

# **EXCERPTS KEYNOTE ADDRESS INTERNATIONAL SYMPOSIUM ON ELECTROMAGNETIC COMPATIBILITY** THE HON. RICHARD D. LAMM FORMER GOVERNOR OF COLORADO MAY 23, 1989

Former Governor Richard Lamm is well known for his outspoken and controversial views. At the Denver Symposium he shared his thoughts on the economic, political, and social problems facing the United States in the latter Twentieth Century. Although not specifically directed to the EMI/EMC professional, his views concerning the role of the learned professions and the importance of research and development should prove intriguing to the engineering profession. It is hoped that the following edited excerpts will inform EMC-S members who could not be present in Denver and will allow them to judge for themselves.

It is . . . my argument that we are going to have to reprioritize some societal assets we now spend elsewhere. I believe public policy can give us fewer lawsuits and more sewers. I believe that we need fewer coronary by-passes and more highway underpasses. I believe that it is more

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than possible. I suggest that some of our societal spending is so inefficient and ineffective as to be prime candidates for reallocation. While it won't be easy, there is flexibility in our total societal budget, the knee bone of medical spending is connected to the hip bone of municipal needs; the arm bone of excess litigation costs is connected to the shoulder bone of infrastructure needs, but it will involve taking on some sacred cows: budget items like health care, and Medicare, and Social Security.

I suggest that the excesses in one area are related to the inadequacies in other areas. On any given day in America there are 200,000 to 400,000 empty hospital beds, and studies show that as many as 25 percent of the people in a hospital bed don't need to be there. But our bridges are falling down, our classrooms are overcrowded and our infrastructure is crumbling. There is something fundamentally unsustainable about a country that manufac-



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# CALL FOR BOOK REVIEW EDITOR

A member of the EMC Society is needed to fill the position of Book Review Editor. The ideal candidate would be familiar with the body of EMI/EMC literature and would possess the initiative to solicit review copies of likely publications. Combining this scrutiny of current publishing efforts with an analytic turn of mind and the ability to meet deadlines will provide a NEWSLETTER column which performs a vital service to readers. Of course, an added benefit is a unique opportunity to examine a wide variety of publications while aiding the EMC Society. Interested members should contact:

Robert D. Goldblum, Editor EMC-S NEWSLETTER 20 Clipper Road W. Conshohocken, PA 19428 tures artificial hearts, but which can't furnish its people adequate water or transportation systems.

### **HEALTH CARE AND LITIGATION**

Let us start with health care and litigation. No county spends as much on health care as the United States, yet if you are an American male you're 15th in world life expectancy; and if you're a female 8th in world life expectancy. Eleven and a half cents out of every dollar spent in America is spent on health care, and yet we are not as healthy as many countries that spend only a fraction of what we spend. Give me some of the wasted funds tied up in those empty hospital beds to lock up drunk drivers, and I will save more lives than the hospital will!

Also there are clear public policy alternatives to the massive money we now spend on litigation. It is not an economic or social asset to have two-thirds of all the lawyers in the world practicing in the United States. It is an economic cancer. Other countries run their justice system, resolve disputes between their citizens, protect their civil liberties, and bring order and justice on just a fraction of the lawyers we have. Japan trains 1,000 engineers for every 100 lawyers, and we train 1,000 lawyers for every 100 engineers. That is a crime against the future. Forty percent of our Rhodes scholars go to law school, which is a tragic misapplication of their talents. There are ways to resolve many differences. . . . We can and should adopt more no-fault insurance; we can-and I believe we should-stop allowing a jury trial in civil cases; we can adopt dispute resolution and mediation; we can dramatically reform our tort system.

# TENURE LAWS, SOCIAL SECURITY, AND MEDICARE

Now that we are warmed up, let's look at all America's institutions and decide what we are doing inefficiently and wastefully. In Denver our teacher tenure laws make it a common occurence to have to spend \$100,000 in legal fees just to fire an incompetent teacher, or even a teacher with Alzheimers disease. Similarly our civil service system at every level does not recognize excellence and too often rewards mediocrity. Too many public managers simply tolerate incompetence because it is too cumbersome and expensive to fire an incompetent public employee. That might have been tolerated in a country which was rich and isolated; but now that we are in a new world of international competition, it cannot be tolerated.

Continuing our hunt for sacred cows, let's look at Social Security and Medicare. In America approximately half of all the federal social spending goes to those over the age of 65, and nearly all of these federal dollars are distributed without regard to **need**. We pay Social Security to retired millionaires, Medicare to wealthy retired doctors and sanctimoniously refuse to even question these programs. . . . Millions of working poor pay one dollar out of every seven they earn into a Social Security system which immediately transfers a significant portion of those dollars to people who are wealthier and better off than the person paying the tax.

# **RESEARCH AND DEVELOPMENT**

The U.S. is spending proportionately less for its economic size on non-military research and development. In 1982 our nation spent 1.9 percent of its GNP on non-military research and development while West Germany spent 2.6 percent and Japan spent 2.5 percent. In 1984 the Department of Defense spent \$26.9 billion on research and development compared to \$49 billion spent by all private industry combined. . . . Among the 17 western industrial democracies, the United States ranks first in military spending as a percentage of GNP and last in productivity growth, last in capital growth in manufacturing and last infixed investments as a share of gross domestic product.

## THE POLITICAL SYSTEM AND THE FUTURE

A number of thoughtful people—Lloyd Cutler, James McGregor Burns, and Douglas Dillon among others have raised the question as to whether America's political system is adequate to sustain itself. The American political system is simply not structured to make hard choices. I believe that the answers to the cities' problems cannot wait until Americas's economic engines start again. The problems are too pressing, and there has to be a reallocation from some other public and private functions that we are now engaged in. It is further my feeling that the inefficiencies in these existing systems are so substantial that we can reduce the spending in a number of them and actually benefit society. A dollar saved in medical care or excessive litigation and transferred into an infrastructure is a dollar that makes America stronger.

In summary, let me end with a story that came out of the Second World War when sugar was rationed. A man went into a restaurant and ordered a cup of coffee, and the waitress gave him the usual very small piece of sugar. He asked for more sugar. The waitress cast a cynical eye on him and said, "Stir, what you have, stir what you have."

It is my feeling that the United States, with all its economic problems and challenges, has enough money to make cities livable and to keep up our infrastructure and our public facilities. We can maintain an incredibly high quality of life in the United States, but we're not going to do that with business-as-usual solutions. We are going to have to fund the very obvious needs that we all see on a day-to-day basis. . . Public policy can spend less money in health care and less money on litigation and more money on sewers, schools, roads, teachers, parks, and solid waste disposal projects. There is not going to be enough new money to spend on these, and thus, we are going to have to look at how the old money can be spent more efficiently. It can be done—but America is going to have to . . . "stir what it has."

# PRESIDENT'S MESSAGE

# **INTERNATIONAL ACTIVITIES**



from Donald E. Clark

The IEEE is very much an international organization and is becoming more so everyday. International activities will become a primary focus of the IEEE during the 1990s; and the IEEE will, no doubt, play an important role in the global technical community during the next decade. The IEEE recognizes these changes and is now taking steps to assume its important role. Delegations are being sent to different countries to improve relationships—*e.g.*, an IEEE delegation will visit the Popov Society in the U.S.S.R. in the near future. The IEEE is also considering the feasibility of establishing local offices in both Europe and Japan. In order to comprehend the international dimension of IEEE activities, the following statistics should be examined.

Presently, the IEEE has a membership of 300,500 with members from 130 different countries. Approximately 79 percent of these members reside in the United States while 21 percent reside elsewhere. However, membership is growing at a much faster rate outside the United States. Of the 268 sections within the IEEE, 93 are located outside the United States. Similarly, there are a total of 754 chapters within the IEEE, and 199 are located outside the U.S.A. Significantly 50 percent of the papers for the *Transactions* are submitted by members from abroad. Thus, the overall picture of statistics and activities emphasizes IEEE's international scope.

The EMC Society, as a unit within the IEEE, is also assuming its international role. The EMC Society has a total membership of 3,500 and approximately 27 percent of these members reside outside the United States. Three of the Society's 27 chapters are located abroad. The primary reflections of the Society's international role are its symposia and its chapter activities. A further examination and update on these international activities would seem to be in order. The first EMC Symposium held outside the United States took place in Tokyo, Japan during October, 1984. This very successful event was chaired by Dr. Risaburo Sato. The next international EMC symposium is scheduled for Nagoya, Japan in September, 1989 and will be chaired by Professor Yasuo Akao. Approximately 192 papers will be presented by authors from the United States, China, the U.S.S.R., and several other nations.

Also the EMC Society is a cooperating sponsor for three other international symposia. Several professional organizations lend their cooperative efforts to the Zurich Symposium on EMC. I attended the Zurich Symposium held this past March and found it to be an enriching experience. Dr. Thomas Dvorak has served as Chairman, or Secretary General, of this European symposium and exhibition, which has taken place biennially since 1975. However, Dr. Dvorak has announced that he will retire this year from the Swiss Federal Institute of Technology and that he will no longer serve as Chairman of the Zurich Symposium. Dr. Dvorak has made a significant contribution to the EMC community, and he has played a key role in helping to disseminate EMC technology on an international level. The EMC community owes a debt of appreciation and gratitude to Dr. Dvorak.

The two other international symposia in which our Society cooperates take place in Poland and in the United Kingdom. The tenth session of the biennial Wroclaw Symposium is scheduled for June 26 through 29, 1990. During my visit to Zurich, I had the pleasure of meeting the Wroclaw Organizing Chairman Dr. W. Moron. In the past, the British EMC symposium was sponsored by the Institute of Electronics and Radio Engineers (IERE), but this organization has recently combined with the Institute of Electrical Engineers (IEE). The Sixth Annual Conference on EMC took place at the University of York, September 12 through 15, 1988.

Because of its commitment to disseminating EMC technology on an international level, the EMC Society will continue its cooperation with these three symposia committees and has established reciprocal agreements to trade symposia records with them. In the future, similar cooperative agreements may be reached with other organizations.

The EMC Society is also involved in international activities through its chapters. The Society has active chapters in Tokyo, Ottawa, and Tel Aviv. The Ottawa Chapter recently split from a joint chapter to become an independent entity. The new Chapter Chairman is Mr. Jacques Rollin, and we extend our congratulations to him and to the members. I have been informed that our Society may soon have a chapter in Paris. Professor Ferdy Mayer has been working for a considerable period of time to organize a Paris Chapter, and we applaud his efforts and those of his colleagues. When the Paris Chapter is chartered, it will be the first EMC Society in Europe. Also our Society has received inquiries from members in Sweden, Spain, Mexico, and China about possible new chapters.

The IEEE Technical Activities Board is planning a series of colloquia to be held in October 1989 within Region 10-i.e., Australia, India, Korea, Japan, Singapore, etc. During the May BOD Meeting, the EMC Society approved funding on a cost-sharing basis for participation in these colloquia. Our participation will allow direct exchange of EMC technology and will further the advancement of EMC principles.

What must our Society do in the future to enhance its international role? First, better means of disseminating information must be developed. Technology is not advanced when investigators repeat studies and research which have been carried out previously. In other words, we need to determine what research is being carried on throughout the world and to form cooperative working groups. Another area which needs improvement is the establishment of EMC standards. Uniformity in standards is a desirable goal, and international committees should continue its pursuit. Other areas for innovation might include improvements in EMC education and an International Distinguished Lecturers Program.

In summary, the IEEE recognizes its present and expanding role as an international organization and is taking steps to prepare for the future. The EMC Society, as part of the IEEE, also recognizes the changes which are taking place and is moving to meet the needs of all its members. Anyone wishing to inquire about international projects or to offer help or suggestions, should contact Herbert K. Mertel, Chairman of the Transnational Committee.

Note—Mr. Mertel's telephone number is (619) 578-1480, and his address is listed at the front of this NEWSLET-TER.

# UPDATE

IEEE President Emerson W. Pugh has announced that a delegation of member experts will participate in joint discussions on optoelectronics in Moscow early this fall. He noted that the Institute's participation is in accordance with an agreement reached late last year with the A.S. Popov Society, the Soviet radio and electronics organization based in Moscow.

The visit, which will span ten days, includes a September 18–19 optoelectronics meeting, as well as tours of research, educational, and industrial sites to assess the current state of optoelectrics in the Soviet Union. Also the agreement calls for Popov members to come to the United States at a future time.

Besides President Pugh, the IEEE delegation will consist of Dr. Michael Bass, Professor of Electrical Engineering and Vice President for Research, University of Central Florida, Orlando; Dr. Arthur H. Guenther, Chief Scientist for Advanced Defense Technology, Los Alamos National Laboratory, Las Alamos, NM; Dr. Sven O. Ohrvik, IEEE Region 8 Director and Professor, Lund University, Lund, Sweden; Dr. Bahaa E.A. Saledh, Professor, Department of Electrical Engineering, University of Wisconsin, Madison, WS; Dr. Karl-Ulrich Stein, Executive Director, Discrete Semiconductor Operations, Siemens AG, Frankfurt, Germany; Dr. Malvin Teich, Professor, Department of Electrical Engineering, Columbia University, New York, NY; and Dr. Patrick R. Trischitta, Member, Technical Staff, AT&T Bell Laboratories, Holmdel, NJ.

"Every man owes a part of his time and money to the business or industry in which he is engaged. No man has a moral right to withhold his support from an organization that is striving to improve conditions within his sphere."

-President Theodore Roosevelt-1908

# **INTER-SOCIETY ACTIVITIES**

This Inter-Society Activities column is being prepared by a new Associate Editor. Every effort will be made to provide current information on activities of the many related EMC organizations. Reader comment and contributions are welcome. See "Newsletter Staff" for address.

# EIA

The Electronic Industries Association G-46 EMC Committee has several current projects for updating existing military EMC specifications and standards. G-46 has reviewed and provided comments on all proposed drafts currently being prepared by the SAE AE-4 Committee. G-46 is evaluating the draft of a new section to MIL-STD-461 intended to provide appropriate guidance in the selection of commercial off-the-shelf equipment for various military operational environments. Also a survey is being conducted throughout the industry for comments and recommendations on the revision and updating of MIL-STD-461. Comments and recommendations will be organized and analyzed, and recommendations will be provided to the Air Force custodian of this standard. It is anticipated that G-46 will also prepare draft revisions of portions of the standard. The Committee provided many comments on the draft "MIL-STD-462 EMC Test Procedure LAP Handbook." EIA will continue to provide input reflecting the concerns of member companies in regard to the proposed laboratory accreditation program. In addition to these activities, G-46 attempts to maintain awareness of EMC activities within all governmental agencies, to be alert to major problems and projects, and to provide assistance as appropriate.

### CISPR

Subcommittee D has completed work on the third edition of CISPR Pub. 12, which will appear in print shortly.

CISPR Subcommittee D has now established a second working group. WG1 will deal primarily with interference from vehicles to receivers in buildings. WG2 will deal primarily with interference to mobile receivers resulting from vehicle emissions. Among the activities of WG2 is the development of component RF emission test methods.

#### ISO

ISO TC22/SC3/WG3 is writing documents relating to vehicle electrical transient and RF susceptibility. ISO 7637/1 and /2, transient susceptibility in 12V. and 24V. vehicle systems respectively, are close to being published. Other activity includes study of test methods relating to ESD and RF susceptibility on both vehicles and components.



by Donald A. Weber

### SAE

SAE Committee AE-4, Electromagnetic Compatibility, has released for review and approval a proposed Section P, CONDUCTED SUSCEPTIBILITY, DAMPED SINE WAVE, for addition to ARP 1972, Recommended Measurement Practices and Procedures for EMC Testing.

### **dB** Society

The dB Society is a fraternal, non-profit organization comprised solely of individuals active in the EMC industry for a period of at least ten years. Meetings are held concurrently with an annual "picnic" for members and their spouses. The picnic/meetings coincide with the National IEEE EMC symposium. This year's meeting was held at the "Beef Palace" in Denver, CO. During the course of the meetings, selected members (usually everyone) may find themselves in violation of various rules of the organization. In fact, the "rules" are often created and "tailored" to suit the individual being fined for the infraction. This "tailoring" is, of course, uncannily reminiscent of MIL-STD-461, with which many of the members are familiar. Proceeds from the fines are donated to charity.

The dB Society is now operating with a new set of officers: President, Steve Jensen; Vice President, Herb Mertel; Secretary, Al Martin; and Treasurer, Bill Parker. Each of these officers was "rail-elected" without much warning last year after the abrupt resignation of the previous officers. The dB Society is an opportunity for those long engaged in the EMC business to get together in a social atmosphere and to enjoy themselves while offering a small side benefit to a local charity. The dB Society has a limited membership of one hundred. At present, there are a few openings for new members. Membership information may be obtained by contacting Steve Jensen at (714) 867-3900.

# PCs FOR EMC

# **MINI REVIEWS**

The MININEC System: Microcomputer Analysis of Wire Antennas, J.W. Rockaway, J.C. Logan, D.W.S. Tam and S.T. Li, Boston: Artech House, 1988, ISBN 0-89006-264-1.

Anyone reading this column who uses PCs for antenna modeling but hasn't yet heard of MININEC is probably in a small minority. MININEC began in the early 1980s as an experiment to demonstrate that "real" modeling using a moment-method code on a PC was actually feasible. As a matter of fact, the feature article from which this column originated was published in August of 1983. That article consisted of a brief description of two wire models then running on Apple II + micros—the original MINI-NEC, a frequency-domain code, and TWTD, a timedomain counterpart.

Since then, MININEC has progressed through several generations, culminating (for the time) in the fourth version to be released as the present Artech publication. While an ISBN (International Standard Book Number) is assigned to the MININEC System, this product is really a' software package with documentary, rather than a book. Also please note that while I have used previous versions of MININEC on the Apple and on Macintosh PCs, the account which follows is based primarily on the written descriptions in the MININEC System and on my observations of MININEC use by others. The IBM PC (and compatibles) for which MININEC3 is written is one which I don't use regularly.

Contained in a three-ring, loose-leaf,  $8.5 \times 11$ -inch binder, the documentation consists of 256 pages proper, plus 12 pages of content, etc. Included with the binder are two 5.25-inch floppies which contain the source and executable codes written in Microsoft BASIC for the eleven programs which make-up the MININEC System. The system can be run in the interpreter mode of BASIC or in compiled form if a PC has a math coprocessor and a hard disk. Although written in Microsoft BASIC, with some modifications, it should be possible to use other compilers.

The 13 chapters of documentation include two introductory sections followed by one chapter on each of the programs; they are:

- 1. Introduction to MININEC System.
- 2. A Demonstration of the MININEC System.
- 3. Program: System Supervisor
- 4. Program: Geometry Configuration (GEOMETRY).
- 5. Program: Currents-LU Decomposition (CURLU).
- 6. Program: Currents—Transpose Elimination (CURTE).



by Edmund K. Miller

- 7. Program: Currents—Rotational Symmetry (CURRO).
- 8. Program: Near and Far Fields (FIELDS).
- 9. Program: Pattern Synthesis (SYNTH).
- 10. Program: Coupling Calculation (COUPLE).
- 11. Program: Circuit LaPlace Transforms (LAPLACE).
- 12. Program: Antenna Matching (MATCH).
- 13. Graphics Auxillary (GRAPHICS).

The system supervisor provides organization and control of the other programs for which the operation is as follows:

GEOMETRY creates the antenna geometry;

CURLU, CURTE, and CURRO calculate the current;

FIELDS, SYNTH, and COUPLE provide access to various field quanities;

LAPLACE and MATCH pertain to impedance computation; and

GRAPHICS handles display of the various quanities computed.

Each of the chapters which discuss computation programs (*i.e.* 4–12) follows the same format of introduction, theory, validation, operation, program limits, examples, and figures. This format is a good approach which, once recognized, makes efficient use of the documentation easier for the reader. There are over 60 figures (many full-page) and many pages of input/output to illustrate program operation. The detailed "Table of Contents," which runs to four and a half pages, is a necessity since there is no index. There are also 50 references listed.

Among the examples discussed throughout the book are the L antenna, the straight dipole, the T antenna, parallel dipoles, and a loop antenna. Antennas modeled can be in free space or over a perfect ground plane, and lumped loading can be added to include the effects of either pointwise or distributed loading. The wire model employs a mixed-potential (vector and scaler) integral integration with pulse testing and expansion functions; it is applicable (continued) to bent wires and to multiple-wire junctions and has a small-radius treatment to permit stepping the radius of a wire with good results for steps as large as 100:1. Besides demonstrating MININEC application, most of the examples presented either include independent data for validation purposes or have been selected to demonstrate code limits, such as the low-frequency behavior of a loop antenna. Several different codes are compared with experimental data for the T antenna and provide another indication of relative accuracy.

Once the current distribution has been obtained, the user can select among the various options, which include computation of both the near and far field. The near fields computed can be both electric and magnetic. Included in the far-field capability is the option for approximating the effects of real ground by modifying the image fields with the Fresnel plane-wave reflection coefficient. Provision is also made for modeling laterally varying ground properties using either annular zones or linear strips. Other post-matrix-solution options include computing the excitation voltages (up to 10) for antenna-pattern optimization, obtaining antenna-antenna coupling, computing the driving-point impedance of a circuit connected to an antenna, and designing broadband matching networks.

The GRAPHICS program supports both CGA and EGA adaptors for monitor display and provides hardcopy output using a screen-dump driver and a dot-matrix printer. Both the problem geometry and computed quantities such as currents, fields, patterns and input impedance can be plotted using the available menus. Plot formats for field quantities are both polar and rectangular and include a Smith chart for presentation of input impedance.

All in all, at \$150.00, the MININEC System represents a good buy in EM modeling software. The package provides a modeling capability for antennas which is quite flexible, well validated, and comprehensive. Indications of MININEC's capabilities include the large user community which has developed and the diversity of users, which ranges from amateur radio hams to broadcast radio consultants to antenna designers. As PC power has expanded the horizons of practical desktop computing, MININEC has progressed from an interesting experiment to a valuable design and analysis tool which ably demonstrates that a microcomputer can do real EM problems which were once the sole province of mainframe computers. Its developers (the authors listed above and Don Wilton, who provided analytical guidance) should take considerable satisfaction from the growing popularity of MININEC.

Some concluding comments are probably in order concerning possible future versions of MININEC. One of the more obvious, and easiest, extensions to the present code would be that of adding a plane-wave incident field so that scattering calculations could be done. This step would have little impact on running time and would open up a whole new set of applications. Another incident field that would be worth adding is that of a Hertzian current source. Extending the perfect-ground treatment to include the reflection-coefficient approximation for lossy grounds would be worth considering as well. Another plus would be a fullup Sommerfeld treatment since many users of MININEC are HF and VHF antenna designers. Finally, rewriting MININEC in FORTRAN should be considered. Just as many computer "jocks" found it hard to take the Macintosh seriously because of its diminutive size, many prospective users might react similarly to a code written in BASIC. Besides, a FORTRAN version would be likely to offer speed improvements and could import numerical-analysis software more conveniently.

# PT EXPRESS, Liberty Labs, Inc., P.O. Box 8268, Cedar Rapids, IA 52408; Telephone (319) 390-3646.

Michael W. Howard, President of Liberty Labs, recently sent me a copy of his software package *PT Express*. The package sells for \$99.95 and can be ordered by phone using either MC or VISA. It is a "TSR (Terminate & Stay Resident) program for solving engineering problems and equations relating to EMC and to other engineering principles." It is designed for IBM PC/XT/AT/PS2 and other compatibles. It provides four main functions which are:

Conversions-unit conversions of any type of units.

Equations—automatic solving of commonly used equations placed in a programmable database.

Math with Plotting Capability—calculation and plotting of equations on the CRT display.

Tables—provision of instant access to commonly used tables and reference material.

*PT Express* comes with pre-prepared templates in each of these areas and allows the user to customize or to enter new routines via their favorite word-processing package. It is essentially equivalent to an online handbook, calculator and plotter designed for engineers and technicians working with EMC requirements and equations. The program provides instant access through a series of Hot keys which pop up needed tables (*e.g.*, FCC Part 15-J, VDE 0871). It performs necessary conversions or handles equations needing evaluation. In Macintosh parlance, *PT Express* would be called a desk accessory.

The program comes with a well-prepared, spiral-bound, 5-inch by 8.5-inch user's manual with six sections, three appendices and an index. To develope a more personalized version, equations and tables, to a maximum of 19, can be added and edited by the user. It requires DOS version 2.0 or higher and supports the CGA, VGA, and EGA monitors. Function selection and data entry are made via menus under cursor control. Editing is done in a BASIClike manner on text files, which are then converted to data files using COMPRESS. Functions available for equation evaluation include arc tangent, tan, cosine, sine, exponential, natural and base-10 logarithms, square and square root, and absolute. Where required, this kind of software product can be very helpful and timesaving.

# THE DISTINGUISHED LECTURER PROGRAM ELECTROMAGNETIC COMPATIBILITY SOCIETY INSTITUTE OF ELECTRICAL AND ELECTRONIC ENGINEERS, INC.

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#### **ROSTER OF LECTURERS**

David M. Hanttula, Chairman—Distinguished Lecturer Program, has announced that two new Distinguished Lecturers have been chosen. They are Edwin L. Bronaugh and Joseph F. Fischer. Both have contributed generously to technical sessions of the society and are well regarded by their professional peers. Their terms will run from July 1, 1989 to June 30, 1991. Mr. Bronaugh is an IEEE Fellow, and Mr. Fischer is a Senior Member.

### DISTINGUISHED LECTURER ADDRESSES AND PERIODS OF OFFICE

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# FORTIETH IEEE VEHICULAR TECHNOLOGY CONFERENCE

May 7-9, 1990

# **CALL FOR PAPERS**

The Fortieth IEEE Vehicular Technology Conference will take place at the Crowne Plaza-Holiday Inn, May 7 through 9, 1990 in Orlando, FL. Papers are solicited on Research and Development, Engineering Test Results, System Design, Applications Engineering, and Hardware/Software Design

#### FOR

**VEHICLE ELECTRONICS** 

#### TRANSPORTATION SYSTEMS

Control systems Traffic monitoring Vehicle location Maglev Electromagnetic compatibility Robotics applications Headway management Information display Vehicle control Collision avoidance Land navigation Map generation Multiplexed signaling Pollution sensing and control Microprocessor applications Robotics Signal Processing Propulsion Guidance

### MOBILE COMMUNICATIONS

Signaling Spectrum efficiency Propagation Portable communication System control **Regulatory** issues **Digital cellular** Simulation and test Modular techniques **Dispatch systems Emergency communications** Two-way radio **Rural radio service** Satellite technology Voice synthesis/recognition Channel coding Voice coding Antenna systems **Public safety** Data transmission **RFI** reduction **Components** Computer-aided design

Authors of papers agree to present their papers at the 1990 Conference. Four copies of a typed summary (250 words) and a resume must be submitted by August 1, 1989. Contact:

IEEE VTC '90 Papers Committee P.O. Box 1317 Winter Park, FL 32790 (407) 629-5712

# **TECHNICAL ACTIVITIES BOARD**

# TECHNICAL PUBLICATIONS MEETING MAY 2, 1989

There has been some movement within IEEE concerning technical publications. For some time, we have had two committees with overlapping responsibilities *-viz*. the Society Publications Committee (SPC), chaired by Friedrich Smits and the Periodicals Committee, chaired by James Tien. These have been merged and will be subsumed into a Technical Publications Board (Tech Pubs or simply PUBs).

During the transition period SPC/PC will meet under the "old flag" one day and then will reconvene as Tech Pubs the following day. The next meeting of this "hybrid" committee is scheduled for September 18 and 19 in New York City. Also, in connection with this reorganization, there will be revisions concerning the periods of appointment of division representatives. Division representatives are to be appointed for two years; the starting date is the beginning of the second year of the Division Director's term. Division Directors are elected for two years, and this staggering of the Pubs representatives will allow time for the new Director to develope some familiarity with the situation. Thus appointments need not be made "in the dark."

## MAGAZINE

Approval was given for the IEEE Magazine on Antennas and Propagation, and January 1990 was cited as the first publication date. Final approval will be an item on the TAB agenda in June. Final approval must be given by the IEEE Executive Committee. Unless some totally unforeseen event occurs, publication of this new magazine should take place as scheduled.

### TRANSACTIONS

The perennial "hot potato" of conference records being published as *Transactions* was brought up once again. This issue is still a long way from any final resolution; however, the Committee will make a presentation to the Publications Workshop at the next TAB Meeting. The major points are:

- The practice of using the *Transactions* as a vehicle for Conference Records is to be phased out over a period of three years.
- At present, the IEEE Bylaws do not restrict the *Transactions*, and some changes are to be requested.
- If this practice is to be allowed, then some trivial material, such as photographs of social events, should be eliminated. (These items are more appropriate as newsletter inclusions.)



by Chester L. Smith

- Assurances are needed that the review process is as thorough as is commonly accorded material usually included in the *Transactions*.
- Formatting should conform to IEEE standards for regular issues of *Transactions*. This uniformity should not be too difficult to achieve with the computers and printers now available.

The whole issue is to be referred to the Technical Activities Board for review and recommendation and then turned over to the IEEE Executive Board for final disposition.

A new transactions from the Computer Society to be called *THE IEEE Transactions on Parallel and Distributed Computing* was approved. Publication will begin with the March 1990 issue, and the volume will appear quarterly thereafter.

A draft of a proposed *IEEE Manual for Transactions Editors* was submitted for PUB's review and comment. This manual is intended primarily for new editors and associates and for "guest editors" in charge of assembling special issues. While experienced editors may not need this manual, their views or comments would be most welcome.

### PUBLICATIONS SERVICES REPORT

A running complaint has been that the Publications Services (PS) Report is enigmatic. This difficulty was discussed, and a revised format was suggested as a solution. Also PS has noted that the lead time at Headquarters is about thirteen weeks. This time frame should be taken into account when setting up issue schedules. In general, it appears to have been observed. Unfortunately, a combination of circumstances have worked to delay some issues even though they were submitted in a timely manner. "Murphy's Law" operates in publishing as it does everywhere.

#### UPCOMING MEETINGS

July 10, 1989 Editors Meeting with PUBs

September 18, 19, 1989 SPC/PC Technical Pubs Meeting

# **EMC CERTIFICATION AND ACCREDITATION**

# **PROGRESS REPORT**

I have submitted my copy for this issue somewhat later than usual because momentarily I am basking in the satisfaction of seeing the concept become a requirement! Three recent events have combined to lead to this euphoria. These events were the establishment of a Navywide requirement for certification and accreditation, issuance of a Naval Air Systems Command instruction mandating certified personnel in responsible charge of EMC work, and my personal recognition as a certified EMC engineer.

On 17 March, the Chief of Naval Operations issued the "Electromagnetic Environment (EME) Strategic Plan." The plan (strategic in a business sense) provides "policy guidance and delineates actions and responsibilities for improving the . . . use of the electromagnetic environment." The plan directs CNO . . . "sponsorship and development of a program to certify engineers and technicians in EME management and degradation control and to accredit EMC testing laboratories." It directs the Naval Systems Commands (Sea, Air and Space) to ensure that personnel assigned to EME-related duties receive adequate training and certification in skills to detect, analyze, and correct EME degradation. The plan specifically tasks NAVAIR with responsibility to provide leadership and direction for an EMC certification and test laboratory accreditation process. It tasks the Navy Inspector General with responsibility to inspect for compliance during routine Command reviews.

Naval Air Systems Command Instruction 2410.1D, Electromagnetic Environmental Effects Control, was issued on 17 May. This instruction codifies the requirement for activities, **both** public and private, which support the NAVAIR projects to retain in responsible charge of work, EMC engineers and technicians who have been certified by the National Association of Radio and Telecommunications Engineers. It further requires that EMC test laboratories which carry out final acceptance testing be accredited by the National Voluntary Laboratory Ac-



by Russell V. Carstensen Certified EMC Engineer

creditation Program, administered by the National Institute of Standards and Technology. The requirement takes full effect six months after the date of signing which is 17 November 1989.

I should mention that last fall, development of the laboratory accreditation process had slowed. However, parallel training of the laboratory assessors and development of assessment criteria began in February and has been proceeding on track. The final assessor training meeting will be held at the end of June. We expect to have application forms available for that meeting, and we expect to be able to conduct initial laboratory assessments by August.

Happily, I received my EMC certification from NARTE on 4 May so NAVAIR Headquarters is now able to meet its responsibility for placing a certified EMC engineer in responsible charge of EMC work at the first line supervisor level. I have to admit that I dug up a frame immediately and hung mine in a prominent spot, in full view of my clientele and staff. (Note—NARTE does not provide the frame, only the certificate. Choice of frame size is left to the tastes of the individual and to the dictates of office decor.) I expect peer pressure to motivate others in our office to achieve certification shortly.

Thus, we are at the point of having to face the issue. We, as a technical community, now have a responsibility to demonstrate credentials equal to the requirement. In return, we now have a means of separating credible technical opinions from those of the well-meaning but less qualified.

Issue of the NAVAIR instruction also started the "clock" with respect to qualification for certification by eminence or "grandfathering." Qualification by eminence was

established by NARTE so as to take advantage of the existing pool of established practitioners. Grandfathering allows a candidate to forego the examination and to achieve certification through education, work experience and peer endorsement. To qualify, the candidate must have nine years' practice in the field; only four years of this practice can represent time in school. Grandfathering will be permitted for twelve months after issue of the NAVAIR Instruction 2410.1D. This provision means that the grandfather "window" will close on 17 May 1990.

It is easy to set a requirement, but more difficult to implement one. I am currently advising all of my support activities and contractors of this requirement and asking for their plan for implementation. I expect that the Office of the Chief of Naval Operations will be doing something similar for all of the Systems Commands. Then will come administration of the requirement, validation of certificates, and accreditation of laboratories. I expect that the IG will begin looking for the scope and quality of compliance in the next two years.

## **CONTACTS FOR MORE INFORMATION**

Application forms, the "Personnel Certification Handbook," and the "Study Guide" are available from NARTE. Their address is:

The National Association of Radio and Telecommunications Engineers, Inc. P.O. Box 15029 Salem, OR 97309 Telephone: (503) 581-3336

Application forms and the "NVLAP EMC Laboratory Accreditation Handbook" are available from NVLAP. The address is:

# NVLAP

National Institute of Standards and Technology Gaithersburg, MD 20889 Telephone: (301) 975-4020

Regular progress meetings on EMC accreditation and certification are sponsored by NAVAIR and are open to the public. For schedule information, contact:

#### Commander

Naval Air Systems Command (AIR-5161) Attn: Russell V. Carstensen Washington, DC 20361 Telephone: (202) 692-8600

# TENTH INTERNATIONAL WROCLAW SYMPOSIUM ON ELECTROMAGNETIC COMPATIBILITY

#### June 26-29, 1990

The Tenth International Wroclaw Symposium is scheduled for June 26 through 29, 1990 at the Technical University, Wroclaw, Poland. Held biennially since 1972, the Symposium is open to scientists from throughout the world and provides a forum for information and developments on all aspects of electromagnetic compatibility. In addition to the presentation of papers, an extensive technical exhibition and a display of relevant literature is planned.

Original, unpublished papers are solicited; a list of suggested topics include:

- Antennas and propagation, EMC aspects
- Biological effects of EM radiation
- EMC in computers and PCBs
- EMC in power engineering
- EMC in wire communications
- EMC management
- EMC coupling paths
- EMI measurements
- EMI prediction and analysis
- EMI reduction techniques
- EMI sources
- ESD, lightning, EMP
- Filters and filtering techniques in EMC
- Grounding and shielding
- Immunity of electronic systems and devices
- Natural EM earth fields
- Regulations and standards in EMC
- Spectrum management and utilization
- Spectrum monitoring
- Susceptibility and vulnerability

Six copies of a 50-75 word abstract and a 500-700 word summary should be mailed by July 15, 1989. For further information contact:

Mr. W. Moron EMC Symposium Box 2141 Wroclaw, 12, Poland Telephone: 48-21-41

# **EMC PERSONALITY PROFILE**



by William G. Duff



# **JACK KELLEHER**

John J. "Jack" Kelleher, an IEEE Life Fellow, is the 1988–89 Chairman of the Washington/Northern Virginia Chapter of the EMC Society. Jack's career began in the 1930s as a military and commercial radio-telegraph operator. He joined the Signal Corps R&D Laboratory at Fort Monmouth, NJ in 1940. At Ft. Monmouth, he fieldtested new VHF tactical equipment.

In 1941, he was one of a group of engineers and technicians assigned to the White House contingent of the U.S. Secret Service who worked on protective communications for the President. After Pearl Harbor, a military unit was organized (the White House Signal Detachment, now the White House Communications Agency) to continue this work. Jack was assigned to the Detachment as liaison engineer for support from the Laboratory. This group designed and installed a mobile VHF communications system and equipped a railroad car with HF and VHF equipment so that continuous communications could be maintained.

Early in 1943, Jack joined another Laboratory group assigned to Headquarters North African Theater of Operations. Located in Algiers, this group provided specialized commmunications similar to those provided by the Secret Service. This activity earned him a Commendation for Meritorious Civilian Service. His citation stated that he "displayed extraordinary spirit and cooperation while on temporary duty in the North African Theater of Operations for the purpose of planning, installing, operating, and maintaining the VHF radio-teletype communication system for Allied Force Headquarters to all forward echelons, and accompanied forward echelons in the occupation of Tunis and Sicily, occasionally being under gunfire."

When he returned from North Africa, he was assigned to the R&D Division of the Office of the Chief Signal Officer in the Pentagon, where he managed programs for R&D of strategic radio equipment—primarily line-of-sight radio relay systems. One outcome of this program was an SHF system developed by Bell Laboratories; this was the forerunner of AT&T's transcontinental radio relay systems.

From 1962 until 1969, Jack was at NASA Headquarters involved with experimental communications satellites and with earth-space propagation phenomena at SHF. From 1969 until 1980, he was with Systematics General Corporation (now Atlantic Research Corporation Professional Services Group), and he is now a part-time consultant to NASA.

Jack's first exposure to RFI/EMC dates from 1943, when the Signals Corps developed its first VHF radio relay system, the AN/TRC-1 series. The transmitter employed phase modulation of a crystal-controlled oscillator; thus, a frequency multiplication of 96 was necessary to produce sufficient frequency deviation at the output. Many spurious emissions were produced. Consequently only a few of the 300 available channels could be used at any single location. The usable and unusable frequencies were indicated in the technical manual in matrices which became known as "spotted dog charts."

Jack's principal RFI/EMC activity since 1963 has been in spectrum management and frequency allocation—particularly sharing among space systems and between space and terrestrial systems. He has been a member of more than twenty U.S. delegations to CCIR and ITU Conferences. He also participates in the Space Frequency Coordinating Group (SFCG), which provides national space agencies with an international forum for discussing operational aspects of space radio communications.

Jack has been an active participant in IEEE activities for the past fifteen years. He has been a member of several EASCON Conference Committees, a member and chairman of the EASCON Board of Directors, and a member of the AES Society Board of Directors. He has held a number of positions in the USAB Organization and was responsible for publications and publicity for the 1983 EMC International Symposium. He has taken similar responsibility for publications and publicity for the 1990 International Symposium on EMC. He is a Past Chairman of the Northern Virginia Section and is 1988–1989 Chairman of the National Capital Area Council. During his career, Jack has received the Army's Decoration for Meritorious Civilian Service, the NASA Medal for Exceptional Service, and the IEEE Centennial Medal.

# CHAPTER CHATTER

## **CENTRAL NEW ENGLAND**

Officers for the 1989–90 season include Chair Len Long of DST/TSC, Vice Chair John Clark of ASEC, and Secretary/Treasurer Joe Butler of Chomerics. Program Coordinator is sales rep Larry Lee. The final 1988–89 meeting was held in March at the Chomerics facility, where Tony Genova of Chomerics was the speaker. His topic was "The Role of the EMI/TEMPEST Engineer." Chomerics now has a fully-certified TEMPEST laboratory. [Thanks to John Clark for the input.]

### **NEW JERSEY COAST**

This Chapter's March meeting featured Nelson Sollenberger of Bellcore who spoke on the topic "Efficient TDMA and Portable Radio." He discussed the advantages of TDMA versus FDMA and pointed out the additional problems involved with synchronization when using the former. Nelson presented several techniques, involving digital signal processing, which minimize the synchronization overhead. The photo below shows, left to right, Tony Noerpel, Chairman of the Joint New Jersey Coast Chapter EMC/VT/AP; speaker Nelson Sollenberger; and Stuart F. Meyer, Past President of the VT Society.



At the April meeting, speaker Dr. Donald Cox, Division Manager of Bellcore Research, spoke on "Portable Digital Radio." He described a universal digital portable communication concept which uses TDMA and frequency reuse and which can be integrated into telephone networks. It would seem that these two talks were very closely related.

The May meeting was addressed by Dr. Robert Wilson, who heads the Radio Physics Research Department at Bell Labs. He presented a talk on "Interstellar Molecular Clouds" and pointed out the role of interstellar  $CO_2$  in studies of the molecular clouds in which hot young stars are forming. Dr. Wilson was a co-recipient of the 1978



by Charles F.W. Anderson

Nobel Prize for Physics. Bob Davis of AEL continues his fine job of editing the Chapter's newsletter, which is generously supported by ads from the many EMC/EMIrelated companies in the area.

## SANTA CLARA VALLEY

At this Chapter's April meeting, Brian Lawrence, Vice President of Shielding Systems, spoke on "Anechoic Chamber Test Facilities." His talk explored the differing correlations to field site results obtained at projects completed for IBM, Hewlett Packard, and Fujitsu. He also described the accurate anechoic chamber for 10 M testing at the new EMC laboratory complex built at IBM's Endicott, NY facility.

The May meeting featured Chris Kendall, President CK Consultants, who spoke on "Which Ground System Is Best for Present-day Systems?" Using the approaches of circuit loop control, common and differential mode impedance control and transmission line theory, analog, digital, video and rf circuits.

## TOKYO

The papers presented at the January meeting of this Chapter included the last fourteen bearing EMCJ88 numbers. As usual, the range of material presented was truly impressive. Two intriguing topics covered were analysis of the effects of snow accretion on parabolic antennas and a design for a wide-band antenna using electro-optical crystals. There were forty-five attendees, of whom fifteen were IEEE members. [Our thanks to Chapter Treasurer Yoshio Kami of the University of Electro-communications for providing this report.]

## **TWIN CITIES**

This Chapter's April meeting featured Joe Butler of Chomerics, who spoke on "Shielding Effectiveness." [Thanks to Dan Hoolihan for the input.]

### WASHINGTON/NORTHERN VIRGINIA/ BALTIMORE

At the Chapter's May meeting, independent consultant Phillip McBrayer spoke on "EMC by Design and Retrofit." He contrasted EMC approaches taken on the F/A-18 with those on the UH-60 helicopter. The former program was cited as a good example of integrated EMC design while the problems characterizing the latter are only too well known.

# **PRODUCT SAFETY**

# LOOKING AHEAD

Last issue carried a brief description of the simple structure of the Product Safety Technical Committee (EMC-S/TC-8 or PSTC). Some of the connections, both administrative and technical, between EMC and product safety were mentioned. Rashly enough, some predictions for the future were promised. First, I must issue a disclaimer. These future possibilities seem reasonable enough at this writing, but they are **only** possibilities. I hope that other EMC Society and IEEE members will take the time to comment on the areas which interest them and will lend their knowledge and experience to bring these hopes to reality.

Lacking some dark-robed mystic peering into a crystal ball, we must examine rationally both the short term and long term possibilities for PSTC. "Short term" in this context means the continuation and expansion of our present activities throughout the next year. "Long term". means looking two or three years ahead and considering new directions and activities.

## NEWSLETTER

What is the Committee doing now? The most obvious activity is publishing the "Product Safety Newsletter." This publication is almost a year and a half old; presently, it appears bimonthly. There are regular columns, guest articles, local area activity reports, a calendar of meetings, and even a cartoon. A new feature in the May/June issue (Vol. 2, No. 3) is the "Institutional Listings" column, in which contributing companies are recognized for their support. The same issue carries a proposal for a new regular column which will carry abstracts on articles concerning product safety. Of course, these "Product Safety Abstracts" (PSABS) were inspired by the "EMCABS" featured in this NEWSLETTER. However, there will be some variation because of the widely-scattered sources in which product safety information can be found. PS Abstracts are still in need of something concrete-viz. an editor. Anyone interested should call Roger Volgstadt at (408) 748-2102.

In addition to adding new features to the "Product Safety Newsletter," we are trying to find better methods of publishing and mailing. A recent switch to third class, bulk mail has cut mailing costs, and we are investigating the possibility of having the IEEE Printing Services take care



by John McBain

of both printing and mailing. A long term goal is to achieve IEEE magazine status. That expectation should come about when the technical content, the circulation, the editorial experience of the staff, and the PSTC bank balance fall in line with the requirements. When the magazine appears, the "Product Safety Newsletter" will continue but as a much slimmer volume with less technical content. However, our editor's slogan will remain the same, "Each issue a little better than the last!"

## LOCAL GROUPS

The other highly visible Product Safety activity is sponsoring local technical meetings on product safety topics, such as high voltage testing, safety certification, warning labels, line transient testing, temperature measurement, and product liability, to name a few. Actually, the topics, speakers, and facilities are arranged by the local PSTC "sub-chapters" located in eight geographic areas-Seattle, Portland, Cupertino, Los Angeles, Orange County, Austin, Chicago, and Boston. The local chairpersons are doing excellent work coordinating the meetings and other activities of these groups and have been able, in most instances, to find volunteer help. Three groups-Boston, Chicago, and Austin-are still looking for people interested in serving as program coordinator, publicity chairperson, secretary/treasurer, etc. Volunteer and share the work/fun!

Several short term goals for the PSTC involve encouraging and assisting the growth of local groups. As more individuals interested in product safety inquire about the PSTC or the "Product Safety Newsletter," the number of persons in any geographic area who are on the mailing list gradually increases. At some point regular technical meetings become feasible, but this development depends on finding a facilitator who will arrange the first technical and organizational meeting. We always try to help this brave person by announcing meetings in the "Newsletter" and by providing IEEE development material such as model bylaws, meeting guides, and member service information. An appropriate excerpt from the mailing list allows direct announcement of the forthcoming meeting. Also immediate contact with the local Chapter of the EMC Society is urged. Anyone interested in organizing a local PSTC group should call John McBain at (408) 447-0738.

Once a local group schedules regular meetings, the best action members can take to ensure success is to identify as many local product safety people as possible and to place their names on the "Product Safety Newsletter" mailing list. Since only a certain percentage of members of any group become actively involved, increasing the size of the group becomes very important. At the request of the EMC Society, we will soon be conducting a survey and update of the current list to determine the number of IEEE and EMC Society members currently receiving the "Product Safety Newsletter." Another goal for this year is to produce the first Directory of "Product Safety Newsletter" readers. This information will assist in mutual contact and in exchange of ideas and should help to bring about our next major goal.

### PRODUCT SAFETY AT A NATIONAL SYMPOSIUM

The first steps toward a product safety session at a national symposium are to appoint a Symposium Chairperson, to arrange a Product Safety Session at the next EMC Symposium in 1990, and to organize the people, papers, and budget necessary for this session. I sincerely hope that someone reading this article will volunteer as chairperson because time is growing short for accomplishing our goals. Before the urge to volunteer passes, call PSTC Chairman Richard Pescatore at (408) 447-6607.

Considerable activity is taking place at present, and even more events will occur during the next year. I will keep readers informed of the activities of the PSTC, and even more details can be found within the pages of the "Product Safety Newsletter." The next column will include further PSTC objectives and reports on current activities and achievements. Anyone who has ideas on particular topics to be addressed should feel free to forward their suggestions.

To receive the "Product Safety Newsletter" contact

Roger Volgstadt Tandem Computers 2550 Walsh Ave. Santa Clara, CA 95051 FAX: (408) 748-2137

# NEM 1990 SEVENTH BIENNIAL CONFERENCE

## May 28-June 1, 1990

The 1990 Nuclear EMP Meeting (NEM 1990) will take place at the University of New Mexico May 28 through June 1, 1990. This meeting will focus on EMP-effects technology and its interrelationship with all other electromagnetic protection disciplines including EMC, EMI, high power microwaves, and lightning. Also special sessions are being organized to address specific topics of current interest. Announcement regarding these special sessions will be made in the near future.

Papers are being solicited on the following subject areas:

- EM environments and coupling phenomenology
- Simulation and measurement techniques
- Numerical and statistical analysis techniques
- EM hardness assurance and maintenance
- Integrated EM protection
- High-power microwaves
- Related lightning, EMC, EMI studies
- Consistent EM standards and specifications
- Related education and training

Each abstract submitted must be accompanied by a cover letter from the authors **specifically stating** that the abstract and the content of the proposed presentation have received appropriate review by the cognizant sponsoring agency and that approval for public dissemination has been received. Abstracts with related information should be typed single-spaced on a single 21.5 cm  $\times$  28 cm page ( $8\frac{1}{2} \times 11$  inches). The typed portion is not to exceed 15 cm  $\times$  23 cm. Title of the paper and author(s) name(s) and affiliation, including complete address, should begin 2 cm from the top of the page; the left margin should be 4 cm. This single page shall include all references and other material which the author deems appropriate in cameraready form. The abstract, original and five copies, must be forwarded by January 15, 1990 to:

C.W. JonesNEM '90 Technical Program CommitteeMetatech Corporation2309 Renard Place, S.E., Suite 401Albuquerque, NM 87106

# TECHNICAL ACTIVITIES

by Wilf Lauber

# IEEE TECHNICAL COMMITTEE ON INTERFERENCE CONTROL

The Technical Committee on Interference Control, TC-4, is concerned with the design, analysis, and modeling techniques useful in suppressing interference or in eliminating it at its source. The disciplines of bonding, grounding, shielding, and filtering fall within the purview of this committee. Moreover, these activities span efforts at the system, subsystem, and unit levels.

The activities of TC-4 focus primarily on three areas. Annually, services are available to Symposium Technical Paper Committees for the review of submitted papers within its technical expertise. All TC-4 members evaluate each paper, and a statistical ranking is developed. A summary of these results, with recommended acceptance levels, is conveyed to the Technical Papers Chairman for his/her final determination. Secondly, TC-4 organizes technical sessions and workshops at national or international meetings of the EMC Society. These sessions are designed to illuminate the relationships between various concepts, to resolve any apparent inconsistencies, and to dispel misconceptions. Finally, TC-4 developes standards for processing by the EMC Society Standards Committee. A Working Group studying the measurement of Gasket Transfer Impedance is chaired by George Kunkel. Another Working Group for Cable and Connector Shielding Characterization has several dozen participants and is chaired by Jim Parker.

While various Working Groups meet periodically during the year, the parent TC-4 always meets for an Annual Business Meeting during the IEEE EMC Symposium. The members of TC-4 for 1989 are: Joseph Butler, George Kunkel (Vice-Chrm.), Pete Madle, Lewis Messer, Richard Mohr, and Chairman Jim Parker. All meetings are open for general participation. Those interested in contributing to each of TC-4's focus activities are invited to seek membership. Anyone interested in participating in either the Working Groups or the broader TC-4 activities should contact the chairman:

Jim Parker Apollo Computer, Inc. 300 Apollo Drive Chelmsford, MA 01824 (508) 256-6600 [work] (508) 359-2229 [home]

# **PIERS 1989**

# July 25-27, 1989

The first Progress in Electromagnetic Research Symposium (PIERS) will be held July 25 through 26, 1989 at the Boston Sheraton Hotel & Towers, Boston, Massachusetts. The National Science Foundation Workshop on Future Directions in Electromagnetic Research will take place on July 27, 1989.

PIERS will provide an international forum for reporting progress and advances in the modern development of electromagnetic theory and its many new applications. PIERS will consist of thirty-two technical sessions with a total of over 300 papers. Topics will include:

- Wave propagation in complex media
- Antennas
- Electromagnetic theory and wave guidance
- Ionosphere and lightning research
- Electromagnetic analysis and applications
- Electromagnetic field computation

The NFS Workshop on Future Directions in Electromagnetic Research will follow PIERS. The Workshop will consist of a panel of experts in the various fields of electromagnetics who will report their summaries and recommendations at a plenary session planned for the morning of July 27, 1989. The panel members will be available to answer questions from the audience and to address issues related to future developments in the research of electromagnetic theory and applications.

For further information on registration and participation, contact:

Professor J.A. Kong MIT, Room 26-305 77 Massachusetts Avenue Cambridge, MA 02139 Telephone: (617) 253-8535 FAX: (617) 253-0987



by William H. McGinnis

In this issue we continue publishing abstracts of papers from previous EMC Symposia, other conferences, meetings and publications. The EMCABS committee is composed of the members listed below. By way of introduction to the community, they are listed with their company affiliations:

**EMCABS** 

Mike Crawford, National Bureau of Standards Bob Hunter, Texas Instruments Don Kerns, Southwest Research Institute Jack Orr, Southwest Research Institute R.M. Showers, University of Pennsylvania Tasuku Kakagi, Tohoku University, Japan Daniel Kenneally, Rome Air Development Center Diethard Hansen, Asea Brown-Boveri, Switzerland

"HOW CAN I GET A COPY OF AN ABSTRACTED ARTICLE?" The answer to this frequently asked question follows.

Most large public libraries, some small public libraries, all engineering school libraries and most other college or university libraries have copies of publications in which articles appear. If they happen not to have the desired publication, such libraries usually can obtain it or a copy of the article from other libraries or sources. Many company libraries, both large and small, also have such arrangements. Many articles also are available from the National Technical Information Service (NTIS) and/or the Defense Technical Information Center (DTIC). To retrieve an article or publication containing an article abstracted in EMCABS, it is suggested that you contact your company library, a nearby engineering school library, a university library or your municipal public library. If the library does not have the publication, go to the librarian, explain what you need and he or she will help you get the publication on loan, perhaps from another library or, for a nominal charge, from NTIS. If you have a Department of Defense contract, the contracting officer or your company librarian can help you get publications from DTIC. The information needed is contained in the EMC abstract heading.

Electromagnetic Compatibility Abstracts Detection of Low-frequency Magnetic Signals in a Magnetostrictive Fiber-Optic Sensor with Suppressed Residual Signal	EMCABS: 01-07-89	Reducing Noise in Voltage Regulators Erroll Dietz National Semiconductor	EMCABS: 04-07-89	
Dagenais, et al Sachs Freeman Associates Journal of Lightwave Technology Vol. 7, No. 6, June 1989, pp 881–887.		Electronic Design Vol. 37, No. 5, March 8, 1989, pp. 84 & 90		
<b>ABSTRACT:</b> Fiber-optic magnetometers employing magnetostrictive metallic glass transducers exhibit a substantial residual signal at the dither frequency which impedes signal extraction and which gives rise to excess sideband noise. This paper presents a correlation between experimental data obtained under various operating conditions and a modified coherent rotation model which predicts the behavior of the residual signal and the sideband noise. There is also an operating regime which eliminates the residual signal and which reduces noise levels by a factor of five over previously reported results. Minimum detectable fields of $11 \pm 2 \text{ pT}/\sqrt{\text{Hz}}$ and $38 \pm 8 \text{ pT}/\sqrt{\text{Hz}}$ at 0.1 Hz are achieved. <b>INDEX TERMS:</b> Fiber-optic sensors, measurements, magnetic fields		<b>ABSTRACT:</b> Three-terminal voltage regulators generally have an inductive output impedance which results in a frequency-dependent output noise spectrum. Loading the output of the regulator with capacitors does not necessarily reduce the noise but instead produces a noise spike at the resonant frequency of the regulator output inductance and the shunt capacitor. This article provides a discussion of the phenomena and graphs of the frequency dependence of the noise and regulator output impedance. <b>INDEX TERMS:</b> Regulator noise		
Design Optimization of Interstitial Antennas Magdy Iskander <sup>1</sup> and Amer Tumeh <sup>2</sup> <sup>1</sup> U of Utah	EMCABS: 02-07-89	Council Directive—Electromagnetic Compatibility (89/336/EEC) The Council of the European Communities NA	EMCABS: 05-07-89	
<sup>2</sup> BSD Medical Corp. IEEE Trans. on Biomedical Engineering		Official Journal of the European Communities 23.5.89 No. L 139 thru L 139/26, incl.		
IEEE Trans. on Biomedical Engineering Vol. 36, Number 2, Feb. 89, pp. 238-246 ABSTRACT: To improve the performance of interstitial antennas for microwave hyperthermis, parameters such as the uniformity of the heating pattern, the depth of penetration, and the impedance of matching properties must be optimized. The radiation characteristics of multisection insulated antennas in conductive tissues are examined analytically and experimentally. The effects of varying the diameters and lengths of the center conductors in the various sections of the antenna and the type of the insulation on the electromagnetic power disposition pattern and an on the impedance characteristics are examined. INDEX TERMS: Antennas, EM fields, biological effects		ABSTRACT: This document is analogous to a rule published in the <i>Federal Register</i> by the FCC. It lays the groundwork for the elimination, by 31 December 1992, of trade barriers which might otherwise spring from national EMC requirements within the European Community. This Council Directive refers to "type approval for telecommunications terminal equipment" as well as to the necessity of protecting power mains from disturbances produced by connected equipment. It calls for harmonized international laws to replace national provisions for EMC. Mechanisms for the member states to adopt harmonized regulations, or to propose the use of a national regulation where no harmonized regulation exists, are detailed. Member states are required to "withdraw the apparatus from the market" when it has been determined that an apparatus does not comply with the requirements. INDEX TERMS: International EMC Requirements, European Community Directives, EMC requirements for telecommunications in the EC, EMC Certification in the EC.		
The Tapered Slot Antenna—A New Integrated Element for Milliwave Applications Yngvesson et al.	EMCABS: 03-07-89	Electromagnetic Compatibility—Regulations and Standards Worldwide [International EMC Handbook] H. Th. C. Haus, Nederlands Normalisatie-Instituut	EMCABS: 06-07-89	
U. of Mass. IEEE Transactions on Microwave Theory and Techniques Vol. 37, No. 2, Feb. 89, pp. 365–374.		Nederlandse Philips Bedrijven NA September 1988 UDC 621,391,82(100) 207 pp.		
<b>ABSTRACT:</b> Tapered slot antennas (TSA's) have a number of potential applications as single elements and focal plane arrays. TSA's can be fabricated with photolithographic techniques and can be inte- grated in either hybrid or in MMIC circuits with receiver or transmitter components. They offer con- siderably narrower beams than other integrated antenna elements and have high aperature efficiency and packing density as array elements. Typical applications which have been demonstrated, or which are under development, are reviewed. <b>INDEX TERMS:</b> Antennas, millimeter wave		<ul> <li>ABSTRACT: This book provides an overview of terminology and of the organizations concerned with EMC—the IEC, CISPR, IEC/TC77, CENELEC and the European Communities (EEC). Both promulgated and de facto regulations for several kinds of equipment are discussed. Household appliances, fluorescent lamps, and information technology are covered, as well as broadcast, radio frequency, and ISM equipment. The entries for each country include "Radio Frequency Interferences" and "Other Interferences." The work—past, present, and future—of IEC/TC65/WG4 "Electromagnetic Interference" is summarized. Additionally the regulations and standards for 69 countries are summarized. The NNI plans to update this volume through an "EMC News Bulletin."</li> <li>INDEX TERMS: EMC regulations, EMC standards, radio frequency interference, national regulations and standards, IEC/CISPR</li> </ul>		

# EUROSTAT 1989

### September 12-14, 1989

The first European Static Protection and Shielding Exhibition will take place from September 12 through 14, 1989 at the Barbicon in London, England. Sponsored by the British Electrostatic Control Association, EUROSTAT will feature innovations in products and services designed to control electrostatic discharge. Additionally numerous RFI and EMI manufacturers will represent the EMC industry. It is expected that considerable emphasis will be placed on the impact of the regulations of the new European Economic Community.

The conference portion of EUROSTAT is being organized by the Universities of York and Southampton, and a roster of speakers from throughout the world is expected.

EUROSTAT's goals are to heighten awareness of the vital roles of the static protection and shielding industries and to emphasize increasing consolidation and international marketing efforts. For further information contact:

> Simon Osborn Technology Events Limited 26 Voltaire Road London, SW4 6DJ UK Telephone: +44 (0) 1 622 2414 Telefax: +44 (0) 1 498 0486

# **EDITORS' DEADLINES**

The essential ingredient of a newsletter is informative and *timely* content. Mailing this NEWSLETTER and current information to all Society members depends upon prompt submission of all articles and features. All Associate Editors are reminded that the submission deadline for the fall issue of the *IEEE EMC Society NEWSLETTER* is August 16, 1989.

# NOTICE

## EMC-S DUES SET AT \$10.00

After 16 years with dues at \$7.00, the EMC-S Board of Directors has had to raise dues to \$10.00. Despite this increase, we still rank in the lowest decile of IEEE Society dues and provide one of the best cost/benefits ratios.

# CALENDAR 1989

July 24-28

26th Annual Symposium on Nuclear and Space Radiation Effects Marriott's Marco Island Resort Marco Island, FL Contact: Klaus G. Kerris Harry Diamond Laboratories Branch 22900 2800 Power Mill Road Adelphi, MD 20783-1197 (202) 394-2290

July 25-27

1989 Progress in Electromagnetic Research Symposium (PIERS) Boston Sheraton Hotel & Towers Boston, MA Contact: Prof. J.A. Kong MIT, Room 26-305 77 Massachusetts Ave. Cambridge, MA 02139 Telephone: (617) 253-8535 FAX: (617) 253-0987

August 1–3	EMC Expo '8 Sheraton Was Washington, 1 Contact:	39 hington Hotel DC EMC Expo '89 State Route 625 Gainesville, VA 22065 Telephone: (703) 347-0030 FAX: (703) 347-5813
August 14–17	Triennial URS on Electroma The Royal Ins Stockholm, S Contact:	SI International Symposium gnetic Theory stitute of Technology weden Prof. S. Strom Organizing Committee Chairman Dept. of Electromagnetic Theory S-100 44 Stockholm Sweden
August 22–25	1989 Internati and Propagat (ISAP '89 Jap Nippon Toshi Tokyo, Japan Contact:	ional Symposium on Antennas ion pan) i Center Dr. Takashi Katagi, Chairman ISAP '89 Publicity Committee Mitsubishi Electric Corporation 325 Kamimachiya, Kamakura, 247 Japan Telephone (0467) 44-8862, FAX (0467) 47-2005 Telex: 3862-165 MULCO J.
September 8–10	IEEE Interna Trade and Ind Nagoya, Japa Contact:	tional Symposium on EMC dustry Center in Prof. Y. Miyazaki Toyohashi Univ. of Technology Toyohashi, Japan 440 Telephone: 0532-47-0111, ext. 576 FAX: 0532-45-0480
September 12–14	1st European Conference The Barbicon London, UK Contact:	Static Protection and Shielding Simon Osborn Technology Events Limited 26 Voltaire Road London, SW4 6DJ UK Telephone: +44 (0) 1 622 2414 FAX: +44 (0) 1 498 0486

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September 12–16	2nd Internation Electromagne Bangalore, In Contact:	onal Conference and Workshop on etic Compatibility (INCEMIC) adia Col. (Dr.) G.K. Deb Electronics and Radar Development Establishment, C V Raman Nagar Bangalore 560 093 India
September 26-28	11th Annual Electrical Overstress/ Electrostatic Discharge Symposium	
	Hyatt Regence	ху У
	New Orleans,	LA
	Contact:	Bob Rountree
		Texas Instruments, Inc.
		12201 Southwest Freeway, MS 631
		Houston, TX 77001
		Telephone: (713) 274-4077
		FAX: (713) 274-2067
October 3-5	International Carnahan Conference on Security Techn Swiss Federal Institute of Technology	
	Contact:	Dr. Gene Grenaker
		TDD, RAIL, CCRF
		Georgia Institute of Technology
		225 N. Ave. N.W.
		Atlanta, GA 30332
		Telephone: (404) 421-7744
		FAX: (409) 421-7728

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May 28–June	1990 Nuclear EMP Meeting (NEM '90) University of New Mexico	
	Albuquerque	, NM
	Contact:	C.W. Jones
		NEM '90 Technical Program Committee
		Metatech Corporation
		2309 Renard Place, SE, Suite 401
		Albuquerque, NM 87106
June 26–29	10th International Wroclaw Symposium	
	on Electromagnetic Compatibility	
	The Technical University	
	Wroclaw, Poland	
	Contact:	Mr. W. Moron
		EMC Symposium
		Box 2141
		Wroclaw 12, Poland
		Telephone: 48-42-41

# 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 Street, Amsterdam, NY 12010 Telephone (518) 843-2600 EMI Analyzer/Receivers, Computer Control EMISS/SUSC Systems, TEMPEST, ESD, Testing/Consulting Services.

RADIATION SCIENCES, INC., 3131 Detweiler Road, 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 Street, Erie, PA 16505 Telephone (814) 445-0966, FAX (814) 455-2550 Complete EMC, FCC/MIL Consulting, Testing, Repair, Mfr. RFI Filters, RFI Gaskets, D-Subminiature Connectors. Surface Mounted Devices: Chip Capacitors, Capacitor Networks, HIC and QUAD Fastbus Line Drivers.

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, TWX: 910-346-6733, Telefax (213) 631-0674 EMI filters and EMI testing: MIL-STD-461, RTCA DO-160, etc. 200 V/m RS03, 10 kHz-40 GHz. Remote site testing. EMC consulting and computer analysis.

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, Annapolis, MD; Eatontown, NJ; and San Antonio, TX Telephone (301) 266-1700 Complete services for EMI/EMC/TEMPEST, system design and integration.

UNIVERSAL SHIELDING CORPORATION, 20 W. Jefryn Blvd., Deer Park, NY 11729 Telephone (516) 667-7900, FAX (516) 667-7912 RF shielded enclosures, modular & prefabricated. RFI/EMI power and signal line filters, RF waveguide air vents.

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. Shielded Enclosure Leak Detection System.

OMEGA SHIELDING PRODUCTS, 1384 Pompton Ave., Cedar Grove, NJ 07009 Telephone (201) 890-7455, Telefax (201) 890-9714 EMI/EMP/ESD shielding materials, gaskets and contact strips, both standard and custom designed.

R&B ENTERPRISES, 20 Clipper Rd., W. Conshohocken, PA 19428 Telephone (215) 825-1960, TWX: 510-660-8120, FAX (215) 825-1684 EMI testing/consulting. Full-threat EMP simulation. EMC training/publications. EMP test equipment.

AMPLIFIER RESEARCH, 160 School House Road, Souderton, PA 18964-9990 Telephone (215) 723-8181, TWX: 510-661-6094, Telefax (215) 723-5688 Broadband RF power amplifiers, 1 W to 10 kW, 10 kHz to 1 GHz; RFI test accessories and antennas; EMP simulators.

TECKNIT, Inc., a TWP Company, 129 Dermody Street, Cranford, NJ 07016 Telephone (201) 272-5500 EMI/EMP/ESD shielding materials, gaskets, vent panels, windows, and conductive coatings and adhesives.

FAIR-RITE PRODUCTS CORP., P.O. Box J, 2 Commercial Row, Wallkill, NY 12589 Telephone (914) 895-2055, FAX (914) 895-2629, TWX 510-249-4819 Ferritte EMI suppressor elements for cables, ferrite beads on leads for circuit board insertion, ferrite beads for surface mount technology, ferrite sleeves for filter pin connectors.

INSTRUMENTS FOR INDUSTRY, INC., 731 Union Parkway, Ronkonkoma; NY 11779 Telephone (516) 467-8400, FAX (516) 467-8558 Anechoic Shielded Rooms, Turnkey Systems, EMC/Susceptibility Measurement Systems, Broad-band Amplifiers, Leveling Pre-Amps, TEM Cells, E-Field Sensors up to 40 GHz, Radiation Hazard Monitors, E-Field Generating Antennas.

ARK ELECTRONICS CORPORATION, 1325 Industrial Hwy., Southampton, PA 18966 Telephone: (215) 322-6510, FAX: (215 322-4231

RF shielded enclosures, custom-manufactured shielded doors, RF filters, waveguide air vents, EMI laboratory testing, EMC consulting; a complete EMC capability.

MAXWELL LABORATORIES, INC.—MAXWELL/ELGAL, 8888 Balboa Ave., San Diego, CA 92123 Telephone (619) 576-3737, FAX 619-277-6754 Products, Consulting, Testing, and Training for all Electromagnetic Disciplines and Technologies.

COMPLIANCE ENGINEERING, 271 Great Road, Acton, MA 01720

Telephone (508) 264-4208, FAX (508) 635-9407 Complete Information Source for EMC: Publications and Annual Design Handbook, Bi-Monthly Seminars, International Standards and Documentation.

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 47th Street, New York, NY 10017.