

IEEE**ELECTROMAGNETIC COMPATIBILITY GROUP**

NEWSLETTER

ISSUE NO. 73 - April, 1972

EDITOR ROBERT D. GOLDBLUM

MESSAGE FROM THE PRESIDENT OF G-EMC

The Electromagnetic Compatibility Group is now in its 15th year of operation. It has managed to survive despite drastic reductions in defense funding upon which we came to depend, a severe financial loss and a reduction in membership. Although we have not regained the pinnacle of 1968-1969, we at least have reached a plateau that hopefully provides a solid base for the future due to untiring efforts of the ADCOM and in particular to Dr. Heinz Schlicke our past Chairman. Despite the difficulties encountered, the membership fees have not been increased nor have the services to the membership been diluted. Our Transactions and Newsletters are still promptly provided; each in its own way assuring the members of up-to-date information. Our annual symposium and associated specialist working groups are considered outstanding; the regional meetings are excellent and the chapters are generally "alive and well". It is on this foundation that we can again grow and flourish.

However, what of the other side of the ledger? Where are we lacking -- and what of the future?

There are two major items that are of immediate concern to me. The first is the lack of participation by the Chapters in the overall work of the Group. The second is the general lack of awareness of the very existence of the EMC Group, by industry, government agencies, and other organizations.



Let's examine each. The ADCOM of the EMC Group consists of eighteen dedicated, competent engineers elected to a term of three years. On a voluntary basis, they chair most of the committees, participate in the Regional and International Symposia and in general conduct most of the work of the EMC Group. This is as it should be -- this is the reason they are elected. However, the EMC Group consists of approximately 1660 members many of which, I am sure, are acquainted with only a few of the ADCOM members and their work. They attend Chapter meetings and the Symposia whenever possible and frequently wonder what the ADCOM is all about. I know that many Chapters would like to be assigned a specific task which would be meaningful and relate to the overall efforts of the Group. It would provide a stimulus for attendance at meetings, recognition for the

ELECTROMAGNETIC COMPATIBILITY GROUP
NEWSLETTER is published quarterly by the EMC
Group of the Institute of Electrical and
Electronics Engineers Inc., 345 East 47th
Street, New York, N. Y. 10017. Sent auto-
matically and without additional cost to each
member of the EMC Group.

Second class postage paid at New York, N. Y.
and additional mailing offices.

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Chapter at the national level and a sense of participation in the overall work of the Group.

Now, let's review the second area of concern. I recently had the opportunity to discuss the electromagnetic compatibility program with a high level echelon in the Department of Defense. Immediately subsequent to that discussion, I attended another meeting which was attended by high ranking representatives of government and industry. In neither instance had these people heard of the IEEE Electromagnetic Compatibility Group! Yet, they were directly involved in the expenditure or allocation of funds for electromagnetic compatibility.

What can be done to eliminate these two diverse areas of concern? -- How can we obtain greater participation in the work of ADCOM by the other numerous excellent EMC engineers located through the world? How can we assure that high level representatives of industry and the Government are aware of the great expertise available in the IEEE EMC Group?

Sometime ago the Washington (DC) Section embarked upon a trial program of "Electro-Technology Forecast and Assessment". This program consisted of each Chapter of the Washington Section preparing a Forecast and Assessment for the 1970's in their particular specialty. The results of this effort, although limited in scope, was highly successful -- successful to the degree that Hdqs IEEE suggested that it be enlarged to a national scale and that all Groups participate. It was considered that the results of such an effort could be used as a management tool by IEEE to chart the future of the Institute. Further, it is understood that the National Science Foundation will participate in this work and may provide funding for the preparation of the Forecast. The EMC Group has been requested to initiate immediate action to prepare a Forecast of the entire electromagnetic compatibility area.

It appears to me that the preparation of a complete, thorough, Forecast of the Electromagnetic Compatibility Area is an ideal task in which the entire Group can participate. Such an undertaking will require discussions with all levels of industry and government engineers and other technical societies. If prepared diligently, effectively, and given ade-

quate distribution, it could assure that the EMC Group is finally recognized for its expertise by everyone concerned with the problem of electromagnetic compatibility.

At the ADCOM meeting during the IEEE convention in March, a committee composed of representatives of each geographical area of the country was formed to prepare this Forecast. In turn, they will request the Chapters in their area to prepare one or more sections of the Forecast furnishing broad guidelines as to format.

This, I believe, is the first time in the history of the EMC Group that such a joint venture has been attempted. It is a challenging venture that will require participation by and recognition for all members. It will provide a valuable document for use by the entire EMC community and alert industrial and government organizations to the fact that an IEEE EMC Group does indeed exist and that the Group is composed of professionals in all areas of electromagnetic compatibility.

Your assistance in this endeavor is sincerely solicited.

Sincerely,

John J. O'Neil
President
G-EMC

LETTER to the EDITOR

Editors Note

In the four years that I have been editor of the G-EMC Newsletter, I have tried to encourage participation and comments from our Group members. This effort has taken many forms, such as "Chapter Chatter" news, ADCOM Committee Reports, Problems & Solutions, and special invitations for letters. The moderate success of these endeavors can really be attributed to the outstanding efforts of our associate editors Marty Berman and Bill Duff. Suddenly, and quite frankly, unexpectedly, there has been a rash of correspondence in response to an article which appeared on the front page of our October 1971 issue, on the subject of changing the name of the G-EMC. It is not surprising that such a subject is of significant interest. The surprising element is that the AdCom considered a change of name in the Fall of 1968 at which time a similar article was published. We received no correspondence from our readers then and the AdCom had to react based upon its own intuition.

What has happened? Has the economic situation rattled our cages such that we are now more aware of the importance of our IEEE Group and its direct effects upon our well-being? Whatever the reason, it is great. Keep it up. You are sincerely encouraged to express your thoughts relative to the IEEE and G-EMC through letters to the Newsletter. Perhaps through the continuing exchange of ideas, we can collectively and objectively improve the viability of our Group and help it become more meaningful and of service to all of us.

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7 January 1972

Dear Sir:

I was shocked when I had to read, that G-EMC is intending to change its name again. EMC is such a versatile and comprehensive name and the EMC Community all over the world has adjusted its terminology to it. The lack in popularity and stature will not increase by changing EMC to SC, or SCC, or whatever some members have suggested. Worse, it will take another 5 to 10 years to make SC or something else as popular as EMC is today. Since ten years I am working as a consultant in the EMC-field and I am right now writing a book on EMI reduction. Thus, I dare to consider myself to be rather competent in the field.

I think you do an excellent job for the sake of the EMC country when you spend all your influence to preserve EMC.

Yours truly
Dr. Ing. A. Schwab
Karlsruhe University
FR - Germany

January 28, 1972

Dear Bob:

I just completed reading the January G-EMC News letter and want to thank you for your usual fine efforts, and in particular the publication of the various letter concerning the possibility of a name change. In reading these letters, the one from Wes Johnson of Boeing-Wichita is the closest to my own feeling on this subject...

Some 15-20 years ago, Paul Georgi, (now Director of ECAC) gave a paper at the Rand Corporation of the need of a sound EMC program within the Government based on four levels of efforts to meet the total end requirements of EMC. These four levels were: 1. The component level, 2. The sub-system level, 3. The System level and 4. The System versus the Environment/ The environment versus the system.

Today, in our EMC Group we have people working at all levels, and it is in our best (interest) that all within G-EMC remember the others in these different levels. The word "environment" today is such that it is a catch word and everyone wants on the band wagon. What will it be this time next year, etc...

Best Regards,
Fred J. Nichols
Lectromagnetics Inc.

Dear Sir:

See: EMC Group Newsletter, Issue no. 70- Oct., 1971, p.1

The EMC group is growing in stature and popularity because it is shedding the guise of specialization. And, the reaction is spreading.

My comment on the same subject is attached. I'm sending it to you instead of the journal as intended (EMC Transactions).

Since the dictionary limits "radio frequency" to - electromagnetic wave frequency intermediate between audio frequencies and infrared frequencies, and "spectrum" con-

notes ordered by frequency, etc., "electromagnetic spectrum" is needed to cover from gamma rays to the longest radio wave and include visible light (waves), therefore, IEMS or EMSI appears inevitable.

If the group generalizes rather than specializes its name as well as its interests, conditions needed for growth, it may be predicted that it will select a name having an acronym with insouciance. For example, ITEMS for Interference Throughout (the) Electro-Magnetic Spectrum.

See: Carl L. Frederick, "Criteria for Papers Published in the IEEE Transactions on EMC", Correspondence, IEEE Transactions EMC, Vol. EMC-13, No. 3, August 1971, p 76.

Mr. Frederick's comment might be paraphrased as a request for group solidarity in group specialization. Unfortunately, from Mr. Frederick's viewpoint, change is a dominant feature of the segment of the technology represented by the IEEE subdivision comprising what was once termed Radio Engineers, and what is now a polyglot admixture of disciplines, which characteristically lacks group solidarity, group permanence, and group stability. The EMC Transactions represents such a group, and is, by definition, subject to change having the quality of an inevitable mutation.

Mr. Frederick is a reactionary. He resists a change involving a simple permutation. There, antenna theory is applied to the EMC problem of analysing the radio signals received on an open circuited coaxial cable terminated in the skin of a missilebody, and the results are published in the EMC Transactions instead of the A & P Transactions. The appearance of antenna theory based papers in the EMC Transactions is not a new feature, certainly. Equally certain, that is a good feature of the journal. Since MR. Frederick objects at this late date, one has to assume that he is commenting against the encroachment, hoping to stem further change. The papers alluded to in the subject correspondence may alternatively be assayed as a manifestation of an alert editorial staff adapting and responding to change. Foreseeing the technical sterility associated with "voluntary control by industry by design of equipment, or thru government regulation of emitted (radiated or conducted) EM power --" etc., the editors of the EMC Transactions are, I hope, changing and mixing - the technical content of the journal, for the purpose of entertaining the attention of those of us who are non-legislators.

EMC is, in its essence, an ecological discipline. It may have militant overtones, as is reflected by Mr. Frederick's statements of belief. I appeal directly to Mr. Frederick. You, too, are seeking change in the form of added regulation(s). Such change is traditionally and actually most effectively sought and obtained through the written word. The function of the writing is to explicate, educate and educe change through the medium of knowledge. Let us ask the editors for more, not less, electromagnetic theory, necessarily including antenna theory:

applied to EMC in vehicular control, applied to EMC in biology-engineering, applied to EMC in the practice of medicine, applied to EMC in wildlife ecology studies, applied to crime detection, applied to EMC in whatever form of technological development that may lack compatibility. Explicit EMC faults will educe regulation, if, they are adequately defined and described in the literature.

Very truly yours,
Ernst L. Bock
Consulting Radio Physicist
Sepulveda, CA 91343

Dear Bob :

I would like to add a comment to the discussion about changing the name of our IEEE Professional Group on Electromagnetic Compatibility. Since the last change, over the years we have made a considerable investment in this broad and meaningful area. Any other name proposed for adoption should be carefully considered in the light of restrictions imposed on the interests of the Group Members.

In studying the meaning of the names suggested in the October 1971 Newsletter, it appears to me that each one, if adopted, would restrict the present range of projects that could be considered for implementation and the findings for publication in our Transactions. Yet every one of those suggested include the goals of Electromagnetic Compatibility as I understand the meaning of the term. For example, 15 of the 16 suggested contain the word "Spectrum." Apparently, most every one agrees that this word is appropriate. Even though the word Electromagnetics is a bit more difficult to pronounce, it is definitive in the sense that it connotes electrical waves with which our technology is concerned and therefore may not be confused, in the nontechnical mind, with the more general uses of the word Spectrum when used to describe a "great range" of topics that might be under discussion, or the description of the rainbow. Electromagnetic does mean that we are concerned only with electrical energy that is either stored (static) or used by transmitting it at some frequency ranging from zero to the highest frequency capable of being transmitted for the purpose of activating a device or penetrating matter to cause some effect.

The word Compatibility, in my view, means that at least two bodies exist in a harmonious state when one body emits energy and the other is not adversely affected or is incapable of being affected. If an adverse effect is caused we have, to some degree, a state of incompatibility. If the energy is in the form of electrical energy the word Electromagnetic Compatibility applies.

All of us who practice in the profession of electrical and electronic engineering must be concerned with both the problems of functional design of devices and systems and also the problems in obtaining Electromagnetic Compatibility with other systems that might be susceptible to emissions that are generated. Some of us specialize, however, in the study of the problems and effects caused by Incompatibility. In doing this, we give support to the functional designer so that his equipment may be used compatibly

in the intended environment. Now looking down the list of proposed names to describe our profession, it is easy to see that each one covers in part what we do in performing our duties. For example, we do prepare guidance to functional designers and even prepare standards and specifications to Control the use of the spectrum, to prepare Engineering or design guide lines for devices and systems so as to obtain Compatibility, eliminate Pollution, control Interference. We also study the Management of the spectrum for the purpose of Conservation and Utilization. We may even Imagine ways to do all these things. But we do not restrict our study only to radiation but do include the conduction of electrical energy. And we do this at all frequencies at which electrical energy is generated and transmitted, even as high as those so-called ionizing particles which have both the characteristics of waves and particles such as X-rays, gamma rays, cosmic rays and neutrons!

Do we really want to change our name?

Sincerely,
Carl L. Frederick
Institute Scientist
Southwest Research Inst.

Dear Sir:

In going thru my file of IEEE EMC Newsletters I note that I am missing ISSUE No. 71. I have No. 70, Oct. 71, and No. 72, Jan. 72. If there was a No. 71 please send me a copy, if not, disregard this letter.

Yours truly
Harold Gerson
Lawndale, Calif.

Editor's Comment: There was no Issue No. 71 for this number was accidentally skipped. We will attribute it to slide-rule error and thank Mr. Gerson for bringing this to the attention of all of our loyal readers.

RDG

Dear Bob:

Your column on page 9 of the January issue of the G-EMC Newsletter mentions the desirability of a breakdown of the origin of the votes for and against the Constitutional amendment.

To do anything on this would be extremely difficult, if not impossible. You realize, of course, that no name or identifying number is on the ballot card. The return envelope for each ballot required a validating signature, but once this validation had been made, the ballots were removed from the envelopes with absolutely no intent of keeping some sort of tie between the name and the ballot.

It is true that a number of different ballots were used. For example, there were elections of Regional Directors in Regions I, III, V, VII and IX. There were elections of Divisional Directors for Divisions I and V, thus, there were different ballots required for the members in the even-numbered Regions who belonged to none of the Groups and Societies in Divisions I and V, than were required for members who were to vote for a Regional Director or for a Divisional Director, or for some combination of Regional and Divisional Director.

It might be possible to go back to the original ballots and sort out the cards by Regions and possibly by Divisions I and V. I doubt that this crude breakdown of the vote would have much value. Meanwhile, the questionnaire sent to all members in Regions I - VI should reveal much more detailed information about the views and opinions of the IEEE membership.

The result of the questionnaire survey will be published in Spectrum. So far as I know, there is no intent and no provision to break down these data on the basis of individual memberships in the IEEE Groups and Societies.

Sincerely,
Richard M. Emberson
Director - Technical
Activities IEEE

Correction Notice:

The following are corrections to the letter by A.H. Sullivan Jr., published on the first page of the January 1972 issue (No. 72) of the G-EMC Newsletter as furnished by the author.

The luncheon address was given in 1968, not 1958, and was entitled "Compatibility Crisis - 1968."

MEETINGS AND EVENTS

The 1972 Conference on Precision Electromagnetic Measurements (CPEM) will be held June 26-29, 1972, at the National Bureau of Standards, U.S. Department of Commerce, Boulder, Colo. The CPEM is held every other year and the goal for the 1972 CPEM is the advancement of electromagnetic measurements science and measurement technique which are critical to technology and beneficial to society.

The conference is international in scope and will include a special session on international comparison of new electromagnetic techniques in length metrology. Each session of the three day conference will begin with an invited review paper to give perspective of the state-of-the-art for a particular area of measurement.

Sessions planned for 1972 include radiation safety (RF, microwave, and laser); automated measurements; measurement applications in biomedicine, air pollution, process control, network analysis, etc.; time and frequency measurement; direct current and low frequency measurement; microwave measurement; and measurement of pulse quantities.

For further information, contact D. F. Wait, 1-4655, National Bureau of Standards, Boulder, Colo. 80302.

KENETICS

(Excerpted from Microwaves, Jan. '72)

PROPOSED AMENDMENTS TO IEEE CONSTITUTION DEFEATED

By a vote of 23,633 to 23,266, IEEE members defeated a series of proposed amendments to the IEEE's constitution in balloting completed this past November. The amendments as proposed would have primarily dedicated the IEEE to improving the economic welfare of electrical engineers and made scientific and educational endeavors of secondary interest. Actually the vote for ratification was not as close as it might appear, since a 2/3 majority of the voting membership is necessary for any constitutional changes.

A breakdown of the vote by region shows a majority in Region 1 covering the New England and New York areas were in favor of the amendments, 6731 vs. 5064. Also Region 6, which includes California, which has been hard hit with engineering lay-offs, voted 5101 in favor of the amendment compared to 4046 against. The remaining four U.S. IEEE regions voted down the proposed amendments (see Table).

Region	For	Against
1	6731	5064
2	4081	4111
3	1984	2454
4	2407	2702
5	1712	2168
6	5101	4046

Dr. Victor Galindo, professor of electrical engineering at Virginia Polytechnic Institute and State University, Blacksburg, Va., initiated the petition while at TRW Systems, Redondo Beach, Calif.

According to Galindo, the reason the amendments failed to receive the needed support from 2/3 of the IEEE voting membership was due to poor publicity the amendments received prior to the balloting, particularly in "Spectrum", the IEEE official publication, and the extreme position the 27-man IEEE board took in interpreting the proposed amendments. Galindo contends the board induced IEEE members not to vote for the amendment by deliberately misleading them as to its meaning and implications.

Galindo plans to propose similar amendments for next year's election if appropriate action is not taken by the IEEE board by March or April of this year. "The amendments will not lose any of their essence except we won't designate primary and secondary objectives nor exclude foreign members as we did before. This should smooth

over some of the trivial objections to the amendments, which were blown up all out of proportion."

Galindo would also seek minority support from the IEEE board if and when he goes ahead with the amendments. "My main objectives will be to control the certification and qualification of engineers. This is where the real power of any organization lies," claims Galindo.

MAY 1972 ISSUE OF TRANSACTIONS ON EMC

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EMBLEMS AND PINS FOR GROUPS/SOCIETIES

OpCom reviewed a report submitted by Mr. D.S. Brereton and considered the present existence and use of emblems by several Groups and Societies. OpCom then adopted the following position:

- Each Group/Society on its own initiative may adopt an emblem; trademark procedures will be handled by IEEE Headquarters.
- If any such emblem design incorporates features of the IEEE emblem, before adoption the question of possible jeopardy of the IEEE emblem trademark shall be resolved through IEEE Headquarters.
- A Group/Society with an emblem may, at its own financial risk, design and procure pins or other devices for sale to its members.

The above item has been extracted from the meeting minutes of IEEE Technical Activities Board Operating Committee (TAB/OpCom) of February 14, 1972. Our AdCom President, John O'Neil would like to receive comments from the G-EMC members. Please send them to John at Mountainside Drive, Colts Neck, N.J. 07722.

PROGRESS & PRODUCTS

A CIRCUIT SAVER FOR ELECTRONICS

The following has been excerpted from an article with the above title which appeared in the January 15, 1972 issue of Business Week.

Building on a Japanese invention, General Electric Co. has come up with a new semiconductor component that it hopes will find its way into virtually all products using solid-state circuitry. The dime-sized disk is a new metal-oxide varistor, or MOV, -an electrical insulator that suddenly becomes a good conductor when a voltage surge occurs. Silicon-carbide varistors, used to protect electrical circuits, have been around for about 40 years. But they consume so much power that they have not been used very much in low-power equipment such as television sets.

Designers often protect circuits against such surges by selecting components with voltage ratings much higher than required by normal operation.

Such components are expensive, and GE thinks that its MOV will do the same job for less. An MOV costs \$1 to \$18, depending on how much voltage it can carry. To protect a circuit, an MOV is simply connected across it in parallel, providing a potential alternate route for the electrical current. When a surge occurs, the MOV's sudden new conductivity provides a harmless path for the current in preference to the rest of the circuit.

GE figures that eventually every color-TV set will have two or three MOVs. The market will grow, says Thomas A. Vanderslice, vice-president of the Components Div., "to \$20-million to \$30-million in five years."

1972 INTERFERENCE TECHNOLOGY PUBLICATION

The 1972 edition of ITEM - Interference Technology Engineer's Master has been published. As an EMC directory and design guide, it contains a complete list of interference related products and manufacturers, including consulting and testing services. Included in the 120 page volume are design notes on interference filters test equipment, shielded rooms, FCC regulations, and many other subjects. Free copies may be obtained by writing to ITEM, P.O. Box 328, Plymouth Meeting, Pa. 19462.

BAILEY & GILLAN FORM NOISE ABATEMENT DEPARTMENT

Bailey & Gillan has announced the formation of a Noise Abatement Department. Headed by Mr. V. H. Bashaw, it will concentrate on serving government, industry and private institutions in the Acoustics and Radio Frequency (interference) aspects of Noise Abatement.

Bailey & Gillan have provided such services in the past. However, due to the continually increasing demand for these specific services, they have decided to set-up a separate department totally dedicated to this technology.

Mr. Bashaw has actively participated in these areas of noise abatement engineering for the past thirteen (13) years. In addition, he is joining together a strong supporting staff of specialists.

Among the Noise Abatement services offered by Bailey & Gillan are: Proposal Evaluation, Program Planning, g, Training, Special Studies, Facilities Evaluation, Testing, Design, Document Preparation, Liaison Engineering.

Bailey & Gillan is located at P.O. Box 345, Valley Forge, Pa. 19481.

ARCHITECTURAL RF SHIELDING

Reprints of a paper entitled "Architectural RF Shielding" by Fred J. Nichols has been made available by Lectro Magnetics, Inc., 6056 West Jefferson Blvd., Los Angeles, Ca. 90015. This is a copy of the paper presented at the IEEE Mountain-West Conference on EMC in Tucson, November, 1971.

The paper refers to Architectural RF Shielding as the art and science of design, construction and testing of large shielded enclosures. Large enclosures are defined as those whose width and length both equal 25 feet and larger.

Free copies of this 14 page paper may be obtained by writing to the author at LMI.

AN ACCOUNTING OF THE GROUP ON ELECTROMAGNETIC COMPATIBILITY: (Condensed)

by H. Schlicke

I. What will be the future?

1.1 Position audit (where do we stand?)

When in January, 1970, I took over the Chairmanship, now Presidency, of the EMC Group, the presently still rather acute recession showed signs of undesirable consequences. In spite of efforts to constrain expenditures, the economic change linked with the inability to counteract previously made commitments, caused our 1970 International EMC Symposium in Anaheim to have an \$18,000 deficit. All our surplus was wiped out. Against vociferous protests, rigorous economic measures were enforced. Consequently, for instance, our 1971 International Symposium in Philadelphia resulted in a surplus of \$6,000 and the Group is again in good financial shape. (The latest financial statement for the Group is in error of \$5,000 (unjustified charge for Special Transactions Issue)).

The changing market conditions made us lose some members and some chapters. Job opportunities, as far as they could be found were spread by word of mouth and by the G-EMC Newsletter. Three new chapters were formed, Tucson, Pacific, and a Chapter at Large, so that our membership in total declined only a little. Our International Symposia (in 1970 in Anaheim, and 1971 in Philadelphia) and our Regional Symposia (1970 in San Antonio and 1971 in Tucson) together with upgrading the EMC transactions, and an excellent EMC Newsletter were quite instrumental in keeping the Group together. Also, there exist still some pockets of strong EMC activities in the country.

Already in 1970, the Group based on growing job threats, requested that the IEEE shift its emphasis from dissemination of technical information to job security as an additional objective of the IEEE. In 1971, the Galindo Petition was printed in our Newsletter and the pros and cons discussed in some detail. The outcome of the official Galindo Petition was no surprise to the Group. In any case, it is expected that the IEEE Board of Directors see the mandate in the outcome of this vote.

1.2 Attributes

The strengths and weaknesses of the Group became quite apparent in a time of crisis. There is a dominance in the membership of purely military oriented people, often rather "rigid" and accustomed to getting "easy" money from the government (this is not a nasty statement). Other areas which had been neglected, were attempted to be brought in the foreground, however, only with limited success, since people were either out of work or worked madly to keep their jobs. And, in addition, formative developments are hard to recognize early and gutsy leadership to grab such opportunities seems to be rather rare. For details see later. One of the key problems was to convince the membership that they are now in a completely new ball game and that the problem is not that we have something to offer, which is not anymore so much in demand, rather that we have to fulfill new needs which are quite apparent, but for which we are not yet fully prepared. This slow process of reeducation has succeeded to a limited extent and will be stressed more and more.

1.4 Challenges

We are facing the following challenges:

- a. Dissatisfaction with the present IEEE policy of publication only, may drive members away (see my comments in TAB meetings.)
- b. Rigidity in job outlook of members may cause membership shrinkage and reduce viability of the Group and cut its size to a small number of specialists without much young blood.
- c. An unawareness of the growing EMI by the general public (this, however, can be reconstructed into an asset.)

II. What we have to do to have a future?

2.1 Objectives

The following, rather interrelated objectives are facing us:

- a. Membership survival, and re-institution, institutewise and groupwise.
- b. Defining new, expanding areas of endeavor (broader scope).
- c. The education in the new areas.
- d. Identification with social-economic areas.

They represent tough problems since they have to be solved under severe constraints of very limited resources and, in part, of the inflexibility of many a member. While, at first sight, this sounds like a formidable task, there are, however, great needs and opportunities in EMC related areas, for which good and adaptable EMC engineers are nearly ideally predestined to be highly effective. EMI is a subtle but ever growing form of insidious pollution of which the general public will have to be made aware of slowly.

2.2 Alternate Strategies

The following areas, agreed upon in our ADCOM meetings, look like promising extensions of our activities, where emphasis is needed:

- a. Standards and instrumentation. (With Chapter participation)
- b. Systems compatibility.
- c. Industrial control, noise in.
- d. Side effects and radiation hazards.
- e. EMP.
- f. Hospital safety.
- g. Incidental interference.
- h. Interference in digital systems.
+ all areas in which we are working now, being essentially military and FCC oriented. These areas will be sustained as much as feasible. Spotty pick-ups become apparent.

Naturally, we cannot break into all these areas simultaneously, but had to set priorities, based on immediacy of needs and availability of suitable men. May I comment briefly on a-d which were elected since they meet both conditions just discussed.

- to a. Standards: here we try to improve social economic progress by technical competence. The Committee Chairman, Jack Bridges, is a fireball and has many active subcommittees. Close cooperation with ANSI is established through Dr. Ralph Showers, who is ANSI Chairman of Committee C63 which, again, is closely coupled to CISPR (international validity).
- to b. System compatibility: against the flak of certain members, a special issue on Walsh Functions (meander functions, a set of ortho-normal functions, economically realizable by MOS technology) was made in 1971. (Walsh Functions permit the formation of antenna patterns without side lobes.) Another attempt to change the thinking.
- to c. Noise control in industrial control systems: breakdown caused by spikes in industrial installations can cost up to \$2,000 per minute. Industry is quite concerned about EMC. Schlicke, writing the chapter on filtering, works closely with the Industrial Application Society on a Noise Guide to be published in 1972.

- to d. Side effects: Rex Daniels works on presidential committees on side effects (not only radiation hazards). Fog is slowly clearing in this controversial area (see, for instance, the fascinating book ELECTROMAGNETIC FIELDS & LIFE, translated from the Russian, by Presman, Plenum Press.)

In other areas we have, so far, only talkers not doers, as it is normally the case in volunteer organizations.

A publicity committee is still in embryonic stage. Some Ad hoc committees failed so miserably that I was close to the point of throwing the responsible members out of the ADCOM.

2.3 Selection of best strategy (What is best?)

We abandoned, temporarily, our broad Long Range Planning and confined it to what merely needs to be planned long range for continuity. Rather, we concentrated on Short Range Planning to stay alive and healthy.

Concomitantly, the Group, being part of the Institute, depends for its viability on the viability of the Institute. If 50% of the Institute members express great dissatisfaction with the Institute's operation (more did not say so because of the particular wording of the Galindo Petition), the Board of Directors must (re-) act. Institute membership in the NSPE is a start, though not enough.

2.4 Plans and programs:

a. Long range

a.1 The following International

Symposia are being planned and approved by ADCOM:

1972 - Chicago

1973 - New York (in conjunction with CISPREE)

1974 - San Francisco

1975 - Open (Europe being investigated or possibly San Antonio)

1976 - Washington, D.C.

a.2 A Symposium guide, continually being upgraded for optimization of resources and avoidance of previous pitfalls is being worked on by former Symposium Chairmen and will be ready for distribution soon.

a.3 Negotiations are being held with FAST, a small charter group for the utilization of Walsh Functions, to join the G-EMC. Other suitable combinations are being investigated to work to a society status. Name change of the Group has to wait for time to apply for society status.

b. Short range

b.1 Implement and followup on 2.2 a-d.

b.2 Find proper leaders for 2.2 beyond d.

b.3 Find time and individual to spearhead reorientation of Group (broadening of scope), to assist the new Chairman.

b.4 Continue strong Transactions and Newsletter but carefully weighing costs. Concentrate on timely topics, for instance, one of our new special issues will be on Earthcurrent (pollution aspect).

b.5 Encourage publicity committee, still in status nascendi.

b.6 Reactivate bibliography service.

c. Difficulties still to be resolved:

Under the present conditions, it is extremely hard to find good first grade volunteer doers. In formative times, an urgent need exists for men who can handle EMC in real perspective, as a pollution problem. It nearly seems this is a full time job for a whole group of dedicated people.

It seems to me, when times get better, we have to look at the formation of an interdisciplinary system society within the IEEE. In such a society, EMC will play a key role; it will include human, biological, and machine systems. Such a Society can only be effective if funds are available, either on a voluntary basis, for instance, by providing key members with money and time to participate, or in form of a non-profit organization. If we do our homework now and think in sufficiently broad terms, we should be ready when the time is ripe. - Complex problems cannot be solved by looking at one aspect only.

III. So What?

We have gone through some rough times. But we have laid the groundwork, I hope, for a healthy future that is, by necessity, bound to come for EMC, if considered on a much broader scope. For people with vision and guts, EMC, in its broader sense, offers plenty of new opportunities. Let us make it happen! This includes adaptation to changed conditions and priorities by Headquarters also, as a sine qua none premise. On this I count.

My cordial thanks, Dick (Emberson) for your helpful cooperation and advice. -These 2 years were a great experience.

H.M. Schlicke
President of G-EMC
1970-71

IEEE BY LAW AND POLICY CHANGES
Board of Directors - Nov. 18-19, 1971

Changes in several ByLaws were made in order to add an Assembly-elected Executive Director to BofD and ExecCom. Four ByLaws were changed to reflect the re-scheduling of the annual Assembly, usually in November hereafter.

Statements of Policy #18 and #20 now contain important modifications, accepted in principle by BofD in Aug. 71 and in detail by November BofD:

#18 - Recruiting at Conventions and Expositions

At times when a severe recession in electrical and electronics industries results in widespread unemployment of engineers, a substantial curtailment is caused both in scientific innovation and in interchange of theoretical and applied technology. During periods when IEEE has been requested by a national government to serve the public interest by attempting to alleviate dislocations of technical personnel, recruiting and placement activities by prospective employers at IEEE conventions and expositions, especially those directed toward the placement of unemployed engineers and scientists, shall be permitted provided they are carried out in accordance with professional and ethical standards approved in advance by the General Manager.

Except during the periods referred to in the preceding paragraph, recruiting and placement activities at IEEE conventions are inappropriate and are to be actively discouraged and prevented.

In order to provide information to members on issues facing the IEEE, the editor of any IEEE publication is not prohibited from accepting the following, so long as the usual standards of accuracy, space limitation and quality are maintained:

1. Statements by those candidates for IEEE offices whose names will be printed on the ballots in accordance with the Constitution and ByLaws, giving their programs and views on issues facing the IEEE, provided that all such candidates for a given office are given equal opportunity to present their views;
2. Letters to the Editor stating an intention to seek candidacy for a given position with reasons.

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 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 nomina-

tions should also consider the technical qualifications 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
Severna Park, Md. 21146

Economics

Economic Conditions

In a sweeping look at current trends and future prospects for the economic growth of the U.S. Electrical/Electronics industries and the potential impact this growth might have on the overall U.S. economy, a committee of top industrialists have completed a comprehensive report detailing their views on the outlook for the next decade.

Among the principal findings for the 1970's their study sees government spending in domestic areas as probably not offsetting decreases in military and space spending until at least 1980. In addition, government actions to reduce trade barriers, stabilize the economy and foster research and development through tax incentives is urged.

They also determined that the electrical/electronics industry will show an average annual growth of 7.5 to 8 percent and indicated their estimate of the percentage growth in a number of major segments of that industry. With regard to engineering employment, they see a slowing of demand for engineers to a growth rate of about 2 percent a year, and that over the next decade, supply and demand will most likely be in reasonable balance.

In assessing the impact of international trade on U.S. technical employment, the report indicates: "The most desirable and probably the most effective approach for broadening U.S. technical employment opportunities, insofar as they may be influenced by international trade factors, involves developing the maximum amount of trade between nations. Under such conditions, where head-to-head competition is a reality, each country's technological skills of all kinds -- research, engineering, and manufacturing -- are challenged, provided there is reasonable parity of capability, a condition increasingly coming into being. In meeting such a challenge, the technologies involved are strengthened and employment opportunities increased.

In the area of financial considerations, the committee looked at trends in the securities markets, sources and uses of capital funds, the supply and cost of capital and arrived at four basic conclusions:

- "1. The most obvious and greatest assistance to the financial markets would be the restoration of an atmosphere of stability with only moderate inflation in the U.S. economy--much less than the current 5 to 7 percent annual rate. There is nothing like a stable dollar to foster stable financial markets. The allocation of the country's resources can be much more wisely and fairly distributed without the conditions of worrisome inflation.
- "2. To allow the operation of stable financial markets, we must have a stable monetary policy. The severe swings of interest rates or of money supply serve only to disturb the financial markets.

Projections of growth, both in engineering employment and the industry, were predicated on available data. However, the committee emphasized that, "a suitable and comprehensive data base sufficient to forecast industry growth with reasonable accuracy does not exist. Consequently, we shall look at major segments of the industry of particular interest to IEEE members, indicate judgments on particularly strong areas of growth, and suggest forces that are operating and are therefore likely to create emphasis on certain areas of technology. A number of sources of information were used; the estimates reflect the judgment of the committee."

LESS-EXPENSIVE SHUTTLE BETTER THAN NONE FOR 5000 ENGINEERS

The space shuttle program announced by President Nixon will probably mean about 5000 new jobs for engineers and 35,000 new jobs for technicians, NASA sources say, but it's a sharply curtailed program, compared with what NASA would like. NASA had sought a reusable booster; it will get a less-expensive one. About 10,000 of the 50,000 jobs predicted in the White House announcement will be filled by administrative and other white-collar personnel. The job figures are at best an estimate and are based upon experience in the Apollo program. The shuttle program is now three years old and its overall predicted cost of anywhere from \$10 billion to \$14-billion has dropped to between \$5.5-billion to \$6.5-billion, with 1978 remaining as the target date for the first flight. NASA's budget for the coming fiscal year will carry about \$200-million for the shuttle, up \$100-million from last year. A fight is expected in the Senate over the money, but the measure is expected to pass. NASA hopes to issue bids next month for both the manned orbiter and the as-yet-undefined, but definitely unmanned, booster. North American, General Dynamics, McDonnell Douglas, Martin-Marietta, Grumman, Boeing and Lockheed are expected to be in the running.

(From Electronic Design 3,
February 3, 1972)

ASME/IEEE EMPLOYMENT INFORMATION EXCHANGE

With space made available by the ASME, both the ASME and IEEE have opened an employment information office on the sixth floor in the United Engineering Center, 345 East 47 Street, New York City.

An inauguration meeting was held on October 25, 1971, and the ASME/IEEE Employment Information Exchange began its operations the next day. This office is functioning in the same way as the VEST (Volunteer Engineers Scientists and Technicians) program which has eight locations around the country, except California, where the program originated approximately 11 years ago as "Experience Unlimited" and still operates under this title with approximately 21 offices.

The Employment Information Exchange is manned by volunteer unemployed engineers from both organizations. One group stays in the office while the other group of volunteers goes into the field to arouse industry interest in the project and collect job openings. The volunteers sort out resumes received and try to match applicants to the available job openings.

While each office in the "Experience Unlimited" and VEST programs concentrates on getting jobs in its own area of operation, the ASME/IEEE Employment Information Exchange has no boundary and is able to solicit job openings anywhere in the U.S. To help in this venture, we would like to ask all employers to help the IEEE in its effort to alleviate the unemployment prevalent among our engineers - a virile segment of the community where unemployment has previously been unknown - by sending in descriptions of job openings in your firms. And we would like the unemployed engineers able to do so volunteer their services to work in the Exchange to both help themselves and their fellow engineers. Write to Mr. John M. Kinn, Director, Educational Services, at IEEE Headquarters.

HOTELS TO REBATE UNFAIR CHARGES

There is now pending in Court an action for damages for alleged violations of Federal and State laws with respect to allegedly illegal room rates and/or incoming telephone message service charges and/or service charges for internal communications, however denominated, at hotels, motels and inns in the United States, Hilton Hotels Corporation ("Hilton"), Loews Corporation ("Loews"), Bismarck Hotel Co. ("Bismarck") ITT Sheraton Corporation of America ("Sheraton") and certain other owners and operators of hotels, motels and inns in the United States are the defendants in such action. Hilton, Loews, Bismarck and Sheraton, while denying the alleged violations and liability on account thereof, have agreed to settle the claims of all members of the "Class" against the Settling Defendants. You may be a member of this Class and if so your rights may be affected by this litigation and the settlement agreement.

*of interest but
probably does not apply to majority*

The Litigation. The complaint in this litigation generally alleges (i) conspiracies among certain owners and operators of hotels, motels and inns to charge illegal room rates and to charge illegal and fraudulent service charges for incoming telephone calls and message services and/or internal communications, however denominated, and (ii) allegedly fraudulent and deceptive practices with respect to service charges for incoming telephone calls and message services and/or internal communications. The time period of the asserted conspiracies is alleged to extend from at least 1966 to at least 1971. Recovery is sought for illegal room rates and/or incoming telephone message service charges and/or service charges for internal communications, however denominated, including without limitation, all such service charges arising or resulting from allegedly misleading, fraudulent or deceptive practices whether by way of commission or omission. During the period in suit, such allegedly illegal incoming telephone message service charges and/or service charges for internal communications were variously labeled by the defendants on hotel bills as "In Tns", "Sundries", "GMS", "Rm Tx", "Misc", "In Tens", "Debit", "Tx", "IMS", "Tax" or other similarly cryptic designations. In addition to the issue of liability each claimant would have to prove individual damages based on the allegedly illegal room rates and/or incoming telephone message service charges and/or service charges for internal communications charged to or paid for by him.

The Settlement. The Hotels have agreed to make a full and final settlement of all present and prospective claims of all members of the Class against the Settling Defendants for the total sum of \$5,945,679 which represents the total dollar amount of allegedly illegal incoming telephone message service charges and/or service charges for internal communications, however denominated. The Settlement Sum will be paid or credited as follows: All verified Sworn Statements of Claim properly filed by members of the Class will be paid in full; provided, however, that if the total of such claims exceeds the Settlement Sum, the Settlement Sum will be divided among and paid to the members of the Class in the proportion that each such claim bears to the total of such claims.

If you are a member of the Class who does not elect to be excluded and you wish to receive a share of the Settlement Sum, you must file not later than June 29, 1972, a Sworn Statement of Claim containing an acceptable covenant not to sue and where required, cancelled checks and/or paid hotel bills supporting your Claims, or you will be forever barred from recovery for any Claims you may have against the Settling Defendants or any of them.

Your Sworn Statement of Claim and where required, cancelled checks and/or paid hotel bills supporting your Claims, and all other documents to be filed or record in this litigation should be addressed to:

"Clerk
United States District Court for the
Northern District of Illinois,
Eastern Division
P.O. Box 1518
Chicago, Illinois 60690"

(The above has been excerpted and edited from a legal notice which appeared in the March 1, 1972 issue of the Evening Bulletin, which is a Philadelphia newspaper. Questions and requests for "Sworn Statement of Claim" forms should be addressed to Court at the above address).

EIA COMMENTS ON MIL-STD-461/2

The Electronic Industries Association (EIA) submitted comments on the proposed "B" revision of MIL-STD-461 to the Naval Electronic Systems Command, and the proposed MIL-STD-462 Phase II and Phase III to the Aeronautical Systems Division (AFSC) in letters dated June, 1971. The "B" version of 461 was forwarded to the Association in October, 1970, where as 462 Phase II and Phase III were forwarded to the Association in November 1970 and March 1971 respectively.

The documents were reviewed by representatives of member companies of the EIA participating in the EMC (G-46) Committee of the Association and the comment and recommendations reflect their views. In order to make meaningful comments, all three documents were reviewed together.

As a general recommendation it was suggested that all of the technical material which is now contained in the drafts of MIL-STD-461 and MIL-STD-462 be placed in one standard, which could be all-inclusive. Alternatively, a separate standard could be written which would give the instructions covering the use of a technical standard which would then contain both the electromagnetic interference characteristics requirements and the measurement techniques now in 461 and 462.

It was also recommended that a Government Industry resolution meeting be held, such as was held on MIL-STD-745A in July, 1969. While such a meeting might take several days, it was considered that the time would be well spent on two such important standards.

Included with the EIA comments was a proposed redraft of MIL-STD-461B. The redraft was in the form of the instructional standard mentioned above which could be used with a separate technical standard or become the first position of one, all-inclusive standard covering all of the material in MS-461/2 or presently proposed by the Government.

NEWS and VIEWS

THE OTHER POLLUTION PROBLEM

The subject of electromagnetic interference seldom enters a microwave engineer's mind until he is forced to tackle an actual interference problem. Even then only a casual acquaintance is generated, just enough for a "quick fix." Interference must often reach crisis proportions before he will even begin to understand the compatibility problem.

There are several reasons for this. One is EMI specifications are difficult to understand except for the specialists who wrote them. The EMC engineer can be confusing to work with. He seems to speak another language. As a result, a microwave engineer gives up at this first yet crucial step.

Another reason is many of the requirements seem unnecessary. Equipment can frequently be designed and built with little or no concern for RFI requirements. Although it might fail RFI tests as an individual component, it has no detrimental effect on the rest of the system. Such situations give rise to the question, "Are EMI specifications realistic?"

What can be done to face up to this challenge? As a first step, it's up to EMC specialists to convince microwave engineers that electromagnetic compatibility is important and must be considered in their design. Before this can be accomplished, however, the methods and language of the EMC engineer must be simplified and made more orderly. Speaking in terms of cause and effect and relating to methods already known by the microwave engineer is one way that's been suggested.

The other side of this picture is a willingness by microwave engineers to get involved with some basic and pertinent EMC practices. Many preliminary EMI measurements are already within his reach, sufficient to catch many potential EMI problems before they get out of hand. Such common lab instruments as the spectrum analyzer and oscilloscope are very useful for EMI measurements.

(Excerpted from an editorial appearing in the November 1971 issue of Microwaves).

PULSE FIRING OF EED'S

The energy necessary to fire an electro-explosive device (EED) is an important characterization parameter. This mode of firing corresponds to delivering the energy in a time that is short compared with the thermal time constant in order that heat diffusion and losses to the explosive environment surrounding the hot bridgewire are at a minimum. Practical firing systems, in most cases, operate in an adiabatic manner by using the discharge of the energy stored in a capacitor. An accurate measurement of this energy provides a useful sensitivity parameter that can then be used in the design of any impulsive firing system.

An apparatus has now been devised in which a half-sine wave pulse is stored on a capacitor to fire an EED. Theory and equations of energy transfer have been developed and several 1-amp, 1-watt EED's were fired. It was concluded that the half-sine wave pulser will provide a reliable and versatile energy source for adiabatic firing. In addition to characterizing the firing energies of devices, other behavior characteristics can be examined. However, continued use in larger sample studies are necessary for a more thorough evaluation. "Half-Sine Wave Pulse Firing of Electroexplosive Devices," by L.A. Rosenthal and V.J. Menichelly, Jet Propulsion Laboratory, Report 32-1534, July 1971. Order as N71 31193 from NTIS, U.S. Dept. of Commerce, Springfield, Va., 22151, \$3.

ELECTRICAL POTENTIALS AND DOMESTIC WATER SUPPLIERS

Why was milk production poor in this Washington herd? Fresh Jerseys brought onto the farm dropped substantially in milk production within a few weeks and didn't regain past performance. The dairyman, a competent university graduate, noted that he once received an annoying shock while milking and also felt tingles while hosing down the milking barn.

The primary supplying the farm was the usual single phase two-wire system with multiple grounded neutral. The farm secondary was single-phase three-wire, with the neutral solidly connected to the primary neutral and to the farm water system. The power utility checked lines for open grounds and found none. The voltage between the water system and a separate ground electrode was measured, varied with the daily load, and reached a maximum of 7 v. While this wasn't considered hazardous, the utility did place more ground rods because individual rods had over 25 ohms resistance. All farm ground rods and the well casing were interconnected with uninsulated copper cable. This reduced the grounding resistance of this interconnected ground system to about 5 ohms but didn't affect the water system voltage to a measurement ground electrode. Milk production still was not good.

Electrical engineers at the Washington State University College of Engineering then were consulted. A quick trial with one Jersey cow showed that voltages of a level considered satisfactory by the utility gave a noticeable effect on the cow. The current passing through this cow was in the high "let go" region for humans.

An analysis of the equivalent electric circuit and the experience of another utility in a human shower annoyance problem showed that more grounds rods at the farm would not decrease the voltage. The engineers suggested that the grounded neutrals of the primary distribution be separated from the farm secondary system. When this was done, secondary neutral voltages were reduced to 1 to 2 v. Dairy production soon became normal! The cows recovered their gloss; feeding and drinking habits seemed normal; the problem apparently was solved.

This experience raised several questions. How widespread is the problem? How well recognized is it as a possible production problem? What voltage levels are acceptable? How can water supply to earth ground voltages be reduced to appropriate levels?

The above item was excerpted from an article sent to us by Lloyd B. Craine, Professor and Electrical Engineer at the Washington State University. This was in response to an item entitled "Utter Disaster" which appeared on page 11 of the January 1972 issue of the G-EMC Newsletter. For a copy of the complete report, request Paper No. J-814 from ASAE, St. Joseph, Mich. 49085. Price is \$1.00 per copy.

CHAPTER CHATTER

BY IRA M. BERMAN

LATE NEWS

It won't be dark so much as it will be gray. A thick layer of clouds will cover the earth (like Venus?) trapping heat. The polar ice caps, as well as the ice in Greenland, Siberia, and on the tall mountains will have melted long ago. The oceans will have risen, of course, but not by as much as was expected, due to some unpredicted shifts in the earth's crust, when the rotation slowed down. And it will be quite warm-- around 150°F-- including the oceans. Sentient life will have long expired and the Earth will have become a silent ball.

That's what may happen when all the available energy is used up and that old devil entropy hits a maximum. While we're waiting, let's see which Chapters are expending energy in their own ways.

CENTRAL TEXAS

Contrary to popular opinion, Texas is still part of the Union and the Central Texas Chapter is still part of G-EMC. The officers for the 1971-1972 season are: Ed Brounough of the Southwest Research Institute, Chairman; C. Mike Brennan of the Electro-Mechanics Company, Vice-Chairman; and Roy J. Welty of the AFSS, Secretary-Treasurer. A meeting was held on January 17, 1972, where a Dr. Frederick spoke on the Effects of Radiation in the Home, Shopping Centers, Hospitals, etc. Ten members and 11 guests sat in at the San Antonio Inn. This seems to be a subject of increasing interest these days, and it must have been quite worthwhile. Another meeting was scheduled for February 28 at IBM in Austin, and a co-hosted meeting with SAE-4 and NATO-EMC is on tap for April. Even a paper or two in under consideration. So now do you believe they are still active?

BOSTON

Guts--that's what it is. The Chapter Chairman, Bob Berkovits, typed me some news during mid-Winter with his wrist in a cast. From playing Rugby, no less. Prior to that, however, a meeting was held with 20 attendees on October 13, 1971, at Raytheon in Bedford, where Francis X. Witkowski of Raytheon Sudbury spoke on CAESAR (Computer Automated Electromagnetic Spectrum Analyzer and Recorder) dedicated to MIL-STD-461 testing. November 17 Mitre hosted the Chapter where 15 heard H.M. Sachs of Sachs-Freeman Associates speak on the "Magic" of System Integration. And another meeting was scheduled for December 6, again at Mitre, to hear P.A. Bello, L. Ehrman and J.W. Graham, all of Signatron, discuss Communication Receiver Interference Analysis. This last was to be co-hosted with the Communications Technology and AES Chapters.

TUCSON

I get the feeling that Tucson is very far away from Schenectady--all the way out in the desert, as a matter of fact. I have news here from last Autumn, which I guess is better than no news at all. The only change in officers was the election of Bob Cowgill as Program Chairman. That does not imply stagnation; on November 11-12, 1971, the Chapter sponsored the Mountain-West EMC Conference, with 180 attendees. Please send details. And an award was tendered to COL. W. V. Sanders. Any more on that? The Chairman Abul Ras hid, reports the members are enthusiastic. Good Going!

METROPOLITAN NEW YORK

There are new officers in Metro New York. They are: Dave Engle, Chairman; Will Bakker, Vice-Chairman; Sy Rubin, Treasurer; and Sal Burnstein, Secretary. The Chapter has scheduled a bunch of meetings this activity year, most of them at Brooklyn Polytechnic Institute. On October 7, J.J. Fisher of the Naval Air Systems Command spoke on "What this Customer Desires" to 26. Dick Mohr of AIL spoke to 14 on November 4, but no topic was available. On December 2, 12 attendees held a group workshop on EMC and the Law, and this format and attendance was repeated on January 6 for Shielding. Planned meetings start with one on February 3, 1972, with still another workshop on Spectrum Analyzer Utilization. The annual Playboy Club joint meeting with the New Jersey Coast Chapter was scheduled for March 9, and yet a fourth workshop on Is "Internal" EMC Analysis Necessary? will occur on April 6. There's even a field trip due on May 4, and, by George, a year-end social meeting on June 3. How's that for a schedule? But that's not all: a Certificate of Appreciation was presented to Will Bakker, immediate Past Chairman, and the Chapter will host the 1973 National Symposium. The Chairman writes the lately often-heard sad news that most companies consider EMC a necessary evil at best, and the EMC engineer a prime target for early layoff. But there are bright sides too: even if an engineer has to take a position not directly related to EMC, the basic principles of compatibility still apply, and quite often he can sneak some in when most needed and least expected. 'Nuff preaching. Stiff upper lip!

CHAPTER CHATTER CONT.

PACIFIC AREA COMMITTEE

No letter this time--just issue No. 3 of the excellent Newsletter. But this never ceases to amaze me--the interest and the sheer physical effort involved in getting and keeping this Committee going. The first meeting was held in the Sanno Hotel in Tokyo, at which the By-Laws were approved, postponement of elections until after January 1, 1972 was agreed to, and some 47 people promised further cooperation. Interest in the area in EMC is very high, indeed. The Newsletter makes for bright, pleasant reading, and it seems to be almost entirely from the President of Robert Ford Industries (sorry, Bob--couldn't resist!) And what is Honolulu like in February? Bob has received a Certificate of Appreciation from the AdCom for establishing the Pacific Area Committee.

CHICAGO

A personal-type handwritten letter from the Vice-Chairman, no less. Now we all know the latest group of Chapter Officers: Chairman, Marvin Frazier; Vice-Chairman, Steve Smandra; and Secretary, Norman Wehling. No words on any meetings but another plug for the Symposium on July 18-20. Steve tells me that good progress is being made.

NEW JERSEY COAST

Hey--have you fellows changed the Chapter name? My records show as above, but your Newsletter shows "Jersey Shore". In any event, the Newsletter calls out a luncheon meeting on October 14, 1971, where Mr. Robert Britian of the USFDA will talk on Federal Radiation Controls. Mr. Britian is in the Bureau of Radiological Health of Food and drug.

ATLANTA

Just a quickie here too: a meeting on November 29, 1971, where Bob Mayher, Senior Engineer at ECAC, spoke to 14 members and two guests on Degradation of Communications Receivers from Interfering Signals.

MOHAWK VALLEY

Still going, still kicking, still perking. Three well-attended meetings in late 1971 ended a most successful calendar year. On September 21, Dr. Woodrow Everett of RADC and Dr. Ben Leon of Purdue spoke to 25 on Communications--Electronic Trends in University Research. The November 3 topic was a lulu: Happiness in Reverence for Relevance. Wonder what that was all about. 30 lucky folk got to know. And COL Sadler spoke to 44 about the Mission of the Air Force Communication System's Northern Communications Area on December 8. A meeting a month is planned through June 1972, including a social meeting, and (as usual) papers are in the preparatory stage. How do they do it?

LOS ANGELES

The Chapter has its own letterhead with the officers listed on which they print meeting notices. A meeting on November 18, 1971, featured Edward Skomal of the Aerospace Corporation speaking on Man-Made Radio Noise in the Urban Environment. A meeting on January 27, 1972, featured a Panel discussion on What's New in EMC. Moderator was Eldon Hughes of North American Rockwell, and the panelists were: Eavid Stratton, HTL Industries, EMC Requirements; Robert Cowdell, Gilfillan Inc., EMC Design; James Spagon, TRW Systems, EMC Analysis; and Robert Molz, Hughes Aircraft, EMC Instrumentation. And their New Opportunities and Information for Spectrum Engineers has 9 job opportunities and 12 situations sought. Bully all around!

PHOENIX

As I write this, Schenectady is under the season's second large snow fall. The weatherman says 12 inches or more, with blowing and drifting. Does it snow ever in Phoenix? It meets in Phoenix--the Chapter that is--and in particular on January 26, 1972 where Neal Baerwald of Lockheed spoke on the Test Capabilities of the Electromagnetic Environmental Test Facility to 25. Another meeting is planned by June. Not bad at all for a new Chapter.

WASHINGTON, D.C.

The Capitol chaps report two meetings so far this activity year: November 18, where Joseph J. Fisher of the Naval Air Systems Command discussed Receiver Susceptibility and EMC before 50, and January 20, when Robert Marcus of the Naval Ships Engineering Center reported on Pulsed Spectrum Measurements--Field Intensity Meters vs Spectrum Analyzers. 51 attended in January. I guess which one you use depends on what kind of pulses you have. On my questionnaire to the Chapter Chairmen, I asked about local business/industry feeling toward EMC. Carl Allen's comment was typical of the general attitude lately: "It generally ignores EMC unless forced by contractual requirement to do something about it. The general public wouldn't recognize an EMC unless it bit them". So what's new? I guess that would be humorous if it weren't so pathetically true.

In spite of this gloomy note, let me duck out with a few cherry words. Business is supposed to be picking up. It won't be the same as 1967, but it should improve. And G-EMC (which is no more or less than its members) is going to have to sell EMC so the public will recognize it before it gets bitten. Happy Spring!

Ira (Marty) Berman

BOOK REVIEW

DESIGN OF LOW-NOISE TRANSISTOR INPUT CIRCUITS,
by William A. Rheinfelder, Hayden Book Co.,
New York, N.Y. \$5.50, 160 pages, cloth bound.

The objective of low-noise design is to obtain the maximum signal-to-noise ratio. Reduction of inherent noise also allows the option of reducing signal strength or increasing range or numerous other trade-offs. This brings low noise design into the realm of the EMC engineer.

The author has produced a very usable reference in this book. The opening chapter is a lucid discourse on the noise figure concept including an explanation of the difference between 3 dB and noise bandwidth.

Cross-modulation and intermodulation are two of the noise problems of serious concern in the EMC community. The author discusses the causative mechanisms and develops design procedures for receiver front ends with low cross and intermodulation distortion. The consideration of front ends also includes a discussion of antenna noise and antenna temperature. In the general sense "noise" is a term that refers to any signal other than the desired signal.

Low noise in audio stages is another story. The author describes the design precepts for low noise audio stages. External noise sources must also be evaluated and laid to rest before a true low noise system is achieved.

The final chapter presents some low-noise designs of leading manufacturers, both of this country and abroad. The examples include various front ends operating in the AM broadcast band up into the UHF TV band. A low noise phono preamplifier rounds out the selection.

This book is a practical treatise for students as well as circuit design engineers. It includes a good usable selection of design curves and graphs. I like the List of Symbols in the front. This is of great assistance when you use the book as a quick reference. The EMC engineer who delves into circuit design or who must work with circuit designers will find this book worthwhile.

James S. Hill
RCA Service Company
Springfield, Virginia

RADIO FREQUENCY INTERFERENCE HANDBOOK

Compiled and edited by Ralph E. Taylor, Goddard Space Flight Center, National Aeronautics and Space Administration, March 1971, \$3.00, 264 pages, paper covers. Library of Congress Card No. 74-174579. Order from National Technical Information Service (NTIS) Port Royal Road, Springfield, Virginia 22151.

This handbook, just off the press, has come about as a result of the effort of Ralph E. Taylor, now at the Communications and Navigation Division, Navigation and Data Collection Branch, Goddard Space Flight Center. Mr. Taylor is a member of the G-EMC Standards Committee. The book was prepared

as a part of the STADAN RFI reduction program to define the various mechanisms that produce RFI, to provide effective solutions to minimize the degrading effects of RFI, and to ensure electromagnetic compatibility in the performance of systems. There are three sections in the handbook.

Section I - Electromagnetic Compatibility Fundamentals Applied to Spacecraft Radio Communications Systems

Section II - Electromagnetic Compatibility Design Guideline for STADAN

Section III - Lightning Protection Practices Applied to Field Station Installations

Section I was prepared under the direction of Dr. Fred Haber of the Moore School of Electrical Engineering, University of Pennsylvania. M. Celebiler and C. Weil-Malherbe were co-authors.

Section II was prepared under the direction of James S. Hill, RCA Service Company, while with the Genistron Washington Facility of Genisco Technology Corporation. Co-authors were Robert B. Cowdell, James C. Senn, Jerald C. Shifman and John W. Skaggs.

Section III was co-authored by Thomas J. Ballock and Edward R. Uhlig of the General Electric Company High Voltage Laboratory at Pittsfield, Massachusetts.

In the Foreword Mr. Taylor thanks the EMC group of IEEE "for providing the academic atmosphere that substantially influenced the preparation of this handbook. For instance, seven members of the EMC group directly contributed to the preparation of the three sections and their respective names appear therein".

References are listed at the end of each chapter. The book is complete with both a subject index and an author index. (This is a press release and not a book review, ed)

AIRWAVES

SPECTRUM MANAGEMENT TASK FORCE ESTABLISHES
FIRST REGIONAL OFFICE IN CHICAGO: TO PROVIDE
LAND MOBILE INFORMATION SERVICE

The Spectrum Management Task Force, established by the FCC to promote more efficient use of the radio spectrum has opened its first regional office in temporary quarters in Chicago, Ill.

Until a permanent site is established, the office will operate from Suite 1900, 176 West Adams Street, in the Loop.

The Chicago area was chosen by the Commission as the first of several regions in which a decentralized spectrum management operation will be carried on. Initial efforts will concentrate on improving the quality of radio communication for licensees in the land mobile radio services, which have been faced with overcrowded radio channels and shortage of radio frequencies.

The Chicago Regional Center will study land mobile radio operations within approximately 175 miles of the Loop, and will collect information from approximately 25,000 licensees in the region. Information con-

cerning the program and the new application form associated with this operation, FCC Form 425 dated October 1971, may be obtained from the Regional Center. Personnel from the center will be available to conduct briefings on use of Form 425. Sessions may be arranged at the center's offices or at other cities within the Chicago Region, as manpower permits. Submit requests by writing or by calling area code 312, 353-1125.

Written requests for applications for briefing sessions and all other correspondence should be addressed to:

Federal Communications Commission
Chicago Regional Center
Park Ridge, Illinois 60068

ANTENNA BEAM INTERSECTION REPORT ISSUED BY FCC

Research Division Report No. R-7201 entitled "PERDIS - A Computer Program to Determine if Two Antenna Beams Intersect and Provide the Perpendicular Distance Between the Beam Axes" has been issued by the FCC.

Since satellite communication system earth stations and terrestrial microwave stations share common frequency bands, it is necessary to calculate the possibility of interference between the two. One possible source of interference is the signal scattering from precipitation or other mechanisms located within the common volume formed by the intersection of two antenna beams. PERDIS was written to determine if a common volume exists between the two beams. The program is completely universal in that it can be used for calculations involving any location on earth, with any antenna pointing configurations and any beamwidths.

Copies of the report may be obtained from the FCC's Research Division, Room 214, 1229 20th Street, N.W., Washington, D.C. 20554.

NEW DEFENSE TELECOMMUNICATIONS POST OKAYED BY HOUSE COMMITTEE

The House Armed Services Committee has favorably reported a bill which would establish the new post of Assistant Secretary of Defense for Telecommunications. The present status of the top DOD communicator is that of an Assistant to the Secretary. It is now temporarily filled by David Solomon following the death last year of Louis A. deRosa.

A CRACKDOWN ON "ELECTRONIC POLLUTION"

An article with the above title appeared in the January 15, 1972 issue of Business Week. Several members have requested that it be reprinted in this newsletter. However, it is too long and would require special permission by the author. The article essentially warns manufacturers of electronic products of the electronic pollution problem. Included are statements such as:

"The situation has become so serious, in fact, that the FCC is now clamping down on manufacturers who persist in designing devices that wantonly emit EMI. The upshot could be what amounts to a licensing procedure for all electrical and electronic products. Last month, the commission gave official notice it was drawing up tough "type approval" rules for a number of worrisome products. Manufacturers have until Feb. 15 to comment on the proposals.

"The rules have real teeth in them", warns John Sodolski, staff vice-president of the Electronic Industries Assn. The FCC will require manufacturers to submit prototype equipment to its laboratory in Laurel, Md., for evaluation. Initially this procedure will apply only to products for which the FCC currently has regulations. These include walkie-talkies and other transmitting and receiving equipment, microwave ovens, diathermy machines, automatic garage-door openers, and video tape recorders. But eventually the FCC may also cover such seemingly innocuous products as blenders, can openers, electric razors, air conditioners, and even household dimmer switches. Says Herman Garlan, Chief of the Agency's Radio Frequency Devices Branch: "We have the authority when and if we need it."

Others quoted in the article include Don White of Don White Consultants, Inc., Heinz Schlicke of Allen-Bradley and as Chairman of the G-EMC, Albert Cohen, President of Metex Corp. and Bob Goldblum of G.E., R.E.S.D.

Fred Nichols, President of Letro Magnetics, Inc., sent us the following comments on the article, "Never have I seen a more active period of lip service to EMC, spectrum utilization, "electronic pollution" etc, without corresponding action in the some past 25 years. If a small mount of this energy and administrative dollars could be channeled into direct engineering, out Group (G-EMC) would be so many that I doubt if we would have all the technical manpower necessary to fill the urgent requirement that now exist. And, the longer we wait, the more complex and more expensive (it will be)."

STUDY SUGGESTS MICROWAVES DISABLE AF PERSONNEL

Air Force jobs around microwave radiation sources produced the most disability discharges due to eye pathology and blood diseases in 1970, the Bureau of Radiological Health has found. When asked about the unpublished epidemiological study, project head Dr. Loren Mills said there appeared to be more eye problems among workers repairing navigational, communication and directional radars, or exposed to the commercial microwave ovens used for cooking. But Mills cautions that no firm conclusions can be drawn before three or four additional years of disability records have been compared with the current study. (From Electronics, Dec. 20, 1971).

NEW JERSEY "SPACETRACK" RF RADIATION CALLED SAFE

(The following is excerpted from an EPA Newsrelease dated 19 Jan. '72).

A scientific survey of the U.S. Air Force "Spacetrack" radar facility in Moorestown, New Jersey has found that the radio frequency emissions are "well below" the current guidelines.

The standards referred to are the Air Force occupational guidelines for electro-magnetic radiation, at the frequencies being used.

"The radiation levels reported by the Air Force are a fraction of the 10 milliwatts per square centimeter exposure guide used by the Air Force and other groups," according to Michael S. Terpilak, a radiological health specialist with the U.S. Environmental Protection Agency's Region II office.

EPA worked with experts from the Air Force, the U.S. Department of Health, Education and Welfare, and the New Jersey Department of Environmental Protection in conducting the test.

Residents of Willingboro Township, near the radar facility, have expressed concern about possible negative effects to human health. There were also complaints that the radar beams interfered with local radio and stereo sets, and with hearing aids.

"We look to the Air Force, and RCA--a contractor that jointly operates the facility--to provide information to the community, advising residents on how to arrange for the installation of simple components that will eliminate static or interference caused by the radar facility," Terpilak said.

ACKNOWLEDGEMENTS

The editor would like to thank the following individuals and their companies for submitting material for this issue of the Newsletter.

G. MacLeod
R. B. Schulz
H. Garlan
L. B. Craine

G.E. RESD
Southwest Research
FCC, RF Devices Branch
Washington State Univ.

WANT A D.A.T.E.

Our EMC Group is preparing the first of several (hopefully) inputs to the Data Access of Technical Education system. This system permits the user to telephone IEEE Headquarters and receive a four to eight minute discussion on a rapidly expanding series of subjects. The only cost is that of a telephone call.

It is important that as much information as possible regarding EMC be included in this system. Those interested in this project are invited to write:

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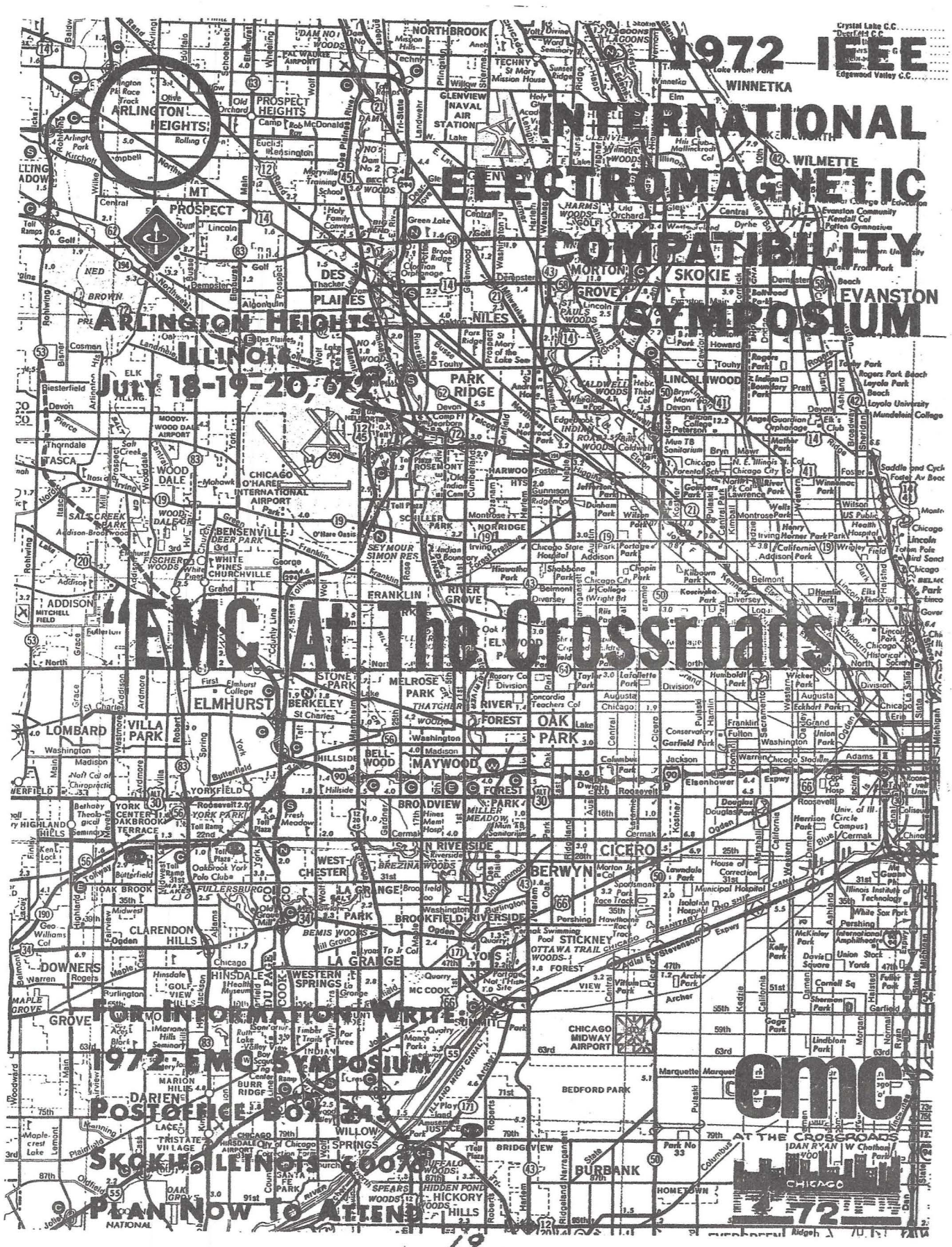
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EMC Problems and Solutions

A previous issue of the EMC Newsletter presented a three-part problem for consideration by the readers. Responses have been received for two of the three questions, and one of them is presented in this issue. Future issues will print other responses to questions posed by the readers.

The question considered in this issue is:

"In view of the general Federal Safety Standard for microwave radiation of 10 milliwatts per square centimeter, what is a good way to calculate the near field power density in the range 100 MHz to 20 GHz?"

Mr. Ernst L. Bock, a Consulting Radio Physicist from Sepulveda, California, submitted the following response:

"The crux of your inquiry is the word near rather than good. '...a good way to calculate the near field power density in the range 100 MHz to 20 GHz,' is to stipulate that one-wavelength has the meaning nearest. Then assuming that you wish to be safe, and who does not, imagine the maximum dimension of the radiator to be the diameter, D_m , of a sphere. Then the maximum power density, P_d , on the surface of the imaginary sphere is given by

$$P_d = 4 P_t / \lambda^2 \quad (1)$$

where P_t = power radiated in milliwatts, and λ is in centimeters, for

$$P_d^* = 10 \text{ mW/cm}^2 = \text{hazard} \quad (2)$$

When the maximum dimension of the radiating object is less than one-quarter wavelength, use the same formula, (1), at a distance of one-wavelength, and be safe. Since radiating transmission line segments may produce pattern gains of 8, (a number), when the segment is a wavelength in extent, the safe approach is good. However, if you wish to gamble

$$P_d = P_t / \lambda^2 \quad (3)$$

may be used for small radiation sources and linear arrays.

Appendix I

$$P_d = P_t G_t / 4\pi S^2 ; \quad (4)$$

Let $S = 2 D^2 / \lambda$, $G_t = 4\pi A / \lambda^2$, $A = D^2$, then

$$P_d = P_t / 4 D^2 = \text{power density at } 2 D^2 / \lambda \quad (5)$$

$$P_d(\text{near}) \leq (P_t / 4 D^2) ((2 D^2 / \lambda) / (D/2))^2 \quad (6)$$

$P_d(\text{near}) = 4 P_t / \lambda^2$, as given in (1), and a safety factor of about 2.5 times is provided for when $D_m > 2.5 \lambda$, allowing for hot spots resulting from struts, feed assemblies, etc..."

Please send your EMC problems to:

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