

MESSAGE FROM THE PRESIDENT



WARREN KESSELMAN PRESIDENT, EMC SOCIETY

Recent IEEE membership statistics indicate that your Society, as of May '94, had 4,057 members, an increase of 93 over May '93 records. The new member list in our Spring '94 Newsletter (Issue 161) contains about 150 names. It appears that about 50 previous members did not renew their membership. I do not intend to analyze these data or draw specific conclusions. However, I would like to note that EMC Society membership increased during a period when the total IEEE Society membership declined about 1 percent. Another observation is that about 40 percent of the addresses in the Newsletter's new member list were in about 25 countries outside of North America. Overall, this

information seems to support previous observations that EMC issues are on the rise and of global concern. Your Board of Directors will be addressing globalization challenges during its Planning Retreat in November. If you have thoughts on member needs in the 21st century, please pass them on to one of the Board members.

A recent IEEE brochure on "Getting the Most from IEEE Membership" prompted me to think in terms of EMC Society membership advantages. Your Society's annual Symposium and Record provide cost-effective access to current information. Another source for technical information is our quarterly Transactions. Also, local Chapter activities keep you in touch with other EMC professionals. I'd like to suggest, however, that getting the most out of EMC Society membership includes "putting in the most." I believe that personal professional involvement results in maximum benefit to the individual and employers. Hence, I suggest you try participating on one of our many committees. Want to be a part of the

Standards or Measurement Techniques development? Call Don Heirman. How about Educational manuals? Call Kimball Williams. Many other technical committee participation opportunities are available. Please refer to page 22 of the Winter '94 Newsletter for a complete list of committee chairpersons. Their addresses and telephone numbers are found on page 23. Be involved in shaping the future and supporting the technical and professional needs of your EMC colleagues.

The 1994 IEEE EMC International Symposium may be just around the corner by the time you receive this Newsletter. I trust that all who attend will take away increased knowledge and will gain a few more professional contacts. At the time of this writing, Symposium Chairman Bob Hofmann and his committee are in "overdrive" finalizing arrangements and a program for an anticipated large attendance. My thanks to those volunteers who have put in many hours of service to provide a quality event. ABSTRACTS William H. McGinnis Southwest Research Institute

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PUBLICATION DATES

November February May August EDITORIAL DEADLINES September 15 December 15 March 15 June 15 received by Sontemb

Editorial Contributions for the November issue should be received by September 15.

BACK ISSUES OF THE EMC SOCIETY NEWSLETTERS ON MICROFICHE

We still have a few sets of the uFiche copies of the back issues of the IEEE EMC Society Newsletters from the present to 1955 when it was called "Quasies and Peaks." The price is \$25.00 postpaid. If you would like to have one of these sets you can order it from: Dr. Chester L. Smith, EMC Society Historian, 2 Jonathan Lane, Bedford, MA 01730.

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CHAPTER CHATTER



TODD HUBING ASSOCIATE EDITOR

Have you heard the latest? "The state-of-the-art in electronics is changing rapidly . . . Today's circuits are more dense and operate at higher speeds than ever before . . . It is imperative that potential EMC problems be anticipated and solved early in a product's design stage."

Of course statements like these are not new. They have been uttered at meetings and printed in trade publications since the early days of EMC. They were true then. They are still true today. Not only are today's circuits faster and denser than ever, but these fast, dense circuits are being used in everything from jet fighters to home appliances.

There was a time when electric lights were controlled by on/off switches. Closing the switch allowed current to flow to the light. Opening the switch interrupted the current. What could be simpler? Today, if you want to turn on the reading light in an airplane or the headlights of a car, chances are your switch sends a signal to a high-speed microprocessor, which in turn (upon deciding that your decision to turn on the light was a good one) sends a signal to the lamp assembly.

I tell students in my undergraduate electromagnetics classes that the material covered in these classes is crucial for any electrical engineer who plans to design or work with high-speed electronic systems. I stress that the concepts of parasitic capacitance, inductance, transmission line theory and radiation play an important role in the design of successful state-of-theart electronics. "Unless you plan to use your degree to design toasters," I tell them, "you must be capable of working with circuits that operate at radio frequencies."

Well, it recently occurred to me that next year's freshman class will graduate in the year 1998. They will be designing electronic systems for the year 1999 and beyond. When I look at what has transpired in the past five years and examine the current trends in electronics technology, it is clear to me that I need to reconsider my current advise to students. For example, if current trends continue the basic ACME toaster (model year 1999) will have the following features:

- 2 Itel Sextium [™] processors clocked at 250 MHz
- personal communication network interface
- automatic voice recognition
- automatic bread recognition
- maximum bread-to-toast time: 30 seconds
- independent controls for toast color, temperature, and crispness
- list price: \$49.95 (about the same as a tank of gas or a sheet of postage stamps)

A high-end model marketed by AT&T will communicate with other kitchen appliances to coordinate meals. The leading manufacturer of household appliances, General Dynamics, will offer several models including one that meets all commercial and military EMI, ESD, and EMP requirements.

Of course, even in the year 1999, engineers who never quite master the concepts taught in their undergraduate EM classes will escape the confines of the academic environment and enter the work force. My guess is that these engineers will still be able to lead useful, productive lives in marketing or management. For those students interested in electronic circuit or system design however, my recommendation is to pay close attention to the material presented in the electromagnetic fields and waves courses.

For those of you who have been working in EMC for a number of years, electromagnetics is no longer the primary challenge. The most difficult task facing experienced engineers is keeping up with the rapid advances in circuit technology, CAE tools, modeling techniques, and manufacturing methods. If you live in an area that has a local EMC chapter, attend the meetings! There's no better way to learn so much about what others in your profession are up to. If you don't live in a location that supports a local chapter (or even if you do), come on out to the national symposium. There's no substitute for the knowledge that can be gained during informal discussions with other professionals working on products and problems similar to yours. And if you should find yourself at a conference talking to someone with EMC problems that are completely different from yours, pay close attention anyway. You never know what the future will hold. Just ask the people at General Dynamics.

CENTRAL NEW ENGLAND

At the March 8th meeting of the Central New England chapter, Dr. Andrew Podgorski of ASR Technologies described a newly developed, Canadian based testing technology and associated methods that have resulted in an order of magnitude savings for system testing versus similar test procedures used in other countries. Dr. Podgorski is an EMC Society Distinguished Lecturer.

The speaker for the April 12th meeting was Howard Bussen, Chief of the Electrophysics Branch in the Food and Drug Administration's

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Center for Devices and Radiological Health in Rockville, MD. The effects of RF radiation hazards on personnel and critical medical devices was the topic.

The title for the May 10th presentation was "Optimized Absorber Designs for EMC Applications." The speaker, Kefeng Liu from Ray Proof Shielding Systems, described the need to develop improved polyurethane absorber products for EMC applications. It was shown that it is now possible to design semi-anechoic chambers that will meet and surpass performance requirements for indoor emission test facilities in accordance with ANSI C63.4-1992 without having to resort to costly and complicated chamber shapes.

Chapter officers for the 1994/1995 season were also elected in May. The new officers are as follows: Chairman - Lawrence Lee; Vice Chairman - Tom Carberry; Secretary - John Clarke; Program Coordinator -Lawrence Hill.

DALLAS/FORT WORTH

A meeting of the Dallas/Fort Worth chapter held on April 19th featured a tour of the Endorsed TEMPEST Test Facility at Computer Crossroads of America, Inc. Mr. Mark Bushnell, Manager of Electromagnetic Compatibility, conducted the tour and gave a brief update on the status of the Endorsed TEMPEST program.

LOS ANGELES CHAPTER

What a way to start the spring season! Some 60 people attended the Los Angeles EMC Chapter meeting in April to hear Henry Ott speak on "Decoupling and Grounding of High Speed Digital Circuits." Henry did not disappoint those who traveled from all over the city for the evening meeting. His presentation was carefully prepared and featured plenty of audience interaction. Not one chapter member nodded off during the presentation and subsequent question and answer period, despite the fact that the questions kept coming for over an hour after Henry's presentation. Chapter officers consider this an indication that the meeting was a resounding success. Also, they credited their chapter members for realizing the unique opportunity they had in having Henry in town, up close and personal. Chapter members seized the opportunity to corner Henry and have him autograph their copies of his book "Noise Reduction Techniques in Electronic Systems." Adding to the

evening's excitement, a contest was held prior to Henry's presentation. Attendees were asked to name the five languages into which Henry's book had been translated. You'd never guess all five languages; in fact, one is a language chapter officers didn't know existed. One stellar chapter member knew all five languages and won the prize of a gift certificate for dinner at a local restaurant. You know how he identified all five languages? This clever fellow read about them in Henry's bio which Henry distributed before the meeting!

It was also a fun evening for chapter officer Janet O'Neil as chapter members surprised her with a big birthday cake and a wonderful(?) rendition of the traditional "Happy Birthday" song. She even received a card signed by the members which featured the caption "What's a nice person like Janet O'Neil doing in a place like the EMC Society?" Chapter Chairman Ray Adams had the card personalized by Hallmark. What a guy! (By the way, if you want to know what was stated-insidethe card, you'll have to stay tuned to a future issue of The EMC Society Newsletter . . .)

The May meeting featured Dick Ford of the Naval Research Lab in



Kanaiya Mahendra (left) presents birthday girl Janet O'Neil with a cake from the EMC Society Los Angeles chapter.



Photos courtesy of the LA Chapter.

Terry He (left) takes notes from Henry Ott following his presentation to the Los Angeles chapter of the EMC Society.



Photo courtesy of the LA Chapter.

Los Angeles EMC Society chapter members (I to r) Al Whittlesey, Ed Ray, Jerry Mandle, Jim Marr and Jerry Boone share a good laugh prior to the meeting.

Washington, D.C. Dick is also a member of the EMC Society Board of Directors, as is Henry Ott, so this affiliation promised to attract meeting attendance. Chapter officers were not disappointed. Dick spoke on "A Sub-Modal Stirred E3 Chamber." Slides of the subject chamber were shown to give the audience an idea (or "idear" as Dick says with his East Coast accent) of the latest developments with this technology. An often overlooked point about stirred mode chambers was raised regarding test set up time required in these chambers. The paddle needs to be stepped through all of the positions before changing frequency, thus increasing the test time. This point caused quite a "stir" (get it?) in the audience. Speaking of testing, after the meeting an impromptu tour was conducted of TRW's EMI test facility where the chapter meetings are held. A handful of chamber members saw the multi-shielded enclosure and anechoic chamber complex which features welded rooms and pneumatic swinging and sliding doors. At 9:30 P.M., the tour concluded with Dick requesting

directions to the nearest ice cream parlor!

In June, with summer just around the corner, chapter members look forward to the year-end social. However, before the party in July, chapter officers took the opportunity to reschedule EMC Society Distinguished Lecturer Ron Brewer



Photo courtesy of the LA Chapter.

Dick Ford searches his bag of tricks for presentation aids prior to the Los Angeles EMC chapter meeting.

> for the June meeting. Ron was originally scheduled to speak in January, but plans were cancelled due to the earthquake. Always popular in the EMC community, with his landmark "mutton chops," Ron is a delightful character who entertained and educated chapter members with his seminar on

> > Continued



Chapter members Jim Cox and Carl Smith are surprised to learn that Ron Brewer's sample honeycomb was produced by "killer bees."

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systems design considerations, shielding and RF gaskets. After calling upon St. Murphy, who Ron noted is the patron saint of EMC engineers, Ron profoundly stated: "The shielding effectiveness of a hole is not particularly good." All humor aside, Ron's comments concerning practical, cost-effective EMI design from the component level to the overall system shielding level were especially timely and appreciated by all attendees.

Well, that was it for the regularly scheduled program for the year. Chapter officers, members, and friends look forward to the July social which will be an outdoor barbecue featuring sizzling fajitas, margaritas and more. Speakers have already been scheduled for the monthly meetings beginning in September 1994 through June 1995. The program reads like a veritable "Who's Who" in the EMC community, and includes Don Weber, Don Heirman, Daryl Gerke, Mark Nave, Ken Javor, Scott Roleson, Hugh Denny and Dennis Shebel. With this great line-up, chapter officers intend to seriously challenge Santa Clara Valley for the EMC Society "Chapter of the Year" award. That is, after they take the summer off and go fishing!

SANTA CLARA VALLEY

Dr. Todd Hubing of the University of Missouri-Rolla [yes, it was me -ed.] was the guest speaker at the May meeting of the Santa Clara Valley chapter. His talk was titled "Beyond the Kool-Aid Paradigm: A Fresh Look at Multilayer Circuit Decoupling." Judging from the number of comments and questions from the audience, this subject is of great interest to many engineers in the area. Many of the dialogs on decoupling that started at this presentation are still continuing via e-mail.

Also at this meeting, Kenneth Renda was elected as the new Secretary for

the 1994/1995 season. The other officers are as follows: Chairman -Jeff Evans; Vice Chairman - Michael Heckrotte; Treasurer - Franz Gisin.

SOUTHEASTERN MICHIGAN

Ray Sasinowski, chairman of the Southeastern Michigan chapter, reports that there was a very good turnout at their March 9th meeting held at the Chrysler Engineering Campus in Auburn Hills, MI. Professor Tom Van Doren gave a very interesting lecture, complete with practical demonstrations, on grounding techniques. The meeting also included a tour of the new Chrysler Engineering EMC facility, which took over two hours due to the high level of interest and the number of questions. The Southeastern Michigan EMC chapter is very grateful to Paul Andersen of Chrysler Engineering for arranging the meeting location and acting as a tour guide of the new EMC facility.

The chapter officers met on May 11, 1994 to plan the meeting schedule for the 1994-1995 season. The chapter officers have put together a very ambitious meeting schedule that should greatly benefit all of the members. During the upcoming season the Southeastern Michigan chapter will be visiting local university IEEE branches to give an overview of the EMC engineering profession. Requests have been received from the University of Michigan, Wayne State University, General Motors Institute, and Oakland University to set up overviews.

Current officers of the Southeastern Michigan EMC Society chapter are as follows: Chairman - Ray Sasinowski; Vice Chair - Kimball Williams; Secretary - Jim Muccioli; Chapter Activities Chair - Dennis Barberi.

UK AND RI

On May 25th, the UK and RI EMC chapter held a colloquium on 'Numerical Modeling for EMC' at Cambridge Consultants Limited in Cambridge, UK. There were seven speakers giving papers covering the majority of numerical modeling techniques and how they've been applied to EMC. Vendors of numerical modeling software were also present to display their wares.

According to Dr. Miles Upton the day was very successful, with a full capacity audience responding well to some very well-presented papers. Credit is due to the authors for making the day such a success. There was even talk of repeating the same event next year.

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CORRECTION

Mr. David T. Geiser, LM IEEE, of New Hartford, NY, has kindly called my attention to an error in the recent article on the History of EMC (Issue No.160, Winter, 1994, p.13). Hiram Percy Maxim, W1AW, of Hartford, CT, was indeed a talented man and a clever inventor. However, it was a relative of his who invented the Maxim machine gun, the terror weapon of WW I. Our Maxim is the inventor of the ubiquitous automobile muffler among other things. He called it the "Silencer." Mr. Geiser also pointed out the possible confusion between Type B emission [spark] and Class B bias used in audio amplifiers. One of the main points of the article was that the Amateur Radio Community has had about the longest history of coping with electromagnetic interference of any identifiable group. The IRE [later, the IEEE] raised the interference issue as a professional matter in the mid 1950s when the late Rexford Daniels and others organized the Professional Group on Radio Frequency Interference (PG RFI), now the IEEE EMC Society. The professional community owes much to the amateurs who have been fighting this battle, technically and legally, since before WW I.

- Chet Smith, Society Historian

IN MEMORIAM PROFESSOR YASUO AKAO, 1922-1994

Professor Yasuo Akao, advisor to the 1994 International Symposium on Electromagnetic Compatibility (EMC'94/SENDAI), passed away on Tuesday, March 15, 1994.

Born in Tokyo, Japan, he graduated from Nagoya University. He received his B. Eng. (Electrical) and his D. Eng. (Electrical) degrees from Nagoya University in 1944 and 1962, respectively.

Professor Akao was an engineering faculty member at Nagoya University as an Associate Professor, from 1948 to 1963, and as a Professor from 1963 to 1985. He also served as a senator from 1976 to 1978, and the Director of the Education Center for Information Processing from 1983 to 1985, at Nagoya University.

From 1985, Professor Akao was a member of the Aichi Institute of Technology (AIT) as a Professor. He established the Department of Information Network Engineering at AIT in 1988. He was also a Principal of Aichi Institute of Technology Communications and Electronics from 1992.

139-1988

140-1990

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Professor Akao developed a new method to protect radio reception against corona noise from extrahigh-voltage power lines, called the "power line broadcasting system," a new measuring method of electron density in plasma column by using electromechanical surface waves, and also several thin film active optical devices.

Professor Akao was a consultant for the Research and Development Headquarters, the Nippon Telegraph and Telephone Public Corporation (1979-1985); and a member of the Japan Radio Technology Council, the Ministry of Post and Telecommunications, Japan (1975-1983). He served as the Chairman of the Committee on Electromagnetic Interferences, the Ministry of International Trade and Industry, Japan. He received an award from the Minister of Post and Telecommunications, Japan, for his contributions to the development of EMC technology in the field of communication and broadcasting in 1984.

Professor Akao was a member of the board of directors of the IEEE

Electromagnetic Compatibility Society (EMCS) from 1992, and was elected to the grade of Fellow in 1989 for leadership in the field of electromagnetic compatibility and related contributions to research and education. He received the IEEE **EMCS** Award for International Exchange of EMC Technology in 1986, and the IEEE EMCS Testimonial for his service as Chairman of the 1989 International Symposium in Nagoya in 1989. He was a chairman of the EMCS Tokyo Chapter (1984-1986), vice-chairman of Working Group of the EMCS Standards Committee (1985-1990), vice-chairman of the 1984 International Symposium on EMC (EMC'84, Tokyo) and the chairman of the 1989 International Symposium on EMC (EMC'89, Nagoya).

We have lost a great leader who has contributed much to our Society. The guidance and leadership given to us in his warm, gracious and sincere manner will long be remembered.



Measurement of Radio Frequency Emission

from Industrial, Scientific, and Medical (ISM) Equipment Installed on the User's Premises

Frequency Heating Equipment (ISBN 1-55937-

IEEE Recommended Practice for the

IEEE Recommended Practice for the

Minimization of Interference from Radio

Reaffirmed, March 18, 1993 S. Berger/L. Napoli

Current Reaffirmation due at end of 1994

Current Reaffirmation due at end of 1994

Reaffirmed March 18, 1993 S. Berger/L. Napoli



DON HEIRMAN ASSOCIATE EDITOR

| 187-1990 | IEEE Standard on Radio Receivers: Open Field Method of Measurement of Spurious Radiation |
|----------|---|
| | from FM and Television Broadcast Receivers |
| | (ISBN 1-55937-062-9) |

213-1987 IEEE Standard Procedure for Measuring Conducted Emissions in the Range of 300 kHz

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| STANDARE DATE | D/TITLE | STATUS W/G CHAIR |
|------------------|--|--|
| | to 25 MHz from Television and FM Broadcast receivers to Power Lines (ANSI recognized) | |
| 299-1991 | IEEE Standard Method of Measuring the Effectiveness of the Electromagnetic Shielding Enclosures (ANSI recognized) (ISBN 55937-108-0) | Active PAR - Nov. 10, 1992 Increase of Frequency Range 5 kHz to 40 GHz W/G Chair R. Schulz Confirmed by Committee. Target completion of next rev. Dec. 95 |
| 376-1975 | IEEE Standard for the Measurement of Impulse Bandwidth (ANSI recognized) | Reaffirmed, March 18, 1993 S. Berger/L. Napoli |
| 377-1980 | (Reaff. 1991) IEEE Recommended Practice for Measurement of Spurious Emission from Land-Mobile Communication Transmitters (ANSI recognized) | Current Reaffirmation due at end of 1 |
| 473-1985 | (Reaff. 1991) IEEE Practice for an Electromagnetic Site Survey (10 kHz to 10 GHz) (ANSI recognized) | Current Reaffirmation due at end of 19 |
| 475-1983 | IEEE Measurement Procedure for Field Disturbance Sensor (rf Intrusion Alarm) (ANSI recognized) | Active PAR - June 1, 1992 W/G Chair Franz Gisin Confirmed; IEEE Ballot in process for revi reaffirmation |
| PAR 482 | Cable Connector Shielding Characterization | PAR Active - June 1, 1992 Last W/G Report filed 10/29, Need MUG & W/G member 1 W/G Chair - L. Hoeft, Vice Chair - W. McGinnis Need to change PAR to reflect W/G leadership |
| PAR 1128 | IEEE Recommended Practice for RF Absorber Evaluation in the Range of 30 MHz to 5 GHz | PAR Active - July 1, 1992 Need MUG & W/G Member W/G Chairs J. Perini/Tsaliov Perini to assume sole W/G Chair position |
| PAR 1140 | IEEE Standard Procedure for the Measurement of Electric and Magnetic Fields (VDTs) from 5 Hz to 400 kHz | Approved 2/17 by Standards Board; Published by Ju |
| PAR 1190 | A Guide for Calibration of Line Impedance Stabilization Networks (LISN) | PAR Closed W/G Chair Robert Egan notifi |
| PAR 1302 | Guide for the Electromagnetic Characterization of Conductive Gaskets in the Frequency Range of DC to 18 GHz | PAR Active - June 1, 1992 W/G & MUG list submitted 1 Awaiting First Draft due by 1 W/G Chair Hugh Denny |
| PAR 1309 | Standard for the Calibration of Electromagnetic Field Sensors | PAR Active. W/G Chair J. Kramer First Draft due August 1994 Publication target 1995 |
| PAR 1385 | IEEE Recommended practice for the measurement of radiation disturbances in the range of 800 MHz to 40 GHz capable of | W/G Chair D. Moongilan Need W/G & MUG lists, and |

INTER-SOCIETY ACTIVITIES



JOSEPH BUTLER ASSOCIATE EDITOR

JEEE TECHNOLOGY COUNCIL COMMITTEE Committee on Man and Radiation (COMAR) **Representative Dan Hoolihan** Revision work continues on several existing entity position statements -"Biological Effects of Electric and Magnetic Fields from Video Display Terminals," "Human Exposure to Microwaves and Other Radio Frequency Fields," and "Health Effects of Power Line Frequency Electric and Magnetic Fields." A draft entity position statement "High Peak Pulse Power Microwaves" needs further work. Another draft entity position statement, "Radio Frequency Radiation Dosimetry" is under review by the committee. A new entity position statement on HDTV and electric power lines is being considered.

A major reorganization of COMAR in 1994 is being considered by the IEEE with a proposal to combine COMAR and the Health Care Engineering Policy Committees into one, which will be called the Medical Technology Policy Committee.

IEEE TECHNOLOGY POLICY COUNCIL COMMITTEE Aerospace R&D

Representative B. Leonard Carlson An entity position statement has been developed by this committee regarding the U.S. Civilian Space Program. An excerpt from this is as follows:

"Because of the technological and economic advantages to be derived by the nation that maintains leadership in space science, exploration and commercialization, the United States commits itself to maintaining preeminence in these fields. This will require a balanced civilian space program. In addition to replacing the shuttle orbiter and keeping the space station on schedule, the United States must allocate sufficient resources to reestablish a robust civilian space program that achieves the following goals within the next decade:

- Expands the use of advanced applications satellites for public and commercial purposes to improve worldwide communications, navigation and remote sensing;
- Expands the number of specific space missions to extend our knowledge of our planet, our solar system, and the universe beyond;
- Develops a mix of launch vehicles, expendable as well as reusable, which ensures greater access to orbit and which provides a broader range of payload capabilities;
- Encourages the public and commercial use of space systems and facilities;
- 5. Continues our exploration of the solar system;
- 6. Supports in-space research facilities for our universities; and
- 7. Sponsors the early development of advanced technology required for long-range goals. The highest priority long-range goals are to reduce sharply the cost of building and using space

systems, and to establish human settlements on the moon and Mars."

IEEE TECHNOLOGY POLICY COUNCIL COMMITTEES Engineering and Defense R&D Representative Dick Ford

A draft entity position statement "Defense Conversion and the Future of DoD Laboratories" has been developed by this committee, specifically by Dick Ford. The document makes several points: defense conversion of federal research must lead to products; it must be done under peer review with adequate academic and industry interchange; and it must be unclassified. Most importantly, the conversion must be done as simply as possible without creating new bureaucracies. However, it will necessitate that Congress redirect a significant amount of present DoD funds for unclassified DoD Federal research.

EOS/ESD Association

Representative T.J. (Bill) Ritenour the 1993 symposium was a resounding success. Attendance was up and the submitted papers were of great interest and (the usual) high quality. This year's symposium will be at the Riviera Hotel in Las Vegas on September 27 through 30. The areas to be explored are:

- Factory ESD control issues
- System effects due to ESD
- ESD test measurement and tester evaluation
- Chip failure mechanisms
- ESD effects on circuits

Other interesting news concerns the Association's formation of a new technical committee whose purpose is to create a calibration standard for system ESD test equipment. This committee chairman is Bob Renninger of AT&T Bell Labs. Bob has

Continued

also been nominated to be the Association's Liaison with ANSI C63.1.

And finally . . . It's official! As of April 1994 the EOS/ESD Association changes to ESD Association.

SOCIETY OF **AUTOMOTIVE ENGINEERS SAE Automotive EMI & EMR** Committees

Representative Ed Bronaugh

SAE J551 Parts 1, 2, 3, 4, 11, 12, 13, 15 and SAE J1113 Part 1, are about to be published. Several other parts may be ready before the May deadline for publishing SAE land vehicle standards.

Both EMI and EMR committees met in January and early March 1994. Further meetings planned were held in May 1994.

ANSI C63 and CISPR A&G **Representative Don Heirman**

The next meeting of CISPR is in October in Beijing, China. CISPR/A Publication 16 is now available (Specification for Radio Disturbance and Immunity Measuring Apparatus and Methods) as a 1993 edition, Part 1.

CISPR/G Publication 22 is now available (Limits and Methods of Radio Interference Characteristics of Information Technology Equipment) second edition - 1993 second edition.

CISPR/G met in San Francisco from March 29 to 31 and will report at the next BoD meeting in Chicago, August 1994.

Society of Automotive **Engineers SAE-AE4 EMC**

After several years of service to the Representative Advisory Committee, Herb Mertel has resigned as SAE-AE4 representative. I personally thank Herb for his contributions to

the RAC. David Graham of Simmonds Precision Engine Systems, current Chairman of SAE-AE4, has agreed to replace Herb.

Radio Technical Commission for Aeronautics (RTCA) S/C 135 and 177 Recognizing the recent activities of RTCA Subcommittees 135 and 177 in the area of EMC, it is necessary to establish liaison with them via the RAC. RTCA SC135 HIRF Working Group has been actively working on revisions to the RTCA DO-160C "Environmental Conditions and Test Procedures for Airborne Equipment." Specifically, this subcommittee is working on revisions to Section 20. Radio Frequency Susceptibility (Radiated and Conducted) to bring this standard into line with proposed FAA High Intensity Radiated Fields (HIRF) regulations for new commercial aircraft. RTCA SC177 Test Criteria and Guidance Relative to Portable Electronic Devices (PED's) On-Board Aircraft has been investigating the instances of PEDs affecting navigation/communication equipment on commercial aircraft. As a member of both these committees, Rich Gaynor of Dayton T. Brown has agreed to act as our RAC representative.

American Society for Testing and Materials (ASTM)

Preliminary discussions have been held with Drew Peregrim of Instrument Specialties, Chair of the ASTM D4935 Committee in terms of setting up an RAC Liaison with ASTM committees involved in EMC standards work. A formal proposal will be made at the Chicago meeting. It appears at the moment that there are at least two ASTM committees working in the EMC area. In addition to D4935, there is a committee working on shelters, which is partly concerned with EMC.

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EMCS EDUCATION COMMITTEE



KIMBALL WILLIAMS ASSOCIATE EDITOR

EDUCATION AND VERIFICATION

One of the maxims for most of us who work in technology is "you never stop learning." This is both the expression of a necessity for staying on top of a rapidly changing information base and an optimistic view of the ability of the human mind to continue to grow throughout life. With the continual striving to learn and understand, eventually there comes a sense of contentment with the process, if not always with the results. There is a lot to learn out there.

Every now and then we stop and mark the milestones as we make progress in this learning odyssey. We do it as we graduate from grade school, high school and various levels of college and there are reasons to mark the progress in the continuing self-learning cycle as well.

PROFESSIONAL ENGINEERS

Whenever I meet another engineer working in EMC and receive their business card I am always pleased when I notice that they have identified themselves as a professional engineer (PE). It is especially appropriate for our associates who make it their business to do consulting work for others to have the certification of the state in which they reside proclaiming that they have met the requirements necessary to act in their customers' behalf in technical matters. I like to think that all the engineers working in EMC are 'professional' in the conduct of their business and working lives. But, the PE certification gives an added assurance of credentials.

For those of us who work within the structure of an established organization, the PE requirement is probably met by others. A college or university degree and PE certification both provide verification of our general training and skills. However, there remains the need to verify our skills in our specific technical area of specialization. For EMC engineers and technicians both inside and outside large organizations that certification comes through the National Association of Radio and Telecommunications Engineers, or NARTE.

NARTE

In 1988, the United States Navy, through the efforts of Dick Ford at NRL and Russell Carstensen at NAVAIR, began seeking a method of verifying the technical skills of the men and women who provide the EMC engineering and test services needed for military electronic systems. The primary motivation for this effort was a concern for excellence in this technical area.

The Navy asked the National Association of Radio and Telecommunications Engineers (NARTE)¹ to set up a program for that purpose. Since that time the NARTE certification has become the accepted method for verifying the technical credentials for professionals in a field that is "derivative," i.e., is not taught as a discipline in a normal course study in institutions of higher learning. Since it is virtually impossible to find someone who has graduated from a university with a degree in EMC engineering, the NARTE examination has become the accepted standard for gauging the qualifications of practitioners in our field.

John Holmberg, executive director of NARTE, estimates that two-thirds to three-quarters of the certified EMC engineers and technicians are in non-DoD related industries. Also, from the time of its inception, the renewal rate for EMC engineers and technicians has remained at 96% and 95%, respectively. This indicates that the NARTE certification has been and continues to remain relevant to the work of these engineers and technicians both inside and outside of the military arena.

Just as I notice the PE on business cards, I am beginning to notice the NCE (NARTE Certified Engineer) as well. This is an appropriate and valid way of identifying and marking another milestone in our personal learning process.

NVLAP

As part of the Naval program to promote excellence in EMC, the National Institute of Science and Technology (NIST), through its National Voluntary Laboratory Accreditation Program (NVLAP)², was asked to set up a program to certify the operation of the laboratories conducting EMC test work for Navy electronics systems. The NVLAP EMC process is able to certify laboratories under two different programs. The FCC EMC

The National Association of Radio and Telecommunications Engineers, Inc. (NARTE) P.O. Box 678 Medway, MA 02053 Contact: John Holmberg (508) 533-8333

The National Institute of Science and Technology (NVLAP)
 Bldg. 411, Room A162
 Gaithersburg, MD 20899
 Contact: Eric Lindstrom
 (301) 975-5606

Continued

program certifies laboratories for FCC emission tests only. The MIL-STD-462 program certifies laboratories for the "soup to nuts" complete set of tests from radiated and conducted emissions, as well as their immunity counterparts and time domain impulsive transients.

Just as NARTE certification has become the effective standard for verifying the skills of practitioners of EMC, the NVLAP accreditation has become the benchmark by which to judge the quality of the U.S. EMC test laboratories conducting the development and final EMC qualification tests on electronic systems and components.

94 SYMPOSIUM

At the IEEE International Symposium in August 22-26, 1994, in Chicago there will be opportunities to learn and interact with representatives of the NARTE and NVLAP programs, as well as an opportunity to participate in a workshop to assist new applicants to prepare for the NARTE certification examination.

Of interest to those of us concerned with the EMC business on an international market will be a session on Thursday, August 25th at 8:30 A.M. on "Mutual Recognition Agreements." This will include papers and a panel discussion with representatives of both the U.S. and EC laboratory assessment programs. Panel members from the U.S. NVLAP and the EC NAMAS programs will participate in the panel discussion. Though the topic will focus on laboratories, I expect that this same discussion may evolve into questions of future international personnel certification.

NARTE Workshop

On Friday, August 26th from 8:30 to

11:30 A.M., Dr. James Whalen of the State University of New York at Buffalo will conduct a workshop covering the essentials of the NARTE examinations. The details of the workshop are written up in the advance program for the symposium. Those interested in more immediate information on the certification process should see Dr. Whalen's excellent paper "The NARTE EMC Credentials Certification Examination," which was published in the 1993 IEEE EMC Symposium record.

Other Workshops

On Monday and Friday there will be two days of educational workshop opportunities. Based on the standards upheld by past workshops, we can expect excellent presentations of useful and relevant information.

Monday

Fundamentals of EMC: Introduction to the basic concepts of EMC *Surge Arresters and Suppressors on AC Supply Mains:* Overview of applications, coordination and proper use of surge protection methods.

European EMC Requirements: Overview of EC laws, directives and standards and their impact.

Friday

Basic EMC Measurements and Instrumentation: An introduction to the basics of EMC measurements and instrumentation.

Reverberation Chambers: Explore the proper role of the reverberation chamber test method.

C95.1 1991 Safe Exposure Levels: An overview of the latest IEEE Standard C95.1-1991 on Safety Levels for EM fields.

Preparing for the NARTE Exam: Intended for EMC engineers preparing for the NARTE EMC Credentials Certification Exam. *EMC Computer Modeling:* An Introduction to EMC computer modeling

Committee Meetings

As an opportunity to learn and grow in specific technical areas and also contribute to pushing out the envelope don't forget to look into the committee meetings that are held throughout the symposium week. Usually the only requirement for attendance is a sincere interest in the topic. You might find a cause to which you can contribute when you attend one of these meetings.

For those of us concerned specifically with EMC education, the main committee meeting will be held on Tuesday at 7 A.M. and the subcommittee meeting on Wednesday at 7A.M. Please check the bulletin board for the meeting rooms.

Sessions

All this is in addition to the primary focus of the Symposium as an information exchange opportunity for experts and practitioners in the field. Attendees can learn from each other through the session papers, informal gatherings, exhibits, workshops and discussions. Come to think of it, from the view of someone concerned with EMC education, the entire symposium is directed to that goal in one way or another.

Demonstrations

By the way, don't neglect to stop by the EMC Education Committee exhibit booth on EMC Demonstrations and Experiments in the lower exhibit hall. Andy Drozd tells me that we should have another series of interesting EMC phenomenon from the EMC education manual to demonstrate as well as several new experiments that are not currently published.

See you at the Symposium!

BOOK REVIEW



REINALDO PEREZ ASSOCIATE EDITOR

ELECTROMAGNETIC COMPATIBILITY By JASPER J. GOEDBLOED TOM HOLMES (ENGLISH TRANSLATION) PRENTICE HALL, 1992 LIST PRICE \$69.00

This book is another in the series of general introductory books that we have been reviewing in the last several issues of the EMC Society Newsletter. As has been the practice n the past, an effort is made first to point out the salient aspects of each ntroductory EMC book which may listinguish it from the others in the narket. The objective is to help our readers to selectively choose the pook that will most likely match their needs or the needs of those to whom hese books will be recommended.

This introductory book is divided nto 12 chapters. Before proceeding to describe the contents of the book let us first outline its most important features: a) practical experimental examples at the end of each chapter which demonstrate the main topics of that particular chapter. The examples are simple in nature since the purpose is to emphasize the basic EMC principles explained in the chapter; b) a good chapter (Chapter 12) on the IEC European immunity/ emission standards and testing methodologies. Since this book was written mainly for a European audience, the IEC standards from the EEC are the ones mainly discussed; and, c) a chapter on cables with several examples. This editor

observed that the theme throughout the book is on the role of parasitic effects in EMI.

Chapter 1 introduces the reader to the basic concepts and terminology of EMI phenomena. Chapter 2 talks about the electromagnetic environment where the concept of radiated and conducted emissions are explained. For conducted emissions, the material related to common mode and differential mode currents and impedances are introduced using equivalent circuit diagrams. Methods for conducted emission measurements are then covered. For radiated emissions the material emphasizes electric and magnetic fields (far/near fields) from dipoles and loops since many EMI radiation problems resemble those of looks and dipoles, especially at far fields. Methods for radiated emission measurements are then covered. The chapter ends with a simple introduction to time and frequency domain analyses of periodic pulses. EMI properties of passive components - conductors, inductors, and resistors - are presented in Chapter 3. The emphasis of the chapter, as it is in most EMC books, is to show how parasitic effects can considerably alter the expected performance of such components.

Just as parasitic effects play a role in electrical components behavior, the same can also be said of circuits. Chapter 4 addresses the subject of crosstalk which is the coupling of energy among electrical circuits due to either common impedances or near-field effects (capacitive and inductive crosstalk). The chapter covers the basic physics of different types of crosstalk and provides experimental examples of how such effects can be simulated. The chapter ends with techniques used in the reduction of crosstalk: decreasing the common impedances, implementing cable shields well grounded, decreasing mutual inductances. Again, experimental demonstrations

are shown and explained. As previously stated, a unique chapter in the book is the chapter on cables (Chapter 5). The chapter starts by discussing and deriving the concept of transfer impedance. This material is followed by a series of experimental examples in which different types of cables are compared. The chapter is important because it explores, in an analytical approach, what kind of choices in cables should be made under given conditions to assure EMC. Chapter 6 addresses grounding both for safety and for EMI purposes. The main objective of the chapter is to illustrate that parasitic effects make grounding (single-point or multi-point) one of the most difficult and yet most important items to address in any circuit design.

Shielding and filtering are discussed in Chapters 7 and 8, respectively. This material is similar to the one found in other EMC books. Chapter 7 covers attenuation of fields by metal plates, including absorption, reflection, and multiple reflection losses. Reflection losses in the near field are discussed using the electric and magnetic dipole models. Attenuation of plane waves and the effect of apertures in the shielding effectiveness are also discussed. The chapter ends with a generalized discussion of the Faraday cage, not only as it applies to screen rooms but also to the shielding of electronic circuits and cables. Limiting factors that decrease the shielding effectiveness of screen rooms are covered, including slits and seams, cables or conductors passing through the wall (they can act as antennas), openings, and low frequency currents through the walls. The chapter on filtering (Chapter 8) is dedicated mainly to mains filters. It describes the kinds and internal characteristics of the filters most commonly found in the power input of most electronic systems. In Chapter 8 the following concepts are discussed: attenuation

Continued

EMC PERSONALITY PROFILE

Continued

characteristics, effects of installation, impedance mismatching, combination and distributed filters. The chapter ends with a brief discussion of isolation transformers and otcocouplers as electrical separator devices.

Chapter 9 gives an introduction to nonlinear phenomena such as quadratic detection, dc shift, AM modulation, intermodulation and cross modulation. The nonlinear behavior of diodes and transistors is also discussed. The chapter emphasizes out-of-band disturbances since it is in this area that most signals are ignored by design engineers. As in other chapters, examples are worked to shed light on the material covered. Chapter 10 addresses EMI problems in digital circuits. Two sections are mainly covered: immunity issues of digital circuits and the effect of circuit design on the disturbance margin. The material presented is not unlike the one shown in other EMC books. Chapter 11, titled "Impulsive Disturbances," provides brief introductions to transient effects such as switching, lightning, and ESD. The chapter ends with examples of coupling phenomena due to transients and some methods for transient suppression - zener and avalanche diodes, varistors, etc. Chapter 12, which is the final chapter of the book, provides a fairly good introductory overview of the IEC statutory requirements and methodologies for EMC compliance.

The book can be recommended as a reference for the practicing engineer. The experimental examples can also serve as a teaching aid. Because the book does not include problems its use as a textbook for university teaching must be complemented with the needed assignments.



RAY KLOUDA

Ray Klouda is the technical programs chairperson for the 1994 IEEE EMC Symposium to be held the week of August 22-26, at the Palmer House Hilton, Chicago, IL. Together with Ray, Cliff Kraft, technical papers chairperson, and Peter Moy, supporting committee member, have assembled this year's technical program. The program will include a wide variety of subject material, including presentations on all facets of EMC from EMC measurements to computational electromagnetics.

One change implemented by Ray's Technical Program Committee to enhance this year's symposium is the inclusion of the workshops with the regular registration. All full registrants are invited to attend the workshops at no additional charge. In addition, each full registrant will receive a copy of the workshop notes in his or her registration package. By including the workshops with the symposium registration, the Committee hopes to provide the maximum opportunity for attendees to participate in this valuable aspect of the symposium.

Ray has a B.S. in Electrical Engineering from the University of Illinois, Champaign-Urbana ('81) and graduated with honors (Tau Beta Pi and Eta Kappa Nu Honor Societies). He is a registered professional engineer in the state of Illinois, and a NARTE certified EMC engineer.

Ray is currently an EMC test engineer and consultant for Elite Electronic Engineering Co. in



WILLIAM G. DUFF ASSOCIATE EDITOR

Downers Grove, IL. He has been involved in EMC at Elite for the past 12 years. His responsibilities in the test laboratory include supervising and performing FCC Parts 15 and 68 test procedures. He also assists Elite's customers with the application process for the FCC. He has participated in meetings and seminars of the Telecommunications Industry Association (TIA). Additionally, Ray conducts surveys and provides testing and analysis of EMC environments, including hospitals, computer centers, and office buildings.

He is skilled in testing for compliance with both military and commercial EMC specifications, including MIL-STD-461/462, MIL-STD-220, MIL-STD-285, RTCA DO-160C and FCC Parts 2, 15, 18, 68, and 90.

As an RF shielding consultant, Ray analyzed the architectural shielding design of several buildings at the FAA Training Center in Oklahoma City, OK, and provided testing to confirm the shielding integrity.

He is serving his fourth term as Secretary for the Chicago Area Chapter of the IEEE EMC Society. He served as Vice Chairman at the University of Illinois Student Branch of the IEEE.

Ray lives in Lisle, IL, with his wife, Joyce, a legal writing professor, and their three children, Lauren, 7, Stacey 4, and David, 1. Ray enjoys gardening, traveling, and playing with his children.



1994 IEEE International Symposium on Electromagnetic Compatibility







Join us at the Historic Palmer House Hilton, Chicago, IL, on August 22-26. This year's theme is "Compatibility in the Loop." For more information call Bob Hofmann at 708-979-3627, or Tom Braxton at 708-979-1299.

GUIDELINES FOR FELLOW NOMINATIONS

The IEEE Bylaws define the Fellow grade as one of unusual distinction in the profession, to be conferred only by the invitation of the Board of Directors upon a person of outstanding and extraordinary qualifications and experience in IEEE designated fields (including electrical engineering and computer sciences, and the allied branches of engineering and related arts and sciences), who has made important individual contributions to one or more of these fields. A nominee must be a senior member of the Institute, and have been a member in any grade for at least five years prior to January 1 of the year of election.

The Fellow Committee, appointed by the Board of Directors, has the responsibility of making recommendations to the Board of Directors for nominees to be conferred the grade of Fellow.

The Fellow Committee acts as a guardian of IEEE Fellow grade standards and works carefully and faithfully to maintain these standards uniformly throughout the IEEE. In the performance of its duties, the Committee is concerned with determining whether the applicants meet the requirements of the IEEE Bylaws and it seeks assistance from many sources in adjudicating the nominations.

The Fellow Committee depends upon the nominator of a candidate to furnish all of the basic necessary information requested on the nomination form, and to point out the unique contributions of the candidate in a concise and succinct statement.

The Fellow Committee depends upon the Society evaluations of the technical contributions of the candidates, and their ranking of the candidates. The Fellow Committee depends upon the Fellow grade references who feel qualified to comment on and judge the candidate's specific technical achievements with which they are familiar.

The Fellow Committee will consider brief letters of endorsement from IEEE Sections, Chapters, and Committees. During processing by the Fellow Committee, the candidates' dossiers are evaluated on the basis of eight criteria:

1. Individual contributions as engineer, scientist, originator, technical leader or educator;

- 6. Professional engineering service other than the IEEE;
- 7. Opinions of endorsers; and
- 8. Total years in the profession.

Having considered all of the valuable information supplied from these many sources, a consensus of Committee judgments is reached on the nominees to be recommended to the Board of Directors for elevation to the IEEE Fellow grade, taking into account the maximum number of recommendations permitted by the IEEE Bylaws which can be submitted annually.

The Fellow Committee acts as a guardian of IEEE Fellow grade standards and works carefully and faithfully to maintain these standards uniformly throughout the IEEE. In the performance of its duties, the Committee is concerned with determining whether the applicants meet the requirements of the IEEE bylaws and it seeks assistance from many sources in adjudicating the nominations.

2. Evaluation by an IEEE Society;

- 3. Tangible and verifiable evidence of technical accomplishment, such as technical publications, patents, reports or published descriptions of products, facilities, and/or service;
- 4. Confidential opinions of Fellow references who know of the work of the candidate personally (where possible, these should be associated with other than the candidate's own organization);
- 5. Service to IEEE and its predecessors, the AIEE or IRE;

An IEEE Fellow Nomination Kit may be obtained from the Staff Secretary, IEEE Fellow Committee, 345 East 47th Street, New York, NY 10017 (212) 705-7750. All completed forms for Fellow nominations must be received by the Fellow Committee no later than April 15, 1995.

The EMC Fellow Search Committee can provide assistance in obtaining Fellow grade references. Contact: H.E. (Bud) Taggart Taggart Enterprises 1010 Gapter Rd. Boulder, CO 80303. Tel: 303-494-7381 Fax: 303-449-7605.

LIGHTNING JOLT GIVES TRAVELERS FEAR OF LANDING

Something odd was going on. On April 7 at 11 p.m. the staff in the reservations office at Ben-Gurion Airport were getting a little uneasy. Ambulances and police cars were racing past the window.

Unbeknown to them, El Al flight 316 from London had been struck by lightning. All other incoming aircraft had been diverted. There was a chance of an emergency landing.

Lightning strikes the earth once every two minutes. A recent study by the Federal Aviation Association reveals that the average commercial aircraft is likely to be struck once a year. A frightening statistic, but planes are built to bear the shock.

For the passengers it is a terrifying experience. Robert Shipton, a hairdresser from London, and Michael Taub, a leather-goods manufacturer from Glasgow, were on the El Al flight. For six weeks they couldn't bring themselves to talk about it. Only now do they feel capable of recounting their experiences.

"Flying is a doddle for me," says Shipton, "It's my wife who gets tense in the air. Before we boarded the flight to Tel Aviv she said, 'I think I'll take some of that homeopathic stuff. It calms me down.' Little did she know.

"I was sitting next to my friend. We were separated from my wife and my aunt by an aisle.

"The weather in London was lousy. The heavens had opened, but I didn't think anything of it. The captain said, 'Welcome to El Al 316. . . . We wish you a pleasant flight.' The explosion came about five minutes later. A gigantic flash of light engulfed us. The plane shook so violently, I swear I thought we'd been hit by a missile. To my right a stewardess crouched down in the aisle with her hands above her head. My stomach was in my feet. There was this 'Oh my God, what's going on?' sort of atmosphere. People were starting to whimper."

Taub was at the back of the plane. Paranoid about flying at the best of times, he says "Well, I just thought that was it. I reached straight for the whiskey."

The pilot's voice broke the panic. He told his 350 passengers that the plane had been struck by lightning but that everything was fine. Shipton felt reassured.

"My tension disappeared in a split second," he says. "I mean, they say lightning never strikes twice, don't they?"

"Just over four hours later we came to land at Ben-Gurion Airport on schedule. We were close enough to see the lights of the airport on the ground. We were waiting for the bump of the touchdown. But suddenly we zoomed up again at top speed. I thought, 'Something is very, very wrong.'" When the pilot announced that a fighter plane had taken off to see if the wheels were in place, but no one could be sure if they were locked and would stay that way, Taub turned in desperation to the man sitting next to him. "It was tragic and funny at the same time. When I got on the plane, I realized I was next to someone with whom I'd had a big fight in business. By the end of the flight we were holding hands."

"When the pilot announced, 'Ladies and gentlemen we are going to have to prepare you for an emergency landing,' the atmosphere was one of shock," says Shipton.

"There was silence. Total deafening silence. For the entire half hour while we flew over sea dumping fuel to stop us from blowing up when we landed, I didn't hear a single word," he continues. "It was excruciating. I scrutinized the stewardess closest to me. She had tears in her eyes. Another one was taking long deep breaths. That's when I started to think a million things at once.

"Lightning strikes the earth once every two minutes. A recent study by the Federal Aviation Association reveals that the average commercial aircraft is likely to be struck once a year."

Shipton was right. The bolt of lightning had blown the light which told the pilot if the landing gear was working; he had no idea if the wheels were down.

"He was still incredibly calm when he said we were going to fly over the control tower so they could tell us if our landing gear was actually in place," Shipton says. "And there was still no trace of emotion when he announced that the control tower couldn't quite work things out. But minutes later something had changed. I could hear his voice shaking." "I thought, 'Thank God we're not with the kids.' I thought, 'I hope someone will take care of them.' And I even thought, 'Oh well my business partners will get all the insurance money.' I pushed the words 'dead' and 'maimed' away.

"Every crash landing I'd ever seen in a movie screen flashed through my mind. But you don't really believe it until the stewardess says 'Please place your seat cushions in front of you. Lean forward. Place your hands under your knees. Make sure the aisles are clear and remove your shoes.' It was the bit about the shoes that really freaked me out." Continued

EMCABS

Taub says by this time he was seriously inebriated. "They pointed out our nearest emergency exits. They told us to jump on to the chutes as soon as we landed. I'm not sure if it all happened in slow motion because I was drunk or because I was paralytic with fear."

Shipton was still painfully aware of what was going on. He even found himself in a moral dilemma.

"The man in front of me was old and fat. How was he going to jump on to the chute? Should I help him before I help myself? I dared to lift my head from the crash-landing position and look at my wife. She was looking at me and she mouthed, 'Are you OK?'

"I felt the stewardess put a hand on my shoulder. The pilot said, 'Cabin crew to emergency positions.'

"I almost stopped breathing.

"Seconds later we landed like a butterfly on a leaf.

"It was only then that two children started to scream high-pitched screams. It was then hat I saw literally hundreds of red flashing lights chasing alongside the plane. It must have been a whole minute till people started cheering and clapping and crying. It wasn't till that night in bed that I started thinking, I thought the emotion would come out the next day or the day after that. I waited and waited. But it didn't. I was just very glad to be in one piece. Basically I'm a fatalist. I think, when your number's up your number's up.

"It was different for my aunt. Someone asked her what it was like and she burst into tears. As for my wife, well she wanted to return home by ship. But who's got that much time to waste?"

(Source: *The Jerusalem Post,* June 10, 1994)



WILLIAM H. McGINNIS ASSOCIATE EDITOR Following are abstracts of papers from previous EMC Symposia, other conferences, meetings and publications.

EMCAB COMMITTEE

Mike Crawford, Consultant Bob Hunter, Consultant Yoshio Kami, Univ. of Electro-Communications Sha Fei, EMC Research Section, N. Jiatong Univ., Beijing, China Ferdy Mayer, L.E.A.D., Maisons, Alfort, France Diethard Hansen, Euro EMC Service, Berlin Perry Wilson, EMC Baden, Ltd., Switzerland Heinrich Garn, Austrian Research Center Atanas Lazarov, Technical University of Sofia, Bulgaria

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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 or 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, 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.

Also, the steering staff of the Japan Technical Group and the EMC-J Tokyo chapter have offered to act as a central point for requests of papers abstracted here. Most of the papers will be available in Japanese only. The steering staff will assist in routing your request to the author(s) but will not do translating of the papers. The contact person is Prof. Yoshio Kami, the University of Electro-Communications, 1-5-1, Chofugaoka, Chofu-Shi, Tokyo 182, Japan. Abstracts of papers from EMC-J will be clearly identified.

Some of the Chinese papers are not available in English. Associate Professor Sha Fei, EMC Research Section, Northern Jiatong University has offered his time and assistance in routing requests for papers to the appropriate author(s). He is not furnishing a translation service.

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 requesters in getting the information or contacting the author(s). The library at Southwest Research Institute, 6220 Culebra Road, San Antonio, Texas, 78228-0510 has agreed to catalog, shelve, and have available for interlibrary loans proceedings from symposia and meetings which are donated to the library. Any such donations can be sent to me at the above address and I will review them for suitable articles and then forward them to the SWRI library. We are particularly interested in symposium proceedings which have not been available for review in the past. Neither the abstractors nor myself have a budget for acquiring proceedings; we rely on those we receive through attendance at symposia and from various subscriptions. Thank you for any assistance you can give in expanding the EMCS knowledge base.

| MULTILAYER TECHNOLOGY AND NEW PASSIVE ELECTRONIC COMPONENTS FOR NOISE REDUCTION IN CIRCUITRY M. Fugimoto and N. Tamaru Taiyo Yuden (USA), Inc. IEEE SCV EMC '94, Santa Clara Valley Chapter, IEEE EMCS 29-30 March 1994, pp. 3B-9 through 3B-13 Abstract: Multilayer technology has many strong points. The three-dimension structure makes it possible to obtain larger capacitance or inductance in the sizing), and in multi-element configurations such as monolithic LC EMI filter and rectangular shape is suitable for automated surface mounting. Introd multilayer "hi-loss" inductors, EMI LC filters, and common mode chokes, as future passive elements noise reduction systems. Index terms: Filters, surface mount | EMCABS: 01-8-94 onal internal electrode same volume (down- rs. In addition, the flat uced are concepts for swell as a summary of | TROUBLESHOOTING USING A DIFFERENTIAL COAX PROBE Douglas C. Smith AT&T Bell Labs, Middletown, NJ IEEE SCV EMC '94, Santa Clara Valley Chapter, IEEE EMCS 29-30 March 1994, pp. 1D-1 through 1D-7 Abstract: Measurement of high frequency signals or noise can be subjeexceeding the amplitude of the desired signal. This talk outlines sometional measurements and presents a measurement method that overceerror, the "balanced coaxial probe." Index Terms: Measurement techniques | EMCABS: 04-8-94 |
|--|---|--|---|
| PCB DESIGN FOR EMC CONTROL John B. Howard Parallan Computer, Inc. IEEE SCV EMC '94, Santa Clara Valley Chapter, IEEE EMCS 29-30 March 1994, pp. 5B-1 through 5B-6 Abstract: PCB design requires that EMC considerations begin early in the d a well-behaved finished product. The initial consideration is the proper care clocks. The next important consideration is the analysis of the power plane for impedances, coupling potentials and loop areas. Index terms: PCB design, grounding techniques | EMCABS: 02-8-94 lesign process to have e and feeding of circuit es and printed circuits | PREDICTING THE EMC PERFORMANCE OF FILTERS Eddie Paylu SynOptics Communications, Inc. IEEE SCV EMC '94, Santa Clara Valley Chapter, IEEE EMCS 29-30 March 1994, pp. 1D-9 through 1D-19 Abstract: It is common to measure a wide range of EMC performance in Area Networks (LANs) and Common Mode Filters used to lower rad performance of these filters can affect radiated emissions. Comparing ft Test Site (OFTS) measurements can be time-consuming and costly measurement technique which can be used to predict the EMC performances. Index terms: Measurement techniques | EMCABS: 05-8-94 filter modules used in Local lated emission levels. The lters by making Open Field . This paper discusses a ance of a filter prior to OFTS |
| INTERCONNECT SIGNAL INTEGRITY ISSUES Jim Parker Fijitsu Computer Packaging Technologies, Inc., San Jose, CA IEEE SCV EMC '94, Santa Clara Valley Chapter, IEEE EMCS 29-30 March 1994, pp. 5B-7 through 5B-13 Abstract: Signal lines and vias are cascaded to form circuits. Noise effects fro lines) and ground bounce (on vias) add together (superimpose). Causes, an of these problems are discussed and illustrated. Index terms: PCB design, transmission line evaluations | EMCABS: 03-8-94 om crosstalk (on signal alysis, and mitigation | ELECTROSTATIC DISCHARGE - A TUTORIAL T.J. (Bill) Ritenour Storage Technology Corporation, Louisville, CO IEEE SCV EMC '94, Santa Clara Valley Chapter, IEEE EMCS 29-30 March 1994, pp. 5D-1 through 5D-27 <i>Abstract:</i> This paper is a practical explanation of various electrostatic of tics, including rationales for various waveforms observed under differe are ESD test setups for various types of machines, as well as compariso standards and ANSI (U.S.) C63.13. <i>Index terms:</i> Electrostatic discharge, standards | EMCABS: 06-8-94 discharge (ESD) characteris- nt conditions. Also covered ons between European ESD |

EMC SOCIETY CONTINUES TO GROW

Welcome to these new members:

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| ELECTROMAGNETIC SHIELDING EFFECTIVENESS OF A PLANE WAVE THROUGH A MULTILAYERED MEDIA EMCABS: 07-8-94 T. Yamaguchi, Y. Amemiya (1), and T. Hayashi (2) (1) Kanazawa Institute of Technology and (2) Kanazawa Technical College EMCJ Presentation at Kanazawa Institute of Technology 28 January 1994, No. EMCJ93-77 Abstract: Rigorous expressions of the reflection and the transmission coefficients or the shielding effectiveness by a TM-mode plane wave at the oblique incidence to the multilayered media is analytically derived by using electromagnetic field theory. The expressions are quite tractable and simple for calculations. Index terms: Shielding effect, multilayered media, reflection coefficient | THEORETICAL STUDY ON ELECTRIC FIELD SENSOR USING OPTICAL MODULATOR EMCABS: 10-8-94 R. Kobayashi and N. Kuwabara NTT Telecom, Network Labs EMCJ Presentation at Kanazawa Institute of Technology, Kanazawa EMCJ Presentation at Kanazawa Institute of Technology, Kanazawa 28 January 1994, No. EMCJ93-81 Abstract: The paper describes theoretical study on the electric field sensor using an optical modulator. The sensitivity of this sensor can be calculated based on an equivalent circuit of this sensor. The calculated values almost agree with experimental results. Index terms: Electric field sensor, optical modulator |
|--|--|
| ON THE APPROXIMATE FORMULA OF SHIELDING EFFECTIVENESS INCLUDING SURFACE RESISTANCE Y. Amemiya and T. Yamaguchi Kanazawa Institute of Technology EMCJ Presentation at Kanazawa Institute of Technology, Kanazawa 28 January 1994, No. EMCJ93-78 <i>Abstract:</i> Approximate formulas of shielding effectiveness of a plane sheet are derived from electromagnetic field theory for plane waves as well as for magnetic dipole fields. Discrepancies are studied between formulas by a transmission-line analogy and those by EM field theory. <i>Index terms:</i> Shielding effectiveness, plane wave, near field, transmission line analogy | STUDY ON ELECTROMAGNETIC SHIELDING METHODS USING WIRE-MESH STRUCTURES Y. Maeda, H. Masuda, K. Murakawa, H. Yumane, and M. Tokuda NTT Telecom, Network Labs EMCJ Presentation at Kanazawa Institute of Technology, Kanazawa 28 January 1994, No. EMCJ93-82 Abstract: Simple electromagnetic shielding methods using wire-mesh structures were studied experimentally and analytically. It is found that electromagnetic shielding effectiveness is more than 20 dB at resonance frequencies. Index terms: Moment method, wire-grid model, electromagnetic shielding method |
| BASIC STUDY OF MICROWAVE HEATING TREATMENT BY THE USE OF ELECTROMAGNETIC WAVE ABSORBER DESIGN TECHNIQUE T. Tsukagoshi and K. Hatakeyama NEC Corporation EMCJ presentation at Kanazawa Institute of Technology, Kanazawa 28 January 1994, No. EMCJ93-79 EMCABS: 09-8-94 Abstract: Basic characteristics of electromagnetic wave absorption are studied by using electromag- netic absorber design techniques for the purpose of realizing effective heating. The relationship between dielectric constant and absorption characteristics is discussed on some types of absorbers. Power loss distribution is calculated and confirmed experimentally using wedge-type pots. Index terms: Microwave heating, electromagnetic absorption, dielectric constant, power loss distribution | MAKING A FREE QUASI-FREE SPACE EMC TEST SITE EMCABS: 12-8-94 S. Shibuya, A. Kameshima, H. Ishizuka (1); H. Ando (2); and T. Suzuki (3) (1) Consultants; (2) Toin Gakuen Yokohama University; and, (3) Net Alpha Co. Ltd. EMCJ Presentation at Kikai-Shinko-Kaikan, Tokyo 8 March 1994, No. EMCJ93-83 Abstract: The report describes a way to realize a quasi-free space by constructing high fences on the ground. Index terms: Quasi-free space test site |

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INSTRUCTIONS FOR AUTHORS AND TIMETABLE

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| October 3, 1994: | Submission deadline. Submit four copies of a 300-500 word summary to the |
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- 1994 Ninth International Conference on Electromagnetic Compatibility The Armitage Centre Manchester, UK September 5-7 Louise Bousfield Phone: (44) 71 344 5467 FAX: (44) 71 497 3633
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A call for papers has been issued for the Ninth International Conference on Antennas and Propagation (ICAP 95). The conference is scheduled for April 4 to 7, 1995 at the Technical University of Eindhoven, The Netherlands, and is sponsored by the Electronics Division of the Institution of Electrical Engineers.

For more information contact the ICAP '95 Secretariat, Conference Services, The Institution of Electrical Engineers, Savoy Place, London, WC2R OBL Tel: +44 71 344 3577/5478. Fax: +44 71 497 3633.

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The following calendar is compiled by the IEEE Technical Activities Department for its volunteers and is composed of information received on Society administrative meetings as well as other IEEE Boards and Committees. It does not purport to be a complete set of information. Most meetings are open only to Board/Committee members. Any appropraite meeting information you would like to appear in the Administrative Meetings Calendar should be sent to: Support Services Director IEEE **Technical Activities Department** 445 Hoes Lane P.O. Box 1331 Piscataway, NJ 08855-1331 Fax: (980)562-1571 E-mail to m.desarle@ieee.org.

August 22 and 25 EMC SOCIETY BoD The Palmer House Chicago, IL Janet O'Neil (301)973-8757

September 18-19 IEEE EXECUTIVE COMMITTEE Location to be announced Budapest, Hungary Julie Cozin (908)562-3984

November 11-12 EMC SOCIETY BoD IEEE Piscataway, NJ Janet O'Neil (301)973-8757

November 17-19 **TAB MEETINGS** Boneventure Spa and Resort Ft. Lauderdale, FL Paula Dunne (908)562-3919

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