



EDITOR: H. J. Kuno

Hughes Aircraft Co., 3100 W. Lomita Blvd., Torrance, California 90509

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**1980 IEEE/MTT-S  
INTERNATIONAL MICROWAVE SYMPOSIUM  
WASHINGTON, DC  
MAY 28—MAY 30, 1980**



On behalf of the Steering Committee I would like to extend to you a warm invitation to attend the 1980 MTT-S Symposium and associated Workshops. This year our Conference is being held in the Capitol city of the United States at the Shoreham Hotel with support from the adjacent Washington Sheraton Hotel. The conference has been scheduled during the Memorial Day week. Special conference rates have been obtained and will apply to the weekends preceding and following the Conference. It is hoped that many of the Conference attendees will be able to bring their families to the meeting and will be able to participate in the outstanding social program which has been planned to complement the technical program.

The theme for our conference this year is "Technology Growth for the 80's." The large number of papers which have been received and reviewed by the Technical Program Committee attest to the appropriateness of this theme. As in the past few years, the Technical Program Committee has again found it necessary to schedule four simultaneous sessions each day in order to accommodate the large number of accepted papers. The Technical Program will include three invited sessions. The first two will address Technology in Japan and in Europe. The third session will deal with the Export of Technology from the United States.

The Horizon House Company has again done an outstanding job in organizing and managing the exhibits portion of our conference. An even larger number of

exhibitors are expected than in 1979 with increased foreign participation.

A broad range of subjects will be covered in Workshops on May 26 and May 27 just before the symposium. Topics include:

- "Gigabit Logic for Microwave Systems"  
(May 26, MTT-9)
- "Millimeter Wave Devices Using Gyrotropic Media"  
(May 26, MTT-4, MTT-13)
- "ARFTG, Automatic Radio Frequency Techniques"  
(May 26-27, MTT-11, ARFTG)
- "Monolithic Microwave Analog IC's"  
(May 27, MTT-6, MTT-7, ED-S)
- "Symposium on Electromagnetic Dosimetric Imagery"  
(May 27, DOD, MTT-10)

On Wednesday Evening, May 28, two panel sessions organized by MTT Technical Committees will be held. Topics for these panel sessions include:

- "The Solar Power Satellite System"  
(May 28, MTT-16)
- "Millimeter Wave IC's — Challenge of the 80's"  
(May 28, MTT-6)

An outstanding social program, unique and particular to Washington, DC area has been planned. The "Washington Whirl Around" group has assisted in planning these endeavors. The general social program will begin on Wednesday evening with "Champagne and Dessert" tour of Washing-

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## PRESIDENT'S MESSAGE

by Stephen F. Adam

Life is dynamic. So is the Microwave Society: a Society built of people making it dynamic. Changes occurring as times pass is fascinating. In the early fifties we've seen the Professional Group on Microwave Theory and Techniques formed; quite a few of us remember the "Good Old Days" and have been contributing to its growth. Ted Saad, through this publication, reminisces and not only brings back good memories but provides an accurate account of our history which we are proud of. Many great advances were recorded in the 50's. But it was the 60's which took advantage of the Solid State revolution and brought into focus great advances. Communications, navigation, radar, telemetry were just a few of our fields which greatly benefited from this technological boom. As we entered the 70's we had to recover from a relatively deep recession which was followed in the mid-seventies with another one, at that time felt world-wide. But looking back over this past decade, Microwaves continued to advance with a rapid growth proving its vitality. We are now entering again a period of economic hesitation potentially leading to a recession. All these trying times did not greatly effect the members of our Society in extending the State-of-the-Art and contributing to the "Body of Knowledge."

We heard that the Microwave Society is old, or very matured. It will not grow anymore. If we believe that, we do deserve to be doomed. I am convinced that this is not true. MTT is jointly sponsoring with ED the Solid State Circuits Council, one of the most active Councils of the Institute. MTT is a generic Society working on the forefront of technology. MTT actually spawned the QEA Society. We have recognized the fact that they need to form their own entity within Division IV. We have other activities going on in the field of Millimeter and Submillimeter Waves. It is our responsibility to generate and exploit new horizons within our chapter. Our Long Range Planning Committee comprised of the Vice-President and the three ex officio past presidents have the duty to identify these areas among other society planning activities. Our technical committees are responsible for being active in their respective fields of interest, to disseminate information through regularly scheduled and through one day symposia or other avenues they deem appropriate.

During the last decade, the United States membership elected to participate in Professional Activities. USAB (United States Activities Board) is that forum which deals with such issues as: 1) Compensation and Benefits; 2) Employment Opportunities and Assistance; 3) Local Activities; 4) Professional (Employment Guidelines, Professional Conferences, Ethical Conduct Activities, Licensure and Registration, USAB Awards, Congressional Fellowship); 5) Strategic Programs (R&D Innovation in U.S., U.S. Energy

Program, Telecommunications, Health Care Policy, COMAR, U.S. Technology Policy Conference, NRC/IEEE Conference); 6) Communications (Internal/External Communications, PUBL. "The Institute", P.R., Marketing, Surveys: Salary, Opinion); 7) Administration; and 8) Other (Reserve Project Fund). The new 1980 USAB Vice President, Dr. Richard J. Gowen, in his recent letter states his three goals to achieve: 1) To provide the members of the IEEE with the greatest effectiveness possible for the funds available. 2) To provide a balanced program which includes both the immediate and long range needs of our members. 3) To continue the improvement of our ability to influence the development of solutions to our Nation's urgent problems through executive and legislative process at the local, state and national levels.

Technical Activities Board Vice President, Robert Larson states in the TAB Newsbriefs in February that one of his goals is "To increase the participation of Group/Society/Council members in the non-TAB activities of the IEEE." He has found "That these activities, especially our USAB, are very anxious to have our participation; and I feel that getting involved in work with these groups is by far the best way to influence their direction."

Recently I discussed our Professional Activities with our MTT PAC chairman, Dr. Russell Gaspari, who was quite disappointed with the apathy of Chapters not responding to his last year's efforts. He said that as long as most microwave engineers are employed they don't seem to be interested in Professional Activities. Do urge all Chapter Chairmen to consider an active Professional Activities Program to be implemented so as to be ready whenever the need may arise; better yet, to influence USAB with grass roots inputs.

Finally, I'd like to say a few words about our Administrative Committee. This is the governing body of your Society comprised of 24 hard working volunteers, dedicated to the betterment of all microwave engineers. I invite you to drop in at our next ADCOM meeting on May 26 and 27 in Washington at the Symposium site to see how we operate. In case you have any suggestions, please do not hesitate to contact any of our ADCOM members. I am sure they will be interested to hear your inputs.



## EDITOR'S NOTES

by H. J. Kuno

We have many Chapters outside of the U.S. which are very active. For example, we recently received the following interesting activities report from Dr. A. K. Jain, Secretary of the Indian Chapter.

### MTT/ED CHAPTER, INDIA COUNCIL

#### Background

The Microwave Theory and Techniques/Electron Devices Chapter of IEEE India Council is presently in its 7th year

of operation. The chapter activities are designed to meet the professional needs of its members in the country and present a forum for discussions on the technical aspects of the current activities in the areas related to the development and state-of-the-art in the field of electron devices and microwaves. The Chapter also addresses itself in co-ordination with other professional societies to the aspects concerned with the role of technology in Indian environment. A brief report of the chapter activities in the calendar year 1979 follows:

#### Officers

The following were elected to the office of this chapter during its General Body Meeting held on 22nd December 1978.

Dr. R. P. Wadhwa	Chairman
Mr. R. K. Arora	Vice Chairman
Dr. A. K. Jain	Secretary
Dr. R. S. Gupta	Treasurer

#### Technical Meetings

During the period starting from January 1979 till January 1980 the Chapter had arranged 12 technical meetings and one technical visit to Electronics Testing and Standards Laboratories at NPL. The details of its meeting are given in (Enclosure I) to this report. Several of the distinguished speakers who spoke to the audience, which included a large number of members of IEEE along with those interested in the related subjects, were Mr. K. G. Ashar of IBM, USA, Prof Hartnagel & Dr Trinogo of USA, Dr Eli Brookner of USA, Dr GC Jain, Prof AP Mitra and Prof Sanyal. Some of these technical meetings were arranged in co-ordination with the AES/COM Chapter of IEEE India Council and the IETE (India).

#### Annual Workshop

In addition to the technical meetings a three day workshop on "Remote Sensing/Techniques and Applications" was organised in association with the AES/COM Chapter on 5th, 6th & 7th November in New Delhi. On the first two days of this Workshop, Intensive Tutorial Course

was delivered on various aspects of Remote Sensing by the faculty of experts in the field. Ten faculty members delivered the course material on various aspects of Micro-wave, Infra-red and optical remote sensing and their applications to agricultural geology, defence and mineral resources survey. Satellite remote sensing with special application to Meteorology was included as one of the important aspects for the workshop. The Tutorial Course was followed by 3 technical session consisting of 9 invited talks and 7 contributed papers on various aspects of 'Remote Sensing.' The Workshop concluded with the Panel discussion on "Applications of Remote Sensing to Defence."

As many as 42 participants from various disciplines including defence registered themselves for the 3 day workshop. Technical sessions on the 3rd day invited overwhelming response of additional 41 participants. Technical programme of the workshop is put in Enclosure II of this report. The lecture notes of the tutorial course and the abstracts of the technical papers and invited talks were circulated in advance to all the participants of the workshop. The Chapter specifically sought and obtained the feed back from participants during the workshop in order to take care of the shortcomings of this workshop in the chapters future programme.

#### The Co-operation with other Academic Societies/Institutions

The chapter has been able to develop a close co-operation with Institutions of Electronics and Telecommunication Engineers (India). The Chapter has working relationship with the Aerospace Electronics Systems/Communication Chapter of IEEE India Council. Several of the technical meetings are arranged in association with one or more of these. The Chapter has also done work to establish firm contacts with members of organisations such as University of Delhi, IIT Delhi, Telecommunication Research Centre, Department of Electronics, Defence Research & Development Organisation and various industries in the country. This enables the chapter to arrange programme specifically designed to meet the professional needs of not only of its members but also other engineers working in the field of electron devices and microwaves.

#### Technical Lectures & Visits January 1979 – January 1980

S. NO.	DATE	SPEAKER	SUBJECT	SPONSORED BY
1.	1st March '79	Mr. K. G. Ashar (IBM USA)	Microprocessor Revolution and its impact on our lives	ED/MTT and AES/COM Chapters
2.	2nd March 11.00 AM	Mr. KG Ashar (IBM, USA)	Latest Trends in Semiconductor Manufacturing	ED/MTT Chapter
3.	2nd March 3.30 AM	Mr KG Ashar (IBM, USA)	Solid State Memories for Computers and Microcomputers	ED/MTT Chapter
4.	13th March 79	Prof Hartnagel (U.K.)	GaAs Technology in Microwave & Opto-electronics	ED/MTT Chapter
5.	13th March 79	Dr Trinogga (U.K.)	Noise in Communication Circuits	ED/MTT Chapter

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## TECHNICAL LECTURES &amp; VISITS (Cont.)

S. NO.	DATE	SPEAKER	SUBJECT	SPONSORED BY
6.	10th May 1979	Dr GC Jain NPL Delhi	Ferrite-Science & Technology	ED/MTT Chapter
7.	11/12 Sept. 79	Dr AP Mitra (NPL, Delhi)	From VLF to Microwaves Role of the Atmosphere and some New Insights	ED/MTT & AES/COM Chapters
8.	16th Nov. 79	Prof GS Sanyal (IIT, Kheragpur)	Mutual admittance in phased arrays.	ED/MTT Chapter
9.	17th Nov. 79	Prof GS Sanyal	New design methods in microwave antennas and arrays.	ED/MTT Chapter
10.	17th Nov. 79	Prof GS Sanyal	Near zone to far zone transformation in antennas measurements.	ED/MTT Chapter
11.	19th Nov. 79	Prof GS Sanyal	Design of EMI/EMC field enclosures	ED/MTT Chapter
12.	8th Jan. 80	Dr. Eli Brookner (Raytheon Co. USA)	Radar Present & Future trends	ED/MTT AES/COM Chapter
13.	11th Sept. 79		Technical visit to Electronic Testing & Standards Laboratories, NPL	ED/MTT & AES/COM Chapters

### WORKSHOP ON REMOTE SENSING TECHNIQUES AND APPLICATIONS

#### • INTENSIVE TUTORIAL COURSE

"Introduction to Optical Remote Sensing," R. Pisharoty, PRL, Ahmedabad.

"Media Properties & Target Classification," B.L. Deekshatulu, NRSA, Hyderabad.

"Infrared Techniques for Remote Sensing," R. Hradaynath, IRDE, Dehradun.

"Multilevel Multispectral Analysis," B.L. Deekshatulu, NRSA, Hyderabad.

"Principles, Techniques, Systems and Applications of Passive Microwave Radiometers in Remote Sensing," K.S. Rao, SAG, Ahmedabad.

"Radar Techniques for Remote Sensing Applications," Shiv Mohan, SAC, Ahmedabad.

"Thermal Infrared Techniques for Remote Sensing & Omega Sonde and DcPs-Techniques and Applications," K.S. Rao and Shiv Mohan, SAC, Ahmedabad.

"Meteorological Satellite Data Applications," U.V. Gopala Rao and D.K. Mishra, IMD, New Delhi.

#### • TECHNICAL SESSION I

"Remote Sensing of Ocean Parameters (Invited)," D. Srinivasan, NPOL, Cochin.

"Upper Air Windfinding in the Ocean Using Indigenous Omega VLF Upsonde System," Omega Upsonde Team, SAC, Ahmedabad.

"Remote Sensing of Atmospheric Water Content from Satellite Microwave Radiometer (SAMIR) on 'BHASKARA'," Samir Task Team, SAC, Ahmedabad.

"Application of Remote Sensing (Airborne Geophysics) in Geology (Invited)," P.V. Sankar Narayan, NGRI, Hyderabad.

"Application of Geodesy in Remote Sensing (Invited)," M.G. Arur, GSI, Dehradun.

#### TECHNICAL SESSION II

"Application of Remote Sensing to Agriculture (Invited)," C. Dakshina Murty, IARI, New Delhi.

"Use of Temporal Landsat Data for Study of Land Surface and Vegetation Cover Types as an Aid to Understand the Various Ecosystems over Large Areas," M.V. Madhavan Unni & Parthasarathy Roy, NRSA, Hyderabad.

"Detection of Plant Virus Disease through Remote Sensing Techniques," P.P. Nageswara Rao, R.S. Ayyangar & K.R. Rao, NRSA, Hyderabad.

"Application of Remote Sensing to Defence (Invited)," K.R. Rao, NRSA, Hyderabad.

"Spectral Matching Consideration in Optimization of Night Vision Systems (Invited)," G.K. Bhide & B.D. Bhawe, BARC, Bombay.

"Side Looking Radar in Remote Sensing (Invited)," R. Subramanian, IIT, Kanpur.

#### TECHNICAL SESSION III

"Some Studies on Pattern Recognition and Image Processing Methods in Remote Sensing Application (Invited)," D. Dutta Majumder, ISI, Calcutta.

"Some Aspects of Computer Extraction of 3-Dimensional Object Properties from Remotely Sensed Images," D. Dutta Majumder, A.K. Dutta & B.B. Chaudhuri, ISI, Calcutta.

"Application of Microwave Techniques to Remote Sensing (Invited)," O.P.N. Calla, ISRO, Ahmedabad.

"Land Use and Land Cover Study in Western Coast and Ghat Region," G.Ch. Chenniah, NRSA, Hyderabad.

"An Assessment of the Performance Characteristics of Navaid Sounding Systems on Indian Ships in the Arabian Sea and the Bay of Bengal During monsoon-79," N. Seshadri & C.R.V. Raman, IMD, New Delhi.

#### PANEL DISCUSSION

Applications of Remote Sensing to Defence

Panelists;

Major General D. Swaroop (Moderator).

Prof. R. Pisharoty.

Col. Satish Chandra.

Dr. D. Dutta Majumder.



# ADCOM HIGHLIGHTS

by Fred Rosenbaum

The first ADCOM meeting of the new year is traditionally held at the site of the upcoming International Microwave Symposium, in conjunction with the Technical Program Committee Meeting. This year ADCOM met on 16 January at the Shoreham-Americana Hotel in Washington D.C., an aging, but still elegant traditional Washington establishment. Stephen Adam, our new President, chaired the meeting. He introduced Ganesh Basawapatna, HP, who is the 1980 Secretary/Treasurer, welcomed the other new members of ADCOM, and presented his report.

As you all know, MTTs is an IEEE Society whose purpose is to bring to its members significant (and hopefully useful) technical information relevant to the microwave field. The administration of the Society is in the hands of ADCOM, all of whose members are volunteers. It is also supported by industry, government agencies, and universities who underwrite the expenses associated with ADCOM membership. The people on ADCOM, the Transactions reviewers, the local chapter officers, the ADCOM committee members, and the Symposium Committee members, all work to make the Society what it is. It is always gratifying to me to attend an ADCOM meeting which symbolizes the efforts of so many for the benefit of us all.

## ACTION ITEMS

The format of this year's ADCOM has been modified by Stephen Adam to take up Action Items in the morning and reports in the afternoon. This allows adequate time for full debate and balloting on significant items without being rushed. Among the issues considered were by-law changes and MTTs participation in the Millimeter and Submillimeter Conference. There were two items discussed which necessitate by-law changes. A motion was made to select a slate of at least two Senior Members or Fellows from the society as candidates for Divisional Director of IEEE. The purpose of this is to insure that MTTs has a fair opportunity to gain representation at a high level within IEEE. The by-laws committee was instructed to draft a final version for a vote in May.

The second by-laws item also revolves around MTTs representation within IEEE. The Presidents of all IEEE Societies/Groups/Councils are members of TAB (Technical Activities Board), the IEEE entity that governs our actions. Many S/G/C Presidents serve two year terms (MTTs has a one year term). Past Presidents of our Society have noted that by the time a newcomer learns the ropes, his time is over. This leads to the situation whereby two year Presidents have more experience and are thus more influential in the governance of IEEE. Since there are many implications for MTTs financially, technically, and professionally a change in our operations is now under discussion.

Two by-law changes have been proposed. One is to mandate a two-year term for our President. This carries with it certain procedural matters such as adding a Second Vice-President so that terms of office are commensurate

with the current three year full term on ADCOM, and so that there may be an orderly progression toward ADCOM Presidency without locking an individual into a two year term as Vice-President followed by a second two year term as President. There are numerous pros-and-cons regarding this change. One major disadvantage stems from the present rule that an ADCOM member may be elected to no more than three consecutive (three year) terms. This is to permit a steady turnover of ADCOM members, while still providing enough time for a member to learn the organization, and if elected, to serve as an officer. Halving the number of Presidential terms will have the effect of limiting the opportunity of able ADCOM members to serve as President. Secondly, it implies an obligation of up to four years, one which not all ADCOM members or their institutions may be able to accept.

As an interim approach ADCOM has instructed its Vice-President to attend TAB meetings so that if elected President he will have had a years exposure to TAB. The present status is that the proposal to extend the Presidents term has been referred to the Long Range Planning Committee for a report in October, and the Vice President is currently attending TAB meetings. A straw vote by ADCOM showed that eight members were leaning toward a two year term, six were willing to wait and see if sending the Vice-President to TAB would solve our representational problems, and five felt that a one year term President serving on TAB for one year was adequate (status quo). Any membership inputs are more than welcome.

Another major item of concern is MTTs relations with the millimeter and submillimeter community. Some of our members work in the area and, philosophically, there are many techniques and devices common to microwaves and millimeter and submillimeter waves. For this reason MTTs has been a supporter of millimeter and submillimeter wave publication and conferences since 1963. Recent growth in the field has encouraged ADCOM to find an arrangement whereby we can continue to actively participate in this field. Under the able direction of Ken Button, the 1979 Conference on Millimeter and Submillimeter Waves yielded papers totalling nearly 700 pages. Since our total Transactions pages budget for the year is only 1200, this bulk of papers could not be handled in the conventional way. An arrangement was made between the conference and Pergamon Press to publish a quarterly journal devoted to papers from this ongoing conference. We are in discussions now to find a means of continuing MTTs involvement in this important field.

Steps were also taken to explore the merger of MTTs and ARFTG (Automated Radio Frequency Testing Group). This organization is involved in expanding the use of automatic network analyzers and establishing standards for such measurements.

## FINANCES

Jim Degenford reported that the end of the year statements were not yet received, however, projections for the year appear good. A major portion (~\$180K) of our reserves are now invested in a high yield account by IEEE headquarters.

**MTT-SPRING 1980**  
**ADCOM HIGHLIGHTS (Cont.)**  
**TRANSACTIONS**

Reinhard Knerr, Editor of the Transactions, reported that 136 papers had been submitted since July 1980. The December issue had been delayed, but that subsequent issues are on schedule. The following Special Issues are underway:

- May 1980 — Gigabit Logic — P.T. Greiling,  
Guest Editor
- November 1980 — SAW Applications — T.W. Bristol  
and R. C. Williamson,  
Guest Editors
- December 1980 — Symposium Issue — B. Spielman  
Guest Editor
- July 1981 — Open Guided Wave Structures — T. Stoh  
and D. S. Chang,  
Guest Editors

Our authors and their institutions seem to be honoring the Transactions page charge policy. More than 60% of our pages are currently being paid for. It should be noted that page charges do not cover the total cost of producing the page.

**SYMPOSIA**

- 1980 — Washington, D.C. R. C. Van Wagoner, Technical Progress Committee Chairman, reported that 222 papers were submitted, 134 were accepted, and an additional 27 were invited. A full and exciting Symposium is in the offing.
- 1981 — Los Angeles. George Oltman reported that financial planning is under way based on estimates from the Orlando Symposium (1979) and assuming 20% less attendance due to economic factors.
- 1982 — Dallas. Planning is well along. The Dallas Hyatt Regency has been picked as the site.

**ONE DAY SYMPOSIA**

Barry Spielman described a one day program on "Advanced Radar-Systems Technology, to be held on Saturday 3 May 1980, in Baltimore, Maryland. Steve March will take over this ADCOM activity in 1980.

**MEMBERSHIP SERVICES**

Dick Sparks reported that R. Pucel of Raytheon was named the 1980-81 National Lecturer. His topic will be, "Monolithic Microwave Integrated Circuits."

The next ADCOM meeting will be held at the Shoreham-Americana Hotel on May 26-27, 1980. It will begin with a dinner meeting at 6:00 P.M. and run through 2:00 P.M. on the 27th.



**CHAPTER  
ACTIVITIES**

*R. A. Sparks*

Now that the membership statistics for the end of the year 1979 have been compiled you can add another line to the totals that were printed in the Fall issue of the Newsletter. Active members in the MTT-S on December 31 totaled 5933, just a trifle short of the 6000 figure. For whatever significance the number 6000 represents, in the last 15 years our membership has exceeded that figure slightly more than half the time. The year 1980 in all likelihood should begin and end above that level.

The newest MTT-S Chapter in Canaveral (Melbourne) Florida, was established late last year jointly with AP-S and is currently holding regular monthly meetings. A full slate of Chapter Officers has been elected and includes James Cofer, Chairman and John Mara, Vice-Chairman. Congratulations to all the local IEEE members that worked together to create the Canaveral Chapter and best wishes for a successful program this year and in future years.

The petition process whereby new chapters are formed is fairly straightforward, but it does take some initiative and diligent organizational effort by a cadre of dedicated workers. Anyone interested in forming a new chapter should contact Field Activities Staff Director, Patricia Lech at IEEE Headquarters, (212) 644-7759.

The International Microwave Symposium in Washington, D.C., is the next key date that should be in your planning schedule. The regular sessions will begin on Wednesday May 28 and extend through Friday May 30. Several workshops are scheduled to precede the Symposium and on Tuesday evening, May 27, a Chapter Chairman's dinner and meeting is planned. This event has become an annual affair that provides an opportunity for officers from every Chapter to share their experiences from the past year and get new ideas for the following year. Further details will be mailed to Chapter Chairmen in the near future.

Fifteenth Symposium on Electromagnetic Windows sponsored by the Georgia Institute of Technology, Atlanta, Georgia, June 18-20, 1980. Contact: D. J. Kozakoff, Engineering Experiment Station/EML/RSD, Georgia Institute of Technology, Atlanta, Georgia 30332, telephone (404) 894-3505.

## GUIDELINES FOR THE MTT-S NATIONAL LECTURER

*by R. Sparks*

Each year the Microwave Theory and Technique Society selects a recognized expert in a specific technical area to serve as National Lecturer for the Society. The candidate is chosen on the basis of having demonstrated competence in some area of microwave technology as well as effective oral presentation of technical subject matter. The selection process entails the identification of a technical area that is believed to be of widespread interest to the membership and that can be reasonably presented by the speaker in a 1 to 1-1/2 hour tutorial session.

The following guidelines have been established for the National Lectureship as a result of the experiences of the previous speakers and the Administration Committee. They are intended to help define the tasks of the incoming National Lecturer and clarify the responsibilities that are assumed in accepting this position.

1. The period for speaking commitments normally extends from July of the incoming year until June of the following year. The summer months are generally spent in preparations and scheduling with major speaking activity beginning in September.
2. The order in which speaking engagements are accepted and scheduled is at the discretion of the National Lecturer. A suggested order is MTT-S Chapters, Student Chapters, other Group/Society Chapters, Non-IEEE affiliated organizations. Reaching the smaller local MTT-S Chapters is encouraged, however, and arranging a travel schedule to cover specific geographic areas has been found to be the most convenient and economical arrangement.
3. An average of eighteen to twenty speaking engagements has been typical for National Lecturers during the past several years.
4. Prior to the start of the lecture tour a preliminary schedule of speaking engagements and an estimated annual travel expense budget should be provided to the Administrative Committee for inclusion at the Annual Meeting. It has been customary for the National Lecturer's affiliation to share travel expenses with the MTT-S.
5. Interim reports indicating Chapters visited, dates and number of attendees should be prepared for each subsequent ADCOM meeting and a final report submitted after the last lecture is delivered. The National Lecturer is welcome and encouraged to attend all MTT-S ADCOM meetings. Coordination of these reports is the responsibility of the MTT-S Membership Services Chairman.
6. A manuscript of the talk suitable for publication in the MTT-S Transactions should be furnished to the Transactions Editor in December or January. Coordination of the manuscripts is the responsibility of the MTT-S Membership Services Chairman.

## History of MTT

*by Ted Saad*

**ADCOM IX, July 1, 1960 through June 30, 1961**

Administrative Committee:	K. Tomiyasu, Chairman
	T. N. Anderson, Vice Chairman
	H. M. Altschuler, Secretary- Treasurer
R. E. Beam	T. S. Saad
A. C. Beck	H. F. Schwartz
S. B. Cohn	G. Shapiro
R. C. Hansen	G. Sinclair
W. W. Mumford	P. D. Strum
A. A. Oliner	M. C. Thompson
W. L. Pritchard	R. D. Wengenroth
S. W. Rosenthal	
Ex-Officio	Honorary Life Members
H. F. Engelmann	G. C. Southworth
	A. G. Clavier

The Chairman of the ninth ADCOM was Kiyoo Tomiyasu, the Vice Chairman was Tore Anderson and the Secretary-Treasurer was Hal Altschuler. Don King was still Editor of the Transactions and Gus Shapiro continued as Newsletter Editor.

At the first meeting of the ninth ADCOM, on a recommendation by Kiyoo Tomiyasu, a motion was passed to establish a committee that would prepare and keep up to date a handbook of PGMTT Administrative Committee Procedures. Seymour Cohn was named Chairman of the committee.

On a motion by Bill Mumford, the rules for the Microwave Prize were changed to include papers that appeared in the Proceedings of the IRE as well as those appearing in the Transactions.

E. K. Gannett of the IRE staff agreed to have prepared a cumulative index of the MTT Transactions for the 1953 to 1956 period. The index was to appear in a future issue. It was also planned that a cumulative index covering the period from 1956 to 1959 would be included later.

At the Professional Groups Committee Meeting of October 6, 1960, it was announced that the Executive Committee of the IRE had determined there would be no further advertising in the Transactions other than authorized institutional listings. This was a considerable blow to MTT since it had received substantial income from the advertisements in the Transactions. In an effort to help the situation, the Executive Committee reaffirmed an IRE policy to subsidize the Professional Group Publications. However, it was clear from the MTT experience, which was unique in the IRE, the decision would be financially counterproductive for the group. MTT was one of the rare professional groups in the IRE that had been successful in deriving significant advertising income. In an attempt to reverse the decision, the ADCOM held discussions with George Bailey, E. K. Gannett, the Managing Editor of the

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# HISTORY (Cont.)

IRE, and Ernst Weber, the Professional Group Committee Chairman, but to no avail. It was recommended that MTT consider increasing its assessment to \$4.00. Another suggestion was an increased effort to sell institutional listings which the new Advertising Editor, Bob Rivers, had been working on.

The Annual Review of United States Journals was again a topic of discussion. In a poll taken by Editor Don King of the Transactions, 19 people voted in favor of US and foreign reviews, one voted in favor of US Reviews only, 14 were in favor of foreign reviews only, and 6 favored no reviews. The fact remained that obtaining the reviews was a considerable problem since it required a unique type of dedicated individual. Again, it was left to the Transactions Editor to solicit and organize the reviews. However, Bob Hansen did volunteer to prepare the US review for the Transactions with the help of Max Weiss.

Don King, after serving as Editor for more than two years, stated that he wished that the committee would appoint a new editor. He agreed to continue in his role until a suitable replacement had been found.

The local chapters were beginning to express increased interest in holding the National Symposium. Bids for 1962 were received from Los Angeles, Philadelphia, and Boulder, Colorado. The invitation was won by the Boulder group. And later, towards the end of the ADCOM year, interest in the 1963 MTT National Symposium began to grow and petitions were received from Los Angeles, Philadelphia and Long Island. There was also some interest in holding the 1964 Symposium in Seattle.

One proposal of considerable interest was presented by Dr. Michiyuki Uenohara of Bell Labs to hold an International Microwave Symposium in Japan. He felt that he could organize such a meeting with help from the appropriate people in Japan and that it would be of great interest since there was much original work going on in Japan in the communications and other related microwave-application fields. It was suggested that it be a joint meeting of MTT, ED and AP to be held in 1963. MTT indicated that it was in favor of the proposed Symposium and was anxious to cooperate. But it further recommended that the invitation from Japan should be extended to the IRE as a whole.

Later it was decided that the Symposium would be held in 1964 and it would be designed to cover Microwave Theory and Techniques, Electron Devices, and Antennas and Propagation. It was also agreed that co-sponsorship would be sought from the IECEJ.

Since several of the professional groups had two National Symposia a year, usually in different parts of the country, it was suggested that MTT consider a similar arrangement. However, because of the large number of technical meetings already taking place, it was decided to postpone consideration.

In a lengthy ADCOM discussion, it was agreed that the Administrative Committee should assume greater responsibility for National Symposium, and that it should monitor the planning. It was felt that this would provide for inputs based on prior experience and it would also provide for continuity with prior Symposia.

There was some discussion relative to the MTT policy of co-sponsorship of meetings. Although the IRE stated that MTT had autonomy in the matter of co-sponsorship, the ADCOM felt that MTT should have a formal policy of co-sponsorship whether it be with another professional group or with a section.

On a related subject, MTT had had relationships with URSI meetings for several years, at which meetings, on occasion, MTT would sponsor one or more sessions. The relationship with URSI had been discussed several times at prior ADCOM meetings and it was finally moved and voted that the PGMTT would offer to co-sponsor all future US National URSI Meetings.

There was still difficulty in obtaining suitable papers for a good program for MTT sponsored sessions at the IRE International Convention. One of the problems was that the sessions were held at the Coliseum and, as a consequence, there was considerable distraction due to the proximity of the exhibition. There was also some concern over the fact that the papers would be published in the convention record and, hence, lose their archival identity.

The 1960 Microwave Prize, which was presented at the Symposium in Washington, D.C., was awarded to Dr. A. F. Harvey of the Royal Radar Establishment in Worcester, England, for his paper entitled "Periodic and Guiding Structures at Microwave Frequencies" which appeared in the MTT Transactions of January 1960.

After several months of diligent effort, Bob Wengenroth, who was the Chairman of the Constitution and Bylaws Committee, prepared a new draft of the bylaws which was accepted by the Administrative Committee on May 14, 1961, subject to the necessary IRE and Group membership approvals.

The matter of the MTT field of interest was discussed in several of the meetings and the members of the ADCOM were urged to examine the field of interest and submit recommendations for future consideration.

As the interest in lasers began to grow, there was a question as to whether the MTT scope should include some statement on the subject. Eventually, a motion was made and passed which stated that it was the intent of the MTT Constitution to include in its field of interests, "maser technology in all frequency ranges including the optical region".

One of the highlights of the ninth ADCOM was the 1961 MTT Symposium held in Washington, D. C. In addition to the parallel sessions, there were a series of panel sessions, one on High Power Microwave Techniques, another on Low Noise Amplifiers and a third on Noise Performance. In addition, it was the first time that a Symposium digest had been prepared and presented to each attendee prior to the Symposium. Another first was the fact that all of the newly appointed fellows were introduced at the banquet.

But perhaps the most memorable thing about the 1961 Symposium was the great hoax perpetrated on the attendees by Gus Shapiro who was the Chairman of the Symposium and the toastmaster of the banquet. In his original proposal, he had planned to invite John Pierce as the featured banquet speaker. Unfortunately, because of other commitments, Dr. Pierce had to withdraw and, as a



## HISTORY (Cont.)

result, it was left to Gus Shapiro to find an alternate. His alternate turned out to be a Mr. Ivan Serov, whom he described as a Russian Cultural and Scientific Exchange Official. Although Mr. Serov's talk was fascinating and covered the yet unpublished Russian Microwave achievements in detail, it was a very disturbing talk because it appeared in every respect the Russians were ahead of us in all areas of microwave technology. However, it later turned out that Mr. Serov was, indeed, a Dr. Paul Conroy of the United States Information Agency and that the entire speech had been a hoax.

The year was a good one for the MTT. The budget at the end of the year showed a balance of \$31,994.23. Membership was still above 5,000, several of the local chapters were bidding for the future Symposia, and the prospects for the future were bright despite the decision by IRE to eliminate advertising in the Transactions.

## REPORT OF THE DIRECTOR, DIVISION IV

Number 10, January 21, 1980

by Larry Anderson

In this report I'll try to summarize some of the actions and follow-ups resulting from the various meetings which took place in New Orleans in December (TAB Finance Committee, TAB OpCom, TAB, Audit Committee, Executive Committee and Board of Directors) as well as describe organization and plans for 1980.

As you probably know by now, Bob Larson, formerly Director of Division I, will be the 1980 TAB Chairman. I will continue as Chairman of TAB Administration with overview of the Finance Committee (chaired again by Cy Tunis) and the Meetings Committee (chaired again by Dave Hartmann). Bob Larson has had a lot of hands-on IEEE experience. He did an excellent job of chairing last year's Audit Committee, on which I also served, and I feel last year's Audit Committee, on which I also served, and I feel confident that TAB will get vigorous leadership this year.

**Audit Committee:** I will be serving on the Audit Committee again next year. This committee is charged with monitoring the fiscal and other *procedures* of the Institute (not *policies*) to make sure they are effective and fair. Of current concern to the Committee is the possibility that some of the ballots for the 1979 election may not have reached members. Feedback to me from individuals who are aware of problems in this area would be welcome.

**Finance Committee (Cy Tunis, Chairman):** Division IV representative to this committee is Clarke Johnson (Magnetics Society). During 1980, the Committee will continue to hone and monitor the "book broker" mode of financing TAB Conference Services. It will be taking an in-depth look at the distribution and reasonableness of publication

charges, including charges for indexing; it will monitor and hone as needed the revised single copy price structure for G/S/C publications. It will also continue to debate the seemingly perennial issue of the reasonableness of G/S/C surpluses. For 1980, the consolidated G/S/C budgets show an expected total net surplus of \$190K, vs. a projected net deficit of \$1.32M for the General Fund.

**Meeting Committee (Dave Hartmann, Chairman):** Division IV representative to this committee is Larry Whicker (MTT). The Committee will continue to work closely with the Finance Committee on the Book Broker concept. Financial accountability and HQ budget approval procedures for conferences remain a major issue: we are working with the Executive Committee and the Board of Directors on these issues. The Committee also wants to examine and strengthen the actual "nuts and bolts" services offered to the G/S/C and their conferences by the TAB Conference Services Department.

**Executive Committee and Board of Directors:** These bodies took a number of actions (or inactions!) of interest to the G/S/C.

1. **Director nominations:** Division VII, i.e. the Power Society, has been agitating for some time for a formal procedure whereby it, as a division having only a single society, need only submit one candidate for the office of Divisional Director. At issue is the right of a G/S/C to run its own affairs vs. the seeming abrogation of the democratic process. I formulated and led discussion in the Executive Committee and BOD of a compromise motion which would have permitted single candidates provided that procedures for so doing had been approved by a referendum of the affected members. This passed the Executive Committee but not the BOD, where the issue was referred to the Long Range Planning Committee for recommendations "at the earliest possible date".
2. **Member Benefits:** The Institute has a Member Benefits Committee (chaired last year by Leo Young) chartered to search out peripheral services that could be offered to members at attractive prices (e.g. insurance, car rental discounts, etc.). The latest program in this family to be approved by the Executive Committee is a medical diagnostic program (called "Medcor") aimed at providing, on a group rate basis, a particular package of diagnostic clinical services, with computerized analysis. While programs of this sort don't cost the Institute anything in dollars and cents, they do absorb administrative energies and I wonder whether they don't to some extent distract us from our primary mission as a technically-based Institute. I'd appreciate member feedback on this.
3. **IEEE Position Papers:** Three Position Statements of the Energy Committee were approved by the Executive Committee as full-fledged IEEE Position Papers. These were papers on Solar Power Satellites, Solar Energy and Energy from Municipal Waste. Copies of these Papers, which were distributed at the TAB meeting in New Orleans, can be obtained through the TAB office.

## DIRECTOR'S REPORT, DIV IV (Cont.)

4. *National Engineering Foundation*: USAB has come out in favor of either a National Engineering Foundation (along the lines of the National Science Foundation) or a modification of NSF to include engineering as an equal partner. Because TAB has not endorsed this position, the Executive Committee and BOD took no action. At our New Orleans TAB meeting, we agreed to set up an Ad Hoc Committee to examine both sides of the issue and come up with a definitive position. TAB must give this high priority if only to protect our credibility on the BOD.
5. *Qualifications for IEEE Membership*: This started out as a relatively narrow issue — should Bachelor degree graduates in Engineering Technology be admitted immediately upon graduation as full members of the Institute? As the item progressed through RAB, TAB OpCom, TAB, the Executive Committee and BOD in New Orleans, the issues became broadened. Finally, the whole matter of the recognition of "professional level" engineering degrees was thrown back to the Educational Activities Board for further intense study. The consensus seems to be that the focus should be on the scope and level of an entire curriculum, course by course, and not just on the school and nominal degree. I will be serving as TAB liaison to EAB this year, and would appreciate TAB input on this issue in particular.
6. *Reviews of Awards Board*: The Institute Awards Board has been under review in recent months by two separate committies, one internal to the Awards Board, headed by Prof. Van Valkenburg, and a second appointed by the BOD and chaired by Joe Dillard. Both committies came up with similar conclusions and recommendations: The Awards Board is basically working well, particularly in the candidate selection process, but there are communication problems with the rest of the Institute. As a step to correct this, the BOD passed a bylaw providing for seating the Awards and Recognition Committee chairmen from RAB, TAB and USAB on the Awards Board, with a vote on all matters *except* the selection of award recipients. This should provide broad input to the Awards Board on such policy matters as the subject, scope and number of awards without compromising the arms length posture of the Committee on actual candidate selection.



## INTERNATIONAL MICROWAVE SYMPOSIUM (Continued from Front Cover)

ton. The Spouse Tours of the Washington area will begin on Wednesday morning. These tours will include visits to the private homes of prominent Washingtonians and will include lunches in private clubs.

The banquet this year is intended to provide a complete evening's entertainment. The evening events will include:

- Exhibitor's Cocktail Party
- Concert by the U.S. Marine Corps or Navy Band
- Combined Tri-Service Color Guard
- Dinner with Wine
- Entertainment by Mark Russell  
(Political Satirist and TV Celebrity)
- MTT Yearly Awards

Washington is a truly lovely city in the spring with many tourist attractions. The Conference hotels are located near Connecticut Avenue with convenient bus/rail service to the center city area. The National Zoo is a short walk from the Conference site. Details concerning the many attractions will be provided at the Conference.

The hotels require that reservations with one night's deposit be received by April 25, 1980. Since the number of rooms available at the special conference rate is finite, it is advisable to make reservations as soon as possible.

I gratefully appreciate the contributions of the Steering Committee members and Chairmen listed on these pages. Their continuing support will make the 1980 International Microwave Symposium a truly memorable one.

*L. R. Whicker*  
Chairman  
Steering Committee

## WORKSHOPS

### Workshops and Panel Sessions

In addition to the regular Symposium, several MTT Technical Committees and other groups have arranged specialist workshops in areas related to the conference program. The workshops are scheduled on Monday, May 26 and Tuesday, May 27 just preceding the main conference. The fees for these workshops are listed in the registration form contained in this booklet. Two MTT Technical Committees have arranged panel sessions to be held on Wednesday evening, May 28. The panel sessions are open to all symposium attendees.

### Workshop on Gigabit Logic for Microwave Systems

Sponsored by: MTT-9

Date: May 26 — 9:00 P.M. — 5:00 P.M. (Monday)

The workshop is designed for engineers involved in the design, fabrication, and testing of microwave systems requiring gigabit data processing. Engineering managers are also encouraged to attend in order to keep abreast of the state-of-the-art developments in gigabit gallium arsenide integrated circuits. The format for the workshop will consist of presentations by a panel of experts from Government and from U.S., European, and Japanese industries. Each panel member will present their predictions for applications and the future direction of high speed gallium arsenide circuits. Informal discussions among the panel members and the audience will follow. Questions, comments, and short presentations from all workshop attendees will be encouraged.

Continued on page 11

*For additional information, contact:*

P.T. Greiling  
Hughes Research Lab.  
3011 Malibu Canyon Road  
Malibu, CA 90265  
Tel: (213) 456-6411, ext. 420

### **Workshop on Millimeter Wave Devices using Gyrotropic Media**

Sponsored by: MTT-4 and MTT-13

Date: May 26 — 9:00 A.M. — 5:00 P.M. (Monday)

Development of millimeter wave control components is a fertile area for technological progress, and gyrotropic media offer the best promise for ongoing work in this area. Approaches involve the extending of ferrite component technology to higher frequencies in waveguide-like geometries, and the extending of nonreciprocal optical media technology to longer wavelengths using quas-optical arrangements. This workshop is intended to examine the current state-of-the-art in this field of component technology. Several invited speakers will highlight specific aspects of materials and component development, and all participants are encouraged to bring material on recent advancements for informal presentation. Attendance will be open not only to those actively working in the field, but also to those interested in obtaining an overview of current activities and trends in component and material work.

*For additional information, contact:* Chuck Boyd or Dean Hodges.

Chuck Boyd	Dean Hodges
Microwave Applications Group	Aerospace Corporation
Chatsworth, CA 91311	P.O. Box 92957
Tel: (213) 882-7333	Los Angeles, CA 90009
	Tel: (213) 377-4161

### **Workshop on Automatic Radio Frequency Techniques**

Sponsored by: ARFTG (Automatic R.F. Technique Group & MTT-11)

Dates: May 26 — 9:00 A.M. — 5:00 P.M. (Monday)  
May 27 — 9:00 A.M. — 5:00 P.M. (Tuesday)

This workshop covers state-of-the-art developments in computer-aided design, simulation, measurements, and calibration techniques — both software and hardware. Automated RF measurements and computer-aided design support equipment will be presented and demonstrated. Registration also includes dinner on May 26 and lunches on May 26 and May 27.

*To present a paper and for additional information, contact:*

Dick Swartley  
General Electric Space Division  
Room U2312, P.O. Box 8555  
Philadelphia, PA 19101  
Tel: (215) 962-3904

### **Workshop on Monolithic Microwave Analog IC's**

Sponsored By: MTT-6 and MTT-7

Cooperating Sponsor: Electron Devices Society

Date: May 27 — 9:00 A.M. — 5:00 P.M. (Tuesday)

This workshop is intended for the purpose of exchanging information between participants engaged in research, development and fabrication of gallium arsenide, silicon and indium phosphide analog monolithic circuits and device combinations intended for use at frequencies about 1 GHz. Several keynote speakers will give informal presentations in the morning. However, it is expected that *all* participants will be prepared to speak for approximately five minutes on their work in the workshop subject area. Viewgraphs are appropriate. No cameras or recorders will be allowed. Each participant will be required to indicate his topic to one of the organizers of the workshop. It is hoped that the attendance will thus be limited to those working in this area.

*For additional information, contact:* Doug Maki or Eliot D. Cohen.

Doug Maki	Eliot D. Cohen
Hughes Aircraft Company	Code 6811
Torrance, CA 90509	Naval Research Laboratory
Tel: (213) 534-2121,	Washington, DC 20375
ext. 2882	Tel: (202) 767-3894

### **Electromagnetic Dosimetric Imagery Symposium**

Sponsored By: Tri-Services Electromagnetic Radiation Panel  
(DOD) & Walter Reed Army Institute of Research

Cooperating Sponsor: MTT-Society and MTT-10

Date: May 27 — 9:00 A.M. — 5:00 P.M. (Tuesday)

This symposium (workshop) will include presentations concerning the subject of noninvasive measurement of complex permittivity and dosimetry in biological targets. Subject such as in-situ permittivity measurement, active electromagnetic imaging, passive electromagnetic imaging, and combined active/passive systems will be discussed. The principle application of this new technology is in the study of the spatial distribution of absorbed energy for the purpose of assessing biological hazards of electromagnetic radiation. This technology also has important potential applications in the diagnosis and treatment of disease where other imaging techniques such as X-rays or ultrasound fail.

*For additional information, contact:*

Mr. John H. Jacobi  
Dept. of Microwave Research, WRAIR  
Walter Reed Medical Center  
Washington, DC 20012  
Tel: (202) 576-3638

Continued on page 12



**WORKSHOPS (Cont.)**

**PANEL SESSIONS**

**Panel Session on the SPS  
(Solar Power Satellite) System**

Sponsored By: MTT-16 and MTT-11

Date: May 28 — 8 to 10 P.M. (Wednesday)

This panel session will include presentations of an overview of the SPS system, an overview of the microwave transmission portion of SPS, the technology for the microwave power transmission system and a summary of the environmental and societal considerations of the SPS system.

*For addition information, contact:*

W.C. Brown	Ronald F. Gutmann
Raytheon Company	Assoc. Prof. Engineering
Foundary Avenue	Rennssalaer Polytechnic Inst.
Waltham, MA 09154	Troy, NY 12181
Tel: (617) 899-8400	Tel: (518) 270-6486
ext. 4422	

**Panel Session on Millimeter-Wave IC's —  
Challenge of the 80's**

Sponsored By: MTT-6

Date: May 28 — 8 to 10 P.M. (Wednesday)

The panel discussion will address the status of transmission line techniques and semiconductor technology, new insights into applications, compatibility of applications and the present technology and goals for the 80's. The discussion will cover the entire mmw frequency range (26 to over 200 GHz).

*For additional information, contact:* Frank Sullivan or Paul Meier.

Frank Sullivan	Paul Meier
Microwave Associates, Inc.	AIL Div., Eaton Corp.
South Avenue	Walt Whitman Road
Burlington, MA 01803	Melville, NY 11746
Tel: (617) 272-3000	Tel: (516) 595-4562
ext. 1946	

**1980 IEEE/MTT-S Social Program  
Annual Banquet,  
A Complete Evening's Entertainment**

Thursday, May 29, 1980, 7:00 to 10:30 P.M.

The banquet will immediately follow the exhibitors cocktail party and will be held in the Blue Room of the Shoreham Hotel. The banquet will be transformed into an elaborate setting with the use of flowers and decorations.

A proper prelude to the dinner will be a concert by the "President's Own" U.S. Marine Band or the U.S. Navy Band. Following the concert will be the Presentation of the Colors by the Joint Armed Forces Color Guard.

Following dinner, entertainment will be provided by Mr. Mark Russell, Washington's renowned political satirist, night club entertainer and TV celebrity. Mark has promised to provide us with a special show for our group which will

address issues of interest to the microwave community.

In the awards portion of the banquet the Microwave Theory and Techniques Society will honor the following members and present to them the listed prizes and awards:

- Microwave Career Awards: Dr. S. B. Cohn  
Dr. W. J. Klein
- Microwave Applications  
Award: Erwin F. Belohoubek
- Microwave Prize: E. R. Carlson,  
M. V. Schneider, and  
T. F. McMaster

**"Subharmonically Pumped Millimeter-Wave Mixers,"  
MTT Trans., Oct. 1978**

Newly elected IEEE Fellows who are members of MTT will be recognized and additionally, IEEE President, Leo Young, will present the IEEE/USAB Award for Engineering Professionalism to Bruno Weinschel, Past USAB Chairman.

Tickets for the entire evening's activities are \$24.00 and should be ordered in advance, using the enclosed registration form. A limited number of additional tickets will be available at final registration prior to noon Wednesday, May 28, 1980.

**Champagne and Dessert Tour,  
A "Sparkling" Introduction to the  
Nation's Capitol**

Wednesday, May 28, 1980, 8 to 10:30 P.M.

This tour should provide a magnificent overview of the Washington area. The tour should interest both the conference attendees, their spouses, and older children.

An experienced guide will narrate a leisurely tour of Washington monuments and government buildings, beautifully lighted for nighttime viewing. On our bus we will tour the city and see an overview of the Capitol while enjoying champagne and French pastries served by a waiter.

We will pass the Capitol, the White House, the Washington Monument, galleries and museums and the now famous Watergate complex.

Special stops will be made at the Lincoln Memorial, the Jefferson Memorial, the Iwo Jima Memorial and the John F. Kennedy Center for the Performing Arts—all more impressive and inspiring under illumination.

Champagne Tour Cost: \$15.00 per person, all inclusive. Early reservations are advisable.

**Spouses Program**

The spouse's program will begin each day (Wednesday through Friday) at 8:30 with a complimentary continental breakfast in the Shoreham Hotel Executive Room for program participants. After breakfast on Wednesday and Thursday, full day activities are planned. On Friday, a morning tour is planned to leave the afternoon free to travel or shop.

Continued on page 13



## Tour No. 1: Georgetown House Tour

9:30 A.M. — 3:30 P.M., Wednesday,  
May 28, 1980

Leave Shoreham by chartered bus for a visit to Georgetown, which retains a distinctive charm and air of individuality setting it apart from other residential sections of the city. Its history goes back to its days as a tobacco port in the late 1700's. Today, "Row" houses of Georgian and Federal architecture stand side by side with huge Victorian mansions.

We will visit The Old Stone House, which survives as the only pre-Revolutionary house in Georgetown, dating from 1765, fourteen years after Georgetown was founded. Originally, a small and humble home it has been enlarged and remodeled by subsequent tenants. The homey and unpretentious atmosphere provides a contrast to the more famous mansions in Georgetown.

Next, we will have lunch at the Congressional Club, whose membership is composed of the wives of members of the Senate and House of Representatives. Two of the things you will especially enjoy are the doll collections from all over the world presented to the Club by foreign countries, and figures of famous First Ladies in the gowns they wore at their particular inaugural ball. Our speaker at the luncheon will be Mrs. Claire Schweiker, wife of the U.S. Senator from Pennsylvania and the original "Miss Claire" of the Romper Room. She will give her delightful talk "My Side of Capitol Hill."

Fee: \$22.00 per person all inclusive.

## Tour No. 2: Capitol Hill Tour

9:30 A.M. — 3:30 P.M., Thursday,  
May 29, 1980

Leave Shoreham by lecture bus for a visit to the Capitol. Our guide will conduct us through nooks and crannies of the Capitol not seen on the public tour, as well as through the Rotunda, the House and Senate Chambers, Statuary Hall, etc.

Next, we will visit the Library of Congress which ranks as one of the great libraries of the world, comparable to the British Museum and the French Bibliotheque Nationale. Here you can see the Gutenberg Bible.

For lunch we will go to the Capitol Hill Club, a private club on the Hill, whose membership is composed of Senators, Congressmen, Cabinet Officers, etc.

Following lunch, Mrs. Carter Burns, well known lecturer for the Foreign Service Institute of the Department of State, will introduce you, through a slide presentation to the exciting new East Building of the National Gallery of Art. Following Mrs. Burns' lecture, we will proceed to the East Building designed by architect I. M. Pell and constructed of the same rose-white Tennessee marble as the main building. We will also see highlights of the collection of masterpieces housed in the West Building of the National Gallery of Art. Members of the Education Department will be our guide on these tours.

Fee: \$22.00 per person all inclusive.

## Tour No. 3: Mt. Vernon and Alexandria

9:00 A.M. — 12:00 P.M., Friday,  
May 30, 1980

Leave hotel by bus for a forty-minute drive via the lovely George Washington Memorial Parkway for Mount Vernon, George Washington's estate on the Potomac, where we will visit the mansion, formal boxwood gardens and kitchen garden, out-buildings and the museum of Washington memorabilia.

Then we will have a riding tour of historic Alexandria, which was incorporated in 1748 and has more original houses than Williamsburg. Here we will stop, if time permits, at Christ Church, dating from 1773, where plaques mark the pews of George Washington and Robert E. Lee.

Fee: \$15.00 per person all inclusive.

## Additional Stops — On Tours

1. Plans are being made to hold an early morning coffee and V.I.P. tour of the White House. To accommodate these plans, one of the above tours will start somewhat earlier.
2. A visit to one of the many interesting foreign embassies will be included in one of the above tours.

For persons desiring to participate in all three tours, a special reduced rate of \$50.00 will be offered. In order to be included in these tours, reservations should be made as soon as possible. As a given tour is filled, a waiting list will be maintained until a second group is formed.

# 1980 INTERNATIONAL MICROWAVE SYMPOSIUM

WEDNESDAY MORNING, MAY 28, 1980

## Ambassador Room

### WELCOME AND KEYNOTE ADDRESS

Chairman: L. R. Whicker

- 0830 WELCOME FROM GENERAL CHAIRMAN  
A-1 L. R. Whicker, NRL, Washington DC 20375
- 0840 COMMENTS FROM TECHNICAL PROGRAM CHAIRMAN  
A-2 R. C. Van Wagoner, NRL, Washington, DC 20375
- 0850 WELCOME FROM MTT-ADCOM PRESIDENT  
A-3 S. F. Adam, H. P. Co., Palo Alto, CA 94304
- 0900 REMARKS FROM IEEE PRESIDENT  
A-4 L. Young, NRL, Washington, DC
- 0915 KEYNOTE ADDRESS — TECHNOLOGY GROWTH FOR  
A-5 THE 80'S AS VIEWED BY DOD (R&T)  
Dr. Arden L. Bement, Deputy Under Secretary of Defense  
(Research & Technology)
- 1000 BREAK

### MICROWAVE POWER TRANSISTORS

Chairman: Fumio Hasegana

- 1030 IMPROVED ELEMENTARY CELL GaAs POWER FET  
B-1 STRUCTURE  
Pierre Baudet, LEP, France
- 1050 10GHz-10W INTERNALLY MATCHED FLIP-CHIP POWER  
B-2 GaAs FET  
Y. Mitsui, M. Kobiki, M. Wataze, K. Segawa, M. Otsubo,  
M. Nakatani and T. Ishii, Mitsubishi, Japan
- 1110 A 6 GHz-5W GaAs MESFET WITH AN EXPERIMENTALLY  
B-3 OPTIMIZED PATTERN  
A. Higashisaka, K. Honjo, Y. Takayama and F. Hasegawa,  
Nippon, Japan
- 1130 100W CW MICROWAVE BIPOLAR TRANSISTOR  
B-4 David C. Anderson, Power Hybrids

## Diplomat Room

### MILLIMETER RECEIVERS AND COMPONENTS

Chairman: John Smith

- 1030 140 GHz ALL SOLID STATE RECEIVER WITH NOISE  
C-1 FIGURE LESS THAN 6 dB DSB  
J. Putnam, A. Cardiasmenos, P. Boyd, M. Blustine, TRG  
Div. of Alpha Ind.
- 1050 A 200-300 GHz HETERODYNE RECEIVER  
C-2 N. R. Erickson, Univ. of Mass.
- 1110 CRYOGENIC 90 GHz RECEIVER FOR AIRBORNE  
C-3 RADIOMETRY  
B. Vowinkel, J. K. Peltonen, W. Reinert, R.I.U., Bonn,  
W. Germany
- 1130 NOISE MEASUREMENTS OF W-BAND (75-100 GHz)  
C-4 GaAs GUNN AND SILICON IMPATT OSCILLATORS  
John Ondria, TRG Div. of Alpha Ind.

## Forum Room

### MICROWAVE ACOUSTICS AND MAGNETOSTATIC WAVES

Chairman: Dennis Webb

- 1030 THE IMPLEMENTATION OF SURFACE ACOUSTIC  
D-1 WAVE DEVICES IN AVIONICS SYSTEMS  
W. J. Edwards and W. C. Eppers, WPAFB (Invited Paper)
- 1055 SYSTEM ASPECTS OF SURFACE ACOUSTIC WAVE  
D-2 CONVOLVERS  
J. Cafarella, MIT Lincoln Labs, (Invited Paper)
- 1120 EFFICIENT THIN FILM InSb/LiNbO<sub>3</sub> CONVOLVER  
D-3 K. Yamanouchi, S. Mitsui, K. Shibayama, Cornell
- 1140 LOW LOSS MULTIPOLE SAW RESONATOR FILTERS  
D-4 E. J. Staples, J. Schoenwald, J. Wise, T. Lim, Rockwell
- 1200 ADJUSTABLE MAGNETOSTATIC SURFACE WAVE DIREC-  
D-5 TIONAL COUPLER  
J. P. Castera, P. Hartemann, Thomson-CSF, France

1220  
D-6

SIMPLE MAGNETOSTATIC DELAY LINES IN MICRO-  
WAVE PULSE COMPRESSION LOOPS  
K. W. Reed, J. Owens, C. Smith, R. Carter, U. Texas,  
Arlington

## Tudor Room

### MICROWAVE ENGINEERING FOR EXPORT

Chairman: Edward A. Wolff

- 1030 U.S. EXPORT PROCEDURES  
E-1 R. Garnitz, Dept. of Commerce
- 1050 IMPORT AND EXPORT COMMODITY CODES AND DATE  
E-2 W. Fletcher, U.S. Intl. Trade Comm.
- 1110 POLICIES AND TECHNIQUES FOR ENHANCING  
E-3 EXPORTS  
S. Abrahamson, Control Data
- 1130 CRITIQUE OF MICROWAVE EXPORT PERFORMANCE  
E-4 T. Saad, Sage
- 1150 EXPORTING MICROWAVE COMPONENTS AND  
E-5 INSTRUMENTS  
B. Weinschel, Weinschel Eng.

WEDNESDAY AFTERNOON, MAY 28, 1980

## Ambassador Room

### MILLIMETER WAVE POWER GENERATION

Chairman: Apostle G. Cardiasmenos

- 1400 MM WAVE GUNN OSCILLATOR WITH DISTRIBUTED  
F-1 FIN-LINE RESONATOR  
H. Hoffman, AEG-Telefunken, West Germany
- 1420 MULTIDIODE KA-BAND OSC. USING HYBRID PLANAR  
F-2 CIRCUIT DESIGN  
F. Sicking, H. Meinel, AEG-Telefunken, West Germany
- 1440 GUNN DIODE COMBINING AT U-BAND  
F-3 Y. Ma, C. Sun, Hughes
- 1500 MM-WAVE MICROSTRIP AMPLIFIER USING InPh GUNN  
F-4 DIODES  
D. Rubin, NOSC
- 1520 BREAK
- 1600 THE BEHAVIOR OF A PULSED MM-WAVE (70 GHz)  
F-5 IMPATT DIODE OSCILLATOR DURING LASER  
ILLUMINATION  
H. Gerlach, R. Wellman, HDL
- 1620 V-BAND HIGH POWER IMPATT AMPLIFIER  
F-6 Y. Ma, C. Sun, E. M. Nakaji, Hughes
- 1640 PERFORMANCE OF 94 GHz COHERENT PULSED  
F-7 IMPATT TRANSMITTERS  
M. D. Simonutti, D. C. English, F. J. Bernues, Hughes

## Diplomat Room

### HIGH POWER DEVICES & TECHNIQUES

Chairman: H. Goldie

- 1400 HIGH POWER X-BAND MIC DIODE PHASE SHIFTER  
G-1 M. Kuroda, K. Hirai, S. Kamihashi, Toshiba, Japan
- 1420 RF ENERGY COMPRESSOR  
G-2 Z. D. Farkas, SLAC, Stanford
- 1440 THE STABILITY OF MAGNETRONS UNDER SHORT  
G-3 PULSE CONDITIONS  
B. Vyse, H. Levinson, M-O Valve Co., England
- 1500 A NOVEL APPROACH TO THE DESIGN OF A HIGH  
G-4 POWER AUTOMATIC IMPEDANCE MEASURING  
SCHEME  
C. J. Hu, U. Colo.
- 1520 BREAK
- 1550 MODE COUPLING AND POWER TRANSFER IN A  
G-5 COAXIAL SECTOR WAVEGUIDE WITH A SECTOR  
ANGLE TAPER  
A. W. Flitlet, L. R. Barnett, J. M. Baird, BKD and V. L.  
Granatstein, NRL

THURSDAY MORNING, MAY 29, 1980

Ambassador Room

HIGH-POWER SOLID-STATE CIRCUITS

Chairman: Don Parker

- 0830 K-1 A HIGH-POWER X-BAND DIODE AMPLIFIER  
R. J. Pankow and R. G. Mastroianni, Norden
- 0850 K-2 X-BAND PULSED SOLID-STATE TRANSMITTERS  
S. E. Hamilton, R. S. Robertson, F. A. Wilhelmi, M.E. Dick, Hughes
- 0910 K-3 EFFICIENT, HIGHER-ORDER-MODE RESONANCE COMBINER  
M. Dydyk, Motorola
- 0930 K-4 A CORPORATE STRUCTURE FOR COMBINING POWER FROM 3<sup>N</sup> OSCILLATORS  
S. Mizushima and M. Ashiki, Shizuoka Univ., Japan and J. Kondoh, Cornell
- 0950 BREAK
- 1020 K-5 AN IMPROVED TRAPATT OSCILLATOR CIRCUIT  
R. Davies, P. L. Booth, B. H. Newton, Phillips, England
- 1040 K-6 INFLUENCE OF NON-IDEAL CIRCULATOR EFFECTS ON NEGATIVE-RESISTANCE AMPLIFIER DESIGN  
B. D. Bates, P. J. Kahn, U. Queensland, Australia
- 1100 K-7 PULSED POWER PERFORMANCE OF GaAs FET'S AT X-BAND  
S. Temple, Z. Galani, J. Dormail, R. Healy, S. Hewitt, Raytheon
- 1120 K-8 A K-BAND, 1 WATT GaAs FET AMPLIFIER  
J. Sore and Y. Takayama, Nippon, Japan
- 1140 K-9 THIRTY-TWO DIODE WAVEGUIDE POWER COMBINER  
S. Hamilton, Hughes

Diplomat Room

SATELLITE COMMUNICATION SYSTEMS IN EUROPE  
(Invited Session)

Chairman: P. DeSantis

- 0830 L-1 COMMUNICATION SATELLITE PAYLOADS: A REVIEW OF PAST, PRESENT AND FUTURE ESA DEVELOPMENTS  
M. Lopriore, ESTC, Netherlands
- 0900 L-2 GaAs FET'S IN PRESENT AND FUTURE COMMUNICATION SATELLITE PROGRAMS  
J. Turner, Plessey, England
- 0930 L-3 MICROWAVE TECHNOLOGY DEVELOPMENTS IN ITALIAN SPACE PROGRAM  
M. Massani, Selenia, Italy
- 1000 BREAK
- 1030 L-4 WEST GERMAN MICROWAVE ACTIVITY STATE OF THE ART IN SATELLITE COMMUNICATIONS  
H. Brand, U. Erlangen, Fed. Rep. Germany
- 1100 L-5 SOME ADVANCES IN FRENCH SOLID STATE COMPONENTS AND TECHNOLOGIES FOR SPACE APPLICATIONS  
J. Magarshack, L.E.P., France
- 1130 L-6 MICROWAVE ACTIVITY FOR SATELLITE COMMUNICATION IN SWEDEN  
L. Fzelius, Ericson, Sweden

Forum Room

GUIDES AND COMPONENTS

Chairman: T. Itoh

- 0830 M-1 A METAL-TO-DIELECTRIC WAVEGUIDE TRANSITION WITH APPLICATION TO MILLIMETER-WAVE INTEGRATED CIRCUITS  
T. N. Trinh, J. Malherbe, R. Mittra, U. Illinois
- 0850 M-2 TRAPPED IMAGE GUIDE FOR MILLIMETER-WAVE CIRCUITS  
T. Itoh, U. Texas, Austin and, B. Adelseck, AEG-Telefunken, W. Germany
- 0910 M-3 A METHOD FOR REDUCING RADIATION LOSSES AT BENDS IN OPEN DIELECTRIC STRUCTURES  
M. Desai and R. Mittra, U. Illinois

- 1610 G-6 CIRCULAR-ELECTRIC MODE WAVEGUIDE COUPLERS AND JUNCTIONS FOR USE IN GYROTOR TRAVELING-WAVE AMPLIFIERS  
L. R. Barnett, J. M. Baird, A. W. Flitlet, BKD and V. L. Granatstein, NRL
- 1630 G-7 RECENT ADVANCES IN GYROTRONS  
H. Jory, R. Symons, P. Ferguson, J. Shively, J. Moran, Varian
- 1650 G-8 GAIN OF THE GYROTRON AMPLIFIER WITH HIGH CIRCULAR WAVEGUIDE MODE AND CYCLOTRON HARMONIC NUMBER  
S. Ahn, J. Choe, NRL

Forum Room

MICROWAVE SYSTEMS - 1

Cochairmen: P. Greiling & F. Ivanek

- 1400 H-1 A MONOLITHIC GaAs DECISION CIRCUIT FOR GBIT/S PCM TRANSMISSION SYSTEMS  
M. Peltier, G. Nuzillat, M. Gloanee, Thomson-CSF, France
- 1420 H-2 DIGITAL GENERATION OF WIDEBAND LINEAR FM WAVEFORMS  
F. W. Hapwood, R. C. Tracy, Westinghouse
- 1440 H-3 16-LEVEL QAM MIC MODULATOR WITH PHASE LINEARITY IMPROVED  
T. Takano, M. Niori, Y. Tokumitsu, K. Ozawa, Kawasaki, Japan
- 1500 BREAK
- 1520 H-4 HIGH-POWER UPCONVERSION FOR SSB-AM SIGNALS  
E. Loiser, K. Schuenemann, Inst. Hft. Tech. Univ., Braunschweig, Germany
- 1540 H-5 INSTANTANEOUS BEARING DISCRIMINATORS WITH OMNI-DIRECTIONAL COVERAGE AND HIGH ACCURACY  
S. Rehnmark, Anaren
- 1600 H-6 THE TIROS-N MICROWAVE SOUNDER UNIT  
P. N. SWANSON, W. M. HARRIS, E. J. JOHNSTON, F. S. Soltis, JPL
- 1620 H-7 TWO MICROWAVE COMPLEX WEIGHTING CIRCUITS  
M. J. Fithian, E-Systems
- 1640 H-8 IMPEDANCE VARIATIONS IN ELECTRONICALLY BEAM-STEERED ACTIVE LENS ANTENNAS FOR SPACE BASED RADAR  
D. W. Griffin, U. Adelaide, S. Australia

Tudor Room

MICROWAVE FILTERS AND MULTIPLEXERS

Chairman: Ralph Levy

- 1400 J-1 SYNTHESIS OF COMMENSURATE COMB-LINE BAND-PASS FILTERS WITH HALF-LENGTH CAPACITOR LINES  
S. B. Cohn, S. B. Cohn Assoc.
- 1420 J-2 ASYMMETRIC REALIZATION FOR DUAL-MODE BAND-PASS FILTERS  
R. Cameron, ESA and J. Rhodes, U. Leeds, England
- 1440 J-3 BANDPASS FILTERS USING PARALLEL-COUPLED STRIP-LINE STEPPED IMPEDANCE RESONATORS  
M. Makimoto, S. Yamashita, Matsushita, Japan
- 1500 J-4 GENERAL EXTRACTED POLE SYNTHESIS TECHNIQUE WITH APPLICATION TO LOW LOSS TE<sub>011</sub> MODE FILTERS  
J. D. Rhodes, U. Leeds, England and R. J. Cameron, ESTEG
- 1520 BREAK
- 1550 J-5 DESIGN OF MIC BROADBAND CONTIGUOUS MULTIPLEXERS  
J. Dean, Filtronic, England and J. Rhodes, U. Leeds, England
- 1610 J-6 A LOW COST MULTIPLEXER FOR CHANNELIZED RECEIVER FRONT ENDS AT MILLIMETER WAVES  
K. Breuer and N. Warontzoff, AIL Eaton
- 1630 J-7 MICROSTRIP VARIABLE BAND-PASS FILTERS USING VARACTOR DIODES  
S. Toyoda, Osaka Inst. Tech., Japan
- 1650 J-8 ADVANCES IN THE ANALYTICAL AND COMPUTER-AIDED DESIGN OF OPTIMUM EQUALIZERS FOR HIGH FREQUENCY RF AND MICROWAVE SOLID STATE AMPLIFIERS  
W. Ku, Cornell

## MTT-SPRING 1980

- 0930  
M-4 COUPLING CHARACTERISTICS OF DIELECTRIC WAVE-  
GUIDES OF RECTANGULAR CROSS-SECTION  
T. N. Trinh and R. Mittra, U. Illinois
- 0950  
BREAK
- 1020  
M-5 RESONANT FREQUENCY OF DIELECTRIC RESONA-  
TORS IN HOMOGENEOUS MEDIA  
R. Bonetti and A. Atia, COMSAT
- 1040  
M-6 ANALYSIS AND APPLICATION OF THE SCATTERING  
MECHANISM IN AN ABRUPTLY ENDED ROD  
DIELECTRIC WAVEGUIDE  
P. H. Gelin, M. Petenzi, J. Citerne, P. Kennis, U. Sci. Tech.  
Lille, France
- 1100  
M-7 THE COMPLEX POINTING VECTOR, AND THE FRAC-  
TIONAL CURRENT ON THE UPPER SURFACE OF A  
MICROSTRIP LINE  
L. Lewin and T. Rnehle, U. Colo.
- 1120  
M-8 A 40 GHz MICROSTRIP ARRAY ANTENNA  
W. Menzel, AEG-Telefunken, W. Germany

### Tudor Room

#### FERRITE APPLICATIONS

Chairman: A. Yarranton

- 0830  
N-1 PARALLEL COMPONENT  $\mu_z$  OF PARTIALLY MAGNE-  
TIZED MICROWAVE FERRITES  
M. Igarashi, Tokai Univ. and Y. Naito, Tokyo
- 0850  
N-2 PLANAR MEANDERLINE FERRITE PHASE SHIFTERS  
WITH MULTI-LAYER FERRITE/DIELECTRIC  
IMBEDDING  
E.R. Bertil Hansson, Chalmers Univ. Tech., Sweden
- 0910  
N-3 NEW NONRECIPROCAL DEVICES IN A COPLANAR  
WAVEGUIDE  
Y. Naito and Y. Yamanaka, Tokyo Inst. Tech., Japan
- 0930  
N-4 MAGNETOSTATIC SURFACE WAVE SIGNAL-TO-  
NOISE ENHANCER  
S.N. Stitzer, H. Goldie, J.D. Adam, P.R. Emtage,  
Westinghouse
- 0950  
BREAK
- 1030  
N-5 A NEW ACCURATE EQUIVALENT NETWORK FOR  
STRIPLINE Y-JUNCTION CIRCULATORS  
E.R. Bertil Hansson, K. Gunnar Filipsson, Chalmers  
Univ. Tech., Sweden
- 1050  
N-6 EXPERIMENTAL CHARACTERIZATION OF JUNCTION  
CIRCULATORS USING WYE RESONATORS  
W.T. Nesbit, Lochend, Scotland and J. Helszajn,  
Heriot-Watt Univ., Scotland
- 1110  
N-7 A NEW TYPE CIRCULATOR FOR MILLIMETER INTE-  
GRATED CIRCUITS  
Y. Naito, M. Nuraguchi, A. Tsuji, Tokyo Inst., Tech., Japan

## THURSDAY AFTERNOON, MAY 29, 1980

### Ambassador Room

#### MILLIMETER WAVE IC's

Chairman: Nick Jansen

- 1330  
O-1 CHARACTERISTICS OF UNILATERAL FIN-LINE  
STRUCTURES WITH ARBITRARILY LOCATED SLOTS  
L.P. Schmidt, T. Itoh, Univ. Texas and H. Hofmann,  
AEG-Telefunken, W. Germany
- 1350  
O-2 A SOLUTION OF THE EARTHED FIN LINE WITH  
FINITE METALIZATION THICKNESS  
A. Beyer, I. Wolff, Univ. Duisburg, W. Germany
- 1410  
O-3 CUTOFF FREQUENCIES IN FIN LINES CALCULATED  
WITH A TWO-DIMENSIONAL TLM-PROGRAM  
Y. Shih, W.J.R. Hoefer, Univ. Ottawa, Canada
- 1430  
O-4 ADVANCES IN PRINTED MILLIMETER-WAVE  
OSCILLATOR CIRCUITS  
L.D. Cohen, AIL Div. Eaton
- 1450  
BREAK
- 1520  
O-5 E-PLANE COMPONENTS FOR A 94 GHz PRINTED-  
CIRCUIT BALANCED MIXER  
P.J. Meier, AIL Div. Eaton
- 1540  
O-6 PHASING TYPE IMAGE RECOVERY MIXERS  
R.H. Oxley, P.L. Lowbridge, N.D.R. Sheperd, AEI Semi.,  
England, M.J. Ming, J.E. Curren, GEC, England

- 1600  
O-7 LOW COST MM-WAVE DIELECTRIC LOADED MIXER  
J.A. Paul and P. Yen, Hughes
- 1620  
O-8 MILLIMETER-WAVE IC COMPONENTS USING FINE  
GRAINED ALUMINA SUBSTRATE  
H. Yatsuka, M. Ishizaki, H. Komizo, Fujitsu, Japan

### Diplomat Room

#### SATELLITE BROADCASTING IN JAPAN (Invited Session)

Chairman: K. Suetake

- 1330 MAIN TRANSMIT AND RECEIVE STATION IN  
JAPANESE BSE PROGRAM  
N. Imai, Y. Otsu and T. Tanaka, R.R.L. Min. Posts and  
Telecomm., Japan
- 1355  
P-2 PERFORMANCE CHARACTERISTICS OF TRANS-  
PORTABLE TYPE - A EARTH STATION FOR JAPAN'S  
EXPERIMENTAL BROADCASTING SATELLITE  
SYSTEM (BSE)  
S. Nishimura, S. Betsudan, M. Nakanishi, Mitsubishi, Japan,  
Y. Konishi, NHK, Japan, S. Hoshino, M. Takahashi,  
Nippon, Japan
- 1410  
P-3 14/12 GHz BAND MOBILE-TYPE EARTH STATION FOR  
JAPANESE BROADCASTING SATELLITE  
COMMUNICATION  
H. Hayashida, S. Hikosaka, Y. Yamashita, I. Sato,  
H. Shimayama, Nippon, Japan
- 1425  
P-4 RECEIVE-ONLY STATIONS FOR BROADCASTING  
SATELLITES EXPERIMENTAL  
S. Kikukawa, M. Kaijima, T. Chiba, Y. Sasaki, Toshiba,  
Japan, S. Hoshina, Y. Imahori, Nippon, Japan
- 1440  
P-5 SATELLITE BROADCASTING RECEIVER - PRESENT  
AND FUTURE  
Y. Konishi, NHK, Japan
- 1500  
BREAK
- 1530  
P-6 DEVELOPMENT OF 12 GHz TWT FOR BROAD-  
CASTING SATELLITE  
K. Yamamoto, NHK, Japan, K. Sugimori, Toshiba, Japan,  
T. Kimura, Nippon, Japan
- 1550  
P-7 A CROSS-SHAPED HORN AND A SQUARE WAVE-  
GUIDE POLARIZER FOR A CIRCULARLY POLARIZED  
SHAPED BEAM ANTENNA FOR A BROADCASTING  
SATELLITE  
N. Toyama, NHK, Japan
- 1610  
P-8 OPERATIONAL ACHIEVEMENTS WITH JAPANESE  
BROADCASTING SATELLITE FOR EXPERIMENTAL  
PURPOSE (BSE)  
S. Shimizu, K. Arai, Nat. Space Devel. Ag., Japan
- 1640  
P-9 EVALUATION OF SERVICE AREA IN THE SATELLITE  
BROADCASTING BY THE BSE  
Y. Yamamoto, Min. Posts and Telecomm., Japan,  
S. Sonoda, NHK, Japan

### Forum Room

#### GUIDED WAVE OPTICS AND INTERACTIONS

Chairman: Thomas Giallorenzi

- 1330  
Q-1 GUIDED-TO-RADIATION MODE CONVERSION IN  
HETEROSTRUCTURE PLANAR WAVEGUIDES AND  
ITS APPLICATION TO A LIGHT MODULATOR  
H. Onodera, I. Awai, M. Nakajima, J. Ikenoue, Kyoto  
Univ., Japan
- 1350  
Q-2 AN OPTICALLY COUPLED MICROWAVE SWITCH  
R. Kiehl and D. Drury, Sandia
- 1410  
Q-3 A FIELD STRENGTH MEASUREMENT SYSTEM USING  
AN INTEGRATED OPTICAL LINEAR MODULATOR  
H.I. Bassen, BRH, C.H. Bulmer and W.K. Burns, NRL
- 1430  
Q-4 NONRECIPROCAL EFFECTS IN AN OPEN DIELECTRIC  
WAVEGUIDE WITH GRATING STRUCTURES  
K. Araki, B.S. Song, T. Itoh, Univ. Texas
- 1450  
BREAK
- 1510  
Q-5 AN APPROXIMATE ANALYSIS OF RIB WAVEGUIDES  
H. Shigesawa, M. Tsuji, K. Takijama, Doshisha Univ., Japan
- 1530  
Q-6 ANALYSIS OF CHIRPED GRATING LENSES  
S. Forouhar, W.S.C. Chang, Univ. Cal., La Jolla



- 1550 MICROWAVE MODELS OF BLAZED DIELECTRIC  
Q-7 GRATINGS FOR INTEGRATED-OPTICS  
APPLICATIONS  
T. Tamir, Polytech. Inst., N.Y.
- 1610 FINITE ELEMENT ANALYSIS OF OPTICAL WAVE-  
Q-8 GUIDES  
N. Mabaya, P.E. Lagasse, Univ. Gent, Belgium

**Tudor Room**

**BIOLOGICAL APPLICATIONS AND EFFECTS**

Chairman: Elliot Bostow

- 1330 RATIONALE FOR NEW ANSI C95 RECOMMENDED  
R-1 SAFETY LEVEL WITH RESPECT TO HUMAN  
EXPOSURE TO RF ELECTROMAGNETIC FIELDS  
A.W. Guy
- 1400 ELECTROMAGNETIC ENERGY DEPOSITION IN AN  
R-2 INHOMOGENOUS BLOCK MODEL FOR NEAR-FIELD  
IRRADIATION CONDITIONS  
I. Cattorjee, M.J. Hagmann, O.P. Gandhi, Univ. Utah
- 1420 MICROWAVE EFFECTS ON THE OCULAR LENS  
R-3 J. Stewart-Dehann, J.R. Trevithick, M. Creighton,  
L. Larsen, J. Jacobi, Univ. West Ontario and WRAIR
- 1440 A MICROSTRIP MICROWAVE BIOLOGICAL  
R-4 EXPOSURE SYSTEM  
A.W. Friend, NMRI and H. Howe, Jr., Microwave Assoc.
- 1500 BREAK
- 1530 DUAL MODE MICROWAVE SYSTEM TO ENHANCE  
R-5 EARLY DETECTION OF CANCER  
K.L. Carr, Microwave Assoc., A.L. El-Mahdi, J. Shaeffer,  
Eastern Va. Med. Sch.
- 1550 MICROWAVE APPLICATORS FOR LOCALIZED  
R-6 HYPERTHERMIA TREATMENT OF MALIGNANT  
TUMORS  
R.W. Paglione, F. Sterzer, RCA, J. Mendecki,  
E. Frendenthal, C. Botstein, Montefiore Hosp.
- 1610 A 2450 MHz SLAB-LOADED DIRECT CONTACT  
R-7 APPLICATOR WITH CHOKE  
G. Kantor, D.M. Witters, BRH
- 1640 A MICROSTRIP ANTENNA FOR MEDICAL  
R-8 APPLICATIONS  
I. Bahl, S.S. Stuchly, Univ. Ottawa, Canada and M.A.  
Stuchly, RPB, Canada

**FRIDAY MORNING, MAY 30, 1980**

**Ambassador Room**

**GaAs FET CIRCUITS**

Chairman: Eliot D. Cohen

- 0830 A MONOLITHIC GaAs I.F. AMPLIFIER FOR INTE-  
S-1 GRATED RECEIVER APPLICATIONS  
D.R. Decker, A.K. Gupta, W. Petersen, D.R. Chen,  
Rockwell
- 0850 SUPER LOW NOISE PACKAGED GaAs FETs  
S-2 FOR K<sub>v</sub> BAND  
T. Suzuki, Y. Kadowaki, M. Ito, M. Nakatani,  
T. Ishii, Mitsubishi, Japan
- 0910 A 12 GHz 140° K LOW NOISE GaAs FET  
S-3 AMPLIFIER  
Y. Fujiki, S. Fukuda, J. Haga, K. Okata,  
Nippon, Japan
- 0930 BREAK
- 1000 OPTIMUM LARGE-SIGNAL DESIGN OF FIXED-  
S-4 FREQUENCY AND VARACTOR-TUNED GaAs  
FET OSCILLATORS  
C. Rauscher, NRL
- 1020 A HIGHLY STABILIZED 9-14 GHz GaAs FET  
S-5 OSCILLATOR USING A DIELECTRIC RESONATOR  
FEEDBACK CIRCUIT  
T. Mori, O. Ishihara, M. Nakatani, T. Ishii,  
Mitsubishi, Japan
- 1040 ULTRA LOW CHIRP GaAs DUAL-GATE FET  
S-6 MICROWAVE OSCILLATORS  
R.S. Pengelly, J. Joshi, Plessey, England

- 1100 AN OSCILLATOR AT K-BAND USING A DUAL GATE  
S-7 GaAs MESFET  
S. Chu, T. Chen, HP
- 1120 GaAs IC DIRECT COUPLED AMPLIFIERS  
S-8 D. Hornbuckle, HP
- 1140 SYNTHESIS OF DISTRIBUTED NETWORKS WITH  
S-9 APPLICATIONS TO THE DESIGN OF ULTRA-  
WIDEBAND GaAs MESFET POWER AMPLIFIERS  
W. Ku, Cornell Univ. and H. Willing, NRL

**Diplomat Room**

**COMPUTER AIDED TECHNIQUES**

Chairman: Walter H. Ku

- 0830 COMPUTER MODELING OF MONOLITHIC GaAs I.C.'s  
T-1 R. Van Tuyl
- 0900 PERFORMANCE OPTIMIZATION OF MILLIMETER  
T-2 WAVE MIXER CIRCUITS  
L. Casner, J. Paul, Hughes
- 0920 FREQUENCY SCALING FOR COMPUTER-AIDED  
T-3 FOURIER MIXER DIODE OPERATION  
H.C. Lin, Univ. Maryland, N.A. Papanicolaou,  
J. McClintock, Martin Marietta
- 0940 MLS SIMULATION FACILITY  
T-4 J. Beneke, C.W. Wightman, Calspan
- 1000 BREAK
- 1030 ANALYSIS AND SENSITIVITY EVALUATION OF 2P-  
T-5 PORT CASCADED NETWORKS  
J.W. Bandler, M.R.M. Rizk, McMaster, Canada
- 1050 ACCURATE MODELS FOR MICROSTRIP COMPUTER-  
T-6 AIDED DESIGN  
E. Hammerstand, O. Jensen, Univ. Trondheim, Norway
- 1110 COMPUTER AIDED OPTIMIZATION OF MICROWAVE  
T-7 FILTER NETWORKS FOR SPACE APPLICATION  
C.M. Kudsia, Com. Dev., Canada, M.N.S. Swamy,  
Concordia Univ., Canada
- 1130 A NEW COMPUTER AID FOR MICROWAVE FILTER  
T-8 DESIGN  
G. Szentirmai, L. Besser, Compact Eng.

**FORUM ROOM**

**MICROWAVE MEASUREMENTS**

Chairman: H. George Oltman

- 0830 DENSITY-INDEPENDENT MOISURE METERING IN  
U-1 FIBROUS MATERIALS USING A DOUBLE CUT-OFF  
GUNN-OSCILLATOR  
W. Hoppe, W. Schilz, W. Meyer, Phillips, W. Germany
- 0850 A GENERAL APPROACH TO THE RESONANCE  
U-2 MEASUREMENT OF ASYMMETRIC MICROSTRIP  
DISCONTINUITIES  
V. Rizzoli, Univ. Bologna, Italy
- 0910 ACCURATE AND AUTOMATIC NOISE FIGURE  
U-3 MEASUREMENTS  
N. Kuhn, HP
- 0930 PRECISION AUTOMATED REFLECTOMETER USING  
U-4 AIR-LINE REFERENCES SPANS UHF THROUGH  
MILLIMETER RANGES  
P. Lacy, Wiltron
- 0950 BREAK
- 1020 TRANSMISSION PHASE MEASUREMENTS WITH A  
U-5 SINGLE SIX-PORT  
G.P. Riblet, MDL
- 1040 A DUAL SIX-PORT AUTOMATIC NETWORK  
U-6 ANALYZER  
H.M. Cronson, L. Susman, Sperry
- 1100 OPTIMIZING THE DESIGN OF THE SIX-PORT  
U-7 JUNCTION  
M. Rafal, W. Joines, Duke Univ.
- 1120 A LEAST SQUARES SOLUTION FOR USE IN THE  
U-8 SIX-PORT MEASUREMENT TECHNIQUE  
Glenn F. Engen, NBS

## TUDOR ROOM

## FIELD THEORY

Chairman: L. Wilson Pearson

- 0830  
V-1 FREQUENCY SELECTIVE SURFACES WITH APPLICATIONS IN MICROWAVES AND OPTICS  
R. Mittra, C.H. Tsao, W.L. Ko, Univ. Illinois
- 0850  
V-2 CALCULATIONS OF QUASI-STATIC CHARACTERISTICS OF MICROSTRIP ON ANISOTROPIC SUBSTRATE USING MAPPING METHOD  
M. Horno, Univ. Sevilla, Spain
- 0910  
V-3 ANALYSIS AND APPLICATION OF A NEW WAVEGUIDE STRUCTURE WITH DIELECTRIC LOADING  
A. Fukasawa, K. Hosoda, T. Sato, OKI, Japan
- 0930  
V-4 A HYBRID METHOD FOR PARAXIAL BEAM PROPAGATION IN MULTIMODE WAVEGUIDES  
E.F. Kuester, D.C. Chang, Univ. Colo.
- 0950 BREAK
- 1020  
V-5 EXACT ANALYSIS OF SHIELDED MICROSTRIP LINES AND BILATERAL FINLINES  
A. El-Sherbiny, Ain Shams Univ., Egypt
- 1040  
V-6 MICROSTRIP ANALYSIS ON ANISOTROPIC AND/OR INHOMOGENEOUS SUBSTRATE WITH THE FINITE ELEMENT METHOD  
M. El-Said, A.A. Ahmed, Cairo Univ., Egypt
- 1100  
V-7 WAVEGUIDE TREATMENT OF THE SUSPENDED MICROSTRIP LINE WITH TUNING SEPTUMS USING THE SPECTRAL DOMAIN APPROACH & THE FINITE ELEMENT METHOD  
K. Sachse, A. Sawicki, Univ. Wroclaw, Poland
- 1120  
V-8 ATTENUATION IN MICROSTRIP TRANSMISSION LINES WITH VERY LOSSY SUBSTRATES  
B.W. Jervis, R.M. Pannell, Dept. Comm. Eng., England

## FRIDAY AFTERNOON, MAY 30, 1980

## Ambassador Room

## MICROWAVE IC COMPONENTS

Chairman: Ed Denlinger

- 1330  
W-1 A SPIRAL MICROWAVE DIRECTIONAL COUPLER FOR MIC APPLICATION  
K. Shibata, Kitami Inst. Tech., Japan; K. Hatori, Res. Inst. of App. Elec., Japan; Y. Tokumitsu & H. Komizo, Fujitsu, Japan
- 1350  
W-2 WIDEBAND HIGH DIRECTIVITY IN MIC PROXIMITY COUPLERS BY PLANAR MEANS  
F.C. DeRonde, L.E.P., France
- 1410  
W-3 PLANAR MULTIPOINT, QUADRATURE-LIKE POWER DIVIDERS/COMBINERS  
A. Saleh, Bell Labs
- 1430  
W-4 THE TRAVELING WAVE POWER DIVIDER/COMBINER  
A. Bert, D. Kaminsky, Thomson-CSF, France

## DIPLOMAT ROOM

## MICROWAVE SYSTEMS-2

Chairman: Gerald Schaffner

- 1330  
X-1 A COMPREHENSIVE CHARACTERIZATION OF FET POWER AMPLIFIER MODULES FOR PHASED ARRAY APPLICATIONS  
C. Wong, J. Bender, Raytheon
- 1350  
X-2 A 25W, 5 GHz GaAs FET AMPLIFIER FOR MLS  
Y. Takayama, K. Honjo, Nippon, Japan
- 1410  
X-3 VERY LINEAR X-BAND MIC BIPOLAR VCO WITH A 100 MHz FM RATE  
R.G. Winch, J.L. Matson, Teledyne
- 1430  
X-4 SHORT-RANGE MICROSTRIP DIPLEX DOPPLER RADAR SENSOR USING A BARITT DIODE  
B.M. Armstrong, R. Brown, E.J. Duffin, J.A.C. Steward, Queen's Univ., Belfast, Ireland

## SCHEDULE OF EVENTS

## MONDAY, MAY 26, 1980 (Memorial Day Observed)

WEST LOBBY 0730-1300 WORKSHOP REGISTRATION AND MESSAGE CENTER	EXECUTIVE ROOM 0900-1700 GIGABIT LOGIC FOR MICROWAVE SYSTEMS	FORUM ROOM 0900-1700 AUTOMATIC RADIO FREQUENCY TECHNIQUES	PALLADIUM ROOM 0900-1700 MILLIMETER WAVE DEVICES USING GYROTROPIC MEDIA
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## TUESDAY, MAY 27, 1980

WEST LOBBY 0730-1300 WORKSHOP REGISTRATION AND MESSAGE CENTER	AMBASSADOR ROOM 0900-1700 ELECTROMAGNETIC DOSIMETRIC IMAGERY	FORUM ROOM 0900-1700 AUTOMATIC RADIO FREQUENCY TECHNIQUES	EMPIRE ROOM 0900-1700 MONOLITHIC MICROWAVE ANALOG IC's
1600-2200 SYMPOSIUM REGISTRATION			

## WEDNESDAY, MAY 28, 1980

WEST LOBBY	AMBASSADOR ROOM	DIPLOMAT ROOM	FORUM ROOM	TUDOR ROOM	EXHIBIT HALL
0730-1500 SYMPOSIUM REGISTRATION AND MESSAGE CENTER	0830-1000 A OPENING SESSION				0900-1800 1980 MICROWAVE EXHIBITION
	1030-1200 B MICROWAVE POWER TRANSISTOR	1030-1200 C MILLIMETER RECEIVERS AND COMPONENTS	1030-1240 D MICROWAVE ACOUSTICS AND MAGNETOSTATIC WAVES	1030-1210 E MICROWAVE ENGINEERING FOR EXPORT	
	1400-1700 F I MILLIMETER WAVE POWER GENERATION	1400-1710 G HIGH POWER DEVICES AND TECHNIQUES	1330-1700 H MICROWAVE SYSTEMS-1	1400-1710 J MICROWAVE FILTERS AND MULTIPLEXERS	
		2000-2200 PANEL SESSION ON MILLIMETER WAVE IC's	2000-2200 PANEL SESSION ON THE SOLAR POWER SATELLITE (SPS) SYSTEM		
	2000-2230 CHAMPAGNE AND DESSERT TOUR OF THE NATION'S CAPITOL				

## THURSDAY, MAY 29, 1980

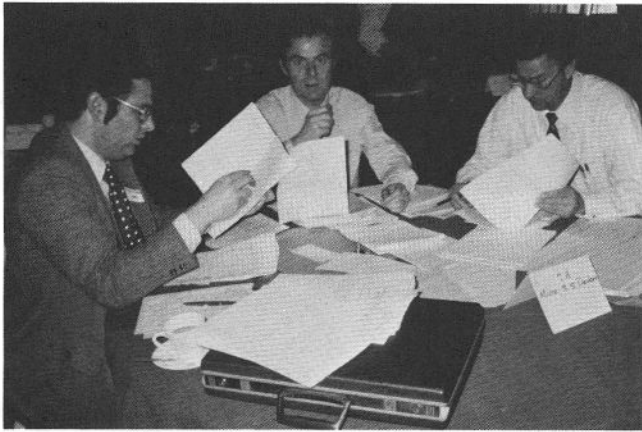
WEST LOBBY	AMBASSADOR ROOM	DIPLOMAT ROOM	FORUM ROOM	TUDOR ROOM	EXHIBIT HALL
0800-1530 SYMPOSIUM REGISTRATION AND MESSAGE CENTER	K 0830-1140 HIGH-POWER SOLID-STATE CIRCUITS	L 0830-1200 SATELLITE COMMUNICATION SYSTEMS IN EUROPE	M 0830-1140 GUIDES AND COMPONENTS	N 0830-1130 FERRITE APPLICATIONS	0900-1700 1980 MICROWAVE EXHIBITION
	O 1330-1640 MILLIMETER WAVE IC's	P 1330-1700 SATELLITE BROADCASTING IN JAPAN	Q 1330-1630 GUIDED WAVE OPTICS AND INTERACTIONS	R 1330-1700 BIOLOGICAL APPLICATIONS AND EFFECTS	
1715-1845 EXHIBITORS' RECEPTION, PALLADIUM ROOM					
1900-2230 1980 IEEE/MTT-S ANNUAL BANQUET, BLUE ROOM					

## FRIDAY, MAY 30, 1980

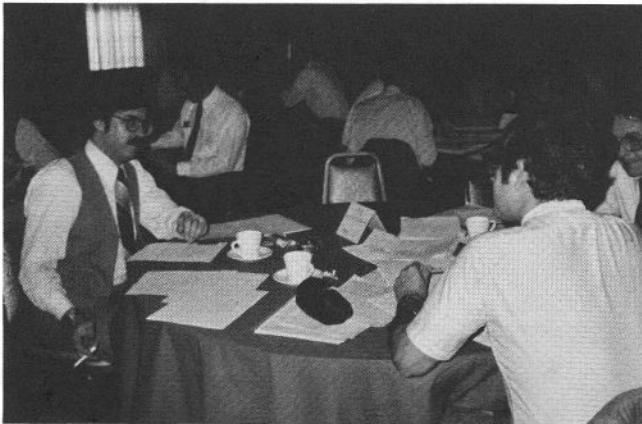
WEST LOBBY	AMBASSADOR ROOM	DIPLOMAT ROOM	FORUM ROOM	TUDOR ROOM	EXHIBIT HALL
0800-1300 SYMPOSIUM REGISTRATION AND MESSAGE CENTER	0830-1200 S GaAs FET CIRCUITS	0830-1150 T COMPUTER-AIDED TECHNIQUES	0830-1140 U MICROWAVE MEASUREMENTS	0830-1140 V FIELD THEORY	0900-1500 1980 MICROWAVE EXHIBITION
	1330-1450 W MICROWAVE IC COMPONENTS	1330-1450 X MICROWAVE SYSTEMS-2			

See You Again  
At The 1981  
Symposium in  
Los Angeles

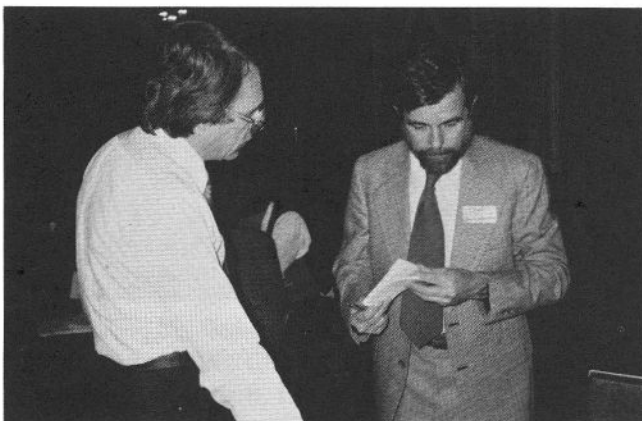
## SCENES FROM TECHNICAL COMMITTEE MEETING



Selection of papers.



Evaluation of manuscripts.



Checking with Technical Committee Chairman.



Conferring with Steering Committee Chairman.



Official photographer.



## ADCOM MEETING



President making a point.



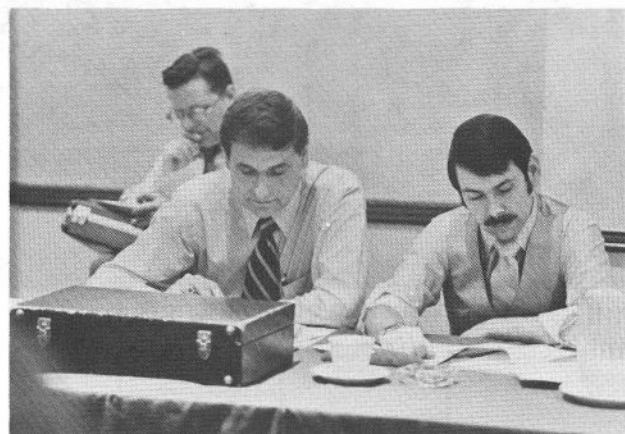
Getting attention of the Committee.



Listening attentively.



Studying the proposed motion.



Adcom members.



# TECHNICAL PROGRAM COMMITTEE



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Fourth row: B. Berson, J. Welehan, T. Itoh,  
A. Cardiasmenos.

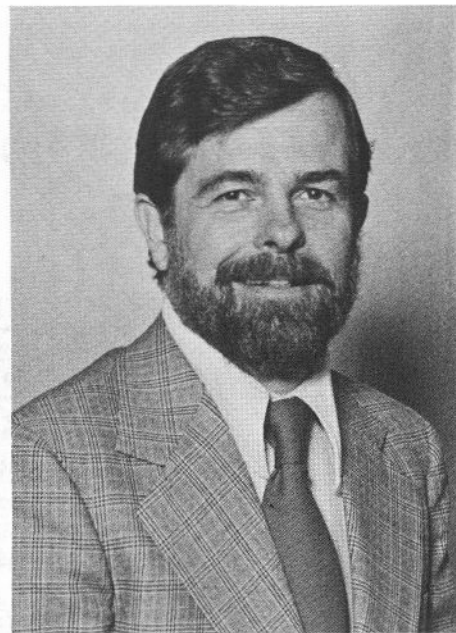
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Larry Whicker, General Chairman



Mrs. Margaret Whicker, Chairman  
Spouces Program



Richard VanWagoner, Program  
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# 1980 MTT Advanced Radar Technology Symposium

Get updated at a one day symposium presented by the Baltimore Chapter of the Microwave Theory and Technique Society

**When:** Saturday, May 3, from 9:00 AM to 5:00 PM

**Where:** Auditorium, Westinghouse Defense Center Administration Building  
Gate 2 Camp Meade Rd., Baltimore, Maryland (near BWI Airport)

## Description

The thrust of the new radars in the '80's and '90's will be in advanced signal processing concepts, making possible ECCM multimode performance, fast beam agility, adaptive processing, spread spectrum techniques, and high resolution processing. In order to make these signal processing concepts operational, a new arena of microwave analog and digital technologies is evolving, including charge-coupled devices (CCD), surface acoustic wave devices (SAW), and monolithic microwave integrated circuits. These new technologies are exposed and compared in this unique one-day symposium.

## Registration

Only the first 200 registrations can be accepted. Ensure your attendance by mailing the registration form with your check today. Companies may enroll a number of persons supplying names later. Registration is complete with receipt of check. The registration fee includes a copy of lecture notes, coffee, and lunch.

## Further Information

Contact: Debbie Walter (301) 765-7272 or Edward Niehenke, MTT Chapter Chairman  
Westinghouse P.O. Box 746, MS 333  
Baltimore, Maryland 21203  
Phone: (301) 765-4573

## Schedule

8:00 Registration and Distribution of Lecture Notes

9:00 CCD Signal Processing

"How CCD's work, configurations, doppler processing, high range resolution processing, adaptive processing, digital memory."

*Dr. Ken Davis, NRL, Washington, D.C.*

10:00 Coffee — Pastries

10:30 SAW Signal Processing

"SAW functions, basic elements, material considerations, delay lines, fuzing, MTI, STALO's, pulse compression, convolvers, current research."

*Dr. Denis Webb, NRL, Washington, D.C.*

11:30 Digital Signal Processing

"Comparison of analog (SAW) and digital processing (time-bandwidth, precision, speed, etc), capabilities, examples."

*Dr. Robert Purdy, MIT Lincoln Lab., Lexington, MA*

12:30 Lunch

1:30 Hybrid RF Integrated Circuits

"Overview of conventional radar systems, active aperture phased array element, projected X-band element performance, comparison with conventional radar."

*Dr. David McQuiddy, T.I., Dallas, TX*

2:30 Monolithic GaAs and Si Integrated Circuits

"Monolithic GaAs receiver elements, gigabit logic, GaAs and Si applications, tradeoffs, projected future applications."

*Mr. Dale Claxton, TRW, Redondo Beach, CA*

3:30 Coffee

4:00 Monolithic IC's (Continued)

*Dr. Ken Weller, TRW, Redondo Beach, CA*

**Mail to: D.E. Dawson, Westinghouse, P.O. Box 1521, Baltimore, Maryland 21203, MS 3717**

**REGISTRATION FORM** Complete and mail to D.E. Dawson. Enclose check payable to "IEEE Baltimore MTT." After April 14 add LATE REGISTRATION FEE.

☐ \$15 Student Member IEEE: Member

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