IEEE ELECTROMAGNETIC COMPATIBILITY GROUP

NEWSLETTER

ISSUE NO. 77-April, 1973 **EDITOR** ROBERT D. GOLDBLUM

MESSAGE FROM THE PRESIDENT

During the past year your ADCOM carried out two distinctive actions which were paramount in sustaining our Group.

First was the action to continue as G-27, and not join with other Groups to form a Society. It is our feeling that joining a larger organization would obscure our discipline and all its activities, and would have resulted in a loss of recognition by Industry and Government.

The other significant item was the action to reduce the costs of our transactions with little loss in their quality. Since the transactions are our single largest budget expense, this affirmative action will go a long way to balancing our budget, and make us self sustaining.

I am taking this opportunity to point out these two facts to you because I'd like to dispel the concept that the ADCOM is a "Do Nothing" group. I'd like to remind you, the membership, that the ADCOM members are elected by your votes, and that you are in fact authorizing these individuals to act for you in promoting the field of Electromagnetic Compatibility.

The G-27 will do no better than you the membership want it to. G-27 as a Group has been accused of "Talking to Ourselves". After pondering this though I'm not sure that we do that as well as we might.

I believe our Newsletter under Bob Goldblum and Transactions under Dick Schulz are excellent publications, and you'll probably find no better, but we need your participation!

One of the best ways I know to help you participate is to increase the amount of talking between the ADCOM and the Chapters, attend your chapter meetings and talk to your local officers or ADCOM members. Tell them what's on your mind be it either technical or economical survival. The ADCOM has to "know" in order to do you any good. It won't get there by the "Grapevine" or rumor.

In order to open up the pipeline between ADCOM and Chapters, I've asked our Vice President, Gene Knowles, to explore how this best can be accomplished. If you have ideas on this subject, I'm sure Gene would like to hear from you. He can be contacted by phone at (206) 655-9839 or written to at 2566 128th Ave. S.E., Bellevue, Washington 98005.

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We have excellent chairmen doing conscientious jobs; however, I do feel that the participation in all affairs has to stem from the "Grass Roots" with each member participating. The Standards Committee under Jack Bridges is an excellent example of where necessary work is falling by the wayside because of lack of support. Remind yourself every time you're in the lab that your experiences there are invaluable in establishing the standards of our discipline.

Lack of awareness of the very existence of our EMC Group by industry, government agencies, and other organizations is still serious, and will not be overcome in a short time. John O'Neil is continuing to make people aware of us and our capabilities by participating as our representative to the "United States Environment and Resources Council" (USERC). This council is to provide a vehicle of information on the environment and earth resources.

I pledge that the ADCOM will be responsible to the needs and desires of its members. Further, ADCOM will work towards and emphasize EMC a a total discipline rather than being a fragment of many inter-related programs.

To fulfill our objectives we need you! I look forward to working with you in the coming year.

Joseph F. Fischer, Jr.
President
G-EMC

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IEEE NEWS & VIEWS

ON INCREASED DUES

On Page 6 of the January issue of the newsletter, we discussed the IEEE membership dues increase and presented a series of questions originated by the Los Angeles chapter. Readers were requested to express their opinions to the editor.

Your editor sadly reports that only one response was received. This was a brief note which answered as follows:

"1. $42. may be too much, but I can afford it.
2. IEEE at $35.00 - OK
G-EMC at $7.00 - OK - except the Proceedings really isn't worth much
3. G-EMC should repair part of IEEE."

We would like to thank our member from Glen Burnie, Md., for taking a moment to respond.

SHERR APPOINTED TO EXECUTIVE STANDARDS COUNCIL OF ANSI

Roy P. Trowbridge, President of the American National Standards Institute (ANSI) has appointed Sava I. Sherr, IEEE's Manager of Standards Operations to membership on the newly formed Executive Standards Council. The Council, composed of six representatives of Organizational Members, six representatives of Company Members, two members of the Consumer Council, and three members-at-large, is responsible for the development and maintenance of all procedures relating to the initiation, coordination, and management of American National Standards. The Executive Standards Council is responsible for the establishment and supervision f the Technical Advisory Boards of ANSI.

Mr. Sherr is Chairman of the ANSI Electrical and Electronics Technical Advisory Board and Secretary of the IEEE Standards Committee. He joined the IEEE staff in 1970 to implement the IEEE Board of Directors' decision to revitalize the Institute's standards activities.

NOMINATIONS FOR ADCOM

The annual nominations for G-EMC Administrative Committee are currently being accepted by the undersigned.

A nomination petition signed by 15 members of the G-EMC and a short biographical sketch of approximately 100 words (but not to exceed 125 words) are sufficient to enable the nominee's name to appear in the listing submitted to the members for vote. The deadline for petitions is May 30, but I would appreciate an earlier receipt.

I would like to remind you that persons nominated and elected to ADCOM should have adequate resources and company backing to be able to attend meetings and contribute actively to ADCOM activities. The nominations should also consider the technical qualification and stature of the individual in the EMC Community. It is necessary to have the above in mind in order to have an ADCOM that will perform effectively.

This year 6 members will be elected to the ADCOM, and a minimum of 12 nominees are required to make up the slate.

J. PAUL GEORGI, Chairman
Nominations Committee
111 Lochleven Drive
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SALATI ELEVATED TO FELLOW GRADE

Dr. Octavio M. Salati, of the University of Pennsylvania, has been named as one of the 120 IEEE members elevated to the Fellow Grade in 1973. He has received the citation:

"For contributions to electromagnetic compatibility technology, and for leadership in engineering education".

Dr. Salati is well known within the EMC community and our Group, although he is not a member of any specific IEEE Groups. The G-EMC was not represented in this year's Fellow election.

OOPS!

We couldn't have done it to a nicer guy. When we mentioned John Merrell on Page 6 of the January issue of the EMC Newsletter, and complimented him on the fine job he is doing in Los Angeles as Chapter Chairman, we misspelled his name. This is the second time that we've done it to John. The first time was about five years ago when we also misspelled his company's name, Glenair. Again, John, I apologize.

Editor

ASSOCIATE EDITORS OF EMC TRANSACTIONS

According to Richard B. Schulz, Editor of the G-EMC Transactions, there have been several changes concerning associate editors and their primary responsibilities.

Reasons for the changes are:

1. The Walsh Functions Committee of the EMC Group is entitled to a publication outlet.

2. Many areas long considered a part of EMC by the Group are now identified specifically as being in our domain of interest.

3. Although TEMPEST and EMP are widely different subjects, the amount of publishable material is so limited that it can be handled by one Associate Editor.

Let us welcome the new editorial lineup.

Methods of Measurement and Measuring Equipment	J. E. Bridges IIT Research Institute
Origin of Interference: Lightning, Static, etc.	H. M. Bartman AF Avionics Laboratory
Equipment EMC Assurance and Prediction	A. R. Kall ARK Electronics
Systems EMC Assurance and Prediction	J. A. Spagon TRW Systems
Spectrum Utilization and Advanced EMC Effects	W. A. Stirrat Army Elec. Labor'ties
TEMPEST and EMP Subjects	W. C. Dolle Southwest Research
Radiation Hazards to Fuzes, Personnel, etc.	D. A. Miller IIT Research Institute
Walsh Functions and EMC Applications	N. Ahmed Kansas State University

IEEE CONSTITUTIONAL AMENDMENTS PASS

By a 7:1 majority, IEEE members have voted to amend the IEEE constitution to address matters of political and economic activity. As part of its new activities, the IEEE plans to develop a portable pension plan for its members and to lobby in Congress through its new Washington, D. C. office.

One dissenting view of the new plan was expressed by Walter Fee, vice president of engineering for the Northeast Utilities Service Corp., claiming only 32% of the members had voted for the plan. Fee expressed concern that the recent increase in membership fees would reduce member participation in the IEEE's technical groups.

New pension rights

The new Constitution is expected to take full effect by March, 1973. The portable pension plan will cover members who switch jobs as well as those who remain with one company indefinitely. Many engineers lose their pension rights because they stay with companies only a few years -- reflecting the cyclical nature of the defense work in which they are involved. According to Donald Fink, executive director of the IEEE, the pension program would be based on contributions with "after tax dollars". The IEEE would also begin to lobby Congress to allow engineers to put money away for their pensions using "before tax" dollars. Problems exist, however, because engineering companies have their own pension programs.

The IEEE will undergo a change in its tax status from a so-called C-3 organization which means it cannot influence the legislative process to a C-6 status which will allow it to lobby in Washington. "The change will affect the tax-exempt status of the organization", says Fink. Tax-deductible donations to the IEEE will be ruled out but members will still be able to deduct dues as a business expense.

NEW BUILDING for IEEE Headquarters at Piscataway, N. J. The hold placed on the architect a year ago after 4 months' work, on account of questions raised by the UEC tax situation, was lifted in August '72. On the basis of a report by Executive Director Fink, September B of D increased the size of the building, to be erected with IEEE reserve funds, to accommodate all but a dozen of the headquarters employees. The latter would remain in UEC on the 10th floor, to comply with the perpetual-occupancy clause of the Founders Agreement, to serve such local functions as sales and contacts, and to provide meeting rooms for boards and committees. Space on 5 other floors would be phased out during 1974.

United Engineering Trustees (UET) have been granted future tax exemption on the UEC building as a result of appeal.

Rapidly appreciating land values in Piscataway and general movements from the city to suburbs will contribute to the future marketability of the IEEE property.

WASHINGTON LEGISLATIVE REPORT
(Ralph Clark, Director, Washington Office)

Activities of the 92nd Congress

The 92nd Congress considered many subjects of interest to engineers. Several legislative proposals involved engineers in their professional role in the advance of technology and as citizens concerned with the continued growth and health of the economy. Other proposals would affect engineers personally in their employment, retirement, occupational safety, etc. Many bills would affect both aspects of an engineer's professional life. We need to keep in mind, however, that only about 8% of the bills introduced ever become law.

Two bills, the proposed National Science Policy and Priorities Act of 1972, identified in the scientific-engineering community by the Senate No. S. 32 and the Technology Assessment Act of 1972 H.R. 10243 would have long range impact on science and engineering. S 32 failed of passage whereas H.R. 10243, approved by Congress on October 4, was signed by the President on October 13 to create the Congressional Office of Technology.

S-32 National Science Policy Legislation

This proposal, the product of nearly 3 years work in the Senate Subcommittee on the National Science Foundation of the Committee on Labor and Public Welfare has been characterized as "a bill to put science and technology to work on the problems of society". It would establish as national policy that federal support of civil science research and engineering should be expanded to equal the support of defense research and engineering. And, further, that these levels should be maintained or exceeded except when inconsistent with overriding considerations of national security. Civil science is considered to be research and development to meet America's human needs in such priority problem area as health care, poverty, public safety, pollution, unemployment, productivity, housing, education, transportation, nutrition, communications and energy resources.

The legislation would charge the National Science Foundation with creating a new Civil Science Systems Administration to administer these programs. It would also establish an Advisory Council to advise the Director of the Administration and review the programs in support of civil science objectives. It would provide for retraining scientists and engineers idled by changes in government space and defense priorities to get them into civil science programs.

S-32 passed the Senate 70-8, providing authorization of slightly over $1 billion to support these programs during fiscal years 1973, 1974 and 1975. The bill did not get out of Committe in the House but it is important because it is certain to be reintroduced very early in the next session in both the House and the Senate.

Technology Assessment Act of 1972

The Office of Technology Assessment (OTA) created by H.R. 10243 is intended to provide the Congress with adequate and timely information, independently developed, relating to the potential impact of technological applications to aid in determination of public policy on existing and emerging national problems.

The law charges the Library of Congress and the General Accounting Office with providing services and assistance within their respective fields of competence to OTA. It also provides for coordination with the National Science Foundation in matters relating to grants and contracts to avoid unnecessary duplication or overlapping research activities.

Other Legislation Under Consideration

Other legislation under consideration dealt with consumer product safety, procurement of Architectural and Engineering services by the Federal Government, amendments to the Occupational Health and Safety Act, conversion to the metric system and with many aspects of pension reform.

IEEE FORMS COMMITTEE ON SOCIAL IMPLICATIONS OF TECHNOLOGY

Engineers are becoming increasingly concerned with the effects of technology on our society. The uses of technology, the priorities assigned in developing new technology, and the effects on our physical and social environment are of vital importance to our future. The present generation is the first in history to face the prospect of a planet limited in its ability to support an exponentially growing and polluting human race. The public has become increasingly tolerant of what it sees as the nuisances or hazards resuling from technology.

In response to these concerns the Executive Committee of the IEEE has formed an Ad Hoc Committee on Social Implications of Technology (C-SIT). Its areas of concern include: professionalism and social responsibility in engineering; understanding the interaction between technology and society; predicting and evaluating the impact of technology on society; and fostering study, discussion and appropriate action in these areas. C-SIT is committed to providing a forum in which all engineers, as well as experts in non-technical fields such as law, economics and the social sciences, may express their thoughts in this area. In the coming months such diverse issues as electronic warfare, environmental pollution, communication and transportation, electronic surveillance and data banks, and bioelectronics will be discussed.

Interested engineers are invited to keep in touch with the activities of the Committee via its bi-monthly newsletter. The first issue was pub-

lished in December, 1972. Future issues will include notices of meetings, lectures, and discussion groups, publication of papers and articles, bibliographical reviews, and personal commentary. Sample copies may be obtained from IEEE, C-SIT Newsletter, 345 East 47th St., New York, N. Y. 10017.

CHARTER FLIGHT TO DRESDEN

As a service to members, and without any financial interest, IEEE GEMB has arranged for a 26 day charter flight by jet to the 10th International Conference on Medical and Biological Engineering next summer. The conference will be held in Dresden, D.D.R. (East Germany) August 13-17, 1973. Only GEMB members and their immediate families are eligible for the flight. IEEE members may join the GEMB for $4.00.

The flight will be run by Globe Travel Service, Inc., of Philadelphia. It will leave Philadelphia for Munich on July 26th and return from Frankfurt on August 21st. The round trip fare will be $172.50 including airport taxes.

The travel agency has made land arrangements for those who wish them. The package includes transportation, baggage handling, comfortable hotels with private bath, continental breakfasts, visas (fees not included) taxes and tips. The price is $427.60, or a total of $599. The trip will include the 6 conference days in Dresden and about 3 days each in Munich, Vienna, Budapest, Brno, Prague and Berlin. The trip from Vienna to Budapest will be down the beautiful blue Danube on a boat; the remainder by air-conditioned bus. There will be one orientation trip in each city. Not definite at this writing are plans for a concert at the Salzburg Festival and plane transportation from Berlin to Frankfurt. Incidentally, during the six day stay in Dresden, all public transportation will be free to those registering for the Conference.

The travel agency expects a rush of applications at these prices, and requires a reservation deposit of $75 per person for either the charter flight alone or for the package including the flight. The company reserves the right, however, to cancel the trip on April 26th with full refund. Full payment is required by June 15th.

The address of Globe Travel Service, Inc., is 716 Walnut Street, Philadelphia, Pa. 19106. The person to contact is Mr. Herbert Finkelstein. His telephone number is (215) WAlnut 2-0100.

Further information on the Dresden meeting is available from IEEE GEMB Travel Coordinator, K. V. Amatneek, Hahnemann Medical College, BSB 4604, Philadelphia 19102 (tel. 215-448-8640).

FCC ADOPTS RULES TO PROTECT RESEARCH WORK AT TABLE MOUNTAIN, BOULDER COUNTY, COLO., FROM RADIO INTERFERENCE

Rules to assist in the protection of research activities of the Department of Commerce laboratories at Table Mountain, Boulder County, Colo., from radio interference by non-Government radio stations have been adopted by the FCC (Docket 18180).

The Table Mountain facility is used for various research activities of the Department of Commerce, such as the National Bureau of Standards, the Environmental Research Laboratories and the Institute of Telecommunications Sciences (ITS). ITS provides research and analysis for the Department of Commerce, Office of Telecommunications, in support of the Office of Telecommunications Policy (OTP). Table Mountain is also a major receiving site for Commerce propagation studies conducted for the Department of Defense and other Federal agencies.

At the request of the Commerce Department, the Commission proposed rules to help develop a coordination procedure for protecting the Table Mountain field site, inviting comments on the proposed rules in an action adopted May 8, 1968. In its present action, the Commission modified the coordination criteria in its proposed rules, incorporating power flux density figures that correspond to each field strength figure and clarifying the standards for measuring effective radiated power.

The rules specify the distance and power criteria which are to serve as guidelines for determining whether a proposed radio facility in the Table Mountain area should be coordinated with the Table Mountain laboratories to assist in avoiding interference problems. By this coordination the applicants and the Table Mountain laboratories can cooperate in efforts to resolve interference problems, the FCC said.

The rules are not applicable to mobile stations or to stations in the Amateur, Citizens and Emergency Communications Services. The Commission also emphasized that the recommended coordination applies only to future assignments or modifications which produce increased signal levels at Table Mountain.

The Interdepartment Radio Advisory Committee (IRAC) has indicated that parallel action would be taken to require equivalent coordination by applicants for Federal Government radio stations with the Table Mountain site.

The present FCC action amends Parts 21, 23, 25, 73, 74, 78, 87, 91 and 93 of the rules and is effective January 19, 1973.

EMC Problems & Solutions

Two years ago your EMC Newsletter editors established this EMC problems and solutions column as a regular newsletter item. Initially, the response was favorable and a number of interesting EMC problems and solutions were provided by readers. Recently, however, reader participation has declined. As a result, we have no problems to present in this issue. This could indicate that we have already solved all EMC problems, but I seriously doubt that. If you are interested in maintaining this column, please consider the following request.

Do you have an EMC related problem that you have been unable to solve? Would you like to have the assistance of several thousand "EMC experts"? If so, submit your problems to the EMC Newsletter so that they may be presented to the EMC community for ideas and solutions.

All of the problems received will be reviewed by the editorial staff and those judged appropriate will be printed in future issues of the Newsletter. Hopefully, some of our readers will be able to offer excellent solutions or suggestions to your problem, and we will print those considered to be most promising. If space is available, several alternative solutions will be presented. Thus, all of the readers will profit from the exchange of problems and ideas. In addition, copies of all solutions, suggestions or comments received will be forwarded to the reader that submitted the problem.

We hope to present a wide variety of problems concerning the many areas related to EMC such as:

Prediction and Analysis
Suppression and Control
Measurements and Acceptance Testing
Specifications and Standards
Circuit Design
Quality Control and Reliability
System Effectiveness and Performance
Management, Economics, or Legal
Frequency Allocation and Assignment
Philosophy
Education
Ethics

Problems may include ones that you have (1) been unable to solve; (2) solved but would like to compare your solution to the readers' solutions; or (3) solved and would like to share your solution with the readers.

In preparing your problem, please try to limit it to one page of single spaced type. A simple sketch or figure may accompany the problem if required. Your name and company affiliation will accompany the problem unless you indicate a desire to have this information withheld.

The success or failure of this Newsletter feature depends entirely on reader participation. If you will send your problems and solutions, the column will provide media for exchanging knowledge and ideas and will be of immense value to all of us. If there is sufficient reader interest and participation, the EMC Problems and Solutions will continue to be a regular feature of the Newsletter. Don't make others "carry the ball"; submit your EMC problems immediately to:

William G. Duff
Atlantic Research Corporation
Shirley Highway at Edsall Road
Alexandria, Virginia 22314

A BOOK REVIEW

Handbook on Radio Frequency Interference; Volume 1, Fundamentals of Electromagnetic Interference; Volume 2, Electromagnetic Interference Prediction and Measurement; Volume 3, Methods of Electromagnetic Interference - Free Design and Interference Suppression; Volume 4, Utilization of the Electromagnetic Spectrum, published by Frederick Research Corporation, 2601 University Boulevard, Wheaton, Maryland, 1962, originally published at $85.00 for the four volume set. Volumes 1 and 2 are currently available at $10.00 and $12.00 each respectively from ITEM BOOKS, Box 328, Plymouth Meeting, Pa. 19462. A limited number of Volume 4 are available at $16.00. Volume 3 is no longer available.

This is the first definitive work on RFI/EMC and it is still recognized as a good basic source work. The handbook series is addressed to system planners, designers, field engineers, and other technical people who must deal with compatability problems in communication-electronics systems. RFI theory, prediction procedures, measurement techniques, instruments, specifications, and design are covered in the four volumes.

The first volume discusses the fundamental aspects of electromagnetic interference as the basis for prediction, measurement and design. The discussion includes both theoretical and practical approaches to system compatibility and interference reduction. Chapter I addresses the basic considerations with a discourse on each of the sources of interference from random noise and man-made sources to infrared applications even including nuclear explosions. Analysis of interference in communications-electronic systems is the subject of the second chapter. It discusses the methods of signal transmission, the various effects on receivers such as desensitization and intermodulation and analysis procedures for aerospace and ground based systems. Chapter III looks at compatibility and interference reduction. The characteristics of various types of communication-electronic systems are examined with reference to interference generation and sensitivity.

Antennas and propagation is the subject of Chapter IV. The treatment is sufficiently detailed to guide the engineer in the calculation of signal levels from interfering sources where space loss is concerned or in situations where the coupling is by transmission line or waveguide. Chapter V on radiation hazards to personnel and equipment examines a problem that is becoming increasingly important as new high powered electromagnetic energy sources are put into operation. The appendices provide additional material on fourier integral analysis, the impedance concept, and mutual coupling between long wires.

The second volume discusses prediction and measurement of interference. Problems of prediction and measurement are basic to all aspects of science and engineering. The degree to which the resources of nature can be utilized is dependent on the ability to forecast or predict conditions and/or measure these conditions.
In this volume the aim has been to bring together information concerning measurement and prediction principles, as well as information concerning equipment and techniques in current use and under development.

Chapter I contains a discussion of the criteria and requirements of signals by the user. Aural and visual effects of interference are described and there is a discussion of interference to digital data systems and acceptibility criteria for automatic systems. Chapter II deals with a technique for the prediction of radio frequency interference between a transmitter and a receiver pair.

Chapter III is devoted to interference measurements, instruments and techniques. It describes a typical well equipped laboratory and a van mounted facility for mobile or field measurements. There is a very complete description of interference testing of a receiver to meet military specifications.

Chapter IV deals with test instrumentation. From a general description of the typical radio interference meter the discussion goes to a description of each of the standard instruments of the period. Most of these are still standard instrumentation in contemporary laboratories.

Chapter V provides a brief discussion of shielded rooms with construction details and maintenance procedures. The treatment of radiation hazard prediction and measurement in Chapter VI includes a detailed method of calculation of power density in the fresnel region. The subject of spectrum signature measurement technique is taken up in Chapter VII. The discussion is based on a description of a complete set of measurements on a radar set. A well detailed test procedure is given for each of the transmitter, receiver and antenna characteristic measurements. Chapter VIII incorporates a brief discourse on test locations and environmental electronic data. When interference measurements cannot be conducted in a shielded room it is essential to consider the effect of the surrounding objects and signals emanating from other equipments in the area. This chapter presents information concerning selection and characteristics of test locations and discusses acquisition of environmental electronic data.

There are four appendices dealing with measurement of filter insertion loss, r f impedance of bonds, data sheets of interference test sets, and decibel equivalents of current, voltage and power ratios.

The third volume of the Frederick handbook series discusses specific design and suppression practices. System design is discussed in the first part of the volume and in later parts of the volume attention is focused on components and auxilliary devices.

Volume 4 provides an excellent explanation of the workings of spectrum magement on a national and international level. The major portion of this volume is given over to the reproduction of selected FCC regulations and military standards and specifications pertaining to radio frequency interference. Unfortunately, the referenced military documents are almost all outdated. The first chapter discusses the electromagnetic spectrum as a national resource. This is followed by a chapter on considerations and problems in spectrum utilization with a look into the future. Chapter 3 explains international frequency and allocation procedures. The function of the International Telecommunications Union and its various subgroup activities is described. In Chapter 4 there is a description of frequency allocation in the United States. There is an excellent exposition on the division of responsibility between the Interdepartmental Radio Advisory Committee (IRAC) and the Federal Communications Commission (FCC). Chapter 5 describes the government programs that have been implemented for interference free spectrum utilization.

Chapter 6 gives a good discussion of specifications and standards. Deficiencies are pointed out and standards and specifications in use at the time are compared. Three of the appendices are taken up with symbols, definitions, and selected references. A fourth appendix contains the FCC Rules and Regulations; Part 15, Incidental and Restricted Radiation Devices; and Part 18, Industrial, Scientific, and Medical Equipment. The fifth appendix contains the military standards and specifications that were in use at the time of publication. Some of these are still in use, others are being phased out and replaced by the more recent 460 series standards.

In each volume the table of contents is designed to give the user a quick overview of the subject matter. Major subject headings are set out in bold type and sub-headings are indented. In addition, there is a comprehensive subject index of the text material in each volume. These two features make the Frederick set an ideal basic reference work for the technical library.

James S. Hill
RCA Service Company
Springfield, Virginia

SPECS & PUBLICATIONS

EIA COMMENTS ON MS-469A

The Electronic Industries Association has submitted its comments on the proposed MIL-STD-469A "Radar Engineering Design Requirements, Electromagnetic Compatibility". The document was reviewed by representatives of member companies of the EIA participating in the EMC (G-40) Committee of the Association, and the comments reflect their views.

The comments were quite critical of the document. For instance, they stated

"The requirements of MIL-STD-469 are generally unrealistic as applied to modern high performance radar and consequently the application of this standard to current military contracts has been, at best, sporadic. Some requirements, e.g. emission and receiver bandwidth, are extremely severe and others, e.g. frequency stability and antenna side lobes, are relatively lax such that the tendency has been to establish these parameters on the basis of performance requirements and ignore the standard. The complex and time consuming test procedures also lead to the ineffectiveness of this standard. The last paragraph of the Foreward to this standard on page iii indicates that the military recognizes these factors, which leads to the natural question, "Why publish a standard which is not applicable to many new radar systems?"

The most significant problem is the method of measurement, given for the transmitter spurious radiations. The method calls for in-guide measurements, using a directional coupler. It is well known that spurious emissions in a wave guide propagate in numerous ways. Some modes, in fact, exhibit almost no energy down the center of guide, with the result that a directional coupler would not be particularly effective.

We have no perfect solution, but we do not feel that this is the way to go. AIL, many years ago (and GE) developed multi-mode sampling devices. I believe that Raytheon also built a gadget of this type. If such a device existed, in-guide measurement procedures would be appropriate.

PROPOSED RAD HAZ SPEC IN REVIEW

The proposed draft of MIL-R-9673C "Performance Standards for Electronic Equipment as They Apply to Personnel Exposure Limits to Designated Radiations" has been circulated to industry by the EIA for review. The draft was prepared by the USAF Radiological Health Laboratory, Air Force Logistics Command. The following paragraphs have been excerpted:

1. Scope

1.1. This specification establishes requirements for submission of contractor--provided data defining and quantifying selected radiation emission from electronic products or their components. It provides guidance on USAF policy regarding permissible personnel exposure limits to electromagnetic and particulate radiation, and policy guidance to the contracting officer for evaluating such information. This specification also covers, in general terms, procedures and methods by which hazardous and potentially hazardous sources of emissions shall be identified

6.2.4.2 All end items and components thereof designed to generate radio-frequency radiation will be so designed, constructed and fabricated that, under all conditions of operation and maintenance, average power density levels will not exceed 1.0 milliwatt per square centimeter, when measured:

a. At all distances greater than 5 centimeters from any external surface of the item, averaged over a period not to exceed 36 seconds, and over an area not greater than 25 square centimeters, except at the designated portal of exit of the radiation.

6.2.4.4 Instrumentation used to measure radio-frequencies applicable to this section will be calibrated and accurate to within ±10% of the correct values, for frequencies and power density levels requiring measurements to demonstrate compliance with this standard.

Contact your company's EIA representative (preferably G-46 Committee Member) if you would like to review a copy of this specification.

SAE EMC DOCUMENT STATUS

NO.	TITLE	ISSUED/ REVISED	PRICE
ARP 935	Suggested EMI Control Plan Outline	12/15/70	$ 1.50
ARP 936	Capacitor, 10 MFD for EMI Measurements	5/31/68	1.50
ARP 937	Jet Engine EMI Test Requirements and Test Methods	11/1/68	3.50
ARP 958	Broadband EMI Measurement Antennas; Standard Calibration Requirements and Methods	3/1/68	1.50
ARP 1060	Unmanned Vehicles and Payloads	Dropped	
AIR 1147	EMI on Aircraft from Jet Charging	6/1/70	1.50
ARP 1172	Filters, Conventional, EMI Reduction General Specification for	5/72	2.25
ARP 1173	RF Shielding Characteristics of EMI Gaskets	N/A	
AIR 1208	Bibliography-Lighting and Precipitation State	N/A	
AIR 1209	Construction and Calibration of Parallel Plate Transmission Line for EMI Susceptability Testing	N/A	
AIR 1221	EMC System Design Checklist	10/71	1.50
AIR 1255	Spectrum Analyzers for EMI Measurements	9/71	2.25
AIR 1261	Aircraft Power Systems vs. EMC Requiremts.	N/A	
ARP 1267	EMI Measurement Impulse General Standard Calibration Requirements and Techniques	N/A	
ARP 1285	Test Procedures for Measuring Shielded Effectiveness of Electrical Connectors and Associated Hardware	N/A	

N/A - not available - document in draft form

THE GOVERNMENT BOOK STORES

The Government sells publications through three outlets. (By the way, all purchases must be prepaid.) While GPO deals in general publications, occasional titles will be of interest to the explosives and pyrotechnics man.

GPO
Superintendent of Documents
U. S. Govt. Printing Office
Washington DC 20402

DDC
Defense Documentation Center
Cameron Station
Alexandria VA 22314

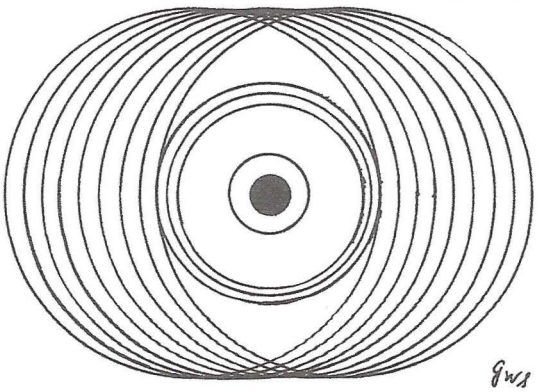
NTIS
National Technical Information Service
U. S. Dept. of Commerce
Springfield VA 22151

The two technical houses are DDC and NTIS. DDC used to be ASTIA. It handles classified or otherwise restricted documents and you must be registered there. This is important. If you are not registered, write for information but don't waste time asking for documents. (Limited documents - numbers followed by the letter L - require additional approval by the issuing agency.) NTIS used to be Clearinghouse. It sells open material. Documents in both collections are indexed, the indexes being available in most technical libraries. Most documents from DDC and NTIS cost $3 for hard copy and 95¢ for microfishe while GPO publications are priced individually. (From Explosives & Pyrotechnics, published by the Franklin Institute)

MIL-STD-463 REVISED

Notice 1 to MIL-STD-463 "Definitions and Systems of Units, Electromagnetic Interference Technology" (Tri-Service) has been issued. The Notice defines new frequency band designations. Copies may be obtained from:

Director
U. S. Navy Publications & Printing Services
700 Robbins Avenue
Philadelphia, Pa. 19111



METRIC CONVERSION CARD

The use of the metric system of measurement is increasing in the United States. As a result many persons frequently need to convert from customary to metric units and vice versa. The Bureau has prepared a plastic metric conversion pocket card which contains the minimum data needed for such conversions. One side gives the factors for converting from customary to metric units of length, area, volume, mass (weight), and temperature. The other side gives the corresponding conversion factors for going from metric to customary. The most widely used units are included and are accompanied by their accepted symbols. In addition, there is a centimeter scale along one edge of the card, an inch scale along another edge, and a direct-readout scale for converting from Fahrenheit to Celsius (Centigrade) temperatures and vice versa. All numbers are given to two-figure accuracy, sufficient for everyday practical needs. The card is available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 for 10¢ each, or $6.25 per 100. Use SD Catalog No. C13.10:365 when ordering.

CONTROL OF E.M. ENERGY THROUGH RF SHIELDED ENCLOSURES

A paper with the above title was presented at the 1972 Symposium of Electromagnetic Hazards, Pollution & Environmental Quality by Fred J. Nichols. The 20 page paper describes the need for RF enclosures, planning the shielded enclosure, a review of the formulas, shielding properties of metals, application and testing information. Also included are shielding nomographs among the 28 figures.

Free copies of this paper may be obtained by contacting Lectro Magnetics, Inc., 6056 W. Jefferson Blvd., Los Angeles, Ca. 90016 (213) 870-9383.

ELECTROMAGNETIC NEWS REPORT

A new newsletter entitled "Electromagnetic News Report" (ENR) has been issued. Published bi-monthly, the newsletter is devoted to the EMI/EMC field, and includes analysis and design notes, reports on the activities of the FCC, HEW, EIA, SAE, and many other governmental agencies. It also presents new products, purchases and acquisitions, EMC contract awards, article abstracts, MIL-SPEC status and job opportunities.

Called "The Pulse of the Electromagnetic Community", it is edited for engineers, managers, administrators, marketing and sales executives. It is edited by James S. Hill and published by R & B Enterprises, P. O. Box 328, Plymouth Meeting, Pa. 19462. Annual subscriptions are $7.00 for U. S. and Canada, and $10.00 foreign.

LIGHT HAZARDS

The Environmental Health & Light Research Institute, 1873 Hillview Street, Sarasota, Fla. 33579, is heavily involved in studying the hazardous effects of the light spectrum on human and plant life. Under the direction of Dr. John Ott, founder and executive director, the Institute is directing efforts to the possible influence of light on cancer and tumor development. The new book, "Exploring the Spectrum" by John Ott relates his efforts to research the effects of light on animals, plants and man in the years since 1958. The Institute, which issues a quarterly newsletter, offers annual membership starting at $10.00 per year. For additional information, write to Dr. Ott.

CHOMERICS OFFERS TECHNICAL SEMINAR REPRINTS

Chomerics, Inc., supplier of conductive polymers for EMI and EMP Shielding, has reprinted the text of its technical seminar of EMI/RFI shielding and gasketing, and offers copies to interested EMI/EMP specialists, materials engineers, and packaging designers upon request. The seminar, presented by Chomerics' key technical personnel at many contractor facilities in recent months, covers materials properties, EMI/EMP testing, and gasket design. Included is test data never before published. For further information, contact R. A. Rothenberg, Chomerics, Inc., 77 Dragon Ct., Woburn, Mass. 01801.

TIME-SHARING COMPUTER TECHNIQUES FOR SPECTRUM MANAGEMENT AND EMC THREE DAY COURSE

To be held April 24-26, 1973, at Sachs/Freeman Associates, 7515 Annapolis Rd., Hyattsville, Md. The course will include:

Demonstrations of a variety of intrasystem/intersystem time-sharing programs directly useful to Spectrum Management engineers

Actual classroom experience with these programs, including problem solving sessions on time-sharing terminals

Copies of listings and tapes of over 30 EMC-oriented time-sharing programs

Guidance on how to develop your own time-sharing programs

The total cost for the course if $350. per person (10% discount for 3 or more persons from a single organization)

CEP

What is the next Co-Operative Engineering Program the SAE AE-4 Committee on EMC is planning?

PROGRESS & PRODUCTS

BART BATTLES TO KEEP AUTOMATIC CONTROLS

The following paragraphs have been excerpted from an article with the above title which appeared in the December 2, 1972, edition of Business Week. BART are the initials used for California's Bay Area Rapid Transit system.

Legislative attack. Of all the criticisms of BART since the Oct. 2 accident, the most damaging was delivered on Nov. 9 by A. Alan Post, the legislature's analyst. Post's 106-page report is sharply critical of both BART's management and several components of its automated system. It makes 31 recommendations, many of which focus on alleged shortcomings in the automatic train control system supplied by Westinghouse Electric Corp.

In his critical report, Post considers the train detection circuits potentially the most troublesome components of the BART system. From Oakland to Fremont, he says, they are "unreliable and under some conditions inoperative." He says that they are not working because the system uses the track itself to transmit signals and Westinghouse selected a low power level to minimize signal interference from adjacent track sections. The low power level, he says, is insufficient to overcome adverse conditions of rust and dirt film on the tracks in driving signals through the train wheel and axle assemblies. Before service can be extended to San Francisco, he insists, a solution must be found.

When the power on the BART system was first turned on, it had some high-frequency noise that no one had expected, interfering with the train control. "We had to correct that problem. But that's not a design problem - that's an application problem."

BART officials spent hours answering the Post report's charges and its 31 recommendations. "We are concerned that the inferences in the analyst's report have led to the wide impression that BART is unsafe," Silliman told the Senate committee.

ICE INTRODUCES ITS PULSE AND TRANSIENT RECORDER

The Model PTR-9200 Pulse and Transient Recorder, designed for easy operation and easier reading, is introduced by Inter-Computer Electronics, Inc. (ICE). a subsidiary of American Electronic Laboratories, Inc. (AEL).

Without utilizing an oscilloscope, ICE's Pulse and Transient Recorder digitizes input signals directly via an A/D converter, stores the information in a high speed digital memory and at the required time, will transfer the stored information into a computer for processing.

The Model PTR-9200 records transient waveforms and repetitive signals, accepts dual differential inputs of ±50 millivolts to ±5 volts full scale, and stores 110 points of baseline and leading edge of signal in the pre-trigger mode.

Easily interfaced to TTY, printer, magnetic tapes, or digital processors, the recorder provides analog output for oscilloscope, plotter and strip chart recorders, and features a digital memory output speed from dc to 4 MHz and a sampling interval from 10 nanoseconds to 50 seconds.

Capable of digitizing signals at speeds up to 100 MHz with 8 bits of resolution and storing over 2800 words, the recorder is designed for application in recording instantaneous non-repeating or repeating signals.

ICE's Model PTR-9200 Pulse and Transient Recorder is available at a unit selling price of $9,850.00. Adress requests for additional information to Inter-Computer Electronics Inc., MS/1123, P. O. Box 507, Lansdale, Pa. 19446.

SAE AE-4 COMMITTEE TO SPORT BLAZERS

Members, Liason Representatives and consultants of the SAE AE-4 Committee (EMC) have been offered the opportunity to wear identifying blazers.

The blazer will be a double knit burgundy and will have an SAE logo with Committee AE-4 designation in addition to the person's name. It is thought that this distinctive blazer would set aside AE-4 members at meetings, committee sponsored workshops, symposia and conferences; for that matter, any technical function where he might desire to advertise the committee.

NEW GASKET MATERIAL

For applications where electrical shielding gaskets are required, a new type of electromagnetic-interference "weatherstripping" reportedly overcomes some of the problems of conventional mesh and finger stock. It's a helical spring made of thin, flat metal called Spira. The spiral gasket is available in stainless stel or tin-plated beryllium copper, either alone or bonded to a rubber extrusion, and it provides high-frequency contact for doors and other joints in electrical equipment.

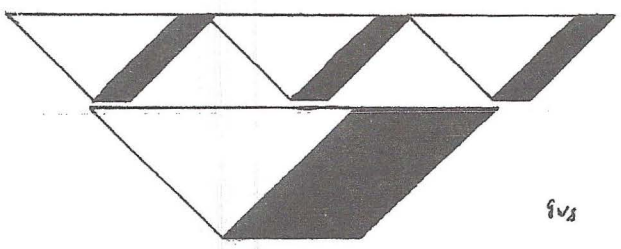
According to the inventor, George M. Kunkel of Electro-Data Technology, the relatively wide material guarantees a low impedance path for electromagnetic current through the microwave range, and the resilient spring material insures good contact throughout the life of the bond. He says that the spring, like finger-stock emi shielding makes good contact (typically 0.6 milliohm for 1 lb per linear inch) but cannot break off, as the fingers sometimes do.

Electro-Data Technology, 2808 Naomi St., Burbank, Calif. 91504

MAGNESIUM MAGIC

An unknown reader from Leesburg, Va., sent us a clipping from the Radio Shack catalogue on a Driver Alert Kit. The description reads as follows: "Radar sentry warns of radar speed zones, promotes safer driving. Gives audible warning of radar within $\frac{1}{2}$ mile range. Solid state, battery operated. Magnesium case prevents radio/TV interference. (Note: Use may be subject to state laws.)

Our thanks to Mr. Unknown.



SUPERCONDUCTING SENSOR ADVANCES RF METROLOGY

For the first time, a purely quantum mechanical phenomenon has been made the basis of a practical rf measurement.

Scientists at the NBS Boulder, Colo., Laboratories have developed a new sensor that is a variant of the Superconducting Quantum Interference Device (SQUID). With the SQUID they have measured changes in rf attenuation over a 40 dB range (0.3 microwatts to 3 milliwatts) to within 0.004 dB of the NBS calibration service values.[1,2] Though a 30-MHz signal was chosen for the initial test, the new device has responded satisfactorily to signals over a 0-1 GHz range.

The SQUID's measurement capability arises from its basic periodic response to a varying magnetic field. This periodicity in turn arises from the quantized nature of magnetic flux linking a ring of supercurrent. The new sensor, in other words, utilizes the flux quantum as a fundamental unit of measurement.

LINDER RESIGNS FROM NAE

Clarence H. Linder, first full-time president of the National Academy of Engineering, will resign his post at the conclusion of the NAE Annual Meeting in May, 1973. Mr. Linder, who has served in his present post since May, 1970, submitted his resignation to the NAE Council at its meeting on November 13.

The Council accepted the resignation with "deep regret" and expressed its gratitude for "Clarence Linder's devotion and excellent services, and the progress made under his leadership".

The National Academy of Engineering is a private organization established in 1964 to share in the responsibility given the National Academy of Sciences under its Congressional charter of 1863 to advise the Federal Government, upon request, in matters of science and engineering; to sponsor engineering programs aimed at meeting national needs; to encourage engineering research; and to recognize distinguished engineers.

NOMINATION OF CANDIDATES FOR FELLOW OF IEEE

April 30, 1973, has been established as the deadline date for completed nominations of candidates for Fellow grade of the IEEE.

If the candidate is not now of Senior Member grade, the nominator is required to submit with the nomination form B-27 the properly filled out transfer application proposing transfer to Senior Member grade. Failure to include the completed transfer application will invalidate the nomination.

For additional information, contact Mr. James Hill, Associate Editor of this Newsletter.

40 Years Ago

From the pages of Electronics, January, 1933

As a result of a field-strength survey in Ohio of broadcast stations on several frequencies made by Professor J. F. Byrne of Ohio State University, and reported in its Bulletin 71, there is no longer any need or excuse for an ostrich-like attitude on the relative merits of frequency assignment at the two extremes of the present band. Although the research did not take into account unfavorable location of the transmitter, the results are most important.

Professor Byrne's studies conclusively prove "that the different frequencies in the broadcast band cannot be treated as equivalent, and that frequencies of 1,000 kilocycles or above are uneconomical for large coverage and high power. They also indicate that low-power stations are at present wasting good low frequency assignments that are suitable for high power.

NSPE CHARGED WITH RESTRAINT OF TRADE

The Justice Department has instituted charges against the National Society of Professional Engineers for unlawfully restricting competition among Professional Engineers. The Department said that the Society's Code of Ethics forbids its members from bidding against each other for jobs. Justice has asked the U.S. District Court in Washington to cancel provisions of the Code which it said suppresses competition among its members. It was claimed that as a result of the Society's practices, customers requiring services by Society members have been deprived of the benefits of free and open competition.

HAROLD CHESTNUT ELECTED PRESIDENT OF IEEE

Dr. Harold Chestnut has been elected President of the IEEE. Dr. Chestnut was Vice President of Regional Activities of the Institute and is a consultant, Systems Engineering, Information Science and Engineering, G.E. Corporate R & D Center, Schenectady, N. Y. He succeeds Mr. Robert H. Tanner.

CORNELL AERO LAB BECOMES CALSPAN

Cornell Aeronautical Laboratory, Inc., has changed its name to Calspan Corp., terminated its exemption from federal income tax, and filed a registration statement with the Securities and Exchange Commission for a public offering of 350,000 of the 1.1 million shares of its common stock owned by Cornell University. The public offering is the first step in the University's plan to eventually divest itself of the Laboratory. Calspan Corp., P. O. Box 235, Buffalo NY 14221.

MEETINGS & EVENTS

CALL FOR PAPERS
IEEE/G-AP SYMPOSIUM AND USNC/URSI MEETING TO BE HELD AUGUST 21-24, 1973--BOULDER, COLORADO

The 1973 Main Meeting sponsored by the U.S. National Committee of URSI and the 1973 IEEE International Antennas and Propagation Symposium will be held jointly at the Engineering Center of the University of Colorado. URSI and IEEE/G-AP technical programs will be arranged separately except for the appropriate coordination.

Authors are invited to present papers in their fields of interest related to the topics indicated below:

Topics covered by URSI Commission include:

- Radio Measurements and Standards
- Radio and Non-Ionized Media
- Radio Waves and Transmission of Information
- Radio Electronics

Topics covered by G-AP include:

Antennas, scattering and diffraction, electromagnetic theory, guided and unguided propagation of radio waves, and allied fields of radio physics, such as plasmas.

Special Topics recommended by joint Technical Program Committee include:

- Measurement Techniques
- RF and Microwave Fields Relating to Biological Hazards
- Passive E.M. Techniques in Remote Sensing
- EM Waves in Solid-Earth Geophysics
- Sub-surface Communications
- Underseas Communications
- Sea Scatter and Application to Oceanography
- Ionosphere - Protonosphere Coupling

Deadline for submission for all authors if May 28, 1973. Material is to be sent to:

Dr. James R. Wait
Chairman, Technical Program Committee
URSI/IEEE G-AP Symposium
U. S. Department of Commerce
Boulder, Colorado 80302

INSTRUCTIONS FOR ALL AUTHORS

If the author wishes his paper to be considered for both URSI and G-AP, he should provide both an abstract and a summary. The original and three copies must be submitted in final form according to the requirements listed below for URSI and G-AP authors. The author will retain the right to submit his complete paper to a journal of his choice for formal publication.

ADDITIONAL INSTRUCTIONS FOR URSI AUTHORS

An abstract of 200 words maximum should be submitted with Commission preference indicated. A separate block of lines should be used for the title of the abstract, the author's name, and his affiliation. Acknowledgment of financial support is not deemed appropriate.

ADDITIONAL INSTRUCTIONS FOR G-AP AUTHORS

The summary is to be limited to four pages including all text reference, figures, and photographs. Since the Digest will be prepared direct from the author's original, the following layout instructions should be followed as closely as possible so that the summary, as submitted, is camera ready.

SAE MEETING INCLUDES ONE-DAY SEMINAR

The SAE AE-4 Committee meeting in Washington, D.C., during the week of May 7 to 11, 1973, will include a one-day seminar on Friday, the 11th. The seminar has been organized by Navy Joe Fisher of NAVAIR as an EMC awareness course for managers and non-technical personnel. It will also be of interest to technical personnel as an up to date presentation on military EMC. One of the features will be a first time showing of new releases of the NAVAIR EMC Training Films including the lightning series.

The seminar is offered on a no-charge basis as a service to industry. It will be held at the Silver Spring Sheraton Hotel with two morning sessions and one afternoon session. Call J. J. Fisher, Code 5335, 202-OX2-3875 for further information on the seminar.

EM Pollution Workshop

Committee AE-4 on Electromagnetic Compatibility, the Department of Health, Education and Welfare, and the Environmental Protection Agency have planned an EM Pollution Workshop on May 7-8, 1973, preceding the AE-4 Committee Meeting on May 9-11, 1973.

The purpose of the Workshop will be to evaluate measurement parameters, instrumentation needs, sources of EM pollution and standards that may be required for the control of EM pollution.

Workshop details can be obtained from Mr. Andrew Salem at the SAE office in New York.

WESCON DATE SET

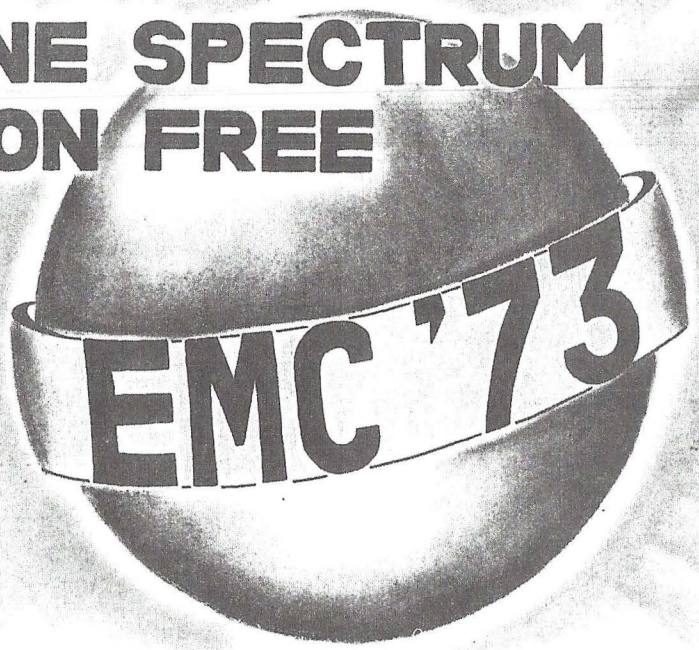
Sep. 11-14'73: Western Electronic Show and Convention (WECON), Brooks Hall/Civic Auditorium, San Francisco, California; for further information: Don Larson, WESCON General Manager, 3600 Wilshire Boulevard, Los Angeles, Ca. 90010

ACKNOWLEDGMENTS

The editor would like to thank the following individuals and their employers for their contributions to this issue of the Newsletter.

F. Nichols	LMI
H. Garlan	FCC
L. Thomas	Consultant
J. Bridges	IITRI

ONE WORLD - ONE SPECTRUM
POLLUTION FREE



1973 IEEE INTERNATIONAL SYMPOSIUM ELECTROMAGNETIC COMPATIBILITY

NEW YORK HILTON HOTEL

JUNE 20-22, 1973
NEW YORK, N.Y.

P.O. BOX 171
WESTBURY, N.Y. 11590