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ROBERT D. GOLDBLUM, Editor

MESSAGE FROM THE PRESIDENT



H.R. HOFMANN
PRESIDENT, EMC SOCIETY

It has been 18 months since I was first elected President of the EMC Society by the Board of Directors, and the time has passed rapidly. The Society is running smoothly with our many volunteers filling all the appointed and elected positions very capably. However, major changes will be occurring shortly.

Some of our volunteers who have served the Society faithfully for many years will be retiring from their elected and appointed offices at the end of this year. Others will be ineligible to continue serving on the Board due to having already served two consecutive three-year terms. The Board, including the newly elected directors-at-large, will meet in November to elect new officers and to fill the many appointed positions within the Society. Now is

the time for individuals who are interested in serving the Society to make their interests known so that they can be considered and contacted before the November Board meeting. Please call or write Ed Bronaugh, our immediate Past President, and let him know your area of interest within the society, or as a liaison to allied societies. Ed's telephone number is: 512-835-4684, ext. 665; his fax is: 512-835-4729; and he may be reached at: EMCO, P.O. Box 1546, Austin, TX 78758. The Society can only be as good as its volunteers. Please help!

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NIST ADDRESSES MEASUREMENT CAPABILITY

The National Institute of Standards and Technology has announced *Measurements for Competitiveness in Electronics* (NISTIR 4583), a new publication from NIST's Electronics and Electrical Engineering Laboratory. NISTIR 4583 identifies measurement needs that are most critical to U.S. competitiveness, that would have the highest economic impact, and that are the most difficult for individual companies to address.

Measurement needs are reviewed for nine important fields of electronics: semiconductors, magnetics, superconductors, microwaves, lasers, optical-fiber communications, optical-fiber sensors, video and electromagnetic compatibility. Each field's section contains a technology review, an overview of economic importance to the world market, a look at U.S. industry goals for competing internationally and a discussion of measurements needed to meet these goals.

NISTIR 4583 is available from the National Technical Information Service, Springfield, VA 22161, (703)487-4650. The price is \$52 (print) and \$19.50 (microfiche); order by number PB 93-160588.

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IEEE EMC SOCIETY NEWSLETTER PUBLICATION SCHEDULE

PUBLICATION DATES

November
February
May
August

EDITORIAL DEADLINES

September 15
December 15
March 15
June 15

Editorial contributions for the November 93 issue should be received by September 15.

BACK ISSUES OF THE EMC SOCIETY NEWSLETTERS ON MICROFICHE

We still have a few sets of the microfiche 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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JOHN W. ADAMS

1932 - 1993



EMC Society Board member John W. Adams of Boulder, CO, died Thursday, July 15, from injuries suffered in an automobile accident near Colorado Springs on Monday. He was 61.

John was born March 14, 1932, in Birmingham, AL, to Henry W. Adams and Nell Baucom Adams. He married Hilda Ortiz on April 14, 1956, in

Muenchweiler, Germany.

He received a bachelor's degree from the Georgia Institute of Technology in 1954 and a master's degree from North Carolina State University in 1964. From 1954 to 1956, John served as a captain in the U.S. Army.

John was an electrical engineer with the Boulder Laboratories of the National Institute of Standards and Technology for 29 years.

In 1993, John was elected an IEEE Fellow for contributions to the development of standards for measuring the electromagnetic shielding effectiveness of planar materials. John was also a member of the Board of Directors of the IEEE Electromagnetic Compatibility Society, Chairman of its Distinguished Lecturer's Committee, and a technical adviser on standards for electromagnetic interference and compatibility to the American Society for Testing and Materials, the Society of Automotive Engineers, the Department of Defense and several industrial corporations.

In 1990, he was awarded the U.S. Department of Commerce's Bronze Medal for his outstanding contributions in the measurement of electromagnetic interference.

Over the last 25 years, he and his wife have served as host family to many foreign exchange students studying in Boulder.

Survivors include his wife, Hilda; two daughters, Margaret Sparks of Louisville and Brenda Adams of Boulder; a son, Robert Adams of Longmont; a sister, Sarah Mate of Alcoa, TN; and four grandchildren.

Services were scheduled for Monday, July 19, 1993 at St. Aidan's Episcopal Church, 2425 Colorado Ave, Boulder. Contributions can be made to the charity of the donor's choice.

REPORT OF THE DIVISION IV DIRECTOR



W.K. DAWSON
ASSOCIATE EDITOR

Newsletter and magazine editors for the societies of Division IV traditionally have allocated space to the Division Director for reports on Board activities. With their indulgence topics that increase awareness of activities by other societies in the division as well as discussions of general issues will be included. Your comments are always welcome and are very

important in providing me, your society and the IEEE with the information required to make sensible decisions. My postal address is TRIUMF, 4004 Wesbrook Mall, Vancouver, BC Canada V6T 2A3; e-mail address is k.dawson@ieee.org; Fax number (604)222-8325 and phone number (904)222-1047.

A current problem shows all too clearly the hazards of basing the best intentioned decisions on incomplete information. I've only recently become aware of the difficulties caused by the elimination of chapter support as a term in the formula for Section rebates. While the total funds to Sections have remained about the same, some have gained and others have lost. The financially hard pressed ones now have little or no incentive to support chapter activities. TAB is concerned and a motion asking RAB to reopen the question will be proposed at the TAB Administrative Council meeting in April. Don Belle, the TAB Vice President, is setting up, with RAB participation, a TAB task force chaired by Mary Alys Lillard whose charge is to propose a new set of bylaws and policies that will better serve the needs of chapters.

In the first seven weeks of the year I managed to attend six society Ad Com or Board meetings plus an orientation session for new directors. (The seventh society has not yet met.) While each society has its own distinct personality there are a few constants. The principal one is the cooperative, friendly atmosphere in which serious discussions are held and hard decisions are made. Service to members is a primary consideration, again pointing out the importance of your feedback or feedforward to your society's Ad Com or Board. Many societies are finding that the time and effort required to develop long- and short-term strategic plans are a good investment. Such plans provide a consistency of purpose (by damping presidential agendas, one person said!) and a tool by which a society's executive can gauge its performance.

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DON HEIRMAN
ASSOCIATE EDITOR

The second EMCS Board of Directors Meeting for 1993 was held on Sunday, June 6 at the Chateau Laurier Hotel in Ottawa, Canada. The meeting was called to order at 8:00 AM by President Dan Hoolihan. Board members present were Janet O'Neil, Gene Cory, John Adams, Andrew Podgorski, Walt McKerchar, Don Clark, Ed Bronaugh, Pat Coles, Henry Ott, Dick Ford, Bob Goldblum, Bill Gjertson, and Hugh Denny. Members were Herb Mertel, Al Mills, Don Heirman, Warren Kesselman, Don Weber, Dave Staggs and Yaso Akao.

The minutes of the February meeting were presented by Secretary Janet O'Neil and were then approved with corrections. Treasurer Dick Ford gave his report that the Society's net worth on June 1, 1993, was \$489K.

The various directors gave their reports. The following briefly summarizes the various reports and actions taken by the BOD.

Dan Hoolihan, Director of Membership Services presented his reports first. The new Chapter Handbook written by Dave Staggs has been sent out to the chapter chairs. The Board approved a motions for chapters to offer a free first year membership in the EMC Society (membership in the IEEE must be paid by the member). There are currently 25 chapters in the US and 11 worldwide. Membership in the EMC Society has increased 4% since March 31, 1992. The top three membership categories are: 64% members, 9% senior members, and 8% associate

members. Seventeen new members signed up at the EMC symposium in Zurich. Pat Coles, Awards Chair, announced the call for nominations for awards to be presented at the symposium in Dallas this August. John Adams, Distinguished Lecturer Chair, proposed Scott Roleson of Hewlett Packard as a new distinguished lecturer with a term expiring in June, 1995. This was approved by the Board. Nominations and Elections Chair Ed Bronaugh has received petitions for members to be on the ballot for election to the EMC Society Board of Directors.

Next, Bill Gjertson, Director of Communication Services, gave his reports. Four new associate editors have been appointed for the Transactions. Newsletter Chair and Editor Bob Goldblum noted that the last issue was printed by IEEE headquarters to reduce costs. Gene Cory, Symposia and Conferences Chair announced that things are proceeding smoothly with the August symposium in Dallas. Booth sales are high. John Osburn has been selected as Chair of the 1997 EMC Symposium in Austin. Seattle has formed a steering committee with Bill Gjertson as Chair for hosting the 1999 EMC Symposium. Mr. Cory's report closed with a presentation by the representatives of the Montreal chapter to host the 2001 EMC Symposium - An Electromagnetic Odyssey. The Board approved their proposal subject to approval of IEEE Symposium forms and budgets. Hugh Denny, IEEE Press Liaison Chair, requested additional book reviewers. Two books are currently in progress; one on EMI power supply and one on interference cancellation.

Walt McKerchar, Professional Services Director, presented his reports. A 62-page booklet entitled "Worldwide EMC Standards" is now available for \$20.00, plus \$5.00 shipping and handling. This collection of tutorial papers by members of the EMC Society was presented at the 1993 EMC Symposium in Zurich. Copies may be obtained by calling Bob Goldblum at (215)825-1960 or your

local chapter chairman. Also decided was that IEEE-EMCS insulated coffee mugs will be offered as an incentive to complete the survey. The Board approved the written proposal of Herb Mertel, Transnational Chair, that the EMC Society continue to be a cosponsor for the IEEE EMC Symposium in the United Kingdom.

In the absence of Don Heirman, Director of Technical Services, Janet O'Neil presented his reports. For the Standards Committee, Chairman Don Heirman's report indicated that no meeting was held in Canada since there would be no quorum due to limited travel funds for its members. Of primary concern is the status of Standard 475 on measurement of field disturbance sensors. This standard was being considered for withdrawal as an ANSI standard since no activity has been registered to change or reaffirm the standard. The Committee is actively pursuing a reaffirmation to stave off the cancellation of the standard. There is an urgency to find volunteers to work on the many standards for which the EMC Society is responsible. Due to reduced company support of the current volunteers, several vacancies have arisen and need to be filled. Contact chair Don Heirman (908-741-7723 or FAX 908-530-5695) for information on vacancies that might directly match your interests. You may also contact Dave Traver on 619-673-2601 for additional information. Kimball Williams (Education Committee) reported that a second document - University Class Outline for an EMC course - has been entered into the Internet bulletin board (See last BoD report for logon information). He also reported that all plans for the "EMC Demonstration Booth" at the Dallas symposium have been completed. He hopes that all attendees will visit the booth to see our work in action. Wilf Lauber (Technical Advisory Committee) proposed confirmation of Dr. Stan Kubina as the Chairman of the new TC-9 on Computational Electromagnetics. The Board did so. Call Wilf for information on this committee on (613)998-2377. Finally,



TODD HUBING
ASSOCIATE EDITOR

Does your IEEE EMC Society chapter hold regular chapter meetings? Was your last meeting reported in the newsletter? If not, get on the phone. Call your chapter president. Call your chapter secretary. Call me! Your chapter deserves to be represented.

As I write this, I am returning from the IEEE Antennas and Propagation Society Symposium which was held this year in Ann Arbor, Michigan. Cutbacks in defense spending have caused a number of exceptionally talented electromagnetic modeling experts attending this symposium to begin looking for new lines of work. Many of these engineers could make significant contributions to advancing the state-of-the-art in EMC, but we need to establish better lines of communication.

As an EMC engineer, you might want to consider offering to speak at a local Antennas and Propagation Society chapter meeting on the topic "Why existing numerical modeling tools are useless to me." Or perhaps, you would get a better turn-out if you titled your presentation "Features and Capabilities that EMC Engineers Want to See in Numerical Modeling Tools." In this presentation, you could outline the types of problems that you typically deal with and describe the capabilities that a numerical modeling code would have to have in order to be useful to you.

As a member of an EMC Society chapter, you may also want to consider inviting a numerical modeling expert to speak at an upcoming meeting. There are already a number of numerical modeling codes available that can be very useful to EMC engineers in some situations. An overview of these codes, their capabilities, and limitations would certainly be of interest to a majority of the chapter membership. Improved communication between EMC engineers and numerical EM modeling developers will surely benefit both groups.

In April, I had an opportunity to attend a meeting of the Seattle Chapter. Dean Boston and Dan Reeb gave an excellent team presentation describing their experiences designing and implementing EMI/EMC controls in a large industrial facility. The quality of the presentation was high, but the attendance was low. If you are fortunate enough to live or work in an area with an active EMC Society chapter, attend the meetings. The state-of-the-art in EMC, circuit, and packaging technology is progressing at a rapid pace. Chapter meetings are a convenient way to stay abreast of the latest developments affecting your profession and your career.

AUSTRIA CHAPTER FOUNDED

Dr. Heinrich Garn Österreichisches Forschungszentrum Seibersdorf, A-2444 Seibersdorf, Tel. (02254) 80 2500, Fax (02254) 80 2118 sends the following announcement:

The 18 Austrian members of the IEEE-EMCS have founded the Austria Chapter on June 10, 1992. The objectives of the chapter are:

- promotion of communication between EMC experts in Austria;
- establishment of a discussion panel for informal exchange of experiences and information;
- common work on subjects that are of interest to the members; and
- communication with foreign EMC experts and institutions.

The constituent general assembly was held on October 15th, 1992. The following executive committee was elected:

Chairman: Dr. Heinrich Garn
Vice Chair: Dr. Wolfgang Bittinger
Secretary: Dipl.Ing. Wolfgang Mullner
Treasurer: Dipl.Ing. Gerhard Horak

Events include lectures by international EMC experts, workshops about EMC-related technical subjects, and informal discussion meetings. For further information, contact Dr. Heinrich Garn.

CENTRAL NEW ENGLAND

John Clarke reports that four meetings were held this spring and that the new chapter officers have been elected. On March 9th, Vincent F. Kajunski of the Federal Communications Commission made a presentation entitled, "Update on Part 15 FCC Regulations and Enforcement Policies." Mr. Kajunski discussed proposed changes to Part 15 regulations. The FCC is in the process of amending Part 15 to permit manufacturers of digital devices to demonstrate compliance with either FCC requirements or international standards for radio frequency emissions. On March 30th, at a meeting organized by the North Shore subsection, J. Todd Hendrickson of TRW spoke to the chapter about a "Post-Installation Test Approach for Monitoring Cable Shield Performance." His talk covered cable shield performance and the relationship to system hardness. Field test examples and test techniques were presented with an emphasis on establishing a standard for cable shield performance. At the April meeting, Ron Brewer of Instrument Specialties provided an excellent theoretical discussion on the topic of "Designing PCs to Meet Emission Reduction Requirements." At the May meeting, Bruce Archambeault of Digital

Continued . . .

Equipment Corporation made an interesting presentation entitled "Introduction to Numerical Modeling for EMC." Also at the May meeting, chapter officers for 1993/94 were elected. The new chairman is Lawrence Lee of EMC Sales. The new Vice Chairman is Tom Carberry of Mitre. The Secretary/Treasurer is John Clarke, US DOT/FAA (Retired).

CENTRAL TEXAS

Mr. Lee Hill, independent EMC consultant (and graduate student) was the speaker at the May meeting of the Central Texas EMC chapter. His talk was entitled "Common Mode EMI Filter Fundamentals and Applications for PC Board Design."

LOS ANGELES

Many thanks to Janet O'Neil for contributing the following summary of the Los Angeles Chapter activities.

The Los Angeles Chapter of the EMC Society has been very active since the first of the year. January featured the presentation of Distinguished Lecturer Myron Crawford entitled "Innovations in the Reductions of Shielded Room Resonances and Reflections." The talk described work in progress at the National Institute of Standards and Technology (NIST) to develop hybrid facilities combining TEM cell and reverberating chamber technology into a single, integrated facility for EMC/V and SE testing over the frequency range 10 kHz to 18 GHz. Myron is pictured here between Janet O'Neil, Chapter Secretary and Publicity Chair, and Derek McNally, chapter member. They are sampling the six-foot sandwich provided before the meeting compliments of the chapter's corporate sponsors. Chapter Chairman Ray Adams was unanimously elected by chapter members to deliver the sandwich prior to each chapter meeting due to the fact that he drives a truck which can safely transport a six-foot long sandwich! Ray notes that attendance

is up at chapter meetings since the chapter started providing the complimentary sandwich and soft drinks. He only wishes he could get Janet and Derek to share the sandwich with other chapter members, ha!

In February, the chapter hosted EMC Society President Bob Hofmann who spoke on the plans and visions of the EMC Society and how it could be of service to its members. His presenta-

tion was followed by a one-hour question/answer period in which chapter members eagerly participated.

In March, Jim Dykema of GDE Systems Inc. spoke on the changes in emission testing included in the new revision of MIL-STD-461D. The discussion covered changes to test procedures and limits.



Members of the LA Chapter sample the six-foot sandwich at the January meeting. Pictured (l-r) are Distinguished Lecturer Myron Crawford, Chapter Secretary Janet O'Neil and Chapter member Derek McNally.



Old-timers Joe Fischer (l), Larry Toller (c), and Bill Limburg (r) reminisce about the lighter side of EMC at the LA Chapter social.



Peter Deal (l), Ray Adams (c), Chapter Chairman, and Fernando Mendoza (r) announce dinner at the LA Chapter social.



At the LA summer break meeting, Cal Ursury, the winner of Henry Ott's book on noise reduction techniques, is congratulated by Ray Adams.

April's meeting featured the dynamic duo of Scott Davies and Timothy Peterson of EMACO Product Service. These experts discussed innovations in the new MIL-STD-461/462 susceptibility limits and tests.

For the May meeting, EMCS Board Member Herb Mertel gave an informative presentation entitled "The New European Community Immunity (Susceptibility) Standards." This was Part II of his presentation. Herb presented Part I, "The New European Community

Emission Standards," to the chapter in November. As always, Herb drew a large and loyal audience. He announced the sale of a 62-page booklet written by members of the EMC Society and presented at the Zurich EMC Symposium. This is a collection of tutorial papers which greatly interested chapter members.

Chapter members enjoyed the beginning-of-summer-break social meeting in June. This was hosted by Janet O'Neil at her home. The fabled California weather was picture

perfect! Members and "significant others" (as they say in politically correct California) dined outdoors and feasted on a Mexican style barbecue. Several chapter members came out of the woodwork to attend. After dusting off their cobwebs, they were treated to a margarita. A few chapter members met for a round of golf prior to the chapter meeting. They told tall tales about their heroic efforts on the course. The program for the evening featured cameo presentations by chapter members Steve Jensen, Joe Fischer, Bernie Cooperstein, Gurdip Saran and Bill Limburg on "The Lighter Side of EMC." They shared some humorous moments from their respective careers in EMC. The evening concluded with a raffle of Henry Ott's book, *Noise Reduction Techniques in Electronic Systems*. Cal Ursurt received the book which was also personally autographed by Mr. Ott.

The Chapter Officers deserve the summer meeting break! Chapter Chairman Ray Adams and Treasurer George Kunkel worked together to publish an innovative monthly newsletter entitled, "EMC Focus." This was modeled after the successful newsletters published by the Santa Clara and San Diego EMC Chapters. "EMC Focus" features the monthly meeting announcement, information on employment opportunities, and a lively column entitled "Member Update" by Janet O'Neil. Each month this column profiles a stellar Los Angeles distinguished member. Chapter Vice-Chairman, Gurdip Saran, introduced an "unofficial" EMC reference material list which included many worthy technical books. A recent issue announced the formation of a NARTE Certification study group to assist members who plan on taking the NARTE Certification test. These and other services are featured regularly in "EMC Focus." The Los Angeles Chapter wishes to acknowledge and thank George and Bonnie

Continued...



PHOTO: Dick Ford

EMCS Distinguished Lecturer Myron Crawford at the access door of the NIST hybrid reverberating TEM cell at the NIST in Boulder, CO. Myron recently spoke at the LA Chapter of the EMC Society.

Kunkel of Spira Manufacturing. Bonnie has been generous in donating her time and graphic art talents in the design and format of each issue of "EMC Focus."

SEATTLE

As mentioned, Dean Boston and Dan Reeb of Boeing teamed up to give the featured talk at the April meeting. Their presentation, entitled "Designing Electromagnetic Interference Protection for Test Facilities in New Buildings," described their own experiences with ensuring EMC compliance in a large industrial facility. There was a great deal of interest in this topic among the audience whose questions and comments kept the speakers well beyond the scheduled close of the meeting.

TWIN CITIES

Jerry Becker reports that Rochester, Minnesota was the site of the Twin Cities Chapter's second meeting of 1993. On April 14th, Twin Cities Chapter members met with Southeastern Minnesota EMC personnel for a social hour, dinner, and technical program. The Program featured EMC Society Distinguished Lecturer Mike Crawford, who presented a program on "Reverberating/TEM Cell Development at NIST."

Joe Butler (Representative Advisory Committee) indicated in his report that John Luchini (RAC Liaison with NARTE) met with the Central New England EMC Chapter to see how NARTE and the EMCS can help local EMC engineers in the New England economy downturn. Don Heirman, CISPR/A and G Subcommittee and ANSI C63 liaison representative, indicated that the next edition of Publication 22 may be released by the year's end and that Publication 24 (Immunity of ITE) is moving forward in draft form. Herb Mertel, SAE AE4 liaison representative, reported that ARP 4242 on EMC System Compatibility is being circulated to the SAE AE Council for approval. Ed Bronaugh, liaison to the SAE EMI/EMR TCs of SAE indicated that SAE J1 and J1113 are being revised.

Other business included the following:

Dick Ford presented a targeted scientific survey which will be randomly sent to 3% of the EMCS membership. Those who do not return the surveys will be contacted by phone to ensure the goal of 100% response. President Hofmann announced that the next IEEE TAB meeting will take place November 19-20 in the Raleigh-Durham area. In Vice-President Warren Kesselman's absence, Don Clark reviewed the EMCS progress in meeting the goals and objectives of the Long Range Plan. President Hofmann stated that he will work with the IEEE to build up EMC libraries in foreign countries in order to distribute symposia records, Transactions, and other related material. Chet Smith, History Chair, will report at the next Board meeting on data discs for historical archiving. Joe Butler has indicated a willingness to replace Don Heirman as Director for Technical Services since this is Mr. Heirman's last year on the Board.

The Board voted to rescind the previous meeting's approved funding for travel and per diem for Board members to attend regularly scheduled Board meetings. The Board was sensitive to the fact that several Board members, due to recent company funding problems, needed financial support to finish the current year's commitment on the Board. However, the Board felt it needed to take action as well as to reduce expenses. As a result of the discussion, the Board voted to decrease the total number of meetings in 1994, from the traditional four to three meetings. Also, all Board meetings will be held over the weekend reduce travel costs and minimize Board members' time away from their jobs. Finally, the Board authorized the President to approve up to \$500.00 per meeting for a maximum of two meetings in 1993 only to reimburse Board members for travel expenses whose financial support has diminished since election/appointment to the Board. This will enable Board members to satisfy their commitment to the Board during 1993.

The meeting adjourned at 5:00 PM. The next meeting is planned for Monday, August 9 from 9:30 AM to 1:00 PM and Thursday, August 12 from 6:00 PM to 9:30 PM. These meetings will be held at the Grand Kempinski Hotel in conjunction with the Dallas EMC Symposium. For further information on the meeting call Janet O'Neil at (213) 870-9383.



KIMBALL WILLIAMS
ASSOCIATE EDITOR

EMC ON THE INTERNET

In the Winter 1993 issue of the EMCS Newsletter I mentioned that Todd Hubing had provided us with space on the University of Missouri at Rolla computer where anyone from the outside could connect via the INTERNET and retrieve EMC-related documents. The first document placed in the directory structure was the EMC Bibliography. Todd reports that there is continuing activity on the system.

Our objective is to provide a central repository for the EMC Education-related documents that can be accessed by anyone who needs the information without going through a long, formal request process with an equally long reply time. If someone has a computer and access to INTERNET via any of the literally thousands of connection points, they can retrieve the document they want in a matter of minutes.

ACCESS TO THE SYSTEM

The most direct method to acquire a document is to utilize the File Transfer Protocol (FTP). What follows is a typical login and movement through the directory structure to where the user obtains a copy of the document that he or she wants.

At your system prompt,
'Enter' ftp emclab.ee.umsr.edu.

Note: Lower case letters are essential.

When the system recognizes your request, it will ask for your Name:

'Enter' anonymous

The system will request a

Password:

'Enter' guest

The system will acknowledge your login by replying with: 230 Guest login ok, access restrictions apply.

'Enter' ls (this is a request for a listing of the directory contents)

The system replies:

200 PORT command successful.
150 Opening ASCII mode data connection for file list. and displays the contents of the directory which should be:

bin
dist
etc
pub
00INDEX
incoming
00README

'Enter' cd \pub

At this point you could repeat the 'ls' command and do some more exploring. However, at this time just:

'Enter' cd \ieec

Now you will be in the \pub\ieec directory. When you enter the next 'ls' the system should display the following files (without our editorial comments):

emcbib.txt
(EMC Bibliography in ASCII text format).
emcbib.wp5
(EMC Bibliography in WordPerfect 5.1 format).
00readme
(A description of the directory contents).

To copy a file:

'Enter' get filename (filename is the file to copy).

To terminate the session and return to your home system:

'Enter' exit.

For system security reasons, this access into the UMR computer system is restricted. However, if you wish, you may 'put' a file into the system. Do so by moving over into the '\incoming' directory with the 'cd' command and using the 'put' command. The system manager will then move it to the proper sub-directory.

NEW DOCUMENTS

By the time you read this, we will have placed our second document, Clayton Paul's 'University Class Outline', on the system. Our third document, John Maas's 'Abstract and Outline' will follow shortly thereafter. As we add documents to the list, we will keep the membership informed through the EMCS Newsletter.

DOCUMENT USE AND COMMENT

One of our motives for making these documents available to a wider audience is that we also request your comments on the document contents, style, utility, readability, etc. If you download one or more of these documents and have a comment (favorable or unfavorable) please leave a message on the system to tell us of your opinion, experience and suggestions so that we can reach the full potential that this system represents.

We expect that this will become a communications mode for the education committee itself, and we want to encourage that use as well as comments from interested members of the society, the IEEE, and the general interested user as well.

We look forward to hearing from you.



JOSEPH BUTLER
ASSOCIATE EDITOR

NARTE

John Luchini -

RAC Representative

On January 28th, the officers of the Central New England EMC Chapter met with John Luchini to discuss future cooperative activities. We discussed the need to help both NARTE and IEEE EMC Society members adjust to the New England economy of the 90's. In order to provide the EMC practitioner with employment alternatives outside of the regional defense and computer industries, we decided to pursue the following initial activities.

1. Investigate the possibility of holding joint meetings with other local IEEE societies chapters such as Engineering and Medicine and Biology or other professional groups (The Medical Device Industry, American Society of Hospital Engineers) or government agencies (FCC, FDA, etc.) which may have a need to address EMC issues (whether they recognize it or not).
2. Request that NARTE provide a mailing list of all NARTE Certified EMC Engineers and Technicians in the Greater Boston/Central New England area. These individuals would be placed on the local IEEE EMC Society Chapter's mailing list, primarily for meeting notice purposes.
3. Continue to work towards providing employment alternatives to traditional jobs in the defense and computer industries for the EMC engineer for the present time,

while being receptive to other issues facing our members in the future.

Progress made in pursuing the short-term goals identified above is as follows:

1. NARTE agreed to provide a mailing list of certified EMC members in the greater Boston area for use in conducting joint meetings with the IEEE EMC Society. (About 50% of the attendees at the local chapter meetings are NARTE members.)
2. Chapter officers and John Luchini met with the IEEE's Job Bank Chairman, Irving Weiner to discuss how the Job Bank may be helpful in putting unemployed EMC engineers/technicians in touch with employers who are looking for people with EMC or similar skills. Irving reported that he doesn't receive many job postings requiring these skills and conversely hasn't seen many resumes from unemployed engineers with EMC experience. His suggestion was that IEEE and NARTE consider encouraging their members to network amongst themselves in order to connect the unemployed with employers seeking people with EMC skills. (Similar suggestions have been offered by NARTE's Kent Mills.)
3. The possibilities of holding joint meetings with other local IEEE Society Chapters or other professional groups was explored with emphasis placed on the medical and health fields. Preliminary contacts were made with the American Society of Hospital Engineers (ASHE). (ASHE addresses engineering issues in the hospital arena, which would include biomedical electronics and other facilities issues such as power and equipment installation, etc.)

I was referred to Doctor Yadin David, Director of Biomedical Engineering at the Texas Children's

Hospital and ASHE member. Dr. David indicated that he had first-hand experience with EMC problems in the hospital environment and that he was interested in pursuing this issue further. As the new chairman of the IEEE's Health Care Engineering Policy Committee, he was interested in evaluating this issue and was hoping to call upon the EMC Society for technical guidance when developing a position on this subject.

The Health Care Engineering Policy Committee planned to meet on June 14 and Dr. David planned to bring this issue up for discussion. I'll touch base with him to determine the outcome and future plans. Hopefully, highlighting this issue will provide another avenue for accomplishing some of our previously stated goals.

SAE AEROSPACE EMC STANDARDS ACTIVITIES

SAE AE-4 Electromagnetic Compatibility

Herb Mertel - RAC Representative

The most recent SAE/AE meeting was held in Stroudsburg, PA on 11-13 May 1993. The following standards were discussed as follows:

1. ARP 4242, EMC System Compatibility was approved by the SAE/AE-4 Committee. It will be circulated to the SAE Aerospace Council for approval.
2. ARP 4244, Filter Test Methods in non-50-ohm Circuits will be circulated to SAE/AE-4 Committees for balloting.
3. ARP 1705, Transfer Impedance Test Method for EMI Gaskets will be updated.

SAE SURFACE VEHICLE EMC

SAE Automotive EMI and EMR Committees

Ed Bronaugh, RAC Representative

The EMI and EMR Technical Committees continue to develop parts for the revision of SAE J551 and J1113. When complete these will be entirely harmonized with (in most cases identical to) CISPR/D and ISOKC22/SC3/W63 documents. The EMR TC has a task group developing

EMI emissions test methods for integrated circuits to measure their magnetic dipole moments. One technique uses spare loop probes (on the order of ICM dimensions); the other technique uses a tiny TEM cell or a small GTEM cell.

IEC/CISPR Working Groups A/G
Don Heirman, RAC Representative
CISPR/A has not met since the last BOD meeting; their revised Pub 16 Part 1 is scheduled for printing within the next three months. CISPR/G met in Eindhoven, Netherlands in April, at which time inclusion of signal port emission measurements below 30 MHz moved further along. CISPR Pub 22 is scheduled for release as a revision by year's end. The next amendment to Pub 22 will include most of C63.4-1992 for the method of measurement of emissions. Pub 24 (immunity of ITE) is moving ahead with further refinements of radiated and conducted immunity tests as well as finalizing ESD tests.

ANSI C63
Don Heirman, RAC Representative
ANSI C63 met in February. Ideas on substituting current clamp measurements on cabling instead of radiated emission measurements are being studied. C63.16 on ESD was sent to ANSI for public review.

IEEE TECHNOLOGY POLICY COUNCIL COMMITTEE (IEEE TPC) COMMITTEE ON MAN AND RADIATION (COMAR)
Dan Hoolihan, RAC Representative
The last COMAR meeting was scheduled for Monday, June 14, at the Biltmore Hotel in Los Angeles, California. It was to be held in conjunction with the bioelectromagnetics society (BEMS) world congress.

The agenda for the meeting had not been received at the time this report was written.

IEEE TPC COMMITTEE AEROSPACE R&D
Len Carlson, RAC Representative
Meetings of March 30, 1993:

According to Dr. Gibbons, Science Advisor, a plan is underway to seek reduced costs for Space Station "Freedom" in order to maintain support for other space and aeronautics activities. The FY94 NASA budget five-year runout shows an \$8B cut in Space Station and \$3.4B in Shuttle funding. Other cuts include: (1) delaying TDRS-II; (2) facility construction \$600M; (3) civil service attrition \$700M; (4) redesign of AXAF Mission \$300M; (5) Earth Orbiting System redesign \$2B; (6) Termination of National Launch System \$10B; (7) Terminated Space Exploration Initiative (SEI) \$50B; (8) Cancellation of Space Nuclear Program and other reductions \$3.5B. Total projected cuts: \$23.8B over five years.

Additions to NASA funding for other Space and Aeronautic programs include: (1) Shuttle improvements; (2) Gravity Probe-B to verify Einstein's theory of Relativity; (3) Technology for next generation SST (project 500-1000 plane market by 2010); (4) Subsonic long-haul aircraft, commuter and general aviation research along with remotely piloted vehicles; (5) upgrading national aeronautical facilities, i.e. wind tunnels, hypersonic research in consort with DoD and Advanced Solid Rocket Motor, for a total add-back of \$8.1B. Other initiatives sought are: (1) A Technology Research Institute, a consortium made up of NASA, Aerospace industry and universities to develop dual use technologies; (2) Automation and Robotics for deep space probes; (3) Small Spacecraft technology applications (i.e., ultra light and low cost to provide a steady flow of scientific data; (4) New small earth probes for global monitoring and small deep space probes for science and exploration; (5) Advanced Launch Technology and Expendable Launch Vehicle improvements and (6) Increased funding for science research and analysis. All of the above changes are seen by NASA and the White House as putting NASA solidly back on track.

An initiative by the Antennas and Propagation Society has worked its way up to the IEEE Board level where it received approval at the March meeting (which I missed because of a bad bout with the flu). The object of the initiative is to allow, during times of severe economic difficulties such as now, "recruiting activities by prospective employers at IEEE conventions and expositions, especially those directed toward the placement of unemployed engineers and scientists."

The economic climate has, understandably, made it more difficult for Ad Com and Board members to receive support from employers for attendance at society business meetings. Whenever possible costs are minimized by holding meetings on weekends in conjunction with appropriate technical meetings. Despite this the problem remains and some committee members must use vacation time and their own funds in order to attend. Several societies in the division are looking for reasonable ways to support travel costs when necessary. An undue burden must not be placed on society finances, while at the same time assuring some level of support to those who need it. It is not a simple problem, but it is being faced.

ENRICH OUR LEGACY

Contribute to
the President's
Memorial Fund



RUSSELL V. CARSTENSEN
ASSOCIATE EDITOR

My office does not have a door. Because of that, I have an open door policy. A fellow walked into my office the other day to talk about certification as an EMC professional. He raised several points beginning with a quote from the 1993 edition of *ITEM*, a journal published by a longtime member of the EMC community. The *ITEM* editorial stated that "In the test areas, the prospects for NVLAP and NARTE are not very bright; both have been victims of Government defense budget cuts." My walk-in visitor was concerned because he felt that certification was a valuable demonstration of proficiency. I told him that the *ITEM* statement is not correct.

I explained to him that the EMC personnel certification and laboratory accreditation processes are self-supporting through participant fees. They are not dependent upon Government funding in any capacity. The National Voluntary Laboratory Accreditation Program (NVLAP) is administered by the National Institute of Standards and Technology. Accreditation of electromagnetic compatibility test laboratories is but one of several laboratory accreditation programs under NVLAP. EMC test laboratories receive an on-site visit by a team of assessors specially

trained by NIST. The assessor team examines the candidate laboratory's test facility, standing procedures, processes, personnel credentials, documentation and equipment calibration to assure conformance to program standards. The assessors report is reviewed as one part of the accreditation process by the NVLAP laboratory accreditation board at NIST. Currently there are 12 EMC laboratories accredited by NVLAP.

The National Association of Radio and Telecommunications Engineers (NARTE), a nonprofit professional association, certifies EMC technical personnel based upon the applicant's education, work experience, peer endorsement, and successful completion of an examination in EMC fundamentals. There are more than 1000 EMC engineers and 330 EMC technicians currently certified by NARTE.

I work at the Naval Air Systems Command. NAVAIR has always had a strong program to control the adverse effects of electromagnetic radiation to equipment, systems and personnel. For example, NAVAIR is the only Defense organization specifically requiring certification of EMC personnel and accreditation of EMC test laboratories.

Like other defense organizations, NAVAIR is going through staff reductions, consolidations and mission purifications to achieve a greater level of efficiency in the face of budget reductions. A portion of this realignment process involves an examination of the multitude of functions for which the Command is responsible and where leadership for those functions should be codified.

Electromagnetic compatibility is an engineering function, as is cost analysis or systems safety. The Command has taken the view that

leadership in functional areas is based on the formation of relationships extending across our technical community to secure consistency, quality and sustained excellence in engineering and cost analysis disciplines.

Within the electromagnetic effects community, functional leadership will consist of "the cooperative efforts of a designated E³ area leader and a network of E³ area managers to sustain the capacity of the E³ community to execute the acquisition and support of naval aeronautical systems." Selection for these appointments will be based upon established E³ policy. Our current EMC instruction requires NARTE certification for persons in responsible charge of EMC work. Since these are positions of significant responsibility, personnel qualifications (such as education, work experience, NARTE certification, etc.) will be key to selection. In effect, persons who fill these positions will be the "backbone" of the E³ community; they will work autonomously and directly in support of the program manager for specific programs.

My walk-in visitor also had questions about the EMC certification examination. He had heard that the NARTE certification examination was a "back breaker" and he was concerned that he might not pass. I explained to him that the examination was carefully structured to measure competence, not to be a filter. The examination questions were reviewed by an ad-hoc EMC committee for authenticity and correctness of language. The time needed to construct a solution to each question was timed by a university professor, who then multiplied his time by three for examination purposes. Questions for a particular examination were then

pulled from a master file based on level of difficulty and time for solution and compiled into a specific one-day examination. Thus far, of all the examinations given, no one has failed. That is to be expected, considering that only those who are qualified as EMC practitioners are permitted to sit for the examination.

One last point was raised by my visitor. He understood that NARTE permitted non-engineers to be certified as EMC engineers. I explained to him that in the beginning it was determined that the EMC community had a lot of non-degreed engineers in successful practice. To avoid driving them out of the field (and to be more in line with state engineering license practice) it was decided that an individual who had a combination of education and experience in a position of EMC engineering responsibility would be permitted to sit for the examination. I pointed out to my visitor that within the Federal system, one does not have to be degreed to be placed in an engineering position. Federal appointments can be made for engineers without a degree but with a state license, or for those with proof of passing the engineer-in-training examination or who have achieved above a certain score on the Graduate Record Examination, or those who have converted from other fields such as mathematics or physics. The issue that NARTE keys on is the combination of experience in EMC work and education.

At that point my walk-in visitor was satisfied that he had a future as a certified EMC engineer. I went back to work, realizing that I really do not want to get a door. If I had a door, I might miss a lot of interesting discussions.



DR. FERDY MAYER
EMC PERSONALITY

Dr. Ferdy Pierre Mayer was born in Luxembourg (August 19, 1926). He attended College Atheneum of Luxembourg, Ecole Nationale Supérieure d'électricité (Degree of Engineer in Electricity, 1949), Ecole Nationale Supérieure de Radioélectricité de Grenoble, France (Degree of Engineer in Electronics, 1950) and Science Faculty of Grenoble, France (Ph.D., 1957, related to Faraday Effect and Birefringence in Ferrites).

Dr. Mayer's primary areas of interest are solid state physics, dielectromagnetics, ferrites, composite materials and electromagnetic propagation structures. He is Chairman and Chief Executive in his own independent Research and Development Corporation (LEAD). LEAD is the only independent French Corporation devoted 100% to research and development of new generic technologies. Dr. Mayer has contributed to the theory of ferromagnetism and has pioneered the development of materials for suppressing electromagnetic interference.

He has also been a Professor for several universities, which include Polytechnic Institute Grenoble (1953-1957), ISEP Apris (1957-1961), ISEN Lille (1959-1961), and Economic and Political Science University II Grenoble (1965-1971). He is now lecturing to industry and university audiences.

Dr. Mayer is a Fellow of the IEEE EMC Society (1981) and Officer of



WILLIAM G. DUFF
ASSOCIATE EDITOR

the Couronne de Chene (Grand Duchy of Luxembourg). He is also a member of several other scientific societies. He is President of the IEEE EMC Chapter in France, responsible for IEEE Region 8 EMC related activities, and Associate Editor for the IEEE Transactions on Electromagnetic Compatibility.

He holds over 150 patents and is the author of over 300 scientific and technical publications on R&D activity, working at the interface of solid state physics and electromagnetic propagation (dielectromagnetics, EM-functional composites and their modelizations). He is also the author of several books and studies on transfer of technology, technological forecasting, and R&D management, as they relate to LEAD activity on "Research on Research."

Dr. Mayer is listed in Who's Who in France, Who's Who in (European) Commerce and Industry, Who's Who in Science, and Who's Who in Electromagnetics.

Ferdy's hobbies are skiing (near professional caliber), horseback riding (competition), and Judo (Black belt).

He is married to Danielle Rousseaux and has three children, Bernard, Marie-Lise and Corinne.

His business address is LEAD, 12 Avenue de la République, 94700 Maisons-Alfort, France, 1-49.77.94.00. His home address is 7 Rue Barruel, 75015 Paris, France.



J.L. NORMAN VIOLETTE
ASSOCIATE EDITOR

CONTROLLING RADIATED EMISSIONS BY DESIGN

by Michel Mardiguian
Van Nostrand Reinhold, New York
1992 (ISBN 0-442-00949-6)

The book reflects the talented author's EMC experience of many years and his approach to the identification and solution of EMI problems on a practical level. The emphasis of the book is on a progressive development of radiation coupling and solutions from basic concepts to system design. A chapter-by-chapter summary follows.

CHAPTER 1

A brief summary is presented on the evolution of radiated electromagnetic spectrum use and EMI concerns from the turn of the century to the present time (1900's). Basic EMI terminology and units are presented with examples. U.S. and worldwide EMI regulatory standards (civilian and military) are summarized and tabulated for various countries.

CHAPTER 2

A brief review is presented of basic radiated electric and magnetic field patterns generated by simple radiation elements (small loops and straight wires). The author presented simplified mathematical models to determine radiated field patterns. The models are derived from other sources provided as references. It is well known that careless interpretation and use of these models can produce significant errors in predicting electromagnetic field patterns for actual circuit

layouts. This is clearly indicated by the author. The basic concepts of wave impedance (near-field and far-field) are developed.

Radiation from differential mode (DM) and common-mode (CM) sources is discussed with examples of each presented. Again, the simple models used to develop examples can result in significant errors if not used carefully. As the author indicates, the effects of distributed-parameter (transmission line) circuit configurations and distributed inductance and capacitance must be taken into account. Appendix B presents some validation results of the simplified radiation models.

CHAPTER 3

This chapter addresses fields radiated by nonsinusoidal (waveform) sources. Based upon Fourier techniques, graphical approximations are developed for the frequency spectra of voltage and current waveforms commonly encountered. Simplified examples are presented for deriving graphical, Fourier envelope approximations for the amplitude of frequency spectra for some time-domain, nonsinusoidal waveforms. From these developments the author illustrates radiated emissions possible from narrowband and broadband spectra. Random versus periodic spectrum concepts are addressed briefly.

CHAPTER 4

In this chapter a strategy is developed for designing products with low radiated emissions. The emphasis is essentially aimed at management decisions that affect the EMC outcome of products, including: system design decisions, areas of design activity, and EMI control milestones to be observed. Basic outlines (checklists) for helpful product design are provided.

CHAPTER 5

Topics in this chapter pertain to controlling radiated emissions at the chip and IC levels. Characteristics of logic families that affect radiated EMI are presented, including voltage swing, rise/fall times, equivalent

frequency bandwidth, input capacitance, output resistance, and DC noise margins. These parameters are provided for some typical specific logic families. The calculation of decoupling capacitors is illustrated. The influence of the IC packaging, and the advantage of surface mount components are described. Several drawing illustrations are provided.

CHAPTER 6

The book progresses to printed circuit board (PCB) design. Topics covered in detail include board zoning, single-layer and multilayer board design, power decoupling, power and ground plane applications and anomalies, crosstalk minimization, impedance matching, connector pin assignment, grounding, and 0-volt reference selection. Several helpful illustrations are provided to support the text development.

CHAPTER 7

The progression to radiated emission control in motherboards and backplanes is covered in this chapter. Wire-wrapped backplanes are discussed briefly. Trace layouts, impedance matching, and connectors at backplane interfaces are illustrated.

CHAPTER 8

Controlling radiated fields from switched-mode power supplies (SMPS) is discussed in this chapter. Basic radiating sources from SMPS are identified. Topics include packaging and circuit layout, magnetic field leakage, shielding, filtering, and illustrations for "poor" and "good" SMPS layouts from an EMI point of view.

CHAPTER 9

Techniques for the reduction of radiated EMI from internal cabling and packaging fill this chapter. Interconnecting components and topics discussed and illustrated include ribbon cabling, coaxial cables, shielded cables, the unintentional formation of ground loops, feedthrough capacitors and filters, filtered connectors, and PCB-mounted filters.

CHAPTER 10

This chapter covers topics related to box shielding concepts and techniques. Basic methods for determining shielding requirements are illustrated. Shielding and shielding effectiveness basic concepts are presented, including shielding material properties, aperture penetration, gasketing, and an illustration of box design for a given shielding effectiveness objective.

CHAPTER 11

Techniques for controlling radiation from external cables are developed. Topics include differential and common mode excitation, circuit balancing techniques and devices, isolation transformers, ferrite loading, cable twisting, cable shielding, coaxial cable radiation, shielded flat cables, proper shield connection, and the application of fiber optics.

CHAPTER 12

This chapter delves into some radiated emission specifications and test methods. This short chapter provides some insight into MIL-STD-461/462; CISPR International Limits; FCC Part 15-J; EN 55022; VDE 871 and 875; EN 55014; Japanese VCCI; FCC Part 18; and RTCA/DO-160.B. This chapter covers topics difficult to write about due to the continual changes always in progress. Some of the specifications covered have been revised since publication of the book. However, this chapter contributes to an awareness of existing national and international EMC compliance requirements.

CHAPTER 13

This last formal chapter presents some troubleshooting techniques for addressing radiated EMI problems. A basic strategy is outlined with step-by-step procedures.

Appendix A and B

These appendices provide some development for radiation from a dipole model (Appendix A) and some validation results supporting the simplified radiation model (Appendix B).

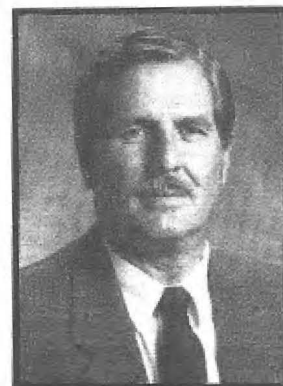
In summary, this book is recommended to a broad range of electrical/electronic design engineers and technicians, managers of electrical/electronic product design and development, and others who are likely to encounter practical EMI problems which they must solve. The main strengths of the book are:

- The straightforward language which makes it easy to read and apply. It is therefore useful to engineers and technicians at practical levels of EMC experience;
- The many ideas and illustrations in all the chapters developed from the author's broad, practical "hands-on" EMC experience; and
- The chapter-by-chapter progressive development of the material from basic concepts, to chip, to PCB, to system-level design.

Following are abstracts of papers from previous EMC Symposia, other conferences, meetings and publications.

EMCAB COMMITTEE

Mike Crawford, NBS
Bob Hunter, Texas Instruments
R. M. Showers, Univ. of Pennsylvania
Yoshio Kami, Univ. of Electro-Communications
Daniel Keneally, Rome Air Development Ctr.
Sha Fei, EMC Research Section, N. Jiatong Univ., Beijing, China
Ferdy Mayer, L.E.A.D., Maisons, Alfort, France
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WILLIAM H. MCGINNIS
ASSOCIATE EDITOR

"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 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.

THE MEASUREMENT OF FIELD STRENGTH IN A SCREENED ENCLOSURE

R.J. Cook, P.S. Bansal, M.J. Alexander
Div. of Electrical Science, National Physical Laboratory, Teddington, UK
11th International Wroclaw EMC Symposium, Wroclaw, Poland
Part 1, September 2-4, 1992, pp. 224-228

EMCABS: 01-8-93

Abstract: This paper describes how selectively placed RAM can be used to greatly reduce the Q value of the natural resonances of unlined screened rooms. This provides a stable and reproducible measuring environment where emission measurements agree with those obtained on an open-site range to within 5 dB over the frequency range 30 to 200 MHz. The effectiveness of the RAM damping has been demonstrated in two rooms of different sizes and aspect ratios.

Index Terms: Measurements, radiation absorbing material (RAM)

APPARATUS AND SOFTWARE FOR INVESTIGATION OF RADIOELECTRONIC SYSTEMS STABILITY TO THE INFLUENCE OF PULSED ELECTROMAGNETIC FIELDS

V.V. Knyazev, G.F. Neskorodov, and Y.S. Nemchenko
Kharkov Polytechnical Institute, Ukraine
11th International Wroclaw EMC Symposium, Wroclaw, Poland
Part 1, September 2-4, 1992, pp. 245-248

EMCABS: 04-8-93

Abstract: The results of experimental investigation of many EMC aspects obtained in the time domain on the base of pulse excitations are considered to be more informative than that obtained during the test by the harmonic signals. The experimental rigs, generating pulsed electromagnetic fields, data measuring complex and software developed and used at the test laboratories of the Kharkov Polytechnical Institute, realizing the advantages of the pulse excitation method, have been described. The technique for carrying out the experimental investigations which allows construction of mathematical models of a nonlinear dynamic process of interaction of a definite element in a radioelectronic system with a electromagnetic field has been presented. The model allows one to predict the behavior of the tested element in other electromagnetic fields.

Index Terms: Modeling, EMP, measurements

CREST FACTOR SENSOR FOR ELECTROMAGNETIC FIELDS

D. Golzio
Independent Researcher, Munich, Germany
11th International Wroclaw EMC Symposium, Wroclaw, Poland
Part 1, September 2-4, 1992, pp. 232-235

EMCABS: 02-8-93

Abstract: This paper presents a new instrument suitable to measure the Crest Factor of an Electromagnetic (EM) Field having unknown polarization and direction of propagation. The instrument is based upon the simultaneous detection in isotropic mode of both the peak value and the RMS value of the EM field and then the evaluation of these two quantities. This instrument is particularly useful for the EMC and Radiation Hazard activities because it allows a more complete characterization of the EM field. A prototype and some experimental measurements of electric fields are presented.

Index Terms: Measurements, sensors

COUPLING-DECOUPLING NETWORKS FOR SURGE IMMUNITY TESTS: AN EXAMPLE OF DESIGN

M. Wiecek
Tech. Univ. of Wroclaw, Poland
11th International Wroclaw EMC Symposium, Wroclaw, Poland
Part 1, September 2-4, 1992, pp. 257-259

EMCABS: 05-8-93

Abstract: Presented are two coupling-decoupling networks for testing the immunity of electronic devices to both oscillatory and pulse type surge waves. In the networks proposed, the device under test can be fed with normal current up to 16 A. The admissible pulse amplitude amounts to 6 kV. The coupling-decoupling networks meet the European Standards IEC-801 and IEC-255, as well as the Polish Standard PN-86/E-06600.

Index Terms: Surge immunity, IEC Standards

SYSTEM FOR MEASURING THE ELECTRIC PROPERTIES OF COAXIAL CABLES

W.E. Grzebyk and J.M. Janukiewicz
Technical University of Wroclaw, Wroclaw, Poland
11th International Wroclaw EMC Symposium, Wroclaw, Poland
Part 1, September 2-4, 1992, pp. 241-244

EMCABS: 03-8-93

Abstract: In terms of electromagnetic compatibility, the quality of coaxial cables is one of the major factors affecting the quality of cable television networks and community CATV. The quality of coaxial cables is influenced by their electric parameters. The authors present a measuring system which is now operated at the EMC laboratory of the Institute of Telecommunication and Acoustics, Technical University of Wroclaw (EMC-ITC), Poland. The system enables joint investigations of the electric parameters of coaxial cables according to the widely used IEC standard.

Index Terms: Measurements, IEC standards

INVESTIGATION ON CALIBRATION TECHNIQUES OF A STANDARD DIPOLE USING TRANSMISSION-LINE METHOD AND STANDARD FIELD METHOD

S.K. Das, A. Sanyal, and V. Venkatesan (1), and G.H. Koepke, D.G. Camell, R.D. Orr, and M. Kanda (2)
(1) Sameer Center for Electromagnetics, Madras, India, (2) EM Field Div., NIST, Boulder, CO
11th International Wroclaw EMC Symposium, Wroclaw, Poland
Part 1, September 2-4, 1992, pp. 295-297

EMCABS: 06-8-93

Abstract: This paper describes the facilities and an investigation carried out on test procedures for the calibrations of horizontally polarized radio frequency electric dipole at the National Institute of Standards and Technology (NIST), Boulder, Colorado, USA.

Index Terms: Antenna calibration

TEM CELLS MODELLED USING TLM METHOD

A.A. Kucharski

Technical University of Wrocław, Poland

11th International Wrocław EMC Symposium, Wrocław, Poland

Part 1, September 2-4, 1992, pp. 305-309

EMCABS: 07-8-93

Abstract: In this work the TEM cells were modelled using both two- and three-dimensional TLM methods. Cutoff and resonant frequencies were calculated as well as the electromagnetic field distribution in the work volumes. The influence of putting an object into the cell was investigated. Results were verified experimentally using HP 8752A Network Analyzer.

Index Terms: Modelling, TEM, TLM, GTEM

**PROBES FOR EMP MEASUREMENT:
METHODS OF PULSE SHAPE RECONSTRUCTION**

T.W. Wieckowski, R.A. Makowski, and J.M. Janukiewicz

11th International Wrocław EMC Symposium, Wrocław, Poland.

Part 2, September 2-4, 1992, pp. 461-465

EMCABS: 10-8-93

Abstract: Two methods of reconstructing the real shape of the EMP are presented and compared. The methods involve deconvolution in the frequency domain and deconvolution in the time domain. Measurements were carried out, single-loaded loops, double-loaded loops, or high-voltage dividers.

Index Terms: EMP, measurements, sensors

**NEW EMISSION MEASUREMENT METHODS FOR AN
ELECTRICALLY SMALL SOURCE: A THREE LOOP METHOD
AND A TEM CELL METHOD**

Motohisa Kanda and David A. Hill

Electromagnetic Fields Div., NIST, Boulder, CO

11th International Wrocław EMC Symposium, Wrocław, Poland

Part 1, September 2-4, 1992, pp. 310-312

EMCABS: 08-8-93

Abstract: This short paper proposes a method for determining the radiation characteristics of an electrically small source. The source is located at the center of three orthogonal loop antennas, each terminated with identical loads at diametrically opposite points. The electrically small source is represented by equivalent electric and magnetic dipole moments, and these dipole moments can be determined from the appropriate combinations of the loop responses.

Index Terms: Measurements, orthogonal loops, TEM

**TRANSIENT ELECTROMAGNETIC FIELD COUPLING TO
MULTICONDUCTOR CABLES**

K. Kerroum, A. Benali, & J. Fontaine (1) and A. Zeddam (2)

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11th International Wrocław EMC Symposium, Wrocław, Poland

Part 2, September 2-4, 1992, pp. 493-498

EMCABS: 11-8-93

Abstract: The subject of this paper is coupling between multiconductor cables (crosstalk) and coupling between these cables with an external electromagnetic field. We show the effects of electromagnetic pulses (EMP) on a multiconductor line, suspended over a reference conductor (ground), in a homogenous or inhomogenous medium. In the quasi-TEM assumption, we derive new matrix expressions of the terminated currents. The cables can be excited by generators of arbitrary impedances. The conductors can have finite conductivity. Time domain experimental and numerical results show how the perturbations can be reduced. Numerical results related to short lines, shielded cables illuminated by an electromagnetic field are presented.

Index Terms: EMP, coupling, cables

**STRUCTURING THE INTERIOR FIELDS OF A BOUNDED
WAVE EMC/EMP TEST FACILITY BY IMPEDANCE LOADING
OF WAVEGUIDE WALLS**

Ira Kohlberg

Kohlberg Associates, Inc., Alexandria, VA

11th International Wrocław EMC Symposium, Wrocław, Poland

Part 2, September 2-4, 1992, pp. 429-433

EMCABS: 09-08-93

Abstract: This investigation deals with structuring the interior electromagnetic fields of a bounded wave test facility by impedance loading the waveguide walls. The analysis is relevant to the design of electromagnetic environments which can be used to evaluate the response of large systems against a transient vertically polarized electromagnetic pulse. The space-time-two-dimensional fields in the test volume are compared using the exact eigen functions of the impedance-loaded waveguide, also taking into account the reflection between the launching system and testing regions.

Index Terms: Facility design, EMP, modeling

EM COUPLING INTO RECTANGULAR RACK-AND-PANEL CONNECTORS

L.O. Hoeft, M.T. Montoya and J.S. Hofstra, BDM Internat'l, Inc., NM

11th Internat'l Wrocław EMC Symposium, Wrocław, Poland

Part 2, September 2-4, 1992, pp. 512-515

EMCABS: 12-8-93

Abstract: Measurement of the surface transfer impedance of both standard and EMI rack-and-panel connectors from 1 kHz to 100 MHz showed that the standard rack-and-panel connector provides essentially no electromagnetic shielding because it contains no positive mechanism for maintaining electrical contact between the plug and receptacle. Supplementary grounding devices reduce the transfer impedance to desirable levels for frequencies below a few tens of kHz. Electromagnetic shielding at high frequencies is minimal. Spring fingers around the periphery of the plugs were very effective for maintaining electrical contact between the plug and receptacle and preventing electromagnetic coupling through the plug/receptacle interface. Control of the electromagnetic coupling through the plug/backshell interface was essential for good high frequency shielding performance. Gaskets installed in the plug/backshell interface were electromagnetically effective but cumbersome to install. At 100 MHz, the surface transfer impedance was dominated by the bonding impedance between the receptacle and the chassis. When spring fingers and a gasketed backshell were used, the transfer impedance of the rack-and-panel connector slowing increased from a fraction of a milliohm at low frequencies to several milliohms at high frequencies. This is about equivalent to the electromagnetic shielding expected of a quality circular connector and a good backshell.

Index Terms: Coupling, transfer impedance

HOUSE PANEL EXAMINES POSSIBLE LINK BETWEEN CELLULAR PHONES AND CANCER

The average person's sense of well-being is rocked from time to time by reports — which get prominent play on TV and on the front page — that some useful appliance causes cancer. The most recent example stems from a Florida lawsuit in which the plaintiff charges that a cellular telephone caused his wife to develop a fatal brain tumor. The rash of publicity in a hastily called Congressional hearing (labelled a "briefing") in which expert witnesses agreed that there is no proof that portable cellular phones damage health.

The panel chairman said that the briefing was called to allow members a chance "to explore the scientific issues without seeking formal agency positions on this controversial issue." The consensus of the experts was that there is no proof that cellular phones cause cancer. Not unexpectedly, they all recommended more research.

One important source of information to the subcommittee (the Telecommunications unit of the House Energy & Commerce Committee) was a letter from a Wisconsin research scientist.

In a letter dated February 2 to the panel's chairman, Dr. F.K. Storm said that all the research at his center shows that no credible scientific experiment has ever refuted the validity of the standard that governs radio frequency exposure. He called it "an extremely conservative standard with a margin of safety 10-fold for occupational exposure and 50-fold for the public." During the decade of the cellular phone, the incidence of brain cancer has not changed significantly and remains 5-6 cases per 100,000 people. Dr. Storm's conclusion is that "electromagnetic fields at the cellular phone operating frequency band and power level (have) proven incapable of causing DNA, gene, or chromosome mutations that could lead to cancer." He is the associate director of the Cancer Center at the University of Wisconsin Medical School.

One government representative at the briefing (held February 2), the Chief Engineer of the FCC, told the panel his agency is not responsible for evaluating the biological effects of RF radiation on human health and safety but relies on standards and guidelines developed by other organizations. This official, Thomas P. Stanley, said IEEE has recently issued guidelines that replace the 1982 radio-frequency exposure guidelines (ANSI has also recently approved the replacement) and that cellular hand-held telephones comply with the 1992 ANSI guidelines. He said he will propose that the Commission initiate a rule-making proceeding soon to update its guidelines for evaluating environmental RF fields.

A representative of Motorola expanded on the standard-setting process. The current standard, according to Dr. Quirino Balzano, resulted from seven years of deliberation by 14 biological evaluation working groups. There were 120 scientists, physicians, and engineers in all. Most came from academia and the relevant government agencies. Only 12 came from industry.

Balzano went on to say that the IEEE standard is "the same as, or more conservative than, those of the National Radiological Board in Great Britain, the World Health Organization's International Radiation Protection Association, the European Community Directorate, and the Canadian Health and Welfare Ministry. The standard — finalized in December 1992 — emerged after a careful and deliberate winnowing down of thousands of pieces of research to 321 studies. The point, he said, is that "this exhaustive process established a threshold, below which there was no scientific evidence of adverse health effects." He noted that since the standard was established in 1992, the IEEE has "already reviewed 124 new pieces of research in anticipation of its mission to review and even renew the standard every five years."

Another source of worry for the average airline passenger is the possibility of navigation error as a result of passenger use of some electronic device during flight. The question of airline passengers' use of such devices is being examined by the FAA, which issued an advisory circular on February 11 requesting airlines to report instances of suspected navigation interference from electronic devices such as lap-top computers used by passengers.

The FAA also reminded airlines about restrictions on cellular phone use. FAA said the main reason for issuing the circular is to emphasize the cellular phone rule and that the likelihood of interference caused by lap-tops and other things that leak energy is very remote.

In 1961, the FCC banned use of portable phones aboard aircraft because of potential interference with ground-based communications. The FAA supported the decision because of potential navigation interference, and the phones currently may be used only when a plane is at the gate.

Other possible links with cancer in the public at large were featured in a tabloid newspaper (the *USA Weekend* magazine, January 1, 1993). The story warned of possible links between electric blankets — and a variety of other household items — and disorders ranging from miscarriages to cancer. The account stated that weak electromagnetic fields (EMFs) are linked to leukemia, brain tumors, breast and skin cancer, reproductive problems, and mood disorders. EMFs are emitted by electric blankets, electric razors, and hair dryers, among other appliances.

(© 1993 Institute of Electrical and Electronics Engineers, Inc. Source: *IEEE-USA Legislative Report*; March 1, 1993)

INTERNATIONAL ACTIVITY ON PREDICTION OF SIGNAL LEVELS LIKELY TO CAUSE CO-CHANNEL INTERFERENCE

Martin M.P. Hall

Rutherford Appleton Laboratory, Oxon, UK
11th International Wroclaw EMC Symposium, Wroclaw, Poland
Part 2, September 2-4, 1992, pp. 683-688

EMCABS: 13-8-93

Abstract: The need for improved predictions of signal levels likely to cause interference in Europe produced a six-year COST study which has produced extensive new data and a recommended prediction procedure. Extensive studies have been conducted for clear-air conditions, for hydrometeor-scatter conditions and for site-shielding. This European work has been followed up in the worldwide forum of CCIR, with a very favorable outcome.

Index Terms: Spectrum management, co-channel interference

SPECTRUM MANAGEMENT IMPROVEMENT PROPOSALS: MARKETPLACE APPROACHES

Joseph L. Gattuso and William F. Maher

National Telecommunications & Information Adm., U.S. Depart. of Commerce, Washington, D.C.
11th International Wroclaw EMC Symposium, Wroclaw, Poland
Part 2, September 2-4, 1992, pp. 720-726

EMCABS: 16-8-93

Abstract: In the United States, unprecedented attention to spectrum allocation and assignment issues exemplifies the current worldwide debate over fundamental spectrum management principles. A 1991 study by the National Telecommunications and Information Administration (NTIA) proposed greater reliance on market-based techniques in U.S. spectrum management, particularly competitive bidding (auctions) in the assignment of licenses, and greater flexibility in spectrum allocation. Two current reform proposals now pending in the United States seek to implement some limited market-based reforms to the U.S. process. Moreover, New Zealand and the United Kingdom are leaders in the adoption of market-oriented reforms. This paper discusses the U.S. proposals, and the New Zealand and U.K. experiences, in the context of the theory of market-based spectrum management.

Index Terms: Spectrum management

A PROPAGATION MEASUREMENT RETRIEVAL SYSTEM

William E. Frazier

U.S. Department of Commerce, Annapolis, MD
11th International Wroclaw EMC Symposium, Wroclaw, Poland
Part 2, September 2-4, 1992, pp. 703-707

EMCABS: 14-8-93

Abstract: The Propagation Measurement Retrieval System (PMRS) contains a large number of measured propagation loss values with frequencies from 20 MHz to about 10,000 MHz, antenna heights from 1 m to about 2,400 m, for line-of-sight and beyond line-of-sight paths over rough terrain. These data currently reside in a computer system that was specifically designed to utilize the data with propagation analysis and statistical models to present the data in various formats. Most of the data in the PMRS has been submitted for inclusion in the CCIR Study Group 5 Data Bank.

Index Terms: Spectrum management, propagation

SATELLITE BROADCASTING PLANNING ASPECTS IN THE WAKE OF THE WARC-92

Terry O'Leary

EBU Technical Department, Switzerland
11th International Wroclaw EMC Symposium, Wroclaw, Poland
Part 2, September 2-4, 1992, pp. 742-745

EMCABS: 17-8-93

Abstract: New technologies (digital transmission methods, satellite distribution systems, etc.) have facilitated the potential for a more efficient use of the frequency spectrum. The possibilities of applying these new developments in planning, using frequency bands allocated to satellite broadcasting services (digital sound and HDTV) at the WARC-92, are discussed.

Index Terms: Spectrum management

EVOLUTION OF RADIO COMMUNICATIONS AND FUTURE ITU

R.H. Struzak and R.C. Kirby

International Radio Consultative Committee, Geneva, Switzerland
11th International Wroclaw EMC Symposium, Wroclaw, Poland
Part 2, September 2-4, 1992, pp. 715-719

EMCABS: 15-8-93

Abstract: This paper reviews the changes in the functioning of the International Telecommunication Union recommended by the ITU High Level Committee, in the context of international spectrum management and developments in radio communications.

Index Terms: Spectrum management, communications

TECHNIQUE FOR OPTIMIZING SPECTRUM USAGE IN MICROWAVE RADIO SYSTEMS

Mahbub Hoque

Bell Communications Research, Morristown, NJ
11th International Wroclaw EMC Symposium, Wroclaw, Poland
Part 2, September 2-4, 1992, pp. 748-752

EMCABS: 18-8-93

Abstract: With the sharp increase in the number of microwave radio stations, the need to determine proper coordination distances to avoid interference between stations has become critical. This paper describes a model for determining the coordination distance, using a "keyhole concept." This model has been shown to be more efficient than the currently used technique. It also gives several calculations that show the variations of coordination distances at different antenna heights.

Index Terms: Spectrum management, microwave communications

A great deal of confusion persists regarding the role and jurisdiction of European competent bodies. The specific issue of assessments of US test labs by competent bodies was recently covered the June/July 1993 issue of Microwave Engineering Europe. The issue was also addressed in the June 17 issue of Electronic Times. A subsequent rebuttal was printed. These are reprinted in their entirety below.

This month we raise serious questions about the image of Europe being presented to the rest of the World in relation to the European Directive on electromagnetic compatibility, and share with you the concerns of the European Commission's expert on this important matter.

The EMC Directive is intended to prevent electrical and electronic apparatus from being too prone to emit or susceptible to electromagnetic interference. It is most certainly not a trade barrier; rather, it is a measure to promote quality and safety for these goods. There now seems to be confusion about the Directive, and as to the role of "Competent Bodies" appointed by national authorities to oversee part of it.

The Competent Bodies are specifically appointed to act as independent expert assessors for products which do not fit either generic or product-specific standards. However, it has been drawn to our attention that some of those appointed have been using the Competent Body status to charge for unofficial assessments of EMC laboratories in the USA. Three companies that we know have been active in this respect are Interference Technology International in the UK, AKZO in the Netherlands, and TUV Rheinland in Germany. The "assessments" have been proposed on an annual basis with fees confirmed of up to \$10,000, and among the well-established and respected laboratories in the US that have elected to pay are AT&T Bell Labs, Retlif Laboratories

and DLS in Illinois. When a file on the practice, compiled by *Microwave Engineering Europe*, was sent to the European Commission's expert on EMC, Michel Kupiec, he was shocked and dismayed. "It is absolutely not the role of the competent bodies," he told us. And he is puzzled by the motivation behind the US laboratories' opting for this kind of unofficial assessment since it cannot give them the status of Competent Body.

The story does not end there. We also sent to Kupiec details of TUV Rheinland's unofficial "competent body mark," promotional literature from AT&T which claimed to have an "accreditation" for CE marking, and a promotional publication from Interference Technology International entitled "European Community Quarterly Review" which then features, in quotation marks, the legend: "Your key to fortress Europe." The process of CE marking is based on a manufacturer's or representative's

declaration, so an EMC laboratory cannot CE mark to show compliance with the directive. This confusion was brought to the attention of AT&T's Gardner Burkhardt, who immediately agreed to withdraw the incorrect literature. The TUV mark is certainly not in line with the spirit of EC Directives and the single, simple CE mark that shows compliance and gives access to the Single European Market. Finally, the sensationalist term "Fortress Europe" conveys an impression of the European Community and its Directives that we certainly don't share.

For these reasons, we have been proud to bring the attention of the Commission these practices and while there is no suggestion that any of the activities have been contrary to EC or national legislation, we believe that the companies have, at least in spirit, been stepping beyond the CE mark.
(Source: *Microwave Engineering Europe*, June/July 1993)

Presented by members of the IEEE EMC Society at the Tenth International Zurich EMC Symposium in March, 1993, *Worldwide EMC Standards* comprises tutorial papers. Articles address military and commercial EMC standards, international standards, EMC education, and EMC requirements for ISM. The cost is \$20.

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EMC PRACTICE BLASTED

Some of Europe's officially appointed 'competent bodies' for the European Community emc [sic] directive have used their status to charge US emc laboratories for unofficial emc assessments.

Interference Technology International of UK, AKZO (Netherlands) and TUV Rheinland (Germany) have set annual 'assessment' fees for US companies of around \$10,000.

In response to a file compiled by *Electronic Times'* sister journal *Microwave Engineering Europe*, Michel Kupiec, the European Commission's emc expert, condemned the practice.

"I don't understand why the US labs have done that. If they think they are going to have the same status as a competent body in Europe they are going to be disappointed.

"It is absolutely not the role of the competent bodies," said Kupiec.

DLS in Illinois, Retlif in New York and AT&T's Bell Laboratories in New Jersey have all been 'assessed' despite approval by the US FCC and other official bodies.

Walter Poggi, president of Retlif, said he is confused after approaches from three different competent bodies. Poggi is also chairman of a US Department of Commerce emc advisory committee and said the department is also unhappy.

"I think the Department of Commerce is starting to show the same concern," he said.

Kupiec was shocked by AT&T's claim to be accredited for CE marking, and by TUV Rheinland's own 'competent body mark.'

Gardner Burkhardt at AT&T's laboratory agreed to withdraw the accreditation claim on Monday.

Victor Clements, sales and marketing director of Interference Technology International, refuted any suggestion that competent bodies are exploiting the emc directive.

"The DTI is fully aware of what we are doing. There is nothing illegal about it. We are only assessing the US laboratories to give us a level of confidence in their results. After that the client is free to use any test laboratory."

Geoff Orford, a technical officer at Namas, saw nothing wrong with the practice "as long as they do not claim Namas accreditation with such an assessment." (Source: *Electronic Times*, 6/17/93)

EMC ACCREDITATION

Sir — I was extremely surprised and annoyed by your front page story (17 June) on "accreditation" of US emc test laboratories. You accused certain companies, naming this company, of essentially accrediting some US test labs to perform CE testing for the EC directive on emc.

As a UK appointed competent body, we have a legal requirement to ensure that results presented to us in a technical construction file as evidence of compliance with the directive accurately describe the performance of the product.

In the UK this is done by the use of Namas accredited facilities. But in the US there are currently no Namas approved facilities and the nearest equivalent, the Department of Commerce's Navlap system, has no consistency of standard required by Namas.

Furthermore, should a manufacturer wish to use his own, or a non-Navlap test lab, we, because of our ISO 9001 quality system requirement, would have to assure ourselves that the results were adequate and the tests had been performed accurately. The only way to achieve this is by some form of assessment of the facility.

We decided to establish an arrangement whereby labs may request to be assessed by us, to comply with our ISO 9001 requirements, and thereby join our "network." The principles used for the assessment are based on those used by Namas, although we are in no way accrediting them to this requirement.

The test labs are not accredited or formally approved by a European body capable of giving approvals. Therefore, as far as EC compliance is concerned they cannot claim to be a competent body or issue assessment reports. But they claim that they can test to European standards required for the application of the CE mark and the issue of an EC declaration of conformity.

As I am sure you appreciate, they could have done this without assessment by ourselves. With regard to charges, we charge the cost only of the engineer who performs that assessment, without overhead. This is well below the sensationalised cost you indicated.

Martin Green
Managing Director
Interference Technology
International, Swindon, Wilts
The article stated:

1. ITI is carrying out unofficial assessments of US emc labs.
2. ITI is charging for this activity.
3. The EC's emc expert said this was not the role of competent bodies.

Martin Green confirms the first two points: his assessments are not a Namas accreditation and are therefore unofficial and a charge is made. (Source: *Electronic Times*, 7/1/93)

NOTE: Excerpts, abstracts and reprints of articles addressing the EC and accreditation are reprinted for informational purposes only. Neither the IEEE, EMCS or the editor have expressed an opinion on the subject material. All material reprinted is without comment.

WROCLAW SYMPOSIUM ON EMC

The Wroclaw Symposium on EMC is scheduled for June 28 - July 1, 1994. A first announcement and call for papers has been issued. All aspects of EMC theory and practice will be addressed. EMC is understood in a broad sense as an ability of a device, equipment, or system to function satisfactorily in its electromagnetic environment without introducing intolerable disturbances to anything in that environment. Spontaneous papers are solicited and invited sessions are planned.

The preliminary program is scheduled for March 1994. For more information, please contact Mr. W. Moron, EMC Symposium, Box 2141, 51-645 Wroclaw 12, POLAND; Phone: +4871 481041; Fax: +4871 482815 or +4871 483248; Telex: 712118 ilw pl.

CONFERENCE ON EMC IN UK

The 9th Annual Conference on EMC is scheduled for September 5-7, 1994, at the Armitage Centre, University of Manchester, UK. The conference provides an essential forum for the exchange of views on EMC problem areas, standards, methods of analysis and solutions through the medium of original technical papers and discussions. The conference will be supported by an exhibition of equipment and components related to the work of achieving electromagnetic compatibility.

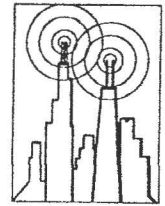
A call for papers has been issued for the conference. Synopses should be received by October 13, 1993. Send to: Louise Bousfield, EMC '94 Secretariat, IEE Conference Services, Savoy Place, London WC2R 0BL, UK. Fax: +44(0) 71 497 3633.

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EOS/ESD SYMPOSIUM

The 15th Annual Electrical Overstress/ Electrostatic Discharge Symposium will be held at the Buena Vista Palace in Orlando, FL, from September 26 to September 30, 1993. The program will comprise a one-day seminar on ESD basics, a one-day ESD tutorial and three days of paper presentations. The keynote speaker will be Professor B. Jayant Baliga, Power Semiconductor Research Center, North Carolina State University, who will discuss "Smart Power Technology: An Elephantine Opportunity."

For more information, contact the 1993 EOS/ESD Symposium, P.O. Box 913, Rome, NY 13442-0913. Phone (315) 339-6729.

CONFERENCE ON LIGHTNING & STATIC ELECTRICITY

The Bundesakademie für Wehrverwaltung und Wehrtechnik (BAkWVT) has announced that the 1994 International Aerospace and Ground Conference on Lightning and Static Electricity will be held in Mannheim, May 24-27, 1994.

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