walk-ins are welcome.

Wednesday, June 4, 2008

Capitol College Graduate School Virtual Open House

Sponsor: Capitol College

Time: 7:00 pm

Place: Online

More Info: Capitol College is an IEEE Education Partner. Learn about its master's degree programs, meet faculty and staff, and experience the online classroom. For information about IEEE tuition discounts, see ***www.capitol-college.edu/academicprograms/partnerships/ieee.***

Contact: RSVP required. Please send your name, email address, phone number and program of interest to Laura Broughton at ***gradadmit@capitol-college.edu.***

Wednesday, June 11, 2008

♦ Allocation vs. Diversification: Managing Your Portfolio for Success

Sponsor: Graduates of the Last Decade (GOLD)

Speaker: Larry Grogan, Grogan Advisory Services

Time: Light dinner and networking 6:30 pm, presentation 7:00 pm

Place: Export Import Bank of the United States, 800 Vermont Ave. NW, Washington, DC

Directions: Convenient to the McPherson Square Metro station (Blue, Orange lines).

More info: Because the site is on U.S. Government property, **advance registration and picture ID are required.** All are welcome. Investing requires a practical and manageable approach in order to accomplish your goals and to achieve success. See Diamond story, p. 5.

Cost: Free

Contact: Pre-registration is required by Monday, June 9. Please send an email to Kerry Hartman at ***khartman@ieee.org.***

Wednesday, June 11, 2008

Northern Virginia Section Administrative Committee Meeting

Time: 6:30 pm

Place: Olive Garden Restaurant, 8133 Leesburg Pike (Tysons Corner), Vienna, VA

Directions: From I-495, take Route 7 West (Exit 47A) toward Tysons Corner. Turn left at Gallows Road. Parking garage is behind the restaurant.

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

Contact: Chuck Baldi at ***cbaldi@ieee.org*** or 703-675-0678.

Thursday, June 12, 2008

♦ Applications and Demonstration of Lightglove, a New User Interface

Sponsor: Engineering in Medicine and Biology Society

Cosponsors: Antennas and Propagation Society, Computer Society, Graduates of the Last Decade, Signal Processing Society (Northern Virginia chapter)

Speaker: Bruce Howard, Chief Technical Officer, Lightglove Corporation

Time: 7:00 p.m.

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, p. 5. Pizza and light refreshments will be served.

Contact: Please RSVP by Wednesday, June 11 to Paul Otto at ***ottop@saic.com.***

Tuesday, June 24, 2008

The NIST Trustworthy Software Program

Sponsors: IEEE Computer Society; American Society for Quality (ASQ) Section 509 Software SIG; and the Society for Software Quality (SSQ)

Time: 6:30 pm

Speaker: Tom Rhodes, National Institute of Standards and Technology

Place: Video teleconference with sites in McLean, Silver Spring and Gaithersburg. Addresses are provided at the registration link below (rooms subject to change).

More Info: All interested IEEE members and guests are invited to attend. Pizza will be served. Advance registration is required to enter the facilities. See ***www.asq509.org/ht/d/sp/i/2499/pid/2499*** for details and to register.

Contact: Tom Starai at ***starai@ieee.org.***

diamond♦stories

Tuesday, May 20, 2008

♦ Design for Reliability: Uncovering Elegant Solutions

Is your organization is making too many specification changes? Too many design changes? Then this presentation is for you. It covers the art and science of nipping potential system failures in the concept design, when the return on investment is the highest. Examples from the aerospace, medical and automotive industries will be presented to show how thinking outside the box can yield elegant and efficient solutions. A case history of a company that was rescued from going out of business will be discussed to demonstrate the power of a reliable design.

Dev Raheja, a new product engineering consultant since 1981, is dedicated to design assurance technologies. He chairs the IEEE Design for Reliability Committee and is the author of two books, *Assurance Technologies Principles and Practices* and *Zen and the Art of Breakthrough Quality.* His range of consulting encompasses automotive, aerospace, medical systems, defense systems, consumer products and high tech manufacturing.

Being a true international consultant, Raheja has conducted training in several countries including Sweden, Australia, Japan, Germany, the United Kingdom, Singapore, Taiwan, South Africa and Brazil. His clients include NASA, GM, Boeing, FDA, Siemens Medical Systems, Johnson & Johnson, Karl Zeiss, Nissan, Litton, General Dynamics, ITT, BAE Systems, Lockheed-Martin, IBM, Intel, Harley-Davidson, United Technologies, and the U.S. Government. Raheja successively served as an executive with Booz Allen Hamilton, General Electric Health Care Systems, and Cooper Industries.

Tuesday, May 27, 2008

♦ Protecting Your Business from Liability

Business insurance may be legally or contractually required. Are you protected from undue liability? What are your insurance needs? What are GL, E&O, and property insurance? What are common business practice and legal requirements for insurance? What is contractual liability? What employee coverage is needed? What about business use of private vehicles and related liability issues? Is my personal property protected from business liability? Can an employee sue me?

It is essential to protect yourself and your business from liability, and indeed business insurance may be a legal or contractual requirement. This talk will help you understand various forms of liability, legal requirements for insurance coverage, common business practice, and insurance and contract language. Various forms of coverage will be discussed, including general liability, errors and omissions, property insurance, product liability, employee coverage, and automobile insurance. The talk will also cover personal protection from business liability. The presentation will focus on the needs of consultants and businesses with a few employees.

Christopher Moody II is president of Moody Insurance Worldwide. He has been working with multinational businesses structuring and managing domestic and global insurance programs for more than 10 years.

See **DIAMOND STORIES,** *p. 5*

DIAMOND STORIES, *from p. 4*

Prior to joining Moody, he worked as a commercial underwriting manager for the Chubb Group of Insurance Companies, a large property and casualty insurance company. At Chubb, Moody managed Chubb's Washington, D.C. middle-market commercial division. This division focused on professional services, government contracting and manufacturing industries. He was instrumental in creating Chubb's Mid-Atlantic International Underwriting Unit and participated in the formation of Chubb's Eastern Region International strategic plans.

Moody's experience and expertise lie in the development of insurance and risk management programs for domestic and multinational companies. These programs focus on the global scope of a company's property, liability, directors and officers, and professional liability exposures as well as integrating these programs with employee benefit and welfare programs.

Moody Insurance Worldwide is one of the Washington area's largest independent insurance agencies. Moody has more than 40 employees and works with clients to customize insurance programs appropriate for their exposures and needs.

Wednesday, June 4, 2008

♦ Earth's Changing Climate

What's been happening to the Earth's climate in recent decades? What might we do about it?

The evidence that Earth has been warming primarily due to increased emission of greenhouse gases from human activity is presented in the context of natural climate forces due to volcanoes, solar activity, and natural variability. Dr. Cahalan will introduce components of the Global Earth Observing System of Systems (GEOSS) that is now revealing regional climate changes and their interconnections in unprecedented detail and precision.

Dr. Cahalan will consider the data that was used by the 4th Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), which received the 2007 Nobel Peace Prize along with Albert Gore, Jr. He will primarily focus on the scientific basis of the IPCC report from Working Group 1 (WG1), and emphasize the primary uncertainties that limit our capability to predict the timing of changes in the polar icecaps, in rainfall, and in other key climate variables. These include uncertainties due to aerosols and clouds that are the main focus of the Climate and Radiation Branch at Goddard, and also a priority of the U.S. Climate Change Science Program that coordinates the research of NASA with 12 other federal agencies. Dr. Cahalan will also consider the other two IPCC reports, on adapting to climate change (WG2) and on mitigating climate change (WG3), and give his opinion of a likely scenario in which we may begin to meet the challenge of 21st century climate change.

Dr. Robert Cahalan is Head of the Climate and Radiation Branch at NASA Goddard Space Flight Center, which he joined in 1979, coming from the National Center for Atmospheric Research.

He is also Visiting Senior Research Scientist at UMCP/ESSIC, Adjunct Professor of Physics at UMBC, Lead Scientist for THOR lidar, Chair of the 3DRT Working Group of the International Radiation Commission, NASA Project Scientist for the EOS SORCE mission, Project Scientist of the International Intercomparison of 3D Radiation Codes (I3RC), and NASA representative to the U.S. Climate Change Science Program, where he chaired the Observations Working Group.

Dr. Cahalan's research focuses on climate and cloud structure, developing retrieval techniques that extend the "independent pixel approximation" (IPA) by use of 3D transfer methods, and parameterizations such as the "effective thickness approximation" (ETA) that relate cloud optical properties to cloud structure. With colleagues at NASA Goddard and LANL Dr. Cahalan led development of a new measurement approach, "Thickness from Offbeam Returns," realized in Goddard's innovative THOR lidar system that combines a multiple field-of-view wide-angle receiver with 3D retrieval methods to determine the thickness of optically thick cloud layers. THOR is now being adapted to measure thickness of snow and sea ice layers. Dr. Cahalan directs the Intercomparison of 3D Radiative Codes (I3RC) that has developed a set of benchmarks used to certify 3D radiative transfer codes, and is now coordinating a community 3D coding effort.

Wednesday, June 11, 2008

♦ Allocation vs. Diversification: Managing Your Portfolio for Success

Investing requires a practical and manageable approach in order to accomplish your goals and to achieve success. Allocation and diversification are key aspects that all experts say you need in your portfolio. But what exactly are these principles? How do they differ? What can you do to make your portfolio practical and manageable? This presentation will discuss these aspects and include a demonstration of successfully implementing allocation and diversification in your portfolio.

Larry N. Grogan is president of Grogan Advisory Services, an independent financial services firm focusing on planning to strategically guide clients through life stages. The company offers complete financial planning, asset management, insurance, analytical portfolio analysis, and consultation. Grogan Advisory Services was established in 2001, determined to provide clients unbiased opinions and recommendations. The company's research comes from multiple sources in order to present a scope of intelligent opinions, and it offers over 11,000 mutual funds, unlimited stocks and bonds.

Thursday, June 12, 2008

♦ Applications and Demonstration of Lightglove, a New User Interface

Lightglove is a new technology worn underneath the wrist that optically images the shape of the hand in real time. Narrow infrared beams scan the hand, and reflections are sensed in the Lightglove. Solid state accelerometers and gyroscopes track hand motion, completing a virtual reality glove function without a physical glove. The resulting data sets are transmitted wirelessly via Bluetooth to a host computer, entertainment center or smart-home controller. A device driver synthesizes user actions from glove-hand emulations of mouse, joystick, gaming controller and keyboard functions.

Advantages of a virtual (non-contact) controller result from Lightglove's action sensing any size or shape hand comfortably and basing inputs on changes in the hand shape to detect natural intuitive gestures as though there were a physical device in or below the hand. Examples include dropping a finger down to press a mouse or keyboard button, operating the thumb as a joystick or moving the hand to direct cursor motion. Intuitive gestures may be extended to include raising or lowering the hand to raise or lower TV volume or a light dimmer. The hands may operate in any comfortable position or orientation, which may change over time to mitigate repetitive stress injury. Action trigger points may be adjusted to offer tight, fast dexterous control for 3D drawing or flight stick operation, or loose, slower input for hand-challenged or tired users. Advanced features include processing out tremors. The presentation will feature a hands-on demonstration and a discussion of medical applications.

Bruce Howard is the co-founder and chief technical officer of Lightglove Corporation. He designed and prototyped all of the Lightglove hardware and has written and debugged all the software and firmware for it. He also wrote all four patents for Lightglove technology. He has been involved with optical design since his undergraduate work at Virginia Tech, where he earned a B.S. in electrical engineering.

Howard has more than 22 years experience in hardware systems design and support for several prominent manufacturers. His technical expertise is concentrated in the areas of radio communications and electromagnetic interference. As an electrical engineering manager, he oversaw the design and testing of various pieces of equipment for the military, NASA and other federal agencies. In addition to his hardware expertise, he was responsible for both product-embedded and test software.

Having established himself as an effective leader, Howard spearheaded numerous successful teams during his career. Notable contributions include planning and execution of an EMI program for air traffic controller terminals for the FAA at Harris Electronics, and establishing and maintaining electromagnetic compliance for Space Shuttle communication and telemetry modules at TRW.

Robotics for All Ages!

On Saturday, May 10, DCRobotics, a special interest group of the Capital PC User Group (CPCUG), is sponsoring an open house at Shepherd Elementary School, 7800 14th St. N.W., Washington, D.C., from 1:00 to 4:00 p.m.

The free event offers the opportunity to meet other people interested in youth and robotics. There will be activities for students from first grade through high school, as well as information for mentors—high school and college students and adults who like to play!

You, your children, your team, your display, and your robot are invited to participate in this fun and educational event. Come see how much fun robots can be—and how we can encourage the next generation of techies and inventors!

Many of the programs that will be on display are sponsored by FIRST (For Inspiration and Recognition of Science and Technology), which is supported by local IEEE sections through individual team sponsorships.

FIRST Robotics Challenge (FRC) is aimed at high school ages and is the "big" robots that may be 100 pounds and 5 feet tall. It is the "Cadillac" of the programs, requiring more expertise and greater financial resources. Some of the local FRC teams are Banneker, McKinley, Roosevelt, Ballou, Blair, and Patriot Center.

FIRST LEGO League (FLL) is FIRST's program for 9- to 14-year-olds in upper elementary and middle school, while the **Junior FIRST LEGO League (JrFLL)** is for 6- to 9-year-olds. Next year's theme for both FLL and JrFLL is Global Climate.

VEX was originally promoted by FIRST for high school students, but now is an independent program from Innovation First for middle through high school.

The **Potomac VEX League** is an informal association of VEX teams in this area that holds scrimmages and workshops. Innovation First is developing a network of tournaments.

FIRST Tech Challenge originally used the VEX robots, but it is becoming a new program for high school students.

For more information about the open house or FIRST programs, contact Janet Lathan, FIRST Senior Mentor for the Washington Metro Area, at *janetlathan@comcast.net,* or call her at 240-393-1474 after 1:00 p.m.

Metro's Automatic Train Control System Has Origins in 19th Century Invention

By James Christian

In the early 1970s, the Washington Metropolitan Area Transit Authority (WMATA) considered several methods of controlling subway train cars to achieve safe operation. A form of Automatic Train Control (ATC) was selected. This method meant that the subway train cars would be operated as if they were driverless. An operator would be in the control cab to handle incidents in which the train automatics malfunction and for terminal turnaround.

ATC for WMATA is composed of three subsystems, Automatic Train Protection (ATP), Automatic Train Operation (ATO), and Automatic Train Supervision (ATS). ATP is the subsystem that ensures safe operation of trains. ATO is the subsystem that automatically allows the train to control speed, start and stop at subway stations underground, at grade, and on aerial structures. ATS (Automatic Train Supervision) is the subsystem that controls the routing and scheduling of trains.

Before this article goes into further technical depth, a brief history lesson shall be presented. On August 20, 1871, Dr. William Robinson invented the closed track circuit. This invention was significant because it detected the presence of a train. All modern track circuits are based upon his design, which has been improved over the past 137 years.

ATP provides protection against collisions and hazardous over-speed conditions by utilizing an automatic block signaling (ABS) system, control of interlockings, route security through interlockings, and control of train door operations. At this point another history lesson needs to be presented.

Prior to 1851, train separation was maintained by schedule from destination to destination. This system did not protect trains that broke down between destinations. The stopped train was often hit in the rear by the next scheduled train. Mechanical block signaling was introduced. In this system the distance between destinations was divided into blocks with mechanical signals that indicated if the block ahead had a train in or out of the block ahead. In 1851, another 19th century invention, the telegraph, was utilized to verify location of trains within or outside of blocks. Train orders were sent to trains permitting movement or delaying movement. Although safety was much improved, this system had no protection if part of train stopped in a block while the train was entering the next block. Only the frequency of train collisions was reduced. In 1911, General Railway Signal engineer Sedgewick Wright developed the absolute permissive block signaling, which permitted train movements for both following and opposing moves that used track circuit technology. However this is not an automatic system and, like all other block signaling methods, it required an investment in manpower.

Ensuring Safe Operation—*A Metro train leaves Glenmont Yard. WMATA's Automatic Train Control system depends on the closed track circuit invented in 1891.*

The ABS system uses train detection and speed commands to maintain safe train separation. Interlocking control is maintained by the use vital and non-vital circuitry. Train door control is coordinated with station stopping circuitry on the train and the train dwell time circuits in the local train control room (TCR).

All ATP track circuits for WMATA utilize the following equipment: track installed impedance bonds mechanically with 1000 MCM cable to the running rails and by cable from the bond to the local TCR, ATP electronic modules, and vital track circuit relays (gravity drop operated). WMATA ATP track modules generate one of eight audio frequencies for train detection and certain speed commands (15, 22, 28, 35, 40, 45, 50, 55, 65, 75 mph) as required when a train is detected and where the preceding train is in the blocks ahead.

All modules at stations and some between station contain Train to Wayside Communication (TWC) electronics. Most of these functions concern the ATS subsystem and will be discussed later.

Interlocking control utilizes vital circuits which align and lock routes. The types of locking are route (preventing switch movement until train movement through interlocking is complete), traffic (preventing opposing signals from clearing), switch (preventing switch movement when route locking and detector locking is in effect), approach (locking the route when the approach is occupied), time (depending on situation, preventing switch movement or opposing signals from clearing), and detector (preventing switch movement when train is occupying the track circuit the switch machine is in). Non-vital circuits are used for route storage, route initiation, route completion, and route checking. In simple words, the circuits need to initiate and complete a route, check proper traffic direction and switch position, and store entrance and exit signal information until route check circuits verify that locking circuits can function properly. Further technical discussion is beyond the scope of this article.

When a subway train stops it uses its onboard communications the TWC to tell the TCR that it is stopped and is not receiving speed commands above zero. If the train is operating under automatic doors, the train dwell circuits allow the doors at most stations to be open 12-16 seconds. At certain times and/or during rush hours certain stations like Gallery Place, Metro Center and L'Enfant Plaza have dwell times varying 20-45 seconds. When the door chimes at completion of the dwell timer, the train doors start closing and are completely closed in 2 seconds. It is not recommended to attempt to board the train unless you have verifiable super speed powers.

The ATO subsystem regulates the train running speed and stopping the train at the stations. The wayside marker units are the local train control technical equipment that activates the program station stopping functions.

The ATS subsystem controls and supervises routing & scheduling of trains. The ATS subsystem consists of the Rail Operations Computer System (ROCS) located at 600 5th Street, N.W. in Washington, D.C. in the Jackson Graham Building (originally called OCCB or Operations Central Control Building), the data transmission system between each local control room, station, and the ROCS, and includes passenger information displays at the stations, and the TWC train dispatching and door dwell control. Also ROCS monitors and/or controls mechanical support system (tunnel fans, chiller plants, sewage ejectors, etc.) and electrical support systems (battery rooms, station electrical rooms, traction power (third rail) facilities, etc.).

The primary functions of Central Control are:

1. To monitor status of the transit system by displaying the desired information to the ROCS supervisors and operators.

2. To enable ROCS personnel to exercise control necessary to damp out incipient disturbances to the schedule to prevent large scale disruptions.

The original computer system in 1976 consisted of two Xerox SIGMA 5 main frame computers. The equipment has been updated continuously over the years due to creeping obsolescence of electronic parts.

The ROCS can control train destinations (Silver Spring, Greenbelt, New Carrollton, etc.), ATS speed acceleration (ATO train car acceleration), ATS speed limits (speed commands lower that the ATP speed commands, i.e. 59 for 60, or 34 for 35), train number (ID of train as it is displayed at ROCS), hold trains at stations with doors closed or doors open (this condition is used only if the entire train is within the station platform area), traction power breakers, tunnel fans, pumps, and chiller plants. The ROCS monitors the indication status of all equipment mentioned in the previous statement plus fire and intrusion alarms, equipment temperature status, humidity at selected locations, and other types of status information.

The WMATA ATC system is essentially 19th century technology updated to the 20th century. However both the 19th century and 20th century components are increasingly difficult to maintain due to lack of available spare parts. So the ATC system infrastructure is being replaced gradually. Perhaps by 2025, all of the 1976 equipment will have been replaced. The system equipment was expected to last 30-40 years. However, like New York City, portions of the infrastructure may not be replaced until 2050 due to financial constraints. New technologies are being constantly developed and today's improvements also may be replaced later in the 21st century.

Symposium Speakers will Discuss Trends in Assistive Technologies for the Elderly

SYMPOSIUM, *from p. 1*
series data and a Bayesian network can provide highly predictive qualities for medical support systems, while generating fewer false alarms.

The NIH study will determine the feasibility of using non-intrusive, wearable monitors to derive gait analysis parameters in real-time during normal daily activities. The goal is to alert caregivers to deterioration in the gait stability of individuals and detect falls automatically with minimal false alarms.

Crump has more than 20 years of experience in the network technology industry, including executive positions with Caspian Networks, MCI Metro, and Freddie Mac. She holds an M.A. in economics from Virginia Polytechnic Institute and State University.

Automated Transport and Retrieval System: Towards Equality in Personal Automobility for Wheelchair Users

Dr. John Spletzer will present his research in the development of the Automated Transport and Retrieval System (ATRS), a technology-based solution for drivers in wheelchairs. ATRS integrates robotics and automation technologies into a traditional automobile without making permanent changes to the vehicle. This eliminates the need for an attendant or costly van conversion. The heart of ATRS is a smart wheelchair system which navigates autonomously from the driver's position to a lift platform at the rear of the vehicle.

He will discuss both the technical and commercial challenges faced in bringing such a robotic system to a market that operates in the presence of and service to people.

Dr. Spletzer is an assistant professor of computer science and engineering at Lehigh University. He received both his Ph.D. and M.S. in computer and information science from the University of Pennsylvania, and an M.S. in mechanical engineering from Johns Hopkins University.

His research focus is mobile robotics, with emphasis on assistive technologies for driving and multi-agent systems. In 2007, he served as co-team leader on the Ben Franklin Racing Team, which reached the finals of the DARPA Urban Challenge.

Product Development Challenges and Opportunities for Meeting the Needs of People with Disability

Dr. Satyandra K. Gupta will share his experiences and observations in developing products for people living with a disability.

He believes that a multi-pronged approach is necessary to make a meaningful societal impact in the field of assistive technology. First, we will need to continue developing innovative sensing, actuation and mobility technologies to advance the assistive technology area. Second, we will need to develop analysis tools to evaluate product usability and help designers understand the implications of their decisions on the lives of people with disabilities. We will also need to ensure that the needs of people with disabilities are emphasized in the undergraduate engineering design curriculum. Finally, we will need to develop common product platforms to reduce the cost of individual assistive technology-based products.

Dr. Gupta is an associate professor in the Mechanical Engineering Department and the Institute for Systems Research at the University of Maryland. Previously, he was a research scientist in the Robotics Institute at Carnegie Mellon University.

He holds a Ph.D. in mechanical engineering from the University of Maryland College Park and a M.Tech. in production engineering from the Indian Institute of Technology, Delhi. He has authored or co-authored more than 160 articles in journals, conference proceedings, and book chapters.

Rehabilitation of the Upper Extremity using a Robotic Arm Exoskeleton

Dr. Craig Carignan will present and demonstrate his current research involving a robotic arm exoskeleton rehabilitation system developed specifically for physical therapy.

A significant limitation of shoulder rehabilitation programs is the lack of quantitatively graded and controlled rehabilitation protocols as well as objective measures of outcome. Robotic arm exoskeletons offer an alternative to traditional therapy using resistance bands, dumbbells, and pulley-weight machines that restrict movement to a single direction at uncontrollable levels of resistance.

Because exoskeletons encapsulate the patient's arm, they move with the patient and can exert forces at multiple points of contact. In addition, they can modulate the level of resistance thereby tailoring the exercise to conform to natural mechanical advantage. These features allow therapeutic protocols to be rendered on the exoskeleton that are similar to what can be performed manually by a therapist. Sensory feedback from the exoskeleton can be used to provide metrics on patient progress, which are not easily attained in manual therapy.

Dr. Craig Carignan is a research associate professor at Georgetown University's Imaging Science and Information Systems Center, where he is leading the effort to develop the robotic arm exoskeleton for rehabilitation.

Senior Members

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

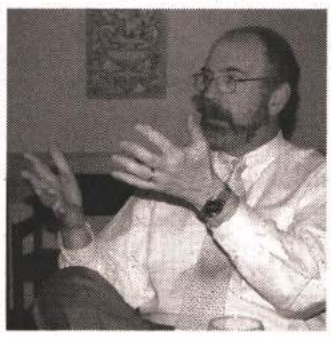
Natalia Bliznyuk (NV)
Eduardo Bustamante (NV)
Gerald Cooperstein (W)
Esmail Dinan (NV)
Stephen Katona (NV)
Andrew Koffman (W)
Xiangning Lin (NV)
Gurudatta Parulkar (NV)
Alexander Smith (NV)

If you are interested in becoming a Senior Member, please see ***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.

Disclose, Explain, Document Thoroughly to Streamline Security Clearance Process

By Monica Mallini, P.E.

On March 25, IEEE member Dr. Jon Roberts, a local intellectual property attorney whose practice includes security clearance law, gave some sound advice to members of the National Capital Area Consultants' Network: *in the security clearance world, the law says you are guilty until proven innocent.*



Dr. Jon Roberts

You cannot apply directly to the government for a security clearance; an employer must have a need for you to be cleared. Typically, a company wins a contract award for classified work and needs additional personnel with security clearances.

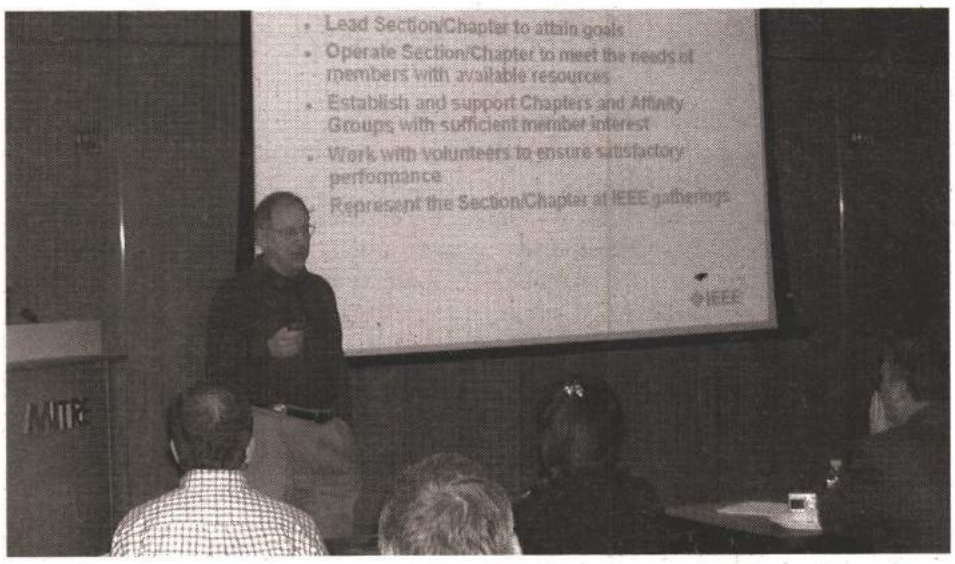
Before you apply, it may be worthwhile to question whether you are clearable. Roberts recommends reading the SF-86 adjudicative guidelines and the Director of Central Intelligence Directive 6/4, which contain detailed universal clearance guidelines. If you are not a good candidate for clearance, resolve problem areas prior to applying.

The time required to obtain a clearance depends on the priority of the program in which you will be working and the contents of your file. An 18-month wait may be reduced to six months if all potential problem areas have been explained in your application.

The worst thing you can do is casually fill out the SF-86 and submit it as if it were just another form. Addenda should be added to explain the mitigating circumstances for anything the least bit negative or questionable in your background, and there can be no unexplained gaps in your residences, education and employment.

Another way you can streamline the investigation is to name all your references in the same town, preferably where you live now, Roberts said. Pick three people who have known you well for 6 or 7 years. If you choose geographically diverse references, your investigation file must make the rounds to each location in turn, which can add several months to the investigation.

Once you get a clearance, it is important to communicate with your security officer any time a situation arises that may affect your clearance status.



Mike Cardinale, 2006 Chair of the Northern Virginia Section, explains officer roles.

Leadership Training Sets Attendance Record

By Pete Sypher

Experienced IEEE leaders shared their knowledge at the 2008 National Capital Area Leadership Training Workshop on Saturday, March 8 at Mitre Corp. in Tysons Corner, Va.

The workshop was organized by Doug Holly, Jeff Poston and Fred Seelig. The five-hour workshop consisted of 12 presentations, plus a continental breakfast and lunch. About 65 members attended, probably the largest attendance ever. This was a pleasant surprise to the organizers, because only nine had registered by March 2.

The leadership workshops are designed to acquaint chapter and section officers with what is expected of them, and provide some details about reporting the financial and meeting activity of a section and society chapter. The workshop included presentations on membership development, how to run meetings using *Robert's Rules of Order,* and an overview of how IEEE functions. Marc Apter, a recent Region 2 Director and currently the Region 2 Bylaws/Parliamentarian, gave the overview presentation.

The master of ceremonies (and one of the presenters) was Doug Holly, who obviously enjoys training people. He has had a leading role in all the workshops held this decade. He recently earned a private pilot's license and most often flies the Maryland skies in the Chesapeake Bay area.

It may seem that the duties of IEEE chapter and section officers are burdensome and difficult, but they are not. Some indoctrination and learning of the mechanics of reporting are necessary to have smooth interaction with the IEEE national organization. The IEEE provides a wealth of information on how to run a successful chapter.

Anyone with an IEEE Web Account can view the slides that were presented at the workshop. Go to ***www.ieeecommunities.org/nca,*** log in, then click on the "Related" button near Doug Holly's name, then click on Leadership Training 2008. If you are considering becoming active in Washington-area IEEE, these slides will give you a look at what volunteer life is like.

calls *for* papers

Performance Metrics for Intelligent Systems Workshop

August 19-20, 2008
National Institute of Standards and Technology Gaithersburg, MD
Deadline: May 29, 2008
www.isd.mel.nist.gov/PerMIS_2008

The theme of PerMIS'08 is identifying and quantifying contributions of functional intelligence towards achieving success. As in previous years, the workshop will also focus on applications of performance measures to practical problems in commercial, industrial, homeland security, and military applications. Prospective authors are requested to submit a draft paper (max. 8 pages) or an extended abstract (1-2 pages) for review.

Applied Imagery Pattern Recognition Workshop

October 15-17, 2008
Cosmos Club, Washington, D.C.
Abstract submission deadline: June 30, 2008
www.aipr-workshop.org

The theme of AIPR 2008 is multiple image information extraction. Papers are solicited that deal with the extraction of information from time-varying sequences of images or video, as well as multiple images that collocate in space and/or time. Examples of such use are in the identification of time-varying elements and of objects viewed from multiple vantages and orientations. Examples of the use of multiple images include object tracking, extraction of information from time-varying and multiple medical imagery, hand and body gesture recognition, and historical film and television preservation and restoration.