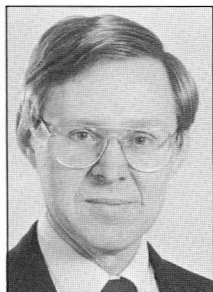


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## EDITOR'S NOTES



by Peter W. Staecker

By the time you receive this issue, the Administrative Committee will have completed its first meeting of the new year, the 1987 MTT-S Symposium TPC will have graded a new record number of papers, and the countdown will have begun toward the June meeting in Las Vegas. This issue, in addition to introducing our new AdCom Officers and two new AdCom elected members, features our (two) new Distinguished Microwave Lecturers for 1987/1988, our newly-elected MTT-S affiliated IEEE Fellows and recipients of the 1987 MTT-S Awards.

### John Kuno

This year marks the first in over a decade that John Kuno's name will not be among those serving as an elected member of AdCom, since he has served his three term limit. Reinhard Knerr's remarks at the October AdCom meeting in Dallas recognized John's years of service to the Society:

"As you know, most of us sooner or later turn into *old elephants*. I would like to salute our most recent addition to the herd, John Kuno, who has been with AdCom for 11 years. John has held almost all positions in AdCom including Newsletter Editor and Chairman of the Membership Services Committee. In addition, he has been guest editor on two separate occasions of special Transactions issues on millimeter wave topics, and has contributed substantially to the organization of a number of MTT-S Symposia. John has made many contributions to AdCom and our membership and is well-known to MTT members not only as an expert in millimeter waves, but also as a contributor to the Society. We thank you, John, for your personal efforts, and hope your association with and valuable inputs to the Society continue."

### Directory, Chapter Officer Info

You will note the 1987 MTT-S Directory stitched into the center of this issue; remove it, read it, and store it away for reference purposes in the coming year. If you notice that any mistakes or changes occur as the year progresses, please inform me so that we may keep our records current. A special note to Chapter Officers: please take a few minutes to review the data compiled for your chapter by Zvi Galani (this issue, and also the directory), and contact him with any necessary corrections or additions.

## INCOMING PRESIDENT'S REPORT



by David N. McQuiddy, Jr.

I have spent the past year working with Reinhard Knerr, our 1986 President. Under his leadership, we have taken a serious look at long range planning and are in the process of considering several new AdCom sponsored activities that should benefit the MTT-S membership as well as the microwave industry in general. It has been a satisfying experience to work for Reinhard and it is with pleasure that I extend, on behalf of AdCom and all MTT-S members, thanks for a job well done.

### The Year Ahead

We enter 1987 with over 8800 members after having experienced an 8.3 percent growth in membership during 1986. The International Microwave Symposium and related activities continue to improve in both quantity and quality. The Transactions is recognized as a leader among technical publications. Our financial reserve is greater than one year's operating expenses and places us fifth among the 36 IEEE societies and councils in both reserves per member and in total dollar value. We have a well-qualified and dedicated group of volunteers serving as members of the Administrative Committee. Our future as a Society is certainly bright.

A major goal for the AdCom in 1987 will be to complete the evaluation and approval of the projects recommended by the 1986 Long Range Planning Committee. A good start has already been made with the projects having been referred to the appropriate AdCom standing committees to generate an implementation plan.

We are in the process of revamping our financial planning and budget formation procedures. Our growth over the last several years in membership and in member-related activities has resulted in extensive revenue generation and additional expense actions. We should have a new budgeting procedure in place by the end of 1987 that will support these expanded needs.

The strength of a professional society resides in its membership. A strong and capable Administrative Committee can maintain the momentum but overall member participation is needed to expand our horizons. You are encouraged to make your views and opinions known by contacting me or any AdCom member. I look forward to the challenges that 1987 will bring and am honored to serve as your President.

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# OUTGOING PRESIDENT'S REPORT



by *R.H. Knerr*

It appears that the year 1986 and my tenure as President passed very fast. I look back and try to assess what I, together with a terrific group of very professional people — our AdCom, have accomplished.

I suppose, as every President, I aspired to have a long-term effect on the operation of our Society. In view of this, let me present my perspective of important achievements in 1986.

## **MTT Budget: 1986 and the Future**

I have this hang-up about running MTT-S in a business-like manner, a conviction which is being reinforced by the event of us as a Society having become millionaires in 1986. You may have read Dave McQuiddy's last column summarizing a special two day meeting in Atlanta where we produced a long-term plan which, most important, was formulated in the context of a realistic assessment/projection of our present and future financial situation. Many useful, new projects and expansions of present ones were proposed and are being implemented by the various committees. However, a very important aspect of our finances also emerged: our expenses are increasing at a faster rate than our income!

I remember sitting down with Fred Rosenbaum over dinner to discuss this issue. We both agreed from the start that we did not want to cut corners by making our International Microwave Symposium less enjoyable for our members or have AdCom eat hotdogs for lunch or dinner (some devious soul suggested that I was more concerned about the wine than the food), but rather find a mechanism to learn more efficiently from past experience and be more disciplined in our operation. We decided that the appropriate vehicle would be to establish a yearly budget for all our operations, to have AdCom vote on it and then enforce it. Later it was also decided to establish guidelines for the operation of our International Microwave Symposium and the other conferences we sponsor or co-sponsor. These guidelines should also include standard budget and reporting forms which would allow meaningful comparisons from year to year. The intent is not to stifle the innovation of the local arrangement committees but rather help to avoid costly mistakes and clearly define the various responsibilities. Finally, after many long phone conversations with Fred Rosenbaum, Charlie Rucker and Don Parker, I decided to make use of the yet mostly untapped resource of Past Presidents to provide a con-

trol and audit function plus other tasks which would be handled by the senior body to provide continuity in all our operations. Don Parker graciously agreed to chair the Past Presidents' Council. Ferdo Ivanek and Walter Cox readily agreed to establish a committee to work out Symposium Guidelines. Dave McQuiddy, then our Vice-President and Chairman of the Long Range Planning Committee, immediately agreed to the budgeting idea and took steps to implement it. This was terrific because, not only was Dave the busiest Vice-President I can remember, but his acceptance of these proposals also means that he will, as President, continue to address them because full implementation will take at least another year.

I feel very strongly about the budgeting and think that it will provide a tool for AdCom to exert its proper influence to administer our funds in a responsible and business-like manner.

Finally, there are other events which I am pleased to report:

## **Educational Activities**

Our educational activities under the leadership of Kris Agarwal have grown to the point where I decided to establish the Education Committee as a Standing Committee with its own budget and structure of subcommittees. We awarded our first undergraduate scholarship for children of MTT members. It was very appropriately presented by Past President Harlan Howe who, in 1985, signed our first contract with the National Merit Scholarship Foundation. We are presently soliciting applications for Graduate Scholarships and Grants-in-Aid. For the first time we are also organizing Undergraduate Microwave Paper Contests with cash prizes on the local levels and free trips to our Symposium for winners at the national level.

## **MITA**

The establishment of a "Microwave Industry Trade Association" headed by Fred Rosenbaum and Harlan Howe is an extension of Fred's initial idea of a Microwave Foundation. It will ultimately be self-supporting through contributions from our industry. MTT-S is providing sponsorship and initial seed money.

## **Kudos**

It is a real pleasure to acknowledge by name all the people who responded to my often time-consuming requests for action:

- There is Martin Schneider who so ably took charge of our Membership Services and recruited Steve Temple to help him.
- There is Ted Saad whose commitment to MTT-S is exemplary and whose Historical Exhibit has become an integral, well-recognized, popular part of our Symposium.
- There are other individuals whose ears I bent in long evening phone calls, for example Charlie Rucker and Tatsuo Itoh.

*continued on page 4*

## Outgoing President's Report (continued from page 3)

- I am especially indebted to Norm Dietrich, our past Patent Abstracts Editor who represents us on the Journal of Lightwave Technology. Norm acted as a sounding board and freely contributed his ideas when I discussed many subjects with him at lunch or while riding with him in our car pool.
- There is Steve March who despite his own career changes handled very efficiently the tremendous paperwork associated with the Treasurer's job.
- Reynold Kagiwada expanded the Newsletter and made it a pleasure to read.

I realize that, by choosing to acknowledge individuals by name, I am bound to omit some but I do want to give proper credit and apologize to those I did not mention who have carried out their tasks for our Society in the true spirit of serving all our members to the best of our abilities.

It has been a very gratifying experience to serve as your President with such a dedicated group of individuals who unselfishly give their time and talents.

Thank you all!

## DIVISION IV DIRECTOR'S REPORT



by Kiyomi Tomiyasu

I wish to thank your President Reinhard Knerr for inviting me to participate in your Administrative Committee Meeting held on October 6 and 7 in Dallas, Texas. It was indeed gratifying to witness so many dedicated volunteers expending their precious time and effort for the benefit of the MTT Society. It became evident that the efficiency of conducting the meeting with its enormous agenda was a result of the excellent stewardship of the President who demonstrated that the essence of the issues could be identified, and to focus the effort and attention on their resolution. The team effort of the entire AdCom was clearly visible and it is this dedicated action that has had a profound impact on the success of the MTT Society.

The previous time I met with MTT AdCom was in October 1985 in Long Beach, California. Unfortunately during my two-year term as Division IV Director, I was unable to attend either MTT Symposium due to schedule conflict with other activities.

Some membership statistics may be of interest to

you. The MTT-S membership ranks 10th in IEEE. The annual growth in membership is 8% and ranks 6th. In regards to fiscal matters, the Society has a substantial cash reserve and ranks 5th in the IEEE. This reflects upon the good, sound management of MTT activities.

### Suggestions for Future Activity

#### MTT Scholar Program

To help perpetuate the MTT Society, it is suggested that MTT consider the possibility of establishing an MTT Scholar Program similar to a Rhodes Scholar. It should be available only to an MTT member for a post-doctorate fellowship with a stipend perhaps over \$25,000. This should enable the recipient to develop a specialty and commitment to microwaves.

Individuals who deserve some attention for special recognition are the young faculty. These are the individuals who nurture and stimulate the growth and perpetuation of the profession. A young faculty member who has demonstrated such talent could benefit from this encouragement and recognition. The requirements suggested are that he is an MTT-S member, is under 35 years of age, has published in the **MTT Transactions**, has presented a paper at an MTT Symposium, has shown teaching skill, is endorsed by students, teaches in a school located in a section where there is an MTT Chapter and in a school which has an IEEE Student Branch, and endorsed by the MTT Chapter and the IEEE Student Branch. The honoree should receive a certificate, honorarium and travel expenses to receive that recognition.

#### Summer Intern Program

There are other learned Societies who sponsor Industrial Summer Intern Programs to match student interests and industrial needs. The Society serves as a central channel and recommends the more promising applicants to industry. In this program, the applicant should be an IEEE and an MTT member. It may be desirable to create a part-time staff function to implement this activity.

#### Complaint Department

I have heard many complaints from authors regarding the lateness of reprints of their papers published in the **Transactions**, with reported delays of up to about 8 months. This lateness results in late billings and hence delayed income to the Society treasury. I have been assured that steps have been taken to reduce the elapsed time to about 6 weeks as it has been formerly. If this is not restored by Spring of 1987, please let me know.

#### ... And Another Suggestion

At the Board level, we have heard complaints that the publications of the IEEE entities are on occasion much too esoteric. We need papers that are "readable" and applications-oriented. The problem as I view it is largely a budgetary one. The **Transactions** editor

*continued on page 5*

receives many more excellent papers than can be published within budget. As near as I can ascertain, the type of papers frequently sought by many members falls into the category of tutorials, primers, post-college level, handbook style, continuing education and in-house course material. Such a publication may be called "IEEE Review of Microwave Engineering." A dedicated editor must be sought, a budget separate from the **Transaction's** needs to be established, and authors found from in-house course and beginning faculty instructors. The papers need to be peer-reviewed for technical content and specially reviewed for readability. It is likely that the papers will have to be invited. Each paper should not be very long and should address a particular aspect of tutorial interest. If such a publication were to be pursued, it would require MTT AdCom and IEEE approvals. It is believed that the distribution of this type of publication would help immeasurably in reducing the number of members failing to renew their membership.

**Kudos**

I hope the MTT members noticed the Fall 1986 issue of **The Newsletter**. The coverage was excellent and it contained many items of high interest. The committee reports were informative, the filler items certainly caught my attention and we now have both the MTT Constitution and By-Laws in one place. Special commendations to the outgoing Editor Reynold Kagiwada and his able assistant Cindy Yokono.

At its June meeting the Board of Directors approved the establishment of a new IEEE medal for Engineering Excellence. We are now seeking the funds to implement the Medal. I should inform you that much of the initial effort and development of the new Medal was exerted by Dr. Harold Sobol in 1984 and 1985. We should thank him for his enormous contribution in this regard. It is probable that the first recipient may be in 1988. Candidates for this Medal will be considered in the near future, and I would encourage you to start thinking of suitable recipients for this Medal.

During the latter half of October 1986 the TAB Op-Com visited Brazil to participate in panel discussions, to learn of the state of development in the electrical and electronics industry and education in Brazil and to visit some factories and laboratories engaged in such activities. The trip was arranged by Region 9 Director Sergio Fronterotta and it included the Itaipu hydroelectric power system, Sao Paulo, Campinas and Rio de Janeiro. The entire trip was packed with very interesting items and we were able to witness the high state and rapid development and achievement in the Brazilian educational and industrial sectors.

It seems almost unbelievable that my two-year term as Director of your Division is virtually over. During the latter part of November, I will be participating in the meetings of the Technical Activities Board and the Board of Directors in New Orleans. I wish to thank you for electing me to serve as your Director. It has been a very rewarding and memorable experience.

**AdCom HIGHLIGHTS**



*by David M. McQuiddy, Jr.*

Three AdCom meetings are held each year. The third meeting, held in the September-October time period, is called the annual meeting. The 1986 annual meeting was held in Dallas on October 6th and 7th. A major agenda item for the annual meeting is the election of AdCom members for the succeeding year.

MTT-S is administered by eighteen elected members and the last three successive past presidents of AdCom. The President and Vice-President are chosen from the elected members and must be Senior Member grade or higher to serve. The Secretary is selected by the President and is not necessarily an elected member but can be chosen from the membership-at-large. Since AdCom members serve three year terms, each year a third of the AdCom membership must be determined through the election process. A Nominations Subcommittee provides a slate of nominees containing at least two candidates for each opening. Additional nominations may be made by members of AdCom or by petitions signed by 25 members of the Society. This procedure has served MTT-S well in allowing for the infusion of new members while maintaining a very stable core of seasoned veterans who are thoroughly familiar with the functions of AdCom. Further, the Nominations Subcommittee tries to maintain a balance between members from government, industry and university and between geographical regions as well.

This year, we welcome two new members:

- Kris Agarwal — Industry — Region 5
- Jim Crescenzi — Industry — Region 6

and four re-elected members:

- Walter Cox — University — Region 3
- Ed Niehenke — Industry — Region 2
- Steven Temple — Industry — Region 1
- Barry Spielman — Government — Region 2

Reinhard Knerr, who has guided AdCom so well as President this year, will continue as an ex-officio member for the next three years. Barry Spielman was unanimously elected Vice-President. John Kuno now becomes one of our senior statesmen since he has served on AdCom for three full terms. We certainly appreciate John's service and many contributions.

This year, we will again have two Distinguished Lecturers, David K. Barton and Rolf H. Jansen. Ed Niehenke and John Bryant are now on their final lecture swing to finish the year.

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## AdCom Highlights (continued from page 5)

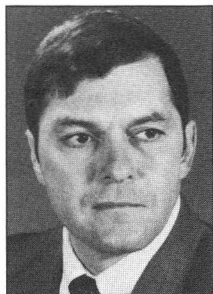
Interest in future symposia continues to be high. Four chapters competed to hold the 1992 International Microwave Symposium — Albuquerque, Phoenix, San Diego and Chicago with Albuquerque being chosen as the site.

The Education Committee was activated as a Standing Committee. MTT-S now has ten standing committees as provided in the By-Laws (see Newsletter Number 116, Fall 1986).

Publications, awards, visiting fellows and various aspects of chapter activities were among the numerous other items discussed. An 8% increase in membership was realized over the last year which further reflects the continuing vitality of MTT-S.

The next MTT-S AdCom meeting will be at Bally Grand Hotel in Las Vegas on January 15-16, 1987. This meeting coincides with the Technical Program Committee meeting in preparation for the 1987 International Microwave Symposium for Las Vegas. Our newly elected AdCom members will be installed at that time.

## AdCom ELECTIONS



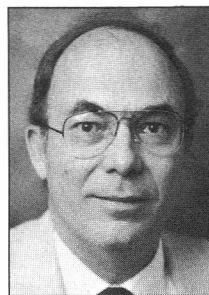
by Vladimir G. Gelnovatch

The annual Fall election meeting of the MTT-S was held in Dallas, Texas on October 6, 1986. A total of six dedicated people were elected to AdCom membership, all for three year terms. Reelected members were Walter Cox, Ed Niehenke, Steve Temple and Barry Spielman. Newly-elected were Kris Agarwal and Jim Crescenzi. The voting was very close and required four ballots to choose the above from a slate of 14 nominees. Twelve of the nominees were selected by the nominations committee, one was a petition candidate and one was a nomination from the floor. The reelected members have demonstrated an excellent track record of service to the Society and I am sure their collective contributions will reach even greater heights in the future. The new members will bring many innovative approaches and ideas to AdCom.

In order that you may meet the newly elected AdCom members, Kris Agarwal and Jim Crescenzi, their biosketches are presented below. The biosketches of the reelected members have been included in past Newsletters.

In additional elections, a President and Vice-

President for 1987 were chosen. Dave McQuiddy was elected to President while Barry Spielman was elected to Vice-President. We congratulate these tireless supporters of MTT-S and look forward to a fine year with them at the helm of our ship.



**E. James Crescenzi, Jr.** received the B.S. degree from the University of California in 1962 and the M.S. degree in 1962 and Ph.D. degree in 1969 from the University of Colorado.

From 1962 to 1965, Dr. Crescenzi served as an officer in the USAF assigned to Rome Air Development Center, where he worked on reconnaissance receiver system and antenna development. He then returned to the University of Colorado, where he completed the Ph.D. degree and postdoctoral research.

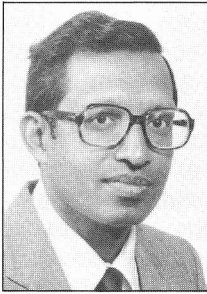
Dr. Crescenzi has been with Watkins-Johnson Company since 1970. He has managed the Solid State R&D and Microwave Amplifier Departments. His technical activities have included the development of reconnaissance receivers, microwave integrated circuit deposition and lithography processes, and numerous GaAs FET amplifiers, mixers and integrated front ends. He managed the AMRAAM missile RF processor prototype development at Watkins-Johnson Company.

Since 1984, he has served as Staff Scientist and Head, Special Projects, with responsibility for specialized GaAs FET amplifier development and moderate quantity manufacturing. He developed a low harmonic distortion 2-6 GHz limiting amplifier utilizing GaAs MMIC limiters in 1984, applied his technique to a variety of IFM, FML and DRFM programs and is currently extending these limiting amplifier circuits to 18 GHz. He developed a series of miniature medium power GaAs FET amplifiers covering 2-6 and 2-8 GHz, and militarized TWT replacement solid state amplifiers with output powers to two watts. Much of his current work is very practical in nature, and it has resulted in approximately 90 new microwave amplifier products in the last three years.

Dr. Crescenzi has published twelve papers relating to microwave technology and holds one patent. He served as Chairman of the Santa Clara Valley Chapter of the Microwave Theory and Techniques group in 1981-1982 and as Vice Chairman of the Technical Program Committee for the 1984 MTT-S Symposium. He was Guest Editor of the December 1984 IEEE Transactions on Microwave Theory and Techniques and has been on the MTT-S Symposium Technical Program Committee since 1983.

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## MTT-S AWARDS



**Krishna K. Agarwal** was born in Meerut City, India on July 1, 1939. He received the B.E. (Hons) in 1960 from Roorkee University (Roorkee, India) and M. Tech. in Electrical Engineering in 1962 from Indian Institute of Technology (Kharagpur, India). He obtained his Ph.D. in Electrical Engineering in 1973 from N.C. State University

at Raleigh, NC.

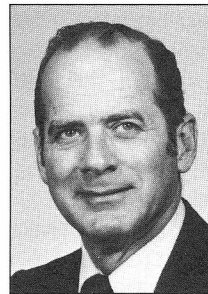
From 1963 to 1966 he was a Research Fellow at the Technical University in Eindhoven, Netherlands doing research in microwave propagation in magnetized ferrites. In 1967 he joined Bell Telephone Laboratories in the Transmission Systems Division where he was engaged in research and development on active and passive microwave components for application in communications systems. In 1979 he joined the Senior Staff at TRW Space & Defense. He managed the breadboard development of the satellite transponder under contract from Bell Labs and was part of the team responsible for solid state power amplifier design for Ku band satellites.

Since 1982 he has been with Advanced Technology, Rockwell International in Dallas where he is the Manager of Optics and RF Components. He has been doing applied research in GaAs and high speed devices and components for applications in fiber optics and microwave product lines of Rockwell.

Dr. Agarwal is also very active in engineering education and has taught at several universities. Currently he is an Adjunct Professor at the University of Texas at Arlington in the Electrical Engineering Department and is a member of the Advisory Board for Advanced Electron Devices and Systems of the University.

Dr. Agarwal is a Senior Member of IEEE and was the 1986 Secretary of MTT-S AdCom. He is the Chairman of the Education Committee of MTT-S Society and a member of IEEE Technical Advisory Council of EAB. He is a member of Editorial Board of MTT-S Transactions and is very active in Dallas area IEEE-MTT.

Dr. Agarwal received the President of India award for merit and is the recipient of Philips Research Fellowship, Ford Foundation Fellowship and several merit-based scholarships and fellowships. He is a member of Eta Kappa Nu, Tau Beta Pi and Pi Mu Epsilon. He has published several papers in journals on microwave subsystems and components and continues to do research with emphasis on circuit applications of advanced materials and devices.



by C.T. Rucker

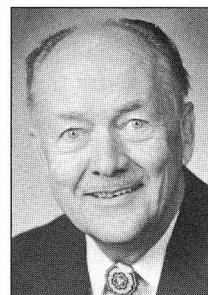
The Microwave Theory and Techniques Society's Administrative Committee at its recent meeting in October selected the recipients of its awards for 1987. The recipients of the Microwave Career Award, the Distinguished Service Award and the Microwave Prize were approved. Brief information on the awardees is as follows.

### MICROWAVE CAREER AWARD

The Microwave Career Award is the highest award given by the Microwave Theory and Techniques Society. It is given to an individual for a career of meritorious achievement and outstanding technical contribution in the field of microwave theory and techniques. The eligibility requirements are publication in technical journals, presentations of lectures and a distinguished career of contributions to the microwave field. This award is given only to those individuals who have distinguished themselves over a long period of time.

The award consists of a suitable certificate, a plaque, a cash sum of two thousand dollars and a feature publication in the **IEEE Transactions on Microwave Theory and Techniques**.

The Administrative Committee of the Microwave Theory and Techniques Society has selected Robert Beatty as the recipient of the 1987 Microwave Career Award, "for a career of meritorious achievement and outstanding technical contribution in the field of microwave theory and techniques."



**Robert W. Beatty** was born in York, PA on May 31, 1917. He received the B.S. degree in electrical engineering from George Washington University, Washington, D.C., in 1939, the S.M. degree in electrical communication from the Massachusetts Institute of Technology, Cambridge, in 1943, and the Doctor of Engineering degree

from the University of Tokyo, Tokyo, Japan, in 1972.

From 1940 to 1942 he was employed by the U.S. Naval Research Laboratory, Washington, D.C., in work on underwater sound- and radio-direction finding. He was a Staff Aide at the M.I.T. Radar School in 1943 and served in the U.S. Naval Reserve from 1943 to 1946.

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## MTT-S Awards (continued from page 7)

He has had several years' experience in the field of consulting radio engineering for the radio broadcast industry. From 1948 to 1974 he was employed by the U.S. National Bureau of Standards, working in the field of microwave standards, and was Chief of the Microwave Circuit Standards Section at NBS, Boulder, Colo., from 1955 to 1962. Dr. Beatty received the Department of Commerce Silver Medal in 1963.

Over a period of more than 25 years, he published numerous technical articles, a book on Microwave Network Analysis with Dr. D.M. Kerns (Pergamon Press, 1967), and two National Bureau of Standards Monographs (nos. 137 and 151) concerned with Microwave and automated measurements.

He has been a member of Sigma Tau, Theta Tau, Sigma Xi, the Instrument Society of America (ISA) and the International Scientific Radio Union (URSI). He was chairman of U.S. Commission I of URSI from 1957 to 1960 and was editor of the **IEEE Transactions on Microwave Theory and Techniques** during 1963-1965. He was Scientific Editor of Commission I for the 14th and 15th General Assemblies of URSI, and was for many years a member of the Administrative Committee of the IEEE Group on Microwave Theory and Techniques, now the Microwave Theory and Techniques Society.

He was sent by the U.S. National Bureau of Standards to Japan in 1970 to be a guest worker at the Electrotechnical Laboratory (ETL) in Tanashi, Tokyo. While there, he delivered lectures (on microwave standards developed at NBS in Boulder, Colorado) at each of the Imperial Universities in Japan. He received an award from the Director of ETL for meritorious service.

Together with Mr. I. Tajima, President of the Anritsu Electric Company, Tokyo, Japan, he organized the 1973 Microwave Measurement Seminar in Tokyo, Japan and helped open the first Microwave Exhibition at the U.S. Trade Center in Tokyo.

Since retiring from the National Bureau of Standards in 1974, he has done consulting work for the Jet Propulsion Laboratory, Pasadena, California and the General Dynamics Electrodynamics Division, San Diego, California.

He was the 1975 MTT-S National Lecturer, delivering a lecture entitled "The Development of Modern Automatic Systems for the Measurement of Network Parameters."

In 1985, he became a part-time employee of the Barth Electronics Co., Boulder City, Nevada.

## DISTINGUISHED SERVICE AWARD

The Distinguished Service Award was initiated in 1983 to honor those whose service to MTT-S and IEEE has been extraordinary. Beginning in 1983 with Ted Saad, the award has recognized Al Clavin, Pete Rodrigue and Hal Sobol, all vital contributors to the

Society and the Institute.

The Distinguished Service Award is made to an individual who has given outstanding service for the benefit and advancement of the Microwave Theory and Techniques Society. The eligibility requirements are service in one or more of the following areas: the Administrative Committee, publications, meetings and symposia, chapter leadership, committee chairman, committee member, editor, lecturer or other distinguished service. Factors which will be considered are: leadership, innovation, activity, service, duration, breadth of participation and cooperation. The individual must be a member of the IEEE and a member of the Microwave Theory and Techniques Society.

The award consists of a suitable certificate, a plaque and a feature publication in the **IEEE Transactions on Microwave Theory and Techniques**.

The Administrative Committee of the Microwave Theory and Techniques Society has selected Kiyo Tomiyasu as the recipient of the 1987 Distinguished Service Award "for his outstanding and dedicated service to the Society."



**Kiyo Tomiyasu** was born in Las Vegas, Nevada on September 25, 1919. He received the B.S. degree in Electrical Engineering from the California Institute of Technology, Pasadena, in 1940 and the M.S. degree in Communication Engineering from Columbia University, New York, NY in 1941. He studied at Stanford University, Stanford, California under a Low Scholarship and then entered Harvard University, Cambridge, Massachusetts, where he continued graduate work with a Gordon McKay Scholarship and received the Ph.D. degree in Engineering Science and Applied Physics in 1948.

He served as a Teaching Fellow, Research Assistant, and Instructor at Harvard University. In 1949 he joined the Sperry Gyroscope Company, Great Neck, New York, as a Project Engineer, and in 1952 was promoted to Engineering Section Head for Microwave Research in the Microwave Components Department. In this capacity he was responsible for developments on ferrites, microwave components, spectroscopy and radiometers. In 1955 he joined General Electric Microwave Laboratory, Palo Alto, California, as a Consulting Engineer, and five years later he transferred to the General Electric Research and Development Center, Schenectady, New York, where he was involved with lasers and microwave projects. In 1969 he became a Consulting Engineer at General Electric Valley Forge Space Center, Philadelphia, Pennsylvania.

For the past several years he has been involved with microwave remote sensing of the earth using satellite-borne radiometers, scatterometers and synthetic aper-

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## MTT-S Awards (continued from page 8)

ture radar. He helped design the NASA/JSC Skylab S-193 Microwave Radiometer Scatterometer Altimeter, and he was a Principal Investigator of the NASA Langley Research Center AAFE RADSCAT sensor. On SEASAT, he was responsible for specifying the spacecraft interfaces with the scatterometer and synthetic aperture radar. Several papers on remote sensing of the earth using microwave sensors have been published and presented by him at various symposia. Recent configurations discussed have been a monostatic synthetic aperture radar from a nutating satellite in geosynchronous orbit, and a bistatic synthetic aperture radar employing two satellites. He has also worked on a conceptual design of a coarse resolution, wide swath synthetic aperture radar for imaging sea ice, oceanic oil spills and geologic features, and inferring soil moisture. He has been concerned with the propagation of microwave signals through rain, the troposphere and the ionosphere.

His total publications list over sixty papers and twenty patents have been issued in his name. In 1977 he was granted a General Electric Company Charles Proteus Steinmetz Award for outstanding individual achievement over a sustained period as evidenced by impact on the company and society. As part of this award a \$5,000 stipend was designated to California Institute of Technology to be used for three annual scholarships. In 1977 Dr. Tomiyasu and his sister from Los Angeles established also at Cal Tech an annual scholarship called the "Tomiyasu Scholarship."

Dr. Tomiyasu was President of MTT-S in 1960-1961 and has subsequently served on the Nominations Committee and the Awards Committee. He was the Editor of **MTT Transactions** in 1958 and 1959, and Guest Editor of the May 1978 Special Issue of the **Transactions** on High Power Microwaves. In 1973 he was elected Honorary Life Member of MTT-S and of its Administrative Committee. He was named recipient of the 1980 Microwave Career Award by the MTT-S. In 1984, he received an IEEE Centennial Medal.

At the IEEE level, he has served on the Publications Board, the Technical Activities Board and on the Awards Board for several years. He was elected for the 1985-1986 term as IEEE Director of Division IV which embraces electromagnetics and radiation. He serves a concurrent term on the IEEE Board of Directors and as a Delegate to the IEEE Assembly.

In 1986 he was awarded an Annual Prize of the Telecommunications Association of Japan. The citation reads, "for his distinguished contributions towards the progress of telecommunication industries and for his outstanding service." He is the first non-Japanese citizen to receive the prize in its 27-year history. Dr. Tomiyasu delivered his acceptance speech at a meeting jointly sponsored by the Association and the IEEE Tokyo Section.

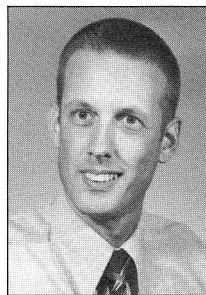
Dr. Tomiyasu was elected to the IEEE Fellow Grade in 1962 and became a Life Fellow in 1984. His name is listed in several biographical references among which are American Men of Science, Who's Who in

Engineering, Men of Achievement, Leaders in Electronics, and Who's Who in America. He is a member of the American Physical Society.

## MICROWAVE PRIZE

The Microwave Prize is awarded to the author of that paper, published in the **IEEE Transactions on Microwave Theory and Techniques**, **Proceedings of the IEEE**, or other official IEEE publication, which is judged to be the most significant contribution in the field of interest of the Society. The paper must have been published during the period January 1 to December 31 of the year preceding the annual meeting of the Administrative Committee at which the award is considered. The award shall consist of a suitable certificate, a cash sum of one thousand dollars, and a feature publication in the **IEEE Transactions on Microwave Theory and Techniques**. If the paper as published has more than one author, a certificate will be presented to each author and the cash sum of \$500 will be provided to each up to a total of \$3,000. If more than six authors are involved, the \$3,000 will be split equally among the authors.

The 1987 recipient of the Microwave Prize is Christen Rauscher, whose winning paper "Microwave Active Filters Based on Transversal and Recursive Principles" appeared in the December 1985 issue of the **IEEE Transactions on Microwave Theory and Techniques**.



**Christen Rauscher** was born in Boston, MA on November 4, 1944. He received the diploma in electrical engineering and the doctorate degree in 1969 and 1975, respectively, both from the Swiss Federal Institute of Technology, Zurich, Switzerland.

From 1969 to 1976 he worked as an Assistant and Research Associate at the Microwave Laboratory of the Swiss Federal Institute of Technology, where he conducted research on methods to numerically optimize microwave active circuits so as to reduce variations in performance characteristics resulting from parameter tolerances. He also studied the large-signal behaviors of microwave active diodes and techniques for employing such diodes in broadband power amplifiers. Subsequently, he held a two-year international fellowship from the Swiss National Science Foundation providing opportunity to further pursue interests in the area of nonlinear interaction between microwave active semiconductor devices and circuits. He spent this time at Cornell University in Ithaca, NY, and at the Naval

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## MTT-S Awards (continued from page 9)

Research Laboratory in Washington, DC, concentrating specifically on nonlinear properties of GaAs field-effect transistors.

Since 1978, he has been employed at the Naval Research Laboratory in Washington, DC, where he currently heads the Solid-State Circuits Section. His research interests have remained focused primarily on nonlinear phenomena in microwave and millimeter wave active semiconductor devices. Particular topics of investigation have included the derivation of a quasi-static device model to describe the nonlinear characteristics of GaAs field-effect transistors and the development of novel circuit concepts that optimize the impact of nonlinear effects in a variety of microwave applications. Such applications include power amplification, fixed-frequency and wideband varactor-tuned fundamental frequency oscillation, frequency doubling, and frequency halving. These efforts have been balanced by linear circuit work with emphasis on microwave active filters. He has also pursued interests in the area of optical-microwave signal interaction in semiconductor devices, as exemplified by the development of a self-oscillating GaAs FET demodulator and downconverter circuit for recovering a millimeter wave modulation signal from an optical carrier. Involvement in the optical-related area has been enhanced by his recent sabbatical year at the Los Alamos National Laboratory in Los Alamos, NM, which was devoted to the investigation of new circuit approaches to the implementation of a high-speed photoconductor-based reflectometer concept for on-chip measurement of millimeter wave device characteristics.

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## Did You Know That...

**When playing a state lottery,** it's a good idea to choose at least one number higher than 31?

*Reason:* Many lottery players use number combinations based on birthdays, anniversaries and other dates. Since this group concentrates on numbers of 31 or lower, a winning combination with one or more higher numbers will likely be shared by fewer people.

Dr. Jim Maxwell, American Mathematics Society

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## NEWLY-ELECTED FELLOWS

*by C.T. Rucker*

I am pleased to report that twenty MTT-S members were elected to Fellow Grade as of January 1, 1987. Of these, seven were evaluated by MTT-S as their major society. It seems appropriate that we give special recognition to these seven by noting their names and citations below.

### **Dr. Ali E. Atia**

For developments in microwave filter design for communications satellites.

### **Professor Fred E. Gardiol**

For contributions to the design of ferrite microwave devices.

### **Dr. Bernard Glance**

For contributions to the advancement of phase-locked circuits in communication systems.

### **Dr. Kazuhiro Miyauchi**

For contributions to the development and application of high speed digital transmission technology in communications.

### **Dr. Adel A.M. Saleh**

For contributions to the theory of microwave mixers.

### **Dr. C. Burke Swan**

For contributions to the application of microwave and optical devices.

### **Dr. Albert E. Williams**

For contributions to the theory and development of dual-mode, optimal performance microwave filters.

Each of those listed will be given the opportunity to be recognized further at this year's Symposium Awards Banquet. I look forward to participating in the event.

Now, a reminder. IEEE Fellow nomination kits can be obtained by writing:

Staff Secretary  
IEEE Fellow Committee  
345 East 47th Street  
New York, NY 10017  
(212) 705-7750

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## 1987 MTT-S FELLOW LIST

The names of IEEE Fellows associated with the MTT-Society are listed below for reference purposes.

G. Abraham	A.A. Collins	G.R. Harrison	R.E. McIntosh
Saburo Adachi	J.H. Collins	Wolfgang Harth	David N. McQuiddy, Jr.
Stephen F. Adam	H.W. Cooper	G.S. Heller	R.J. McIntyre
R.J. Adams	H.V. Cottony	R.E. Henning	K.K. Mei
A. Alford	Wallace H. Coulter	W.D. Hershberger	P. Meier
J.L. Allen	E.G. Cristal	Eric Herz	Robert G. Meyer
Dietrich A. Alsberg	James A. Cronvich	A. Hessel	Theodore G. Mihran
Helmut M. Altschuler	W.F. Croswell	Ralph E. Hiatt	Edmund K. Miller
Dean B. Anderson	A.L. Cullen	James Stewart Hill	S.E. Miller
D.J. Angelakos	C.C. Cutler	M.E. Hines	Fumio Minozuma
F.R. Arams	Louis J. Cutrona	Samuel Hopfer	Raj Mittra
E.A. Ash	G.C. Dalman	John B. Horton	Shota Miyairi
M.P. Bachynski	Richard W. Damon	Harlan Howe, Jr.	Louis F. Moose
E. Bahar	J.W. Dees	Masaru Ibuka	Kiyoshi Morita
C.A. Balanis	J.E. Degenford	A. Ishimaru	A.S. Mostafa
A. Ballato	Edgar J. Denlinger	Tatsuo Itoh	G. Mourier
J.W. Bandler	G.A. Deschamps	Richard C. Johnson	C.A. Muller
Frank S. Barnes	Lawrence E. Dickens	Howard S. Jones, Jr.	M.W. Muller
R. Bartnikas	Sven H.M. Dodington	W.K. Kahn	James H. Mulligan, Jr.
R.H.T. Bates	M.R. Donaldson	Gideon Kantor	William W. Mumford
Carl E. Baum	R.H. Duhamel	Shoei Kataoka	N.S. Nahman
A.C. Beck	J.W. Duncan	Irving Kaufman	Tsuneo Nakahara
A.H.W. Beck	J.D. Dyson	K.C. Kelly	H.C. Nathanson
Nicholas A. Begovich	L.F. Eastman	A.R. Kerr	Leon S. Nergaard
E.F. Belohoubek	H.A. Ecker	Hiroshi Kikuchi	J. Nishizawa
Heinz Beneking	Richard C. Eden	Hisao Kimura	Tatsuji Nomura
Alexander B. Bereskin	W.A. Edson	Ray J. King	J.B. Oakes
J.R. Biard	Glenn F. Engen	Ronold W.P. King	Kanichi Ohashi
E.F. Bolinder	Mark K. Enns	Werner Kleen	Sogo Okamura
R.C. Booton, Jr.	Rufus G. Fellers	Reinhard H. Knerr	Herman C. Okean
C.R. Boyd, Jr.	A. Fong	V. Prasad Kodali	T. Okoshi
E.M. Bradburd	Timothy T. Fong	J.A. Kong	Seymour Okwit
Frank A. Brand	A.G. Fox	Y. Konishi	A.A. Oliner
A.D. Bresler	Carl L. Frederick, Sr.	Nobuaki Kumagai	H.G. Oltman
W.B. Bridges	Hatsuaki Fukui	W.H. Kummer	John M. Osepchuk
J. Brown	James J. Gallagher	H.J. Kuno	D.T. Paris
W.C. Brown	O.P. Gandhi	K. Kurokawa	Don Parker
John H. Bryant	Robert V. Garver	R. La Rosa	W.T. Patton
C.M. Butler	Thomas K. Gaylord	Peter D. Lacy	P. Penfield, Jr.
Kenneth J. Button	V. Gelnovatch	R.E. Lafferty	Barry Perlman
C.K. Campbell	Horst W. Gerlach	P.M. Lapostolle	Leon Peters, Jr.
H.J. Carlin	William J. Getsinger	Vincent Learned	John E. Pippin
Kenneth L. Carr	J.W. Gewartowski	Matthew Lebenbaum	Louis Pollack
Paul H. Carr	A.B. Giordano	Ralph Levy	Wilbur L. Pritchard
Martin Caulton	Joseph A. Giordmaine	Leonard Lewin	R.A. Pucel
David C. Chang	John Granlund	Charles A. Liechti	Yahya Rahmat-Samii
William Chang	Paul Greiling	James C. Lin	John F. Ramsay
Kun-Mu Chen	Al Gross	Ernst H. Lueder	Jorg E. Raue
T.C. Cheston	Richard W. Grow	J.A.M. Lyon	Herbert J. Reich
R.A. Chipman	F.W. Gundlach	A.B. Macnee	I. Reingold
M. Chodorow	A.W. Guy	R.J. Mailloux	John D. Rhodes
Peter J.B. Clarricoats	G.I. Haddad	T. Makimoto	H.J. Riblet
Alvin Clavin	Michael Hamid	Nathan Marchand	L.J. Ricardi
M. Cohn	Peter W. Hannan	Robert Mattauch	Donald Richman
S.B. Cohn	R.C. Hansen	George L. Matthaei	Robert A. Rivers
Paul D. Coleman	C.D. Hardin	F. Mayer	
R.E. Collin	Roger F. Harrington	P.E. Mayes	

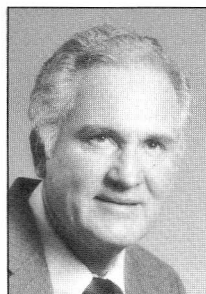
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**Fellow List** (continued from page 11)

Peter N. Robson  
George P. Rodrigue  
H.A. Rosen  
F.J. Rosenbaum  
E. Roubine  
Charles T. Rucker  
A.W. Rudge  
Carl R. Ryan  
R.M. Ryder  
Theodore S. Saad  
Rudolf Saal  
C.T. Sah  
S. Saito  
E.W. Sard  
Gentei Sato  
R. Sato  
Erwin Schanda  
A.C. Schell  
S.P. Schlesinger  
Ernst F. Schloemann  
K.J. Schmidt-Tiedemann  
H.J. Schmitt  
Martin V. Schneider  
Manfred R. Schroeder  
Harald Schutz  
Harold Seidel  
S. Sensiper  
Hans Severin  
Gustave Shapiro  
W.M. Sharpless  
J.P. Shelton, Jr.  
James E. Shepherd  
A.J. Simmons  
George Sinclair  
Glenn S. Smith  
Phillip H. Smith  
A.K. Smolinski  
Harold Sobol  
Isao Someya  
Gunther U. Sorger  
Fred Sterzer  
G. Strull  
M. Strutt  
Y. Suematsu  
K. Suetake  
Masao Sugi

Calvin T. Swift  
R.S. Symons  
Geo Szentirmai  
Chen-To Tai  
Michio Takaoka  
T. Tamir  
Ikuo Tanaka  
Jesse J. Taub  
G.A. Thiele  
T.E. Tice  
F.J. Tischer  
M.E. Tiuri  
K. Tomiyasu  
E.N. Torgow  
C.H. Townes  
Michiyuki Uenohara  
A. Uhler, Jr.  
Fawwaz T. Ulaby  
H.G. Unger  
J.G. Van Bladel  
A.S. Vander Vorst  
J.R.M. Vaughan  
D.L. Waidelich  
J.R. Wait  
C.H. Walter  
Chao C. Wang  
Shyh Wang  
Hugh E. Webber  
E. Weber  
Sander Weinreb  
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Harold A. Wheeler  
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J.R. Whinnery  
J.F. White  
Richard C. Williamson  
James C. Wiltse  
William R. Wisseman  
E.A. Wolff  
Eikichi Yamashita  
Leo Young  
Karl H. Zaininger  
L.T. Zitelli

## SPECIAL ARTICLES FOR THE MTT NEWSLETTER



by *J.B. Horton*

The MTT Newsletter staff is very interested in obtaining feature articles dealing with current topics in the technical and professional areas of interest to MTT members. The idea is to provide the members with a general understanding of the topic and its significance in current and future activities in the microwave field. I would like to emphasize, however, that these special articles will cover topics in a broad, general sense. Specific design techniques and applications will be covered in papers appearing at the MTT Symposium and in the Transactions.

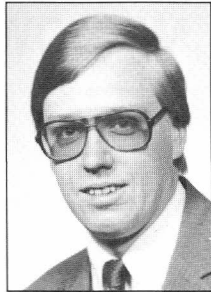
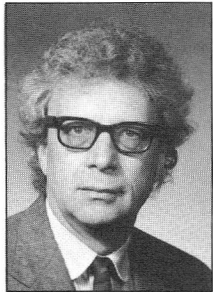
If you know of a topic that is current and/or you are willing to contribute an article to the NEWSLETTER, please contact:

John Horton  
TRW  
One Space Park  
Redondo Beach, CA 90278  
(213) 536-3190

OR

Peter Staecker  
M/A-COM, Inc.  
52 South Avenue, Bldg. 7  
Burlington, MA 01803  
(617) 272-3000, X1602

## MEMBERSHIP SERVICES



by *Martin V. Schneider, Chairman*  
and *Steven J. Temple, Co-Chairman*

### Membership Reaches New Record High

The number of MTT-S members increased by 8.3% to 8,825 over the last 12 months. The Institute membership increased by 2.7% to 269,947. MTT-S is currently the sixth fastest growing IEEE Society among 33. We hope that Chapter Officers and members will continue to attract new MTT-S members. Keep your membership growing! Forms for joining the IEEE and MTT-S can be ordered directly from:

IEEE Service Center  
Attention: Roseann Schulz  
445 Hoes Lane  
Piscataway, NJ 08854  
Phone (201) 981-0060, ext. 300

### Free Membership for New MTT-S Members

New members joining MTT-S will receive free MTT-S membership to the end of 1987. This should stimulate your colleagues and friends to join MTT and benefit from the educational opportunities that the Society has to offer. It is also to be noted that the four fastest growing Chapters will receive a \$200 award and a plaque at the International Microwave Symposium in Las Vegas in June 1987. The membership application forms which can be ordered from the IEEE Service Center should be marked "New MTT Member-FREE" to insure that the new member will not be billed for the MTT-S membership.

### New Chairpersons and Chapters

For the first time women were elected as Chairpersons. They are Diane Camerer (Florida West Coast), Mary Heimer (Washington, Northern Virginia) and Jeanine Meyer (St. Louis). The Society has currently 53 Chapters (42 North & South America, 11 Overseas) with an average membership of 137 members per Chapter. New Chapters are presently being formed in Denmark, England and Taiwan.

### New Distinguished Microwave Lecturers

One hundred requests for presenting talks to Chapters and Sections were received by the 1986/87 lecturers John Bryant and Ed Niehenke. Both Distinguished Lecturers are fully-booked for the next few months and they have already given numerous talks locally and overseas on their respective topics,

"The First Century of Microwaves 1886-1986" and "Gallium Arsenide, Key to Modern Microwave Technology."

Two new Distinguished Microwave Lecturers have been appointed by AdCom for 1987/88. They are David K. Barton, ANRO Engineering Consultants, Lexington, Massachusetts and Rolf H. Jansen, Industrial Microwave and RF Techniques, Inc., Ratingen, West Germany. Dave Barton will lecture on "Technology Trends in Microwave Radar" and Rolf Jansen will present talks on "CAD of Hybrid and Monolithic Microwave and Millimeter-Wave MICs." Both lecturers are well-known to the MTT community through the high quality of their original contributions, their expertise in their fields, and their reputation for giving good talks. The appointment of a domestic and an overseas lecturer was made to serve the needs of the rapidly growing Chapters outside the USA. It will also reduce both travel time and travel expense for the lecturers and thus result in a more efficient use of available resources.

Abstracts of the new lecturers and biographies of the speakers are printed below. It is advisable to contact the Distinguished Lecturers early even though their official term starts in summer 1987. It is expected that Chapters which invite a lecturer from overseas will pay for his local travel and living expenses. The expenses for overseas travel will be covered by MTT-S.

### Financial Support to Chapters

Twelve Chapters requested and received a total of \$4,200 for covering the expenses of organizing technical meetings. Chapters can request up to \$350 by sending a request with a description of specific anticipated expenses to:

Steven J. Temple  
Raytheon Company  
Hartwell Road, Mail Stop M1-16  
Bedford, MA 01730  
Phone (617) 274-4736

It is important to note that your Chapter is entitled to receive \$300.00 from your Section if you organize a conference which is co-sponsored by your Section (Section Technical Conference). Your Section also receives a rebate of \$35.00 for each Chapter meeting which is reported and submitted to the Section Secretary on a meeting report form (yellow IEEE form L-31). The forms can be ordered from the IEEE Service Center, Chapter Services, 445 Hoes Lane, Piscataway, New Jersey 08854. If you wish to call, ask for Mark Lucas, (201) 981-0060, ext. 287. A copy of the meeting report should also be sent to Zvi Galani who is in charge of the MTT-S Chapter records and who will publish your activities in the next MTT-S Newsletter. Please mail a copy of your meeting report to:

Zvi Galani  
Raytheon Company  
Hartwell Road, Mail Stop M1-41  
Bedford, MA 01730  
Phone (617) 274-4184

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## Membership Services (continued from page 13)

### Changes in the Membership Services Group

Reynold Kagiwada has been serving as the Newsletter editor for three years and his term will expire at the end of 1986. Peter Staecker has been appointed by Ad-Com as the new editor. We all would like to thank Reynold for his efforts and dedication in publishing a first rate Newsletter that has been informative and very useful to the MTT community.

Pat Green, who has been in charge of Membership Development, will be fully occupied with a special engineering project in 1987. Al Estes, Chairman of the Dallas MTT-Chapter, will assume responsibility for Membership Development. We also would like to thank Pat Green for keeping track of the growth of the Society, organizing and setting up the membership booth at the Symposia and recruiting many new members for MTT-S.

### Microwave Theory and Techniques Society

#### Chairman

Martin V. Schneider  
AT&T Bell Laboratories  
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Holmdel, NJ 07733  
(201) 949-2503

#### Co-Chairman

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#### MTT-S Newsletter Editor

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#### Chapter Records

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Hartwell Road  
Mail Stop M1-41  
Bedford, MA 01730  
(617) 274-4184

#### Membership Development

Alton L. Estes  
Texas Instruments  
Mail Stop 404  
North Central X-way  
Dallas, TX 75266  
(214) 995-5230

#### International Liaison

Richard A. Sparks  
Raytheon Company  
Hartwell Road  
Mail Stop CF1-141  
Bedford, MA 01730  
(617) 274-4708

### Distinguished Microwave Lecturers 1987/88

#### *"Technology Trends in Microwave Radar"*

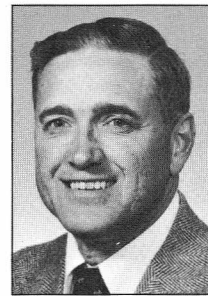
David K. Barton  
ANRO Engineering Consultants  
Suite 104, 5 Militia Drive  
Lexington, MA 02173  
(617) 862-3000

#### *"CAD of Hybrid and Monolithic Microwave and Millimeter-Wave MICs"*

Rolf H. Jansen  
Industrial Microwave and RF Techniques, Inc.  
Neanderstrasse 5  
D-4030 Ratingen 1  
West Germany  
Phone 49-2102-83095

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## TECHNOLOGY TRENDS IN MICROWAVE RADAR



by David Barton  
ANRO Engineering  
Consultants  
5 Militia Drive  
Lexington, MA 02173  
Phone (617) 862-3000

### DISTINGUISHED MICROWAVE LECTURER (1987/88)

#### Abstract

The capabilities of microwave devices used in today's radars are compared with requirements for future systems. Areas in which system requirements may drive technological advances are identified, along with those in which technology may open up new system approaches. An example of the former is the requirement for ultra-stable microwave sources to drive doppler radar systems operating with high power near the ground surface. To date, the only satisfactory source is a cavity-stabilized klystron oscillator operating in the final RF band. An example of the second is the modular, solid-state T/R module for small tactical radar applications. Modular arrays have, in the past, been limited primarily to large systems in the lower-frequency bands, but the prospect of greater efficiency in the microwave bands makes it possible to consider the modular approach to mobile and airborne radars.

The relationships among modular phased arrays, solid-state microwave sources and conventional antennas and transmitters are explored. There have been predictions for the past twenty-five years that reflector antenna systems would be phased out of the inventory, to be replaced first by passive arrays and then by active modular arrays. The slow rate at which these predictions have been realized is only partly explained by the high cost of phase shifters and the high cost and limited power capability of microwave T/R modules. Some of the system considerations in applying the new technology are reviewed, and areas in which applications may be most practical are identified.

#### Biography

David K. Barton joined the staff of ANRO Engineering Consultants in 1984 after serving 21 years with the Raytheon Company. Prior to that, he was with RCA at Moorestown, NJ and with the Signal Corps Engineering Labs at Ft. Monmouth, NJ and White Sands Missile Range. He is a Fellow of the IEEE and has been active in that organization's Aerospace and Electronic Systems Society, having served on the Board of

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**Distinguished Microwave Lecturer — D.K. Barton**  
(continued from page 14)

Governors, as Associate Editor for Radar of the AES Transactions, and as Chairman of the Radar Systems Panel.

Barton has specialized in radar since his graduation from Harvard College in 1949 with an AB in Physics. He has authored 75 papers and books on radar engineering subjects. He is the author of *Radar System Analysis*, and coauthor of the *Handbook of Radar Measurement*, both published by Artech House. David Barton is also the series editor of the Artech Radar Library, which includes a seven-volume set on *Radars*. He is a lecturer on radar in The George Washington University's program on Continuing Engineering Education, and has served on a number of advisory committees to the Department of Defense. In 1958 he received RCA's David W. Sarnoff Award for outstanding achievement in engineering, in 1961 the IEEE PGMIL M. Barry Carlton Award, and in 1984 the IEEE Centennial Medal.

## CALL FOR PAPERS

IEEE TRANSACTIONS ON MICROWAVE THEORY AND TECHNIQUES

SPECIAL ISSUE ON COMPUTER-AIDED DESIGN

MTT-1, MTT-15 and MTT-6, are jointly sponsoring a special issue of IEEE Transactions on Microwave Theory and Techniques on "Computer-Aided Design" to be published in February 1988. The aim of this special issue is to present the current state-of-the-art and trends in CAD techniques useful for microwave and millimeter-wave engineers. The topics of interest for the special issue include:

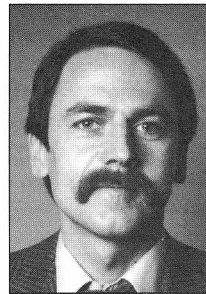
- Modeling of active and passive microwave components
- Characterization and modeling of transmission structures and discontinuities
- Linear and nonlinear analysis of devices & circuits
- Large scale numerical simulation of devices and circuits
- Optimization techniques applicable to microwave CAD
- Other microwave CAD related topics

Prospective authors are requested to submit five copies of the manuscript in standard IEEE format to:

Dr. K.C. Gupta  
Guest Editor MTT Special Issue on CAD  
Dept. of Electrical and Computer Engineering  
Campus Box 425  
University of Colorado Boulder  
Boulder, CO 80309-0425  
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Please submit manuscripts by **April 15, 1987**.

## CAD OF HYBRID AND MONOLITHIC MICROWAVE & MILLIMETER-WAVE MMICs



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### DISTINGUISHED MICROWAVE LECTURER (1987/88)

#### Abstract

With the availability of transistors having useful gain in the MM-wave range and the advanced development of GaAs monolithic MICs in the last five years, demand for accurate and reliable CAD up to highest frequencies is growing. The economic design of MMICs without CAD is simply impossible. Yet the development of sophisticated computer-aided design tools is far behind the pace of technology and the needs arising thereof, similarly as in the early days of silicon ICs. With today's advanced technologies having complex metallization schemes, multilayer dielectrics and submicron devices, it is necessary to employ improved component modules and CAD strategies to ensure first design iteration success as far as possible. In view of this, engineering workstations are under development which will finally close the gap between standard technology processes and CAD as well as eventually merge silicon and GaAs design techniques.

The electrical phenomena which complicate the design of MICs into the MM-wave range will be discussed in relation to technological and economic requirements. Also, an overview on existing CAD packages and their specific features will be given. This includes the first commercial solutions representing essentially extensions from the electronic circuit domain as well as a variety of less-known dedicated microwave packages with particular stress put on developments made in Europe. The discussion addresses linear and non-linear CAD and the advantages and shortcomings of frequency-domain and time-domain analysis. Out of more than 10 years of professional experience in the computer-aided design and realization of MICs, a judgement of the existing solutions and concepts will be attempted. A process-independent design and layout engineering workstation system as it is presently configured in one of Europe's most progressive GaAs MIC companies will be described. The lecture will be concluded by a

*continued on page 16*

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**Distinguished Microwave Lecturer — R.H. Jansen**  
(continued from page 15)

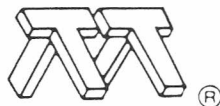
demonstration of various MMIC designs and the latest techniques used to simulate the respective circuits and verify new modeling approaches and CAD strategies.

**Biography**

Rolf H. Jansen received his MS (1972) and Ph.D. (1975) degrees, both in electrical engineering, from the University of Aachen (RWTH). In his thesis he treated large-signal bipolar transistor modeling and the hybrid-mode analysis of arbitrarily-shaped microstrip structures, respectively. He continued his research work at the RWTH Aachen microwave laboratory as a Senior Research Engineer (1976-1979) where he was mainly engaged in the characterization of MIC components and the CAD of microwave circuits. He was also in charge of the thin-film technology of the microwave lab and, since 1977, worked as a research associate for radio communication at Standard Elektrik Lorenz AG (SEL) in Pforzheim, West Germany.

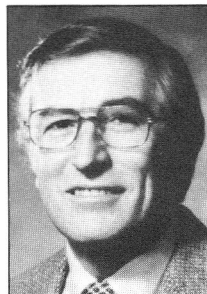
In 1979, he became Professor of Electrical Engineering at the University of Duisburg near Düsseldorf/Cologne and did teaching and research on such topics as electromagnetic theory, microwave techniques and CAD, measurement techniques and modeling. His university career was supplemented by a one year's leave 1981/1982 as a full-time scientist with SEL Pforzheim, and of a variety of software and hardware projects for the communication industry since 1976. He developed, introduced and tested the first layout-oriented general purpose microwave CAD package in a West Germany production-oriented industry environment. He is author of 55 technical papers in the field of microwave CAD and related topics and recipient of the outstanding publications award in 1979 of the German Society of Radio Engineers.

Presently, with a preparatory phase since the end of 1984, he is engaged in the development of a novel engineering CAD workstation for GaAs MMICs with Plessey Research Caswell, GB, following completely new design concepts. He is co-founder of MCAD Software and Design Corp. in Aachen and owner of another small microwave company. He is a Senior Member of the IEEE, member of the editorial board of the Transactions on MTT and of two MTT Technical committees. He is serving as the West Germany MTT Chapter Chairman for the period 6/85 to 5/87.



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## THE APPLICATION OF MICROWAVE TECHNOLOGY TO THE DETECTION AND TREATMENT OF CANCER



*by Ken Carr*

### DISTINGUISHED MICROWAVE LECTURER (1985/86)

It has been a pleasure to be able to represent the IEEE as its Distinguished Microwave Lecturer for the 1985-1986 season. As you can tell from my previous reports, I have traveled extensively — both in the U.S. and abroad — and have met with nothing but courtesy and assistance from the various Chapter Chairmen and their associates. It truly has been an exciting time for me!

There have been approximately 65 domestic lectures given as of this writing, with one or two still in the offing. I believe that attendance at this group of lectures has run close to 2500 people.

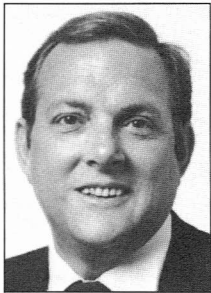
As stated in my May report, I have visited Argentina, Brazil, the United Kingdom, Canada, Nova Scotia, and have just recently returned from a visit to New Zealand and India. This latter trip was cut short due to unavoidable last-minute problems, and I was unable to continue on to Taiwan and Japan; however, I was able to tape the session and this assisted our Japanese colleagues at their already-scheduled events. I have since rendered my apologies and shall yet reach both Taiwan and Japan at a later time during my normal business travel.

Attendance at the out-of-country lectures thus far I believe has exceeded 650 people. It has been most gratifying to visit with the attendees after the various lectures and exchange ideas/thoughts on possible additional avenues of research.

I would like to take this opportunity to thank the IEEE organization for its support through this time-consuming but very rewarding experience. My personal best wishes to Ed Niehenke and John Bryant as they continue as this year's Lecturers and to Dave Barton and Rolf Jansen as they plan their itineraries for the coming year. I know they will gain a new appreciation of the word "teamwork" as they and the cognizant Chapter Chairman work out their respective schedules. It's a challenge, but a most satisfying one.



# GALLIUM ARSENIDE — KEY TO MODERN MICROWAVE TECHNOLOGY



by Edward C. Niehenke

## DISTINGUISHED MICROWAVE LECTURER (1986/1987)

It has been a pleasure presenting my lecture "Gallium Arsenide — Key to Modern Microwave Technology" to 34 groups and 1198 people so far. Since my last report, I lectured throughout the United States, Australia, New Zealand, Europe and Israel. On each trip everyone was very hospitable and helpful to me, enjoyed the lecture and had many interesting questions.

My lectures in the Southern hemisphere included five major cities in Australia and two cities in New Zealand, one on the North Island and one on the South Island. Mr. Max Simons, the Chairman of the Australian Council, made all the necessary arrangements and coordinated the lectures in Australia while the New Zealand Council Chairman, Mr. Robin Harrington, made the arrangements in New Zealand. I lectured nine times over a period of 15 days, covering 12,500 miles not counting the 22,000 miles getting there and back.

In Australia and New Zealand I saw all sorts of microwave developments including low-noise room temperature and cryogenic FET amplifiers, patch antennas, antenna dishes, circular waveguide antenna feeds, power-combining networks, mixers, Gunn and FET oscillators. At the University of Western Australia, in Perth, I saw a microwave system being developed to measure the gravitational field as predicted by Einstein. Of special note is the fact that half the world's supply of gallium can be found in Australia. On my last day in Australia, I was interviewed by the Australian Electronics Engineering magazine for a future article on my impressions of Australia and the status of microwave technology in the United States.

While in Europe and Israel, I was fortunate to lecture to every one of our MTT-S chapters covering some 10,000 miles which did not include the 11,000 miles getting there and back. In London, I witnessed the completion of the petition organized by Ian Williamson by MTT members at Kings College to form a new MTT chapter there. I was quite impressed by the history of Kings College: Maxwell lectured there and Dr. Arthur Clark was a student there.

In Europe and Israel I visited many laboratories, seeing first-hand experimental work on GaAs monolithic

circuits, optical detectors, MOCVD equipment, radial stub analysis and experiments, remote sensing experiments, Josephson junction cryogenic receivers, and much GaAs circuit work. I participated in workshops, seminars, and a one-day symposium in which many interesting microwave developments were discussed. Included were: distributed FET equivalent circuits, CAD for monolithic circuits, FET CAD models, millimeter wave front ends, highly stable metal-GaAs electrodes, InGaAs JFETs, x-ray lithography, harmonic balance analysis method for nonlinear circuits (mixers and amplifiers), and monolithic integrated optical PIN-FET detectors.

One very interesting observation about Europe was the fact that all the MTT-S Chapter Chairmen were professors and all the meetings were held at the University. In the United States, the chairmen are mostly from industry and the meetings are generally held in a local restaurant. In addition to MTT chapters, I also lectured to two IEEE Sections in Denmark. While at the Technical University of Denmark, I learned that Hans Christian Oersted, the eminent physicist who first demonstrated the connection between electricity and magnetism, suggested the formation of this university in 1829 and served as its first director.

My many lectures in the States were well attended. I had a very interesting visit to the Georgia Tech Research Institute where they are studying techniques for growing and characterizing epitaxial semiconductor films including heterojunctions for millimeter wave devices. Sophisticated compositional and doping profiles are being studied for advanced microwave and millimeter wave devices. At the University of Texas at Austin, similar research is progressing using their MBE system.

The remainder of my lecture schedule is included below. I look forward meeting you at your local MTT meeting when I am in your city.

LOCATION	DATE
Milwaukee: MTT Chapter and Section	3/17/87
North Jersey: MTT Chapter	3/18/87
New Jersey Coast: MTT Chapter	3/19/87
Princeton: MTT Chapter	3/19/87
Philadelphia: MTT Chapter Benjamin Franklin Symposium	3/21/87
Syracuse: MTT, ED Chapter	3/31/87
Montreal: Gill University	4/01/87
Montreal: MTT Chapter	4/01/87
Buffalo: New York State University	4/02/87
Buffalo: IEEE Section	4/02/87
SE Michigan: MTT Chapter Joint with Univ. of Michigan	4/07/87
Long Island: MTT Chapter	4/08/87
Schenectady: MTT Chapter Joint with RPI Colloquium	4/09/87
Boston: MTT Chapter	4/16/87

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For the first time the records include the names, addresses and telephone numbers of Chapter Chairpersons and Vice-Chairpersons.

The records of some Vice-Chairpersons are missing from the list. Please help me to finalize the list by sending me the records of those Vice-Chairpersons. Also, please send me the records of Chapter Chairpersons and Vice-Chairpersons following the election of Chapter Officers.

My address and phone number are listed above.

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*Term of Office: 6/86-5/87***NOTES TO SYMPOSIUM LOCAL ARRANGEMENTS COMMITTEE**

Go "undercover" when sampling meeting or convention sites. Best tests:

- Send a letter to yourself to arrive before check-in. Is it produced promptly upon arrival, or do you have to ask for it?
- Call yourself 30 minutes before check-in. Are you listed? The operator should ring the room but *not* disclose the room number.
- Leave messages for yourself — one written note at the desk, one phone message with the switchboard. Is the staff courteous? Are messages accurate? Are they forwarded quickly?

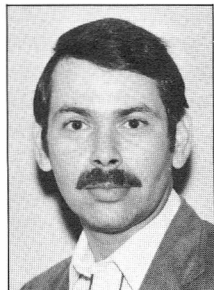
Homer Smith, planning consultant, writing in *Sales & Marketing Management*, 633 Third Ave., New York, NY 10017, 16 issues, \$36/yr.

**The more the merrier.** A few extra waiters at a banquet improve service *and* can save money. *Reason:* Having waiters pour wine by the glass throughout the meal prevents guests leaving half-empty bottles.

Ken Hattan, director of corporate communications, Standard Register, 626 Albany St., Dayton, OH 45408.

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# THE 1987 IEEE MTT-S INTERNATIONAL MICROWAVE SYMPOSIUM



by Steve March

The Steering Committee for the 1987 IEEE MTT-S International Microwave Symposium has been hard at work for several years to plan and put together what will be the best symposium produced to date on behalf of the Microwave Theory and Techniques Society. The Steering Committee, formed in 1983, is not only still intact, but its membership has more than doubled due to the willingness and support of many dedicated individuals and their employers.

## Facilities

For the first time, our annual Symposium will be held in Las Vegas. The meeting dates are Tuesday, June 9th through Thursday, June 11th. We are using the Bally's Grand Hotel as our convention headquarters where we have secured 2500 rooms at the rate of \$75 per night (single or double occupancy). Even this number of rooms in one hotel will not be sufficient to house the anticipated record attendance. Therefore, we have also obtained 1100 additional rooms at Caesar's Palace for \$65 per night, 500 rooms at the Flamingo Hilton at the same rate and 400 rooms at the Dunes Hotel at \$50 per night. The Dunes should prove very attractive for university and government personnel on fixed *per diems*. All of these hotels are within an easy five minute walk from the Symposium headquarters.

The response to our Call for Papers has been very gratifying. While we may not exceed the record number of submissions received by the 1986 MTT Symposium, the number of pages will be in line with the 269 averaged by the 1983 through 1985 Symposia.

## Special Sessions, Workshops

The MTT-S Technical Committees and our TPC Special Sessions Vice-Chairman, Dr. Tatsuo Itoh, have expended considerable time and effort to round out the technical program with workshops and panel sessions. Workshops planned for Monday, June 10th, include: Numerical Techniques for Microwave Field Problems and their Implementation on Personal Computers, Amplification in High Power Systems, and Non-Invasive Microwave Sensing of Physiological Signatures. The workshops scheduled for Friday, June 12th, are: Optical Microwave Interactions, Nonlinear Microwave Computer-Aided Design and Associated Modeling,

Dielectric Resonator Oscillators, and Quasi-Planar Millimeter-Wave Components and Subsystems.

## Panel Sessions

Panel sessions are scheduled for all three lunch times and box lunches will be available for those wishing to attend these informative discussions. So far four panel sessions have been selected and are in the process of being finalized. Tuesday will include a PACE-sponsored panel on either Financial Planning for the Engineer or The International Microwave Market. The other Tuesday panel session will be GaAs Microwave Monolithic Integrated Circuits. At noon on Wednesday, the panelists will meet to discuss Applications of HEMT Devices and Circuits. There is also the possibility of another Wednesday panel discussion. On Thursday, a panel will convene to discuss Problems in Primary and Continuing Engineering Education. Except for the cost of the box lunches, which are optional, there are no charges for attending the panel discussions.

## Focussed Sessions

The 1986 International Microwave Symposium introduced focused sessions to the agenda. For the upcoming Symposium, John Horton has arranged for two half-day Focused Sessions. The first is Optical Techniques for Microwave Applications, organized by Prof. Chi Lee. The second is on Millimeter-Wave Techniques from 60 GHz to 230 GHz and is being formulated by John Horton and Jim Wiltse. This second focused session will feature both device and systems technology.

As part of the reciprocal exchange arranged by the MTT Society's Administrative Committee between the International Microwave Symposium and the European Microwave Conference, the Symposium will again feature an international session with presentations by recognized European experts.

In addition to the outstanding technical program, Bally's Grand Hotel has sufficient square footage for both exhibitions, commercial and historical. With nearly 400 booths already rented by almost two hundred organizations, the commercial exhibition by vendors of microwave materials, components, devices, services, etc. will eventually be larger than that of any previous Microwave Symposium.

## Microwaves Week

Microwaves Week will begin Sunday evening, June 7th, with a reception for the attendees of the 1987 IEEE Microwave and Millimeter-Wave Monolithic Circuits Symposium. The MMWMC Symposium will be held all day Monday and jointly with the International Microwave Symposium for one-half day on Tuesday. The 29th Automatic RF Techniques (ARFTG) Conference is scheduled for Friday, June 12th, and a half-day on Saturday, completes the event-filled week.

On Monday evening, June 8th, the Microwave Journal will be hosting a complimentary reception and cocktail party, an event which has become an annual tradition. Toward the end of the week, the ARFTG Con-

*continued on page 25*



## 1987 MTT SYMPOSIUM (continued from page 24)

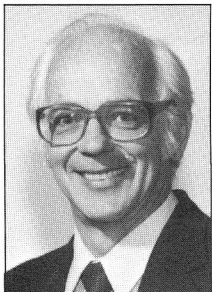
ference banquet is slated to be held Friday evening at Caesar's Palace. In between, Wednesday evening promises to be the highlight of the Symposium's social activities. The Industry-Sponsored Cocktail Reception from 5:45 p.m. to 7:15 p.m. will again precede the Symposium's Awards Banquet. The banquet is one activity that you should plan to attend. The Committee has planned a gourmet dinner and excellent, top-flight entertainment.

The program for the guests and companions of the attendees promises to be equally as exciting. At this time, however, not all of the details have been finalized. The activities will include a fashion show, a visit backstage to one of Las Vegas' revue shows and trips to Red Rock Canyon, Hoover Dam, the Liberace Museum and the Ethel M. Chocolate Factory. The Guests' Hospitality Suite will be open from 7:30 a.m. to 4:00 p.m. and will feature continental breakfast in the morning and finger sandwiches in the afternoon.

The Steering Committee has not planned any structured events for either Tuesday or Thursday evenings, so that you, the technical attendees and exhibitors, can enjoy some of the non-microwave activities offered by Las Vegas.

The 1987 IEEE MTT-S International Microwave Symposium promises to be the largest and best one to date. It is certain to be a most memorable and rewarding week. We hope that you will experience it with us.

## THE 1988 IEEE MTT-S INTERNATIONAL MICROWAVE SYMPOSIUM



by Chuck Buntschuh

Incredible! Boggles the mind. Defies comprehension. The last time the MTT Symposium was held in New York was 1964! Almost a quarter-century for the Symposium to return to the *Big Apple*. In fact, back in those days New York City wasn't even known to the general public as the *Big Apple*. The story goes that the term was used by sports and entertainment people in the twenties and thirties to refer to New York as the *Big Time*. It wasn't until 1971 that the Convention and Visitor's Bureau launched the *Big Apple* campaign, and ultimately made it everybody's *Big Apple*.

## New York and MTT

The Symposium wasn't always a stranger to New York. The PGMTT was founded in 1952 and the first three symposia — in '52, '53 and '54 — were all held in New York. These early conferences were ad hoc affairs and, in '52 and '53 were cosponsored by other professional groups. 1957 was the year of the first Annual PGMTT Meeting sponsored and financed by the PGMTT. This first official symposium was held in the Western Union Auditorium in New York and was put on by the New York, Long Island and Northern New Jersey Chapters. The attendance was 306.

After traveling around the country from '58 to '63, we returned to New York, as the PTGMTT to inaugurate the first *International Symposium*. It was fittingly held at the International Hotel at the JFK International Airport. The attendance was 657, including 24 from abroad. The Symposium was hosted by the Long Island Chapter of the PGMTT, and, since JFK is situated on Long Island, it is known as the *Long Island Symposium* in the record books. (Of course, there are those who refuse to acknowledge that anything within the New York City limits is part of Long Island, but we won't get into that here.)

No one really knows why the Long Island Chapter didn't seek to host the Symposium in all the intervening years. It did, however, co-host the Bicentennial Symposium in 1976 in Cherry Hill, New Jersey, with the North Jersey, Princeton and Philadelphia Chapters. By then, the Long Island and New York Chapters had merged into the LI/NY Chapter.

But Cherry Hill is not New York. Thus, the LI/NY Chapter of the MTT wants to make amends and invite all of you to the best-ever International Microwave Symposium in the Big Apple.

Of course, the Symposium has grown so much since 1964 there is no place on Long Island big enough to hold us — even within the New York City limits. Consequently, we will be meeting in midtown Manhattan, the veritable core of the *Big Apple*. Where all the action is.

## 1964: Looking Back

Before describing the facilities we will be using in 1988, I thought you might enjoy a reminiscent look back to the 1964 convention.

A few items from the symposium and banquet programs are reproduced on the next page. All the activities took place in the Starlight Gardens Ballroom of the International Hotel at the JFK Airport. The hotel is now the Viscount International, but the ballroom is still the Starlight Gardens. Just months before, Idlewild International Airport had been renamed in honor of John F. Kennedy.

There were forty-one submitted and four invited papers in five sessions. One of the hot topics was millimeter waves. Some things never change. Dr. Ernst Weber, President of Polytechnic Institute of Brooklyn gave the keynote address on *The Era of Microwaves*.

The banquet entertainment featured Morris

*continued on page 26*

**1988 MTT SYMPOSIUM** (continued from page 25)

Ettenberg of CCNY and the Local Arrangements Committee with his company of singers in their musical exposé of the electronics industry: *My Smart Engineer*. On the serious side, Eugene Fubini's address concerned the impending DOD cutback in R&D funding for FY '65. The other highlight of the social activities was a trip to the New York World's Fair, which was in full swing at the time.

You may also note, if you look closely at the committee roster, that three members of the 1964 Symposium Committee — Saul Rosenthal, Jesse Taub and Bert Aaron — are back in the saddle again as members of the 1988 Committee. Provides a nice touch of continuity after such a long hiatus.

**1988: What's Ahead**

Now, let's look ahead to 1988.

The *Big Apple's* newest architectural showpiece is the Jacob K. Javits Convention Center, located along the Hudson River, taking up the five blocks between 34th and 39th streets. The magnitude of the building, designed by I.M. Pei, is hard to fathom from the snapshots on these pages. You have to see it in person to appreciate it. The exterior walls and ceilings are "composed of ten-foot-square glass panels mounted on a gigantic, lacy space-frame skeleton consisting of 76,000 rods with 18,760 nodes." (Interestingly, my data sheet omits mentioning the number of windows in this grand building.) It has a total of 640,000 square feet of exhibit space, plus over 100,000 square feet for meeting rooms of all sizes, and 63,000 square feet is devoted to food service. In sheer footage, McCormick Place in Chicago is a little bigger, but it doesn't even

come close to the Javits center in architectural elegance and interest.

Of course, as much as the MTT has grown, we are still not big enough to fill the entire Convention Center. We will be using about 110,000 square feet of exhibit space and 50,000 square feet of meeting rooms. Our space is conveniently arranged around the main special events lobby, just below the main entry called the Crystal Palace. Thus, in spite of the immensity of the place, we will have as cozy a feeling as one can achieve in almost five acres.

Our headquarters hotel, the Marriott Marquis, opened in September '85, is billing itself as New York's newest spectacular landmark. Rising fifty stories above Times Square in the heart of the theater district, the Marriott boasts the world's tallest atrium — 46 stories — its own 1500-seat Broadway theater, 1876 guest rooms, and a host of restaurants, shops, ballrooms and meeting rooms — all naturally describable in glowing superlatives.

It is really quite an impressive hotel, and we are looking forward to having many of our symposium activities there.

We have 1400 rooms blocked at the Marriott, which takes care of about half our needs. For the rest, we have booked several hotels in the area with a range of rates to suit a range of budgets. Also, since there are no hotels within practical walking distance of the Convention Center, we will be providing bus service, as has been the practice at previous symposia.

The Symposium Committee is warming up to its task, and we are beginning to toss around ideas on how to make this the most enjoyable, memorable and instructive symposium since 1964. In future articles we will report on the plans as they take shape.

**1964**

**PTGMIT INTERNATIONAL SYMPOSIUM**

**INTERNATIONAL HOTEL**  
J. F. Kennedy International Airport, L. I., N. Y.

**Banquet Program**

*Master of Ceremonies*  
**William W. Mumford**  
*Musical Satire*  
**Dr. M. Ettenberg & Company**

*Microwave Prize Award Presentation*  
by  
**Dr. D. D. King**  
*Chairman, PTGMIT National Administrative Committee*

to  
**Dr. Leo Young**  
*Stanford Research Institute*

Address  
**Dr. Eugene G. Fubini**  
*Assistant Secretary of Defense - Deputy Director  
of Defense Research and Engineering*

♦  
**THE INTERNATIONAL HOTEL**  
JOHN F. KENNEDY INTERNATIONAL AIRPORT, L. I., N. Y.  
*Wednesday, May 20, 1964*

**CONDENSED PROGRAM**

**MONDAY, MAY 18, 1964**  
10:00 a.m. Registration:  
to 6:00 p.m. The Registration Desk will be open in the Main  
Lobby of the International Hotel  
8:30 p.m. Gabbfest, Flight Bar, International Hotel  
to 10:00 p.m.

**TUESDAY, MAY 19, 1964**  
8:30 a.m. Registration:  
to 9:00 p.m. Foyer, Starlight Gardens, International Hotel  
9:30 a.m. Introductory Session:  
to 10:00 a.m. Welcoming Remarks and Keynote Address,  
Starlight Gardens, International Hotel  
10:00 a.m. Session I. WAVEGUIDES  
to 12:45 p.m. Starlight Gardens, International Hotel  
2:30 p.m. Session II. FERRITES  
to 5:30 p.m. Starlight Gardens, International Hotel  
8:00 p.m. World's Fair Tour:  
to 12:30 a.m. Foyer, Starlight Gardens, International Hotel

**WEDNESDAY, MAY 20, 1964**  
8:00 a.m. Registration:  
to 9:00 p.m. Foyer, Starlight Gardens, International Hotel  
9:00 a.m. Session III. LASERS & MILLIMETER WAVES  
to 12:30 p.m. Starlight Gardens, International Hotel  
2:30 p.m. Session IV. HIGH POWER  
to 5:00 p.m. Starlight Gardens, International Hotel  
6:00 p.m. Cocktail Party:  
to 7:00 p.m. Starlight Gardens, International Hotel  
7:00 p.m. Banquet:  
to 10:00 p.m. Foyer, Starlight Gardens, International Hotel

**THURSDAY, MAY 21, 1964**  
8:00 a.m. Registration:  
to 2:30 p.m. Foyer, Starlight Gardens, International Hotel  
9:00 a.m. Session V. MICROWAVE SEMI-  
to 12:30 p.m. CONDUCTORS (A)  
Starlight Gardens, International Hotel  
2:30 p.m. Session V. MICROWAVE SEMI-  
to 5:15 p.m. CONDUCTORS (B)  
Starlight Gardens, International Hotel

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Seymour B. Cohn	William W. Mumford	Theodore S. Saad	Robert D. Wengenroth

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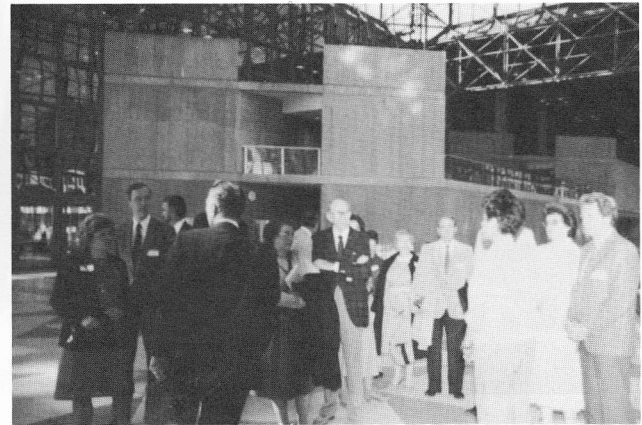
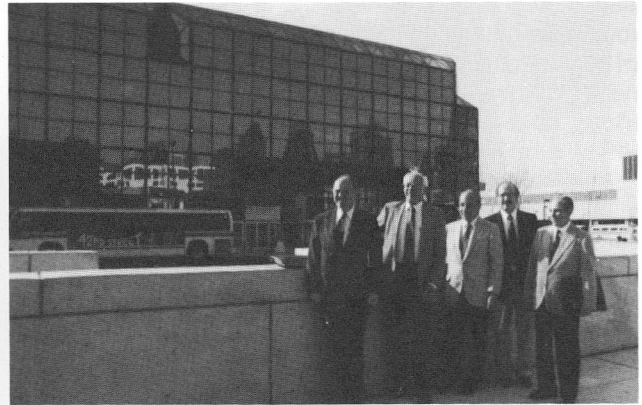
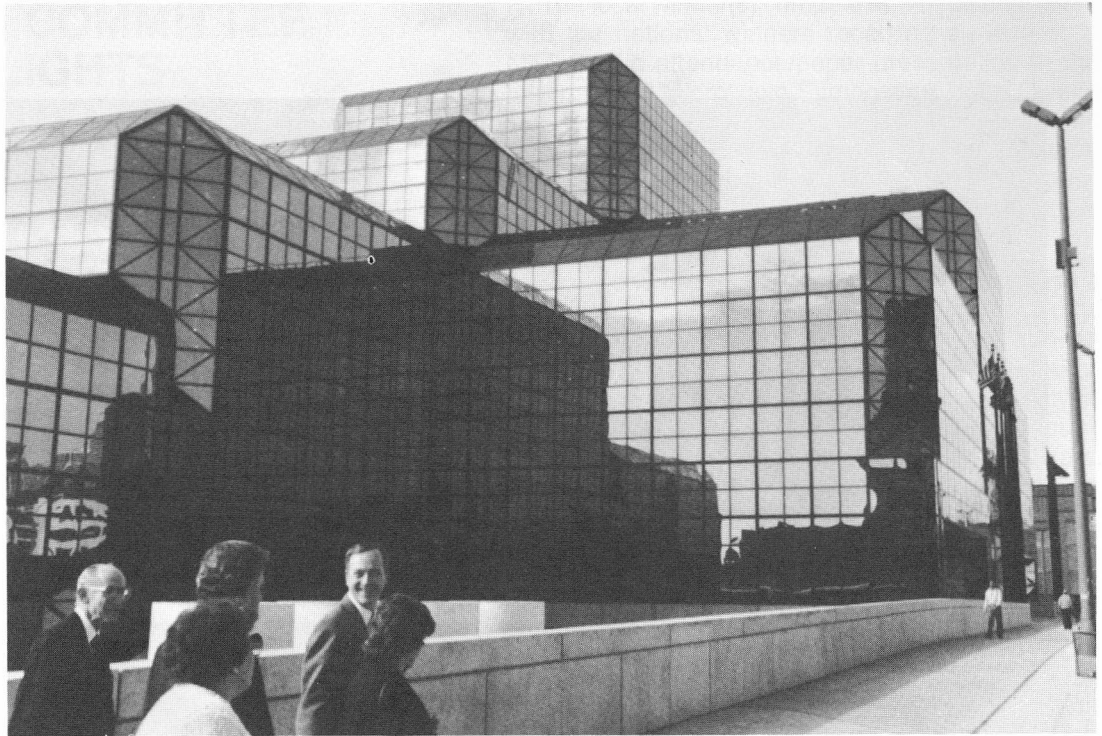
Stuart D. Casper	Herbert S. Kulik
Samuel H. Goldstein	Leonard J. Kusnowski
Harold L. Hochman	Louise Olive
Joseph W. Kearney	

**DIGEST COMMITTEE**  
HELMUT M. ALTSCHULER, Chairman

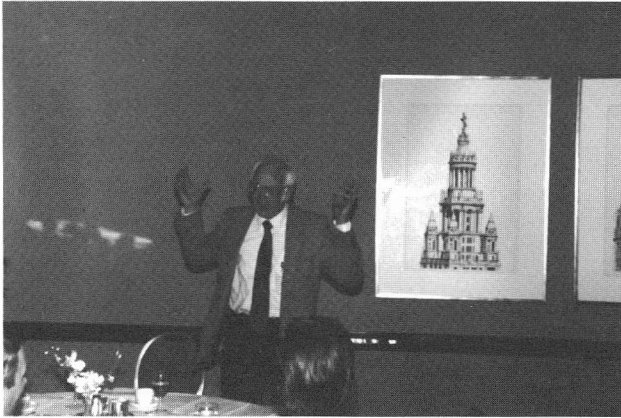
Frank R. Aram
Martha Crowell
Patricia Loth



Acknowledgements: The historical data on the MTT Symposia was gleaned from Ted Saad's article in the Symposium Index issue of *Transactions, MTT-31*, September 1983. Details on the 1964 LI Symposium are from the introduction to the January 1965 *Transactions* issue and the long memories of some of our committee members. Al Arkin provided the program excerpts. The Convention Center and Marriott Marquis statistics are from their promotional literature.



**"88 Symposium Committee Looking over the Jacob K. Javits Convention Center in the Big Apple.**



**Chairman, Chuck Buntschuh, making a point**



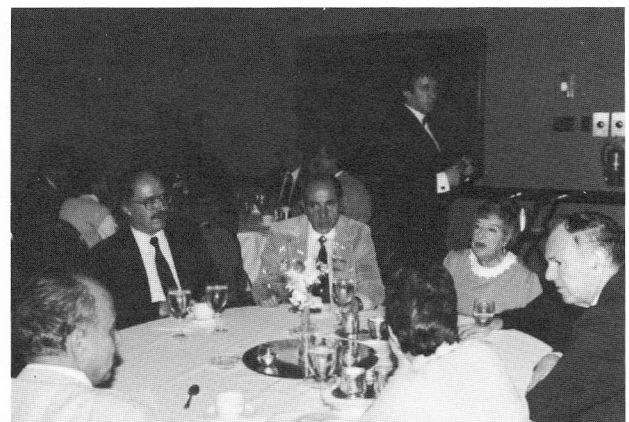
**Chairman Emeritus, Saul Rosenthal and Estelle**



**The Marriott Marquis, Times Square, New York**



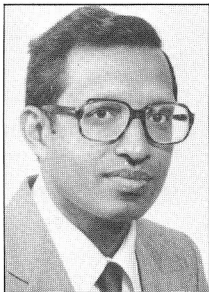
**Rosemary and Ray Viola**



**Jesse Taub, John Pierro, Joe and Millie Calviello, Joan and Jim Whelehan, and Naomi Taub**

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## EDUCATION COMMITTEE HIGHLIGHTS



by Krishna K. Agarwal

The Education Committee has programs in the areas of microwave education/continuing education, financial aid at graduate and undergraduate level, grants-in aid for research and education, microwave student paper contest (undergraduate) and MTT-S visiting fellows, all these programs with the purpose of serving the needs of MTT Society membership in the area of information and education.

The chairmen for the various activities within the Education Committee for 1987 are:

**Dr. Jorg E. Raue**

Graduate Fellowships Program  
Grants-in-Aid Program  
MTT-S Visiting Fellows Program

**Dr. John M. Owens**

Microwave Student Paper Contest  
Surveys

**Dr. Krishna K. Agarwal**

Merit Scholarships for the children of  
MTT-S members  
Representative to IEEE EAB TAAC

Now some brief news about the activities of the Education Committee:

- Jorg Raue has received several applications for 1987 Graduate Fellowships and Grants-in-Aid. The evaluation is expected to be complete in January '87 for recommendation and approval by the MTT-S AdCom. The announcement of the recipient shall be made thereafter.
- Jorg is also responsible for MTT-S Visiting Fellows activity. This responsibility is being inherited from the Membership Services Committee. Under this program sabbatical exchange of engineers and scientists among university, industry and government shall be promoted by the MTT Society. With the help of Membership Services, Jorg is proceeding with outlining the program.
- Microwave Student Paper Contest at the undergraduate level encourages engineering students to choose microwave courses for their studies. This program supports the schools to run a local paper contest in microwave related topics and award prizes, the prizes being provided by the MTT Socie-

ty. The local winner(s) compete at the national level, with the national winners receiving as awards a MTT-S paid attendance/paper presentation at the International Microwave Symposium. John Owens is inheriting this program from Dr. Glenn Thoren who did the initial work. This program is expected to be in full operation in the Fall of 1987. John is busy working out the final details; contact him for inputs and suggestions.

- John Owens is conducting a survey to establish a data base on Microwave Education (faculty, courses, available facilities, etc.) in the United States. A questionnaire was mailed out and returns are coming in. The data compilation and analysis of the survey shall be made available through publications in microwave-related magazines and the Newsletter.
- 1987 Merit Scholarship applicants for the children of MTT Society members are being evaluated by the National Merit Scholarship Corporation (NMSC). Nine applications for two merit scholarships have been received. The awards shall be announced by NMSC. In 1986, one merit award of \$2,500 a year, renewable for four years, was made to Ms. Manik Hinchev, who is attending MIT and expects to major in Electrical Engineering.
- IEEE Board of Directors has authorized a Midcareer Academy for high technology continuing education and upgrade. Also EAB/TAAC has proposed two Individual Learning Packages/Tapes on Microwave Circuits and Microwave Systems. Authors and reviewers are urgently needed for both these courses.

Contact Kris Agarwal if you can help or have suggestions.

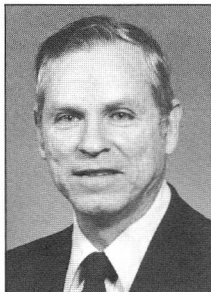


**Use computers** to teach writing skills to children, says Nancy Taylor.\*

*Fact:* Many kids don't know how to write only because they're too young to control a pen or pencil. The computer keyboard is a perfect solution for many kids.

*Reason:* When they're able to create words by punching keys, kids don't get frustrated as they do when they find it difficult to print legibly by hand. (And computers can help adults write better, too.)

\*Research at Catholic University of America, quoted in *Management Review*, 135 W. 50 St., New York, NY 10020, monthly, \$28/yr.



by *Richard A. Sparks*

The 16th European Microwave Conference was opened on September 8 by the Chairman, Professor Sean Scanlon and the welcoming address was given by Mr. Edward Collins, Minister of State, Department of Industry and Commerce.

The Special Session of U.S. invited speakers was held on Monday afternoon and was attended by a representative of the U.S. Consulate in Dublin, Ms. Jean Vogt. Following the session a short reception with her was held in the Board Room of the National Concert Hall.

Monday evening beginning at 7 p.m. a reception and dinner meeting was held at the Blooms Hotel jointly with IEEE Officers of Region 8, MTT Society Chapter Officers of Region 8 and several invited representatives of Irish engineering organizations.

Following dinner, an informal Chapter Chairmen's meeting was held similar to the type usually held at the

MTT-S International Symposium. Professor VanderVorst was especially appreciative of the opportunity to voice issues of concern to Region 8 members. Two specific proposals were submitted during the discussion:

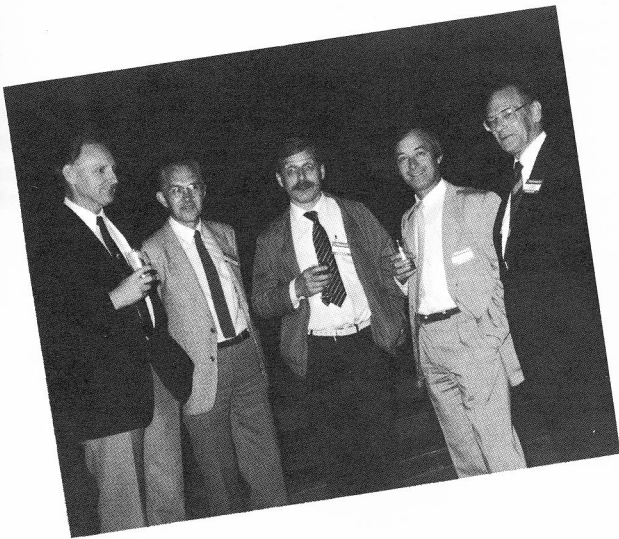
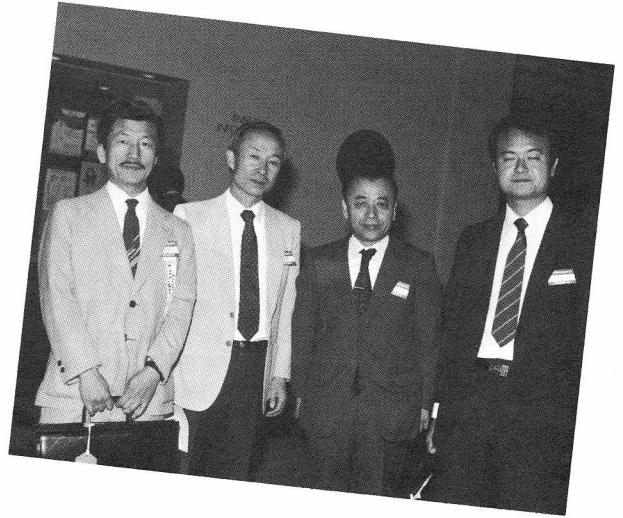
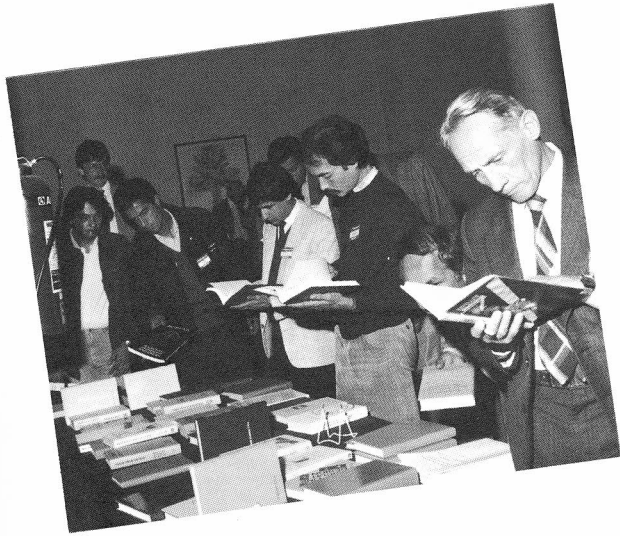
- 1) that the MTT-S AdCom select a Distinguished Lecturer from Europe in the near future.
- 2) that the MTT-S AdCom provide a \$400 travel expense stipend each year to each Region 8 Chapter specifically for a member under 30 years of age to attend the International Symposium with preference given to post graduate students.

On Tuesday evening a reception for all delegates was held at Mansion Hall, home of the Mayor of Dublin, Brian Ahern, who offered a hospitable welcome to all attendees.

Wednesday at noon the EuMC Management Committee met to discuss business matters including next year's proposal for the Conference to be held in Rome. Specific discussion addressed the U.S. invited session with the recommendation that in 1987 speakers be limited to three, allowing more time for discussion. It is preferred that systems topics be the theme with emphasis on communications subjects. Professor VanderVorst will plan to attend the Las Vegas TPC Meeting in January and provide the list of European speakers for the MTT Symposium in June. It was stressed that this session should be featured as a forum on European technology only.

Wednesday evening a reception was held at the Kilmainham Hospital with greetings from Minister Noonan of the Ministry of Trade and Commerce.





## CALL FOR PAPERS

September 7-10, 1987  
Ergife Palace Hotel, Rome,  
Italy

September 11, 1987  
Workshop

*Supported by:*

**FUB** Fondazione "Ugo Bordoni"

*In co-operation with:*

- IEE** The Institution of Electrical Engineers
- EUREL** The Convention of National Societies of Electrical Engineers of Western Europe
- IMPI** The International Microwave Power Institute
- URSI** The International Union for Radio Science
- IEEE** The Region 8 and several Professional Groups
  - Antennas and Propagation
  - Electron Devices
  - Magnetics
  - Microwave Theory and Techniques

**CONFERENCE TOPICS**

All areas of microwaves will be considered. Special emphasis will be placed on the advanced applications on:

- Radiocommunication Terrestrial Systems
- Communication Satellite Systems
- Radar
- Remote Sensing
- Mobile Radio Systems
- New Technologies

Also papers on recent advances in the following areas will be welcomed:

- Millimeter and sub-millimeter components and circuits
- Passive circuits including SAW
- Tubes
- MMIC's and their applications
- Antennas
- Propagation
- Electromagnetics
- Measurements including EMC
- CAD-CAM
- Industrial, medical and biological applications

It is also planned to hold a **WORKSHOP** on the 11th September dealing with "Present and future terrestrial and satellite microwave communications for fixed and mobile services."

**TECHNICAL PROGRAMME COMMITTEE**

*Chairman:*

F. Fedi, Fondazione "Ugo Bordoni", Roma, Italy

*Vice-Chairman:*

B. Palumbo, Selenia S.p.A., Roma, Italy

*Secretary:*

F. Barbaliscia, Fondazione "Ugo Bordoni", Roma, Italy

*Members:*

- T. Berceci, Research Institute for Telecommunications, Budapest, Hungary.
- E. Berglund, Institute of Microwave Technology, Stockholm, Sweden.
- J. Christie, University College, Dublin, Ireland.
- A. D'Ambrosio, GTE, Milano, Italy.
- G. D'Auria, University "La Sapienza" of Roma, Italy.
- J. Detlefsen, Technical University, Munich, West Germany.
- G. Falciasecca, University of Bologna, Italy.
- G. Franceschetti, University of Napoli, Italy.
- Y. Garault, University of Limoges, Cedex, France.
- M. Hallikainen, Helsinki University of Technology, Espoo, Finland.
- P. Harrop, M.E.L., Crawley, Sussex, United Kingdom.
- A. Laloux, Catholic University of Louvain, Belgium.
- G. Marzocchi, Telettra S.p.A., Vimercate, Milano, Italy.
- A. Paraboni, Politecnico di Milano, Italy.
- V. Rizzoli, University of Bologna, Italy.
- D. Solimini, University "Tor Vergata" of Roma, Italy.
- F. Valdoni, Piano Spaziale Nazionale-CNR, Roma, Italy.
- P. Weissglas, Institute of Microwave Technology, Stockholm, Sweden.

**CONTRIBUTIONS**

Papers are sought describing work **not** previously published which can be either theoretical, technological or applications oriented. Papers will be in English. Authors are requested to submit six typed copies (single-spaced) of a 3-page summary. The summary should include a concise statement of the work under review, emphasizing what is new, as well as the techniques being employed together with the main conclusions. Whenever appropriate, a few essential figures should be added. The first page should start with the author's name, affiliation and full address clearly stated.

**DEADLINE FOR SUMMARIES: MARCH 2nd 1987**

Summaries should be sent to: -

**Prof. F. Fedi,**  
**17th European Microwave Conference,**  
**Fondazione "Ugo Bordoni",**  
**Via Baldassarre Castiglione, 59**  
**00142 Roma, Italy.**

The summaries will be assessed by a European review board. The final decision, taken by the Technical Programme Committee, will be forwarded to the authors at the end of April 1987. A complete manuscript will be requested in June 1987, for inclusion in the Proceedings.

Presentation of papers during the Conference will be in English.

**EuMC MICROWAVE PRIZE**

The Management Committee will award an EuMC Microwave Prize of S.F. 1000 to the author(s) presenting the best paper at the Conference.

I wish to offer a contribution provisionally entitled:

I require ..... programmes and registration forms.

I wish to obtain further Workshop details.

Name ..... First .....

Affiliation/Company .....

Address .....

Country ..... Code .....

Telephone ..... Telex .....

Please tick box as appropriate.

*Please Return To:*

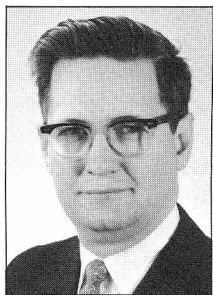
**Microwave Exhibitions & Publishers Ltd.,**  
**90 Calverley Road, Tunbridge Wells,**  
**Kent TN1 2UN, United Kingdom.**



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# THE MICROWAVE ENGINEER'S STAKE IN FEDERAL LEGISLATION

## PACE REPORT



by R.A. Moore

Though I hope I am wrong, my first-hand experience suggests that few engineers have significant interest in closely following the legislative process and major Executive Branch actions which significantly affect our professional and career well-being. Perhaps this is not surprising in view of the fact that for many federal, state and local elections fewer than 50% of eligible voters turn out.

This past year I was in a group privileged to hear K.P. Lou, a former IEEE Congressional Fellow and, at that time, Senator Pete Domenici's staff member on the Senate Energy Committee. Mr. Lou was one of the very few IEEE Fellows asked to stay on as an aide. The thrust of his talk was that the engineering community simply does not understand the legislative process, at least if one assumes we give our attention on a priority basis to items of importance to our interests. He pointed out that there are lobbyists aplenty out there. The visible lobbyists are the ones that will guide our legislative process. Congressional Committee members, and more directly their staffers, require immense amounts of information in areas of potential legislative activity. They eagerly seek out lobbyists who have a record of providing accurate information about their client's areas of interest. In this respect, the IEEE has gained considerable stature and now is not able to provide all the testimony and backup material requested: a far cry from earlier experiences in trying to get an audience for legislation it felt significant. Having gained respect and stature with significant committees is, of course, good. We can use our stature to provide information aggressively. As Mr. Lou would point out, however, if we fail to provide testimony and backup material at each significant opportunity we deny ourselves and our interests needed representation. To the extent our technological background is important to the country, our lack of committed lobbying effort is denying the country the benefit of our knowledge. Though the IEEE is the most active engineering organization in terms of legislative interfacing, Mr. Lou insists we are far from active enough.

Issues may be industry-related, i.e. federal research budgets, program thrusts, key agency service such as NBS, trade policy, long-term technology policies and

many more. In a society in which there is significant vocal opposition to technology, as such, it is important we keep leaders well-informed of the values of technology. Issues may also be career- and benefits-related. Of importance to many of us are pension rules, IRAs, immigration policy, intellectual property policy and tax and credit policies as they affect small businesses and consultants' abilities to compete. For those with exposure, the professional liability environment is changing rapidly.

How does the IEEE lobby for us? For significant long-term value two fundamental criteria must be met: (1) the IEEE must have a means of determining our real interests and (2) it must develop and maintain the respect of the legislative community for effective lobbying. Both of these criteria require (1) substantial membership interface with the process, (2) generation of significant backgrounds of facts on issues important to the membership and (3) frequent visible interfaces with the legislative community — members of Congress and their staff personnel.

The USAB structure continues to evolve toward filling these needs. There are a series of Councils: (1) Member Activities Council which seeks to collect and analyze member interests (the salary survey and opinion survey activities are in this Council); (2) Government Activities Council maintain interfaces with government agencies and Congress (the legislative Newsletter is a product of this Council); (3) Professional Activities Committee for Engineers (PACE) originally a committee of the Member Activities Council has grown to the point it is now a Council. PACE provides for a representative structure throughout the Societies, Sections and Chapters to interface with authorities on issues of importance to them. (I am the MTT-S PACE representative); (4) Career Activities Council committees develop positions and represent the IEEE in areas like pensions, intellectual property, age discrimination, ethics, licensure and entrepreneurial activities; (5) Technology Activities Council committees develop and represent the IEEE on issues such as energy, communications policy, health care, radiation hazards, environmental quality and research and development policy. The TAC committees are joint between USAB and the Technical Activities Board (TAB).

This may seem like an imposing structure and, perhaps, a lot of unneeded luggage. If the total structure were enlightened, energetic, truly sensitive to membership needs and aggressive, we would have lobbying representation second to none. To effectively interface with executive agencies and Congressional committees requires an immense factual background. Government agencies and committees have immense means for assembling facts. If we don't match or exceed this information in areas of importance to us, we won't help ourselves and stand to hurt our causes. "Being prepared" is not just a Boy Scout motto in this arena, it is a necessity of life. Your committees desire your inputs and your participation. Let's help them.

*continued on page 34*

### **Legislative Update**

With the above introduction, it is important that the MTT-S do its part to provide members with timely information on legislative activities of the Society and Institute. It is my intent that a Legislative Update be a feature of every Newsletter, i.e., included as a part of each PACE Report. Included with each update will be a review of recent activities regarding a limited number of issues of importance to the microwave engineering community. We will hope to work through many of the issues of importance to us over a period of time.

### **PNMS**

The Committee to **Promote National Microwave Standards** of the MTT-S with considerable leadership from Mario A. Maury, Jr., MTT-S Administration Committee Member, has over several years assembled and organized material documenting the need for major increases in NBS technology base and service for microwave standards. The PNMS committee has met with several agencies, including key NBS leadership and has testified before the Congressional Committee on Science and Technology. More recently, we have submitted this issue to be included in the USAB Executive Branch Agenda and to the TAC Committees on Engineering R&D and Defense R&D. Though receiving favorable review at all points of presentation, this issue appears to require more support in order to realize its objectives.

### **Technology Transfer**

If you are in the defense industry and have encountered greater difficulty in gaining paper publication approval, you are part of a trend. If you are in the defense industry and haven't had this difficulty or were required only to scale back information you intended to publish, consider yourself lucky. This problem has resulted from Administration efforts to reduce the information available from our literature to Iron Curtain countries.

Monitoring export of technical data became a DoD responsibility with passage of Public Law 98-94, "Department of Defense Authorization Act" of 1984. Since, realistically, publication in open literature constitutes export, DoD has been trying to increase restrictions on unclassified data releases for publication. The IEEE and MTT-S have a major stake in the way this problem resolves itself. The Technology Transfer Committee of the USAB Government Activities Council is working with various government agencies toward reducing the impact of new restrictions. It would appear, though, that reversing the trend toward increased restriction on publication will require developing a broader base of support. At present, there appears to be little movement in this direction.

### **Bio-Effects of Radiation**

A positive paper on "Absence of Hazardous Levels of Non-Ionizing Radiation from Video Display Terminals" has been approved by the IEEE Board of Directors. The paper was originally submitted by the IEEE Committee on Man and Radiation (COMAR). Copies are available through the IEEE Washington Office.

### **Japanese Technical Literature**

Congress recently passed into law an amendment to the Stevenson-Wydler Technology Innovation Act of 1980, in order to improve the availability of Japanese science and engineering literature in the United States. The IEEE Committee on Communications and Information Policy had presented testimony to the House Science and Technology Committee in March 1986 and initiated a USAB Position Statement that was approved in May to support the efforts to translate Japanese technical journals.

The Stevenson-Wydler amendment authorizes and directs the Secretary of Commerce, through the National Technical Information Service and other Department Offices, to establish and maintain a program that will:

- monitor Japanese technical activities and developments;
- consult with U.S. businesses, professional societies and libraries regarding their information needs on Japanese developments in technology and engineering;
- acquire and translate selected Japanese technical reports and documents that may be valuable to Federal departments and agencies and to U.S. businesses and researchers; and
- coordinate with other Federal agencies and departments to identify significant gaps and avoid duplication of efforts.

Translations will only be performed when they are not otherwise available from the U.S. private sector.

### **Age Discrimination**

The Age Discrimination Committee recently revised and reprinted three PACE Source Sheets. Two dealing with Age Discrimination are now available. The first outlines major provisions of the Age Discrimination in Employment Act (ADEA), IEEE's Policy on age discrimination, and some of the danger signs of age discrimination in the workplace. The second, excerpted from the IEEE-USAB Policy and Procedures, provides information on support by USAB in age discrimination matters. A third Source Sheet, Legal Services, lists state lawyer referral services for members who require legal assistance in such matters as discrimination or ethics. Copies of these Source Sheets are available from the IEEE Washington Office.

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# MEETINGS OF INTEREST

## GENERAL INTEREST

**Southcon '87** — March 24-26. Georgia World Congress Center, Atlanta, GA. Contact: Ms. Alexes Razevich, Electronic Conventions Mgmt., 8110 Airport Blvd., Los Angeles, CA 90045, (213) 772-2965, (800) 421-6816.

**Southeastcon '87** — April 5-8. Holiday Inn, Tampa International Airport, Tampa, FL. Contact: David C. McLaren, General Chairman, General Telephone of FL, P.O. Box 110, Mail Code 32, Tampa, FL 33601, (813) 224-4409 or Dr. Rudolf E. Henning, Technical Program (813) 974-2369.

**Electro '87/Mini/Micro Northeast** — April 7-9. Jacob K. Javits Convention Center, New York, NY. Contact: Ms. Alexes Razevich, Electronic Conventions Management, 8110 Airport Blvd., Los Angeles, CA 90045, (213) 772-2965, (800) 421-6816.

**1987 University/Government/Industry Conference** — June 9-11. Hilton Inn on the Campus, Rochester Institute of Tech., Rochester, NY. Contact: Dr. Lynn Fuller, Rochester Inst. of Tech., Rochester, NY 14692, (716) 475-2035.

**1987 IEEE Annual Meeting** — June 18-19. New York Marriott Marquis, New York, NY. Contact: Adeline T. Zeni, Annual Meetings Admin., 345 East 47th Street, New York, NY 10017, (212) 705-7304.

**MIDCON '87** — Sept. 15-17. O'Hare Exposition Center, Rosemont, IL. Contact: Ms. Alexes Razevich, Electronic Conventions Mgmt., 8110 Airport Blvd., Los Angeles, CA 90045, (213) 772-2965, (800) 421-6816.

**NORTHCON '87** — Sept. 22-24. Portland Memorial Coliseum, Portland, OR. Contact: Ms. Alexes Razevich, Electronic Conventions Mgmt., 8110 Airport Blvd., Los Angeles, CA 90045, (213) 772-2965, (800) 421-6816.

**International Professional Communication Conference — IPCC '87** — Oct. 14-16. Sheraton Hotel Winnipeg, Winnipeg, Manitoba, Canada. Contact: Ron S. Blicq, General Chairman, The Roning Group, Box 181, Postal Station C, Winnipeg MB Canada R3M 3S7, (204) 632-2292.

**Western Electric Show & Convention (WESCON '87)** — Nov. 17-19. Moscone Center and Brooks Hall, San Francisco, CA. Contact: Ms. Alexes Razevich, Electronic Conventions Mgmt., 8110 Airport Blvd., Los Angeles, CA 90045, (213) 772-2965, (800) 421-6816.

## AEROSPACE/MILITARY

**IEEE Military Communications Conference (MILCOM 87)** — Oct. 19-22. McLean Hilton, McLean, VA. Contact: Mr. Alan J. Roberts, The Mitre Corporation, M/S

W300, 1820 Dolley Madison Blvd., McLean, VA 22102-3481, (703) 883-5691.

## CIRCUIT THEORY

**1987 IEEE International Symposium on Circuits and Systems — ISCAS '87** — May 4-7. Dunfey City Line Hotel, Philadelphia, PA. Contact: Samuel D. Bedrosian, General Chairman, Department of Electrical Engineering, University of Pennsylvania, Philadelphia, PA 19104, (215) 898-8518 or Professor W.K. Chen, University of Illinois, Box 4348, Chicago, IL 60680, (312) 996-2462.

## COMMUNICATIONS

**International Switching Symposium (ISS '87)** — March 15-21. Phoenix Civic Center, Phoenix, AZ. Contact: Ed Glenner, GTE Network Systems, 2500 W. Utopia Road, Phoenix, AZ 85027, (602) 582-7792.

**GLOBECOM '87** — Nov. 15-18. Keio Plaza International Hotel, Tokyo, Japan. Contact: Noriyoshi Kuroyanagi/NTT ECL, Musashino, Tokyo 180, Phone: +81-422-59-2539, Telex: 02822620 NTT ECLJ or Takuro Muratani, General Affairs Chairman, R&D Labs., KDD, Nakameguro, Tokyo 153, Phone: +81-3-713-0111, Telex: J 22500 KDD TOK In N.Y. (212) 705-7857.

## COMPUTERS

**1987 International Conference on Robotics and Automation** — March 30-April 2. Radisson Hotel & Raleigh Convention Center, Raleigh, NC. Contact: Tu-Chi Ho, Conference Chairman, Pierce Hall, Harvard University, Cambridge, MA 02138, (617) 495-3992 or Arthur Sanderson, Program Chairman, The Robotics Institute, Carnegie-Mellon University, Pittsburg, PA 15213, (412) 578-2590.

**1987 First IEEE International Conference on Computer Vision** — June 8-11. London, England. Contact: Dr. Azriel Rosenfeld, Center for Automation Research, University of Maryland, College Park, MD 20742, (301) 454-4526.

**1987 Conference on Software Maintenance** — Sept. 21-23. Washington, DC. Contact: Software Maintenance, 1730 Massachusetts Ave., NW, Washington, DC 20036-1903, (202) 371-0101. TWX: 7108250437 IEEECOMPSON.

**IEEE Computer Society International Conference on Computer Languages** — Oct. 27-30. Konover Hotel, Miami Beach, FL. Contact: IEEE Computer Society, 1730 Massachusetts Avenue, NW, Washington, DC 20036-1903, (202) 371-0101, TWX: 7108250437 IEEECOMPSON.

*continued on page 36*

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## MEETINGS OF INTEREST (continued from page 35)

**IEEE International Conference on Computer Aided Design (ICCAD '87)** — Nov. 9-12. Santa Clara Convention Center, Santa Clara, CA. Contact: Dr. Basant Chawla, AT&T Bell Laboratories, 1247 S. Cedar Crest Blvd., Allentown, PA 18103, (216) 770-3485.

## INSTRUMENTATION

**IMTC '87 — Instrumentation & Measurement Technology Conference** — April 27-29. Sheraton-Boston Hotel, Boston, MA. Contact: Robert Myers, 1700 Westwood Blvd., #101, Los Angeles, CA 90024, (213) 475-4571.

## MICROWAVES

**1987 IEEE Microwave and Millimeter Wave Monolithic Circuits Symposium** — June 8-9. Bally's Grand Hotel, Las Vegas, NV. Contact: Dr. Yalcin Ayalsi, Hittite Microwave Corp., 5 Ingleside Road, Lexington, MA 02173, (617) 933-7267.

**1987 IEEE MTT-S International Microwave Symposium** — June 9-11. Bally's Grand Hotel, Las Vegas, NV. Contact: Steven L. March, Conference Chairman, Maury Microwave Corp., 8610 Helms Avenue, Cucamonga, CA 91730, (714) 987-4715.

**1987 IEEE/AP-S International Symposium and URSI/USNC Radio Science Meeting** — June 15-19. Virginia Tech Continuing Education Center, Blacksburg, VA. Contact: Dr. Warren Stutzman, Virginia Tech, Electrical Engineering Dept., Blacksburg, VA 24061, (703) 961-6835.

**1987 2nd International Microwave Symposium/Brazil** — July 27-30. Rio Palace Hotel, Rio de Janeiro, Brazil. Contact: Prof. Alvaro Augusta A. de Salles, 1987 INTERNATIONAL MICROWAVE SYMPOSIUM/BRAZIL COMMITTEE, CETUC-PUC/RJ, Rua Marques de Sao Vicente, 225-Gavea, CEP: 22451, Rio de Janeiro-RJ-BRAZIL. Telex: 2131048.

**12th Annual IEEE International Conference on Infrared and Millimeter Waves** — Dec. 14-18. Americana Dutch Resort Hotel, Orlando, FL. Contact: Kenneth J. Button, Conf. Chairman (Temporary), Box 72, M.I.T. Branch, Cambridge, MA 02139-0901, (617) 253-5561, (617) 489-4353, Telex: 92-1473.

## QUANTUM ELECTRONICS

**Conference on Lasers and Electro-Optics (CLEO '87)** — April 27-May 1. Baltimore Convention Center, Baltimore, MD. Contact: OSA, Meetings Department, 1816 Jefferson Place, NW, Washington, DC 20036, (202) 223-0926.

**1987 Quantum Electronics Conference** — April 27-May 1. Baltimore Convention Center, Baltimore, MD. Contact: OSA, Meetings Department, 1816 Jefferson Place, NW, Washington, DC 20036, (202) 223-0926.

## RELIABILITY

**International Reliability Physics Symposium** — April 7-9. Town & Country Hotel, San Diego, CA. Contact: Michael S. Adler, Electron Devices Society, Corporate Research & Development, P.O. Box 8 — Room KW-C328, Schenectady, NY 12301, (518) 387-5882 or Dr. David Yaney, AT&T Bell Laboratories, 555 Union Blvd., Allentown, PA 18103, (215) 439-6118.

**3rd Annual Conference on Electronic Packaging and Corrosion in Microelectronics** — April 26-30. The Radisson South, Minneapolis, MN. Contact: Professor Morris E. Nicholson, 1776 North Pascal Avenue, St. Paul, MN 55113, (612) 645-1613.

## SOLID STATE

**1987 IEEE 34th International Solid State Circuits Conference** — February 25-27. New York Hilton, New York, NY. Contact: Lewis Winner, 301 Almeria Avenue, Coral Gables, FL 33134, (305) 446-8193/94 or Jack A.A. Raper, Chairman General Electric Co., Syracuse, NY.

**19th IEEE Photovoltaic Specialists Conference** — May 4-8. Sheraton New Orleans Hotel, New Orleans, LA. Contact: Dr. Lawrence L. Kazmerski, Conference Chairman, Solar Energy Research Inst., 1617 Cole Blvd., Golden, CO 80401, (303) 231-1115.

**1987 Device Research Conference** — June 22-24. Santa Barbara, CA. Contact: Michael S. Adler, Electron Devices Society, General Electric Co., P.O. Box 8, Rm. KW-C328, Schenectady, NY 12301, (518) 387-5882 or Dr. Jerry Woodall, IBM Watson Research, P.O. Box 218, Yorktown Heights, NY 10598, (914) 945-1568.

**1987 IEEE International Electron Devices Meeting (IEDM '87)** — Dec. 6-9. Washington Hilton, Washington, DC. Contact: Ms. Melissa Widekehr, c/o Courtesy Associates, Inc., 655 15th Street, NW, Suite 3000, Washington, DC 20005, (202) 347-5900.

## MISCELLANEOUS

**1987 Particle Accelerator Conference** — March 16-19. Omni Shoreham Hotel, Washington, DC. Contact: Dr. Louis Costrell, National Bureau of Standards, C-333 Radiation Physics, Washington, DC 20234, (301) 921-2518.

**37th Electronic Components Conference (ECC)** — May 11-12. Boston Park Plaza, Boston, MA. Contact: Mr. James A. Woolley, 3M Company, 3M Center, 207-1W-10, St. Paul, MN 55144, (612) 733-9699.



**IEEE**

**THE INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, INC.**

**Announces the 15th Annual Competition for**

**1987-1988**

## **Congressional Fellowships**

**A CONGRESSIONAL INTERNSHIP  
FOR MEMBERS OF IEEE**

**PROGRAM:** Electrical and Electronics Engineers and Allied Scientists are competitively selected to serve a one-year term on the personal staff of individual Senators or Representatives or on the professional staff of Congressional Committees. The program includes an orientation session with other Science-Engineering Fellows sponsored by the American Association for the Advancement of Science (AAAS).

**PURPOSE:** To make practical contributions to more effective use of scientific and technical knowledge in government, to educate the scientific communities regarding the public policy process, and to broaden the perspective of both the scientific and governmental communities regarding the value of such science-government interaction.

**CRITERIA:** Fellows shall be selected based on technical competence, on ability to serve in a public environment and on evidence of service to the Institute and the profession. Specifically *excluded* as selection criteria shall be age, sex, creed, race, ethnic background, and partisan political affiliations. However, the Fellow must be a U.S. citizen at the time of selection and must have been in the IEEE at Member grade or higher for at least four years. Additional criteria may be established by the selection committee.

**AWARDS:** IEEE plans to award two Congressional Fellowships for the 1987-1988 term. Additional funding sources may permit expansion of awards.

**APPLICATION:** Further information and application forms can be obtained by calling W. Thomas Suttle (202) 785-0017 at the IEEE Washington, D.C. Office or by writing:

**Secretary, Congressional Fellows Program  
The Institute of Electrical and Electronics Engineers, Inc.  
1111 Nineteenth St., N.W.  
Suite 608  
Washington, D.C. 20036**

Applications must be postmarked no later than March 31, 1987 to be eligible for consideration.

**IEEE AP/MTT-S**

Philadelphia Section

**Sixth Annual Benjamin Franklin Symposium  
Advances in Antenna and Microwave Technology**

March 21, 1987

**Announcement and Call for Papers**

The Philadelphia Chapter of the IEEE AP/MTT-S will hold its 6th Annual Benjamin Franklin Symposium on Saturday, March 21, 1987 from 8:30 AM to 5:00 PM. This one-day symposium will consist of:

Morning Session: Invited papers on Phased Arrays & Related Techniques.

Afternoon Session: Parallel Sessions of Contributed Papers, on:

- a. Antennas and Propagation: Phased Array Technology, Antenna Design, Radiating Elements and Phase Shifters, Antenna Applications, Imaging and Radiometry.
- b. Microwave Theory & Techniques: Microwave Networks and Filters, Solid State Devices and Circuits, Millimeter Waves and Monolithic Technology, Microwave Applications.

**PLACE:** Hyatt Cherry Hill  
State Highway No. 70 & Cuthbert Blvd.  
Cherry Hill, NJ

**REGISTRATION:** Priority will be given to the first 200 registrations. Mail your registration form and check today to ensure your attendance. Registration is complete with receipt of check. The registration fee includes the symposium digest, coffee and lunch.

**PAPERS:** Authors are invited to submit papers in either field. Please send a camera-ready summary (one to four 8 1/2 x 11 pages with one inch margins) by January 5, 1987 to:

Ravi K. Moorthy, RCA-MSR, Mail Stop 101-124  
Borton Landing Road, Moorestown, NJ 08057 (609) 722-7769

**FURTHER INFORMATION:** Contact Ms. Laura Jacobs (215) 898-8106 or Dr. Ashok K. Agrawal, Chairman, AP/MTT-S Chapter, RCA-MSR, Mail Stop 101-105 (609) 722-3405.

**MAIL REGISTRATION TO:** Ms. Laura Jacobs  
IEEE Office, Moore School of E.E.  
University of Pennsylvania  
Philadelphia, PA 19104

**OVERNIGHT ACCOMMODATIONS:** Contact Hyatt Cherry Hill, (609) 662-1234, no later than March 3, 1987.  
(Please mention B. F. Symposium to get Special Rates.)

**REGISTRATION FORM** Complete and enclose check payable to: "IEEE Philadelphia Section" by **March 1, 1987**. Add Late Registration Fee after **March 1, 1987**.

\_\_\_\_\_ \$50 Regular Member IEEE No. \_\_\_\_\_ Non-Member \$65 \_\_\_\_\_  
 \_\_\_\_\_ \$20 Student & Retired Member IEEE No. \_\_\_\_\_ S & R Non-member \$35 \_\_\_\_\_  
 Late Registration Fee \$ 5 \_\_\_\_\_

**PRINT**

Name \_\_\_\_\_ Phone No. \_\_\_\_\_  
 Address \_\_\_\_\_ Zip \_\_\_\_\_  
 Affiliation \_\_\_\_\_

I plan to contribute a paper. Yes \_\_\_\_\_ No \_\_\_\_\_

If yes, submit one to four page summary by January 5, 1987.

# 7th INTERNATIONAL ZURICH SYMPOSIUM AND TECHNICAL EXHIBITION ON ELECTROMAGNETIC COMPATIBILITY

The Symposium and Technical Exhibition on Electromagnetic Compatibility is organized every odd year and attained in 1985, at its 10th anniversary, with 850 attendees and 43 exhibitors, a new record in participation. According to the interest registered, a similar success is expected for EMC 87.

The EMC 87 will be organized under the auspices of the Director-General of the Swiss PTT, Mr. R. Trachsel, by the Institute for Communications Technology of the Swiss Federal Institute of Technology (ETHZ) in Zurich. It is sponsored by the Association of Swiss Electromagneticians (SEV/ASE) and presided by Professor Dr. P. Leuthold (Zurich). Symposium Chairman is Professor Dr. T. Dvorak (Zurich); the technical program committee is chaired by Professor Dr. R.M. Showers (USA). The cooperation of renowned scientists and professional organizations (URSI, EUREL, IEEE, etc.) from all over the world promises a successful conference.

In all 124 papers will be delivered in 18 sessions covering a large variety of EMC topics (micro- and power-electronics, radio communications, lightning and nuclear EMP, power and data line transients, electrostatic discharges, interference-sources and countermeasures, measurements, etc.). Tutorial lectures (crosstalk, shielding effectiveness, digital design for EMC, antennas), workshops (EMP, lasting effects of transients, computers in EMC education), technical excursions and a rich social program round off the event.

As usual, the symposium will review the current status and future trends of EMC science. The tutorial lectures and workshops, organized on a question-answer basis in direct contact with the speakers, provide an introduction to newcomers, and respond to the needs of practicing engineers. The exhibition, which will also be open to the non-registered public, will introduce modern measuring techniques, new technologies in materials and components, as well as EMC training programs. The full text of all conference papers will be made available in the conference proceedings: "EMC 1987."

Copies of the Preliminary Program with registration forms and further information concerning the Symposium and Technical Exhibition may be obtained from: Professor Dr. T. Dvorak, ETH Zentrum-IKT, 8092 Zurich, Switzerland, Phone (+411) 256-2790, Telex 53-178 ethbi ch.



**EMC**

*preliminary  
program*

*7th International Zurich Symposium  
& Technical Exhibition on:*

**electromagnetic  
compatibility**

**zurich 1987  
march 3-5**

*Under the auspices of:*  
Mr. R. Trachsel, Director-General of the Swiss PTT, Berne

*Sponsor:*  
Swiss Electrotechnical Association (SEV/ASE)

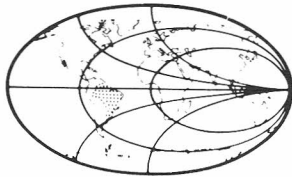
*Organised by:*  
Institute for Communication Technology of the Swiss Federal  
Institute of Technology Zurich

*Cooperating:*  
International Union of Radio Science (URSI), Convention of the  
National Societies of Electrical Engineers of W. Europe (EUREL),  
International Radio Consultative Committee (CCIR), IEEE Elec-  
tromagnetic Compatibility Society, European Broadcasting Union  
(EBU), IEEE Switzerland Section, Association of Polish Electrical  
Engineers (SEP), Committee AE-4 on Electromagnetic Compati-  
bility of the Society of Automotive Engineers (SAE), Information  
Technology Society of the SEV (ITG)

**1987 INTERNATIONAL MICROWAVE SYMPOSIUM/BRAZIL**

RIO PALACE HOTEL, RIO DE JANEIRO, JULY 27-30, 1987

**"GATHERING THE WORLD THROUGH MICROWAVES"**



**CALL FOR PAPERS**

The 2<sup>nd</sup> International Microwave Symposium/Brazil, organized by the Brazilian Microwave Society (SBMO) in cooperation with the IEE, IEEE MTT-S, IEEE AP-S, will be held on July 27-30, 1987 at the Rio Palace Hotel, Rio de Janeiro, Brazil.

It is intended to provide a major international forum for the exchange of information on research and development in the fields of microwaves, antennas and propagation, including millimeter waves and optics.

**DEADLINE**

The deadline for the receipt of the papers is **December 31, 1986**. Advanced submission is encouraged. Authors will be notified of acceptance of their papers by the end of February 1987.

**\* TECHNICAL PROGRAMME COMMITTEE**

- Profs. Luiz Costa da Silva, Abelardo Podcameni and Álvaro Augusto de Salles (Center for Studies in Telecommunications - CETUC, PUC, Rio).
- Prof. Antonio R. Panicelli and Dr. Claudio Violato (Center for Research and Development - CPqD, TELEBRÁS, Campinas, S.P.).
- Profs. Attilio Giarola and Rui Fragassi Souza (University of Campinas, Campinas, S.P.).
- Profs. J. Kleber C. Pinto and Edmar Camargo (University of São Paulo, S. Paulo).
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- Prof. José Rodolfo Souza (Military Institute of Engineering - IME, Rio).

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Dr. Richard A. Sparks (Raytheon, Bedford, Ma., U.S.A.).

**\* EXIBITION COORDINATOR FOR U.S.A. COMPANIES**

Dr. Howard Ellowitz (Microwave Journal).

**GENERAL INFORMATION**

- **SYMPOSIUM LANGUAGE**  
The Symposium language will be English.
- **TECHNICAL EXHIBITION / COCKTAIL**  
In conjunction with the Symposium a technical exhibition of telecommunication equipments will be organized. Exhibitors will offer a cocktail, for all participants, at the first evening of the Symposium.

● **SYMPOSIUM PROGRAM**

The Symposium Program will be available by **March 87**. If you want to receive the Symposium Program, please fill the appropriate box in the Registration Form.

● **BRAZILIAN TOURS, SOCIAL AND COMPANIONS PROGRAMS**

Social and companions programs as well as special tours in Brazil will be organized by the official tour operator of the Symposium.

● **SYMPOSIUM DINNER**

The Symposium dinner for the participants and accompanying persons will be held at the Rio Palace Hotel on Wednesday evening, July 29, 1987. The Symposium dinner fee is US 30.00. Participants are kindly requested to fill in the Registration Form for advance reservation.

● **SYMPOSIUM KIT**

Badges, cocktail tickets and Symposium proceedings, as well as further information must be picked up at the Registration Desk when you arrive at the Symposium.

**SBMO 1987 INTERNATIONAL MICROWAVE SYMPOSIUM/BRAZIL**

RIO PALACE HOTEL, 27-30 JULY 1987, RIO DE JANEIRO, BRAZIL

REGISTRATION FORM

COMMITTEE USE

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- Registration Fee: (Please tick off one)
  - Until May 1<sup>st</sup>, 1987  participant without Proceedings. US\$ 55
  - participant with one copy of the Proceedings . . . . . US\$ 70
  - After May 1<sup>st</sup>, 1987  Participant without Proceedings. US\$ 85
  - Participant with one copy of the Proceedings . . . . . US\$ 100

● I would like to register for the Symposium dinner at the Rio Palace Hotel on Wednesday evening, July 27, 1987. Number of tickets

like to receive detailed information on travel packages (and other hotels) and/or Brazilian tours, social and companions, specially organized by the Symposium official operator

I enclose a check in the amount of US\$  to SBMO - Sociedade Brasileira de Microondas) Credit cards are accepted)

Form should be returned to: Álvaro Augusto de Salles, U.C. - PUC/RJ, Marquês de São Vicente 225, Gávea, CEP 22453, Rio de Janeiro, Brazil.





# IEEE 1987 ULTRASONICS SYMPOSIUM



October 14-16, 1987

Sheraton Denver Tech Center, Denver, Co.

*Sponsored by The Ultrasonics, Ferroelectrics and Frequency Control Society*

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## Call For Papers

**Deadline: Monday, June 1, 1987**

Papers are solicited describing original work in the field of Sonics and Ultrasonics. Papers concerned with mechanical wave phenomena, including the topics suggested below, will be considered.

### GROUP 1:

ABS Arrays and Beam Steering  
BB Bioeffects and Biophysics  
HT Hyperthermia  
IS Inverse Scattering  
MU Medical Ultrasonics  
PF Piezoelectric and Ferroelectric Materials  
TC Tissue Characterization

### GROUP 2:

AE Acoustic Emission  
AM Acoustic Microscopy  
CU Consumer Ultrasonics  
DMC Defect and Material Characterization  
IU Industrial Ultrasonics  
NDE Nondestructive Evaluation  
PMC Process Monitoring and Control  
SEN Sensors

### GROUP 3:

AO Acousto-Optic Effects and Devices  
AOS Acousto-Optic Signal Processing  
BW Bulk Wave Effects and Devices  
MSW Magnetostatic Waves and Devices  
PA Physical Acoustics  
PAS Photoacoustics  
PM Porous Media  
TFB Thin Films (Bulk & Optical Devices)

### GROUP 4:

ACE Acousto-Electric Effects and Devices  
SFT SAW Filters and Transducers  
SMP SAW Materials and Propagation  
SRO SAW Resonators and Oscillators  
SSA SAW System Applications  
SSP SAW Signal Processing  
TFS Thin Films (Surface Wave Devices)

Authors of contributed and invited papers are requested to submit an abstract, using the format on the next page to:

Dr. Jan Brown  
c/o LRW Associates  
1218 Balfour Dr.  
Arnold, MD 21012

The abstract original (unfolded) and 20 copies should be provided.  
Deadline for receipt of abstracts is **Monday, June 1, 1987.**

Each abstract will receive careful evaluation. A good abstract clearly explains the paper's intent and content. Evaluation criteria will include: contribution to the state of the art, originality of the work, and overall interest to the ultrasonic community.

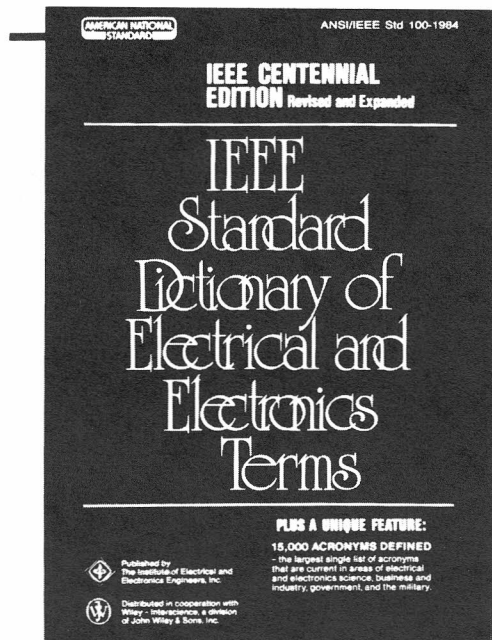
**POSTER SESSIONS** will provide an alternative format which allows greater flexibility for the presentation of new work.

**STUDENT TRAVEL SUPPORT** — Some limited travel assistance is available to support student attendance at the Symposium. Awards will be made on a competitive basis. Further information and applications can be obtained from: G.W. Farnell, Dept. of Electrical Engineering, McGill University, McConnell Engineering Bldg., 3480 University, Montreal, Quebec H3A 2A7, Canada. The deadline for applications will be July 1, 1987.

# The Right Tool for the Correct Meaning

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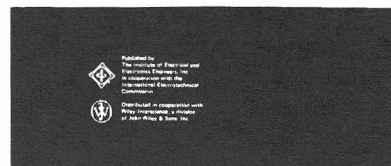
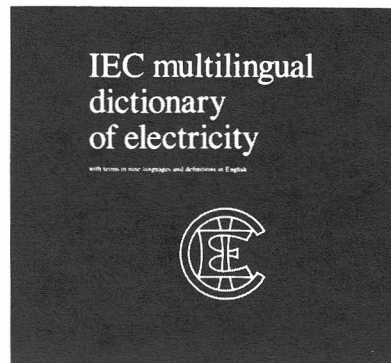
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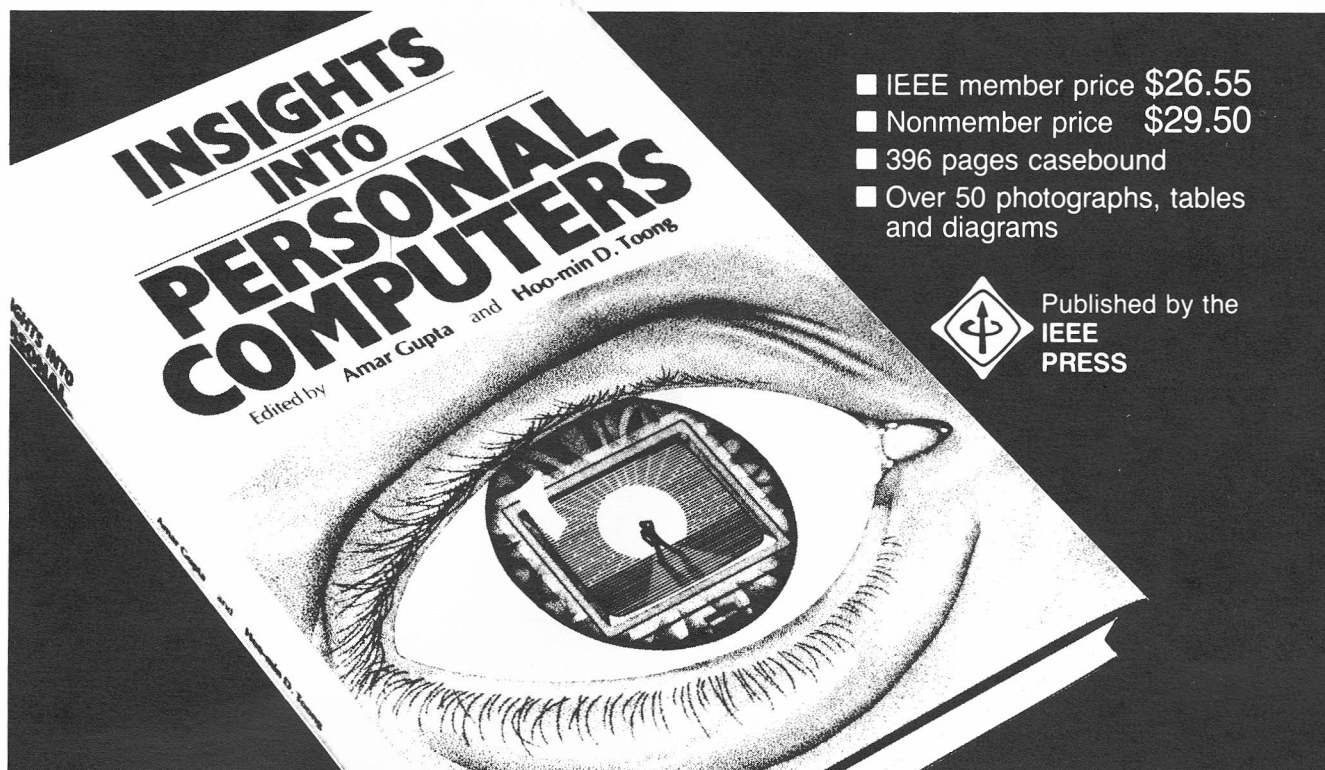
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