IEEE

Electromagnetic Compatibility Society

Newsletter

ISSUE NO. 127 FALL 1985 (ISSN 0164-7644) EDITOR: ROBERT D. GOLDBLUM

IEEE A/P-S SYMPOSIUM

The 1986 International Symposium, sponsored by the IEEE Antennas and Propagation Society, and the National Radio Science Meeting, sponsored by the USNC/URSI Commissions A, B, E, F, and J, will be held jointly at the Wyndham Franklin Plaza Hotel, Philadelphia, Pennsylvania, June 9-13, 1986. The technical sessions for IEEE AP-S and the National Radio Science Meeting will be coordinated to provide a comprehensive and well-balanced program. Authors are invited to submit papers on all topics of interest to the AP-S and URSI membership. Inquiries regarding the technical program may be directed to Ali Afrashteh, Technical Program Committee Chairman. Further information regarding the symposium may be obtained from Charles C. Allen, General Chairman, General Electric Company, Valley Forge Space Center, Room U4018, P.O. Box 8555, Philadelphia, PA 19101.

Among topics suggested are:

Electromagnetic theory
Environmental effects on waves
Measurement techniques
Millimeter-wave antennas and propagation
Transients
Wave propagation theory
Characterization and modeling of EM noise
Effects of EM noise on systems performance

All summaries and abstracts must be received before January 6, 1986. For more information contact: Ali Afrashteh: IEEE AP-S and URSI Symposium, Technical Program Chairman, c/o IEEE Office, Moore School of Electrical Engineering, University of Pennsylvania, Philadelphia, PA 19104.

IEEE IMTC/86

The IEEE Instrumentation/Measurement Technology Conference will be held March 25-27, 1986, at the University of Colorado, Boulder, CO. New and expanding technologies and related standards in instrumentation and measurements, constitute the thrust of the technical program. Papers to be presented on test instruments, measurement methods and technology in keeping with the conference theme "Standards of Excellence," include:

DC and Low Frequency
Acoustic, RF, Microwave and Thermal Noise
EMI and EMC
Optical Electronics

For more information, contact the IMTC Office, 1700 Westwood Blvd., Los Angeles, CA 90024. Phone: (213) 475-4571.

IEEE ELECTROMAGNETIC COMPATIBILITY SOCIETY NEWSLETTER is published quarterly by the EMC Society of the Institute of Electrical and Electronics Engineers, Inc., 345 East 47th Street, New York, NY 10017. Sent automatically and without additional cost to each member of the EMC Society.

Second-class postage paid at New York, NY and additional mailing offices.

4181178 M
DONALD L SWEENEY 27N ***
1403 HUNTINGTON DR IEG28
GLENVIEW IL 60025

EDUCATION COMMITTEE NEWS

EMC QUESTIONNAIRE RESULTS

At the IEEE — EMC National Symposium at San Antonio in April 1984, the Education Committee decided to survey the colleges and universities in the United States to determine the status of EMC education at that level. It was further decided that the most direct method for reaching a majority of the institutions with engineering curriculum would be to address a questionnaire to the IEEE Student Chapter advisors. This report is based on the response to that questionnaire.

KEY QUESTIONS:

Is there a course in EMC (Electromagnetic Compatibility) offered at this institution? (Yes or No)

Is the subject matter of EMC included as a part of another course? (Yes or No)

Do you think that the subject of EMC should be covered in a course? (Yes or No)

If yes, what are the main reasons for not offering it? (Time, experienced instructors, course material?)

Other questions dealt with identification and elaboration on "Yes" or "No" answers.

RESULTS

There are 350 domestic IEEE Student Chapters. Eighty-four responses were received from 33 states and Canada. Of these:

2 (2.4%) offered a course in EMC engineering.

18 (21.4%) presented material on the subject in the context of another course.

63 (75%) of the respondents were of the opinion that the subject should be covered.

6 (7.1%) did not think that the material should be covered or were not sure.

The reasons for not offering the material were:
Lack of time,
Lack of course material,
Lack of experienced faculty,
Curriculum constraints,
Unfamiliarity with the material,
Lack of interest.

EMC SOCIETY HELP:

In response to the question, "What can the IEEE-EMC Society do to help you offer a course on this subject?", the following replies were given in the order of occurrence:

— "Experiments and Demonstrations in Electromagnetic Compatibility" booklet (74 requests).
— Material on the subject,
  Bibliography
  Tutorial Papers
  Course Outlines
— Experiments, Problems, Case Studies.

(Continued . . .)

NEWSLETTER STAFF

EDITOR

Robert D. Goldblum
R & B Enterprises
20 Clipper Road
W. Conshohocken, PA 19428

ASSOCIATE EDITORS

CHAPTER CHATTER — Charles F.W. Anderson, Martin Marietta, 1716 Reppard Road, Orlando, FL 32803

BOOK REVIEWS — James. S. Hill, The EMXX Corp., 6706 Deland Drive, Springfield, VA 22152

EMC PERSONALITY PROFILES — William G. Duff, Atlantic Research Corp., 5390 Cherokee Ave., Alexandria, VA 22314

SEQUENCY UNION — Dr. G. Robert Redinbo, Dept. of Electrical & Computing Engineering-Univ. of California, Davis, CA 95616

ABSTRACTS — Melvin J. Johnson, Southwest Research Institute, P.O. Drawer 28510, San Antonio, TX 78284

PHOTOGRAPHER — Fred J. Nichols, LectroMagnetics, Inc., 6056 W. Jefferson Blvd., Los Angeles, CA 90016

EMC STANDARDS ACTIVITIES — Herbert Mertel, EMACO, Inc., P.O. Box 22066, San Diego, CA 92122

EMCS EDUCATION COMMITTEE — Henry Ott, AT&T Bell Laboratories, Room 1E-212A, Whippany, NJ 07981

EMC-S BOD ACTIVITIES — Donald N. Heirman, AT&T Information Systems, Crawfords Corner Rd., Building 41-112, Holmdel, NJ 07733

POINT AND COUNTERPOINT — Anthony G. Zimbalatti, Grumman Aerospace Corp., M.S. B25/35, Bethpage, NY 11714

SHORT PAPERS, ARTICLES & APPLICATION NOTES — Edwin L. Bronaugh, Electro-Metrics, 100 Church St., Amsterdam, NY 12010

INTER-SOCIETY ACTIVITIES — Walt McKerchar, Northwest Engineering Service, P.O. Box 1888, Poulsbo, WA 98370-0269

(Continued . . .)

— Speakers.
— Video or Film.

OBSERVATIONS AND CONCLUSIONS:

— It is known that there are other colleges and universities that offer course work in EMC but did not respond to the questionnaire.
— When EMC was included as part of another course, the host courses were in fields, and wave, communications or microwave theory. Two schools offered it as part of a digital systems classes.
— Responses indicated varying degrees of awareness or interest in the subject. Several of the respondents expressed the opinion that the material was not fundamental or of sufficient importance to merit a separate course. Several recognized a need for the subject to be covered, but were limited by resource constraints. Many were not sufficiently aware of the subject to have an opinion.
— If the membership of the EMC Society wants to help to increase awareness and interest in this subject in the colleges and universities there are several ideas which I might suggest.

1. Submit simple experiments or demonstrations for inclusion in the Education Committee booklet.
2. Submit articles and papers intended for publication in EMC journals to digital or electronic design publications.
3. Submit tutorial papers for publication and distribution to the student chapters or those instructors who responded to this questionnaire.
4. Volunteer to speak at a Senior Seminar or IEEE Student Chapter meeting at a college or university offering a degree in Electrical Engineering.
5. Help the EMC Society produce a video which would introduce the subject.

If you have other suggestions or resources which might be used to help reach these future engineers, please send them to me or any other member of the Education Committee. Patricia Coles, Hewlett-Packard, 19111 Pruneridge Ave., 44MC, Cupertino, CA 95014.

EDITORIAL STAFF CHANGES

Longtime IEEE and EMC-Society member Dick Schulz has resigned as an associate editor for the EMC Society's Newsletter. For over six years, Mr. Schulz has been editor of the "EMC Standards Activities" section of this newsletter. Mr. Schulz announced his resignation at the May meeting of the IEEE EMC-S Board of Directors.

Since 1941, Dick Schulz has been a member of the IEEE, and a member of the EMC Society for 26 years. He is presently the editor of the Society's "EMC Transactions," a position he has held for 16 years. For his achievements in the overall success of the transactions newsletter, Mr. Schulz received the Lawrence G. Cumming Award. He is also an IEEE Fellow and recipient of the IEEE Centennial Medal. Outside of the IEEE, Mr. Schulz is manager of the EMC/SID Design and Test Department of the Xerox Information Products Division.

Replacing Dick Schulz as the new editor is Herb Mertel. The Board of Directors recommended Mr. Mertel whose service to the national and international standards-setting organizations includes: the U.S. National Advisor to IEC/CISPR Subcommittee A, EMC Instrumentation; ANSI/C-63, U.S. National EMC Standard Committee; SAE/AE-4 International Liaison; and IEEE EMC Society's past chairman of Technical Committees. In addition, Mr. Mertel has translated the West German VDE RFI and Safety Specifications.

Mr. Mertel started his EMC career in 1959, and in 1976 founded his own firm, EMACO, Inc., an EMC/RFI consulting and testing firm in San Diego. He has been a member of the EMC Society since 1961, and is a registered professional engineer with B.S. and M.S. degrees.

We would like to welcome Herb Mertel to our editorial staff. We would also like to thank Dick Schulz for his many years of dedicated service to the newsletter.

dB SOCIETY DONATION

Through the generosity of the IEEE's dB Society, a donation of $250 was given to the Arthritis Foundation's Massachusetts Chapter. The dB Society, a fraternity of electronics engineers dedicated to the preservation of the electromagnetic spectrum, made the contribution during their annual meeting at this year's IEEE International Symposium in Wakefield, MA.

Each year the dB Society solicits its members to provide a charitable donation to a local charity. Dr. Chester L. Smith of the Mitre Corp. and chairman of this year's symposium suggested that the donation be made to the Arthritis Foundation in Boston.

BOARD OF DIRECTORS MEETING IN WAKEFIELD, MASSACHUSETTS

The third and final 1985 Board of Directors meeting was held on Monday, August 19, at the Colonial Hilton Hotel in Wakefield, Massachusetts. The meeting was a day before our 1985 International EMC Symposium at the same hotel. Seventeen of the 20 board members were present with many additional Society members in attendance. It was a pleasure to see such a turnout from our Society membership.

President Knowles brought the meeting to order at 10 am to hear a presentation of IEEE activities. The main portion of the meeting started at 11 am with review of the minutes of the May 29th Philadelphia meeting by the Secretary, Don Clark. The minutes were approved with minor changes.

The following are the major items discussed at the meeting:

1. Treasurer Len Carlson indicated that as of June 30th, the net worth of our Society was $270K and that $230K of that was invested in interest bearing investment options. A total of $4000 was loaned to the 1985 and 1986 symposium organizing committees. The 1985 committee has repaid their portion and another $2000 payment was received from the San Jose (1982) committee. Len's report was approved as presented.

2. Next, Bob Haislemaier, who is the Technical Director for Communications Services, introduced chairpersons reporting to him who gave the following reports. Bob Goldblum, EMCS Newsletter Editor, indicated that all was going well and that the first short technical article was published in the last Newsletter. Dick Schulz, Transactions Editor, indicated that he would like to publish a few foreign language papers which were of most interest to our readers. The board approved an expenditure of up to $5000 over two years to translate these select papers. Dick also discussed the need for archiving not only the Transactions, but perhaps the Newsletter as well. Dick serves with Jim Hill and Len Thomas as our Society's historians. The possibility of using microfiche was suggested. Jim Hill, chairman of the International Affairs Committee, indicated he was looking into getting copies of other EMC symposia on microfiche. This would be a more convenient way to handle such bulky documents.

Gene Cory, Chairman of the Conference Committee, went over plans for the present and future symposia. Chet Smith indicated that for this year, there were 102 papers and 72 exhibitors, and that the advanced registration was well over 300. For 1986 in San Diego (September 16-18), there will be 130 exhibitors. There is also expected an increase in the original forecasted attendance since many of the CISPR (Special International Committee on Radio Interference) working group delegates meeting a week earlier in San Diego will be attending. Atlanta in 1987 is proceeding on schedule. The site for the 1989 national EMC symposium was changed to Denver since Boulder could not accommodate the expected turnout. In 1990, the hotel was changed to the Washington Hilton for the three days of August 21-23. Plans for an international symposium in 1989 in Japan continues. Osaka and Kyoto were mentioned as possible locations. There was a discussion of holding our international EMC symposium in Tel Aviv, Israel in 1992. An EMC Chapter in Israel would organize the event. Those interested in this prospect should contact Gene Cory at (512) 684-5111, Ext. 2711. Also, an audit committee was established by President Knowles to assist the 1982 symposium organizing committee to close its financial books. Gene then handed out the EMCS Guide for Organizing an IEEE EMC Symposium which was revised on 8-15-85. He asked that the board review the contents and report any changes to him by the next board meeting. For those of our readers involved with future symposia, if you want a copy of this document give Gene a call.

3. Ed Bronaugh, Technical Director for Technical Services, reported that he is awaiting comments on questions raised by Ed Skomal who chairs the Technical Advisory Committee. As reported in the last Newsletter, the board has been asked to determine the extent of the Technical Committee's participation in symposia. Comments on the scope of the Technical Committee on Measurements are also due. Ed Bronaugh will again ask for board comments. Don Heirman, Chairman of the EMCS Standards Committee, presented his report which highlighted the work of the past three months. The Committee is balloting approval of revisions to IEEE Standards 139 and 140, which cover ISM emission measurements and mitigation, respectively. Another ballot on open field measurements of FM and TV broadcast receivers is also coming to a close. Of particular interest is the urgency to either revise or reconfirm our standards every five years. The IEEE Standards Office reports that if no action is taken every five years, the standard will automatically be submitted for withdrawal. We will need volunteers to work on updating our standards or suffer the penalty of losing them through administrative action. The past five issues of this column in the Newsletter give a complete view of the standards subjects. If any of our readers have interests in these, please volunteer and let Don know at (201) 834-3566. The Standards Committee will next meet preceding the board meeting in February 1986. There will be more details in the next Newsletter. Finally, Hank Ott, Education Committee Chairman reported on the results of his committee survey of EMC activities at the university level. For further information on the results of the survey, contact Hank at (201) 386-6660 and read his column on page 2 of the Newsletter.

4. Fred Nichols, Technical Director for Members Services, reported that two new chapters are very close to becoming official — Phoenix and Detroit. Bob Hofmann, one of the chapter activity chairmen, has pulled together an updated chapter officer list as well as a revised directory of key EMCS Board and committee chairpersons. Fred further reported that Jim Toler has resigned as Membership and Award

(Continued . . .)

Chairman. Jim will be missed. He has worked long and hard in those tasks. We wish him well. Bill Duff has taken over chairing the Fellows Committee. Bill reported an urgent need to have EMCS fellow nominations for 1986. We had only one nomination for 1985.

5. There was no report for professional services. We are still interested in expanding this area which includes inter-society relations, public relations, and employment analysis. If interested call Gene at (206) 773-1577.

6. President Knowles discussed the EMCS support of the CISPR Working Group meetings in 1986, the week before our San Diego Symposium. He has on several occasions tried to get a policy reading from Headquarters. Gene will continue his efforts. We reported in the last Newsletter our interest in this support. Gene also indicated that nominations for the next three-year terms of office for board membership were due. Ballots must be returned by October 25, 1985.

7. Finally, President Knowles adjourned the meeting at 4:30 pm. The next board meeting will be in Anaheim, California, on February 5, 1986, at 10 am. This meeting will be in conjunction with the Los Angeles area Regicon. For more details, contact Don Clark at (404) 894-3535.

Respectfully submitted,
Don Heirman
Associate Editor
Board of Directors Activities

INTER-SOCIETY ACTIVITIES

SAE Committee AE-4 on Electromagnetic Compatibility will meet in New Orleans, April 22 and 23, 1986. Details of the meeting place/hotel will be announced in later newsletters. All SAE Committee meetings are open to interested individuals at no charge. The committee welcomes participation from all attendees.

At the AE-4 meeting in Wakefield, Mass., Mr. Duane R. Awerkamp was installed as National Chairman by Mr. Jack L. Moe and the Committee. Mr. Moe now becomes the immediate past Chairman (1976-1985) and a permanent member of the Executive Committee along with Walt McKerchar (1965-1975) and Charlie Dean (1960-1965).

Chairman Moe served the AE-4 Committee well for the past 10 years, and was directly responsible for advances in the EMC state-of-the-art, government, military and international liaison, business systems interface and shipboard EMC. There have been many SAE documents (Aerospace Information Reports, Aerospace Recommended Practices and AE-4 Bulletins) issued during his tenure. Mr. Moe has deserved the several SAE Awards and the admiration of those that have served with him. It is impossible to enumerate the many duties and responsibilities a Chairman undertakes over a 10-year period. Mr. Moe accomplished all the tasks with ease and proficiency, proving himself a talented and efficient leader in a difficult technical endeavor. The EMC community at large congratulates him for a job well done.

Comments have been received by Chairman Awerkamp on the proposed Aerospace Recommended Practice #1972- "Recommended Measurement Practices and Procedures for EMC Testing." The comments were reviewed and resolved by the AE-4 Committee at the Boston IEEE Symposium. The document is now in the SAE approval "cycle."

by Walt McKerchar

It is reasonable to expect SAE publication of this ARP early in 1986. Should the readers want further information on this ARP they should contact the AE-4 Chairman: Duane R. Awerkamp, M/S H 2550, Motorola Inc., 8201 McDowell Street, Scottsdale, AZ 85252. Phone: 602-949-3138.

There was an abundance of Blue Ribboned "dB Society Greeters" seen at the 1985 IEEE International Symposium. The dB Society augmented the Symposium Committee Staff by assisting with registration, sessions, projection duties and special activities during the Symposium. The Chairman, Dr. "Chet" Smith, honored the Society from the podium during the banquet and at a special luncheon for the dB Society.

The dB Society meets again at the 1986 IEEE International Symposium in San Diego, California.

POINT AND COUNTERPOINT

WHAT'S ON PEOPLE'S MINDS

by Anthony G. Zimbalatti

We'll never stop listening. This column was created to provide a powerful forum from which persons could influence actions of the EMC community, our society and profession. The acceptance of the "point-counterpoint" column was again demonstrated to its editor in August in Wakefield, Massachusetts, during the 1985 IEEE International EMC Symposium where I listened to and talked to people about what was on their minds. Before reporting on those discussions, I want to again solicit letters from people who want to make a "point" whether it is political, technical or administrative. Perhaps one of the Wakefield discussions may inspire you to write.

After reading your letters, I will solicit letters from appropriate people to make a "counterpoint." When appropriate I will make an analysis of the opposing views and project a conclusion.

It is recognized that some writers would not like their names associated with a particular view. In that case, just request in your letter that your name be withheld from publication. This withhold is permitted by the editorial rules and you can trust me not to violate your need for confidentiality. Also, some writers may want to disassociate their views from those of their organizations, in that case, add a disclaimer sentence in your letter to the effect, "the stated views are not necessarily those of the XYZ organization."

Here are some of the things that people asked me about during our recent symposium or in response to my column. Perhaps you would like to present your views on one or more of those discussions.

- EMC Symposium in Israel — Several people talked about the petition put before the Executive Committee by the Israel EMC Chapter to hold an International Symposium in Israel in 1992. They told me the petition was tabled after some discussion which included words like: we don't even know whether there will be an Israel by then. To me, that statement is unworthy of a professional society and hopefully, its speaker didn't mean it. The case for such a symposium should be treated on the merits of the petition and compliance with the rules of the EMC Society and the IEEE. Based on my experience gained when I worked with Israeli EMC engineers and other professionals in Israel and in the USA, I fully endorse the idea of an EMC symposium in Israel. Why don't you write me about your view on holding an International EMC Symposium in Israel.
- EMC Engineer Training/Education — Another topic on peoples' minds were how do we get E^3 skilled engineers (some people prefer to call them EMC) to fill today's and tomorrow's shortages. With more and more undergraduate engineers specializing in computer science, should colleges institute an undergraduate course dedicated to E^3 engineering? Since several organizations are in the business of EMC training what is the relationship between their course and a college course.
- E^3 Instrumentation — Is automation being oversold?
- Nuclear Electromagnetic Pulse (NEMP) — Is the emphasis placed on NEMP hardening being misplaced? Does it belong in EMI/EMC MIL-STD-461/462?
- Lightning Induced Transient Effects — Should hardening against these effects be a part of MIL-STD-461/462?
- Tailoring — Whatever happened to tailoring subsystem or system performance specifications to reduce inapplicable requirements of Military Standards, say for example, MIL-STD-461/462?
- EMC Society Viability — Dr. Robert L. Hutchins, BDM Corporation, in responding to my last column says in his letter that the key for the EMC Society is to keep adding new technology to the EMC engineer's tool kit, such as that needed for NEMP and Lightning hardening. To those needs, Jim Toler told me, last year, that the EMC-S should place more emphasis on Radiation Hazard Effects. However, several people have told me that NEMP, lightning, radiation hazards or for that matter antenna-to-antenna coupled electromagnetic effects should be outside the purview of the EMI/EMC engineer!

Anthony G. Zimbalatti
Grumman Aerospace Corp.
M.S. B25/35
Bethpage, NY 11714

SEPTEMBER 1986

	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

SAN DIEGO

IEEE INTERNATIONAL SYMPOSIUM ON ELECTROMAGNETIC COMPATIBILITY

P.O. Box 231559 • San Diego, CA • 92123-0920

September 16-18, 1986 • Town & Country Hotel

Chairman
Herbert K. Mertel
EMACO, Inc.
7562 Trade Street
San Diego, CA 92121
(619) 578-1480
Vice Chairman & Publicity
George Ufen
GRU Associates
1105 E. Commonwealth Ave.
Fullerton, CA 92631
(714) 738-0903
Secretary/Treasurer
Alfred H. Mills
General Dynamics Electronics Division
P.O. Box 85227
San Diego, CA 92138
(619) 573-6320
Technical Papers
Edward N. Skomal
Aerospace Corporation
P.O. Box 92957 MS:M4/937
Los Angeles, CA 90009
(213) 648-7024
Technical Program
Joseph F. Fischer
Fischer Custom Comm.
P.O. Box 581
Manhattan Beach, CA 90266
(213) 642-0049
Publications
Duane P. Mealey
General Dynamics Space Systems Division
P.O. Box 85990
San Diego, CA 92138
(619) 573-8000
Exhibits
Jerry Rothhammer
Eaton Ailtech
5340 Alla Road
Los Angeles, CA 90066
(213) 822-3061
Arrangements
Bill Johnson
EMT, Inc.
4410 Glacier Ave.
San Diego, CA 92120
(619) 283-5592
Registration
John W. Hafer
SAIC, MS: 199
10401 Roselle St.
San Diego, CA 92121
(619) 458-3856
Hospitality
Jill Mertel
EMACO, Inc.
7562 Trade Street
San Diego, CA 92121
(619) 578-1480
Advisors
Fred Nichols
(213) 870-9383
Gene Cory
(512) 684-5111
Chester Smith
(617) 271-7086

CALL FOR PAPERS

The 1986 IEEE International Symposium on EMC will be held at the Town & Country Hotel in San Diego, California, September 16-18, 1986.

The IEEE EMC Society is seeking original, unpublished papers on all aspects of EMC. Suggested topics include, but are not limited to, the following categories.

TECHNICAL AREAS

Analysis
Control
Design
EM Environment
EMP
ESD
Filters
Instrumentation & Theory
Lightning
Magnetics
Materials
Microwave Theory & Techniques
Noise Phenomena
Non-Sinusoidal Signals
Radiation Hazards
Regulations
Signal Processing
Spectrum Management
Standards
Susceptibility
Vulnerability

APPLICATION AREAS

Aerospace & Electronic Systems
Antennas & Propagation
Automatic Control
Biomedical Engineering
Broadcasting
Circuits & Systems
Communications
Components, Hybrids & Manufacturing
Computer-Aided Design of Integrated Circuits & Systems
Computers
Consumer Electronics
Control Systems
Education
Electrical Insulation
Electron Devices
Geoscience & Remote Sensing
Isolation & Shielding
Industrial Electronics
Industry Applications
Medicine
Military Applications
Plasma Science
Power Apparatus & Systems
Quantum Electronics
Solid State Circuits
Vehicular Technology

AUTHOR'S SCHEDULE

Abstract and Summary (three copies) ..... *December 13, 1985*
Notification of Acceptance ..... *February 1, 1986*
Camera-Ready Copy ..... *March 31, 1986*

Prospective authors should submit a 50- to 75-word abstract and a 500- to 750-word summary with up to five illustrations, clearly explaining the contribution, its originality and relevance to the EMC discipline. For anonymity during review, please identify the author(s) only on the cover sheet. Upon acceptance, authors will receive IEEE copyright release forms, format, and instructions for the preparation of material to be printed in the Symposium Record. If only a poster presentation is desired, please so indicate in the abstract and summary.

Abstracts and Summaries should be sent directly to:

Technical Paper Chairman

Mr. Edward N. Skomal, MS:M4/937
Aerospace Corporation
P.O. Box 92957
Los Angeles, CA 90009
(213) 648-7024

For other information, contact:

Vice Chairman & Publicity Chairman

Mr. George Ufen
GRU Associates
1105 E. Commonwealth Ave.
Fullerton, CA 92631
(714) 738-0903

EMC ENGINEERING FOR THE FUTURE: BUILDING ON THE PAST

"EMC 1985": 6TH ZURICH SYMPOSIUM AND TECHNICAL EXHIBITION ON EMC

850 participants from 26 countries, 43 exhibitors and a growth rate of 35% with respect to the "EMC 1983": These figures of the "EMC 1985" confirm the growing importance of electromagnetic compatibility and the high standing of the series of Zurich-organized biennial EMC symposia, which this year celebrated 10 years of their existence (previous symposia: 1975 and 77 in Montreux, 1979 in Rotterdam, 1981 and 83 in Zurich).

As in 1983, the symposium was held under the auspices of Mr. R. Trachsel, Director-General of the Swiss PTT and was sponsored by the Swiss Electrotechnical Association (SEV/ASE). A number of international and national professional organizations cooperated. Organization of the conference was with the Institute for Communication Technology of the Swiss Federal Institute of Technology (Zurich) (ETHZ). President of the Symposium was Prof. Dr. P. Leuthold (Zurich), organizing chairman Dr. T. Dvorák (Zurich) and technical program chairman Prof. Dr. R. M. Showers (USA).

The technical program featured 116 papers in 19 sessions, 5 workshops, 2 discussion panels, an exhibition and 2 technical excursions. A welcome cocktail party, dinner, authors lunch and a ladies program contributed to the general success of the meeting.

The sessions were entitled: "Automated EMC measurements," "ESD techniques," "Triggered lightning EMP," "EMC measurements," "Printed circuit board EMC," "Lightning EMP," "EM interaction with biosystems," "Statistical aspects of noise and limits," "EM phenomena in power transmission," "EMC computer programs," "EMI in microelectronics," "Nuclear EMP impact," "Power and data line transients," "Spread spectrum and mobile communications," "Shielding and cable coupling," "Statistical theory of EMC," "Power electronics," "Key problems of spectrum use," "Systems EMC & protection."

The workshops, organized by H. K. Mertel, and discussion panels were devoted to following topics: computer-aided design for EMC; measurements related to biological effects; filters and surge arrestors for EMP; communications and EMC; open test site calibration; EMP instrumentation; transient phenomena; URSI factual statement on NEMP and associated effects.

With 34 papers, the USA still remains the leading contributor to the technical program which featured 116 papers, originating from 18 countries and 4 continents. Compared to 1983, however, there was a net increase in contributions from Europe and other parts of the world.

The following outstanding papers received certificates of honour and monetary awards totalling 5000. — Swiss Francs: A.D. Spaulding: "Locally optimum and suboptimum detector performance in non-Gaussian broadband and narrowband interference environments;" J. Sack, H. Schmeer: "Computer-aided analysis of the RFI voltage generation by small commutator motors;" S. Yamazaki, H. Kuronuma, Y. Noguchi; "Relation between APD/CRD of automobile ignition noise and resultant TV picture degradation;" F. C. Zach: "A new pulse width modulation control for line commutated converters minimizing the mains harmonics content;" C. E. Baum: "Black box bounds;" B. L. Michielsen: "A new approach to electromagnetic shielding." A citation was presented to Dr. T. Dvorák, who founded and organized the conference during the last decade.

Further information and the 680-pages conference proceedings "electromagnetic compatibility 1985," (price: Swiss Francs 100. —, incl. mailing) is available from:

Dr. T. Dvorák, ETH Zentrum-IKT, 8092 Zurich, Switzerland, phone: (+ 411) 256-2790.

CHAPTER CHATTER

by Charles F.W. Anderson

Much to my regret, the workload was too heavy to permit my getting to the Symposium. A most important proposal effort at Martin Marietta had priority.

SYMPOSIUM

Thanks to Bob Hofmann, I just received a fine report on the chapter officers' luncheon. To Gene Knowles's request for feedback from the chapters on ways in which efforts at the local level can be used to strengthen the Society at chapter level, your editor adds his own plea! All such suggestions will be published, either in this column or elsewhere in the Newsletter. Hugh Denny's suggestion that the BoD sponsor a national lecturer has great merit. As Hugh conceives it, this designee would visit local chapters to put on EMC programs, thereby stimulating interest at local levels. IEEE would pick up the transportation and lodging costs, with the lecturer donating his time while gaining prestige as an IEEE-sponsored expositor. Please discuss this idea in your respective chapters, and send your consensus to any BoD member or to Bob Hofmann. Gene's concluding remarks had to do with the goal he has set to have BoD members act as "godfathers" to local chapters and the board. Feedback on this concept is also solicited.

The list of attendees at the luncheon speaks well of the health of the EMC Society. Herewith their names and chapter affiliations:

Yasuo Akao — Tokyo
Bob Berkovits — Central New England
Del Black — Seattle
L. D. Caney — Orange
Gerry Capraro — Mohawk Valley
John Clarke — Central New England
Hugh Denny — Atlanta
Rozalina Ebrahimian — Detroit
Kurt Fischer — Dallas
Bob Haislmaier — Washington
Gilda Haskins — Philadelphia
Don Heirman — New Jersey Coast
Bob Hofmann — Chicago
Don Hoolihan — Twin Cities
R. S. Jacobson — Phoenix
Bill Johnson — San Diego
Gene Knowles — EMCS President
Bob Loveland — Denver/Littleton
Tom Mahoney — New York/Long Island
Hank Ott — New Jersey Coast
Ghery Pettit — Santa Clara Valley
Rafi Rubinstein — Israel
Dick Schulz — Dallas
Chet Smith — Central New England
Glenn Whiting — Los Angeles

CENTRAL NEW ENGLAND

John Clarke, Chapter Secretary/Treasurer reports that the symposium had nearly 1200 attendees. In the 17 sessions, 102 papers were presented. Twelve countries were represented in the technical sessions. John also reports that Bob Berkovits, who is on the Boston Section Membership Committee, said that the Symposium resulted in about 30 new IEEE/EMC affiliations!

The CNE chapter has plans for its meetings through May '86. The September 26th meeting featured Chet Smith's report on the Symposium. On October 24th, the topic was "TEMPEST After Aging," and in November "FCC EMI Requirements Update" will be presented. (We'll give speakers' names and other details in the next Newsletter.)

LOS ANGELES

The chapter's September 19th meeting had Kenneth Asten (President of Ken Asten & Associates) as the speaker. The topic was "Future Trends in Telecommunications."

SANTA CLARA VALLEY

On September 10th, the chapter met at Sneaker's Turf Club in Cupertino. The meeting was devoted to planning and socializing. Prospective technical program participants were invited to discuss their possible contributions to the chapter's program.

TOKYO

Activities continue high in the Far East. Meetings were held on June 21 and 22 at which 23 papers were presented. The range of topics was quite wide, and covered both theoretical and practical areas. Abstracts will appear in the Newsletter. The July meeting featured six papers — abstracts also to appear in the Newsletter.

Apology and plea from your column editor. I have the disturbing feeling that I have misplaced some reports received in the last few months. My apologies to all, and please send copies of any reports for the June/September time frame which you submitted but which do not appear above.

SCV-EMC '86

The Santa Clara Valley EMC '86 will be held April 29-30, 1986, at the San Jose Convention and Cultural Facilities, San Jose, CA. Sponsored by the IEEE EMC Society, the SCV-EMC '86 is a biannual meeting focusing on the electronics industry, and national and international radio frequency interference regulations (FCC, VDE, CISPR, etc.). The program combines the tutorial, practical, analytical and theoretical aspects of EMC. All managers, engineers and technicians involved in this work are invited.

A Call for Papers has been issued. Technical papers are solicited in the following EMC areas:

Case Studies
TEMPEST
Susceptibility
Components
Bio-effects of Non-ionizing Radiation
Analytical Models and Correlating Experiments
Measurement-site Calibration
Electrostatic Discharge (ESD)
Product Design/Application
EMC Education/Professionalism
Estimation of Measurement Errors
Measurement Techniques and Data Analysis
Measurement of EM Environment (Background)
Standards and Regulations
(MIL, Commercial, FCC, VDE, CISPR, etc.)

An abstract of less than 100 words and a summary of less than 500 words should be submitted in triplicate by December 15, 1985. Notification of acceptance will be made after February 1, 1986. Further details are available by contacting:

Mr. Joseph H. Wujek
Technical Program Chairman — EMC '86
P.O. Box 70577
Sunnyvale, CA 94086 USA
Phone: (408) 973-3084

General information is available by contacting Mr. Alan K. Johnson, Chairman — EMC '86, at the same address, or phone (408) 257-8614.

CPEM 86

The Conference on Precision Electromagnetic Measurements (CPEM 86) will be held June 23-27, 1986, at the National Bureau of Standards, Gaithersburg, MD. Sponsored by the National Bureau of Standards, IEEE Instrumentation and Measurement Society, and the Union Radio Scientific Internationale, the CPEM 86 is an international conference on electromagnetic metrology and related fundamental physical constants. Papers describing original work, not previously published or presented, covering the theory, design, performance, simulation, or application of electromagnetic standards, measurements, techniques, instruments, or systems, are solicited. Of particular interest are : EM-related fundamental constants and standards; direct current, low frequency, and RF; time, time-interval, and frequency; antennae and fields; microwaves and millimeter waves; infrared, visible, and ultra-violet radiation, lasers; electro and fiber optics; cryo-electronics; and automated measurements, and technical calibration services. Contact Norman Belecki, B146 Metrology Building, National Bureau of Standards, Gaithersburg, MD 20899, (301) 921-2715, for more information.

8TH INTERNATIONAL WROCLAW SYMPOSIUM ON EMC

The 8th International Wroclaw Symposium and Exhibition on EMC will be held in Wroclaw, Poland on June 24-26, 1986. The intent of this conference is to bring together those working in the field of EMC, both from western and eastern countries, for the exchange and contact of scientific and technical information.

Topics to be discussed include the following:

Equipment EMC
Spectrum Utilization
Bioeffects of EM Radiation
Radiation Hazards
EM Noise
Measurement Technology and Spectrum Monitoring
Antennas and Propagation
EMC Standards
ESD, Lightning and EMP
EMC Aspects of New Concepts
Computer-aided EMC Analysis and Design

Contact W. Moron, International Wroclaw Symposium on EMC, 51-645 Wroclaw 12, Box 2141, Poland, telex 0712118 ilw pl, for more information.

SHORT PAPERS, ARTICLES, AND APPLICATION NOTES

In this issue, we are publishing an article entitled, "The Engineer as Expert Witness," by Dr. Heinz M. Schlicke. Dr. Schlicke makes some excellent points about being an expert witness. His experiences, as he tells of them, make me continually glad that I have not been called for such duty. I recommend that readers also read his **IEEE Spectrum** article about the breath analyzers, and the ensuing letters to the editor of **IEEE Spectrum** that he mentions in the text of this article.

by Edwin L. Bronaugh

THE ENGINEER AS EXPERT WITNESS

by
Heinz Schlicke; LF, IEEE
Interference Control Company
8220 North Poplar Drive
Milwaukee, Wisconsin 53217

The article, "Injustice Through RFI" (by Schlicke, **IEEE Spectrum,** August 1984, page 9) and the ensuing letters, "RFI" (by Barrington) and "The Author Replies" (by Schlicke), both in **IEEE Spectrum,** March 1985, page 6, address the technical and social aspects of RFI-prone breath analyzers. Breath analyzers are supposed to help to objectively convict drunk drivers. But if such instruments are very sensitive to RFI, which is often unavoidably present in large police stations, the reverse may happen. Sober people may be convicted of drunk driving and drunk drivers may get free.

Using the above case for illustration, I would like to discuss briefly four points, in particular the fourth point. They are important for would-be expert witnesses who do not want to be treated like hapless cretins who can answer only yes or no. The expert should not get flustered by a circumstantial process based on linear thinking of seemingly the most primitive kind. Highly technical matters are decided by people who have no technical background at all. Now, here are these four important points.

I. Know Your Stuff

Be sure that the subject matter under discussion is your forte. Do not take cases where your knowledge is only marginal. Establish all pertinent facts and non-facts. Study applicable codes. In short, make sure that you are technically in complete command of the situation; e.g., in the breath analyzer (B.A.) case, I plotted, as shown in Figure 1, the normalized critical distance for "open field conditions" on probability paper. The critical distance may be larger or smaller by a factor of 3 to 5, as unpredictably affected by the near neighborhood (see examples cited in **Spectrum).** This thorough technical preparation will give you a great confidence that will be noticed by all.

II. Translate into Everyday Language

All your competence is not of much use unless you can translate it into simplest terms easily understood by the jury, lawyers, and judges; otherwise, you might as well talk in Chinese. Analogies from everyday life are very helpful. To explain the effect of standing waves, you talk about ghost pictures on TV. Nearly everybody knows that you can get rid of ghost pictures by adjusting the rabbit ears. Or to explain the waveguide effect (low-loss propagation along large corridors in many a public building), you can point out the fact that in a tunnel you can receive FM (short waves) but not AM (long waves) on your car radio. In Milwaukee, we have a long tunnel under the Safety Building where everyone experiences this phenomenon.

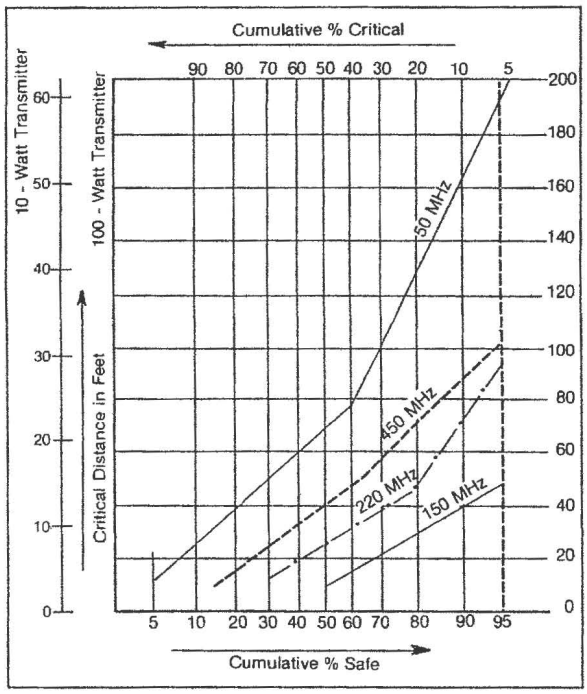

Figure 1

III. Educate Your Lawyer

Your lawyer should be sharp and sincere, and have some inkling of physics. Discuss all pro's and con's openly with him/her. Anticipate adversary objections and be prepared for them. The opposing lawyer will also have one or several

(Continued . . .)

(Continued . . .)

expert witnesses, one of them smart.

IV. The Adversary Game

The adversary game of lawyers is a way of thinking very different from engineering thinking. When an engineer appears as an expert witness before a judge and jury, his/her lawyer will first go through the "voir dire" building up the engineer as a real expert. His/her education, publications, relevant experience, reputation in the engineering community, awards, etc. are emphasized and documented ("No hearsay, please"). In contrast, the adversary lawyer, in our case an Assistant District Attorney (D.A.), must: (1) try to discredit the engineer's expertise or at least put it into doubt, and (2) by language manipulation, will trick the expert. The D.A.'s seemingly formalistic objections, his/her insistence on simplistic yes/no answers somehow go against the grain of an engineer, who, by training, is accustomed to look at entities and relations from all angles and takes all critical parameters into consideration. This situation is further influenced by the unavoidable fact that lawyers are not trained in engineering — as engineers are not trained in law. Let us illustrate.

A. D.A. Tries to Discredit Expert

(1) D.A. Attacks Character of Expert

Q by D.A.: "Isn't it true that you charge $100/hour?" Thereby implying a greedy, biased expert.

Expert answer: "Yes, normally I get $100/hour, but..." The D.A. interrupts: "Yes or No, no but . . . Judge, would you please instruct him to answer my question with *yes* or *no.*"

After a lengthy discussion between the lawyers and the judge, who was really fair, I was permitted to explain: "When my attorney asked me to be an expert witness, I initially declined. The case seemed so simple and I take only challenging cases. But when I learned more about the situation from my attorney, I took the job. And when I realized that my attorney worked for the public defender, I said that I would not charge a substantial part of my time spent on the case. The whole affair seemed like a civic duty to me."

(2) D.A. Questions Applicability of Experience

Q. by D.A.: "In your book on RFI *(Electromagnetic Compossibility,* previously introduced by my lawyer as Exhibit #x), you address much more complex and sensitive systems containing microprocessors, etc. The breath analyzer is a much simpler device and much less sensitive, isn't it? Yes or No?"

Answer: "Yes and No. It's simpler. But the microprocessor is made up of transistors as is the amplifier of the 900A. Transistors are pairs of rectifiers and sensitive to RFI."

(3) D.A. Tries to Show that Expert Does Not Know Enough

D.A.: "Did you read the manual on how to operate the B.A.?"

Answer: "Yes."

D.A.: "Then will you please give us a step-by-step description how you do it."

The answer (based on the suspicion imparted by the previous line of questioning, that the D.A. wanted to trip me on a minor, irrelevant detail. "I can read. If I would have to operate the B.A., I would go strictly by the book. I saw no reason to memorize the whole manual. But I would be glad to explain the principles and major steps."

B. D.A. Tries to Control Answers

The engineer as an expert witness must realize that he is not engaged in a technical discussion, but in a contest of wits. The D.A. will try to elicit damaging admissions by forcing the expert to answer a concatenation of simplistic, but clever yes/no-only questions. Thus, he/she stops at a certain point that seems to support his/her contention without admitting qualifications and assumptions that would put the situation in a very different light.

The D.A. again and again asked the judge to tell me to answer his questions with yes or no — as if I were a little schoolboy. Well supported by my lawyer, I said: "Sir, I would very much like to answer yes or no, if it would be possible. Moreover, the questions asked are often so devoid of technical understanding that they must be clarified to make sense, at least sense to me. If I, not trained in legal thinking, would ask you some questions about a complex matter of law, I am sure you would have the same impression of imperfection and desire for clarification as I have in the reversed situation."

The judge was understanding and said he would decide in each case whether or not I could elaborate. In fact, he permitted me to give a micro-course on EMC in very simple terms, again using easily understood analogies.

Epilogue

The State of Wisconsin has, by now, replaced all the RFI-sensitive B.A.'s by RFI-hardened ones. It would have been much less costly to filter the old B.A.'s with two simple ceramic filters properly mounted as feedthroughs. But, as I said, lawyers are not engineers.

Heinz M. Schlicke received a Dipl.-Ing. degree in 1937, and Dr.-Ing. degree in 1938. Both degrees received from the Institute of Technology in Dresden, Germany. Since 1975, he has been self-employed as a consulting engineer on the prevention of electrical noise and as an expert witness. Dr. Schlicke has published over 60 articles, contributed to five books, and authored *Essentials of Electromagnetic Engineering* (John Wiley & Sons, Inc., New York 1961) and *Electromagnetic Compossibility* (Marcel Dekker, Inc., New York, 1982, 2nd edition).

EMC STANDARDS ACTIVITIES

by Herbert K. Mertel

Since this is my first column for the EMC Society Newsletter, I would like to explain the format of my contributions. First, broad overview articles of standards activities will be prepared; and second, and perhaps of greater importance to the active EMC engineer, a presentation of narrow tutorial topics of immediate interest will be prepared. The discussion below is in the broad overview category.

CISPR Meeting in Sydney, Australia

The CISPR meeting was held at the Standards House in Sydney from 26 August to 6 September 1985, upon the invitation of the Australian Standards Association. Sydney is a city of 3.5 million, yet the atmosphere is upbeat, and the natives are very friendly when out of their cars. Unfortunately, Australians drive on the wrong side of the street and also do this very fast. All CISPR delegates were quite shocked to hear that Art Wall, who is Secretary for CISPR-A, was hit by a car while in a crosswalk and while walking with five other people. Art has both legs in a cast and spent several weeks in a Sydney Hospital. He is now convalescing at home and, I am sure, would like to hear from you. His home address is 10651 Breezewood Drive, Woodstock, MD 21163. Now to some of the significant CISPR activities.

CISPR Plenary Meeting

The plenary meeting is held to accept subcommittee reports and also to take collective action. The key agenda items were:

— Election of a new CISPR Chairman
— Election of a new SC/G Secretariat and Chairman
— Election of a new SC/B Chairman

Mr. Gerald A. Jackson, United Kingdom, was elected the new CISPR Chairman, replacing Dr. Ralph Showers, USA, who held this position for six years.

Four countries expressed interest to furnish the Secretariat for the SC/G (Information Technology Equipment): Canada, Japan, Germany and USA. Germany was elected and Mr. Jack Trigg, U.K., was nominated and elected Chairman of SC/G.

Dr. Whitehouse, U.K., was nominated and elected Chairman of SC/B. The next CISPR meeting will be in San Diego, CA, from 6 through 13 September 1986.

CISPR Subcommittee Meetings

Each subcommittee (SC) and the subsidiary working groups are very active to discuss, consider and implement national and individual inputs to the "Study Questions." The CISPR Study Questions are the "Work Statement" around which all activities are centered. Some of the work items of general significance are as follows:

SC/A is revising Publication 16, The CISPR Manual, into three parts:

Part 1: Measuring Equipment Specification
Part 2: Measuring Methods and Standard Conditions
Part 3: Statistics and General Information

Other work items are related to the current probe, open site, LISN, immunity of measuring receivers, calibration of the absorbing clamp and quasi-peak vs average detectors.

SC/B has completed the new specification "Limits of Interference and Measurement Methods for Information Technology Equipment." This document was released as CISPR/B (Central Office) 16 for national vote, and should become a CISPR publication during 1986. A publicly available version of this document is issued as: ECMA-95 from ECMA, 114 Rue du Rhone, 1204 Geneva, Switzerland.

Another SC/B work item is the correlation of open-site and absorbing clamp measurements on I/O cables. Data is desired from all labs that do this work. The USA coordinator is Ralph Calcavecchio, IBM, Tel.: (914) 385-1865.

Instead of listing all the CISPR work items in this article, the names of the responsible CISPR advisors in the U.S. are given, so that the reader can contact them if further interest exists.

SC/A EMC Instrumentation
Herb Mertel — (619) 578-1480
SC/B ISM
Julius Knapp — (202) 653-8247
SC/C Overhead Powerlines
Vernon Chartier — (206) 696-0351
SC/D Ignition and Autos
Fred Bauer — (313) 565-4690
SC/E Radio Receivers
Eb Tingley — (202) 457-4975
SC/F Household Appliances
Don Heirman — (201) 834-3566
SC/G ITE
Wally Amos — (215) 648-2860

Australian EMC Standards

Since the CISPR meeting was held at the Standards House, information was also obtained on the status of Australian EMC/RFI standards. The Australian Radiocommunication

(Continued . . .)

(Continued . . .)

Act has come into force in 1985 to replace the Wireless Telegraphy Act of 1905.

A most important provision of the new Act is section 9 which empowers the Minister to make standards, known as Ministerial standards, for transmitters, receivers and radio-sensitive devices. Such standards may relate to the design, performance or construction of such equipment.

Transmitters for which Ministerial standards can be made include not only radiocommunications transmitters, but anything capable of radio transmission. A Ministerial standard could thus be made for industrial machinery which emits spurious radiation. It is anticipated that existing EMC/RFI specifications would be enforced as part of this Act.

In accordance with sub-section 9 (11) of the Act, Ministerial standards may adopt all or part of a standard proposed or approved by the Standards Association of Australia (SAA) or other prescribed bodies. A number of SAA standards relating to radiocommunications equipment currently exist and these are observed by industry on a voluntary basis. However, until an SAA standard is adopted by a Ministerial standard it will not have any legal force.

The first standards are expected to cover:

- — cordless telephones
- — low-power headset communicators
- — children's toys, such as walkie-talkie radios and remote-controlled models
- — auditory training devices
- — remote-controlled garage door openers
- — emergency position indicating radio beacons (EPIRBs)

At present, the Australian Standards Association, 80 Arthur Street, North Sydney 2060, Australia, has the following EMC/RFI standards for sale:

AS 1044-1973 Limits for EMI for Electrical Equipment and Appliances (similar to CISPR 14 and BS 800)

AS 1052-1976 Part 1: EMI Measuring Equipment, 10 - 150 kHz

AS 1052-1976 Part 2: EMI Measuring Equipment, 0.15 - 1,000 MHz. Both parts are revised in the new Draft Standard DR 85115, dated 15 April 1985

AS 1053-1973 Limits for TV and Radios

AS 1054-1973 Limits for Semiconductor Controls

AS 2064-1977 Limits for ISM Equipment

AS 1541-1983 Part 14, RFI Suppression Capacitors. Based on IEC 384-14

AS 2344-1980 Limits for Overhead Powerlines

This is it for this issue. If you find this type of article useful let me or Bob Goldblum know. My phone number is (619) 578-1480.

Cordially,

Herb Mertel

POSITION PAPER ISSUED BY IEEE

The IEEE's Committee on Man and Radiation (COMAR) has published a paper on VDT nonhazardous radiation emissions. After several revised drafts, the IEEE approved the paper in February, 1985. The text is reprinted below.

Absence of Hazardous Levels of Non-Ionizing Radiation from Video Display Terminals

Committee on Man and Radiation IEEE
February 24-25, 1985

Video display terminals (VDTs) emit radiation in the visible spectrum, and a small amount of long-wavelength infrared radiation is produced by the heat generated within their casings. Some VDTs also emit ultraviolet radiation. Although these radiations are known to cause eye and skin injuries at high intensities, the exposure levels associated with the use of VDTs are well below those currently considered to be hazardous. Radiofrequency (RF) non-ionizing electromagnetic fields are also emitted by VDTs, the major source being the horizontal deflection system, specifically, the high-voltage transformer. These emissions are primarily at frequencies between 15 and 150 kHz (kilohertz). The levels at the position of the operator are very low; the electric field strength is usually below 10 V/m (volts per meter). This intensity is very low, for example, compared with the American National Standards Institute (ANSI) 1982 Radio-frequency Protection Guide of 632 V/m at 300 kHz (guides are not given by ANSI for frequencies below 300 kHz, but the basic characteristics of electromagnetic fields at 300 kHz are similar to those at 150 kHz). Some VDTs have higher intensity RF emissions localized close to their cabinets near the high-voltage sections. These higher intensity RF emissions are localized within a small volume (approximately 5 x 5 x 5 cm), and the intensity of the field decreases very rapidly with distance from the cabinet. Even these higher intensity emissions are well below the levels that may potentially be hazardous, but they are capable of causing detectable electromagnetic interference in some survey meters used for measuring ionizing and non-ionizing radiation.

In summary, the position of the IEEE is that the non-ionizing electromagnetic emissions of video display terminals are not considered to be hazardous. However, the IEEE recognizes that there may be reasons for concern about other problems associated with the use of VDTs, but these are unrelated to non-ionizing radiation.

For more information, contact COMAR, c/o IEEE, 345 E. 47th Street, New York, NY 10017. Phone: (212) 705-7900.

BOOK REVIEWS

by Jim Hill, The EMXX Corp.

Dick Schulz has given us another book review. This one is not directly related to EMC, but Dick suggests that some of our readers may be interested in cybernetics. In that the thesis of the book is a goal-directed machine, and such a machine would incorporate electronic control systems, the EMC engineer will be involved in the design concept and EMC problems which may arise in the application of such a machine.

A second review has come in from across the Atlantic. Prof. Dr. F. Louis Stumpers has offered a review of the Conference Record of the International Aerospace and Ground Conference on Lightning and Static Electricity recently held in Paris. He comments that it is a very beautiful cloth bound book with gold lettering. He favors the cloth binding for libraries but suggests that the usual paperback being less expensive is preferred for general distribution.

Prof. Dr. Stumpers suggests that there is not enough representation in the EMC Society Newsletter from outside the United States so I am asking him to serve on the International Affairs Committee and report his viewpoint from the Philips Research Laboratory in the Netherlands.

GOAL-DIRECTED BEHAVIOR
by
Michael Weir
St. Andrews University
St. Andrews, Scotland
Published by:
Gordon and Breach, Science Publishers, Inc.
New York, New York 10010
Copyright 1984
Hardbound, 289 Pages, $61.95

Although this new book is not at all concerned with EMC, some EMC engineers might also be interested in the subject of cybernetics. This review is written for those who are interested in knowing:

> "Can we build a machine to act purposefully and spontaneously to achieve a goal? Interesting and often controversial, **Goal-Directed Behavior** attempts to prove that, with different principles of operation, machines in the future could be constructed to be goal-directed. After a detailed, careful analysis of the characteristics, pattern and structure of natural goal-directed behavior, the author presents an in-depth analysis of goal-directedness and an innovative design for a goal-directed machine."

The book is well characterized by its preface, the major portion of which is repeated here.

> Behavior directed by and towards goals is a broad class of behavior which is familiar to all of us. It takes up much of our attention, not only because it frequently unfolds right in front of us, but also because we ourselves constantly attempt to achieve goals. Despite its familiarity and ubiquity, its principles have been elusive or controversial in science and philosophy.
>
> The aim of this book is to show the structure and pattern that is inherently characteristic of goal-directed behavior. The approach is a cybernetic one. Since cybernetics is the science of machines, this means that there will be an emphasis on the central cybernetic question of whether there are machines which are or which can be built that are goal-directed.
>
> The notion of what a machine is or can be, draws upon many disciplines at a basic level. Therefore, no advance specialist knowledge in any subject is assumed and the book is self-contained.

The book provides an explanation of natural goal-directed behavior, but it also provides the principles for designers to construct machines that can be directed by goals. These dual features thus make the book relevant to a wide audience including biologists, computer scientists, cyberneticians, engineers, mathematicians, philosophers and psychologists.

My intention is to show that currently machines are not goal-directed, but that machines with different principles of operation could be built to be goal-directed.

The book has three main parts. First, a general systems framework is created using an innovative methodology called 'the path space approach.' Traditionally, the unit of behavior of a system is the state of the system at an instant. The state at an instant is replaced by the path of the system over an interval as the unit of analysis in the new approach. This allows representation of a system, in terms of not just the various occurrences or events of the system, but their unfolding as well. In short, attention can then be focused upon the way the system is behaving. This is shown to be crucial for a proper understanding of goal-directed behavior where action is taken in a characteristic way.

Second, a conceptual analysis and review of the main theories of goal-directed behavior provide a philosphical basis for goal-directed behavior.

Third, the systems theory and the philosophy are wedded in a presentation of a cybernetic theory of goal-directed behavior through a reformulation of an earlier account. Both a set of criteria of goal-

(Continued . . .)

(Continued . . .)

directedness and a design for a goal-directed machine result from this theory.

My own reaction is first that the book does what the author promises in the above preface, and he does it quite thoroughly. Probably due to its thoroughness, the book is not intended for the casual reader. Many existing concepts, as well as new ones advanced by the author, are not only presented, but are examined in microscopic detail. It is in such critical analysis that the real worth of the book resides. Consequently, an excellent foundation is laid upon which future advances can be built.

Some minor criticism of the book concerns the quality of publication. My copy contained two unprinted pages, as well as an above-normal number of typographical erros.

Reviewed by:
Richard B. Schulz
Xerox Corporation, IPD
1301 Ridgeview Drive - MS 330
Lewisville, Texas 75067

Tenth International Aerospace and Ground Conference on Lightning and Static Electricity, Paris, June 10-12, 1985.

This conference was joined to the 17th International Aeronautic Congress, and organized by the Aeronautical and Astronautical Association of France. It was cosponsored by the National Interagency Coordination Group (U.S.A.), European Space Agency, S.E.E. (France), U.R.S.I. and others.

About half of the 91 papers were on the effect of lightning, NEMP and electrostatic discharges on air- and space-craft, leading to a good and many sided survey of the state of the art in this field. This started with the keynote address by Lerouge (Dassault, France), and had about 20 papers from U.S.A., 10 from France, four from F.R. Germany, three from U.K. There were numerous calculation and simulation results, but also quite a few papers on in-flight measurements during thunderstorms, e.g., in-flight thunderstorm environmental measurements during the Landes 84 campaign (Laroche, a.o., France), location of lightning strokes on aircraft in storm field (Gayet a.o., France), airborne and ground electromagnetic field measurements (at low altitudes) (Rustan a.o., U.S.A., two papers), research in lightning swept stroke attachment patterns and flight conditions with the NASA F 106 B airplane (Fisher, a.o., U.S.A.), E- and H-field measurements on the transall C 160 aircraft during lightning flashes (Moreau, Alliot, France).

Phenomenology and characteristics of lightning had 17 papers on ground measurements, modelization, and triggered lightning. A new model of lightning subsequent stroke (Hubert, France) was a thorough study of one triggered event. Laroche, a.o. also characterized the triggered lightning flash. Kawasaki a.o. (Japan) treated the group velocity of lightning return strokes.

The design of and measurements with lightning simulators were covered by nine papers. Fuel ignition hazards (3 papers), aircraft protection (10 papers), ground systems protection (9 papers) were the subjects of special sessions. A 12 year study of lightning stroke prevention systems (Carpenter, Drabkin, U.S.A.), and lightning and logistics, Cape Canaveral, a proving ground for lightning research (Golub, U.S.A.) were also mentioned.

Lightning locators of new designs were studied in U.S.A. (four papers). Electrostatic discharges were studied in connection with vulcanic eruptions and explosive tests, aircraft, spacecraft, and simple measurement instruments.

Sixty-eight papers were produced splendidly in a 512-page cloth-bound book by "Les Editions de Physique," B.P. 112,91944, Les Ulis Cedex, France at 550 F. Francs. (23 papers were not available in time).

F.L.H.M. Stumpers

NATIONAL RADIO SCIENCE MEETING

The National Radio Science Meeting, sponsored by the U.S. National Committee of the International Union of Radio Science, will be held January 13-16, 1986, at the University of Colorado, Boulder, CO. It is being held in cooperation with the IEEE Antennas and Propagation Society, IEEE Circuits and Systems Society, IEEE Electromagnetic Compatibility Society, IEEE Geoscience Electronics Society, IEEE Information Theory Group, IEEE Instrumentation and Measurement Society, IEEE Microwave and Techniques Society, IEEE Nuclear Plasma Sciences Society, and the IEEE Wave Propagation Standards Committee.

The following USNC/URSI Commissions will take part: A (Electromagnetic Metrology), B (Fields and Waves), C (Signals and Systems), D (Electronics and Optical Devices and Applications), E (Electromagnetic Noise and Interference), F (Remote Sensing and Wave Propagation-Neutral Atmosphere, Oceans, Land, Ice), G (Ionospheric Radio and Propagation), H (Waves and Plasmas), and J (Radio Astronomy).

For further information, contact the Steering Committee Chairman, Professor S. W. Maley, Department of Electrical Engineering, University of Colorado, Boulder, CO 80309.

Addresses of 1985 EMC-S BOD, Standing Committee and Symposia Chairpersons

Adams, Jonn W.
Nat Bur Stds-MC 723.04
325 Broadway
Boulder, CO 80303
(303) 497-3328 (Work)

Akao, Yasuo
Dept of Electrical Eng
Nagoya University
Furo-Cho, Chikusa-Ku
Nagoya 464, Japan

Anderson, Charles F. W.
1716 Reppard Road
Orlando, FL 32803
(305) 356-2636 (Work)
(305) 896-6649 (Home)

Berry, Leslie A.
ITS
325 Broadway
Boulder, CO 80302
(303) 497-5474 (Work)

Bronaugh, Edwin L.
Electro-Metrics
100 Church Street
Amsterdam, NY 12010
(518) 399-6142 (Home)
(518) 843-2600 (Work)

Brook, R. H.
9 Ruey Place
Plainview, NY 11803
(516) 595-3136 (Work)
(516) 938-6991 (Home)

Capraro, Gerard T.
1027 Mohawk Street
Utica, NY 13501
(315) 732-1955 (Work)
(315) 733-3286 (Home)

Carlson, B. Leonard
Boeing Aerospace Co.
PO Box 3999, M.S. 3A-03
Seattle, WA 98124
(206) 773-6297

Clark, Donald E.
4086 Shady Circle NW
Lilburn, GA 30247
(404) 894-3535 (Work)

Cory, William E. (Gene)
Southwest Research Inst
P.O. Drawer 28510
San Antonio, TX 78284
(512) 684-5111 x2711

Dash, Glen R.
Dash, Straus & Goodhue
593 Massachusetts Ave
Boxborough, MA 01719
(617) 263-2662 (Work)

Denny, Hugh W.
2528 LaVista Road
Decatur, GA 30033
(404) 894-3535 (Work)

Doeppner, Tom W.
8323 Orange Court
Alexandria, VA
703-780-3983

Duff, Dr. William G.
Atlantic Research Corp.
5390 Cherokee Avenue
Alexandria, VA 22312
(703) 642-4049 (Work)
(703) 250-2409 (Home)

Everett, W. W., Jr.
S.C.E.E.E.
Box 68
Port Royal Square
Port Royal, VA 22535
(804) 742-5611

Freeman, Ernest R.
Sachs/Freeman Assoc., Inc
14300 Gallant Fox Ln, Rm 214
Bowie, Maryland 20715
(301) 262-4400 (Work)
(301) 262-7294 (Home)

Goldblum, R. D.
R&B Enterprises
20 Clipper Road
West Conshohocken, PA 19428
(215) 825-1960

Grant, Peter
Technit
EMI Shielding Products
129 Dermody Street
Cranford, NJ 07016
(201) 272-5500 (Work)

Hagn, George H.
4208 Sleepy Hollow Road
Annandale, VA 22003
(703) 941-7663 (Home)
(703) 524-2053 (Work)

Haislmaier, Robert J.
3021 Gumwood Drive
Hyattsville, MD 20783
(301) 864-9395 (Home)

Hanttula, David M.
Ridge Computers
2451 Mission College Blvd.
Santa Clara, CA 95054
(408) 986-8500 x324 (Work)

Harmuth, Dr. Henning F.
The Catholic Univ. of America
Electrical Engineering Dept
Washington, D.C. 20064
(202) 635-5193

Heirman, Donald N.
AT&T-Information Sys-Bldg 41
Crawfords Corner Rd.
Holmdel, NJ 07733
(201) 834-3566 (Work)
(201) 741-7723 (Home)

Herz, E.
IEEE Headquarters-General Mgr
345 East 47th Street
New York, NY 10017
(212) 705-7908

Hill, James S.
6706 Deland Drive
Springfield, VA 22152
(703) 451-4619

Hofmann, H. R. (Bob)
AT&T-Bell Laboratories
Room 2B-220
Naperville Road
Naperville, IL 60566
(312) 979-3627 (Work)

Iki, Tei
Sony Corp.
16450 W. Bernardo Drive
San Diego, CA 92127
(619) 487-8500 x332

Johnson, Melvin J.
Southwest Research Inst
P.O. Drawer 28510
San Antonio, TX 78284
(512) 684-5111 x2009

Knowles, Eugene D.
16954 Southeast 149th St
Renton, WA 98056
(206) 773-1577 (Work)
(206) 271-3396 (Home)

Kunkel, George M.
Spira Mfg Corp
12721 Saticoy St South
North Hollywood, CA 91605
(818) 843-5880

Krevsky, Seymour
69 Judith Rd
Little Silver, NJ 07739
(201) 741-4918 (Home)

Lambdin, William S.
Electro-Metrics
100 Church Street
Amsterdam, NY 12010
(518) 843-2600 (Work)

Lauber, Wilfred
Communications Research Ctr
P. O. Box 11490, Station H
Shirley Bay, Ottowa
Ontario, Canada K2N852
(613) 596-9438 (Work)

McHale, Michael R.
Honeywell Inc
1100 NW Loop 410
Suite 768
San Antonio, TX 78213
(512) 377-1710 (Work)

Mertel, Herbert K.
EMACO, Inc.
P.O. Box 22066
San Diego, CA 92122
(619) 578-1480 (Work)
(619) 453-2480 (Home)

Nichols, Fred J.
Lectromagnetics, Inc.
6056 West Jefferson Blvd.
Los Angeles, CA 90016
(213) 870-9383

Ott, H. W.
48 Baker Road
Livingston, NJ 07039
(201) 386-6660

Parker, William H.
Genisco Technology Corp.
18435 Susana Road
Rancho Dominguez, CA 90221
(213) 537-4750 x320

Rothhammer, Gerald P.
EATON Corp
5340 Alla Road
Los Angeles, CA 90066
(213) 822-3061 (Work)

Sato, Risaburo
Tohoku University
Aramaki Aza Aboa
Sendai, Japan 980

Schulz, Richard B.
XEROX Corp IPD - MS-330
1301 Ridgeview Drive,
Lewisville, TX 75067
(214) 420-7919 (Work)
(214) 689-6340 (Home)

Showers, Dr. Ralph M.
Moore Sch. of Elect. Eng.
University of Pennsylvania
Philadelphia, PA 19104
(215) 243-8123 (Work)
(215) 898-8123 (Home)

Skomal, E. N.
Aerospace Corporation
P.O.Box 92957, MS A-2/1293
2350 E. El Segundo Blvd.
Los Angeles, CA 90009
(213) 648-7024

Smith, Dr. Chester L.
The Mitre Corp.
Burlington Road
Bedford, MA 01730
(617) 271-7086 (Work)
(617) 275-0598 (Home)

Thomas, Leonard W., Sr.
1604 Buchanan St., NE
Washington, DC 20017
(202) 526-2545

Toler, James C.
ECSL/BRD - Baker Bldg
Georgia Tech Research Inst
Atlanta, GA 30332
(404) 894-3964 (Work)

Tyson, Charlotte R.
1231 Martin Road
Longmont, CO 80501
(303) 447-5891 (Work)
(303) 651-3272 (Home)

Vance, Ed
Route 3, Box 268A
Fort Worth, TX 76140
(817) 478-5653 (Home)

Wall, L. Art, Jr.
10651 Breezewood Drive
Woodstock, Md 21163
(301) 725-1585 (Work)
(301) 465-3119 (Home)

Weber, Don A.
Hamilton Eng Assoc
16765 32nd Ave SW
Seattle, WA 98166
(206) 244-3456 (Work)

H. R. Hofmann
July 22, 1985

EMC Society Chapter Chairpersons

ALBUQUERQUE
Term: Jan 1, 85-Dec 31, 85
Chris Jones
Dikewood
1613 University Blvd, N.E.
Albuquerque, NM 87102
505-842-6106 (Work)

ATLANTA
Term: July 1, 84-June 30, 85
Hugh W. Denny
2528 La Vista Road
Decatur, GA 30033
404-894-3535 (Work)

BALTIMORE/ANNAPOLIS
Term: July 1, 84-June 30, 85
Vernon I. McConnell
8 Carole Court
Severna Park, MD 21146
301-647-0843 (Home)
301-859-6631 (Work)

BOULDER
Term: Jan 1, 85-Dec 31, 85
Bruce Sparks-Temporary
Hewlett Packard-Bldg B
2945 Center Green Court South
Boulder, CO 80301
303-938-3039 (Work)

CENT. NEW ENGLAND (BOSTON)
Term: July 1, 85-June 30, 86
Robert Berkovits
Teledyne Brown Engineering
70 Westview Street
Lexington, MA 02173
617-863-5600 (Work)

CENT. TEXAS (SAN ANTONIO-AUSTIN)
Term: July 1, 85-June 30, 86
Mark Bushnell
P.O. Box 28510
6220 Culebra Road
San Antonio, TX 78284
512-684-5111 xt3515 (Work)

CHICAGO
Term: Jan 1, 85-Dec 31, 85
H. R. (Bob) Hofmann
AT&T-Bell Laboratories
Rm. 2B-220
Naperville Rd.
Naperville, IL 60566
312-979-3627 (Work)

DALLAS-FT WORTH-UNOFFICIAL
Term: Jan 1, 85-Dec 31, 85
Kurt Fischer
XEROX Corp IPD
1301 Ridgeview Drive, MS-330
Lewisville, TX 75067
(214) 420-7923

DAYTON
Term: Jan 1, 85-Dec 31, 85
Victor Morats
USAF ASD/ENACE
Wright Patterson Air Force Base
Dayton, OH 45433
513-255-2907 (Work)

DENVER/LITTLETON
Term: Jan 1, 85-Dec 31, 85
Robert O. Loveland
Martin Marietta Co
P.O. Box 179 M/S V0435
Denver, CO 80201
303-977-6578

DETROIT-UNOFFICIAL
Term: Jan 1, 85-Dec 31, 85
Rozalina Ebrahimian
GENERAL MOTORS EMC
GENERAL MOTORS PROVING GROUND
Milford, MI 48042-2001
313-685-6186

TEL AVIV
Term: Jan 1, 85-Dec 30, 85
Rafi Rubenstein
264 Bene-Efraim Street
Tel Aviv, Israel 69414

JAPAN
Term: Jan 1, 85-Dec 31, 85
Yasuo Akao
Nagoya University
Furo-cho, Chigusa-ku,
Nagoya City, Japan

LONG ISLAND
Term: July 1, 84-June 30, 85
Thomas Mahoney
28 Cranbrook Drive
Centerport, New York 11721
516-364-0400 x2543 (Work)
516-757-9780 (Home)

LOS ANGELES
Term: Sept 1, 85-Aug 31, 86
Glen Whiting
Lockheed
Dept 6951, Bldg 80, Plant A1
Box 551
Burbank, CA 91520
818-847-1516 (Work)

MINNESOTA-TWIN CITIES
Term: Jan 1, 85-Dec 31, 85
Dan Hoolihan
AMADOR Corp
Wild Mountain Road
Almelund, MN 55002
612-257-2074 (Home)
612-583-3322 (Work)

MOHAWK VALLEY
Term: Jan 1, 85-Dec 31, 85
Gerard T. Capraro
1027 Mohawk Street
Utica, NY 13501
315-732-1955 (Work)
315-733-3286 (Home)

NEW JERSEY COAST - Joint AP, VT
Term: July 1, 85-June 30, 86
John Mumbauer
Honeywell
P. O. Box 54
Eatontown, New Jersey 07724
201-542-1400 (Work)

ORANGE COUNTY
Term: Oct 1, 84-Sept 30, 85
Larry Caney
EATON Corp
5340 Alla Rd
Los Angeles, CA 90066
213-827-0472

OTTAWA
Term: July 1, 84-June 30, 85
Prof. James Wight
3410 Albion Rd.
Ottawa, Ontario
Canada K1V8W3
613-231-2637 (Work)
613-820-8280 (Home)

PHILADELPHIA
Term: July 1, 84-June 30, 85
L. Gilda Haskins
Haskins Assoc
2525 Sharon Court
Bensalem, PA 19020
215-752-4749 (H&W)

PHOENIX-Unofficial
Term: Jan 1, 85-Dec 31, 85
Al Gross
Sperry Corp-Aerospace & Marine
P. O. Box 21111, MS-02885
Phoenix, AZ 85036
602-869-2104 (Work)

SAN DIEGO
Term: Jan 1, 85-Dec 31, 85
Wm Johnson
Electromagnetic Technology
4410 Glacier Street
San Diego, CA 92122
619-283-5592 (Work)

SANTA CLARA VALLEY
Term: July 1, 85-June 30, 86
David M. Hantulla
Ridge Computers
2451 Mission College Blvd.
Santa Clara, CA 95054
408-986-8500

SEATTLE
Term: Jan 1, 85-May 31, 86
Del Black
EATON Corp
18839 197th Ave N.E.
Woodinville, WA 98072
206-788-6131 (Work)

TUCSON-Joint MTT, COM, AP
Term: Jan 1, 85-Dec 31, 85
Howard Kohlbacher
1050 East Valencia Rd.
Tucson, AZ 85706
602-294-2651 (Work)
602-296-5578 (Home)

WASHINGTON D. C.
Term: July 1, 85-June 30, 86
Dr. Robert Haislmaier
3021 Gumwood Drive
Hyattsville, MD 20783
301-864-9395 (Home)
202-695-7503 (Work)

Changes - H. R. Hofmann
CHICAGO - July 19, 1985

EMC Directors

FUTURE EMC SYMPOSIA LOCATION	SYMPOSIA CHAIRMAN
1985 - Boston, MA, Aug 20-22	C.L. Smith
1986 - San Diego, CA, Sept 16-18	H.K. Mertel
1987 - Atlanta, GA, Aug 24-27	H.W. Denny
1988 - Seattle, WA, Aug 2-4	D.A. Weber
1989 - Denver, CO, Late Spring	J.W. Adams
1989 - Japan - Fall	Y. Akao
1990 - Wash, DC, Aug 28-30	T. W. Doeppner
1991 - Northern NJ, Fall	D. N. Heirman

SOCIETY OFFICERS	1985
President	Eugene D. Knowles
Vice-President	Chester L. Smith
Secretary	Donald E. Clark
Asst Secretary	VACANT
Treasurer	B. Leonard Carlson
Asst Treasurer	Seymour Krevsky

DIRECTORS AT LARGE

Term Expires End of 1987	Term Expires End of 1985	Term Expires End of 1986
D.E. Clark	W.E. Cory	E.L. Bronaugh
C.R. Tyson	W.G. Duff	R.D. Goldblum
R.J. Haislmaier	J.S. Hill	D.N. Heirman
G.M. Kunkel	E. D. Knowles	H.W. Ott
C.L. Smith	G.T. Capraro	R.B. Schulz
B.L. Carlson	W.H. Parker	L.A. Wall

EX OFFICIO (WITH VOTE)
Immediate Past Pres
W. G. Duff

EX OFFICIO (WITHOUT VOTE)
Chapter Chairmen
Standing Com Chairmen
E. Herz,
I. Engelson, IEEE HQ

COMMUNICATION SERVICES

Committees:			
Newsletter Editor	DIRECTOR:	R. J. Haislmaier
Symposia/Conferences	CHAIRMEN:	R. D. Goldblum
		W. E. Cory
Transactions Editor		R. B. Schulz
EMC Abstracts		M. J. Johnson

MEMBER SERVICES

Committees:		
Awards and Fellows	DIRECTOR:	F. J. Nichols
Chapter Activities Regions 1-4	CHAIRMEN:	J. C. Toler
Chapter Activities Regions 5-10		C. F. W. Anderson
Membership		H. R. Hofmann
Fellow Evaluation		J. C. Toler
Constitution and Bylaws		W. G. Duff
Nominations		G. R. Dash
		W. G. Duff

TRANSNATIONAL COMMITTEE

CHAIRMAN: W. G. Duff

TECHNICAL SERVICES

Committees:		
	DIRECTOR:	E. L. Bronaugh
	ASST. DIRECTOR:	VACANT
Education	CHAIRMEN:	H. W. Ott
Standards		D. N. Heirman
Technical Advisory Committees Coordinator		E. N. Skomal
Electromagnetic Compt Mgmt-TC1		D. Hantulla
Electromagnetic Compt Msrmts-TC2		D. N. Heirman
Electromagnetic Environments-TC3		W. R. Lauber
Electromagnetic Interference Ctrl-TC4		G. M. Kunkel
Electromagnetic Pulse-TC5		E. F. Vance
Spectrum Management-TC6		L. A. Berry
Sequency Union-TC7		H. F. Harmuth

PROFESSIONAL SERVICES

Committees:		
	DIRECTOR:	R. Sato (Tei Iki)
	ASST. DIRECTOR:	G. P. Rothhammer
Employment Analysis	CHAIRMEN:	E. R. Freeman
Government Relations		G. H. Hagn
Intersociety Relations		M. McHale
Public Relations		P. Grant

REPRESENTATIVES TO TAB COMMITTEES

Committee on Man and Radiation (COMAR)	D. D. Hoolihan
Society on Social Implications of Technology	R. H. Brook
Energy Committee	VACANT
Environmental Quality Committee	L. W. Thomas, Sr.
PACE Coordinator	W. H. Parker
Research & Development	W. W. Everett, Jr.
Standards Board	D. N. Heirman

REPRESENTATIVES TO EXTERNAL ORGANIZATIONS

U.S. National Committee of U.R.S.I.	E. N. Skomal
International Consultative Committee on Radio (CCIR) U.S. Study Group 1	L. W. Thomas, Sr.
CISPR Subcommittee A (US National Committee of IEC TAB)	W. S. Lambdin
IEEE Representative to ANSI C63	E. L. Bronaugh
IEEE Representative to CBEMA	H. R. Hofmann

Please send all corrections and changes to H. R. Hofmann.
July 22, 1985

INSTITUTIONAL LISTINGS

The IEEE Electromagnetic Compatibility Society is grateful for the assistance given by the firms listed below and invites application for Institutional Listings from other firms interested in the electromagnetic compatibility field.

ELECTRO-METRICS, Division of Penril Corp., 100 Church St., Amsterdam, NY 12010
Telephone (518) 843-2600
EMI Meters/Spectrum Analyzers/Systems incl.; Computer Control—20 Hz-40 GHz/TEMPEST & ESD Instruments.

RADIATION SCIENCES, INC., 3131 Detweiler Rd., Harleysville, PA 19438
Telephone: (215) 256-4133
TEMPEST/EMI/EMC/FCC; FULL Engineering and Support Services: Testing, Design, Documentation.

SPECTRUM CONTROL, INC., 2185 W. 8th St., Erie, PA 16505
Telephone (814) 455-0966 TWX: 510-699-6871
Complete EMC; FCC/MIL Consulting, Testing, Repair, Mfr. RFI Filters, RFI Gaskets, D-Subminiature Connectors.

LECTROMAGNETICS, INC., 6056 W. Jefferson Blvd., Los Angeles, CA 90016
Telephones (800) 325-9814 (213) 870-9383
RF shielded enclosures, modular, prefabricated & all welded. RFI/EMI power line filters; signal line filters, RF Shielded Anechoic Chambers.

GENISCO TECHNOLOGY CORPORATION, 18435 Susana Rd., Rancho Dominguez, CA 90221
Telephone (213) 537-4750
EMI Filters and EMI Testing; FCC, VDE, MIL-STD-461, 200 V/m capability, 10 kHz-18 GHz, Mobile EMI test vans.

CHOMERICS, INC., 77 Dragon Ct., Woburn, MA 01888-4014
Telephone (617) 935-4850
EMI/EMP Shielding materials, gaskets, conductive compounds, shielded windows, vents and filters, cable shielding, FCC and TEMPEST Testing, application engineering, shielding tapes and laminates.

HONEYWELL, INC., Signal Analysis Center, P.O. Box 391, Annapolis, MD 21404
Telephone (301) 244-4500 Ext. 281
Complete services for EMI/EMC/TEMPEST, System Design and Integration.

SCHAFFNER EMC, INC., 825 Lehigh Ave., Union, NJ 07083
Telephone (201) 851-0644 Telex 685-3444
RFI/EMI Power Line Filters, EMC Testing, Instruments for Simulation or Measurement of EMI.

DON WHITE CONSULTANTS, INC., State Route 625, P.O. Box D, Gainesville, VA 22065
Telephone (703) 347-0030
Interference Control Training, Handbooks, Computer Programs, EMC Technology Magazine & Consulting.

UNIVERSAL SHIELDING CORPORATION, 20 W. Jefryn Blvd., Deer Park, NY 11729
RF shielded enclosures, modular & prefabricated. RFI/EMI power and signal line filters, RF Waveguide Air Vents.

AMADOR CORPORATION, Wild Mountain Road, Almelund, NM 55002
Telephone (612) 583-3322 Telefax (612) 583-2242
Comprehensive EMI/FCC/VDE/MIL-STD-461 Testing, Consulting.

G & H TECHNOLOGY, INC., Electromagnetics Laboratory, 750 W. Ventura Blvd., Camarillo, CA 93010
Telephone (805) 484-0543
EMI Testing MIL-STD-461, TEMPEST, EMP Simulation, Design Engineering Consulting.

EATON CORPORATION, Electronic Instrumentation Division, 5340 Alla Road, Los Angeles, CA 90066
Telephone (213) 822-3061 TWX: 910-343-6969
EMI/EMS Measurement Instrumentation; Computer-controlled Systems for MIL/FCC/CISPR/VDE Requirements.

An Institutional Listing recognizes contributions to support the publication of the IEEE Newsletter and TRANSACTIONS ON ELECTROMAGNETIC COMPATIBILITY. Minimum rates are $75.00 for listing in one issue; $200.00 for four consecutive issues. Larger contributions will be most welcome. No agency fee is granted for soliciting such contributions. Inquiries, or contributions made payable to the IEEE, plus instructions on how you wish your Institutional Listing to appear, should be sent to M. Bonaviso, The Institute of Electrical and Electronics Engineers, Inc., 345 East 47 Street, New York, NY 10017.