

IEEE GROUP ON
MICROWAVE THEORY
AND TECHNIQUES



NEWSLETTER

EDITOR: G. P. Rodrigue

School of Electrical Engineering, Georgia Tech, Atlanta, Georgia 30332

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Bob Knox



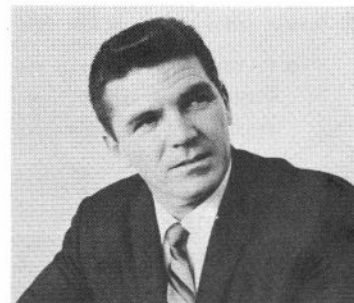
Larry Hansen

SYMPOSIUM CO-CHAIRMEN'S INVITATION

"Microwave International" --This abbreviated theme is our way of expressing the fact that the microwave art is one which has no national boundaries. While the IEEE Microwave Symposium has always been "International" in name and there has always been non-U.S. participation, in 1972 a dramatic increase in such participation will occur. The program contains papers from Australia, Canada, France, Germany, Great Britain, Israel, Italy, Japan, Netherlands, Sweden, and the United States. Of the 70 contributed papers appearing in the program 27 (39 percent) originate outside of the United States.

Chicago, despite the changing character of this modern age, is a city which retains in its population and in its civic vitality the ethnic and cultural attributes of the world's nations. It is perhaps appropriate, then, that Chicago would be the scene of an increased awareness by microwave engineers and scientists of their international citizenship. Your steering committee extends to you an invitation to participate in the 1972 IEEE International Microwave Symposium and to share in the rewarding experience of interacting with other members of the international microwave community.

WM. M. MAGRUDER BANQUET SPEAKER



Symposium attendees will have an opportunity to hear a most significant and timely talk by William M. Magruder, a man who directly influences national policy on science and technology. Mr. Magruder will speak on "Technology and National Goals" at the MTT Symposium banquet on Tuesday, May 23.

Prior to his current responsibilities, Mr. Magruder served as head of the New Technology Opportunities Program, a high-priority program designed to relate the technological capability of this nation to its pressing domestic problems. Earlier, Mr. Magruder led the administration effort to obtain Congressional support for the SST program.

Mr. Magruder represents, and speaks for, the Nixon Administration. A large attendance at the banquet by Symposium registrants will indicate to the Administration that engineers are not apathetic about the impact of technology on society, the nation and the world.

Professor Paul Coleman of the University of Illinois will serve as Master of Ceremonies. The award of the Microwave Prize will be made to Mr. Marion E. Hines of Microwave Associates.

The annual Symposium Cocktail Party (with cash bar) will take place from 6:00 to 7:00 pm. Banquet tickets are priced at \$8.00. *It should be noted that the prices listed on the registration form in the Advanced Program are incorrect. If registration has already been mailed, a refund will be made when registration materials are obtained at the Symposium.*



EDITORS NOTES

by Pete Rodriguez

The forthcoming IEEE Microwave Symposium in Chicago should be an interesting one to observe for a number of reasons. The adverse economic conditions of 1970-71-72 had an obvious detrimental effect on the attendance at many technical conferences. Recent evidence has, however, pointed to a rather marked upsurge in both attendance and technical vitality. It will be interesting to see how our next Microwave Symposium fares. Everything points to a stimulating three day session with the traditional format spiced by some new innovations.

- First, the convention site is the Arlington Park Towers with all the attractions of a resort--golf course, race track, pool--yet convenient to the excitement of Chicago's Loop.
- This year's banquet will feature an outstanding speaker, Mr. William M. Magruder, who as Special Consultant to the President can provide a significant communications channel between the engineering community and the federal administration.
- In addition to covering technical areas represented in recent Symposia, a new topic area, "Gigabit Data-Rate Applications," has been added, in recognition of the role that microwave technology plays in very high speed logic and data processing.
- On Monday evening, Ted Saad (the 1972 G-MTT National Lecturer) will chair a panel session, "Microwave State-of-the-Art International," with reports by authorities from various parts of the globe on recent significant developments in microwave technology. Attendees will be advised of the status of research throughout the world on solid state devices, transmission line components, and other microwave devices, as well as reports of new systems applications.
- Exhibits come to the symposium in 1972. The product exhibit booth area will open at noon on Monday and will remain open during daytime hours throughout the symposium.

Further details on symposium arrangements (registration, meals, ladies activities) and the technical program are described on pages 8 thru 12.

The IEEE administration, spurred on by the results of the recent poll, shows every sign of moving toward a modification of their constitution and becoming more "active." (Note the opening of a Washington office under Personalities, page 3, and Leo Young's Report, page 4).

Considerable pressure for overcoming inertia came from G-MTT and G-AP members, the Galinda movement, and Bob Rivers Political Action Committee. The prodding of Al Calvin (as Newsletter Editor)



PRESIDENT'S MESSAGE

by Al Calvin

In this issue of the Newsletter you will find a great deal of material concerned with our International Symposium. I hope that after reading this material you will all make plans to attend. The word "international" certainly applies to the symposium this year. Over 40 papers from outside the U.S.A. were received. The Program Committee deserves considerable praise for their efforts in this regard. Ted Saad is moderating a special panel session entitled "Microwave State-of-the-Art International." I'm sure that this will give us all an opportunity to catch up with what is happening outside our borders.

Also, for the first time in our Symposium history we are allowing exhibits of commercial microwave components and instrumentation. Exhibitors will have senior level, competent, engineers available to discuss their particular products with you in detail. What better way to see the latest commercially available items than at our Symposium.

In the past the annual banquet, while offering excellent programs, has not attracted the attendance it should. In order to help correct this problem the Steering Committee has obtained a truly outstanding dinner speaker in William M. Magruder, Special Consultant to the President. Mr. Magruder was formerly Head of the New Technology Application Programs. He is a truly dynamic speaker and his field of expertise is certainly timely to the present problems of our profession. A second inducement to attend the banquet is the low \$8/head price.

In addition to all the above features, I'm sure you will enjoy the facilities of the Arlington Park Towers in Chicago. They are excellent. The "Race Track" atmosphere is fun, and the rooms are large and comfortable.

I'll see you all on May 22 at the "Starting Gate."

two years ago was also a stimulant. It is very satisfying that pressure from within has been successful in bringing this large, prestigious, and responsible organization to a more active status.

Next order of business in getting our house in order will be a long range planning attempt. Hal Altshuler is guiding this effort, and its aim is not so much a (perhaps sterile) projection of numbers but rather a soul searching look at what direction MTT should take in future years--merge with other groups? --become more applications, systems oriented? --encompass new technologies? Everyone must have some thoughts on these alternatives. Lets hear from you!



CHAPTER ACTIVITIES

by L. R. Whicker

Chapter Records

An effort has been made to contact each MTT Chapter Officer in order to bring our Chapter Records up to date. Thus far we have heard from less than half the Chapters. Please encourage your Chapter Officers to respond. Updated records should be sent to myself (Code 5250, Naval Research Laboratory, Washington, D.C.) or Dr. Gene Chao (Code 5257, Naval Research Laboratory, Washington, D.C., 20390).

Chapter Chairmens Meeting

A Chapter Chairmen's Meeting is scheduled for Sunday, May 21 at 7:30 PM in the War Admiral Room, Arlington Park Towers Hotel, Arlington Heights, Illinois, at the 1972 International Microwave Symposium. Chapter Chairmen will receive a notice by May 1, giving an agenda. This Annual Meeting gives the Chapter Chairman or his delegate a good opportunity to meet with members from other Chapters and ADCOM officers. For further information, contact me at (AC 202) 767-3312.

Speakers List

A short speakers list of people who are interesting speakers and who are willing to make one or more speaking trips a year is being prepared. This list will be complete and available by the end of May.

National Lecturer

The schedule for the National Lecturer, Ted Saad, is rapidly becoming filled as indicated by his schedule listed below. However, if you are interested in having his presentation at your Chapter Meeting, please contact him at Sage Laboratories, Inc., 3 Huron Drive, E. Natick, Mass., 01760, Telephone (AC 617) 653-0844.

Topic: "The Microwave Industry 1972"

Schedule:

Date	Chapter	Attendance
Mar 8, 1972	Orlando	22
Mar 9, 1972	Dallas	29
Mar 10, 1972	Fort Worth	23
May 8, 1972	Phoenix	
May 9, 1972	Huntsville	
May 10, 1972	Atlanta	
May 25, 1972	Columbus	
Jun 7, 1972	San Francisco	
Jun 8, 1972	Los Angeles	
Sep 20, 1972	Long Island	
Oct 12, 1972	Schenactady	
Oct 18, 1972	New Jersey Coast	
Dec 12, 1972	Washington, D.C.	
Dec 13, 1972	Baltimore	

Washington Lecture Series

The Washington Chapter is holding in lieu of the traditional Chapter Meeting a more formal lecture series (that requires registration) on Modern Radar. The first lecture by Merrill Skolnick had a total attendance of 287 and subsequent lectures in this series have all attracted more than 150. Congratulations are in order to this Chapter for a most successful and innovative series.

PERSONALITIES

Ralph Clark joined IEEE staff to head new Washington office. In a move designed to increase the effectiveness of IEEE communication with U.S. government agencies in areas of common technical interest, a Washington, D. C. office has been established by the Institute. Dr. Ralph L. Clark, who has had a career of 37 years of active government service, has been appointed Manager of the new office.

In making the appointment, Donald G. Fink, IEEE's Executive Director, said: "It will be the task of this new IEEE Office to develop liaison with the Congress and agencies of the Federal Government, to make the resources of the Institute available in the solution of the

complex technical problems which face this country today. We are fortunate to have available Ralph Clark's years of experience in working in the Washington scene. I am confident that, as our plans for activities in this office develop, he will provide the IEEE with highly effective technical communication to and from the Federal Government."

The Microwave Biological Effects Technical Committee (MTT-10) was listed in the 1972 G-MTT Committee Directory as disbanded. H. Sobol announced at the February 1 ADCOM meeting that this committee has been reinstated under the chairmanship of:

John M. Osepchuk
Raytheon Company,
28 Seyon Street,
Waltham, Massachusetts 02154
(617) 899-8400, ext. 2475.

A. Clavin, ADCOM President, announced at the February ADCOM meeting that H. W. Cooper has been appointed Chairman of the G-MTT AD HOC Committee on Technological Forecasting. Warren's address is:
Westinghouse Electric Corporation,
Advanced Technology Labs.,
Box 1521,
Baltimore, Maryland 21203
(301) 765-7264.



THE STATE OF THE IEEE

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

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

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

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

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

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

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

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

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

What can IEEE do? A program should be formulated, with priorities. There are long-term programs (such as public relations) and short-term programs (such as alleviating present unemployment). There are socio-technological problems (such as radiation hazards) and socio-economic problems (such as portable pensions). There is legislative action (who is the legal "expert" to rule on the safety of electronic equipment in hospitals--the physician or the engineer?) and professionalism (ethics, employment guidelines). There is certification (of engineers) and accreditation (of Colleges and Universities). IEEE could operate an employment service and provide mid-career counseling. It could provide more insurance plans and a group pension plan (perhaps linked to the ACS "Pensions for Professionals"). Under 1971 President Jim Mulligan's leadership last year a beginning was made. But continued progress over the long haul will only be made if we remember that IEEE exists "solely to carry out to the best of [its] abilities the wishes of the greatest numbers of our members," as 1972 President Bob Tanner so aptly put it (in IEEE Spectrum, March 1972). But these words must be backed by action.

Let us consider portable pensions for a moment. Only a small minority of engineers ever benefit from the pension programs they participate in, because of long vesting requirements. An engineer who joins a company and then is laid off or leaves for a good reason and loses his pension has been deceived or victimized. A man who stays because he is afraid to lose his pension rights "is the victim of a sophisticated form of economic indenture" (Dun's Review, September 1969). The same article says "Despite much corporate hand-wringing that portability is a difficult thing to put into effect, business should look to the world of higher education for the ideal model for a portable pension plan" (referring to the TIAA-CREF plan in Colleges and Universities and certain non-profit Institutes). According to the Wall Street Journal, "longshoremen currently have pensions of \$400 a month at age 62." According to a friend of mine with a large electronics company on the San Francisco peninsula, an engineer with his company collects the same pension if he manages to stay with the company for 25 years and earns a high five-year average of \$17,000 a year. But few engineers indeed stay that long and ever collect. Although IEEE cannot do it alone, it can help to promote social justice for its members (if its members really want social justice, by asking for it, voting for it, and working for it).

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

On Funding, members must expect to pay for new services that may eventually be worth to them much more than the fee paid. On

the question of mandatory-versus-voluntary fees on the January 1972 IEEE questionnaire (mentioned earlier), members voted better than 2:1 in favor of mandatory fees. Indeed, voluntary fees would be self-defeating. If a small voluntary group within IEEE were formed, how can it speak for IEEE on such far-reaching issues? But there is little likelihood that a voluntary group would ever succeed, a lesson to be learned from our friends in England. There the major engineering societies started a Professional Engineers' Association, Ltd. (PEAL) in 1970 on a voluntary basis. (Membership was about \$10). Checks received were held for a while, then returned, because of insufficient response. Although widely advertised, no announcement was ever made when PEAL was abandoned, because the engineering organizations concerned could not agree upon the terms of an announcement.

Like it or not, a mandatory fee for professional action is not unlike a tax. And I'm not going to pay mine if you don't pay yours. So it can't be voluntary. These fees should be collected and placed into a separate account controlled by USAC (which should probably be expanded and possibly incorporated). This should leave the IEEE as a whole to remain transnational and serve all its members, U.S., Canadian, and overseas, with the same dedication and effectiveness as in the past.

HIGHLIGHTS OF TAB, USAC AND BOARD OF DIRECTORS MEETINGS, JANUARY, FEBRUARY AND MARCH 1972

Just to review, TAB (Technical Activities Board) consists of the TAB chairman and vice chairman, the 31 Group (or Society) Presidents, the two Council chairmen, the six Division directors, plus sundry TAB committee chairmen (finance, publication, standards, long-range planning, technical meetings), almost 50 people. Its executive committee, known as OpCom (Operating Committee), consists of the TAB chairman and vice chairman, the Division directors and principal committee chairmen, for a more manageable total of about a dozen people.

Recent developments at TAB and TAB OpCom include the following. TAB has been considering the application of electro-technology to social problems, and the division directors have been asked to propose suitable areas for consideration. For Division IV, I have proposed the topic of radiation hazards. As many of you know, this subject has received considerable attention, and will become more important as more transmitters come into operation, from radio stations to futuristic car radars, from microwave ovens to satellite antenna farms collecting energy from the sun and transmitting it to the ground over microwave beams. What is a safe level? The Russian and Eastern European standards are 1000 times lower than the U.S. Is the potential hazard only due to heating, or through the nervous system also? There is also the question of radio "pollution" of the atmosphere. We would like to report on this (a) in more detail for the engineering community, (b) in a "popular" article that would be of interest to the general public. Related to this is the question of whether the IEEE is willing to accept invitations to give expert advice on these and related matters to legislators, or should leave such activity to the AMA (American Medical Association) as in the past.

It is a truism to say that IEEE is run by people. The constitutional amendment is important, and the new constitution, if approved by the membership, will give IEEE far-reaching opportunities to serve its membership--but this will be of little use if we don't avail ourselves of these opportunities. That is why I am particularly pleased with the selection of Hal Chestnut and John Guarrera as the Board's nominees for President and Vice-President. Hal is this year's hard working vice-president. John is now director of Region 6, and was instrumental in setting up USAC and in getting it going. We wish them both all the best.

I would welcome any assistance on any of these questions from anyone interested and knowledgeable in the area of radiation hazards.

Last year TAB had about twenty adhoc technical committees on very diverse subjects, all reporting to the TAB chairman. This year they are being transferred to Divisions or Groups as far as practical. We welcome the Committee on Electronic Materials, under Dr. Harold Jacobs, to Division IV. Materials are of interest to many Groups, but none more so than those in Division IV. We will attempt to coordinate the Committee's activities with similar activities in various Groups or Societies.

Professional Action has been discussed not only at TAB and TAB OpCom meetings, but even more so at meetings of USAC (United States Activities Committee) and the Board of Directors. USAC consists of the six U.S. region directors, and Vice-President Chestnut is the (non-voting) chairman. Division directors have been invited to attend as guests, but so far I have been the only division director to accept the invitation. Our Division IV Professional Action Committee (PAC) under Bob Rivers is of course very interested. I have thus tried to improve communications between USAC and PAC.

The Board meeting in January approved a new bylaw authorizing fees for the regions, both U.S. and non-U.S. Funds raised in this way would support an IEEE office in Washington (paid for by members in Regions 1-6) and in Canada (paid for by members in Region 7). If an overseas region wants a special service, e.g. bulk air freighting of IEEE publications for quicker delivery, then that region can, if it so wishes, assess regional fees for this purpose.

The Board meeting in March was almost exclusively devoted to discussing the results of the questionnaire, and drafting a constitutional amendment to Article I, Sections 2 and 3, which define the purpose of the IEEE. This amendment will be placed on the ballot for a vote by the membership. In essence the amendment, which was approved by the Board, adds to the present "scientific and educational" purpose another one, a "professional" purpose.

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EXCERPTS FROM ADCOM MEETING

by J. B. Horton

The G-MTT Administrative Committee met February 1, 1972 at the Arlington Park Towers Motel in Chicago, Illinois. This meeting was held at the site of the 1972 G-MTT International Microwave Symposium.

Al Clavin, G-MTT ADCOM President, opened the meeting with introductions of those present and an announcement that H. W. Cooper has been appointed Chairman of the Ad Hoc Committee on Technological Forecasting.

Bob Rivers, Chairman of the Professional Action Committee, summarized the work of the PAC since the last ADCOM meeting (details of this work were given in the January 1972 NEWSLETTER, page 3). Bob stated that the first priority of the committee is the Vested Pension Problem. Leo Young reported that the IEEE Board of Directors has considered a proposal for Vested Pensions by Senator J. Javits of New York. No action on this plan was taken. Leo Young next reported that the IEEE Board of Directors will send a letter to Congress endorsing the extended Keogh plan (for pension contributions on a deferred tax basis) which would allow other than self-employed people to set-up a tax deductible retirement plan (further details of this plan are available from B. Rivers or L. Young).

Bob Rivers reported that the PAC has considered the type of organization required to implement an effective professional action plan. Bob indicated that it would be a long term effort to promote the actions suggested by the PAC Committee. Bob further stated that the Committee feels that their work should be done through IEEE.

Bob Garver reported on a study he has made of the present PAC activities. Bob presented two recommendations that the ADCOM considered. The first was that G-MTT ADCOM initiate a committee to approach IEEE Headquarters to start a reprint journal on topics of social and economic concern to IEEE members. This motion was passed. The second recommendation was that G-MTT establish a committee to identify those senators and congressmen to whom G-MTT members would write, and those topics which should be pursued. Considerable discussion of this second motion followed and it was ruled by A. Clavin, ADCOM President, that the PAC under Bob Rivers could accomplish this action. A straw vote of ADCOM favored the PAC assuming this responsibility.

Leo Young reported that the IEEE TAB has asked for inputs on Socio-Technical problems that IEEE can act on (example: Radiation Hazards and Safeguards). Suggestions should be forwarded to Leo Young, 406B, SRI, Menlo Park, CA 94025.

E. N. Torgow reported that G-MTT is forecasting a surplus

of \$12,000 for 1972. He reported that this will provide G-MTT with a surplus of \$24,000 at the end of 1972. In view of the 750 page Transactions budget for 1972, E. N. Torgow moved that the 1972 Transactions page allocation be increased to 900 pages. Motion was passed. E. N. Torgow asked L. Young to correct the apparent impression at IEEE Headquarters that G-MTT is financially irresponsible (see Progress Report 1971, Division IV, G-MTT NEWSLETTER, January 1972, p. 6).

F. J. Rosenbaum, Transactions Editor, reported that the first six issues of the Transactions have been submitted to the printer. The number of papers for the remaining six issues will be increased as allowed by the new budget of 900 voted earlier. F. J. Rosenbaum requested ADCOM authorization for a special issue for November 1972 on gibabit logic. Recommendation was endorsed by ADCOM. F. J. Rosenbaum next reported he has instituted a new paper category of short papers, and that in general, he has set limits on length of papers and instituted a stricter review on all papers.

S. Okwit reported for F. Arams on Meetings and Symposia. B. Garver reported that the final report for the 1971 G-MTT Symposium is complete and has been distributed. Bob Knox reported that the 1972 G-MTT Symposium is proceeding as planned. The technical program will consist of 77 papers (152 papers were received). An evening session on state-of-the art microwave activities in foreign countries is planned (T. Saad will be moderator). Two rooms have been reserved for exhibits. Exhibit booths will be 10 feet by 10 feet. The banquet is planned for Tuesday evening, with the Chicago Section participating in the banquet.

David Wait reported that work on the 1973 G-MTT Symposium is proceeding as planned. The Symposium will be held at the University of Colorado, and space for exhibits will be at a premium.

G. P. Rodrigue asked that ADCOM comment on having an overlapping symposium in 1974 with the AP-URSI Symposium in Atlanta, Georgia. The ADCOM expressed no adverse comments to this suggestion.

A. Wexler stated that he would look into the possibility of having the 1974 G-MTT Symposium in either Ottawa or Winnipeg, Canada.

H. Sobol reported that organization of the MTT Technical Committees for 1972 is essentially complete. Committees have been added to cover Microwave Ferrites, Microwave Low Noise Receivers, Microwave Field Theory and Microwave Subsystems. MTT-16, Microwave Subsystems, is planning to sponsor a book on optical waveguides with QEC. MTT-6, Microwave Integrated Circuits, will sponsor a workshop in conjunction with the 1972 G-MTT Symposium.

R. W. Beatty submitted a proposal by K. Tomiyasu to amend the G-MTT By-Laws to allow Past Chairmen (Presidents) full voting privileges. The amendment was not passed by ADCOM.

T. Saad reported that he has continued to work on the history of G-MTT. He reported that Dr. A. Clavier, G-MTT Life Member and second Chairman of G-MTT, died recently. T. Saad stated that he will send a letter to Dr. Clavier's family on behalf of ADCOM.

G. P. Rodrigue, Chairman of Membership Services, reported that Carl Blake, 1971 National Lecturer, spoke at 17 Chapters. Next L. R. Whicker, Chairman of Chapter Activities, announced that a Chapter Chairmen's meeting will be held at the 1972 G-MTT Symposium (details of the meeting can be obtained from L. Whicker - (202) 767-3312). L. Whicker requested names for potential speakers for Chapter meetings. The intent is to generate East Coast and West Coast lists. L. Whicker reported that the Washington Chapter Radar Lecture series has continued to be a success.

J. B. Horton presented a year-end report on the NEWSLETTER. He announced that G. P. Rodrigue will become NEWSLETTER Editor effective February 1, 1972. J. B. Horton requested \$500 for publication of the 1972 G-MTT Committee Directory. Request was granted by ADCOM.

Reports for the QEC (F. Arams) and for the SSCC (B. From) were received. S. Okwit submitted a written report from P. H.

Smith for the Standards Coordinating Committee. L. Young asked for suggested names for chairman of the Magnetics Standards Committee.

A report from K. Tomiyasu for the 1971 G-MTT ADCOM Nominating Committee was presented. Next, nominations for Division IV Director were opened. Al Clavin nominated Leo Young. Nomination was unanimously confirmed by ADCOM.

Several items of new business were taken up by ADCOM. D. Wait asked if G-MTT members should be given special consideration in acceptance of papers for the 1973 Symposium. Consensus of opinion (ADCOM) was that no special consideration be given. Bob Rivers was granted \$200 to cover mailing costs of the PAC. L. Young reported that the Group on Engineering In Medicine and Biology has elected a student member to its ADCOM.

The ADCOM meeting was adjourned at 4:12 p.m. The next meeting will be held March 20, 1972 in Room 507 at the New York Hilton, New York, New York.

1972 GMTT Administrative Committee

Seated: S. Okwit, J. Horton, A. Clavin, L. Young, G. Haddad. Standing: A. Wexler, N. Lipetz, R. Beatty, G. Rodrigue, J. Osepchuk, J. Bryant, F. Rosenbaum, L. Whicker, R. Garver, D. Parker, H. Sobol, E. Torgow, R. Rivers. Missing: H. Cooper, D. Leeson, F. Arams, S. Rosenthal. Photo taken at 1 February 1972 meeting, Arlington Park Towers Hotel, Arlington Heights, Illinois.



1972 IEEE INTERNATIONAL MICROWAVE SYMPOSIUM

"Microwaves International"

Arlington Park Towers

Chicago, Illinois



CONDENSED SCHEDULE OF EVENTS

SUNDAY, MAY 21, 1972

1400	ADCOM Meeting (Swaps)
1700-2100	Registration (Main Lobby)
1930-2130	Early Arrival Reception (Equipose/Whirlaway)
1930	Chapter Chairman's Meeting (War Admiral)
1930	1973 Technical Program Committee Meeting (Sea Biscuit)

MONDAY, MAY 22, 1972

0715	Breakfast - Speakers and Chairmen: Sessions 1-4 (Citation)	
0730-1500	Registration (Main Lobby)	
0900-0930	Welcome and Keynote Address (Durante A)	
0940-1230	1 - Low Noise Microwave Receiving Systems	2 - Microwave Measurements
1000-1800	Hospitality Center (Parlor 1)	
1200-1800	Exhibits (Parlors 4 and 5)	
1245	Symposium Luncheon (Durante 8)	
1400-1640	3 - Solid-State Microwave Control Devices	4 - Waveguides - Techniques and Analysis
1930-2130	Panel Session: Microwave State-of-the-Art International (Durante A)	

TUESDAY, MAY 23, 1972

0715	Breakfast - Speakers and Chairmen: Sessions 5-8 (Citation)	
0730-1500	Registration (Main Lobby)	
0900-1200	5 - Microwave Acoustics	6 - Computer-Aided Microwave Practices
1000-1800	Hospitality Center (Parlor 1)	
1000-1800	Exhibits (Parlors 4 and 5)	
1215	Symposium Luncheon (Durante 8)	
1330-1630	7 - Commercial and Industrial Applications of Microwaves	8 - Passive Microwave Components
1800-1900	Cocktail Party (Paramount)	
	Banquet (Paramount)	

WEDNESDAY, MAY 24, 1972

0715	Breakfast - Speakers and Chairmen: Sessions 9-12 (Citation)	
0730-1400	Registration (Main Lobby)	
0900-1200	9 - Solid-State Microwave Active Devices	10 - Gigabit Data-Rate Applications
1000-1800	Hospitality Center (Parlor 1)	
1000-1700	Exhibits (Parlors 4 and 5)	
1215	Symposium Luncheon (Durante 8)	
1330-1640	11 - Microwave Integrated Circuits	12 - Ferrite Devices

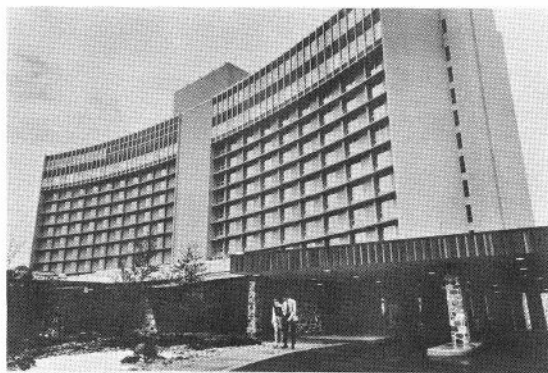
NOTE: ODD-NUMBERED TECHNICAL SESSIONS WILL BE LOCATED IN DURANTE A.
EVEN-NUMBERED TECHNICAL SESSIONS WILL BE LOCATED IN DURANTE C.

Steering Committee 1972 IEEE-GMTT

INTERNATIONAL MICROWAVE SYMPOSIUM

Seated: C. Knop, P. Toulfos, Mrs. L. Hansen, L. Hansen, R. Knox; Standing: A. Feller, C. Arnow, J. Brown, G. Stanton, E. Weber, J. Hupert, R. Morgan, J. Huber, R. Hargis, E. Book, A. Holtum; Missing: G. Haddad, H. Cooper, K. Snyder, T. Charlton, T. Smith, Miss B. Lukasevicius, Mrs. L. Whitney, Mrs. J. Brown, Mrs. K. Wrobel





HOTEL ARRANGEMENTS

The Arlington Park Towers Hotel, located in the Chicago suburb of Arlington Heights, will be the site of the 1972 IEEE International Microwave Symposium. The hotel is located 10 miles northwest of Chicago's O'Hare airport and operates a courtesy limousine service between the hotel and the airport on a 20-minute schedule at the United or American terminals. All hotel facilities, including 375 rooms, have been made available for the use of the Symposium. In case of overflow, space has been reserved at a nearby Howard Johnson Motel. Special room rates are offered to all Symposium attendees, as shown below. In addition, a block of 50 rooms is available for Government and University employees at even lower rates. Consideration for government rates or other requested rates will be on the basis of earliest received application.

Daily Room Rates:

Government Single	\$16.00
Government Twin	\$20.00
Single	\$17.00, 20.50, 22.00
Twin	\$22.00, 24.50, 27.00
Parlor	\$40.00, 45.00, 50.00

MEALS

Food preparation and service are given the highest priority at the Arlington Park Towers and, as a result, this hotel enjoys a widespread reputation for excellence in the culinary art. The Carousel restaurant is open for all meals. A daily feature is the breakfast buffet. There is a continental breakfast in the Tack Room for the light eater. At noon the Tack Room is the scene of a fast moving sandwich buffet. In the evening, the Top of the Towers offers supper-club elegance with a beautiful view.

Noon luncheons will be offered each day giving Symposium attendees an opportunity to dine together in a location convenient to the technical sessions. These luncheons will be held in Durante "B." A single charge of \$15.00 covers luncheon for all three days.

SOCIAL EVENTS

On Sunday, May 21, the traditional informal reception will be held in the Equipose and Whirlaway Rooms from 7:30 to 9:30 p.m. This will provide early arrivals with an opportunity to renew old acquaintances and make new ones over cocktails.

The Paramount Ballroom will be the location of the principal social events of the conference on Tuesday. The cocktail party (with cash bar) will start at 6:00 p.m. and will be followed by the Symposium Banquet (tickets \$8.00) at which William M. Magruder will speak.

REGISTRATION

Symposium fees are shown in the table below. Registration prior to 5 May 1972 will result in lower applicable fees. Non-members can qualify for member fees by joining the IEEE at the Symposium. A membership desk will be open near the Symposium registration desk. Checks are payable to: 1972 IEEE International Microwave Symposium. Registration should be mailed to:

Mr. Robert Hargis
Motorola, Inc.
1301 Algonquin Road
Schaumburg, Illinois 60172

Registration	Postmarked by May 5	Postmarked After May 5
IEEE Member	\$25.00	\$28.00
Non-Member	37.00	42.00
Student	7.00	7.00
Banquet	8.00	8.00
Ladies' Program	15.00	18.00
Luncheon	15.00	15.00

LADIES ACTIVITIES

Wives attending the Symposium are invited to participate in the Ladies Program. The activities will be as follows:

Monday, May 22

- 930 Continental Breakfast
- 1300 Tour of Haeger Potteries

Tuesday, May 23

- 1100 Leave by Bus for tour of Chicago.
- Free time for shopping in the Loop will be available.

Wednesday, May 24

- 1100 Depart for lunch and visit to the unique shops of Long Grove, an "Old Town" with country charm.

INTERNATIONAL HOSPITALITY CENTER

Because of the increased participation of non-United States residents at the 1972 Symposium, a hospitality center with an international atmosphere will be open during the Symposium, in Parlor 1 on the lower level. All attendees are invited to use the facilities of the Center for leisure moments or when personalized assistance is needed. The center will feature a message desk and bulletin board. A hostess will be available to answer questions, and provide information on hotel services and facilities, tours, and travel arrangements. A lounge area will provide an opportunity for conversation with old or new acquaintances.

Hours of Operation:

Mon., Tues., Wed. 100 - 1800

TECHNICAL PROGRAM

INTRODUCTORY SESSION

0900-0930 Monday, May 22

Welcoming Remarks

Robert M. Knox, Co-Chairman, Steering Committee

Keynote Address

Alvin Clavin, President, G-MTT ADCOM

1 - LOW-NOISE MICROWAVE RECEIVING SYSTEMS

0940-1230 (Durante A)

Chairman, C. M. Knop, Andrew Corp.
Chicago, IL1-1 "Survey of Noise Aspects in Commercial Microwave
0940 Radio Relay Systems," U. S. Berger, Bell Telephone
Laboratories, North Andover, MA1-2 "An S-Band Radiometer Design for High Absolute
1005 Precision Measurement," (Invited I-1) A. W. Love,
North American Rockwell Corp., Downey, CA

1030

-----Coffee Break-----

1-3 "A Spaceborne Hybrid MIC Pin Diode Radiometer Switch,"
1050 R. H. Pflieger, AIL, Division of Cutler Hammer, Inc.,
Melville, Long Island, NY1-4 "An Integrated C-Band Parametric Amplifier System,"
1115 R. K. Hendriks, AIL, Division of Cutler Hammer, Inc.,
Melville, Long Island, NY1-5 "18 GHz Paramps with Both Liquid Helium and Room
1140 Temperature Operation and with Triple Tuned Gain
Characteristics," T. Okajima, et al, Kamakura Works,
Kanagawa, Japan1-6 "Low Noise Microwave Receiving System on a 64 Meter
1205 Antenna," M. S. Reid, B. A. Bathker, Jet Propulsion
Laboratory, California Institute of Technology,
Pasadena, CA

3 - SOLID-STATE MICROWAVE CONTROL DEVICES

1400-1640 (Durante A)

Chairman, J. White, Microwave Associates
Burlington, MA3-1 "Diode Switching Topics," (Invited I-3)
1400 R. V. Garver, Department of the Army
Harry Diamond Labs., WA D. C.3-2 "A High Power UHF Microstrip Diode Phase Shifter,"
1435 R. L. Holden, R. W. Burns, Hughes Aircraft Company,
Fullerton, CA3-3 "A Lumped Element Phase Shifter," (Invited I-4),
1455 P. Rizzi, Southeastern Massachusetts University,
North Dartmouth, MA

1520

-----Coffee Break-----

3-4 "High Power Microstrip RF Switches," S. D. Choi,
1540 J. F. Boreham, Jet Propulsion Laboratory,
Pasadena, CA3-5 "An X-Band Paramp with 0.85 dB Noise Figure (Uncooled)
1600 and 500 MHz Bandwidth," L. E. Dickens, Westinghouse
Electric Corp., Baltimore, MD3-6 "High Burnout Gallium Arsenide Schottky Barrier
1620 Diodes," T. H. Oxley, G. H. Swallow, A. Hansom,
General Electric Company, Ltd., Wembley, England

2 - MICROWAVE MEASUREMENTS

0940-1230 (Durante C)

Chairman, R. W. Beatty, National Bureau
of Standards, Boulder, CO2-1 "NBS Millimeter Wave Power Standards," (Invited I-2)
0940 M. E. Harvey, National Bureau of Standards, Boulder, CO2-2 "Automatic Rieke Diagram Drawing System," Y. Kosugi,
1010 Y. Naito, Tokyo Institute of Technology, Tokyo, Japan

1030

2-3 "Scattering Parameter Measurement Techniques in
1050 Microstrip," J. L. Schallenberg, J. C. Beal, Queen's
University, Kingston, Ontario, Canada2-4 "An RF Time Domain Reflectometer Not in Real Time,"
1110 L. A. Robinson, W. B. Weir, L. Young, Stanford
Research Institute, Menlo Park, CA2-5 "Microwave Measurements with Active Systems,"
1130 R. C. Ajmera, D. B. Batchelor, H. Lashinsky,
University of Maryland, College Park, MD2-6 "A Millimeter Wave Hot Load," A. Larsen, E. J.
1150 Wendt, J. de Gruyl, J. J. Whelehan, AIL,
Division of Cutler-Hammer, Melville, Long
Island, NY2-7 "The Measurement of RF Antenna Near Field Patterns
1210 Using Liquid Crystal Sensors," K. L. Truesdale,
F.E. Megerlin, Raytheon Company, Bedford, MA

1245 SYMPOSIUM LUNCHEON

4 - WAVEGUIDES-TECHNIQUES AND ANALYSIS

1400-1640 (Durante C)

Chairman, J. Hupert, DePaul University
Chicago, IL4-1 "Remarks on Variational Bounds for Waveguide Scattering,"
1400 C. J. Kleinman, Long Island University, Brooklyn, NY
and K. Kalikstein, Hunter College of CUNY, NY4-2 "Tapered Waveguide Transitions Between Arbitrary Cross-
1420 Sections and Sizes," G. Schindler and H. G. Unger,
Technische Universität Braunschweig, Germany4-3 "A New Method for Solving the Discontinuity Problems
1440 in Microstrip Lines," T. Itoh, R. Mittra, R. D. Ward,
University of Illinois, Urbana, IL4-4 "Dispersion Characteristics and Field Structure of an
1500 Axially Magnetized Ferrite Loaded Rectangular Waveguide,"
J. T. Bara, D. M. Bolle, Brown University, Providence, RI

1520

4-5 "A Method for the Determination of All the Propagating
1540 Modes in a Loaded Waveguide Structure," A. Delfour,
A. Priou, ONERA-CERT-DERMO, Toulouse, France.
F. Gardiol, EPF-Lausanne, Switzerland4-6 "Analysis of a Tapered Circular Waveguide Using
1600 Spherical Modes," S. C. Moorthy, Bell Telephone
Laboratories, Murray Hill, NJ4-7 "Scattering from a Large Hole of Any Shape in a
1620 Multimode Waveguide," J. Glaser, Bell Telephone
Laboratories, Murray Hill, NJ

PANEL SESSION -- TOPIC: "MICROWAVE STATE-OF-THE-ART INTERNATIONAL"

1930-2130 Durante A -- Moderator: Ted Saad, Sage Labs



TECHNICAL PROGRAM

Tuesday, May 23



5 - MICROWAVE ACOUSTICS

0900-1200 (Durante A)
Chairman, N. Lipetz, U.S. Army Electronics
Command, Ft. Monmouth, NJ

- 5-1 "Acoustic Surface Wave Analog Filters," (Invited I-5)
0900 C. S. Hartmann, Texas Instruments, Inc., Dallas, TX

- 5-2 "Surface Wave Parametric Signal Processing," (Invited
0930 I-6) G. S. Kino, Stanford University, Stanford, CA

- 5-3 "Design Curves for $\text{Bi}_{12}\text{GeO}_{20}$ Spiral Acoustic Surface
1000 Wave Delay Lines," A. J. Stobodnik, Jr., Air Force
Cambridge Research Laboratories, Bedford, MA
1020

-----Coffee Break-----

- 5-4 "A Novel Continuously Variable Delay Line," A. F. Podell,
1040 R. E. Lee and A. J. Bahr, Stanford Research Institute,
Menlo Park, CA

- 5-5 "Transducer-Coupled Surface Acoustic Wave Amplifiers,"
1100 G. Chao, T. R. Larson, Naval Research Lab., WA, D. C.
B. A. Auld, Stanford University, Stanford, CA

- 5-6 "Propagation Characteristics of the Ridge Waveguide for
1120 Acoustic Surface Waves," R.C.M. Li, H. L. Bertoni and
A. A. Oliner, Polytechnic Institute of Brooklyn,
Farmingdale, NY, S. Markman, Bell Telephone Laboratories,
Whippany, NJ

- 5-7 "Reduction of Reflections in Surface Wave Devices with
1140 Quarter-Wave Taps," P. H. Carr, Air Force Cambridge
Research Laboratory, Bedford, MA

6 - COMPUTER-AIDED MICROWAVE PRACTICES

0900-1200 (Durante C)
Chairman, J. W. Bandler, McMaster University,
Hamilton, Ontario, Canada

- 6-1 "General Purpose Microwave Circuit Analysis Incorporating
0900 Waveguide Discontinuity Models," (Invited I-7) M. Greenspan
K. I. Thomassen and P. Penfield, Jr., Massachusetts
Institute of Technology, Cambridge, MA

- 6-2 "Solution to Waveguide Problems by Successive Extrapolated
0930 Relaxation," E. D. Torre and W. Kinsner, McMaster Univer-
sity, Hamilton, Ontario, Canada

- 6-3 "Large Signal Transistor Oscillator Design," J. Gonda,
0955 Bell Telephone Laboratories, North Andover, MA
1020

-----Coffee Break-----

- 6-4 "Differential Techniques and Infinite Regions," B. H.
1040 McDonald, A. Wexler, University of Manitoba, Winnipeg,
Canada

- 6-5 "Computer-Aided Design of Broad-Band Active Matching
1100 Networks," F. R. Ore, University of Illinois, Urbana,
IL

- 6-6 "Waveguides of Arbitrary Cross-Section by Solution of a
1120 Nonlinear Integral Eigenvalue Equation," B. E. Spielman,
Naval Research Lab., WA, D. C., R. F. Harrington,
Syracuse University, Syracuse, NY

- 6-7 "A New Approach to the Computer-Aided Design of Micro-
1140 wave Circuits," J. W. Bandler, C. Charalambous, McMaster
University, Hamilton, Ontario, Canada

1215 SYMPOSIUM LUNCHEON

7 - COMMERCIAL AND INDUSTRIAL APPLICATIONS OF MICROWAVES

1330-1630 (Durante A)
Chairman, A. Solomon, Arthur D. Little Company,
Boston, MA

- 7-1 "Submillimeter Transmission Developments," (Invited I-8)
1330 M. A. Pollack, Bell Telephone Laboratories, Murray Hill,
NJ

- 7-2 "A Guided Millimeter-Wave Transmission System Using High-
1400 Speed PSK Repeaters," K. Miyauchi, K. Izumi, S. Seki,
Nippon Telegraph & Telephone Public Corp., Tokyo, Japan

- 7-3 "High Power Microwave Transistor Oscillator," J. A.
1425 Hall, General Electric Company, Lynchburg, VA
1450

-----Coffee Break-----

- 7-4 "A Solid State, 5-Watt, 6-GHz, Microwave Source for High
1510 Capacity FM Radio Relay," C.W.C. Anderson, H. U. Eichhorn,
W. J. Cameron, Bell Canada-Northern Electric Research
Ltd., Ottawa, Ontario, Canada

- 7-5 "Transmission Lines for Continuous-Access Guided Communi-
1530 cations in Mines and Tunnels," V. Rawat, J. C. Beal,
Queen's University, Kingston, Ontario, Canada

- 7-6 "Reflection of Surface Waves on a Dielectric Image Line
1550 with Application to 'Guided Radar'," S. F. Mahmoud
and J. C. Beal, Queen's University, Kingston, Ontario,
Canada

- 7-7 "Microwave Design Optimization of the TSC Automobile
1610 Crash Sensor," F. R. Holmstrom, Lowell Technical Insti-
tute, Lowell, MA, J. B. Hopkins, M. E. Hazel, A. T.
Newfell, E. F. White, U.S. Department of Transportation,
Cambridge, MA

8 - PASSIVE MICROWAVE COMPONENTS

1330-1630 (Durante C)
Chairman, E. G. Cristal, McMaster University,
Hamilton, Ontario, Canada

- 8-1 "Loss Calculation in Parallel Coupled Lines," D. Kryger,
1330 Israel Ministry of Defense, Tel Aviv, Israel

- 8-2 "Meander-Line and Hybrid Meander-Line Transformers,"
1350 E. G. Cristal, McMaster University, Hamilton, Ontario,
Canada

- 8-3 "Microwave Filters with Arbitrary Prescribed Characteris-
1410 tics," J. D. Rhodes, University of Leeds, Great Britain

- 8-4 "Understanding the Waveguide Diode Mount," L. Eisenhart,
1430 Hughes Aircraft Company, Culver City, CA
1450

-----Coffee Break-----

- 8-5 "A Multi-Channel Rotary Joint for Spacecraft Applica-
1510 tions," E. W. Matthews, M. A. Ikemoto, Philco-Ford
WDL, Palo Alto, CA

- 8-6 "Property of Four-Port Nonreciprocal Circuit Utilizing
1530 Yig and Strip Line--Filter and Circulator," M. Igarashi,
Y. Naito, Tokyo Institute of Technology, Tokyo, Japan

- 8-7 "Unity Transmission Band Splitting and Recombination
1550 Filter Networks," R. J. Wenzel, Wavecom, Inc.,
Northridge, CA

- 8-8 "Design of a Channel Diplexer for Millimeter Wave
1610 Applications," Chung-Li Ren, Bell Telephone Laboratories,
North Andover, MA

1800-1900 COCKTAIL HOUR -- 1900-2100 SYMPOSIUM BANQUET

TECHNICAL PROGRAM

Wednesday, May 24



9 - SOLID-STATE MICROWAVE ACTIVE DEVICES

0900-1155 (Durante A)
Chairman, L. A. MacKenzie,
Microwave Associates
Burlington, MA

9-1 "State-of-the-Art and Potential of Bipolar and FET
0900 Transistors," (Invited I-9) S. Takhana, Hewlett-
Packard, Palo Alto, CA

9-2 "Improved Injection Locking of Microwave FM-
0945 Oscillators," G. Endersz, V. Vucins,
Telefonaktiebolaget L. M. Ericsson, Stockholm,
Sweden

9-3 "K-Band High Power Single-Tuned IMPATT Oscillator
1005 Stabilized by Hybrid-Coupled Cavities," H. Komizo
T. Meguro, Y. Ito, M. Shinoda, Fujitsu Laboratories
Ltd., Kawasaki, Japan

1025

-----Coffee Break-----
9-4 "A C-Band All Ferrite Integrated Wideband High
1045 Power GaAs Avalanche Diode Amplifier," W. C. Tsai,
C. W. Lee, Raytheon Company, Waltham, MA

9-5 "Intermodulation Characteristics of X-Band IMPATT
1105 Amplifiers," R. J. Trew, N. A. Masnari, G. I. Haddad,
University of Michigan, Ann Arbor, MI

9-6 "Widebandwidth IMPATT and Gunn Voltage Tuned
1125 Oscillators," K. M. Johnson, OMNI SPECTRA, Inc.,
Tempe, AR

9-7 "A 22 Percent C.W. Efficiency Solid State Microwave
1140 Oscillator," B. Kramer and A. Farayre, Laboratoires
d'Electronique et de Physique Appliquee, Limeil-
Brevannes, France, and E. Constant, G. Salmer,
Faculte des Sciences de Lille, Lille, France

10 - GIGABIT DATA-RATE APPLICATIONS

0900-1200 (Durante C)
Chairman, W. L. Spaid,
Air Force Avionics Laboratory
Wright-Patterson AFB, Dayton, OH

10-1 "One Gigabit per Second Signal Processing and
0900 Data Handling," (Invited I-10) J. S. Gray,
Radiation, Inc., Melbourne, FL

10-2 "Millimeter-Wave Solid-State Exciter-Modulator-
0935 Amplifier Module for Gigabit Data-Rate," H. J. Kuno,
D. L. English, and P. H. Pusateri, Hughes Research
Laboratories, Torrance, CA

10-3 "A 2 GHz Pulse Counter," H. Jungmeister, P. Drugh,
1000 Siemens AG, Munchen, Germany

1025

-----Coffee Break-----
10-4 "An L-Band, High Baud-Rate DCPSK Detector/AFC
1045 Discriminator in Microstrip," H. F. Lenzing, Bell
Telephone Laboratories, Holmdel, NJ

10-5 "A New Phase Coherent Parametric Mixer for PCM-PSK
1110 Communications," M. Hata, N. Kondo, T. Ohta, Oki
Electric Industry Co., Ltd., Tokyo, Japan

10-6 "Generating PRB Sequences for System Testing at 500
1135 Megabits/Sec. and Higher, Using IC Flip-Flops,"
J. A. Coekin, J. R. Wicking, James Cook University
Townsville, Queensland, Australia

1215 SYMPOSIUM LUNCHEON

11 - MICROWAVE INTEGRATED CIRCUITS

1330-1640 (Durante A)
Chairman, P. Romanelli,
Rome Air Development Center
Griffiss AFB, NY

11-1 "'Microguide' A New Microwave Integrated Circuit
1330 Transmission Line," E. G. Cristal, A. F. Podell,
D. Parker, Stanford Research Institute, Menlo Park,
CA

11-2 "Recent Development in Broad-Band Microstrip
1350 Couplers," (Invited I-11) F. C. de Ronde, Phillips
Research Laboratories, Eindhoven, Netherlands

11-3 "Ceramic Waveguide Microwave Integrated Circuits,"
1415 W. H. From, Raytheon Company, Burlington, MA

11-4 "Two New Integrated-Circuit Structures with Special
1440 Advantages at Millimeter Wavelengths," P. J. Meier,
AIL, Division of Cutler-Hammer, Melville, NY

1500

-----Coffee Break-----
11-5 "Hybrid Microwave Integrated Circuits for Millimeter
1520 Wavelengths," T. H. Oxley, K. J. Ming, G. H. Swallow,
B. J. Climer, M. J. Sisson, The General Electric
Company, Ltd., Wembley, England

11-6 "An All Solid-State MIC Transmit-Receive Module Design
1540 Results and Associated Problems," F. Sullivan and
R. Perry, Raytheon Company, Bedford, MA

11-7 "Design Considerations of a 3.1-3.5 GHz GaAs FET Feed-
1600 back Amplifier," L. Besser, Fairchild Microwave and
Optoelectronics, Palo Alto, CA

11-8 "Single and Dual Gate GaAs FET Integrated Amplifiers
1620 in C Band," S. Arnold, The Plessey Company, Ltd.,
Romsey, Hampshire, England

12 - FERRITE DEVICES

1330-1630 (Durante C)
Chairman, J. L. Allen, Colorado State
University, Ft. Collins, CO

12-1 "Ferrite Transmission Devices Using the Edge-Guided
1330 Mode," (Invited I-12) M. E. Hines, Microwave
Associates, Burlington, MA

12-2 "Experiments on the Optimization of a Novel MIC,
1400 Symmetrical, Three-Port Circulator," P. de Santis,
F. Pucci, Selenia S.p.A., Rome, Italy

12-3 "Elevated Substrate Ferrite Film Circulator," R. R.
1420 Jones, R. A. Moore, Westinghouse Defense & Electronic
Systems Center, Baltimore, MD, A. I. Braginski and
T. R. Oeffinger, Westinghouse Research and Development
Center, Pittsburgh, PA

12-4 "A Lumped-Element Circulator on the Ceramic Substrate,"
1440 S. Okamura, T. Nagai, Toshiba Research and Development
Center, Kawasaki, Japan

1500

-----Coffee Break-----
12-5 "Switching Characteristics of Latching Ferrite Devices,"
1520 (Invited I-13) J. Pippin, Electromagnetic Sciences,
Inc., Atlanta, GA

12-6 "A Precision Analog Duplexing Phase Shifter," C. R.
1550 Boyd, Microwave Applications Group, Chatsworth, CA,
G. Klein, Westinghouse Electric Corporation, Baltimore,

12-7 "Analysis of a Circular Waveguide Cavity Loaded with
1610 Thick Ferrite Disks," J. M. Hellums, L. E. Davis, Rice
University, Houston, TX

CALL FOR PROPOSALS FOR HOSTING THE 1974 G-MTT SYMPOSIUM

by Frank Arams

While many organizations hold their meetings always at the same site, it has been the practice of the IEEE group on Microwave Theory and Techniques to delegate the responsibility for its annual MTT International Symposium to a local MTT chapter under the aegis of the parent organization.

This procedure has worked out well over the years. It has the effect of significantly increasing interest in microwaves in the particular geographical region, and strengthening the MTT local chapter involved and its bonds to the MTT national organization.

Any MTT chapter can apply to the G-MTT Administrative Committee for the privilege of hosting the MTT Symposium. The site of a future MTT Symposium is normally selected two years in advance at the September meeting of the MTT AdCom. Thus, at the September 1971 meeting, the Denver-Boulder, Colorado, chapter was successful in securing the Symposium for May 1973. Unsuccessful chapters are encouraged to resubmit their proposal the following year. The location is normally rotated in such a manner as to give an opportunity to all major areas. Hence the interested chapter would do well to recall where past meetings were held.

The following guidelines are set down here to assist in preparing the proposal. The proposal should discuss:

1. Introduction and Summary

Site and proposed dates
Arguments favoring proposed site
Microwave activity and number of MTT members in the area
Special features of proposed technical program
Arguments for accepting this proposal

2. Arrangements

Hotel(s), distance from airport, available air and ground transportation
The hotel, meeting rooms (number and capacity), number and

rates of rooms set aside for Symposium, special rates if any for government and university attendees, special local facilities and amenities.

3. Technical Program

Technical content and orientation, advanced areas to be included, invited papers

Number of sessions, parallel sessions, keynote session, evening sessions, panel discussions, student papers, if any

4. Proposed Committee Appointments

The following committees should be considered: Steering, Technical Program, Digest, Publicity, Finance, Local Arrangements, Ladies Program

5. Finance

Detailed budget with conservative registration estimates.
Consider possibility of Exhibits.

6. Local Arrangements and Special Events

Tours, if any, of microwave facilities, cocktail party and banquet, ladies program

7. Proposed Schedule and Publicity

8. Symposium Digest

9. Endorsements

From local IEEE Section, one or more G-MTT chapters in the area, etc.

Summarizing, the proposal should address itself as much to the technical program as to the other elements of the symposium. A lot of useful information can be obtained from proposals submitted in previous years. The proposal should be submitted to MTT AdCom members at least 1 month prior to the September ADCOM meeting. Distribution to AdCom members should be arranged through IEEE Headquarters. Any questions concerning the proposal should be addressed to F. Arams, Chairman, MTT Meetings and Symposia Committee, LNR Communications, Inc., 35 Central Avenue, Farmingdale, New York 11735. Telephone (516) 293-1010. A representative should plan to attend the September AdCom meeting for an oral presentation.

CALL FOR NOMINATIONS

Every year 6 members of G-MTT are elected to serve on its Administrative Committee (AdCom) for a 3-year term commencing in January. The election is held in September during the annual meeting of the G-MTT AdCom. Those elected will, together with the 12 hold-over members and ex-officio members as provided in the Bylaws, serve the Group by directing its activities, such as the publication of G-MTT Transactions and the planning of its annual symposia.

Every member of G-MTT should give serious consideration to the nomination of suitable candidates who can best serve his professional interests as well as those of the Group as a whole. Each candidate must meet the following qualifications:

1. Candidate must be of IEEE member grade or higher.
2. Candidate must be a member of G-MTT.
3. Candidate must be willing to serve a 3-year term and should be able to travel to AdCom meetings of which there normally are 4 per year

A Nominating Committee is charged with the responsibility of selecting a slate of at least two candidates for each vacancy which is to be transmitted to the President of AdCom prior to the annual meeting. Also, nominations by petition signed by 25 members of G-MTT will be received by the AdCom on or before its annual meeting.

In accordance with the above, you, as a G-MTT member, have two avenues to express your choice:

- A. You can recommend your candidate for consideration by the Nominating Committee. Such recommendations should be sent prior to July 15 to:

Dr. Kiyo Tomiyasu
General Electric Company
Valley Forge Space Center
P. O. Box 8555
Philadelphia, Pennsylvania 19101

- B. You can file a petition signed by you and 24 of your fellow G-MTT members. Such petitions should be addressed to:

Mr. Alvin Clavin
Hughes Aircraft Company
8433 Fallbrook Avenue
Canoga Park, California 91304

Our Bylaws provide that the 12 hold-over members (those not eligible for re-election) will elect the new AdCom members from the slate presented by the Nominating Committee and the candidates nominated by direct petition.

CALL FOR PAPERS

1972 INTERNATIONAL IEEE/G-AP SYMPOSIUM
and
USNC/URSI MEETING

December 11-15, 1972

at

Williamsburg Convention Center/
College of William and Mary

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

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

URSI COMMISSIONS

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

TOPICS FOR THE G-AP SYMPOSIUM

1. Large Reflector Antennas
2. Phased Arrays and Adaptive Arrays
3. Low Noise Antennas
4. Multiple Beam Antennas
5. Numerical Methods Applied in Electromagnetic Problems
6. Design, Calibration and Application of Radiometer Antennas
7. Spacecraft and Aircraft Antennas
8. Electrically Small Antennas
9. Integration of Antennas and Circuits
10. Propagation Through Rain and Clouds

11. Detection of Clear Air Turbulence
12. Stochastic Methods Applied to Electromagnetic Problems
13. Radiation of Transient Signals by Antennas
14. Broadband Antennas

Deadline for submission to G-AP and URSI Commissions II and VI - September 21, 1972. Deadline for submission to URSI Commissions I, III, and IV - September 21, 1972. Abstracts should be sent to and detail instructions can be obtained from:

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

1972 CANADIAN COMMUNICATIONS

& EHV CONFERENCE

The 1972 IEEE Canadian Conference on Communications and EHV Power Transmission will be held in Montreal, Canada, on Thursday and Friday, November 9th and 10th 1972, at the Queen Elizabeth Hotel.

Technical papers are solicited on subjects of interest to engineers and scientists working in the Communications and EHV Power Transmission fields preferably describing principles, techniques and developments which have novel and informative aspects. Although papers in all areas of the above-mentioned fields will receive consideration, particular emphasis will be placed on:

COMMUNICATIONS

- 1) Communication Theory and Coding
- 2) Synchronization and Modulation Theory
- 3) Digital Data Processing
- 4) Signal Transmission and Channel Characterization

EHV POWER TRANSMISSION

- 1) EHV Techniques (AC & DC)
- 2) System Modelling and Transients
- 3) Measurements
- 4) Power System Control

Authors wishing to present papers are requested to submit title and a 500-word summary in duplicate by June 15, 1972. Please forward summaries and biographical

notes to the Chairman of the Technical Program:

Dr. Dinkar Mukhedkar,
Ecole Polytechnique,
2500 Marie Guyard,
Montreal 250, Que., Canada.

THE 1972 INTERNATIONAL CONFERENCE ON
CYBERNETICS AND SOCIETY
Washington, D.C., October 9-12, 1972

The main goal of the conference is to highlight recent advances in systems sciences and systems engineering technology and their application to current issues of society. The conference will be organized to present developments in the three areas: Bioengineering Systems, Man-Machine Systems and Societal Systems. Theoretical sessions in the relevant systems sciences will be complemented by presentations of substantive case studies in each area. Plenary sessions, panel discussions and workshops will be organized to provide interdisciplinary exposure.

If your work concerns any of the following areas - or related fields - the conference will provide a valuable forum for your ideas.

BIOENGINEERING SYSTEMS

- Modeling
- Diagnostics
- Instrumentation
- Prosthetics

MAN-MACHINE SYSTEMS

- Design
- Display
- Control
- Human Factors

SOCIETAL SYSTEMS

- Transportation
- Environment
- Health Care
- Education

SYSTEMS SCIENCES

- Learning & Adaptive Systems
- Pattern Recognition
- Modeling & Simulation
- Optimization

Authors may contribute papers of two types. The first requiring approximately thirty minutes to present, must discuss

completed investigations. Short papers, requiring fifteen minutes or less will provide an opportunity to present preliminary results.

INSTRUCTIONS FOR AUTHORS:

The following deadlines apply to both types of papers: A title, 50 word abstract and summary are to be submitted by February 15, 1972. Summaries should be of sufficient detail and length to permit careful review. All manuscripts should be sent to:

Professor K. S. Narendra,
Becton Center,
Yale University,
New Haven, Conn., 06520

SHORT COURSES

MICROWAVE ANTENNA MEASUREMENTS

July 24-28, 1972

The Georgia Institute of Technology

COURSE DESCRIPTION

This course is an intensive study of the measurement of microwave antenna radiation characteristics including directivity, gain, pattern, boresight, polarization, and phase. Radome and reflectivity measurements will also be treated.

The course covers the theoretical basis of the measurements as well as current techniques including the analysis of error. An important segment deals with the design and evaluation of antenna measurements facilities.

This will be the fourth in a series of yearly short courses which are offered alternately at Georgia Tech and San Fernando Valley State College. A text written for the series will be used in the course.

The course fee of \$275.00 includes a text and all classroom materials. For further information concerning the Microwave Antenna Measurements short course, contact:

Dr. Richard Wiegand
Department of Continuing Education
Georgia Institute of Technology
Atlanta, Georgia 30332
Telephone: (404) 894-2400

N.A.T.O. ADVANCED STUDY INSTITUTE ON NETWORK AND SIGNAL THEORY

September 4th - 16th, 1972

Bournemouth, U. K.

The Advanced Study Institute on Network and Signal Theory will be held in Bournemouth, as part of the N.A.T.O. Advanced Study Institute Programme.

The aim is to present several aspects of the present state of research in these subjects, stressing common interests of the two fields.

The tentative programme of the Institute includes courses and lectures covering advanced topics of network and signal theory. It is also hoped to arrange a limited number of seminar meetings and round table discussions in the evenings, as well as open problem sessions. The average duration of courses will be two hours and the subjects to be covered are tentatively listed below:

Nonlinear Network Theory
Multivariate and Distributed
Networks
Relation between System and
Network Theory
Optimisation
Signal Theory
Information and Coding Theory
Statistical Theory of Signal
Detection and Measurement

Lecturers from several countries will be invited to contribute during the seminars, the round table discussions and the open problem sessions.

The final list of contributors will be communicated as soon as possible.

Most lectures will be conducted in English, but some will be in French.

For further details write to :

The Director of the Institute
J. K. Skwirzynski
Research Division
Marconi Company Limited
Great Baddow, Essex, England

G/MTT APRIL 1972 COMPUTER-AIDED LINEAR CIRCUIT DESIGN USING MARTHA

A special summer program at M.I.T., July 5-14, 1972 and repeated July 19-28, 1972.

This special Summer Program will deal with computer-aided design of linear circuits, using MARTHA as the general-purpose analysis program.

Topics will include learning the language APL, how to define various kinds of circuits, user-defined elements, synthesis routines, network de-embedding, use of numerically defined elements, and optimization. Examples will include circuits that are lumped and distributed, active and passive, reciprocal and nonreciprocal. Many types of filters and amplifiers will be treated.

For further information, please write to:

Director of the Summer Session
Room E19-356
M.I.T.
Cambridge, Mass. 02139

NOISE CONTROL IN INDUSTRY AND TRANSPORTATION

June 5-9, 1972

The George Washington University
Washington, D.C.

DESCRIPTION

This course is designed for engineers and scientists in industry and in the field of transportation who are concerned with methods of noise control.

The content of the course includes fundamentals in basic theory of acoustics and vibration, hearing mechanism and the noise criteria, noise abatement regulations, review of problems in transportation and industrial noise and methods of their control, acoustic and vibration measurement techniques and laboratory demonstrations.

The fee for this course is \$315.

For further information, contact the:

Continuing Engineering Education
Program
George Washington University
Washington, D.C. 20006

Telephone: (202) 296-8924.

ADVANCED TECHNIQUES IN
SOLID WASTE MANAGEMENT

May 16-19, 1972

The George Washington University
Washington, D.C.

DESCRIPTION

The course will cover the principles of mathematical modeling for optimizing the management of solid wastes. It will demonstrate the capabilities of a Resource Allocation model in producing optimum solutions for the complex problems of waste and resource control. The course will provide opportunity for student participation in actual preparation and evaluation of input data and model responses.

The fee for this course is \$280.

For further information, contact the:

Continuing Engineering Education
Program

The George Washington University
Washington, D.C. 20006

Telephone: (202) 296-8924.

AIR POLLUTION CONTROL

31 May - 1 June, 1972

The George Washington University
Washington, D.C.

DESCRIPTION

This course provides state-of-the-art information on air pollution control for engineers and technical personnel working in this field. Administrators and others interested in cost-effective control of air pollution will also find the material understandable and valuable. The student will become familiar with the general operating principles and selected industrial applications of the major particulate and gaseous air-pollutant control devices. Mathematical analyses of these control devices will not be included.

The fee for this course is \$140.

For further information, contact the:

Continuing Engineering Education
Program

The George Washington University
Washington, D.C. 20006

Telephone: (202) 296-8924.

CONFIGURATION MANAGEMENT

June 19-21, 1972

The George Washington University
Washington, D.C.

DESCRIPTION

This course is designed for all personnel in government and industry who are responsible for areas of work related to Configuration Management (CM). These include engineering, contracts, production, program management, quality control, reliability, purchasing, and others.

The purpose of this familiarization course is to review the impact of the latest defense directives and instructions in the CM area, explain policy for practical application, clarify the role of CM in meeting program/project objectives, and discuss the organizational structure for CM application.

The fee for this course is \$215.

For further information, contact the:

Continuing Engineering Education
Program

The George Washington University
Washington, D.C. 20006

Telephone: (202) 296-8924



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