IEEE

# NEWSLETTER

## ELECTROMAGNETIC COMPATIBILITY GROUP

PLEASE NOTE! Material for publication in the next issue must be received by the Editor by April 21, 1969

ISSUE NO. 58 APRIL 1969

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## CONTENTS



## PEOPLE

### GEORGE JACOBS RECEIVES IEE FELLOW AWARD

Announcement was recently made by the IEEE Board of Directors of the IEEE of the elevation of 127 members to the grade of Fellow. The honor was bestowed on G. Jacobs, a member of the Washington, D. G. Chapter of G-EMC, for "outstanding engineering contributions in the development of international broadcasting and telecommunications." Mr. Jacobs received the award at the annual banquet of the Washington Section on February 14, 1969.

The grade of Fellow, the highest grade of membership in IEEE, is a mark of unusual distinction attained only by invitation. It is conferred only upon persons of outstanding and extraordinary qualifications in their particular fields.

Mr. Jacobs joined the United States Information Agency in 1949. He is presently Chief of the Frequency Division for the Broadcasting Service. He is also a member of the Group on Antennas and Propagation and the Group on Communication Technology.

### FOUNDERS MEDAL AWARDED TO HARRY NYQUIST

Dr. Eric A. Walker, president of the National Academy of Engineering, announced the award of the Academy's fourth Founders Medal to Harry Nyquist in recognition of his many fundamental contributions to engineering. The award ceremony was held on February 19, 1969, at the University of Houston, Houston, Texas.

Dr. Nyquist, former Bell Telephone Laboratories scientist, is well known for his pioneering work in communications systems. His important accomplishments in the field of radio engineering include the first quantitive explanation of thermal noise, signal transmission studies that laid the foundation for modern information theory and data transmission, the invention of the vestigial sideband transmission system now widely used in television broadcasting and the well known Nyquist diagram for determining the stability of feedback systems.

The National Academy of Engineering was founded in 1964 to provide a means for the engineering community to serve the nation in connection with significant problems in engineering and technology. The Academy's 236 members were elected in recognition of important contributions to engineering theory and practice or of unusual accomplishments in the pioneering of new and developing fields of technology.

The Founders Medal was established in April 1965 by the National Academy of Engineering to honor outstanding contributions by an engineer both to his profession and to society. The medal, a gold replica of the NAE seal, is imprinted with a stylized Roman viaduct representing the bridge between science and society. The three previous recipients of the annual award are Vannevar Bush, 1966; James Smith McDonnell, 1967; and Vladimir K. Zworykin, 1968.

Cont'd

## GEORGE UFEN NAMED DISTRICT BOY SCOUT COMMISSIONER

GLENDALE, Calif., December 26, 1968 -- George R. Ufen, Western Manager of Marketing and Sales for FAIRCHILD/ELECTRO-METRICS CORPORATION, has been appointed District Commissioner of the Boy Scouts of America, Verdugo Hills Council, covering the Glendale and Eagle Rock areas.

George has been active in Scouting since 1943.

He holds the Scouters' Training Award, and is a Brotherhood member of the Order of the Arrow. He has served in many capacities in the Cubs, Scouts, and Explorer programs. He also served on the Commissioners staff.

George is also active in the IEEE, advancing through the ranks of the Los Angeles Section as secretary-treasurer and chairman. He was vice chairman of the 1968 Symposium, EMC is one of the liaison officers of the 1969 Symposium, and is National Chairman of the 1970 Symposium.

He is also active in the Society of Automotive Engineers, and is a member of a number of committees, as well as a member of committees for the Electronic Industries Association Group.

## HANDBOOK FOR ELECTRICAL ENGINEERS EARNS SPECIAL COMMENDATION FOR EDITOR

New York, February 5, 1969 ---- Donald G. Fink has been voted special commendation for professional services by the Executive Committee of the Institute of Electrical and Electronics Engineers (IEEE). Mr. Fink, who is General Manager of IEEE, was recognized for his work as Editor -in-Chief of The Standard Handbook for Electrical Engineers, Tenth Edition, McGraw Hill Book Company 19(

The Handbook, previously edited by the late Archer E. Knowlton, has been an indispensable basic reference source for 61 years. Mr. Fink was a major contributor to previous editions and is the author of many technical books. He became Editor-in-Chief for the Tenth Edition shortly after his appointment in 1963 to head the IEEE staff which serves the world's largest technical society of over 160,000 members.

In this position, Mr. Fink was uniquely able to call together an outstanding team of 116 contributors, each an acknowledged expert in his field. Of special importance in his work was providing for the increasing impact of electronic methods and components in the field of electric power. Much new material has consequently been added : such fields as data processing and transmission, control instrument ation, nuclear generation, high voltage d-c transmission, high powe semiconductor devices and the control of interconnected power syste

## PEOPLE CONT'D

## Dr. Schlicke - Keynote Speaker at G-IGA Seminar

Dr. H. M. Schlicke, Vice Chairman of the IEEE G-EMC, gave the Keynote speech and participated in a panel discussion of the G-IGA all day seminar on "The Management of Industrial Equipment to Minimize the Effects of Electrical Noise," held in Milwaukee on March 8, 1969. The Keynote address treated the topic of EMC in perspective, stressing in particular D. O. D. Directive 3222.3 of July 5, 1967 and Public Law P.L. 90-379 of July 5, 1968 and the ir implications. He also briefly discussed the anticipated change of test procedures for interference filters.

Dr. Schlicke is chairman of the Committee on Information Dissemination within the G-EMC. He has been invited to present a paper on the controversial MIL-STD-220A at the June 1969 EMC Symposium, and to present a position paper on the subject to the Armed Services to help them in the formulation of the new Standard MIL-STD-220B. Recent publications include an article on Compatible Filters which appeared in the SPECTRUM, and a Survey Paper which he wrote as the Guest Editor of the G-EMC TRANSACTIONS Special Filter Issue.

Dr. Schlicke is employed by the Allen-Bradley Company of Milwaukee, Wisconsin.

## HAROLD DINGER RETIRES

Retirement day for Harold Dinger, Fellow and past chairman of th G-EMC Ad Com was February 14, 1969. Mr. Dinger had 28 years of service at the Naval Research Laboratory, Washington, D. C. a a communications scientist and consultant. He was made a fellow of the IRE in 1958, "For his contributions to the reduction of radio interference" and by the AIEE in 1961, "For his contributions in fields of propagation and interference." He is also a Fellow of the American Association for the Advancement of Science. The Navy honored him with the Meritorious Civilian Service Award in 1946 when he also received the Service Award of the American Standard Association. He was active in organizing the Professional Group o Radio Frequency Interference which later became the G-EMC and served the Group in a number of capacities receiving the Certific of Appreciation in 1967. He was a pioneer in the investigation of bearings as noise sources and in the development of standard mea ment methods for electromagnetic shielding. He was also active investigation of "whistlers" and "spherics".

Mr. Dinger plans to do some travelling but will maintain his home at 2106 Keating Street, S. E. , Washington, D. C. 20031

# G-EMC COMMITTEE

ading Committees, here we come!

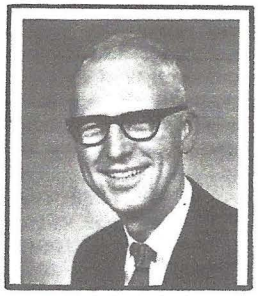
: last issue of the G-EMC Newsletter (Number 57, February 1969) ·oduced a new feature segment for the Newsletter entitled "Steering nmittee Reports." With this issue, we are introducing the new ociate editor in charge of "Steering Committee Reports", William Duff, of the Atlantic Research Corporation in Alexandria, Virginia.

l's new endeavours will include maintaining close liaison with the ious committee chairmen, helping them prepare material for the wsletter which should be of the greatest interest to our members. ere are many subcommittees of the Adcom (approximately 17) and ill be almost a continuous job to eventually present each one of m in the Newsletter. Their orders will be somewhat at random. wever, with only five issues a year, a year and a half will have bably passed by the time we finally present the last one, and it l be time to start over again to pick up the new committee Chair- n as well as new committees.

Bill really has a job to handle, and deadlines to meet. Through his orts, we will finally have an opportunity to take an X-ray view of workings of the G-EMC Administrative Committee.

## EMC SYMPOSIUM COMMITTEE

mmittee Chairman: Dick Schulz
Chief of EMC
Commercial Airplane Division
The Boeing Company



The EMC Symposium Committee is a relatively new committee. It was formed in 1968 to establish policies with respect to the holding of EMC Symposiums, and to provide guidance for the Symposium Steering Committees. The Symposium Committee consists of the Chairman (or their representatives) of the most recent past three EMC Symposiums. Assisting Dick are Frank Etchell of Atlantic Research Corporation and Guy Ottinger of Lockheed Missiles and Space Company.

Recently, there has been increased competition among EMC Chapters to act as host for the EMC Symposium. The Symposium Committee was formed to review the situation and to establish a policy that may be used in the planning of future symposiums. The Committee expects to present their recommendations to the Ad Com at the March 1969 meeting and hopes that as a result symposium policies will be established. Chairman Dick Schulz feels that the establishment of policies will help to provide better coordination and planning, and will insure that each of the chapters are given proper consideration and opportunity in the planning of future sympsoiums.

Although the primary work of the committee to date has been directed toward establishing symposium policies, it is anticipated that as soon as the policies have been approved by Ad Com, the Symposiums Committee will direct their activities toward providing guidance to symposium steering committee. In particular, the committee plans to provide guidance on the many details of symposium operations such as exhibitor and co-sponsor contracts, schedule of pre-symposium and symposium events, and preparation of the large quantities of printed matter.

Dick Schulz received his B.S.E.E. and M.S.E.E. degrees from the University of Pennsylvania. In addition to receiving these two degrees, he completed the course requirements for a Doctors degree at the University of Pennsylvania. Dick presently works for the Commercial Airplane Division of the Boeing Company, where he is Chief of the Electromagnetic Compatibility Group. Dick is well known for his technical contributions in the area of RF shielding. He has been granted three patents in this area.

Dick is a senior member of the IEEE and he has been active in IEEE activities. He has served as both Treasurer and Chairman for the G-EMC, Chairman of the 1968 IEEE Symposium on EMC, and has served on a number of G-EMC committees. He was instrumental in organizing the Chicago and Seattle G-EMC Chapters.

Dick has been the author or co-author of thirty-six papers. The majority of these are in the area of RF shielding.

In addition to the above accomplishments, Dick is a Registered Professional Engineer and a member of TBΠ, ΣΞ, HKN, and XI. Dick received a Certificate of Distinction from the University of Pennsylvania, and Certificate of Appreciation from the USA Office of Scientific Research and Development and the IEEE G-EMC. He also received a Certificate of Achievement from the IEEE G-EMC.

## EMC STANDARDS COMMITTEE

Committee Chairman: John F. Chappell
Chief of the Technical Management Division
Communication-Security Product Manager's Office
Army Materiel Command

John F. Chappell received a BS degree in EE from the Milwaukee School of Engineering in 1938 and engaged in graduate study at Rutgers University during the period 1948 through 1949. Mr. Chappell was employed by the U.S. Army Electronics Command at Fort Monmouth, New Jersey from 1942 to January 1969 where he was engaged in radio interference studies related to military electrical and electronic equipment. For the past eight years he has been Chief of the Electromagnetic Compatibility Branch which is concerned with interference analysis and prediction studies of communications-electronics equipments and systems planned in support of future field armies. In January of this year Mr. Chappell was assigned to the position of Chief of the Technical Management Division, of the Communication-Security Product Manager's Office of the Army Materiel Command.

Mr. Chappell is a member of the IEEE and has been quite active in IEEE activities. He was serving as chairman of the former IEEE Technical Committee on Electromagnetic Compatibility at the time it was merged into the EMC Standards Committee in November 1966. Mr. Chappell has also served on the Advisory Committee for Land Mobile Radio Services and the JTAC Analysis Committee. He is also an Army liaison member of the USASI Committee on Radio Electrical Coordination and through this committee served as a member of the U. S. Delegation to the 1958 and 1965 meetings of the Special Committee on Radio Interference (CISPR) in Hague and Stockholm. In October 1968 Mr. Chappell was elected to a 3 year term on the EMC Group Administrative Committee.

Mr. Chappell has had numerous publications. In July 1968, he received an award presented by the National IEEE Symposium on Electromagnetic Compatibility, at Seattle, Washington, with the following citation: "For contributions to fundamental measurement techniques of Radio Frequency Interference and the development of Standards."



Cont'd

## EMC Standards Committee

Adequate standards have always been essential to the practice of engineering. The requirements are particularly pressing in the field of electromagnetic compatibility. In addition to the IEEE, other organizations such as USASI, CISPR, Society of Automotive Engineers, EIA, and the Military Service are working on the development of EMC standards. Also since EMC encompasses many descriptions in the electrical and electronics fields, many of the other IEEE professional Groups and affiliated technical committees can legitimately become engaged in the area of EMC standards as it applies to their particular engineering discipline.

The alternate objective of a standards program is the use of one set of standards in all areas where similar requirements exist, such standardization, and ultimate goal, can only be accomplished through coordination and cooperation of all standard organizations laboring in a particular standards area. The EMC Standards Committee attempts to provide the required coordination. The EMC Standards Committee originated as the IRE Technical Committee on radio interference during the late 1940's. The original and current scope of the committee is the following:

1. The selection of terms and the preparation and maintenance of standard definitions in the field of Radio Frequency Interference.

2. The preparation and maintenance of standards covering methods of measurement pertinent to this field, where such preparation is not clearly within the scope of another IEEE Technical Committee.

3. The coordination of activities of other IEEE Committees in the field of Radio Frequency Interference and liaison with other professional societies and technical organizations engaged in allied work.

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The Committee is currently composed of 15 members and is broken down into six subcommittees. These subcommittees are (1) Basic Measurements, (2) Definitions, (3) Radio and TV Receivers, (4) Radio Transmitters, (5) Industrial Electronics, and (6) Mobile Communication Equipment.

In the early days, the committee's primary efforts were in the television interference area. This work culminated in IEEE Standard 213 (1961), titled, "Conducted Interference to Power Line from FM & TV Broadcast Receivers in the Range of 300 KHz to 25 MHz". Emphasis then shifted to vehicular interference measurement methods and this effort culminated in IEEE Standard 263 (1965), titled, "Measurement of Radio Noise Generated by Motor Vehicles and Affecting Mobile Communications Receivers in the Frequency Range 25 to 1,000 MHz."

During the 1950's and early 1960's this committee influenced the formulation of radio interference standards by other standards organizations, such as the USA Standards Institute (Committee C-63) and, in the international arena, the Special Committee on Radio Interference (CISPR). This influence was brought to bear in the area of radio interference and field strength meter standards and measuring techniques through common affiliation of several members of the EMC Standards Committee with the USASI and CISPR standards organizations.

Shortly after the merger of IRE and AIEE a new IEEE policy was enunciated calling for the merger of all Technical Committees under appropriate Professional Groups. In accordance with this policy, the Committee was formally merged under the EMC Group on 15 December, 1966 as the EMC Standards Committee.

During 1966 and 1967 the Definitions Subcommittee of the EMC Standards Committee made a major contribution to the IEEE Dictionary project which is still underway at IEEE Headquarters. More than 100 EMC terms were defined and categorized.

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# AD COM NEWS & VIEWS

## MAY ISSUE OF EMC TRANSACTIONS

The May, 1969, issue of the IEEE EMC Transactions, edited by A. H. Sullivan, Jr., will contain the following technical papers:

* "On the Response of a Missile with Exhaust Trail of Tapered Conductivity to a Plane Wave Electromagnetic Field" by Charles W. Harrison, Jr.

* "Further Notes for Predicting Shielding Effectiveness for the Plane Shield Case" by Peter R. Bannister.

* "Distribution and Frequency Dependence of Incidental Man-Made HF/UHF Noise in Metropolitan Areas" by Edward N. Skomal.

* "The Analysis of Airborne VHF/UHF Incidental Noise over Metropolitan Areas" by Edward N. Skomal.

* "The Characteristics of the Electromagnetic Radiation from Gas-Type Arc Discharges on Electric Power Distribution Li By John P. German.

* "Shielding Effects in Thin-Film Integrated Circuits" by Horr bostel, Greenspan, and Taub.

* "Electromagnetic Interference Control Considerations - Soler Operated Control Devices" by C. A. Master.

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## 1968 EMC Symposium Financial Success

The 1968 EMC International Symposium which was held in Seattle, has reported a surplus of $11,156. This surplus is based upon th total expenses of $24,241, receipts of $30,853, plus an approxim: $6,000 credit for 2,214 copies of the Symposium Record furnishe to the Group. Since the IEEE G-EMC was the sole sponsor of the Symposium, it has received the total cash surplus of over $5,100.

The surplus realized from our annual symposium help support the Group Transactions, Newsletter and other Administrative Commi expenses, and also help keep the Group's annual membership dow four dollars.

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## NOMINATION OF CANDIDATES FOR FELLOW OF IEEE

April 30, 1969 has been established as the deadline date for complet nominations of candidates for Fellow grade of IEEE.

The IEEE Bylaws define the qualifications for this grade as follows: "The grade of Fellow is one of unusual professional distinction and shall be conferred only by invitation of the Board of Directors upon person of outstanding and extraordinary qualifications and experienc in the fields of electrical engineering, electronics, radio, allied br: of engineering of the related art and sciences, who meets the requir for Senior Member as stated in these Bylaws and who has been a me ber in any grade for a period of seven years preceding the year of n ination, except that the seven-year provision in any individual case be waived for cause by the Board of Directors."

It is of prime importance to read the leaflet "IEEE Fellow Grade N inations" before serious consideration of possible nominees. This brief publication has just been revised in an effort to assist in the effective preparation of nominations. Following are the criteria u which nominations are appraised; all are important; those of prima emphasis are listed first: technical contributions, theoretical or p tical; personal distinction earned, as evidenced by positions held, erational as well as technical; output of technical papers and paten evaluations by confidential references; duration of particularly dist guished professional activity in positions of major responsibility; duration of active participation in the profession; service to IEEE its predecessor societies; additional support of the nomination by a IEEE organizational unit, such as Section, Group, Committee, etc and service to the engineering community, broadly interpreted, oth than through IEEE.

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## CHAPTER CHATTER

By Ira M. Berman
Associate Editor

### "THE HOUNDS OF SPRING ARE ON WINTER'S TRACES"

hoever said that must have sniffed the hint of Spring that comes
ı the south wind during the waning days of February here in the
ortheast. In April we can all look forward to an occasional shirt-
eeve day - that is, all except the members of the Boston Chapter,
ho may still be digging out from their late winter snowfalls. And
course, April is only two months from June, and we all know
hat happens in June this year. I hope no one minds my writing
ı every issue about the symposium, because it's something that
personally enjoy. For those of you who have been able to attend
ıe previous ones, I'll bet you have enjoyed them, too.

e have lots of Chapters news from all over the country. This time
e'll ship around and visit the Chapters in random order.

### OUTHERN CALIFORNIA:

hairman: Jim Spagon
TRW Systems
One Space Park
Redondo Beach, Calif.

e have received only news of meetings previously reported in
ıe Newsletter. Hope the miserable weather hasn't played too much
avoc with the Chapter meetings.

### 'ASHINGTON, D. C.

hairman: C. J. Saunders
N. B. S. R-109
Bldg. 224
Washington, D. C. 20234

ince it is the Newsletter's function (among others) to highlight the
hapters, we have been gathering a file on each Chapter, and one
f the things we ask is the total number of Chapter members. There
re some very large Chapters around, and Washington is one with
53.

heir last meeting was really pushing the state of the technology:

ate: January 16, 1969

ttendance: 31

peaker: Mr. Richard R. Grim, Section Head at Honeywell's Annapolis R & D Laboratory

opic: An Evaluation of Integrated Circuits as Sources of EM Interference.

he March meeting featured a dean of shielding in a topic that needs
larification for many of us:

ate: March 20, 1969

peaker: Mr. Fred J. Nichols

opic: Simplified RF Electromagnetic Shielding

his was a lunch meeting - a delightful way for men to discuss
echnical matters.

### HICAGO:

hairman: Joe Nasca
6615 West Irving Park Rd.
Chicago, Ill. 60634

e heard just a whisper from Chicago - they held a going away
arty for their departing chairman, Carl P. Jesperson, who was
eing transferred to Arizona.

### NEW JERSEY COAST:

Chairman W. A. Kesselman
31 Hope Rd.
Eatontown, N. J. 07724

These were the lucky devils who, with the Metropolitan New York Chapter met at the Playboy Club. It must have been quite a meeting as they are skipping February altogether. The March meeting dealt with a topic related to EMI since we all deal with RF instrumentation. It should be quite interesting.

Date: March 11, 1969

Speaker: Mr. Mel Morris, U. S. Army Electronics Command

Topic: Designing Microwave Mixers for increased Dynamic Range. Mr. Morris demonstrated that the principles used for microwave mixers are also applicable over other frequency ranges as well.

Just as an aside, the New Jersey Coast Chapter was in existence less than a year, when they proposed to sponsor the 1969 Symposium (there I go again) and were accepted.

### METROPOLITAN NEW YORK

Chairman: H. G. Bostrom
Washington Valley Rd.
Morristown, N. J. 07960

The second annual joint meeting of the New Jersey Coast and Metropolitan New York Chapters was about the best attended function in this column. There were a total of 113 people there, including a number of wives ( or equivalent)

Date: January 21, 1969

Attendance: 113

Topic: Pulses Magnetic Field Susceptibility Testing of Electronic Equipment

This testing involves the use of high-intensity magnetic pulses, representing either natural or man-made interference. This is quite the field today, reflecting some of our newest sophisticated test techniques.

### ATLANTA:

Chairman: James C. Toler
1022 Reeder Circle N. E.
Atlanta, Georgia 30306

No slouches here. These members are out to capture awards for best programs, best attendance, and best everything else that comes along. With 30 in the chapter, they have an average member attendance of 21. My slide rule calls that 70%.

Date: January 20, 1969

Attendance: 65 (joint meeting with section)

Speaker: Mr. Robert Weston, of the FCC (Washington office)

Topic: EMC Legislation

(and doesn't that concern us all)



CONT'D

The March meeting was at a facility that is of interest to everyone, engineer or not, as it means better service for us all:

Date: March 11, 1969

Place: Southern Bell Tel's new Computerized Electronic Switching Station

Speakers: Mr. Hugh Denny, Georgia Tech.; Mr. Dan Mathias, Lockheed-Georgia

Topics: State-of-the-Art in Active Filters (Denny); State-of the-Art in Cable Coupling Prediction (Mathias).

The topic s sound almost custom-made for the meeting place.

One more meeting is planned for May 13, 1969.

Atlanta will be well represented in Asbury Park in June. Three members have submitted papers for approval, two others are on the Technical Paper Review Committee, and still another member will present an invited paper.

And for those of you who like to plan ahead: Atlanta is planning the 3rd Annual Regional EMC Conference for the last week in October. (A note: the plans call for student papers, if possible.)

HOUSTON:

Chairman: V. E. Haywood
1315 NASA Rd.
Apt. 329
Houston, Texas 77058

This here's our newest Chapter, pardners. They sure do look like winners from here. (You'll pardon my attempts at a drawl -- chances are that the members there speak better American than I do). Their next meeting bears directly on the way EMI specs have been going.

Date: April 2, 1969

Speaker: W. R. (Bill) Johnson, TRW Systems, Redondo Beach

Topic: Computerized EMC Specification Development

We'll be looking forward to more good news from Houston.

PHILADELPHIA

Chairman: V. H. Bashaw
General Electric Co.
3198 Chestnut Street
Philadelphia, Pa. 19101

Steven Garcia has resigned as chairman and will travel to Iran on temporary duty for two years for Philco-Ford. Vern Bashaw is the new Chapter Chairman until the April elections. The Chapter still goes on, holding some of the most interesting meetings around.

Date: February 12, 1969

Speaker: Terry Dietrich, Philco-Ford Corporation

Topic: Practical Considerations in EMC Measurements

Attendance: 35

One of the more interesting facets of these practical considerations was how the new FCC legislation will affect the amount of testing.

Date: March 24, 1969

Speaker: Richard Schulz, The Boeing Company

Topic: EMC Considerations in the 747 aircraft

Anyone who has ever seen the mock-up of the 747 can appreciate the potential for EMI problems in anything that large. The next meeting will bring the season to a grand climax.

Date: April 8, 1969

Speaker: Heinz Schlicke, Allen-Bradley Company

Topic:

SAN FRANCISCO

Chairman: Wm. G. Coe
P. O. Box 1383
San Carlos, Calif. 94070

Now, this is a Chapter that always has good meeting topics. Their subjects are pure education, especially the ones about specification (a spec may be defined as a specific that needs clarification). And even if you think you know it "all" about a subject, there is always one wrinkle or facet that you may have overlooked that will surely be brought out in the discussion. San Francisco's latest meetings reflect this approach.

Date: January 20, 1969

Attendance: 25

Speaker: Fred J. Nichols, LectroMagnetics, Inc.

Topic: Simplified RF Electromagnetic Shielding

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Date: February 1969

Attendance: 21

Speaker: Panel Discussion, moderated by Richard Kelkenberg, Lockheed Missiles and Space Company

Topic: EMI Testing to MIL-STD-461

We have no word on the program for the balance of the year.

MOHAWK VALLEY

Chairman: Frank E. Ferrante
20 Evergreen Drive
Rome, N. Y. 13440

The Mohawk Valley is rich in history. Even the name evokes visions of indians in birchbark canoes. These have now been replaced by modern diesel-driven cargo vessels (at least, they were back in 195[illegible] when I went through by train). And spread out along 300 miles of the Mohawk Valley, from Albany to Buffalo, are any number of firms with EMI engineers who, because of the distance involved, have difficulty in attending G-EMC Chapter meetings. Therefore, the Mohawk Valley Chapter is among the Group's smallest. But as usually happens, small size begets big quality - such as a membership of 20 and a meeting attendance of 19!
The topic for the March meeting was of interest to everyone:

Date: March 13, 1969

Speaker: Mr. Edward F. Dyer, Westinghouse Aerospace Division

Topic: Switching Transient Measurements Using Automatic Spectrum Techniques.

Mr. Dyer comes well prepared, as he is responsible for all EMI/C design, testing, and facilities at the Westinghouse Aerospace Test Laboratories.

CENTRAL TEXAS

Chairman: Walter G. Dolle
542 Lakeview Blvd.
New Braunfels, Tx. 78130

All of us know no one should be moving about in a shielded enclosure when radiated measurements are underway. But how many other factors (other than ambient interference) can affect the accuracy of the measurements? The Central Texas Chapter found out in their last meeting.

CONT'D

Date: February 12, 1969

Attendance: 11

Speaker: G. N. Van Steenberg, Southwest Research Institute

Topic: Environmental Factors which Affect Measurement in Shielded Enclosures

BOSTON:

Chairman: Saul Birnbach
Avco
Willington, Mass.

Boston has a new Chairman, too--- Saul Birnbach. The previous Chairman, A. W. DiMarzio, moved to Scotia, New York. The Chapter reports no change in the program previously announced in the Newsletter. However, the Chairman mentions the possible 1969 - 1970 program having greater emphasis on stimulating member participation and exchange of information between people with problems and people who are problem-solvers. Such an approach can only serve to benefit all concerned.

(Some of the topics and presentation methods that we have reported from other Chapers might well form the nucleus of such a program.)

SEATTLE

Chairman: Alford Eckersley
616-166th Ave., N. W.
Bellevue, Washington 98044

Al Eckersley, the Seattle Chairman, always sends such interesting responses to my questionnaires every month, that I look forward to reading them. He points out that they experienced an impossibility on January 29: several inches of snow that, as he puts it, placed Seattle into "virtual immobility". As I remember there are some hills downtown that are reminiscent of San Francsico. Just the thought of snow must send panic through the city. In spite of this, thirteen people attended the January meeting, including three hardy guests:

Date: January 29, 1969

Attendance: 13

Speaker: Mr. Robert O. Lewis, The Boeing Company

Topic: The Lunar Orbiter EMC Program

For their March 26, meeting, the speaker has now been firmed up: he will be William Swift. He will speak about using the Spectrum Analyzer for EMI Measurement. Bill is Secretary of the San Francisco Chapter.

The balance of the 68-69 program is still in the planning stage.

That's it for another two months. It is a little disappointing that three Chapters did not report. The last column was written on New Year's day in a mild Philadelphia. Today is March 2, and it's snowing like it does in, say, Boston. Spring can't come a day too soon this year. See you again when the weather's better (I hope).

## Meetings & Events

1969 IEEE International EMC Symposium

The technical program for the 1969 International EMC Symposium has been set according to Charles D. Joly, Technical Program Committee Chairman. The evaluation of abstracts was completed by the Technical Program Committee in early February. Approximately 40 authors have been invited to submit final papers for presentation and publication in the proceedings.

Sessions of the Asbury Park, New Jersey meeting, to be held at the Berkeley-Carteret Hotel June 17-19, will include 5 invited papers from overseas. The authors are from Switzerland, Canada, Great Britain, Italy and the Netherlands.

A package containing information regarding registration, fees, agenda, and hotel and travel accommodations will be sent to all G-EMC members in late April 1969. For general information concerning the symposium, contact Mr. H. K. Estelle, P.O. Box 1969, Eatontown, New Jersey 07724.

The preliminary technical program for the Symposium is as follows:

JOINT SESSION

Tuesday, June 17

Welcome by Symposium Chairman, John J. O'Neil

Remarks by Chairman of Administrative Committee, Fred Nichols

Keynote Address

MORNING SESSION

SESSION 1A - INTERFERENCE PROPAGATION

Introductory Paper: (Title to be Announced) E. Paolini, University of Naples, Italy.

"Biological Hazards from High Power H.F. Transmitters," A. R. Kall and Dr. H. M. Watts, Ark Electronics Corp., Willow Grove, Pa.

"Compatibility of Man in the Microwave Environment," L. P. Inglis, Atomics International, Canoga Park, Calif.

"Effects of Local Structures on Interference Measurement and Prediction," F. C. Milstead and W. E. Cory, Southwest Research Institute, San Antonio, Texas.

SESSION 1B - INTERFERENCE SOURCES

Introductory Paper: "The Dimensions of Radio Noise," E. N. Skomal, Aerospace Corp., San Bernardino, Calif.

"Interference Prevention in SCR Power Control," D. W. Matthias, Omnionics Vercor, Marietta, Ga.

"The Properties of the Radiation Below 1 GHz from Gap-Type Arc Discharges on Electric Power Distribution Lines," J. P. German, Texas A&M University, College Station, Texas.

"Evaluation of the Different Types of Integrated Circuits as Sources of Electromagnetic Interference," R. R. Grim, Honeywell Inc., Annapolis, Md.



CONT'D

AFTERNOON SESSIONS

SESSION 2A - INTERFERENCE SHIELDING AND FIXES

Introductory Paper: "The Reduction of Interference to Medium and High Frequency Receiver Aerial Systems in Ships," W. Martin, British Admiralty

"Active Preselection Filter Techniques for Adjacent Channel Interference Suppression at UHF," H. W. Denny and R. A. Byers, Georgia Institute of Technology, Atlanta, Ga.

"Interference Blanker for HF Receivers," G. J. Palladino and R. H. Sugarman, American Electronic Laboratories, Lansdale, Pa.

"Techniques for Improving Cosite Compatibility," M. R. Winkley, Bell Aerospace Co., Tucson, Ariz.

"Development of Extended Range Shielded Enclosures," R. C. Follett and L. W. Beard, Sprague Electric Co., Annapolis Junction, Md.

SESSION 2 B - INTERFERENCE PREDICTION

Introductory Paper: "Interference Prediction - The Objective, Philosophies, and Future Direction," J. C. Toler, Georgia Institute of Technology, Atlanta, Ga.

"Aircraft Antenna-Coupled Interference Analysis," M. D. Siegel, McDonnell Douglas Corp., St. Louis, Mo.

"Radiated Interference and Susceptibility Characteristics of Unshielded Wires," R. J. Mohr, Cutler Hammer, Airborne Instrument Lab., Deer Park, N. Y.

"Frequency Spectra and Hermite Functions," Dr. E. F. Trombley, Boeing Co., Missile and Information Systems Div., Seattle, Wash.

"Interference Prediction Model for a Quantized Pulse Position Demodulator Receiver," G. C. Cooper, R. K. Masnaghetti, M. B. McCaleb, Lockheed Electronics, Plainfield, New Jersey.

EVENING SESSION

Panel Discussion: "Application of EMC to Relieve Congestion on Public Safety, Marine and Citizens's Band Communications Channels"
Workshops

WEDNESDAY, JUNE 18

MORNING SESSIONS

SESSION 3 A - INTERFERENCE MEASUREMENT TECHNIQUES

Introductory Paper: "Methods of Measuring Radio Interference on Frequencies above 30 MHz," A. de Jong, Netherlands PTT.

"Insertion Loss Measurements in a 5-Ohm System," S. S. Bernstein Filtron Co., Inc., Flushing, N. Y.

"A Technique for Magnetic Field Susceptibility Testing," E. W. Paschetag and D. W. Bondeheimer, LTV Electrosystems Inc., Dallas, Texas

"Preliminary Interpretation of Near-Field Effects on Measurement Accuracy in Shielded Enclosures," C. W. Stuckey, W. R. Free, and D. W. Robertson, Georgia Institute of Technology, Atlanta, Ga.

"Power Line Impedance Determination Using the Three-Voltage Measurement Method," H. A. Lasitter, U. S. Naval Civil Engineering Labs., Port Hueneme, Calif.

"Meaningful EMC Measurements in Shielded Enclosures," H. A. Mendes, IBM Corp., San Jose, Calif.

SESSION 3 B - INTERFERENCE MANAGEMENT

Introductory Paper (Title to be announced) H. M. Sachs, Vertex Corp., Kensington, Md.

"Approaches to the Quantification of EMC in System Effectiveness," R. B. Schulz, Boeing Co., Seattle, Wash.

"Management and Implementation of EMC on Large Aerospace Programs Utilizing Computer Techniques," W. R. Johnson, J. A. Spagon and A. K. Thomas, TRW Inc., Redondo Beach, Calif.

"A Time Sharing Scheme to Alleviate Interference in Collocated Equipments," Dr. J. Perini and J. F. Spina, Rome Air Development Center, Griffiss AFB, New York.

"Quantitative Evaluation of EMC Programs," H. K. Mertel, General Dynamics Corp., San Diego, Calif.

"Transmission Line Theory as Applied to the Design of Low Pass Noise Filters," G. M. Kunkel, Scanbe Manufacturing Co., Monter Park, Calif.

"Filters Affect Power Line Voltage," R. B. Cowdell, Genisco Technology Corp., Compton, Calif.

EVENING SESSION

Cocktail Hour, Sponsored by Industry

Banquet - Speaker: (To be announced)

THURSDAY, JUNE 19

MORNING SESSIONS

SESSION 5A - INTERFERENCE MEASUREMENT PROBLEMS AND SOLUTIONS

Introductory Paper: "EMC Figure of Merit for Receivers," W. G. Duff, Atlantic Research Corp., Alexandria, Va.

"Controlled Measurement of Shielding Effectiveness of Materials, Conducting Gaskets, and Contact Strips," A. R. Kall, Ark Electronics Corp., Willow Grove, Pa.

"Standardized EMC Cable Parameter Measurement", J. E. Bridge and D. A. Miller, I I T Research Institute, Chicago, Ill.

"Using of Microstrip Transmission Line to Improve Broadband Electromagnetic Measurements," F. M. Roddy and Dr. J. G. Hewitt, Sandia Labs., Albuquerque, N. M.

"Computer Program for EMI Data Reduction," J. R. Engstrom, IBM Corp., Endicott, N. Y.

"Selection and Test of Power Line Filters," D. J. Jobe, Motorola Inc., Scottsdale, Arizona

SESSION 5 B - INTERFERENCE PREVENTION AND CONTROL

Introductory Paper: "Spectrum Measurement and Interference Control," D. Fraser, Canadian Dept., of Communications.

"ISM Large Power Generators Having Low Harmonic Radiations." E. Paolini and L. Piocioli, University of Naples, Italy.

"Structures EMC Engineering - Something New on the Horizon," V. C. Plantz, Boeing Co., Seattle, Washington.

"Suppression of Electromagnetic Radiation from Motor Vehicles," J. V. Clore, General Motors Proving Ground, Milford, Mich.

"Effect of Series Gap on Radiated Ignition Interference," D. C. Schlick and H. P. Hsu, General Motors Technical Center, Warren Mich.

"A New Look at the EMC Problem," M. Morris, U. S. Army Electronics Command, Ft. Monmouth, N. J.

"Nuclear Magnetic Resonance, A New Approach," W. A. Stirrat, U. S. Army Electronics Command, Ft. Monmouth, N. J.



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## NGINEERING SEMINAR ON ELECTRICAL NOISE

one day electrical noise seminar was sponsored by the Milwaukee hapter of the Industry and General Application Group in cooperation ith the Milwaukee Section of the IEEE on March 8, 1969. The pur- se of the seminar was "to provide a forum for the presentation and scussion of the problems of electrical noise and interference en- untered in the design, construction and installation of electric ntrol and measuring equipment." Seminar Topics and speakers ere as follows:

Identification of Electrical Noise in Control Circuits
Mr. Roy Hoink: Cutler-Hammer, Inc.
Mr. William Meinders: Hurky Products, Inc.

The Prevention and Treatment of Noise in Control Signals
Mr. Frank G. Willard - Westinghouse Electric

Design Considerations in Constructing Electronic Circuits to Minimize Noise Effects
Messrs: Joseph Moser & W. Ware Kiffmeyer: Allen-Bradley Co.
Quiet Wiring Zone
Mr. Robert E. Goers: U.S. Steel Corp.

Electromagnetic Compatibility in Perspective - Dr. Heinz M. Schlicke, Allen-Bradley Co.

The Use of Suppression Devices - Mr. Wm. Johnson: The Potter Co.

Round Table Discussion: Are Industry Standards for Noise Control Feasible?

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## NAECON EMC SESSION

he 1969 National Aerospace Electronics Conference will be held May 19-21 at the Sheraton -- Dayton Hotel, Dayton, Ohio. The EMC ession will feature six papers as follows:

- ACTIVE ANTENNA IMPEDANCE MATCHING NETWORK

  By C. H. Miller / E. W. Paschetag
  LTV-Electrosystems
  Dallas, Texas

- HF RECEIVER INTERFERENCE REDUCTION TECHNIQUES

  By G. J. Palladino/R. H. Sugarman
  AEL Inc.
  Colmar, Penna.

- A TECHNIQUE FOR MAGNETIC FIELD SUSCEPTIBILITY TESTING

  By E. W. Paschetag/ D. W. Bodenheimer
  LTV-Electrosystems
  Dallas, Texas

- AIRCRAFT ANTENNA COUPLED INTERFERENCE ANALYSIS

  By M. D. Siegel
  McDonnell-Douglas Corp
  St. Louis, Missouri

- AN AUTOMATIC MULTI-COUPLED INSTRUMENT FOR MONITORING ELECTRICAL TRANSIENTS ON AIRCRAFT

  By R. F. Holtman/L. W. Olson/A. E. Dorband
  Boeing Co.
  Seattle, Washington

- A SOLUTION TO THE EMC PROBLEMS

  By K. Johnson / D. A. Nesheim
  Northrop Corp
  Los Angeles, California

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## "Man in his Environment"

This is the theme of the 15th annual technical meeting and equipment exposition sponsored by the Institute of Environmental Sciences. The meeting will be held April 20-24, 1969 at the Anaheim Convention Center in Anaheim, California. Sessions which may be of specific interest to G-EMC members are as follows:

SESSION C-1, C-2
Panel Discussions
SESSION 1 - EMC Environments Panel

The Unique Aspects of Electromagnetic Environments in Naval Task Forces. H. E. Winter, United States Navy.

Field Army Electromagnetic Environments. T. J. Flahie, Textcon's Bell Aerosystems Co.

Large Scale EMC Environments Composed of Civil-Military C & E Equipments. T. J. Wilson, IIT Research Inst.

SESSION 2 - Are specified electromagnetic Environments Adequate? Moderator: E. Hughes, Autonetics

Interference Measuring Instrument Calibration, F. Hume, Autonetics
Electromagnetic Environment of Aircraft Systems, J. Moe, General Dynamics.

Shipboard Electromagnetic Environment, R. A. Molz, Hughes Aircraft.

Army Electromagnetic Environment, J. H. Watson, McDonnell Douglas Corp.

ICBM Electromagnetic Environment, B. N. Singleton, TRW Systems

Unmanned Space Vehicle Environment, C. B. Pearlston, Aerospace Corp.

Manned Space Vehicle Electromagnetic Environment, W. Lash, McDonnell Douglas Corp.

SESSION C-5, C-6 The Future of Bio-Engineering in our Daily Lives

SESSION 1 Bio-engineering, Animal Behavior and Bionics

Generation of a Low Magnetic Field Environment for Study of Effects of the Space Null Magnetic Field on Man, D. E. Beischer, Naval Aerospace Medical Ctr.

Properties of a Biological Acoustic Transducer, S. Sparks

SESSION E-3 Operation and Management of an Environmental Laboratory

Management of an Army Environmental Laboratory, W. P. Lloyd, U.S. Army Redstone Arsenal

Management of an Air Force Environmental Laboratory, J. F. Dreher, Wright Patterson Air Force Base.

Management of a Navy Environmental Laboratory, R. E. Seely, U. S. Naval Weapons Improvement Lab., NOP

Management of a Research and Development Environmental Laboratory in Industry, T. B. Delchamps, Bell Telephone Labs.

Management of an Environmental Laboratory in a Non-Profit Industrial Organization, L. E. Lamkin, Sandia Labs.

Management of a Commercial Environmental Laboratory, A. Erdman, Associated Testing Labs.

Management of an Industrial Environmental Laboratory, J. D. Campbell, Perkins-Elmer Corp.

The Management of a Commercial Environmental Testing Laboratory, C. J. Brutza, General Testing Labs.

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## A 15-DAY INTENSIVE COURSE - INTER-SYSTEM ELECTRO-MAGNETIC COMPATIBILITY --- AUGUST 15- 29, 1969

The technical area of electromagnetic compatibility is a problem oriented specialty which interfaces with the technical specialties of components, circuit design, systems design and evaluation, antenna development, and signal processing. Managers, supervisors, engineers, and designers have difficulty keeping current in these various technical specialties directly related to the electromagnetic compatibility of systems operating in the same electromagnetic environment. The aims of this intensive course on specific phases of inter-system electromagnetic compatibility are to review pertinent current research, to examine state-of-the-art, and to point out promising future areas and developments.

### Application Due

On or before July 15, 1969. Enrollment will be limited to 40 students on a first come basis.

### Prerequisite

Those attending this intensive course should be, by formal education or practical experience, beyond the B.S. degree level in engineering or physical science.

Visiting Faculty:

Herbert J. Carlin, Professor and Director of the School of Electrical Engineering, Cornell University.
A. S. Gilmore, Jr., Electro-Science Division, Sanders Associates, Inc.
Edwin F. Johnson, School of Electrical Engineering, Cornell University.
L. A. MacKenzie, Associate Professor of Electrical Engineering, Cornell University.
Benjamin J. Leon, Professor of Electrical Engineering, Purdue University.
Richard E. Rabe, Electronics Engineer, Rome Air Development Center.
Octavio M. Salati, Associate Professor of Electrical Engineering University of Pennsylvania.

Permanent Faculty:

Arlon T. Adams, Associate Professor of Electrical Engineering, Syracuse University.
Woodrow Everett, Jr., Research Electronics Engineer, Rome Air Development Center.
Jose Perini, Associate Professor of Electrical Engineering, Syracuse University.
Roland E. Thomas, Colonel, Permanent Professor of Electrical Engineering and Chairman of the Electrical Engineering Department United States Air Force Academy.

### Fee

$275.00 (includes class notes, reference texts, parking)

### Enrollment

Enrollment may be made by individuals or companies. Any number of persons from a single company may enroll as long as there are vacancies. Reservations may be requested for industry and government employees requiring time to obtain authorization. Companies may enroll for a given number of qualified individuals, supplying names later.

### Additional Information

For additional information write, Dr. Arlon T. Adams, Syracuse University, Department of Electrical Engineering, Hinds Hall, Syracuse, New York.

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## 1969 MEASUREMENT & TEST INSTRUMENT CONFERENCE - INSTRUMENT AND MEASUREMENT SYMPOSIUM

The 1969 Electrical and Electronic Measurement and Test Instrument Conference will be held May 5, 6, and 7, 1969, at the Skyline Hotel, Ottawa, Canada. This is the first I & M symposium to be held in conjunction with the Electrical and Electronic Measurement and Test Instrument Conference.

The aim of the symposium is the advancement of electromagnetic measurements and instrumentation broadly useful in engineering application. Test and calibration instrumentation in the d-c, l-f, h-f, and microwave regions forms the core of the symposium. Measurements and instruments directed towards the solution of th technical aspects of broad social problems will be emphasized. For 1969, major emphases will be on automated test and calibrati instruments and measurement techniques. Additionally, instrume and measurement techniques applicable to the broad fields of obse evaluating, and utilizing earth resources are solicited.

The conference is sponsored by the Ottawa section and the Group on Instrumentation and Measurement, both of the Institute of Elec trical and Electronics Engineers.

Original papers on measurement techniques, instrumentation, anc calibration techniques, in the following areas, will be presented.

(1) Automated Systems at d-c, l-f, h-f, and microwave frequen

(2) Applications to study earth resources (land, ocean, or atmc phere).

(3) New measurements, instruments, and techniques.

(4) General test and evaluation applications.

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## CONFERENCE ON MEASUREMENT EDUCATION

### WARWICKSHIRE, ENGLAND

A Conference on Measurement Education will be held from 8th to 10th July 1969 at the University of Warwick, Warwickshire, Engl

The Conference will be co-sponsored by The Institute of Electrica Engineers, The Institute of Mathematics and its Applications, The Institute of Electronics and Radio Engineers, The Institute of Electrical and Electronics Engineers, U. K. and Republic of Ireland Section.

It aims to discuss the need for educational courses dealing with electrical, mechanical, physical and chemical measurements and to discuss the content and method of presentation of such courses various levels of education, up to and including university level, ar also in industry.
The scope of the Conference is:
Training in Measurement in British Industry
Measurement Education - Present Practice
Proposals for Improvement of Measurement Educa

Further details from The Conference Department, The Institution Electrical Engineers, Savoy Place, London, W. C. 2, England. I is intended that all contributions accepted for inclusion in the Conference programme will be printed in a volume in the IEE Confere Publication series, which will be available to all registrants about a month before the Conference.

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## THE 1969 USNC/URSI -IEEE SPRING MEETING

April 21-25, 1969 at the Shoreham Hotel, Washington, D.C.
(Coincident with the American Geophysical Union meeting at Sheraton Park Hotel)

The meeting will be jointly sponsored by the following IEEE Group

Group on Antennas and Propagation
Group on Circuit Theory
Group on Geoscience Electronics
Group on Instrumentation and Measurement
Group on Information Theory
Group on Microwave Theory and Techniques

The following Commissions will hold technical sessions:

| | |
|---|---|
| Commission 1 | - Radio Measurement Methods and Standards |
| Commission 2 | - Radio and Non-ionized Media |
| Commission 3 | - On the Ionosphere |
| Commission 4 | - On the Magnetosphere |
| Commission 5 | - Radio and Radar Astronomy |
| Commission 6 | - Radio Waves and Transmission Information |
| Commission 7 | - Radio Electronics |

A block of rooms has been reserved at the Shoreham Hotel. Advai registration and hotel reservation cards will be mailed with the Pr inary Program to members of the sponsoring groups.

# Air Waves and Regulations

## FCC NOTICE OF PROPOSED RULE MAKING

The long awaited proposed rule making from the FCC incorporating the new Government legislation passed in Public Law 90-379 has been released. It carries Docket No. 18426, adopted January 15, 1969, released January 17, 1969. Due to its large size (9 pages) the document cannot be reprinted in this Newsletter in entirity. Copies may be obtained by writing to the FCC, Washington, D.C. 20554. Excerpts are as follows:

"1. Public Law 90-379, 82 Stat. 290, which was approved July 5, 1968, amended the Communications Act of 1934, as amended, by adding a new Section 302. This section, entitled "Devices which Interfere with Radio Reception," authorizes the commission to "make reasonable regulations governing the interference potential of devices which in their operation are capable of emitting radio frequency energy by radiation, conduction, or other means in sufficient degree to cause harmful interference to radio communication." The new law further provides that such regulations shall be applicable to the manufacture import, sale, shipment or use of such devices and prohibits any person from engaging in such activities with respect to devices which fail to comply with regulations promulgated by the Commission pursuant to this section. The instant proceeding is designed as an initial step in implementation of this new statute and notice is hereby given of the Commission's proposal to adopt the regulations described herein."

"3. Up to the present time the Commission's role in this area has stemmed from Section 301 of the Communications Act which prohibits the use or operation of any apparatus for the transmission of energy or communications by radio except in accordance with a Commission authorization therefor. As a concomitant of this authority, the Commission has for many years prescribed radiation levels and related technical standards for various types of radio frequency devices, the use of which by any person or company has been authorized by the Commission by individual license or general rule. Such standards have been prescribed for equipment used in established radio services such as Broadcast, Domestic Public, Aviation, Marine, Public Safety, Industrial, Land Transportation, Citizens, Amateur, International Fixed Public, etc., and for many radio frequency devices authorized under Parts 15 and 18 of our rules....."

(See e.g., Section 91.109 (b); 93.109 (b); 89.101 et seq.; 73.40; 5.63; 15.7; 15.212; 18.72; 18.102; 21.100 et seq.

"4. The proposed rules, and the new legislation, are designed to create an approach to the problem of harmful interference by permitting control measures directed at one of its major sources. While many manufacturers of radio frequency devices have viewed the interference potential characteristics of their products with much awareness and concern, others have not. Reaching into this source of the problem - to the manufacturers and importers, and in turn to the sellers and shippers of radio frequency devices - should permit corrective action when necessary, before the offending devices have reached prospective users in epidemic proportions. In this connection the Commission advised the Congress, during the latter's consideration of the proposed legislation, that were such legislation to become law, the Commission would proceed to implement it gradually and only after a thorough study of all the problems involved. Thus, the rules proposed in this proceeding do not effect changes in existing technical standards which are presently applicable to radio frequency devices operated under authorization by the Commission for the particular service or purpose involved. What is suggested here is simply the application of existing technical standards to such equipment prior to distribution or shipment and under such type approval, type acceptance or certification requirements as are herein set forth."

"..... Technical standards have already been prescribed by the Commission for all of these radio frequency devices used under Commission authorization except for those in the incidental radiation category and the proposed rules will, in effect, require compliance with these standards prior to the offering for sale or sale of such devices or their importation or shipment for purpose of sale. (Thus, radio frequency devices manufactured solely for purpose of research, development, experimentation or testing, and not for purposes of sale, would not be covered by the proposed regulations.) Technical standards for the many kinds of incidental radiation devices have not yet been prescribed and therefore the basic control over the interference potential of such devices will continue to be the present prohibition against their use if the radiation therefrom causes harmful interference....."

"7. It is recognized that the proposal to require type approval, type acceptance or certification, as a condition precedent to the sale or shipment for sale of radio frequency devices, may raise problems with or require revisions of these procedures as presently set forth in our rules. For example, our certification procedures now set forth in Parts 15 and 18 might more properly be included in that Part of our rules which deal with type acceptance and type approval procedures. Again, further consideration must be given to our on-site test procedures which are applicable to CATV systems, ultrasonic equipment, industrial heating equipment, RF stabilized arc welders, and comments are requested as to the desirability of continuing these procedures without further modification. Possible problems stemming form the application of these rules to components must also be analyzed in the light of present type approval procedures which require the submission for testing of the entire unit. There is an outstanding proceeding, Docket No. 17869, involving changes in our type acceptance procedures and a further notice of proposed rule making may be required in that proceeding to accommodate additional revisions necessitated by the rules proposed herein..."

## APPENDIX TO NOTICE OF PROPOSED RULE MAKING

It is proposed that Subpart F of Part 2 of the Commission's Rules be amended (a) by the addition to the subpart of the provisions set forth below, and (b) by revising the existing provisions of the subpart to conform them to the new provisions.

(1) Radio frequency device defined

As used in this subpart, a radio frequency device is any device which in its operation is capable of emitting radio frequency energy by radiation, conduction, or other means. Radio frequency devices include, but are not limited to, (a) the various types of radio communication transmitting devices described throughout this chapter, (b)the incidental and restricted radiation devices described in Part 15 of this chapter, and (c) the industrial, scientific and medical equipment described in Part 18 of this chapter; or any part or component thereof which in use emits radio frequency energy by radiation, conduction or other means.

(3) Statutory exceptions.

As provided by Section 302(c) of the Communications Act of 1934, as amended, Section (2) of this subpart shall not be applicable to:

(a) Carriers transporting radio frequency devices without trading in them.

(b) Radio frequency devices manufactured solely for export.

(c) The manufacture, assembly, or installation of radio frequency devices for its own use by a public utility engaged in providing electric service: Provided, however, that no such device shall be operated if it causes harmful interference to radio communications.

(d) Radio frequency devices for use by the Government of the United States or any agency thereof: Provided, however, that this exception shall not be applicable to any such device after it has been disposed of by such government or agency.

# A Bit of Humor

The new legislation proposed by the Federal Communications Agency (FCC) will soon bring the problem of EMI/EMC design to the door step of every householder. Eventually there will be too many self-ordained EMI Control Engineers and the competition will be fierce. The Classified section of the newspapers will be full of ads offering EMI services to the public some of which may appear as follows:

FILTERS CHEAP
Rates by oz. lb, or ton (AGE only)

RFI SPECS WRITTEN
while-U-wait

BONDING
Alodyning and Paint Scraping Cheap

GROUNDING
grounding philos ophies cut-and-dried

SHIELDING
100 db or bust (your budget)

SQUIBS TESTED
and tested and tested and tested and tested

ERUDITE PAPERS WRITTEN
this weeks special:
"The Systems Approach to (you name it)"

COMPLETE PROGRAM MANAGEMENT
(where you like it or not)

FREE LUNCHES
vendor benders for special customers

DEVIATIONS
cheerfully written

CONTROL AND TEST PLANS
written in the grandiloquent "Avenue" Style

TEST REPORTS
multibar graphs and varicolored superficial overlays a specialty
(made to match office decor - just specify color scheme)

EMC PROPOSALS WRITTEN
boilerplate philosophy and grandure lip service editted to fit your needs

(Do you have a cartoon which would be of interest to the EMC members? Please send it to the Editor)

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## Spatial filtering cleans up deep-space TV noise

An article with the above title appeared in the October 1968 issue of EDN. The first two paragraphs are extracted as follows:

"Urbana, Ill. - Researchers in Professor Poppelbaum's Computer Hardware Research Group at the University of Illinois have developed an on-line laser technique for eliminating noise that deteriorates space-generated TV signals. This real-time technique for cleaning up TV signals, based on spatial filtering, promises to be far more satisfactory than the time-consuming and expensive computer noise-elimination techniques now in use.

"The basic technique is possible because most noise existing in space varies slowly, while the noise in consecutive TV-frame contains only noise and the next contains both signal and noise; the processing of both into a form in which one signal is subtracted from the other results in a noisefree signal."

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## The Silent Crisis Screams

A book with the above title is in the process of being written by Kenneth A. Norton, Consultant to the Director, Tropospheric Telecommunications Laboratory, U. S. Department of Commerce, Bou Colorado. The manuscript is presently in draft form and has recei limited distribution to those with an expressed interest in return fo constructive comment. It is not presently known when the complet manuscript will be published and available to the public. However, your newsletter editor has had the good fortune to receive a draft copy from Mr. Norton with his kind permission to publish excerpts

The text has a second title - "The Five-Dimensional Electromagne Spectrum Resource" which is described as "A Major Economic and gineering Research Responsiblity of the Federal Government". Con uting to the economical aspects of this text was economist and co-author Louis A. Rose.

The book is made up of three main parts to which is attached twent three appendixes. The three parts are entitled "Part I -- The Res Required for the Improved Use of the Spectrum Resource," "Part The Frequency Dimension of the Resource -- Current ITU and FC Spectrum Allocations," and "Part III --- Optimum Use of the Electr magnetic Spectrum Resource." In the Forward to the Book, Mr. I ton makes the following statements: "The spectrum itself has only a single dimension, which is frequency However, when consider as a resource to be allocated to various users, this resou has five independent dimensions: frequency, time and the three din ensions of the locations in space at which the resource is used. A portion of the spectrum resource is used when this portion is occu by some form of wanted electromagnetic energy. It is a limited re but its use can be shared nationally and internationally. It is an u resource in that it is not depleted by use. However, its value at a specific time can be drastically reduced by misuse. It is unusual another sens e in that frequency assignments to specific users are rently made without a use charge and with no accurate quantitative measure of its value to the national or international welfare."

"....The recognition of the potential retardation to the economic growth of the United States caused by a less than optimum use of t spectrum led the Commerce Technical Advisory Board, in cooper with the Director of Telecommunications Management (DTM), the Federal Communications Commission (FCC), and the Department of Defense (DOD), to establish ad hoc the Telecommunication Scie Panel. This panel recommended that the Federal Government de a Telecommunication Research Organization which has as its prin objective the improvement of the overall effectiveness of utilizatic the Electromagnetic spectrum. The present report discusses the of theresearch which should be conducted by this proposed organiz and by other telecommunication research groups in the United Sta in order to provide the two spectrum policy making organizations United States, the DTM and the FCC, with the factual information which they need in order to manage the use of the electromagnetic spectrum resource in such a way it will better serve the public interest."

In future issues of the G-EMC Newsletter we will quote from vari segments of the Norton's text, correspondence, and related notes areas which should be of interest to many of the EMC community We would like to express our thanks to Mr. Norton for his permi to reproduce such excerpts in our newsletter.

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## NEW SHIELDING STANDARDS

The recommended Practices for the Measurement of Shielding Effectiveness has been approved by the Standards Committee of IEEE and is expected to be published on a trial basis by late fall of 1969. Except for minor changes, the official version from the IEEE will be similar to that published in the IEEE Transactions on Electromagnetic Compatibility Vol. EMC-10 Number 1, March 1968, pages 82-94. A few advance copies of the official version are available from J. E. Bridges, Chairman Committee 27.5, c/o IIT Research Institute, 10 West 35th Street, Chicago, Illinois 60616.

The recommended practices cover many aspects not included in MIL-STD-285, and should lead to a more uniform comparison of enclosure performance. The following tables summarize some of the features of the "Practices" vs. MIL-STD-285.

### GENERAL COMPARISON

| | MIL-STD-285 | IEEE Recommended Practices |
|---|---|---|
| Effectiveness Measurement | Yes | Yes |
| Test Arrangement | | |
| Simulating Actual Environment | Partially | More Complete |
| Specifies Method of Design or Fabrication | Yes | No |
| Specify Test Limits | Yes | No |

### COMPARISON OF MEASUREMENTS AND RELATED FREQUENCY RANGE

| | MIL-STD-285 | IEEE Recommended Practices |
|---|---|---|
| Stated Frequency Range | $10^5 - 10^{10}$ | $10^2 - 10^{10}$ |
| Effective Frequency Range | $10^5 - 10^9$ | $10^2 - 10^{10}$ |
| Nearby Magnetic Field Point Source | $10^5 - 3 \times 10^8$ | $10^2 - 2 \times 10^7$ |
| Nearby Electric Field Point Source | $10^5 - 10^8$ | No |
| Distant Magnetic Field Source | No | $10^2 - 2 \times 10^5$ |
| Nearby Plane-Wave Source | $10^8 - 10^9$ | $3 \times 10^8 - 1.2 \times 10^{10}$ |
| Distant Plane-Wave Source | No | Assessed $3 \times 10^8 - 1.2 \times 10^{10}$ |

### SPECIAL FEATURES

| | MIL-STD-285 | IEEE Recommended Practices |
|---|---|---|
| Seam Measurement | No | Yes |
| Door Gasket Measurement | No | Yes |
| Air Vent | No | Yes |
| Uniform Exciters and Sensors | Yes | Yes |
| Specified Position | Yes | Yes |
| Worst-Case Polarization | No | Yes |
| Worst-Case Position | No | Yes |
| Specified Cable Runs | No | Yes |
| Specified Cable | No | Yes. |

Committee 27.5 of the IEEE EMC Group also expects to develop a standard to measure the shielding effectiveness of various cables. Those who have a possible interest in this area should contact Mr. Bridges at the above address.

As a function of the G-EMC Specialist Working Group on Shielding an informal workshop seminar on shielding is expected to be conducted at the next EMC Symposium in June. The details as to time and place will be announced later. Topics covered will include results of locally conducted workshops on shielding, benefits and disadvantages of "seam sniffer" techniques, results to date using the shielding measurement procedures suggested in the forthcoming IEEE Recommended Practices on the Measurement of Shielding Effectiveness, shielding effectiveness measurement procedures for air filters and shielding measurement methods for cables, the need for additional standards, and problem areas for future papers.

# Miscellany

## SPECTRUM CONTROL OFFERS ADDITIONAL EMC CAPABILITIES

The formation of a new electronics industry, Spectrum Control, Inc., 152 E. Main Street, Fairview, Pa., is announced by Thomas L. Venable, President.

The new company will manufacture and market electronic equipment custom designed to assist in reduction and isolation of radio frequency interference. Products will include custom designed electronic grounding strips and flexible electro-mechanical sealing and shielding forms. The firm will provide an electro-magnetic compatibility consulting and management service.

The ultimate goal of SCI is to provide a total capability in the field of EMC in the areas of:

EMC Consulting and Management
Shielding and Gasketing
Shielded Rooms and Enclosures
Instrumentation
Special Test Fixtures
High Frequency Capacitors
Special Suppression Devices

These products and services will be offered on a planned program basis as the capabilities are developed.

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## New EMC Engineering Firm

Mr. C. Hewison, formally of HEATCO, has announced the formation of Charles M. Hewison and Associates, Box 507, Stillwater, New York, 12170. The new firm will specialize in engineering and technical services related to electromagnetic compatibility. Although primarily a consulting organization, they will provide special purpose custom design test equipment.

Mr. Hewison, President, is a registered Professional Engineer in the state of Texas and New York, and is a member of the IEEE-G-EMC. The newly formed firm presently has four employees, including Mr. John F. Manley, formerly of Sprague Electric Company.

## STODDART ELECTRO SYSTEMS FORMS NEW DIVISION

Stoddart Components, a division of Stoddart Electro Systems, has been established at 13225 S. Western Ave., Gardena, California 90249. The initial product designed and manufactured will be EMI filters. The EMI filter design and manufacturing capability is a further extension of the many EMI/EMC products and services already available from Stoddart Electro Systems. Mr. Lawrence J. Zynda has been obtained as General Manager of formulate and guide the activities of Stoddart Components.

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## Definitions for Transients

The last issue of the G-EMC Newsletter (February 1969) contained the definitions for transients extracted from the proposed MIL-STD-1281 (EL), "Internal Transient Control for Solid State Power Supplies", dated 10 October 1968. The proposed standard has recently been reviewed by the EIA, which has recommended that the definitions be changed to the following:

"Transients: The perturbation of a parameter which occurs during its transition between two steady-state conditions."

"Surges: A surge is a transient away and back to the controlled steady-state level of parameter, resulting from the inherent regulation of an electric power supply system and remedial action by the regulator."

"Spikes: A spike is a transient away from and back to the surge level or the controlled steady-state level of a parameter which reaches its greatest amplitude in a time less than 50 microseconds."

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## SEALAB III HAS INTERFERENCE PROBLEMS

An article entitled "Designing for the Explosive Undersea Dep which appeared in the January 18, 1969 issue of Electronic De contained several paragraphs discussing interference problem the Sealab III. The article was written by John F. Mason, the itary Editor of the publication. Paragraphs of interest are ex as follows:

"The umbilical cord to the diver, for example, carries ele for his heated suit and a light, it also carries communicat plus telemetry data on the amount of oxygen in the breathir ture. Part of the communications equipment in each aquar backpack is not shielded properly, and the SCR controller f electric suit interferes with communications."

"To repair this would have been a major job, and there ju time when it was discovered." Berry Cannon, an electror engineer and one of the aquanauts, said in an interview be Sealab III experiment began.. "All the preamplifiers pott the microphone cables would have to be changed. The noi a little irritating, but its something we are going to have t with."

"There is also interference between the TV cameras and or pingers, that are fastened to the habitat. There was n test this precisely enough to know how to repair it before the habitat. The aquanauts hope to block out the noise wi

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## MORE MONEY FOR SPACE RECOMMENDED

A two-year study by the National Research Council's Divisi Engineering has concluded that the practical benefits to be from earth-orbiting satellites appear to be very substantial would justify two to three times the current level of federa

To obtain these benefits within the coming decade, the pan mends "an extensive, coherent, and selective program" cc $200 - 300 million a year.

The Central Review Committee of the NRC Summer Study Applications presents its recommendations and conclusion National Aeronautics and Space Administration in a brief Useful Applications of Earth-Oriented Satellites.* A seco containing summaries of the report of the 13 technical pan made up the study group, is expected to be available withi Reports of the panels are being published as individual vo

*Subtitled Report of the Central Review Committee, avai $2 from the Printing and Publishing Office, National Rese 2101 Constitution Avenue, N.W., Washington, D.C. 2041

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## DOD TIGHTENS DEFERMENT DIRECTIVE

The Defence Department has tightened its policy on occu deferments for employees of the Department and of its c contractors. Under the new policy, DOD activities may request occupational deferments for college graduate em who have been less than one year on the job. While the applies directly to government activities under DOD mar it will preclude any support on the part of defense agenc tractors' employees. This could ultimately have a long of pressuring contractors to follow the same procedure to their civilian employees.
(Reprinted from the G-EM Newsletter)

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## RED TAPE RANKLES CONSULTING ENGINEERS

Only the shortage of experienced and qualified technical manpower is considered more of a problem than government red tape by private engineering firms. Consulting Engineers Council surveyed its 2000 member firms, who account for an estimated $7 billion in project value, and found that government controls were of concern in all fields of practice, regardless of the size of the firm. Last year in a similar survey, not one firm marked red tape as a problem.

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## MOST BUSINESS FAILURES DUE TO POOR MANAGEMENT

The number of business failures of electronic manufacturers and distributors declined during a year-long period studied by the Electronic Industries Association. Thirty-six companies failed during the year observed against forty-eight for the previous year. The number has been declining for the past five years. "Poor or inexperienced management" was cited as the prime factor contributing to failures along with tight or expensive money. "Others became involved because of low bidding or taking on contracts at prices which did not permit a fair or reasonable profit," the report stated. (Reprinted from the G-EM Newsletter)

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## UNIVERSITIES RESEARCH ASSOC. INCREASES MEMBERSHIP

The election of two more major universities to membership in the Universities Research Association, Inc., of Washington, has been announced.

They are Case Western Reserve University, Cleveland, Ohio, and the State University of New York at Stony Brook. Their election brings to 50 the number of academic institutions that are members of URA, 49 in the United States and one in Canada.

The addition of the two universities, both of which have distinguished departments in the physical sciences, took place at the annual meeting of the URA Council of Presidents.. The Council, the highest governing body of the URA, is made up of the presidents of URA member universities. Norman F. Ramsey, professor of physics at Harvard University, is president of URA.

URA operates the National Accelerator Laboratory, developer of the world's highest energy particle accelerator for the U.S. Atomic Energy Commission. Chairman Glenn T. Seaborg and Commissioner Gerald Tape of the AEC spent some time with the Council discussing the 200 BeV accelerator project. Later, acting administrator Thomas Paine, Homer Newell, and John Naugle of NASA met with the Council to discuss NASA -university relations.

URA was formed by 34 major research universities after a meeting of their presidents at the National Academy of Sciences, Washington, D. C., in June, 1965, to provide a broad national basis for the management of the 200 BeV accelerator and similar unique facilities in other fields. The Board has delegated management responsibility to Professor Ramsey, assisted by other corporate officers.

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# New Products and Brochures

### Electromagnetic Compatibility Handbook:

First edition of the Air Force Systems Command (AFSC) Design Handbook 1-4, "Electromagnetic Compatibility" has been released. Available without charge to qualified agencies supporting USAF official interests and objectives. U.S. Government organizations must justify requests based on their need in carrying out assigned functions and functions. Non-Government organizations must satisfy at least one of the following requirements:

1. The specific handbook is cited in an active Air Force contract or current Invitation for Bid.
2. The specific handbook is needed in private or education technical efforts, the results of which will directly benefit the Air Force.

Those who qualify should write to the Design Handbooks Branch (ASNPS -40), Aeronautical Systems Division, Wright-Patterson AF Ohio 45433 and provide the following information where applicable:

a. Identification of the Handbook

Qualifying under 1 above:

b. Contact or IFB number.

c. Title of the work.

d. Responsible Government Office.

Qualifying under 2 above:

e. Description of the requesting organization and work.

f. Description of the expected benefits to the Air Force.

Individuals or organizations that do not satisfy any of the above requirements may review copies of the handbook in any bona fide technical library qualified under 2 above. The handbook on electromagnetic compatibility is one of a series of general design handbooks released or in preparation by AFSC.

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### Application Guide for Electromagnetic Compatibility

A new brochure with the above title has been released by Chomerics, Inc. The fourteen page brochure provides application notes for the shielding of electronics enclosures, electronic subassemblies, connectors, waveguides, and switches. It also provides data on surface coatings plus typical shielding curves. This brochure is available free by writing to Chomerics, Inc., 85 Mystic Street, Arlington, Mass. 02174.

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### Sub-Miniature EMI Filters:

New sub-miniature EMI filter brochures were noted recently in previous G-EMC Newsletters. Manufacturers including RF Interonics and Sprague Electric.

Since mentioning the above brochures, other brochures, for miniature filters have been brought to the editor's attention. These are:

1. 75000 Series EMC/RFI Filters, Electro Materials Corp., 11620 Sorrento Valley Rd., San Diego, Calif. 92121.
2. Bulletin No. 8131 Subminiature EMI Filters, Sprague Electric Co., North Adams, Mass. 01247.
3. F-104 Miniature Series, Coptor Corp., 5040 South County Rd., 25A, Tipp City, Ohio 45371.
4. Bulletin No. 2000, U.S. Capacitor Corp., 2151 No. Lincoln Street, Burbank, California 91504.
5. Catalog No. 181, Components Corp., 2857 N. Halsted, Chicago, Ill., 60657.

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### SHIELDING MATERIALS FOLDER

The art of electromagnetic shielding has developed so rapidly in the last decade that many designers may be unaware of some of the techniques and materials which are now available.

To fill this gap, Emerson and Cuming, Inc., offers at no charge a new folder on Eccoshield RF Shielding Materials which describe briefly with many photographs the wide variety of approaches to shielding requirements.

Included are: Eccoshield PST - pressure sensitive metallic tape with conductive adhesive; Eccoshield TF - high permeability metallic foil; Eccoshield MNF - conductive fabric; Eccoshield VX and VY - conductive calk and sealer; Eccoshield ES - conductive surface coating; Eccoshield SO and CO - conductive greases. Shielding performance in terms of insertion loss possible with most of these approaches is of the order of 100 db.

For additional information, write to Mr. Eino J. Luoma, Emerson and Cuming Inc., Canton, Mass. 02021.

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SCOPE ACCESSORY CONVERTS SHORT DURATION NOISE SPIKES TO SQUARE WAVE OUTPUT

SCOPAC S-1 is a new Noise Spike Detector Scope Accessory which is plugged between the oscilloscope and the probe using BNC connectors. Specifically designed for debugging digital integrated circuit assemblies, the SCOPAC S-1 is suited for the detection of random and widely spaced short duration voltage supply and ground loop spikes. This accessory converts a short duration, positive or negative spike to an easy-to-see change of state of the output appearing like a square wave.

Spikes which are 3 or 4 orders of magnitude narrower than their spacing are faint and difficult to observe even on the best oscilloscopes. This difficulty is compounded if the scope is not synchronized with the recurrence frequency of the spikes, or the spike is too fast for the oscilloscope response. With SCOPAC S-1, however, spikes as short as 50 nanoseconds duration are easy to see, even on narrow band scopes. The spikes Pulse Repetition Frequency (PRF) can be anywhere between 0.1 Hz and 5 MHz. SCOPAC's input impedance is high and represents a negligible load on typical digital logic circuits.

For further information, write to Travis Electronics, Inc., 56 Elmwood Street, Newton, Mass. 02158.

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EMI INSTRUMENTATION

A brochure with the above title has been released by the Electro-Mechanics Company (EMCO). The brochure contains catalog information on new instrumentation which has been designed for testing to the MIL-STD-461 series and FED-STD-222. Unique items include a Magnetic Field Intensity Meter and accessories covering the frequency range of 0.1 Hz to 50 KHz, Magnetic Shield Cans consisting of two concentric cylinders, Helmholtz Coil Systems for calibration and susceptibility testing, various conical spiral antennas and tunable rejection and notch filters over the frequency range of 10 KHz to 10 GHz. For additional information, write to Mr. D. R. Malone, EMCO, P.O. Box 1546, Austin, Texas 78767.

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Voltage Probe for High-Frequency Measurements

A two-page article with the above title appeared in the November 1968 issue of the Hewlett-Packard Journal. Written by Eddie A. Evel of HP, the article offers a solution to the problem of accurate high frequency measurements. The following are excerpts from the article:

"When measuring high-frequency signals, accuracy can be adversely affected by circuit loading caused by the measuring instrument. Since loading may change the characteristics of the circuit under test or the wave-form of the signal, it is often necessary to use a high-impedance, low-capacitance input device. The new HP Model 1123A Voltage Probe is a wide-bandwidth, active probe designed for making accurate high-frequency measurements.

Using active circuitry in the probe tip, the probe input capacitance is approximately 3.5 pF. Because of the low capacitance, it has a high input impedance at high frequencies. Thus it allows accurate measurement of high frequency signals having a high source impedance. Output impedance of the probe is 50 ohms, making it useful for driving a variety of instruments. A matched output impedance is necessary to maintain good pulse fidelity over a variety of load conditions. If the probe is used to drive a pulse into improperly terminated 50ohm coax, the reflection will be absorbed by the probe and not reflected again. Therefore the reflection will not appear at the coax output. With the 50 ohm output impedance, long lengths of cable may be used to connect the probe to the instrument as a remote signal input, while still preserving good signal fidelity."

# Out of the past

QUASIES AND PEAKS

EDITORIAL

September - November 1957

Sputnik, Mutnik et al:

A real threat to the electronic organizational structure of the Western World was brought out by Representative James T. Patte It is the ability of the Soviets to jam our communications, whe accidentally or intentionally, through the use of satellites. O satellite gets into its orbit, it is going to be rather difficult t vice if anything goes wrong. And how can the Western World certain that a frequency shift might be only accidental? Repr ative Patterson was reported as follows:

> "Washington, Dec. 10 (AP) - Rep. James T. Patter (R-Conn) today quoted authoritative sources as sayi Russians are working on a new one-ton Sputnik capa jamming all U.S. TV and radio communications ...
>
> Other news items, which have a bearing on this pos are:
>
> "Stockholm, Oct. 13 (UP) - Stockholm police repor the Russian Satellite violated Swedish law when its "beep-beep-beep" jammed the police Radio-frequen terday.
> "Interfering with the police radio network is a puni offense here."
>
> "Schenectady, N.Y. Oct. 15 (AP) - The Russian ea satellite, Sputnik, was blamed today for an open ga door in Schenectady.
> 'Dr. Thomas Rinaldi has been trying since Oct. 5 out why the radio-operated doors on the garage of were open each morning.
> "Sputnik was launched Oct. 4, but is believed to ha near the Schenectady area for the first time early 5.
> Today, Rinaldi, a physician, arose early. At 6:23 the doors flew open, he reported. No one was in s Sputnik was over the area..."

INTERFERENCE TESTING AND RESEARCH LABORATORY

BOSTON, MASS.

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AND NOW---- THE DANGER OF LIGHT POLLUTION

The February 23, 1969 edition of the Philadelphia Sunday B (Penna) featured an article by Gary Brooten with the above Two paragraphs of interest are excerpted (without commer follows:

"Luke Thorington, a North Bergen, N. J., lighting engine possible "light pollution" seriously and believes the U.S. study it under a law passed last October to study and contr tronic product radiation."

The law resulted from fears of health hazards from X-ray by television picture tubes, but Thorington thinks it applie to any kind of radiation including light."

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# Communications Designer's Digest in Review

By Reuben Goldman
Boeing Company
Seattle, Washington

irtually all of the many electronic - electrical periodicals currently ailable recognize the importance of EMC and provide coverage in rying degrees of EMC advances and equipment. Too often, however, ough the reporting and coverage are excellent, the EMC articles e interspersed in a body of heterogeneous electronic material d only by methodically thumbing through the periodical - or by udying the Table of Contents - are they disclosed.

his situation is being corrected in some of the newer trade periodicals. eparate sections contain all recent EMC news and equipment announce- ents. One periodical in particular, "COMMUNICATIONS DESIGNER'S IGEST," edited by Morris Edwards contains such a section. Boldly eaded "ELECTROMAGNETIC COMPATIBILITY", and consisting of everal pages, it reports in depth the more significant advances in MC theory, method and equipment for the reporting period. Import- nt papers are abstracted at length and opinions of engineers working the EMC discipline are reported. Given below are comments about e excerpts from significant articles in some recent issues.

he August 1968 issue of COMMUNICATIONS DESIGNER'S DIGEST eports at length on the findings of a four year study on use of the adio spectrum. The full details of the study are contained in a ,200 page report entitled "Spectrum Engineering - The Key to rogress," published by the IEEE who co-sponsored the study with e EIA. (Rexford Daniels brought copies of the report to the 1968 -EMC Symposium in Seattle last July and they were persued with nterest by all concerned with spectrum management.) Highlights f the report, as given in CDD are:

Through the use of spectrum engineering, the economic and social ields from the electromagnetic spectrum can be quadrupled over the ext 20 years - even in the face of visible saturation today in some ands and some geographies".
Of the many recommendations in the report, the major ones are that:

* Allocation and assignment procedures should be based on a spectrum engineering philosophy such as set forth in the report.

* Methods should be developed to analyze the behavior of systems subject to noise environments and means of predicting noise ambients.

* A center interdisciplinary coordinating body should be established for "side effects" - the interaction of men's use of the spectrum with nature's use.

What to do Specifically, the report recommends that we should:

* Adopt a combined spectrum engineering and systems design approach and increase spending over the present.

* Develop elements of the "next generation" system and gradually introduce the functional parts leading to its full implementation.

* Improve data based capabilities by standardization items, detailing and implementing the data base part of the design, and by establishing a coordinated data collection activity.

* Review existing standards and develop and establish new ones.

* Conduct a nationwide study on man-made noise, considering the time, frequency and geographical variations and the effects of such noise."

In the same issue, under the heading "Equivalent circuit gives more accurate prediction of bonding network impedance" appears a summary of a paper presented at the recent EMC Symposium in Cocoa Beach, Fla. H. W. Denny of the Engineering Experiment Station, Georgia Tech, lescribed "an expanded equivalent circuit which permits a more accurate prediction of the impedance behavior of a bonding network from audio to VHF." Denny claims that equivalent bonding circuits of models which consider only the bonding strap to the exclusion of related components in the bonding network do not adequately describe the impedance behavior of the networks at HF and beyond.

"In general, Denny's radiated tests on the effectiveness of bonding straps in reducing case pick-up showed that:

* At low frequencies, where the strap reactance is low, bonding straps do effectively minimize case-induced voltages.

* At frequencies where parallel resonance exist in the bonding network, the straps may severely degrade the interference properties of the equipment by increasing the induced voltage level.

* Above parallel resonance, bonding straps do not contribute significantly to the reduction of interference."

Continuing the theme of spectrum conservation, the October 1968 issue describes in detail an orthogonal detection techniques which "could play an important role in spectrum conservation by suppressing common-channel double-side-band interference in communications receivers. Principles of operation of orthogonal detection as a suppression technique are given by an ingenious rotating-phasor diagram. Block diagram of a simplified orthogonal detector and the author's experimental set-up are presented.

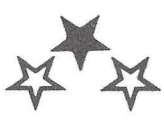
Obviating the formation of broadband EMI normally resulting from the use of fast rise time rectangular pulses has long been the concern of the digital circuitry designer. An article continuing the numerous recent discussions on the advantages of binomial pulses (or $\cos^{2n} wt$ pulses) to synthesize square waves, with the resultant reduction of high-frequency components, appears in the November 1968 issue of COMMUNICATIONS DESIGNER'S DIGEST. More fundamental and tutorial discussions of the use of binomial pulses have appeared elsewhere, but this article extends the applications of $\cos^{2n} wt$ pulses to MIL-STD-188B requirements. The introductory paragrap is given below:

"A prime example of how you can stop electromagnetic interference before it starts has been demonstrated by W. L. Cipperly, a senior consultant for EMI Consultants, Inc., of Hackensack, N. J. According to Cipperly, by synthesizing required pulse shapers from binomial waves you can almost wipe out the broadband EMI frequently created by rectangular or trapeqiodal pulses."

Appearing in the same issue, November 1968, is an article on a highly controversial topic among the EMC confraternity; the relative shielding merits of shielding enclosures of different constructions. The article is by Erik A. Lindgren of the company bearing his name. Lingren summarizes his findings in a series of bar-graphs one for each construction type and concludes that the "double-isolated" construction offers the greatest shielding advantages.

COMMUNICATIONS DESIGNER'S DIGEST is published monthly by Douglas Communications, Inc. The editor, Morris Edwards, tells us that he intends to include an EMC section in every issue.

For additional information on subscriptions, write to the Circulation Department, Douglas Communications, Inc., 386 Park Avenue South, New York, New York 10016.



# Focus on EMC

Mr. Ira M. Berman, Associated Editor and Ruben Goldman, have been asked to review the monthly magazines, "Communication Designer's Digest" and "Frequency Technology", and to prepare a report of their coverage of EMC for the Newsletter. The following items are their reports. Opinions expressed therein are those of the authors, and do not necessarily represent the opinions of the Newsletter Staff, the G-EMC, or the IEEE. The G-EMC Newsletter is not establishing a policy of endorsing other commercial technical publications, but your editor feels that it is in the interest of the membership to report on publications which provide, in our opinion, significant coverage in the field of electromagnetic compatibility.

FREQUENCY TECHNOLOGY magazine takes up the good fight

There must be several hundred magazines and other periodicals that are concerned to some degree with the problems of Electromagnetic Interference and Compatibility. Many (with a few exceptions) treat EMI/C only superficially. They may publish an article on cabinet shielding or a brief review of a new EMI specification. However, one magazine, FREQUENCY TECHNOLOGY, is apparently jumping into the EMI soup with both feet.

The Editor of FREQUENCY TECHNOLOGY, Mr. James W. Hughes, has taken EMC under his wing, and it seems to have happened quite by accident. The magazine published a Staff Report, "Practical Notes for RFI/EMC: Bonding," in the April 1968 issue. The first paragraph of that report said, in part: "Bonding is a subject that has long been relegated to a minor role in the RFI/EMC community. Apparently such a pedestrian subjects merits little attention ... Even the RFI/EMC engineer seems to think it somewhat unworthy of his attention ..." It appears that the FREQUENCY TECHNOLOGY report intended merely to focus some long-overdue attention on Bonding.

The first hint of response was under "Current Events" in the June 1968 issue. A letter to Mr. Hughes from a Mr. C. F. W. Anderson of Honeywell-Annapolis made some minor corrections and expanded the original Staff Report in an admirable manner. The column then mentioned a report from the Franklin Institute in Philadelphia on techniques for performing impedance measurements of bonds. The column concluded with a request for more articles and short items on bonding.

In the same June issue, a paper by Van Steenberg and Willman entitled "Innovated RIFI Meter Calibration Method" was published (This paper was mentioned in the February 1968 Newsletter Chapter Chatter column.) By now it appeared that FREQUENCY TECHNOLOGY was becoming quite active in the EMC field.

August 1968 brought forth under "Current Topics," an editorial on the development of the "RFI/EMC Community" and the activities of the IEEE G-EMC. The highlight here was a plea for a consolidated bibliography of all EMC articles, with the magazine acting as a forum for the exchange of these ideas and as a coordinator for these articles. The Editor even offered to "work it into an overall bibliography when it finally does take shape."

In the September issue, three letters from readers were printed, dealing directly with the EMC problem. One letter, by Mr. Ernest R. Freeman, of the Vertex Corporation, indicated that he would appreciate obtaining a copy of an "up-to-date RFI bibliography." No doubt Mr. Freeman spoke for many of the 1700 members of the G-EMC and the many EMI engineers who are not members of the Group. Also in the September issue of FREQUENCY TECHNOLOGY, under "Current Topics," the article "U.S. Running Short of Radio Waves for Urban Communications," published in the New York Times last July, was summarized, and the summary ended with the comment that since the article makes no mention of the EMC engineers' eff to effect spectrum conservation, we have not made a very good ca for ourselves. So as not to alienate the magazine from all G-EM readers, "Current Topics" then gave an excellent full-page revie of the 1968 Symposium.

By now FREQUENCY TECHNOLOGY was up to the waist in EMC. The October issue contained two very interesting letters. One wa by A. W. DiMarzio, who was recently Chairman of the Boston Ch ter, G-EMC. Mr. DiMarzio gave eight references that a new ma in EMC might refer to for information. He stated, discussing th references, "While none of these exactly takes the reader by the hand, specific subjects are discussed at good length and to good purpose." Mr. DiMarzio concluded with a healthy plug for the N letter, the Abstracts (from our own Information Retrieval Comm and Chapter meetings.

The second letter in October was from Bob Goldblum, the Newsl Editor. Bob wrote about the Information Retrieval Committee a the Newsletter, and he threw in special bouquets for Rexford Da and Dr. Ralph Showers.

The editor closed his column with the comment that more effort should be made on an improved bibliography and a changed Conf ence format (i.e., reviving the Armour conferences).

Mr. Hughes, in his November 1968 column, dealt primarily wit the effects of Electromagnetic Pulse (EMP), opening with a dis sion of the September 25, 1968 New York Times' article on Sen Henry Jackson's report concerning electronic blackout in atomi explosions. He continued with a suggestion to the EMC commu to make an effort to interest legislators about this problem. H ended with a brief review of a paper by Don Clark and Homer I of the U.S. Naval Civil Engineering Laboratory, Port Huenem ornia, on "NEMP Protection for Communication Facilities and ment."

The ball kept rolling in December with the magazine first spor its current name -- FREQUENCY TECHNOLOGY -- (it was fo called FREQUENCY) and containing a long letter by Mr. Richa Schulz, Chairman of the G-EMC. Dick explained the Group's rationale behind the work of the Information Retrieval Commi the sponsorship and location of the annual Symposia, and the p for accepting papers for presentation and publication. A thr a-half page article on EMI gasket corrosion considerations w cated toward the rear of the issue, and Mr. Hughes, in his ye editorial, thanked (among others) ' the G-EMC Group" for th in preparing the year's issues.

In January, a favorable note was given for the Metropolitan N and NewJersey Coast joint meeting at the Manhattan Playboy The two published letters to the editor were related to EMC: first from Mr. Roy A. Spiker, Martin Marietta Corporation, exception to some parts of a previously published tutorial ar

Guide Lines for Frequency Selection." The editor asked for more omments pro and con on the subject. The other letter was from Ir. Walter D. McKerchar, Chairman of the SAE Committee AE-4 EMC). (Walt is also a member of the G-EMC and is Publicity hairman of the 1970 Symposium). He wrote in depth about the joint ndustry-government efforts "in developing a single document which ould serve to demonstrate control of (EMI), within prescribed limits, y performing certain prescribed tests." Walt also mentions a eeting on December 9, 1968, to be attended by the AIA, EIA, IES, TCA, USASI, and the Tri-Service Committee to investigate further efinements in these documents.

nother Staff Report was also published in January, "RFI/EMC ontrol Plan." It started describing the plan and its contents, and nded as an actual design guide for EMI-free design. It included elay surge damping, wire twisting and shielding, use of filters, onding considerations, classes of circuits, and test considerations. hose who do not get their own copies of the magazine might do well to rite and request tear sheets of this article, if they are still avail-ble.

book review on "Techniques of System Engineering," by S. M. inners, commented that RFI/EMC was virtually without mention the text. The impression left by the reviewer was that this is excellent book, which is all the more surprising to have it omit MC.

r. Gary Harris, Goddard Space Flight Center, wrote a tutorial ticle in the February issue entitled "Conducted EMI; Responsibility d Control." As Mr. Harris mentions, the determination of respon-bility for the generation of Conducted EMI is always a thorny oblem. He pursues the topic into the fact that eliminating Con-cted EMI is a joint responsibility of all parties concerned. The ticle then becomes a design guide, discussing the EMI environ-ent, analysis of applicable subsystems, calculated predicted vorst-case" interference, and methods to reduce and eliminate EMI.

nis was followed one page later by still another Staff Report on EMC Considerations in Equipment Packaging." This is similar to e design guide section of the Staff Report in the January issue, re including separation of critical wire runs, mechanical consider-ions, and proper use of shielding.

r. Hughes' editorial, on the last page of the February issue, is itself a fitting climax to this summary. He points out that his ne magazine's) coverage of EMC/EMI/RFI has attracted considerable mmunication, controversy, and compliments. FREQUENCY ECHNOLOGY deals with frequency generation, control, selection, d measurement, which is the lifeblood of G-EMC members, as ell as engineers not in the Group but who do EMC work. Mr. Hughes ints out that these "RFI engineers" (for which please read frequency chnologists) have a need for a source of practical information. To ap up his discussion, the editor then compares the "giant strides" ade by the G-EMC with its Transactions, symposia, study groups, bcommitteess, information retrieval program, and local Chapter eetings, to his magazine's efforts. His last paragraph is quoted full:

Ve, at FREQUENCY TECHNOLOGY, will continue on our committed urse of presenting, in each issue, a section on this field. It will be, most cases, on an earthier level than that of the G-EMC Trans-tions. However, we sincerely trust that our efforts will result in useful addition to the fund of knowledge in this challenging technology.'

ou bet your life, Mr. Hughes!

r those of you who do not already subscribe to this publication; ease address inquiries to:

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## INTERNATIONAL CONFERENCE ON COMMUNICATIONS

The 1969 IEEE International Conference on Communications will be held in Boulder, Colorado, June 9-11, 1969. Included will be a morning and afternoon session on EMC as described below. Other sessions which should be of interest to EMC members are:

Session 5 Spectrum Sharing Techniques
Session 13 Spectrum Sharing - Economic, Regulatory, and legal aspects.
Session 23 Vehicular Communications
Session 44 Antennas and Coupling Devices

### SESSION 24

### TUESDAY MORNING

24.1: Electromagnetic Compatibility Assurance -- A Vital Step in Planning for Communications of the Future, J. M. Deterding, IIT/ECAC

24.2 An Automated EMC Analysis Process
W. G. Duff, K. G. Heisler, Jr., Atlantic Research Corp., H. J. Hewitt, RADC

24.3 Recent Interference Analysis Developments
J. Edwards, Jr., RADC

24.4 Application of Degradation Considerations to a UHF AM Communications System Problem
M. Lustgarten, R. Mayer, IIT/ECAC

### SESSION 32

### TUESDAY AFTERNOON

32.1 Biological Effects of Radio and Microwaves: Present Knowledge, Future Directions. A. M. Burner, Brooks AFB.

32.2 Earth Station Antenna Sidelobe Envelope Analysis
G. Hyde, R. W. Kreutel, Comsat Lab.

32.3 Measurement Problems Imposed by the Wide Dynamic Range of Electromagnetic Interference.
R. J. Matheson, ESSA/ITS

32.4 E-field Penetration of Opening in Shields and Application to Braided Cable Shields
A. Eckersley, Boeing

32.5 Some Electromagnetic Compatibility Considerations Related to Adhesive-Bonded Aircraft Structures
R. K. Donohue, Boeing

32.6 The Rusty Bolt -- Threat to Communications
J. J. Krstansky, R. F. Elsner, IIT Research Institute

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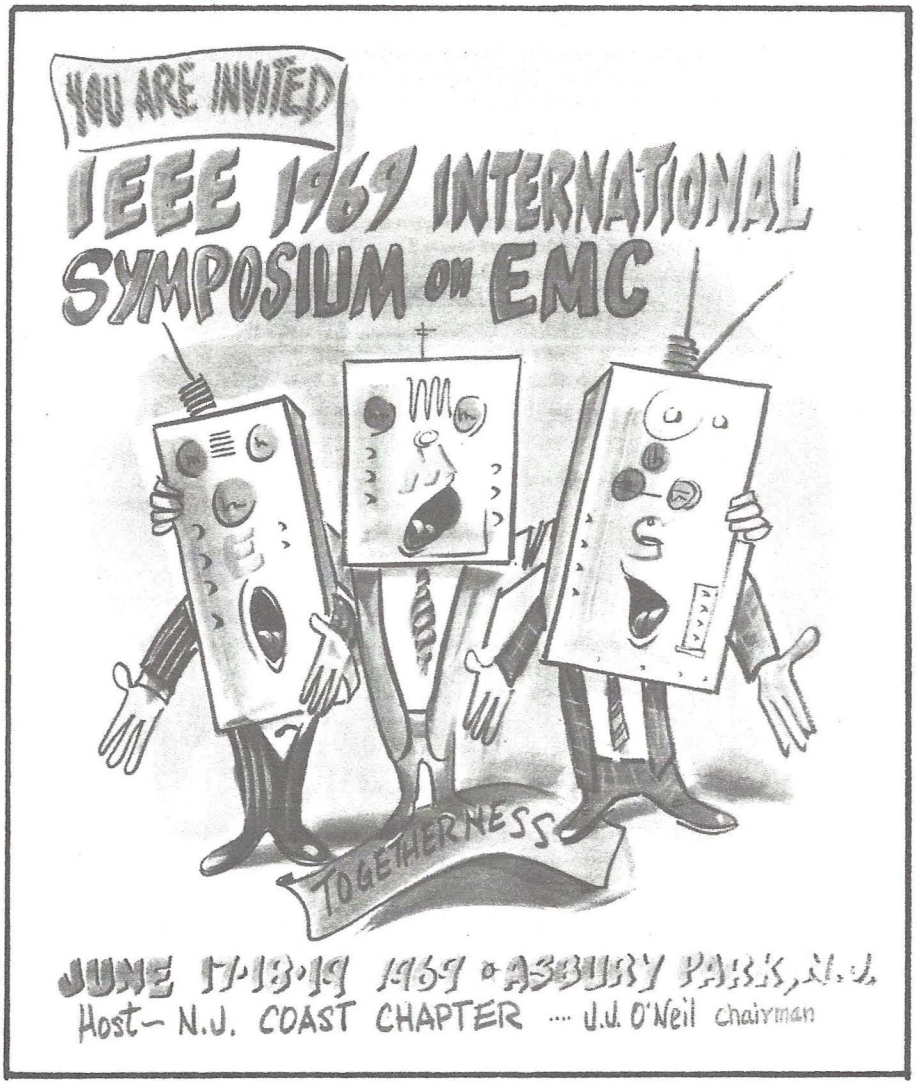


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