IEEE GROUP ON
MICROWAVE THEORY
AND TECHNIQUES

NEWSLETTER

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Number 67, July 1972

Marion Hines receiving Microwave Prize

TECHNOLOGY AND NATIONAL GOALS

Wm. M. Magruder Speaking at Banquet

INNOVATIONS SPARK 72 SYMPOSIUM

The 1972 Symposium held at the Arlington Park Hotel had a registration of approximately 400 with more than half (211) attending the banquet at which Marion Hines was awarded the Microwave Prize. Over 200 also attended the Panel Session "State-of-the-Art International", with many participating in a lively discussion of microwave applications.

This year marked a first for exhibits. Reaction of the sixteen exhibitors ranged from satisfaction with to enthusiasm about their interactions with Symposium attendees. Most exhibitors indicated their intention to return next year. The income from exhibits helped this year's Symposium finish financial well in the black.

In his talk at the '72 Symposium banquet, Wm. M. Magruder cited some of the consequences of the Congressional vote against the SST, with particular reference to the U.S. balance of payments and the international monetary situation. He cited a need for engineers and scientists to give responsible testimony before committees of Congress in areas of their expertise and a parallel responsibility to avoid testifying in areas patently outside their areas of expertise. The following paragraphs are excerpts from this talk which outline some of the Administrations technological planning.

"The economic world in which we work is entering a new phase. The reconstruction of Europe and Japan after World War II is complete. The Marshall Plan and the Truman Doctrine have done their work. The Free World is not only free -- it is economically strong. 300 million Europeans and almost 100 million Japanese are no longer just our clients -- they are now our healthy competitors.

"The economic concerns of today are addressed in the Administration's new economic plan of August 1971:

(cont'd p. 2 col. 2)

1973 MICROWAVE SYMPOSIUM AT BOULDER

New dates have been set for the 1973 Symposium. A minor shift was necessitated by a change in the academic calendar of the University of Colorado, site of the Conference. The new dates are June 4, 5, and 6, Monday through Wednesday. This schedule will allow MTT to use Williams Towers, the most modern of the University housing. An American plan package including the banquet will be offered by the University for about $50 for the three days and nights.

The pleasant climate, the nearby recreational areas, and the facilities of the University of Colorado as a convention center make the Boulder area especially attractive for the Symposium. Arrangements are being made to have the internationally known speaker, Ray Stanish,as banquet speaker. He was selected because his scientific talks are entertaining and appeal to both husbands and wives.

David F. Wait is Chairman of the Symposium Steering Committee and Wilber J. Anson, also of NBS,is Vice-Chairman. Bob Beatty and Hal Altshuler are chairman and vice-chairman, respectively, of the Technical Program Committee. Prof. J. R. Ashley of Colorado University (Colroado Springs) is exhibit manager. The first call for papers should reach members in July.

National Lecturer Holds Forth

L—R: John Bryant, Art Solomon, Paul Meier, Jack Lepoff, Ted Saad.

Wheels

L—R: Paul Coleman (Master of Ceremonies), Wm. McGruder (Banquet Speaker), Leo Young (IEEE Director), Bob Knox (Symp. Co-Chairman), Al Clavin (MTT-Pres.), Larry Hansen (Symp. Co-Chairman). (Wilbur Anson over Clavin's shoulder.)

Magruder_

- + How to redress our balance of trade.
- + How to increase U.S. industrial productivity.
- + How to compete effectively abroad.
- + How to attain full employment.
- + How to control inflation. . .all augmented by the added concern about how to keep our defense secure and able to withstand any potential surprise.
- + How to enrich our lives with a properly balanced concern and action about the quality of life for our citizens and our fellow-man.

"The question seems to me to resolve into a simple analysis of the proposition that we can have a proper balance of the applications of our advanced technology or we cannot. I must say at the start that I am squarely on the side of a balanced application of our advanced technology for trade, security and social enrichment; for, without the former we cannot have the latter. And without the latter, the former loses its most humane meaning.

"We must purge ourselves of the growing notion that we are an "either-or" society. Guns or butter. Black or White. SSTs or social welfare. We can have the proper balance of what is necessary -- if we want to. Just as important, we can have them within our free-trade/free-enterprise system, but we will have to be just as innovative in our institutional responses as we have been in our scientific inventiveness. As Mike Michaelis, of Arthur D. Little, said at the White House Conference on the World in 1990, "We must learn to manage change as brilliantly as we have learned to accomplish scientific advances."-----The President has called for 1972 to be a year of action. One such action, building upon the foundation I have already described in balancing our national research and development, was a study by the Domestic Council, sometimes called the New Technology Opportunities Program, which Mr. Nixon asked me to assist last August.

"The purpose was to examine the means whereby our scientific and technical resources could help to stimulate innovation in the civil sector aimed at urgent national problems and/or economic opportunities. It was a unique program in several ways:

- + It made use of the systems management talent of NASA in order to coordinate the functions of other departments, the Office of Management and Budget, the Office of Science and Technology and the Council of Economic Advisers, as well as the private sector.
- + It called for a broad response from the civilian technical community, including universities, industry, associations, financial institutions, businesses, labor unions, citizens groups and private individuals. More than one thousand voluntary studies were received from these sources.
- + And, it made a concentrated, across-the-board, effort to identify those national areas of opportunity where our technical resources could make a positive impact.

Every Department and agency played a role. The private sector contributed voluntarily-----Here are some of the programs to which the President referred in that call to action:

1) In Health Care An emergency medical services system that will demonstrate in five areas, each serving 500,000 people; an integrated ambulance system, communications network, clinical facilities and personnel training programs that, when implemented nationally, could save 30,000 lives annually and supply expert emergency care for most of our ten million medical emergencies in a matter of minutes.

2) In Environmental Control A regional air pollution modeling

experiment that will examine two complete urban regions, collect data on emissions, topography and weather, and then provide a prediction system regarding atmospheric pollution levels.

"Also a health effects research program that will develop quantitative information on the health benefits of air pollution controls for revising existing standards, or the setting of new standards for a variety of known pollutants.

3) In Mass Ground Transit A development program to design and test an automated high capacity transit system of small vehicles for four to six passengers, constrained to a guideway with non-stop high speed service from origin to destination at lower costs than auto travel.

"Also, research studies of a dual mode system of ground transportation where the vehicle, in one mode, is operated under its own power and manually controlled and, in the other mode, by automatic control and/or external power.

4) In Natural Resources An exploratory mapping survey of the resources of the continental shelf along the northeast coast of the United States and in the Gulf of Alaska. This exploration will provide information for private explorations, environmental relationships, construction conditions and geologic hazards.

5) Programs that will provide Protection from Natural Disasters include:

+ Earthquake prediction techniques, location of hazardous areas and the engineering of structures to resist damage.
+ An increase in hurricane seeding experiments that show promise of diminishing hurricane wind forces and damage, such that computer modelling could be available for prediction of results.
+ Development and testing of fire control systems, resistant materials, escape systems and control techniques that could save 6,000 lives and $2 billion in damage annually by 1980.

6) Programs that will augment the President's Energy Message of last year include:

+ Expanded research into magnetohydrodynamics, an emission-free energy system that produces electric power by passing a conducting gas through a magnetic field.
+ A low BTU coal gasification program that will design, build and test a system that will utilize our 400 year known supply of high sulfur content coal to produce clean industrial gas for use in power generating sources.
+ Expanded research into the AEC's large-scale lithium sulfide batteries for storing clean electric power for later use during peak power use periods.
+ Fusion power using magnetic and laser techniques.

7) Electronic Mail Research and development that will eventually provide overnight, and one hour priority service, station-to-station electronic mail development and demonstration.

8) An Integrated Modular Utility System research program that will provide low cost, low pollution integration of waste disposal, power light and utility services for new communities. -----

---- If we are to balance the application of our technical resources, we must see that institutional arrangements are developed to find solutions to:

+ Mass urban transit problems
+ Low cost health care provisions
+ Environmental control
+ Conservation of our natural resources
+ Effective law enforcement
+ Urban development
+ Low cost educational methods

Each of these is reported to require tens, even hundreds, of billions of dollars for their proper development over the next decade.

"We need a better measure of the terms -- benefit, progress and cost.

"Some people say that the technology is already available to accomplish much that needs to be done -- I don't think so. We need more research and development.

"We must recognize all over again what a novel and innovative arrangement was the formation of these United States. The development of our social-financial system that got us to our present development was unique:

+ Our free enterprise competitive business system
+ Our banking and investment system
+ Our patent system
+ United funds
+ Conglomerates
+ Comsat
+ Postal service
+ Mass production/assembly line techniques
+ Agricultural productivity by application of science
+ Computer technology application
+ Transportation and communications networks

are just a few. -----

---- We must re-examine:

+ Our methods of stimulating innovation
+ Our regulatory systems
+ Our university training
+ Our methods of applying technology to national goals
+ Our methods for portraying technical facts to our decision-makers.

We must question if our present system can deal with both the size and complexities of the domestic challenges and still remain competitive in the international marketplace. Many wise and experienced heads think maybe not. We want to keep our free enterprise, free trade principles and still compete effectively. We want less Federal control -- not more.

"It is a sobering fact that our banks have just had their best year ever, while industry and labor recall primarily the recession. Venture capital does not seem to be available for the macro-projects at hand. Is it true that the ability to take advantage of the obvious major domestic opportunities is hobbled by the 19th century thinking? -----

---- This much I feel sure of. We have made a "beginning." We have examined the national needs (opportunities) and we can find much agreement about what might be feasible. Now we must face the enormity of the task and learn to manage change with an open mind, and be willing to experiment. To do this will require the inputs of industry, business, labor, the financial community, concerned citizens, the government, and a sense of involvement. The first response was outstanding. Keep it coming."

EDITORS NOTES

by Pete Rodrigue

The changes in defense department procurements, the interest in social aspects of engineering, and especially the maturation of the microwave industry have all led to a soul searching on the part of IEEE as a whole and our professional group in particular. Thus we arrive at the question of appropriate directions for our group --- and long range planning. Are we content with the present format or should we chart new directions?

The principle activities of MTT are its Transactions and its Symposium. The former has long been a respected achival publication of significant advances in the microwave field. It is expensive and will continue to be so as publishing and mailing costs climb. Is it or will it continue to be popular in the maturing years of microwaves? In the words of K. K. Darrow--do we need to be concerned about the "reader to author ratio falling below the critical value of 1.0"? More design oriented papers might be of interest, but as the industry becomes more commercially oriented it may be difficult to obtain high quality design papers. Industry has always supported publications as a form of public relations, a demonstration of competance and a means of getting one's name before potential R&D sponsors. As R&D becomes less important than the product, industry will be less prone to support or even approve publications. (How many publications have you seen lately on the proper design of microwave ovens? or anti-shoplifting devices? or automobile radars?) One might wonder whether our Transactions then becomes an organ of universities and government laboratories suffering from a "publish or perish" syndrome. An appeal for the status quo can be based on arguments that design is never (or rarely) of archival interest and that basic or applied microwave research results will continue to be of sufficient value to warrant publication.

Recent Symposia have shown reduced attendance (any number of extenuating circumstances can be cited to explain that), but they still make money. The programming of our Symposia do not reflect the same cross section of papers as does the Transactions. This may be a simple (obvious?) result of the fact that a good written paper cannot always make a good oral paper and vice versa. Some feel that it, however, is an indicator of the direction microwave engineers are taking, since the material reported at Conferences is considerably more current than that which ultimately makes it into print.

Should we be content with a smaller group--an exclusive club that meets annually--or should we attempt to modify our direction and attract more members? Should we merge with other groups--AP, ED, SU, MAG, etc. or should we broaden our base within our present charter? These are the sorts of questions Hal Altschuler and ADCOM are pondering at this time. Everyone feels a shade different on most points. Your newsletter can provide a forum for members to make their feelings and arguments known. What do you think?

PRESIDENT'S MESSAGE

by Al Calvin

ON CHANGING THE CONSTITUTION OF THE IEEE

There is a new feeling of professionalism rising from the grass roots of our engineering community. This feeling has been building over the past 4-5 years but has accelerated in intensity in recent years. Most engineers now realize that their non-professional actions of the last decades have left them and technology vulnerable to acts from non-thinking environmentalists, anti-militarists, and demagogues. Typical of the latter is Dick Cavett who, in an interview with William Magruder, said to more than 8 million viewers a few months ago on ABC television, that he felt about as sorry for the 15,000 SST workers being unemployed as he would about the people who ran the Nazi death camps being out of jobs! Whether one approves of the SST or not it is hard to accept that if you are an aerospace worker, you can be equated with Nazis running death camps.

So the Congress and the Senate will begin the dismantling of our defense teams (thinking that this will hasten the application of science to social ills) and we as engineers wonder what is happening - where did things go wrong?

Things went wrong because we were not professionals. We do not control our own career environment. What is a professional? I do not have space here to define this completely - there are volumes* printed on the subject. Suffice to say that we had no code of ethics, we had no lobby, no public relations; what we had were universities turning out engineering graduates on a machine-like mass production basis. We had a high salary structure with no foundation, and therefore became easy victims of the layoff. We also suddenly realized that pensions were not portable, and were lost--no equity built up for all those years of work. There are only ourselves to blame, but I hope we are learning something from all of the mess. It is necessary to learn that being a professional engineer involves more than just technical know how.

Engineers are now looking around for a means to express this professionalism.

+ If we want higher salaries, then let's join the UAW (as could happen at North American Rockwell).
+ If we want a lobby in Washington, then let's join the NSPE.
+ Or do we want a broad-based scientific and educational Institute like the IEEE to attack our problems of professionalism?

I for one believe the IEEE should represent us. This broad base of science is needed to act wisely and ethically in matters of concern, such as public relations, academic practice and curriculum, technological forecasting, long and short term scientific priorities, and, yes, better pension legislation.

Many of us in G-MTT and G-AP, as well as others, have urged the IEEE to assume this role of professional action. The moment of truth has finally arrived. The Board of Directors has recommended a Consti-

tutional change allowing for professional action. The details were spelled out in the June 1972 Spectrum. A vote of the members will determine the future role of IEEE in professional action. How should you vote?

I polled the G-MTT Ad Com for their feelings on the subject. The Ad Com consists of 18 elected members and 3 ex-officio members. All are senior men of experience. I believe their advice to be significant to the members. The poll showed 15 for and 2 against, with 4 either having no opinion or not responding. Some of those who voted no feel that the change is not strong enough and should have contained provision for collective bargaining. Some who voted yes feel it imperative to have visible action soon after passage of the amendment.

I personally urge a YES vote. To me it is the only sensible alternative to remaining non-professional, helpless, and prone to layoffs. But mark that a YES vote also implies a personal commitment to professionalism. This includes a fair contribution of your time and effort to study groups, workshops, presentation teams, and news conferences under IEEE auspices.

During the course of the election on the Constitutional change you will also be asked to vote for Directors of the Institute. Consider your vote carefully and also consider the candidates' views on professional action. Bob Rivers' Professional Action Committee has sent a questionnaire (with questions similar to those asked in the membership questionnaire) to each candidate for Director asking his opinions on professional action. These replies will be published in the MTT Newsletter. Read them carefully and vote. Do not let someone else decide the future of the IEEE. Vote - become active in IEEE affairs, become a professional.

*For example, see H. M. Vollmer and D. L. Mills "Professionalization", Prentice-Hall, 1966; and E. T. Layton, "The Revolt of the Engineers" Case Western Reserve University Press, 1971.

Military—Industrial Complex Huddles at Symposium

L—R: Nat Lipetz, Bob Rivers, Pat Romanelli, Al Clavin, Gene Torgow, Sy Okwit, Bob Knox

CHAPTER ACTIVITIES

by L. R. Whicker

CHAPTER CHAIRMEN'S MEETING

As has become the custom, the annual Chapter Chairmen Meeting was held at the site of the 1972 International Microwave Symposium. Representatives from eight chapters compared notes on attendance and discussed in general their programs for the past year. Several ADCOM representatives met with the group including Al Clavin, ADCOM President, Ted Saad, National Lecturer, Bob Rivers, Professional Activities, Pete Rodrigue, Membership Services, G. Chao, Chapter Records, and myself. Some areas which were discussed at length include:

Attendance--Nearly all of the chapter representatives agreed that a good publicity program for a meeting is the key to good attendance--Bulletin board notices plus a post card mailing seems to be a good combination.

Special Meetings--Large chapters find that half day or one-day meetings with several speakers (also lecture series) and registration fees create considerable interest.

Section Support--Considerable discussion on the lack of section support for chapter activities was held. I was surprised to find that all the sections other than Los Angeles and Washington provide good support for the chapters.

Chapters represented at the meeting include:

Atlanta, Ga.	Los Angeles, Calif.
Baltimore, Md.	San Diego, Calif.
Chicago, Illinois	Tokyo, Japan
Southeast, Michigan	Washington, D. C.

CHANGES IN CHAPTER STATUS

New Chapters--Congratulations:

Ottawa GMTT

Israel GAP/MTT/ED

Long Island-New York GMTT (Merger)

Chapter Dissolvement:

Tucson, Arizona GAP/MTT

Foothills, Calif. GAP/MTT

New Hampshire GMTT

OTHER ITEMS

As part of the long range planning program a short questionnaire will be mailed soon to members of four MTT chapters. If your chapter is selected, please complete the form and return it to Hal Altshuler.

The Chicago Chapter is to be commended for the fine job they did in planning and carrying out the 1972 International Microwave Symposium.

Final note on the Washington Lecture Series--By special action of TAB, the Washington MTT Chapter was allowed to split the $3,000 profit from their lecture series between the Washington Section and ADCOM.

National Lecturer--Ted Saad is continuing his busy schedule as National Lecturer. Thus far Ted has met with eleven chapters and is scheduled to speak at eight additional chapters. Questions concerning Ted's schedule should be addressed to Sage Laboratories, Inc., 3 Huron Drive, E. Natick, Mass. 01760 (Telephone (AC 617) 653-0844).

CHAPTER MEETINGS

Atlanta Chapter

Date: May 11, 1972
Speaker: Ted Saad, Sage Labs
Title: The Microwave Industry, 1972
Elected Officers, 1972-73:
Chairman: T. G. Hickman, Scientific Atlanta
Vice Chairman: H. A. Ecker, Georgia Tech
Secretary: Bill Allen, Lockheed

Baltimore Chapter

Date: March 8, 1972
Speaker: Dr. G. H. Knittel, Brooklyn Poly. Inst.
Title: Design of Radiating Elements for Large Phased Array Antennas

Date: May 10, 1972
Speakers: Dr. J. White, Microwave Assoc.
Dr. C. R. Boyd, Microwave Applications Group
Titles: Diode Phase Shifters for Phased Arrays
Reciprocal Ferrite Phase Shifters for Phased Array Systems

Dallas Chapter

Date: March 9, 1972
Speaker: Ted Saad, Sage Laboratories
Title: The Microwave Industry, 1972

Long Island Chapter

Date: April 26, 1972
Speaker: Robert L. Sleven, AIL
Title: Recent Advances in Filter Technology
Elected Offices, 1972-73:
Chairman: Paul J. Meier, AIL
Vice Chairman: Menachem A. Balfour, General Microwave Corp.
Publicity: David S. Levinson, AIL
Facilities: Alan G. Gayer, Sedco Systems, Inc.

Milwaukee Chapter

Date: March 21, 1972
Speaker: Prof. Tom Smith, Univ. of Illinois, Chicago Circle
Title: T.V. Scattering by Super High Rise Buildings

Date: May 9, 1972
Speaker: Walter Curtis, Univ. of Michigan
Title: Microwave Semi-Conductor Devices
Elected Officers, 1972-73:
Chairman: Wayne Schaefer, Delco Electronics
Vice Chairman: Robert C. Garnier, Waukesha County Technical Institute
Secretary: Charles Krisher, Univ. of Wisconsin, Milwaukee

Phoenix Chapter

Date: March 13, 1972
Speaker: Scott Norman, G.T. & E. Laboratory
Title: Optical Communications - In the '70's and Beyond

Date: April 10, 1972
Speaker: Fred Hickernell, Motorola, Inc. GED
Title: Signal Processing with Surface Acoustic Waves

Southeastern Michigan Chapter

Date: April 19, 1972
Speaker: Jonathan D. Young, Dept. of Electrical Engineering, Ohio State U.
Title: Transient Response Measurements of Antennas and Scatterers
Elected Officers, 1972-73:
Chairman: W. R. Curtice, Univ. of Michigan
Vice Chairman: W. J. Jaeckle, Bendix Research Laboratories
Secretary: N. Masnari, Univ. of Michigan

THE STATE OF THE IEEE

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

WE CAN'T AFFORD TALKING ONLY TO OURSELVES*

The other day I went to an IEEE section meeting on the "World Future for Electronics Engineers." It consisted of a panel discussion preceded by a scene-setting half-hour talk by the chairman. The panelists came from Europe, Japan, and the U.S. Some were economists familiar with the electronics industry, and some were electronics engineers who had participated in market forecasting. One message came through loud and clear: The future electronics engineer must become acquainted with a wider range of technologies and must show more social awareness. (He must also be trained in the fundamentals not only of electronics but also of physics and mathematics, including digital mathematics; it was further stated that a knowledge of the Japanese language would be useful.) In other words, the electronics engineer must communicate with other engineers as well as with non-engineers. As the European panelist said, "l'art pour l'art" (art for art's sake) no longer applied to electronics.

Someone asked "What's the IEEE doing about it?" Before commenting on this question, let me jot down some of the interesting figures on predicted market trends between 1970 and 1980.

Table 1: World Electronics Market Trends

	Billions of Current Dollars		Annual Growth Rate (%)
	1970	1980	
World	58	145	9-1/2%
U.S.	30	64	8%
Japan	4-1/2	17	14%
Western Europe	10	28	11%
Rest of World	14	35	10%

Thus, the U.S. share will be down from 52% to 44% of the world total. The Japanese panelist told us that salaries of Japanese electronics engineers are going up at the rate of 13 percent a year, and are expected to about equal those of U.S. engineers by 1975.

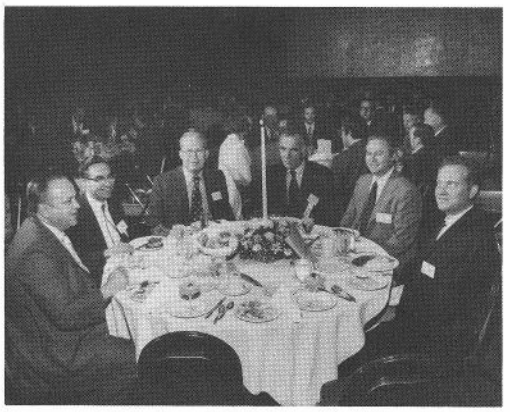
On the changing demand for electronics engineers in the 70's, the following table summarizes the figures I heard.

Table 2: Demand for Electronics Engineers

	1970	1980	Annual Growth Rate (%)
U.S.	213,000	280,000	2.8%
Outside U.S.	200,000	350,000	5.8%
World Total	420,000	630,000	4.2%

Statistics aside, what can IEEE do to help the electronics engineer meet his future needs in relating to the non-engineering sector? We have many forums where engineers can talk to engineers. We have a well-run publication in IEEE Spectrum, and we have many IEEE conferences and conventions, some very fine, but most of them declining markedly in attendance. I would like to suggest that we use IEEE to arrange more meetings between engineers of different disciplines, as well as meetings between engineers and non-engineers. We should set up workshops where component and device engineers can meet systems engineers to exchange ideas and papers, thus stimulating the application of technology. We should not expect such meetings to supplant or even to be as well attended as some of the current conferences of kindred souls, but nor should we judge their impact by registration numbers alone. We should initiate other meetings between engineers and non-engineers, ranging from economists to social scientists, from law-enforcement officers to city planners and public health officials. The nearer these meetings are to policy making and the farther they are from hardware, the smaller will be the number of people directly involved, until all the way at the top there would be meetings of the IEEE president and certain officers with legislators and other public officials. We are now beginning to see the results of the contacts made by 1971 President Mulligan and 1972 President Tanner, but IEEE has yet to move on a broad front. It is as important on technical and on professional matters that we stop talking only to ourselves.

*The main results of the two most recent Board-of-Directors meetings (of March 23 and May 2 and 3) are well summarized in the article by IEEE executive director Don Fink in the June 1972 issue of IEEE Spectrum. Therefore I will not attempt to comment on recent Board actions in this Newsletter.



At Table

Foretable L—R: Wes Matthews, Leo Young, John Bryant, Marion Hines, Sy Okwit, John Horton

EXCERPTS FROM ADCOM MEETING

by J. B. Horton

The G-MTT Administrative Committee met May 21, 1972 at the Arlington Parks Towers, Arlington Heights, Illinois. This meeting was on Sunday afternoon prior to the opening of the 1972 G-MTT International Microwave Symposium at the Towers.

Al Clavin, G-MTT ADCOM President, opened the meeting with a general introduction of those present and a reading of the minutes of the March ADCOM meeting.

Bob Rivers, Chairman of the Professional Action Committee, reported on the committee's activities since March. He reported that he was unable to get operating funds from IEEE although the committee has received endorsement by the U.S. Activities Committee (IEEE). Bob summarized his report with the following recommendations to ADCOM: 1) That a committee be established to evaluate and list legislative consultants in the various fields of specialization within the Microwave Field having some bearing on public policy, e.g., non-ionizing radiation, frequency allocations, and phased array systems; 2) that a Microwave Public Relations Committee be established to promote the writing of articles for public consumption about advances of interest to the public in the Microwave Field; 3) that a Task Force be established to operate in the area of career development.

A discussion of Bob's report and his recommendations followed. It was the consensus of those present that the PAC should work on these recommendations. Al Clavin reported that the United Auto Workers has approached engineers at North American Rockwell (Los Angeles) to organize and represent engineers at that location. To date it is believed that 30% of NAR engineers have signed for representation, and the National Labor Relations board has agreed to hold an election.

H. W. Cooper next reported on activities of the ad hoc committee on mergers (groups). It was recommended that G-MTT not enter into any mergers with other groups/societies at this time. However, Warren suggested that G-MTT consider joint symposia and other functions with other groups when profitable. D. D. King commented that we should consider merger only when a more efficient distribution of technical information can be realized. L. Young suggested that G-MTT consider getting into new fields by communicating and interacting with other groups instead of merging. T. Saad suggested we consider a Division IV symposium.

H. Altschuler reported on Long-Range Planning. He distributed a revised edition of the March 17, 1972 "G-MTT Long-Range Planning" and a preliminary Long-Range Plan on Technical Areas (Prepared by H. Sobol). Discussion of various aspects of the revised plan followed.

R. M. Knox next reported on a recent Division IV meeting at which he represented G-MTT. His report included a request for nominations for committee positions in Division IV (nominations should be submitted to Leo Young).

L. R. Whicker reported on Chapter Activities. A new chapter has been formed in Ottawa. A discussion on administration of chapters by ADCOM followed. L. Whicker presented a letter from H. Edwards, Chairman of the Washington Chapter, reporting the success of the recent Radar Lecture Series sponsored jointly by the chapter and the Washington Section. A check to G-MTT for $1,500 net proceeds from the series was enclosed with the letter.

W. R. Curtice, Chairman of the S. E. Michigan Chapter asked for ADCOM endorsement of a seminar on automobile radars to be sponsored jointly by the University of Michigan and MTT-16 Technical Committee on Microwave Subsystems in June. ADCOM endorsement was unanimous.

G. P. Rodrigue announced that per an agreement with F. Rosenbaum (Transactions Editor), the NEWSLETTER will publish the Foreign Abstracts feature scheduled to be deleted from the Transactions. ADCOM consensus was in favor of this change.

S. Rosenthal reported that he has received some response from his letters to universities about student activities. He reported that a committee meeting on university relations was scheduled for Tuesday morning at the Symposium (0700 am!).

F. Rosenbaum, Transactions Editor, reported that a Special Issue on Microwave Acoustics is scheduled for April 1973 (issue is joint with the group on Sonics and Ultrasonics). Guest editor for this issue is Dr. T. M. Reeder, Chairman of MTT-6 Technical Committee on Microwave Acoustics. ADCOM endorsement was unanimous.

F. Rosenbaum reported that a change of type size is planned for the Transactions. 9-point type is planned for papers and 8-point type for short papers. He reported that this change could result in a cost savings of $4,400 per year, or an increase of 50 - 60 pages of Transactions at present funding.

Bob Garver reported that efforts to increase the returns on voluntary page charges (for the Transactions) have been successful. E. Torgow noted that approximately 50% page charge return has been received to date. This is more than originally budgeted. Gene reported that G-MTT now has approximately 5,500 memberships and that a year-end surplus of $1,000 is forecasted, based on reasonable incoming funds for the remainder of 1972. This will bring MTT's reserves to $17,500 at the end of 1972. E. Torgow closed by requesting projected budgets for 1973 from committee chairmen.

R. M. Knox reported that the 1972 Symposium was proceeding as planned (this is covered in detail in another section of the NEWSLETTER). W. J. Anson reported on the 1973 G-MTT Symposium to be held in Boulder in the latter part of May, 1973. Because of a change in the University of Colorado graduation date for 1973, the dates for the 1973 Symposium have been rescheduled to June 4, 5, 6, 1973.

Al Clavin announced that the next ADCOM meeting is scheduled for September 11 at IEEE Headquarters in New York. The meeting was adjourned by President Clavin at 6 p.m.

IEEE ELECTIONS

Editor's Note: A special combined MTT-AP, Newsletter is in the works to cover the candidates and issues in this forthcoming election. This issue should reach members in early September and will contain statements and more complete biographies of the candidates.

CANDIDATES FOR IEEE OFFICES ANNOUNCED

The Nominations and Appointments Committee of the Institute of Electrical and Electronics Engineers announced this week the names of the candidates selected to appear on the election ballot for 1973 offices within the Institute.

Dr. Harold Chestnut, Consultant, Systems Engineering, Information Science and Engineering, General Electric Corporate Research and Development, Schenectady, N. Y., has been nominated for the Presidency in 1973. Dr. Chestnut is a Fellow of the IEEE and has been chairman of numerous IEEE committees. He has served on the IEEE Board of Directors since 1967, and served as Vice President-Technical Activities in 1970-71, and Vice President of the Board in 1972.

John J. Guarrera, President, Guide Scientific Industries, Inc. has been nominated for the position of Vice President of the Institute. Mr. Guarrera has been President of Guide Scientific Industries, Inc. since its inception in 1968. During that time he has spearheaded its growth from a microwave components manufacturer to a communications systems company engaged in filling the growth requirements for Public Safety and Security. He has served in a wide variety of positions within the IEEE over the years including holding office in the Los Angeles Council, San Fernando Valley Section and as Director of Region 6 on the IEEE Board of Directors. His other IEEE activities include chairmanship of WESCON for 1966 and active participation in its committees.

The nominees for the Regional Delegates/Regional Directors for 1973-74 are:

Region 2 - Howard B. Hamilton, Professor and Chairman, Electrical Engineering Dept., University of Pittsburgh, Pennsylvania; William W. Middleton, General Buildings Engineer, Bell Telephone Company of Pennsylvania, Philadelphia, Pennsylvania; Leland D. Whitelock, Chief Engineer, Digital Techniques, Naval Ship Engineering Center, Hyattsville, Maryland.

Region 4 - Rolland B. Arndt, Manager, Technical Planning, Univac Division, Sperry Rand Corporation, St. Paul, Minnesota; Alvin A. Read, Professor, Electrical Engineering Dept., Iowa State University, Ames, Iowa.

Region 6 - Einar E. Ingebretsen, Manager, Support Systems Engineering, Lockheed Missile & Space Company, Sunnyvale, California.

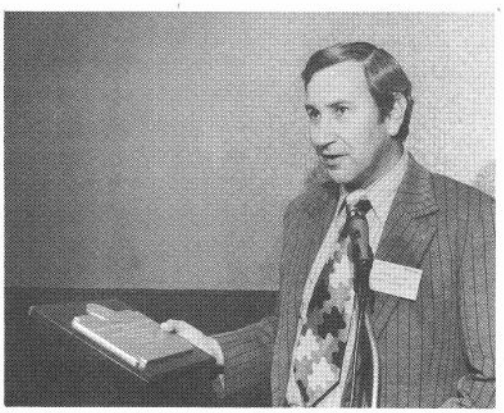
Region 8 - Giuseppe L. Francini, Professor of Applied Electronics, University of Padua, Institute of Electronics, Padua, Italy; Werner J. Kleen, Consultant to Siemens AG; Professor, Technical University, Munich, Germany; C. Reginald Russell, Principal Lecturer, Thames Polytechnic, London, England.

Divisional Delegate/Divisional Director nominees for 1972-73 are:

Division II - Andrew F. Dunn, Senior Research Officer, National Research Council, Division of Applied Physics, Ottawa, Ontario, Canada; Julian Forster, Manager, Engineering, Atomic Power Equipment Department, General Electric Company, San Jose, California; Anthony J. Hornfeck, Director, Research, Bailey Meter Company, Research & Development Division, Wickliffe, Ohio.

Division IV - Joseph E. Rowe, Chairman, Department of Electrical and Computer Engineering, University of Michigan, Ann Arbor, Michigan; Leo Young, Program Manager, Microwave Techniques, Stanford Research Institute, Menlo Park, California.

Division VI - Warren B. Boast, Head, Electrical Engineering Dept., Iowa State University, Ames, Iowa; Robert W. House, Manager, Social and Systems Science Section, Battelle Memorial Institute, Columbus, Ohio; Homer M. Sarasohn, Director of Engineering Communications, IBM Corporation, Armonk, New York.



"Carl Blake?"

Correction:

1972 INTERNATIONAL IEEE/G-AP SYMPOSIUM
and
USNC/URSI MEETING
December 11-15, 1972
at
Williamsburg Convention Center/
College of William and Mary

Deadline for submission to G-AP and URSI Commissions II and VI - September 7, (not Sept. 21 as previously printed) 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 IEEE CONFERENCE ON DISPLAY DEVICES

October 11-12, 1972
New York, New York

The 1972 IEEE Conference on Display Devices will be held on October 11-12, 1972, in the United Engineering Center Auditorium, 345 East 47th Street, New York City, sponsored by the Electron Devices Group of the IEEE and the Advisory Group on Electron Devices.

The program will cover all of the disciplines relevant to the research, development, and design of electronic display devices. Among the areas of interest are the following: cathode-ray tubes, solid-state light emitters, plasmas, liquid crystals, lasers, holography, light valves, and projection displays. Related topics such as drive address and control techniques,phosphors, fiber optics, electron optics,photochromics and cathodochromics, recording media directly applicable to displays, new phenomena, pertinent operational characteristics, and measurement techniques are to be included.

The deadline for abstracts is June 16, 1972. Prospective authors must submit a comprehensive abstract, approximately 200 words long, appropriate to a 20 minute paper including discussion.

Late news papers will be considered if 75 word abstracts for ten minute papers are recieved before September 11, 1972.

Mail all material to Louis N. Heynick, Physical Electronics Group, Stanford Research Institute, Menlo Park, California 94025.

CALL FOR PAPERS

1972 IEEE INTERNATIONAL ELECTRON DEVICES MEETING

December 4-6, 1972
Washington, D.C.

The Annual Technical Meeting of the Electron Devices Group will be held at the Washington Hilton Hotel in Washington, D.C. December 4-6, 1972. This meeting will emphasize new and significant aspects of research, development, design, and manufacture of electron devices.

Specific areas to be covered include:

Device Technology
Integrated Electronics
Solid State Devices
Imaging, Storage, Information Processing, & Display Devices
Lasers & Other Opto-Electronic Devices
Microwave & Power Tubes

The deadline for abstracts is August 18, 1972. Prospective authors must submit a comprehensive abstract, approximately 200 words long, appropriate to a 20-minute paper including discussion. The abstract must be written exactly as it may appear in the program of the meeting; complete with title, author(s), company affiliation, city and state of company location; on one side of a double-spaced typewritten page.

Late news papers will be considered if 75-word abstracts for ten-minute papers are received before October 16, 1972.

Roland H. Haitz
Technical Program Chairman
Hewlett-Packard Associates
620 Page Mill Road
Palo Alto, Calif. 94304

1973 EUROPEAN MICROWAVE CONFERENCE

4-7 September 1973
Brussels, Belgium

The Third European Conference on Microwaves will be held at Brussels University from 4 to 7 September 1973. It is organized with the support of Fabrimetal and the cooperation of the Institute of Electrical Engineers (Great Britain), the Institute of Electrical and Electronic Engineer (IEEE Region 8, Professional Groups M.T.T., A.P., E.D.), and the Belgian Committee of URSI. The main topics of the Conference will be:

-Passive components for microwaves (millimeter and optical waves included) and their computer optimization.
-Active semi-conductor elements and integrated sub-systems.
-Components and systems for communication purposes.
-Microwave acoustics.
-Industrial applications of microwaves.
-Microwave tubes.

Conference address:

Dr.ir. Gh. Hoffman, Secretary General
1973 European Microwave Conference
St. Pietersnieuwstraat 41
B-9000 GENT Belgium

1973 IEEE POWER ENGINEERING SOCIETY WINTER MEETING

January 28-February 2, 1973
New York, N.Y.

The 1973 Winter Meeting of the IEEE Power Engineering Society will be held January 28th - February 2, 1973, at the Statler Hilton Hotel in New York City. The Winter Meeting is a general meeting and covers the entire field of Power and its many areas of technical interest. Authors who have important information to contribute are invited to submit a paper, attend the meeting to present it, and answer questions asked by discussors. Papers on research efforts that have resulted in new equipment, techniques, or new phenomena, of interest to the Power Industry, will be especially welcomed.

Prospective authors should, without delay, request from the Technical Conference Services Office at IEEE Headquarters a Power Author's Kit which includes a Declaration of Intent form, a Power Author's Guide outlining the current requirements, and a supply of model paper on which the manuscript is to be typed. The completed Declaration of Intent form should be returned immediately so that preliminary plans may be made to include the paper in the technical program.

September 15, 1972 is the deadline date for the receipt of original manuscripts at IEEE Headquarters, if they are to be considered for the 1973 Winter Meeting.

1973 IEEE-SOUTHEAST-CON
(Region 3 Conference)
April 30, May 1 and 2, 1973
Louisville, Kentucky

TOPICS:

Quality papers in the theory and practice of electrical engineering are solicited. Papers and attendance from outside Region 3 are welcome.

INFORMATION FOR AUTHORS:

Please submit three copies of the following material to the Technical Program Chairman, Dr. R.D. Shelton, EE Department/University of Louisville, Louisville, Kentucky, 40208 by October 1, 1972.

1. A 50-word (maximum) abstract.
2. A 250-500 word introduction to the paper.
3. A resume of the author(s).

1972 CARNAHAN CONFERENCE ON ELECTRONIC PROSTHETICS

September 21-22, 1972
Lexington, Kentucky

The College of Engineering of the University of Kentucky will sponsor a Conference on Electronic Prosthetics, September 21-22, 1972. Papers are solicited in the following subject areas.

Sensory-Motor Enhancement Devices
Sensory-Motor Alternatives
Communication Prostheses for Impaired Vision, Speech, Hearing or Writing
Mobility Aids for Paraplegics and for the Blind

The major purpose of the conference is to provide support to research and development in the field of electronic prostheses and to integrate disparate disciplines. Liaison with professional groups other than electrical engineering will be encouraged.

CRITICAL DATES:

Deadline for abstracts (200 words)
August 7, 1972
Notification of acceptance
August 14, 1972
Conference
September 21-22, 1972

Mail abstracts to:
John S. Jackson
Electrical Engineering Department
University of Kentucky
Lexington, Kentucky 40506
Phone: (606) 257-3926

1973 SOUTHWESTERN IEEE CONFERENCE AND EXHIBITION (SWIEEECO)

April 4-6, 1973
Houston, Texas

The 1973 SWIEEECO Steering Committee solicits the submission and presentation of original research papers by researchers in universities, industries, and government.

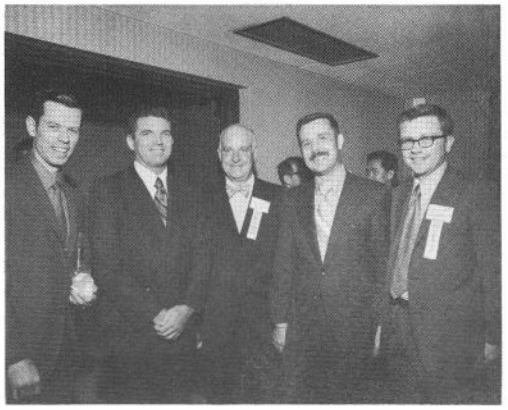
Instructions for Authors: Papers are invited for twenty to thirty minute presentations.

Four copies of a summary of at least 500 words and a one paragraph abstract for convention digest must be received prior to November 1, 1972. The summary should be of sufficient length and detail to permit careful reviewing. Please send abstracts and summaries to:

Dr. Wendell C. Bean
Technical Program Chairman
Electrical Engineering Dept.
Lamar University
Beaumont, Texas 77710

Acceptances of papers for the conference will be announced December 8, 1972. Final manuscripts will be due February 8, 1973.

L—R: Don King, John Bryant, Wilbur Anson, Art Oliner



L—R: Bob Knox, Bill Magruder, Paul Coleman, Larry Hansen, and Tom Smith.

SPECIAL ISSUES

G-MTT and G-SU Plan a Special Issue
on
MICROWAVE ACOUSTIC SIGNAL PROCESSING

The major goal of this special issue is to present design methods and examples for the use of acoustic devices in signal processing applications. Invited are papers dealing with a variety of acoustic phenomena (e.g., volume and surface acoustic waves, magneto-acoustic and acousto-optic interactions, etc.). All papers must emphasize: 1) known or suggested signal processing applications, 2) comparison of device parameters with application requirements, and 3) where possible, advantages and disadvantages of acoustic signal processing with competing methods. The words "microwave acoustic" are used in their broad sense; papers considering frequencies well below the usual microwave range will be considreed as long as microwave methods and techniques are used.

Both new application of older devices and potential applications of new devices are being sought for this special issue.

The deadline for contributed papers is 1 September 1972. Prospective authors must send three complete manuscripts to:

T.M. Reeder, Guest Editor
United Aircraft Research Laboratories
East Hartford, Connecticut 06108

OR

Prof. F.J. Rosenbaum, Editor
IEEE Trans. on Microwave Theory & Tech.
Department of Electrical Engineering
Washington University
St. Louis, Missouri 63130

Length and Style of papers should be in accordance with the "editorial policy statement", MTT-20, Trans. on Microwave Theory and Techniques, March 1972.

The special issue is scheduled to appear as the regular April 1973 issue of both the G-MTT and G-SU Transactions.

Industrial, Scientific and Medical
Applications of Microwaves
to be Subject of Special Issue.

Industrial, scientific and medical applications of microwaves is the subject of a special issue of the PROCEEDINGS OF THE IEEE planned for January 1974 publication. Papers for consideration for inclusion in this issue are solicited. Prospective authors are requested to submit a paper outline, in the form of a summary, of about 500 words, on or before November 15, 1972 to the Guest Editor. The deadline for submission of complete papers is May 1st 1973. (Whereas authors are encouraged to submit an outline in advance, any submission up to May 1st next will be considered). The issue will include a number of invited papers, as well as submitted papers and letters in all the non-communication areas of microwaves.

Guest Editor:
W.A.G. Voss, Department of Elecrtical Engineering, University of Alberta, Edmonton, Canada.
Tel: 403-432-5147

SHORT COURSE

A four day short course on "Computer Techniques for Electromagnetics and Antennas" will be offered at Sorrento (40 km. from Naples), Italy, under the auspices of the University of Naples. It will be directed by Professor G. Franceschetti of the University of Naples and Professor R. Mittra of the University of Illinois. The course is scheduled to be held from September 5-8, 1972 and will feature lectures by Professors R. Harrington, R. Mittra, W. V. T. Rusch, P. Uslenghi and Dr.A. Poggio. For further details please contact Professor G. Franceschetti, Universita Di Napoli, Facolta Di Ingegneria, Istituto Elettrotecnico, Napoli, Italy.

CONFERENCES

OCEAN 72
Sept. 13-15, 1972
The Newport Harbor Treadway Inn
Newport, Rhode Island, 02840

The "Project Sanguine" communication system and off-shore nuclear power platforms will be among subjects featured at OCEAN 72, the International Conference on Engineering in the Ocean Environment to be held in Newport, R. I., September 13, 14, and 15, 1972. Over 100 reports of activity in coastal zone and ocean research and engineering will be made at the conference to be headquartered in the Newport Harbor Treadway Inn. Conference co-sponsors are the Oceanographic Coordinating Committee of the Institute of Electrical and Electronics Engineers (IEEE) and the Providence, R. I. Section of the IEEE.

OCEAN 72 will include invited and contributed papers in the following areas:

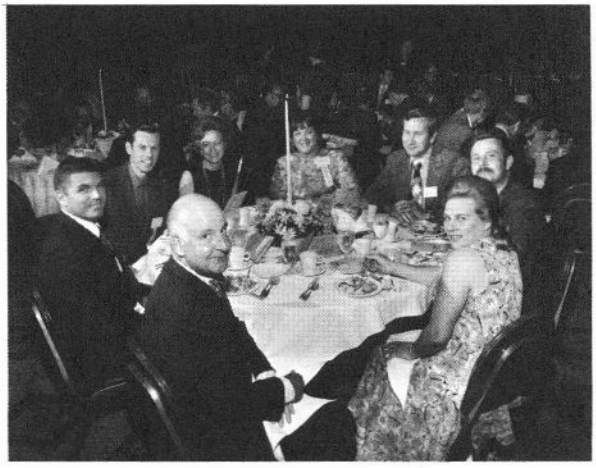
- Navigation, positioning and tracking systems
- Marine bio-electronics
- Underwater acoustic propagation
- Underwater acoustics - transducers and arrays
- Acoustic signal processing
- Oceanographic data collection and digital processing systems
- Oceanographic instrumentation
- Sediment properties and seismic profiling
- Coastal zone and pollution measurements
- Materials for marine environments
- System modeling and optimumization
- Underwater optics
- Electromagnetic remote sensing
- Magnetic methods
- Arctic problems
- Nuclear power employing offshore platforms

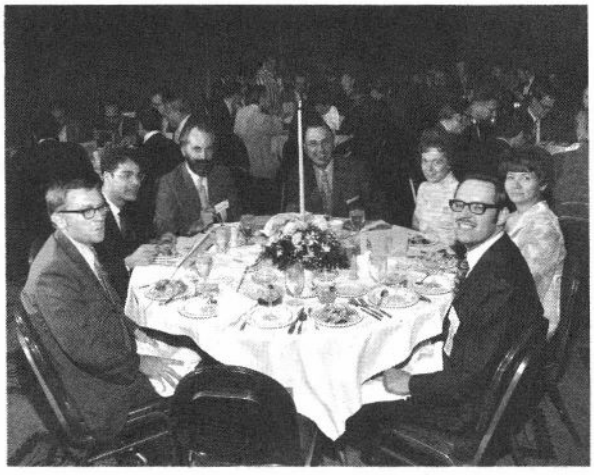
A special session and panel discussion on Wednesday, 13 September will be devoted to "Project Sanguine", the Navy's proposed long range, extremely low frequency communication system. Participating in the discussion will be critics of the system from the University of Wisconsin, neutral experts from a special National Academy of Sciences panel, and Navy engineers. Chairman of the session will be Dr. James R. Wait of the Environmental Research Laboratory of the National Oceanic and Atmospheric Administration.

OCEAN 72 will open at 9:30 am on Wednesday, September 13, 1972 with a plenary session to be addressed by the Hon. John H. Chafee, former Secretary of the Navy and Governor of Rhode Island.

Inquiries concerning the conference should be directed to Mr. Norman Serotta, General Chairman OCEAN 72, c/o Raytheon Company, Submarine Signal Division, P. O. Box 360, Portsmouth, R.I. 02871.

SYMPOSIUM SCENES





LETTERS TO THE EDITOR

Waves, Frequencies, Inches, Alphabets!!

Ed/MTT March 21, 1972

Taub and Beatty[1] champion the WR nomenclature for standard rectangular waveguides, at least for US use. The British also champion their WG system. NATO has a system. The US Armed Services have new designations. Manufacturers have their own systems. A real potpourri? Why?

Maybe it's like walking into a drugstore to buy something to cure a headache: you may have 25 preparations to choose among. The reason why there are so many is clearly that none of them are really effective.

Likewise, none of the existing waveguide nomenclature systems can successfully convey meaning to all waveguide users. But on a global or industry-wide scale, the IEC system is by far the best compromise. Let's not sell it short. Specifically, the arguments for adopting the IEC system are:

1) Code letter or consecutive number nomenclature systems are doomed to failure[2] as new waveguide types are added and older types deleted.

2) Systems based on dimensions (like WR) can become involved, even if for no reasons other than historical: The oldest waveguide sizes (the original KXCSLP from World War II) were originally extruded rectangular tubes used for decorative purposes and came in whole multiples of quarter or half inches handy for carpenters. Then sizes were added whose internal dimensions were whole multiples of inches. Then some metric-base sizes crept in. As Beatty[1] points out, systems based on dimensions either must admit of error or have a lot of significant figures to be descriptive.

3) Dimensions, as might be given by nomenclature, don't allow accurate computation of cutoff wavelength simply because standard rectangular waveguides seldom have perfect rectangle cross-sections but rather have rounded corners. Actual cutoff wavelengths of standard waveguides in air deviate from the ideal by as much as 0.9%.[3]

4) The IEC System is user-oriented. Innovators and practitioners (which probably include most of the G-MTT membership) are not really waveguide comsumers on a large scale as, say, are the telecommunications or radar industries. And these industries are primarily interested in frequency, which is the cornerstone of the IEC system.

5) The IEC System works equally well for circular, square, tall, elliptical, or ridge waveguides. It is devoid of components giving rise to nationalistic arguments such as inches vs. centimeters. It is equally effective in all indo-European languages (in some languages, coax lines are "waveguides," thus the W of WR, even if translated, would not be specific).

6) The United States of America is one of the 17 countries to have voted explicitly in favor of publishing the IEC waveguide nomenclature system.[4]

[1] J.J. Taub and R. W. Beatty, "Waveguide Designations," G-MTT NEWSLETTER, January 1972, page 4.

[2] M.M. Brady, "Waveguide Band Standardization," G-MTT NEWSLETTER, January 1970, pp. 8-9.

[3] M.M. Brady, "Cutoff Wavelengths and Frequencies of Standard Rectangular Waveguides," Electronics Letters, Vol. 5, No. 17, pp. 410-412, 21 August 1969.

[4] IEC, "Hollow metallic waveguides, Part 2: Relevant specifications for ordinary rectangular waveguides," Publication 153-2, page 5, IEC, Geneva, 1964.

M.M. Brady
Sr. Electronics Engineer
Norconsult A.S.
P.O. Box 9
1322 Hovick, Norway

Ed/MTT March 30, 1972

I have received a copy of M.M. Brady's comments re waveguide designations. His arguments for the IEC system are valid ones and persuasive. The main remaining argument in preference of a system based upon wavelength rather than frequency is the following. If one uses frequency to arrive at designating numbers, as IEC has done, then as the size of the waveguide gets smaller, the designating number gets larger. This is not only logically unappealing but may be a real disadvantage in labelling components.

I wonder if the IEC would reconsider a slight change in their numbering system so as to choose numbers based upon wavelength rather than frequency? One could calculate the free-space in vacuo wavelength corresponding to the approximate center frequency of the waveguide and choose an appropriate 2-digit number close to this wavelength. Here are some numbers to illustrate how the present IEC system could be revised so as to be based upon wavelength.

WR System	Old IEC-R System	Corresponding $\lambda_{mm} \times 10$	A Proposed New IEC-R System
2300	3	9992	10000
2100	4	7494	7500
1800	5	5996	6000
1500	6	4996	5000
1150	8	3747	3750
975	9	3331	3300
770	12	2498	2500
650	14	2141	2150
510	18	1665	1650
430	22	1363	1350
340	26	1153	1150
284	32	937	950
229	40	749	750
187	48	624	625
159	58	517	515
137	70	428	430
112	84	357	360
90	100	300	300
75	120	250	250
62	140	214	215
51	180	166	165
42	220	136	135
34	260	115	115
28	320	94	94
22	400	75	75
19	500	60	60
15	620	48	48
12	740	40.5	40
10	900	33.3	33
8	1200	25	25
7	1400	21.4	21
5	1800	16.6	17
4	2200	13.6	14
3	2600	11.5	12

Example: x-band
f = 10 GHz, λ_o = 3cm = 30mm
$10\lambda_o$ = 300.

Perhaps such a change would satisfy nearly everyone.

Sincerely,

R.W. Beatty
Sr. Research Scientist
NBS, Boulder, Colorado

Ed/MTT April 3, 1972

This letter is essentially a P.S. to Bob Beatty's letter to you of 3/30/72.

Waveguide designations based on wavelength have the following advantage: The designation numbers are (at least approximately) directly proportionate to the dimensions of the waveguide cross section; this imparts easier visualization of both wavelength and waveguide size. Corresponding designations based on frequency are directly proportionate fo frequency only.

By making this observation I take no general position in favor of the wavelength-based designation, but imply that other things being equal waveguide-based designations appear more practical to me.

Sincerely,

Helmut M. Altschuler
Senior Research Scientist
NBS Electromagnetics Division
Boulder, Colorado

Ed/MTT 10 April, 1972

Thank you for your letter of 4 April concerning my comments on waveguide designation for the G-MTT Newsletter. H. M. Altschuler and R. W. Beatty of NBS have both sent me carbon copies of their remarks to you favoring a wavelength-based designation system. This is my reply.

As Altschuler and Beatty point out, a wavelength-based designation system is indeed the more logical and has numerous practical advantages. However, the arguments for a frequency-based system, some of which the IEC considered in developing their existing nomenclature, are pretty convincing.

First, for most stationary microwave system work, frequency is considered more basic than wavelength. When you specify a wavelength, you must also specify if it is free-space, in the ambient atmosphere, or in the dielectric (air, gas, etc.) actually inside the waveguide in question.

Second, the telecommunications and radar industries, by far the greatest consumers of waveguide, think frequency, not wavelength. Almost all microwave communications system design equations or curves expressing relationships involving frequency or wavelength are stated or drawn using frequency (1).

Third, most people seem to think frequency, not wavelength. The Amateur radio bands are practically the lone survivors of the era when radio bands carried wavelength designations. US radio receiver scales have always been in frequency. Japanese radio receiver scales are in frequency. Multi-band European radios which used to have both scales and bands in wavelength now have scales in frequency and only rough designations of wavelength (short, medium, long) on the bands. This trend may be impossible to reverse, even for waveguide nomenclature

Fourth, the units of frequency are simple and universal, comprising the Hz and its decimal multiples. Wavelength involves two units. neither of which is truly in universal use (some elementary US texts still state the speed of light in miles per second or miles per hour, more"familiar" units for the reader.).

Fifth, and last, human interest may be keen but human inertia is greater. When a telecommunications engineer designs or builds microwave systems to install for a telecommunications authority for a specific frequency band using frequency diversity, having had to explain microwave as being really extremely high frequency, drives home in his car listening to a radio tuned to 100.2 MHz, and then spends the evening watching a TV show on the UHF band, it is doubtful if he will be willing to think wavelength in specifying waveguides, a minor part of his work. For those of us to whom waveguides are major, it's a different picture. But we are in the minority.

1) note, for instance: R.F. White, Engineering Considerations for Microwave Communications Systems, San Carlos, Calif.: Lenkurt Electric Co., June 1970. (one of the most widely-used design handbooks for the microwave link industry).

In summary, I believe that we practitioners (GMTT members) may have the better feeling for the more logical (at least, to ourselves), but that we may have to scarifice our logic for the sake of making our products more easily understood by their users. Albeit sophisticated, we are just another technical industry trying to do business.

Sincerely,

M.M. Brady,

Dr. R. W. Beatty 12 April 1972
(272.10)
National Bureau of Standards
Boulder, Colorado 80302

Dear Dr. Beatty,

Reference: Comment on Waveguide Designation, G/MTT Newsletter, January 1972

My vote is to keep our existing WR designation in inches. It is an identifying number established in a very reasonable manner and is well accepted. So what, if our WR-inches designation is a deterrent to international acceptance? Why should we be concerned with giving in to international demands? If the U.S. is the greatest user and manufacturer of waveguides, why can't we have the international standards committee accept U.S. standards?

Yours truly,

Howard E. King, Head
Antennas and Propagation Department
Electronics Research Laboratory
Building 120/Room 2005

Ed/MTT 24 March, 1972

I have read in the G-MTT Newsletter that you are the new editor. As editor of the G-EMC Newsletter for the past four years, I would like to offer my best wishes towards your new endeavor.

I have recently prepared the 1972 edition of ITEM (copy enclosed). Over 13,000 copies have already been distributed and we have approximately 2000 remaining. Therefore, I would like to offer interested members of the G-MTT a free copy if they will write or send a post card to the attention of our circulation manager.

The book should speak for itself. Interference problems are not strangers to microwave engineers. Many problems such as grounding, shielding, filtering, spectrum utilization are common in their everyday work. Therefore, I would appreciate your inserting an appropriate notice in your Newsletter and we will fill the requests on a first come basis until our surplus is exhausted.

I should like to thank you in advance for your consideration and hope that you find my publication interesting and useful.

Sincerely yours,

Robert D. Goldblum
Publisher
R&B Enterprises
P.O. Box 328
Plymouth Meeting, Pa. 19462

PERSONALITIES

Mr. Stewart E. Miller, Director, Guided Wave Research, received the IEEE Morris N. Liebmann Memorial Award at the International Quantum Electronics Conference in Montreal.

The Morris N. Liebmann Memorial Award, established in 1919, is presented to an individual or group of individuals for the most important contribution to the radio art recognized during the preceding three calendar years.

Mr. Miller received a certificate and one thousand five hundred dollars. The citation to Mr. Miller reads:

"For pioneering research in guided millimeter wave and optical transmission systems."

The Institute of Electrical and Electronics Engineers presented the 1972 Morris E. Leeds Award to Forest K. Harris at the Conference on Precision Electromagnetic Measurements at Boulder, Colorado.

The Leeds Award established in 1958 is awarded each year to an individual or group of individuals who have benefited the arts and sciences by making an outstanding contribution to the field of Electrical Measurement.

Mr. Harris received a certificate and one thousand dollars. The citation to Mr. Harris reads:

"For a lifetime of making outstanding advances in the science of high-accuracy electrical measurements, and of stimulating further advances through his teaching, authorship, and committee activity."

George Byron Weathersby, a member of the Institute of Electrical and Electronics Engineers, was appointed as a 1972-73 White House Fellow. The 1972-73 Fellows were selected from a field of 1,509 applicants and represent the best of the Nation's rising young leadership.

"The White House Fellows program was created in 1964 with the purpose of providing outstanding young Americans with some firsthand experience in the process of governing the Nation by affording them the opportunity of a year's service at the highest levels of the Federal Government."

As a Fellow, Mr. Weathersby will be assigned to either the staff of the President or to a Member of his cabinet for a term of one year beginning September.

Mr. Weathersby is presently Associate Director, Office of Analytical Studies, and Director, Ford Foundation Research Program in University Administration, at the University of California at Berkeley.

Prof. Paul D. Coleman, has been appointed to serve on the IEEE Quantum Electronics Council as one of the G-MTT representatives. QEC meetings are generally held in conjunction with quantum electronics and related major conferences. Representatives on the QEC also represent IEEE on the Joint Council on Quantum Electronics of the American Physical Society, Optical Society of America and IEEE.