

IEEE

ELECTROMAGNETIC COMPATIBILITY GROUP

NEWSLETTER



ISSUE NO. 74—July, 1972

EDITOR ROBERT D. GOLDBLUM

AN INVITATION

WHAT IS ONE OF THE MAJOR ACTIVITIES OR BENEFITS
WHICH YOU MAY RECEIVE WHILE BELONGING TO G-EMC?

"Attending The Annual Symposium"

As Chairman of the 1972 EMC Symposium, it is my pleasure to invite, or perhaps should I say—strongly request—you to attend this year's Symposium, July 18-20, in Arlington Heights, Illinois. Regardless of your background and degree of current involvement in EMC, you will profit from attending the technical sessions and exhibits. The G-EMC will also profit in several ways from your attendance: as an indication to the world of the support which exists within our Group; monetary support from your registration fee; and an indication to the exhibitors (who form our financial base of support) that their investment is indeed worthwhile.

Unlike many symposiums which "Guarantee 100% perfect weather or the world's most beautiful scenery," we are not highlighting our midcontinent location or our modern, full service facility. Rather, I will promise you three fully packed days during which you can participate in 13 sessions covering many, many aspects of EMC from biological effects and cardiac pacemaker susceptibility, through policy discussions on Spectrum Management by the Office of Telecommunications Policy (OTP) of the Department of Commerce and the Federal Communications Commission (FCC). The program will also cover EMC Test Specifications, Instrumentation, Shielding, Grounding, Antennas and many other EMC topics.

We have adopted the theme of "EMC AT THE CROSSROADS" for this year's Symposium, and it is the expectation of your Symposium Committee that the program which will be presented will properly reflect the expanding role of EMC—from just the military and governmental, to include the ecological, environmental and safety aspects of this area.



As an additional major part of the Symposium, we will have a well planned exhibit area covering instrumentation, services, and components associated with the EMC community. The total "Symposium System" is designed to appeal to all management and technical personnel involved in EMC from the expert researcher, to the individual just becoming associated with EMC because of the consumer or industrial product, or service his employer manufactures or offers.

As we all know, in many areas, approval of travel funds is very hard to obtain; however, funds are available if you prepare your case properly. When you receive your Symposium program, review it carefully and use its contents to explain what you expect to obtain from attendance at this year's Symposium. Remember—don't be afraid to ask for approval but do be ready to justify it!

We are looking forward to exploring EMC with you in July!

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MEETINGS & EVENTS

PERRY TO HEAD 1973 EMC SYMPOSIUM

Sam Perry, President of All Tronics Inc., Wesbury, N.Y. has accepted the responsibility for Chairing the 1973 International Symposium on Electromagnetic Compatibility. He has formed new committees with the help of Tony Fimbalatti and Dave Engle, and is moving along fast.

The '73 Symposium has been scheduled for New York City on June 20-23, instead of the West Coast so that it may be conducted adjunct to the Plenary CISPR meeting. The CISPR meeting will be held for 10 days immediately preceeding the Symposium on June 11th-19th.

CISPR is the French initials for International Special Committee on Radio Interference. Chairmanned by Professor F. L. Stumpers of the Netherlands, a Plenary meeting is held every 3 years in different countries. The U.S. National Committee of the IEC (International Electro-Technical Commission) invited the CISPR meet here next year. It last meet in the U.S. in 1961 when it convened at the University of Pennsylvania in Philadelphia. Working Group meetings are conducted annually also at different countries and report their progress at the Plenary meeting. There will be more on this in future newsletters.

G-EMC AD COM MEETING

The second tri-annual meeting of the G-EMC Ad Com is scheduled on Monday, July 17, 1972, the day prior to the opening of the 14th Annual EMC Symposium. The meeting is scheduled as a full day session, starting in the morning (10:A.M.) at the Arlington Park Towers. Ad Com members and other interested persons should check at the front desk for the room number and a possible change in starting time. The meetings are open to the general group membership. However, persons wishing to bring up subjects not in the agenda, should contact the President, John O'Neil, prior to the meeting at (201) 535-1877. Scheduling will be tight and we would like to give *all* subjects an appropriate time allotment.

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IEEE ANNOUNCES MAJOR CHANGES FOR NEXT YEAR

The IEEE plans four innovations for next year's IEEE show in an effort to reverse the poor turnout for the show this year. Only 25,000 people passed in and out of New York City's Coliseum in 1972 compared to 35,000 the year before, and only 258 exhibitors turned up compared to 426 in 1971.

Next year, the IEEE will play up the 25th anniversary of the transistor—probably to lure back major semiconductor firms; put out a call for papers instead of limiting those the association chooses to invite; group the exhibits according to 10 product areas; and provide special centers for discussing specific engineering disciplines.

The exhibit groups will include communications and systems; components and microelectronics; data processing and transmission; electromechanical design; electro-optical technology; energy utilization and control; fabrication and packaging; instruments and instrumentation; and solid state and circuits.

Still alive. Says William Hilty, convention and publishing services director: "All in all, we are not going to die, nor is the big-show concept. We offer specialization, and we also offer the overview that's necessary for the industry. People don't realize we are just a reflection of the industry, on the whole. We feel we have bottomed out this year."

As for those critical of New York as a convention site, Hilty points out a recent poll indicates that exhibitors still prefer New York, followed by Los Angeles and San Francisco.

"We had thought about moving out of New York, but realized the show would die. New York is still the center of the East Coast electronics industry, and it suits our needs, just as Wescon suits the West Coast's needs, and NEREM suits Boston's needs."

Yet, one of the major complaints about New York has been the expenses for exhibitors and visitors. Hilty's answer is succinct: "About the only place that isn't expensive nowadays is Hope, Ark." However, an economy move for next year will be the rental of only a portion of the Coliseum, instead of the 100% space commitment of past years.

'72 ICC CONFERENCE FEATURE EMC SESSION

The 1972 IEEE International Conference on Communications met in Philadelphia during June. The following papers were presented at a session sponsored by the G-EMC:

- 1A: New Trends in Spectrum Management
Michael Toia, Federal Communications Commission
- 1B: Is There A Communication Compatibility Theory?
George R. Cooper, Purdue University
- 1C: Digital Receiver Susceptibility Measures
Dr. Denmer D. Baxter, Martin-Marietta Corp.
and John J. O'Neil, U.S. Army Electronics Command
- 1D: Design of a Communications Security Test Receiver for Maximum Broadband Dynamic Range
J. B. Hager, J. C. Jones, and J. R. Van Cleave, American Electronic Laboratories, Inc.

CALL FOR PAPERS

1972 IEEE/G-AP Symposium, December 11-14, 1972
Jointly Held With
FALL USNC/URSI MEETING, December 12-15, 1972

The 1972 Fall Meeting sponsored by the U.S. National Committee of URSI and the 1972 IEEE International Antennas and Propagation Symposium will be held jointly at the Convention Center of Colonial Williamsburg and the College of William and Mary in Williamsburg, Virginia. URSI and IEEE/G-AP technical programs will be arranged separately except for appropriate coordination.

Authors are invited to present papers in their fields of interest, treating theoretical, experimental or developmental work related to the topics below:

URSI COMMISSIONS

- I. Radio Measurement Methods and Standards
Measurement of RF and Microwave Fields Causing Biological Effects. Measurement of Quality of Broadband RF Communications in the Presence of Man-Made Noise.
- II. Radio and Non-Ionized Media
Radiometric Remote Sensing. Laser Measurements for Determining Atmospheric Pollutants (To be Held Jointly with Commission I).
- III. Ionospheric Radio
- IV. Magnetospheric Radio
- VI. Radio Waves and Transmission of Information

TOPICS FOR THE G-AP SYMPOSIUM

1. Low Noise Antennas
2. Numerical Methods Applied in Electromagnetic Problems
3. Design, Calibration and Application of Radiometer Antennas
4. Electrically Small Antennas
5. Integration of Antennas and Circuits
6. Propagation Through Rain and Clouds
7. Detection of Clear Air Turbulence
8. Stochastic Methods Applied to Electromagnetic Problems
9. Radiation of Transient Signals by Antennas
10. Broadband Antennas

Deadline for submission to G-AP and URSI Commissions II and VI—September 7, 1972.

Deadline for submission to URSI Commissions I, III, and IV—September 21, 1972.

Abstracts should be sent to:

Dr. Calvin T. Swift
NASA-Langley Research Center
Mail Stop 490
Hampton, Virginia 23365

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.

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.

The text and heading should be typed on white 8-1/2" x 11" paper. Left and right margins should be 1 1/2". A 1" margin should be left at the top and bottom of all pages. Both text and heading should be single spaced and not indented except where specified. A double space should be left between paragraphs. The summary is to be limited to four pages including text, references, figures, and photographs.

BOOK REVIEWS

RADIO INTERFERENCE HANDBOOK NASA SP*3067

Ralph E. Taylor

For several years, the Headquarters Office of Tracking and Data Acquisition, Supporting Research and Technology (SRT) NASA, has supported a RFI Reduction Program for Space Tracking and Data Acquisition Network (STADAN) facilities. An objective of the SRT program has been 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. This handbook addresses itself to these topics and is an effective handbook which can be used for many EMC programs.

The handbook is divided into three sections, each written by different authors.

Section I defines the mechanisms that produce RFI by intermodulation, cross modulations, and spurious emissions. Calculations and formulae define the spectral characteristics of various forms of modulation. Various forms of interference reduction techniques are discussed in general including site selection with an emphasis on STADAN frequency requirements.

Section II entitled "EMC Design Guideline for STADAN" is an excellent reference for EMC design and can be used for most system and equipment problems. Some of the highlights of this section are; discussion of shielding theory with nomographs for determining reflection and absorption losses of shielding, graph of the impedances of common bonding materials, a section on handy calculations aids which contains many charts, and graphs useful in EMC calculations. In addition, this section contains excellent chapters on filtering and grounding.

The grounding chapter presents a fair unemotional assessment of the particular advantages of "Single-Point" and "Multiple-Point" grounding systems. This chapter also discusses the use of shielded leads for high and low frequency E and H field protection and the use of returns for power and signal. This discussion then leads into a chapter on cabling.

The Filtering chapter starts out with a basic filter theory, then addresses the practical design of interference suppression filters. A nomograph is provided for computing the values of inductance and capacitance for a specific filter requirement.

Section III discusses the theoretical considerations of lightning phenomena. A typical Stadan tracking site is analyzed from a lightning standpoint. Recommendations are made for lightning protection and examples of actual installations are shown. This section is concerned primarily with lightning strikes to ground stations and particularly the STADAN network.

All sections in this book contain excellent references and bibliographies which, in itself, is a valuable tool. Some chapters in the first section appear to be too brief and out of place, as if the author was just introducing a reference without saying anything. There appear to be conflicts between sections I and II in the area of cabling and grounding. This is not uncommon, since no two people agree on these subjects, but unfortunately may confuse the layman.

The book, I found, to be a very good broad brush treatment of good EMC practices and a useful addition to any EMC library.

For sale by the National Technical Information Service, Springfield, Va. 22151. Price \$3.00.

Prepared by: Bill Johnson
Fairfax, Va.

BOOK REVIEWS (Continued)

TOPICS IN INTERSYSTEM ELECTROMAGNETIC COMPATIBILITY

Edited by Woodrow W. Everett, Jr., Holt, Rinehart and Winston, Inc. New York, \$21.00, 563 pages, cloth bound. Available from R & B Enterprises, P.O. Box 328, Plymouth Meeting, Pa. 19462.

This is the first college level textbook to address the subject of electromagnetic compatibility (EMC). The editor, director of the post-doctoral program in electromagnetic compatibility at Rome Air Development Center, has been assisted by Professors Arlon T. Adams and José Perini of the Electrical Engineering Department, Syracuse University. The book has been developed from the lecture notes for a 15 day intensive course presented by Syracuse University in the summer of 1969 and 1970. Major contributions are credited to A. Scott Gilmour, Jr., Edwin F. Johnson, Benjamin J. Leon, Lee A. MacKenzie, Octavio M. Salati, and Roland E. Thomas, all of whom were listed on the faculty of the course presented at Syracuse.

The authors do not attempt to cover all the facets of inter-system EMC which could be covered, or even those which should be covered. They do consider the aspects which, in their opinion, are most important and which will remain so in the foreseeable future. The topics covered are amplification and oscillation, filters and nonreciprocal elements, signal processing and detection, antennas, and transmitter and receiver systems. The section on intrasystem EMC covers grounding, bonding and shielding. The material is slanted to accommodate practicing engineers and technical managers as well as students at the upper undergraduate or lower graduate levels.

The book is well organized into 7 parts. Part 1 is introduction and provides an orientation to the intersystem point of view, an overall appraisal of compatibility requirements. Part 2 covers two of the major system components, transmitters and receivers. The discussion of transmitters deals with spurious emissions and focuses on design considerations and methods which are effective in reducing pollution of the RF spectrum. The interest in receivers is a limited one in that receiver susceptibility to undesired signals and receiver spurious responses are of top importance. Part 3 on signal generation and amplification considers in depth the widely used linear-beam and crossed-field devices as well as the evolving bulk solid-state devices. These bulk solid state devices will be in use for the next decade and have not been treated in the literature with specific emphases on EMC implications. Part 4 examines filters and nonreciprocal elements. Active filter concepts in integrated circuits, digital filters, and microwave filters are featured. The chapter on nonreciprocal

elements includes consideration of circulators and isolators—the nonreciprocal elements in common use in every experimental laboratory. Part 5, signal processing and detection, covers topics considered to be advanced areas of interest to intersystem engineers. Phase-locked loops, information theory, detection techniques, and modulation and time sharing schemes are pertinent in developing concepts for handling cochannel interference problems. Part 6 is devoted to antennas and antenna concepts. The pertinent Aspects of antennas are treated from an electromagnetic compatibility standpoint. A matrix inversion method of solving antenna design problems is described. Part 7, intrasystem electromagnetic compatibility, covers the important systems and intersystem concepts of grounding, bonding, and shielding even though these areas have traditionally been considered the province of intrasystem engineers.

References are cited throughout the text and listed in a separate section. There are 298 entries in the "References and Bibliography" and in addition to this a selected bibliography for Part 7 on intrasystem EMC.

There is no EMC course in any college curriculum at present and with the drop in engineering enrollments it is not probable that there will be an EMC college course in the immediate future. However, this book is being used as an adjunct to the primary text in certain related courses at the University of Buffalo, the Air Force Academy and at the Navy Post Graduate School, Monterey. This is beneficial to the EMC community in that it introduces the intersystem EMC concept to students who might otherwise be unaware of it.

"Topics in Intersystem Electromagnetic Compatibility will be particularly useful to the engineer working in the area of advanced system design where application of the newer evolving technologies will push the state-of-the-art. As a case in point the author notes that radar transmitters in 1940 operated with a 10 watt average power level while today average power levels exceed 1 megawatt. For a single transmitter, spurious energy 50 dB below the fundamental signal resulted in 0.1 milliwatt average power in 1940 and 10 watts of average power today, or about the same amount of spurious energy today compared with energy at the operating frequency in 1940. Expand this by the number of individual operating units today and you can perceive why there is concern about pollution in the electromagnetic environment. This book is recommended as an essential reference for all electrical and electronics engineers.

James S. Hill
RCA Service Company
Springfield, Virginia

PUBLICATIONS

August '72 EMC Transactions

The following is the Table of Contents for the August 1972 issue of the IEEE 6 EMC Transactions:

Cross-Ambiguity Function for a Linear FM Pulse	
Compression Radar	S. A. Cohen
Man-Made Noise	J. F. Lynn
Transmission Line Coupled to a Cylinder in an Incident Field	R. W. P. King and C. W. Harrison, Jr.

NEW EMC BIBLIOGRAPHY AVAILABLE

An updated (1962-1970) EMC bibliography is now available from IEEE Headquarters. It is a re-printing of the document "Bibliography on Electromagnetic Compatibility" by D. G. Arnason made available on a non-profit basis by the Defence Research Establishment, Ottawa. To cover printing costs, the list price is \$6.00 for non-members of the IEEE, libraries, etc., or \$4.50 for IEEE members. Ordering information is:

IEEE Publication 72 CHO 680-9-EMC

from

Order Department
Institute of Electrical and Electronic Engineers
345 East 47th Street
New York, New York 10017

PUBLICATIONS (Continued)

EIA COMMENTS ON PROPOSED MIL-HDBK FOR EMC

The Electronic Industries Association has submitted comments on the proposed MIL-HDBK for "Electromagnetic Compatibility/Interference Program Requirements" in a letter dated March 28, 1972.

The proposed document was reviewed by representatives of member companies of the Electronic Industries Association participating in the Electromagnetic Compatibility (G-46) Committee of the Association and the comments and recommendations reflect their views.

The Committee considered the proposed handbook to be of value in its present form and recommended its publication. It was further recommended that, following publication of the handbook, a project be set up to expand the material contained in it as may be necessary to put it in appropriate form for a MIL-STD on EMC plans.

The letter stated, "The criteria for other specialty plans are presently contained in several MIL-STD's and if the criteria for the Electromagnetic Compatibility plan for programs were contained in a MIL-STD it would be more consistent and would remove some of the possibilities for misunderstandings. An example of a current standard giving criteria for a program plan is MIL-STD-785 which covers the reliability plan."

Specific comments to the proposed handbook were relatively few and were submitted on an attachment to the letter.

ALUMINUM ELECTRICAL CONDUCTOR HANDBOOK

A major new and comprehensive handbook on aluminum electrical conductor, written especially for the electrical application engineer, has been published by the Aluminum Association. The 368-page publication, entitled "Aluminum Electrical Conductor Handbook," brings together in a single volume a wealth of detailed information and data of primary interest to the electrical application engineer. Its major editorial emphasis is on aluminum conductors for transmission, distribution, and use of electric power.

The handbook is divided into the following major subjects: aluminum, the metal; aluminum as a conductor; bare aluminum wire and cable; covered and insulated aluminum wire and cable; aluminum bus conductors; electromagnetic and other electrical applications of aluminum, and related structural applications of aluminum.

These subjects are covered in 18 separate chapters, beginning with basic information on the metal itself, aluminum metalworking processes, aluminum conductor properties and advantages, and engineering design of conductors. Succeeding chapters are devoted to product identification and data on aluminum conductors, installation practices, operating performance and problems, and a review of aluminum conductor types and their applications.

The remaining chapters cover aluminum conductor insulation and related cable components; elements of dielectric theory; engineering design as related to cable applications; an explanation of the IPCEA-IEEE tables of ampacity of insulated aluminum cables on aluminum cable products; bus conductor shapes and applications; aluminum magnet conductor; capacitor foil; cast aluminum rotors and switchgear; rigid aluminum conduit; and aluminum street lighting, towers and station structures.

The handbook also provides detailed information on aluminum connectors and connections, including connecting procedures, connecting aluminum conductors to other metals, connecting single-conductor secondary wires and cables, etc.

"Aluminum Electrical Conductor Handbook" was produced by the Aluminum Association's Electrical Division and its Technical Committee on Electrical Conductor. Copies are available at a cost of \$6.00 from the Aluminum Association, 750 Third Avenue, New York, New York 10017.

EMC PROBLEMS AND SOLUTIONS

A reader who wishes to remain anonymous poses the following for consideration by other readers of the Newsletter.

Several articles about the possible dangers of electromagnetic (EM) pollution have appeared recently in newspapers in the Washington, D.C., area. One such article which appeared in the Washington Star was titled "Scientist Worried by Electronic Smog." Selected quotes from this article are presented below.

"Another form of pollution—unseen, subtle and potentially more deadly than pesticides or mercury—is worrying scientists. It's electronic smog.

'Its impact—as usual—will be in the cities,' Dr. Henry L. Logan said in an interview this week. 'Urban living is doomed unless we do something about it.'

The effects of electronic smog, on people, are still unknown and unpredictable Logan said. Its impact on electronics has already been both costly and catastrophic.

Logan believes that the same sort of catastrophic failures and long term inhibitions which electronic smog inflicts on electronic equipment may also impact directly on people.

The reason is that biological systems are far more sensitive to electromagnetic energy than anyone ever imagined.

'Today's man is the first to live in this sort of a world,' Logan says. 'We don't know what all the effects will be, but we know enough to be sure there will be some we haven't even imagined yet.'

Logan and others believe that increased rates of certain diseases in urban areas may be related to electronic smog. If something as slight as the minute variation in the forces of the earth's geomagnetic fields can be statistically correlated with mental hospital admissions, then perhaps other forms of mental illness are being caused by electronic pollution, he suggests."

In general I am pleased to see articles of this type because they draw public attention to EMC problems. However, each time that I read one of these articles I cannot help but wonder if the problems are exaggerated or if they really are as bad as indicated. Consequently, I would like to obtain responses from readers of the EMC Newsletter on the following:

- clippings of other articles of this type
- individual reactions to these articles
- comments as to the potential dangers of urban RF environment levels to human existence
- information on existing or planned research projects to investigate the effects of normal levels of urban RF environment on human existence.

Please send your responses and EMC problems to:

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

CHAPTER CHATTER 74

by Ira (Marty) Berman

This is it, kid, this is the day—all the way from Mauna Loa to the Midnight Ride with way stops enroute. It's a milk train, a night train, a hot shot express with a mixed consist and layovers in Anaheim, Azusa and Toonerville, and all DOT's horses and all DOT's men couldn't put AMTRAK back together again. All aboard!

The sand is white, the sun is hot, and I know where I am not: in the PACIFIC AREA COMMITTEE's bailiwick. Where the sun shines and the soft trade winds blow and because of the distances involved, everyone uses radio (no telephone poles yet to Guam and/or Midway) and everyone has EMC problems. The Committee's first 1972 meeting was held on January 13 at Hickam Air Force Base with the day's speaker stuck in Korea so they held a meeting anyway and decided to hold at least one meeting a quarter in Honolulu over lunch which is one heck of a long haul from Tokyo even longer than from Schenectady to Rome, New York just for fried rice and poi or whatever they eat in Hawaii (is there a MacDonald's on the islands?). The Chairman Bob Ford managed a long trip to the Mainland where he fell into SAE AE-4 meetings wherein (he says) much EMC business is discussed and even a Los Angeles Chapter meeting which featured a trip to see the mock-up of the new B-1 bomber which he says is small from above but large from below depending on where you stand and which no doubt will be beset with EMI problems by the barrelful because who has a shielded room large enough for a B-1? Aloha, baby.

It's not the Chattanooga Choo-Choo, it's not the Rock Island Rocket, it's ATLANTA from the state of Georgia peaches and as the train slides into Union Station we still hear the echoes of Dr. Robert Elder's talk on the Public Basis for Radiation Hazards Standards last March 20. Forty members from the Chapter and the Section laid ears on Dr. Elder, who is with the Bureau of Radiological Health in Rockville, Maryland and there should have been more on account of RADHAZ being a sneaky pete gig that cooks you inside while you're cool outside. And if you dig monkeying around, you should have been at the May 31 meeting where Dr. Adrian Perochio of the Yerkes Primate Center of Emory University related on Instrumentation for Bio-Medical Studies of Primates which are man's cousins and sometimes I wish I had extra hands instead of feet too (or is it two?). And if you listen carefully there's still a murmur from January 31, when Dr. Denmar D. Baxter of Martin-Marietta gave forth on EMC for Digital Communications Systems to 25, including visiting firemen from the Com-Tech Group. And off the record just between the grooves, I asked in my questionnaire if the Chapter plans to try to make it next year and all answered yes except Atlanta which is playing the questionmark blues on the old piano roll which does not sound too great so don't quit now fellas when we really need you!

Ever play Monopoly and look carefully at the names of the Railroads which are Reading and Pennsylvania and Baltimore & Ohio and Short Line which (for those who *know*) are named after railroads that were in the PHILADELPHIA area in the

1930's because Monopoly was developed in Atlantic City for something to do for the wealthy folks from Philly who were staying in Atlantic City when it rained. As we stroll from 30th Street Station a newsboy slips us a small newsletter which says that despite small attendance (would you believe as low as six per meeting) there was, there is now, and there will be a Philadelphia Chapter and as evidence we are offered a March 9, 1972 meeting where Marge Stone of AEL and Carl Dolle of the University of Pennsylvania jointly discussed the Rationale and problems of Implementing MIL-STD-461 and -462 and again on April 20 where the Chairman Ev Raylman passed the current poop on EMP and Transient Testing and wouldn't you know that 14 warm bodies dug each session? And here's no jive, 'cause the Chapter staff is selected for the following season namely Everett Raylman of GE/RESO as Chairman and Milton Kant of RCA as Vice-Chairman and Joseph Blazewicz of GE/RESO as Secretary and the Program duties handled by the officers inpanel and even a social meeting (maybe) on the books before the June humidity lays the lazies on Philly. Sorry you lost the Bicentennial bid but Philadelphia G-EMC should have all the fireworks by '76 so keep a stiff-upper-you-know-what and press on!

As long as the Salt River doesn't taste like its name PHOENIX will grow baby and with the growth of the city goes the EMC Chapter which is a pleasure while we are still sitting on a sidetracked Engineering Express. This Chapter picks its prexy and staff on a calendar year basis so we don't have that news but they did have a meeting this past April 26 where Dick Wilson and David Sansbury of St. Joseph's Hospital told it like it was about Hospital Electronic Equipment to 30 who are now a little smarter than the rest of us. And the Chapter plans to hang tough for at least another year which is good news from anywhere and when I figure out how to promote a trip out there except for job hunting which is why I was in Phoenix in 1969 break out the brass bands.

"The stars at night are big and bright" (or did I violate someone's copyright) and CENTRAL TEXAS (no "yellow rose" they —oops, I did it again) burns with a hard blue flame. The IBM Computer folks in Austin fixed up a tour for the Chapter on February 28 with only 12 taking the advantage but on April 18 1972 the Chapter pulled a tour-de-force out of the hat when IEEE President Robert H. Tanner spoke on IEEE Plans and Programs to 130 and when you're 2000 miles away from New York City and you can't get to "Intercon" because the bucks are tight and the head man himself comes to you—well! On the same night John Mitchell of Brooks AFB School of Aerospace Medicine let it all hang out on Biomedical Considerations in Setting Electromagnetic Radiation Standards and with a title like that I'll bet it was a long and fascinating and worthwhile April Experience. And on May 15 just too late for press deadline there was a Workshop on National EMC Standards and while I doubt 130 will have turned out I'll bet it was well attended what with the present still-confused EMC Standards situation and if you come up with any great ideas fellas yell them out y'hear?

CHAPTER CHATTER (Continued)

Fun City is only a fun place for the Mayor but it's funny how everyone always goes there like Mecca or the Ganges River or Mt. Fuji. METROPOLITAN NEW YORK are doing starting this May planning and organizing for that bash called the 1973 EMC Symposium and for the 10% who haven't gotten the word Miss Liberty is the hostess next year. It will be fun and games for all and I hope to see you there because Chicago right now looks out of reach and I am a Symposium hound and by the way kudos to Will Bakker to whom the Chapter presented an award in appreciation of his Chairmanship.

What do you do with a group who when told that things are bad crosses you up by looking good and then publicizes the hell out of it besides? LOS ANGELES is doing just that with their professionally printed meeting notices and consistently good attendance and program content to make your eyes turn green and bug out of your head. Like dig these: a five count em folks five man panel namely Bob Cowdell/ITT Gilfillan, Mile King/Cornell-Dubilier, Larry Zynda/VP of LectroMagnetics, Dick Guerna/Genisco, and Bill Park/U.S. Capacitor Corporation doing it on Filters "What's New for 72" on February 24 with 44 there or a daytime Field Trip on March 16 to the Pacific Missile Range/Point Magu facility for a rare look at the Frequency Interference Control Center which is a groovy scene because this place coordinates just about all the military activities and contractors in California and Nevada which is a bunch of work. And to top it off Cliff Mohwinkel of Fairchild Space and Defense Systems passed out information on "A New Approach to Broad-band Amplifiers" which among other good features have no band-width-limiting transformers.

After seeing The Last of the Mohicans on our local UHF station up here I've become an Indian tribe buff and even found out how to spell "Iroquois" which doesn't help me very much because I already know where the MOHAWK VALLEY Chapter is so I was not amazed just pleased when I saw that 41 heard Dr. John Sterrett of NORAD speak on EMC at NORAD on March 14. I was part of NORAD once myself in a rather indirect way

but in the mid-50's we all did our part and I'm glad to see the fellows in Rome, New York are still doing theirs.

We're still on our train which has made some pretty wild excursions but is still chuffing on and I think we did ourselves no favor by taking off steam engines because there is little more impressive than a steam engine at full speed and the Union Station at WASHINGTON, D.C. is pretty impressive too. The Spring meeting for the Chapter was held on May 18 where the Director of ECAC COL Ackerland spoke on Future EMC Programs at ECAC which is pretty exciting because ECAC and EMC are virtually synonymous at least on the East Coast and I'll bet that was a fine meeting!

"The Next Station Stop is Boston South Station. This Train goes no further. All off at South Station." Just because it's the end of the track doesn't mean it's the end of the line here because the BOSTON Chapter is still running full steam with Edward Mead of GTE Sylvania as Chairman and James Gordon of Raytheon MSD as Vice-Chairman and a couple of late Winter meetings. On February 15 J.P. Ruina spoke on Military R&D and Arms Control to 33 who were from G-EMC and AES and other places and on March 8 a panel who were M. Greenspan, K.I. Thomassen and P. Penfield Jr spoke to 20 on Use of Waveguide Discontinuity Models in a General Purpose Linear Network Analysis Program and I don't understand how a discontinuity fits into a linear program but then I was not at RCA Burlington on March 8. And Frank Witkowski is writing an article but I don't have the title. And that's Boston!

And that's all the news I have to report because that's all the news they sent me and I thank all the Chapters and Chairmen and/or Secretaries who took the time and trouble to write me and shame on those of you who didn't and if you like this style of writing great and if you don't I'm sorry but complain to Jack Kerouac who started it all about 15 Years ago and this stuffy EMC Newsletter needs a little pzazz once in a while and so long for now.

SORRY ABOUT THAT-CHIEF!

Last Summer at the IEEE G-EMC Symposium in Philadelphia, I recorded many of the presentations, including the luncheon address. Using Jim Hill's cassette recorder with the stereo microphones, I paid careful attention to the level indicator so when played back it could not be distorted. These tapes were to be the nucleus of the tape library for the unaffiliated membership. Jim had just gotten his recorder serviced, and he pronounced it in great shape. It was, too, because I sat in an unobtrusive spot in a corner, with the microphone cord stretched out as far as it would reach on the table in front of the speakers. I recorded on both sides on nine C-90 cassettes and I thought I had great recordings.

I had great recordings all right, but not of the speakers. Oh, yes, they were there, intoning EMC subjects with great erudition. But there was someone talking in the background, and occasionally the background talker was louder than the speaker in front of me. So wha' happen? It took a while to figure out, but as nearly as I can reconstruct, here it is (hint: These voices were *not* on the tapes from the luncheon session):

- a. Just South of the Bellevue-Stratford Hotel where the Symposium was held is the Telephone Company's main downtown building.

- b. On top of the phone building is a huge antenna farm (anybody catch on yet?).
- c. The lecture rooms in the Bellevue-Stratford were roughly on the same level as the antennas (getting warm?)
- d. The microphone cable was *unshielded*, and it was stretched out *in a straight line* more or less perpendicular to a line between the antennas and the recorder ('nuff said.).

There was no way of monitoring what was going on the tape as I had no earphone. Now, I have Fred Nichols and Paul Georgi and lots of other nice EMC people who are pretty much drowned out by "KCA-3027 you have no calls" or "KPR-2665 call the Hospital immediately," repeated endlessly. Of course, the lunch tapes, recorded on the second floor of the hotel, were clear of any interference.

When my older son heard the tapes he had to sit down, because he could not stand while laughing so hard. Win a few, lose a few, sorry about that Chief, but that was the wrong one to lose. Moral: monitor what you tape, because EMI is a sneaky devil (but you know that).

by Marty Berman

BIO-EFFECTS

DORSAL STIMULATOR JAMS PAIN SIGNALS

Medical researchers are using military electronic counter-measure technology—against pain. The device they've come up with is the Myelostat, a dorsal column stimulator developed at Medtronics Inc., Minneapolis, Minn., to jam pain signals. It consists of an externally worn rf transmitter and antenna, plus a surgically implanted rf receiver. So far, about 300 persons are using the \$915 device, principally through the University of Minnesota Hospitals.

Pain is sensed only when it reaches the brain via the spine. However, only a limited number of pain signals can be transmitted at one time. The impulses continuously transmitted by the Myelostat keep the pain "gates" full, blocking the entrance of signals to the brain. To relieve pain, the patient simply presses an "on" button.

In order to implant the receiver, the surgeon opens the spinal column at shoulder level and attaches an inch-long electrode with three platinum prongs to the spine. The electrode is connected by a pair of wires to the receiver, which is implanted in the chest just beneath the skin. The signal travels through a demodulator and filter, and is passed on to a tuned coil through an ac coupling device. Then it is sent to the brain.

The transmitter, worn at the waist, is connected to an antenna that is taped on the skin directly over the embedded receiver. The transmitter is about the size of a cigarette pack, and contains a single printed-circuit card. Frequency is on the order of 460 kilohertz, and voltage level is 30 volts maximum peak-to-peak at 8 milliamperes.

Variable. Besides three transistors, the card contains an air-coupled transformer and a rate generator that uses a programmable unijunction transistor. This permits nine to 250 pulses per second to feed into a monostable vibrator. The vibrator uses this output for the rf signal.

The battery-operated device has two sets of controls. One, which is hidden beneath the battery pack, is for the physician, who sets the maximum amplitude allowable for his patient. The patient, however, can adjust rate and amplitude beneath that upper limit on his own set of controls. Another built-in safety feature eliminates any chance of intermittent stimulation.

RADIATION PROGRAM

MIT will conduct a special 2-week program on *Biological Effects and Medical Applications of Nonionizing Radiations* starting 31 July, 1972. With the increasing use of ultrasound, laser microwaves and magnetic fields in clinical medicine and the growing interest of Federal Regulatory Agencies in the potential hazards associated with their clinical and industrial uses, this course should prove interesting and useful to clinicians, scientists and engineers. Basic physics, biological effects, biomedical applications and hazards of ultrasound, laser, microwaves and magnetic fields will be discussed so as to be intelligible to people with clinical and physical science backgrounds.

Information is available from the Director of the summer Session, Room E-19-356, Massachusetts Institute of Technology, Cambridge, MA 0-2139.

FRENCH ELECTRONIC ANESTHESIA SYSTEM

The first feasible electronic anesthetic system has been developed by a French dental surgeon, Aimé Limoge, and used on more than 20 patients at Necker Hospital in Paris. It consists of a signal generator, three electrodes, a potentiometer, and an oscilloscope to monitor the signal.

The system produces a deep sleep with 2-milliamperere pulses when the electrodes are positioned in a special pattern that won't cause muscle spasms and variations in blood pressure. The cathode is placed between the eyebrows and two anodes are placed in the back of the ears behind the mastoids. The main flow of current passes through the sides of the brain instead of through the center.

Limoge says that his method was developed by trial and error. After experimenting with hundreds of variations of pulses, Limoge settled on a single-polarity current at 77 cycles per second, supplemented by the injection of 3-millisecond hf pulses at 130 kilohertz. These additional pulses are of 10-microsecond duration with 30-second intervals. There is a 10-ms interval between each of the three groups of hf pulses.

Three prototypes are being built by the French firm Sirel, and Limoge says that the U.S. Army has used his plans for construction of its own system. He says the Army is interested because of the simplicity of the system and its convenience for field hospitals. In France, the government-backed patent agency is negotiating with several electronics firms to commercialize the Limoge device. And at least one U.S. pharmaceutical and medical equipment house is considering purchase of U.S. rights.

RADIATION STUDY ANNOUNCED

Are humans endangered by electromagnetic radiation from everyday equipment such as television sets and microwave ovens? Starting July 1, the Federal government will launch a five-year study to find out.

The \$63 million investigation eventually will involve more than a dozen federal agencies... was recommended by the Electromagnetic Radiation Advisory Council, a group of non-government experts working with the Government for the past two years.

Microwaves and other radio frequencies at high intensities are known to cause adverse biological effects. What is not adequately known are the extent and importance of more subtle changes that may occur at low intensities. It's important because the increase in radiation sources since 1940 has been phenomenal and is continuing at an accelerated rate.

In addition to the study, another \$4 million a year will be spent on radiation surveys by DOD, HEW, and the Environmental Protection Agency.

(From the April 1972 issue of the Spectrum)

AIR WAVES

EMBASSY ALARMED BY MICROWAVES

Hidden in the Central Intelligence Agency's most secret files is an account of a possible Soviet attempt to brainwash our embassy personnel in Moscow with mysterious microwaves.

In the '60s, U.S. security men discovered the strange microwave impulses, some steady, some pulsating, directed into our Moscow embassy from a neighboring building.

The CIA quickly learned that Russian medical literature suggested microwaves can cause nervous tension, irritability, even disorders. There was speculation that the Russians were trying to drive American diplomats stir crazy with the waves.

The agency quietly began a study, under the direction of Richard Cesaro, into the effects of microwaves on people. Cesaro gave the project the code name Operation Pandora and called in a physician, two crack military scientists, and engineer-microwave expert.

MONKEYS were trained to perform tasks, then were rewarded with food, much as embassy employees might be rewarded with a dry martini at the end of the day. The monkeys were studied night and day for months at Walter Reed, while a collateral experiment also was conducted on rabbits by a consultant, in his own laboratory.

In the embassy in Moscow, meanwhile, no one except the highest diplomats and security men were aware of the secret microwave drama.

By 1967, the scientists felt that they had watched the monkeys long enough for a tentative reading. Some felt there were signs of "aberrant behavior" caused by the microwaves, but the majority disagreed. Only the rabbits showed clear changes—in their heart rate—which was attributed to heart from the rays.

The disagreements on psychological changes were sent to a top secret reviewing board, which also could reach no absolute conclusion that the rays affected the monkeys' minds.

Nevertheless, the suspicion lingered, and the White House decided that even if the microwaves were not brainwashing embassy people, they should be halted. It was also suspected that the waves might be part of some radical new surveillance technique.

AT THE GLASSBORO MEETING between President Lyndon Johnson and Soviet Premier Aleksei Kosygin, in June 1967, the question of the microwave rays came up. One informant insists Mr. Johnson personally asked Kosygin to end the ray bombardment, although other sources say the request was made at a lower level.

By 1968, most of Cesaro's scientists were convinced that the microwaves were not psychologically harmful, and the experiments ended in early 1969.

(Excerpted from Jack Anderson's Washington Merry-Go-Round)

FCC's PROPOSED EMI RULES STIR ANXIETY IN INDUSTRY

New rules on rf emission proposed by the Federal Communications Commission have raised fears in the electronics industry of increased costs and delays in the manufacture of equipment.

Herman Garlan, chief of the FCC's Radio Emergency Devices Branch, says the changes are needed to control spurious emissions by electronic equipment and subsequent interference with communications. The proposed rules affect two parts of the FCC's statutes. These are Part 15 covering incidental and restricted radiation devices, such as walkie-talkies, wireless microphones and radio-controlled garage door openers—and Part 18, which covers industrial, scientific and medical equipment, such as rf welders and heaters and diathermy machines. The new rules, Garlan says, would limit the manufacture, shipment and sale of devices that emit unwanted electromagnetic interference.

Manufacturers are objecting to the following:

- Elimination of a self-certification procedure by users and, in its place, a rule requiring FCC certification before the equipment is marketed.
- On-site certification requirements.
- Lack of maximum time delay provision which would allow manufacturers to assume that the device had been accepted if the FCC did not reply within 14 days.
- FCC inspection of sales and marketing records.
- A rule allowing public disclosure of all technical information about a product once the FCC has approved it. Manufacturers say this could give competitors an unfair advantage in cases where the marketing of a product did not immediately follow with its certification by the federal agency.

In the past the FCC has provided for a self-certification procedure for most equipment operated without individual license under Parts 15 and 18. Self-certification merely required the user to perform certain engineering tests on the device and to attach a label to it certifying that it had been tested and had been found to comply with FCC regulations.

This system, Garlan asserts, has not proved satisfactory from the standpoint of controlling electromagnetic interference (EMI). The FCC proposes that equipment be certified by it prior to marketing.

(From ELECTRONIC DESIGN 6, March 16, 1972).

MICROWAVE STUDY ISSUED BY FCC

Phase I of a two-part study entitled "Frequency Assignment Techniques for Microwave Systems," recently completed by Communications and Systems, Inc., under contract to the Commission, is now available for public distribution by the National Technical Information Service.

The report recommends establishment of a microwave spectrum management group responsible for the implementation and maintenance of an integrated, standardized, automated national data base on all microwave station information and writing of interference computation programs. It also proposes that the group eventually assume control over microwave spectrum usage and management on a Commission-wide basis.

The purpose of Phase I of the study was to analyze present microwave utilization and frequency assignment techniques in the bands allocated to the fixed point-to-point radio services and to recommend changes leading to more effective use of the spectrum.

Phase II will be devoted to a determination of the mechanics of data gathering; identification of the specific data to be gathered; and its storage, processing and analysis.

Copies of the study may be purchased from the National Technical Information Service, Springfield, Va. 22151. The following accession numbers and prices have been assigned and should be used when ordering the report:

Volume I —PB 205747—\$6.00

Volume II—PB 205748—\$3.00

Both volumes are available on microfiche for \$0.95 each.

IEEE NEWS & VIEWS

THE STATE OF THE IEEE

by Leo Young, Director, IEEE Division IV
Stanford Research Institute, Menlo Park, California 94025

Much has been written in recent months about IEEE and "professional activities." As one who has been interested in this topic since before it became fashionable, I welcome this opportunity to discuss it. The views stated here are my own and are not necessarily IEEE policy.

IEEE represents a total of about 170,000 members. Of these about 145,000 reside in the U.S. Some 60,000 members returned a questionnaire sent out by IEEE in January 1972. They expressed a preference for IEEE becoming more active in political and economic matters of concern to the electrical engineering profession by a better than two-thirds majority. This phenomenon is not unique to IEEE.

In Chemistry: Members of the American Chemical Society nominated by petition and elected a presidential candidate who stated "The first responsibility of the ACS is to its membership."

In Accounting: Dun's Review (March 1972) quotes one senior accountant: "There are plenty of accountants walking the streets. I've heard a number of them say they wish the American Institute of Certified Public Accountants would help."

In Science: Warren Weaver, writing in the February 1972 *Bulletin* of the American Association for the Advancement of Science, says: "As a believer in the democratic process, I think the relevant issues should be faced by the largest possible, the most broadly representative, group of scientists—that is, by the membership of the AAAS. . . . The AAAS might set up committees, for example, which could study and, of their own initiative, criticize the programs of federal agencies which utilize, support, and profoundly influence science and its impact on our society." Try reading engineers for scientists, IEEE for AAAS!

In Medicine: Engineers both criticize and envy the American Medical Association. The AMA is hardly an appropriate model for engineers. Nevertheless I looked at the latest (1970) *Information Booklet* of the AMA, and found the following statement: "AMA's expanded role in the legislative process has been necessary in order to provide the physician with a more active role in decisions affecting his professional services and his patients' welfare." It goes on to state that "During the 90th Congress (1967-68), 1400 health or medical bills were reviewed by the Legislative Department" of the AMA.

And in Engineering: *Electronics* magazine on 27 September 1971 reported results of a questionnaire it had published earlier: "A majority of respondents favoring an association [of engineers] thought that the IEEE should take the lead in organizing it."

The American Institute of Chemical Engineers has published two booklets, "Professional Ethics" (1967) and "Professional Standards" (undated) and has taken under consideration one on "Guidelines for Employment of Professional Personnel," all of which the IEEEmight well try to emulate for electrical engineers.

Let us consider portable pensions for a moment. Only a small minority of engineers ever benefit from the pension programs they participate in, because of long vesting requirements. An engineer who joins a company and then is laid off or leaves for a good reason and loses his pension has been deceived or victimized. A man who stays because he is afraid to lose his pension rights "is the victim of a sophisticated form of economic indenture" (*Dun's Review*, September 1969). The same article says "Despite much corporate hand-wringing that portability is a difficult thing to put into effect, business should look to the world of higher education for the ideal model for a portable

pension plan" (referring to the TIAA-CREF plan in Colleges and Universities and certain non-profit Institutes). According to the *Wall Street Journal*, "longshoremen currently have pensions of \$400 a month at age 62." According to a friend of mine with a large electronics company on the San Francisco peninsula, an engineer with his company collects the same pension if he manages to stay with the company for 25 years and earns a high five-year average of \$17,000 a year. But few engineers indeed stay that long and ever collect. Although IEEE cannot do it alone, it can help to promote social justice for its members (if its members really want social justice, by asking for it, voting for it, and working for it).

How should IEEE do it? It will have to work with other engineering (and perhaps non-engineering) professional societies. On the part of IEEE it will take (1) the Will, (2) the Organization, and (3) the Funds. The Board of Directors, of which I am one, must have the Will to do these things. The Organization is already emerging through the U.S. Activities Committee (USAC), recognized by the Board in January 1972. USAC consists of the six U.S. Region directors with IEEE Vice President Hal Chestnut as non-voting chairman. Much will depend on these seven men.

(Excerpted from G/MTT Newsletter, April, 1972).

INSURANCE PLAN ISSUES 55 PERCENT DIVIDEND CREDIT

IEEE has announced there will be a 55 percent dividend credit during the policy year that ended September 1, 1971, for those members insured under the Institute's Life Insurance Plan. The next notice of payment will reflect a 50 percent credit and the remaining 5 percent will appear on the following notice. The credit will be given in two installments for most members because it will cover more than one full semi-annual payment.

Annual dividend credits amounting to a substantial percentage of premium contributions by insured members have been made since the beginning of the Life Insurance Plan. The current 55 percent credit declared for 1970. Credits have averaged 46 percent during the last five years.

All inquiries about the Life Insurance Plan and any of the other plans in the Group Insurance Program for IEEE members should be made to the Administrator, IEEE Group Insurance Program, 1707 L St., N.W., Washington, D.C. 20036.

IEEE MEMBERS ASKED FOR SALARY DATA

A comprehensive Salary and Fringe Benefit survey of the entire U.S. and Canadian IEEE Membership above Student Grade has been authorized by the Board of Directors of the IEEE. This benchmark survey is anonymous and the first of its type to be conducted by the Institute. It is being implemented as a direct response to the wishes of its' members.

The decision to conduct the survey was reached when results from an earlier survey of members' attitudes toward the Institute becoming more involved in non-technical areas of interest showed that they favored gathering such information by a factor of 2 to 1. The survey has been implemented by the staff under the general direction of William E. Cory, Director of IEEE Region 5, and member of the G-EMC.

Returns from this survey are expected to be in by late June and a report and analysis of the information should appear in IEEE SPECTRUM in September.

IEEE BOARD RECOMMENDS EXPANSION INTO NON-TECHNICAL AREAS

Robert H. Tanner, the President of the IEEE, announced that the IEEE Board of Directors had agreed in principle to recommend to the membership a change in its Constitution which would permit entry into non-technical fields, while continuing its present scientific and educational functions. The action came after analysis by the Board of 57,000 replies to a questionnaire mailed to members in the United States early this year. The details of the questions and a tabulation of 47,000 replies appear in the March issue of IEEE SPECTRUM.

The U.S. members were asked whether they would favor IEEE becoming more active in political and economic matters of concern to the electrical engineering profession. The response was affirmative by a vote of better than 2-to-1. Other matters included in the questionnaire were the preparation by IEEE of position papers, recommendations on professional employment practices, pension plans, salary surveys, public relations, technological forecasting, continuing education and career guidance. With few exceptions the returns indicated a desire on the part of the U.S. membership to enter or enlarge programs in these areas. President Tanner reported that some of these activities, such as technological forecasting and career guidance, are permitted under the present Constitution and the IEEE has active programs now under the way in these areas. Professional activity in economic, social, legislative and ethical areas of the profession is, however, barred by the present Constitution. He reported to the Board a legal opinion that the proposed amendment to the Constitution would permit the Institute to enter all of the areas dealt with in the questionnaire. He noted that the proposed amendment would expressly bar IEEE from engaging in collective bargaining, customarily dealt with by labor unions.

A provision of the proposed amendment, necessary to implement non-technical programs governed by the laws and customs of individual countries, provides that the IEEE may engage in activity that meets the needs of members residing in a particular country or area of the world. An implementing Bylaw, covered by this provision, provides that payment for special services so rendered would be reflected in the dues and fees charged in the respective areas of the world.

Mr. Tanner stated that, as anticipated in a matter of such fundamental importance to the Institute, the vote by the Board was not unanimous, but the vote, 18 to 5 in favor, showed that a substantial majority of the Board supported the proposed move when the vote occurred. Later in the meeting all members of the Board present declared their support of the action.

The wording of the proposed amendment will be released after review by legal counsel and after a program of specific implementation, which would be undertaken if the members adopt the amendment, is acted on by the Board at its May meeting. Thereafter, publication of the amendment and the program in IEEE SPECTRUM is planned, followed by presentation of the amendment to the members for vote, in ballots to be mailed in September. If approved by the required two-thirds of the members voting, a further step, a conforming modification of the Charter under which IEEE is incorporated in New York State, must be taken, after which implementation of the new amendment can legally occur.

Mr. Tanner said that it was the hope of the Board that the membership would grant approval of the amendment by a substantially larger vote than the required two-thirds. He emphasized that the provisions of the Constitution relating to the Institute's present technical activities have been retained unchanged, except for minor editorial revisions to improve their clarity, and that the Board was committed to continue and to advance its position as the leading technical society, in membership and resources, in the world.

R. CLARK NAMED MANAGER OF IEEE'S WASHINGTON OFFICE

Ralph L. Clark (F), who has had a career of 37 years of active government service, has been appointed manager of IEEE's new Washington, D.C., office. The office has been established, on a trial basis, to develop liaison with the U.S. Congress and agencies of the federal government to make the resources of the IEEE available in the solution of the complex technical problems of today.

One of Mr. Clark's immediate areas of technical concern will be the possible interaction of the IEEE and interested government bodies in technological forecasting. In addition, he will look into areas of new technical opportunities in which the Institute might effectively participate. He will also provide the Institute management with first-hand information on actions being taken or contemplated in Washington that could have an effect on electrical/electronics technology and on the engineers who develop it.

REPORT OF THE AWARDS AND FELLOWS COMMITTEE

March 21, 1972

The Chapter-of-the-Year award was made to the San Antonio Chapter at the Philadelphia Symposium. Certificates were prepared and sent to each chapter officer. In scoring the performance of the chapters it became apparent that the scoring system could be improved. The committee is preparing a new scoring schedule which will be mailed to all chapters. One significant change is that the scoring period will be on a calendar year basis. The next score will be computed for the year 1972 and the presentation will be made at the 1973 Symposium.

In the announcement of new Fellows for 1972, two group members were included. The committee is working on two nominations for submission this year. The new Fellow nomination evaluation procedure provides for review by the professional group in whose area the nominee has worked. The committee will be seeking the assistance of Fellows within the group in doing these evaluations.

Recently, a certificate was prepared for Dr. Parks of Seattle to make him a Life Member of the group. Dr. Parks had retired and was resigning because of this. If other members of long standing are considering resignation because of retirement similar action may be taken.

Many of the groups now have awards in recognition of leadership or outstanding contributions within the technical area of the group. These awards may consist of a plaque or certificate and a prize of from \$50 to \$500. Many of these are presented annually. Your Ad Com President has charged this committee with the task of preparing a program for a G-EMC award. This program will be presented at the July Ad Com meeting. If you have any suggestions for the name or type of this award please discuss them with this committee.

Certificates of Acknowledgement were prepared for Abul F. Rashid for his services as Chairman of the 1971 Mountain-West EMC Symposium and for Robert R. Ford for his efforts in establishing the Pacific Area Committee.

Respectfully submitted,

James S. Hill

PROGRESS & PRODUCTS

PRINTED CIRCUIT CARDS OFFER HIGH NOISE IMMUNITY

A full line of printed circuit cards that feature high immunity to noise is now available from the Systems Division of Struthers-Dunn, Inc. These include counters, registers, timers, comparators, logic, analog, etc. Called the 70K Series, the cards are designed to perform reliably in even the most difficult industrial environments.

The high noise immunity is achieved through a combination of engineering innovations. First, HNIL circuitry is used throughout. More than 4½ times as much voltage is required for triggering as in DTL and TTL logic. Secondly, a unique method of "clocking," at one microsecond intervals, admits input signals at peak voltage—which eliminates the possibility of input and output signals affecting each other. Thirdly, photo-isolated inputs and transformer-isolated outputs contribute substantially to noise immunity, since electrical connections are prone to accidental triggering and light "connections" are not.

Complete information on 70K Series PC cards is available from Struthers-Dunn, Inc., Systems Division, P.O. Box J, Bettendorf, Iowa 52722.

GASKET MATERIAL FOR MICROWAVE OVENS

Eccoshield MO is a newly developed lossy rubber sheet stock which was designed especially for use as the gasketing material around the door of microwave ovens. It is loaded with magnetic particles to effect both dielectric and magnetic loss, thereby resulting in very high insertion loss at microwave frequencies and providing the desired protection against radiation exposure for personnel near the oven when in use.

Thickness of the Eccoshield MO sheet stock is in the 1/16 to 1/8 inch range. In the application, the sheet is cut into strips 5/8 to 3/4 inches wide which are adhesive bonded or mechanically fastened around the periphery of the door of the oven. The resiliency of the rubber cushions the door as it is closed. The rubber is easily cleaned and is chemically resistant to foods and cleansers.

Eccoshield MO can also be used in other microwave gasketing applications. The resilience of the material makes it possible to obtain pressurized seals as well as microwave seals, and it is priced in the \$5.00 per sq. ft. range.

For additional information, write to Emerson & Cuming, Inc., Canton, Mass. 02021.

ELECTROSTATIC SENSITIVITY OF EED's

The design and operation of a circuit to study the pin-to-case electrostatic sensitivity of electroexplosive devices is described. This circuit provides a high-voltage, low energy spark discharge that simulates the energy delivering capability of the human body. The circuit is then utilized to evaluate selected electroexplosive devices that contain explosive and pyrotechnic flash charges. It is shown that properly formulated pyrotechnic charges can withstand repeated electrostatic discharges at 25 K.V. Exploding bridgewire detonators and No. 6 electric blasting caps were also static insensitive at this potential. The role of a 500-ohm series resistance in the output of the circuit is discussed, and it is shown that the omission of the resistance has a drastic effect on output pulse profile but a small effect on the electrostatic sensitivity of electroexplosive devices. ("Circuit for Studying the Electrostatic Sensitivity of Electroexplosive Devices," by James L. Austing and Richard Gortowski, *Explosivstoffe*, Vol. 19, No. 2, February 1971, pp. 39-43.)

ELEVEN NEW PROGRAMS RECOMMENDED FOR ASTRONOMICAL RESEARCH

Finding explanations about the nature of our physical universe is the potential of astronomical research according to the Astronomy Survey Committee of the National Academy of Sciences. Calling astronomy "one of the most rapidly advancing frontiers of human knowledge," the committee, chaired by Jesse L. Greenstein of the California Institute of Technology, proposes 11 programs "to exploit fully the promising opportunities opened by advanced technologies." Of these programs, including both ground-based and space-based facilities, it selected four for immediate funding and ranked them in order of importance, leaving the remaining seven unranked.

The committee sees the greatest need for a *very large radio telescope array*, which can break through existing observational barriers and provide an unprecedentedly clear picture of the universe at radio wavelengths. This very large array (VLA) would attain resolution equivalent to that of a single radio telescope some 20 miles in diameter by using 27 antennas, deployed in a carefully calculated pattern over an area 26 miles in diameter. Funds for initial development of the VLA are included in the 1973 budget of the National Science Foundation.

The committee also views the following seven items as essential to a well-balanced program of astronomical research:

- ¶ The construction of a very large millimeter-wavelength antenna;
- ¶ A doubling of support within three years for astrophysical observations from aircraft, balloons, and rockets;
- ¶ A continuation of the Orbiting Solar Observatories through OSO-L, -M, and -N;
- ¶ A sizable increase in support for theoretical investigations;
- ¶ An expanded program of optical space astronomy, directed toward the ultimate launch of a large space telescope;
- ¶ A large, steerable radio telescope designed to operate efficiently at wavelengths of 1 cm and longer; and
- ¶ Construction of several modern astrometric instruments at various geographic locations.

To provide support for these programs, the committee recommends that funding for basic astronomical research increase at the rate of 5½ percent per year, in constant dollars, from the current \$270 million per year to an average of \$355 million per year over the next decade.

NEW CONTRACT

American Electronic Laboratories, Inc. (AEL) announced receipt of a \$157,400 award from the U.S. Army involving study to develop a series of circuit modules for use in universal EMI systems.

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