

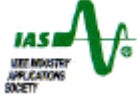
Pittsburgh Section

IEEE Bulletin



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Serial Communications
Tony Pollice, Advisory Engineer
Mark Bolha, Application Engineer
ASI Robicon, Inc.



Different types of serial networks that are commercially available and their practical applications will be presented. Modbus, Modbus Plus, Device Net, Profibus, DH+, RIO and several other protocols are discussed in their common context of serial communications systems. The structure of star networks, point-to-point networks, token ring networks and RS485 standards are described along with the data structure and protocol for each. Hot back up and redundant PLC systems, what systems are available from various manufactures and some lessons learned on their practical implementation are also discussed.

Application of serial networks to power electronic systems and motor drives will be shown as examples. One application involves the operation of parallel motors on a conveyor system using Device Net to control all of the signal interfaces between drives. Another application is a power supply system that uses a hot back up approach for control redundancy as well as several different networks to communicate with field devices. A demonstration of how to set up a PLC network using a Profibus configuration tool and RS Network for Device Net are given.

Mr. Pollice received a B.S.E.E. degree from University of Pittsburgh in 1980. He has over 24 years of experience in applying computer controlled solutions to automatic test equipment, communication networks, and industrial controllers. Mr. Bolha has designed medium voltage VFD systems as well as AC and DC power supply systems using PLC based and serial communication system interfaces.

Place:	Westinghouse Energy Center, Monroeville
Date:	September 2 nd
Social:	6:30 PM
Program:	7:00 PM

This meeting will be of particular interest to the members who belong to the PES and IAS societies. For more information or to register, contact Keith Sueker at (412) 793-8909 or ksueker@att.net by August 26th.

Directions: From downtown Pittsburgh, take the Parkway East Outbound to Exit 14A (Monroeville). Cross the traffic light (Business 22) and proceed on Rt. 48 South for two traffic lights. Turn left onto Northern Pike. Proceed East ~ 0.2 miles and turn right at the first traffic light onto Westinghouse Drive. Travel 0.7 mile to the three flags where the main entrance is located. Parking in the evening will be plentiful in the large area in front of the building. Enter the main entrance. Check with the security inside. You will be directed to the proper auditorium for the presentation.

From PA Turnpike, take Exit 57 (Monroeville). After the toll plaza, get in the left lane (Business-22). At the first light, turn left on to Rt. 48 South and follow the directions shown above.

Volunteers Needed as Mentors

The Engineers' Society of Western Pennsylvania (ESWP) in conjunction with the Carnegie Science Center will present the 6th Annual Future City Competition in the Pittsburgh area. It is a national program sponsored by the engineering community to promote technological literacy and engineering to middle school students. The Competition asks middle school students to create their city on computer using *SimCity 3000*, build a 3-D model of the city, and write an essay – all in the hopes of winning the regional competition in January and an all-expense-paid trip to the National Finals in Washington, D.C. in February.

In 2004, more than 30,000 students from 1,100 schools in 33 regions participated in Future City, the largest engineering education program in the country. Our own Pittsburgh regional team from Riverview Junior/Senior High School, mentored by Bill Brooks of Brooks Fire Protection Engineering, captured the 2004 National championship! More volunteer engineer mentors are needed for this fun, worthwhile program. Each volunteer engineer mentor works with seventh and eighth-graders, in a team of three students, and their teacher, helping to guide the youngsters through the rigors of building a functioning city. Engineers generally devote only 20 - 40 hours to the project over the period from October to January. Part time mentors are also needed. This year's Pittsburgh Regional Competition will be held at the Carnegie Music Hall on Saturday, January 15, 2005.

For more information on volunteering as an engineer mentor for the 2005 Future City Competition, please contact Werner Loehlein, Pittsburgh Future City Mentor Coordinator, at (412) 395-7363, loehlein@usace.army.mil, or visit www.futurecitypittsburgh.org.



Fuel Cells: Combined Heat and Power (CHP) Applications for Mission-Critical Facilities

S. Faruq Ahmed, P.E.
Burt Hill Kosar Rittelmann Associates



The economic engine of our civilization is increasingly dependent on electricity. In the modern times, electricity is the life-blood of our economy. Thus more and more business processes are becoming "mission-critical" and depending heavily on the availability of reliable electric power. A twenty minute power interruption may cost the industries \$6.29/KW of installed capacity (PNNL 13797, 2002). For the transportation industry the cost is \$8.91/KW. Combined Heat and Power (CHP) provides an opportunity to use on-site distributed generation along with the waste heat from the generation process. The best power plant, coupled with the transmission losses, may provide a fuel use efficiency of 38%. The CHP applications can have fuel use efficiency of 70% to 80%.

The presentation describes a high temperature Solid Oxide Fuel Cell with combined cycle gas turbine power generator along with heat activated "desiccant cooling" system for a mission-critical facility – a biomedical research laboratory. Such buildings serve mission-critical functions and also use large amounts of energy compared to other building types. The Fuel Cell CHP application will be presented for ten different climate types in the country. The uses of waste heat from the fuel cell (typically 1000 deg C) will be discussed. The environmental benefits of using CHP technology will also be presented.

Mr. Ahmed is the Principal of Technology Engineering Division of Burt Hill Kosar Rittelmann Associates. Mr. Ahmed holds a Masters degree from Colorado State University. Over the years, he has been involved with many projects, including solar and renewable energy, distributed generation, telecommunications systems, communications system technology, high technology medical facilities etc. He has been a consultant for Renewable Energy Technologies to the World Bank. He is a frequent speaker at various technical meetings and conferences.

Place: Westinghouse Energy Center, Monroeville
Date: September 16th
Social: 6:30 PM
Program: 7:00 PM

This meeting will be of particular interest to the members who belong to the PES and IAS societies. For more information or to register, contact John Momyer at (724) 864-6777 or john.momyer@crispcntrl.com by September 9th.

Directions: For directions, please refer to the article on the 1st page of The Bulletin.



Take Me Out to the Ballgame



Enjoy a day at the ballpark with the IEEE. Join the IEEE Pittsburgh Section members and guests for a double header with Pittsburgh Pirates and the Houston Astros.

Place: Pirates Cove at PNC Park (Sections 203, 204, 205)
Date: September 9th
Time: First game: 5:05 PM
Second game: 7:30 PM.
Dinner: Begins at 5:30 PM.
You may arrive as early as 3:30 PM.
Cost: The dinner and game cost \$34.00, not including parking.

Registration for this event has been extended until September 7th. Please contact Charles Urso at (412) 338-4871 or curso@llitechnologies.com.

Please make checks payable to "IEEE Pittsburgh Section" and send them to:
5077 Lougean Avenue
Pittsburgh, PA 15207.

EXCELLENT CAREER OPPORTUNITY ELECTRICAL ENGINEER

Our firm currently has an opportunity for an individual with extensive experience performing power system studies, which include protective device coordination, short circuit, load-flow, and harmonic. PA P.E. license is required. Knowledge of SKM software a plus. Qualified candidates should send resume to powerstudies@adelphia.net

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Mitigating the Effects of Voltage Sag and Flicker on Distribution Lines with Solid-State Switched Capacitors

Chris Sermon, P.E.

Power Quality Systems, Inc



Residential, commercial and industrial growth along long distribution feeders has increased the awareness and impact of poor power quality events such as voltage sag and flicker. Voltage sag and flicker can have a commercial and economic impact on both suppliers and users of electric power.

The distribution-class Static VAR Compensators (SVC) provides an economical and field proven solution to the problems of voltage sag and flicker. This presentation will provide an overview of the distribution-class SVC including power and control implementations, application considerations and application examples.

Mr. Sermon earned a B.S. in Applied Physics in 1979, and a MSEE degree in 1981 from the Georgia Institute of Technology. Chris joined Power Quality Systems (in West Mifflin, PA) in 2003 as a Senior Engineer. His duties and responsibilities include project management, application engineering and product development, for their medium voltage distribution-class Static VAR Compensators. Chris is a member of the IEEE and a Registered Professional Engineer in the Commonwealth of Pennsylvania.

Place: Westinghouse Energy Center, Monroeville
Date: September 23rd
Social: 6:30 PM
Program: 7:00 PM

This meeting will be of particular interest to the members who belong to the PES and IAS societies. For more information or to register, contact Dave Vaglia at (412) 491-6944 or davevaglia@ieee.org by September 16th.

Directions: For directions, please refer to the article on the 1st page of The Bulletin.

IEEE International Symposium on Electrical Insulation September 19th through 22nd Indiana Convention Center Indianapolis, IN

The 2004 IEEE International Symposium on Electrical Insulation (ISEI 2004) conference is directed toward those who develop, test or use electrical insulation in electrical equipment. In the technical program, 140 papers from 31 countries will be presented. These papers will focus on the practical issues that are of a concern to those who work with transformers, rotating machines, cables, outdoor equipment and switchgear. Attendees will find answers to questions on what new insulation materials are available, as well as what new developments are being made in diagnostic testing and life extension. Poster sessions will be held on two evenings of the conference to address both practical application issues and research into new materials and test methods.

Shorts courses have been scheduled during ISEI 2004 that will provide basic information on a wide range of topics that will be useful to those new to the field, or who may need a better understanding of new materials and diagnostic techniques available.

Attendees will also have the opportunity to see the latest in electrical insulating materials, products and test equipment at the Engineering Manufacturing Expo 04 (EME 04). This Expo is located at the same facility as the ISEI 2004.

A number of working groups developing or revising IEEE standards related to electrical insulation as applied to rotating machines will also meet during the ISEI 2004. Attendees are welcome to attend.

For more information, or to register online, please visit www.deis.nrc.ca/isei2004.htm. IEEE members receive a discounted registration fee.

IEEE Pittsburgh Section 7th Annual Fall Picnic

Your entire family is invited to attend our 7th Annual IEEE Pittsburgh Section Fall Picnic. The Outlook Grove in South Park has been reserved for the day. The section will provide hot dogs, buns, condiments, and soft drinks. Each member that is attending is asked to bring a covered dish that will serve 10-12 people.

Activities are planned for children based on age and number of children attending. Also in store is a volleyball game for the adults. Please come out and join the fun. The picnic will start at 1:00pm, and food will be served around 2:00pm. Games and activities will begin after lunch.

Reservations are required so the correct amount of food can be purchased. Please contact Michelle Antantis at (412) 393-4912 or mantantis@dqe.com by September 13th to RSVP. When you call, please let us know how many will be attending, the number and ages of the children attending, and what covered dish you will bring.

Place: Outlook Grove, South Park
Date: September 18th
Time: 1:00 PM, Lunch served at 2:00 PM

Directions: From Downtown, take Route 51 South to Route 88 South. From the left lane, go straight onto Corrigan Drive. Follow Corrigan Drive through South Park until the road comes to a T. The Fairgrounds will be on the right. At the intersection, make a left onto Brownsville Road. Follow Brownsville for 2/10 of a mile. Make a left turn at the sign for Outlook Grove. Outlook Grove will be on the left.

The Mathematics of Robotics

Dr. Guy M. Nicoletti
University of Pittsburgh



Analysis and control of robot arms require the development of analysis techniques and control algorithms. Robotics arms with multiple joints are subject to many forces and external influences require complex analysis. This presentation summarizes the developments in Denavit, Hartenberg and Paul on the use of homogeneous matrices and coordinate transformations in kinematic analysis for robots. The Denavit *et al.* developments are the foundations upon which control algorithms for robotic kinematics and dynamics are based.

Dr. Nicoletti is an Associate Professor of Engineering at the Greensburg Campus of the University of Pittsburgh. He is presently involved with the implementation of the newly developed Freshman Engineering Program by the University of Pittsburgh. He earned B.S., M.S. and Ph.D. degrees from the Technical Industrial Institute, Cosenza, Italy, and the University of Pittsburgh. His research interests are in Digital Control Systems, Neural Networks, and Volume Rendering Imaging.

Place: Kresge Hall, Room 1175 (in Benedum Hall)
3700 O'Hara Street
Date: September 29th
Social: 7:00 PM,
Program: 7:30 PM

This meeting will be of particular interest to the members who belong to the Robotics society. For more information or to register, contact Dr. Ron Stone at (412) 488-1100 or RStone@ParadigmGenetics.com by September 22, 2004.

Benedum Hall is located at 3700 O'Hara Street in Oakland, on the University of Pittsburgh main campus. Parking is conveniently located in the O'Hara parking garage across the street, or on the neighboring streets.



How to Build and Expand a Successful Consulting Practice

Dr. Gary L. Blank, P.E.
Engineering Update Institute



With the recent DOWNSIZING AND RESTRUCTURING the demand for consultants (full-time and part-time) has increased dramatically. The question is "Are you available?" Learn "How to be a Successful Consultant and Get in on a Booming Market". This six-hour seminar for engineers, scientists, and other professionals illustrates how to keep your present job and launch a successful part-time consultancy. Also explained is how to allow your practice to grow as rapidly as you desire using the right strategies. For more information, please visit the website <http://www.drblank.com/cosem.htm> for a preview.

Dr. Blank received his B.S. from Illinois Institute of Technology, M.S. from the University of Idaho, and Ph.D. from the University of Wisconsin in Madison. All degrees are in electrical engineering. His career has advanced along parallel paths in industry and in academia. For 15 years he was a full-time consultant while concurrently teaching part-time at the University of Florida and UCLA. For 13 years he held full-time faculty positions at Marquette University, Northern Illinois University, and the Illinois Institute of Technology, while concurrently consulting part-time in industry.

Dr. Blank made a smooth transition from a full-time salaried employee to a full-time independent consultant in 30 days. He has taught and helped hundreds of professionals internationally to start and to expand their consulting practices. During the thirty years of his consulting business, he was never without a client for more than one week. Dr. Blank is a dynamic and effective workshop leader. His illustrations and tips are down-to-earth, practical proven methods. Dr. Blank is a Senior Member of the IEEE and the IEEE-USA Vice President, Member Activities.

Place: Westinghouse Energy Center, Monroeville
Date: October 2nd
Registration: 8:30 AM
Program: 9:00 AM to 4:00 PM (lunch will be provided)

For more information or to register, contact Dr. Kal Sen at (724) 696-1611 or senkk@ieee.org by September 15th. The program fee is \$100 for IEEE members and \$125 for non-members.

Please make registration checks payable to "IEEE Pittsburgh Section" and mail them to:

Dr. Kal Sen
126 Pauline Dr.
Monroeville, PA 15146.

Directions: For directions, please refer to the article on the 1st page of The Bulletin.



Simulation for Power Electronics: An Update

Thomas E. McDermott, Ph.D., P.E.

Ansoft Corporation



The design and application of power electronic systems practically requires computer simulation. For high-speed digital circuits, control systems, or electric utility systems, there are obvious choices for the simulation tool. The choice is not so obvious for power electronic systems, and the device models are also not as well developed. This presentation will cover the unique modeling requirements for power electronics, and the current limitations. The pros and cons of several candidate techniques will be discussed:

- The SPICE family
- The EMTP/ATP family
- Simulink and the Power System Blockset
- The VHDL/AMS family
- Custom-purpose (Saber, SIMPLORER)

In the second half of the presentation, a motor model and a semiconductor device model will be illustrated using the IEEE Std. 1076.1-1999, "VHDL Analog and Mixed-Signal Extensions". Attendees will have access to a free VHDL-AMS simulator to run the examples.

Mr. McDermott is a senior R&D engineer with Ansoft, currently working on the SIMPLORER product. He has a M. Eng. Degree from Rensselaer (1981) and a Ph. D. from Virginia Tech (1998). He has over 20 years experience with consulting, simulation, and custom software development in electric utility and power electronic systems. He is a past chairman of the Pittsburgh Section and PES Chapter, past secretary of the IEEE/PES Distribution System Analysis Subcommittee, and past chairman of the IEEE/PES Working Group on Estimating the Lightning Performance of Transmission Lines. In the fall of 2001, Tom presented a tutorial on "Power Electronics Simulation with SPICE" for the Pittsburgh Section. This presentation will be an update of the 2001 tutorial.

Place:	Westinghouse Energy Center, Monroeville
Date:	October 6 th
Social:	6:30 PM
Program:	7:00 PM

This meeting will be of particular interest to the members who belong to the PES and IAS societies. For more information or to register, contact Charles Urso at (412) 338-4871 or curso@llitechnologies.com by September 30th.

Directions: For directions, please refer to the article on the 1st page of The Bulletin.

SC2004 – High Performance Computing Networking and Storage Conference

SC2004, the world's leading conference on high performance computing, networking and storage, will be held in the brand new David L. Lawrence Convention Center in Pittsburgh from November 6-12. The SC2004 conference will bring representatives from many technical communities together to exchange ideas, celebrate past successes and plan for the future. To reflect this important function, the conference theme is Bridging Communities. This represents not only the technical communities participating in the conference but the architecture of the city, too. State-of-the-art technology will be utilized in the conference's high-performance network, SCinet, and in the Access Grid to bring participants from around the world to Pittsburgh. At the convention center itself, the Technical Program, Education Program, and Minority Serving Institutions Program will all create bridges to new communities.

The conference Technical Program will continue the tradition of providing high quality, peer reviewed papers in research and application areas of high performance computing, networking and storage. Papers are being presented from all communities including industry, DoD, federal agencies, and universities. The Technical Program will be the highlight of the conference. A total of 23 tutorials ranging from introductory to advanced concepts will be available. Additionally, there will be industry exhibits showcasing the latest technology available now that will be on the desktop in just a few more years, and research exhibits showcasing what's new in the university, federal government and not-for-profit sectors. The Exhibits provide the time and the place for real information exchange and can lead to new partnerships and ideas!

More details about the conference and information on how to register can be found at the conference website www.sc-conference.org/sc2004. An early registration discount is offered for registrants who complete and submit their application by October 8th.

Place:	David L. Lawrence Convention Center Pittsburgh PA
Date:	November 6 th - 12 th

