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EMC

IEEE EMC Society Newsletter

INSIDE:

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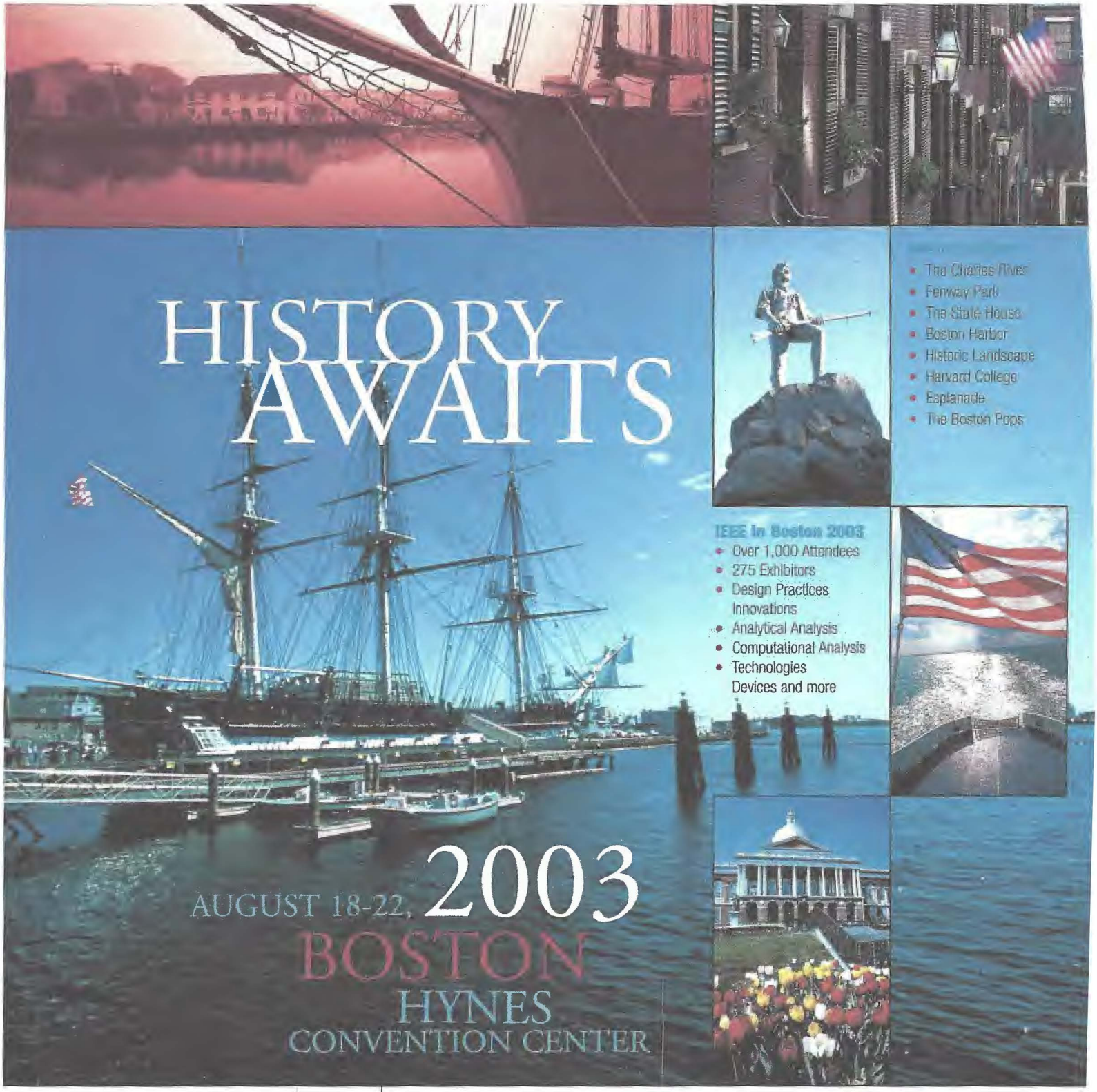

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Letter from the Editor

Photo by Dick Ford

Janet O'Neil, EMC Newsletter Editor, receives the Honorary Life Member award from EMCS President Todd Hubing during the IEEE EMC Symposium in Minneapolis.

Janet O'Neil
Editor, EMC Society Newsletter

Welcome to the Fall 2002 issue of the EMC Society Newsletter! As you will see, this issue is full of material about the 2002 IEEE International Symposium on EMC in Minneapolis. You can tell from the cover photo collage that this was quite a unique symposium. And it wasn't just the log rolling and lumberjack entertainment that made it unique. Rather, it was a combination of a wonderful city, friendly people, an attractive convention center environment, and an incredibly energetic and positive symposium steering committee, to name just a few things. Dan Hoolihan, of Hoolihan EMC Consulting, was the Chairman of this fine event. He and his committee deserve our thanks for their volunteer efforts in putting on a most memorable symposium.

This was a very special symposium for me in that I received the EMC Society's Honorary Life Member Award. The standing ovation I received from those in attendance at the Awards Luncheon was very humbling. I've always considered it an honor to work with the many fine EMC engineers in our community; I never expected to be recognized with such an incredible award. It felt like the Academy Awards, except I didn't have a prepared speech rolled up in my pocket. I said a few words at the podium, but I regret that I neglected to publicly thank those who have inspired and guided me throughout my career in EMC, including Clayton Paul, Joe Butler, Dan Hoolihan, Bill Curran Sr., and last, but not least, Len Carlson. I also did not recognize my employers over the years, LectroMagnetics, Lindgren RF Enclosures, and now ETS-Lindgren for supporting my volunteer work for the IEEE and the EMC Society. This generous company support certainly has enabled me to do the work I have over the years. Finally, I also have to acknowledge my father, the late Fred Nichols, who got me involved in EMC and the IEEE in the first place when I started working for his company, LectroMagnetics, as a summer job just after college. It's been one long summer! Seriously though, I had to recognize these positive influences in my career that enabled me to receive this award.

It was also a special symposium for me in that I got to try a new sport: logrolling! I was cornered into being a "volunteer" to try this sport during the symposium gala event. Actually, it was quite fun, but the water was very cold! I thought I did a pretty good job, but there were no phone calls from David Letterman, Katie Couric or Oprah to appear on their

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President's Message

Todd Hubing, President, EMC Society

A rather wet and cold EMC Newsletter Editor and EMC President following a try at logrolling in Minneapolis.

I am pleased to report that the Minneapolis Symposium was a huge success. The feedback that I've received suggests that the technical program was one of the best ever. The hardware and software demonstrations were interesting and well organized and the exhibition hall was bustling. For one week in August, Minneapolis was THE place to be if you were an EMC engineer.

Next August, THE place to be will be the IEEE EMC Symposium in Boston. Boston is one of my favorite cities in the world to visit. Preparations are well underway and Jon Curtis has assured me that at no point during the entertainment does the President get drenched in cold water. It should be another great symposium.

There will be three new faces on the Board of Directors starting in 2003. Bruce Archambeault, Nigel Carter and Mike Hatfield were recently elected by the membership to serve a 3-year term. Also elected were three familiar faces; Dan Hoolihan, Jose Perini and Andrew Podgorski. I am looking forward to working with all of the new (and old) board members during the coming year.

Did you vote for your representative on the board? This year, there were 12 excellent candidates for 6 open positions. Although only 20% of the membership participated, approximately 4,000 votes were cast (up to 6 votes per member). One candidate missed being elected by 1 vote. Two others were within 6 votes of being elected. In the IEEE EMC Society, your vote does count!

If your candidate didn't get elected, you can still make your voice heard. Is there something we're doing that you think should be done differently? Is there something we're not doing that we should be? Let any member of the board know about it. Ask them to bring up your issue at the next meeting. Better yet, come to the next board meeting yourself. All meetings are open and guests are always welcome.

I had the fortunate opportunity to attend the EMC Europe 2002 Symposium that was held in Sorrento, Italy this past September. What a beautiful venue for an EMC symposium! Of course, Italy is well known for its history, fashion, wine, opera, beauty, romance and EMC research. So it's no surprise that a symposium in Sorrento would be well attended and enjoyable. Nevertheless, Mauro Feliziani and his committee should be commended for organizing such an outstanding event.

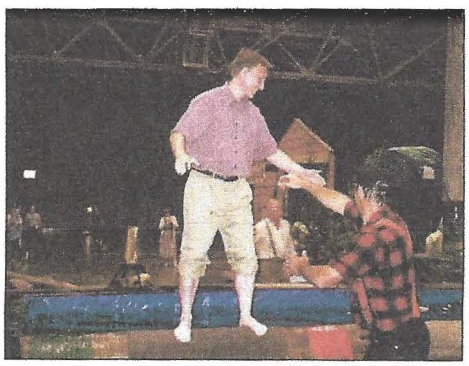
In 2004, EMC Europe will move to Eindhoven in the Netherlands. On or about that time, the EMC Europe, EMC Zurich and EMC Wroclaw symposia will combine their efforts to sponsor one annual European EMC Symposium. Although the details are still being worked out, it appears that the new symposia will combine many of the best features of each of its sponsoring organizations. This is good news for EMC engineers in Europe who have had to choose between competing symposia in the past. It is also good news for those of us who are always looking for another excuse to visit Europe.

Finally, I want to be sure to update everyone on the changes taking place in IEEE. As you may be aware, the past year's economic downturn had a significant impact on IEEE operations. In order to remain financially viable, IEEE has had to re-evaluate every aspect of its operation. In my opinion, this has been one of the best things to ever happen at IEEE headquarters. Although some difficult choices have had to be made, IEEE and its member societies are taking a much closer look at all their products and services. There is a renewed emphasis on mission versus cost and effort.

Many societies, including the EMC Society, actually lose money with every new member they recruit. At the direction of the IEEE Technical Activities Board meeting, this is a practice that will soon change. In the coming years, we are likely to see society membership fees increase slightly. However, we will also have more options as members. For example, members who don't want to receive printed copies of the Transactions probably won't have to pay for them in the near future. Some of the less tangible member benefits will disappear, while the more popular benefits with the greatest impact on our membership will be enhanced.

With all of our operations under review and subject to change, this is a great time to become more involved in society activities. The mission of our Society is to serve the EMC profession. If you have ideas for ways that we could better fulfill this mission; or better yet, if you would like to be more actively involved in this effort, we'd like to hear from you. **EMC**

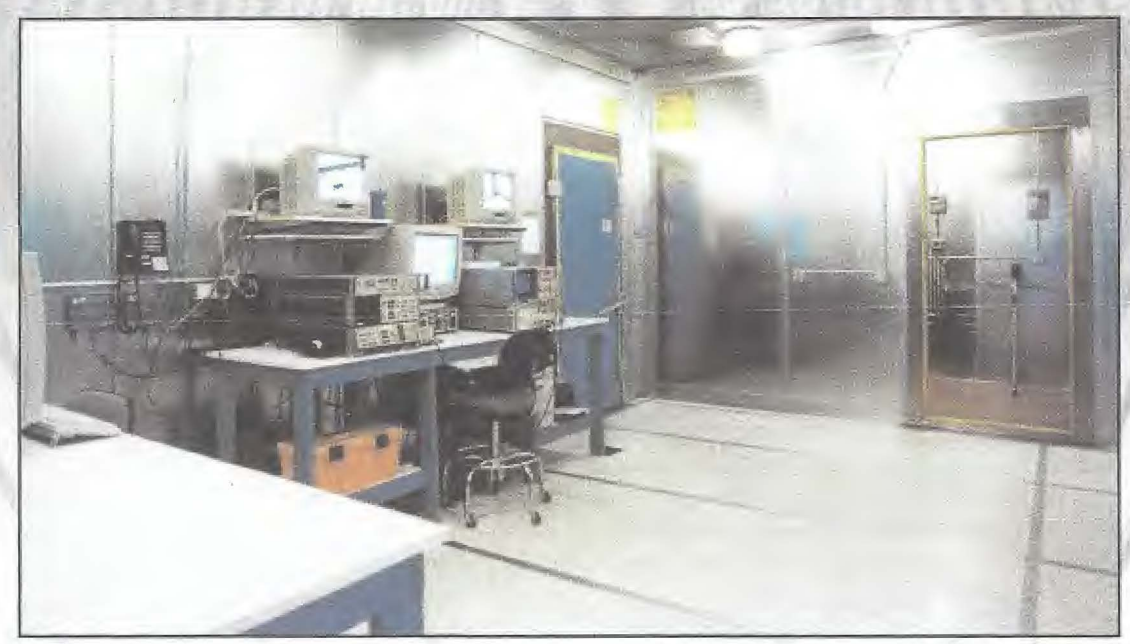
I'm glad it's her and NOT me!



This is easier than it looks. Just relax!

Wow, I guess rolling up my pants legs won't help me now!

All photos by Shmuel Auster



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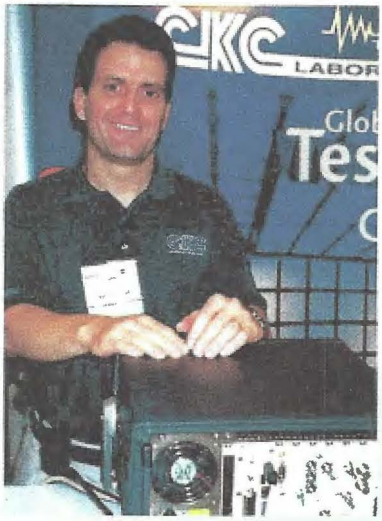

Photo by Janet O'Neil

Chapter Chatter

Todd Robinson, Associate Editor

During the Minneapolis symposium, Todd Robinson manned his company's booth and demonstrated EMC test and measurement software.

Thanks to Steve Jensen of Steve Jensen Consultants, Inc. for sharing this memorable EMC story with Chapter Chatter.

Could you please turn the volume down at night?

According to Steve, this story originates as a result of his late father's (Bob Jensen) association with the radio station KMPC in the San Fernando Valley (710 on your AM dial, 50 kW). In the early 1970's, Bob Jensen received a call from the chief engineer at the station, a fellow by the name of McKenzie (Mac). The station had been receiving phone calls from an elderly lady whose house was adjacent to the field where the KMPC three-tower antenna array was located. Her request was simple. She asked KMPC to "turn the volume down" on the station, as it was keeping her awake at night. The calls were eventually received by "Mac" and he initially suggested that she turn her radio off. She explained that "Mac" didn't understand her problem. "I don't own a radio.... my late husband didn't like radios so we didn't own one."

Mac from KMPC paid a visit to her house and sure enough he could hear the sounds of "Wink Martendale" (the KMPC morning man at the time) emanating from the house as he drove up the driveway. The broadcast became even louder when she opened the front door. However, she refused to let him in the house to investigate the problem. After Mac's first visit, the lady's calls continued. This is when Mac called Bob Jensen for some help. Because Bob's health was failing at the time, he deferred the task to Steve. Mac and Steve arranged another appointment with the elderly lady. Upon their arrival at her house, Steve too heard the music of KMPC clearly coming from the house. This time, the lady let the 'investigators' into the house. Steve says that he couldn't help but ask her if she was pulling their leg. She really had a radio somewhere, perhaps in the attic, right? She insisted she did not have a radio. Steve then took a water glass and proceeded to hold it up to the various walls inside the house and determined that the *outside* bearing walls were vibrating with the sounds and melodies of KMPC, 710 on your AM dial.

Steve and Mac conferred and continued their investigation – outside. Walking around the old house, Steve found the clue he was looking for. Near ground level, the stucco had broken off, exposing chicken wire that had held the stucco to the wall. Of course, the exposed chicken wire was very corroded. As he was surveying what he saw, Steve recalled stories about the "rusty bolt theory," having mostly to do with shipboard EMI problems due to salt-water corrosion. Steve then said to Mac, "I think the old, corroded chicken wire in this genuine lath and plaster house is rectifying KMPC, yielding baseband audio currents flowing in the chicken wire." Mac replied, "OK but how does that make the walls vibrate?" Steve reminded Mac that we were all standing in a DC magnetic field associated with the planet we live on. Steve pressed on with the idea that the lady's house constituted a loudspeaker of sorts.

Although Mac looked at Steve like he was drinking varnish, all he could say was, "Well, what can we do?" Steve proposed grounding the chicken wire to an exposed water faucet on one side of the house and zapping the chicken wire on the other side of the house with a "suicide cord" connected to 115 VAC. (Note: "Suicide cords" were commonly used at that time and earlier to defeat interlocks on TV sets for servicing.) The theory was that they would "blow the rectifying junctions in the chicken wire clear" by hitting them with large currents. They did this and on the second "ZOT" the lady came running out of the house exclaiming: "It stopped! Thank you! I sure was getting tired of hearing that station!"

Central New England (Boston)

A Chapter meeting was held on Wednesday September 11, 2002 with 24 members and guests attending. The speaker was Douglas C. Smith, independent consultant. His presentation covered the topic "Unusual Sources of Power Supply Noise." According to Mr. Smith's presentation, the source of EMI noise is often very sporadic and occurs only as a glitch once every 30 minutes. The speaker described some war stories on elusive power supply glitches. Outside of great technical content, Doug believes that all presentations should have some entertainment value and this was evident with the war stories and demonstrations used throughout. On September 25, 40 members and guests enjoyed the annual joint meeting with the Northeast Product Safety Society (NPSS). The speaker was Russell Bechard, Principal Staff Engineer, Motorola Regulatory Services. The topic covered was "Validation of an Open Area Test Site (OATS) in the Frequency Range 1GHz – 18GHz". The CISPR A committee has developed "CISPR A/342/CD" which details the methodology for performing Normalized Site Attenuation (NSA) in the frequency band 1GHz to 18 GHz for site verification. This procedure will support the upcoming CISPR requirements for emission testing in this same band. The 3-meter test setup used at

Motorola Test Lab Services was shown along with the specific equipment and cabling, which formed the complete test loop. Technical issues discovered during the course of the testing and their resolutions were discussed. Additional experimentation with the test setup to better understand the net effect of the various components was also presented. Results of the testing were presented. The potential cost and test methodology impact (CISPR 22 vs. ANSI C63.4) to the current standard OATS were also described.

IEEE students and Dr. Sabath (6th from left) in Germany's largest stripline at the German Armed Forces Laboratories, Munster.

Germany

The EMP Fellows Committee of the Summa Foundation elected Professor Heyno Garbe, Chairman of the IEEE German EMC Chapter, to the grade of Fellow for his contributions to the analysis of TEM waveguides. The German EMC Chapter is also successfully continuing its student activities program. In cooperation with manufacturers, institutes, and IEEE Student Branches, field trips were organized. During one such event, students were invited to join an exciting presentation on the generation and measurement of transient electromagnetic fields given by Dr. Sabath of the Armed Forces Scientific Institute for Protection Technologies. Many students also took part in a day excursion to the Armed Forces Laboratories, co-organized by Markus Heidemann, Chairman of IEEE Student Branch Hannover. Fascinating experiments using stripline or impulse radiating antennas were well presented. The outdoor test facilities for huge test devices were of special interest. The students got a look inside a Marx Generator (without oil of course) and saw Germany's largest stripline and horizontal field generator. Dr. Sabath also gave his lectures on location at the University of Hannover and Magdeburg. Due to the success of this lecture, the German EMC Chapter will continue this series.

Professor Heyno Garbe, Chair of the German EMC Chapter, received the EMP Fellow Certificate from the Summa Foundation.

Israel

The Israel EMC Chapter, in cooperation with ILTAM (Israeli Users Association in the Electronics Industry), invited Dr. Anatoly Tsaliovich from the United States. Dr. Tsaliovich presented a seminar entitled "Advanced EMC Design Techniques For High Speed Electronics." Three other presentations were also given. First, Dr. Alexander Axelrod presented, "EMI Effects Due to Unbalance in Signal and Power Ports." Next, Mr. Elya Joffe spoke about, "The Principles of Path of Least Inductance in Circuit and Grounding Design." Lastly, Mr. Oren Hartal presented "Magnetic Shielding Power Plants for Large Facilities." About 80 engineers attended the two-day seminar. The feedback was simply great!

Korea

Professor Dong Il Kim (Korea Maritime University), Chairman, reports that the Korea EMC Chapter hosted the "2002 Spring Conference on Microwave/Radio" at Honam University on September 14, 2002. The papers presented at the conference covered various aspects of the electromagnetic field including active/passive circuits and components, EMI/EMC, antenna, scattering, etc. A total of 104 papers were presented. Some 250 participants attended this conference, which was coordinated by the Korea Electromagnetic Engineering Society (KEES) and the IEEE AP/MTT Korea Chapter. In addition, the Korea Chapter is making plans to hold the "EM Field and Bio-Effects" conference on Oct. 17-18, 2002 and the "EMC KOREA 2002" on Oct. 29-30, 2002 at the Seoul Education Center. The Korea Electromagnetic Engineering Society (KEES) will also coordinate this event.

Nanjing

On June 21, the Nanjing Chapter hosted a meeting attended by 20 members and guests. Dr. Xi-Dong Wu of the University of Toronto gave a presentation entitled "Integrated Dielectric Lens Antenna with Application to MMV Communication and Collision Avoidance Radar." Then, on September 25, Professor Theodore Van Duzer (DL) of the University of California at Berkeley gave an excellent presentation on the "Applications of Unique Superconductor Quantum Phenomena in Electronics." Nearly 50 guests and members were on hand for his very well received presentation. Five days later, Professor Van Duzer gave another presentation to the chapter

Orange County EMC Chapter members enjoy catching up with each other during their first Fall meeting.

entitled, "Research in Superconductor Electronics and UC Berkeley." Another large group enjoyed this presentation.

Orange County

On September 10, 2002 the Orange County Chapter met at Dave and Busters restaurant in Irvine. Greg Kiemel, the Director of Engineering at Northwest EMC, was the speaker for the meeting. Mr. Kiemel provided an overview of the wireless product approval process for EMC in the United States and in Europe. The new FCC authorization process through TCBs was discussed as well as how the R&TTE Directive is implemented in the European Union. The meeting was very informative and provided insight in how the TCBs, acting on the authority of the FCC, are able to provide customers with speedy certification of their wireless products. The European wireless certification process contrasted the US process in that certification isn't needed when the standard and frequencies are harmonized. There was an excellent turnout of over 25 people to enjoy the presentation and dinner.

Oregon and SW Washington

On May 22nd, a new slate of officers was elected by the chapter. The incoming and outgoing officers met for a "transition" meeting/picnic in July. The new officers are: Derick Skouby - Chair, David Britton - Vice Chair, Bill Owsley - Treasurer, Camille Good – Secretary, Chuck Britten - Communications Director, and Varuzhan Kocharyan - Membership Director. On September 25th, Dr. Clifford Skouby spoke to the chapter on "Lightning and its Effects on Aircraft". There were many interesting slides depicting the interaction between aircraft and lightning. The crowd of 31 chapter members and guests thoroughly enjoyed the presentation. Coming up: On October 23rd the chapter will host Greg Kiemel of NW EMC speaking on "The EMC Authorization of Wireless Devices in the USA and EU." The chapter will hold a holiday social event for all chapter and affinity group members in December. The schedule for the chapter can be found at: http://www.worldaccess-net. com/~emc/ For reference, the chapter maintains a Product Safety Technical Committee (PSTC) affinity group. The PSTC officers are: Henry Benitez - Chair, Lisa Brown (ITS) - Vice Chair, Randy Mayorga – Secretary, Art Henderson – Treasurer, Ali Elmi – Communications and Wendy Blanton – Membership. The PSTC had an excellent turnout on September 16 for a presentation on "New China Product Regulations" given by Thomas Smith from Underwriters Laboratories. On October 23, a one-day "Designing for Product Safety" Workshop and Exhibition will be held. On November 18 there will be a presentation on "Intrinsic Safety - Hazardous Location Considerations". They will also hold a holiday social event in December. The Portland area EMC Chapter is active and committed to providing activities for its membership each month.

Greg Kiemel, Dean Ghizzone and Jerry Page of Northwest EMC at the Orange County EMC Chapter meeting in September.

Rocky Mountain

Colorado MEDtech in Boulder hosted the July meeting of the Rocky Mountain Chapter. A small turnout of members and guests were able to forgo a beautiful Colorado summer evening to eat pizza provided by CMED and listen to a lively, interactive presentation by Doug Smith on "Computer Security for the Individual." Doug opened by posing the question: "What is the worst thing that can happen to your computer?" He suggested that it might be much worse than just losing your files or having them posted on the Internet for all to see. This talk covered some of the things that can happen and how to avoid them. Screen shots from an attack on Doug's own computer were shown. The manufacturer of Doug's laptop leaves it wide open to hackers to provide remote diagnosis access. During a recent trip, that weakness was proved multiple times per hour over a dialup by hackers! Doug provided links to websites that can help individual users analyze secu-

It's a line up of the Oregon and Southwest Washington EMC Chapter Officers, including, from left, Varuzhan Kocharyan of Northwest EMC, Camille Good of Veris Industries, David Britton of Hewlett Packard, Chuck Britten of JJ Associates, Derick Skouby of Hewlett Packard, and Bill Owsley of Underwriters Laboratories.

The speaker, Dr. Clifford Skouby (left), with the Oregon and Southwest Washington EMC Chapter Chair, Derick Skouby, who happen to be father and son in EMC, at the September chapter meeting.

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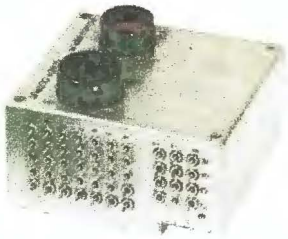

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rity problems with their system and provide appropriate protective measures. A real time demonstration showed several potential weaknesses in a computer with Internet access. Further information is available on Doug Smith's Web Site http://emcesd.com/ and the Rocky Mountain Chapter Website http://www.ieee.org/rmcemc/. Another meeting was held on September 17th, starting with a great social hour at the Louisville Outback Steakhouse. War stories were swapped and new acquaintances were made. The chapter then proceeded to a most entertaining and informative meeting with Daryl Gerke of Kimmel Gerke Associates. During his presentation, Daryl went where most engineers fear to tread and unveiled the "Mysteries of Grounding". In the very beginning his talk, Daryl pointed out what we knew all along but only whispered in dark corners; grounding is like a sewer system and much of EMC engineering is really sewer work! The sewer analogy actually worked very well as Daryl probed the eternal question of what a ground actually is and pointed out that used current, like used water, still wants to flow somewhere. Daryl did save the best for last, "To really excel as an EMC engineer, when presented with a problem, look studious, stroke your chin and say: It must be a *grounding* problem!" The chapter is currently setting up the next meeting and is in the planning stages for a one-day colloquium and exhibition in the Spring of 2003.

Rocky Mountain EMC Chapter attendees eagerly awaiting Daryl Gerke's "sewer talk".

(From left) Chas Grasso of EchoStar (Rocky Mountain EMC Chapter Vice-chairman) and Bob Reinert of StorageTek (Chapter Chair) welcome Daryl Gerke to Colorado and the Rocky Mountain Chapter.

Santa Clara Valley

Darryl Ray reports that the Santa Clara Valley chapter has been quite busy in 2002. During the first half of 2002, meeting attendance was at an all time high! The January 2002 turnout was the highest of the year when 127 attendees came to hear Stephan Resu of Intel give his talk on "Trends and Challenges in VLSI Technology Scaling Towards 100nm". The chapter took June through August off: a well-deserved summer recess. However, the chapter officers kept active. In August, the chapter donated $1,000 to the IEEE Scholarship fund. Meetings resumed in September with the traditional, annual chapter social held at SGI in Mountain View, California. The 39 attendees enjoyed food and drinks. Lively discussions took place on topics ranging from the latest PCB EMC mitigation techniques to reviews of several EMC related books currently in publication. The Santa Clara Valley Chapter will be hosting the 2004 IEEE International Symposium on EMC at the Santa Clara Convention Center. John Howard has accepted the position of Symposium Chair and an enthusiastic committee with a "raring to go" attitude has been formed. The committee looks forward to seeing everyone in Santa Clara in 2004.

Several past Chairmen of the Santa Clara Valley EMC Chapter gathered at a recent chapter meeting. Viewed from left to right are Geoff Day, Jeff Evans, Ken Renda, Hans Mellberg, Al Woldow, Tom Cokenias (current chair), John Howard, Jim Duckett, Darryl Ray, and Mike Heckrotte.

Seattle

"Lightning and its Interaction with Aircraft" was the title of the presentation by Clifford D. Skouby, PhD at the September 24, 2002 meeting of the Seattle EMC Chapter. Janet O'Neil, Seattle EMC Chapter Chair, welcomed the 36 chapter members and guests to the meeting held at CKC Labs in Redmond. The topic of course drew several attendees from Boeing, based in Seattle, as well as several students from De Vry University. With great photos, Dr. Skouby presented a review of the basic mechanisms of lightning generation including the various phases of lightning strikes, the currents and fields produced, and types of lightning interactions of concern to mankind. Consideration of the effects of lightning interactions with aircraft, including various forms of direct strike, and the consequences of

Photo by Mark Chase

Ed Blankenship, immediate past Chairman of the Oregon and SW Washington Chapter (far right), shares EMC tales with De Vry University students before the Seattle Chapter meeting.

Photo by Mark Chase

The Seattle EMC Chapter September meeting speaker, Dr. Cliff Skouby with his son Derick, the Oregon and SW Washington Chapter chairman. Derick revealed that it was not until after Derick had earned his Masters degree at the University of Missouri at Rolla that he found out about his father's work in the field of EMC. His father helped shape his career by telling Derick to stay out of EMC.

nearby lightning were discussed. The presentation focused on the mechanisms by which lightning can cause damage to aircraft and how protection can be achieved. It was a very lively and interactive presentation with numerous questions and answers throughout. Clifford D. Skouby received his B.S., M.S. and Ph.D. degrees, all in Electrical Engineering, from the University of Missouri at Rolla. (Nice pedigree in EMC!) Early in his career, Dr. Skouby worked for The Boeing Company and McDonnell Douglas Corporation, in St. Louis, Missouri. He was an analyst and technical consultant assigned to the F/A-18 in the area of Low Observable (LO) antennas and apertures in the design of a stealth version of the F/A-18. Since 1982 to the present, Dr. Skouby has been an Adjunct Professor of Electrical Engineering at Graduate Extension at the University of Missouri at St. Louis (UMSL) campus. Wonder if he ever gets over to see the EMC folks at the University of Missouri at Rolla! The Seattle EMC Chapter would like to thank its "sister" chapter, Oregon and Southwest Washington, for sharing this wonderful speaker for its September meeting. These two chapters are working together to share speakers at their respective meetings for the 2002/2003 program year.

Singapore

The Singapore Chapter had a full house meeting on May 14th with 67 participants! The meeting was hosted by the Rohde & Schwarz Support Center Asia. The Chapter Chair, Associate Professor Kye-Yak See of Nanyang Technological University, spoke on radiation from digital circuits through the printed circuit board. The meeting was held in the evening and started with the participants getting to know each other amidst coffee and refreshments generously provided by the host. Another meeting was held July 15th on the premises of the Institute of High Performance Computing (IHPC), and was attended by 64 members and guests. The speaker was Professor Christos Christopoulos of the University of Nottingham, United Kingdom. Professor Christopoulos was in Singapore for a month as an OAP (Overseas Attachment Program) Fellow, sponsored by the Agency for Science, Technology and Research. He spoke about the progress and challenges involving EMC modeling and simulation. On September 3rd, the chapter meeting was hosted by PSB Corporation. The Telecom & EMC group of PSB Corporation is the largest EMC test service provider in Singapore. 100 participants attended the full-house meet-

The Singapore EMC Chapter meeting in May featured (from left) Boon-Huat Lim, Managing Director of Rohde & Schwarz Support Center Asia, Associate Professor Kye-Yak See, Chapter Chair, Wee-Sing Chow of CET Technologies, Chapter Treasurer, Elya B Joffe from the Board of Directors of the EMC Society, Robert Tan of Delphi Automotive Systems, Tim Foo of Ngee Ann Polytechnic, Chapter Secretary, Buck-Chew Ng, Chapter Committee Member, Yajun Wang of DSO National Lab and Y S Ng of Infotel.

A full house eagerly awaits Associate Professor See's presentation to the Singapore EMC Chapter in May.

100 participants packed the house while paying attention to Mark Montrose's presentation at the September Singapore EMC Chapter meeting.

Several prominent members of the EMC community attended the Singapore EMC Chapter meeting in September, including front row (from left): Robert Tan of Delphi Automotive Systems, Tim Foo of Ngee Ann Polytechnic (Chapter Secretary), Mark Montrose, Dr ErPing Li of IHPC (Chapter Vice Chair), Wee-Sing Chow of CET Technologies (Chapter Treasurer), Weng-Hoe Chong of PSB. Back row (from left): Associate Professor Kye-Yak See (Chapter Chair), Collin Gan of PSB and N Somou Suresh of PSB.

The Winning Alliance: Rhode Warriors, Spartans and the Southern Maryland RoboBees.

ing! Owing to the unexpected demand, 15 'would be' participants from 7 companies had to be turned away. Mark Montrose, a member of the EMCS Board of Directors, spoke on two topics. The first was on the concerns about signal integrity on printed circuit boards. The second topic was about the analysis on the effectiveness of the 20-H rule. It was a very lively meeting with Mark constantly challenging the audience with thought provoking ideas and scenarios. The participants had an enjoyable time and mingled freely with each other, catching up on the latest industry developments during the coffee break. The Singapore chapter would like to thank the Rohde & Schwarz Support Center Asia, Institute of High Performance Computing, and PSB Corporation for their generosity in hosting the meetings.

Southern Maryland

Fred Heather, Chairman of the Southern Maryland Joint Chapter of the Communications, Computer and EMC Societies, submitted the following report. He would like to announce a big win by the engineering students from the Dr. James A. Forrest, Career & Technology Center, in Leonardtown, Maryland! In the winter of 2001, the Southern Maryland Chapter of the Communications, Computer and EMC Societies and the IEEE Washington Section joined with other technical groups to sponsor the students' participation in the F.I.R.S.T. Robotic Competition. The sponsorship was in the form of financial aid and engineering mentoring. The student team, with the support of their mentors, applied the 'system engineering development process' to the creation of their award winning F.I.R.S.T. robot. Over the Labor Day weekend, our team of students, engineers and Mr. David Buddenbohn (instructor) participated in and won an open F.I.R.S.T. Robotics Tournament held at the Maryland State Fair, in Timonium, Maryland. The NASA Goddard Space Flight Center and the Maryland State Fair Commission sponsored the open tournament. The tournament was a three-day event with 23 teams entering from as far away as Boston, Massachusetts. The tournament game was based on the 2002 F.I.R.S.T. Robotics Competition, "Zone Zeal," where teams competing must strategically score points against other teams in a field of play by controlling soccer balls and scoring goals. Teams are allied with randomly picked robot partners for the initial rounds of action. Each alliance partnership is in battle with another alliance partnership. After the initial rounds of action, the teams are seeded for the finals of the tournament. The top eight seeded teams choose two allied partners to compete in the final rounds. At the end of the initial rounds of action, our team, #836 RoboBees, was in 13th place. In the final rounds of this tournament the number one seeded team, Team #121 Rhode Warriors, from Middletown Rhode

Island, chose our team and team #487, Spartans from Erdenheim, Pennsylvania to be their alliance partners in the final rounds of the tournament. In the final rounds, our alliance partnership conquered all! In the quarter final round, they won the first two matches in the best of three series. In the semifinal round, they won the first two matches in a best of three series and in the final round; they won the first two matches in a best of three series. Our alliance team dominated the finals. This event was not at all without its challenges. The weekend was rainy and damp which is not conducive to electronic equipment. The robot was seemingly continuously in need of repair between matches. However, the students persevered and conquered the adverse conditions. They are to be congratulated on their efforts and dedication. Winning this event has certainly given the team a boost to start the new robotics season. They will be traveling to one more open tournament in New Jersey, the Duel on the Delaware, in October. Then in January they start a new season of F.I.R.S.T. Robotics competition, with a new robot and a new game. The Chapter and Section plan to pitch in with engineering mentoring and support of the robotics team as they go forward into their second year of F.I.R.S.T. competition.

Score one for the F.I.R.S.T. Robot from the Dr. James A. Forrest Career & Technology Center! The Southern Maryland Chapter of the Communications, Computer and EMC Societies and the Washington IEEE Section joined with other technical groups to sponsor the students' participation in the F.I.R.S.T. Robotic Competition.

Toronto

The Toronto Chapter held a meeting on August 12th, 2002, which was hosted by the St. George Campus of the University of Toronto. The speaker for our meeting was one of the Distinguished Lecturers of the IEEE EMC Society, Dr. Maria Sabrina Sarto. Dr. Sarto is an Associate Professor at the Department of Electrical Engineering of the University of Rome "La Sapienza", Rome, Italy. Her presentation was composed of two related sections with the title of "EM Performances of Composite Materials and Metalized Plastics for Industrial Applications." The slides of her presentation are posted at: http://www.tor.ieee.ca/societies/electromag.htm This successful event was very well attended by many students and faculty members of the University of Toronto as well as by engineers from local industries. During her visit to Toronto, Dr. Sarto also had meetings with the professors of the Electromagnetics and Power Groups. She also attended the Lightning

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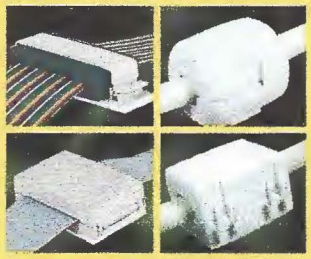

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Photo by Professor Konstantin Lukin

The NRTW'2002 participants before Crimean wine tasting tour.

Workshop Co-Chairman Professor Konstantin Lukin welcomes attendees to the First International Workshop on Noise Radar Technology (NRTW'2002) September 18-20 at the Yalta Hotel, Yalta, Crimea, Ukraine.

Research Group meeting, organized by Professor Janischewskyj (Power Group) on August 13th. As well, separate tours of the Laboratories of the Electromagnetics Group and Lightning Measurement facilities both at the University of Toronto and the Toronto CN Tower were arranged for her visit.

Twin Cities

Curt Sponberg, Chair of The Twin Cities EMC Chapter, happily reports that the 2002 IEEE International Symposium on EMC in Minneapolis was very well received. The chapter's thanks go out to all who attended, including the exhibitors and speakers. They would like to give special thanks to Vita Feuerstein and the IEEE Meeting Planning Services staff for a well-organized and efficient operation. The chapter officers are still debriefing (looking back a little) and catching up after many busy weeks. They wish the best of luck to next year's symposia planning committees!

Ukraine

The Kharkov Joint Chapter held two meetings last Spring and Summer focussing on current technical issues. These meetings were organized by the EMCS portion of the Joint Chapter. During the first meeting, on May 30, a paper entitled "Spatial Rejection of Partially Polarized Interference in Conditions Non-Identical Performances of Input Channels of Adaptive Compensators" was given by Dr. Phedor Ph. Mysik. Dr. Mysik is the research officer for the Kharkov Institute of Air Forces, Kharkov, Ukraine. The meeting was attended by 14 Chapter members and guests. During the second meeting, held June 5, Dr. Sergey I. Tatarchuk gave a paper entitled, "Perfection of Means of Telecommunication in Regional Management Ukrtelecom Co." Dr. Tatarchuk is the Director of the Regional Department of the Ukrtelecom Co., Kharkov, Ukraine. The June 5 meeting was attended by 18 Chapter members and guests. September 18-20, the first International Workshop on Noise Radar Technology (NRTW'2002) was held in Yalta Hotel, Crimea, Ukraine. It was organized by the Laboratory of Nonlinear Dynamics of Electronic Systems (LNDES) of the Institute for Radiophysics and Electronics, National Academy of Science of Ukraine (IRE NASU), Kharkov, Ukraine, and sponsored by the Office of Naval Research International Field Office (ONRIFO), the EMC Society of the Ukraine Section (Kharkov), the AP/C/EMC/SP Joint Chapter, the Science and Technology Center in Ukraine (STCU), and the Scientific Council of

President's Memorial Award Fund Donation

EMCS President, Todd Hubing (left), gratefully accepts a check from Kimball Williams in his role as Treasurer of the SE Michigan EMC Chapter. The chapter donated $1,000 USD to the President's Memorial Award. President Hubing hopes other EMC chapters will consider donating to this fund that is administered by the IEEE Foundation. The award depends upon charitable donations! It funds the travel expenses and registration fees for an exemplary EMC student to attend an annual IEEE EMC Symposium. All donations are tax-exempt. If you would like to donate to this fund, please contact Warren Kesselman, EMC Society Treasurer, phone 732-842-3207, e-mail: w.kesselman@ieee.org.

Photo by Janet O'Neil

NASU on Radio-Physics and Electronics. The Workshop was held in the Yalta Hotel, Yalta, Crimea. Yalta city is the center of the popular Black-Sea climatic resort known as "Greater Yalta" stretching for nearly 80 km along the Crimean littoral and comprising the well-known resort of the Crimea. From an historical point of view, Yalta was the summer residence of Russian Tsars. During the Second World War, an important meeting of the leaders of the USSR, USA and Great Britain took place there, known as the "Yalta Conference." Noise Radar Technology (NRT) has been under intensive development during the last 10 years in the Ukraine, USA, Russia, Italy, China and other countries. Noise Radar Technology provides excellent potential capabilities for unambiguous and simultaneous range and Doppler measurements with high resolution and accuracy. Noise Radar Systems have good 'low probability of intercept' (LPI) and electromagnetic compatibility (EMC) performance, which enables the design of cost-effective and affordable radar systems for various military and civil applications. The advantages of NRT have drawn the significant attention of radar engineers. This was the main reason for the great interest in the Workshop: it has drawn speakers and observers from 13 countries of America, Europe, and Asia, representing 43 papers. The NRTW'2002 scientific program included tutorials on the NRT, invited talks by worldwide known scientists in this field and original papers presented in the oral and poster sessions. The Round Table Discussion on the advantages, drawbacks and applications of NRT was also successful. Demonstration of laboratory models involving various Noise Radar components and systems developed in LNDES IRE NASU was provided. In the evening, all attendees enjoyed traditional Ukrainian cuisine at the reception and banquet. Several interesting tours also took place, including a trip to Sebastopol. The next Workshop/Conference on Noise Radar Technology will be September 2003, also in Yalta. The details will be available later on the NRTW web-site: http://www.NRTW-2002.com.ua For more information on the Workshop, please contact the Workshop Co-Chairman: Professor Konstantin Lukin, IRE NASU, 12 Academica Proskura Street, 61085 Kharkov, Ukraine. Telephone: +38 0572 448349, 448371, Fax: +38 0572 441105, e-mail: lukin@ire.kharkov.ua, http://www.ire.kharkov.ua **EMC**

Photo by Professor Konstantin Lukin

Many famous professors from many countries attended the NRTW'2002, including (from left) Fillipo Modestini (Italy/The Netherlands), Liu Guosui (P.R. China), Konstantin Lukin (Ukraine), Victor Chernyak (Russia), Hermann Robling (Germany), Ram Narayanan (USA), Gennadiy Churyumov (Ukraine), Yakov Shirman (Ukraine).

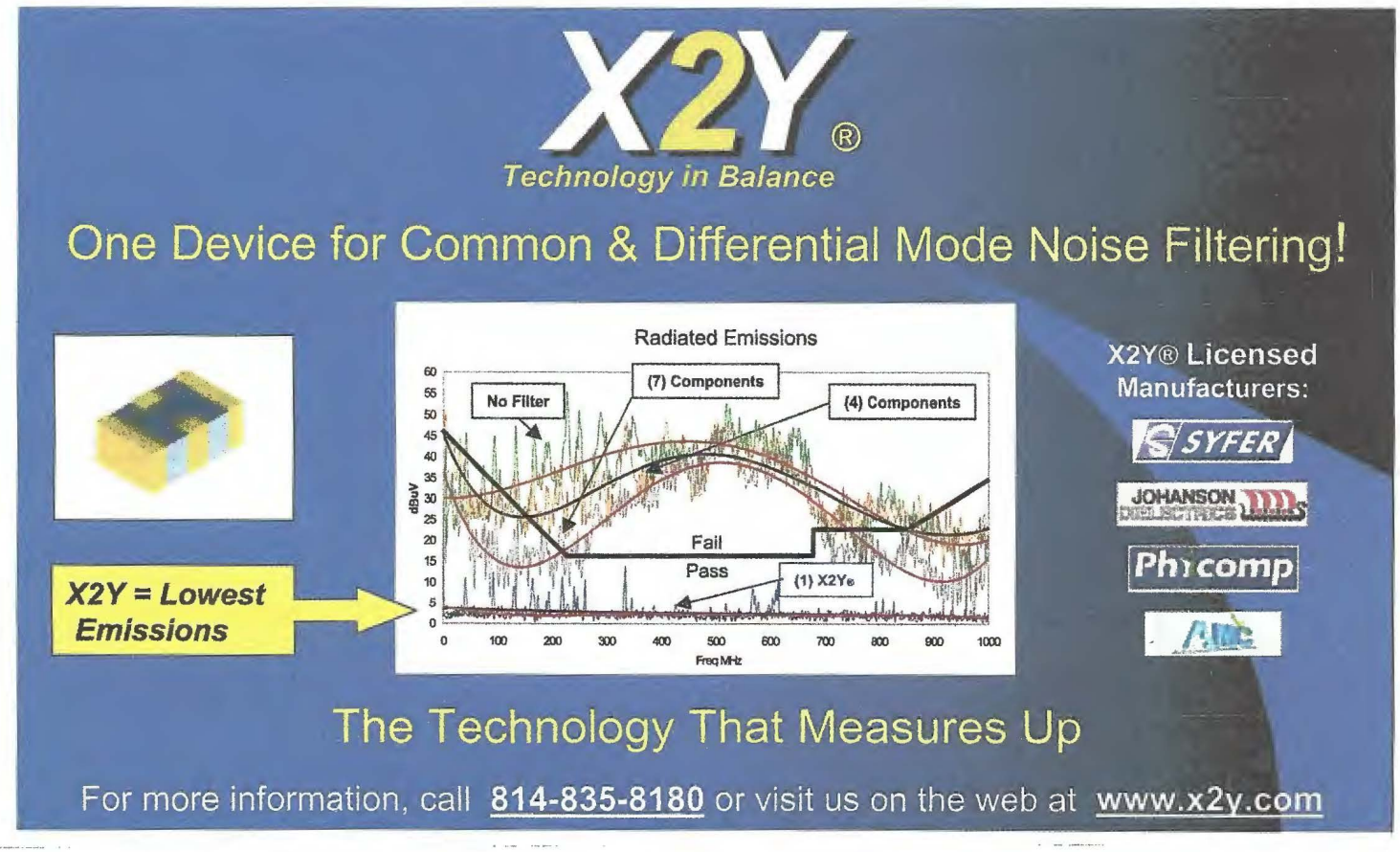

Photo by Janet O'Neil

EMC Personality Profile

Bill Duff, Associate Editor

Bill Duff visited the exhibit area during the symposium and perused some EMC product catalogs.

Introducing William Hurst

Bill Hurst was born and raised in Salt Lake City, Utah. He graduated from the University of Utah in 1978 with a Bachelor of Science Degree in Electrical Engineering. While at the University he joined the IEEE and has been an active member ever since. He is a registered Professional Engineer in the State of Utah.

Shortly after graduating from the University of Utah he went to work for Communication Certification Laboratory (CCL). His initial assignment was as a test engineer in the area of telecommunications. In the late 1970s the telecommunications industry was going through major regulatory changes. It was now possible for the customers to own their own terminal equipment. Bill was involved in the testing of terminal equipment and the development of test methods to demonstrate compliance with the newly created Part 68 of the Federal Communications Commission (FCC) Rules.

Bill is well known for his work in the area of Part 68. He has been involved in several industry associations and committees supporting the development terminal attachment standards and test methods. In the 1980's he was introduced to the field of EMC as a result of the FCC's "computing device" order. At first most of his work was in the area of EMC testing for telecommunications equipment. But his experience soon grew to cover a wide-range of product types.

He has given numerous presentations over the years and has enjoyed giving his time in teaching others. The first course he taught was in 1982 at George Washington University and the first paper he presented was in 1983 at the IEEE International Communications Conference. He is currently active in giving presentations throughout the world with regards to the conformity assessment system in the United States and the regulatory requirements of the FCC.

In 1980 he was made Vice President of CCL and was responsible for the technical management of the laboratory. As Vice President at CCL, he became involved in several industry groups concerned with telecommunications, EMC and laboratory accreditation. He served as Chairman of ACIL's EMC committee and EMC Laboratory Accreditation Working Group (ELAWG). He was very active in representing industry in the negotiation of Mutual Recognition Agreements in Europe, APEC and CITEL. He took a very active role in the development of the FCC's Telecommunication Certification Body (TCB) program and served as the first chairman of the TCB Council. As a result of his service to the laboratory community, he was presented with the ACIL Truesdail Award.

After 25 years of working in the private sector, Bill took a job with the Federal Communications Commission (FCC). His role has changed from representing industry before regulatory bodies to representing the FCC. In his position at the FCC he is working in the area of standards, accreditation and mutual recognition agreements. He is a member of the ANSI Accredited Standards Committee C63 (EMC), a technical expert for the International Special Committee on Radio Interference (CISPR) of the IEC Subcommittees A, B, F, H and I and he is a member of the ANSI Accreditation Committee concerning the accreditation of certification organizations.

William Hurst

In his spare time Bill is a volunteer with the Boy Scouts of America and it should be no surprise that his involvement with the BSA is in the area of standards, accreditation and training. He is a member of the BSA's National Health and Safety Committee. In recognition of his service, he has received the BSA's Silver Antelope Award. **EMC**

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http://www.emcs.org

Letter from the Editor

continued from page 3

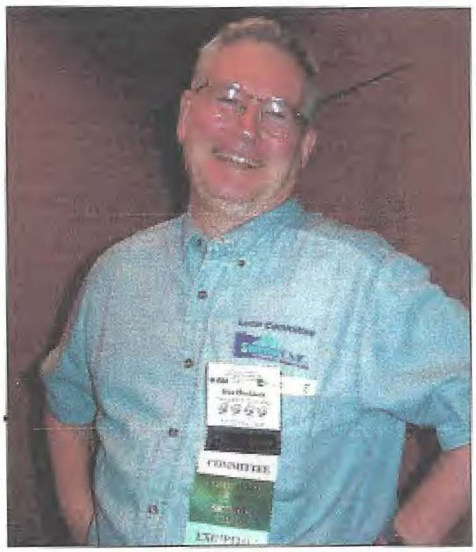

Photo by Dave Traver

Dan Hoolihan, Chairman of the steering committee for the 2002 IEEE International Symposium on EMC, makes it all look so easy....

respective talk shows. No big bucks book deal was offered from IEEE Press. I had a title ready to go, too: The Art of the Roll. (I was thinking of combining the logrolling with baking, you know, a cookbook and logrolling book would probably sell more copies than either type book alone, right?)

I'd certainly be in really great shape if I took up logrolling full time. Maybe the other "volunteer" would quit his job at UMR and do the logrolling show "circuit" with me!

On second thought, I guess I'll keep my day job.

Photo by Dave Traver

...That's because he knew he could count on his wife and two daughters to do all the work, along with the members of his steering committee, of course! Pictured from left are Claire, Rosemary and Bridget Hooliban.

Editor's Note: Many thanks to those who sent in photos of Minneapolis symposium activities for publication in the EMC Newsletter, including Dave Traver, Shmuel Auster, Vita Feuerstein, Bob Hofmann, Richard Georgerian, Jolene Murphy, and, of course, EMCS Photographer Dick Ford. **EMC**

CALL FOR PAPERS!

Next Meeting of the Reverberation Chamber, Anechoic Chamber, and OATS Users Scheduled for April 28-30, 2003

The next meeting of the Reverberation Chamber, Anechoic Chamber, and OATS Users will be April 28-30, 2003 at the historic Inter-Continental Stephen F. Austin Hotel located in the heart of downtown Austin, the live music capital of the world. The meeting sponsors include The Boeing Company, Underwriters Laboratories Inc., ETS-Lindgren and the Central Texas Chapter of the IEEE EMC Society. Papers are solicited which address reverberation chamber, anechoic chamber and OATS test methodology. Abstracts should be submitted via e-mail to Mike Hatfield at HatfieldMO@ NSWC.NAVY.MIL no later than February 28.

PROGRAM: This April meeting will begin on Monday afternoon, April 28 with optional, unique half-day hands-on workshops. Tuesday and Wednesday, April 29 and 30 will feature two full days of technical presentations. An awards banquet will be held on Tuesday evening where the best paper award will be presented. On Wednesday, the Central Texas EMC Chapter has organized a tabletop show in the area adjacent to the technical presentations. Vendors who specialize in EMC products and services will be on hand the entire day. Immediately following the presentations on Wednesday, the Central Texas EMC Chapter and vendors will host a farewell "Happy Hour" reception.

VENDOR TABLETOP DISPLAY SPACE: To reserve a tabletop display for April 30, please contact Mark Prchlik at 512-249-5255, mark.prchlik@bmiinc.com.

REGISTRATION: Registration fees are $250 by February 28, $275 by March 28 and $325 thereafter and at the door. Registration fees include admission to the workshops and all technical presentations, a copy of the meeting record, continental breakfast, lunch, and afternoon breaks on April 29 and 30, the gala awards banquet on April 29, and the reception on April 30. To register, contact Valarie Jones of Underwriters Laboratories Inc. at 847-664-3481 or e-mail at Valarie.A.Jones@us.ul.com. Register online at www.ul.com/oats. Hotel reservations may be made by calling the Inter-Continental Hotel directly at 512-457-8800. Call by the March 30 cut-off date and reference "2003 OATS Users Meeting" to obtain the group rate of $159 USD plus tax for single or double occupancy.

Book Review

By Brian Lawrence, Guest Associate Editor

ELECTROMAGNETIC ANECHOIC CHAMBERS – A Fundamental Design and Specification Guide

Author: Leland H. Hemming

A Wiley-IEEE Press Publication, June 2002, 236 pages

For more than 50 years, Electromagnetic Anechoic Chambers have been used to provide controlled and consistent environments in which to test and calibrate a wide variety of devices. The original Anechoic Chambers were used by military establishments to verify performance characteristics of radar antennas and to evaluate radar returns from military targets. These typical test applications prevailed through the early 1980's, during which time most Chambers were being used to evaluate intentional radiators, such as military and commercial antennas. Such Chambers were designed to each end user's specific requirements and chamber characteristics and performance verification methods were typically developed through collaborative efforts between the end user and the chamber supplier. In these instances both parties would have an understanding of the electromagnetic technologies involved and how the Anechoic Chamber could be expected to perform.

In the last 20 years, the Anechoic Chamber marketplace has changed and the emphasis today is more on verifying the Electromagnetic Compatibility of equipment, intended both for commercial and military use. In recent years, there have been more Anechoic Chambers constructed to measure unintentional radiators for levels of electromagnetic pollution and to verify susceptibility to the electromagnetic ambient within which they are expected to operate. Such Chambers, generally classified as EMC test facilities, could be used to evaluate anything from a cell phone to a combine harvester. Unlike the custom designed antenna test Chambers, EMC Chamber characteristics and how to measure them are defined in specific international regulatory standards. Furthermore, EMC Chamber end users from the different industries may not necessarily have an electromagnetic engineering background. Consequently, EMC test engineers often feel uncomfortably reliant upon the Chamber supplier for guidance and advice, knowing that each supplier will promote their own products and interests. Wading through different data sheets with claims of excellence can be a very difficult process when entrusted with making a significant capital expenditure decision.

This new book from Leland Hemming is valuable and informative reading for engineers of all disciplines who are planning to specify and procure an Electromagnetic Anechoic Chamber. In this book, Mr. Hemming pulls together the relevant information that would previously have required searching through literature on antennas and propagation, simulation and computer modeling, dielectric properties of materials, electromagnetic wave theory and electromagnetic measurement procedures. Depending upon one's thirst for knowledge, it is possible to get a good understanding of a particular Chamber's capabilities and limitations from a few selected chapters, or to press further into the science behind the "black magic" of Chamber design. The book is comprised of ten chapters, which are followed by three useful Appendices, the third of which is a Chamber Design and Specification Checklist. After the Appendices, the book contains a Glossary of Terms and a listing of Selected Bibliography for those who may feel more information is required, although each chapter concludes with a selection of References specific to the content of that chapter.

Chapter 1 provides the reader with a guide to the contents of the remaining chapters, elaborating upon simple title statements of the proceeding Table of Contents.

Chapter 2 covers different aspects of the measurement of electromagnetic waves. Although this information is essential to the evaluation of antenna characteristics, this chapter relates these principals to the design of EMC test facilities. EMC test engineers may find this chapter heavy reading but will discover that it helps in the understanding of test facility design principles.

In Chapter 3 the magic of the electromagnetic absorber is revealed. Many different materials are discussed, including both their physical and electromagnetic properties. Careful study of this chapter will help Chamber designers and purchasers understand the advantageous of each absorber type and the performance limitations that absorbers impose on specific Chamber designs. Many industries have a need to perform measurements of both intentional and unintentional radiators, including electromagnetic susceptibility of equipment. An excellent example would be a manufacturer of wireless communication products, where there is a need to verify antenna radiation patterns and to perform EMC testing of the equipment.

A frequently asked question by such a company is: "What Chamber do I need to perform both of these tasks?" Understanding rhe different performances of the absorber materials available for Chamber construction shows that optimizing the Chamber for one test application will almost certainly compromise it for the other.

Chapter 4 presents a brief description of different chamber enclosure construction options. A more in-depth discussion of this subject can be found in Mr. Hemming's first book, "Architectural Electromagnetic Shield Handbook", published in 1992.

In Chapter 5 the information presented in the earlier chapters is brought together and used in examples of different Anechoic Chamber designs. Here one can appreciate how chamber geometry and the positional relationship of equip-

ment and antennas will play an important role in achieving the desired test environment characteristics.

The information and design concepts from Chapter 5 are more thoroughly developed and discussed in Chapters 6, 7 and 8. Readers may be interested to see some of the illustrations and photographs of different Chamber designs that are presented here. Although much of the information in these chapters is related to different antennas and radar cross section (RCS) test facilities, there are also sections on EMC test facilities. These feature Chambers that are frequently referred to as semi-anechoic, having an exposed reflective ground plane floor and even non-anechoic Reverberation Chambers which depend upon surface reflections to create resonant modes.

Chapter 9 covers the testing of Chambers and includes the testing of absorber materials. The absorber tests describe not only standard methods of determining electromagnetic properties of the material but also its fire safety characteristics. Accurate Chamber testing is essential in understanding the measurement uncertainty related to the work that will be carried out in the Chamber. This Chapter describes the most commonly used Chamber test methods, including those that are described in the EMC regulatory standards.

In Chapter 10 the reader is treated to an interesting view of many different practical examples of electromagnetic test facilities. Here one can see how the Chamber constructor has been able to implement the geometric design requirements and how the absorber materials have been used to achieve the anechoic characteristics. Included here are photographs and illustrations of some of the larger, more unusual and significant indoor test facilities in use today.

In closing, this book will be a valuable asset for anyone involved with Anechoic Chambers from the experienced Chamber designer to the potential new Chamber user. In this one volume, Mr. Hemming has presented information that would normally have required exhaustive research in several different publications and papers. For anyone planning to acquire a Chamber, this book will provide them with the knowledge to develop their specifications correctly according to their needs and to better interpret the information contained in the different proposals that they will eventually review. For the experienced Chamber designer or consultant, the book will quickly become a handy reference and save considerable shelf space.

***Brian Lawrence** is currently the Managing Director of ETS-Lindgren's UK facility. He has been involved in the design and construction of Electromagnetic Anechoic Chambers for almost 40 years, including six years working with the author. He may be reached at (appropriately enough) ChambersRme@aol.com.* **EMC**

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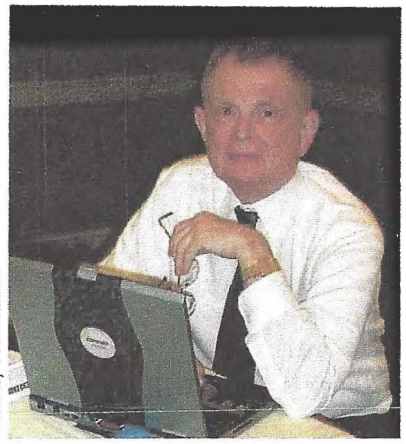

Photo by Bob Hofmann

EMC Standards Activities

Don Heirman, Associate Editor

Don Heirman was busy during the Minneapolis symposium! He is shown here during the "Measurement of Radio-Noise Emissions (ANSI C63.4)" workshop held just prior to the start of the symposium. Leading and coordinating this workshop is just one of the many activities Mr. Heirman undertakes during the symposium. After this class, he donned his hat as EMCS VP of Standards Services to participate in workshops, lead committee meetings, etc. etc.!

Minneapolis was Magnifico for Standards Activity!!

Eight standards related committee meetings were held at our annual EMC symposium in Minneapolis. That was nearly double what it was in previous years. Close to 40 hours of standards deliberations (another record) were held on subjects including the annual meetings of the Standards Development Committee (SDCom), Standards Education and Training Committee (SETCom) and Standards Advisory and Coordination Committee (SACCom). There were meetings held on such topics as EM site surveys, shielding effectiveness of chambers, validation of computational EM computer modeling, RF filter suppression capability, and RF absorbing material performance (the subject of the feature article below). In fact, we had to borrow money from the budget to provide some food functions to facilitate this unexpected burst of energy and EMC standards interest. This burst was also seen in the large turnout for our SACCom luncheon with the Representative Advisory Committee (RAC) where we had an excellent review of our joint activity noting where we might have closer ties and technical exchanges. Even our special session on Standards Development experiences on the Monday afternoon of the symposium week was a blow out with approximately 80 attending the meeting. Last year, there was only had a handful of people in the audience for this meeting. This all speaks to the importance that EMC standardization is playing for both product developers as well as testing organizations, especially with the need to optimize very limited resources during conditions of downsizing and difficult economic conditions. So, let's keep up the momentum! There is a place for your expertise in our standards work. If we are not working on a needed EMC standardization area, let me know. I will see if we can get the necessary interest to move this forward if not first in the standards committee, but maybe in our EMCS technical committees who may in turn ask that standardization occur. Please contact me on d.heirman@ieee.org with any ideas you may have, including your potential solution. Again, Minneapolis left its mark on our standards work. We thank the organizing committee for its accommodation and all who participated in our activity. See you in Istanbul and in Boston!

What Absorber Material Should You Use to Meet Chamber Requirements above 1 GHz?

A hot topic these days is will your test site be usable above 1 GHz? Or even below 80 MHz? If not, how can it be made to conform to proposed site validation procedures (in the Special International Committee on RF Interference (CISPR)) or use at these frequency ranges? Do you have to use different or additional absorber material to meet the validation criteria? If so, how do you know that the material you are selecting will meet your needs? IEEE Standard 1128 was written to give guidance on evaluating the performance of the absorber material to assist in the selection of such material to suppress unwanted reflections from walls and ceilings of chambers. Now, with the requirement for meeting free space conditions above 1 GHz, the conducting ground plane has to have absorber material as well. Hence, the specification of suitable absorbing material becomes critical. This has led to opening up the work on possibly amending Standard 1128. So now is the time for those affected by this activity to come forward to help out in the review of the Standard. The article below describes the background and how you can join in the discussions. So it's up to you to be heard!

IEEE Standard 1128 is Up for Review

By Professor Jose Perini, Chairman of the 1128 Standard Developing Committee

Introduction – The IEEE Std 1128-1998 "IEEE Recommended Practice for Radio- Frequency (RF) Absorber Evaluation in the Range of 30 MHz to 5 GHz" is up for its first review after being in use since its approval on January 13, 1998. Standards are documents that can become obsolete very rapidly with technology advances. Thus, a review after five years is desirable to see if anything has to be changed, updated, or deleted to reflect the technology changes.

PAR 1128 Goals – This standard was developed to guide the manufactures of RF absorber or Radar Absorbing Material (RAM) on how to measure the performance of such materials. It also addressed the measurement of the constitutive parameters of the raw materials used in the manufacture processes. It pointed out that the reflection coefficient of an RF absorber material or RAM has to be specified in magnitude and phase to allow users to predict their

behavior in any application. When signals are reflected from the material surface they will recombine with other reflections and the direct signal to determine the total field at any position in space. Without knowing the magnitude and the phase of the reflection coefficient, it is not possible to calculate the total fields.

Technology Changes – The most dramatic change in the last few years is the development of ferrite materials that can operate from 30 MHz to 5 GHz and higher. This has allowed the construction of fully anechoic and semi-anechoic chambers without using extremely large pyramid absorbers resulting in smaller chambers. The techniques presented in the Std 1128 are still valid especially for the high frequencies, but perhaps some review is necessary on the low frequency measurement aspects. The development and sophistication of new measurement instrumentation should be also examined to see if any simpler methodology could be applied. The manufacturers of these materials and of measurement instrumentation should play a very important role in this process.

Invitation to Participate – All interested parties are invited to volunteer to participate in the review process. We need contributors from the groups that manufacture, use, and model RF absorber material and RAMs, and those that manufacture measurement instrumentation. The IEEE EMC Society needs your help. Note that everyone who is a member of the groups mentioned above has an interest to ensure Std 1128 truly addresses their specific needs. The only way that this can happen is if each group is represented. Please contact the working group chair—Jose Perini—at jperini@ieee.org or call him at (386) 763-0914 (until May 2003). **EMC**

Photo by Janet O'Neil

Photo by Richard Georgerian

Students at the C63.4 workshop included (from left) Rolando Velbis of Hitachi Home Electronics, Richard Georgerian of Carrier Access, and Bret Widdifield of Thomas Multimedia. These students participated in the Friday/Saturday workshop and appreciated hearing about test standards first hand from the experts. During the lunch hour break, they compared notes on test techniques.

Eric Penne of the Nebraska Center for Engineering Excellence (NCEE) proved his engineering expertise by explaining how his team of students solved their problem set during the C63.4 workshop.

Photo by Janet O'Neil

Instructors for the C63.4 workshop included (from left) Don Heirman of Don HEIRMAN Consultants, Bob Hofmann of Hofmann Engineering, and Bill Hurst of the FCC. The instructors also participated in a half-day workshop addressing a comparison of CISPR 22 (1997) with C63.4-2000/2001.

Photo by Bob Hofmann

Don Heirman (standing) supervises a problem set given to a team of students to solve at the C63.4 workshop.

Photo by Richard Georgerian

The C63.4 workshop included an informal question and answer period where everyone participated, students and instructors alike!

A New Way to Review for the NARTE Exam

By Kimball Williams, EMC Society Vice President for Technical Services

Engineers and technicians who are working toward their NARTE certification have a new way to prepare for the NARTE exam. D.L.S. Electronic Systems, Inc. in cooperation with the National Association of Radio and Telecommunications Engineers, Inc. (NARTE) has developed a web page with a "NARTE Question of the Week." Each Monday a new question is listed as a test of your EMC technology skills.

Go to www.dlsemc.com and click on "NARTE'S EMC Credentials Certification Examination Question of the Week." Review the current question of the week. Decide on your answer and then click to see if you are correct.

This is also a good idea for those of us who are already NARTE certified. In our daily work it is unlikely that we will be equally exposed to, and therefore reinforce, all the requirements represented in the "body of knowledge". By taking a few moments at the start of your week to check the weekly question, you can determine if you should set aside time to do a quick review of some part of the technology, or if you have that portion firmly in hand.

Here are some tips for analyzing the question:

1. Read the question. Then ask yourself, "What are they really asking for?"
2. Read all the answers. Don't stop at the first one you come to that looks correct, but instead choose the best one after reading all the listed answers.
3. As you go through the questions week after week, think about what resource materials you might want to bring with you to the final test, since it is an open-book test.

This is also the recommended procedure for approaching the NARTE examination itself, so in your weekly practice, you will also be practicing this 'skill' in preparation for the exam.

When you feel that you are sufficiently prepared for the test, log onto the NARTE web page at: http://www.narte.org to get application forms and other materials. Or, plan to take the exam while attending the annual IEEE EMC Symposium. A prep course for the exam is held on Monday of the symposium week and the exam itself takes place on Friday of the symposium week.

What is NARTE EMC certification and why would someone want it? In the late 1980's the Navy through NAVAIR wanted a way of knowing that their equipment was being tested correctly. NARTE, the National Association of Radio and Telecommunication Engineers, was contacted to set up a program for both EMC Engineers and Technicians.

Initially through a grandfathering process, the certification requirements could be met by someone having a specific level of education, of experience and three individuals in the industry to vouch for their level of experience and expertise. After the initial grandfathering was over, new applicants were also required to pass a written examination. The exam takes place in two four-hour sessions that cover 13 of the disciplines of EMC. The standard way to prepare is to order study guides and work sample questions.

With a new web page listing the 'NARTE question of the week', the study or review process is now as convenient as your web browser. We all owe a vote of thanks to Don Sweeney and the staff at D.L.S. Electronic Systems for providing this boost to the EMC community. Way to go guys!

Practical Papers, Articles and Application Notes

Bob Olsen, Associate Editor

In this issue you will find one practical paper that should be of interest to the EMC community. "What is a Phasor Anyway?" has been written by Professor Jose Perini. In this paper, Jose reviews the theory of "vector phasors" that are so often used solving steady state electromagnetics problems. Of perhaps most interest is his discussion of several subtle issues that affect the interpretation of results written as vector phasors.

The purpose of this section is to disseminate practical information to the EMC community. In some cases the material is entirely original. In others, the material is not new but has been made either more understandable or accessible to the community. In yet other cases, the material has been previously presented at a conference but has been deemed especially worthy of wider dissemination. Readers wishing to share such information with colleagues in the EMC community are encouraged to submit papers or application notes for this section of the Newsletter. See page 3 for my e-mail, FAX and real mail address. While all material will be reviewed prior to acceptance, the criteria are different from those of *Transactions on EMC* papers. Specifically, while it is not necessary that the paper be archival, it is necessary that the paper be useful and of interest to readers of the *Newsletter.*

Comments from readers concerning these papers are welcome, either as a letter (or e-mail) to the Technical Editor or directly to the authors.

What is a Phasor Anyway?

By
Professor Jose Perini
Syracuse University, Syracuse, New York
jperini@ieee.org

The solution of any electromagnetic field (EMF) problem, such as that shown in Fig. 1, is the solution of Maxwell's equations of Eq.1 for that particular geometry:

$$\nabla \mathbf{x} \mathbf{E}(\mathbf{r},t) = -\mu \frac{\partial \mathbf{H}(\mathbf{r},t)}{\partial t} \qquad (1)$$

$$\nabla \mathbf{x} \mathbf{H}(\mathbf{r},t) = \varepsilon \frac{\partial \mathbf{E}(\mathbf{r},t)}{\partial t} + \mathbf{J}(\mathbf{r}',t')$$

In these equations the fields **E**(r,t), and **H**(r,t) are vectors that depend on their position in space given by the vector r, and the time t. The same is true for the source current density vector J(r',t'). Note that the time for the fields is t and for the source is t'. They are different because of the time delay for the source excitation to be felt at the field's position.

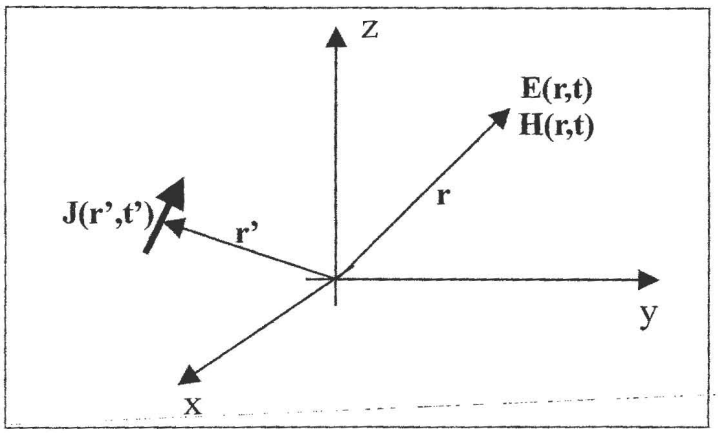

Figure 1. Simple EMF Problem Geometry

When the excitation is of a single frequency, like Jcos(wt), called the time harmonic case, Maxwell's Equations assume a different form shown in Eq. 2.

$$\nabla \mathbf{x} \mathbf{E}(\mathbf{r}) = -\omega\mu \mathbf{j} \mathbf{H}(\mathbf{r}) \qquad (2)$$
$$\nabla \mathbf{x} \mathbf{H}(\mathbf{r}) = \mathbf{j}\omega\varepsilon \mathbf{E}(\mathbf{r}) + \mathbf{J}(\mathbf{r}')$$

Each of the vectors of these equations are only a function of the positions r and r'. The Cartesian components of these vectors are complex numbers called phasor. Because of this, the vectors are called vector phasors. Note that the time dependency disappeared! Why is that? Then we are told that if we want to recover the time dependency of the solution, we have to multiply the phasors by:

$$e^{j\omega t} = \cos(\omega t) + j\sin(\omega t) \qquad (3)$$

and take the real part. Again, why is that? For example, for the phasor representing the x component of the E field we have:

$$\mathbf{E}_x = |\mathbf{E}_x| e^{j\alpha} \qquad (4)$$

Multiplying Ex by the exponential $e^{j\omega t}$ and taking the real part we get:

$$e_x(t) = \mathrm{Re}\left[\mathbf{E}_x e^{j\omega t}\right] = \mathrm{Re}\left[|\mathbf{E}_x| e^{j\alpha} e^{j\omega t}\right] = \qquad (5)$$
$$\mathrm{Re}\left[|\mathbf{E}_x| e^{j(\omega t+\alpha)}\right] = |\mathbf{E}_x| \cos(\omega t+\alpha)$$

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The phasor phase angle is now the phase of the time solution. In order to obtain an answer for the two questions: why do we have to multiply the phasors by $e^{j\omega t}$ and take the real part, and why did the time dependence disappear from Maxwell's equations, we have to go back to Maxwell's equations, assume that the excitation current density is of the type $J\cos(\omega t)$ and see what happens. Because Maxwell's equations in Eq. 1 have derivatives with respect to time, it is simpler to assume that the excitation is an exponential as:

$$\mathbf{J}e^{j\omega t} = \mathbf{J}\left[\cos(\omega t) + j\sin(\omega t)\right] \tag{6}$$

As the derivative of the exponential function is the exponential function multiplied by the exponent:

$$\frac{de^{j\omega t}}{dt} = j\omega e^{j\omega t} \tag{7}$$

then the time derivative is replaced by a multiplication by $j\omega$. This would not happen if we had used $J\cos(\omega t)$ for the excitation. As we are dealing with linear systems, we can look at the exponential excitation as exciting the system with the superposition of two excitations: $J\cos(\omega t)$ and $Jj\sin(\omega t)$. Because the real part of the excitation is what we are interested in, the desired answer is the real part of the exponential excitation solution. This explains the first of our questions.

With this in mind, let us now apply the exponential excitation to Maxwell's equations. Let the excitation be $J(r',t')e^{j\omega t'}$. The field vectors E(r,t) and H(r,t) are to be calculated at an arbitrary position r in space. The effect of an excitation at position r', and time t' is only felt at the field position r at a time t given by:

$$t = t' + \frac{|\mathbf{r} - \mathbf{r}'|}{c} \tag{8}$$

where c is the speed of light and $|r-r'|/c$ is the time delay that took it for the effect of the source to travel to the position where the fields are being calculated. We are assuming free space conditions for this discussion, thus, the propagation velocity is c. Since t appears in the exponent, the time delay can be expressed by a simple phase term α given by:

$$\alpha = \omega\frac{|\mathbf{r} - \mathbf{r}'|}{c} = 2\pi f\frac{|\mathbf{r} - \mathbf{r}'|}{c} = 2\pi\frac{|\mathbf{r} - \mathbf{r}'|}{Tc} = 2\pi\frac{|\mathbf{r} - \mathbf{r}'|}{\lambda} \tag{9}$$

Where T and λ are the period and wavelength, respectively, for the frequency f.

As the time dependency of the fields and source components is known, the field and source can have the time dependency shown explicitly as:

$$\begin{aligned}\mathbf{E}(\mathbf{r},t) &= \mathbf{E}(\mathbf{r})e^{j\omega t}\\ \mathbf{H}(\mathbf{r},t) &= \mathbf{H}(\mathbf{r})e^{j\omega t}\\ \mathbf{J}(\mathbf{r}',t') &= \mathbf{J}(\mathbf{r}')e^{j\omega t'}\end{aligned} \tag{10}$$

Introducing the results of Eq. 10 in Maxwell's equations shown in Eq. 1, and the fact that the time derivative of $e^{j\omega t}$ is $j\omega e^{j\omega t}$ we obtain:

$$\begin{aligned}\nabla\mathbf{x}\mathbf{E}(\mathbf{r})e^{j\alpha}e^{j\omega t'} &= -j\omega\mu\mathbf{H}(\mathbf{r})e^{j\alpha}e^{j\omega t'}\\ \nabla\mathbf{x}\mathbf{H}(\mathbf{r})e^{j\alpha}e^{j\omega t'} &= j\omega\varepsilon\mathbf{E}(\mathbf{r})e^{j\alpha}e^{j\omega t'} + \mathbf{J}(\mathbf{r}')e^{j\omega t'}\end{aligned} \tag{11}$$

The $e^{j\omega t'}$ terms can be eliminated since they multiply every term in Eq. 11. A new entity, defined as **vector phasor**, can now be introduced as:

$$\begin{aligned}\overline{\mathbf{E}}(\mathbf{r}) &= \mathbf{E}(\mathbf{r})e^{j\alpha}\\ \overline{\mathbf{H}}(\mathbf{r}) &= \mathbf{H}(\mathbf{r})e^{j\alpha}\end{aligned} \tag{12}$$

A vector phasor is defined by its Cartesian component phasors. Introducing these new entities in Maxwell's equations of Eq. 11 results in:

$$\begin{aligned}\nabla\mathbf{x}\overline{\mathbf{E}}(\mathbf{r}) &= -j\omega\mu\overline{\mathbf{H}}(\mathbf{r})\\ \nabla\mathbf{x}\overline{\mathbf{H}}(\mathbf{r}) &= j\omega\varepsilon\overline{\mathbf{E}}(\mathbf{r}) + \overline{\mathbf{J}}(\mathbf{r})\end{aligned} \tag{13}$$

which is the same as Eq. 2. Now all time dependencies have been eliminated and all field and source quantities are vector phasors. This answers the second question. As a matter of fact, this is the most commonly used form of Maxwell's equations as opposed to the form shown in Eq. 1. Thus, Eq. 13 has no time dependency, only frequency and space. Now we know that when Eq. 2 is used, we are assuming a single frequency and phasor solution.

There is one subtle point that we have to address now. Strictly speaking, Eq. 7 is correct only if the problem excitation is a single point source. In this case, each of the Cartesian components of the vector phasor have the same phase since they are all subjected to the same time delay between the source and the field observation point. This allows the phase term to be shown explicitly as in Eq. 12. If there are two or more point sources at different locations, then the phases of the three Cartesian components usually are not the same. This is easy to understand. Assume that we have three separate point sources parallel to each of the Cartesian axis, x, y, and z. If properly placed, their far field is linearly polarized in the x, y, and z directions respectively at the field observation point. Therefore, each will only contribute to one of the components of the vector field phasors. Thus, the three components of the vector phasors can have any phase and amplitude we want. Since in any EMF problem the excitation is spread over some physical dimension, it is then approximated by a large number of point sources. The probability that the Cartesian components will have the same phase is extremely small. This is why only the Cartesian Components of the vector phasor fields are calculated. All the necessary information is provided to obtain their amplitudes and phases and fully describe the behavior of the vector phasor.

Once the phasor solution is obtained, the solution for the $\cos(\omega t)$ portion of the excitation, shown in Eq. 3, is found by multiplying each phasor Cartesian component by $e^{j\omega t}$ and taking the real part. For example, the E vector components are obtained as:

$$\begin{aligned}\mathbf{e}_x(\omega t) &= |\mathbf{E}_x|\cos(\omega t + \alpha)\\ \mathbf{e}_y(\omega t) &= |\mathbf{E}_y|\cos(\omega t + \beta)\\ \mathbf{e}_z(\omega t) &= |\mathbf{E}_z|\cos(\omega t + \gamma)\end{aligned} \tag{14}$$

Where α, β, and γ are the phases of the x, y, and z phasor components of E. The magnitude of the field can now be calculated as:

$$|\mathbf{E}(\omega t)| = \sqrt{\mathbf{e}_x^2(\omega t) + \mathbf{e}_y^2(\omega t) + \mathbf{e}_z^2(\omega t)} \tag{15}$$

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NEW TRANSACTIONS ON EMC OVER LENGTH CHARGE

At its August 2002 meeting, the EMC Society Board of Directors approved charging $175 USD per page or partial page to the author of any paper longer than eight printed pages that are submitted for publication in the IEEE Transactions on EMC. This paper over length charge will take effect with papers published in the August 2003 issue of the Transactions on EMC.

which shows that the vector phasor **magnitude and orientation in space** is a function of time. That is, the field polarization is a function of time! Usually the values presented in the solution are for t=0. The vector phasor magnitude is then:

$$|\mathbf{E}(0)| = \sqrt{|\mathbf{E}_x|^2 \cos^2(\alpha) + |\mathbf{E}_y|^2 \cos^2(\beta) + |\mathbf{E}_x|^2 \cos^2(\gamma)} \quad (16)$$

We often see in the literature that the maximum field is calculated as:

$$|\mathbf{E}_{max}| = \sqrt{|\mathbf{E}_x|^2 + |\mathbf{E}_y|^2 + |\mathbf{E}_x|^2} \quad (17)$$

since it is expected that the maximum will be attained for some value of t. This value of $|E_{max}|$ is really an upper bound, and is seldom attained while t varies over a period of the excitation frequency. The actual value of the phasor magnitude may be as much as 3dB smaller than that.

For example, if the magnitude of the three components is 1 and the phases are the same and **equal** $-\alpha$ then this maximum magnitude will occur at $\omega t=\alpha$, and will be equal to the square root of 3 or 1.732. If the phases of the components are not the same, then there is no guarantee that this **value will ever be attained**. If the magnitude of the three components is 1 and the phases are 0, 60^0, 120^0 respectively, the maximum magnitude is 1.225 (square root of 1.5) **independent** of t. This is 3dB below the maximum possible value of Eq. 17

Geometrically, in the general case, the tip of the vector phasor is on the surface of a solid similar to a football, also known as an ellipsoid. The initial phases determine the size and orientation of the three axis of the ellipsoid and where the tip of the vector phasor lies. This means that the polarization is changing with time in a very complex way. In the simple case of a two-dimensional vector phasor, its tip describes an ellipse that degenerates in a straight line when the two components are 90° out of phase. This two dimensional case can be observed in the far field from a source where the propagating field wave has no radial component, and is close to a plane wave. Depending on the source, a linear, elliptical, or circular polarized field may be present.

Conclusions

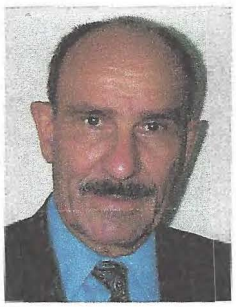
When solving Maxwell's equations shown in Eq. 2 we are assuming time harmonic fields and the solution are represented by vector phasors. A vector phasor is a vector whose Cartesian components are phasors. To obtain its time dependent solution, the Cartesian components of the vector phasor have to be multiplied by $e^{j\omega t}$ and the real parts taken. The tip of the vector phasor, and therefore the field polarization, changes with the time in a complex way. The maximum value of the field depends on the initial phases of the vector phasor Cartesian components. Furthermore, it is not correct to assume that, for some t, eventually the maximum value of the vector phasor will be:

This is simply an upper bound. The actual value may be off

$$|\mathbf{E}_{max}| = \sqrt{|\mathbf{E}_x|^2 + |\mathbf{E}_y|^2 + |\mathbf{E}_x|^2}$$

by as much as 3 dB.

The details of how to calculate the maximum field from the Cartesian components phases, amplitudes, and other issues, will be addressed in a full-length paper being submitted to the IEEE Transactions on EMC.



Professor Jose Perini *was born in Sao Paulo, Brazil, on March 1st 1928, where he received the BS degrees in Electrical and Mechanical Engineering from Escola Politecnica de Sao Paulo in 1952. Between 1951 and 1955, he was the Manager of Radio Maintenance for a Brazilian Airline. In 1961, he obtained the Ph.D. in EE from Syracuse University (SU), New York. He joined Syracuse University in 1962 as an Assistant Professor, moved through the ranks to Full Professor, and retired in 1991. He is now a Syracuse University Emeritus Professor of EE. He has taught in many different areas such as EMF, Antennas, EMC, Digital Signal Processing, Communications, Radar, Circuit Theory, Mathematics, and Computers. Professor Perini has had continuous research support from the Navy, Air Force, Army, and industry, mostly in the EMC area, during his 29 years at SU. He is still active in the profession as a consultant, lecturer, and researcher. As a consultant, he has done extensive work in the US and abroad. He has published and presented over 150 papers in the US and overseas. He has given many invited papers, lectures, and tutorials. He has co-authored a book on Intersystem EMC, and contributed chapters to two others. He was a Distinguished Lecturer for the EMC Society, for two years, until 1998. He has been a member of the IEEE EMC Society Board of Directors since 1999. He was the chairman of the committee that developed EMC Standard 1128 on Radar Absorbing Materials Evaluation. He has received many awards from the EMC Society and other institutions. He is a reviewer for the IEEE Transactions on EMC, and Education. He is the author of two patents in the area of Television Transmitting Antennas. He has also applied for two patents in the area of Excitation of Mode Stirred Chambers. He is a Fellow Member of the IEEE, and a certified NARTE EMC Engineer.*

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NEW TITLES

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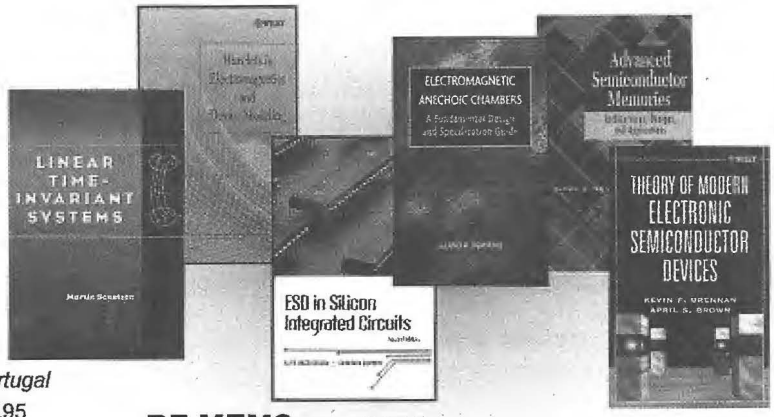

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Without overly complex or abstract mathematics, offers a quick introduction to the basics of wavelets and outlines applications of wavelets in real-world engineering problem.

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This book provides hypothesis testing to give signal estimation techniques, specify optimum estimation procedures, provide optimum decision rules for classification purposes, and describe performance evaluation definitions and procedures for the resulting methods.

Theory of Modern Electronic Semiconductor Devices

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0-471-41541-3 2002 448pp. $84.95

Focuses on three increasingly important areas: telecommunications, quantum structures, and challenges and alternatives to CMOS technology. The text examines the behavior of heterostructure devices for communications systems, quantum phenomena that appear in miniaturized structures and new nanoelectronic device types that exploit these effects, the challenges faced by continued miniaturization of CMOS devices, and futuristic alternatives.

From Wiley-IEEE Press

Electromagnetic Anechoic Chambers

A Fundamental Design and Specification Guide

Leland H. Hemming, *Phantom Works, Mesa, Arizona*

0-471-20810-8 2002 240pp. $99.95

This handbook reviews the current state of the art regarding indoor electromagnetic testing facilities and their design and specifications. Features information on a large variety of anechoic chambers used for a broad range of electromagnetic measurements.

Reviewed on Page 18 of this Newsletter

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Ashok K. Sharma, *NASA*

0-471-20813-2 2002 672pp. $110.00

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Also Available by A.K. Sharma

Semiconductor Memories
0-7803-1000-4 1997 480pp. $120.00

Linear Time-Invariant Systems

Martin Schetzen, *Northeastern Univ.*

0-471-23145-2 2002 384pp. $79.95

Approaching the subject from a system, rather than an application-oriented perspective, this volume provides a solid, clearly explained foundation in the fundamentals of linear time-invariant system theory.

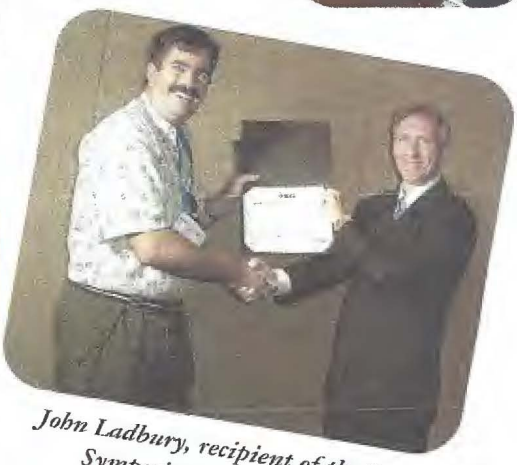
EMC Society Annual Awards

EMC Society President Todd Hubing presented numerous awards at the Annual Awards Luncheon held during the 2002 IEEE International Symposium on EMC in Minneapolis, Minnesota. He is shown below with some of the award recipients. For a complete listing of the awards presented in Minneapolis, please turn the page!

John Howard, Chairman of the University Grant Committee (left), presented the grant award to Bud Hoeft who represented the winner, Clemson University. Joining in the revelry are EMCS Education and Student Activities Committee members Bob Nelson of North Dakota State University, (second from left) and Bill Croisant (far right) of the US Army Corps of Engineers, Engineering R&D Center in Champaign, Illinois.

Risaburo Sato (center), recipient of the Richard R. Stoddard award, is shown with his grandson and President Hubing.

Henry Benitez, EMC Society Awards Chairman, welcomes everyone to the annual Awards Luncheon.



John Ladbury, recipient of the Best Symposium Paper award.

Wolfgang Fichtner, recipient of the IEEE Transactions on EMC Best Paper award.

Benoît Nadeau, recipient of the Certificate of Appreciation award.

Tom Van Doren, recipient of the Fellow award.

Colin Brench, recipient of the Certificate of Technical Achievement award.

Florian Krug, recipient of the Best Student Symposium Paper award.

All Photos by Dick Ford

A highlight of the Awards Luncheon was the presentation of the President's Memorial award. This award is presented in the memory of a prominent member of the EMC Society. This year, Sandy Bush was honored to present the award in the memory of her late husband, Donald R. Bush. She is shown at the podium sharing stories about Don's pleasure in being a long time member of the EMC Society.

2002 EMC SOCIETY AWARDS LUNCHEON

2002 EMC Society Awards

IEEE International Symposium on Electromagnetic Compatibility

CERTIFICATE OF ACKNOWLEDGEMENT

Frank Krozel - For successfully chairing the 2002 Chicago Chapter IEEE EMC Society Mini-Symposium, a one-day technical symposium and exhibition.

Markus Heidermann - For outstanding service to the German EMC Chapter as Secretary and to the Hannover student branch as Chairman.

Frank Gronwald - For outstanding service as activity chair to the German EMC Chapter.

Randy Mayorga - For contributions as Secretary for the Oregon and Southwest EMC Affiliate Product Safety Technical Committee.

Lisa Brown - For contributions as Vice Chair for the Oregon and Southwest EMC Affiliate Product Safety Technical Committee.

CERTIFICATE OF APPRECIATION

Yosef Peker - For his leadership and initiative in enhancing cooperation between the Israel IEEE EMC Chapter and the Association of Engineers and Architects in Israel (AEAI).

Elya Joffe - For extraordinary contribution to EMC engineering, standardization, legislation and training of the new generation EMC engineers.

Elya Joffe - For service as Global Symposia Coordinator plus initiating and assisting in the establishment of four new IEEE EMC Chapters in Region 8: Russia, Turkey, Benelux, and Ukraine.

Boris Shusterman - For contributions as Vice President of the Boston Section Central New England EMC Chapter.

Flavio Canavero - For contributions as guest editor for the Transactions on EMC Special Issue on "Recent Advances in EMC of Printed Circuit Boards".

Christopher Holloway - For contributions as guest editor for the Transactions on EMC Special Issue honoring the late Motohisa Kanda, February 2002 issue.

Perry Wilson - For contributions as guest editor for the Transactions on EMC Special Issue honoring the late Motohisa Kanda, February 2002 issue.

Jim Blaha - For contributions as Chair of the Milwaukee EMC 2002 Tutorial and Exhibition.

Teresa White - For contributions as Registration Chair of the Milwaukee EMC 2002 Tutorial and Exhibition.

Bruce Fiorani - For contributions as Logistics Coordinator of the Milwaukee EMC 2002 Tutorial and Exhibition.

Irina P. Kasperovich - For significantly revitalizing the pace and progress of the IEEE Mohawk Valley EMC Chapter activities and raising the awareness of the importance of EMC within the local information technology and R&D communities.

Mark Montrose - For the development and creation of TC-10, Signal Integrity, contributing to the expansion of the Technical Activities of the EMC Society.

Douglas C. Smith - For contributions as a Distinguished Lecturer 1999-2001 for the IEEE EMC Society.

Werner Schaefer - For contributions as a Distinguished Lecturer 1999-2001 for the IEEE EMC Society.

Robert Dockey - For contributions as a Distinguished Lecturer 1998-1999 for the IEEE EMC Society.

Donald R. Bush - For contributions as EMCS Board Member for 1999-2001.

Douglas C. Smith - For contributions as EMCS Board Member for 1999-2001.

David P. Millard - For contributions as EMCS Board Member for 1999-2001.

Amy Pinchuk - For acting as the Publicity Chair for the 2001 IEEE International Symposium on EMC.

Bernard Segal - For acting as the Workshops Chair for the 2001 IEEE International Symposium on EMC.

Constance Brown - For acting as the Communication and Press Room Chair for the 2001 IEEE International Symposium on EMC.

Christian Dubé - For acting as the Vice-Chairman and Publication Chair for the 2001 IEEE International Symposium on EMC.

Christian Forget - For acting as the Registration Chair for the 2001 IEEE International Symposium on EMC.

Clermond Marquis - For acting as the Local Arrangements & Social Program Chair for the 2001 IEEE International Symposium on EMC.

Howard Mende - For acting as the Demonstration Area Chair for the 2001 IEEE International Symposium on EMC.

2002 AWARDS LISTING

Minneapolis Convention Center

AUGUST 22, 2002
Minneapolis Convention Center

2002 EMC SOCIETY

Hans W. Baumans - For acting as the Secretary for the 2001 IEEE International Symposium on EMC.

Jean-Jacques Laurin - For acting as the Technical Papers and International Liaison Chair for the 2001 IEEE International Symposium on EMC.

Richard Duhamel - For acting as the Exhibits Chair for the 2001 IEEE International Symposium on EMC.

Stanley J. Kubina - For acting as Advisor for the 2001 IEEE International Symposium on EMC.

Shantnu Mishra - For acting as the Technical Program Chair for the 2001 IEEE International Symposium on EMC.

Benoît Nadeau - For acting as the Chairman for the 2001 IEEE International Symposium on EMC.

CERTIFICATE OF TECHNICAL ACHIEVEMENT

Colin E. Brench - For significant contributions and achievements since the 1970's in the development of EMC modeling capabilities directed towards understanding EMI shield and antenna behavior in real product environments.

Salvatore Celozzi - For outstanding contributions to the EMC Society, especially in the field of shielding and transmission line theory applied to printed circuit boards.

UNIVERSITY GRANT AWARD

Clemson University, Department of ECE, Clemson, South Carolina.

BEST STUDENT DESIGN AWARD

Stella Filippatos and Frederic Dumas, Ecole Polytechnique de Montréal, Montréal, Québec, Canada.

BEST STUDENT SYMPOSIUM PAPER AWARD

"Ultra-fast Broadband EMI Measurement in Time-domain Using FFT," by Florian Krug (student author) and Peter Russer.

BEST SYMPOSIUM PAPER AWARD

"Coupling to Devices in Electrically Large Cavities, or Why Classical EMC Evaluation Techniques are Becoming Obsolete" by J.M. Ladbury, T. Lehman and G. H. Koepke.

IEEE TRANSACTIONS ON EMC BEST PAPER AWARD

"Parasitic Modes on Printed Circuit Boards and Their Effects on EMC and Signal Integrity," by C. Schuster and W. Fichtner, November Issue 2001.

LAWRENCE G. CUMMING AWARD

Elya Joffe - For outstanding service and leadership as the Israeli IEEE EMC Chapter Chairman, contribution to the EMC standardization of commercial products in Israel, promotion of the 2003 IEEE International Symposium on EMC as Chairman, and contribution to the overall success of the IEEE EMC Society.

RICHARD R. STODDARD AWARD

Risaburo Sato - For distinguished leadership of EMC research and education.

HONORARY LIFE MEMBER AWARD

Janet Nichols O'Neil
For outstanding service and contributions to the IEEE EMC Society.

FELLOW AWARD

Andrew Drozd – For the development of knowledge-based codes for modeling and simulation of complex systems for electromagnetic compatibility.

Tom Van Doren - For contributions to electromagnetic compatibility education at the undergraduate, graduate and postgraduate levels.

EMC SOCIETY PRESIDENT'S MEMORIAL AWARD (IN MEMORY OF DONALD R. BUSH)

Sharon Hall *(Student), State University of New York, Institute of Technology.* For significant contributions towards advancing CEM modeling and simulation technology through the use of novel software design, modeling and post-processing visualization schemes associated with the EMC analysis of large, complex systems.

MOST IMPROVED CHAPTER

Montréal, Canada

CHAPTER OF THE YEAR AWARD

Nanjing, China

2002 • Signature Advertising • www.signature-ad.com

Minneapolis Convention Center

2002 AWARDS LISTING

2003 AWARDS NOMINATIONS

It's time to start thinking about nominations for IEEE EMC Society Awards to be presented in 2003. The nomination deadline has been changed in order to allow awards to be presented at the IEEE EMC Society's two symposia in 2003 (Istanbul and Boston).

Consider nominating a fellow co-worker or colleague whose IEEE volunteer work or significant EMC contributions deserve recognition by the EMC Society! Visit the EMC Society web page at **www.emcs.org** to see the list of award categories, criteria for awards, past award recipients and nomination forms.

< SUBMIT ONLINE >

SUBMITTAL DEADLINE:
MARCH 7, 2003

SUBMIT TO: HENRY BENITEZ,
IEEE EMC Society Awards Chairman
Phone: 360-212-0471
E-mail: henry_benitez@hp.com or h.benitez@ieee.org

Please take the time and fill out a nomination form from the IEEE Web site. **There are so many deserving candidates!**

www.emcs.org

AWARDS
NOMINATIONS REQUESTED

< ISTANBUL, TURKEY

BOSTON, MA >

2003 Awards Ceremony:

Awards will be presented at the Awards Ceremony held during the 2003 IEEE INTERNATIONAL SYMPOSIUM ON EMC, **MAY 11-16, 2003, in ISTANBUL, TURKEY** for those in attendance.

Remaining awards will be presented at the 2003 IEEE SYMPOSIUM ON EMC, **AUGUST 18-22, 2003, in BOSTON, MASSACHUSETTS**.

Scenes from the 2002 *IEEE International Symposium on EMC*, Minneapolis, Minnesota, August 19-23

Photo by Dave Travor

Michihisa Yamazaki (left) and Tetsuya Hashimoto of A-Pex International Co. Ltd. enjoy one of the thousands of lakes in Minnesota following the symposium.

Colin Brench of Hewlett Packard and his wife Bronwyn got into the "fishy" spirit while in Minneapolis. Nice frog Colin!

Photo by Jolene Murphy

The IEEE's Vita Feuerstein (left) gamely dressed as a walleye (the most popular game fish in Minnesota) to direct traffic at the symposium banquet... that is, until she got "caught" by Tracy DeJong of metroConnections, the event planners for the banquet.

It's not all technical sessions at the annual EMC symposia! The social activities can be quite fun, including the dB Society annual picnic attended by Dave Staggs and Janet O'Neil. This year's theme was "Gone Fishin'!"

Photo by Jolene Murphy

Amy Pinchuk of InField Scientific organized the children's program in Minneapolis. Based upon her popular children's science books, this program has been a real hit with the budding EMC engineers that attend the symposium.

Photo by Jolene Murphy

The symposium banquet featured an impressive laser show for the pre-dinner entertainment.

EMC Chapter chairs and representatives gather during the annual "Chapter Chair Luncheon" held during the symposium week, including (from left) Risaburo Sato of the new Sendai chapter, Kenaiya Mehendra of the Los Angeles chapter, Irina Kasperovich of the Mohawk Valley chapter, and Glenn Robb of the Eastern North Carolina chapter.

Bob Patrick of Electronic Instrument Associates (right) did double duty at the symposium. He assisted the steering committee by serving as the exhibits chair and he assisted his principals with booth duty. He is shown here with Doug McKinnen of Emscan.

Photo by Jolene Murphy

Symposium steering committee members John Maas of IBM (left) and Joel Peltier of Medtronic worked studiously behind the scenes at the symposium. John handled the technical papers while Joel handled the technical program.

A special session titled "Managing EMC Semi-Anechoic Facilities" featured expert speakers (from left) Jerry Green of Cisco Systems, Dave Traver of Sony, Dave Staggs of Dell Computer, Dan Hoolihan of Hoolihan EMC Consulting, Steve Cass of the Nebraska Center for Engineering Excellence, and Greg Kiemel of Northwest EMC. (Not pictured: Speaker Robert Scully of NASA Houston.)

The symposium always presents a good opportunity for long time friends to get together. Bruce Archambeault of IBM and Darryl Ray of Apple Computer join Ken Hall and Jeff Evans of Hewlett Packard (from left) for a nice reunion.

Mike Hatfield of the Naval Surface Warfare Center in Dahlgren, Virginia, (far left) stopped by one of the many Irish pubs in Minneapolis with his wife Pat and colleagues Steve Deppen of Honeywell, Diane Kempf and Buzz Brezinski, (from left) both with the Naval Air Warfare Center at Patuxent River, Maryland.

Photo by Jolene Murphy

Curt Sponberg of Medtronic, Vice-Chairman of the Minneapolis symposium steering committee, got into the act and became a walleye just for fun!

The spacious entryway of the Minneapolis Convention Center was a bustling place for registration at the 2002 IEEE International Symposium on EMC in Minneapolis.

Photo by Jolene Murphy

Amplifier Research had an impressive gathering in their booth during the symposium with (from left) Pat Malloy and Ken Shepherd of AR and Mark Yovut of ETM.

Glen Kuriger, Associate Director of the Center for the Study of Wireless EMC at the University of Oklahoma, enjoyed the booth traffic on the exhibit floor during the Minneapolis EMC symposium.

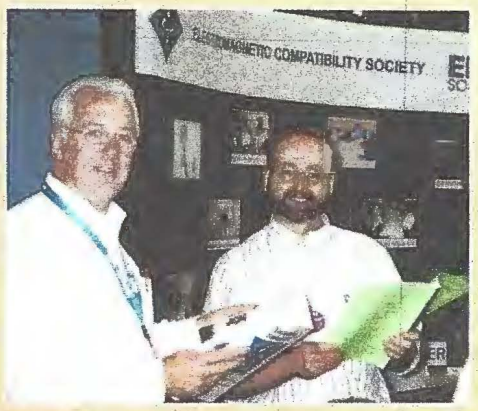
Elliott Labs enjoyed showing their EMC educational software (EMCT) to visitors during the Minneapolis symposium. Shown from left are Damir Olivas of Elliott Labs, Nathan Belsher of Texas Instruments, Don Erwin of Elliott Labs, Randy Masline and Mark Hinman of Kodak, and Michael King, EMC consultant.

Kimball Williams of Underwriters Laboratories was joined at the symposium by his wife, Mary Lou. They, too, could not resist the many beers on tap at the pubs in Minneapolis.

Lorie Nichols mans her booth for Conformity magazine. She looks relaxed while visiting with Warren Merkel of A2LA, but next year at this time she will be VERY busy! Jan Curtis, Executive Editor for Conformity magazine, is the chairman of the steering committee for the 2003 IEEE Symposium on EMC in Boston, Massachusetts. Lorie is the publisher of this magazine and is active on the steering committee as well.

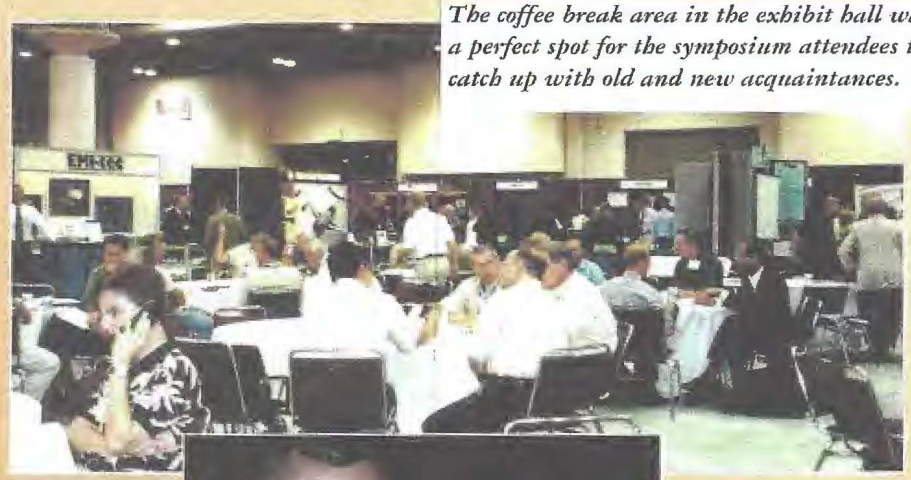
August Kalohn of Siegel-Robert (left) was an exhibitor on hand at the Minneapolis symposium. He is shown demonstrating a new product line to his colleague Keith Schellhardt.

All Photos by Janet O'Neil, unless otherwise noted



Dave Traver of Sony (left) and Harry Gaul of General Dynamics stop by the EMC Society membership booth and catch up on some good reading: the EMC Society Newsletter and the Transactions on EMC!

The European EMC contingency was well represented in Minneapolis. Brian Butler of ETS-Lindgren in Cedar Park, Texas (center) joined colleagues Klaus Wulf and Hanna-Leena Makitalo of ETS-Lindgren in Finland.



The coffee break area in the exhibit hall was a perfect spot for the symposium attendees to catch up with old and new acquaintances.

Jene Cain of ElectroTek International Corporation (left) and Rob Taylor of Panel Components Corporation were one of the some 180 exhibitors present in Minneapolis.

Brent and Edith DeWitt (he's with Dutex-Ohmeda) wouldn't miss the annual EMC symposia. They enjoyed Minneapolis as one of the best ever!

Some people traveled quite a ways to attend the Minneapolis symposium, including (from left) Leonel Sant'Anna of Abricem in Sao Paulo, Brazil and Benjamim da Silva Medeiros C. Galvao of INPE in Sao Jose dos Campos, Brazil. They joined Hernan Urdiales of ETS-Lindgren and Paco Sepulveda of SI EMC. Paco is based in Mexico City.

Waiting for the post banquet entertainment are Ed Bronaugh of Ed dB EMC Consultants, Ghery Pettit of Intel, and Dave Dixon of the Naval Undersea Warfare Center in Rhode Island (front row from left). Looking on just behind this trio are Terry He of Boeing and Todd Hubing of the University of Missouri at Rolla.

Photos by Janet O'Neil

IEEE EMC Society Education and Student Activities Committee (ESAC)

Maqsood Mohd, Associate Editor, ESAC Chairman

Even a casual perusal of the annals of human history reveals vividly those civilizations, which put education and learning at the highest level of importance in their societies, have dominated the world. As the importance of education and learning gets diminished in their civilization, so is their importance in the world and their domination. The rise and fall of the Greek, Roman, Egyptian, Indian, Chinese, Arab, and several other similar civilizations bear a testimony to this simple precept. What is true for a nation, or a country, is also true for a group of people or a Society like ours – the EMC Society. If we, as a Society, desire to dominate the current technology scene, we must promote education and learning in our Society. We as a Society must strive to innovate the art of EMC science through advanced learning and education. In my decade of formal connection with the Society, I have never been more excited and confident about our future than now. We have some very talented young men and women in our midst who are on a path to take EMC science to greater heights and excellence. I am pleased to report that the ESAC has been instrumental in propelling the interest in EMC engineering and making this field of science a worthwhile endeavor for our young men and women around the world. Decade old programs such as Fundamental Tutorials, Experimental Demonstrations, The NARTE Exam Preparation, and the University Grant have continued to increase in their appeal and participation by the membership. Even the "new kid on the block" type programs, such as the Best Student Paper Award and the Best Student Design Competition, have been accepted and have continued to increase in popularity at an exponentially increasing rate. The success due to the amalgamation of all these ESAC programs is palpable in the discussions and the knowledge base of the "customers" who profit by attending the events organized and conducted by the hardworking men and women of the ESAC. Every one of these officers of the ESAC (listed below) deserves recognition for his/her part of the success and for what their synergy brings to the overall success of the ESAC. Next time you meet one of them, show your appreciation for their dedication to promoting excellence in EMC education and learning. We at ESAC are not satisfied with the success achieved thus far. We believe that there is always room for improvement. If you have any ideas that you would like to share with us to make ESAC better in accomplishing its charter, then please contact any one of the officers listed below or me. The Minneapolis, Minnesota Symposium was a great success for ESAC. With record attendance in every program and the new threshold of excellence set in both the Best Student Paper Contest and the Best Student Design Competition, we are poised to launch yet another program called the "Partners in EMC Education" with this issue of the Newsletter. We need help in this area. Let me provide you with the details of the ESAC activities during the symposium for your reading pleasure and enjoyment.

Our biggest education events at the symposium included: Experiment Demonstrations and the Fundamental Tutorial Workshop. Ten years ago, we started the Experiment Demonstrations session; the Fundamental Tutorial and NARTE Exam Preparation workshops were started nine years ago. On Mondays of the symposium week, nine years ago there was hardly any other workshop offered. Over the years the choice for the attendees has grown to almost eight workshops on Mondays. Thanks to our excellent speakers and presenters, our Tutorial sessions have never lost their appeal and utility. The real down-to-earth and fundamentals education is really in demand. One of the reasons for this demand is that the environment in which we live is becoming richer with man-made electromagnetic energy and at the same time the susceptibility threshold of electronic technology is decreasing. So, many are in desperate need to know how to deal with EMI and EMC today. Increasing participation of novices in this field at semi-

Photo by Dick Ford

Sharon Hall, worthy student at the State University of New York, Institute of Technology, received the 2002 "President's Memorial Award" from EMC Society President Todd Hubing.

nars and symposia and even the desire of seasoned professionals to brush-up and soak-up every tidbit of EMC knowledge is noteworthy. After all, knowledge is power. This makes our Committee's responsibility very important, and we don't take that lightly. We of ESAC, as in the past, will continue to strive to bring the best in EMC Education. But, we are always open for newer ideas.

Knowledge is power. And indeed education is the means to get the knowledge. To seek knowledge is a birth right of every human being. EMC professionals are included in this. It is never too late to learn and seek education. Education is a verb. Our goal is to become the premier education committee of the IEEE. This is *your* Committee. We are here to help *you* and support *your* education needs. We are striving to undertake unconventional and innovative means to achieve our goals. Help us help you better. Let me update you on activities of various subcommittees. We welcome your help and support that you may be able to provide to any of our subcommittees. Please feel free to contact any of these subcommittee chairs.

Do YOU Have a Product to Donate to a Worthy Educational Institution?
Wanted: Partners in EMC Education!

The Partners in EMC Education is a win-win program that the Education and Student Activities Committee (ESAC) would like to launch with the help of EMC/electronic test and measurement equipment manufacturers. The ESAC is soliciting participation in this program from the EMC/electronic equipment manufacturers. The ESAC has conducted the "Student Design Competition" every year for the last three years. The competition has been well received by the students and the professors alike. It is time to grow and improve it further. In this competition, a kit of parts is provided to the school upon request. The components in the kit are for a power supply design. The students then employ techniques to make it EMI-free. The design with the best performance and the best technical report wins the competition. The award includes $900 USD cash for the winning team and a free trip to the IEEE EMC symposium for the lead team member.

It would be great if we can take this opportunity to make the Student Design Contest even better by awarding the school of the winning team and also the runner-up team a product of some type that will be useful in their respective labs. The manufacturers will contribute these products. It would be a prudent move by the manufacturers to participate in this program. While the equipment will be useful in the laboratory, the students would also become familiar with the products and companies in the EMC community - an invaluable advantage to the manufacturers. Just like a good design depends upon upfront EMC considerations, a company's good future depends upon upfront marketing by becoming partners with ESAC in this worthy project. So, we would like to hear from the EMC equipment manufacturers. This would be a win-win situation for both the manufacturers and also for the winning students of our EMC community. The students will be constantly exposed to the name of the company and its product lines throughout their academic life. What product and which company will they turn to after they graduate and get in a position to make a purchase? This is a no-brainer.

I actually got this idea from the regional marine biology competition that I attended three years ago at the University of Southern Mississippi. The top five teams were the winners and the top two teams got some type of product donated to their schools. We would also like to be able to provide donated products to top two schools. Though preferable, the products don't have to be new. As long as they are in working order, of reasonable current technology, and not dinosaurs, they would be a welcome addition to any school laboratory. What do you think? For more information on this aspect of cooperation in excelling EMC education and our profession, and how to be an EMC Education Partner, please contact the ESAC chair Maqsood Mohd at maqsood@ieee.org

Minneapolis, Minnesota Symposium 2002:

The Minneapolis, Minnesota Symposium is now behind us; and it was the best yet for educating and enriching the EMC professionals. The Minneapolis Symposium Committee deserves thanks and appreciation for the job well done. At this symposium, the Education and Student Activities Committee achieved great success in several areas. In the following paragraphs I have highlighted some of the events that took place that you may find of interest.

Tutorials:

It was another landmark year for the Fundamentals Tutorials. Although the tutorials are primarily targeted for the entry-level engineers in the EMC field, quite a few seasoned engineers also enjoy brushing-up on concepts that they might not have used in a while. This year several noted experts from various organizations provided the tutorial material to help attendees better understand EMC concepts and how to better design systems from an EMC point of view. A highlight of the Tutorials was that not only theoretical concepts from PC board design to system engineering issues such as grounding and shielding were discussed, but the rationale of considering an environment in the design was also presented. Notable additions to this Tutorial were the presentations about the EM environment around medical devices and designing them for RF immunity.

If attendance is any measure of success and popularity, the Fundamental Tutorials were very successful. Throughout the day, on an average there was an impressive attendance of about 350 participants peaking to 450. We had standing room only during parts of the day. We could have done a little better with our audiovisual screens this year. We will make it better next year. Like previous years, this year too, the first-time attendees were relatively higher in percentage than the seasoned ones. Thanks to all the speakers and the attendees who made the Fundamentals Tutorials a great success. The Tutorial Subcommittee is busy planning for another exciting and informative session during the Boston Symposium. If you would like to propose a topic or a speaker for the Boston Symposium, email your comments and ideas to maqsood@ieee.org.

Experiment Demonstrations:

This is another popular and "educational" activity we do as a committee. A variety of EMC concepts are demonstrated experimentally during the symposium to educate the symposium attendees. This was also the second year for the demonstrations of EM modeling and simulation (M&S) concepts. For the three main days of the symposium, more than 20 experts demonstrated 24 EMC concepts that sometimes might be classified as abstract or black magic. Many a happy souls were pleased to learn these concepts during these demonstrations. Their doubts changed into convincing beliefs. The number of demonstrations presented in the M&S area was fewer than the hardware demonstrations.

There were at least two noteworthy highlights during this year. We had presenters from around the world and demonstrations were in the best location at the symposium. The Minneapolis Symposium committee worked closely with the ESAC to make this a success. The experiments were solicited from a "Call for Experiments" and the Symposium committee also arranged for the equipment for the presenters. In the past the ESAC used to do everything in this regard. This has been a successful transition. We are not totally in autopilot mode yet, but we are making it now in being a part of the main annual symposium committee function. A minimal interaction will still be with the ESAC for the foreseeable future, especially in an advisory role. The ESAC representatives who have helped champion this effort are Andy Drozd and Larry Cohen. We want to recognize the invaluable service they have provided over the years to the great success of this wonderful program. Our thanks are due to the Minneapolis Symposium committee for a fine job on the Experiment Demonstrations. Our thanks are also due to very supportive vendors. If you would like to demonstrate an experiment at the Boston symposium, respond to the Call for Experiments. If you would like to demonstrate an EMC modeling and simulation concept at the next symposium in Boston, please contact Andy at andro1@aol.com.

For more information about the Experiment Demonstrations, please see the article by Andy Drozd on page 41 of this Newsletter.

NARTE Activities:

As during the past several years, Dr. James Whalen conducted the workshop for engineers and technicians who are preparing to take the National Association of Radio and Telecommunications Engineers (NARTE) examination to certify as EMC engineers and technicians. Dr. James Whalen is also a part of the overseeing committee of the EMC Society that reviews the question pool along with several folks from the technical committees (TCs).

At the NARTE examination on Friday, 21 engineers and technicians sat for the exams. The word from NARTE is that 52% of the participants passed the exams. Our congratulations to all the successful applicants, and welcome to the ranks of certified NARTE professionals. Our thanks to Dr. James Whalen for championing the cause of "preparing for the NARTE exams."

University Grant:

John Howard heads the University Grant Committee. This year his committee has been successful in finding a winner for this grant; we had responses from around the world requesting the grant money! The grant is provided to an institution that is on the verge of offering an EMC course. The grant money is used as seed money to start an EMC course as an established part of the curriculum in the Electrical Engineering department. The grant is open to all universities in the world. For more information, contact John Howard

Photo by Jolene Murphy

One of the major activities undertaken each year by ESAC is the "Demonstrations" held during the EMC symposium. Mike Hatfield (in glasses) of the Naval Surface Warfare Center in Dahlgren, Virginia is shown demonstrating how reverberation test chambers work.

Photo by Jolene Murphy

Winners of the Student Design Contest participate annually in the "Poster Paper" session held during the EMC symposia.

at jhoward@emcguru.com. This year's winning school is Clemson University, Clemson, South Carolina. Congratulations to Dr. Fred Tesche of Clemson.

University Survey:

Professor Antonio Orlandi is the Chair of this subcommittee. The mission of the University Survey Committee is to survey the universities and collect data about the EMC course offering, student population, modeling and simulation usage, etc. The data collected will help the EMC Society and its members in various ways. Information will be useful for prospective students, industry, employers, etc. If you have not already done so, please, complete an online survey by going to the website http://dau.ing.univaq.it/art. If you know of a school or a college that has not participated in the survey, please encourage them to complete an online survey. For more information on this activity, please contact Professor Orlandi at orlandi@ing.univaq.it.

Student Design Contest:

This is the most exciting area of growth this year for our Committee. This effort epitomizes the proverbial synergistic cooperative effort between industry and the EMC Society. Ahmad Fallah of Ciena CSD in Cupertino, California, is the Chair of this effort. This was our third year and we have learned a few more things this year. We will still learn and fine-tune the process as we go. If you would like to get on this bandwagon and help advance and fine tune this contest, then contact Ahmad Fallah. In this competition parts of a circuit (designed by Fallah) in the form of a kit are sent to the professors at the universities. The kit is yours for the asking. This year almost 30 kits were sent around the world. We received 5 entries. The entries were evaluated against a set of criteria provided in the information packet sent with the kit. The evaluators are EMC engineers from industry and academia without any conflict of interest.

The 2002 EMC Student Design Competition was a major success! We had an excellent winning entry from Ecole Polytechnique de Montreal, Canada. The team consisted of two members, Stella Filippatos and Frederic Dumas. The team members presented an impressive poster paper in the Experiment Demonstrations area. The team qualified to receive $900 USD in cash and one student from the winning team received an expense-paid trip to attend the 2002 IEEE International Symposium on EMC in Minneapolis, Minnesota. The most important reward for the participants, however, was the experience of applying their EMC design knowledge to a real-life problem and explaining the EMI-reduction techniques to scores of professionals at the symposium.

If you are a student and want to participate in the 2003 EMC Design Contest then all you need to do is have your professor contact Ahmad M. Fallah at (408) 342-5516, or (408)-366-4866 (fax), or via email at ahmadfallah@ieee.org, and request a design kit and a copy of the competition rules by January 15, 2003. Follow the rules and submit a winning entry. Get started early and remember, the early bird gets the worm. The price is right: A FREE trip to the 2003 IEEE Symposium on EMC in Boston and $900 USD! Not bad!

Experiments Manual On-line:

Dr. Jim Drewniak is heading up this effort. Dr. Dick DuBroff is helping Jim in expanding this activity to additional manuals. The first Experiment Manual published by the Education and Student Activities Committee is on the web site at: http://www.ewh.ieee.org/soc/emcs/pdf/EMCman.pdf. If you have an Adobe Acrobat Reader, you can download the entire manual from this site. If you don't have the Adobe Acrobat Reader, it can easily be downloaded from the site: http://www.adobe.com. Jim and Dick can still use some help from a volunteer who can do the follow-up work of soliciting and arranging the new experiments. If you are interested in broadening your career horizons, contact Jim or Dick or any other officer of the Education and Student Activities Committee. Dick DuBroff has been instrumental in preparing the second volume of the Experiments manual. If you are interested in getting more experimental material, then go to the site http://www.ewh.ieee.org/soc/emcs/edu/exper.htm for Experiment Manual Volume II and additional experiments.

Education Committee Web Site:

Bob Nelson is the Chair of this subcommittee. He has done a wonderful job of creating the website for your ESAC. As the duties fall under secretary of the committee, Dr. Bob Nelson has done a superb job. Randy Jost of Utah State University is helping Bob in maintaining the web site. Take a look at our web site at http://www.ewh.ieee.org/soc/emcs/emcsedu.html. If you have any ideas on how to improve our web site, please contact Bob or me.

Student Activities:

Ahmad Fallah is the new Chair of this subcommittee. The mission of this committee is to reach out and touch some students (in fact, all students). Primarily, the focus is on working with student chapters in four areas: The Awareness of EMC, Student Paper Contest, The President's Award, and the Student Design Contest. The first order of business is to introduce the student chapters to EMC educational materials. If you have any ideas or wish to volunteer, please contact Ahmad Fallah (ahmadfallah@ieee.org) or me (maqsood@ieee.org).

Student Award Winners at the 2002 EMC Symposium:

In addition to the Best Student Design Award, each year the Education and Student Activities Committee also awards the Best Student Paper Award at the annual Symposium event. The winning entries for this year are as follows:

Best Student Paper Contest: "Ultra-fast Broadband EMI Measurement in Time Domain Using FFT and Periodograms," by **Florian Krug** of the Institute for High Frequency Engineering, Munich, Germany. His award included $900 USD and an expense paid trip to the Minneapolis Symposium. Congratulations to Florian Krug for his excellent and innovative paper about a novel technique to measure EMI.

Best Student Design Contest: The winning entry was from Ecole Polytechnique de Montreal, Canada. The team members were: **Stella Filippatos** and **Frederic Dumas**. The two members of the Ecole Polytechnique team share a cash award of $900 USD. The team members also received an expense paid trip to the Symposium. This year, both team members were able to attend the symposium because they kept the total expense under the budgeted $2,100 USD. **Congratulations to these students, their team members, their professors, sponsors, and the universities.**

Video/CD-ROM Based Educational Material Production:

The task of this committee is to produce educational material in an appropriate and useful medium to the EMC-S membership. Dick Ford is the Chair of this committee. He will welcome any help you can provide him in this task. What we do in this committee will have a far-reaching impact in the 21st century. At the present time, we are in process of producing some video products of experiments that will be valuable to EMC students and professionals alike.

EMC Outreach:

The task of this committee is to produce educational material in an appropriate and useful medium for EMC Society members. The outreach consists of three segments: The Kindergarten - grade 12 population, the college student population, and the professional members who are not fulltime students. We are beginning to devote our efforts and resources to the K-12 population segment during the coming months. If you have any ideas how to go about doing this job more effectively, please contact me at maqsood@ieee.org.

Education and Student Activities Officers:

Some changes have occurred during the Symposium. Contact any one of the following to become a part of the ongoing innovation in EMC engineering through education.

Student Activities
Ahmad Fallah, ahmadfallah@ieee.org
NARTE BOD Liaison
David Case, dcase@telxon.com
Experiments Manual II
Jim Drewniak, drewniak@ece.umr.edu
Vice Chair
Andy Drozd, andro1@aol.com
Demonstrations
Andy Drozd & Larry Cohen, cohen@radar.nrl.navy.mil
Student Design Contest
Ahmad Fallah, ahmadfallah@ieee.org
Video Productions
Dick Ford, dford@radar.nrl.navy.mil
University Grant
John Howard, jhoward@emcguru.com
Tutorials
Maqsood Mohd, maqsood@ieee.org
University Survey
Antonio Orlandi, orlandi@electtrica.ing.uniroma1.it
NARTE
Jim Whalen, jjw@eng.buffalo.edu
EMC Outreach
Maqsood Mohd, maqsood@ieee.org

I would like to express my personal thanks and appreciation to each of the above chairs who tirelessly work throughout the year to bring the very best in EMC education materials, workshops, demonstrations, tutorials, and student contests at every symposium and to all the members of the EMC profession throughout the year. When you email them, contact them, or see them during a symposium, express your appreciation for volunteering their valuable time for the EMC Society and the Education and Student Activities Committee. **EMC**

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2003 STUDENT EMC DESIGN COMPETITION

Apply Your EMC Design Knowledge to a Real-Life Problem!

The 2003 Student EMC Design competition is underway, and the winner will be announced at the 2003 IEEE Symposium on EMC in Boston, Massachusetts.

The 2003 Student EMC Design Competition is the 4th annual student competition sponsored by the IEEE EMC Society, and is conducted by the Education and Student Activities Committee (ESAC). The goal of this competition is to provide Electrical and Computer Engineering students who are interested in the field of EMC an opportunity to apply their knowledge and gain hands-on experience.

The winning entry is awarded $900 USD in cash, and one team member receives an expense-paid trip to attend the 2003 IEEE Symposium on EMC in Boston, Massachusetts. This includes a free pass to all technical sessions and exhibits and a special recognition during the Awards Luncheon! The most important reward for the participants is the learning experience of applying their EMC design knowledge to a real-life problem.

If you are interested in participating in this competition, please contact Ahmad M. Fallah via email at ahmadfallah@ieee.org by January 15, 2003 and request a design kit and a copy of the competition rules. Then, apply your knowledge of the EMC design principles and submit your design entry and a detailed report on how you arrived at your solutions. You will be notified well in advance so you can attend the 2003 IEEE Symposium on EMC in Boston from August 18 to 22, and present the results of your efforts in a poster session. And, of course, you can then collect the $900 USD cash award!

The trip to the EMC Symposium is just part of the competition, the learning experience lasts a lifetime.

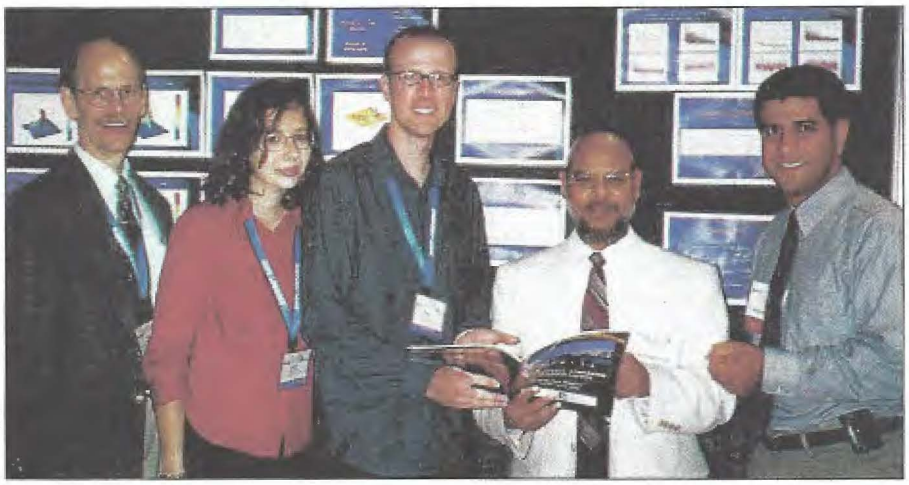

Photo by Janet O'Neil

A gathering of the Student Design Competition supporters and winners, including (from left) Bob Nelson of North Dakota State University, 2002 Student Design Competition winners Stella Filippatos and Frederic Dumas of the Ecole Polytechnique de Montréal, Maqsood Mohd of Sverdrup Technology, and Ahmad Fallah of CIENA Core Switching Division.

Inter-Society Activities

Dave Case, Associate Editor
Chair of the Representative Advisory Committee (RAC)

Another symposium has gone by and I'm already looking forward to next year's IEEE EMC symposium. In 2003, the international one will be held in Istanbul, Turkey from May 11-16 and the national one will be held in Boston, Massachusetts from August 18-22.

At this year's symposium in Minneapolis, we extended the tether so to speak and 802.11b WLAN systems were operating in the convention center as well. That means not only could pages and PCS calls interrupt me, but now I could also answer emails while remote in real time. This allowed me to work on other issues at the symposium (though sometimes I prefer when I can not be contacted too easily).

This years RAC/SAC (Standards Advisory and Coordination Committee) joint luncheon was held on Monday of the symposium week and the attendance was good. Like last year, we did a round robin and everyone gave a brief introduction and a quick overview of what RAC or SAC activity they were addressing. Next year it is up to the SAC Chair to host this luncheon when he has time with all the other activities he needs to do before our annual symposium. Elya Joffe is the SAC Chair and he also happens to be the Chair of the 2003 IEEE International Symposium on EMC in Istanbul! I am not sure if there will also be a RAC/SAC luncheon at the Boston Symposium or just a meeting

It is good from my point of view to see more and more wireless issues being addressed in papers and workshops. The wireless field is expanding and we will see more and more topics involving wireless technology come up in the future.

If you read my last column or were at the RAC/SAC luncheon in Minneapolis, you may have heard of a change coming to RAC. This will be my last official column as the RAC chair. I am reluctantly stepping down as Chair of RAC. I am not quitting EMC like the last Chair did, but with my involvement in US preparation work for the World Radio Conference 2003 next June and other industry activities, my time is limited.

I very much enjoyed chairing the RAC committee and will still participate as a committee member. A new chair has been nominated and will be announced pending final Board approval. In fact, it was almost as fun being the RAC Chair as it was watching Janet and Todd fall off the logs during the logrolling event at the Minneapolis Symposium Gala!

I hope to see everyone next year at one of the IEEE EMC Symposia, whether in Istanbul and/or Boston. **EMC**

Photo by Janet O'Neil

2002 EMC Symposium Demonstrations and Call For Demonstrations: 2003 Istanbul & Boston EMC Symposia

by Andy Drozd

This year's complement of EMC Experiments and Computer Modeling and Simulation Demonstrations at the 2002 IEEE International Symposium on EMC in Minneapolis brought to mind words like diversity, thought-provoking, originality, educational, international and fun. Indeed, this year we had a record number of new presenters from nine different countries. Each gave excellent demonstrations of original and challenging EMC topics drawn from real world problems. These were conducted over the three main days of the symposium for the purpose of raising the awareness of engineers to effective EMI troubleshooting methods, the importance of implementing good EMC design and measurement practices, and providing insights into basic electromagnetic phenomena and effects via practical examples. The EMC Society Education and Student Activities Committee (ESAC) traditionally sponsors these demonstrations as part of the annual IEEE EMC symposia.

The idea for the demonstrations began during the late 1980s/early 1990s. This soon led to the EMC Experiments and Demonstrations Manual, Volume 1, a compendium of experiments covering fundamental EMC concepts and phenomena. It has become a useful resource to educators and EMC practitioners over the years. The manual was originally compiled and reviewed by Clayton Paul and Henry Ott for the EMC Society Education Committee. In 1993, a first attempt to demonstrate selected experiments from this manual in an open, interactive forum in conjunction with the EMC symposium grew into what we know today. By the way, a Volume 2 manual has been compiled. Both volumes can be downloaded from the IEEE EMC Society Web Site at www.emcs.org.

Photo by Janet O'Neil

Mark DeBattista of Harley-Davidson Motor Company presented one of the demonstrations in Minneapolis. Several symposium attendees crowded the demonstrations area to see "EMC in action."

The demonstrations continue to grow in popularity judging from the ongoing, positive feedback received over the years. This seems to be due to the educational spin of the demonstrations and of course, the fun factor. The fun comes in the opportunity to directly interact in a hands-on way with the demonstration setup and getting a first-hand glimpse into subtle electromagnetic phenomena and ways to control EMI, something that the uninitiated have often called a "black magic" art. The demonstrations are often designed to demystify EMI/C by giving new, practical meaning to EMI troubleshooting and EMC compliance. As we approach the 10-year mark for the experiment demonstrations session, we continually strive to emphasize practicality as well as improve the diversity, technical quality, and the educational aspects of the demonstrations.

This year's lineup consisted of 24 different experiment demonstrations:

- Coupling Mechanisms by M. Albach, D. Kübrich and Th. Brehm of the Lehrstuhl für Elektromagnetische Felder, Friedrich-Alexander-Universität, Erlangen-Nürnberg, Germany
- Effect of Pulse Width Modulation (PWM) Frequency Dithering on Vehicle Entertainment Radios by Heritianarisoa Rakouth and Luke Comstock of Delphi Automotive Systems, Saginaw, Michigan
- Measurement of Common Versus Differential Mode Coupling in Line Conducted Applications by Travis Lee of Compaq NSD (Tandem Division), Cupertino, California
- EMC of Spread Spectrum by Art Light of ITT Industries, Alexandria, Virginia
- Shielded Enclosure Maintenance by Amy Pinchuk of InField Scientific Inc., Pointe-Claire, Quebec, Canada

Photo by Janet O'Neil

Toshihiko Matsuura of Fujitsu in Japan (left) and Ulrich Jakobus of EM Software & Systems in South Africa presented one of the relatively new demonstrations involving computer modeling.

Photo by Dick Ford

Irina Kasperovich of ANDRO Consulting Services (left) welcomed Sharon Hall, the recipient of the EMC Society's President's Memorial Award, to her demonstration area where she provided expertise on computer modeling.

- How Parasitic Effects in Inductors and Capacitors Affect Electrical Equipment by James J. Whalen of the Department of Electrical Engineering, State University of New York at Buffalo, Buffalo, New York
- Reverberation Chamber Testing by Michael O. Hatfield, D. Mark Johnson and Michael B. Slocum of the Naval Surface Warfare Center, Dahlgren Division, Dahlgren, Virginia
- Common Ground Impedance Coupling Phenomena by Heritianarisoa Rakouth and Clane Cammin of Delphi Automotive Systems, Saginaw, Michigan
- Measurements of Surge Waveforms - Trickier Than You Think! by Mike Hopkins, Thermo KeyTek, Lowell, Massachusetts
- Measurement and Modeling of Parasitic Emissions Generated by Micro-Controllers by Christopher Lochot of Motorola, Toulouse, France in collaboration with Etienne Sicard of INSA/DGEI, Toulouse, France and Sebastien Calvet of Motorola, Toulouse, France
- Analyzing Current Paths and Magnetic Field Effects (based on Douglas C. Smith's experiment "Noise Measurement by Induction") by Roy C. Ediss of Philips Semiconductors, Southampton, United Kingdom
- Real World Performance of Common Components by Greg Snyder and Mike Violette of Washington Laboratories, Gaithersburg, Maryland
- Wavelength Demonstration in a Cable by Mark DeBattista of Harley-Davidson Motor Company, Milwaukee, Wisconsin
- About Measurement Problems of Electric Field Intensity by Oleg U. Vodyaho of Kharkov National Technical University of Radioelectronics, Ukraine
- Use of Ferrites for EMI Control by John Horner of Fair-Rite Products Corporation, Wallkill, New York and Jim Burgard of DLS Electronic Systems, Inc., Wheeling, Illinois
- Parallel Plate Power Bus Behavior With Discrete Decoupling Capacitors and Capacitive and Inductive Crosstalk in Printed Circuit Boards: Simple Models Yield Design Insight by Lee Hill and Randal Vaughn of Silent Solutions, Amherst, New Hampshire
- Reducing the Harmful Effects of ESD on Electronic Circuits by Ahmad Fallah of CIENA Corporation, Cupertino, California, Lincoln Davidson of Analog Design, Fargo, North Dakota and Robert Nelson of North Dakota State University, Fargo, North Dakota
- EMC of Ultra Wideband (UWB) Communications by Art Light of ITT Industries, Alexandria, Virginia
- Voltage Field Levels Generated by Everyday Appliances/Electronics by Mark DeBattista of Harley-Davidson Motor Company, Milwaukee, WI
- EMC-Ferrites: Simulation and Practical Measurement by Alexander Gerfer of Würth Elektronik USA, Ramsey New Jersey c/o Wurth Elektronik GmbH & Co KG, Germany
- Shielding Effectiveness of Cables to ESD by Doug C. Smith of D.C. Smith Consultants, Los Gatos, California
- Automatic Measurement System for Margin of System-Level Radiating Susceptibility by Zhou Kaiji of Key Laboratory of Electromagnetic Compatibility, Canada
- EMC Demo Box: Conducted and Radiated Emissions by Marcel van Doorn of the Philips EMC Competence Centre, Eindhoven, The Netherlands
- Automated Detection of Transient Electric and Magnetic Fields with Unknown Amplitude by A. Mahanfar, S. Bila, S. Verdeyme and M. Aubourg of IRCOM, Limoges, France

Additionally, demonstrations were given on site by the winners of the Student Design Competition, which is also sponsored by the Education and Student Activities Committee. The 2002 recipients were Stella Filippatos and Frederic Dumas of L' Ecole Polytechnique de Montréal, Montréal, Québec, Canada. The objective of the competition was to develop the best solution to a standardized broadband EMI problem using a design kit while maintaining the capability to perform required electronic functions for the 100 kHz to 100 MHz frequency range.

The computer demonstrations were conducted in parallel with the hardware experiments. These illustrated the application of practical EMC modeling approaches and simulation techniques to simple canonical problems. The application of discrete analytical models as well as rigorous numerical techniques were demonstrated for selected problems. These included the moment method (MoM), uniform theory of diffraction (UTD) and variations on the asymptotic ray tracing method, finite difference time-domain (FDTD), finite element modeling (FEM),

transmission line methods (TLM), and other approaches. The emphasis was on demonstrating the efficacy of analytical, computer-based problem solving methods for a selected problem using a general-purpose code. The IEEE EMC Society encourages engineers to investigate the utility or applicability of these methods to addressing their specific EMI/C concerns, but does not endorse in any way the software codes, tools, or techniques used in the demonstrations.

This year's agenda of computer modeling and simulation demonstrations included:

- The EMC Expert System ar Work - Identifying Sources of EMI on PCBs by Markus Buecker, Zuken, EMC Technology Center Paderborn, Germany
- Real-Time Calculation and Plotting of 2-D or 3-D Theoretical NSA Calculations by Manny Barron of Hewlett Packard Company, Cupertino, California
- Evaluation of Coupling through Apertures using FDTD by Colin Brench of Compaq Computer Corporation, Marlborough, Massachusetts
- Modeling Shielding Effectiveness of Structures with an Asymptotic Approach by Matthew Miller, Ken Welch, and Robert Kipp of SAIC-DEMACO, Champaign, Illinois
- How to Accurately Simulate High-Speed Frequency Dependent Losses in Transmission Line Systems by Brian Burke of Interactive Products Corporation, Cary, North Carolina
- System-Level EMC Antenna Coupling Analysis for Large, Complex Structure Topologies Using a Multi-Fidelity Modeling and Simulation Approach by Andrew L. Drozd, Irina P. Kasperovich, and Sharon C. Hall of ANDRO Computational Solutions, Rome, New York
- Modeling the Shielding Effectiveness Using Integral Equation Techniques by Ulrich Jakobus of EM Software & Systems, Stellenbosch, South Africa
- A Lambda-Sized Box Shielding at 2.3 GHz with Some Gasketing Using the Method of Moments by Toshihiko Matsuura of Fujitsu Limited, Kawasaki, Japan
- FEM Analysis of Printed Circuit Board Signal Coupling by John Howard, EMC Consultant, Sunnyvale, California
- Antenna to Antenna Coupling Simulation Using the Shooting and Bouncing Rays (SBR) Technique by Matthew Miller, Ken Welch, and Robert Kipp of SAIC-DEMACO, Champaign, Illinois
- Using FDTD for Real-World EMC Simulation by Bruce Archambeault of IBM, Research Triangle Park, North Carolina
- Demonstrating the Necessity of Model Validation for Electromagnetic Codes by Maqsood Mohd of Sverdrup Technology, Eglin AFB, Florida
- Modeling of Simultaneous Switching Noise in High Speed Systems by Igor V. Vasiltsov of the Institute of Computer Information Technologies, Ternopil Academy of National Economy, Ukraine
- Fundamental Concepts of Spice Simulations by Mark Montrose of Montrose Compliance Services, Santa Clara, California

You can clearly see the diversity of topics and the blend of talent that was brought to bear here, providing an excellent and unique educational opportunity over the three main days of the symposium.

I should point out that something this ambitious does not come without its share of problems. We did run into several situations where the equipment or software did not work quite as expected. This led to several of the presenters and attendees working together in real time to find clever and resourceful ways of overcoming problems. This practical demonstration of team troubleshooting in real time was an educational exercise in and of itself. Let's give Murphy's Law some credit for creating opportunities for education in the raw, as it were.

Acknowledgements

First, our thanks go out to each of the presenters for contributing to the overall success of the demonstrations. Also, we are indebted to the volunteers who helped coordinate and arrange these demonstrations, in particular, Gregory Lawrence, Edwin Dunlap, and Vita Feuerstein, who together did an outstanding job with regard to logistical planning, supplying equipment, and setting up the demonstration stations in the Exhibit Area. We are also very grateful once again to Tektronix, Rohde & Schwarz, Advantest, Agilent/Hewlett-Packard, KeyTek, and Schaffner EMC for providing the oscilloscopes, spectrum and network analyzers, EMI receivers, signal and function generators, meters and probes, and other hardware for the demonstrations. Thanks also go to Dr. Bruce Archambeault of IBM, Research Triangle Park, North Carolina who co-chaired the EMC Computer Modeling and Simulation Demonstrations forum. **EMC**

Ringing the Bell - Call for Demonstrations!!

We are in the process of planning demonstrations at the IEEE EMC Symposia in Istanbul, Turkey (May 2003) and Boston (August 2003). A Call for Experiments and Demonstrations for next year's events is available on the web. If you have ideas for a demonstration and want to have it considered, please visit the EMC Society home page at www.emcs.org, and the 2003 EMC Symposia web sites at www.ortra.com/emc2003 (Istanbul) and www.emc2003.org (Boston). We are particularly interested in experiment demonstrations that may have a computer modeling and simulation or technical paper counterpart.

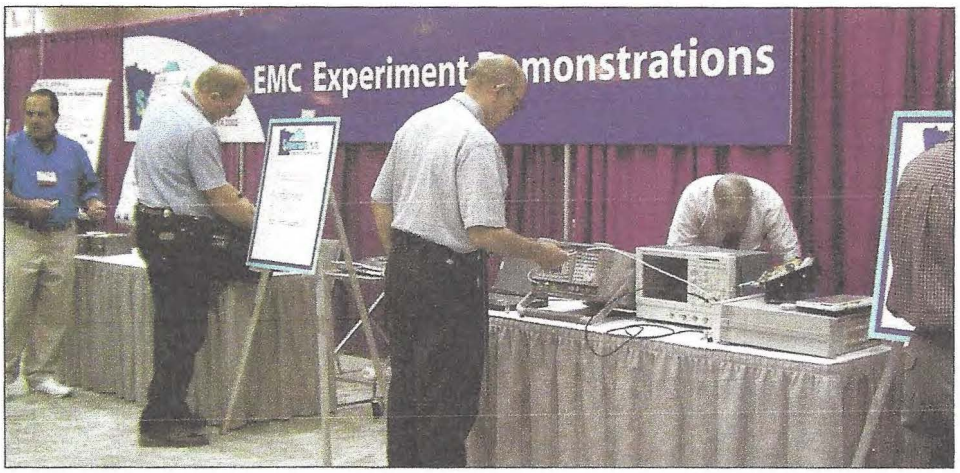

Photo by Shmuel Auster

Numerous volunteers assist with the set-up of the "EMC Experiment Demonstrations" area.

An Overview of Recent Developments in Nanotechnology

A Distinguished Lecture by
Dr. M. Meyyappan, Director, Center for Nanotechnology
Sponsored by the IEEE Nanotechnology Council

ABSTRACT: Nanotechnology deals with the creation of functional materials, devices and systems in the nanoscale through exploiting novel properties (electrical, physical, chemical...) arising solely due to the nanoscale. This is a broad, enabling technology with expected impact on materials and manufacturing, electronics and computing, health and medicine, energy, transportation, national security and space exploration. The basic science and applications are of great interest to the IEEE community. This talk will provide an overview of novel nanoelectronics concepts based on carbon nanotubes (CNTs) and molecular electronics, nanosensors and detectors, nanoelectromechanical systems (NEMS), nanoscale materials and fabrication techniques.

ABOUT THE SPEAKER: Dr. M. Meyyappan is the Director of the Center for Nanotechnology at NASA Ames Research Center in Moffett Field, California. NASA's nanotechnology center, established in 1997, consists of about 50 scientists working on various aspects of nanotechnology including carbon nanotubes for nanoelectronics, sensors and detectors, molecular electronics, inorganic nanowires for sensors and devices, protein nanotubes, nanotechnology in gene sequencing, quantum computing, computational nanotechnology, computational quantum electronics and optoelectronics. The center has strong academic ties through programs for undergraduate and high school interns, and visiting faculty and graduate students.

Dr. Meyyappan's research interests include nanoelectronics, nanodevices and sensors, CVD and plasma CVD approaches for growth of nanotubes and inorganic nanowires. He has published over 80 papers in refereed journals including 25 in nanotechnology related subjects and has given over 50 Invited, Plenary and Keynote talks and Invited seminars in the last four years. He is a member of the Interagency Working Group on Nanotechnology (IWGN), which is responsible for the National Nanotechnology Initiative (NNI). He is the chairman of the Nanosensors Working Group of the IEEE Nanotechnology Council. He has a Ph.D. from Clarkson University and is a member of IEEE, AVS, MRS, and ECS. He is on the Editorial Board of the Journal of Nanoscience and Nanotechnology. For further information, please visit www.ipt.arc.nasa.gov.

TO SCHEDULE A LECTURE: IEEE Sections, Chapters, Student Branches or Nanotechnology Council Regional Interest Groups wishing to schedule a lecture should contact:

M. Meyyappan
Director, Center for Nanotechnology
NASA Ames Research Center
Moffett Field, CA 94035
Phone: 650-604-2616
Email: meyya@orbit.arc.nasa.gov
Web: http://www.ipt.arc.nasa.gov

Editor's Note: The EMC Society is a member of the Nanotechnology Council.

Chip Inductors

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IEEE Fiscal State of Affairs: VI

Peter Staecker, Divison IV Director (p.staecker@ieee.org)

September 2002

Summer, specifically, the period of time between the June Board Series and Labor Day, is a time of preparation. TAB financial staff has been busy obtaining final inputs from Societies that will be rolled up to the IEEE level by the next Board Series in November. Since June, the financial markets have been lurching around; net downward, and we all are feeling the pinch of tighter fiscal constraints. Societies whose technical areas of interest include telecommunications, optical networks, and semiconductors are seeing declining conference attendance and income. 2003 IEEE dues increases were approved in June. As of the end of July, year-to-date IEEE membership is up about 2%, while the total Society membership is flat compared to last year. Over this same period of time, membership across the Division IV Societies is down by about 2%. In spite of the lackluster performance of the market, IEEE operations are still strong, and scrutiny of the infrastructure value proposition is continuing.

Infrastructure Expenses

In July, an independent accounting firm began a review of IEEE operations, a study requested by Society Presidents. This study is scheduled for completion in August, and September and October are reserved for report finalization. The expense for this exercise is the only significant reporting event under initiative programs since my last report, and was approved as an out-of-cycle initiative expense in June by TAB and the Board of Directors.

In June, substantial additional infrastructure cuts were identified for the June view of the 2003 IEEE Budget. While over half of this impacts IEEE staffing, much of the remainder is targeted at reducing publications costs. One component of publications reduction is the proposal that manufacturing processes for our journals be changed. The recommendations are that the paper weight be reduced, and the trim size of the margins be reduced by 1/4 inch in width and 1/8 inch in depth. Although the Computer and Communications Societies have adopted these changes, the sense of many other Societies was that this proposal needed more thought. A solution is brewing. In a separate activity, the IEEE Awards Board and its cost infrastructure are under review by an adhoc committee of the BoD.

At the TAB level, as mentioned in the previous report, the distribution of indirect infrastructure charges is still being studied and is scheduled for re-presentation at the November meeting.

Business Rule Simplification

In November 2001, the BoD charged RAB and TAB with identifying business rule changes to realize a possible $3M annual savings in infrastructure charges associated with membership services. RAB and TAB Business Rule Simplification teams have been working the details since February. TAB committee discussion has focussed on simplifying the options available for Society membership, and the subscription process for members regarding optional Society publications. TAB's Strategic Planning and Review Committee is engaged in a wider discussion on the value proposition of Society Membership and optional publications.

In June, TAB endorsed the concept that, in general, member fees and prices should at least cover the relevant variable costs. To that end, each Society/Council (S/C) will annually be provided with the appropriate variable costs and shall consider them seriously in setting member fees and prices. Modification of S/C financial reporting templates has started, allowing explicit tracking of the membership costs. But formatting the data is the easy part, compared to the task of defining and identifying the relevant variable costs. These efforts are currently slowed down because a parallel effort at the IEEE level to define the cost of membership has surfaced the need for consistency in the TAB and IEEE definitions of cost. While this consistency effort proceeds at the staff level, temporarily stalling the cost-of-membership progress, it is important to keep our eyes on the goal. And that goal has two parts:

a. simpler membership renewal process (reduced set of member categories)
b. simpler method of offering optional publications (reduced set of pricing categories by membership)

RAB is addressing other details of Membership Business Rules simplification, whose eventual success depends heavily on the acceptance of web renewal (35% in 2001, 47% in 2002 – comparing mid-June numbers).

2002 Forecast (Update)

As of the July year-to-date actuals, the IEEE operations forecast is net positive while the TAB forecast is net negative. This is not as bad as it might seem. For 2002, there have also been substantial infrastructure cuts, which, because of the financial model, will flow to TAB's bottom line as substantial improvements. After the accounting adjustment, the S/C net will also be positive. On the investment side of the balance sheet, news at this reporting time is not great, as the market fluctuation is negative as of July.

Discussion

The principles of the IEEE Financial Model have partitioned operations from investments. Improvements in operations continue, together with identification and allocation of infrastructure costs. Infrastructure costs are being driven down, with net positive effect to the Societies and Councils of TAB. There is additional work to do. For those of you who read this before the IEEE elections, read the statements of the candidates carefully to see what ideas they have on our four favorite topics: initiatives (selection and management process), infrastructure review process, business rule simplification, and financial model. If the winners have already been selected, ask them to share their ideas for improvement!

One last note: The end of the year and my term as your Division IV Director is approaching. Although you may hear from me one more time, it is appropriate to introduce your Division IV Director for 2003-2004, Hal Flescher. He arrives fresh from handling the job of TAB Treasurer, and is eminently capable of carrying these discussions to the next level. Welcome, Hal! **EMC**

Board of Directors Activities

Sunday, August 18 and Thursday, August 22, 2002

Minneapolis, Minnesota

THE PRESIDENT'S OPENING REMARKS

President Todd Hubing called the meeting to order at 9:00 am. A round of introductions was made. Board members present included H. Benitez, R. Brewer, J. Butler, L. Carlson, L. Cohen, B. Crain, A. Drozd, R. Ford, F. Heather, D. Heirman, T. Hubing, E. Joffe, W. Kesselman, M. Montrose, J. Muccioli, J. Norgard, J. O'Neil, H. Ott, Z. Pantic-Tanner, J. Perini, G. Pettit, A. Podgorski, C. Sartori, K. Williams, and T. Yoshino. There were no members absent. Guests present included M. D'Amore, T. Bertka, A. Cerana, D. Clark, G. Cory, C. Faduska, H. Gaul, W. Gjertson, R. Goldblum, C. Herbers, H. R. Hofmann, H. Mertel, S. Schneiderman and P. Staecker. President Hubing presented the agenda. The timing of a few items was changed. Since the last Board meeting, President Hubing advised that he had received several e-mails concerning a commercial short course that appeared to be endorsed by IEEE. This is being held in conjunction with the Minneapolis EMC Symposium. Mr. Hubing has spoken with the appropriate people at IEEE to rectify this situation. However, he feels it shows that we need to control the use of our logo and communicate with our members that the use of our logo shows endorsement, while no logo present indicates that there is no endorsement. Somehow the EMC Society needs to manage the implication that the EMC Society is technically endorsing any type of entity. Mr. Hubing also discussed the memo he had received from Bob Goldblum regarding disassociating the EMC Society from the IEEE. This document was distributed via e-mail to the Board of Directors. Mr. Hubing encouraged Board members to share their views on this document with Mr. Goldblum during the symposium. Mr. Hubing asked which Board members are planning to attend the EMC conference in Sorrento next month. He advised that the Board would host a reception for the steering and organizing committees of EMC Sorrento. The following day there will be a business luncheon to discuss a potential "IEEE EMC Europe", i.e. one major EMC conference in Europe that is coordinated among the respective chairs of the Zurich, Wroclaw, UK, and Italy EMC symposia. Mr. Hubing also advised that Tom Chesworth has resigned from the Board. There is no immediate plan to replace him since we have an extra Board member currently on the Board (due to the last election resulting in a tie vote).

SECRETARY'S REPORT

Secretary O'Neil presented the minutes from the Board meeting on May 31, 2002 for review. The minutes were approved as amended.

TREASURER'S REPORT

Treasurer Warren Kesselman presented his report. The Board approved the following refinements to the 2003 2nd pass 8-1-02 budget, Committee and Other account lines: AdCom Committee: Increase by 10K to 85K; Standards Coord: Increase by 5K to 17.2K; Publicity and PR: Decrease by 5K to 5.6K. Mr. Kesselman advised that these changes are reflected in the refined 2003 2nd pass budget to be submitted to TAB by August 28, 2002. The net effect of the changes is a $10K reduction in the estimated 2003 budget surplus to 7.4K. Mr. Kesselman advised that as of 30 June 2002, the EMCS had an operating surplus of $208K and the net worth of the EMCS is $1,086K. He also estimated that second half 2002 expenses will probably reduce the 30 June surplus to about zero by year-end.

DIVISION IV DIRECTOR'S REPORT

Peter Staecker presented his report on the current financial status of the IEEE. He advised that the IEEE budget for years was based upon assuming a 9% return on investments. When these returns were not achieved, a deficit budget resulted. The IEEE has been taking steps to reduce the deficit by cutting costs, charging infrastructure fees to the Societies, and increasing membership dues. The IEEE has hired a financial accounting firm to oversee the handling of the infrastructure

Several members of the EMC Society Board of Directors were present in Minneapolis, including Dick Ford, Elya Joffe and Ghery Pettit. Pictured from left are Mr. Ford of the Naval Research Lab, John Hirvela of Hewlett Packard, Mr. Joffe of KTL Project Engineering, Mr. Pettit of Intel, Art Light of ITT Industries, and Shmuel Auster of Elisra Electronic Systems.

The EMC 2004 Steering Committee already hard at work. A dinner meeting was held in October with Henry Ott to review the Symposium Policies and Procedures. Left to right: Henry Ott (EMCS), John Howard (Chair), Srini Chandrasekaran (Treasurer), Tom Cokenias (Secretary), Mike Heckrotte (Vice Chair) and Darryl Ray (Publicity).

charges. There has been a $7 million cut in infrastructure charges. Mr. Staecker also noted that the publications department has cut costs by reducing the paperweight for published material, minimizing margins, etc. These steps taken to reduce costs will be institutionalized. Additional topics of interest include TAB's development of a "membership model" and consideration of member cost guidelines. Mr. Staecker also discussed some of the IEEE offerings, such as Xplore, and publication/periodicals packages that generate revenue for the IEEE. The IEEE is considering opening up its membership to IT professionals. Mr. Hubing thanked Mr. Staecker for coming to the Board meeting from Boston to make his presentation.

Photo by Janet O'Neil

EMC Society Board of Director member Andrew Podgorski of ASR Technologies visits with Michael and Paul Bender of Carnel Labs and Scott Lytle of Yazaki North America (from left) during the symposium exhibition. Michael is Paul's grandson and he handles engineering for Carnel Labs.

COMMUNICATION SERVICES

Len Carlson, Vice-President for Communication Services, presented his report. He introduced Professor Marcello D'Amore, Transactions on EMC Editor-in-Chief. Professor D'Amore discussed the electronic paper review process, which is being handled by IEEE "Manuscript Central". This is a state-of-the-art Internet-based review process. Using this capability has reduced the time from submission to delivery of a peer-reviewed article while maintaining or improving quality. He presented a proposal for over length page charges for regular papers in order to increase the number of printed pages per year without changing the budget allocated for the publication of EMC-T and to encourage authors to reduce the length of submitted manuscripts. As a consequence, this will allow an increase in the number of papers that can be printed each year within the limit of printed pages. Other Societies currently implement these charges. The average over length charge is $156 USD per page. Future considerations include creating an annual CD of the EMC-T that is distributed with the EMCS annual symposia record CD. Professor D'Amore discussed promotion of the EMC-T at the Wroclaw EMC Symposium in June 2002 and to Universities/institutions in Spain and Australia. Regarding topic statistics in 2001, the majority of papers submitted (39%) were related to transmissions lines and printed circuit boards. The second most popular topic (16%) was measurement technology. The special issue for 2003 will be titled "Advanced EMC Numerical Modeling" with guest editors being James Drewniak and Christos Christopoulos. This will be published in February. Janet O'Neil, Newsletter Editor, then presented her report. The Summer 2002 issue came in at 52 pages. One more grade of lighter weight paper stock was used for this issue than the Spring 2002 issue to further cut back on printing and mailing expenses. The issue will available on the EMCS website. Susan Schneiderman of IEEE Media has secured the advertising for the Newsletter. A summary of Newsletter advertising revenue and costs were shown. Next, Mark Montrose presented his report as IEEE press liaison. He advised that the last IEEE Press Board meeting was conducted virtually via teleconferencing to save money. Several people globally participated in this meeting. The relationship between the IEEE and Wiley & Sons has been going very well. The total royalty paid in 2002 to the EMCS was $1,421.59. The latest book available that was sponsored by the EMCS is on anechoic chambers by Dr. Leland H. Hemming. This book will be available from the IEEE Press booth during the Minneapolis EMC symposium. It will be reviewed in the Fall 2002 issue of the EMC Newsletter. Mr. Montrose then asked Catherine M. Faduska, Senior Acquisitions Editor of the IEEE Press, for comments. Ms. Faduska discussed the increased capabilities of the IEEE Press due to its liaison with Wiley & Sons. They are working to be more proactive in soliciting authors and topics for future books. She encouraged members to consider working with the IEEE Press for book publications. Lastly, Andy Drozd presented his report as the EMCS Webmaster. He is continuing to work with the technical committees to update their websites and update the IEEE logo to reflect current IEEE policy. A web guideline is being prepared for the Technical Committees (TCs) that is tailored to our specific needs. Regarding web advertising, one additional advertiser signed up since the last meeting. This is from VTI Vacuum Technologies. The IEEE has provided information on bundled web/publication ad programs. Don Heirman acknowledged and thanked Mr. Drozd for the website activity he has undertaken on behalf of the TCs.

STANDARDS SERVICES

Don Heirman, Vice-President of Standards, presented his report. It was noted that the webpage (http://www.ewh.ieee.org/soc/emcs/) for EMC Standards is now operational. Standards activity is currently at an all time high and covers three major areas: The Standards Education and Training Committee (SETCom) chaired by Hugh Denny, the Standards Advisory and Coordination Committee (SACCom) chaired by Elya Joffe and the Standards Development Committee (SDCom) chaired by Stephen Berger. He showed the schedule of Stan-

dards Committee activity during the symposium week. All three standards committees will meet during the week. They will participate in the RAC/ SACCom Luncheon and will lead a workshop on standards from 1:30-5:30 pm on Monday. Several standards working groups will also meet during the week. Each working group is on schedule and no major problems have been reported. Mr. Heirman noted that the SETCom has contributed eight articles for publication in the EMC Newsletter and has organized three workshop sessions during the annual EMC symposia. Hugh Denny, chair of SETCom will be stepping down at the end of 2002 and wishes to have a replacement named. Anyone interested should send an e-mail to Mr. Heirman at d.heirman@ieee.org. Lastly, Mr. Heirman showed the matrix of SDCom standards that listed the current status of the IEEE standards they are working on.

Photo by Dick Ford

Elya Joffe promoted the 2003 IEEE International Symposium on EMC in Istanbul, Turkey when he wasn't attending the EMC Society Board meeting. Lending him a helping hand are his daughter Tami Lee (right) and Gaye Ertan, an agent of Omar's Destination Services in Istanbul. Gaye came to the symposium from Istanbul just to promote the symposium. Her costume, therefore, is not only beautiful, but original and real!

MEMBER SERVICES REPORT

Andy Drozd, Vice-President of Membership Services, presented his report. The total number of active members as of June 2002 is 4,681. This is down approximately 5.8% compared to the same time in 2001. Regarding the Membership Committee, Bruce Crain advised that he has taken care of arrangements for the two EMCS membership booths at the Minneapolis symposium. He produced new signage to replace the worn out booth signage. Flo Haislmaier and Sandy Bush will be staffing the booth this year. Board members were encouraged to stop by and lend some support to their efforts. The Senior Member program has been a bit stagnant lately. Board members were encouraged to let members know that anyone can elevate their membership to the senior level during the symposium by visiting the membership booth. Andy Drozd then reported for Lee Hill, chair of the DL program. There has been quite a bit of DL activity this year. Mr. Hill will submit a minimum of three new DL applications for the 2003-2005 terms to the Board for review at its November 2002 meeting. He is working on a survey for meeting attendees to complete following a DL presentation. This will help DLs know their audiences better and enable them to refine their presentations. The DL program will be promoted during the Chapter Chairman's luncheon. Awards Chairman Henry Benitez next reported briefly on awards. Some of the awards will be presented at the Tuesday evening reception. Dick Ford will videotape this part of the reception and it will be shown at the Awards Luncheon on Thursday. All awards (i.e. certificates, plaques, checks, etc.) have been received in a timely manner from the IEEE. The printed awards program was completed and will be distributed at the Awards Luncheon. Next, Chapter Activities Committee Chairman Ghery Pettit reported that he expects a good turn out for the Chapter Chairman's luncheon on Tuesday afternoon. 16 chapters will be represented at the luncheon. Elya Joffe then presented his report as the Region 8 Activity Chairman. He attended the 16th International Wroclaw Symposium and Exhibition on EMC held during June 25-28 and staffed the EMCS membership booth, with the assistance of Takeo Yoshino. A report on this symposium will be provided for publication in the EMC Newsletter, Fall 2002 issue. He noted that IEEE membership costs still present problems to participants from low-income nations such as Poland, Russia, Ukraine, etc. Mr. Joffe also attended the Symposium Council meeting as the official EMCS delegate on June 28. The purpose of the meeting was to discuss the proliferation of EMC conferences in Europe. Mr. Joffe will also staff the EMCS membership booth at the Sorrento EMC conference in September. He has secured a prominent location for the EMCS membership booth during the 2003 IEEE International Symposium on EMC in Istanbul during May 11-16. Regarding new EMC chapters in Region 8, Mr. Joffe reported activity in the Czech Republic and South Africa. Jose Perini, Region 9 Activity Chairman, discussed EMC activity in South America. He asked Carlos Sartori to discuss the EMC Colloquium and Exhibition that is being organized by the South Brasil EMC Chapter. This will be held on Friday, November 22, 2002 at the Renaissance Hotel in Sao Paulo, Brasil. The advance program/registration form has been printed and will be distributed from the EMCS membership booth during the symposium. Board members were encouraged to register and attend this conference as well as help promote this conference to others. Vendors of EMC products and services are also being solicited for the tabletop display exhibition. This will be the first major IEEE EMC Society sponsored event in South America. Takeo Yoshino then reported on EMC activity in Region 10. He attended the international EMC conference in Bangkok, Thailand (ICEMC'2002) over July 24-27. It was a very good conference. Kimball Williams also attended this conference. They staffed an EMCS membership tabletop display at this event. All of the IEEE promotional material displayed at

the booth was distributed, including membership applications and the 2003 IEEE International Symposium on EMC in Istanbul "Call for Papers." There was a problem recruiting new IEEE members because the fee was considered too high for the engineers in Thailand. A report on this conference will be provided for publication in the EMC Newsletter, Fall 2002 issue. A letter from the ICEMC'2002 Technical Committee Chairman was included in Mr. Yoshino's report. This letter expresses formal thanks to the EMC Society for supporting the conference. There is a new EMC chapter in Sendai, Japan that is chaired by Risaburo Sato. Information on this chapter is included in the Summer 2002 issue of EMC Newsletter in the "Chapter Chatter" column. There are 32 members of the Sendai chapter who were formally members of the "Japan EMC Chapter". EMC Sendai 2004 is being planned for early June. The Chairman is Professor A. Sugiura. The Japan (greater Tokyo area) EMC chapter thus now has 238 members since the Sendai chapter was formed. Regarding other new EMC chapters in Region 10, Mr. Yoshino reported that he has made contact with the Australia EMC Society and has encouraged them to become a part of the IEEE. Mr. Drozd next reported for Bill Duff that two Fellow nominations only were received and evaluated by the EMCS this year. Bill Duff will be present at the Awards Luncheon to personally present the Fellow Awards. Mr. Drozd is evaluating the role of PACE in relation to the EMCS. There has not been any activity in this area under the chairmanship of Bill McGinnis. Dick Ford then discussed the annual symposium survey. He is planning a major change to the survey this year. People will be asked first if they are a member and if not, they are asked to skip to question 10. Additional changes were made to questions concerning the Newsletter and whether or not our members were planning to attend the 2003 IEEE International Symposium on EMC in Istanbul. Regarding the CD effort, the demonstrations CD made in memory of the late Don Bush has been produced in a limited quantity. This will be distributed during the Minneapolis symposium. New CDs are under discussion for the Education Committee. Lastly, Joe Butler presented his report as Chairman of the Nominations and Bylaws Committee. Regarding the ballot for the EMCS Board of Directors, there were 12 nominees for six EMCS Board positions commencing in January 2003. The nominees represented all IEEE Regions, except the Region represented by our current president. The nominations committee focus now is on Board officer elections, which will take place at the November 2002 Board meeting in Sao Paulo, Brazil. Mr. Butler advised that he would address the bylaws changes later in the meeting.

CONFERENCE SERVICES

Henry Ott, Vice President for Conference Services, presented his report. Mr. Ott then introduced Barry Wallen to report on the various symposia. Mr. Wallen reviewed the status of future symposia as follows: 2001: Montréal: Benoît Nadeau, chair of this symposium, advised that the audit is currently underway at IEEE. The final symposium surplus was $258,000 USD, of which the local Montreal EMC Chapter will retain $10,000 USD. Mr. Nadeau presented a check for $48,000 to the Society as final payment of the symposium surplus (a $200,000 check was previously given to the Society in May 2002); 2002 Minneapolis: Mr. Wallen advised that the registrations are down by 100 member and non-members, which amounts to some $100,000 USD down in registration revenue from the prior year's symposium. The total registration number is 1,590 of which 363 are IEEE members and 184 are non-IEEE members. There were 697 exhibitors registered. The balances of registrations were guests, students, EMCS Life Members, and "other". There were a total of 160 exhibitors occupying 232 full sized booths and 13 tabletop booths; 2003 Boston: Joe Butler, Vice-Chair of the Boston Symposium, advised that they will have a booth at the Minneapolis symposium to promote the Boston symposium. The majority of the steering committee members will attend the symposium this week. The convention center contract is complete. The hotel room block has been reduced based upon actual hotel room pick up in Minneapolis. Boston exhibitor packages will be distributed during the Minneapolis symposium. The symposium website is now ready for visitors. The 2003 symposium gala event will take place at the Boston Museum of Science. Vita Feuerstein of IEEE will handle the conference management and Sue Kingston of Electronic Conventions International (ECI) Tradeshow Services will handle exhibit sales (ECI is a division of IEEE); 2003 Istanbul: Elya Joffe presented a verbal report on this symposium. He distributed the "First Announcement and Call for Papers." All necessary adjustments to accommodate the move from Tel Aviv to Istanbul have been made. As a result, extra costs have been incurred to reprint the call for papers, create new advertisements, etc. The Board approved changing the amount of the symposium surplus from 15% to 5%; 2004 Santa Clara: Mr. Wallen advised that Franz Gisin has stepped down as Chair of this sympo-

Board members join EMC Society members for a little socializing before the start of the symposium week. Bob Dockey of Phillips Medical (far left) and Dennis Friday of NIST (far right) joined Board members Janet O'Neil, Todd Hubing and Ghery Pettit (center from left).

sium. The Board approved the selection of John Howard as the chairman for the 2004 IEEE International Symposium on EMC; 2005 Chicago: Tom Braxton, Chair of the 2005 Symposium steering committee, has advised the committee is researching various conference management firms, including IEEE; 2006 Portland: Henry Benitez is the chair of this symposium. He has a core committee formed. Various conference management services firms, including IEEE, are being evaluated; 2007 (50th ANNIVERSARY OF THE EMC SOCIETY): There were three presentations given by representatives of the Honolulu, Fort Lauderdale, and St. Louis Visitors Bureau and Convention Centers. Todd Bertka, Carol Herbers and Anita Cerana gave these presentations, respectively. Each person presented reasons why the EMC Society should consider holding the 2007 50th Anniversary Symposium in their respective city. In closing this report, regarding the St. Petersburg EMC Symposium, Mr. Ott noted that the EMCS is not a technical co-sponsor, however, their promotional material for this conference uses the EMCS logo. Mr. Hubing advised that he would write a letter to the organizers of this conference to ask them to remove the EMCS logo from their promotional material. Janet O'Neil then presented her report as Exhibitor Liaison. She has been working with Vita Feuerstein of IEEE on various exhibitor issues as they come up these past few months. She will be present for the Exhibitor's Breakfast to be held in Minneapolis and noted that Elya Joffe will present information on the new venue for the symposium in Istanbul. Lastly, Janet O'Neil presented her report as Regional Conference Chair. There were several tabletop shows planned in early 2002. Coverage for these shows was shown in the EMCS Newsletter. There is one tabletop show scheduled for the fall of 2002. This will be a November 22, 2002 colloquium and exhibition organized with the South Brazil EMC Chapter. Future tabletop shows for 2003 include April 30 with the Central Texas Chapter (Austin), May 20 with the Chicago Chapter and June 6 with the Southeastern Michigan Chapter. In the fall, the cities of Los Angeles, Atlanta and Melbourne are being considered for tabletop shows. Plans for the tabletop shows will be discussed and/or confirmed at the Chapter Chairman's luncheon in Minneapolis.

Photo by Dick Ford

Representatives from the Convention and Visitors Bureau attended the August meeting of the EMC Society Board of Directors. President Hubing thanks Anita Cerana (St. Louis), Todd Bertka (Honolulu) and Carol Herbers (Fort Lauderdale) (from left) for making presentations on their respective cities as possible locations for the 2007 IEEE EMC Society Symposium. 2007 marks the 50th Anniversary of the EMC Society.

TECHNICAL SERVICES

Kimball Williams, Vice President for Technical Services, presented his report. The NARTE questions are being pooled and reviewed now. The resulting questions will be used for the NARTE exam to be held on the Friday of the symposium week. The Technical Services budget through 2006 was presented. Mr. Williams noted that Virgilio Arafiles, Chair of the Technical Advisory Committee (TAC), plans to submit a revised TAC handbook reflecting the TC3 and TC4 charter changes and the addition of TC10. The TC8 (Product Safety) plans to become an IEEE Society are on schedule according to Jack Burns. The TCs reviewed 236 papers for the 2002 Minneapolis Symposium. The TAC succession leadership is scheduled to occur during the August 22 TAC meeting. Dave Case, Chair of the Representative Advisory Committee (RAC), has asked to be replaced. He has new work commitments such that he can no longer adequately address this committee work. The annual RAC/SAC luncheon will take place as planned. Mr. Case will attend the Minneapolis Symposium and chair this luncheon, however, after this he will need to step down as the RAC chair. Mr. Williams reviewed the Education and Student Activities report of Chairman Maqsood Mohd. The committee is very active during the symposium week. The student paper contest had 23 papers under consideration this year, versus 21 papers last year. The student design contest is in its third year of competition. The contest was promoted in the EMC Newsletter and the request for design kits was tremendous. Some 32 kits have been sent to requestors from around the world. This year five entries were received; one was from the US and four were from non-US entities. The experiments and demonstrations have been lined up for the symposium and were excellently located within the exhibits area. There will be an article on all the activities of this committee in the Fall 2002 issue of the EMC Newsletter.

OLD BUSINESS

Joe Butler discussed the draft EMCS financial policy. Some amendments to the policy were made from the floor. The Board approved the amended draft financial policy document

NEW BUSINESS

The following items were discussed under New Business:

BYLAW CHANGES

Nominations and Bylaws Committee Chair Joe Butler discussed various EMCS administrative issues that necessitated changes to the bylaws. The Board approved several changes to the bylaws. These are posted on page 66 of this Newsletter.

DRAFT WHITE PAPER ON POLICY FOR EMCS MEMBERSHIP ACCESS VIA SOCIETY NEWSLETTER

Kimball Williams presented a draft white paper for the Board to review. This proposed policy was presented as a result of the task force formed to address this topic at the February Board meeting. The motion to accept this policy was tabled.

CD ROM DISTRIBUTION

Dick Ford advised that 400 CD ROMs were produced on the Y2K War Stories and Experiments/Demonstrations for distribution at the Minneapolis Symposium. These will be distributed free of charge to all EMCS Senior Members.

ISTANBUL EMCS AWARDS CEREMONY

The Board approved presenting the EMCS awards during the 2003 IEEE International Symposium on EMC in Istanbul to any award recipients who may be attending this symposium. This includes recipients of all levels of awards. The awards ceremony in Istanbul will be videotaped and this will be shown during the Boston 2003 Symposium. The balance of awards for 2003 will be presented at the Boston symposium.

SUPPORT FOR SCIENTISTS

Elya Joffe presented information on scientists from lower developed countries that cannot attend major EMC conferences. The Board approved allocating a sum of $5,000 USD per annum for supporting qualifying young scientists and mature excellent scientists from low income countries, working in the field of EMC, and providing significant contribution to the said EMCS International Symposia. The Board agreed that the sum allocated to each candidate should not exceed $1,000 USD or 80% of the travel expenses. Mr. Joffe proposed that the IEEE EMC Symposia organizing committees be asked to develop a special, reduced attendance fee for those candidates found eligible for this support. The Board approved increasing the Membership Services 2003 budget by $2.5K to support the spending on young engineers/scientists. The Board then appointed an ad-hoc committee to prepare the policy for granting these funds to the candidates, and report to the Board no later than the November 24, 2002 meeting. The policy shall come into effect on January 1, 2003 or when approved by the Board, whichever is the latter date of the two. Mark Montrose, John Norgard, Jose Perini, Kimball Williams, Andy Drozd, Elya Joffe, and Zorica Pantic-Tanner volunteered to be members of this ad hoc committee.

The Board meeting on Sunday, August 18, adjourned at 5:00 pm. The Board reconvened at a meeting on Thursday, August 22, at 6:00 pm.

President Hubing opened the meeting at 6:15 pm. A round of introductions was made. He introduced Professor Seum Sheker from Turkey who spoke about the 2003 IEEE International Symposium on EMC in Istanbul, Turkey. He spoke about the city of Istanbul and the Hilton Hotel, which will be the headquarters hotel for the symposium. The agenda for the evening meeting was presented.

The Vice Presidents then presented updated reports based upon symposium week activity.

STANDARDS

Don Heirman reported that there were nine committee meetings of the Standards Committees and working groups. There was a notable increase in Standards activity over last year. For example, there were 80 people at the SACCom meeting; last year there were 12 people. All meetings were similarly very well attended. Elya Joffe reported that the SACCom meeting was well attended during the symposium, as was the RAC/SACCom luncheon.

CONFERENCES

Henry Ott introduced Dan Hoolihan who reported on the 2002 symposium. Mr. Hoolihan presented a list of the expenses ($767,470) and income ($872,335) for the symposium. This represents a 12% surplus. He also presented a registration summary for Montreal and Minneapolis. There were 2,066 attendees in Montreal and 2,267 attendees in Minneapolis. This is broken down as follows:

455 - 408 member full registrations in Montreal/Minneapolis

259 - 201 non-member full registrations in Montreal/Minneapolis

254 - 106 accompanying persons in Montreal/Minneapolis

415 - 724 all others in Montreal/Minneapolis

Mr. Ott then discussed the 2007 symposium venue cities, including San Diego, St. Louis, Fort Lauderdale, and Honolulu. He dismissed St. Louis and Fort Lauderdale, for while they may be attractive cities in their own right, he does not feel they are that special for a 50th anniversary symposium location. That leaves San Diego and Honolulu. The San Diego convention center, however, is only available the last weeks in August or early September. The Board agreed to drop San Diego from consideration of possible venues for the 2007 IEEE International Symposium on EMC since the convention center is not available in mid August. Fred Heather suggested presenting more material on Fort Lauderdale and Honolulu to the Board at the November Board meeting.

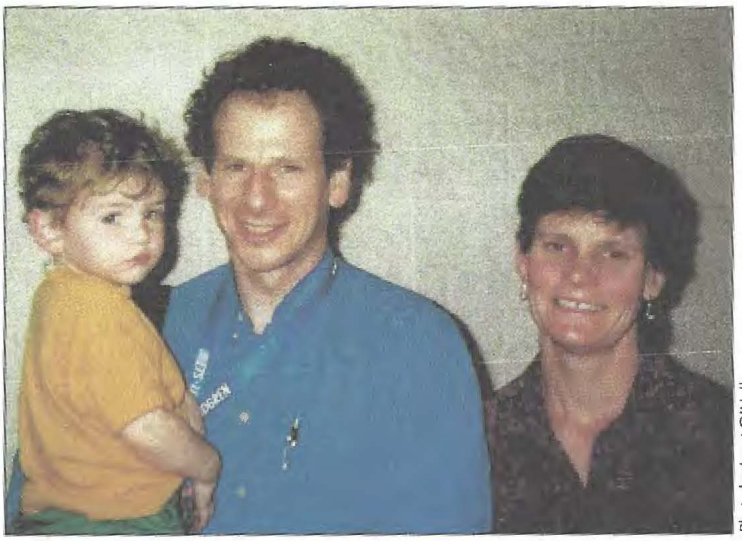


Photo by Janet O'Neil

The Chairman of the EMC Society Distinguished Lecturer program, Lee Hill of Silent Solutions, made the Minneapolis symposium a family affair by bringing along his wife Ellen Groh and their son Aaron.

Photo by Janet O'Neil

The exhibitors are a big part of each EMC symposium. Long time participants Rohde&Schwarz always have a welcoming booth; here's what it looks like crated up and ready to ship! Celebrating another great symposium are (standing, left to right) Chris Petroli, James Young, Volker Janssen, Hans-Geunther Titze, Achim Gerstner, and Sean Emerson. Sitting (left to right) are Vic Hudson and Hans-Peter Bauer.

TECHNICAL SERVICES

Kimball Williams presented Maqsood Mohd's update on the tutorials presented during the symposium week. Attendance was over 450 in the morning and 350 in the afternoon. The experiments were heavily attended. The winning students representing the design contest received many visitors with good questions at their booth. The Education and Student Activities Committee's promotion of excellence in EMC education is working! The students turned in a high quality of papers for the best student paper award and the student design contest resulted in several very high level submittals. During the TAC meeting, Virgilio Arafiles advised that he would like to step down as TAC chair. The Board approved the appointment of Bill Strauss as the new TAC chair. Mr. Strauss reported on recent TAC activity at the symposium. They confirmed that the protocol was in place for the NARTE MOU regarding the exam questions being reviewed by the EMCS technical committees. They discussed the symposia paper reviews for both the Boston and Istanbul symposia. Budget discussions also occurred. TC3 and TC6 have been asked to discuss combining their efforts to be a single technical committee. President Hubing advised that TCs couldn't change their respective charters without approval of the Board. Mr. Strauss advised that only TC4 at this time is considering changing their charter and when they have a revised charter proposed, he will bring this to the Board for review and approval.

Photo by Shmuel Auster

All's well that end's well! After the symposium banquet, Minneapolis symposium steering committee chairman, Dan Hoolihan (second from right), enjoys the last laugh while Janet O'Neil (second from left) dries off after the log rolling activities. Joining in the fun are (from left) Dave Case of Cisco Systems, Colin Brench of Hewlett Packard and Fran Carlson (the Mrs. of Len, EMCS Board VP for Communication Services).

COMMUNICATIONS

Len Carlson advised that since the last meeting of the Board on Sunday, August 18, only Andy Drozd has had activity. As Webmaster, he met with the TCs to discuss the template for posting website activity. This activity is ongoing.

MEMBERSHIP

Andy Drozd asked Bruce Crain to report on membership activity at the symposium. Mr. Crain advised that 15 senior members were recruited and 22 new IEEE members signed up at the symposium in the membership booth. Flo Haislmaier was acknowledged for doing an excellent job in staffing the membership booth. Dick Ford reported that 78 symposium surveys have been returned so far. He hopes to receive more tomorrow. Henry Benitez advised that there was a light turn out for the Tuesday evening reception at which the certificate awards were given. He will work to increase turnout for next year. The awards luncheon went well, although it was suggested for next year that the highest EMCS award be reserved for presenting last. This is the President's Memorial Award. Dick Ford was commended for his work on the video. President Hubing thanked Henry Benitez, Andy Drozd and Dick Ford for their work in organizing a very well planned and executed awards luncheon. The Board approved presenting the certificate of appreciation awards to the organizers of the Istanbul Symposium at the symposium in Istanbul.

NEWSLETTER EDITOR POLICY

Ghery Pettit moved to bring the previously tabled motion off the table regarding the Newsletter editor censorship policy. The motion was defeated.

TRANSACTIONS OVER LENGTH CHARGE

The Board approved charging the author of any paper longer than eight printed pages that are submitted for publication in the Transactions on EMC $175 US dollars per extra page or partial page. The paper over length charge will take effect with papers published in the August 2003 issue of the Transactions on EMC.

FREE MEMBERSHIP IN EMCS – MEXICO AND BRASIL

The Board approved offering a free first year EMCS membership to those who join the IEEE at the November 22, 2002 South Brazil EMC Chapter sponsored Colloquium and Exhibition and to those who join the IEEE at the first meeting in Mexico of EMC engineers that is being organized by Kimball Williams, Jose Perini and Paco Sepulveda.

IEEE EMC SYMPOSIUM BEST PAPER PRIZE

The Board approved awarding a $1000 USD cash prize for the Best Symposium Paper presented at the annual IEEE EMC Symposia. This would be effective with the 2003 IEEE symposia on EMC.

ACTION ITEM REVIEW

President Todd Hubing reviewed the action items discussed during the meeting.

NEXT MEETING

The next meeting of the EMCS Board of Directors will be held on Sunday, November 24, 2002 at the Renaissance Hotel in Sao Paulo, Brazil.

There being no further business, the meeting then adjourned at 9:00 pm.

Submitted by:
Janet O'Neil
Secretary,
EMC Society Board of Directors

New Members of the IEEE EMC Society Board of Directors Announced!

As you know, a ballot for the election of the six members to the IEEE Electromagnetic Compatibility Society Board of Directors was issued on July 29, 2002. The returned ballots have been counted and the following candidates have been elected for a three-year term beginning January 1, 2003:

Bruce Archambeault

Nigel J. Carter

Michael O. Hatfield

Daniel D. Hoolihan

Jose Perini

Andrew Podgorski

Brief biographies of these candidates will be featured in the next issue of the EMC Society Newsletter.

ICEMC 2002 Thailand: An Overview

By Takeo Yoshino, EMC Society Board Member and Region 10 Membership Services Chair

During July 24 to 27, the International Conference on Electromagnetic Compatibility (ICEMC) 2002 of Thailand was held at the Amari Watergate Hotel in Bangkok. This was the first International EMC Symposium in "The Land of Smiles" (Thailand). This conference was mainly supported by the IEEE Thailand Section and the King Mongkut's Institute of Technology Ladkrabang (KMITL) of Thailand. The operation funds of the conference were provided by JICA (Japan International Cooperation Agency), the major financial supporter. The conference chairman was Associate Professor Samruay Sangkasaad of Chulalongkorn University, and the practical management of the conference was handled by Associate Professor Werachet Kharn-ngern, Technical Program Chairman of the conference. The technical operation was supported by the very active volunteers of the research staffs and several graduate students of the EMC Laboratory, Research Center for Communications and Information Technology (ReCCIT) of KMITL. Associate Professor Werachet Kharn-ngern, the most powerful manager of the conference, is the Director of this EMC Laboratory.

Dr. Samruay Sangkasaad, Chairman of ICEMC 2002, Bangkok, Thailand.

The conference was successful. The proposed papers numbered 84, of which 71 were accepted; thus, the acceptability percentage was 84 %. There were a total of 75 presented papers, which included four invited papers. In 14 sessions, topics presented included EMC modeling and related areas, Communications and Information Technology, Power Electronics, High Voltage Technology and ESD, Standards and Noise Measurement, Electronics and PCB, Power System and Power Quality, Bio Effects, and Education. Three special sessions included a keynote address presented at the Opening Ceremony and at the Closing Ceremony. In addition to the above sessions, two Tutorial Sessions were presented by Professor B. K. Bose of the University of Tennessee and Professor M. H. Rashid of the University of Florida.

The conference was attended by engineers from twelve countries of the world, such as two from Australia, two from China, five from Germany, two from Indonesia, 16 from Japan, one from Latvia, one from Malaysia, one from Singapore, one from Sweden, one from Turkey, three from the USA and 41 from Thailand. Mr. Kimball Williams and I attended as representatives of the Board of Directors of the IEEE EMC Society. There were 158 total conference participants, which included the exhibitors. Two special half-day tutorial sessions were scheduled for young EMC engineers and students on the Saturday of the last day of the conference. A total of 101 students and young engineers took part in these special tutorial sessions.

The majority of the presented papers were considered to be a high level, both theoretically and technically, in comparison with other major global EMC symposia. This conference was unique, however, in that special interest research fields in the area were presented. The topics were adapted to the environment of the tropical countries in southeastern Asia, including Thailand. For example, the irradiation experiments involving strong static DC, AC and impulsive magnetic, electric and electromagnetic fields over seed-rice grains before seeding (for a quick and rich rice harvest) were presented. To date, the results of these experiments are not clear.

Four social events were organized for the conference, such as a Welcome Party on

Very beautiful and exotic folk dancing of Thailand was presented by the EMC students of KMITL at the conference banquet.

ICEMC 2002 Technical Program Chairman, Dr. Werachet Kharn-ngern, sings a song of gratitude to Buddha for a rich crop of rice.

The IEEE EMC Society booth in the exhibition room was staffed by Kimball Williams of Underwriters Laboratories and Takeo Yoshino.

Need EMC today! This photo shows an example of the terrible wiring system of a huge number of power cables and telephone lines bound together and hanging from pole to pole without insulation, like a spider's web in the downtown streets of Bangkok.

Wednesday evening, the Opening Ceremony on Thursday morning, a Banquet on Thursday evening and the Thank You Party (a Farewell Party) on Friday evening. This was a boat cruise with dinner on the Chaopraya River, which flows across the city of Bangkok. These social events were held in the very warm climate and very exotic feeling of southeastern Asia. There was extremely beautiful folk dancing and the music of Thailand was always played at the social events. The participants were quite surprised that all of the musicians and the beautiful dancing team consisted entirely of EMC students of KMITL! They played a perfect performance, the same as professional entertainers.

The IEEE EMC Society participated in the conference by manning a booth in the exhibition room. Although the booth display is in need of updating, many young participants visited the booth during the lunch and coffee break times in the conference, and they expressed great interest about the international activities of the EMC Society. The IEEE membership application forms and the "Call for Papers" for the May 2003 IEEE International Symposium on EMC in Istanbul were completely distributed.

After the conference, the Thailand EMC group, consisting of 21 members of the IEEE, expressed an interest in establishing themselves as a Thailand Chapter of the IEEE EMC Society. Associate Professor Werachet Kharn-ngern was elected as chairman of the new Thailand EMC Chapter. **EMC**

Aubrey James Rowe

1942-2002

Aubrey Rowe born September 27, 1942 in Ware, Massachusetts, died Tuesday night July 2, 2002, in San Diego, California, after suffering a massive heart attack. Aubrey was an ElectroMagnetic Compatibility and Interference Engineer throughout most of his professional career.

He began his career at McVey Television Service in 1959 prior to graduation from Glynn Academy High School in Brunswick, Georgia. He then owned and operated Rowe Television Service on St. Simons Island Georgia for a two-year period prior to his entrance into the Georgia Air National Guard in 1962.

Aubrey served for a period with the Naval Atlantic Underseas Warfare Center in the Bahamas from 1963 until 1968, which began his long and dedicated association with the US Navy. His duties included progressively responsible leadership positions on the development of several undersea systems.

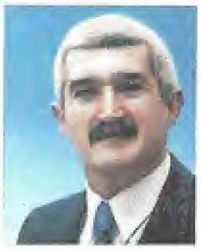
Aubrey served as Senior Electronics Advisor to the Allied Forces Southeast Asia during the Vietnam era from 1969 through 1973. In 1973 he earned his BSEE degree at the University of Santo Tomas, Philippines while serving in South East Asia. During this period, Aubrey was associated with the Naval Electronic Systems Command's Naval Shore Engineering Activity, Naval Ship Systems Engineering Activity, and forces afloat out of Charleston South Carolina. In this capacity, Aubrey worked on the deployment of the Naval Tactical Data System and development of other shipboard and undersea systems. Aubrey also held leadership positions in several of the Navy's Electro Magnetic signature detection and analysis projects, TEMPEST and other surveillance programs.

In 1973, Aubrey joined Litton Industries in both Pascagoula Mississippi, and Thousand Oaks, California as a Senior Electronics Engineer responsible for the development and management of E3 engineering for ship systems, weapon systems, navigation and control systems, ship inertial navigation equipment, and the TOMAHAWK guidance set equipment.

In 1982, Aubrey moved to the General Dynamics Corporation, Convair Division to continue his work with the TOMAHAWK program as the Manager of Electromagnetic Effects. During his time at General Dynamics, Aubrey served as the Chairman and Co-Chairman of the Tomahawk Electromagnetic Compatibility Advisory Board (EMCAB).

In 1984, Aubrey went to work for the Instrument Research and Technology (IRT) Corporation, where he continued his E3 systems engineering work on the TOMAHAWK Weapon System. Highlights include support

continued on page 70



Reporting From the 16th International Wroclaw Symposium and Exhibition on Electromagnetic Compatibility

By Elya Joffe, EMC Society Region 8 Membership Coordinator

Introduction

Co-sponsored by the URSI and by the IEEE EMC Society, the 16th International Wroclaw Symposium and Exhibition on Electromagnetic Compatibility took place from June 25 to June 28, 2002 in Wroclaw, Poland. This is the first and oldest EMC Symposium in Europe; in the year 2002 it celebrated the beginning of its 4th decade and the 16th time it has been held.

The Symposium took place in the Wroclaw University of Technology, which offered very convenient conference facilities along with multiple locations for meetings as well as for discussions and reunions of colleagues and friends worldwide. It was held under the patronage of Mr. Marek Pol, Deputy Prime Minister and under the auspices of the Polish Academy of Sciences Committee on Electronics and Telecommunications. As in the past, the symposium was co-organized by the Wroclaw University of Technology, the National Institute of Telecommunications, and the Association of Polish Electrical Engineers, with dozens of cooperating international organizations and professional associations from various countries.

Professor D.J. Bem and Professor A.Wierzbicki were the Symposium co-chairmen and Mr. W. Moron, the founder of the Symposium, was its honorary chairman.

Technical Program

The technical program of the Symposium was very extensive and interesting. It is noteworthy that the Wroclaw Symposium is very unique in its technical scope and topics covered in it.

In contrast to the IEEE EMC Society Symposia, plenary sessions take a central place in the Wroclaw Symposium, and attract a large audience. On a personal note, I miss those sessions in our Symposia covering a spectrum of issues of interest to the majority of our community.

Plenary Sessions

Four plenary sessions took place in Wroclaw, dealing with EMC regulations and standardization issues with speakers including Mr. W.A. Luther and Ms. D. Dalton presenting the experience of the FCC and the EPA in setting regulations through negotiations among the parties involved. Mr. K. Rosenbrock reviewed recent access technologies and discussed the role of the regulations and standards in supporting technology development. His lecture summarized the experience of ETSI he heads for many years now. Mr. P. Kerry, the CISPR president, reviewed the worldwide EMC standardization activities of IEC/ACEC and CISPR. In the last plenary lecture, Professor M. D'Amore presented the IEEE and the IEEE Transactions on EMC in his capacity as its Editor-in-Chief.

All plenary sessions attracted a large audience and great interest.

The Wroclaw EMC Technical Exhibition.

The general technical program covered a variety of topics and papers, including several "classical" topics such as "EMC Modeling", "Spectrum Engineering", "EMC in PCB and IC", etc. However, some of the topics were very special and rarely covered in other EMC symposia, for instance: the special sessions sponsored by URSI, Commission E on topics such as "Terrestrial EM Noise", "Natural EM Environment Phenomena" and "Gravito-Electrodynamics, EHD and Their Applications to Natural Hazards."

Four sessions focused on issues of spectrum utilization and management, covering such aspects as spectrum congestion as a factor limiting the development of all applications of radio and having significant economic impact, spectrum management processes, spectrum management solutions and spectrum monitoring.

Entrance to the Wroclaw EMC Symposium.

Sessions Sponsored by ITU-T SG5

Professor G. Varju, Vice-chair of ITU-T SG5 organized a regular and a panel session on EMC and EMF effects in telecommunication, sponsored by ITU-T Study

Group 5 "Protection Against Electromagnetic Environment Effects." In those sessions, papers were presented on current studies undertaken in the group, aimed at setting standards, recommendations, directives, and handbooks related to electromagnetic phenomena that can cause damage or disturbance to telecommunication installations or injury to telecommunication personnel, or health effects to the population.

Sessions Sponsored by NATO WG10

It is especially interesting to mention the special contributions of NATO WG10 on "EM Environment Effects" to the Symposium Technical Program, including two special sessions, the first dealing with EMI measurement technology and methodology for naval applications, and the second devoted to modeling of maritime electromagnetic environment effects (E3).

Other Invited and Regular Sessions

Several other invited sessions took place on stimulating and "hot" topics such as: "Coupling In and Interaction with Linear Structures and Electronics", "EMC and Transmissions Performance of Telecommunications Access Networks", "Power Line Communication vs. Radio Services", Electromagnetic Field (EMF) Exposure Limits and Standardization in IEC and CENELEC", "Interference Modeling in Wireless Systems" and "EMC in Amateur Radio Service".

Other high quality oral and poster sessions as well as workshops and tutorials were included in the technical program.

Some Statistics

The total number of participants in the Symposium was 195 people from 34 countries. What an international variety!

Thanks to the financial contributions obtained from the URSI and from the European Office of the United States Air Force Research Laboratory, it was possible to support 16 participants: Ukraine (4), Russian Federation (4), Germany (3), Czech Republic (2), Belarus (1), Poland (1), and Bangladesh (1), including young scientists.

The total number of paper contributions to the Symposium was 162 papers delivered by 382 authors and co-authors from 35 countries. The contributions were presented at a total of 2 plenary sessions, 29 regular sessions, 9 poster sessions, 3 workshops, and 2 tutorials.

Professor D.J. Bem, Chairman of the 16th International Wroclaw Symposium and Exhibition on Electromagnetic Compatibility.

Elya Joffe presenting a tutorial on "EMC Basics for System Engineers" at the Wroclaw Symposium on EMC.

The two-volume, 794-page Symposium Record and a CD-ROM included all the Symposium papers as well as the workshop materials.

In addition to the technical program, a technical exhibition and relevant technical literature exhibition was held. The exhibition was well received and well attended.

The IEEE EMC Society was proud to be a Technical Co-Sponsor of the Symposium, and was well represented at the Symposium by:

- Professor Takeo Yoshino, Member of the EMC Society Board of Directors
- Dr. Andrew Podgorski, Member of the EMC Society Board of Directors
- Elya B. Joffe, Member of the EMC Society Board of Directors
- Professor Marcello D'Amore, Editor in Chief of the IEEE Transactions on EMC

As the IEEE EMC-S Region 8 Membership Coordinator, I brought along the IEEE EMC Society Membership booth, which was placed across from the registration area, thus attracting much attention. Many participants visited the booth and received information about the various activities of the IEEE and particularly the EMC Society.

During the Symposium, several social events were also held, the most noteworthy of which was the reception in the ancient but most beautiful City Hall, which was of a Gothic Style. The dinner buffet was accompanied by wonderful music played by a first class team of musicians, which, of course added to the fantastic atmosphere in the Reception.

I would like to congratulate the Organizing Committee of the Symposium for a well-organized and high quality Symposium and for making our time at the Symposium so pleasant and enjoyable. **EMC**

THE 2003 IEEE INTERNATIONAL SYMPOSIUM ON ELECTROMAGNETIC COMPATIBILITY (EMC)

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Be Prepared... for the 2003 IEEE International Symposium on EMC, Istanbul
May 11-16, 2003

Call for "War Stories" Raconteurs (Story Tellers)

We are planning to hold a special session on EMC "**War Stories**" at the **2003 IEEE International Symposium on EMC** in **Istanbul, Turkey.**

The best and runner up stories will be recognized at the awards ceremony during the Symposium banquet. "War Stories" must be submitted in writing. They may even be published in the EMC Society Newsletter (no pseudonyms allowed).

Please submit **by e-mail only** a written version of your proposed "War Story" in 500 to 2,000 words (free format) to the Symposium Secretariat at emc2003@ortra.co.il no later than the Ides of March (March 15, of course) 2003 (how is that for an historical perspective?).

Please indicate in the e-mail subject line: "War Story - EMC'2003"

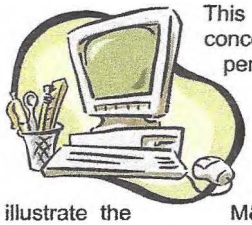
The story should be about an interesting EMC project in which you were involved, and (hopefully) in which you were successful in bringing it to a triumphant completion. Like any good story, embellishments and exaggerations are expected, in fact – encouraged! Oh yes! The story should have a kernel of truth though.

The chosen stories will be presented verbally at the Symposium in a special "War Stories" session by the authors (or their designee) and should be at least 10 minutes, but not more than 20 minutes long.

An overhead projector will be available for cartoons and notes so you needn't write on your shirt cuffs or sleeves...

Call for EMC Computer Modeling and Simulation Demonstrations

We are planning to hold special sessions on **EMC Computer Modeling and Simulation (M&S) Demonstrations** at the **2003 IEEE International Symposium on EMC** in **Istanbul, Turkey.**



This session is devoted to illustrating fundamental EMC modeling and simulation concepts and methods through a series of interactive computer demonstrations performed over a three-day period.

Various computational electromagnetic (CEM) modeling techniques will be demonstrated illustrating their application to simple canonical-type problems in order to show how specific EMC problems can be analytically solved.

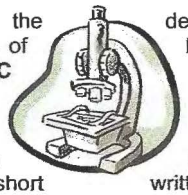
The demonstrations will be conducted using general-purpose codes to illustrate the M&S concepts and approaches. Hands-on participation during the demonstrations is encouraged. The demonstrations may cover any topic of EMC, from circuit to system. M&S demonstrations on popular topics from previous years will also be welcomed.

If you are interested in having a M&S Demonstration considered, please submit **by e-mail only** a short written proposal to the Symposium Secretariat at emc2003@ortra.co.il or to Andy Drozd at a.l.drozd@ieee.org no later than **January 30, 2003**.

Call for EMC Experiments Demonstrations

We are planning to hold special sessions on **EMC Experiments Demonstrations** at the **2003 IEEE International Symposium on EMC** in **Istanbul, Turkey.**

This session is devoted to illustrating important EMC concepts through a series of interactive experiments performed continuously over a three-day period. The experiments demonstrate EMC concepts and principles, phenomena and effects, and measurement methods. The demonstrations show how in most cases, fairly simple test hardware can be used to quantify various electromagnetic effects.



Hands-on participation during the demonstrations is encouraged. The demonstrations may cover any topic of EMC, including those based upon the EMC-Society Education Committee's **EMC Experiments Manual, Vol. I and II** (see www.emcs.org). Several popular experiment demonstrations from previous years are also welcomed.

If you are interested in having an Experiments Demonstration considered, please submit **by e-mail only** a short written proposal to the Symposium Secretariat at emc2003@ortra.co.il or to Andy Drozd at a.l.drozd@ieee.org no later than **January 30, 2003**.

Please visit our web site at www.ortra.com/emc2003/ for further details on all of the above activities.

2003 IEEE International Symposium on EMC Istanbul, Turkey, 11-16 May 2003

Special Session For Radio Amateurs

Announcement and Call for Papers

In the beginning of the 21st century, the community of Radio Amateurs found itself in a new situation: politicians and lawyers took the position of radio services legislators within international and national regulating bodies. These good people, having limited knowledge in the Radio Sciences, and under political influence of pressure groups that lack knowledge, are easily drawn to conclusions, not necessarily substantiated, that any "unnecessary" radiation is harmful, hence, they conclude that there is no place for Radio Amateurs within populated areas.

On the other hand, Radio Amateurs are here to exercise their rights obtained from the International Telecomm Union (ITU) and the Government and national authorities. It is an undisputable fact that they are the only community that can provide communications during natural or other disasters. This is quite clear from every report on the situation during these disasters. Only the "distributed" not "cost effective" Radio Amateurs can provide a not "cost effective" service during disasters.

That and more, the Radio Amateurs frequency bands are the only bands where experiments could be conducted without tedious regulatory processes. On the other hand, how could one experiment under regulations? Experiment in matters that could be regulated? This is logical, isn't it?

Last but not least, Radio Amateurs have got a right to be active on the Radio Frequencies, just for being a recognized hobby. No one avoids photography and other hobbies.

The community that provides the regulators with data regarding environmental and personal effects of non-ionizing electromagnetic radiation include EMC experts.

The 2003 IEEE International Symposium on EMC offers a platform and a meeting place for the Radio Amateurs to convene, discuss and influence people that are involved in research in the EMC field of radio frequency interference and safety, as well as regulatory advisers who are expected to attend the symposium. This is probably the last chance for meeting relevant and influential people before the WARC 2003 that will be held in Geneva during June and July 2003. WARC 2003 will deal with subjects related to Radio Amateurs.

Understanding the importance of this subject, we have established a special committee to deal with papers regarding Radio Amateurs and their concerns. Of special interest will be papers regarding the problems and activities mentioned above.

Note that planning is underway for a Radio Amateurs Station to be operated on site during the Symposium.

We hope to have you with us in Istanbul! WELCOME!

For further information regarding the Symposium please visit our web site at:

http://www.ortra.com/emc2003/

Please submit proposals to: emc2003@ortra.co.il and indicate in the subject line: "Radio Amateurs" session

For questions please e-mail to:

Peleg L. Lapid 4X1GP
Radio Amateurs Activities Coordinator
lapid@netvision.net.il

Slouching Toward Minneapolis

By Ciscero

I have to confess that I was not planning on going to Minneapolis. After Montréal the previous year, one did not entertain high hopes for any culinary discoveries or epiphanies. The idea of Velveeta sauces did not appeal me. But, I had a paper to present and my co-authors had managed to come up with low-down weasel excuses before I did, so I was stuck with it, best to make a go of it, grace under pressure, that sort of thing.

Turns out, Minneapolis is a pretty city. The downtown is centered along a main drag, with dozens of outdoor cafes and booze emporiums. The weather was good and not the sultry sticky humid mess I had expected. Also, there's this incredible elevated pedestrian walkway that goes everywhere, sort of like Houston's underground tunnel system. In Houston it gets you out of the humidity; in Minneapolis I suppose it keeps you above the snow line.

I was there for only a few days so I'll just describe a few of the things that have stayed with me. First is that they do indeed have food in the Midwest. Upon the recommendation of a friend I had dinner at a place called Vincent's just down the street from the Hyatt. As I am wont to do, I ordered a martini before reading the menu. Now, in most places a martini comes in a rather demure portion, a few swigs and you're done, you wring some juice out of the olives and order another. At this place the martini came in a quart size martini glass. It seemed about the size of a moderate birdbath, the olives looked decidedly small and very far away at the bottom. It took a while to toss that down, and perhaps my recollection of the food is tempered by the martini, the sensual glow I had about half way through it, the sense of well-being and love for mankind in general, so when the food came, lamb loin chops and a risotto, I was perhaps a little more receptive than I might otherwise have been, a trifle less critical perhaps, but still...the food was spectacular! The service was right on, none of that "Hi, my name is Arbuthnot, I'll be your server tonight" nonsense, no interrupting conversation to ask if everything is hunky dory; no they just kept an eye on things, cleared what needed to be cleared, went silently about giving us a good meal. And a good meal it was, topped off with an espresso and triple crème brulee. And another martini. Off to dream land. I did get back to the hotel, I know that, because that's where I woke up.

Spent the next two days of the Symposium wandering the technical papers and the exhibits in the company of an elderly friend of mine. We slowly strolled the aisles, engaged in conversation with acquaintances, gathered up the free booty from the vendors. We had to sit down several times so he could catch his breath from the excitement. I think I woke him up twice from short, unscheduled naps. The best exhibit was ETS-Lindgren's, but only when a certain young lady was there.

The last night I was there was the big social do, the gathering at the convention center for wine and hors d'oeuvres, then the meal and entertainment. One slight down note was that they only provided two bottles of wine at each table to cover eight people for an entire meal. At our table the two bottles vanished in the first five minutes. One of us wandered over to the small bar and asked the bartender if perhaps we could purchase some more for our table since we had not even received the first course and we were dry, very dry. He squawked into a walkie-talkie and sadly shook his head, could not be done. One of us then noticed that people at other tables had hardly touched the wine at their tables, so we then started foraging, quite successfully. Luckily, too, for next came the entertainment and alcohol was definitely a necessity. The entertainment, um, yes. Quite interesting. I don't believe that I ever heard the washboard played with such expression and insight. Isaac Stern would've wept with jealousy. One person at the table wondered aloud if the washboard virtuoso played first or second washboard with the Minneapolis Symphony. While good, I suspected more probably second rather than first. **EMC**

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EMCABS

EMC Abstracts

Osamu Fujiwara, Associate Editor

Following are abstracts of papers from previous EMC symposia, related conferences, meetings and publications.

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"How Can I Get a Copy of an Abstracted Article?"

Engineering college/university libraries, public libraries, company or corporate libraries, National Technical Information Services (NTIS), or the Defense Technical Information Center (DTIC) are all possible sources for copies of abstracted articles of papers. If the library you visit does not own the source document, the librarian can probably request the material or a copy from another library through interlibrary loan, or for a small fee, you can order it from NTIS or DTIC. Recently it became clear that EMCABs were more timely than publications which were being listed in data files. Therefore, additional information will be included, when available, to assist in obtaining desired articles or papers. Examples are: IEEE, SAE, ISBN, and Library of Congress identification numbers.

As the EMC Society becomes more international, we will be adding additional worldwide abstractors who will be reviewing articles and papers in many languages. We will continue to set up these informal cooperation networks to assist members in getting the information or contacting the author(s). We are particularly interested in symposium proceedings which have not been available for review in the past. Thank you for any assistance you can give to expand the EMCS knowledge base. **EMC**

EMCABS: 01-11-2002

MIXED-MODE EMI NOISE AND ITS IMPLICATIONS TO FILTER DESIGN IN OFFLINE SWITCHING POWER SUPPLIES

Song Qu+ and Dan Chen++
+ The Maxim Integrated Products, Sunnyvale, CA, 94086 USA
++ The Bradley Department of Electrical and Computer Engineering, Center for Power Electronics Systems, Virginia Polytechnic Institute and State University, Blacksburg, VA 24061-0111, USA
E-mail: chen@vt.edu

IEEE Transactions on Power Electronics, Vol. 17, No. 4, July 2002, pp. 502-507.

Abstract: Conducted noise is generally divided into two kinds, common mode (CM) and differential mode (DM). This paper considers a newly recognized kind of noise, non-intrinsic differential mode (NIDM), called mixed-mode (MM) noise in this paper. The investigation uses the Zero-Span Mode of a spectrum analyzer to analyze the MM noise and relate it to line filter design, including the DM choke and the X capacitors. The size and placement of X capacitors, LISN or EUT side of the DM (or CM) choke, is reviewed and confirmed experimentally.

Index terms: SMPS Line Filter Design, Mixed-Mode Conducted Noise, X-capacitor selection and placement.

EMCABS: 02-11-2002

COUPLING IN 3D INTERCONNECTION STRUCTURES CONSIDERING NONLINEARITIES IN THE CIRCUIT ENVIRONMENT BY USING THE METHOD OF PARTIAL ELEMENTS

G. Wollenberg+, S.V. Kochetov+, and A. Gorisch ++
+ Otto-von-Guericke-University Magdeburg, IGET, Germany
++ Siemens AG, Corporate Technology, Erlangen, Germany

Proceedings of 16th International Wroclaw Symposium and Exhibition on EMC, Wroclaw, Poland, June 25-28, 2002, pp. 89-92.

Abstract: The paper studies the simulation of transients in interconnection structures with nonlinear loads excited by an incident field or lumped sources. It is shown that the Partial Element Equivalent Circuit (PEEC) method is applicable for such problems. It allows analyzing the processes with nonlinear effects and high frequency interactions in the interconnection system.

Index terms: Interconnection structures, mathematical models, PEEC method, SPICE code.

EMCABS: 03-11-2002

HYBRID REPRESENTATION METHODS FOR THE EFFICIENT ANALYSIS OF ANTENNA COUPLING WITHIN CAVITIES

Frank Gronwald, Juergen Nitsch, and Sergey Tkachenko
Institute for Fundamental Electrical Engineering and EMC, Otto-von-Guericke-University of Magdeburg, Germany
Phone: +49 391 6711436, Fax: +49 391 6711236, E-mail: Frank.Gronwald@et.uni-magdeburg.de

Proceedings of 16th International Wroclaw Symposium and Exhibition on EMC, Wroclaw, Poland, June 25-28, 2002, pp. 109-114.

Abstract: In the context of electromagnetic antenna coupling within metallic resonators, this paper discusses various repre-

sentations for the electromagnetic Green's function of a rectangular cavity. In general, Green's function comprises the main electromagnetic properties of a cavity. It needs to be computed in order to evaluate analytical formulas that characterize the electromagnetic properties of antennas within a cavity. Its explicit numerical computation by means of a standard representation, however, usually is rather time consuming. To improve this circumstance, it is demonstrated that the choice of hybrid representations for the Green's function can drastically reduce computation time.
Index terms: Cavity, electromagnetic coupling, Green's function, hybrid representation.

EMCABS: 04-11-2002

ANALYSIS OF SUBSTRATE COUPLING EFFECT IN MIXED ANALOG-DIGITAL CMOS INTEGRATED CIRCUITS
Mariusz Solecki, and Zbigniew Felendzer
Department of Electronic Circuits, Technical University of Gdańsk, Poland
E-mail: solec@ue.eti.pg.gda.pl
Proceedings of 16th International Wroclaw Symposium and Exhibition on EMC, Wroclaw, Poland, June 25-28, 2002, pp. 159-164.

Abstract: This paper concentrates on qualitative and quantitative analysis of the substrate coupling effect in mixed CMOS ICs. A matrix of 100 simultaneously switched inverters has been chosen as the digital part of an IC and a simple current source as the analog part. A silicon substrate model is taken into account during the layout extraction process. A detailed analysis is performed, showing how signals in the digital part influence the parameters of the analog part. The effectiveness of guarding rings included in the circuit topology is discussed. A few practical rules for mixed analog-digital circuit designers are formulated based on the experiments.
Index terms: CMOS ICs, Green function, guarding rings, substrate coupling.

EMCABS: 05-11-2002

TRANSMISSION AND EMC ASPECTS OF POWER-LINE TELECOMMUNICATIONS
Seppo J. Halme, Rauno Kytönen, and Viktor Nässi, HUT and Lauri Halme, HUT/ Goldaccess
E-mail: lauri.halme@hut.fi
Proceedings of 16th International Wroclaw Symposium and Exhibition on EMC, Wroclaw, Poland, June 25-28, 2002, pp. 195-202.

Abstract: Low-voltage power-line networks (NW) are designed for transmission of electrical power at low frequency (50 or 60 Hz), where the wavelength is several thousand kilometers and the NWs can be of mixed mesh and star types and tapped without any transmission problems because even big cities remain electrically short. This kind of construction leads to multi-path propagation at frequencies when NW becomes electrically long. At 20 MHz, the wavelength is about 10 m and even a home is electrically long. Multi-path propagation leads to forward echoes that complicate high capacity digital transmission. The measurements made demonstrate clearly these difficulties. The main principle of line-transmission is that the transmitted signals should be kept inside the cables. This is not followed because the power-lines are unsymmetrical, unscreened and the NW can be regarded as a broadband antenna system that electromagnetically pollutes its surroundings. Looking from the telecommunications point of view, power-line NWs are unbalanced, unscreened, radiating, noisy, time variant, and multi-path transmission media.
Index terms: Power-line telecommunication or communication (PLT or PLC), stubbed or bridge tapped transmission line, NEXT, FEXT, immunity and emission.

EMCABS: 06-11-2002

EXACT FULL-WAVE MODEL OF A THREE-PHASE POWER LINE SYSTEM
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E-mail: pirinoli@polito.it
Proceedings of 16th International Wroclaw Symposium and Exhibition on EMC, Wroclaw, Poland, June 25-28, 2002, pp. 225-228.

Abstract: In this paper the radiation from a three-phase power line has been addressed. In particular, a full-wave model of real poly-phase power lines has been developed in order to consider properly the radiation from this kind of system, radiation that with the usual approximated models is typically neglected, but that is becoming more and more significant nowadays for EMC considerations. Starting from the rigorous formulation of the problem in terms of the dyadic Green's function, it is possible to obtain a more flexible analytical tool by the introduction of a suitable transforming operator that leads to a diagonalization of the kernel of the problem. This can be effectively done by the use of a suitable version of the Park transform, analytical tool typical of the analysis of the rotating machines, that can be extended in order to study the considered problem. In this way, many different canonical problems may be studied, and some real problems may be rephrased in terms of the canonical ones. The numerical implementation, in a suitable computer code, of this approach will yield a fast and reliable tool in order to consider these kinds of geometries.
Index terms: EM field radiated by a power system, power lines, three-phase systems.

EMCABS: 07-11-2002

INFLUENCE OF THE 1 OMEGA METHOD TEST SETUP ON IC CONDUCTED EMISSION MEASUREMENTS
Franco Fiori and Francesco Musolino
Dipartimento di Elettronica, Politecnico di Torino, Corso Duca degli Abruzzi 24, I-10129 Torino, Italy
E-mail: fiori@polito.it
Proceedings of 16th International Wroclaw Symposium and Exhibition on EMC, Wroclaw, Poland, June 25-28, 2002, pp. 289-292.

Abstract: This paper deals with the electromagnetic emissions induced by integrated circuit operations. In particular, four different measurement techniques are explained in detail. Such techniques are employed for the estimation of the conducted emissions delivered via integrated circuit power supply ports. Differences among experimental results are explained by referring to the influence of each measurement test setup on the measured quantities.

Index terms: 1 omega method, conducted emissions, magnetic probe, measurement techniques, TEM cell.

EMCABS: 08-11-2002

EFFECTS OF A LIMITED SIZE OF THE EMI TEST SITE GROUND PLANE ON THE 3-METER SITE ATTENUATION

Katsumi Fujii+, Akira Sugiura+, Yasushi Matsumoto+, Yukio Yamanaka++, and Takashi Iwasaki+++
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++ Communication Research Laboratory, Yokosuka, Japan
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E-mail: katsumi@riec.tohoku.ac.jp
Proceedings of 16th International Wroclaw Symposium and Exhibition on EMC, Wroclaw, Poland, June 25-28, 2002, pp. 307-312.

Abstract: A limited size of the EMI test site ground plane is numerically investigated with respect to the 3-meter Normalized Site Attenuation using the method of moments with modeling a ground plane as an assembly of planar-segments. It is found that the site attenuation in vertical polarization depends on the size of a conducting ground plane more strongly than in horizontal polarization. In addition, the minimum size of a ground plane specified in CISPR 22 is insufficient for EMI test sites to comply with the NSA requirements. Height patterns of the insertion loss between antennas are also numerically investigated for various sizes of the ground plane. As a result, it is recommended that the test site validation should be made in detail not only on the site attenuation characteristics but also on the insertion loss height patterns.
Index terms: EMI measurement, insertion loss, method of moments, site attenuation.

EMCABS: 09-11-2002

AIRCRAFT HAZARDS BY USING PORTABLE ELECTRONIC DEVICES (PED)

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E-mail: wolfgang.tauber@eurocopter.com
Proceedings of 16th International Wroclaw Symposium and Exhibition on EMC, Wroclaw, Poland, June 25-28, 2002, pp. 383-388.

Abstract: In the future, passengers on airplanes should have the permission to work onboard with PEDs of any kind. However, this is only acceptable if the airplanes are protected in a sufficient way so that all interferences of PEDs with aircraft systems are excluded. Investigations on radiated fields of carry-on electronics stopped around 1996, though the evolution of new technologies is rapid and the number and types of PEDs is increasing daily. Within the frame of the European research program EM-HAZ, the emissions of the most recent PEDs on the market (laptops, notebooks, audio devices like CD players, Mini-Disc recorders, and Walk-men, digital video cameras, digital photo cameras, mobile phones, electronic organizers) have been investigated. The measurement results were compared to all previously available test results and a new worst-case envelope with respect to radiated emissions is proposed. If the PEDs are allowed to be operated onboard an aircraft, sensible electronic equipment functions of the aircraft (especially the COM and NAV receivers) have to be immunized against those internal electromagnetic fields. The paper presents the measurement results and the novel consequences for protection levels.
Index terms: PED, electromagnetic hazards, emission, electromagnetic interference, safety.

EMCABS: 10-11-2002

FDTD COMPUTATION MODELING BASED ON A SPARK-RESISTANCE FORMULA FOR ELECTROMAGNETIC FIELDS DUE TO ELECTROSTATIC DISCHARGE

Osamu Fujiwara, and Hideaki Seko
Faculty of Engineering, Nagoya Institute of Technology, Nagoya, Japan
E-mail: fujiwara@odin.elcom.nitech.ac.jp
Proceedings of 16th International Wroclaw Symposium and Exhibition on EMC, Wroclaw, Poland, June 25-28, 2002, pp. 421-424.

Abstract: The electrostatic discharge (ESD) due to charged metal objects poses a serious electromagnetic threat to high-tech information equipment. In order to predict the ESD fields due to charged metals having arbitrary shapes, we have proposed a new FDTD algorithm based on gap excitation with the time-variant conductivity and electric field of a spark channel. The algorithm has also been validated by a spark experiment using two types of metallic objects.
Index terms: Charged metal, electrostatic discharge, electromagnetic fields, spark-resistance formula, FDTD algorithm.

EMCABS: 11-11-2002

CALIBRATION UNCERTAINTY OF ESD SIMULATOR ESTIMATED WITH FREQUENCY DEPENDENT TRANSFER IMPEDANCE OF THE TARGET

Jan Sroka
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Proceedings of 16th International Wroclaw Symposium and Exhibition on EMC, Wroclaw, Poland, June 25-28, 2002, pp. 429-432.

Abstract: The author presents the calibration uncertainty of an ESD simulator estimated with frequency dependent transfer impedance. The formula used for transfer impedance, however, is so complex that derivation of uncertainty of the transfer impedance with commonly used sensitivity coefficients between measured (scattering parameters) and output quantity (transfer impedance) is impossible. Contribution of this uncertainty is, however, essential for the total uncertainty budget. In this paper a simplified formula for transfer impedance is introduced. Simplification is achieved with replacing the actual load of the target (input impedance of the oscilloscope) with idealized 50W resistance. Calculation of sensitivity coefficients of this simplified transfer impedance of the target is not complicated. Criterion of suitability of the simplified formula is comparison of the peak current uncertainty calculated for actual and simplified transfer impedance. The method is illustrated with uncertainty calculation for the current pulse with different rise times varying from 360ps to 1030ps. The comparison shows very good agreement specifically for the rise time, which is of practical interest.
Index terms: Electrostatic discharge, discharge target, transfer impedance, uncertainty estimation.

EMCABS: 12-11-2002

SOME IN-SITU MEASUREMENTS OF THE RADIATED POWER EMISSION IN AN INDOOR NETWORK

Fawzi Issa, Jean-Pierre Rouzaud, and Eric Perrier de la Bâthie
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Proceedings of 16th International Wroclaw Symposium and Exhibition on EMC, Wroclaw, Poland, June 25-28, 2002, pp. 547-551.

Abstract: In order to understand the origins of some electromagnetic disturbances in the frequency band from 1 MHz to 30 MHz, some noise measurements of widely used household appliances have been carried out. These measurements are needed in order to differentiate disturbances coming from power line communication (PLC) systems and all the others. The radiated emission associated to some devices have been measured and compared to regulation limits proposals such as NB 30. Moreover, a parametric model is proposed for the description of the electric field strength versus the observation distance between the radiating source and the measuring point. Hence, it is possible to predict the evolution of the electric emission in a near field context for household appliances.

Index terms: Power line communication, radiated emission, household appliances, parametric model, experimental data, standards limits. **EMC**

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EMCS BY-LAW CHANGES PROPOSED

The following changes to the EMCS by-laws were approved at the August 2002 meeting of the EMC Society Board of Directors. They will become effective January 31, 2003. IEEE EMC Society members have until January 30, 2003 to comment for or against these by-law changes. Please direct your comments to Joe Butler, Chair of the EMCS Nominations and By-Laws Committee, via e-mail **jbutler@parker.com**, phone 781-939-4267.

Reference: Tie Voting for Sixth Place in Annual Director-at-Large Elections
By-Laws Section 3.1 Directors-at-Large
APPROVED MOTION

In Paragraph 3.1 Directors-at-large, add the following after the existing second sentence: "In case of a tie for the sixth and last Director-at-Large slot, or a tie between two candidates from the same qualifying region (7, 8, 9, or 10), the Board of Directors shall vote to choose the winner(s).

Reference: Term Limits for Elected Officers
By-Laws Section 5.1 Elected Officers Term of Office
APPROVED MOTION

Delete the third sentence which begins, "There is no restriction..." and insert two new sentences, "The Vice-Presidents, Secretary and Treasurer shall be limited to three successive elected terms. However, if circumstances warrant, the term limit may be waived on an individual case by case situation by a two-thirds vote of the BoD."

Reference: Term Limits for Editors
By-Laws Section 7.1 Editors Term of Office
APPROVED MOTION

Delete the current sentence in section 7.1 and replace it with, follows: "An Editor shall serve for a three-year term and may be re-appointed for a second three-year term, subject to mutual agreement with the President and the appropriate Vice-President. However, if circumstances warrant, the term limit may be waived on an individual case by case situation by a two-thirds vote of the BoD."

Reference: Term Limits for Committee Chairs
By-Laws Section 10.1 and 10.2 Committee Chairs and Members Term of Office
APPROVED MOTION

Delete everything in section 10.2 after the phrase "Terms of Appointment." Add new sentences as follows, "The term of office for a Committee officer shall be three successive two year terms. However, if circumstances warrant, the term limit may be waived on an individual case by case situation by approval of the appropriate Vice-President and a two-thirds vote of the BoD."

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Authors are invited to submit original, unpublished papers on all aspects of Applied Electromagnetics, including but not limited to the following technical areas: Electromagnetic Compatibility, Microwave Devices and Techniques, Radio Propagation and Antennas, Magnetics, Wireless Networks, Computational Electromagnetics, Electromagnetic Education, Bioelectromagnetics, Radar and Satellite Technology, and ELF.

Prospective authors are invited to submit a maximum of two (2) extended abstracts, in English, by electronic mail only (Word or .pdf only) by January 31, 2003. The abstract should not exceed 300 words, including figures, diagrams and data. The instructions for submitting the abstract are available at **www.kuittho.edu.my/apace2003/abstract**. Submission can be made via email to the following address: **apace@unim.edu.my** or **deepmalay@yahoo.com** Postal mail and fax submittals will not be accepted. The website for the conference is available at **www.kuittho.edu.my/apace2003**. All inquiries should be directed to **apace2003enquiries@kuittho.edu.my** or **deepmalay@yahoo,com**. The postal address of the conference secretariat is: APACE 2003, Faculty of Engineering, Kolej Universiti Teknologi Tun Hussein Onn, Locked Bag 101, 86400 Batu Pahat, Johor, Malaysia.

Important Deadlines

Submission of abstract	31 January 2003
Notification of Acceptance	28 February 2003
Submission of full paper	15 May 2003

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Non-IEEE student	RM 300	US$150
IEEE member	RM 600	US$250
Others	RM 750	US$300

Calendar

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2003

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Rudiger Vahldieck, Symposium President
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July 28-30
3rd World Scientific and Engineering Academy and Society (WSEAS) International Conferences:
- on Applied Informatics and Communications (AIC '03)
- on Signal Processing, Computational Geometry and Artificial Vision (ISCGAV '03)
- on Systems Theory and Scientific Computation (ISTASC '03)

Rhodes Island, Greece
http://www.wseas.org

April 28-30
(See ad on page 17)
2003 Reverberation Chamber, Anechoic Chamber and OATS Users Meeting
The Stephen F. Austin Intercontinental Hotel
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Technical Program: Mike Hatfield, 540.653.3451
HatfieldMO@NSWC.navy.mil

September 2003
V Symposium EMC-2003
Saint Petersburg Electrotechnical University
St. Petersburg, Russia
E-mail: discone@mail.ru

September (exact dates TBD)
2003 Workshop/Conference on Noise Radar Technology
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Fax: +38 0572 441105
e-mail: lukin@ire.kharkov.ua

EMCS Cooperating Symposia

U.K.: Biannually, even years, in September

Zurich: Biannually, odd years, in February

Wroclaw: Biannually, even years, in June

EMCS Symposia Schedule

2003	May 11-16	(International IEEE) Istanbul, Turkey Elya Joffe Fax: 972.9.765.7065 E-Mail: emc2003@ortra.co.il
2003	August 18-22	Boston, MA Sheraton Boston Jon Curtis 978.486.8880
2004	August 9-13	Santa Clara, CA John Howard 408.736.2514
2005	August 8-12	Chicago, IL Tom Braxton 630.759.8674
2006	August 13-17	Portland, OR Henry Benitez 360.212.0471

IEEE EMC Society Board of Directors Meetings

(For information on all meetings, contact Janet O'Neil, 425.868.2558)

March 14, 2003
Honolulu, Hawaii

May 16, 2003
Istanbul, Turkey

August 17 and 21, 2003
Boston, Massachusetts

IEEE EMC Chapter Colloquium and Exhibition "Table-Top Shows"

March 24, 2003
Oregon and SW Washington EMC Chapter
Tutorial with Tom Van Doren on "EMC Troubleshooting Techniques"
The Greenwood Inn
Beaverton, Oregon
Chuck Britten, JJ Associates
503.463.9590, cbjjaor@cs.com

April 8, 2003
Milwaukee EMC Chapter
Tutorial with Lee Hill of Silent Solutions
The Sheraton Four Points Hotel, Milwaukee Airport
Jim Blaha, L. S. Compliance, Inc.
262.375.4400, jblaha@lsr.com

April 30, 2003
Central Texas EMC Chapter
In Conjunction with the Reverberation Chamber, Anechoic Chamber and OATS Users Meeting
(See ad on page 17)
The Stephen F. Austin Intercontinental Hotel, Austin
Mark Prchlik, BMI Corporation
512.249.5255, mark.prchlik@bmiinc.com

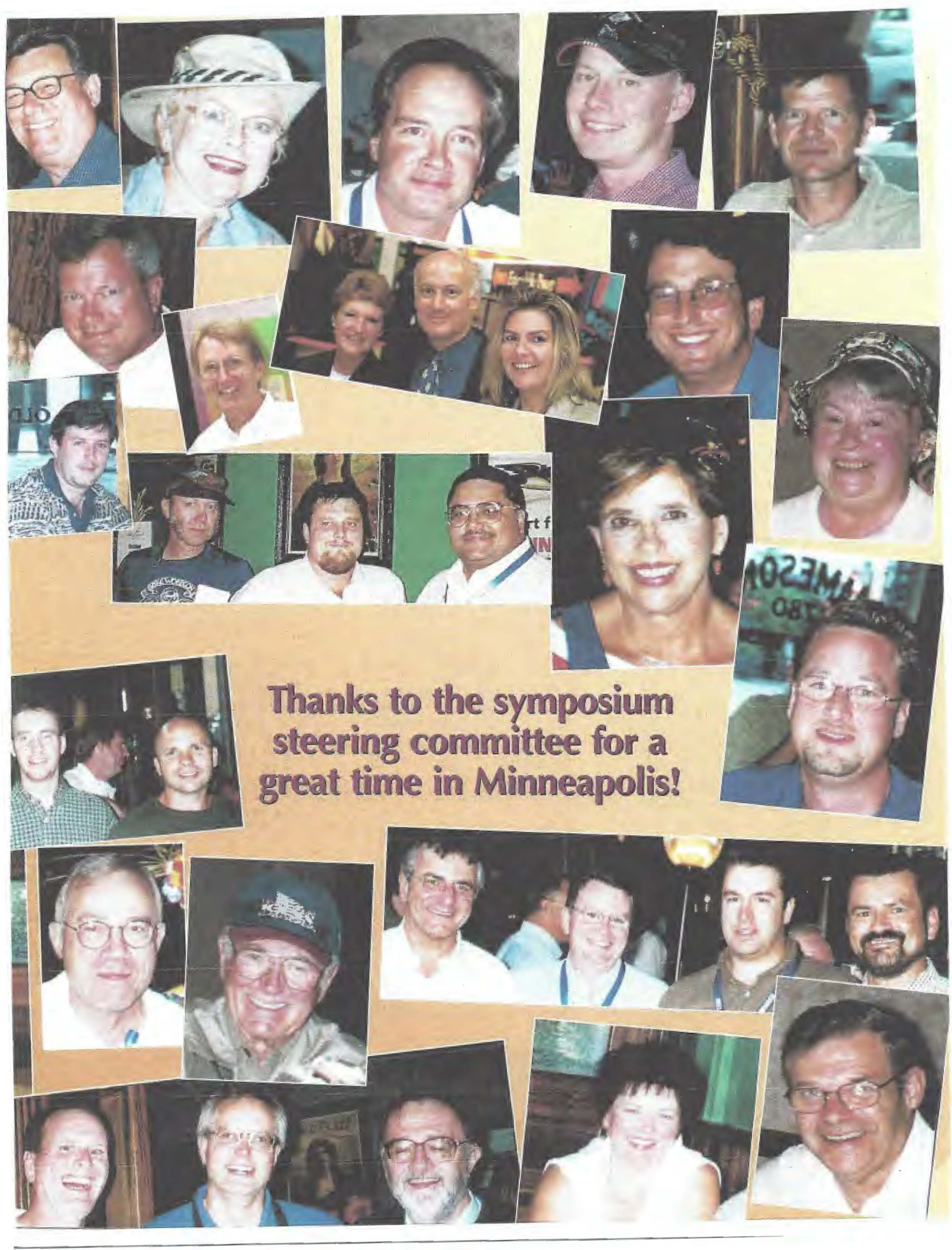
May 20, 2003
Chicago EMC Chapter
Multiple Speakers on a Variety of EMC Topics
The Holiday Inn, Itasca
Frank Krozel, Electronic Instrument Associates
630.924.1600
frank@electronicinstrument.com
http://www.ewh.ieee.org/soc/emcs/chicago/

June 6, 2003
SE Michigan EMC Chapter
Tutorial with Clayton Paul of Mercer University
The Dearborn Inn, Dearborn, MI
Kimball Williams, Underwriters Laboratories Inc.
248-427-5325, k.williams@ieee.org

If you would like to add your name to the list of exhibitors to receive direct announcements in advance of these upcoming tabletop shows, please send an e-mail to *j.n.oneil@ieee.org*.

Just a few more...

Photos by Ilana O'Neil



Thanks to the symposium steering committee for a great time in Minneapolis!

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Aubrey James Rowe

continued from page 55

provided to the design, development, installation and integration of the first TOMAHAWK Weapon Control System, Armored Box Launcher, Vertical Launching System, and the first TOMAHAWK missile launches from both the ABL and Vertical Launch System.

In 1986, Aubrey left IRT to begin his own company, Special Projects/Services in San Diego, California. Aubrey continued to provide superior E3 support to the TOMAHAWK program until his death.

Recently, in contemplation of retirement, Aubrey built a house in Alaska and started a telecommunications firm, Remote Communication Service, to provide wireless communication services to remote areas in the Alaskan bush.

Aubrey was a long time member of the IEEE EMC Society and NARTE. **EMC**

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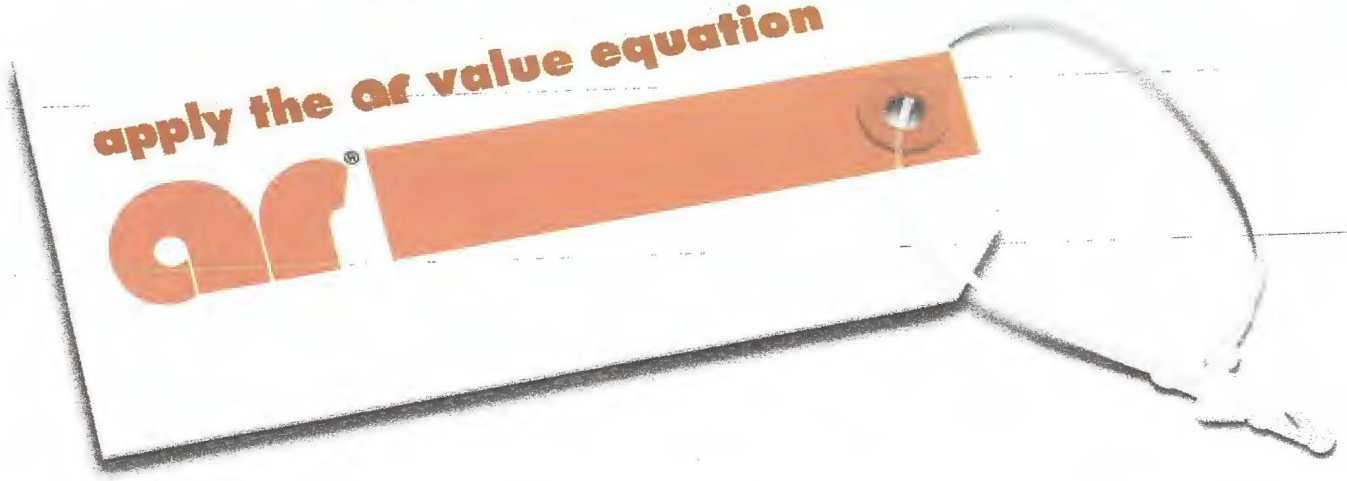

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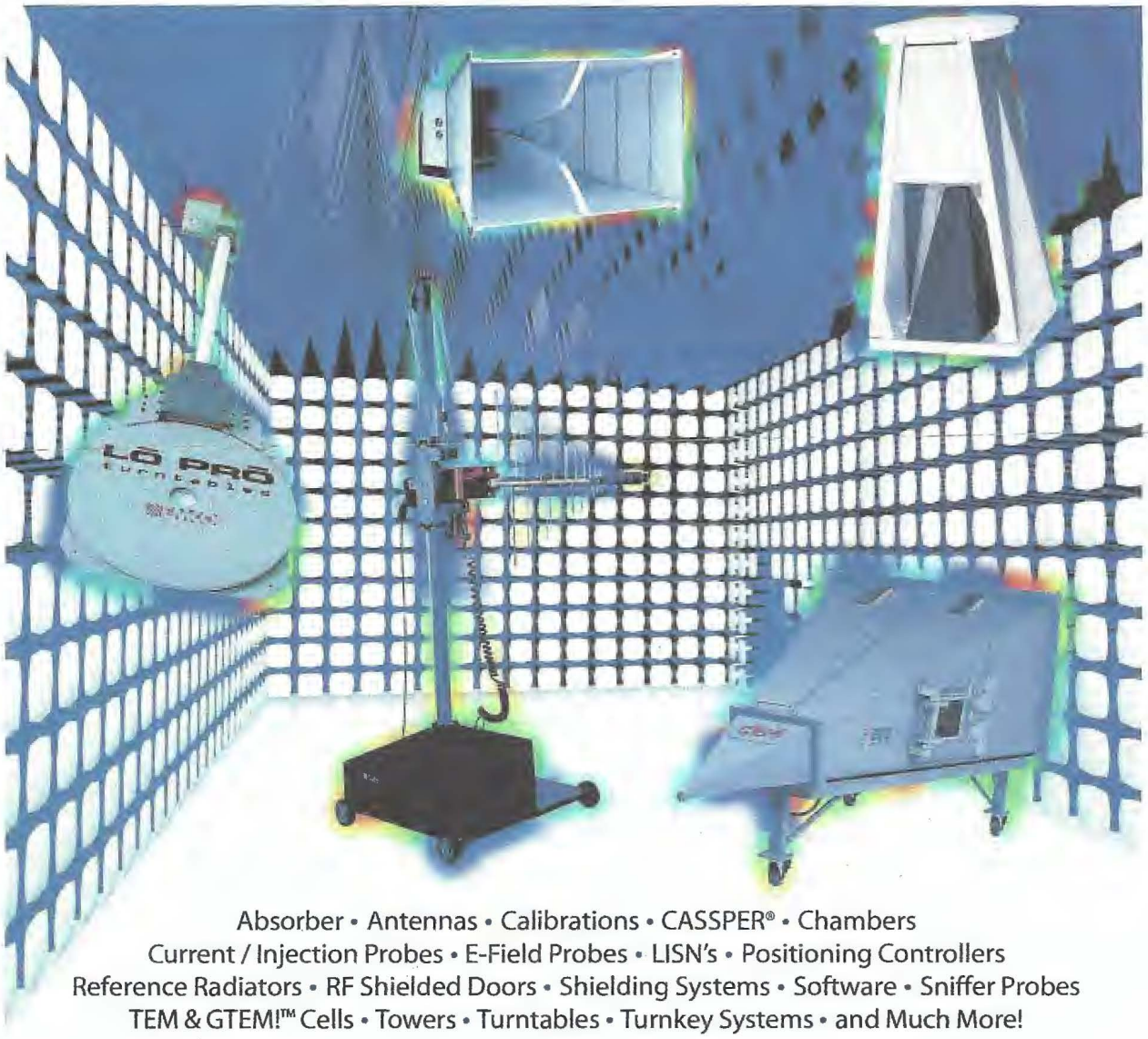

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