# ELECTROMAGNETIC COMPATIBLLITY GROUP 

EDITORIAL
This is an interim issue of the newsletter in order to get the nomination information into the hands of the members so that they can meet the 30, May date. If our members will pay special attention to the by-laws, they will gain an understanding of how their Group functions and why some things have to be dome as they are. We cannot lose sight that we are all part of a very largs technical society which has to lay down certain ground rules within which we have to operate. Another issue of the newsletter will follow this one shortly.


# Nomination and Election of the Ad Com 

The Nominating Committee shall be reconstituted by the Group Chairman on or before April 1 st of each year. The Nominating Committee shall consist of a chairman and four or more members of the Group, not more than half of which may be members of the Ad Com.

The Nominating Committee shall immediately after April 1 st mail notices for the solicitation of Nominations for membership on the Administrative Committee to Ad Com members, and to Chapter Chairmen. There shall also be published in the Newsletter prior to 15, April a call for nominations for Ad Com membership. Such nominating petitions shall be received by the Chairman of the Nominating Committee by 30, May.

On or before 10, June the Chairman of the Nominating Committee shall mail to IEEE Headquarters the slate of at least ten nominees for election to the five offices to be filled on the Ad Com.

On or before 1, August IEEE Headquarters will mail ballots to Group members, with the request that the ballots be retarned to IEEE Headquarters by 1 , September.

IEEE Headquarters will have completed ballot count, and by 1, October will have notified the new Ad Com members and the Ad Com officers of the results of the election.

During the third week in October the new Ad Com members will be introduced to their duties at a regular meeting of the Ad Com in preparation for their assuming duties on 1 , January.

A nominating petition shall carry a minimum of 15 names of Group members, excluding students, for the nominee to be placed on the slate.

The nominating committee may make nominations for the Administrative Committee in addition to those nominated by petition.

The Ad Com may make contingent elections to be effective in case an elected member fails to accept the office, or a disapproval is received from Headquarters.

In the preparation of the slate of nominees, and in the election proper consideration shall be given to both geographical representation and technical interests.

Mail all nominating petitions to :
J. J. Krstansky, Chairman, Nominations Committee IIT Research Institute
10 West 35 Street,
Chicago, Illinios 60616


The members of the Administrative Committee, whose term of office expires on December 31, 1968, are as follows:

| Stanton A. Bennett <br> John A. Eckert$\quad$James J. Krstansky <br> Richard B. Schulz |
| :--- |

According to the by-laws, Stanton A. Bennett and Leonard W. Thomas are not eligible for nomination for membership on the Administrative Committee at this time.

The following chart has been prepared by Leonard W. Thomas as a quick means of determining the eligibility of present and past Ad Com members for re-nomination:


## G-EMC STANDING COMMITTEE CHAIRMEN 1968

Awards
Chapter Activities
Constitution \& Bylaws
Education Committee Information Retrieval Committee IEEE Area Activities and Meetings
Extra EMC Meetings
Membership
Newsletter Editor
Nominations (1969)
Publications
Standards
Spectrum Study
Technical Advisory \& Technical Liaison Committee
Technical Papers Committee
Transactions Editor
Alternate for Chairman on
Extension of Areas of Interest Workshop
J. S. Hill
Z. V. Grobowski (East Coast)
B. Weinbaum (West Coast)
L. W.. Thomas
M. Kant
H. Garlan
H. Randall
S. A. Bennett
R. Daniels
J. Krstansky
L. G. Cumming
W. F. Chappell
R. Daniels
R. M. Showers
A. H. Sullivan
A. H. Sullivan
F. J. Nichols
R. M. Showers

## AD HOC COMMITTEE CHAIRMEN

EMC Symposiums
Information Dissemination
Information Retrieval Demand
Manufacturing Technology

Steering Committee Chairmen
H. M. Schlicke
Z. V. Grobowski
H. A. Gauper

## G-EMC CHAPTER CHAIRMEN 1968

| Atlanta | Huntsville | New York, Long Island, North Jersey |
| :---: | :---: | :---: |
| William R. Free | Glenn R. Rowe | Mervin H. First |
| 3143 Embry Hills Dr. | IBM Dept. 215 | R. F. Interonics Inc., |
| Chamblee, Ga. 30005 | 150 Sparkman Drive | 15 Neil Court |
|  | Huntsville, Ala. 35805 | Oceanside, Long Island, N. Y. 11572 |
| Boston |  |  |
| 46 Bartlett Street, | Joseph F. Fischer, Jr., | Robert D. Goldblum |
| Malden, Mass. 02148 | 769-33rd Street, <br> Manhattan Beach, Calif. 90266 | 608 Gawain Road, Plymouth Meeting, Pa. 19462 |
| Canaveral ${ }_{\text {C }}$ ( ${ }^{\text {a }}$ |  |  |
| H. Dean Mc Kay <br> 115 Fairway Drive | Mred L. Moore (EMCVI) | Victor Turesin |
| Melbourne, Fla. 32901 | Rome Air Development Center Griffiss Air Force Base | 1731 Walnut Drive <br> Mountain View, Calif. 94040 |
| Central Texas | Rome, New York 13440 | Seattle |
| 10318 Burr Oak Drive | New Jersey Coast | Eugene Knowles |
| San Antonio, Texas 78230 | J. J. O'Neil <br> 251 Cambridge Road, | 2566-128 Ave, S. E. <br> Bellevue, Washington 98004 |
| $\frac{\text { Chicago }}{\text { Carl P Jesperson }}$ | Fair Haven, N. J. 07701 | Wa shington, D. C. |
| Motorola, Inc., | New Orleans | F. S. Marshall |
| 1450 N. Cicero Ave. | John C. Hughes | 5811 Bryn Mawx Road, |
| Chicago, Ill. 60651 | Chrysler Corp, Space Division P. O. Box 2920 <br> New Orleans, La. 70116 | College Park, Md. 20740 |

## G-EMC SYMPOSIA CHAIRMEN

## PLANS FOR 1970 NATIONAL IEEE EMC SYMPOSIUM

'The Expanding Science of EMC' has been selected as theme for the 1970 National IEEE/EMC Symposium according to George R. Ufen, General Chairman. The symposium is scheduled for Anaheim California's Grand Hotel in July, 1970.

According to officials, the convention site was chosen because of its being centrally located between the Los Angeles area and the rapidly expanding electronics industry of Orange and San Diego Counties.

The following heads of pre-symposium planning committees also have been named:

Ben Weinbaum, Vice Chairman; Joe Berger, Secretary; Tom Walter, Treasurer and Finance; Walt McKerchar, Publicity --. to be assisted by John Peters and Bill Becher; Eldon Hughes, Arrangements; John Merrill, Exhibits; Joe Fischer, Publications, and Jim Senn, Program Chairman, assisted by Fred Schor, George Kunkel and Donn Ingram.

It was explained that area coordinators throughout the United States will be named, according to geographical locations.

1970 Symposium headquarters are located in the EMC Science Center, 1616 Victory Blvd., Glendale, California 91201


## CHAPTER

ACTIVITIES

Boston:
On November 28, 1967 a meeting was held and a talk given on
"The State of the Art in EMI Shielding for Electronics and Aerospace" byR. F. Jasse and C. Spurling of Chomerics, Inc., Arlington, Mass.

## Canaveral:

Two meetings were held by this Chapter. On November 27, 1967 Dale Samuelson, Fairchild Electro-Metrics, Amsterdam, New York, spoke on "Automatic EMC Analysis System!' On January 15, 1968 a talk was given on "EMC Antennas and Antenna Factors" by Don White, White Electromagnetics, Inc., Rockville, Maryland.

## Mohawk Valley:

A meeting was held on November 28, 1967 and Dr. O. M. Salati, University of Penna., Philadelphia, Pa., spoke on "Insights into Electromagnetic Compatibility. "

## Philadelphia:

There was a meeting held on December 5, 1967 and a talk was given on "CATV and EMC/EMI" by W. Wydro, American Electronics Labs., Colmar, Penna. Another meeting was held on February 2, 1968 and Prof. R. Showers, University of Pennsylvania, Philadelphia, Pa., spoke on "New Concepts in EMC Instrumentation."

## San Francisco:

Two meetings have been held: One on December 28, 1967 and a talk was given by Archie Marez, Watkins-Johnson, Palo Alto, Calif. , on "The W-J 1007 Reconnaissance System" and on January 17, 1968 Carl B. Pearlston, Jr., Aerospace Corporation, El Segundo, California, spoke on"Historical Analytical Survey of EMI Spec. Limits."

Seattle:
On January 31, 1968 a meeting was held and Thomas A. Herring, Boeing, Apollo-Saturn Program, spoke on "Perfect Electrical Transmission!

## Washington:

The following meetings have been held by this Chapter: April 20, 1967 a talk was given by Kenneth C. Heisler, Jansky \& Bailey, Electronics Communication Div., Atlantic Research, on "Discussion of EMC Statistical Analysis."

September 21, 1967 John Findley, National Radio Astronomy Observatory, West Virginia, spoke on "Radio Astronomy Why a Quiet Zone."

November 16, 1967 a talk was given on "Global Communication Satellite System and RFI" by J. Thompson and J. Levatich, COMSAT, Washington, D.C.

January 18, 1968 William J. Prysner, U.S.N. Underwater Sound Lab., New London, Conn., spoke on "EMC and Submarine Electronic Systems."

# PHILADELPHIA SECTION G-EMC NEWSLETTER JANUARY 1968 

Past Meeting: The GEMC had its largest evening turnout in recent years with almost 60 members and guests attending the December meeting. Waltex Wydro of AEL made an excellent presentation on CATV and EMI/EMC which afterwards produced over twenty minutes of questions and discussion. Our host, the General Electric Company, provided us with very comfortable facilities (The Purple Palace) and a guided tour, which included a visit to the Space Similator. The Sponsors, Griffin-Campbell Associates and Axel Electronics, provided us with delicious refreshments after the meeting

Next Meeting: The next meeting will be held at the Franklin Institute Research Laboratories on Tuesday, February 6. 1968. Dr. Ralph Showers will speak on "NewConcepts in EMC Instrumentation." Included will be a tour of the Institute's HERO and other RED LABS with refreshments after the meeting. The Institute's facilities are highly sought after and we are most fortunate to be able to schedule our meeting there. This is one meeting you certainly should try to attend and bring your friends.

EMC Abstracts: The first trial publication of EMC Abstracts has been issued to a small number of EMC Group members. Its ultimate purpose is to inform Group members of current papers and articles published in their field of interest and to enable them to preserve and easily retrieve this information. The membersof the Ad Com Information Retrieval Committee review each issue of approximately 90 publications, seeking EMC related articles on system considerations, instrumentation, methods of measurement and studies of the origin, control and characteristics of interference. After comments have been received on two trial issues, the abstracts will be available to all GEMC members. This is just one of the many tasks performed by the EMC Ad Com and sponsored by the IEEE.

Certificates: The gentlemen who honor us by taking the time and having the interest to prepare and present timely papers at our Group meetings are not paid for their efforts. The Philadelphia EMC Group expresses its grat itude by presenting these gentlemen with Certificates of Appreciation. This is a new procedure which was initiated at our September 1967 meeting.

IEEE Meeting Change: The IEEE Headquarters has changed the dates of the International Convention from 25-28 March to 18-21 March. Mark your Almanac and desk calendars accordingly.

Education: The UCLA engineering school is establishing a post graduate EMC course with some cooperation from the JPL. The University of Florida and the Genesis Program (a class televised throughout Florida) are establishing an undergraduate level course in EMC. The lectures may be video taped and made available for presentation over other educational setworks. It is also possible that the University of Pernsylvania will offer a course in EMC and Biological Hazards next year.

EMC Text: A book entitled "Electromagnetic Compatibility Principles and Practices ${ }^{11}$ is one of the finest EMC theory and reference texts presently available. It was written by a joint effort of the nation's leading EMC specialists, including local personalities suc' as Drs. Ralph Showers, Fred Haber and R. F. Schwartz of the Moore School, and Henry Hoffart of G. E. Copies are $\$ 3.75$ each and may be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, D. C. 20402. It was printed in October 1965 and bears the numbers NASA NHB 5320.3 and Apollo Doc. No. RA-D16-001-1. It would make a valuable addition to your personal library.

Posters: The Philadelphia Section send posters monthly to indus rial organizations containing notices of forthcoming meetings.
Several persons have volunteered to post and distribute EMC meet notices throughout their organizations. If you wish to help us pub licize our meetings, please call the Group Chairman for additional advance copies of the meeting notices. If your organization is not receiving the monthly posters, please call Miss Yonam at the IEEE Office.

1971 Symposium: The Philadelphia GEMC Chairman is currently preparing a preliminary budget for the Symposium which is to be submitted to the Ad Com at the March Meeting. It is expected the the Ad Com will choose between the Washington and Philadelphia Chapters at that time. If we are successful, we will call for the first meeting of the Symposium Coordinating Committee in order to choose Committee Officers. All EMC Group nembers will be invited.

Definition: The field of interest of our Group is the enhancement of Electromagnetic Compatibility. From the IEEE GEMC Constit ution, Article II Section 1, the following definition of EMC is quot "Electromagnetic Compatibility is defined as the capability of electronic systems or equipments to be operated in the intended operational environment at designed levels of efficiency without degradation due to unintentional electromagnetic interference."

Editor:
Robert D. Goldblum Chairman, Phila. GEMC
608 Gawain Rd.
Plymouth Mtg. , Pa. 19462
215-962-6839
NOTE: The Editor would like to thank the General Electric Com -space-Craft Department, for their assistance in the publication $c$ this Newsletter.

## ECAC VACANCY ANNOUNCEMENTS

## Electronic Engineers (Electro-Magnetics) GS-855-13 vacancies:

1. Incumbent will be one of the Center's Radar Systems EMC Planning Engineers. Knowledge of current advances in the state-of-the-art in C\&E equipment and circuit theory is required. Determines DOD requirements for solution of EMC problems and assures that the Center's compatibility analysis and prediction capabilities now in existence or under development will satisfy these needs.
2. Incumbent will be one of the Center's Communications Systems EMC Planning Engineers. Knowledge of current advances in the state-of-the-art in C\&E equipment and circuit theory required. Determines DOD requirements for solution of EMC problems and assures that the Center's compatibility analysis and prediction capabilities now in existence or under development will satisfy these needs.

QUALIFICATION REQUIREMENTS: A full 4 year profassional engineering curriculum accredited by the Engineers Council for Professional Development leading to a bachelor's degree is required.

In addition 3 years of specialized experience is required in progres sive, responsible, professional engineering which has demonstrated a very extensive knowledge of engineering principles and their application and ability of high order in planning, directing and coordination of engineering activities. At least one year of this experience must be in or closely allied to the duties described above, and at a level of difficulty and responsibility equivalent to GS-12.

All of the above positions require occasional or frequent travel by military or commercial aircraft.

SELECTION WILL BE MADE FROM AMONG THE BEST QUALIFIED APPLICANTS WITHOUT DISCRIMINATION OF RACE, COLOR, SEX, RELIGION, NATIONAL ORIGIN, LAWFUL POLITICAL AFFILIATION, PHYSICAL HANDICAP OR MARITAL STATUS. SELECTIONS FOR THESE POSITIONS ARE SUBJECT TO RESTRICTIONS RESULTING FROM THE DEPARTMENT OF DEFENCE PRIORITY PLACEMENT SYSTEM FOR DISPLACED DOD EMPLOYEES.

Persons interested should communicate with:
Lt. Col. Curtis B. Godwin (ACL)
ECAC
N. Severn

Annaplois, Maryland 21402

## NEW POSITION AT ECAC

From letter dated 29, March 1968 from Leonard W. Thomas:
"We are also in the process of establishing a position which would head up the Plans Division of the Plans and Programs Directorate, which is presently headed by Lt. Col. Godwin. This position hopefully will be appropriately graded and the salary will be commensurate with the incumbent's background and experience. The level has not presently been determined but we are thinking in terms of wellqualified EMC engineers preferably of the doctorate level in electronics or electrical engineering. This position is challenging and offers opportunities not equal elsewhere in the EMC field......"

Interested persons should also contact Lt. Col. Curtis B. Godwin.

## 

1. These Bylaws provide detailed guidance for the supervision and management of the G-EMC affairs, in accordance with the Group Constitution. Amendments may be made by means of the procedures described in Article VIII, Section 2, of the Constitution:

Suitable Bylaws, and amendments thereto, may be adopted by a two-thirds vote of the Administrative Committee in meeting assembled, provided that notice of the proposed Bylaw, or amendment, has been sent to each member of the Administrative Committee at least a week prior to such meeting; or a Bylaw, or amendment, may be adopted by a two-thirds mail vote of the members of the Administrative Committee, provided a 30 -day period is provided for such responses. In either event, the proposed Bylaw, or amendment, shall be published in the Group Transactions or Newsletter. No Bylaw, or amendment, shall take effect until it has been published and it has been mailed to the Technical Activities Secretary of the IEEE, and he has obtained approval of the General Manager.
2. Membership: There shall be only one grade of Group membership available to all IEEE members, based on the payment of the annual fee prescribed in Bylaw 8.1.
2. 1 Honorary Life Members: Such membership, exempt of the payment of the $\checkmark$ annual fee, shall be based on the recommendation of the Group Awards Committee, the endorsement of the Group Administrative Committee, and the approval of the General Manager of IEEE.
2. 2 Affiliates: Affiliation may be based on membership in other societies that have been recognized for affiliate purposes by specific action of the Administrative Committee. A list of approved societies will be maintained by the Technical Activities Secretary of the IEEE. Further, affiliates may join in accordance with any other provision that may be incorporated in the IEEE rules and regulations.

A Group Affiliate cannot serve in elective office in the Group or in a Chapter or vote for candidates for these offices. An Affiliate can serve in any appointive office in the Group or a Chapter of the Group. A Group Affiliate is entitled to receive notices of all meetings sent to Group members, to receive copies of publications of the Group, to attend and participate in any function of the Group by payment of IEEE member charges, and to receive any award bestowed upon him by the Group. A Group Affiliate may not receive any IEEE benefits that are derived through IEEE membership except as approved by the Erecutive Committee of the IEEE.
2. 3 Students: An exception to the annual fee shall be made for students, as prescribed by IEEE rules and regulations.
2. 4 Special Provisions: Any special members (life, or other honorary) and affiliates of the Group on $\qquad$ (date of adopting the new Bylaws), may continue even though their respective attainment of such special membership or affiliation was by a means other than as defined above.
3. Administrative Committee: Article V, Section 1, of the Constitution provides that the Ad Com shall consist of 15 elected members-at-large plus ex-officio members. Article VII, Section 4, provides that a quorum shall be eight members, without distinction between the members-at-large and the ex-officio members with vote, and that all members shall have an equal vote.
3. 1 Each retiring Ad Com Chairman shall be for a period of one year, an ex-officio member with vote, if he is not elected a member-at-large (in the latter case, there shall be only one vote).
3. 2 Unless otherwise provided, a majority vote of the members attending an Ad Com meeting shall be sufficient for the conduct of its business.
3. 3 In order to ensure a continuously active Ad Com, elected Ad Com members who miss three consecutive meetings will be dropped from membership in the absence of extenuating circumstances. Vacancies thus or otherwise created shall be filled by the appointments for the unexpired terms by the Chairman with the consent of the Ad Com.
3.4 Roberts Rules of Order (Revised) shall govern conduct of Ad Com meetings on all matters not otherwise specified in these Bylaws or the Constitution.
4. Nomination and Election of the Ad Com: The Nominating Committee shall be reconstituted by the Group Chairman on or before April 1 st of each year. The Nominating Committee shall consist of a chairman and foun or more members of the Group, not more than half of which may be members of the Ad Com.
4. 1 The Nominating Committee shall immediately after 1 April mail notices for the solicitation of Nominations for membership on the administrative committee to Ad Com members, and to Chapter Chairmen. There shall also be published in the Newsletter prior to 15 April a call for nominations for Ad Com membership. Such nominating petitions shall be received by the Chairman of the Nominating Committee by 30 May.
4. 2 On or before 10 June the Chairman of the Nominating Committee shall mail to IEEE Headquarters the slate of at least ten nominees for election to the five offices to be filled on the Ad Com.
4.3 On or before 1 August IEEE Headquarters will mail ballots to Group members, with the request that the ballots be returned to IEEE Headquarters by 1 September.
4.4 IEEE Headquarters will have completed ballot count, and by 1 October will have notified the new Ad Com members and the Ad Com officers of the results of the election.
4. 5 During the third week in October the new Ad Com members will be introduced to their duties at a regular meeting of the Ad Com in preparation for their assuming their duties on 1 January.
4. 6 A nominating petition shall carry a minimum of 15 names of Group members, excluding students, for the nominee to be placed on the slate.
4. 7 The nominating committee may make nominations for the Administrative Committee in addition to those nominated by petition.
4. 8 The Ad Com may make contingent elections to be effective in case an elected member fails to accept the office, or a disapproval is received from Headquarters.
4. 9 In the preparation of the slate of nominees, and in the election proper consideration shall be given to both geographical representation and technical interests.
5. Officers: Following the election of incoming Ad Com members, the Ad Com, during the fall (third week in October) meeting, shall elect from among chemselves a Chairman and Vice-Chairman, Secretary and Treasurer who will occupy those respective offices for the succeeding year.
5.1 The term of elected officers shall be one year, commencing on January lst. The Chairman may be re-elected to a second term of one year. Whether he serves for one or two years, he shall not again be eligible for election to the chairmanship until a lapse of three years. The Vice-Chairman may hold office for not more than two consecutive years. Eligibility is restored after a lapse of one year.
5.2 All officers shall continue to serve until their successors take office.
5. 3 The Chairman shall supervise the affairs of the Group and shall speak for the Group on all matters not specifically delegated to others.
5. 4 The Vice-Chairman shall fulfill the duties of the Chairman in his absence or incapacity, He shall fulfill such other functions as the Chairman of the Ad Com shall from time to time direct.
5. 5 The Secretary shall be responsible for keeping the records of the

Administrative Committee in the areas commonly ascribable to his functions.
$\infty$ He shall prepare and distribute reports, notices, or such documents as may
be required by the Chairman and the Ad Com.
5. 6 The Treasurer shall be responsible for keeping the financial records of the Administrative Committee in the areas commonly ascribable to his functions. He shall prepare vouchers for withdrawal of Group funds for payment to officers or members of the Group; certify bills to be paid by IEEE
Headquarters direct to suppliers; make a report at each Group business meeting covering the current financial status of the Group; and perform such other duties as may be assigned to him by the Chairman of the Ad Com.
6. Sub-Groups: Sub-Groups are voluntary associations of a significant portion of the total Group membership and, hence, are not equivalent to the standing committee, which are appointive.
6. 1 Chapters; Chapters are sub-groups organized on a geographical basis. This subject is fully treated in the IEEE Bylaws and the Groups and Section Manuals.
6.2 Technical Sub-Groups: A technical sub-group may be organized to cover a specified portion of the field of interest of the Group. Each technical sub-group shall be governed by a Technical Committee. Sub-Groups may organize sessions at a Group Symposium or Technical Conference and may also organize separate, specialized symposia, Sub-Groups may organize special issues of the
Transactions or a special section in an issue. Any service for sub-group members, beyond those provided all Group members, must be paid for by the sub-group and the amount must be endorsed by the Ad Com and approved by the, its form Manager of tho TEEE.
7. Publications: The Group shall sponsor such publications as are recommended by the Publications Committee and approved by the Ad Com. The Chairman, with the advice and consent of the Ad Com, shall appoint the editor for each publication.
7. 1 Term of Office: An editor may serve indefinitely, subject to mutual agreement with the Chairman. The compensation for an editor may be set by the Chairman, with the advice and consent of the Ad Com.
7. 2 The editor of the Transactions shall be an ex-officio member of the Publications Committee, The Papers Procurement Committee, and the Chairman of the Papers Review Committee.
7. 3 The Newsletter editor shall be an ex-officio member of the Publications Committee.
7. 4 The editor shall be responsible for implementing the publication program defined by the Publications Committee, In accordance with the guidance of this committee and general IEEE rules and regulations, he shall designate associate editors, special guest editors, and manuscript reviewers.
7. 5 Editorial expenses shall be subject to review and approval of the Transactions and Finance Committee chairmen, the latter being explicitly responsible for adherence to the annual publication budget.
8. Group Funds: The Group may raise funds as specified in Article IV of the Constitution and in the IEEE Bylaws and rules and regulations.
8. 1 The annual Group fee shall be $\$ 4.00$.
a. Failure of a Group member to pay the annual Group fee will not render him liable to dismissal from the IEEE, but any Group member who fails to pay such fee before March 31 of each year will be automatically dropped from the Group membership.
8. 2. IEEE Headquarters shall act as bursar for all Group funds except as specified hereunder. Billings and receipt of the annual fee shall be via the IEEE Membership and Fiscal Departments. All other fisçal affairs shall be handled through the office of the Technical Activities Secretary.
8. 3. The general committee for a symposium or technical conference may, with the advice and consent of the Ad Com, authorize the symposium treasurer or fiscal officer to open an account to be used for the deposit and disbursement of funds related to the symposium. In each case, the Ad Com shall be asvised of the name of the bank, the anticipated size of the account, the names of the account signatories, and of arrangements of insurance and for bonding. Symposia jointly sponsored with other technical societies are excluded where a charter of operations with those societies is approved by the Ad Com and the IEEE.
8. 4. For other special circumstances, such as co-sponsorship of a symposium, the Ad Com shall make prudent arrangements to safeguard where other authorization is specified.
9. Group Business: The Chairman and officers shall conduct the Group affairs subject to the advice and consent of the Ad Com, except where other authorization is specified.
9. 1 No Ad Com meetings shall be held for the purpose of transacting business unless each member shall have been sent notice of the time and place of such meeting 20 days prior to the scheduled date of the meeting. Provided, however that if less than a quorum attend a duly called meeting, tentative actions may be taken which will become effective upon subsequent ratification, either at a meeting or by mail by a sufficient number of members as to constitute a majority. Minutes of such meetings shall be mailed by the Secretary to each Committee member who shall register his disapproval of any actions taken at such meetings, within ten days after receiving said minutes, or he shall be deemed to have ratified.
9.2 An appropriate order of business at the annual meeting of the Administrative Committee shall be:
a. Roll call
b. Reading of minutes of previous Annual Meeting
c. Reading of report on business transacted other than at
meeting
d. Report of Communications
e. Reports of Officers
\&. Reports of Committees
g. Unfinished Business
h. New Business
i. Elections if not otherwise provided for
j. Adjournment
9.3. Technical Meetings: The Group shall sponsor at least one technical meeting each year.
10. Technical Committees: A Technical Committee, which may organize a sub-group if desired, functions in a specific technical area with a scope to be approved by the Ad Com.
10.1 Appointment: Members and officers shall be appointed by the Chairman of the Ad Comi.
10. 2 Functions: Each Technical Committee shall promote activities in its field and shall provide the expert knowledge and assistance to:
a. Receive, generate, and review papers within its scope in cooperation with the Transactions Editor and the Technical Papers Committee.
b. Organize and operate sessions at meetings of IEEE at all levels and at meetings of other organizations with which Group EMC is desirous of cooperating, in accordance with the rules in effect at such meetings.
c. Arrange through appropriate editors for publishing pertinent papers in IEEE publications in cooperation with the cognizant Technical Program Committees.
d. Generate and develop appropriate standards in its field for processing by the IEEE Standards Committee, through the Group Standards Committee and otherwise in accordance with Institute policies.
10.3 Operations: The operation of each Technical Committee shall be in accordance with the Manual for Operation of Technical Committees, or other Administrative Committee rules.
10.4 Council: The chairmen of all the Technical Committees shall constitute a Council to coordinate their activities. The Council shall organize itself. Not more than two members of the Council including its Chairman, shall be members ex-officio with vote of the Administrative Committee.
11. Standing Committees: Standing Committees shall be appointed by the Group Chairman, with the advice and consent of the Ad Com. It will be discretionary with the Group Chairman to appoint any part or all of any Standing Committee, or to appoint the Chairman only of a committee and request the latter to appoint additional committee members.
a. The terms of office of the Chairman and members shall be for one year or until a successor is appointed, unless a different term of office is designated by the Administrative Committee.
b. Special or ad hoc committees may be created by the Ad Com. For each such case, the Ad Com shall specify the number of members the committee shall have and how the members are to be selected and the terms of the members if other than for the life of the committee. Special or ad hoc committees shall be automatically dissolved after two years unless the Ad Com sets an expiration date.

## 11. 1 Awards and Fellows Committee: The functions of the Awards and Fellows Committee will be to:

a. Recommend candidates for all awards and prizes in accordance with requirements, requests, and rules and regulations of IEEE Headquarters, both for general IEEE awards and Group EMC awards.
b. Recommend candidates for Fellow gade.
11.2 Chapters Activities Committees: The functions of the Chapters Activities Committees will be to:
a. Create and promote interest in the Sections for the formation of Chapters of Group EMC.
b. These Committees (East Coast, and West Coast) are charged with carrying out this organization of Chapters in accordance with the procedures established by IEEE Headquarters, as set forth in the IEEE Technical Activities Manual.
11.3 Constitution and Bylaws Committee: The functions of the Constitution and Bylaws Committee will be to:
a. Maintain records of the Constitution and Bylaws.
b. Ascertain that the Constitution and Bylaws are not in conflict with any requirements or rules of IEEE Headquarters.
c. Make recommended changes in the Constitution or Bylaws as necessary to conform to the development of the Group on Electromagnetic Compatibility, its Administrative Committee, and its membership and mode of operation.
11. 4 Education Committee: The functions of the Education Committee will be to:
a. Ascertain the needs for education of the overall Group membership in the areas covered by the Group's field of interest as set forth in Article II, Section 1 of the Group Constilution.
b. Promote such programs, in cooperation with other committees of the Group EMC, as appropriate, to fulfill these needs.
11.5 Meetings Committee: Thefunctions of the Meetings Committee will be to:
a. Promote and manage meetings of the Group.
b. Cooperate with the Technical Papers Committee and with other committees concerned with arranging programs at Group sponsored and jointly sponsored meetings, and with the IEEE Convention Program Committee in arranging for participation of the Group at the International Convention.'
c. Handle all necessary arrangements for Group Technical Sessions at the WESCON or other IEEE sponsored meetings.
11.5.1 The Chairman of the Meetings Committee may in turn appoint Conmittee Members to head any of the various meetings for which the committee is responsible.
11.5.2 The Meetings Committee shall take office and begin functioning immediately upon appointment, and shall continue for one year plus such time as is necessary to bring to a termination all activities in connection with any mectings managed
B by said committees. Such an extension of term of a Meetings Committee beyond the

- nominal year shall not preclude the appointment of the committee at the designated time for the succeeding year.

11. 6 Membership Committee: The functions of the Membership Committee will be to:
a. Supply information to the members and Sections, on Group EMC and advantages of membership in it.
b. Provide promotional material to the members and sections and plan membership drives.
c. Act as liaison with the Section Chapter officers and members for the other staff committees.
d. Make recommendations to the Administrative Committee whether to accept a new society as the basis for allowing affiliate membership.
12. 7 Newsletter Committee: The functions of the Newsletter Committee will be to:
a. Solicit and promote the collection of information pertinent to the Group and its activities, and publish a Newsletter on a regular schedule.
11.8 Nominating Committee: Duties of the Nominating Committee are detailed in Section 4 of the Bylaws.
13. 9 Publications Committee: Thefunctions of the Publications Committee will be to:
a. Solicit or otherwise obt ain sufficient quantity of suitable material and technical articles for publication of the Transactions on a regular schedule.
b. Supervise and otherwise arrange for the publication of the Transactions on this basis.
c. Supervise other Group publications.
14. 10 Standards Committee: The function of the Standards Committee will be to recommend standards of engineering practices to be followed in electrical and electronics and allied industries in the field of Electromagnetic Compatibility.
11.11 Technical Papers Committee: The functions of the Technical Papers Committee will be to:
a. Study the needs of members of the Group, and of procuring papers, lectures, tables, books, tutorial papers, and other material within the field of interest of the Group.
b. Cooperate with the Meetings Committee for presenting said material, and with the IEEE Papers Procurement Committee in the IEEE Papers Procurement Program.

## 11. 12 Technical Advisory Committee: The functions of the Technical Advisory Committee will be to:

a. Study the needs of the Group regarding such matters as fall within the field of interest, including, but not limited to, terminology, definitions, specifications and standards, measurement procedures, guidelines and workshops.
b. Recommend to the Administrative Committee those areas where further effort is necessary. In making these recommendations, work of outside groups (EIA, AIA, SAE, AIS, USASI, CISPR, DOD, etc.) in these areas shall be taken into consideration. In so far as is possible, recommendations. of this committee shall be specific.
11. 13 Information Retrieval Committee: The functions of the Information Retrieval Committee will be to:
a. Plan methods of improving the availability of EMC information.
b. Establish the necessary indexing, storage and retrieval procedures.
c. Establish liaison with IEEE Groups, and with other bodies engaged in information planning and handling.
d. Make recommendations in this area to the Ad Com.

## UNIVERSITY OF COLORADO TO HOLD ELECTROMAGNETIC PROPAGATION COURSE

The University of Colorado plans to hold a $21 / 2$ week course in Electromagnetic Propagation in Boulder, Colorado, June 17 to July 3, 1968. The following is an outline of the scope of the course:

1. Properties of media of propagation.
2. Statistical aspects of propagation and propagation in random media.
3. Electromagnetic spectrum utilization.
4. Modulation and channel characterization.
5. Ground wave propagation.
6. Electromagnetic Propagation -1 Hz . to 200 KHz .
7. Electromagnetic Propagation - 200 KHz . to 2 MHz .
8. Electromagnetic Propagation -2 MHz . to 100 MHz .
9. Electromagnetic Propagation - 30 MHz . to 40 GHz .
10. Electromagnetic Propagation -40 GHz . up to and including optical frequencies.
11. Propagation over earth-space communication links.
12. Antenna systems, receiving systems, signal detection and processing theory.

A preliminary 2 -week preparatory course will be made available to persons in need of a review of the fundamentals of electromagnetic propagation. This course will be held June 3-14, 1968. Tuition to the 2 -week preparatory course is $\$ 200.00$. For the $21 / 2$-week course, the fee is $\$ 300.00$ and tuition for both courses is $\$ 400.00$. Those interested in attending should get in touch with the following:

Professor S. W. Maley
Department of Electrical Engineering
University of Colorado
Boulder, Colorado 80302

## or

Mr. R. C. Kirby
Institute for Telecommunication Sciences
Environmental Science Services Administration
Boulder, Colorado 80302

## PROBLEMS OF FREQUENCY MANAGEMENT

William A. Plummer, Associate Director (Frequency Management) Office of the Director of Telecommunications Management, Executive Office of the President, Office of Emergency Planning, Washington, D. C. gave a talk before the New Jersey Coast and Metropolitan New York Chapters, on January 23, 1968, on the "Problems of Frequency Management. " Copies of the talk may be obtained from Herbert G. Bostrom, Metex Corporation, 970 New Durham Road, Edison, New Jersey 08817.

## George R. Ufen with Fairchild/Electro-Metrics

George R. Ufen, Vice Chairman of the 1968 National EMC Symposium, has recently joined Fairchild/Electro-Metrics Corporation, Amsterdam, New York, as Western District Manager with offices at 1616 Victory Blvd., Glendale, California 91201. George formerly was Vice President of McDonald Associates, a manufacturers ${ }^{\text {i }}$ xcpresentative group.

Active in professional groups, George also is Chairman of the 1970 National EMC Symposium scheduled for Los Angeles. He is past chairman of the Southern California G/EMC.

## EXTRACTS FROM " SPIKES AND RIPPLES" AE-4 NEWSLETTER

The following extracts are from the new SAE AE-4 Newsletter, January 1968:

EDITOR'S NOTE: This little note will not be a regular item. A newsletter is no place to editorialize. But, I did want to thank the several members who took the time to write complimentary remarks about the first issue of "Spikes and Ripples." The response was very encouraging. As a famous man says at the end .of his program, "Keep those cards and letters coming in, folks."

While I have the floox I'd like to point out the obvious. We ${ }^{1}$ re a new publication. There will be some groping and stumbling as we attemp to find the best format. The formula is simple enough. Be brief, informative and factual. We'll try. Your comments will be helpful. (CMD).

## OPEN LETTER FROM CHAIRMAN

Please read the attached letter from Walt McKerchar. It is very important that members of SAE Technical Committees remember that they function as individual technical experts, not as representatives of their employers. (See Attachment I.)

## UFO's and EMI

The controversy over UFO's will probably rage as long as the boys gather in the bait house on a cold winter's night. At first glance this may not appear a proper subject for an EMC/riMI newsletter. However, a calm and scientific consideration of the subject suggests that a good "noise" man with suitable instrumentation might provide an irrefutable identify for many of the reported phenomena. First though, let's dispose of the argument that UFO's are extriaterrestrially related, whether manned by little green goblins or radio controlled.

Professor William Markowitz of Marquette University has written a basic and devastating rebuttal to any such claims, His paper, "The Physics and Metaphysics of Unidentified Flying Objects," SCIENCE, 15 September 1967, is recommended reading.

A rational study of thousands of reported sightings can be ezzplained as forms of "ball' lightning. This fairly well known phenomenon can be generated by either man or natural sources of excitation. Scientists do not agree on the precise mechanisms required to sustain the "ball" for extended periods of time. However, it is generally agreed that it is electrical in character, most likely a manifestation of electrical corona. If this is so then it certainly will generate EMI fields which can be measured. Interested members might start by reading "Plasma Theory May Explain Many UFO's, "Philip J. Klass, Aviation Week and Space Technology, 22, August 1966.

Measurement of the magnetic field and earth current in the vicinity of a tornado strongly supports the suggestion that the energy source of tornadoes is primarily electrical. An interesting mathematical model has been constructed by Stirling A. Colgate of the New Mexico School of Mines. See his paper, "Tornadoes, Mechanism and Control" in SCIENCE, 22, September 1967. A companion paper by Marx Brooks of the same school, entitled, "Electric Currents Accompanying Tornado Activity, "appears in the same is sue of SCIENCE. Here is a challenge to those interested in measuring large electric fields. Calculations imply energy dissipation at the rate of $2.25 \times 10^{8}$ joules / second and average currents of over 225 amperes. Based on the assumed model it is inferred that the effect of such large charges could be measured several hundred miles from the source. Strong evidence suggests an early warning system might be practical.

Members interested in the physics of the air might also read
"Characteristics of Hurricanes," by Banner I. Miller of the National Hurricane Research Lab., It is also in the 22, September 1967 issue of SCIENCE.

## RADIATION HAZARDS

Two bills now pending in Washington, S. 2067 and H. R. 10790 propose to ". ...conduct.research and set standards applicable to the emission of radiation from electronic products. " Initially these bills were mostly concerned with the generation of $x$-rays by some color TV sets. But, testimony during recent hearings indicate that radiation from medical and dental x-rays, microwaves, lasers, unltaviolet light, infrared and untrasonics will be considered in the final regulation.
********
EMC also stands for Engineering Manpower Commission.

## 

## BONDING

Electrical bonding of vaious structures, particularly aeronautical has long been practised. In the good old days of simpler designs almost anything from bell wire to an old battery cable was strapped, willy-nilly, to any handy protuberance on an aircraft. (We once had open cockpit airplanes, remember ?) Now, modern aircraft and space vehicles with their cargo of sophisticated electrical and electronic devices, requires a more scientific approach to bonding. The requirements become more acute with the increased use of highly resistive materials (titanium) and dissimilar metal interfaces. Two papers on modern bonding requirements were recently presented at the "Eastcon '67 Convention' in Washington.
"Low Resistance Electrical Bonds," T. R. Wilson, J. R. Turner and E. M. Skane
"Electrical Bonding Requirements for Avoidance of FuelAir Explosions."T. R. Wilson
Authors of both papers are with Boeing Seattle.

## FIRE HAZARD

Members involved with the hazards of fuel handling will find the following papers of interest:
"Added Safety in Aircraft Fueling," F. Brown and L. P. Haxby

This paper is interesting in its approach to the problems of containing static electricity during fueling of an aircraft. Aviation fuels have inherently low conductivities on the order of 0.1 to 10 picomho/meter. This is raised to 50 to 300 picomho/meter by the introduction of an additive to the fuel. ASA-3 identifies the three component additive - a chromium salt and calcium aerosol bound within the formulation by an organic material. Raising the fuel conductivity to levels approaching 300 picomho/
meter relaxes or dissipates any changes generated during fuel flow to the aircraft. The authors warn, however, that ASA-3 adds safety to a specific operation made hazardous by a particular phenomenon. It is not a panacea. A copy of the paper is available from:

National Fire Protection Association
60 Batterymarch Street,
Boston, Massachusetts 02110
The following publications are also available from the same source:

| NFPA NR 407, | Aircraft Fueling |
| :---: | :--- |
| NR 77 | Static Electricity |
| NR 78 | Lightning Protection Code |

Another very good paper on the subject of fire hazards initiated by electrical ignition sources, is:

API RP 2003, Protection Against Ignition
Caused by Static, Lighning and Stray Currents.
Obtainable from:

> American Petroleum Institute
> Department of Technical Service
> 50 West 50 th Street
> New York, New York 10020

## RECENTLY ISSUED

MIL-E-6051D, Electromagnetic Compatibility Requirements, System. MS25083, Jumper Assembly, Electrical, Bonding and Current Return NOTE: Charlie Seth advises that a major change to MS25083, makes the A1 bonding jumpers inactive for new designs. The Al jumpers were very erratic in resistance and did not provide satisfactory performance. They MAY cause a safety problem where high fault or lighning currents are involved. He suggests that all applications of the Al jumper be reviewed where safety might be involved.

## NOW CIRCULATING

MIL-W-5086, Wire, Electrical, Hookup and Interconnecting, Polyvinyl-Chloride Insulation, Copper or Copper Alloy Conductor

The redraft of proposed revision " B " is now circulating for comment. HELP WANTED

The U.S. Corps of Engineers has initiated a project to compile and collect information on shielding of buildings, recommended construction practices, attenuation of building materials and similar related subjects. AE-4 members are requested to make available copies of pertinent reports or identifying information if reports are not available. Address all correspondence to :

## U.S. Corps of Engineering

Ohio River Division Labs
Attn: W. D. Ford
Instrumentation and Special Studies Branch
5851 Meriemont Avenue,
Cincinnati, Ohio 45224

## AVAILABLE PAPERS

Lee Avery has copies of the following papers available for distribution upon written request:
"USAF Development Efforts Concerning Atmospheric Electrical Hazards," by Claude R. Austin, WPAFB
"Analysis of Errors in the Determination of Impedance by the Use of Two Current Probes," by Clifford O. Keih1, WPAFB
"EMC of Manned Airborne System, " by Capt. Victor Morats, WPAFB
"Idealized Methodology of EMC Systems Design, " by Gearge Kunkle, JPL
"The Relativity of Grounding, " by Thomas H. Herring, Boeing

Write directly to:
Lee W. Avery
LTV Electrosystems, Inc.,
Unit 2435 W
Garland Division, P.O. Box 6118
Dallas, Texas 75222

## AE-4 WORKSHOP SESSIONS

The Spring meeting of Committee AE-4, in Las Vegas, will be held on May 15, 1968, followed on May 16 and 17 by a workshop session 'or which the following program has been established:
'Cable Coupling (Transfer Impedance) Effects, " Thomas E. Herring, Boeing Company, Houston
"Simplified EMI Analysis," J. Duncan, Litton, Van Nuys
"Shielding and Its Application, " R: B. Schulz, Boeing Company, Seattle
"Filtering and Its Application," Joe Fischer, Genistron Compton

Members wishing to attend these sessions should make early reservations. Attendance will be limited and by invitation only. Committee AE-4 members and their friends will receive first consideration until January 30, 1968. After that date attendance will be thrown open to all CEP members on a first come basis. If you ${ }^{\text {tre }}$ interested, write now, stating the names of persons for whom you want reservations. Address requests to:

John G. Lippert
Society of Automotive Engineers
485 Lexington Avenue,
New York, New York, 10017

The next issue of "Spikes and Ripples" will be circulated about April 15, 1968. Copy sheets for that issue will close March 30. Address all material for "Spikes and Ripples" to:

Charles M. Dean
16 Oak Grove Street,
Manchester, Connecticut 06040

## PGASE-SENSITIVE DETECTOR NONLINEARITY AT THE SIGNAL DETECTION IN THE PRESENCE OF NOISE

In the December 1967 issue of the IEEE Transactions on Instrumentation and Measurement is a paper by Branko Leskovar, Lawrence Radiation Laboratory, University of California, Berkley, California, under the above title. The Abstract is as follows:
"Abstract - The essential non-linearity characteristics of a phasesensitive detector are studied theoretically, assuming that the input signal is a sine wave in the presence of additive narrow-band Gaussian noise. Three interesting cases of the non-linearity of the phasesensitive detector characteristics are analyzed by means of the expression which has been derived for the output signal-to-input noise ratio as a function of the input signal-to-noise ratio, the reference wave-to noise ratio, and the phase angle between the input signal and reference wave. In the first case, the detector nonlinearity $\mathrm{N}_{\mathrm{a}}$ as a function of the input signal-to-noise ratio is determined. In the second and third cases, the detector nonlinearities $N_{a}$ and $N_{c}$ as a function of the phase angle between the input signal and the reference wave are obtained. The results are presented as closed-form analytical expressions. Several interesting cases are plotted as a function of the significant parameters. Besides being important in themselves, the results are of a general interest because they may be used to estimate essential nonlinearities in some other more complicated cases."

## CORONA AND RI CAUSED BY PARTICLES ON OR NEAR EHV CONDUCTORS: I - FAIR WEATHER

The November, 1967, issue of the IEEE Transactions on Power Apparatus and Systems, contains an article with the above title by H. ㄱ. Newell, T. W. Liao and F. W. Warburton. The summary is as follows:
"This stuidy was made to identify, photograph, and establish the radio noise importance of the fair-weather coronas occurring on an ac high-voltage transmission-line conductor. Excursions of fair-weather interference to over ten times the base value of the line noise are attributed to corona plumes from vegetable particles and insects attached to the conductor. Vegetable particles and insects are dielectrics whose plumes occur on the positive half-cycle of potential. Radio noise from the se plumes overrides other corona noises associated with the dielectric particles, the noise from weathered metal protrusions on the conductor strands, and the normal noise from insulators, accessories, and hardware. The conductor surface gradient, the total conductor surface area, and the rate of gradient decay outward from the surface are important to both particle attachment and severity of plume formation."

EDN September 20, 1967 carried a two page article under the title Flat-Cable Investigations. The following was included in a special box. "A guide for circuit/system designers was developed. There is no simple panacea to eliminate round - or flat - cable electromagnetic incompatibilities. Each cable must be analyzed individually. A few recommendations that might be applied with discretion are listed.
${ }^{4 t}$ Divide circuits into groups on the basis of interference intensity and degree of suceptibility; consider the following:

1. Signal level
2. Signal frequency
3. Circuit impedance
4. Minimum requested signal-to-noise ratio
5. Circuit bandpass characteristics
"Develop a.fixed conductor assignment scheme for various types of signals, placing the worst interference at one edge, the susceptors at the other.
"Stack cables with a fixed orientation so that compatible conductors are above each other.
"Use shielded cable for susceptible circuits and alternating current signals.
"Do not use single-shielded flat cable where unshielded surfaces are adjacent begause of stack layout or folded bends.
"Placing flat cabel against the ground plane provides partial shielding.
"Where magnetic shielding properties are required, use flat cable with a complete circumferential shield. Significant magnetic fields will exist when signals contain considerable RF energy. This includes digital and video pulses.
"Do not use flat cable to transmit radio frequencies. ${ }^{\text {tt }}$ Treat cable shields as an extension of the component case or structure."

## CAUSE OF 2 LAB BLASTS IS KNOWN

The following article appeared in the Boston Sunday Advertiser, January 28, 1968.
"Confronted with three similar explosions at hospital laboratories within the city in the past three weeks, authorities on Saturday were still in the dark on the reason for one of them but were able io pinpoint the cause of the other two.....
"The blast in a pathology laboratory at Harvard Medical School on January 5 , in which two women techmicians were injured, was touched off by static elentricity genexated by nylon dresses worn by Lab= GFtoxy attendants, Fire Commi. William S. Fitzgerald disclosed for the first time. "

Electromechanical Design, January 1968 has in article under the above title by D. D. French, Engineer, Raytheon. Paragraphs of interest are as follows:

## DESIGNING AROUND NOISE

"The few U.S. manufacturers of quality rotary electric couplings are in the business because of some unique abilities and/or proces which have been developed to provide performance in this field. In no small number of instances, especially with miniature units, a practical performance and reliability has been obtained only by the strategic use of precious metals, alloys, and, sometimes, speciall developed plastic insulation materials. Along with these practices manufacturers have developed a number of highly specialized techniques which are proprietary and not available for publication.
"The low-noise slip ring requires optimum electrical characteristics after long idle periods with either no motion or very little motion between brush and ring.
"Certain things are, however, well known to the industry. For ex* ample, gold in its pure state is an excellent metal surface protectio It is also a relatively good electrical conductor. Thus, it provides a good sliding electrical surface. For that reason most of the min iature slip rings in critical applications use gold or gold surface rir of some sort.
"On miniature assembles, particle contamination can be a real hazard. The design must be such that a minimum of wear particles is generated during life, no external particles can enter and fine greas oil or bearing debris are excluded from the contact area."

Further details of the reaction of miniature slip ring assembles in the high vacuum of space can be obtained by writing to the following: Environmental Study of miniature Slip Rings -- From Technology Utilization Officer, Marshall Space Center, Huntsville, Ala. 35812

## ATMOSPHERIC ELECTRICITY AND THE WATERFALLS OF YOSEMITE VALLEY

In the May 1965 Issue is a six page article by E. T. Pierce and A. L. Whitson and a reply in the July, 1966 issue. The first paragraph is as follows:


#### Abstract

Measurements of the electric field on the floor of Yosemite Valley show that the field is usually small in size and negative in sign. As individual waterfalls are approached the field can become several hundreds of volts per meter negative. Traverses up the steep side of the valley showed a steady trend to increasingly positive fields with increasing height; on the plateau above the valley the field was of the order of $+100 \mathrm{y} m-1$, a conventional fair weather value. Cheracteristics diurnal variations in field were noted at the valley floor. A maximum of about $+10 \mathrm{v} m-1$ was reached near local noon with a minimum of some $-60 \mathrm{v} \mathrm{m}-1$ at midnight. The field fluctuated violently at night, but the variations were slow by day. The rannlis san be interpatcted in termas of a convective exchange layer the development of which is in phase with solar heating, with ucgative suace chamge produced at tho waterfalls being entrained into exchange layer.


## R F I WHOSE RESPONSIBILITY?

In the December 1967 issue of The Electronic Engineer is a one page article under the above title. The first paragraph is as follows:
"A drive system that can move a large structure (designed for an 85 ft . tracking antenna) with essentially zero backlash and with out generating RFI is for low speed, long term tracking of space probes and stars. The system, which is capable of multimode operation, could be useful wherever several signals must be combined to move a large structure a specified distance. This could include large machine tools controllable by analog or digital-toanalog sources."

Further information may be obtained by contacting the Technology Utilization Officer, N.ASA Pasadena Office, 4800 Oak Grove Drive Pasadena, Calif. 91103, Ref. B67-10220

FREQUENCY, January 1968 issued a three page article by Rocco F. Ficchi, RCA Camden, N. J., with the above title. The first paragraph is as follows:

Growing awareness of problems assoctated with electromagnetic compatibility and RFI has resulted in the question of responsibility being examined by all persons concerned. Whose responsibility is electromagnetic compatibility and RFI? One can reply to this question with a trite answer, a meaningless answer or really think about the question and come up with a genuine answer. One can say that the responsibility lies with whomever has the systems responsibility. This of course, does not solve the problem because the systems contractor is so dependent upon the cooperation of subcontractors. One can also say that the responsibility lies with everyone who is concerned with the system. This is a meaningless answer because it implies responsibility to everyone and yet the order of responsibility is not clear. An individual subcontractor can certain Iy not be identified with responsibility for problems on a system basis nor with the problems of subsystems other than his own. The questi then must be answered by an examination of the functioning of particular systems so that principtes, rulea or guidimea may to develop These can be applied to particular systems and the question of respon sibllity will be clariffed.

## MEMBERSHIP APPLICATION

IEEE ELECTROMAGNETIC COMPATIBILITY GROUP
Send to: IEEE Headquarters, 345 East 47th Street, New York, N.Y. 10017

NAME $\qquad$ IEEE MEMBERSHIP NO. $\qquad$
MAILING ADDRESS

## COMPANY

FIELD OF INTEREST $\qquad$
1 I am a member of IEEE and hereby apply for membership
in G-EMC.
1 My fee* is enclosed.
$\Gamma$ I am interested in joining IEEE and the G-EMC. Please send information.
*Fee: \$4.00 for IEEE members of all grades except Student.
Student fee is \$1.00 if G-EMC is first Group selected.
Pay one-half annual fee for Group on payments received
in IEEE during the period April 1 thru September 30 .

