

EDITOR: R. S. Kagiwada

TRW ESG, One Space Park, Redondo Beach, California 90278

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THE 1984 IEEE MTT-S INTERNATIONAL MICROWAVE SYMPOSIUM, SAN FRANCISCO, CALIFORNIA MAY 30 - JUNE 1



by Stephen F. Adam



On behalf of the Steering Committee and the San Francisco/Santa Clara Valley MTT-S Chapter it gives me great pleasure to invite you to attend the 1984 IEEE MTT-S International Symposium and Workshops. This year the symposium will be held in the city of the Golden Gate, San Francisco. It was 1975 when our Chapter last hosted the International Microwave Symposium.

The Technical Session will be held in the Civic Auditorium which is located in the Civic Center of the City. The Exhibits will be held in the underground Brooks Hall adjacent to the Civic Auditorium. We expect to have in excess of 320 exhibit booths this year at our Symposium. The Hyatt Regency Hotel of San Francisco is the headquarters hotel where the social functions and organizing committees will be housed. Some of the workshops will also be held in the hotel. As it was for the last few years, we will also hold the 1984 Microwave and Millimeter Wave Monolithic Circuits Symposium preceding our symposium.

We have put together an excellent Technical Program. We will have three parallel sessions to minimize potential conflicts. We also will have two full Open Forum sessions with no overlapping activities. As part of the Symposium we will have two parallel panel sessions on Wednesday night 8:00-10:00 p.m. In addition we will have Thursday afternoon a panel session organized by Dr. Reynold Kagiwada, and moderated by Dr. Leo Young on: Japan/U.S. competition in Technology. We have noticed that the posture of the technical sessions have changed again, pointing to increased activities in Millimeter Wave fields. Monolithic

Integrated Circuits Activities are still very dominant in our program. The first day we will share our meeting with the Microwave and Millimeter Wave Monolithic Circuits Symposium. We also have noticed more Biomedical papers and industrial uses of microwaves gaining recognition. Microwave semiconductor technology is still a very important field, and there will be many sessions dealing with this subject. Communications and systems applications of microwaves, along with the customary measurement and field theory sessions will round out our program.

We will have an opening/plenary session on Wednesday morning. After the welcoming remarks from the Symposium Chairman and the MTT Society President, we will hear a keynote address by John A. Young, Chief Executive Officer of Hewlett-Packard Company. In his address he will deal with the subject of his presidential commission, national competitiveness.

In addition to our two symposiums we also will conduct our customary workshops during this "week of microwaves." There are six workshops scheduled, five of them are sponsored by the MTT-S Technical Committees and one by IMPE, International Microwave Power Institute. The six workshops are: Testing and Trimming Monolithic MIC's; Field-Theoretical Methods for Microwave; Coaxial Connector —40 GHz and Beyond; Suspended Stripline Filter Technology; Clinical Hypothermia; and Industrial Applications of Microwave. ARFTG, Automatic RF Techniques Conference will be held the week following our symposium in Santa Rosa, California.

(Continued on page 9)



PRESIDENT'S COMMENTS

by H. George Oltman, Jr.

1984 is shaping up to be a great year to be MTT President, and an IEEE member. Not because of any Orwellian flavor, but because it is IEEE's Centennial Year. In celebration of this anniversary, a number of special events are planned throughout the year. As President, I will have the honor and pleasure of taking part in some of them while representing the MTT Society. I feel especially fortunate to have been elected in 1984. I hope 1984 will be especially meaningful for you, also.

A special Centennial Task Force organized back in 1982 has been responsible for developing and promoting Institute-wide centennial activities. These activities focus in two areas: Technology and Awards.

The Awards program for 1984 is especially meaningful. This year on the order of 2,000 special awards honoring persons making significant contributions to the IEEE will be made. Second to promoting and recording the technology, I believe that the Institute's role in identifying and honoring people making significant contributions to the technology and profession is most important.

Starting out the year on January 31st, the Institute honored its founders and major builders at the Founder's Centennial Program in Dallas. Throughout the year at symposia and meetings all over the world, the Societies, Sections and other IEEE entities will honor 1984 selected members that played major roles in the history of each entity. At our Symposium Banquet on May 31, we will honor 19 such MTT members. If you attend, you will see the faces of some well known names. It promises to be a memorable event.

To wind up the year's activities and honor people that promise to be future contributors to the profession, the IEEE will honor promising young engineers. That selection process is already underway by a special adhoc MTT Awards Committee. I will have the honor of presenting his award at the ceremonies in Santa Clara, California on December 1, 1984. I'm looking forward to that.

And there is more. In September, each of us will receive an extra special issue of the Transactions. Our MTT Historian, Ted Saad, was commissioned by the AdCom to edit a Centennial edition. He has assembled invited papers from 28 renowned specialists in microwave technologies to record the history including the personal side of the development of the technologies. It will also in-

clude a section on major historical microwave patents. Most of the papers have already been written. After hearing Ted describe them last month, I am sure we all will read it and treasure it. The issue will be hard-cover bound.

1984 promises to be a good year!



EDITOR'S NOTE

by Reynold S. Kagiwada

Unfortunately, I have the distinction of following Steve L. March as Editor of the MTT Society's Newsletter. Steve has done an outstanding job. He has single-handedly produced a very complete and exciting newsletter. I will try hard to carry on the tradition set by Steve March, John Kuno, and the many that preceded them.

Since I am new on the job, I am soliciting your help in making this a Society newsletter. I feel that the newsletter should serve the needs of the MTT-S membership. For that reason I have asked Kurtis L. Kurisu to be in charge of a "Feedback Column." This column is designed to respond to the reader's comments. That is what they feel are interesting and exciting, or what they feel is not appropriate for the Newsletter. Kurt is a young, dynamic engineer working on millimeter wave devices. I am sure that you will find him very responsive and helpful.

In addition to having the feedback column, I thought it would be nice to have a "Special Articles" column. John Horton, who has been active in MTT-S since the 1960's, has been so kind to be responsible for these articles. John has been involved in the MTT-S for several years. This involvement includes serving as a former editor of the Newsletter. We are fortunate to have his experience and wisdom for the job.

As I mentioned before, I would like to get your thoughts and ideas for making the Newsletter a resounding success.



ADCOM HIGHLIGHTS

by Harlan Howe, Jr.

The January ADCOM meeting was held on Tuesday, January 17, and Wednesday, January 18, 1984, at the Hyatt Regency Hotel in San Francisco, California. George Oltman, our new ADCOM President, started his term with a flourish of efficiency which is unparalleled in ADCOM history. The meeting agenda, which he presented, was complete with the number of minutes allocated for each agenda item. This technique proved to work so well that we actually finished the ADCOM meeting early.

ORGANIZATION

George has streamlined and reorganized ADCOM into 6 operating subcommittees. The Committee on Operations is chaired by P. T. Greiling. Membership Services is headed up by E. C. Niehenke. Technical Committees are chaired by B. E. Spielman with H. J. Kuno as Vice Chairman. Meetings and Symposia will be chaired by D. N. McQuiddy, Publications and Standard Activity chaired by R. H. Knerr, and Intersocietal Relations and Planning Activities, including Long Range Planning, will be chaired by H. Howe. This regrouping of activities and responsibilities could cut down on some of the lengthy reporting processes and further smooth ADCOM operations.

FINANCIAL APPROPRIATIONS

Among other expenditures, ADCOM approved a budget of \$15,500 for the 1984 Transactions Editor and made advances to the 1985 Symposium and to the 1984 Monolithic Circuit Symposium.

MEMBERSHIP

Ed Niehenke, the newly assigned chairman of membership services, reported that the MTT-S membership for the period ending November 30, 1983 was 7,145, an increase of 6.9% from a year ago and an all time high for the MTT-S. While our membership increased by 6.9% for the same period the overall IEEE membership increased by 5.7%. It is planned to have membership booths at both the MTT-S Symposium, in San Francisco, as well as this fall's European Microwave Conference. It was also reported that three new chapters are in various stages of being established in Europe. They are Sweden, West Germany, and Switzerland.

FUTURE SYMPOSIUM ACTIVITIES

A proposal to hold the 1988 MTT-S Symposium in New York City was made by Chuck Buntschuh, Steering Committee Chairman. After some discussion of the exact site it was agreed that the 1988 Symposium will be held at the New York Hilton during the week preceding the Memorial Day Weekend. After selection of the 1988 site, Chuck Swift made a presentation on the 1989 MTT-S Symposium on behalf of the Los Angeles area chapter. It was agreed that the 1989 Symposium will be held in the Los Angeles area with the site selection open for purposes of negotiation by the local Steering Committee. The most probable sites are either Anaheim or Long Beach.

Interest has been expressed for 1990 by the Dallas Chapter and also by Phoenix and Minneapolis. In addition, the Boston Chapter and San Diego Chapter expressed interest in 1991. The plan is to select the 1990 site in October 1984 and the 1991 site in January of 1985.

CLASSIFIED SESSIONS

A study was conducted by Walter Gelnovatch with the results presented by Bob Weck on the subject of classified sessions at the MTT-S Symposia. Approval, physical security, and publication and distribution of classified material were discussed. The consensus of ADCOM was that it is simply not practical to hold classified sessions at MTT-S Symposia and, in fact, the MTT bylaws prohibit us from holding classified sessions. It is not likely that any future action will be taken in this area.

PAST PRESIDENTS COUNCIL

A proposal was made by Al Clavin to create a past presidents council exclusive of ex officio past presidents. The council could perform specific tasks requested by the President, and would as a total group, have one vote in matters other than elections. The proposal is being considered and possible bylaw changes which would implement it are being drafted for future action.

MICROWAVE STANDARDS

Mario Maury discussed "promoting national microwave standards" and the need for such standards. An ADHOC committee to promote national microwave primary measurement standards was established by the President, chaired by D. Rytting.

CHINESE SLIDE SHOW

During the ADCOM lunch on the 18th, Ted Saad, Ed Niehenke, and Dick Sparks showed several hundred slides that had been taken in China during their recent trip there. It was a fascinating way to spend lunch. Since that time, Ted Saad has presented that same slide show to the Boston Chapter at a regular chapter meeting and it was extremely well received. Many thanks to Ted for his effort and interest.

1984 MTT-S ADCOM COMMITTEE MEMBERS



Front row: R. B. Hicks, T. Itoh, S. L. March, K. J. Button; Back row: P. T. Greiling, R. H. Knerr, F. Ivanek, R. S. Kagiwada, H. Sobol.

Front row: J. Raue, H. G. Oltman, Jr., H. Howe, Jr.; Back row: A. A. Oliner, R. A. Sparks, T. S. Saad, M. A. Maury, Jr.



Front row: B. E. Spielman, G. Jerinic, H. J. Kuno, J. E. Degenford; Back row: N. W. Cox, D. Parker, E. C. Niehenke, D. N. McQuiddy, F. J. Rosenbaum





U.S. ACTIVITIES BOARD REPORT

by H. G. Oltman, Jr.
President

USAB DECLINES TO ENDORSE ONE POLITICAL STATEMENT BUT APPROVES OTHERS

In the forum offered, United States Activities Board (USAB) declined to endorse the draft entitled "Republican Agenda for U.S. Technology Leadership and Industrial Competitiveness." However, USAB is submitting a response to the Republican Task Force on High Technology that sets forth the IEEE positions. USAB also approved to furnish both Republican and Democratic parties, platform statements on technical matters. USAB declined to support the total platform of either party. It will publish analyses of each party's platforms in the frame of reference of IEEE positions for the IEEE membership. Members can obtain a complete set of position papers by writing USAB at IEEE Washington Office, 1111 19th Street, N.W., Washington, DC 20036 (telephone (202) 785-0017.)

CRISIS IN SCIENCE/MATH EDUCATION

USAB, together with the IEEE Educational Activities Board, is also working on a position paper on the Crisis in Pre-College Science, Math and Engineering Education. In addition, they plan coordinate action programs for us at the "grass roots" level and to prepare Legislative Alerts to call our attention to pending legislation. Any further action will then be up to us to react as we feel appropriate.

CURRENT MEMBER APATHY TOWARD PROFESSIONAL ACTIVITIES

It's been my observation of late that there is little discussion and apparent interest these days in professional activities. For example, we currently can't find a PACE chairman at the AdCom level. Apparently this is widespread. The subject is being discussed, and USAB has proposed a study to evaluate the situation. Professional activities is a matter that the US members should not be complacent about. Advances cannot be made nor achievements retained if we start ignoring the professional side of our activities. If I am wrong, let me know. If you are interested in participating in professional activities at the national level, give me a call at (818) 702-2293. Let's explore the qualifications.

COMAR MAKING A FILM ON NON-IONIZING RADIATION

The public and press frequently misunderstand the difference and the effects of ionizing and non-ionizing radiation. When the term radiation is heard, deadly forces are often envisioned. The Committee on Man and Radiation (COMAR) is making a film to clarify the difference. COMAR is

a joint TAB/USAB committee. It is populated by over 40 experts in all IEEE Technologies having a bearing on man and radiation. It formulates IEEE policies and coordinated activities for the approval of the IEEE Board of Directors and/or TAB and USAB. Its connection with the Technical Activities Board is to allow the Societies to review its technical direction. The film will be made available to IEEE Sections, Chapters and Societies, and especially to the public.

ARFTG HIGHLIGHTS

by Mario A. Maury, Jr.

The Automatic RF Techniques Group (ARFTG) is a professional society that is affiliated with MTT-S. It is primarily concerned with computer-aided microwave measurements and design.

The next ARFTG Conference will be held on June 4 and 5, 1984, (Monday and Tuesday) at the Luther Burbank Center in Santa Rosa, California. This is the 23rd ARFTG Conference and it will be held as a workshop directly following the MTT-S International Microwave Symposium in San Francisco. Advance registration is recommended utilizing the symposium registration form, although, attendees can register directly preceding the Conference.

The Conference's main topic will be "Millimeter Automated Network Analyzers." Papers will be given on recent hardware and software developments in the main topic and other computer-aided RF design and testing topics. Technical exchange will be accomplished by informal twenty minute talks. A portion of the session is reserved for manufacturers to discuss and/or demonstrate new equipment that has been specifically designed for use in computer-aided RF design and test.

Papers are solicited on recent hardware and software developments. Submit 500 to 1,000 word abstracts by March 30, 1984, to the Technical Program Chairman:

M. A. Maury, Jr.
Maury Microwave Corporation
8610 Helms Avenue
Cucamonga, CA 91730
(714) 987-4715, X21

The Conference host is James Fitzpatrick of Hewlett Packard, Santa Rosa. Jim and his staff are planning an excellent program which includes an interesting tour of Sonoma County on Sunday, June 3, the ARFTG Awards Banquet which will be held Monday night and a tour of Hewlett Packard, Networks Measurement Division located in Santa Rosa on Tuesday afternoon.

For further information, contact the ARFTG 23rd Conference Chairman:

Wendell Seal, M/S S-2471
TRW
One Space Park
Redondo Beach, CA 90278
(213) 535-5155

1984 MTT-S ADCOM COMMITTEE MEETING IN SAN FRANCISCO IN ACTION





TAB HIGHLIGHTS

by C. T. Rucker
1983 President

The November 1983 meeting of the Technical Activities Board was held in Atlanta on Thursday, November 17. The President's Forum was held one day earlier.

TAB meetings have become quite crowded and formal, leaving little time for discussion, discussion or affirmation with respect to issues before the committee. About two years ago, an informal forum (the President's Forum) was started to allow discussion prior to the TAB meetings. This forum takes no formal action but helps to generate an exchange of Society views and leads to consensus among the Societies. I take special note of this forum because I believe it to be a healthy and almost indispensable tool available to the Society within the Institute.

Some of the more important items discussed at the November TAB meeting are summarized below in order to keep you informed.

I) TRANSFER OF SOCIETIES/COUNCILS AMONG DIVISIONS

New Procedures for transfer were approved as outlined below.

- The Society/Council proposing a transfer should submit a formal request approved by its administrative committee, including justification for such a transfer, to the Vice President - Technical Activities, with a copy to the TAB Secretary.
- Views of the Societies/Councils and the Division Director of the Society's/Council's present Division should be documented.
- Approval of the Societies/Councils and the Division Director of the receiving Division should be documented.
- Divisions must remain technically cohesive under their existing names or a proposed name change(s) should be submitted with the formal transfer proposal.
- TAB OpCom must approve the transfer.

II) IEEE BYLAW REVISION

Bylaw 310 was revised such that, among other items, the TAB Operations Committee would become the Executive Committee of TAB. TAB, by majority vote, at any meeting, reserved the right to overrule any decision or act of the TAB Opcom.

III) IEEE POSITION PAPER ON EDUCATION IN MATH, SCIENCE AND TECHNOLOGY IN THE UNITED STATES

A position noting the crisis in precollege education in mathematics, science and technology was recommended with minor wording changes. Pertinent IEEE actions were outlined.

IV) TRANSACTIONS ON MEDICAL IMAGING

The EMB Society requested permission to withdraw from co-sponsorship of the Transactions on Medical Imaging. EMB perceives severe problems with this publication. TAB voted to allow withdrawal upon completion of existing commitments but earlier withdrawal was not approved.

V) DUPLICATE TRANSACTIONS/JOURNALS ISSUES

Pete Rodrigue, Vice President for Publications, noted that IEEE Policy 6.6 prohibits publication of identical material in two or more Journals except where both PUBs and TAB Opcom have approved. This policy and exception rule have been ignored in recent years by many Societies including MTT-S.

Numerous TAB members objected to enforcement of this policy and extensive discussion ensued. No action was taken (or requested) and the policy stands at present.

VI) MTT-S SCHOLARSHIPS AND GRANTS-IN-AID

Our request for approval was endorsed by the IEEE Executive Committee with authorization to allocate up to 4% of our total yearly budget during 1984, 1985 and 1986.

A PERSONAL NOTE

As your 1983 President, I take this opportunity to once again thank each Society member for the privilege of serving. I continue to be encouraged by the dedication and commitment I find in those with whom I deal in MTT. This sincere and selfless service is sometimes a rare commodity in today's society. I look forward to continuation of friendships and to participation in all MTT matters where I can be of service.



CALL FOR LECTURERS

This is a call for lecturers to apply for a 1984 IEEE Distinguished Lecture Tour of Region 9. This approximately two week tour is scheduled for the fourth quarter of this, our Centennial, year; the proposed itinerary includes visits to some or all of the following countries: Brazil, Chile, Colombia, Mexico, Peru and Venezuela. Participants will interact with IEEE Section officers and members throughout South America. Funding is the responsibility of the individual lecturer.

IEEE members who wish to be considered as potential lecturers should send letters indicating their interest in this tour, accompanied by their resume and a summary (limited to one typewritten page) of their proposed technical lecture, to their respective Society/Council president. A copy should also be sent to Dr. M. E. Van Valkenburg, Chairman, IEEE Transnational Relations Committee, c/o Ms. Barbara Ettinger, TRC Administrator, IEEE, 345 East 47th Street, New York, NY 10017.

The deadline for submitting applications is July 15, 1984.

STEERING COMMITTEE FOR 1984 IEEE MTT-S INTERNATIONAL MICROWAVE SYMPOSIUM



Back row, left to right:
James Crescenzi, Nicholas
Kuhn, Joseph Barrera,
Jay Stone.
Front row, left to right:
Reynold Kagiwada, Ferdo
Ivanek, Philip Chen.

Back row, left to right:
Donald Chambers, Larry
Stark, Ronald Pratt.
Front row, left to right:
Edward Hensperger,
Roger Wong, Stephen
Adam, E. Wes Matthews.



STEERING COMMITTEE FOR 1984 IEEE MTT-S INTERNATIONAL MICROWAVE SYMPOSIUM AT WORK



INTERNATIONAL SYMPOSIUM . . . from page 1

As in the past several years, Horizon House is managing the exhibits. The Horizon House-Microwave Journal cordially invites all MTT-S registrants, Monolithic Symposium registrants, Workshop registrants and exhibitor personnel to a reception on Tuesday, May 29, 1984 from 6:00 to 8:00 p.m. at One Market Plaza, which is located across the street from the Hyatt Regency. Wine and light hors d'oeuvres will be served.

The 1984 MTT-S Symposium Exhibitors Reception will be held on Thursday, May 31, 1984 from 5:45 until 7:30 p.m. in the Atrium Lobby of the Hyatt Regency San Francisco. MTT-S Symposium and Monolithic Symposium registrants will each receive two Complimentary Beverage Tickets in their registration packages which will be honored during this reception. Additional beverage tickets may be purchased during the reception. Complimentary hors d'oeuvres will be served.

This year is the Centennial year of the Institute of Electrical and Electronics Engineers. We will have many activities during the symposium reflecting upon our history. In addition to our nicely growing MTT-S Historical Exhibit, we will also have the Institute's Centennial Exhibits with our Exhibit.

The Arrangements Committee has hired local bus lines to provide an almost continuous transportation between the seven hotels and the Civic Center. In addition, the Muni (city's local transportation) has excellent connections to the Civic Center, as does BART (Bay Area Rapid Transit). We do not expect any major difficulties to occur due to the dispersed nature of the Symposium. However, if you encounter any difficulties, please inform someone on the Steering Committee. There will be Steering Committee offices continuously at both the Hyatt Regency Hotel and the Civic Auditorium.

This year being the Centennial year of the Institute, we will have the honor to present the Centennial Medal and Certificate during our Awards Banquet. The recipients, in alphabetical order, are: Stephen F. Adam, Alfred C. Beck, Alvin Clavin, Seymour B. Cohn, Marion E. Hines, Donald D. King, William W. Mumford, Arthur A. Oliner, Don Parker, George P. Rodrigue, Fred J. Rosenbaum, Charles T. Rucker, Theodore S. Saad, Phillip H. Smith, Harold Sobol, Richard A. Sparks, Kiyo Tomiyasu, Lawrence R. Whicker and John R. Whinnery.

We will also be presenting the Fellow Award Certificates to our 1984 new Fellows. This year's Fellows are: Glenn F. Engen, Anthony R. Kerr, Louis F. Moose, Gunther U. Sorger, Kunihiro Suetake, William R. Wiseman, and Eikichi Yamashita.

In addition, our Society President will present our major awards. John Robinson Pierce is this year's recipient of the Microwave Career Award

"For a Career of Meritorious Achievement and Outstanding Technical Contribution in the Field of Microwave Theory and Techniques." Dr. Pierce is best known for his fundamental contribution to the invention of the Traveling Wave Tube. His contemporaries well remember the "Pierce gun." This year the Microwave Applications Award will be presented to Paul Meier "For the Invention of Fin-Line Transmission Medium and the Development of Related Components." The Microwave Prize recipients are R. K. Hoffmann and J. Siegl of the Central Communications Laboratories of Siemens AG. They receive the Award for their paper entitled: "Microstrip-Slot Coupler Design-Part II: Practical Design Aspects." The 1984 Distinguished Service Award will be presented to Alvin Clavin "for his Outstanding and Dedicated Service to the Society." Other awards and recognitions will also be presented at the banquet.

After the serious business of Awards presentation, we will provide you with an evening of the best entertainment in San Francisco. Relax after a gourmet banquet and you will enjoy a three-act performance of singing, juggling and dance, with literally something for everyone's taste.

The first part will be the Donald Pippin Pocket Opera Company, a San Francisco Bay Area tradition for years. They have specialized in presenting outstanding light opera. For us they will present a sparkling potpourri of musical delights from Verdi to Porter, and Offenbach to Rodgers and Hammerstein.

Next will be Ray Jason, who, over the past decade, has been San Francisco's premier solo juggling act. Ray Jason has taken the art of juggling to the very limits, and has performed his magic for thousands of delighted audiences. He combined dance and comedy with the traditional juggler's fare for a sensational act you won't forget.

For the finale, we will present dancers from the Oakland Ballet Company. They are ranked among the top ten companies in America. Their two-part presentation will feature a stunning performance to the music of Ravel's Bolero that will leave you breathless.

Come and enjoy an evening of superb food, relaxation, see your friends, maybe you will even receive an award. This entertainment is unforgettable. Don't be disappointed, be sure to reserve your seat as early as possible. Ticket sales are limited to approximately 700 seats.

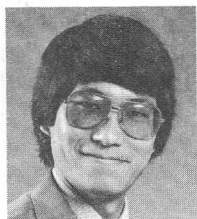
San Francisco and its Bay Area is very rich in sights and with a variety of entertainment. We have contracted one of the finest agencies to conduct our guest/social program. We have scheduled sight-seeing tours of the City and both North and South Bay Areas. Shopping opportunities are also included. As an evening attraction, there will be a cruise on the San Francisco Bay to Tiburon, where a superb dinner will be served;

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INTERNATIONAL SYMPOSIUM . . . from page 9

following a bus tour, through the Golden Gate and the city back to the hotels. This year we have added a Saturday tour to the "wine country." Please consult the advance program for detailed information. A Hospitality Suite in the Hyatt Regency San Francisco will be open in the morning and afternoon for the pleasure of your spouse or guest.

I believe that we have put together a great symposium to fulfill your professional and social desires. I would also like to take this opportunity to thank all the members of the Steering Committee, who have worked countless days, evenings for so long and so diligently to make this a really memorable event for you. Volunteer work many times is very frustrating and the only pay-back is the satisfaction of a job well done for the betterment of your Society. Their countless hours of hard work made this symposium possible. Again, I extend my personal invitation to each of you, and I am looking forward to greeting you in San Francisco!



FEEDBACK

by Kurtis L. Kurisu

The MTT-S Newsletter editorial staff solicits responsible opinions and feedback from MTT-S members regarding topics of interest and importance to our members. It is my sincere hope that this column can serve the needs of the MTT-S membership by providing a forum in which we can share our thoughts regarding pertinent and current issues.

I consider it a distinct privilege to serve the MTT-S membership by acting as the feedback editor. If I may rephrase a note to the membership given in the last MTT-S Newsletter: "Now we have another opportunity to 'let someone else do it'. I sincerely hope we won't. Each of us can contribute to the quality growth of MTT-S. What will your contribution be?" If you have an opinion you would like to express in this column, please contact the feedback editor, Kurt Kurisu, TRW, One Space Park, Redondo Beach, CA 90278.

GaAs IC SYMPOSIUM

The 1984 Gallium Arsenide Integrated Circuit Symposium will be held at the Copley Plaza Hotel in Boston, Massachusetts, October 23-25, 1984. Papers are invited on topics related to gallium arsenide integrated circuits, including: monolithic digital integrated circuits, monolithic linear and power integrated circuits, electro-optical integrated circuits, processing technology, device physics, modeling and simulation, radiation effects and reliability, packaging and testing, materials considerations and advances, and systems applications and affordability.

The object of the meeting, sponsored by the IEEE Electron Devices Society and cooperatively sponsored by the IEEE Microwave Theory and Techniques Society, is to accelerate the successful development of gallium arsenide and related III-V compound integrated circuits by providing a forum for the interchange of technical information relative to the design, fabrication, and application of such ICs. Attendees should be prepared to discuss the technical aspects of these topics.

Authors wishing to submit abstracts for consideration by the technical program committee should mail the original plus twenty-five (25) copies of a one-page abstract to: Dr. Ronald E. Lundgren, Hughes Research Laboratory, 3011 Malibu Canyon Road, Malibu, CA 90265, (213) 456-6411, extension 335. The abstract should clearly state the purpose of the work, how much it advances the art, and what specific results have been obtained. Additional supporting material may be submitted at the discretion of the author(s). Please indicate the specific area (as listed in the first paragraph) to which the abstract applies.

Persons wishing to receive further information on this year's Symposium (including the advance program) and the Calls for Papers for future symposia should send name, organization, mailing address and telephone number to: Melissa Widerkehr, 1984 GaAs IC Symposium, 655 15th Street, N.W., Suite 300, Washington, DC 20005.

For additional information, contact the Chairman of the Symposium Executive Committee, Dr. James L. Vorhaus, Raytheon Company, Research Division, 131 Spring Street, Lexington, MA 02173 at (617) 860-3114 or the Publicity Chairman, Mr. Don Kinell, at (408) 702-3879.





TAB HIGHLIGHTS

by Harlan Howe, Jr.

The Winter TAB meeting was held in Washington, DC on February 21, and was preceded on February 20 by a TAB Orientation meeting, and the Society and Council Presidents Forum meeting. As a first time attendee at TAB, I went to the orientation session on the 20th, which I found to be extremely educational. It gave me an overview of IEEE operations, and an opportunity to discover that a TAB meeting is not a party at which low calorie soft drinks are served, but rather a large and very formal operations meeting, in which some fifty-five people including all of the Society and Council presidents, directors, and others, plot out the future course of IEEE technical activities. The meeting is not unlike a New England Town Meeting with a trifle more dignity. TAB took action on a number of items. Some of these are of direct interest and impact upon the Microwave Theory and Techniques Society.

TIMELY APPOINTMENTS

It was stressed that there is a need for earlier appointments from the various societies to operating IEEE committees. This should be done as close as possible to the beginning of the year in order that these committees can function efficiently. It was recommended that the president and president-elect should work together to make these appointments prior to the time the new president actually takes office in January.

COMAR

A report by COMAR (Committee on Man and Radiation) revealed that they are working on two position papers as well as a movie. The position paper on non-ionizing radiation as it effects video display terminal safety is in its fifth draft. A position paper is also being generated on the non-ionizing radiation effects of heat sealers. Of greater interest, perhaps to MTT members is that progress is being made on a movie ("NOVA" style) on non-ionizing radiation. Negotiation and funding is expected this year and although the movie will have to have the same type of review cycle as a position paper it should be finished within a two to three year period. This will undoubtedly be an "X-band" rated film!

WITHDRAWAL OF PAPERS

There was much discussion on the changes in policy to permit authors to be charged when they withdraw a paper once it has entered the publication cycle. The reason for this is the concern

of the Institute with regard to papers that are being withdrawn because of lack of approval or the rescinding of approval because of some government agency. This occurred to the MTT at the Boston Symposium. The question was referred back to committee because of concerns over whether the author should be penalized, or whether the costs of such withdrawal should be passed on to whatever company or agency has changed its position on approval. This is a serious problem and there is no doubt that some action will be taken at the next TAB meeting.

SINGLE CANDIDACY

A bylaw change was submitted which would prohibit the ability of the Societies to nominate only a single candidate for a given office or position. After much debate the motion was defeated on the grounds that in many cases there is only one candidate or if there are two candidates, their positions are the same and it becomes merely a popularity contest which serves no purpose either for the Society or for the individual candidates.

FIBER OPTICS COUNCIL FORMATION

Over the past several years TAB has expressed, through several resolutions, its wish to establish a council on fiber optics and has directed the steering committee on lightwave technology to draft a constitution and bylaws for the council. The proposed constitution and bylaws were generated but not adopted by the Light Wave Technology Committee primarily because of substantial differences in the views of the quantum Electronics and Application Society and the MTT's. Several possible options were presented. The one which was moved, was to continue with the present Steering Committee operation but assign it to the technically most appropriate division in the same way councils are normally assigned. In this case, it was suggested Division I would be the appropriate division. The committee would continue to publish the Lightwave Journal but not form a council with its additional functions and implications. George Oltman, MTT President, spoke against the motion because he pointed out that interest is changing from physics to engineering orientated interests which cover nine different Societies. He also pointed out that this needed IEEE focus not Optical Society focus. George spoke eloquently for the formation of a genuine council. Unfortunately, the motion passed by a very close 13 to 10 vote with abstentions. At least for the moment there will be no fiber optic council.

NEXT TAB MEETING

The next TAB meeting is scheduled for Tuesday, May 15, in Boston, Massachusetts.





TECHNICAL PROGRAM COMMITTEE REPORT

by Ferdo Ivanek

Last year's symposium, which introduced the Open Forum, encouraged us to consider additional changes that could further improve the technical program. We submitted a set of proposals to the 1984 MTT-S Technical Program Committee at its first meeting in Boston and received strong support for their implementation. To this end we submitted more specific proposals at the subsequent ADCOM meeting where broad consensus was reached and a few refinements were made. The Technical Program Committee implemented these changes very successfully. Now we are looking forward to the reaction of the symposium participants. To stimulate feedback, I am drawing attention to the major changes we introduced:

- The session length is reduced from 3 hours to 1½ hours. The motivation was to better structure the sessions by topics, which is greatly facilitated by reducing the number of papers per session and by increasing the number of sessions. Making the sessions more homogeneous in content simplifies attendance decisions and reduces the need for commuting between parallel sessions.
- A short paper category is introduced to alleviate a consistently encountered problem in the evaluation and selection of papers. Namely, a significant number of submissions contain valuable new information on major projects previously reported at the symposium or elsewhere, but extensive repetition tends to disqualify such papers in comparison with the prime candidates that report major new work for the first time. If only a single paper category exists, the reviewers are in a dilemma between inherently different valuable submissions. The introduction of the short paper category resolves this dilemma and enriches the program. In this way we also made it possible to accept submissions on recently started projects which gave promising initial results. It is significant that 40% of the session papers ended up in the short paper category.
- The role of the session chairman is broadened to include a brief introductory presentation on development trends in the session's topic area and on the contributions of the papers to be presented. A one-page version of the chairman's introduction is to be included in the Symposium Digest.

We are particularly interested in the observation on and criticism of these changes on the part of regular symposium participants, but we also solicit comments from first-time participants.

Last year's success with the newly introduced Open Forum prompted us to adopt it in the same form. We paid special attention to the details of implementation which confirm the declared intent to establish an alternative presentation format for specialized papers which satisfy the same quality criteria as the papers accepted for verbal presentation. It was, therefore, important to formulate straightforward paper selection criteria for both TPC members and authors. Since such criteria can greatly influence the program quality, we decided to list them in the annex to this report and to invite comments.

There has also been a structural and procedural change motivated by our desire to more effectively profit from the experience of our closest predecessors and, in turn, to more effectively pass on our own experience. For this purpose we supplemented the traditional TPC structure consisting of specialized paper evaluation groups with a "Symposium Program Group." It included the TPC Chairman of the past two and coming two symposia. Steve March (1982), Ralph Levy (1983), Bill Hord (1985) and Marv Cohn (1986) kindly agreed to serve in this special capacity. Our member of this group was Jim Crescenzi, the TPC Vice Chairman. This group was successful in structuring the overall symposium program for the desired measure of year-to-year continuity, advantageous session distribution and minimum conflict between the parallel sessions.

As a result, the introduced structural and procedural changes have been smoothly introduced into the inherited, proven program framework consisting of three parallel session columns. In broad terms, these can be defined as follows: (1) solid-state device applications, (2) passive circuits, (3) systems, measurements and other topics. Some crossover and overlap were inevitable in view of the complex interrelationship between active and passive circuits, theory and applications, and a variety of relevant factors. Nevertheless, the symposium participants should find it easy to spot their topics of interest and to conveniently schedule their attendance.

The session titles reflect rather well the program content. GaAs FET applications are extensively covered in five sessions which include the two organized jointly with the Microwave and Millimeter Wave Monolithic Circuits Symposium, as well as in the Open Forum. While this quantity of GaAs FET papers was expected and planned for, we were caught by surprise finding that five session titles include the words "millimeter-wave." We planned for only two such sessions. The much higher than expected number of received submissions and number of reported practical applications suggest that the maturing of the millimeter-wave technology has substantially accelerated.

Dielectric resonators and their active and passive applications account for a significant number of submissions, which prompted us to plan on at least one session dedicated to this topic of growing interest. While due to different paper grouping we ended up without such a session, the substantial number of dielectric resonator papers included in several sessions and in the Open Forum provide the deserved coverage.

Providing useful feedback to the authors of papers that were not accepted has become an important task of the MTT-S TPC. Initiated last year it has proven very beneficial. We opted for a somewhat different set of reasons based on additional considerations. Providing too little new information over previous publications on the same subject turned out to be the reason in nearly one half of all cases. The next most frequently given reason (approximately 25%) was that the submitted summary provided insufficient essential information for proper evaluation. The remainder of the submissions that were not accepted were of either insufficient interest for presentation at this stage of progress in their particular fields, or have been preempted by a previous publication by the author(s); these two reasons have been given in nearly equal numbers of instances.

I am sure other TPC Chairmen have also found that the amount of work required to do the job is greater than expected. However, there is high reward in working together with a cohesive group of colleagues and members of our Society. I take the liberty in the name of the entire Technical Program Committee to thank all authors who responded to the Call for Papers and entrusted us with the evaluation and selection of their contributions which combine into a highly interesting and varied program.

It was a great personal pleasure to join forces with my closest associates Jim Crescenzi, TPC Vice Chairman and Phil Chen, TPC Secretary. Special Session Chairman Joe Barrera greatly contributed to the program by coordinating two panel sessions and five workshops, while his Co-Chairman, Reynold Kagiwada, provided the impetus for and ably organized the special panel session "Japan/U.S.A. Competition in Technology." All of us together are indebted to the other members of the Steering Committee and to the MTT-S Adcom for their encouragement and strong support which were instrumental in accomplishing our task. The coordination with the Technical Program Committee of the Microwave and Millimeter Wave Monolithic Circuits Symposium under Bill Wiseman's chairmanship ran smoothly and produced two excellent joint sessions.

ANNEX: CRITERIA FOR PAPER EVALUATION AND CATEGORIZATION

All papers:

- Original work
- Previously unpublished

- Of interest to MTT membership
- Clear, explicit summary supported by sufficient quantitative information and references, as applicable.

Full-length paper:

- Finished project or major phase thereof
- Conclusive and/or essentially complete results
- Candidate for full-length Transaction paper

Short paper:

- Follow-up of previously published work or initial phase of promising new work
- Results may or may not be conclusive and/or essentially complete
- Candidate for short Transaction paper

Session:

- Of broader interest to MTT membership
- Lends itself to summary verbal presentation without the need for detailed elaboration

Forum:

- Of interest to relatively narrow segment of MTT membership
- Meaningful presentation requires a great deal of detail in any one of the following: equations, phenomenological description, design details, experimental details, performance characteristics.



NEW BOOKS

Edited by Nicholas C. Currie, Artech House, Dedham, Massachusetts has recently announced the publication of **Techniques of Radar Reflectivity Measurement**. The hardcover book (ISBN 0-89006-131-9) contains 480 pages and is priced at \$60.00.

The book discusses the measurement of the radar reflectivity of clutter and man-made targets from a practical, easy-to-understand point of view. Written for radar engineers, technicians, or researchers, the book covers such topics as radar cross-section, reflectivity measurement techniques, radar ranges, calibration, data recording and analysis techniques, statistical properties of data, and testing.

Many examples of actual radar systems and data are included to illustrate the techniques described. Many useful formulas are given for the radar cross-section measurements, calibration errors, multipath effects, statistical properties, and radiometric parameters.

SCHEDULE OF EVENTS

MONDAY, MAY 28, 1984

3:30 am - 5:30 pm
WORKSHOP ON TESTING
AND TRIMMING MICs
San Francisco A B (Hyatt)

TUESDAY, MAY 29, 1984

8:30 am - Noon
MW & MMW MONOLITHIC
SYMPOSIUM
Golden Gateway Ballroom (Hyatt)

8:30 am - 5:30 pm
WORKSHOP ON 40 GHz
CONNECTORS
Embarcadero C D (Hyatt)

8:30 am - 5:30 pm
WORKSHOP ON CLINICAL
HYPERTHERMIA
Embarcadero B (Hyatt)

8:30 am - 5:30 pm
WORKSHOP ON SUSPENDED
STRIPLINE FILTERS
San Francisco A (Hyatt)

8:30 am - 5:30 pm
WORKSHOP ON
FIELD THEORY METHODS
Embarcadero A (Hyatt)

1:30 pm - 5:00 pm
MW & MMW MONOLITHIC
SYMPOSIUM
Golden Gateway Ballroom (Hyatt)

8:30 am - 5:30 pm
WORKSHOP ON INDUSTRIAL
APPLICATIONS ON MICROWAVES
San Francisco B (Hyatt)

WEDNESDAY, MAY 30, 1984

8:30 am - 10:00 am
PLENARY SESSION
Main Arena (Civic Aud.)

1. 10:30 am - Noon
MONOLITHIC MMW CIRCUITS
(JOINT SESSION)
Larkin B (Civic Aud.)

2. 10:30 am - Noon
FIELD THEORY OF
GUIDING STRUCTURES
Larkin A (Civic Aud.)

3. 10:30 am - Noon
ACOUSTIC AND MAGNETIC
DEVICES
Polk (Civic Aud.)

4. 1:30 pm - 3:00 pm
DEVICES & MONOLITHIC
CIRCUIT ELEMENTS
(JOINT SESSION) Larkin B. (Civic Aud.)

5. 1:30 pm - 3:00 pm
COMPONENT APPLICATIONS OF
FIELD THEORY
Larkin A (Civic Aud.)

6. 1:30 pm - 3:00 pm
BIOMEDICAL ASPECTS OF
MICROWAVES
Polk (Civic Aud.)

7. 3:30 pm - 5:00 pm
OPEN FORUM I
Main Arena (Civic Aud.)

8:00 pm - 10:00 pm
PANEL ON MMW MEASUREMENTS
San Francisco A (Hyatt)

8:00 pm - 10:00 pm
PANEL ON MMICs, PROGNOSIS UPDATE
San Francisco B (Hyatt)

THURSDAY, MAY 31, 1984

8. 8:30 am - 1:00 pm
FET AMPLIFIERS
Larkin B (Civic Aud.)

9. 8:30 am - 10:00 am
FILTERS
Larkin A (Civic Aud.)

10. 8:30 am - 10:00 am
SYSTEMS
Polk (Civic Aud.)

11. 10:30 am - Noon
NOISE & FREQ. STABILIZATION
OF FET OSC's
Larkin B (Civic Aud.)

12. 10:30 am - Noon
COMMUNICATIONS FILTERS
Larkin A (Civic Aud.)

13. 10:30 am - Noon
SYSTEMS TOPICS
Polk (Civic Aud.)

14. 1:30 pm - 3:00 pm
OPEN FORUM II
Main Arena (Civic Aud.)

3:30 pm - 5:00 pm
PANEL ON JAPAN-U.S.A. COMPETITION
IN TECHNOLOGY
Main Arena (Civic Aud.)

5:45 pm - 7:15 pm
INDUSTRY HOSTED COCKTAIL PARTY
Hyatt Regency Atrium Lobby

7:30 pm
AWARDS BANQUET
Golden Gateway Ballroom (Hyatt)

FRIDAY, JUNE 1, 1984

15. 8:30 am - 10:00 am
SEMICONDUCTOR CONTROL &
FREQ. CONVERSION
Larkin B (Civic Aud.)

16. 8:30 am - 10:00 am
MILLIMETER-WAVE
APPLICATIONS
Larkin A (Civic Aud.)

17. 8:30 am - 10:00 am
MIC TECHNIQUES
Polk (Civic Aud.)

18. 10:30 am - Noon
FET MODELING AND
NOVEL STRUCTURES
Larkin B (Civic Aud.)

19. 10:30 am - Noon
MILLIMETER-WAVE
TECHNIQUES
Larkin A (Civic Aud.)

20. 10:30 am - Noon
PLANAR TRANSMISSION LINE
STRUCTURES
Polk (Civic Aud.)

21. 1:30 pm - 3:00 pm
IMPATT AND BIPOLAR
OSCILLATORS
Larkin B (Civic Aud.)

22. 1:30 pm - 3:00 pm
DIELECTRIC WAVEGUIDES
Larkin A (Civic Aud.)

23. 1:30 pm - 3:00 pm
MICROWAVE & MILLIMETER-WAVE
MEASUREMENTS
Polk (Civic Aud.)

24. 3:30 pm - 5:00 pm
OPTICAL & SUBMILLIMETER-WAVE
TECHNOLOGY
Larkin B (Civic Aud.)

25. 3:30 pm - 5:00 pm
MILLIMETER-WAVE
MIXERS
Larkin A (Civic Aud.)

26. 3:30 pm - 5:00 pm
SIX-PORT MEASUREMENT
TECHNIQUES
Polk (Civic Aud.)

1984 IEEE MTT-S INTERNATIONAL MICROWAVE SYMPOSIUM

SYMPOSIUM SCHEDULE

MONDAY, MAY 28 — HYATT REGENCY

6:00 pm-9:00 pm Symposium Registration, Market St. Foyer
6:00 pm-9:00 pm Wine and Cheese Reception, Golden Gateway Foyer

TUESDAY, MAY 29 — HYATT REGENCY

7:30 am-Noon Symposium Registration, Market St. Foyer
8:30 am-11:50 am Technical Program, Golden Gateway Ballroom
1:30 pm-4:40 pm Technical Program, Golden Gateway Ballroom
6:00 pm-8:00 pm Attendees and guests are invited to a reception hosted by Microwave Journal at 1 Market Place, across Market Street from the Hyatt Regency

WEDNESDAY, MAY 30 — CIVIC AUDITORIUM

8:30 am-10:00 am MTT-S Opening Session, Main Arena
10:30 am-Noon Technical Program, Larkin B
1:30 pm-3:00 pm Joint sessions with 1984 IEEE MTT-S International Microwave Symposium

GUEST PROGRAM

In addition to the reception Monday and the Microwave Journal reception Tuesday, guests of attendees of the 1984 IEEE Microwave and Millimeter Wave Monolithic Circuits Symposium are invited to participate in the following social events:

- Hospitality Suite (Fountainview Room in the Hyatt Regency) providing refreshments, information on San Francisco and other events will be available from 8:00 am-6:00 pm, Tuesday, May 29.
- On Wednesday, May 30, the MTT-S Symposium guest program tours will be available. See Guest Programs and the Advance Registration Form.

WEDNESDAY MORNING, MAY 30, 1984

MAIN ARENA (CIVIC AUDITORIUM) PLENARY SESSION

8:30 am **Steering Committee Chairman**
Stephen Adam, Hewlett-Packard Co., Palo Alto, CA
8:40 am **MTT-S President**
H. G. Oltman, Jr., Hughes Aircraft Co., Canoga Park, CA
8:50 am **Technical Program Committee Chairman**
F. Ivanek, Harris Corp., San Carlos, CA
9:00 am **Keynote Address**
John A. Young, President and Chief Executive Officer, Hewlett-Packard Co., Palo Alto, CA

LARKIN HALL B (CIVIC AUDITORIUM)

10:30 am **IV. MONOLITHIC MILLIMETER-WAVE CIRCUITS**
Co-Chairmen: B. E. Spielman, NRL Washington, DC; R. W. Sudbury, MIT, Lincoln Laboratory, Lexington, MA
10:40 am **A 68 GHz Monolithic FET Oscillator**
1-1 D. W. Maki, J. M. Schellenberg, H. Yamasaki, L. C. T. Liu, Hughes Aircraft Co., Torrance, CA
11:00 am **A W-Band Monolithic GaAs Crossbar Mixer**
1-2 L. T. Yuan, Hughes Aircraft Co., Torrance, CA
11:20 am **94 GHz Planar GaAs Monolithic Balanced Mixer**
1-3 P. Bauhahn, T. Contolatis, J. Abrokwhah, C. Chao, C. Seashore, Honeywell, Bloomington, MN
11:40 am **GaAs Monolithic Frequency Doublers With Series Connected Varactor Diodes**
1-4 A. Chu, W. E. Courtney, L. J. Mahoney, H. A. Atwater, R. W. McClelland, MIT Lincoln Laboratory, Lexington, MA

LARKIN HALL (A)

10:30 am **FIELD THEORY OF GUIDING STRUCTURES**
Chairman: J. Knorr, Naval Postgraduate School, Monterey, CA

10:40 am **Space Domain DeCoupling of LSE and LSM Fields in Generalized Planar Guiding Structures**
2-1 A. S. Omar, K. Schunemann, Technische Universitaet Hamburg-Harburg, Hamburg, F. R. Germany
11:00 am **Simple and Accurate Expressions for the Dominant Mode Properties of Open Groove Guide**
2-2 A. A. Oliner, P. Lampariello, Polytechnic Institute of New York, Brooklyn, NY
11:20 am **Fourier Transformed Matrix Method of Finding Propagation Characteristics of Complex Anisotropic Layered Media**
2-3 C. M. Krowne, Naval Research Lab, Washington, DC
11:40 am **Theory and Experiment Predicting the Cutoff Frequencies for a Rectangular Stripline**
2-4 R. Lampe, P. Klock, D. Tanner, P. Mayes, University of Illinois, Urbana, IL
11:50 am **The Simulation of Three-Dimensional Wave Propagation by a Scalar TLM-Model**
2-5 D. Choi, W. J. R. Hoefer, University of Ottawa, Ottawa, Ontario, Canada

POLK HALL

10:30 am **ACOUSTIC AND MAGNETIC DEVICES**
Chairman: T. Lukaszek, U.S. Army Electronics Command, Fort Monmouth, NJ
10:40 am **YIG Oscillators: Is a Planar Geometry Better?**
3-1 R. L. Carter, J. M. Owens, D. K. De, University of Texas, Arlington, TX
11:00 am **A 94 GHz Suspended Stripline Circulator**
3-2 M. H. Arain, Hughes Aircraft Co., Torrance, CA
11:10 am **Recent Developments in SAW Device Applications**
3-3 K. Lau, K. Yen, R. Kagiwada, R. Stokes, TRW, Redondo Beach, CA
11:30 am **Fundamental-Mode Pierce Oscillators Utilizing Bulk-Acoustic-Wave Resonators in the 250-300 MHz Range**
3-4 S. G. Burns, R. S. Ketcham, Iowa State University, Ames, IA
11:40 am **Passive Magnetostatic Wave Pulse Compression Loop**
3-5 K. W. Chang, L. R. Carter, J. M. Owens, University of Texas, Arlington, TX
D. Gerli, Sengalamento Marittimo E. Aereo, Firenze, Italy
11:50 am **Magnetostatic Volume Wave Delay Lines With Stepped Ground Planes**
3-6 J. D. Adam, Westinghouse Electric Corp., Pittsburgh, PA

WEDNESDAY AFTERNOON, MAY 30, 1984

LARKIN HALL B (CIVIC AUDITORIUM)

1:30 pm **V. DEVICES AND MONOLITHIC CIRCUIT ELEMENTS**
Co-Chairmen: D. R. Chen, Microwave Monolithics, Inc., Simi Valley, CA
M. N. Yoder, ONR, Arlington, VA
1:40 pm **Calibration Methods for Microwave Wafer Probing**
4-1 E. W. Strid, E. R. Gleason, Tektronix, Inc., Beaverton, OR
2:00 pm **Low Noise High Electron Mobility Transistors**
4-2 J. Berenz, K. Nakano, K. Weller, TRW, Redondo Beach, CA
2:20 pm **High Efficiency GaAs MBE Power FET for Ka-Band**
4-3 J. Geddes, V. Sokolov, T. Contolatis, J. Abrokwhah, W. Larson, Honeywell, Bloomington, MN
2:40 pm **Highly Accurate Design of Spiral Inductors for MMICs with Small Size and High Cut-Off Frequency Characteristics**
4-4 M. Parisot, Y. Archambault, D. Pavlidis, J. Magarshack, Thompson-CSF, France

LARKIN HALL (A)

1:30 pm **COMPONENT APPLICATIONS OF FIELD THEORY**
Chairman: E. J. Denlinger, RCA Laboratories, Princeton, NJ

- 1:40 pm** **Coupling Between a Dielectric Resonator and a Dielectric Image Guide**
5-1 P. Guillon, F. Farzaneh, Lab de Communications Microondes et Optiques, Limoges, France
- 2:00 pm** **Microwave Network Analysis of a Leaky-Wave Structure in Non-Radiative Dielectric Waveguide**
5-2 A. Sanchez, A. A. Oliner, Polytechnic Institute of New York, Brooklyn, NY
- 2:20 pm** **Mode Propagation Through a Step Discontinuity in Dielectric Planar Waveguide**
5-3 H. Shigesawa, T. Tsuji
Doshisha University, Kyoto, Japan
- 2:40 pm** **Planar Circuit Analysis of Microstrip Radial Stub**
5-4 F. Giannini, R. Sorrentino, J. Vrba
University of Rome, Rome, Italy
- 2:50 pm** **Scattering Parameters of Axial Inductive Strips in Rectangular Waveguide**
5-4 Y. Shih, Naval Postgraduate School, Monterey, CA

POLK HALL

- 1:30 pm** **BIOMEDICAL ASPECTS OF MICROWAVES**
Chairman: A. Rosen, RCA Laboratories, Princeton, NJ
- 1:40 pm** **Microstrip Spiral Antenna for Local Hyperthermia**
6-1 T. Tanabe, A. H. McEuen, S. Caslow, C. S. Norris
Varian Associates, Inc., Palo Alto, CA
T. V. Samulski, P. Fessenden,
Stanford University, Stanford, CA
- 1:50 pm** **An Approach of the Slot Antenna Radiating in Muscle**
6-2 P. Pribetich, P. Kennis, C. Seguinot, P. Garmand
Centre Hyperfréquences et Semiconducteurs,
Villeneuve d'Ascq., Cedex, France
S. Toutain, P. Gelin, Ecole Nationale Supérieure
des Telecommunications de Bretagne,
Brest, France
- 2:00 pm** **Enhancing the Efficacy of Thermotherapy by Monitoring Changes in Tumor Blood Flow**
6-3 F. Sterzer, R. W. Paglione, RCA Laboratories,
Princeton, NJ; A. Winter, J. Laing, The Hospital
Center at Orange, Orange, NJ; E. Friedenthal,
J. Mendacki, C. Botstein, Albert Einstein
College of Medicine, Bronx, NY
- 2:10 pm** **Specific Absorption Rate Distribution in a Model of Man at Various Polarizations**
6-4 A. Kraszewski, M. A. Stuchly, S. S. Stuchly,
G. Hartsgrove, University of Ottawa,
Ottawa, Canada
- 2:30 pm** **A Three-Band Microwave Radiometer for Noninvasive Temperature Measurement**
6-5 S. Mizushima, H. Oh-i-shi, Y. Hamamura,
Shizuoka University, Hamamatsu, Japan
- 2:50 pm** **Microwave and Infrared Thermograms of Hot Spots in Tissue**
6-6 G. Schaller, Universitaet Erlangen-Nuernberg,
Erlangen, F. R. Germany

WEDNESDAY LATE AFTERNOON, MAY 30, 1984

3:30 PM TO 5:00 PM — MAIN ARENA

OPEN FORUM I

- 7-1** **An Ultra Low Transient GaAs VHF Switch**
D. W. White, MIT Lincoln Laboratory, Lexington, MA
- 7-2** **Large Signal Upper-Sideband Varactor Upconverter Linearization**
E. Loeser, Technical University Braunschweig,
Braunschweig, F. R. Germany
- 7-3** **A Solid State, X-Band, Exciter/Local Oscillator/Down Converter Subsystem For An Airborne, Coherent Radar Fire Control System**
J. B. Vuong, A. M. Madni, L. A. Wan, Systron Donner Corp., Van Nuys, CA; G. Keogh, Emerson Electric Co.
- 7-4** **Distributed GaAs FET Circuit Model for Broadband and Millimeter Wave Applications**
R. LaRue, C. Yuen, G. Zdasiuk, Varian Associates, Palo Alto, CA

- 7-5** **V-Band Double-Drift Read Silicon IMPATTs**
Y. E. Ma, E. M. Nakaji, W. F. Turner,
Hughes Aircraft Co., Torrance, CA
- 7-6** **Field Analysis of Millimeter-Wave GaAs Double-Drift IMPATT Diode in the Traveling-Wave Mode**
Y. Fukuoka, T. Itoh, University of Texas, Austin, TX
- 7-7** **W-Band GaAs Gunn Diode Harmonic Power Combiner**
Z. Sun, S. Li, Nanjing Institute of Technology,
Nanjing, China
- 7-8** **A Wideband 60 GHz 16-Way Power Divider/Combiner Network**
T. Hsu, M. Simonutti, TRW ESG, Redondo Beach, CA
- 7-9** **A Two-Frequency Method for Impedance Measurement in Frequency-Halving Networks**
R. G. Harrison, G. A. Kalivas, Carleton University,
Ottawa, Ontario, Canada
- 7-10** **Parallel Feedback FET DRO Design Using 3-Port S-Parameters**
APS Khanna, Loral Advanced Technology Labs,
Lanham, MD
- 7-11** **Optimum Design of Shielded Dielectric Rod and Ring Resonators for Obtaining the Best Mode Separation**
Y. Kobayashi, M. Miura, Saitama University,
Urawa, Saitama, Japan
- 7-12** **Inhomogeneous Open-Ended Resonators As Microwave Sensor Elements**
H. Moschuring, Ingo Wolff, Duisburg University,
Duisburg, F. R. Germany
- 7-13** **A Composite, Multilayered Cylindrical Dielectric Resonator**
M. Dospieszalski, S. Maj, University of Virginia,
Charlottesville, VA
- 7-14** **Computed Modal Field Distributions of Isolated Dielectric Resonators**
D. Kajfez, A. W. Glisson, J. James,
University of Mississippi, University, MS
- 7-15** **Disc-Type Resonator Mount in Rectangular Waveguide**
M. E. Bialkowski, University of Queensland,
St. Lucia, Brisbane, Australia
- 7-16** **Miniaturized Channel Dropping Filter Using TM₀₁₀ Mode Dielectric Resonator**
K. Wakino, T. Nishikawa, Y. Ishikawa,
Murata Mfg. Co. Ltd., Kyoto, Japan
- 7-17** **Dielectric Waveguide Grating Design for Band-Stop and Band-Pass Filter Applications**
D. C. Park, G. L. Matthaei, M. S. Wei,
University of California, Santa Barbara, CA
- 7-18** **Lossy Hybrid Coupled Amplitude Equalizers for Narrow Band Filters**
R. V. Snyder, R. S. Microwave Co., Inc., Butler, NJ

WEDNESDAY EVENING, MAY 30, 1984

SAN FRANCISCO A (HYATT REGENCY)

8:00 pm-10:00 pm PANEL I.

MILLIMETER-WAVE MEASUREMENTS

Moderator: William H. Prather, Electromagnetic Sciences, Inc., Atlanta, GA

SAN FRANCISCO B (HYATT REGENCY)

8:00 pm-10:00 pm PANEL II.

MMICs, A PROGNOSIS UPDATE

Moderator: Marvin Cohn, Westinghouse Electric Corp., Baltimore, MD

THURSDAY EARLY MORNING, MAY 31, 1984

LARKIN HALL (B)

- 8:30 am** **FET AMPLIFIERS**
Chairman: S. Temple, Raytheon Company,
Bedford, MA
- 8:40 am** **Reflective Match, Lossy Match, Feedback and Distributed Amplifiers: A Comparison of Multioctave Performance Characteristics**
8-1 K. B. Niclas, Watkins Johnson Co., Palo Alto, CA
- 9:00 am** **A 1 Watt, 8-17 GHz FET Power Amplifier**
8-2 T. Dao, W. S. Tsai, R. Healy, B. Liles
Raytheon Co., Northborough, MA

- 9:20 am **A Solid-State 2-10 GHz 1 Watt TWT Replacement Amplifier**
8-3 A. M. Pavio, D. L. Allen, S. D. Thompson, S. J. Goldman, Texas Instruments, Inc., Dallas, TX
- 9:30 am **Third-Order Nonlinearity of GaAs MESFETs**
8-4 J. H. Abeles, S. H. Wemple, W. D. S. Schlosser, J. P. Beccone, Bell Laboratories, Murray Hill, NJ
- 9:50 am **A 1.5 Watt, 28 GHz Band Amplifier**
8-5 T. Takagi, K. Seino, Y. Ikeda, O. Ishihara, F. Takeda, Mitsubishi Electric Corp., Kamakura City, Japan

LARKIN HALL (A)

- 8:30 am **FILTERS**
Chairman: R. V. Snyder, R. S. Microwave, Butler, NJ
- 8:40 am **Millimeter-Wave Multiplexers with Printed Circuit Elements for the 88-100 GHz Frequency Range**
9-1 L. D. Cohen, N. Worontoff, J. Levy, A. Harvey Eaton Corp. AIL Div., Deer Park, NY
- 9:00 am **Broadband Millimeter-Wave E-Plane Bandpass Filters**
9-2 L. Q. Bui, D. Ball Hughes Aircraft Co., Torrance, CA
- 9:10 am **Analysis and Design of Evanescent-Mode Waveguide Dielectric Resonator Filters**
9-3 Y. C. Shih, K. G. Gray Naval Postgraduate School, Monterey, CA
- 9:20 am **Dielectric Resonator Bandpass Filter with High Attenuation Rate**
9-4 P. Guillon, M. P. Chong, Lab de Communications Microondes et Optiques, Limoges, France
- 9:40 am **Design of Non-Radiative Dielectric Waveguide Filter**
9-5 T. Yoneyama, F. Kuroki, S. Nishida Tohoku University, Sendai, Japan
- 9:50 am **Miniature Band Reject Filters for Satellite Applications**
9-6 J. Bowes, S. J. Fiedziuszko, J. Redd, C. Ziegler Ford Aerospace & Communications Corp., Palo Alto, CA

POLK HALL

- 8:30 am **SYSTEMS**
Chairman: G. Heiter, Bell Laboratories, North Andover, MA
- 8:40 am **24 GHz FM-CW Radar for Detection of Information for Traffic Purposes**
10-1 G. Seehausen, Institut fuer Technische Elektronik der RWTH Aachen, Aachen, F. R. Germany
- 9:00 am **A 26 GHz High Performance MIC Transmitter/Receiver for Digital Radio Subscriber Systems**
10-2 H. Ogawa, Nippon Telegraph and Telephone Public Corp., Yokosuka-shi, Japan
- 9:20 am **17/12 GHz Communication Receiver for Direct Broadcast Satellites**
10-3 S. S. Dhillon, P. Goldgeier, R. Sudarsanam, H. Goldberg, RCA Astro-Electronics, Princeton, NJ
- 9:40 am **A Circularly Polarized Active Antenna Array Using Miniature GaAs FET Amplifiers**
10-4 H. C. Johnson, R. E. Marx, A. Sanchez, E. Mykietyn, RCA Laboratories, Princeton, NJ

THURSDAY LATE MORNING, MAY 31, 1984

LARKIN HALL (B)

- 10:30 am **NOISE AND FREQUENCY STABILIZATION OF FET OSCILLATORS**
Chairman: F. N. Sechi, RCA Laboratories, Princeton, NJ
- 10:40 am **Relation Between Device LF Noise and Oscillator Phase Noise for GaAs MESFETs**
11-1 H. Rohdin, C. Y. Su, C. Stolte Hewlett-Packard Laboratories, Palo Alto, CA
- 11:00 am **A Single-Resonator GaAs FET Oscillator with Noise Degeneration**
11-2 M. J. Bianchini, J. B. Cole, R. DiBiase, Z. Galani, R. W. Laton, R. C. Waterman, Jr. Raytheon Co., Bedford, MA

- 11:20 am **A New Method of Reducing Phase Noise in GaAs FET Oscillators**
11-3 A. N. Riddle, R. J. Trew North Carolina State University, Raleigh, NC
- 11:40 am **Digital and Analog Frequency-Temperature Compensation of Dielectric Resonator Oscillators**
11-4 J. Lee, J. E. Andrews, K. W. Lee, W. R. Day Varian Associates, Santa Clara, CA

LARKIN HALL (A)

- 10:30 am **COMMUNICATIONS FILTERS**
Chairman: H. C. Bell, Wavecom Div. of Loral Corporation, Northridge, CA
- 10:40 am **"Engine-Block" Dual Mode Dielectric Resonator Loaded Cavity Filter with Nonadjacent Cavity Couplings**
12-1 S. J. Fiedziuszko, Ford Aerospace & Communications Corp., Palo Alto, CA
- 11:00 am **Narrow Bandpass Filters Using the High Q Cylindrical TE_{0ml} Resonator Modes**
12-2 R. R. Bonetti, A. E. Williams Comsat Laboratories, Clarksburg, MD
- 11:10 am **Predistortion Techniques for Multiple-Coupled Resonator Filters**
12-3 A. E. Williams, W. G. Bush, R. R. Bonetti Comsat Laboratories, Clarksburg, MD
- 11:20 am **Novel Lowpass Harmonic Filters for Satellite Application**
12-4 A. M. K. Saad, Com Dev Limited, Cambridge, Ontario, Canada
- 11:40 am **A 12 GHz 12 Channel Contiguous Multiplexer for Satellite Applications**
12-5 S. C. Holme, Ford Aerospace & Communications Corporation, Palo Alto, CA
- 11:50 am **A 12-Channel Contiguous Band Multiplexer for Satellite Application**
12-6 R. Tong, D. Smith Com Dev Limited, Cambridge, Ontario, Canada

POLK HALL

- 10:30 am **SYSTEMS TOPICS**
Chairman: J. B. Horton, TRW, Redondo Beach, CA
- 10:40 am **A Planar 4.0 GHz Reactively Steered Adaptive Array**
13-1 R. J. Dinger, Naval Weapons Center, China Lake, CA
- 11:00 am **Thermal Noise and RF Spectrum of a Microwave Cavity-Oscillator**
13-2 B. Villeneuve, P. Tremblay, M. Tetu Laval University, Quebec, Canada
- 11:20 am **TWTA Linearizer Using Dual-Gate MESFETs**
13-3 M. Kumar, J. C. Whartenby RCA Laboratories, Princeton, NJ

THURSDAY EARLY AFTERNOON, MAY 31, 1984

1:30 pm to 3:00 pm Main Arena (Civic Auditorium)

OPEN FORUM II

- 14-1 **Scattering by Dielectric Obstacles Inside Guiding Structures**
A. S. Omar, K. Schuenemann, Technische Universitaet Hamburg-Harburg, Hamburg, F. R. Germany
- 14-2 **A Useful Equivalence for the Input Reactance Seen by the Coaxial Line in a Broadwall Coaxial-Microstrip Launcher**
C. D. Gupta, R. S. Tomar, Indian Institute of Technology, Kanpur, India
- 14-3 **Generalized Spectral Domain Analysis of Planar Structures Having Semi-Infinite Ground Planes**
H. Lee, V. K. Tripathi, Oregon State University, Corvallis, OR
- 14-4 **An Improved Model for Short- and Open-Circuited Series Stub in Fin-Lines**
M. Burton, W. J. R. Hoefler, University of Ottawa, Ottawa, Ontario, Canada
- 14-5 **Accurate and Simple Formulas for Dispersion in Fin-Lines**
J. K. Piotrowski, Technical University of Warsaw, Warsaw, Poland

- 14-6 Analysis and Synthesis of Tapered Fin-Lines**
P. Pramanick, University of Ottawa, Ottawa, Canada
P. Bhartia, Defence Research Establishment Ottawa, Ottawa, Canada
- 14-7 Transmission-Matrix Representation of Fin-Line Discontinuities**
A. S. Omar, K. Schuenemann, Technische Universitaet Hamburg-Harburg, Hamburg, F. R. Germany
- 14-8 Power Density Distribution Analysis of Ferrite Loaded Fin-Lines for the Development of Integrated Nonreciprocal Millimeter-Wave Elements**
A. Beyer, I. Wolff, Duisburg University, Duisburg, F. R. Germany
- 14-9 An Automatic Material Parameter Measurement System**
A. Beyer, W. Mueller-Gronau, I. Wolff, Duisburg University, Duisburg, F. R. Germany
- 14-10 The Method of Lines for the Analysis of Planar Waveguides with Magnetized Ferrite Substrate**
R. Pregla, Fern Universitaet, Hagen, F. R. Germany
- 14-11 Magnetostatic Wave Delay Lines Using the Non-Uniformly Magnetized YIG Films**
M. Tsutsumi, T. Sakurai, N. Kumagai, Osaka University, Osaka, Japan
- 14-12 Edge-Guided Magnetoplasmons on Curved Interfaces in Submillimeter-Wave Devices**
D. M. Bolle, J. F. Wagen, Lehigh University, Bethlehem, PA
- 14-13 Coherent Transmitter Considerations Utilizing Injection Locked Magnetrons**
W. S. Best, Naval Weapons Center, China Lake, CA
R. W. Laton, Raytheon Co., Bedford, MA
V. H. Smith, M-O Valve Co. Ltd., London, England, UK
- 14-14 High-Harmonic Gyrotron Oscillators and Gyro-Klystron Amplifiers**
D. B. McDermott, D. S. Furuno, N. C. Luhmann, Jr. University of California, Los Angeles, CA
- 14-15 A Feasibility Study to Monitor Soil Moisture Content Using Microwave Signals**
E. Bahar, J. D. Saylor, University of Nebraska, Lincoln, NE
- 14-16 Performance Characteristics of the Thin-Film, Etched-Circuit Rectenna**
W. C. Brown, Raytheon Co., Waltham, MA
- 14-17 A Stabilized Broadband Correlator for Medical Microwave Thermography**
J. C. Hill, Enon Microwave, Inc., Topsfield, MA
R. Goldner, Tufts University, Medford, MA

THURSDAY LATE AFTERNOON, MAY 31, 1984

3:30 pm to 5:00 pm — Main Arena (Civic Auditorium)

PANEL III: JAPAN/USA COMPETITION IN TECHNOLOGY

Moderator: Leo Young, Office of the Undersecretary of Defense for Research and Engineering, Washington, DC

Panel Members: John Arnold, Vice President, Harris Corp., San Carlos, CA; W. Andrew Osterman, Intel, Santa Clara, CA; H. William Tanaka, Counselor at Law, Washington, DC; Keisuke Yawata, President, NEC Electronics, San Mateo, CA

FRIDAY EARLY MORNING, JUNE 1, 1984

LARKIN HALL (B)

- 8:30 am SEMICONDUCTOR CONTROL AND FREQUENCY CONVERSION**
Chairman: J. F. White, MACOM Inc., Burlington, MA
- 8:40 am Octave-Band High Precision Balanced Modulator**
15-1 Z. Adler, B. Smilowitz
General Microwave Corp., Farmingdale, NY
- 9:00 am Multi-Octave Phase Modulators**
15-2 T. Mocawski, J. Zborowska, P. Miazga
Technical University of Warsaw, Warsaw, Poland
- 9:20 am Novel GaAs FET Phase Detector Operable to Ka Band**
15-3 T. Takano, Y. Tozawa, T. Shima, T. Kato, H. Komizo, H. Yatsuka, Fujitsu Ltd., Kawasaki, Japan

- 9:40 am A FET L Band Phase/Amplitude Control Module**
15-4 A. Presser, RCA Laboratories, Princeton, NJ

LARKIN HALL (A)

- 8:30 am MILLIMETER-WAVE APPLICATIONS**
Chairman: J. E. Raue, TRW, Redondo Beach, CA
- 8:40 am Fundamental Wave Injection Locked Second Harmonic Gunn Oscillators**
16-1 H. Barth, AEG-Telefunken, Ulm, F. R. Germany
- 9:00 am Efficient, Broadband Circuit Performance of Millimeter-Wave IMPATT-Diode Power Amplifiers**
16-2 D. F. Peterson, Steinbrecher Corp., Woburn, MA
- 9:20 am Active Phase Shifters for the Millimeter and Microwave Bands**
16-3 L. D. Cohen, Eaton Corp., AIL Div., Deer Park, NY
- 9:40 am High Power Broadband 35 GHz Waveguide Switch Using a Monolithic Diode Array**
16-4 A. L. Armstrong, D. E. Wheeler, J. Goodrich
M/A-COM Millimeter Co., Burlington, MA
- 9:50 am Large Signal Analysis of Nonlinear Microwave Systems**
16-5 M. B. Steer, P. J. Khan
North Carolina State University, Raleigh, NC

POLK HALL

- 8:30 am MIC TECHNIQUES**
Chairman: R. L. Camisa, RCA Laboratories, Princeton, NJ
- 8:40 am Quasi Lumped-Element 3- and 4-Port Networks for MIC and MMIC Applications**
17-1 R. Gupta, W. J. Getsinger
COMSAT Laboratories, Clarksburg, MD
- 9:10 am Transverse Resonance Analysis of Fin-Line Discontinuities**
17-3 R. Sorrentino, T. Itoh
University of Texas, Austin, TX
- 9:30 am Quarter Wave Transformers for Matching Transitions Between Waveguides and Fin-Lines**
17-4 C. J. Verver, Communications Research Center, Ottawa, Ontario, Canada; W. J. R. Hoefer, University of Ottawa, Ottawa, Ontario, Canada
- 9:50 am Synthesis of Optimum Fin-Line Tapers**
17-5 C. Schieblich, J. H. Hinken, Technische Universitaet Hamburg-Harburg, Hamburg, F. R. Germany

FRIDAY LATE MORNING, JUNE 1, 1984

LARKIN HALL (B)

- 10:30 am FET MODELING AND NOVEL STRUCTURES**
Chairman: M. Kumar, RCA Laboratories, Princeton, NJ
- 10:40 am Self-Consistent FET Models for Amplifier Design and Device Diagnostics**
18-1 W. R. Curtice, R. L. Camisa
RCA Laboratories, Princeton, NJ
- 11:00 am Modeling of Nonlinear Distortion in GaAs MESFETs**
18-2 R. J. Gilmore, F. J. Rosenbaum
Central Microwave Co., St. Louis, MO
- 11:10 am Analysis and Design of GaAs MESFET Mixers**
18-3 S. A. Mass
University of California, Los Angeles, CA
- 11:20 am A Low Noise AlGaAs/GaAs FET with P⁺ Gate and Selectively Doped Structure**
18-4 K. Ohata, H. Hida, H. Miyamoto
NEC Corp., Kawasaki, Japan
- 11:40 am A 6 Watt 6 GHz GaAs FET Power Module with GaAs Matching Circuits**
18-5 F. M. Magalhaes, J. P. Beccone, J. C. Irvin, S. J. Perelli, W. O. Schlosser
Bell Laboratories, Murray Hill, NJ
- 11:50 am A C-Band 10 Watt GaAs Power FET**
18-6 J. Fukaya, M. Ishii, M. Matsumoto, Y. Hirano
Fujitsu Ltd., Kawasaki, Japan

LARKIN HALL (A)

- 10:30 am MILLIMETER-WAVE TECHNIQUES**
Chairman: M. Dydyk, Motorola, Inc., Scottsdale, AZ

- 10:40 am 60 GHz Integrated Circuit Quadruphase
19-1 Exciter and Modulator
A. Grote K. Chang
TRW ESG, Redondo Beach, CA
- 11:00 am Silicon Millimeter-Wave Integrated
19-2 Circuits Technology
P. J. Stabile, A. Rosen, W. M. Janton,
A. Gombor, B. S. Yarman, M. Kolan
RCA Laboratories, Princeton, NJ
- 11:20 am Monolithic Antennas for Millimeter-Wave
19-3 GaAs Integrated Circuits
F. C. Jain, University of Connecticut, Storrs, CT
R. Bansal, Harvard University, Cambridge, MA
- 11:30 am Reduction of Propagation Losses in
19-4 Coplanar Waveguide
D. F. Williams, S. E. Schwarz
University of California, Berkeley, CA
- 11:40 am Nonreciprocal Effects in Semiconductor Loaded
19-5 Waveguide at Millimeter-Wavelengths
E. M. Godshalk, F. J. Rosenbaum
Washington University, St. Louis, MO
- 11:50 am W-Band Broadband Integrated Circuit Receiver
19-6 K. Chang, TRW ESG, Redondo Beach, CA

POLK HALL

- 10:30 am PLANAR TRANSMISSION LINE STRUCTURES
Chairman: J. M. Owens, University of Texas
at Arlington, Arlington, TX
- 10:30 am Spectral Iterative Technique for Analyzing
20-1 Multiconductor Microstrip Lines
C. Chan, R. Mittra
University of Illinois, Urbana, IL
- 10:50 am A Spectral Domain Hybrid Field Analysis of
20-2 Periodically Inhomogeneous Microstrip Lines
F.-J. Glandorf, I. Wolff
Duisburg University, Duisburg, F. R. Germany
- 11:10 am Theoretical and Experimental Investigation of
20-3 Asymmetric Coplanar Waveguides
V. Foud Hanna, D. Thebault, Centre National
d'Etudes des Telecommunications,
Issy Les Moulineaux, France
- 11:30 am Optimized Microstrip Ring-Star 5-Ports for
20-4 Broadband 6-Port Measurement Application
M. Malkomes, G. Kadisch, H. J. Schmitt
Rheinisch-Westfaelische Technische
Hochschule Aachen, Aachen, F. R. Germany
- 11:50 am Fundamental Superstrate Effects on
20-5 Printed Circuit Antenna Efficiency
N. G. Alexopoulos, D. R. Jackson
University of California, Los Angeles, CA

FRIDAY EARLY AFTERNOON, JUNE 1, 1984

LARKIN HALL (B)

- 1:30 pm IMPATT AND BIPOLAR OSCILLATORS
Chairman: N. W. Cox, Georgia Institute of
Technology, Atlanta, GA
- 1:40 pm GaAs IMPATT Diodes Pulsed at 40 GHz
21-1 M. G. Adlerstein, S. L. G. Chu
Raytheon Research Division, Lexington, MA
- 2:00 pm Analysis of a J-Band Pulsed Read
21-2 IMPATT Oscillator
J. E. Curran, J. P. Bridge, J. L. B. Walker
GEC Research Laboratories, Wembley, UK
- 2:20 pm Broadband Injection-Locked or Stable
21-3 IMPATT Amplifier
C. S. Ward, R. W. Laton, J. A. Spada
Raytheon Missile Systems Division, Bedford, MA
- 2:40 pm 8 GHz Low Noise Bias Tuned VCO
21-4 M. E. Znojkwicz
Northern Telecom, Montreal, Canada

LARKIN HALL (A)

- 1:30 pm DIELECTRIC WAVEGUIDES
Chairman: D. Kajfez, University of Mississippi,
University, MS

- 1:40 pm Powder Core Dielectric Waveguides
22-1 W. M. Bruno, W. B. Bridges
California Institute of Technology, Pasadena, CA
- 2:00 pm Directly-Connected Image Guide 3dB Couplers
22-2 With Very Flat Couplings
D. E. Kim, D. Kawabe, K. Araki, Y. Naito
Tokyo Institute of Technology, Tokyo, Japan
- 2:20 pm Phase-Matched Waveguide Using the Artificial
22-3 Anisotropic Structure and Its Application
to Mode Converter
T. Mizumoto, H. Yamazaki, Y. Naito
Tokyo Institute of Technology, Tokyo, Japan
- 2:40 pm A Transition to Non-Radiating Dielectric
22-4 Waveguide
J. A. G. Malherbe, J. H. Cloete, I. E. Loesch
University of Pretoria, Pretoria, South Africa

POLK HALL

- 1:30 pm MICROWAVE AND MILLIMETER-WAVE
MEASUREMENTS
Chairman: B. S. Perlman, RCA, Princeton, NJ
- 1:30 pm An Analysis of the A. C. Bandwidth of
23-1 Transmission Line Discrimination for
FM Noise Measurement
R. S. Brozovich, J. R. Ashley
Sperry Defense Systems, Clearwater, Florida
- 1:40 pm Optimizing an Electromagnetic Field Sensor for
23-2 Microwave Amplitude and Phase Detection Via
Fiber Optic Transmission Link
M. T. Avalos, R. M. Segal
University of Colorado, Colorado Springs, CO
- 1:50 pm Large Signal Pulsed Network Analyzer Operation
23-3 T. R. Apel, Acian, Inc., Cupertino, CA
R. J. Weber, Rockwell-Collins, Cedar Rapids, IA
- 2:10 pm Measurement of the Complex Dielectric Constant
23-4 at Millimeter Wavelengths
F. I. Shimabukuro, S. Lazar
The Aerospace Corp., El Segundo, CA
- 2:20 pm Dielectric Properties of Millimeter Wave Materials
23-5 M. N. Afsar, K. J. Button, Massachusetts
Institute of Technology, Cambridge, MA
- 2:40 pm Application of a Dielectric Resonator on
23-6 Microstrip Line for a Measurement of a
Complex Permittivity
S. Maj, J. Modelski
Warsaw Technical University, Warsaw, Poland

FRIDAY LATE AFTERNOON, JUNE 1, 1984

LARKIN HALL (B)

- 2:30 pm OPTICAL AND SUBMILLIMETER WAVE
TECHNOLOGY
Chairman: W. S. C. Chang, University of
California at San Diego, La Jolla, CA
- 3:40 pm Analog Microwave Fiber Optic
24-1 Communication Links
W. E. Stephens, T. R. Joseph, B. U. Chen
TRW, Redondo Beach, CA
- 3:50 pm A New Method for Modal Analysis of Optical
24-2 Fibers Having Symmetrically Distributed
Multiple Cores
E. Yamashita, S. Ozeki, K. Atsuki
University of Electro-Communications, Tokyo
- 4:00 pm 2.24 Gb/s Direct Modulation of Injection Laser
24-3 by Monolithic Silicon Multiplexer
B. G. Bosch, V. Langmann, D. Daniel, Ruhr-
Universitaet Bochum, Bochum, F. R. Germany
- 4:20 pm Direct DC to RF Conversion by Picosecond
24-4 Optoelectronic Switching
C. S. Chang, M. Jeng, M. J. Rhee, C. H. Lee
University of Maryland, College Park, MD
A. Rosen, H. Davis
RCA Laboratories, Princeton, NJ
- 4:30 pm Polarization-Sensitive Imaging Arrays
24-5 P. P. Tong, D. B. Rutledge, California Institute
of Technology, Pasadena, CA
D. P. Neikirk, University of Texas, Austin, TX

LARKIN HALL (A)

3:30 pm MILLIMETER-WAVE MIXERS

Chairman: S. Dixon, Jr., ERADCOM,
Fort Monmouth, NJ

3:40 pm 25-1 A Comparison of the Measured and Theoretical Performance of a 140-220 GHz Schottky Diode Mixer

P. H. Siegel, A. R. Kerr, NASA Goddard Institute
for Space Studies, New York, NY
R. J. Mattauch, University of Virginia,
Charlottesville, VA

4:00 pm 25-2 Noise Measurements and Noise Mechanisms in Microwave Mixer Diodes

A. Jelenski, University of Massachusetts,
Amherst, MA; M. V. Schneider, A. Y. Cho,
AT & T Bell Lab, Holmdel, NJ; E. R. Kollberg,
H. Zirath, Chalmers University, Goteborg, Sweden

4:20 pm 25-3 Broadband Millimeter-Wave Crossbar Mixer on Soft Substrate

L. Q. Bui, N. Ton, D. Ball,
Hughes Aircraft Co., Torrance, CA

4:30 pm 25-4 Low-Noise, Fixed Tuned, Broadband Mixer for 200-270 GHz

J. W. Archer, M. T. Faber, National Radio
Astronomy Observatory, Charlottesville, VA

POLK HALL

3:30 pm SIX-PORT MEASUREMENT TECHNIQUES

Chairman: G. F. Engen, National Bureau of
Standards, Boulder, CO

3:40 pm 26-1 A Dual Six-Port Automatic Network Analyzer and Its Performance Tests

N. S. Chung, J. H. Kim, J. Shin
Korea Standards Research Institute
Dae Deog Science Town, Republic of Korea

3:50 pm 26-2 Evaluation of a 94 GHz Diode-Based Dual Six-Port Network Analyzer

R. A. Fong-Tom
Sperry Defense Electronics, Waltham, MA

4:00 pm 26-3 A New Real-Time Six-Port ANA Method

L. Kaliouby, R. G. Bosisio, University of Montreal,
Montreal, Quebec, Canada

4:20 pm 26-4 A Calibration Method for a Six-Port Reflectometer Which Minimizes the Effect of Power Measurement Errors

J. A. Dobrowolski, E. Bridges, L. Shafai
University of Manitoba, Winnipeg,
Manitoba, Canada

4:40 pm 26-5 Theoretical Comparison of Six-Port Reflectometer Junction Designs

E. J. Griffin, T. E. Hodgetts
Royal Signals and Radar Establishment
Malvern, Worcestershire, England

PANEL SESSIONS

Three panel sessions are scheduled on Wednesday, May 30, and Thursday, May 31, 1984; two on Wednesday morning, and the third on Thursday afternoon.

Panel I: Millimeter-Wave Measurements

Date: Wednesday, May 30, 1984, 8:00 to 10:00 pm

Room: San Francisco A, Hyatt Regency Hotel

Organizer: James Wiltse
Georgia Tech (EES), Atlanta, GA
(404) 894-3494

Moderator: James Wiltse-

Abstract

The panel will discuss the current problems, accuracies, and reference standards relating to reproducible measurements from about 30 to 100 GHz. The types of measurements include power, frequency, frequency stability, scattering parameters, oscillator noise, noise figure, and other properties for which the measurement accuracy becomes poorer at higher frequencies.

The discussion will also include new measuring techniques and instruments, as well as accurate measurements of the properties of materials such as GaAs and low-loss dielectrics.

Panel II: MMIC's, A Prognosis Update

Date: Wednesday, May 30, 1984, 8:00 to 10:00 pm

Room: San Francisco B, Hyatt Regency Hotel

Organizers: Marvin Cohn, Westinghouse Electric Corp.,
Baltimore, MD
Douglas W. Maki, Hughes Aircraft Company,
Torrance, CA

Moderator: Marvin Cohn

Abstract

There has been rapid growth and extraordinary advances in the development of MMIC's during recent years. But low cost, the principal justification for this technology, has yet to be demonstrated. Costs are a function of processing yields, testing, chip section criteria, and packaging.

This panel will attempt to update yield and cost projections, and to discuss the interaction of yield and specifications. They will evaluate the cost impact of testing at various levels—the undiced wafer, the chip, and the assembled multichip package. Probes, required for d.c. and RF measurements, affect chip selection, subsequent packaging, and additional testing—all bearing on cost. What is the cost impact of "out of spec" performance at this last stage? Is the concept of trimming MMICs worth investigating?

Panel III: JAPAN-USA Competition in Technology

Date: Thursday, May 31, 1984, 3:30 to 5:30 pm

Place: Main Arena, Civic Auditorium

Panelists: John Arnold, Vice President, Harris Corp.,
San Carlos, CA

W. Andrew Osterman, Intel, Santa Clara, CA

H. William Tanaka, Counselor at Law,
Washington, DC

Keisuke Yawata, President of NEC
Electronics, USA, San Mateo, CA

Moderator: Leo Young, Office of the Undersecretary of
Defense for Research and Development,
Washington, DC

Abstract

Over the past two decades, American industries have witnessed massive Japanese inroads in both domestic and overseas markets across a broad spectrum of products including automobiles, steel, motorcycles, and consumer electronics. Is high technology in danger of also falling behind Japan? After the oil shock in 1973, Japan's Ministry of International Trade and Industry (MITI) placed a major thrust on high technology, particularly in the semiconductor, communication, and information processing industries. What impact will this have for microwave engineers? How important is MITI to Japan's industrial success? What is the importance of their industrial success? What is the importance of their industrial approach, management style, and quality assurance? This panel will help prepare the microwave community for the coming challenges.

WORKSHOPS

There will be seven workshops held in conjunction with the 1984 IEEE MTT-S International Microwave Symposium. Six of the workshops will precede the Symposium, while the fourth, the ARFTG Workshop, will be held following the MTT-S Symposium.

Testing and Trimming of Miniature Batch Processed MICs

Sponsored by MTT-6: Technical Committee on Microwave & MMW Integrated Circuits

Date: Monday, May 28, 1984, 8:30 am to 5:30 pm
Room: San Francisco A B, Hyatt Regency Hotel

Organizers: E. F. Belohoubek, RCA Laboratories, Princeton, NJ
D. Hornbuckle, Hewlett-Packard Co., Santa Rosa, CA

For additional information contact:
E. F. Belohoubek
RCA Laboratories, Princeton, NJ
(609) 734-2629

Abstract

An increasing number of organizations are currently developing monolithic or miniature hybrid processes which are ultimately aimed at low-cost, batch processed microwave integrated circuits. Once past the curiosity-feasibility stage, the equally hard question of how to test and trim large numbers of very small circuits with good yield has to be answered. In many respects the testing of multistage or multi-function components on the same chip poses a substantially more challenging task than the two-port testing of standard hybrid MICs.

This workshop shall address the above and related problem areas. Several invited speakers will give general overviews in particular areas. Other, technically more detailed topics are scheduled for the afternoon. Technical demonstration are encouraged and all participants of the workshop are expected to be willing to contribute to the general topic with short presentations.

Topics and speakers for the morning session are:

- US Overview on Chip Testing, Don Esterich, Hewlett-Packard
- US Overview on Tuning and Trimming, Gary Lerude, Texas Instruments
- European Overview, Roger Pollard, University of Leeds
- Japanese Overview, Hideaki Kohzu, NEC
- Chip Design for Testability and Analysis, James Hutchins, Hewlett-Packard

High Frequency Coaxial Connectors - 40 GHz and Beyond

Date: Tuesday, May 29, 1984, 8:30 am to 5:30 pm
Room: Embarcadero C D, Hyatt Regency Hotel
Organizer: M. A. Maury, Jr., Maury Microwave Corp., Cucamonga, CA

For additional information, contact:
Mario A. Maury, Jr.
Maury Microwave Corp.
8610 Helms Avenue
Cucamonga, CA 91730
(714) 987-4715, x21

Abstract

The purpose of this workshop is to bring together industry personnel who are vitally interested in high frequency coaxial connector technology. Connectors will be discussed covering the frequency range of 18 to 60 GHz, with special emphasis on the range of 40 to 50 GHz.

Papers will be presented on the current state-of-the-art of high frequency coaxial connectors by experts in the field, and a panel discussion will be held in the afternoon.

The following topics will be discussed:

1. Requirements and applications.
2. Interface standardization and dissemination (interfaces are not proprietary).
3. Types of connectors; general purpose and precision for devices, components, cables, rigid lines, microstrip, etc.
4. Measurement and calibration standards.
5. Future needs and directions.

There is increasing interest in high frequency coaxial connectors, particularly due to MILSTAR. Each attendee is encouraged to participate in the discussions and manufacturers will be displaying and demonstrating current connectors and devices at the end of the workshop.

Progress and Problems in Clinical Hyperthermia

Sponsored by MTT10: Technical Committee on Biological Effects and Medical Applications

Date: Tuesday, May 29, 1984, 8:30 am to 5:30 pm

Room: Embarcadero B, Hyatt Regency Hotel

Organizer: Dr. Peter Fessenden, Stanford University, Stanford, California

For additional information, contact:
Prof. J. C. Lin
University of Illinois, Chicago, IL
(312) 996-2331

Abstract

Hyperthermia continues to be a promising modality for treatment of cancer patients. Numerous preliminary studies are completed or well on their way. While these in general are encouraging, they have also pointed out many technical difficulties associated with clinical hyperthermia. This workshop will review progress and deal with some problems in the field.

Suspended Stripline Filter Technology

Sponsored by MTT-5: Network Theory Committee

Date: Tuesday, May 29, 1984, 8:30 am to 5:30 pm

Room: San Francisco A, Hyatt Regency Hotel

Organizer: Peter La Tourette, Los Altos, CA

For additional information, contact:

Peter La Tourette
1019 Loma Prieta Court
Los Altos, CA 94022
(415) 961-2821

Abstract

A full day's schedule has been planned to cover general considerations of suspended stripline filter technology, including design philosophies, CAD/CAM aspects of design, and details on the suspended stripline media. Presentations on material characteristics, packaging, cost factors, and actual software and hardware demonstrations will be made. Design details on high and low pass, band pass and notch filters will be covered.

Critical Inspection of Field-Theoretical Methods for Microwave Problems

Sponsored by MTT-15

Date: Tuesday, May 29, 1984, 8:30 am to 5:30 pm

Room: Embarcadero A, Hyatt Regency Hotel

Organizer: T. Itoh, University of Texas, Austin, TX

Workshop Chairman: J. W. Mink, Army Research Office, Durham, NC

For additional information, contact:

T. Itoh
University of Texas, Austin, TX
(512) 471-1072

Abstract

As monolithic circuits, millimeter-wave components and other increasingly complex structures are utilized by the microwave industry, elaborate analytical techniques are required for their characterization and design. During the past several years, significant advances have been made in analytical and numerical techniques. When the engineer is faced with new structures and applications, often the need arises to consider which technique should be employed, what pitfalls are associated with a particular method and what modifications are needed.

This workshop is designed for exchanging information among attendees and keynote speakers on the topical areas listed below. Keynote speakers will introduce the listed topics with an overall perspective followed by critical assessment based on their experiences. In addition to a question

and answer period, opportunity will be given to selected members of the audience to present their views and experiences.

Keynote Speakers and Topics:

1. Spectral Domain Method: R. Jansen, University of Duisburg.
2. TLM and Point Matching Method: W. Hoefer, M. Mey, University of Ottawa.
3. Lossy Systems: I. Wolff, University of Duisburg.
4. Open Structures: S. T. Peng, New York Institute of Technology.
5. Planar Circuits, Waveguide Models and Segmentation Method: R. Sorrentino, University of Rome.
6. Structures with Anisotropic Media: N. Alexopoulos, UCLA.

Industrial Applications of Microwaves

Sponsored by: International Microwave Power Institute (IMPI)

Date: Tuesday, May 29, 1984, 8:30 am to 5:30 pm

Room: San Francisco B, Hyatt Regency Hotel

Organizer: Dr. John Quine, Corporate R&D Lab., General Electric Co., Schenectady, NY

For additional information, contact:

John Osepchuk
Raytheon Research Div., Lexington, MA
(617) 860-3030

Abstract

Industrial applications with an emphasis on microwave heating, and the coordinating role of IMPI are reviewed. Included are technical expositions of tubes, ferrites and solid-state devices used in a variety of applications from large (200 kW) applications to the consumer microwave oven, and safety RFI considerations. Advanced research on microwave ovens, the greatest market for microwave components ($\pm 6,000,000$ units per year), is being directed toward many challenging questions for microwave engineers, including the role of solid-state power generation. The Workshop is of value not only as an update to those involved in ISM applications but also to a variety of specialists interested in their possible role in non-military applications of microwave power.

Automated RF Techniques (23rd Conference)

Sponsored by: The Automatic RF Techniques Group in affiliation with MTT-12

Date: Monday and Tuesday, June 4 & 5, 1984, 8:30 am to 5:30 pm

Location: Luther Burbank Center
Santa Rosa, California

For additional information, contact the ARFTG Conference Chairman:

Wendell Seal, M S S-2471
TRW
One Space Park
Redondo Beach, CA 90278
(213) 535-5155

Abstract

The conference's main topic will be Millimeter ANA's. Papers will be given on recent hardware and software developments. They include the main topic area and other computer-aided RF design and testing topics. Technical exchange will be accomplished by informal twenty minute talks.

A portion of the sessions is reserved for manufacturers to discuss and/or demonstrate new equipment that has been specifically designed for use in computer-aided RF design and test. The second day of the workshop will include a tour of Hewlett-Packard, Network Measurement Division, Santa Rosa, California.

SHORT COURSES

by Kurtis L. Kurisu

A number of organizations are offering short courses this Spring which will be of interest to some of the members of the Microwave Theory and Techniques Society.

A number of short courses will be offered by the UCLA (University of California at Los Angeles) Extension in the second quarter of 1984. These include: **Guidance for Control for Tactical Aircraft, Missiles, and Armament Systems**, course number 839.15, April 23-27, \$895.00 per participant, instructors include Hal Erhardt, Keith Anderson, and Henry A. Weidemann; **Microwave Circuit Design II-Nonlinear Circuits**, April 23-28, \$995 per pupil, instructors are Jerry Chin, K. C. Gupta, Edward Niehencke, and Robert Pucel; **Adaptive Antenna Signal Processing for Interference Rejection**, May 14-18, \$895 per student, instructors are Ephaim Mendelovicz and Thomas Miller; **Microwave Circuit Design I-Linear Circuits**, May 21-25, \$895 per participant, instructors are Steven March and Robert Wenzel. For further information on these short courses, contact UCLA, Engineering Short Courses, P.O. Box 24901, 6266 Boelter Hall, Los Angeles, CA 90024, (213) 825-1295 or 825-3344.

Several interesting short courses will be offered by the Continuing Education Institute. These include the following: **Microwave Circuit Design: Linear Circuits**, May 7-11 in Palo Alto, California and June 4-8 in Boston, Massachusetts. Instructors L. Besser, S. March and R. Wenzel; **Modern Microwave Measurements: Signal & Network Analysis**, April 23-26 in Palo Alto, California. Instructor is S. Adam; **Spread Spectrum Anti-Jam Communications**, May 7-9 in Los Angeles, California and June 5-7 in Washington, D.C., Instructor A. Durling and J. Oetting. For additional information contact CEI, 10889 Wilshire Boulevard, Los Angeles, California 90024, (213) 824-9545.

Five short courses of interest have been announced by Georgia Institute of Technology, Department of Continuing Education. They are: **Problem Solving for Engineering Spread Sheets and Microcomputers**, April 17-19, \$600 per participant; **Management for Engineers**, April 26, \$170 per student; **Problem Solving for Engineers Using Microcomputer Data Base Systems**, May 8-11, \$800 per pupil; **Digital Signal Processing**, June 11-15, \$800 per person. **Fundamentals of Corporate Finance for Engineers**, June 27-29, \$475 per participant. Additional information can be obtained from Elaine Nicholas at G.I.T. Department of Continuing Education, Atlanta, Georgia 30332, (404) 894-2547.



1984 MTT-S INTERNATIONAL MICROWAVE SYMPOSIUM TECHNICAL PROGRAM MEMBERS



Front row: James C. Lin,
Mario A. Maury, Jr., R. H. Swartley,
B. S. Perlman, A. E. Williams,
H. G. Oltman, Jr., G. L. Matthaui.
Back row: A. Rosen, D. Kajfez,
G. F. Engen, J. Lange, E. Belohoubek,
C. Buntschuh, B. Hallford, J. M. Osepchuk.



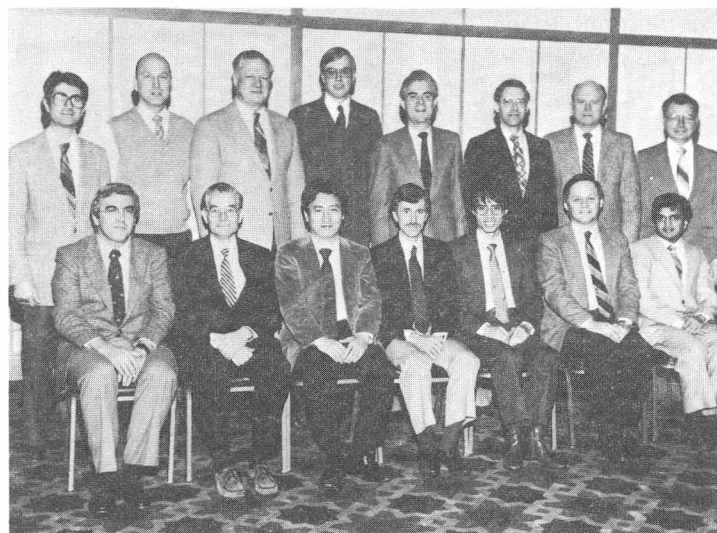
Front row: E. W. Matthews, R. B. Hicks,
G. M. Gooch, K. B. Niclas,
R. A. Pucel, H. Howe, Jr.
Back row: S. Okwit, R. L. Camisa,
E. C. Niehenke, J. M. Owens,
D. N. McQuiddy, J. B. Horton, G. L. Heiter



Front row: R. E. Brown, A. E. Atia,
H. Sobol, S. B. Cohn, W. S. C. Chang,
R. V. Snyder, C. R. Boyd.
Back row: R. H. Knerr, H. C. Bell,
P. M. La Tourrette, A. Clavin,
T. J. Lukaszek, R. D. Weglein, D. C. Hanson.

1984 MTT-S INTERNATIONAL MICROWAVE SYMPOSIUM TECHNICAL PROGRAM MEMBERS

Front row: N. G. Alexopoulos,
A. A. Oliner, T. Itoh, J. B. Knorr,
L. Bui, J. E. Degenford, M. Kumar.
Back row: F. N. Sechi, E. G. Cristal,
L. F. Eastman, S. J. Temple, B. Berson,
E. J. Denlinger, N. R. Dietrich, J. W. Mink



Front row: J. Raue, D. H. Steinbrecher,
G. Jerinic, J. Whelehan,
J. C. Wiltse, S. Dixon.
Back row: F. J. Rosenbaum, D. Parker,
A. G. Cardiasmenos, J. F. White,
D. M. Bolle, P. W. Staecker,
N. W. Cox, C. T. Rucker.

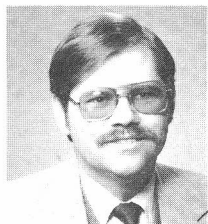
Front row: P. T. Chen, M. Caulton,
J. J. Taub, C. M. Krowne,
R. Levy, S. L. March.
Back row: E. J. Crescenzi, Jr.,
W. E. Hord, R. A. Sparks, G. R. Harrison,
M. Dydyk, M. Cohn, F. Ivanek.



**1984 MTT-S INTERNATIONAL MICROWAVE SYMPOSIUM
TECHNICAL PROGRAM COMMITTEE IN ACTION**



1984 IEEE MICROWAVE AND MILLIMETER WAVE MONOLITHIC CIRCUITS SYMPOSIUM



by **J. G. Oakes**
*Chairman,
Steering Committee*

The third IEEE Microwave and Millimeter-Wave Monolithic Circuits Symposium will be held at the Hyatt Regency Hotel, San Francisco, CA on May 29 and 30, 1984. The strong technical sessions will be complemented by the many sights in this colorful city.

The technical program includes twenty-four papers representing the current state of monolithic circuits in linear, digital and signal control applications at frequencies up to 94 GHz. Sixteen papers covering analog and digital control circuits, amplifiers and oscillators will be presented on Tuesday, May 29 at the Hyatt Regency. On Wednesday, May 30, the technical sessions move to the San Francisco Civic Auditorium for an eight paper joint session with the 1984 IEEE MTT-S International Microwave Symposium. Bus service will be available from conference hotels to the Civic Auditorium. Our strong program represents the best of many submissions from around the world.

Make your reservations early for a rewarding conference. The Symposium Steering Committee and the Technical Program Committee welcome your attendance and promise you up-to-date information on today's microwave monolithics.

Advance registration for the Symposium will be \$40 for IEEE members and \$50 for non-IEEE members. At the Symposium, the registration fees will be \$45 for IEEE members and \$55 for non-IEEE members. Additional Symposium Digests will be available for \$15 for IEEE members or \$20 for non-IEEE members. Registration hours will be 6:00 pm to 9:00 pm on Monday, May 28 and 7:30 am to 12:00 noon on Tuesday, May 29.

The Symposium program is as follows:

GOLDEN GATEWAY BALLROOM (Hyatt Regency) Tuesday Morning, May 29, 1984

I. MICROWAVE CONTROL CIRCUITS

Chairman: Russ Gilson, ERADCOM,
Ft. Monmouth, NJ

- 8:30 am** **Introductory Remarks**
J. Oakes, General Chairman,
Raytheon, Northborough, MA
W. Wissemann, Technical Program Chairman,
Texas Instruments, Inc., Dallas, TX
- 8:40 am** **A Microwave Phase and Gain Controller With
Segmented-Dual-Gate MESFETs in GaAs MMIC**
Y. Hwang, Y. Chen, R. Naster,
General Electric, Syracuse, NY
D. Temme,
MIT Lincoln Laboratory, Lexington, MA
- 9:00 am** **An X-Band Analog Phase Shifter**
D. Dawson, A. Conti, S. Lee, G. Shade, L. Dickens
Westinghouse Electric, Baltimore, MD

- 9:20 am** **Wideband S-C Band Monolithic Phase Shifter**
D. Dawson
Y. Ayasli, S. Miller, R. Mozzi, L. Hanes
Raytheon Research, Lexington, MA
- 9:40 am** **Break**

II. SIGNAL PROCESSING

Chairman: P. Greiling,
Hughes Research Labs, Malibu, CA

- 10:10 am** **Monolithic Gallium Arsenide I-Q DeModulator**
V. O'Neill II, C. Ryan, Motorola, Gilbert, AZ
C. Weitzel, Motorola, Phoenix, AZ
- 10:30 am** **GaAs Monolithic MIC Mixer-IF Amplifiers
For Direct Broadcast Satellite Receivers**
S. Watanabe, J. Ozaki, M. Miyauchi, M. Tatematsu,
S. Hori, K. Kamei,
Toshiba, Kawasaki, Japan
- 10:50 am** **12 GHz GaAs Monolithic Front End: From the
Monofunctional Chips to the Fully Integrated
Receiver**
C. Kermarrec, J. Faguet, B. Vancon, C. Mayousse,
A. Collet, P. Kaikati, D. Beaufort
Laboratoires d'Electronique et de Physical
Appliquee, Limeil-Brevannes, France
- 11:10 am** **Si-Monolithic Microwave Prescaleric**
S. Watanabe, S. Shinozaki, N. Kusama,
S. Miyazaki, T. Nakata, NEC, Yokohama, Japan
- 11:30 am** **On-Chip Pulse Transmission In Very High
Speed LSI/VLSIs**
H. Hasegawa, S. Seki,
Hokkaido University, Sapporo, Japan

GOLDEN GATEWAY BALLROOM (Hyatt Regency) Tuesday Afternoon, May 29, 1984

III. AMPLIFIERS AND OSCILLATORS

Co-chairmen: Y. Ayasli, Raytheon Co. Lexington, MA; H. J. Kuno, Hughes Aircraft Co., Torrance, CA

- 1:30 pm** **Transformer Coupled High Circuit Density
Technique for MMIC**
D. Ferguson, J. Keuper, R. Lokken, J. Culp
Honeywell, Minneapolis, MN
P. Bauhahn, C. Chao,
Honeywell, Bloomington, MN
A. Podell, Podell Associates, Palo Alto, CA
- 1:50 pm** **A Manufacturable GaAs MMIC Amplifier
With 10GHz Bandwidth**
S. Moghe, T. Andrade, H. Sun, C. Huang
Avantek, Santa Clara, CA
- 2:10 pm** **A Miniature 2-18 GHz Monolithic GaAs
Distributed Amplifier**
W. Kennan, T. Andrade, C. Huang
Avantek, Santa Clara, CA
- 2:30 pm** **A Monolithic Multi-Stage 6-18 GHz
Feedback Amplifier**
A. M. Pavio, S. D. McCarter, P. Saunier
Texas Instruments, Inc., Dallas, TX
- 2:50 pm** **An 8-18 GHz Monolithic Two-Stage
Low-Noise Amplifier**
L. C. Liu, D. W. Maki, C. Storment, M. Sokolich,
W. E. Clatskin, Hughes Aircraft Company,
Torrance Research Center, Torrance, CA
- 3:10 pm** **BREAK**
- 3:40 pm** **Capacitively-Coupled Traveling-Wave
Power Amplifier**
Y. Ayasli, S. W. Miller, R. Mozzi, L. Hanes
Raytheon Company, Lexington, MA
- 4:00 pm** **A GaAs Monolithic 6-18 GHz
Medium Power Amplifier**
C. D. Palmer, P. Saunier, R. E. Williams
Texas Instruments, Inc., Dallas, TX
- 4:20 pm** **A Family of Four Monolithic VCO MICs
Covering 2-18 GHz**
B. N. Scott, M. Wurtele, B. B. Cregger
Texas Instruments, Inc., Dallas, TX

**LARKIN HALL B (Civic Auditorium)
Wednesday Morning, May 30, 1984**

- 10:30 am IV. MONOLITHIC MILLIMETER-WAVE CIRCUITS**
Co-Chairmen: B. E. Spielman, NRL,
Washington, DC; R. W. Sudbury, MIT,
Lincoln Laboratory, Lexington, MA
- 10:40 am A 68 GHz Monolithic FET Oscillator**
D. W. Maki, J. M. Schellenberg, H. Yamasaki,
L. C. T. Liu, Hughes Aircraft Co., Torrance, CA
- 11:00 am A W-Band Monolithic GaAs Crossbar Mixer**
L. T. Yuan, Hughes Aircraft Co., Torrance, CA
- 11:20 am 94 GHz Planar GaAs Monolithic Balanced Mixer**
P. Bauhahn, T. Contolatis, J. Abrokwhah, C. Chao,
C. Seashore, Honeywell, Bloomington, MN
- 11:40 am GaAs Monolithic Frequency Doublers With
Series Connected Varactor Diodes**
A. Chu, W. E. Courtney, L. J. Mahoney,
H. A. Atwater, R. W. McClelland
MIT Lincoln Laboratory, Lexington, MA

Wednesday Afternoon, May 30, 1984

- 1:30 pm V. DEVICES AND MONOLITHIC CIRCUIT
ELEMENTS**
Co-Chairmen: D. R. Chen, Microwave Mono-
lithics, Inc., Simi Valley, CA; M. N. Yoder,
ONR, Arlington, VA
- 1:40 pm Calibration Methods For Microwave Wafer Probing**
E. W. Strid, E. R. Gleason
Tektronix, Inc., Beaverton, OR
- 2:00 pm Low Noise High Electron Mobility Transistors**
J. Berenz, K. Nakano, K. Weller
TRW, Redondo Beach, CA
- 2:20 pm High Efficiency GaAs MBE Power FET
For Ka-Band**
J. Geddes, V. Sokolov, T. Contolatis, J. Abrokwhah,
W. Larson, Honeywell, Bloomington, MN
- 2:40 pm Highly Accurate Design of Spiral Inductors
For MMICs With Small Size and High Cut-off
Frequency Characteristics**
M. Parisot, Y. Archambault, D. Pavlidis,
J. Magarshack, Thompson-CSF, France

**ENROLLMENT OF FOREIGN
NATIONALS IN ENGINEERING
PROGRAMS RISES**

The number of foreign nationals enrolled full time in graduate science and engineering programs increased by 8% from 1980 to 1981, according to a recent study by the National Science Foundation. This growth rate equals the average annual growth rate from 1975 to 1980. In 1981, the study found, foreign nationals made up 40% of the graduate students in engineering and 20% of the graduate students in the sciences.

The NSF was able to obtain racial and ethnic data for about 80% of the U.S. citizens enrolled in science and engineering programs in 1981. According to the data, nine out of ten of the students were white and non-Hispanic. It also noted a discrepancy between racial and ethnic groups in different fields: Asians and Pacific Islanders were found to be more heavily concentrated in engineering, and blacks and American Indians were found to be more frequently enrolled in the social sciences.

**INFRARED AND MILLIMETER-WAVE
CONFERENCE**

*by K. J. Button
Program Chairman*

The Eighth International Conference on Infrared and Millimeter Waves was held December 12-17, 1983, at the Doral Hotel, Miami Beach, Florida, USA.

Five principal topics: millimeter waves, gyrotrons, free electron lasers, plasma diagnostic and sub-millimeter waves, were covered in three parallel sessions. More than 100 papers were presented on millimeter wave topics including sources, receivers, detectors, mixers, integrated circuits, systems, guided propagation, various devices and atmospheric physics. There were ten invited keynote talks on millimeter wave topics. Nearly 40 millimeter wave gyrotron papers were presented including six invited keynote speakers. Although there was substantial international participation among the 19 papers on the free electron laser, attendance and participation was diminished by the conflict with "Lasers 83" which was belatedly scheduled during the same week in San Francisco. The three full sessions on plasma diagnostics enhanced both the millimeter and submillimeter programs by covering one of the most important current applications of these technologies. More than 100 papers were presented on submillimeter wave topics including spectroscopy, semiconductor phenomena, dielectric measurements, lasers, detectors, devices, atmospheric physics, astronomy, and pulsed sources and nonlinear optics.

The next meeting, the ninth in this series, will be held near Osaka, Japan, October 22-26, 1984. Information is available from K. J. Button, M.I.T., Cambridge, MA, USA.

**DOCTORATES EARNED
BY U.S. CITIZEN
ENGINEERS DROP**

The number of science and engineering doctoral graduates tripled from 1960 through 1981. However, the share of those doctorates awarded to engineers declined, and the number of those engineers who were not U.S. citizens increased dramatically, according to data collected by the National Academy of Sciences for the National Science Foundation.

The number of electrical and electronics engineers receiving Ph.D.s each year more than doubled from 1960 to 1981, from 201 to 478. However, in 1960, 77% of the Ph.D. recipients were U.S. citizens, and in 1981 that proportion had declined to 51%. Of the noncitizens, 37% were permanent residents in 1960 and 63% were on temporary visas, while in 1981 only 27% were permanent residents and 73% were in the U.S. on temporary visas.



MEMBERSHIP SERVICES

by E. C. Niehenke
Membership Services Chairman

FINANCIAL ASSISTANCE AVAILABLE TO MTT-S CHAPTERS

To provide better services to MTT-S membership, the MTT-S Adcom has again approved financial assistance to all active MTT-S Chapters in 1984 to subsidize Chapter activities. The Chapters play a key role in serving the membership by providing technical meetings, lecture series, one-day symposia, tours, and social events. Up to \$300 in 1984 can be used by each Chapter to enhance the Chapter's program. Fifteen Chapters made good use of this assistance in 1983. Chapters should prepare a letter requesting a specific amount describing how the Chapter plans to use the money. Address the letter to:

E. C. Niehenke
Westinghouse Electric Corporation
P.O. Box 746, MS-339
Baltimore, MD 21203
(301) 765-4573

COORDINATED LECTURE SERIES

Chapters that desire assistance in preparing a Coordinated Lecture Series for their membership should contact Dr. Roger D. Kaul. Roger has played a key role in organizing numerous successful lecture series for the Washington, DC, MTT Chapter. We are very fortunate to have his help serving in Membership Services. Roger will assist Chapters by supplying suggested lists of topics and speakers for a series tailored around the Chapters interests. Please give Roger a call or write to him at the following address:

Dr. R. D. Kaul
Litton Systems
5115 Calvert Road
Mail Stop 8-25
College Park, MD 20740
(301) 454-9796

MTT-S MEMBERSHIP HITS RECORD HIGH

MTT-S membership on December 31, 1983, was 7435, surpassing the Society's year end record high set last year by 6.7 percent. The student membership included in these figures grew to 1003, representing a 4 percent increase over last year's membership. The overall Institute's membership was 248,275 December 31, 1983, representing a 6.1 percent increase during 1983.

With recent new hirings and increased microwave activity, each MTT-S member should plan to take a few minutes to invite that new prospective MTT-S member to join. Each MTT-S Chapter should plan to increase their membership for the

vitality of the Chapter. Invite nonmembers to the Chapter meetings and acquaint prospective members with the advantages of belonging to MTT-S. Urge them to sign up.

Each year membership recognitions are given to two MTT-S Chapters with the highest percentage annual membership increases, one from Regions 1 through 6 and one from Regions 7 through 10. Each Chapter receives \$200 as well as a plaque, which are presented at the annual MTT-S Symposium.

Mr. Patrick A. Green is a new member of Membership Services responsible for membership. Contact Pat for membership information at the following address:

P. A. Green
Westinghouse Electric Corporation
P.O. Box 746, MS-339
Baltimore, MD 21203
(301) 765-2832

CHAPTER NEWS

Distinguished Microwave Lecturers Scheduling Talks

Dr. Stephen Adam, the 1983/1984 Distinguished Microwave Lecturer, has presented his lecture "Modern Microwave Measurements" to 17 groups throughout the world through this January, with numerous lectures planned for Chapters throughout this year. Chapters and Sections should contact Dr. Adam to make his lecture available to the MTT-S membership. MTT-S Distinguished Microwave Lecturers for 1984/1985 are listed below with their lecture topics.

Dr. Paul T. Greiling
"High Speed Digital IC Performance Outlook"

Dr. Sander Weinreb
"Radio Astronomy—A Challenge to the Microwave Engineer"

Chapters and Sections should start planning their fall and 1985 meetings by making requests to the new lecturers.

Nelson Takes Over Chapter Records

Mr. Ted Nelson, a new member of Membership Services, will be serving MTT-S responsible for chapter records. Please inform Ted of any officer changes and keep him informed of your meetings by mailing him the meeting report notices. Ted's address is listed below:

T. M. Nelson
Westinghouse Electric Corporation
P.O. Box 1897, MS-709
Baltimore, MD 21203
(301) 765-6461

Sparks Is International Liaison

Mr. Richard A. Sparks, a past MTT-S president, is serving Membership Services as International Liaison Chairman dealing with overseas chapter formation and with international activities.

Four New MTT-S Chapters Formed in Late 1983

Middle and South Italy, Twin Cities, Sweden, and Switzerland have recently formed new MTT-S chapters. Welcome to MTT-S! The new chapter chairmen are listed below:

Middle and South Italy — Roberto Sorrentino
Twin Cities — Charles R. Seashore
Sweden — Erik L. Kollberg
Switzerland — Professor Fred E. Gadoil

The Switzerland Chapter elected its officers at its first business meeting on December 21, 1983 and is planning a half-day workshop on the topic "Measurement Techniques in Microwaves and Electromagnetism" in Bern on May 15, 1984. All interested persons are welcome. For detailed information, contact the Chapter's secretary, Ray Ballistry, Institut fur Elektronik, ETH Zentrum, 8092 Zurich, Tel. 01-256 '27' 53.

Philadelphia MTT/AP Chapter is Selected "Chapter of the Year"

The Philadelphia MTT/AP Chapter was selected by the Philadelphia Section as "Chapter of the Year" for 1982/1983. There are 17 Chapters in the Philadelphia Section. The award will be presented at the Annual Awards Banquet at which time the IEEE president, Dr. Richard J. Gowen, will give the dinner talk. Congratulations to the Philadelphia Chapter led by the Chapter Chairman Charles C. Allen.



CALL FOR ADCOM NOMINATIONS

by C. T. Rucker
Chairman,
Nominations Committee

The MTT-S Bylaws provide three means by which one may be nominated for the MTT-S Administrative Committee. They are:

- 1) Nomination by the Nominations Committee,
- 2) Nomination by petition signed by 25 Society members and submitted to the Nominations Chairman prior to 1 September 1984 and
- 3) "Informal Chapter recommendations are also in order."

This year, your nominations committee consists of:

R. A. Sparks, Boston(617) 274-7100, x4708
E. C. Niehenke, Baltimore/Wash. ..(301) 765-4573
C. T. Rucker, Atlanta (chairman) ..(404) 894-3420
F. J. Rosenbaum, St. Louis(314) 291-5270
H. Sobol, Dallas(214) 996-5881
R. Hargis, Chicago(312) 576-5621

H. Goronkin, Phoenix(602) 244-6728
S. F. Adam, San Francisco(415) 857-3075
A. Clavin, Los Angeles/San Diego (619) 755-2917
C. K. Chou, Seattle(206) 543-1071
V. G. Gelnovatch, N.Y./N.J., Phil. ..(201) 544-4883

This wide representation should provide most Society members with ready access to the nominations process.

The bylaws of MTT-S state that the Nominations Subcommittee should select a slate of at least two members of the Society for each vacancy which occurs on the Administrative Committee on January 1 of the next year. Each nominee is contacted to assure his willingness to serve and his ability to attend Adcom meetings. Nominees by the Nominations Subcommittee are selected by the principles of efficiency and geographic and organizational distribution. Elections of the nominees are made by members of the Adcom who are not eligible for re-election at that time.

This year we will elect six members for a term of three years and one member for a term of two years. The geographic distribution of the twelve committee members serving unexpired terms (hold over members) is: East-6, Central-1, and West-5. Nine of these are from industry, two are from the U.S. Government and one is from a university. Six committee members complete their current three year terms in 1984 and all but one are eligible for renomination. The geographic distribution of this five is: East-1, Central-4, West-0. Four are from industry and one is from a university. This may be clearer in the tables below.

Present (1984) Adcom

East	8	Industry	14
Central	5	Government	2
West	5	University	2

Holdover Members (1985)

East	6	Industry	9
Central	1	Government	2
West	5	University	1

Terms End 1984 — Eligible For Committee Renomination*

East	1	Industry	4
Central	4	Government	0
West	0	University	1

Your Nominations Committee will have already begun work when you receive this Newsletter. I urge you to participate actively in its work. Contact the Committee member nearest you with your suggestions or recommendations. Remember, each nominee should be able to attend three meetings of the Adcom each year and must specifically commit to attend at least two.

*An Administrative Committee member who has served three consecutive three year terms may not be renominated by the Nominations Committee.



DISTINGUISHED MICROWAVE LECTURER INTERIM REPORT

by Stephen Adam

Dr. Stephen Adam is the 1983/1984 Distinguished Microwave Lecturer. Dr. Adam's lecture "Modern Microwave Measurements" has already been presented to groups throughout the world this January. Chapters and Sections should contact Dr. Adam to make his lecture available to the MTT-S membership. The following is the scheduled lectures for Dr. Adams:

Date	Chapter/Section
10/27/83	San Francisco/Santa Clara Valley Chapter
11/1/83	Schenectady Chapter at RPI (Troy NY)
11/2/83	Syracuse Chapter
11/3/83	Trident Chapter (Washington Univ.)
11/15/83	St. Louis Chapter (Washington Univ.)
11/17/83	Salt Lake City Chapter (U. of Utah)
11/28/83	Tokyo Section at Yokogawa-Hewlett-Packard Ltd.
11/29/83	Tokyo Chapter at Tokyo University
11/30/83	Tokyo Chapter at UNIDEN Labs.
12/2/83	Tokyo Chapter at Kyoto University
12/12/83	Dallas-Ft. Worth Chapter
12/13/83	Phoenix Chapter
12/14/83	Alamagordo/Holloman Section
12/15/83	Albuquerque Chapter
1/9/84	Vancouver, British Columbia Section
1/10/84	Santa Barbara Section
1/11/84	San Diego Chapter
2/20/84	Central Pennsylvania Section
2/21/84	South New Jersey Section
2/22/84	Tri-Section (North Jersey, Princeton and Jersey Coast)
2/23/84	Philadelphia Chapter and Section
2/28/84	Florida West Coast Chapter (Tampa)
2/29/84	Melbourne, Florida Chapter
3/1/84	Orlando Chapter
3/15/84	Baltimore Chapter
3/19/84	Chicago Chapter at University of Illinois at Chicago
3/20/84	Central Iowa Section at Iowa State U.
3/21/84	Cedar Rapids Section
3/22/84	Milwaukee Chapter
4/3/84	Susquehanna Section
4/4/84	Columbus AP/MTT-S Chapter/Section
4/5/84	Ottawa Chapter
4/18/84	Seattle Chapter
5/1/84	Atlanta Chapter
5/2/84	Central Virginia Section
5/3/84	Boston Chapter
5/22/84	Los Angeles Chapter

Requests received but lectures not yet scheduled:

Israel Chapter, Singapore Section, Karachi Section, Panama Section, Madras Section, Venezuela Section, Benelux Section, University of Porto, Portugal, and Switzerland Chapter.

In Memoriam

DR. HAROLD JACOBS



Dr. Harold Jacobs, 66, died suddenly on December 24, 1983. He was Senior Scientist and Millimeter Wave Devices and Circuits Team Leader in the Electronics Technology and Devices Laboratory of the U. S. Army. Dr. Jacobs was born in Port Chester, N.Y., and received his education in chemistry and physics at Johns Hopkins (BA, 1938) and New York University (MS 1942, Ph.D. 1945). He began his professional career in 1942 on the radar tube war production line at RCA. In 1945 he joined Sylvania Electric Corporation doing research on cathodes and gas discharges. In 1949 he joined the U. S. Army Signal Corp Laboratory to begin a long and distinguished research career in the fields of electron tubes, solid state devices, quantum electronics, millimeter-wave devices and systems and submillimeter wave lasers. He authored approximately 75 papers in professional journals and was granted 27 patents. In recognition of his outstanding research contributions, Dr. Jacobs received the IEEE Fellow Award in 1967 and in 1969 was given the Army's highest civilian award (Decoration for Exceptional Civilian Service) for millimeter wave and imaging innovations. In 1973 he received the IEEE Harry Diamond Award for identification of new bulk semiconductor effects at millimeter-wave frequencies with applications to imaging and surveillance. At various points in his career, Dr. Jacobs served as Army or U. S. delegate to NATO committees and chaired semiconductor device long range planning groups. Dr. Jacobs complemented a highly productive research career with contributions to the field of engineering education. He was chairman, to 1978, of the Department of Electrical Engineering at Monmouth College, West Long Branch, New Jersey and was active at the college as a professor at the time of his death. He organized the Department in 1957 and developed the curriculum into a certified MS degree program. Dr. Jacobs is survived by his wife Lydia, sons Glenn and Steven, daughters, Maura and Mrs. Suzanne Miller, his mother Lillian, a brother Perry, a sister Mrs. Miriam Shapiro, and a grandson.

— By V. G. Gelinovatch

MTT-S NATIONAL LECTURE "MICROWAVE COMMUNICATIONS TECHNOLOGY" IN CHINA



by Ferdo Ivanek

It must have been due to the excellent impression left by Bob Pucel, the first MTT-S National Lecturer invited to China, that I was invited, too. Actually, I later heard many highly praising comments about him, including his on-the-spot acquired expertise in handling the 100 proof "Moutai" at the banquets!

The initial invitation came from the Nanjing Solid State Devices Research Institute and the official invitation from the Ministry of Electronics of the People's Republic of China. The Consulate General in San Francisco was instrumental in an intermediary role. The arrangements included my wife Vojka with her lecture on one of her architectural projects at Stanford University.

We arrived in Beijing on Monday night, September 16, 1983, after a two-day rest in Tokyo, which was beneficial in view of the busy schedule in China. The following morning we were taken to the Palace Museum (Forbidden City) for sightseeing. What an impressive beginning. At noon we left by train for Shijiazhuang where we arrived in the late afternoon; a very relaxing trip through pleasing agricultural landscape. This first day was indeed an excellent preview of the sightseeing part of our most rewarding three-week visit to China. I could not possibly continue giving any more details within the confines of this brief report.

The one-day visit to the Hebei Semiconductor Research Institute included the official welcome meeting, a tour of laboratories, our lectures, a discussion session and a banquet in the evening. I was impressed by the range of microwave and other solid-state devices developed in this institute: low-noise and power Si bipolar transistors and GaAs FETs including MMIC amplifiers and oscillators, Si static induction transistors and a CCD linear array imaging sensor. The results surpass by far what one would expect from the modest facilities. In addition, I was shown microwave communication equipment developed with their own solid-state devices. The engineering staff impressed me with their expertise and response to technological challenges. The inevitable consecutive interpretation of my lecture must have been felt by them as an impediment, but the subsequent discussion made it clear that they focused on the same problem areas that preoccupy their colleagues in technologically more advanced coun-

tries. The banquet and other social contacts during this brief visit enriched this memorable experience of our second day in China which established the pattern for our subsequent meetings with Chinese colleagues.

We returned to Beijing for meetings with officials of the host organization, the Ministry of Electronics. They are focusing on modernization of communications equipment manufacture and are determinately pursuing the course of action that appears most promising to them under the circumstances.

We had more sightseeing in and around Beijing. What could have been more appropriate than to visit the Great Wall on October 1, the national holiday! However, when I requested the particular schedule (due to the TELECOM 83 in Geneva which dictated my timing) I was unaware of the fact that this three-day holiday is the longest vacation in China. This obviously caused inconvenience to our hosts, but they spared no effort to accommodate us at the expense of their sparse free time.

Sunday morning, October 2, we arrived in Nanjing and were greeted by a group of engineers and interpreters of the Nanjing Solid State Devices Research Institute who took us sightseeing for most of that day and the following morning. Although this was also a holiday, a large group gathered in the early afternoon for the first of my three lectures. Consecutive interpretation made each last a half-day. I very much enjoyed the extended contact with this group that included researchers from the Nanjing Institute of Technology. The third day of lectures, a discussion session was added which lasted for the better part of the afternoon. The range and nature of the questions reflected a high level of expertise in a broad area of R & D activities.

The two of us were pleased to meet the MTT-S delegation led by Dick Sparks while we were in Nanjing. I was included in their visit of the institute which impressed everyone. Since a rather detailed account with photographs has been published by Dick Sparks in the January, 1984 issue of the Microwave Journal, I shall avoid unnecessary repetition. In my narrower area of interest I was most impressed by the experimental microwave radio-relay repeater using the institute's own GaAs FETs in all active microwave functions, and by the parametric amplifier production.

I was also invited for a brief visit to the Nanjing Institute of Technology where I saw the hardware implementation of a 1.5 GHz transmitter-receiver with direct frequency modulation and demodulation which had been reported at the 1983 International Microwave Symposium (paper T4 in the Digest).

Due to the four-day stay with daily working and social contacts we naturally developed close-

(Concluded on following page)

IEEE MOURNS THE LOSS OF DR. DONALD D. KING, 1984 PRESIDENT-ELECT

The passing of Dr. Donald D. King, 1984 President-Elect of the Institute of Electrical and Electronics Engineers, Inc. (IEEE), represents a grievous loss to the Institute and to the entire engineering profession, according to an announcement by the IEEE. Dr. King, President of Philips Laboratories Division of North American Philips Corporation, died March 13 following a brief illness. He was 64 years old and lived in Chappaqua, New York.



"We are deeply shocked and saddened by the unexpected and untimely passing of Dr. King," said Dr. Richard J. Gowen, President of IEEE. "During his almost 40 years of service to the Institute, Don King gave of himself and his talents unsparingly. His dedication to and support for the Institute, its members and our

profession could well serve as a model for each of us. His was a concern for the whole man, for the whole engineer—a concern which he pursued throughout his career and which in recent years was expressed in part through his efforts to encourage retraining and continuing education programs for engineers as one means to guard against obsolescence.

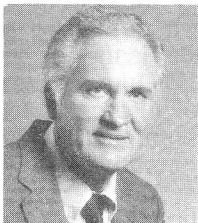
"Dr. King would have assumed the office of President of the IEEE on January 1, 1985," Dr. Gowen added. "Ours is a grievous loss. Leaders of Dr. King's character, dedication, talent and perceptiveness come along only once in a great while. In his few short weeks as President-Elect of the IEEE, he had already made an indelible impres-

sion on those who were privileged to work with him. On behalf of his many friends and colleagues, we offer our deepest sympathy to his family at their loss; we also thank them for having shared Don with us. Our lives, and our profession, are the richer for it."

Dr. King was a Fellow of the IEEE and had been a member since 1946. Among his many activities, he served on the Awards, Publications and Technical Activities Boards and on a number of major committees including those concerned with Individual Benefits and Services, Pensions, Fellow, Group/Society Awards, and Nominations and Appointments. Dr. King was a member of the Antennas and Propagation Society and the Microwave Theory and Techniques Society (MTT), and served on their Administrative Committees. He served as Vice President and then as President of the MTT Administrative Committee in 1963 and 1964, respectively, and was an Honorary Life Member of the Committee. He also edited the MTT Transactions from 1959 through 1962.

Prior to joining Philips Laboratories in 1967, Dr. King was Director of Electronics Research Laboratory, Aerospace Corporation. Previously, he was responsible for organizing the Research Division of Electronic Communications, Inc. in Timonium, Maryland, where he managed a series of research programs. Dr. King received his A.B. and Ph.D. degrees (physics, 1946) from Harvard University where he subsequently held a number of research and teaching positions, including Assistant Professor of Applied Physics in 1948. Prior to joining Electronic Communications he taught at Johns Hopkins University where he also became Director of the Radiation Laboratory.

SPECIAL ARTICLES SOLICITED FOR THE MTT NEWSLETTER



by John Horton

The MTT Newsletter staff has instituted a new feature for the Newsletter, publication of special articles dealing with current topics in the technical and professional areas of interest to MTT Members. The purpose of these feature articles is to provide the member with a general understanding of the topic and its significance in current and future activities in our field. I would like to emphasize that the special articles will cover topics in a broad, general sense. Papers dealing with specific design techniques and applications should be submitted in the customary way to the MTT Symposium and/or to the MTT Transactions.

If you know of a topic that is current and you

are willing to contribute an article to the Newsletter, please contact John Horton or Reynold Kagiwada at TRW, One Space Park, Redondo Beach, CA 90278. Our first article will appear in the Summer issue of this Newsletter.

LECTURER CHINA TOUR . . . from page 31

est rapport with engineers, interpreters and management of the Nanjing Solid State Devices Research Institute. The personal contacts extended throughout the rest of our visit to China which was ably organized and guided by two of their engineers under the auspices of the Ministry of Electronics. The wonderful trip took us to Suzhou, Wuxi, Shanghai, Hangzhou, Guilin and Kunming. We returned full of deep impressions which we greatly enjoy recounting whenever given the opportunity.

Those individuals to whom we are indebted for this unique experience are too numerous to list. Their kindness bestowed upon us reflects the high esteem for the IEEE Microwave Theory and Techniques Society which I was honored to represent with the MTT-S National Lecture.

NEW IEEE MTT-S FELLOWS

The Board of Directors has elevated a group of 132 IEEE Senior Members to the Fellow grade. The Fellow grade, considered a great honor, implies unusual professional distinction. The following is a list of the newly named IEEE Fellows who are MTT-S members. Also included are their affiliations and their citations.

Professor Saburo Adachi

Department of Electrical Engineering
Tohoku University
Aramaki Aoba
Sendai, Japan 980

For contributions to the theory and practice of antennas in plasma.

Dr. Carl E. Baum

5116 Eastern SE, Unit D
Albuquerque, New Mexico 87108

For pioneering the singularity expansion method and electromagnetic topology in electromagnetic theory, and for development of EMP simulation and electromagnetic sensors.

Professor Heinz Beneking

Department of Electrical Engineering
Technical University of Aachen
Templergraben 55
D-5100 Aachen, West Germany

For innovation in the field of compound semiconductor technology and devices, especially for work on heterostructure bipolar transistors.

Mr. Wallace H. Coulter

590 West 20 Street
Hialeah, Florida 33010

For developments in automated instrumentation for clinical hematology and contributions to the technology of cytological instrumentation.

Mr. Julian W. Dees

Office of Contract Administration
Georgia Institute of Technology
Atlanta, Georgia 30332

For advancing infrared and millimeter wave instrumentation of the metal-oxide-metal detector.

Dr. Glenn F. Engen

U. S. Department of Commerce
National Bureau of Standards
724.01
Boulder, Colorado 80303

For contributions to microwave metrology, particularly the development of the "six-port" measurement technique.

Professor Wolfgang Harth

Technische Universität München
Arcisstrasse 21
D-8000 München 2, West Germany

For contributions to optoelectronic and high-frequency semiconductor devices.

Dr. Shoei Kataoka

Ministry of International Trade and Industry
Electrotechnical Laboratory
1-1-4 Umezono
Sakura, Niihari
Ibaraki, Japan 305

For contributions in the field of compound semiconductor devices.

Dr. Anthony R. Kerr

National Aeronautics and Space Administration
Goddard Institute for Space Studies
2880 Broadway
New York, New York 10025

For contributions to millimeter-wave receivers.

Dr. Hiroshi Kikuchi

3-8-18 Komagome
Toshima-ku
Tokyo, Japan 170

For contributions and leadership in plasma studies.

Mr. Louis F. Moose

Box 159, Route 5
Quakertown, Pennsylvania 18951

For contributions to microwave relay communication systems.

Dr. Gentei Sato

4-1-37 Kamikizaki
Urawa
Saitama-ken, Japan 338

For research and development in the field of specialized antenna design.

Professor Erwin Schanda

Institute of Applied Physics
University of Bern
Sidlerstrasse 5
CH-3012 Bern, Switzerland

For theoretical and experimental contributions to microwave emission from the earth and atmosphere.

Dr. Gunther U. Sorger

25 Lerida Court
Menlo Park, California 94025

For innovative contributions to the development of precision, electronic measuring instruments, and standards.

Dr. Kunihiro Suetake

3-10-11, Minami
Meguro-ku
Tokyo, Japan 152

For contributions to the theory and techniques of microwave absorbers and the introduction of educational technology.

Dr. William R. Wisseman

5747 Melshire Drive
Dallas, Texas 75230

For technical leadership in the development of gallium arsenide power field-effect transistors and integrated circuits.

Professor Eikichi Yamashita

Department of Applied Electronics
The University of Electro-Communications
1-5-1, Chofugaoka
Chofu-shi
Tokyo, Japan 182 TOS-100

For contributions to the analysis and design of microstrip networks.



AWARDS

by D. Parker

MTT-S Awards
Chairman

Recognition of outstanding achievement in the field of Microwave Theory and Techniques is one of the major objectives of our Society. Paraphrasing the IEEE Awards Guide, awards serve several purposes. First, they are a recognition of outstanding contributions to the art and science of microwave techniques, devices, and subsystems. Second, they are an incentive to others to emulate excellence. Third, they are personalized presentations to the public of the achievements of the profession and its members. Fourth, awards are the identification of MTT-S with these achievements.

We can be proud of our Society in meeting the objectives of recognizing significant achievements of its members over the years. In this article we briefly review the major Awards of the Society and list the past recipients of each. We also review the IEEE Awards. Our purpose is to better inform the MTT-S membership and to solicit your nomination of candidates for those various awards.

MICROWAVE CAREER AWARD

The Microwave Career Award is presented periodically to an individual for a career of meritorious achievement and outstanding technical contributions in the field of Microwave Theory and Techniques. This is the most prestigious award given by the Society. Eligibility requirements call for publication in technical journals, presentations of lectures, contributions considered with any or all of these aforementioned areas. Recipients and the year of their award are listed as follows:

1973 William W. Mumford	1979 Werner J. Kleen
1974 Henry J. Riblet	1980 Kiyo Tomiyasu
1975 Harold A. Wheeler	1982 Arthur A. Oliner
1976 John R. Whinnery	1982 Akio Matsumoto
1977 Ernest Weber	1983 Marion E. Hines
1978 A. Gardner Fox	1984 John R. Pierce
1979 Seymour B. Cohn	

MICROWAVE APPLICATIONS AWARD

The Applications Award is presented to an individual for an outstanding application of microwave theory and techniques. The eligibility requirements are: creation of a new device, component or technique, novel use of a device or component, or a combination of the above. Publication of a paper is not required. Our guidelines suggest that we consider young or emerging workers but we have in the past several years made the award to individuals who are established in our field and who have made significant contributions in the past. Past winners of the award include:

1973 Edward G. Cristal
Stripline and microstrip filter design
1974 Dean Peterson
Practical design of high power IMPATT amplifiers

1975 James White	Development of practical high power PIN diode phase shifters
1976 Martin Walker	Application of microwave circuit synthesis to development of GaAs FET amplifiers
1977 Stephen Long	Study of InP material and circuits for MMW Gunn Diodes
1978 Dale Claxton	Development of silicon and GaAs microwave analog and digital integrated circuits
1979 Erwin Belohoubek	Practical implementation of internal matching of microwave transistors
1980 Julius Lange	Invention of interdigitated quadrature hybrid
1982 Charles Boyd	Application of ferrite devices to control elements
1983 Les Besser	Development of COMPACT
1984 Paul J. Meier	Pioneering contributions to Fin-Line

Also in 1974, a special Microwave Application Award was presented to Phillip H. Smith for the "Practical Realization of a Circular Transmission Line Chart for Analyzing Microwave Circuits, The SMITH CHART." Mr. Smith's award was in special recognition for his invention and application of the Smith Chart, one of the most widely used design tools in the microwave field.

MICROWAVE PRIZE

The Microwave Prize is awarded annually for the paper making the most significant contributions in the field of interest to the Society among those published in an IEEE publication during the year ending June 30th. This award is the oldest given by the Society. Past recipients are listed:

1955 Herman N. Chait	1975 Tullio E. Rozzi
Nicholas G. Sakiotis	Wolfgang F. G.
1956 Robin I. Primich	Mecklenbrauker
1958 Ladislav Goldstein	1976 Robert A. Pucel
1959 Bert A. Auld	Daniel Masse
1960 A. F. Harvey	Richard F. Bera
1961 George Matthaei	1977 Marion E. Hines
1962 Leonard Lewin	Ronald S. Posner
1963 Leo Young	Allen A. Sweet
1964 Seymour B. Cohn	1978 Anthony R. Kerr
1965 Hendrik Bosma	Daniel N. Held
1966 Arthur Oliner	1979 Eric R. Carlson
1967 Robert Wenzel	Martin V. Schneider
1968 William Gabriel	Thomas F. McMaster
1969 John D. Rhodes	Hatsuaki Fukui
1970 William J. Evans	1980 K. Kobayashi
1971 Marion E. Hines	Y. Nemoto
1972 Harrison E. Rowe	R. Sato
Dale T. Young	1983 K. Honjo
1973 W. Richard Smith	Y. Takayama
Henry M. Gerard	1984 Reinmut K. Hoffman
William R. Jones	Johann Siegl
1974 Charles A. Liechti	
Robert L. Tillman	

DISTINGUISHED SERVICE AWARD

The Distinguished Service Award is a new IEEE Award. It is presented to honor an individual who has given outstanding service over a period of years for the benefit and advancement of the Microwave Theory and Techniques Society.

Theodore S. Saad was the first recipient in 1983. Alvin Clavin is the second recipient and will receive the award at the 1984 banquet.

DISTINGUISHED MICROWAVE LECTURER

The IEEE MTT-S Distinguished Microwave Lecturer is selected annually by AdCom to present a lecture to MTT-S Chapters on a subject of important and current interest to members. The Distinguished Microwave Lecturer is an individual who has made significant contributions in the field of his talk. The Distinguished Microwave Lecturer was formerly known as the MTT-S National Lecturer. The name was changed beginning with 1984 to reflect the fact that the Lecturer also gives his talk to several MTT-S Chapters outside the United States. Below are the names of past lecturers:

1967	A. A. Oliner	1977	John Osepchuk
1968	Leo Young	1978	Charles Liechti
1969	Dick Damon	1979	James C. Wiltse
1970	Harold Sobol	1980	Robert A. Pucel
1971	Carl Blake	1982	Ferdo Ivanek
1972	Theodore S. Saad	1983	Joseph A. Giordmaine
1973	John L. Allen	1984	Stephen Adam
1974	Sy Okwit	1985	Paul Greiling
1975	Robert W. Beatty	1985	Sander Weinrab
1976	Fred Sterzer		

For 1985 two Distinguished Microwave Lecturers have been designated. Paul Greiling will talk on High Speed Digital Integrated Circuits. Sander Weinrab's lecture is entitled "Radio Astronomy—A Challenge to the Microwave Engineer."

CENTENNIAL MEDALS

1984 is the IEEE Centennial Year. To commemorate this event, the IEEE will award 1,984 Centennial Medals to members of the Institute. These medals are to be presented to those who have made significant contributions to the technology of electronic and electrical engineering or service to the Institute or its Societies. The MTT-S was allocated 19 medals. A Special Awards Committee selected the following members of MTT-S to receive the Centennial Medal at the 1984 Symposium banquet:

Stephen F. Adam	Fred J. Rosenbaum
Alfred C. Beck	Charles T. Rucker
Alvin Clavin	Theodore S. Saad
Seymour B. Cohn	Phillip H. Smith
Marion E. Hines	Harold Sobol
Donald D. King	Richard A. Sparks
William W. Mumford	Kiyo Tomiyasu
Arthur A. Oliner	Lawrence R. Whicker
Don Parker	John R. Whinnery
George P. Rodrigue	

In addition to the above, Leo Young, a Past President of MTT-S, will receive a Centennial Medal from the Institute.

OUTSTANDING YOUNG ENGINEER

Also as part of the IEEE Centennial Year, each Society has been asked to select an outstanding young engineer. These candidates will be given a "key to the future" by the IEEE at a special banquet in December. This will be the closing event of the Centennial Year. The MTT-S Awards Committee is presently in the process of selecting its candidate for the outstanding young engineer. Already we have received nominations of several worthy individuals. There are no set criteria but it is generally felt that the individual should be under 35 years of age and has made significant contributions to our technology.

IEEE AWARDS

The Institute Awards fall into six categories: Medal of Honor, Major Annual Medals, Field Awards, Service Awards, Prize Paper Awards and Scholarships. The Medal of Honor and the Major Annual Medals aim at the recognition of achievements having outstanding significance for the profession, the Field Awards recognize unusual accomplishment in a particular field of interest to the Institute, the Service Award recognizes outstanding service to the Institute and the Prize Paper Award recognizes publications significant for their excellence. The Scholarships aim at the support of worthy students.

Pertinent data on each of the IEEE Awards, in condensed form, as presented in the IEEE Awards Guide is as follows:

IEEE MEDAL OF HONOR

The Award was established in 1917. The Awards Board as a committee of the whole, shall recommend to the Board of Directors (from the nominations received) the names of candidates for the principal award of the Institute, the IEEE Medal of Honor. The Medal of Honor, the highest award offered by the Institute, is awarded for a particular contribution which forms a clearly exceptional addition to the science and technology of concern to the Institute. The Award is normally made within a few years after recognition of the exceptional nature of such contribution. The recipient need not be a member of the IEEE. The Medal of Honor is a gold medal inscribed with the name of the recipient, the year of presentation, the uniform citation "For outstanding scientific and engineering achievement." The medal is accompanied by a bronze replica, certificate and ten thousand dollars. It is not necessarily awarded on an annual basis.

The following listed have been recipients of the IEEE Medal of Honor:

1917	E. H. Armstrong	1952	W. R. G. Baker
1919	E. F. W. Alexanderson	1953	J. M. Miller
1920	Guglielmo Marconi	1954	W. L. Everitt
1921	R. A. Fessenden	1955	H. T. Friis
1922	Lee de Forest	1956	J. V. L. Hogan
1923	John Stone-Stone	1957	J. A. Stratton
1924	M. I. Pupin	1958	A. W. Hull
1926	G. W. Pickard	1959	E. L. Chaffee
1927	L. W. Austin	1960	Harry Nyquist
1928	Jonathan Zenneck	1961	Ernst A. Guillemin
1929	G. W. Pierce	1962	Edward V. Appleton
1930	P. O. Pedersen	1963	John H. Hammond, Jr.
1931	G. A. Ferrie	1963	George C. Southworth
1932	A. E. Kennelly	1964	Harold A. Wheeler
1933	J. A. Fleming	1966	Claude E. Shannon
1934	S. C. Hooper	1967	Charles H. Townes
1935	Balth. van der Pol	1968	Gordon K. Teal
1936	G. A. Campbell	1969	Edward L. Ginztan
1937	Melville Eastham	1970	Dennis Gabor
1938	J. H. Dellinger	1971	John Bardeen
1939	A. G. Lee	1972	Jay W. Forrester
1940	Lloyd Espenschied	1973	Rudolf Kompfner
1941	A. N. Goldsmith	1974	Rudolf E. Kalman
1942	A. H. Taylor	1975	John R. Pierce
1943	William Wilson	1977	H. Earle Vaughan
1944	Haraden Pratt	1978	Robert N. Noyce
1945	H. H. Beverage	1979	Richard Bellman
1946	R. V. L. Hartley	1980	William Shockley
1948	L. C. F. Horle	1981	Sidney Darlington
1949	Ralph Bown	1982	John W. Tukey
1950	F. E. Terman	1983	Nicolaas Bloembergen
1951	V. K. Zworykin		

In 1973 IEEE created a Special Award to commemorate the 25th Anniversary of the Transistor. Those recipients were: John Bardeen Walter H. Brattain William Shockley

IEEE MAJOR ANNUAL MEDALS

The Major Annual Medals are awarded on an annual basis except when in the judgment of the Awards Board suitable candidates are not available. Recipients of the IEEE Major Annual Medals shall be members of the IEEE, however, under exceptional circumstances, the Board of Directors may approve the presentation of any of the IEEE Major Annual Medals to a nonmember.

ALEXANDER GRAHAM BELL MEDAL

The Alexander Graham Bell Medal, sponsored by the American Telephone and Telegraph Company, was established in 1976 to commemorate the centennial of the invention of the telephone by Alexander Graham Bell. It is awarded by the Board of Directors on the recommendation of the Alexander Graham Bell Medal Committee and the Awards Board "for exceptional contributions to the advancement of telecommunications." Preference shall be given to achievement by a single individual, but may be conferred upon a team or not more than three individuals. The award consists of a gold medal, bronze replica, certificate and ten thousand dollars.

Past recipients of the Alexander Graham Bell Medal are:

1976	Amos E. Joel, Jr.	1979	Christian Jacobaeus
	William Keister	1980	Richard R. Hough
	Raymond W. Ketchledge	1981	David Slepian
1977	Eberhardt Rechtin	1982	Harold A. Rosen
1978	M. Robert Aaron	1983	Stephen O. Rice
	John S. Mayo		
	Eric E. Sumner		

EDISON MEDAL

The Edison Medal was founded by an organization of associates and friends of Thomas A. Edison, who desired to commemorate the achievements of a quarter of a century in the art of electric lighting with which Edison had been so prominently identified, to serve "as an honorable incentive to scientists, engineers, and artisans to maintain by their works the high standard of accomplishment" which had been set by Edison. The Edison Medal was established in 1904 and is awarded by the Board of Directors on the recommendation of the Edison Medal Committee and the Awards Board, for "a career of meritorious achievements in electrical science or electrical engineering or electrical arts." The award consists of a gold medal, small gold replica, certificate and ten thousand dollars.

Past recipients of the Edison Medal are as follows:

1909	Elihu Thomson	1948	Morris E. Leeds
1910	Frank J. Sprague	1949	Karl B. McEachron
1911	George Westinghouse	1950	Otto B. Blackwell
1912	William Stanley	1951	Charles F. Wagner
1913	Charles F. Brush	1952	Vladimir K. Zworykin
1914	Alexander Graham Bell	1953	John F. Peters
1916	Nikola Tesla	1954	Oliver E. Buckley
1917	John J. Carty	1955	Leonid A. Umansky
1918	Benjamin G. Lamme	1956	Comfort A. Adams
1919	W. L. R. Emmet	1957	John K. Hodnette
1920	Michael I. Pupin	1958	Charles F. Kettering
1921	Cummings C. Chesney	1959	James F. Fairman
1922	Robert A. Millikan	1960	Harold S. Osborne
1923	John W. Lieb	1961	William B. Kouwenhoven
1924	John W. Howell	1962	Alexander C. Monteith
1925	Harris J. Ryan	1963	John R. Pierce
1927	William D. Coolidge	1964	(Schedule revised)
1928	Frank B. Jewett	1965	Walker L. Cisler
1929	Charles F. Scott	1966	Wilmer L. Barrow
1930	Frank Conrad	1967	George H. Brown
1931	E. W. Rice, Jr.	1968	Charles F. Avila
1932	Bancroft Gherardi	1969	Hendrik W. Bode
1933	Arthur E. Kennelly	1970	Howard H. Aiken
1934	Willis R. Whitney	1971	John W. Simpson
1935	Lewis B. Stillwell	1972	William H. Pickering
1936	Alex Dow	1973	B. D. H. Tellegen
1937	Gano Dunn		

1938	Dugald C. Jackson	1974	Jan A. Rajchman
1939	Philip Torchio	1975	Sidney Darlington
1940	George A. Campbell	1976	Murray Joslin
1941	John B. Whitehead	1977	Henri Busignies
1942	Edwin H. Armstrong	1978	Daniel E. Noble
1943	Vannevar Bush	1979	Albert Rose
1944	E. F. W. Alexanderson	1980	Robert Adler
1945	Philip Sporn	1981	C. Chapin Cutler
1946	Lee de Forest	1982	Nathan Cohn
1947	Joseph Slepian	1983	Herman Paul Schwan

FOUNDERS MEDAL

The Founders Medal is given "for major contributions in the leadership, planning, or administration of affairs of great value to the electrical and electronics engineering profession." The award was established in 1952. The award is made by the Board of Directors on the recommendation of the Founders Medal Committee and the Awards Board. The award consists of a gold medal, bronze replica, and a certificate. The following are past recipients of the Founders Medal:

1953	David Sarnoff	1971	Ernst Weber
1954	Alfred N. Goldsmith	1972	Masaru Ibuka
1957	Raymond A. Heising	1973	William R. Hewlett
1958	W. R. G. Baker		David Packard
1960	Haraden Pratt	1974	Lawrence A. Hyland
1961	Ralph Bown	1975	John G. Brainerd
1963	Frederick E. Terman	1976	Edward W. Herold
1964	Andrew G. L. McNaughton	1977	Jerome B. Weisner
	Elmer W. Engstrom	1978	Donald G. Fink
1966	Harvey Fletcher	1979	Hanzo Omi
1967	Patrick E. Haggerty	1980	Simon Ramo
1968	E. Finley Carter	1981	James Hillier
1969	Morris D. Hooven	1982	Shigeru Yonezawa
1970		1983	Joseph M. Pettit

LAMME MEDAL

The award was established in 1928 through a bequest made by the late Benjamin G. Lamme, Chief Engineer of the Westinghouse Electric and Manufacturing Company, and is supported by the Westinghouse Foundation. It is an award of the Institute for meritorious technical achievement in "the development of electrical or electrical apparatus or systems," and is awarded by the Board of Directors on the recommendation of the Lamme Medal Committee and the Awards Board. The award consists of a gold medal, bronze replica and a certificate. Past recipients are listed as follows:

1928	Allan Bertram Field	1957	H. S. Black
1929	Rudolf E. Hellmund	1958	P. L. Alger
1930	William J. Foster		S. Beckwith
1931	Giuseppe Faccioli	1959	L. A. Kilgore
1932	Edward Weston	1960	John G. Trump
1933	Lewis B. Stillwell	1961	Charles Concordia
1934	Henry E. Warren	1962	E. L. Harder
1935	Vannevar Bush	1963	Loyal V. Bewley
1936	Frank Conrad	1964	(Schedule revised)
1937	Robert E. Doherty	1965	A. Uno Lamm
1938	Marion A. Savage	1966	Rene Andre Baudry
1939	Norman W. Storer	1967	Warren P. Mason
1940	Comfort A. Adams	1968	Nathan Cohn
1941	Forrest E. Ricketts	1969	James D. Cobine
1942	Joseph Slepian	1970	Harry F. Olson
1943	A. H. Kehoe	1971	Winthrop M. Leeds
1944	S. H. Mortensen	1972	Yu H. Ku
1945	David C. Prince		Robert H. Park
1946	J. B. MacNeil	1973	Charles S. Draper
1947	A. M. MacCutcheon	1974	Seymour B. Cohn
1948	V. K. Zworykin	1975	Harold B. Law
1949	C. M. Laffoon	1976	C. Kumar N. Patel
1950	Donald I. Bohn	1977	Bernard M. Oliver
1951	Arthur E. Silver	1978	Harry W. Mergler
1952	I. F. Kinnard	1979	James M. Lafferty
1953	F. A. Cowan	1980	Eugene C. Starr
1954	A. M. deBellis	1981	George B. Litchford
1955	C. R. Hanna	1982	Marvin Chodorow
1956	H. H. Beverage	1983	Marion E. Hines

IEEE EDUCATION MEDAL

The award was established by the Institute in 1956 and is supported by the Life Members Fund Committee and the continuing voluntary contributions by the Life Members of the Institute to this fund. The Education Medal is awarded by the Board of Directors on the recommendation of the Education Medal Committee and the Awards Board to recognize "outstanding contributions to education for excellence in teaching and ability to inspire students; leadership in electrical engineering education through publication of textbooks and writings on engineering education; innovations in curricula and teaching methodology; contributions to the teaching and engineering profession through research; engineering achievements, technical papers, and participation in the education activities of professional societies." The award consists of a gold medal, bronze replica, a certificate and five thousand dollars. Past recipients of this award follow:

1956 F. E. Terman	1970 Jacob Millman
1957 W. L. Everitt	1971 Franz Ollendorff
1958 J. F. Calvert	1972 M. E. Van Valkenburg
1959 G. S. Brown	1973 Lotfi A. Zadeh
1960 Ernst Weber	1974 John G. Truxal
1961 George F. Corcoran	1975 Charles A. Desoer
1962 Ernst A. Guillemin	1976 John G. Linvill
1963 William G. Down	1977 Robert M. Fano
1964 B. R. Teare, Jr.	1978 Harold A. Peterson
1965 Hugh H. Skilling	1979 John R. Ragazzini
1966 William H. Huggins	1980 Aldert van der Ziel
1967 John R. Whinnery	1981 Ernest S. Kuh
1968 Edward C. Jordan	1982 King-Sun Fu
1969 Donald O. Pederson	1983 Mischa Schwartz

SIMON RAMO MEDAL

The Simon Ramo Medal, sponsored by TRW, Inc., was established in 1980 in recognition of the distinguished engineering contributions of Dr. Simon Ramo, Vice Chairman of the Board and Chairman of the Executive Committee for TRW, Inc. It is awarded by the Board of Directors on the recommendation of the Simon Ramo Medal Committee and the Awards Board for "significant achievement in systems engineering and systems science as evidenced by some major engineering contribution or for technical leadership in a major innovative engineering project within the scope of the IEEE."

If the candidate has not previously published an IEEE paper on the subject of the award, the recipient may be requested to present a Simon Ramo lecture on an appropriate subject at a designated IEEE meeting. The award consists of a gold medal, certificate, five thousand dollars and a travel allowance not to exceed one-half of the honorarium.

IEEE FIELD AWARDS

The Field Awards Committee of the Awards Board shall administer and recommend candidates for the IEEE Field Awards in several fields of science and technology and in particular classes of service. The scope of a Field Award encompasses the interests of one or more Societies of the Institute.

The awards shall be made by the Board of Directors on the recommendation of the Field Awards Committee and the Awards Board.

CLEDO BRUNETTI AWARD

The award was established in 1975 through a bequest made by the late Clelio Brunetti, an executive of the FMC Corporation "for outstanding contributions in the field of miniaturization in the electronic arts." The award consists of a certificate and one thousand dollars.

Recipients of the Clelio Brunetti Award to date are:

1978 Jack S. Kilby	1981 Donald R. Herriott
Robert N. Noyce	1982 Robert H. Dennard
1979 Geoffrey W. A. Dummer	1983 Abe Offner
Philip J. Franklin	1984 Harry W. Rubinstein
1980 Marcian E. Hoff, Jr.	

CONTROL SYSTEMS SCIENCE AND ENGINEERING AWARD

The award was established in 1980 and is sponsored by Systems Control, Inc., "for meritorious achievement in contributions to theory, design, or techniques, as evidenced by publications or patents in the area of control systems science and engineering" to an individual. The award consists of a certificate and one thousand dollars.

Recipients of this award to date are:

1982 Howard H. Rosenbrock 1984 Arthur E. Bryson, Jr.

HARRY DIAMOND AWARD

The award was established in 1949, by friends of the late Harry Diamond who felt that his professional life exemplified the highest type of scientific effort in government service, "for outstanding technical contributions in the field of government service in any country, as evidenced by publication in professional society journals." The award consists of a certificate and two thousand dollars.

The following are recipients of the award:

1950 A. V. Haeff	1968 Harry I. Davis
1951 M. J. E. Golay	1969 Maurice Apstein
1952 Newbern Smith	1970 Allen V. Astin
1953 R. M. Page	1971 Arthur H. Guenther
1954 Harold Zahl	1972 William B. McLean
1955 Bernard Salzberg	1973 Harold Jacobs
1956 W. S. Himnan, Jr.	1974 Chester H. Page
1957 Georg Goubau	1975 Louis Costrell
1958 E. W. Allen, Jr.	1976 Maxime A. Faget
1959 J. W. Herbstreit	1977 Jacob Rabinow
1960 K. A. Norton	1978 David M. Kerns
1961 H. L. Brueckmann	1979 Henry P. Kalmus
1962 William Culshaw	1980 Martin Greenspan
1963 Allen H. Schooley	1981 George Abraham
1964 James R. Wait	1982 Jules Aarons
1965 George J. Thaler	1983 Merrill I. Skolnik
1966 John J. Egli	1984 Sydney R. Parker
1967 Rudolf A. Stampfl	

WILLIAM M. HABIRSHAW AWARD

The award was established in 1958, by the Phelps Dodge Cable & Wire Co., "for outstanding contribution to the field of electrical transmission and distribution" to an individual or group of individuals. The award consists of a bronze medal, certificate and one thousand dollars.

The following have been awarded the William M. Habirshaw Award:

1959 William A. Del Mar	1973 Eugene W. Boehne
1960 Selden B. Crary	1974 Herbert R. Stewart
1961 Samuel B. Griscom	1975 Everett J. Harrington
1962 Herman Halperin	1976 Francis J. Lane
1963 L. M. Robertson	1977 (Schedule revised)
1964 C. S. Schifreen	1978 Martin H. McGrath
1965 Wilfred F. Skeats	1979 Howard C. Barnes
1966 I. Birger Johnson	Theodore J. Nagel
1967 Robert J. Wiseman	1980 Edward W. Kimbark
1968 Eugene C. Starr	1981 William R. Johnson
1969 James A. Rawls	1982 Peter L. Bellaschi
1970 Fred J. Vogel	1983 Andrew F. Corry
1971 Gunnar Jancke	1984 Ralph S. Gens
1972 J. J. Archambault	
Lionel Cahill	

IEEE AWARD IN INTERNATIONAL COMMUNICATION (in honor of Hernand and Sosthenes Behn)

The award was established in 1966 through agreement with the International Telephone and Telegraph Corporation, "for outstanding contribution to the field of international communication." Preference given to achievement by a single individual, but may be conferred on a team of not more than three individuals. The award consists of a plaque, certificate and two thousand dollars.

The following have been recipients of this award:

1966 E. Maurice Deloraine	1975 John B. Puente
1967 Leonard Jaffe	1976 Sidney Metzger

1968	Edward W. Allen	1977	(Schedule revised)
1969	Henri Busignies	1978	F. Louis H. M. Stumpers
1970	Herre Rinia	1979	A. Nejat Ince
1971	Eugene F. O'Neill	1980	Armig B. Kandoian
1972	Frank deJager	1981	Richard C. Kirby
	Johannes A. Greefkes	1982	Hiroshi Inose
1973	Vladimir A. Kotelnikov	1983	Lynn W. Ellis
1974	Leslie H. Bedford		

MORRIS E. LEEDS AWARD

The award was established in 1958 by the Leeds and Northrup Foundation and shall be made to an individual, or group of individuals, "making an outstanding contribution to the field of electrical measurement." Special consideration shall be given to the value of contributions made before the candidate has reached his thirty-sixth birthday. The award consists of an illuminated framed certificate and one thousand dollars.

Recipients of the award are the following:

1959	Herbert B. Brooks	1972	Forest K. Harris
1960	Perry A. Borden	1973	C. Howard Vollum
1961	Theodore A. Rich	1974	Norbert L. Kusters
1962	Bernard E. Lenehan	1976	Francis L. Hermach
1963	Francis B. Silsbee	1977	Arthur M. Thompson
1964	John G. Ferguson	1978	Thomas M. Dauphinee
1965	Harold E. Edgerton	1979	Robert D. Cutkosky
1966	William W. Mumford	1980	Wallace H. Coulter
1967	Henry R. Chope	1981	Frank C. Creed
1968	Albert J. Williams, Jr.	1982	Lothar Rohde
1969	Harry W. Houck	1983	Erich P. Ippen
1970	Harold I. Ewen		Charles V. Shank
1971	Martin E. Packard	1984	Leonard Samuel Cutler

MORRIS N. LIEBMANN AWARD

The award was established in 1919 to perpetuate the memory of Colonel Morris N. Liebmman. The award shall be made "for the most important contribution to emerging technologies recognized within recent years." The award consists of a certificate and two thousand dollars.

The following are recipients of the award:

1919	L. F. Fuller	1957	O. G. Villard, Jr.
1920	R. A. Weagant	1958	E. L. Ginzton
1921	R. A. Heising	1959	Nicolaas Bloembergen
1922	C. S. Franklin		C. H. Townes
1923	H. H. Beverage	1960	J. A. Rajchman
1924	J. R. Carson	1961	Leo Esaki
1925	Frank Conrad	1962	Victor H. Rumsey
1926	Ralph Bown	1963	Ian Munro Ross
1927	A. H. Taylor	1964	Arthur L. Schawlow
1928	W. G. Cady	1965	William R. Bennett, Jr.
1929	E. V. Appleton	1966	Paul K. Weimer
1930	A. W. Hull	1968	Emmett N. Leith
1931	Stuart Ballantine	1969	John B. Gunn
1932	Edmond Bruce	1970	John A. Copeland
1933	Heinrich Barkhausen	1971	Martin Ryle
1934	V. K. Zworykin	1972	Stewart E. Miller
1935	F. B. Llewellyn	1973	Nick Holonyak, Jr.
1936	B. J. Thompson	1974	Willard S. Boyle
1937	W. H. Doherty		George E. Smith
1938	G. C. Southworth	1975	A. H. Bobeck
1939	H. T. Friis		P. C. Michaelis
1940	H. A. Wheeler		H. E. D. Scovil
1941	P. T. Farnsworth	1976	Herbert J. Shaw
1942	S. A. Schelkunoff	1977	Horst H. Berger
1943	W. L. Barrow		Siegfried K. Wiedmann
1944	W. W. Hansen	1978	Kuen C. Kao
1945	P. C. Goldmark		Robert D. Maurer
1946	Albert Rose		John B. MacChesney
1947	J. R. Pierce	1979	Ping King Tien
1948	S. W. Seeley	1980	A. J. DeMaria
1949	C. E. Shannon	1981	Calvin F. Quate
1950	O. H. Schade	1982	John R. Arthur, Jr.
1951	R. B. Dome		Alfred Y. Cho
1952	William Shockley	1983	Robert W. Brodersen
1953	J. A. Pierce		Paul R. Gray
1954	R. R. Warnecke		David A. Hodges
1955	A. V. Loughren	1984	David E. Carlson
1956	Kenneth Bullington		Christopher R. Wronski

JACK A. MORTON AWARD

The award was established in 1974 and is sponsored by twenty semiconductor organizations of the United States, Europe and Japan. The award shall be made to an individual or group of individuals "for outstanding contributions in the field of solid-state devices." The award consists of a bronze medal, certificate and two thousand dollars.

The following are recipients of this award:

1976	Robert N. Hall	1982	Dov Frohman-Bentchkowsky
1977	Morgan Sparks	1983	Jun-ichi Nishizawa
1978	Juri Matisoo	1984	Hans S. Rupprecht
1979	Martin P. Lepselter		Jerry M. Woodall
1980	James F. Gibbons		
1981	Nick Holonyak, Jr.		

FREDERIK PHILIPS AWARD

The award was established in 1971 by N. V. Philips' Gloeilampenfabrieken. The award shall be made "for outstanding accomplishments in the management of research and development resulting in effective innovation in the electrical and electronics industry." Preference given for achievement by a single individual, but may be conferred on a team of not more than three individuals. The award consists of a gold medal, certificate and two thousand dollars.

The following are recipients of this award:

1971	Frederik J. Philips	1978	William E. Shoupp
1972	William O. Baker	1979	Gordon E. Moore
1973	John H. Dessauer	1980	William M. Webster
1974	Chauncey Guy Suits	1981	Dean A. Watkins
1975	C. Lester Hogan	1982	Werner J. Kleen
1976	Koji Kobayashi	1983	Allen E. Puckett
1977	(Schedule revised)	1984	John K. Galt

EMANUEL R. PIORE AWARD

The award was established in 1976 and is sponsored by the International Business Machines Corporation. The award shall be made "for outstanding achievement in the field of information processing, in relation to computer science, deemed to have contributed significantly to the advancement of science and to the betterment of society." Preference given for achievement by a single individual, but may be conferred on a team of two individuals. The award consists of a gold plated bronze medal, certificate, two thousand dollars and an international travel grant of two thousand five hundred dollars.

The following named are recipients of this award:

1977	George R. Stibitz	1982	Kenneth L. Thompson
1978	J. Presper Eckert		Dennis M. Ritchie
	John W. Mauchly	1983	Niklaus Wirth
1979	Richard W. Hamming	1984	Harvey G. Cragon
1980	Lawrence R. Rabiner		
	Ronald W. Schafer		

DAVID SARNOFF AWARD

The award was established in 1959 by the RCA Corporation. The award shall be made "for an outstanding contribution to the field of electronics." Preference given to a single individual for achievement recognized during the five years preceding the year in which the award is made. May be conferred on a team of not more than three individuals. The award consists of a gold medal, bronze replica, certificate and one thousand dollars.

The following are recipients of this award:

1959	David Sarnoff	1973	Max V. Mathews
1960	Rudolf Kompfner	1974	F. L. J. Sangster
1961	Charles H. Townes	1975	Bernard C. De Loach, Jr.
1962	Harry B. Smith	1976	George H. Heilmeyer
1963	Robert N. Hall	1977	Jack M. Manley
1964	Henri G. Busignies		Harrison E. Rowe
1965	Jack A. Morton	1978	Stephen E. Harris
1966	Jack S. Kilby	1979	A. Gardner Fox
1967	James Hillier		Tingye Li
1968	Walter P. Dyke	1980	Marshall I. Nathan
1969	Robert H. Rediker	1981	Cyril Hilsum
1970	John B. Johnson	1982	Nobutoshi Kihara
1971	Alan L. McWhorter	1983	Hermann K. Gummel
1972	Edward G. Ramberg		

CHARLES PROTEUS STEINMETZ AWARD

The award was established in 1979 and is sponsored by the IEEE Standards Board. The award shall be made to an individual "for major contributions to the development of standards in the field of electrical and electronics engineering." The award consists of a certificate and one thousand dollars.

The following have been presented this award:

1980 Leon Podolsky	1983 William A. McAdams
1982 Ralph M. Showers	1984 H. Baron Whitaker

NIKOLA TESLA AWARD

The award was established in 1975 and is sponsored by the IEEE Power Engineering Society. The award shall be made to an individual or group of individuals "for outstanding contributions in the field of generation and utilization of electric power." This award consists of a plaque and one thousand dollars. To date, the Yugoslav Society for the promotion of Scientific Knowledge-Nikola Tesla, and the Union of Yugoslav Electric Power Industry have provided additional recognition to the recipient.

The following have received this award:

1976 Leon T. Rosenberg	1980 Philip H. Trickey
1977 Cyril G. Veinott	1981 Dean B. Harrington
1978 Charles H. Holley	1982 Sakae Yamamura
1979 John W. Batchelor	1984 Herbert H. Woodson

VLADIMIR K. SWORYKIN AWARD

The award, supported by the RCA Corporation, was established in 1950 by Dr. Vladimir K. Zworykin. The award shall be made "for the most important technical contribution to electronic television." The award consists of a certificate and one thousand dollars.

The following are recipients of this award:

1952 B. D. Loughlin	1970 Charles H. Coleman
1953 Frank Gray	1971 Alfred C. Schroeder
1954 A. V. Bedford	1972 Robin E. Davies
1955 H. B. Law	1973 Albert Macovski
1956 F. J. Bingley	1974 Senri Miyaoka
1957 Donald Richman	1975 Eugene I. Gordon
1958 C. P. Ginsburg	Ralph E. Simon
1959 P. K. Weimer	1977 Dalton H. Pritchard
1961 P. C. Goldmark	1978 Sam H. Kaplan
1962 G. A. Morton	1979 Albert M. Morrell
1963 P. J. Rice, Jr.	1980 Walter Bruch
W. E. Evans, Jr.	1981 Naohiro Goto
1965 Norman F. Fyler	1983 Jon K. Clemens
1966 Ray D. Kell	Eugene O. Keizer
1967 Keiji Suzuki	1984 Takehiro Kakizaki
1968 Kurt Schlesinger	Yasuharu Kubota
1969 Otto H. Schade	

IEEE SERVICE AWARD

The Founders Medal Committee of the Awards Board shall administer and recommend candidates for the Haraden Pratt Award. Nominees shall be Senior Members or Fellows of the IEEE.

HARADEN PRATT AWARD

The award was established in 1971 in honor of Haraden Pratt who served as an IEEE Officer, Director and Director Emeritus. He had given dedicated and distinguished service to the Institute. The purpose of the award is to annually recognize individuals who "have conferred outstanding service to the Institute." The award consists of an illuminated certificate.

The following are recipients of the Haraden Pratt Award:

1972 Alfred N. Goldsmith	1978 Ivan S. Coggeshall
1973 Elgin B. Robertson, Sr.	1979 John D. Ryder
1974 James H. Mulligan, Jr.	1980 Raymond W. Sears
1975 Walter J. Barrett	1981 Robert H. Tanner
1976 Clarence H. Linder	1983 Thomas H. Lee
1977 (Schedule revised)	

IEEE PRIZE PAPER AWARDS

The IEEE Prize Papers Committee of the Awards Board shall administer and recommend candidates for these awards. The awards are made annually by the Board of Directors on the recommendation of the Prize Papers Committee and the Awards Board. Nominations must be received by the Awards Board by July 1 and shall include only papers in publications which have been issued between January 1 and December 31 of the preceding year.

W. R. G. BAKER AWARD

The award was established by W. R. G. Baker in 1956 "for the most outstanding paper reporting original work in the TRANSACTIONS, JOURNALS, and MAGAZINES of the Societies or in the PROCEEDINGS of the IEEE." The award consists of a certificate and one thousand dollars.

The following are recipients of this award:

1957 D. R. Fewer	1973 Leon O. Chua
R. J. Kircher	1974 David B. Large
R. L. Trent	Lawrence Ball
1958 R. L. Kyhl	Arnold J. Farstad
H. F. Webster	1975 Stewart E. Miller
1959 R. D. Thornton	Enrique A. J. Marcattili
1960 E. J. Nalos	Tingye Li
1961 Manfred Clynes	1976 Robert W. Keyes
1962 Marvin Chodorow	1977 Manfred R. Schroeder
Tore Wessel-Berg	1978 Eugene C. Sakshaug
1963 Leonard Lewin	James S. Kresge
1964 Donald L. White	Stanley A. Miske, Jr.
1965 D. C. Youla	1979 Stephen W. Director
1966 Robert G. Gallager	Gary D. Hachtel
1967 Dean E. McCumber	1980 Gordon M. Jacobs
Alan G. Chynoweth	David J. Allstot
1968 J. Andersen	Probert W. Brodersen
H. B. Lee	Paul R. Gray
1969 Tosiro Koga	1981 Timothy C. May
1970 George J. Friedman	Murray H. Woods
Cornelius T. Leondes	1982 Carl O. Bozler
1971 Andrew H. Bobeck	Gary D. Alley
Robert F. Fischer	1983 Ryszard Malewski
Anthony J. Perneski	Kurt Feser
J. P. Remeika	Chinh T. Nguyen
L. G. Van Uitert	Nils Hylten-Cavallius
1972 Dirk J. Kuizenga	
Anthony E. Seigman	

DONALD G. FINK AWARD

The award was established in 1979, in honor of Donald G. Fink, and is supported by the IEEE Life Member Fund Committee, "for the outstanding survey, review or tutorial paper in any of the IEEE TRANSACTIONS, JOURNALS, MAGAZINES or PROCEEDINGS of the IEEE." The award consists of a certificate and one thousand dollars.

The following are recipients of this award:

1981 Whitfield Diffie	1982 Arun N. Netravali
Martin E. Hellman	John O. Limb
	1983 Anil K. Jain

BROWDER J. THOMPSON AWARD

The award was established in memory of Browder J. Thompson in 1945. The award is made "for the most outstanding paper in any IEEE publication." The author, or joint authors, must not have reached the age of thirty (30) years at the date of submission of the original manuscript. The award consists of a certificate and one thousand dollars.

The following are recipients of this award:

1946 G. M. Lee	1966 Kenneth M. Johnson
1947 C. L. Dolph	1967 Leon O. Chua
1948 W. H. Huggins	R. A. Rohrer
1949 R. V. Pound	1968 Michael L. Dertouzos
1950 J. F. Hull	1969 Malvin C. Teich
A. W. Rands	1970 J. David Rhodes
1951 A. B. Macnee	1971 L. J. Griffiths

1952 H. W. Welch, Jr.	1972 G. David Forney, Jr.
1953 R. C. Booton, Jr.	1973 Jerry Mar
1954 R. L. Petritz	1974 Jorn Justesen
1955 B. D. Smith, Jr.	1975 Nuggehally S. Jayant
1956 J. E. Bridges	1976 Russell M. Mersereau
1957 D. A. Buck	Dan E. Dudgeon
1958 Arthur Karp	1977 Michael R. Portnoff
1959 F. H. Blecher	1978 David A. Hounshell
1960 J. W. Gewartowski	1979 Marvin B. Lieberman
1961 Eiichi Goto	1980 Alan S. Willsky
1962 Henri B. Smets	1981 Lawrence H. Goldstein
1963 Chih-Tang Sah	1982 Stig Skelboe
1964 Harry B. Lee	1983 Daniel S. Kimes
1965 S. R. Hofstein	Julie A. Kirchner
F. P. Heiman	

SCHOLARSHIP AWARDS

The Scholarship Awards Committee of the Awards Board shall administer and recommend candidates for the Fortescue Fellowship Award and the Volta Scholarship Award. The Awards shall be made by the Board of Directors on the recommendation of the Scholarship Awards Committee and the Awards Board. In the case of Scholarship and Fellowship Awards, the Board of Directors may delegate its authority to the Executive Committee.

FORTESCUE FELLOWSHIP

An annual Graduate Fellowship was established in 1939 as a memorial to Charles LeGeyt Fortescue in recognition of his valuable contributions to the field of Electrical Engineering. The stipend is provided by the income from a trust fund established by Westinghouse Electric Corporation with whom Dr. Fortescue was associated throughout his professional career. The program is administered by The Institute of Electrical and Electronics Engineers, Incorporated.

The Fellowship, carrying a stipend of \$10,000, is for one year of full time graduate work in Electrical Engineering at an engineering school of recognized standing located in the United States or Canada. The recipient is selected by a committee on the basis of the candidate's potential to contribute to the profession of electrical engineering.

To be eligible, the student must have majored in the field of Electrical Engineering and have received a Bachelor's degree from an engineering college of recognized standing. Preference will be given to applicants about to begin their first year of graduate work.

The recipient of this Fellowship may not hold or receive other Fellowships for the same academic year. However, a grant to cover tuition and fees is permitted. Earnings up to \$5,000 for work which is directly related to the graduate study is also allowed. The recipient must pursue full time graduate work in Electrical Engineering. Evidence of satisfactory academic performance is required midway in the academic year in order for the recipient to continue under the Fellowship.

Applicants should take the Graduate Record Examinations, both aptitude and advanced test,* when these tests are given on the college campuses in October* and December of each year. The Educational Testing Service, which scores the test, should be asked to send copies of test scores to the Secretary of the Fortescue Fellowship Committee at IEEE Headquarters under specified Code R2318. A certified transcript of all college courses is also required.

This application, completed in detail, should reach the Secretary of the Fellowship Committee by January 15; letters of recommendation, transcripts and Graduate Record Examination scores should also arrive by this same date. Awards will be made as soon thereafter as possible.

*The advanced test must be in engineering (area 37). It is recommended that those examinations be taken in October.

The following are recipients of the Fortescue Fellowship:

1940 Norman Z. Alcock	1963 Edgar A. DeMeo
1945 Morton M. Astrahan	Thomas G. Sharpe
1947 Paul Kaczmarczik	1964 Thomas R. Bierma
Theodore G. Mihran	Stephen F. Nygren
1948 James B. Woodford, Jr.	1965 Wayne T. Otsuki
1949 Edward F. Koncel, Jr.	1966 Bruce A. Wooley
James B. Woodford, Jr.	1967 John A. Boucher

1950 Robert E. Horn	1968 John Gilchrist
Robert R. Johnson	1969 Michael H. Hartung
1951 Clarence J. Baldwin, Jr.	1970 Alton L. Gilbert
1952 Peter A. Rizzi	1971 Richard J. Fisher
James E. Shea	1972 Alan D. Legatt
1953 Richard C. Heyser	1973 Harold G. Sampson
John M. Tomlinson	1974 David J. Reinagel
1954 William L. Kilmer	1975 Dean P. Kolba
1955 Taylor L. Booth	1976 Victor H. L. Cheng
1956 D. F. Fox	1977 Michael R. Lowry
K. F. Steffan	1978 Michael E. Mauel
1957 Sigmund Scala	1979 Scott H. Goodwin
1958 Thomas H. Harley, Jr.	1980 Thomas E. McDermott
1959 Ira Richer	1981 James E. Dvorsky
1960 Jeffrey Frey	1982 Seshadri Subbanna
1961 George W. Gruver	1983 Thomas A. Petsche
1962 Malcolm L. Heimer	

VOLTA MEMORIAL FUND SCHOLARSHIP

The Alessandro Volta Memorial Fund was established in 1927 by the Italy-America Society of New York in memory of Alessandro Volta and to establish closer ties between Italy and the United States. The award is made biennially to an Italian electrical engineer (not over thirty (30) years of age) for one year of post-baccalaureate or graduate study in the field of electrical engineering in the United States. It provides for an allowance of six thousand dollars.

Applications for the award are submitted to the Associazione Elettrotecnica ed Elettronica Italiana who in turn provide recommendations to the Volta Scholarship Subcommittee and to the Scholarship Awards Committee.

The following are past recipients of this award:

1951 Giovanni Malaman	1964 Renato Pagano
1952 Enrico Chiesa	Giovanni E. Perona
1953 Maurizio G. Vallauri	1965 Carlo G. Someda
1954 Fernando Amman	1966 Sergio DeJulio
1955 Giuseppe Biorci	1967 Alessandro Chiabrera
1956 Giuliano Raviola	1968 Paolo A. Antognetti
1957 Danilo Zucoli	1969 Giacomo R. Bisio
1959 F. Mariotti	1971 Luciano Buti
1960 Arrigo L. Frisiani	1972 Paolo A. Gargini
1961 G. L. Collina	1973 Roberto Napoli
1962 C. Muzzi	1978 Rinaldo Castello
1963 N. Rubino	1981 Maurizio Bressani
	1983 Barbara Pernici

Indeed the MTT-S and the IEEE are meeting one of their principal functions to honor those in the profession who have made significant contributions. It is hoped that the above summary of those who have been honored in the past will stimulate the reader to make recommendations for those who should be honored in the future. I invite you to send your recommendations to me (Hughes Aircraft Company, Building 268, Mail Station A55, Canoga Park, California 91304). If you have any questions or would like more information, please call, (818) 702-1483.



BOOK REVIEW

Digital Communications (Satellite/Earth Station Engineering) by Kamilo Feher (1983, 469 pages, hardbound \$36.00), is reviewed by Richard B. Schulz, ITT Research Institute, Annapolis, Maryland. This review of the Prentice-Hall, Inc. published book is reprinted from the Electromagnetic Compatibility Society Newsletter, Fall 1983 issue (number 119).

In his preface, the author claims that "this book is for the professional engineer and manager, for the advanced student who wants a solid understanding of this field, and for the researcher who needs a consolidated, comprehensive up-to-date reference text of digital communications systems." This reviewer believes that the claims are well substantiated by the material presented, which includes a considerable number of figures, some tables, and questions and problems posed to the student at appropriate points (an answer book is available). He also believes that the book would have been more readily assimilated with the addition of two items: a glossary of symbols (even though the book is not unduly mathematical) and a list of acronyms for the various systems described.

The emphasis in this book is on modern satellite communication systems, where the trend in development is to utilize digital methods. A prerequisite to understanding it is an exposure to the fundamentals of communication systems. For a portion of the text, an exposure to probability theory would be an asset. An EMC engineer with such a background will find the book fascinating in its up-to-the-minute presentation of the principles of satellite digital communications. He will be especially interested in Section 4.10 on Adjacent and Cochannel Interference Effect on the P_e (probability of error) Performance of Binary PSK Systems, profusely illustrated with graphs. He also will be interested in Chapter 7 on Synchronization Subsystems: Analysis and Design, especially Sections 7.2 on Carrier Phase Recovery, 7.3 on Baseband Timing Recovery, and 7.4 on Joint Recovery of Carrier Phase and Symbol Timing. For the EMC engineer concerned with spectrum utilization, the entire Chapter 5 on Spectrally Efficient Modulation Techniques for Satellite Systems will be a reading "must."

The various chapters, some written by specialists in the areas, will now be reviewed. Although Chapter 1 is an introductory chapter, it also provides a wide perspective of operational and planned communications satellite systems that employ digital techniques. It discusses basic considerations inherent in their design.

Chapter 2 discusses signal processing and multiplexing in terrestrial interface systems, including various techniques for analog-to-digital conversion, echo suppression, digital speech interpolation, interfacing, and energy dispersal (scrambling) in digital communications.

Chapter 3 covers baseband systems, with respect to the spectral density of random synchronous signals, band-limited systems, Nyquist theorems (minimum bandwidth, etc.), filtering and equalization techniques, and probability-of-error performance in an additive white Gaussian noise environment.

Chapter 4 relates power-efficient modulation techniques for linear and non-linear channels. This appropriately long chapter (112 pages) covers a large number of different techniques and includes Section 4.10 on EMC mentioned earlier.

Chapter 5 is concerned with spectrally efficient modulation techniques for satellite systems, as also noted earlier. By "spectrally efficient" is meant better than the Nyquist criterion for linear systems of 2 b/s/Hz. The nonlinear systems described are able to achieve approximately 3.7 b/s/Hz for a 16-ary QAM system.

Chapter 6 describes coding for error and detection and correction, and is written by Dr. William H. Tranter. Concepts are clearly presented on entropy, mutual information, and channel capacity; coding for reliable communications; and convolutional codes.

Chapter 7 on synchronization subsystems; analysis and design, written by Dr. Lewis E. Franks, was discussed earlier.

Chapter 8 covers quite well time-division multiple-access (TDMA) systems; it was co-authored by Dr. S. Joseph Campanella and Dr. Daniel Schaefer. TDMA is expected to supersede current frequency-division multiple-access (FDMA) systems, and has already been selected for some satellite applications. TDMA material includes basic TDMA architecture, TDMA control architecture, TDMA terminal implementation, ancillary TDMA processing, terrestrial interfaces, and TDMA system examples.

Chapter 9 on regenerative (on-board processing) satellite systems covers a performance comparison of regenerative and conventional QPSK satellite systems, on-board DQPSK regenerative satellite systems, and performance of regenerative satellite systems using NLF-OKQPSK (Feher's QPSK) and conventional QPSK modems.

The final chapter 10 discusses single-channel-per-carrier (SCPC) preassigned and demand-assigned, SPADE, digital satellite earth stations. Among the topics are single-channel-per-carrier frequency-division multiple-access (SCPC-FDMA) digital satellite systems, system capacity and trade-offs in SPADE and SCPC systems, and new modulation techniques for low-cost, power-efficient earth stations.

The book concludes with an extensive list of references for those who wish to "dip deeper", and also an index.

(Concluded on following page)

BOOK REVIEW . . . concluded from page 41

In summary, this book is impressive on several counts:

- Thorough coverage of the subject area
- Emphasis on principles and practical applications
- Just enough mathematics to support the text
- Well illustrated, with many useful graphs
- Pertinent problems to assure a correct understanding

It is unusual to find a well-written text like this that is suitable to the professional engineer and the serious student alike, and that will also form a valuable reference for future use.



MEETINGS OF INTEREST

The following list of meetings of potential interest to members of the Microwave Theory and Techniques Society covers a period of nearly a year. All efforts will be made to maintain a complete compilation of IEEE-sponsored and non-IEEE-sponsored meetings. Any additions should be sent to the MTT-S Newsletter Editor.

- **International Symposium on Circuits and Systems**, May 7-10, Queen Elizabeth Hotel, Montreal, Quebec, Canada. Sponsor: CAS. Contact: Dr. M.N.S. Swamy, Dean of Engineering, Concordia University, 1455 De Maisonneuve Blvd. West, Montreal, Que. H3G 1M8 Canada, (514) 879-5926.
- **International Switching Symposium (ISS '84)**, May 7-11, Palazzo del Congressi, Florence, Italy. Sponsor: COM, Reg. 8. Contact: A. E. Joel, Bell Laboratories, Holmdel, NJ 07733, (201) 949-2366.
- **34th Electronic Components Conference (ECC)**, May 13-16, Hyatt Regency, New Orleans, LA. Sponsor: CHMT. Contact: Diana Bendz, IBM Corporation, Dept. 648, 1701 North Street, Endicott, NY 13769, (607) 755-2862.
- **International Conference on Communications (ICC '84)**, May 14-17, Congresscentrum Rai, Amsterdam, Netherlands. Sponsor: COM, Reg. 8, Benelux Sect. Contact: Dr. K. Teer (Gen. Chairman), Philips Research Laboratory, Prof. Hostlaan, 5600 MD Eindhoven, Netherlands, Tel: (31)-40-742609.
- **Electro '84**, May 15-17, Bayside Exposition Center, Boston, MA. Sponsor: Reg. 1, Cen. New England Council, METSAC Sect. Contact: Dale Litherland, Electronic Conventions, Inc., 8110 Airport Blvd., Los Angeles, CA 90045, (213) 772-2965.
- **Custom Integrated Circuits Conference**, May 21-23, Genesee Plaza/Holiday Inn, Rochester, NY. Sponsor: ED, Rochester Section. Contact: Laura A. Hayward, Conference Coordinator, 6272 Boughton Hill Road, Victor, NY 14564, (716) 924-2948.
- **National Aerospace and Electronics Conference (NAECON '84)**, May 21-25, Dayton Convention Center, Dayton, OH. Sponsor: AES, Dayton Section. Contact: Erwin Gangl, 110 East Monument Ave., Dayton, OH 45402, (513) 255-2025.
- **The 1984 IEEE Microwave and Millimeter-Wave Monolithic Circuits Symposium**, May 29-30, Hyatt Regency, San Francisco, CA. Sponsor: MTT. Contact: Dr. James G. Oakes, Raytheon Company, Special Microwave Device Operation, Bearfoot Road, Northborough, MA 01532.
- **International Microwave Symposium and Workshops**, May 30-June 1, Hyatt Regency, Civic Auditorium, San Francisco, CA. Sponsor: MTT. Contact: Dr. Stephen F. Adam, Hewlett Packard Co., 350 W. Trimble Road, San Jose, CA 95131, (408) 263-7500, ext. 2820.
- **38th Annual Frequency Control Symposium**, May 30-June 1, Marriott Hotel, Philadelphia, PA. Contact: Dr. Samuel R. Stein, National Bureau of Standards, Time and Frequency Division, 325 Broadway, Mail Code 524, Boulder, CO 80303.
- **2nd Seoul International Symposium on Electrical and Electronics Engineering (SISEEE '84)**, June 5-7, Hotel Shilla, Seoul, Korea. Sponsor: Korea Section. Contact: Prof. Z. H. Cho, Department of Electrical Science, Korea Advanced Institute of Science, P.O. Box 150 Chong Yang Ri, Seoul, Korea, Tel: +877-5010-9.
- **International Conference on Consumer Electronics**, June 6-8, Westin Hotel, Chicago, IL. Sponsor: CE. Contact: Hiro Kawamoto, Sony Consumer Electronics Laboratories, 15 Essex Road, Paramus, NJ 07652, (201) 368-5168.
- **42nd Annual Device Research Conference**, June 18-20, University of California at Santa Barbara, Santa Barbara, CA. Contact: Pallab Chatterjee, Texas Instruments, M/S 369, Box 225621, Dallas, TX 75265, (214) 995-7914.
- **16th Power Modulator Symposium**, June 18-20, Arlington, VA. Sponsor: ED. Contact: Sol Schneider, 37 Northvale Ave., Little Silver, NJ.

(Please continue to next page)

IT ALL ADDS UP!

A hard working computer operator, asking for a well-deserved raise, was put off by his boss who was known to be the town skin-flint.

"Pat," he said, "you really don't work as hard as you say. And I can prove it to you. There are 365 days in a year. You sleep 8 hours a day, making 122 days. Subtracted from 365, that leaves 243. You also have 8 hours every day for recreation and taking care of your family, which makes another 122 days. That leaves a balance of 121 days. Then, too, there are 52 Sundays; deducting these leaves 69 days. As you know, our office is closed every Saturday afternoon, giving 52 half-holidays or 26 more days that you do not work. This leaves a balance of only 43 days. However, we allow you one hour for lunch, which over the year makes 16 days, leaving 27 days. We give you two weeks vacation; that leaves only 13 days. Also, there are 12 legal holidays, leaving only one day; and if you add up all your coffee breaks, you will see that you probably owe me money!"

Poor Pat, not having heard the old adage, "Figures don't lie, but liars can figure," hastily retreated to his work station, fearing he might not even get his regular paycheck.



IEEE DIVISION 4 MAGNETISM DELEGATION TO PEOPLES REPUBLIC OF CHINA

At the suggestion of Emerson Pugh, Director of Division 4, we are trying to arrange a technical visit to China. We hope to have perhaps two people from each of the five Societies in Division 4 to go. Each representative should be prepared to speak about his past work in the area of magnetism, and perhaps about related work recently published. The Chinese have agreed to arrange a brief conference and visits to a variety of their laboratories doing significant work in magnetism. The entire visit may take two or three weeks. It is anticipated that spouses will be welcome and that about one-third to one-half of our time may be available for sightseeing.

Anyone interested in participating should contact:

Fred E. Luborsky
General Electric Company
Corporate Research and Development
P. O. Box 8
Schenectady, NY 12301
Telephone: (518) 385-8692

MEETINGS OF INTEREST . . . from preceding page

- **Power Electronics Specialist Conference (PESC '84)**, June 18-21, National Bureau of Standards, Gaithersburg, MD. Sponsor: PEC, ED (Cooperating). Contact: Frank F. Oettinger, Division 726, National Bureau of Standards, Washington, DC 20234, (301) 921-3541.
- **International Quantum Electronics Conference (IQEC '84)**, June 18-22, Anaheim Convention Center, Anaheim Marriott Hotel, Anaheim, CA. Sponsor: QEA. Contact: Meetings Dept., Optical Society of America, 1816 Jefferson Place, NW, Washington, DC 20036, (202) 223-8130.
- **Conference on Lasers and Electro-Optics (CLEO '84)**, June 19-22, Anaheim Convention Center, Anaheim, CA. Sponsor: QEA. Contact: Meetings Dept., Optical Society of America, 1816 Jefferson Place, NW, Washington, DC 20036, (202) 223-8130.
- **International IEEE Antennas and Propagation Symposium and USNC/URSI Meeting**, June 25-29, Westin Hotel, Copley Place, Boston, MA. Sponsor: AP. Contact: Dr. Allen C. Schell, RAD/EE, Hanscom AFB, MA 01731, (617) 861-3700.
- **7th International Worclaw Symposium on Electromagnetic Compatibility**, June 26-28, Technical University, Worclaw, Poland. Sponsor: EMC (Cooperating). Contact: W. Moron, Box 2141, 51-645 Worclaw 12, Poland.
- **Fifth International Conference on Ion Implantation**, July 23-27, Vermont. Sponsor: ED. Contact: Prof. R. Anderson, Department of Electrical Engineering, University of Vermont, Burlington, VT 05405.
- **3rd International Conference on Molecular Beam Epitaxy**, August 1-3, San Francisco, CA. Sponsor: ED. Contact: A. Y. Cho, Bell Laboratories, 600 Mountain Avenue, Murray Hill, NJ 07974, (201) 582-2093.
- **International Geoscience and Remote Sensing Symposium—IGARSS '84**, August 27-30, Strasbourg, France. Sponsor: GRS. Contact: Dr. Keith Carver, U.S. Liaison Officer, New Mexico State University, Box 3449, Las Cruces, NM 88003, (505) 646-3421.
- **1984 International Conference on Solid-State Devices and Materials**, Aug. 30-Sept. 1, International Conference Center, Kobe, Hyogo, Japan. Sponsor: ED & IEEE Tokyo Section (Cooperating). Contact: Prof. Susumu Namba, Osaka University, Faculty of Engineering Science, Toyonaka, Osaka 560, Japan.

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IEEE ELECTION NEWS

For the third consecutive year, the IEEE Board of Directors has ensured a contested election for the post of President-Elect by nominating two candidates, Jose B. Cruz, Jr. and Bruno O. Weinschel. The winner of the election will serve as President-Elect during 1985 and will automatically become IEEE President in 1986.

Dr. Cruz most recently served as IEEE Vice President for Technical Activities. Dr. Weinschel, President of Weinschel Engineering Company, Gaithersburg, Maryland recently served the IEEE as Vice President for Professional Activities and as leader of the U.S. Activities Board's Task Force on Productivity and Innovation.

The Board of Directors has also nominated two candidates for the post of 1985 Executive Vice President. They are George P. Rodrique and Merlin G. Smith. Dr. Rodrique was president of MTT Administrative Committee in 1976 and vice president in 1975. He served on MTT Adcom from 1970 to 1979. He has held many positions for MTT Adcom; Newsletter Editor, 1972 to 1975; Membership Services Chairman, 1973 to 1974; Meetings and Symposium Chairman, 1973 to 1975; Awards Chairman, 1977 to 1978; and Long Range Planning Committee, 1975 and 1978.



MEETINGS OF INTEREST . . . from preceding page

- **10th European Conference on Optical Communication (ECOC)**, Sept. 3-6, Liederhalle, Stuttgart, Federal Republic of Germany. Sponsor: Reg. B, Germany (West) Sect. Contact: Secretary, Germany Section IEEE, Stresemannallee 15, D-6000, Frankfurt 70, Federal Republic of Germany. Tel: (+611) 630-8221.
- **International Conference on Digital Signal Processing**, Sept. 5-8, Florence, Italy. Sponsor: Middle and South Italy Section ASSP (Cooperating). Contact: Dr. A. G. Constantinides, Department of Electrical Engineering, Imperial College of Science and Technology, Exhibition Road, London SW7 2BT, England. Tel: (01) 5895111.
- **Electronics and Aerospace Systems Conference (EASCON '84)**, Sept. 10-12, Shoreham Hotel, Washington, DC. Sponsor: AES, Washington Sect. Contact: Dr. James H. Babcock, IRT Corporation, 6800 Poplar Place, McLean, VA 22101, (703) 893-2111.

- **OCEANS '84: "Industry, Government, Education—Design for the Future,"** Sept. 10-12, Sheraton Washington Hotel, Washington, DC. Sponsor: OE. Contact: RADM J. B. Mooney, Jr., Oceanographer of the Navy, U.S. Naval Observatory, Washington, DC 20390, (202) 653-1299.
- **14th European Microwave Conference**, Sept. 10-13, Palais des Congres, Liege, Belgium. Contact: Prof. A. Vander Vorst, Laboratoire de Telecommunications et d' Hyperfréquences, Batiment Maxwell, B-1348 Louvain-la-Neuve, Belgium.
- **MIDCON '84**, Sept. 11-13, Dallas, TX. Sponsor: Regs. 4 and 5, Chicago and Dallas Sects. Contact: Dale Litherland, Electronic Conventions, Inc., 8110 Airport Blvd., Los Angeles, CA 90045, (213) 772-2965.
- **Electromagnetic Compatibility**, Sept. 18-20, University of Surrey, England. Sponsor: UKRI Section. Contact: Conference Department, IERE, 99 Gower Street, London WC1E 6AZ, England. Tel: 01-388-3071.
- **10th International Broadcasting Convention**, Sept. 21-25, Brighton, England. Sponsor: UKRI Section. Contact: Brian Atkinson, IEE, Savoy Place, London, WC2R OBL, England, Tel: 01-836-2441.
- **EUROCON '84: "Computers in Communications and Control,"** Sept. 26-28, Brighton, England. Sponsor: C, COM, CS, Reg. 8. Contact: Brian Atkinson, IEE, Savoy Place, London, WC2R OBL, England, Tel: 01-836-2441.
- **1984 Canadian Conference on Communications and Energy**, Oct. 2-4, Palais de Congres, Montreal, Canada. Sponsor: Reg. 7, Montreal Sect. Contact: H. S. Lunan, Canadian General Electric Co., 3 Place de Commerce, Isle des Soeurs, Verdun, Que. H3E 1J2 Canada, (514) 761-3587.
- **1984 International Test Conference (Cherry Hill '84)**, Oct. 16-18, Franklin Plaza Hotel, Philadelphia, PA. Sponsor: C, Philadelphia Sect. Contact: Harry Hayman, P.O. Box 639, Silver Spring, MD 20901, (301) 589-8142.
- **International Symposium on Electromagnetic Compatibility**, Oct. 16-18, Tohoku University, Tokyo, Japan. Sponsor: EMC. Contact: Prof. Risaburo Sato, Dept. of Electrical Comms., Tohoku University, Sendai, Japan 980, Tel: 0222-22-1800.
- **MILCOM '84—1984 IEEE Military Communications Conference**, Oct. 21-24, Los Angeles Marriott Hotel, Los Angeles, CA. Sponsor: COM, LA Council. Contact: Michelle Hamilton, MILCOM '84, P.O. Box 1984, Fullerton, CA 92634, (714) 732-2345.

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MEETINGS OF INTEREST . . . from preceding page

- **1984 International Symposium on Noise and Clutter Rejection in Radars and Imaging Sensors**, Oct. 22-24, Tokyo, Japan. Sponsor: AES (Cooperating). Contact: Prof. Toshimitsu Musha, Dept. of Applied Electronics, Tokyo Institute of Technology, 4259 Nagatsuta, Midori-Ku, Yokohama, 227, Japan, Tel: (045) 922-1111, Ext. 2546.
- **9th Annual International Conference on Infrared and Millimeter Waves**, Oct. 22-26, Takarazuka City, Japan. Sponsor: MTT. Contact: Prof. Kenneth J. Button, MIT National Magnet Lab, Bldg. NW 14, Cambridge, MA 02139, (617) 253-5561.
- **1984 IEEE GaAs IC Symposium**, Oct. 23-25, The Copley Plaza, Boston, MA 02116. Contact: Chairman of the Symposium Executive Committee, Dr. James L. Vorhaus, Raytheon Company Research Division, 131 Spring Street, Lexington, MA 02173, (617) 860-3114.
- **IECON '84 — Annual Conference on Industrial Electronics**, Oct. 23-25, Tokyo, Japan. Sponsor: IE. Contact: Prof. Fumio Harashima, Institute of Industrial Science, University of Tokyo, 22 Roppongi 7 Chome, Minato Ku, Tokyo, Japan.
- **Western Electronic Show and Convention (WESCON '84)**, Oct. 30-Nov. 1, Los Angeles, CA. Sponsor: LA and SFBA Councils. Contact: Dale Litherland, Electronic Conventions, Inc., 8110 Airport Blvd., Los Angeles, CA 90045, (213) 772-2965.
- **AUTOTESTCON '84**, Nov. 2-4, Sheraton Washington Hotel, Washington, DC. Sponsor: AES, IM, Washington Sect. Contact: M. D. Myles (Code Air 552), Naval Air Systems Command, Washington, DC 20361, (202) 692-3146.
- **International Telecommunications Energy Conference (INTELEC '84)**, Nov. 11-14, New Orleans Hilton, New Orleans, LA. Sponsor: COM. Contact: James M. Fletcher, Western Electric Co., Gateway II, Newark, NJ 07102, (201) 468-5493.
- **1984 Ultrasonics Symposium**, Nov. 14-16, Dallas Hilton, Dallas, TX. Sponsor: SU. Contact: Dr. Lewis T. Claiborne, 920 North Lake, Richardson, TX 75080, (214) 238-2426.
- **Global Telecommunications Conf. (GLOBECOM '84)**, Nov. 25-29, Atlanta Hilton, Atlanta, GA. Sponsor: COM, Atlanta Sect. Contact: Allen H. Cherin, Bell Laboratories, 2000 N.E. Expressway, Norcross, GA 30071, (404) 447-2619.
- **Magnetism and Magnetic Materials Conference**, Nov. 27-30, Town and Country Hotel, San Diego, CA. Sponsor: MAG. Contact: Alex Malozemoff, IBM Research, P.O. Box 218, Yorktown Heights, NY 10598, (914) 945-2154.
- **1984 International Electron Devices Meeting**, Dec. 10-12, San Francisco Hilton, San Francisco, CA. Sponsor: ED. Contact: Melissa Wiedeker, (202) 347-5900.
- **23rd IEEE Conference on Decision and Control**, Dec. 12-14, Las Vegas Hilton, Las Vegas, NV. Sponsor: CS, Las Vegas Sect. Contact: Dr. A. H. Haddad, School of Electrical Engineering, Georgia Institute of Technology, Atlanta, GA 30332, (404) 894-3930.
- **SOUTHCAN '85**, Feb. 26-28, 1985, Georgia World Congress Center, Atlanta, GA. Sponsor: Reg. 3, Florida Council, Atlanta Sect. Contact: Dale Litherland, Electronic Conventions, Inc., 8110 Airport Blvd., Los Angeles, CA 90045, (213) 722-2965.
- **4th Annual Phoenix Conference on Computers and Communications**, March 17-21, 1985, Phoenix, AZ. Sponsor: C, COM, Phoenix Sect. Contact: Doug Powell, Motorola, Inc., P.O. Box 2953, Phoenix, AZ 85062, (602) 244-3965.
- **International Reliability Physics Symposium**, March 26-28, 1985, Sheraton Twin Towers, Orlando, FL. Sponsor: R, ED. Contact: John W. Peeples, NCR Corporation, 3325 Platt Springs Road, West Columbia, SC 29169, (803) 796-9250 Ext. 344/341.



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MEETINGS OF INTEREST . . . from preceding page

- **SOUTHEASTCON '85**, March 31-April 3, 1985, Mission Valley Inn, Raleigh, NC. Sponsor: Reg. 3. Contact: C. L. Wright, IBM Corporation, Dept. 328, Bldg. 205, P.O. Box 12195, Research Triangle Park, NC 27709, (919) 543-6198.
- **ELECTRO '85**, April 23-25, 1985, Coliseum and Sheraton Centre, New York, NY. Sponsor: Reg. 1, Cent. New England Council, METSAC Section. Contact: Dale Litherland, Electronic Conventions, Inc., 8110 Airport Blvd., Los Angeles, CA 90045, (213) 772-2965.
- **INTERMAG**, April 29-May 2, 1985, Radisson-St. Paul, St. Paul, MN. Sponsor: MAG. Contact: E. J. Torok, Sperry Univac, P.O. Box 3525, MS U2 P26, St. Paul, MN 55165, (612) 456-2432.



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