IEEE SOCIETY ON MICROWAVE THEORY AND TECHNIQUES

NEWSLETTER

EDITOR: *S. L. March*

Microwave Division, CGIS, 7701 North Lamar Boulevard, Austin, Texas 78752

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THE 1983 IEEE MTT-S INTERNATIONAL MICROWAVE SYMPOSIUM

Boston, Massachusetts

June 1-4, 1983

by H. Howe, Jr.

On behalf of the Symposium Steering Committee it gives me great pleasure to invite you to attend the 1983 IEEE MTT-S International Microwave Symposium to be held in Boston. Since 1967, when the last MTT-S Symposium was held in Boston, dramatic changes have occurred in the city of Boston, to the MTT Society, and to the size and significance of our annual Symposium. I hope you can share the expanded Symposium activities with us.

This year's Symposium will be held in the Sheraton-Boston Hotel, which has ample facilities for a large meeting such as ours. The meeting halls are spacious, with high ceilings and good acoustics. This year we have reduced the number of parallel sessions from four to three in order to minimize conflicts and allow the attendees to hear more of the papers. The topics to be covered include: filters and passive networks, near millimeter-wave techniques, millimeter-wave solid-state devices, microwave biological effects, GaAs FET amplifiers and oscillators, millimeter-wave integrated circuits, acoustics and ferrites, systems applications of GaAs, microwave measurements, new effects in guided wave structures, microwave systems, IMPATT diode power combiners, semiconductor control, microwave measurements for MICs, microwave integrated circuits, microwave communication systems, low noise receiver technology, and field theory. In addition, we have introduced "open forum" sessions in the late afternoon to afford additional coverage to a variety of these topics. These sessions have been arranged to avoid conflicting activities. The open forum or poster session concept has found wide acceptance at the annual European Microwave Conference and at many IEEE Society meetings. This will be the first time that it will be utilized at an MTT-S Symposium. At the conclusion of the Symposium, we would welcome feedback concerning its effectiveness.

In addition to the regular technical program, two Panel Sessions will be held on Wednesday evening, June 1st. One is *Commercial Applications of Microwaves*, sponsored by Technical Committee MTT-7 and the other is *Are Active Aperture Systems Here At Last*, sponsored by MTT-6. Four Workshops have also been organized. *Broadband Matching and Design of Microwave Amplifiers*, will be held from 8:30 AM to 5:30 PM on Monday, May 30th. The workshop *Modern Mixer Technology* will be held from 8:30 AM to 5:30 PM on Tuesday, May 31st. At the same time, a third workshop will be held on *Hyperthermia for Cancer Therapy*. The *Automated RF Techniques Group* workshop will be held after the Symposium on June 6th and 7th at the Holiday Inn in Burlington, Massachusetts.

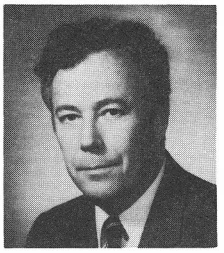
Again this year, the 1983 IEEE Microwave and Millimeter-Wave Monolithic Circuits Symposium will be held in conjunction with the MTT-S International Symposium. Technical sessions on signal

processing, device processing, millimeter-wave circuits and power amplifiers will be held from 8:30 AM to 4:20 PM on Tuesday, May 31st. A session joint with the MTT Symposium covering monolithic amplifiers will be held Wednesday morning, June 1st.

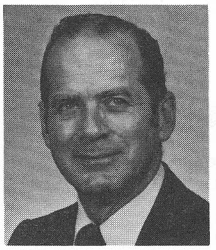
In addition to a very complete technical program, we have also developed an outstanding social program. It begins with a museum reception to be held Tuesday evening at the Boston Museum of Fine Arts. This reception will be hosted by the Microwave Journal, which is celebrating its 25th birthday this year. All attendees at the Symposium and their guests are welcome at the Microwave Journal reception at no charge. Continuous transportation will be provided between the Sheraton-Boston and the museum. For those guests attending the Symposium, we have arranged three daytime tours covering the Newport, Rhode Island mansions, an introduction to Boston, and a tour of the historic and literary points of interest in Lexington and Concord. The Newport, Rhode Island tour is an all day event with lunch and a wine and cheese snack included on the return trip. The tour of Boston is a morning event which ends at the restored Faneuil Hall Marketplace. Participants can either return at that time to the Hotel or leave the tour for lunch and shopping in the Quincy Market area. The tour of Lexington and Concord includes lunch at the historic Colonial Inn in Concord.

The Awards Banquet will be held on Thursday evening, June 2nd. This year we are honoring Mr. Marion Hines as the recipient of the Microwave Career Award. The Microwave Applications Award will be presented to Mr. Les Besser for the development and application of COMPACT. The Microwave Prize will be presented to Mr. Kazuhiko Honjo and Dr. Yoichiro Takayama for their paper "GaAs FET Ultra-broadband Amplifiers for Gbit/s Data Rate Systems" and the Distinguished Microwave Lecturer's Award will be presented to Dr. Joseph A. Giordmaine for his lecture on *Integrated Optics*. The new MTT-S sponsored Fellows of the IEEE will also be honored. In addition to the opportunity to honor these members of the Society, the Awards Banquet will prove to be especially memorable when our speaker, Dr. Carl Sagan, will present a special talk entitled *In Search of Extraterrestrial Intelligence*. Dr. Sagan is well known for his unique 13-part television series, COSMOS, one of the most widely watched in the history of American Public Television. He is also the winner of a Pulitzer Prize for *Dragons of Eden*. Dr. Sagan has personally played a leading role in the Mariner, Viking, and Voyager space expeditions. To ensure that you can enjoy this special evening with us, be sure to make your reservations early.

I would like to take this opportunity to thank the many members of the Steering Committee who have worked so long and so hard to bring you an outstanding Symposium. Without the dedicated help of these volunteers, this meeting would not be possible. I look forward to seeing you in Boston in June.



Harlan Howe, Jr.
Chairman
Steering Committee



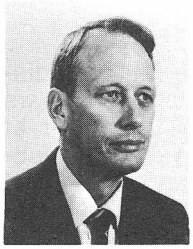
PRESIDENT'S REPORT

by C. T. Rucker

Elsewhere in this Newsletter you will find Harlan Howe's introduction to this year's International Microwave Symposium and Ralph Levy's report on the technical program; the *open forum* sessions are Ralph's experiment and I look forward to them. You can read about our newest award, the MTT-S Distinguished Service Award, and about its first recipient, Ted Saad, who richly deserves it. There is information concerning potential plans for the 1987 MTT-S Symposium, which would break new ground for our Society. Another important item is the report on the most recent TAB (Technical Activities Board) meeting, prepared by George Oltman, who represented MTT-S at the meeting in my absence. George also reports on our most recent Administrative Committee meeting.

Now, why have I chosen to list these people and activities? Because I hope you will consider for a moment the tremendous volunteer effort that makes the Microwave Theory and Techniques Society the success that it is. Harlan didn't really have to do it; nor did Ralph, Ted, or George—nor any of the hundreds of volunteers who make MTT-S click and who make your annual Symposium a pleasure to attend. Since taking an active role in MTT activities, I have found (admittedly to my surprise) that nearly every volunteer does so because of a deep-seated love for microwaves and a desire for our Society to remain a vital force of and for its membership. In my sometimes skeptical way, I had expected to find some less altruistic motives.

Because of hundreds of volunteers, MTT-S is healthy; it could be healthier with **your** help. So, the next time that we err or steer the Society in a direction which you feel is wrong, complain loudly and point a finger at us; then VOLUNTEER. Almost every MTT-S decision is made by a member who did. I look forward to June, Boston and the Symposium. I hope to see you there, too!



ADCOM HIGHLIGHTS

by H. G. Oltman, Jr.

Charlie Rucker, our new MTT-S President, started off the first 1983 AdCom meeting with great speed. In 15 minutes he motivated the AdCom to authorize the expenditure of 22.5 thousand dollars. The next $10,000 took longer, however. Funded were future symposia, computerization of the Transaction Editor's records, the Historical Exhibit, and partial support of the new Journal of Light Wave Technology, and a new student publication, *Potentials*.

Innovative Bootstrap Education Program

Bob McIntosh, Professor of Engineering at the University of Massachusetts, Amherst outlined the University's "bootstrap" microwave education program, which he has been instrumental in developing. This innovative program, in cooperation with industry, trains working engineers for a master's degree in microwave engineering. Raytheon, the first cooperating company, has given a $100,000 grant to UM which, in turn, has provided two semesters of concentrated microwave training for ten Raytheon engineers. Work on their theses was conducted at Raytheon.

Everyone benefits. The engineers receive a stipend while obtaining a master's degree. The company gets a better trained engineer and the university gets funding to expand its faculty and its program, and to attract more students. Synergistically, UM attracts more funding through other grants worked by the added faculty and by other new students.

MTT Fellowships, Scholarships, and Grants-in-Aid

The AdCom approved three programs to assist students and educational institutions in furthering microwave education. The programs include microwave fellowships, microwave graduate assistant scholarships, and educational grants-in-aid. More information on these programs will be forthcoming when the mechanisms to service requests has been fully organized.

Distinguished Service Award

One of the important functions of the Society is to honor its members who distinguish themselves by their contributions to the technology or their service to the Society and the public. In January, AdCom approved the Distinguished Service Award and chose its first recipient, Mr. Theodore S. Saad. (See the accompanying story on page 4).

Is There Going to be a 1987 MTT Symposium?

The Meetings and Symposia Committee has not been able to find a Chapter willing to host the 1987 MTT-S Symposium. In the meantime, available sites large enough to house our Symposium are being taken by others. A group of AdCom members and friends have volunteered to investigate Las Vegas as the 1987 Symposium site. If this site is found feasible, they will make a formal proposal to AdCom at the June 1983 meeting.

Membership at an All-Time High

Membership Chairman Ed Niehenke reported that the MTT-S membership has grown to 6,968. Substantial credit for this increase is due to his enthusiastic efforts and innovative ideas.

A New MTT Rapid-Reporting Publication?

Don Parker reported to AdCom about his investigation regarding starting a new rapid-reporting publication, MTT-S LETTERS. The mechanics of how the LETTERS could be published has been worked out by his committee, but the most vexing discussion has been on the need for such a publication. It is not clear whether microwave technology needs a rapid means of publication. It should be noted that in a straw vote of AdCom, the three past Editors of the Transactions were not in favor of an MTT-S LETTERS. What is your opinion? Let Don Parker or any AdCom member know. The proposed journal is on shaky grounds.

Blizzard Doesn't Stop TPC and AdCom

The 1983 MTT-S Symposium Technical Program Committee (TPC) met the day before the AdCom meeting and made the laborious and difficult selection of papers for our upcoming Symposium in June. Had the blizzard that blanketed the Northeast the day before been worse, the TPC meeting may not have occurred—at least then. Some of the attendees were 5 hours late getting to the hotel. It is not a laughing matter when one considers the effect on the Symposium that a 2 or 3 weeks delay in getting the TPC together again would cause. We may be wise to hold our TPC meeting in more favorable climates in the future.

Security Clearance of Symposium Papers?

Concern is developing among Symposia Committees after the near subversion of a recent symposium when a Department of Defense official threatened to require authors to withdraw their papers. As a result, new rules will go into effect this year. Authors will be required to provide evidence of clearance before publication in the Symposium Digest if an acknowledgment to a DoD agency appears in his paper. Also, the approval of his company will have to be provided. Lastly, any request by a DoD agency for paper withdrawal will have to be made in writing before the Symposium committee will act on it.

Index of Symposia Digests

Peter Staecker, who is responsible for compiling an index of all MTT-S Symposium Digests, reported that the earliest publication date would be September 1983. However, a motion was made to delay publication, if necessary, to include papers from the 1983 MTT-S Symposium Digest. Publication of this index will complete the coverage the all MTT publications, since an index covering MTT Transactions was published in 1981.

FIRST MTT-S DISTINGUISHED SERVICE AWARD

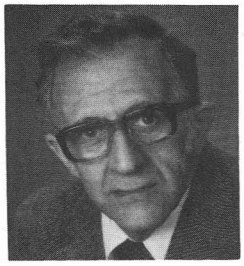
Background

At its January 18, 1983 meeting, the Administrative Committee of the Microwave Theory and Techniques Society voted to amend its by-laws, inaugurating new MTT-S award, **The Distinguished Service Award.**

The purpose of the award is to honor an individual who has given outstanding service for the benefit and advancement of the Microwave Theory and Techniques Society. The awardee must be a member of the IEEE and of the MTT Society. The award shall be considered annually, but may not necessarily be presented annually if no candidate is considered suitable in the judgment of the MTT-S Administrative Committee.

Recipient

By unanimous vote, **Theodore S. Saad** has been selected by the MTT Society's Administrative Committee as the first recipient of its Distinguished Service Award *"For His Outstanding and Dedicated Service to the Microwave Theory and Techniques Society."*



Ted has given dedicated service and leadership to the MTT Society for over three decades, the entire span of the Society to date. He has been an outstanding contributor to the success of the Society from its conception to date. His service covers nearly every possible role in the Society including the first Chairman of the Boston Chapter, Local Arrangements Chairman for the 1959 MTT-S Symposium, Technical Program Committee Chairman for the 1967 MTT-S International Microwave Symposium, Newsletter Editor, Microwave Theory and Techniques Transactions Editor (September 1954 to October 1956), and the MTT-S National Lecturer (1972). Mr. Saad has been a member of the Society's Administrative Committee since 1953 and has served as its Vice Chairman (1958) and Chairman (1959), and currently serves in the capacity of Historian. He has presented Keynote Addresses at past Symposia and is responsible for the establishment and maintenance of the MTT-S Historical Exhibit, displayed each year in conjunction with the annual MTT-S International Microwave Symposium. Ted has also been elected an Honorary Life Member of the Microwave Theory and Techniques Society.

Biography

Except for a six month period immediately following graduation from Massachusetts Institute of Technology in 1941, Mr. Saad has worked his entire professional career as a microwave engineer. His main efforts, in the design and development of passive components, have resulted in sixteen patents being awarded to him.

Mr. Saad spent four years at the M.I.T. Radiation Laboratory as a research associate, four years at the Submarine Signal Company, one year at Sylvania, and four years at Microwave Development Laboratories as Vice President and Chief Engineer. In early 1955, Mr. Saad became co-founder, President, and Chairman of the Board of Sage Laboratories, Inc., positions which he still holds.

In addition to his MTT Society activities noted earlier, Ted has also been an active member of the IEEE. He is presently Chairman of its Public Information Committee and a member of the Electro Board. Mr. Saad was Electro Board Chairman in 1980. He was elected a Fellow of the IEEE in 1965.

In 1958, Mr. Saad co-founded Horizon House Microwave, Inc., which publishes *The Microwave Journal*. He is currently a consulting editor to the Microwave Journal. Mr. Saad was also a co-founder of Artech House, Inc., a publisher of technical books.

For four years, he was a member of the National Academy of Sciences panel, advisory to the Radio Standards Engineering Division of the Institute for Basic Standards of the National Bureau of Standards. He was Chairman in 1969 and 1970.

Mr. Saad was Chairman of the Board of the South Middlesex Area Chamber of Commerce of Massachusetts in 1977 and 1978. He was Chairman, and is currently Vice Chairman, of the Board of Family Health Plan of Massachusetts. Mr. Saad is also a member of the Board of the Commonwealth Gas Company of Massachusetts.

IEEE CENTENNIAL

The American Institute of Electrical Engineers (AIEE) was founded in New York on May 13, 1884. The Institute of Radio Engineers (IRE) was also founded in New York on May 13, but in 1912. The AIEE and the IRE were combined on January 1, 1963 to form the Institute of Electrical and Electronic Engineers.

The IEEE Centennial, its one-hundredth anniversary, will be recognized by a series of seven unique activities, as well as special recognition at the major conventions. The seven activities in 1984 are:

- **The IEEE Founders Centennial Program**
  This activity is to be held on Jan. 30 in Dallas, Texas. The program will be in conjunction with the IEEE 1984 Power Engineering Society Winter Meeting. (The power systems field was its first technological emphasis when the AIEE was formed.)

- **The IEEE Centennial Conference for the Technical Press**

  This new conference will be held Feb. 21 and 22 in Washington, D.C. The Technical Activities Board has taken the lead in developing this first conference ever to share a broader understanding of electro-technological development with the technical press and other media.

- **The IEEE 1984 Conference on U.S. Technology Policy**

  This conference will be held on Feb. 22 and 23 in Washington, D.C. It will be the sixth conference in this series, and special effort is being made to increase the influence and technical support to and within the operation of the U.S. government.

- **The IEEE Centennial Anniversary Celebration**

  This unique event will be held on May 13 (Sunday) in New York, NY. The activities planned thus far include the unveiling of our one-hundredth anniversary plaque at the United Engineering Center and a reception at the United Nations in recognition of our transnational organization.

- **The IEEE Centennial Convocation**

  This most prominent event of the Centennial will be held on May 14 in Boston, Mass. Centennial Day activities will include the IEEE Awards Reception and luncheon at noon, the reception for the 100 Learned Societies in the afternoon and the Centennial Convocation in the evening. The latter will be a black-tie dinner and will feature a dramatization depicting the great engineers and scientists that made electro-technology possible, as well as an address by a distinguished guest.

- **The IEEE Centennial Technical Convocation**

  The first IEEE technical meeting was held in Philadelphia, Pa., in Oct. 1884. A program to be held Oct. 8 and 9 at the Franklin Institute in that city will commemorate this meeting. This event is the technical capstone of the Centennial and will have the theme, "The Second Century Begins."

- **IEEE Centennial Keys to the Future**

  The concluding event will be held on Dec. 1 in Santa Clara, Calif. The thrust of this closing event will be the transfer of responsibility for the future of electrotechnology to the younger members of *The Institute*.

In addition, special programs are being planned for the major conventions including Southcon (Jan. 17-19 in Orlando, Fla.), Electro (May 15-17 in Boston, Mass.), Midcon (Sept. 11 and 12 in Dallas, Texas), Eurocon (Sept. 26-30 in Brighton, England), and Wescon (Oct. 30-Nov. 1 in Anaheim, Calif.). Region 10 is also planning a conference, Tencon '84, in Singapore.

NEW BOOKS

Wiley-Interscience has announced the publication of **VLSI Fabrication Principles: Silicon and Gallium Arsenide** by Sorab K. Ghandhi of Rensselaer Polytechnic Institute. The 672 page book is available for $47.50 from Wiley-Interscience, 605 Third Avenue, New York, NY 10158, (800) 526-5368.

Edited by Kenneth J. Button of MIT National Magnet Laboratory, Volume 7 of **Infrared and Millimeter Waves** is now available from Academic Press, Inc., 111 Fifth Avenue, New York, NY 10003. The particular volume is entitled Coherent Sources and Applications, Part II and consists of approximately 550 pages.

Radar Calculations Using the TI-59 Programmable Calculator by William Skillman has been recently published by Artech House, Inc., 610 Washington Street, Dedham, Massachusetts 02026 (617) 326-8220. The book includes 33 ready-to-use programs for the TI-59 calculator. The 500 page volume contains six chapters plus appendices and is priced at $50.00.

EMPLOYMENT GUIDE FOR ENGINEERS

Unemployed engineers and those seeking a job change have a Guide to help them, the *Employment Guide for Engineers and Scientists*, prepared by the United States Activities Board (USAB).

The Guide, according to its editor-in-chief Richard J. Backe, is written by people in or close to engineering with direct experience in the subjects covered in the Guide. Mr. Backe, who serves as leader of USAB's Task Force on Employment Assistance, wrote a chapter on resume preparation, basing it on his own experience in interviewing applicants for employment, and on a survey of 50 major employers of engineers that determined what they look for in reviewing resumes.

Other chapters address career planning, interviewing, strategies for considering salary and fringe benefit offers, pre-employment agreements and employment contracts, and the role of employment agencies. The Guide also includes a directory of companies and employment agencies.

The Guide is distributed free of charge to unemployed members through the IEEE Washington Office. Others may purchase the Guide (Members $7.50; Nonmembers $10.00) through the IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854, Catalog No. UH0156-0.

RADAR TECHNOLOGY COURSE

The Boston IEEE Aerospace and Electronics Systems Society will be presenting its one-day Radar Technology course in San Jose, California April 18, 1983. The course is framed around the 432 page book, Radar Technology, edited by Dr. Eli Brookner, of the Raytheon Company Equipment Division, who is the course lecturer. The course will be held at the Hyatt Hotel in San Jose, from 8:00 AM to 9:30 PM. The cost, which includes the course text and supplemental notes, lunch and dinner is a modest $125 for IEEE members or $140 for non-IEEE members. Further information is available from Dr. Brookner at Raytheon Company, Equipment Division, Boston Post Road, Wayland, MA 01778, (617) 358-2721, extension 2366.

TPC CHAIRMAN'S MESSAGE

by R. Levy

The 1983 IEEE MTT-S International Microwave Symposium will be held on Wednesday, June 1st, through Friday, June 3rd. Since the workshops commence on Monday, May 30th, we will have a complete week of microwave activities; more if we include the ARFTG workshop on June 6th and 7th. The second annual IEEE MTT-S Microwave and Millimeter-Wave Monolithic Circuits Symposium commences on Tuesday, May 31, and a joint session with the main symposium, open to attendees of either, will be held on Wednesday, June 1st. Details of all activities are listed in the programs which follow.

There was an excellent response to the Call for Papers, with 282 papers being submitted to the MTT-S Symposium, and an additional 48 to the monolithic circuits symposium. The corresponding acceptances were 158 papers for the former and 23 for the latter. Including invited papers, about 184 papers will be presented in the 4 days.

Papers were received from 18 different countries; 58% of the total being from the USA. The acceptance ratio of USA papers was slightly higher than that for the rest of the world. However, there were 5 countries having higher acceptance rates than the USA, a good indication of our objectivity and of the true international flavor of our Symposium.

For the purposes of paper selection the 81 members of the Technical Program Committee were divided into 13 subcommittees. There was a very good balance of papers delegated to these subcommittees, indicating a healthy level of activity in all areas of microwaves. In addition to the expected heavy flood of papers on solid-state technology, there were over 50 papers submitted in the traditional areas of filters and passive components. Will we have to split this subcommittee into two for next year?

For the first time, authors of contributed papers were provided with comments from the appropriate technical subcommittee. One of the most common causes of rejection was failure to provide convincing documentation of originality and interest. Some authors submitted only one page or less of material and no figures. There is little doubt that more papers would have been accepted if the authors had complied with the requirements.

For several years, there has been debate over the introduction of Poster Sessions; this year they are finally being implemented. We expect to provide facilities superior to those of other conferences, and, hence, have decided to use the term *Open Forum Session* to stress the difference. Authors should find ample display space available, with facilities to demonstrate equipment, even those requiring 120 volts, 60 Hertz AC. There will be two Open Forum Sessions; one on Wednesday, June 1st, and one on Thursday, June 2nd, from 4-6 pm. Although no inducement for attendance is implied, refreshments will be provided during the Open Forum Sessions.

The Constitution Room will comfortably accommodate the 20 papers scheduled for each of the two Open Forum Sessions. This room is adjacent to the Grand Ballroom, where one of the regular sessions will be held. As we stated in our Call for Papers, this should be a fresh alternate way of experiencing papers at the Symposium. Not only that, it has enabled us to reduce the number of parallel sessions from 4 to 3, diminishing potential conflicts between sessions.

Reading through the abstracts of the papers submitted to the Technical Program Committee, I was impressed by the great variety of topics covered and by the generally high standard of the papers. The trends are to higher frequencies, higher power, lower noise figure, smaller size, and better comprehension. There is an excellent balance between theory and experiment, both within individual papers, and throughout the papers as a group. It would be difficult to imagine any active worker in the field not being able to take note of several papers of interest.

This Symposium should help refute the suggestions sometimes made that it is intended solely for a small elite group. Rather it is the elite who are presenting their best work for the benefit of the entire microwave community.

On behalf of my Co-Chairman, Gordon Riblet, and the Technical Program Committee, I hope that you will attend the Symposium and will depart with something of value.

SCHEDULE OF EVENTS

GRAND BALLROOM	REPUBLIC BALLROOM	INDEPENDENCE ROOMS (East, Center, West)	CONSTITUTION ROOM
MONDAY, MAY 30, 1983			
		8:30 a.m. - 5:30 p.m. WORKSHOP ON BROADBAND MATCHING (Center, East)	
TUESDAY, MAY 31, 1983			
8:30 a.m. - NOON MW & MMW MONOLITHIC CIRCUITS SYMPOSIUM		8:30 a.m. - 5:30 p.m. WORKSHOP ON MIXER TECHNOLOGY (Center, East)	
1:15 p.m. - 4:20 p.m. MW & MMW MONOLITHIC CIRCUITS SYMPOSIUM		8:30 a.m. - 5:30 p.m. WORKSHOP ON MICROWAVE HYPERTHERMIA (West)	
WEDNESDAY, JUNE 1, 1983			
8:30 a.m. - 9:00 a.m. OPENING SESSION			
9:00 a.m. - NOON MW & MMW MONOLITHIC SYMPOSIUM	9:00 a.m. - NOON FILTERS AND PASSIVE NETWORKS I	9:00 a.m. - NOON NEAR MILLIMETER-WAVE TECHNIQUES	
1:40 p.m. - 4:00 p.m. MILLIMETER WAVE SOLID-STATE	1:40 p.m. - 4:00 p.m. FILTERS AND PASSIVE NETWORKS II	1:40 p.m. - 4:00 p.m. MICROWAVE BIOLOGICAL EFFECTS	4:00 p.m. - 6:00 p.m. OPEN FORUM SESSION I
	8:00 p.m. - 10:00 p.m. PANEL SESSION "ACTIVE APERTURES"	8:00 p.m. - 10:00 p.m. PANEL SESSION "COMMERCIAL MICROWAVES"	
THURSDAY, JUNE 2, 1983			
8:40 a.m. - 11:20 a.m. GaAs FET AMPLIFIERS AND OSCILLATORS	8:40 a.m. - 11:20 a.m. MILLIMETER WAVE INTEGRATED CIRCUITS	8:40 a.m. - NOON ACOUSTICS AND FERRITES	
1:40 p.m. - 4:20 p.m. SYSTEMS APPLICATIONS OF GaAs FETs	1:40 p.m. - 4:40 p.m. MICROWAVE MEASUREMENTS	1:40 p.m. - 4:20 p.m. NEW EFFECTS IN GUIDED WAVE STRUCTURES	4:00 p.m. - 6:00 p.m. OPEN FORUM SESSION II
7:30 p.m. AWARDS BANQUET			
FRIDAY, JUNE 3, 1983			
8:40 a.m. - 11:40 a.m. MICROWAVE SYSTEMS	8:40 a.m. - 10:00 a.m. IMPATT DIODE POWER COMBINERS	8:40 a.m. - 9:40 a.m. MICROWAVE MEASUREMENTS FOR MIC	
	10:20 a.m. - 11:40 a.m. SEMICONDUCTOR CONTROL	10:00 a.m. - 11:40 a.m. MICROWAVE INTEGRATED CIRCUITS	
1:40 p.m. - 3:00 p.m. MICROWAVE COMMUNICATIONS SYSTEMS	1:40 p.m. - 4:40 p.m. LOW NOISE RECEIVER TECHNOLOGY	1:40 p.m. - 3:00 p.m. FIELD THEORY	

1983 IEEE MTT-S INTERNATIONAL MICROWAVE SYMPOSIUM

WEDNESDAY MORNING, JUNE 1, 1983

Grand Ballroom
WELCOME

8:30 am — STEERING COMMITTEE CHAIRMAN
H. Howe, M/A-COM, Inc., Burlington, MA

8:40 am — MTT SOCIETY ADMINISTRATIVE COMMITTEE PRESIDENT
C. Rucker, Georgia Institute of Technology, Atlanta, GA

8:50 am — TECHNICAL PROGRAM COMMITTEE CHAIRMAN
R. Levy, Microwave Development Labs, Inc., Natick, MA

Grand Ballroom
MONOLITHIC AMPLIFIERS

Chairman: R. Decker, Lehigh University, Bethlehem, PA

9:00 am A1 — BROADBAND MONOLITHIC LOW NOISE FEEDBACK AMPLIFIERS
P. N. Rigby, J. R. Suffolk, R. S. Pengelly, Plessey Research (Caswell) Ltd., Caswell, England

9:20 am A2 — 2-6 GHz MONOLITHIC MICROWAVE AMPLIFIER
W. O. Camp, Jr., S. Tiwari, D. Parsons, IBM Federal Systems Division, Owego, NY

9:40 am A3 — WIDEBAND, HIGH GAIN, SMALL SIZE MONOLITHIC GaAs FET AMPLIFIERS
V. Pauker, M. Binet, Laboratoir d'Electronique et de Physique Appliquee, France

10:00 am — BREAK

10:30 am A4 — 12 GHz-BAND LOW-NOISE GaAs MONOLITHIC AMPLIFIERS
H. Itoh, T. Sugiura, T. Tsuji, K. Honjo, Y. Takayama, Nippon Electric Co., Ltd., Kanagawa, Japan

10:50 am A5 — GaAs MONOLITHIC MICs FOR DIRECT BROADCAST SATELLITE RECEIVERS
S. Hori, K. Kamei, K. Shibata, M. Tatematsu, K. Mishima, S. Okano, Toshiba Corporation, Kawasaki, Japan

11:10 am A6 — MINIATURIZATION OF A BAND-X MONOLITHIC GaAs AMPLIFIER
P. Dueme, M. Le Brun, P. R. Jay, C. Rumelhard, Thomson CSF, Orsay, France

11:30 am A7 — GaAs MONOLITHIC LUMPED ELEMENT MULTISTAGE MICROWAVE AMPLIFIER
K. P. Weller, G. D. Robinson, A. Benavides, R. D. Fairman, TRW, Inc., Redondo Beach, CA

Republic Ballroom
FILTERS AND PASSIVE NETWORKS I

Chairman: H. C. Bell, Wavecom, Inc., Northridge, CA

9:00 am B1 — A 12-CHANNEL CONTIGUOUS BAND MULTIPLEXER AT Ku-BAND
M. H. Chen, TRW, Inc., Redondo Beach, CA

9:20 am B2 — ASYMMETRIC CANONICAL DIELECTRIC RESONATOR FILTERS
S. J. Fiedziuszko, Ford Aerospace and Communications Corp., Palo Alto, CA

9:40 am B3 — TRIPLE-MODE TRUE ELLIPTIC-FUNCTION REALIZATION FOR SATELLITE TRANSPONDERS
W. C. Tang, Com. Dev. Ltd., Cambridge, Ontario, Canada; S. K. Chaudhuri, University of Waterloo, Waterloo, Ontario, Canada

10:00 am B4 — A CONTIGUOUS BAND MULTIPLEXER DESIGN
R. Egri, A. E. Williams, A. E. Atia, COMSAT Laboratories, Clarksburg, MD

10:20 am — BREAK

10:40 am B5 — A NEW NARROW BAND DUAL-MODE BANDSTOP WAVEGUIDE FILTER
Qian Jing-Ren, China University of Science & Technology, Hefei, Anhui, China
Zhuang Wei-Chen, Zian Institute of Radio Technology, Zian, Shanxi, China

11:00 am B6 — PARALLEL-COUPLED STRIP-LINE RESONATOR FILTERS HAVING MULTI-COUPLED SECTION
M. Makemoto, S. Yamashita, Matsushita Research Institute, Inc., Tokyo, Japan

11:20 am B7 — LUMPED MODE MICROWAVE RESONANT STRUCTURES, M. Mehdizadeh, T. K. Ishii, J. S. Hyde, W. Froncisz, Marquette University, Milwaukee, WI

11:40 am B8 — MILLIMETER WAVE PRINTED CIRCUIT SPURLINE FILTERS
C. Nguyen, C. T. Hsieh, D. Ball, Hughes Aircraft Co., Torrance, CA

Independence Room
NEAR-MILLIMETER-WAVE TECHNIQUES

Chairman: K. J. Button, National Magnet Laboratory, M.I.T., Cambridge, MA

9:00 am C1 — ULTRA-FAST OPTOELECTRONIC DEVICES FOR MILLIMETER WAVES
C. H. Lee, A. M. Vaucher, M. K. Li, C. D. Striffler, University of Maryland, College Park, MD

9:20 am C2 — PERFORMANCE OF METAL MESHES AS A FUNCTION OF INCIDENCE ANGLE
H. M. Picket, J. Farhoomand, A. E. Chiou, Jet Propulsion Laboratory, Pasadena, CA

9:40 am C3 — A SUBMILLIMETER WAVE QUASI-OPTICAL FREQUENCY DOUBLER
M. A. Frerking, H. M. Pickett, J. Farhoomand, Jet Propulsion Laboratory, Pasadena, CA

10:00 am C4 — A BROADBAND LOW-NOISE 205 GHz RADIOMETER
M. A. Frerking, J. Hardy, W. J. Wilson, P. Zimmerman, Jet Propulsion Laboratory, Pasadena, CA

10:20 am — BREAK

10:40 am C5 — SURFACE WAVE LOSSES OF COPLANAR TRANSMISSION LINES
D. B. Rutledge, D. P. Kasilingam, California Institute of Technology, Pasadena, CA

11:00 am C6 — EFFECTIVE CROSS-SECTIONS FOR DIELECTRIC WAVEGUIDES IN SUBSTRATE ENVIRONMENTS
E. F. Kuester, University of Colorado, Boulder, CO

11:20 am C7 — ANALYSIS OF MULTIPLE DIELECTRIC W/G SYSTEMS WITH EXTENDED POINT MATCHING METHOD
E. Yamashita, Y. Nishino, K. Atsuki, University of Electro-Communications, Tokyo, Japan

11:40 am C8 — IMAGE FORMATION IN CIRCULAR WAVEGUIDES AND OPTICAL FIBERS
A. R. Mahnad, E. F. Kuester, University of Colorado, Boulder, CO

WEDNESDAY AFTERNOON, JUNE 1, 1983

Grand Ballroom
MILLIMETER-WAVE SOLID-STATE DEVICES

Chairman: S. Dixon, U.S. Army ERADCOM, Fort Monmouth, NJ

1:40 pm D1 — A COMPARISON OF THE PERFORMANCE OF MILLIMETER WAVE SEMICONDUCTOR DEVICES AND CIRCUITS
D. C. Smith, T. J. Simmons, Plessey Research (Caswell) Ltd., Towcester, England

2:00 pm D2 — UNBIASED, SUBHARMONIC MIXERS FOR MILLIMETER WAVE SPECTRUM ANALYZERS
R. J. Matreci, R. K. David, Hewlett-Packard Co., Santa Rosa, CA

2:20 pm D3 — MM WAVE FREQUENCY DISCRIMINATOR AIDS REDUCTION OF OSCILLATOR CHIRP
Helmut Barth, AEG Telefunken, Ulm, West Germany

2:40 pm — BREAK

3:00 pm D4 — K- AND Ka-BAND GaAs POWER FETs
Y. Yun, G. Taylor, D. Bechtle, S. Jolly, S. G. Liu, R. L. Camisa, RCA Corp., Princeton, NJ

3:20 pm D5 — MILLIMETER WAVE IMPATT MICROSTRIP OSCILLATORS
P. Yen, D. English, C. Ito, K. Chang, TRW, Inc., Redondo Beach, CA

3:40 pm D6 — A Ka-BAND PIN DIODE SWITCH WITH EXTREMELY LARGE ON-OFF RATIO
R. D. Weglein, D. Y. Kim, R. E. Johnson, L. D.Darlington, Hughes Aircraft Co., Canoga Park, CA

4:00 pm D7 A 60 GHz GaAs FET AMPLIFIER
E. T. Watkins, J. M. Schellenberg, L. H. Hackett, H. Yamasaki, M. Feng, Hughes Aircraft Co., Torrance, CA

Republic Ballroom
FILTERS AND PASSIVE NETWORKS II

Chairman: P. Rizzi, Southeastern Massachusetts University, North Dartmouth, MA

1:40 pm E1 BROADBAND W/G FILTERS WITH WIDE STOPBANDS USING A STEPPED WALL EVANESCENT MODE APPROACH
R. V. Snyder, RS Microwave Company, Inc., Butler, NJ

2:00 pm E2 CIRCUIT DUALS ON PLANAR TRANSMISSION MEDIA
W. T. Getsinger, COMSAT Laboratories, Clarksburg, MD

2:20 pm E3 E-PLANE FILTERS WITH FINITE THICKNESS SEPTA
Y. C. Shih, U.S. Naval Postgraduate School, Monterey, CA; T. Itoh, University of Texas, Austin, TX

2:40 pm E4 FILTER REALIZATIONS WITH FIN-LINES
A. S. Omar, H. E. Hennawy, K. Schunemann, Technical University, Braunschweig, West Germany

3:00 pm BREAK

3:20 pm E5 AN 18 GHz 8-WAY RADIAL COMBINER
I. Stones, J. Goel, G. Oransky, TRW, Inc., Redondo Beach, CA

3:40 pm E6 A MATCHED TURNSTILE TYPE 4-WAY DIVIDER/COMBINER
R. L. Eisenhart, N. Nevils, J. Gulick, Hughes Aircraft Co., Canoga Park, CA

4:00 pm E7 ANALYSIS AND DESIGN OF A FOLDED BRANCH LINE COUPLER
J. P. Starski, H. Lunden, Chalmers University of Technology, Gothenburg, Sweden; V. K. Tripathi, Oregon State University, Corvallis, OR

4:20 pm E8 THE CHANNEL WAVEGUIDE TRANSFORMER: AN EASILY FABRICATED H-PLANE TRANSITION FOR THE RECTANGULAR TE_{10} MODE
P. H. Siegel, D. W. Peterson, Columbia University, New York, NY; A. R. Kerr, NASA Goddard Institute, New York, NY

Independence Room
MICROWAVE BIOLOGICAL EFFECTS

Chairman: K. Carr, M/A-COM, Inc., Burlington, MA

1:40 pm F1 A 5.8 GHz MICROWAVE DEVICE FOR HYPERTHERMIA TREATMENT OF CHOROIDAL MELANOMA
S. Packer, P. Finger, Brookhaven National Laboratory, Upton, NY; R. W. Paglione, RCA Laboratories, Princeton, NJ; D. M. Albert, J. Cross, Massachusetts Eye & Ear Infirmary, Boston, MA

2:00 pm F2 MICROWAVE THERMOTHERAPY FOR THE TREATMENT OF HUMAN BRAIN CANCER
A. Winter, J. Laing, Orange Memorial Hospital, Orange, NJ; R. Paglione, F. Sterzer, RCA Laboratories, Princeton, NJ

2:20 pm F3 THE DESIGN OF A MULTI-ELEMENT MICROSTRIP ANTENNA FOR LOCAL HYPERTHERMIA
E. Tanabe, A. H. McEuen, Varian Associates, Inc., Palo Alto, CA; P. Fessenden, Stanford University, Palo Alto, CA

2:40 pm F4 PRESENT RESULTS AND TRENDS IN MICROWAVE THERMOGRAPHY
Y. Leroy, M. Shive, A. Mamouni, M. Robillard, J. C. Van De Velde, University des Sciences et Techniques, Villeneuve d'Ascq, France

3:00 pm BREAK

3:20 pm F5 THE EFFECT OF ANTENNA MATCH ON MICROWAVE RADIOMETRIC THERMAL PATTERNS
K. L. Carr, R. J. Bielawa, J. F. Regan, M/A-COM, Inc., Burlington, MA; A. M. El-Mahdi, J. Shaeffer, East Virginia Medical School, Norfolk, VA

3:40 pm F6 A FERRIMAGNETIC RESONANCE SENSOR FOR REMOTE WIRELESS TEMPERATURE MEASUREMENTS IN ORGANIC TISSUE
P. Roschmann, K. M. Ludeke, Philips GMBH, Hamburg, West Germany

4:00 pm F7 NON-PERTURBED PHOTOLUMINESCENT THERMOMETRY (PLT) SUITABLE FOR MICROWAVE HYPERTHERMIA IN CANCER PATIENTS
P. N. Shrivastava, T. V. Samulski, Allegheny General Hospital, Pittsburgh, PA

4:20 pm F8 MICROWAVE THERMOTHERAPY OF RECURRENT CHEST-WALL CARCINOMA
E. Friedenthal, J. Mendecki, C. Botstein, Albert Einstein College of Medicine, Bronx, NY; F. Sterzer, R. Paglione, RCA Laboratories, Princeton, NJ

LATE WEDNESDAY AFTERNOON, JUNE 1, 1983

Constitution Room
OPEN FORUM SESSION I

G1 THEORY OF THE VARACTOR FREQUENCY HALVER
R. G. Harrison, Carleton University, Ottawa, Canada

G2 STATISTICAL ANALYSIS OF MICROWAVE BALANCED AMPLIFIERS
G. V. Petrov, Moscow Engineering & Physics Institute, Moscow, USSR

G3 A LOSSLESS RADIALLY SYMMETRIC TEM-LINE IMPATT-DIODE POWER COMBINER
R. Actis, D. F. Peterson, University of Michigan, Ann Arbor, MI

G4 EQUIVALENT CIRCUIT OF A KUROKAWA TYPE WAVEGUIDE POWER COMBINER
P. J. Allen, P. J. Khan, University of Queensland, St. Lucia, Queensland, Australia

G5 THE SWITCH ON CHARACTERISTICS AND NOISE OF PULSED READ IMPATTs
D. M. Brookbanks, B. J. Buck, Plessey Research Ltd., Towcester, England

G6 CONSTANT-VOLTAGE BIASING OF INJECTION-LOCKED IMPATT OSCILLATORS
J. L. Chan, TRW, Inc., Redondo Beach, CA

G7 A THEORY FOR THE PREDICTION OF GaAs FET LOAD-PULL POWER CONTOURS
S. C. Cripps, Watkins-Johnson Co., Palo Alto, CA

G8 COMPUTER-CORRECTED LOAD-PULL CHARACTERIZATION OF POWER MESFETs
P. D. Bradley, R. S. Tucker, University of Queensland, St. Lucia, Queensland, Australia

G9 FIELD DISTRIBUTIONS IN THE TRAPPED IMAGE GUIDE
W. B. Zhou, T. Itoh, University of Texas, Austin, TX

G10 ANALSIS OF A WIRE IN A RECTANGULAR CAVITY
H. Rahman, J. Perini, Syracuse University, Syracuse, NY

G11 CONVERGENCE OF NUMERICAL SOLUTIONS OF STEP-TYPE WAVEGUIDE DISCONTINUITY PROBLEMS BY MODAL ANALYSIS
Y. C. Shih, K. G. Gray, U.S. Naval Postgraduate School, Monterey, CA

G12 SIMPLIFIED ANALYSIS OF STRIPLINE MICRO-STRIPLINE AND COPLANAR STRIPS, WITH ANISOTROPIC SUBSTRATES FOR MIC AND SAW APPLICATIONS
S. K. Koul, B. Bhat, Indian Institute of Technology, New Delhi, India

G13 A NEW METHOD FOR SOLVING THE POTENTIAL PROBLEMS WHICH CONTAIN STRAIGHT OR CURVED STRIP CONDUCTORS
S. Murashima, Kagoshima University, Kagoshima, Japan

G14 TAPERED MICROSTRIP TRANSMISSION LINES
P. Bhartia, Defense Research Establishment, Ottawa, Canada; P. Pramanick, University of Ottawa, Ottawa, Canada

N14 SPURIOUS ZONE CHARTS: A PRACTICAL APPROACH TO FREQUENCY CONVERSION SYNTHESIS
A. D. Vincze, Ford Aerospace & Communications Corp., Palo Alto, CA

N15 INVESTIGATION OF A SINGLE SIDEBAND MIXER ANOMALY
B. R. Hallford, Collins Division, Rockwell International, Dallas, TX

N16 DETECTION OF VX2 CARCINOMA IN RABBITS BY PASSIVE MICROWAVE RADIOMETRY
J. Schaeffer, P. E. Parker, A. M. El-Mahdi, East Virginia Medical School, Norfolk, VA; K. L. Carr, M/A-COM, Inc., Burlington, MA

N17 EFFECT OF 330 MHz RADIOFREQUENCY RADIATION OF THE HUMAN ERYTHROCYTE GHOSTS
V. L. Shnyrov, G. G. Zhadan, I. G. Akoev, USSR Academy of Sciences, Moscow, USSR

N18 THE PERFORMANCE OF INDUCTIVE SHORTWAVE DIATHERMY APPLICATORS
G. Kantor, U.S. Department of Health & Human Services, Rockville, MD; C. Y. Moon, University of Maryland, College Park, MD

N19 THE ACCURATE DESIGN OF LOW-NOISE, BROADBAND FET AMPLIFIERS
Y. S. Wu, Tianyin University, Tianyin, China; H. J. Carlin, Cornell University, Ithaca, NY

FRIDAY MORNING, JUNE 3, 1983

Grand Ballroom
MICROWAVE SYSTEMS

Chairman: J. Osepchuk, Raytheon Co., Lexington, MA

8:40 am O1 MICROWAVE TECHNOLOGY—KEY TO AWACS SUCCESS (INVITED)
W. A. Skillman, Westinghouse Electric Corp., Baltimore, MD

9:20 am O2 WIDEBAND ESM RECEIVER UTILIZING INTEGRATED ACOUSTO-OPTIC TECHNOLOGY
A. Grasso, D. Mergerian, Westinghouse Electric Corp., Baltimore, MD

9:40 am O3 A HIGH RESOLUTION TOTAL-POWER RADIOMETER USING SAW COMPRESSIVE RECEIVERS
J. J. Chambers, R. F. Humphryes, Signal Technology Ltd., Swindon, England; C. I. Smith, Andersen Laboratories, Bloomfield, CT

10:00 am BREAK

10:20 am O4 A DOPPLER RADAR SENSOR IN INTEGRATED FIN-LINE TECHNIQUE
L. Szabo, Standard Elektrik Lorenz AG, Stuttgart, West Germany

10:40 am O5 THE HETERODYNE VCO
R. G. Winch, Teledyne Microwave, Mountain View, CA

11:00 am O6 A LIGHTWEIGHT ACTIVE ANTENNA ARRAY USING MINIATURE BERYLLIA AMPLIFIERS
H. C. Johnson, M. Oz, R. E. Marx, J. Rosen, E. Mykietyn, RCA Laboratories, Princeton, NJ

Republic Ballroom
IMPATT DIODE POWER COMBINERS

Chairman: M. E. Hines, M/A-COM, Inc., Burlington, MA

8:40 am P1 3W, Q-BAND SOLID-STATE AMPLIFIERS
G. Jerinic, J. Fines, M. Schindler, Raytheon Company, Lexington, MA

9:00 am P2 A 20 WATT, 20 GHz IMPATT DIODE POWER COMBINER
J. McClymonds, Raytheon Company, Lexington, MA

9:20 am P3 20 GHz HIGH POWER IMPATT TRANSMITTER
Y. C. Ngan, J. Chan, C. Sun, TRW, Inc., Redondo Beach, CA

9:40 am P4 THE EFFECT OF DISSIMILAR IMPATT DIODES ON POWER COMBINING EFFICIENCY
L. Wagner, R. Laton, Raytheon Company, Bedford, MA; R. Wallace, Raytheon Company, Lexington, MA

Independence Room
MICROWAVE MEASUREMENTS FOR MIC

Chairman: H. E. Stinehelfer, Sr., Made-It Associates, Burlington, MA

8:40 am Q1 MEASUREMENT AND COMPUTER-AIDED MODELING OF MICROSTRIP DISCONTINUITIES BY AN IMPROVED RESONATOR METHOD
M. Kirschning, R. H. Jansen, N. H. L. Koster, University of Duisburg, Duisburg, West Germany

9:00 am Q2 THE CALIBRATION OF A UNIVERSAL TRANSISTOR TEST FIXTURE
R. D. Pollard, University of Leeds, England; R. Q. Lane, California Eastern Laboratories, Santa Clara, CA

9:20 am Q3 DIRECT MEASUREMENT OF THE NON-LINEAR M.I.C. OSCILLATOR CHARACTERISTICS USING INJECTION LOCKING POLAR DIAGRAM
A. P. S. Khanna, J. Obregon, University of Limoges, France

Republic Ballroom
SEMICONDUCTOR CONTROL

Chairman: J. F. White, M/A-COM, Inc., Burlington, MA

10:20 am R1 NEW GaAs PIN DIODES WITH LOWER DISSIPATION LOSS, FASTER SWITCHING SPEED AT LOWER DRIVE POWER
N. Jansen, C. Barrett, M/A-COM, Inc., Burlington, MA; A. Christou, Naval Research Laboratory, Washington, DC

10:40 am R2 BROADBAND REFLECTION-TYPE PHASE MODULATORS
C. H. Schieblick, U. Goebel, Technical University of Braunschweig, West Germany

11:00 am R3 AN E-PLANE BROADBAND BI-PHASE BALANCED MODULATOR FOR Ka-BAND
W. Thorpe, British Telecom Research Laboratories, Martlesham, Ipswich, England

11:20 am R4 THE DESIGN OF A NEW SLOTLINE-TYPE FREQUENCY DIVIDER
G. Kalivas, R. G. Harrison, Carleton University, Ottawa, Ontario, Canada

Independence Room
MICROWAVE INTEGRATED CIRCUITS

Chairman: S. L. March, CGIS, Austin, TX

10:00 am S1 PARAMETER INSENTITIVE MATCHING CIRCUITS FOR LOW-COST INTEGRATED CIRCUITS
A. N. Riddle, R. J. Trew, North Carolina State University, Raleigh, NC

10:20 am S2 A CONTOUR FORMULA FOR COMPENSATED MICROSTRIP STEPS AND OPEN ENDS
W. J. R. Hoefer, University of Ottawa, Ontario, Canada

10:40 am S3 DIELECTRIC RESONATOR $HE_{11\delta}$ MODE COUPLING TO A SHIELDED MICROSTRIP LINE
A. P. S. Khanna, GIGA Instrumentation, Courtabeouf, Les Ulis, France; Y. Garault, University of Limoges, France

11:00 am S4 MINIATURE BERYLLIA CIRCUITS FOR Ku-BAND POWER AMPLIFIERS
F. Sechi, R. Brown, P. Jozwiak, G. Rollard, J. Brown, E. Mykietyn, RCA Laboratories, Princeton, NJ

11:20 am S5 AN OVERLOAD PROTECTED LOW-NOISE X-BAND FET AMPLIFIER
E. C. Niehenke, T. E. Steigerwald, Westinghouse Electric Corp., Baltimore, MD

FRIDAY AFTERNOON, JUNE 3, 1983

Grand Ballroom
MICROWAVE COMMUNICATIONS SYSTEMS

Chairman: J. B. Horton, TRW, Inc., Redondo Beach, CA

1:40 pm T1 A BIPOLAR OSCILLATOR FOR THE 6 GHz COMMUNICATIONS BAND
K. R. Varian, Collins Radio Division, Rockwell International, Dallas, TX

2:00 pm T2 CAVITY STABILIZED OSCILLATORS FOR ADVANCED ANALOG AND DIGITAL RADIO LINKS
G. Corbetta, D. Angelis, Marconci Telettra SpA, Vimercate, Milan, Italy

2:20 pm T3 HIGHLY LINEAR SOLID-STATE POWER AMPLIFIERS FOR SSB VIA SATELLITE APPLICATIONS
R. G. Gels, R. D. Standley, R. Trambarulo, D. L. Wilson, Bell Laboratories, Holmdel, NJ

2:40 pm T4 DIRECT MICROWAVE MODULATION AND DEMODULATION
Zhuang Kuenjie, Lin Fuhua, Nanjing Institute of Technology, Nanjing, China

Republic Ballroom
LOW NOISE RECEIVER TECHNOLOGY

Chairman: J. J. Taub, Eaton Corp., AIL Division, Melville, NY

1:40 pm U1 — CURRENT STATUS OF LOW-NOISE RECEIVER TECHNOLOGY (INVITED)
J. Whelehan, Eaton Corp., AIL Division, Melville, NY

2:10 pm U2 — IMAGE-OPTIMIZED, FREQUENCY-SCALABLE MIXERS FOR MILLIMETER WAVE APPLICATIONS
D. F. Peterson, University of Michigan, Ann Arbor, MI; D. H. Steinbrecher, Steinbrecher Corporation, Woburn, MA

2:30 pm U3 — EXPERIMENTAL INVESTIGATION OF SUBHARMONICALLY-PUMPED BALANCED MIXER PERFORMANCE
R. G. Hicks, P. J. Khan, University of Queensland, St. Lucia, Queensland, Australia

2:50 pm U4 — LOW-NOISE 50-58 GHz MIXERS FOR SPACECRAFT RADIOMETERS
W. J. Wilson, A. L. Riley, Jet Propulsion Laboratory, Pasadena, CA

3:10 pm — BREAK

3:30 pm U5 — IMPACT OF RECEIVER NOISE ON MICROWAVE AND MILLIMETER WAVE COMMUNICATIONS LINK PERFORMANCE (INVITED)
H. C. Okean, LNR Communications, Inc., Hauppauge, NY

4:00 pm U6 — NOISE PERFORMANCE OF MICROWAVE HEMT
K. Joshin, T. Mimura, M. Niori, Y. Yamashita, K. Kosemura, J. Saito, Fujitsu Laboratories Ltd., Kawasaki, Japan

4:20 pm U7 — CRYOGENIC ALL SOLID-STATE MILLIMETER WAVE RECEIVERS FOR AIRBORNE RADIOMETRY
B. Vowinkel, University of Koln, Cologne, West Germany; K. Gruner, H. Suss, Institut fur Hochfrequenz Technik, DFLVR, West Germany; W. Reinert, Fraunhofer Institut, Freiburg, West Germany

Independence Room
FIELD THEORY

Chairman: C. M. Krowne, Naval Research Laboratory, Washington, DC

1:40 pm V1 — NEW PERSPECTIVES ON THE GREEN'S FUNCTION FOR QUASI-TEM PLANAR STRUCTURES
H. Lee, V. K. Tripathi, Oregon State University, Corvallis, OR

2:00 pm V2 — PLANAR CIRCUIT EQUATION AND ITS PRACTICAL APPLICATION TO PLANAR-TYPE TRANSMISSION-LINE CIRCUIT
J. P. Hsu, T. Aneda, Kanagawa University, Yokohama, Japan

2:20 pm V3 — ASYMPTOTIC EVALUATION OF RESONANT FREQUENCIES FOR TWO COUPLED CIRCULAR MICROSTRIP DISK RESONATORS
T. M. Habashy, J. A. Kong, Massachusetts Institute of Technology, Cambridge, MA

2:40 pm V4 — MODAL ANALYSIS OF A LEAKY FEEDER CABLE MODELED BY SHEATH HELIX WITH A CONDUCTING CORE
C. V. Valerio, R. Bansal, University of Connecticut, Storrs, CT

PANEL SESSIONS

Two panel sessions are scheduled for 8:00 PM to 10:00 PM on Wednesday, June 1st.

Commercial Applications of Microwaves is sponsored by Technical Committee MTT-7, Microwave and Millimeter-Wave Solid-State Devices. The panel session will be held in the Independence Rooms. Its purpose is to stimulate thinking about new commercial applications for microwaves, and the design and production techniques necessary to service these markets, by presenting controversial and relevant issues in these areas. Areas of invited presentations include digital satellite communications, DBS, GPS, microwave ovens, automotive radar, medical microwave equipment, terrestrial microwave communications, and commercial microwave components.

For additional information, contact either Bert Berson, Consulting in Technology, 1011 Suffolk Way, Los Altos, CA 94022, (415) 961-7711 or Rob Hamilton, Avantek, Inc., 3175 Bowers Avenue, Santa Clara, CA 95051, (408) 727-0700.

The second panel session, **Are Active Aperture Systems Here at Last?,** is sponsored by Technical Committee MTT-6, Microwave and Millimeter-Wave Integrated Circuits, and is organized and moderated by Edward C. Niehenke, Westinghouse Electric Company, Mail Stop 339, P.O. Box 746, Baltimore, MD 21203, (301) 765-4573. The session will be held in the Republic Ballroom.

Topics which will be addressed by the second panel include monolithic GaAs technology, semiconductor yield, automatic testing, wafer trimming, advanced solid-state devices, robotics, GaAs heat-sinking, module architecture and manufacturing. Also, the latest module development work will be presented with emphasis on present and projected costs.

WORKSHOPS

There are to be four workshops held in conjunction with the 1983 IEEE MTT-S International Microwave Symposium. Three of the workshops will precede the Symposium, while the fourth, the ARFTG workshop, will be held following the MTT-S Symposium.

Organized by H. J. Carlin and B. S. Yarman, **Broadband Matching and Design of Microwave Amplifiers** will be held Monday, May 30th, from 8:30 AM to 5:30 PM in the Center and East Independence Rooms. The workshop will discuss contemporary aspects of broadband matching and amplifier design. Invited presentations include:

- Analytic Gain-Bandwidth Theory and Its Application; R. Levy, Microwave Development Labs., Inc., Natick, MA.
- Gain-Bandwidth Limitations of Microwave Amplifiers and Design of Monolithic Distributed Amplifiers; W. Ku, Cornell University, Ithaca, NY.
- Commercially Available CAD Synthesis Techniques; C. Holmes, COMSAT General Integrated Systems, Palo Alto, CA.
- New Approaches to Gain-Bandwidth Problems; B. S. Yarman, RCA, David Sarnoff Research Center, Princeton, NJ.
- Characterization of Power FETs and Design of Power Amplifiers; F. Sechi, RCA, David Sarnoff Research Center, Princeton, NJ.
- Implementation of Passive Components for Broadband Matching Networks; (Speaker to be announced).

Modern Mixer Technology, the second workshop, will be held Tuesday, May 31st, from 8:30 AM to 5:30 PM in the Center and East sections of the Independence Rooms.

The purpose of this workshop is to bring together individuals interested in microwave and millimeter-wave mixer technology including circuit designers, theorists, device designers, and mixed

users. Three invited speakers will present tutorial overviews on circuits, theory, and device developments:

- Progress in Microwave Mixer Circuitry; Charles Buntschuh, Narda Microwave Corp.
- Mixer Theory, Analysis and Optimization; A. R. Kerr, NASA/Goddard Institute
- Advances in Mixer Device Technology; Erik Kollberg, Chalmers University of Technology

Following each talk, there will be a discussion period. Afterward, the workshop will divide into small groups for in-depth discussions of selected topics. Each participant is encouraged to contribute to the discussions by sharing from his own work.

For further information, contact Charles Buntschuh, Narda Microwave Corporation, 435 Moreland Road, Hauppauge, NY 11788, (516) 231-1700.

Also on Tuesday, **Hyperthermia for Cancer Therapy** will be held in the West section of the Independence Room from 8:30 AM to 5:30 PM.

The enthusiasm generated by pre-clinical and early clinical results of the use of hyperthermia in treatment of cancer indicates that in the near future its clinical application/evaluation will undergo substantial growth in the U.S. and abroad. This intensive one-day workshop is especially designed to impart the fundamental, as well as the state-of-the-art information, on various facets of this exciting field. Internationally renowned experts will discuss different aspects of the following topics: clinical needs and biological rationale; various methods for induction of local/regional and whole body hyperthermia; invasive and non-invasive techniques for measurement of hyperthermia distribution; clinical experience; mechanical devices regulation; and future prospects.

For additional information, contact either Prof. Padmakar Lele, MIT, Room 26-023, 77 Massachusetts Avenue, Cambridge, MA 02139, (617) 253-5235 or Dr. Fred Sterzer, RCA, David Sarnoff Research Center, Princeton, NJ 08540, (609) 734-2634.

The fourth workshop on **Automated RF Techniques,** sponsored by the Automatic RF Techniques Group in affiliation with technical committee MTT-12, will be held Monday and Tuesday, June 6th and 7th, at the Holiday Inn, Middlesex Turnpike, Burlington, Massachusetts.

The workshop's main topic will be Automated Spectrum Analysis. Papers will be given on recent hardware and software developments in the main topic and other computer-aided RF design and testing topics. Technical exchange will be accomplished by informal twenty minute talks.

A portion of the sessions is reserved for manufacturers to discuss and/or demonstrate new equipment that has been specifically designed for use in computer-aided RF design and testing. The second day of the workshop will include a tour of automated RF test facilities. A banquet will be held Monday evening, June 6th.

For further details, contact Richard H. Swartley, General Electric Company, Valley Forge Space Center, P.O. Box 8555, Room U-2312, Philadelphia, PA 19101, (215) 962-3904.

GaAs IC SYMPOSIUM

The 1983 Gallium Arsenide Integrated Circuit Symposium will be held at the Ramada Towne House in Phoenix, Arizona, October 25-27, 1983. Papers are invited on topics related to gallium arsenide integrated circuits, including: monolithic digital integrated circuits, monolithic linear and power analog integrated circuits, electro-optical integrated circuits, processing technology, device physics, modeling and simulation, radiation effects and reliability, packaging and testing, materials considerations and advances, and systems applications.

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

Authors wishing to submit abstracts for consideration by the technical program committee should mail the original plus twenty-five (25) copies of a one page abstract to: Dr. James L. Vorhaus, Raytheon Company, Research Division, 131 Spring Street, Lexington, MA 02173, (617) 863-5300, extension 3114. The abstract should clearly state the purpose of the work, how much it advances the art, and what specific results have been obtained. Additional supporting material may be submitted at the discretion of the author(s). Please indicate the specific area (as listed in the first paragraph) to which the abstract applies.

For additional information, contact the Chairman of the Symposium Executive Committee, Dr. Thomas M. Reeder, Tektronix, Inc., P.O. Box 500, Mail Stop 50-370, Beaverton, OR 97077 at (503) 627-5496 or 627-6107 or the Publicity Chairman, Dr. James A. Hutchby at (919) 541-5931.

FREDERICK TERMAN

Frederick E. Terman (LF), vice president and provost emeritus of Stanford University, Palo Alto, California, died last December 19th at the age of 82.

Dr. Terman was considered the father of the silicon valley electronics industry because he encouraged Stanford graduate students, like William Hewlett and David Packard, co-founders of the firm which bears their names, to start new companies in the Palo Alto area.

NEW LASER JOURNAL

Cambridge University Press announces a new international journal of special interest to anyone concerned with the generation of high intensity laser and particle beams, their interactions with materials, and the physics of systems with very high energy densities.

For details, write to the Cambridge University Press, 32 East 57th Street, New York, NY 10022.

RADAR SYMPOSIUM-INDIA

The IEEE Bangalore Section of the India Council and the IEEE-India Joint Aerospace and Electronic Systems Society and Communications Society Chapters, in cooperation with Region 10, are sponsoring the 1983 International Radar Symposium-India, in Bangalore, Oct. 10-13, 1983.

IRSI-83 will be a forum for the presentation of technical papers covering state-of-the-art theories, design, and developments in radar and related areas. The present status and future trends in radar applications in developing countries will be reviewed, and technology transfer will be discussed. Topical areas to be covered include surveillance and tracking radars, navigational and air-traffic-control systems; guided-weapon systems; target recognition; reflector and array antennas; low-noise radar receivers; high-performance transmitter designs; analog and digital techniques in signal processing; radar video extraction; reliability; radar systems in developing nations; and technology transfer.

Further conference information is available from N. L. Krishnan, Bharat Electronics, Ltd., 29 Race Course Road, Bangalore 560 001, India.

FINANCIAL PLANNING

If you would like to make wiser investments, save on taxes, plan your retirement and get more out of your insurance—and if you like to read a lot—you can get a free list of 70 books on such subjects by sending a stamped, self-addressed envelope to College for Financial Planning, 9725 East Hampden Ave., Denver, CO 80231. Ask for the Bibliography on Financial Planning.

THE BEEP GOES ON

- In New York, a "Stork Alert" pager (beeper) is available to pregnant women so they can immediately contact their husbands should they be unavailable by phone or otherwise.
- In Tulsa, an Oklahoma couple has arranged to have their two teen-age daughters take along beepers when they go out on dates as reminders that the girls are due home at an agreed-upon time.
- In San Antonio, Texas, a mother straps a beeper on her children's belts so she can beep them when it's time for them to come in for dinner.

The United States is on the verge of being "beeperized," with a boom shaping up for the electronic paging device that helps our mobile society keep in touch with office, home and friends. No bigger than a cigarette pack, the beeper—which originated in the 1950's as a communication tool for the medical profession—is now gaining wide acceptance in the nation's households.

In 1970, there were an estimated 53,000 pagers in use; the total jumped to 364,000 by 1976, to 964,000 at the end of '81 and is now at more than 1.5 million, says Thomas Lamoureux, executive director of Telocator Network of America, the industry's trade association. Lamoureux forecasts that there will be 7 million beepers in use by 1990 with revenues exceeding $2 billion. And as the boom for pagers progresses the cost of the service will go down, just as technology slashed the prices for calculators.

GaAs MESFETs

Artech House, Inc., Dedham, Massachusetts has announced the publication of **Applications of GaAs MESFETs,** edited by Robert Soares, Jacques Graffeuil, and Juan Obregon (ISBN 0-89006-120-3, 450 pages, $50.00). The ten chapters are comprised of original contributions by recognized experts in the field. Special emphasis is placed on GaAs monolithic circuits. The titles of the book's chapters are: 1. History and Perspectives; 2. Basic Concepts and Characterization Methods; 3. Small Signal Amplifier Design; 4. Power Amplifiers; 5. Distortion Problems in Amplifiers; 6. Oscillator Design; 7. Monolithic GaAs Integrated Circuits; 8. MESFET Logic; 9. High Electron Mobility Transistors (HEMT); 10. Systems Using GaAs MESFET Circuits. The book can be ordered from the publisher at 610 Washington Street, Dedham, MA 02026, (617) 326-8220.

TAB HIGHLIGHTS

by H. G. Oltman, Jr.

The February Technical Activities Board (TAB) meeting and Presidents' Forum was held at the Bonaventure Hotel in Los Angeles. The latter is an informal meeting of IEEE Society Presidents at which they can let their hair down and discuss items of common interest. This report summarizes the subjects discussed at both meetings which are relevant to the interest of MTT-S members.

SOCIETY PRESIDENT'S FORUM — FEBRUARY 16

The meeting was chaired by Dr. Richard Emberson, Director Emeritus of the IEEE.

IEEE President, Jim Owens, addressed the Forum, expressing his desire during his term to press for greater assistance by IEEE in continuing education for its members. He sees this as a membership need about which the IEEE can do something.

Diluted Voting Rights of Society Presidents

A group of Society Presidents expressed concern about voting rights on TAB. Through the years, as new TAB committees were organized, those committee chairmen were given TAB voting privileges. As a result, Society representation on TAB has been diluted. Presently, TAB voting members include: 35 Society Presidents, 8 Divisional Directors, 3 Operating Committee Chairmen, 9 Subcommittee Chairmen, and 6 Technical Committee Chairmen.

A new plan is being worked out by the group.

Parity in BoD Representation

In a related matter, parity in representation between Regional and Technical Directors on the IEEE Board of Directors (BoD) was discussed. The Societies conduct a large amount and variety of business and the Directors representing them are overloaded with work. If parity can not be obtained through legislative means, a Constitutional Amendment is being considered.

Quality of Spectrum Magazine

Some Society Presidents felt that Spectrum was not good enough to represent the IEEE. It should be more like Scientific American magazine. Dick Emberson, Forum Moderator, will have an editor available to discuss Spectrum at the July Presidents' Forum.

Threat to National Bureau of Standards

There was concerned discussion about a threat to our National Standards with planned NBS budget reductions by the present administration. (Such concern was independently expressed to the undersigned by one department head in an industrial standards lab.). Dr. Emberson suggested that we form a quick reaction ad hoc committee to write a position paper for USAB to funnel to Congress, the Department of Commerce, and the administration. (This item was later discussed at TAB).

TAB MEETING — FEBRUARY 17

The meeting was chaired by Dr. Jose B. Cruz, Jr., Vice-President and Chairman, Technical Activities Board.

Constitutional Amendment

Parity between Divisional and Regional Directors discussed at the Presidents' Forum was brought before TAB with the result that the latter body endorsed the adoption of a Constituional Amendment to achieve parity.

Centennial Medals

As part of its Centennial celebration, IEEE will hand out approximately 1,000 medals during 1984. TAB and each Society will specify recipients for these medals. Guidelines for doing so will be forthcoming.

Journal of Lightwave Technology (J-LWT)

During the last quarter of 1982, a contract between the IEEE and the Optical Society of America (OSA) to publish a Journal of Lightwave Technology was negotiated and signed. The MTT-S representatives to the LWT organizing committee (Reinhard Knerr and Fred Rosenbaum) expressed concern that a concurrent plan to organize a Council on LWT (to direct the IEEE activities in that field) has gotten bogged down and that the Constitution and By-Laws for the LWT Council, worked out in September, 1982, had not been presented to TAB as expected.

That effort now appears to be progressing again. Dr. Irving Engelson, IEEE Staff Director for Technical Activities, reported that the organizing committee would complete the Council organization and report its plan to TAB at its July meeting.

China Visits by Individual IEEE Members

A proposal to accept an invitation from the Chinese Institute of Electronics to assist individual IEEE members in making appropriate technical contacts during visits to China in exchange for giving technical lectures was endorsed.

The TAB Transnational Relations Committee will arrange for the coordination of this program. Persons interested in individual visits should contact Dr. M. E. VanValkenburg, University of Arizona, Tucson, AZ 85721, (602) 626-2345.

Threatening Government Regulations on IEEE Symposia

Dr. Stanley Chamberlain, Ocean Engineering Society President, informed TAB about government regulations that threaten our symposia committees. The International Traffic in Arms Regula-

tions (ITAR) is being interpreted as making conference organizers responsible for controlling distribution of arms-related materials presented in open IEEE meetings. Violators can be imprisoned for two years and can be fined up to $100,000. TAB approved a motion that TAB OpCom prepare guidelines for conference committees in handling such presentation materials.

Funding for the National Bureau of Standards

This item, first brought out during the Presidents' Forum, was put before TAB with the action that the joint TAB/USAB Research and Development Committee prepare a position paper and draw up a plan of action.

Overview of IEEE; Available Projection Slides

Tom White, the new IEEE Staff Director of Public Information (old Public Relations), was introduced to TAB. He discussed the objectives of his office, their 1983 plans, and handed out 20 beautiful 35mm projection slides describing the make-up and status of the IEEE. Slides include IEEE objectives, programs, international and national character, its Societies, its geographical units, membership and membership grade statistics, activities, volunteer and paid staff organizations, finances, revenues and expenditures, and IEEE facilities. These slides would be especially useful in chapter and student chapter membership drives, but should also be of interest to present members. MTT-S Chapters wishing to use the slides should contact John Kuno, Membership Services Chairman.

BYLAW CHANGES

At the January 17-18, 1983 MTT-S Administrative Committee meeting in Boston, several changes to the Society's Bylaws were approved.

- To Section 1, Article B, Elections, add

  3. WITHIN-TERM VACANCIES

     Within-term vacancies on the Administrative Committee shall be filled by elections for the unexpired terms by the remainder of the elected members of the Committee (MTT Constitution, Article VII, Section 3)

- Renumber the next section, i.e.,

  4. HONORARY LIFE MEMBER

- Section 1, Article B, Elections, change the following section to include

  4. HONORARY LIFE MEMBER

     (b) Award

     Society fees for Honorary Life Members shall be paid from the Society treasury. The Secretary shall arrange for this with IEEE Headquarters. The award shall consist of a suitable certificate and a feature publication in the IEEE Transactions on Microwave Theory and Techniques.

- Section VI, Miscellaneous Committee Business, add

  E. DISTINGUISHED SERVICE AWARD

  The Society shall present an award known as "The Distinguished Service Award." The award shall be considered annually, but not necessarily presented annually. The award shall be made to an individual who has given outstanding service for the benefit and advancement of the Microwave Theory and Techniques Society. The individual must be a member of the IEEE and a member of the MTT Society.

  Selection of the recipient of the award will be the responsibility of the MTT-S Awards Committee, which will make its recommendations to the MTT-S Administrative Committee at the annual Fall meeting. Nominations may be made by any member of the MTT Administrative Committee or by a petition signed by at least 25 members of the Society. The award shall consist of a suitable certificate and a feature publication in the IEEE Transactions on Microwave Theory and Techniques.

  1. Guideline for Distinguished Service Award

     The award shall be 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.

- Section VII, Changes to the By-Laws, change to read:

  Suitable by-laws or changes in the by-laws may be adopted by a two-thirds vote of the Administrative Committee present in meeting assembled provided that notice of the proposed by-law or change in the by-law has been sent to each member of the Administrative Committee at least three weeks prior to such meeting, by first class mail. No by-law shall take effect until 30 days after it has been publicized to all members of the Society and a copy has been mailed to the IEEE TAB office (MTT Constitution, Article IX, Section 2)

THE 1983 IEEE MICROWAVE AND MILLIMETER-WAVE MONOLITHIC CIRCUITS SYMPOSIUM

by H. J. Kuno
Chairman
Steering Committee

Microwave and millimeter-wave monolithic integrated circuits have become increasingly important for systems application in recent years. The second IEEE Microwave and Millimeter-Wave Monolithic Circuits Symposium will be held in Boston on May 31 and June 1, 1983 in conjunction with the 1983 IEEE MTT-S International Microwave Symposium. This year, the Symposium will be expanded into one and one-half days.

The high level of interest in monolithic microwave and millimeter-wave integrated circuits technology was evidenced by the large number of papers received in response to the "call for papers." Reflecting the wide geographical spread of the current interest in the technology, papers have been received and accepted from abroad as well as from the United States. The papers included in the program cover various areas of monolithic microwave and millimeter-wave integrated circuits, collectively representing the state-of-the-art and the current trends, as seen in the Advance Program.

On behalf of the Symposium Steering Committee, I wish to extend an invitation to you to attend the 1983 IEEE Microwave and Millimeter-Wave Monolithic Circuits Symposium. I am certain that you will find the conference informative and rewarding.

Advance registration for the Symposium will be $40 for IEEE members and $50 for non-IEEE members. At the Symposium, the registration fees will be $45 for IEEE members and $55 for non-IEEE members. Additional Symposium Digests will be available for $15 for IEEE members or $20 for non-IEEE members. Registration hours will be 5:00 PM to 7:30 PM on Monday, May 30 and 7:30 AM to 2:00 PM on Tuesday, May 31.

The Symposium program is as follows:

SESSION I: SIGNAL PROCESSING

Chairman: C. Chao, Honeywell Corporate Technology Center, Bloomington, MN

0830 Welcome by Symposium Chairman: H. J. Kuno, Hughes Aircraft Company, Torrance, CA

0845 HIGH QUALITY X-BAND MONOLITHIC DIODE MIXER
A. W. Jacomb-Hood and J. R. Smith, GEC Research Laboratories, Wembley, England

0905 WIDEBAND GaAs FOUR QUADRANT MULTIPLIER
C. Ryan, D. Hartman, J. M. Frary, and C. E. Weitzel, Motorola, Inc., Phoenix, AZ

0925 A GaAs HIGH-SPEED COUNTER USING CURRENT MODE LOGIC
K. Suyama, H. Suzuki, Y. Nemoto, S. Yamamura, and M. Fukuta, Fujitsu Ltd., Kawasaki, Japan

SESSION II: DEVICES AND PROCESSING

Chairman: R. A. Murphy, MIT Lincoln Laboratory, Lexington, MA

1010 DESIGN AND FABRICATION OF A NEW AlGaAs/GaAs HETEROJUNCTION BALLISTIC BIPOLAR TRANSISTORS (BBT) FOR EHF AMPLIFIERS
E. J. Zhu, W. H. Ku, and C. E. C. Wood, Cornell University, Ithaca, NY

1030 PROFILE STUDIES OF ION-IMPLANTED MESFETs
J. M. Golio and R. J. Trew, North Carolina State University, Raleigh, NC

1050 LOW NOISE MESFETs FOR ION IMPLANTED GaAs MMICs
A. K. Gupta, D. P. Siu, K. T. Ip, and W. C. Peterson, Rockwell International, Thousand Oaks, CA

1110 TRANSIENT CAPLESS ANNEALING OF ION IMPLANTED PBNLEC GaAs FOR MONOLITHIC MICROWAVE INTEGRATED CIRCUITS
R. C. Clarke, G. W. Eldridge, S. K. Wang, and W. F. Valek, Westinghouse R & D Center, Pittsburgh, PA

1130 A NEW VIA HOLE STRUCTURE FOR POWER GaAs MESFETs and MMIC
Li Songfa and Liu Qingxiang, Hebei Semiconductor Research Institute, Shijiazhuang, China

SESSION III: MILLIMETER-WAVE CIRCUITS

Chairman: Barry Spielman, Naval Research Laboratory, Washington, DC

1315 A TWO-STAGE MONOLITHIC BUFFER AMPLIFIER FOR 20 GHz SATELLITE COMMUNICATION
W. C. Peterson and A. K. Gupta, Rockwell International, Thousand Oaks, CA

1335 A GaAs MONOLITHIC PHASE SHIFTER FOR 30 GHz APPLICATION
V. Sokolov, P. Bauhahn, J. Geddes, T. Contolatis, and C. Chao, Honeywell Corporate Technology Center, Bloomington, MN

1355 MONOLITHIC FREQUENCY DOUBLERS
A. Chu, W. E. Courtney, L. J. Mahoney, R. A. Murphy, and R. W. McClellan, MIT Lincoln Laboratory, Lexington, MA

1415 94 GHz MONOLITHIC GaAs BALANCED MIXERS
C. Chao, A. Contolatis, S. Jamison, and C. Butter, Honeywell Corporate Technology Center, Bloomington, MN

SESSION IV: POWER AMPLIFIERS

Chairman: R. Gilson, U.S. Army ERADCOM, Fort Monmouth, NJ

1500 A NEW, SPECIFICALLY MONOLITHIC APPROACH TO MICROWAVE POWER AMPLIFIERS
D. Pavlidis, Y. Archambault, M. Efthimerou, D. Kaminsky, A. Bert and J. Magarshack
Thomson-CSF/DCM, Orsay, France

1520 MONOLITHIC BROADBAND POWER AMPLIFIER AT X-BAND
A. Platzker, M. S. Durschlag, J. L. Vorhaus
Raytheon Company, Lexington, MA

1540 WIDEBAND 3 W AMPLIFIER EMPLOYING CLUSTER MATCHING
R. G. Freitag, J. E. Degenford, D. C. Boire, M. C. Driver, R. A. Wickstrom, and C. D. Chang, Westinghouse Electric Company, Baltimore, MD

1600 2-20 GHz TRAVELING-WAVE POWER AMPLIFIER
Y. Ayasli, L. D. Reynolds, R. Mozzi, J. L. Vorhaus, and L. Hanes
Raytheon Company, Lexington, MA

SESSION V: MONOLITHIC AMPLIFIERS

Chairman: R. Decker, Lehigh University, Bethlehem, PA

0830 WELCOMING REMARKS
1983 IEE MTT-S International Microwave Symposium Chairman, H. Howe, Jr., M/A-COM, Inc., Burlington, MA
MTT-S ADCOM President, C. Rucker, Georgia Institute of Technology, Atlanta, GA
1983 IEEE Microwave and Millimeter-Wave Monolithic Circuits Symposium Technical Program Chairman, J. Oakes, Raytheon Company, Northborough, MA

0900 BROADBAND MONOLITHIC LOW NOISE FEEDBACK AMPLIFIERS
P. N. Rigby, J. R. Suffolk, and R. S. Pengelly, Plessey Research Ltd., Caswell, England

0920 2-6 GHz MONOLITHIC MICROWAVE AMPLIFIER
W. O. Camp, Jr., S. Tiwari and D. Parson, IBM Corporation, Oswego, NY

0940 WIDEBAND, HIGH GAIN, SMALL SIZE MONOLITHIC GaAs FET AMPLIFIERS
W. Pauker and M. Binet, Laboratoire d'Electronique et de Physique Appliquee, France

1000 BREAK

1030 12 GHz-BAND LOW-NOISE GaAs MONOLITHIC AMPLIFIERS
H. Itoh, T. Sugiura, T. Tsuji, K. Honjo and Y. Takayama, Nippon Electric Co., Ltd., Kanagawa, Japan

1050 GaAs MONOLITHIC MICs FOR DIRECT BROADCAST SATELLITE RECEIVERS
S. Hori, K. Kamei, K. Shibata, M. Tatematsu, K. Mishima and S. Okano
Toshiba Corp., Kawasaki, Japan

1110 MINIATURIZATION OF AN X-BAND MONOLITHIC GaAs AMPLIFIER
P. Dueme, M. Le Brun, P. R. Jay, and C. Rumelhard, Thomson-CSF, Orsay, France

1130 GaAs MONOLITHIC LUMPED ELEMENT MULTISTAGE MICROWAVE AMPLIFIER
K. P. Weller, G. D. Robinson, A. Benavides and R. D. Fairman,
TRW, Redondo Beach, CA

BEN FRANKLIN SYMPOSIUM

The Philadelphia Chapter of MTT/AP-S will be holding its Third Annual Benjamin Franklin Symposium, **Advances in Antenna and Microwave Technology,** on April 30, 1983 at the University Holiday Inn, 36th and Chestnut Streets, Philadelphia, PA.

The Saturday one-day symposium will consist of invited and contributed papers for parallel sessions on Antennas and Propagation and on Microwave Theory and Techniques. A symposium digest will be published.

For further information, contact Ms. Helen Yonan, Moore School of Electrical Engineering, University of Pennsylvania, Philadelphia, PA 19104, (215) 898-8106 or Charles C. Allen, General Electric Company, Valley Forge Space Center, Room U4018, P.O. Box 8555, Philadelphia, PA 19101, (215) 962-4595.

TAXPAYER RIGHTS

Don't overlook new taxpayer rights, incorporated in little-noticed section of last summer's tax-increase bill. Taxpayers may now recover up to $25,000 in fees and costs when Internal Revenue Service is found by court to have been "unreasonable"; value of property exempt from IRS seizure —such as tools of trade—has been increased substantially; IRS must now advise taxpayers of their rights in proceedings, send final notice of delinquency by certified mail and release tax liens within 30 days after debt is satisfied. More detailed information is available free from Citizen's Choice, Room 334, 1511 K Street, N.W., Washington, D.C. 20005.

SPACE COMMAND

General Lew Allen, Jr., ending his four-year term as Air Force Chief of Staff and prior to taking over the directorship of the Jet Propulsion Laboratory, has announced that the Pentagon will establish a new Space Command that will coordinate Air Force activities in outer space, to be based in Colorado Springs, CO. Congress has been pushing for the Pentagon to agree to the formation of a fourth military branch to coordinate defense activities in space, but the new Space Command, for now, will be a subunit within the Air Force with representatives from the other military branches involved. The Space Command will absorb space programs conducted by other military branches.

Also, the Air Force has announced plans to form a Space Technology Center at the Kirtland Air Force Base in New Mexico. The center, beginning in 1983, will have "the mission to plan and execute a coordinated space and space-related technology program," according to the Defense Department.

MTT-S NATIONAL LECTURE IN JAPAN

by Ferdo Ivanek

My lectures during the week of November 8-12. 1982 took place at the invitation of Dr. Yoshihiro Konishi, Chairman of the Tokyo MTT-S Chapter. Last year he invited Dr. Robert Pucel, the 1980-81 National Lecturer, who obviously did an excellent job there, and thereby helped to pave the way for my tour.

The superbly organized five-day program consisted of six lectures and seven company visits which varied in scope from courtesy visits to technical tours and discussions. The official lecture took place at the Tokyo Institute of Technology and the second major lecture for the MTT membership at the Chuo Denki Club in Osaka.

The four additional lectures were combined with the visits to the NHK Technical Research Laboratories, the Toshiba Research and Development Center and the Oki Electric Industry Company in the Tokyo area, and with the Sumitomo Electric Industries in Osaka. My additional visits were to Fujitsu and NEC in Kawasaki and to the NTT Electrical Communication Laboratories in Yokosuka.

The numerous contacts with MTT-S and other IEEE members, as well as with the representatives of the host companies reinforced my impression of the excellent reputation the Society enjoys in Japan, which is ably promoted by the very active and effective Tokyo Chapter. It was a special, unexpected pleasure to meet the first Chairman of the Tokyo Chapter, Dr. Kiyoshi Morita, IEEE Fellow and Honorary Professor of the Tokyo Institute of Technology. The excellent Japanese lunch he hosted as consultant for the Oki Electric Industry Company was one of the highlights of the social program.

The tour ended on Saturday with a most enjoyable visit to Kyoto hosted by the Sumitomo Electric Industries of Osaka. I am indebted to Dr. Konishi for establishing the itinerary and arrangements, which were excellent in every respect.

dB SOCIETY AWARD

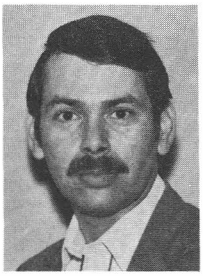
The dB Society has voted unanimously to award its Traveling Trophy for the year 1983 to the National Bureau of Standards for *Outstanding International Contributions to the Field of Electromagnetic Compatibility*. The Traveling Trophy is awarded yearly to an outstanding individual, company or professional organization for technical contributions to Electromagnetic Compatibility (EMC) endeavors. Past recipients have been the IEEE (1977), Air Force Systems Command (1978), Naval Air Systems Command (1979), North Atlantic Treaty Organization (NATO) in 1980, where the Trophy was on display at NATO Headquarters in Brussels for that year, SAE Inc. for 1981, and the award presently resides with its 1982 winner, the Federal Communications Commission in Washington, D.C.

The dB Society fosters the conservation of the electromagnetic spectrum, promotes the introduction of young engineers into the EMC field, and provides financial assistance to engineering students in pursuit of studies related to the field.

In awarding the trophy to the NBS, the following outstanding efforts and accomplishments were particularly noted:

- Fields characterization group (723.03) for their development of electric probes to measure the near-fields of electromagnetic fields
- Interference characterization group (723.04) for the development of the TEM cell for EMI measurements
- Antenna systems metrology group (723.05) for the methods of calibration of EMI antennas

The trophy was presented in recognition of the management, leadership, and support such organizations received from the highest levels of the NBS.



EDITOR'S NOTE

by S. L. March

It is hard to believe that it has been nearly a year since the 1982 International Microwave Symposium was held in Dallas. Those of us who were involved with the 1982 MTT-S Symposium were very busy last year at this time.

I recently received my Advance Program for the 1983 IEEE MTT-S International Microwave Symposium. It promises to be an excellent conference. The "open forum" or poster session concept initiated at this year's Symposium should reduce the problems associated with scheduling four concurrent technical sessions. This year, the number of parallel sessions is reduced to three on each of the three days of the conference and two "open forum" sessions, one each on Wednesday, June 1, and Thursday, June 2, are added to the schedule. I hope the concept proves successful.

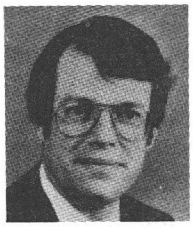
The 1984 MTT-S Symposium will be held in San Francisco. In 1985, the conference site will be St. Louis. In addition, Baltimore has been selected to host the meeting in 1986. What about 1987? As Geroge Oltman reported in *Adcom Highlights,* the Administrative Committee of the MTT Society has not received a proposal from an MTT-S Chapter to hold the 1987 Symposium in its city.

This is potentially a serious problem even though this is only 1983 and that conference is more than four years from now. The reason is that there are only a limited number of locations which have sufficient space to handle the technical and exhibition aspects of our meeting and, even now, other conferences are competing with us for those locations. To alleviate this possible problem, an ad hoc committee has been formed to investigate holding the 1987 MTT-S Symposium in Las Vegas and, if deemed acceptable, to formulate a formal proposal for consideration by Adcom at its meeting in Boston in late May.

I favor the selection of Las Vegas as the 1987 International Microwave Symposium site because I like Las Vegas and because I like what the selection represents. An MTT-S Symposium in Las Vegas would have a steering committee consisting of individuals from various parts of the country and would use professional management to assist with registration, publications, publicity, local arrangements, etc. It would work successfully. Both Eastcon and the Sonics and Ultrasonics Symposium, which also have exhibits, have proven so.

If the Administrative Committee selects Las Vegas as a Symposium site, can other interesting locations be far behind. I can envision MTT-S Symposia in New Orleans, Louisiana, in either Memphis or Nashville, Tennessee, and in either Seattle or Tacoma, Washington. In addition, Honolulu, Hawaii, Acapulco, Mexico, and Bermuda become potential conference locations. And why not! If other conferences can meet in such pleasant surroundings, why can't the annual International Microwave Symposium?

CALL FOR ADCOM NOMINATIONS



by R. B. Hicks

All MTT-S members should note that they may assist the Nominations Subcommittee in obtaining nominees for the 1984 Adcom election. MTT members may enter an MTT Society member's name as a nominee by mailing a petition for that nominee with 25 Society members' signatures to me or the Adcom President prior to 1 September 1983.

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

This year we will elect six members for a term of three years and one member for a term of two years. The holdover members will be geographically divided as follows: East (4), Central (5), and West (2).

Incumbents who may stand for re-election are geographically located as follows: East (3), West (2) and International (1).

It may also be of interest to consider that the present Adcom is composed of fifteen (15) members from industry, one (1) member from universities and non-profit organizations and two (2) from government agencies. Members whose terms expire are distributed as follows: industry (6), universities and non-profit organizations (1).

For those interested in submitting a petition candidate, my address is: Rockwell International, Collins Microwave Systems Division, Mail Stop 402-121, P.O. Box 10462, Dallas, TX 75207.

EMC DESIGN GUIDE

A. H. Sullivan, Jr. has reviewed **Electromagnetic Compatibility Design Guide for Avionics and Related Ground Support Equipment** by Ernest R. Freeman and Herbert M. Sachs. The review of this Artech House, Inc. book (1981, 227 pages, softbound, $30.00) is reprinted from the Winter 1983 issue (number 116) for the Electromagnetic-Compatibility Society Newsletter.

This book has been a long term (9 years) project of the staff of Sachs/Freeman Associates, Inc., and originally was published as NAVAIR AD1115. The publication was developed specifically to provide EMC guidance in connection with development and design of Navy Ground Support Equipment, with particular reference to electromagnetic environments (especially shipboard environments) in which avionics-oriented GSE must operate.

The book contains three chapters on shielding, bonding and grounding. Although much of this material is well-known, the approach here is with special reference to the avionics GSE EM environment. Of particular interest is the material on testing to determine the effectiveness of shields, bonds, and grounds. In a separate chapter, generalized testing requirements and techniques are discussed, including emission tests, susceptibility tests and transient tests, as well as use of EMC test instrumentation and enclosure.

Chapter 1, the Introduction, points up the special EMC problems of GSE, and Chapter 2 continues with a discussion of the sources and coupling of EM energy in the GSE environment. In a following chapter, Design Considerations are discussed, including specific examples of avionic and GSE designs, related material on flight and hangar deck operation, and shop testing.

Important material on EMC Control and Test Planning is contained in Chapter 4, with a complete discussion of the purpose of such plans, the specifications and other documents that are applicable, and the program management requirements.

In Chapter 10, a summary is presented, in tabular form, of 32 military specifications and standards applicable to GSE, as well as information on how to obtain them. There is also tabulated information on NASA Marshall Space Flight Center EMC Specification 279.

The book contains a very large number of illustrations, graphs and tabulations of specific interest to GSE designers. In Chapter 11, there is a collection of miscellaneous nomographs and tables useful in GSE design, including decibel tables, and various tables, equations and nomographs for calculation of EM wave shielding parameters, field strength and power density, cable separation distance, transmission path loss and other useful material.

One of the most important parts of the book is Chapter 8 on Filtering. Rather complete and thorough coverage is provided on general filter design; transient suppression; active power line filters; noise blanking, cancelling and limiting circuits; filter tests; filter installation and mounting; and methods of specifying filters. The authors have wisely pointed out that a thorough EMC control plan and EMI-free circuitry and equipment construction in the original design is the preferred procedure. Filters should be considered as only one of various alternatives in the design and installation process.

The book is well written, technically sound and, obviously, has been prepared for professional engineers and others with a background of electronics and electromagnetic compatibility. In my opinion, the book would be a valuable guide for anyone who must design or use equipment which is to operate in an environment of dense electromagnetic fields of various powers, frequencies and modulation types. I would expect that the many charts, tabulations and nomographs collected together in one place would not only materially assist the designer in getting the job done; but, would be a real time-saver since there would be no necessity for hunting through a number of books or documents for technical data specifically applicable to his job.

ARFTG HIGHLIGHTS

by Mario A. Maury, Jr.

The 20th conference of the Automatic RF Techniques Group (ARFTG) was held November 4-5, 1982, at the Hilton Harvest House in Boulder, Colorado. This conference also marked the tenth anniversary of the founding of ARFTG. The official host was the National Bureau of Standards (NBS), which was quite appropriate since the first meeting, held 10 years before, was also hosted by NBS.

The conference was extremely successful, with over 100 ARFTG members in attendance. Bob Nelson of NBS, the conference host, was commended, along with his staff, for planning and organizing one of the best meetings ever held by ARFTG.

The conference main topic was "Six Port Measurement Systems" and was chaired by Mario A. Maury, Jr., of Maury Microwave Corporation. H. George Oltman, Jr. (Hughes Aircraft Company, Canoga Park, CA), ARFTG Executive Committee President, opened the meeting and introduced Dr. Robert A. Kamper, who welcomed the attendees on behalf of NBS and gave a brief overview of NBS activities. Dr. Kamper is not only Chief of the Electro-Magnetic Technology Division of NBS, he is also the Director of the NBS Boulder Laboratory.

In keeping with the main topic of the conference, many of the papers given during the technical sessions dealt with the "Six Port," which was also appropriate in view of the fact that, for all practical purposes, the development of the Six Port Measurement concept began at NBS Boulder. A number of excellent papers were presented, including:

- *Six Port Characteristics,* Algie Lance, TRW, Redondo Beach, California.
- *Calibrating A Single Four Port or Six Port Reflectometer,* Cletus Hoer, NBS, Boulder, Colorado.
- *Calibration Of Six Port Network Analyzer at Low Frequencies by TRT,* Robert Mozer and Edmund Franzak, Sandia Laboratories, Albuquerque, New Mexico.
- *Detector Requirements for Six Port Systems,* John Barr, Hewlett Packard Co., Santa Rosa, California.
- *A 94 GHz Dual Six Port Network Analyzer,* Harry Crouson and R. A. Fong-Tom, Sperry Research Center, Sudbury, Massachuetts.
- *High Speed VSWR Testing With a Novel Six Port Technique,* Paul C. Goodman, M/A-COM Omni-Spectra, Inc., Merrimack, New Hampshire.
- *Novel Precision Homodyne Network Analyzer,* Tom Guldbrandsen, NBS, Boulder, Colorado.

In addition to the technical papers, there was a panel discussion entitled *The Six Port Measurement Technique: What Is Its Status? Where Is It Going?* which was moderated by Glenn F. Engen of NBS, Boulder, Colorado. The panel was asked some very interesting questions that led to a lively exchange between the various panel members and the audience. Also, a tour was conducted of the NBS Standards Laboratory with particular emphasis on Six Port Measurement systems.

One of the high points of the conference was the ARFTG Tenth Anniversary Banquet, which was a great success. Honored with awards at the banquet were the first ARFTG Steering Committee consisting of John Meeker, Allen E. Rosenzweig, Edward J. Stevens and Alvin D. Wilson. Also, in keeping with the theme of the conference, an award was presented to Dr. Glenn F. Engen for *Contributions to Six Port Theory.*

During the business meeting, a number of subjects were reported on or discussed. Of particular interest was the status of the *ARFTG Traveling Experiment.* Wendall Seal (TRW, Redondo Beach, California), Chairman of the Standards Committee, is in the process of setting up a new plan for routing both traveling kits, which will take place in early 1983. Several hardware improvements are being made, and a desk top calculator will be routed with the kits in order to handle the data more conveniently. Also, plans to publish an ARFTG Digest for each conference is currently underway. The Digest for the 19th meeting (Dallas) should be available by the June 1983 meeting.

Another interesting report was given by Eric Griffin of Royal Signals and Radar Establishment, Great Malvern, England. He advised the group that a counterpart of ARFTG is being established in England. It is called the *Automatic Radio Frequency and Microwave Measurement Society.* Their first meeting was to have been held at Leeds University, Leeds, England, in January 1983.

The next ARFTG Conference will be held on June 6 & 7, 1983, at the Holiday Inn, Burlington, Massachusetts, directly following the International Microwave Symposium in Boston. The conference will be held as a workshop in affiliation with Technical Committee MTT-12. The conference topic will be *Automated Spectrum Analyzers.* For other meeting details, contact the ARFTG Conference Chairman:

Richard H. Swartley
General Electric Company
Valley Forge Space Center
P.O. Box 8555, Room U2312
Philadelphia, PA 19101
(213) 962-3292

INDIA CHAPTER

Dr. Radhey Shyam, Secretary of the IEEE India Council's joint Microwave Theory and Techniques/Electron Devices Chapter recently updated the Chapter's activity report. Additional reported meetings include the following:

- July 8, 1982, Dr. W. G. Vander Touw, Quality Assurance in the Manufacture of Electronics Products
- August 13, 1982, meeting with IEEE President and TAB delegation
- August 13, 1982, Mr. Richard A. Sparks (MTT-S President), Microwave Packaging of Active and Passive Solid-State Phased-Array Antenna Modules
- August 13, 1982, Dr. W. A. Porter, Use of Laser to Control Carrier Lifetime in Silicon
- September 17, 1982, Dr. P. C. Mathur, Status of Research in the Field of Semi-conductors in the USSR
- September 18 and 19, 1982, Dr. T. K. Saxena, Theoretical Treatment of Electron Transport in Semiconductors
- October 4, 1982, Dr. R. T. Filep, Telecommunications in the Year 2000
- November 6, 1982, Dr. W. G. Vander Touw, Electronics Manufacturing, Component Assembly, and Soldering

In addition, chapter meetings were also held August 2, 1982, October 1, 1982 and November 3, 1982.

MICROWAVE TRAINING PROGRAM

A four course (two per semester), part-time microwave engineering specialist training program at the introductory graduate level is being conducted during the 1982-1983 academic year at Tufts University, Medford, Massachusetts. The program is sponsored by the Bay State Skills Corporation, a public corporation funded by the Commonwealth of Massachusetts, with assistance from Hewlett-Packard Company, M/A-COM, Inc., Adams-Russell Company, and Alpha Industries. The program is aimed at presenting concepts and methods of microwave engineering to electrical engineers, who should then be able to contribute more and sooner to research, development, and production in the microwave industry.

The Fall semester consisted of the two courses: Semiconductor Devices and Introduction to Microwaves. The Spring semester includes the required course, Microwave Semiconductor Devices and Circuits, and one elective.

The director for the Specialist program is Professor Arthur Uhlir, Jr. who feels that the program benefits the participants, private industry, and other technical organizations because successful engineering can create production jobs and attract more new engineering opportunities.

WAVE PROPAGATION

The following review of **Wave Propagation Theory** by J. R. Wait (Pergamon Press, Inc., Elmsford, NY 10523, 1981, 348 pages, hardbound—$42.50 or paperback—$22.50) originally appeared in the Electromagnetic Compatibility Society Newsletter, Issue Number 116, Winter 1983. The book was reviewed by Henning F. Harmuth of Catholic University, Washington, D.C.

This book is primarily a collection of previously published articles; 14 of the 23 chapters are reprints, four of them from the author's book, "Electromagnetic Waves in Stratified Media." Here is a listing of the topics of the reprinted chapters: reflection from stratified media; magneto-telluric fields (these are very slowly varying fields caused by earth currents); surface impedance of a spherically stratified conductor; excitation of the HF surface wave by vertical and horizontal apertures; fields of a dipole over an homogeneous anisotropic half-space; asymptotic evaluation of the field of a vertical dipole over an impedance plane surface; transmission in an idealized earth crust waveguide; reflection from inhomogeneous media with special profiles; approximate methods for inhomogeneous media; high frequency electromagnetic coupling between small loops over an inhomogeneous half-space; reflection of VLF radio waves from an inhomogeneous isotropic ionosphere; reflection from a lossy magnetoplasma half-space; EM propagation in the earth-ionosphere waveguide; guiding of microwaves by an elevated tropospheric layer.

Among the newly published chapters are two on the Zenneck wave; this is a wave propagating along the boundary of two homogeneous media such as the earth and the atmosphere, but also along the surface of an open waveguide. Two more chapters are on wave propagation in the ionosphere duct; one about scattering at irregularities in the duct, the other about mode conversion due to a changing refractive index along the propagation path. Further chapters are on the radiation of a horizontal dipole over a horizontally stratified medium, and the field of a circular current loop in a two-layer earth.

A book of this type consisting of a collection of previously published papers, sections of a book, reports, and, perhaps, papers in preparation for publications is primarily of interest to those requiring specialized information on the various topics covered. One cannot give an overall evaluation of this kind of book that goes beyond stating that the author is one of the best known scientists in the field of wave propagation.

SHORT COURSES

April 25-29, 1983, George Washington University is offering **Communications Satellite Engineering** (course 259 DC) for the fee of $855 per student. The course coordinator is Dr. Eugene Cacciamani, President of Macromnet, Inc., Gaithersburg, Maryland.

Other George Washington University short courses include: **Fiber Optics Systems Design,** Course 541 DC, May 9-11, 1983; **Monopulse Radar,** Course 1005 DC, May 10-12, 1983; **Radiowave Propagation for Communications System Design,** Course 249 DC, May 9-13, 1983; **Synthetic Aperture Radar with Remote Sensing Applications,** Course 664 DC, May 16-20, 1983; **Spread Spectrum Communications Systems,** Course 302 DC, May 16-20, 1983; **Direct Broadcast Satellite Systems Design,** Course 991 DC, May 23-25, 1983; **Modern Communication Receiver Design,** Course 1011 DC, instructor is Dr. Ulrich L. Rohde, fee is $685, May 23-25, 1983; **Communications Satellite Systems,** Course 823 DC, June 14-16, 1983; **Fundamentals of Communication Satellite Systems,** Course 503 DC, June 20-24, 1983; and **Military Communications Systems,** Course 806 DC, June 27-July 1, 1983.

George Washington University is also offering **Electronic Warfare Systems** (Course No. 984 DC), June 6-10, 1983; **Agricultural and Forestry Applications of Remote Sensing** (Course No. 900 DC), June 13-15, 1983; **Radar Principles for the Non-Specialist** (Course No. 704 DC), June 14-15, 1983; **Introduction to Modern Radar Technology** (Course No. 1038 DC), June 27-29, 1983; **Microwave Solid-State Devices** (Course No. 1036 DC), August 15-19, 1983; **Modern Air-to-Air Radar Systems** (Course No. 1034 DC), August 16-19, 1983; **Radar Missile System ECCM** (Course No. 848 SD), August 22-26, 1983; **Microwave High-Power Tubes and Wave Propagation** (Course No. 1037 DC), August 22-26, 1983. For additional information, contact the school at (800) 424-9773 or (202) 676-8527 or at Continuing Engineering Education Office, George Washington University, Washington, DC 20052.

A number of short courses are being offered by the Technology Service Corporation, 8555 Sixteenth Street, Suite 300, Silver Spring, MD 20910. These include: **Electronic Warfare,** May 3-6 in Ottawa, Canada; **Radar Range-Performance Analysis,** May 3-6 in Ottawa, Canada; **Microwave Integrated Amplifier and Oscillator Design,** May 17-20 in Washington, DC; **Modern Microwave Techniques,** June 21-24 in Ottawa, Canada; and **Modern Antennas,** June 21-24 in Ottawa, Canada. Contact Technology Service Corporation at (800) 638-2628 or (301) 565-2970 for additional details.

Offered by Continuing Education Institute is **Spread Spectrum and Anti-Jam Communications.** This course is offered April 11-13, 1983 at the Columbia Inn, Columbia, Maryland and May 2-4, 1983 at the Amfac Hotel, Los Angeles, California. The course director is Dr. John Oetting. Also being offered by Continuing Education Institute is **Microwave Theory and Measurements.** The course is being presented June 27-30, 1983 in San Diego, California and July 11-14, 1983 at the Columbia Inn in Columbia, Maryland. The course instructor is Dr. Stephen F. Adam. Continuing Education Institute can be reached at 10889 Wilshire Boulevard, Suite 1030, Los Angeles, California 90024, (213) 824-9545.

A number of courses of interest will be available from UCLA Extension, Short Course Program Office. **Laser Systems and Applications** (Engineering 823.22) will be offered April 25-29 at a fee of $845 per pupil. The course will be taught by Charles C. French and five additional lecturers. May 2-6 are the dates for **High-Speed Integrated Circuit Technology** (Engineering 881.57), taught by Paul T. Greiling and two additional instructors. The fee for this course is also $845. Other UCLA offerings include: **Modern Radar Technology and Applications** (October 3-7); **Gallium Arsenide (GaAs) Integrated Circuits** (October 24-28); and **Synthetic Array and Imaging Radars** (November 7-11). For more information, contact UCLA Short Course Program Office at P.O. Box 24901, 10995 Le Conte Avenue, Los Angeles, CA 90024, (213) 825-1295 or 825-3344.

Microwave Circuit Design is also being offered by the University of Maryland and UCLA on July 11-15 and August 15-19, respectively. The course instructors are Les Besser, Bob Wenzel, and Steven March. Contact UCLA at the address above or the University of Maryland at (301) 454-5237 for further information.

Fundamentals of Radar Cross-Section will be presented June 6-10, 1983 and October 24-28, 1983 in Orlando, Florida. The course instructor will be Dr. Gary A. Thiele of the University of Dayton and past President of the Antennas and Propagation Society. For further information, contact Southeastern Center for Electrical Engineering Education, Central Florida facility, Eleventh Street and Massachusetts Avenue, St. Cloud, FL 32769, (305) 892-6146.

INFRARED AND MILLIMETER-WAVE CONFERENCE

The Seventh International Conference on Infrared and Millimeter Waves was held at the Faculte St. Jerome, Universite de Droit d'Economie et des Sciences, Aix-Marseille, France, February 14-18, 1983.

The Conference concentrated on advances in millimeter and submillimeter techniques and the research and applications arising from these advances. This year, over 300 contributed papers were organized into five parallel sessions. Twenty invited speakers and 36 keynote invited speakers provided a fundamental tutorial foundation for the technical program.

The development of the gyrotron received the most coverage among the many sources of radiation that were described. Optically pumped lasers and electrically pumped solid state sources were also discussed. Free electron oscillators received more attention this year.

Three general sessions on detectors, two additional sessions on Schottky diodes and many additional papers on mixers, receivers and instrumentation demonstrated that a good deal of progress is being made both in Europe and in the United States.

The conference concluded with the presentation of the Gold Medal of the University Aix-Marseille to Kenneth J. Button by the President and Past President of the University and the Minister of the Interior.

The next conference will be held December 12-16, 1983 in Miami Beach, Florida.

MANAGING YOUR TIME

Seems we're all guilty of having said at least once, "If only I had more time . . ." When was the last time you used this excuse? The following 20 hints are practical ways to manage your time more wisely.

1. **Reduce Your Paperwork.**
   Stop writing letters. Stop filing letters received; instead, scribble your reply and send it back. Get off circulation lists for unnecessary memos, reports, and magazines. Never handle a memo twice. Telephone your message, ask the recipient to inform others. Ask your secretary to screen your junk mail. Ask your secretary to sign your name on routine forms, expense accounts, etc. Skim essential reading; avoid the rest.
2. **Delegate.**
   Enrich the jobs of your subordinates. Give them as much responsibility as possible. Never do something for them because "I can do it faster and better." Be truly pleased when people steal jobs from you. And encourage them to do it more often.
3. **Select One Portion of the Day as Not-to-be-disturbed Time.**
   During this period close your door, do not answer the phone, and finish off the few important things that really need doing that day, or work at home.
4. **Do All Your Telephoning At One Time.**
5. **Learn to Say "No."**
   Do not let yourself be talked into commitments on projects in which you have no real interest. Be selective. Remember that it is your time you are spending. Avoid interruptions.
6. **Plan to Use Your "Waiting" Time.**
   Always carry with you a productive project to work on. Welcome the achievement you attain on the bus, in the dentist's office, or waiting to see your boss.
7. **Ignore as Many Trivial Requests and Memos as Possible.**
8. **Have a Policy of Not Doing Things.**
   Every afternoon dump everything—except the very few important things—into the bottom drawer of your desk. Never remove anything from this drawer until 4:00 p.m. on Fridays. Dispatch anything so removed once and for all before you go home.
9. **Avoid Meetings.**
   Arrive as late as possible. Arrange to be phoned shortly thereafter, requiring you to leave again. Schedule your own meetings at 4:45 p.m., preferably with not enough chairs. Insist upon agendas.
10. **Be a Clock Watcher.**
    Plan your work and keep on schedule. Develop a sense of urgency. Keep your watch three minutes fast.
11. **Let George Do It.**
    This is a combination of delegating, refusing work, and motivating others. Stop helping George when he does not ask for it.
12. **Throw Out Everything Possible Every Day!**
13. **Know the Purpose or Function That You Are Trying to Achieve.**
    Establish some specific measures of achievement (objectives) and completion dates.
14. **Know and Use Pareto's Law.**
    Concentrate **only** on the Vital Few.
15. **Manage By Emphasis.**
    Do the right thing before doing things right.
16. **Schedule and Allocate Work Most Effectively.**
    You cannot save time; you can only spend it well. Know and use good scheduling techniques.
17. **Perform Those Few Activities That You Must Do Efficiently.**
    Once you start something, don't put it down until it's completed. Use methods—improvement and opportunity—enhancement strategies. Activities are irrelevant; only achievements are important.
18. **Stop Doing What You Do Best.**
    We all tend to do what we can do well and enjoy doing rather than what is important. Doing well what you have done many times before is nothing to be proud about. Review all socializing on the job from the benefit-to-cost point of view.
19. **Mechanize Those Things You Do Regularly.**
    Develop automatic rules; delegate; use rubber stamps, form letters and open orders. Most decisions are unimportant; let someone else make them.
20. **Don't Turn Decisions into Research Projects.**
    Determine the alternative courses of action **before** collecting data. Collect the least amount and least accurate data necessary to select the best alternative. Then make your decision. Don't ask the advice of others. Be autocratic.

(Reprinted from Professional Communications Society Newsletter, Volume 26, Number 1, January 1983)

OPTICAL FIBER MEASUREMENTS

Corning Glass Works has produced a series of four-page technical application notes on the characterization of optical fibers. The series of four notes, available free from the Telecommunications Products Department, Corning Glass Works, BH-5, Corning, NY 14830, cover bandwidth measurement, attenuation measurement and core diameter measurement of 50 and 100 μm core diameter waveguides.

The bandwidth measurement technique suggested in the application note employs 850 and 1300 nm wavelength semiconductor lasers with a 25 nm spectral width, the test fiber and a 2 meter reference. An approximately 500 psec pulse of light is sent into the fiber and the output Fourier spectrum is transformed into the frequency domain. The Fourier spectrum of the reference fiber is then analytically deconvolved from the Fourier spectrum of the output frequency spectrum point by point by the reference spectrum. The frequency at which the amplitude of the deconvolved spectrum drops 3 dB relative to the zero frequency component is the fiber bandwidth.

Using the same reference fiber and semiconductor laser, attenuation measurements are made by sending a narrow spectral band of light into the full length of the fiber and measuring the transmitted intensity. Repeating the measurement for the first two meters of the same fiber provides a comparison for judging the attenuation. To measure aperture, Corning suggests using a light source with a single wavelength of 850 nm. The numerical aperture of the fiber is calculated from the far-field optical power distribution exiting from two meters of fiber. Similarly, by measuring the near-field optical power distribution, the core diameter is determined.

SEX FOR NAILS

The poet Christopher Marlowe wrote of "the face that launched a thousand ships." Oddly, the faces—and other charms—of some lovely Tahitian maidens very nearly **sank** a ship.

In 1767, Capt. Samuel Wallis discovered the Tahitian Islands. It wasn't long beore the crew of his ship, the *Dolphin*, learned a thrilling fact: The island girls would offer hours of sex in trade for the iron nails that held the *Dolphin* together. The natives used them to make fishhooks.

At first, Wallis was either unaware of the situation or chose to ignore it. Eventually he forbade the trade, but the crew ignored his command. The *Dolphin* was literally falling apart at the seams. What's more, the Tahitians began to demand longer nails (the loveliest girls could only be had for the longest nails). Finally, Wallis refused to grant shore leave until the guilty parties confessed. In the end, a scapegoat, Mr. Pinckney, was blamed. (His efforts apparently had caused the ship's mainsail to collapse.) He was flogged, and shore leave was ended.

The Tahitians later said they had been led to believe that it was customary among white people to fornicate freely and openly—that it was the white man's way of saying "hello."

FIBER OPTIC TESTING

An addendum to RS-455 which establishes standard test procedures for optical fibers, cables, transducers, and connecting and terminating devices has been released by the Electronic Industries Association (EIA). RS-455-5 elevates roughly 24 fiber optic test procedures already published by the EIA to the level of a standard. They include "Frequency Domain Measurement of Multimode Optical Fiber Information Transformation Capacity" (FOTP-30), "Fiber Optic Cable Tensile Loading and Bending Test" (FOTP-33), "Resist Test for Fiber Optic Cable Assemblies" (FOTP-36), "Mode Scramble Launch Requirements of Information Transmission Capacity Measurements" (FOTP-54), "Methods for Measuring the Coating Geometry of Optical Fibers" (FOTP-55), and "Fluid Penetration Test of Refilled Fiber Optic Cable" (FOTP-82).

Eighty other test procedures are being developed for future addenda to RS-455; fifteen of them are approaching final approval. Copies of RS-455-5 and addenda to RS-455 are available from Electronic Industries Association, Standards Sales Department, 2001 Eye Street, N.W., Washington, D.C. 20006.

DIAMOND THIEVES BEWARE!

General Electric Co. scientists Robert C. DeVries and Roy E. Tuft have demonstrated that an ion beam from an ion implanter can "draw" invisible letters, numerals, symbols, or geometric patterns inside a diamond for identification purposes, without compromising the beauty of the gem. To create the desired configuration they place a custom-made mask over one of the diamond's surfaces before it is exposed to the ion beam. The implanted ions create a patterned region that has an electrical conductivity different from the surrounding area.

Once the invisible pattern has been created within the diamond, it is simple to reveal it. First the diamond is given an electrostatic charge by rubbing its surface briskly with a piece of cotton or silk, or by using a corona discharge apparatus. The charge either collects and is held in the region where the ion pattern is implanted, or it is held everywhere but the implanted region. The diamond is then dusted with a special powder that clings only to the charged region, revealing the distinguishing pattern. After identification, the powder is wiped away with a cloth and the pattern disappears.

MEMBERSHIP SERVICES

by H. J. Kuno

During 1982, fifteen MTT-S Chapters received financial support of $300 each, from the Society. At its January 1983 meeting, the Administrative Committee of the Microwave Theory and Techniques Society voted to extend this program of support for 1983 at the same $300 per Chapter level. The Chapter Chairman or his representative must request this funds from the MTT Society Membership Services Chairman.

MTT-S membership on December 31, 1982 was 6,968, the highest year-end value in the history of the Society. The percentage growth over 1981 was five percent, which is an increase over the 1981 growth rate of three percent. The total IEEE membership at the end of 1982 was 234,076, representing a 5.6 percent increase over the previous twelve months. A breakdown of the year-end MTT-S membership status is:

Student	964
Regular	5888
Retired	35
Minimum Income	44
Unemployed	34
Affiliate	3

NEW THESES

In recent months, two doctoral dissertations have been completed at the Ecole Polytechnique Federale de Lausanne in Lausanne, Switzerland. In both cases, the thesis advisor was Professor Fred E. Gardiol.

Contribution to the Theoretical Study of Propagation in Optical Waveguides was presented by Jean-Dominique Decotignie on November 24, 1982 (in French), while on December 3, 1982, Ataollah Azizi presented *Contribution to the Study of Nonlinear Transistor Amplifiers at Microwaves.*

Copies of the dissertations can be obtained upon request from Professor Gardiol at Departement d' Electricite, Laboratoire d' electromagnetisme et d'acoustique, Ecole Polytechnique Federale de Lausanne, Chemin de Bellerive 16, CH-1007 Lausanne, Switzerland.

CALL FOR PAPERS

1984 IEEE International Symposium on Circuits and Systems

When: May 7-10, 1984
Where: Queen Elizabeth Hotel, Montreal, Quebec, Canada
Deadline: September 30, 1983
Submission: Four copies of 500-word abstract
Submit to: Dr. A. S. Sedra, University of Toronto, Toronto, Ontario, M5S 1A4, Canada, (416) 978-6344

1984 International Symposium on Electromagnetic Compatibility

When: October 16-18, 1984
Where: Pacific Hotel, Tokyo, Japan
Deadline: January 31, 1984
Submission: Original plus 2 copies of abstract and 500-700 word summary (up to 6 illustrations)
Submit to: Prof. Takagi, Tohuku University, Department of Communications, Sendai 980, Japan. Telephone: 0222-22-1800, extension 4266

ANTENNA DESIGN

Volumes I and II of the **Handbook of Antenna Design** are also Volumes 15 and 16, respectively, of the IEE Electromagnetic Waves Series.

The first volume was published in 1982 and retails for $97.00 casebound (728 pages). Volume II, containing 960 pages, sells for $121.00 casebound. The purchase of both volumes, edited by A. W. Rudge, K. Milne, A. D. Olver, and P. Knight, entitles the purchaser to a $20 discount.

The Volume I chapter titles include: Basic Properties of Antennas, Analytical Techniques for Quasi-Optical Antennas, Quasi-Optical Antenna Design and Applications, Primary Feed Antennas, Multiple Beam Antennas, Low and Medium Gain Microwave Antennas, and Antenna Measurements.

The chapter titles for Volume II are: Linear Arrays, Planar Arrays, Conformal Arrays, Circular Arrays, Array Signal Processing, Radomes, VLF, LF and MF Antennas, VHF and UHF Antennas, and Coaxial Transmission Lines and Components.

Volumes 13 and 14 of the Electromagnetic Waves Series were also published in 1982. Volume 13, **Energy in Electromagnetism,** by H. G. Booker (384 pages) is available for $82.50. P. Delogne authored Volume 14, **Leaky Feeders and Subsurface Radio Communications,** which contains 304 pages and sells for $67.50.

Any of these volumes are available from PPL Department, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. Orders can be charged to VISA, MasterCard, or American Express cards.

MICROSTRIP ANTENNAS

Microstrip Antenna Theory and Design is volume 12 of the IEE Electromagnetic Wave Series. The book, published in 1981 in England by Peter Peregrinus, Ltd., contains 287 pages and retails for $70. The book was reviewed by M.C. Baily of NASA Langley Research Center.

During the past decade, microstrip antenna technology has developed to a level where many concepts are almost routinely proposed and designed for practical applications. The purpose of this book is to give the reader an appreciation for the state-of-the-art of microstrip antenna technology, a description of various practical design concepts and their radiation properties, and a discussion of the applicability of analytical techniques to the modeling of microstrip antennas. A good selection of references are given and each of the ten chapters concludes with a summary.

Chapter 1 very briefly discusses some low-profile type antennas and serves to introduce the concept of microstrip antennas.

Chapter 2 presents, in a somewhat handbook fashion, some fundamental equations for design of microstrip lines including characteristic impedance and estimations of loss. The inclusion of this material is appropriate as microstrip antennas are sometimes designed to be an integral part of the microwave circuit and feed network.

Chapter 3 discusses the radiation mechanism of an open-circuit microstrip line termination and gives expressions for the radiation conductance based upon both the equivalent volume polarization current and the equivalent radiating aperture at the termination. An improved analysis using the variational method which includes the surface wave excitation is presented and it appears to model reasonably well the behavior of the termination. The concept of a half-wave-length transmission line resonator is introduced and calculations of the Q-factor are presented.

Chapter 4 focusses on the patch radiator and its analysis using the cavity modal fields method. Expressions are given for the radiation fields, resonant frequency and Q-factor of rectangular and circular resonators. The transmission line network model for the input impedance of a rectangular patch is also given and the quarter-wave shorted transmission line model is discussed.

Chapters 5 and 6 survey various forms of practical linear and planar microstrip antenna arrays and feeding techniques. The effects of mutual coupling are discussed in generalities and specifies are lacking.

Chapter 7 describes various techniques which have been implemented for generating circularly polarized radiation from microstrip antennas. Chapter 8 gives a somewhat superficial treatment of manufacturing tolerances.

The approximate analytical methods described in chapters 3 and 4 are adequate for generating initial design data for the basic elements; however, experimental trimming is almost always necessary in implementing a design. More exact analytical models are therefore needed and chapter 9 describes several recent advances in the analysis of microstrip antennas using numerical methods.

Chapter 10 defines some trends and possible future developments in microstrip antenna technology, such as variations on the basic resonant element and the use of multilayer-multielement techniques for improved bandwidth and dual-frequency operation. Several hybrid arrangements of microstrip radiating elements and other structures are described for specialized applications.

Useful appendixes are included which give empirical formulas for microstrip line discontinuities and a comparison of commercially available microstrip materials.

Although very little new material is presented, one can appreciate the convenience of having practical microstrip antenna concepts and basic related analyses summarized in a single volume.

(Reprinted from the IEEE Antennas and Propagation Society Newsletter, August 1982)

MEETINGS OF INTEREST

- Walt Disney World in Orlando, Florida is the site of the **33rd Electronic Components Conference.** For additional details on the May 16-18, 1983 conference, contact Thomas G. Grau, Bell Telephone Laboratories, Whippany, NJ 07981, (201) 386-3303.
- **The 1983 National Aerospace and Electronics Conference (NAECON)** will be held May 17-19, 1983 at the Dayton Convention Center, Dayton, Ohio. Contact NAECON, 140 East Monument Avenue, Dayton, OH 45402, (513) 223-6266 for additional information.
- May 17-20, 1983 are the dates for **CLEO '83, Conference on Lasers and Electro-Optics.** The conference will be held at the Baltimore Convention Center, Baltimore, Maryland. Additional information can be obtained from CLEO '83, Optical Society of America, 1816 Jefferson Place, N.W., Washington, D.C. 20036, (202) 223-8130.
- **The 1983 IEEE Antennas and Propagation Society Symposium** and the **U.S. National Committee of URSI Meeting** will be held at the University of Houston, Houston, Texas, May 23-26, 1983. Contact Dr. Stuart A. Long, Department of Electrical Engineering, University of Houston, Houston, TX 77004, (713) 749-2511 for more information.

- **The 1983 Mediterranean Electrotechnical Conference (MELECON '83)** will be held in Athens, Greece. Additional information on the May 24-26, 1983 conference can be obtained from Prof. E. N. Protonotarios, National Technical University, 42 October 28th Street, Athens (147), Greece.
- **THE 1983 IEEE MICROWAVE AND MILLIMETER-WAVE MONOLITHIC CIRCUITS SYMPOSIUM** will be held May 31-June 1, 1983 at the Boston Sheraton Hotel, Boston, Massachusetts. Contact Dr. Paul T. Greiling, Hughes Aircraft Co., 3011 Malibu Canyon Road, Malibu, CA 90265, (213) 456-6411 for additional information.
- **THE 1983 IEEE MTT-S INTERNATIONAL MICROWAVE SYMPOSIUM** will be held June 1 - June 3, 1983 at the Boston Sheraton Hotel, Boston, Massachusetts. For additional information, contact Harlan Howe, Jr., M/A-COM, Inc., South Avenue, Burlington, MA 01803, (617) 272-3000, extension 1637.
- The URSI Commission F 1983 Symposium, **Wave Propagation and Remote Sensing,** will be held in Wepion-Namur, Belgium, June 9-15, 1983. The conference languages are English and French. Contact the Symposium Secretariat, URSI Commission F 1983 Symposium, Laboratoire de Telecommunications U.C.L., Batiment Maxwell, B-1348 Louvain-la-Neuve, Belgium for additional information.
- Ottawa, Canada is the site for the **1983 Satellite Communications Conference.** SCC-1983 will be held June 15-17, 1983. Additional details can be furnished by Dr. Kamilo Feher, University of Ottawa, 770 King Edward Avenue, Ottawa, Ontario K1N 9B4, Canada, (613) 231-2288 or 231-2495.
- June 19-22, 1983 are the dates for the **1983 International Conference on Communications.** The convention site is the Boston Sheraton Hotel, Boston, Massachusetts. Contact C. William Anderson, New England Telephone and Telegraph, 350 Cochituate Road, Framingham, MA 17101, (617) 879-9000 for additional information.
- **The Fourth International Conference on Integrated Optics and Optical Fiber Communication (IOOC '83)** will be held June 27-30, 1983 at the Keio Plaza Hotel in Tokyo, Japan. Contact Dr. Melvin I. Cohen, Bell Telephone Laboratories, Room 6D-325, 600 Mountain Avenue, Murray Hill, NJ 07974, (201) 582-6623 or Prof. Humio Inaba, Research Institute of Electrical Communication, Tohoku University, 2-1-2 Katahira, Sendai 980, Japan for more information.
- June 27-July 1, 1983 are the dates for **LASER '83,** to be held at the Trade Fair Center, Munich, West Germany. Additional information can be obtained from the Kongressburo LASER 83, Munchener Messe-und,Ausstellugnsgesellschaft mbH, Postfach 12 10 09, D-8000 Munchen 12, West Germany.
- August 22-24, 1983 are the dates for the fifth annual **Satellite Communications Users Conference** to be held at Stouffer's Riverfront Towers, St. Louis, Missouri. For further information, contact Satellite Communications Magazine, 6430 South Yosemite Street, Englewood, CO 80111, (303) 694-1522.
- Santiago de Compostela, Spain is the site for the **1983 URSI International Symposium on Electromagnetic Theory.** For more information on the August 23-26, 1983 meeting, contact Dr. J. L. Sebastian, Department de Electricidad y Electronica, Facultad de Ciencias Fisicas, Ciudad Universitaria, Madrid 3, Spain.
- August 31-September 2, 1983 are the dates for the **1983 International Geoscience and Remote Sensing Symposium.** The conference will be held at the San Francisco Hilton Hotel, San Francisco, California. Further details can be supplied by Mike Beuttner, Lawrence Livermore National Laboratory, Mail Stop L-156, P.O. Box 5504, Livermore, CA 94550, (415) 422-7888.
- **The 13th European Microwave Conference** is scheduled to be held September 5-8, 1983 in Nurnberg, West Germany. There will be a workshop on Microwave Imaging Methods on September 9th. For further information, contact Microwave Exhibitions and Publishers Ltd., Convex House, 43 Dudley Road, Tunbridge Wells, Kent, TN1 1LE, United Kingdom.
- **Midcon '83** will be held September 13-15, 1983 in Rosemont, Illinois (outside Chicago). For further information, contact Kent Keller, Electronic Conventions, Inc., 999 North Sepulveda Blvd., El Segundo, CA 90245, (213) 772-2965.
- The University of Kent, Canterbury, England is the location for the **13th European Solid State Device Research Conference.** Contact Dr. Clive Jones, Institute of Physics, 47 Belgrave Square, London SW1X 8QX, United Kingdom, tel: 01-235-6111 for additional information on the September 13-16, 1983 meeting.
- **EASCON, the Electronic and Aerospace Systems Convention,** will be held at the Shoreham Dunfy Hotel, Washington, D.C., September 19-21, 1983. Contact Dr. John M. Walker, Westinghouse Electric Corp., Mail Stop 3200, P.O. Box 1521, Baltimore, MD 21203, (301) 765-7491 for more information.
- The **Sixth International Conference on Digital Satellite Communications** will be held September 19-23, 1983 at the Hyatt Regency Hotel, Phoenix, Arizona. Requests for information should be directed to Howard B. Briley, Comsat, 950 L'Enfant Plaza, S.W., Washington, D.C. 20024, (202) 863-6248.
- **The Ninth European Solid-State Circuits Conference** is scheduled to be held September 21-23, 1983 in Lausanne, Switzerland. Additional information is available from the Secretary, ESSCIRC '83, Vlado Valencic, EPFL-33 Ave. de Cour, CH-1007 Lausanne, Switzerland.
- The **1983 Electrical and Electronics Conference and Exposition** will be held in Toronto, Canada at the Automotive Building of the Canadian National Exhibition, September 26-28, 1983. Contact IEEE Canadian Region Office, 7061

Yonge Street, Thornhill, L3T 2A6, Ontario, Canada, (416) 881-1930 for more details.

- Bangalore, India is the site of the October 10-13, 1983 **International Radar Symposium, India—1983.** Additional information can be obtained from N. L. Krishnan, Bharat Electronics Ltd., 29 Race Course Road, Bangalore 560-001, India.
- The **1983 International Test Conference** will be held October 18-20, 1983 in Philadelphia, Pennsylvania. Contact Harry Hayman, P.O. Box 639, Silver Spring, MD 20901, (301) 589-3386.
- The Pacific Hotel, Tokyo, Japan is the site for the **Fifth International Telecommunications Energy Conference, INTELEC '83.** The conference is scheduled to be held October 18-21, 1983. Additional information can be obtained from Mr. K. Yamamura, International Congress Services, Inc., Chikusen Building, Fifth Floor, 2-7-4 Nihombashi. Chuo-ku, Tokyo 103, Japan.
- October 23-26, 1983 are the dates for the **1983 IEEE Military Communications Conference (MILCOM '83).** The conference will be held at the Sheraton National Hotel, Arlington, Virginia. Contact Fred W. Ellersick, Communications Division, Mitre Corporation, Bedford, MA 01730, (617) 271-3343 for additional data.
- **ECOC '83,** the **Ninth European Conference on Optical Communication** will take place October 23-26, 1983 in Geneva, Switzerland. Further information can be obtained from H. Melchior, Institute for Applied Physics, Swiss Federal Institute of Technology, 8093 Zurich, Switzerland.
- The **IEEE 1983 International Symposium on Electromagnetic Compatibility** will be held October 24-26, 1983 at the Shoreham Dunfey Hotel, Washington, D.C. Because this will be the Silver Anniversary of the EMC Society, the theme of the symposium will be "A Quarter Century of EMC Progress." Additional details can be received from William G. Duff, Atlantic Research Corporation, 5390 Cherokee Avenue, Alexandria, VA 22314, (703) 642-4049.
- **Forum '83, the 4th World Telecommunication Forum,** is organized by ITU and will be held October 29-November 1, 1983 in the Conference Center in Geneva, Switzerland. Contact Forum '83 Secretariat, International Telecommunication Union, Place des Nation, CH-1211, Geneva 20, Switzerland for more information.
- October 31-November 2, 1983 are the scheduled dates for the **1983 Ultrasonics Symposium.** For additional information on the conference, to be held at the Marriott Hotel in Atlanta, Georgia, contact Dr. R. S. Kagiwada, TRW Space and Defense Systems, Building R6, Room 2033, One Space Park, Redondo Beach, CA 90278, (213) 535-2500.
- The **1983 Military Communications Conference (MILCOM '83)** will be held October 31 to November 2, 1983 in Washington, DC. For further information, contact Charles R. Wolfson, Defense Communications Agency, Washington, D C 20305, (202) 692-2486. Both classified and unclassified papers will be presented.
- **The Fifth Digital Avionics Systems Conference** will be held October 31-November 3, 1983 at the Seattle Sheraton Hotel, Seattle, Washington. Additional details can be obtained from Cary R. Spitzer, Mail Stop 472, NASA Langley Research Center, Hampton, VA 23665, (804) 827-3318.
- November 1-3, 1983 are the dates for **Autotestcon '83,** to be held at the Hyatt Regency Hotel in Fort Worth, Texas. For more information, contact W. T. Beard, General Dynamics Co., Mail Stop 24-65, Fort Worth, TX 76101, (817) 732-4811, extension 4723.
- The Pittsburgh Hilton Hotel, Pittsburgh, Pennsylvania is the site of the November 6-11, 1983 **Magnetism and Magnetic Materials Conference.** Contact Fred J. Werner, Westinghouse R and D Center, 130 Beulah Road, Pittsburgh, PA 15235, (412) 256-3556 for more information.
- **WESCON, the Western Electric Show and Convention** is scheduled to be held November 8-10, 1983 in Los Angeles, California. Dale Litherland, Electronic Conventions, Inc., 999 N. Sepulveda Boulevard, El Segundo, CA 90245, (213) 772-2965 can supply more information.
- San Diego, California is the site for the **Global Telecommunication Conference (Globecom '83).** The November 29-December 1, 1983 meeting theme is "World Communications Year—A Time For Planning." Contact Dr. Peter A. Vena, Globecom '83, P.O. Box 81466, San Diego, CA 92138, (619) 457-2340 for more details.
- The Kenyatta Conference Centre in Nairobi, Kenya is the site for the **First IEEE Conference for All-Africa,** scheduled for December 7-9, 1983. The focus of Africon '83 will be meeting Africa's short-term needs for electrical technology. For further details, contact R. Mischler, IBM Research Laboratories, 8803 Ruschlikon-ZH, Switzerland.
- **The Eighth Annual International Conference on Infrared and Millimeter-Waves** is scheduled for December 12-17, 1983 at the Carillon Hotel, Miami Beach, Florida. Contact Prof. Kenneth J. Button, Massachusetts Institute of Technology, National Magnet Laboratory, Cambridge, MA 02139, (617) 253-5561 for more information.
- January 16-20, 1984 are the dates for the **URSI Specialist Meeting on Microwave Signatures in Remote Sensing.** The conference will be held in Toulouse, France. Contact either Dr. Erwin Schanda, Universitat Berne, Institute of Applied Physics, Silderstrasse 5, 3012 Berne, Switzerland or Dr. Richard K. Moore, Remote Sensing Laboratory, University of Kansas, 2291 Irving Hill Drive-Campus West, Lawrence, KS 66045 for additional information.
- April 10-12, 1984 are the dates for the **Second International Conference on Metal—Organic Vapor Phase Epitaxy.** For further information, contact Dr. P. A. Houston, University of Sheffield, Department of Electronic and Electrical Engineering, Mappin Street, Sheffield S1 3JD, United Kingdom. Telephone 44(0742)78555.

1985 A P SYMPOSIUM

The Third International Symposium on Antennas and Propagation (ISAP) Japan is scheduled for Kyoto, Japan, 20-22 August 1985. The Symposium was initiated in 1971 by the Institute of Electronics and Communication Engineers (IECE) of Japan, with the aim of providing a regular forum for discussion and exchange of information about antennas and propagation. The first and second ISAP were held in Sendai, Japan in 1971 and 1978.

This meeting, the third ISAP to be held in Japan, will take place in Kyoto and will treat a wider range of subjects. The theme will be *New Wave Frontiers* and discussions will embrace new insights into various systems in the field of antennas and propagation and related fields. Papers on interrelated topics pertaining to satellite communications, remote sensing, vehicular technology, EMI, and so forth, will contribute to the theme of the Symposium, in addition to papers on theory, design, practice, and applications of antennas and propagation.

The third ISAP is sponsored by the IECE of Japan and supported by the IEEE Antennas and Propagation Society. The Chairman of the Symposium is Professor Fumio Ikegami, Kyoto University.

Persons interested in receiving the forthcoming announcement of the Symposium are invited to write: Professor Kazuaki Takao, Secretary of the Symposium, Department of Electrical Engineering, Kyoto University, Sayo-ku, Kyoto 606, Japan.

SUMMER CAMP CREDIT

Thinking-ahead note for working parents: If you qualify for a child-care tax credit, next summer's camp costs for a child may be deductible within the credit's limits of 20 to 30 percent of adjusted gross income (depending on that income amount).

A mother working full time in an accounting firm sent her 11-year-old son to a camp for eight weeks at a cost of $1,100. She claimed that amount as a credit, arguing that other care for the same period would have cost as much or more.

The Tax Court upheld her claim, overruling the IRS, but warned that the decision applied only to her "facts and circumstances . . . If the camp had been a specialized camp, such as a golf camp or a computer camp, our conclusion might be different."

CRAY 3 COMPUTER

If the help wanted notices in *Electronic News* are any indication, the Cray 3 computer will be loaded with gallium arsenide chips. Cray Research, Chippewa Falls, Wisconsin has been advertising heavily in the weekly newspaper for professionals experienced in GaAs manufacturing.

The current Cray computers use conventional silicon technology. The next machine, the Cray 2, which is expected at the end of 1983, will also use silicon technology, specifically ECL (emitter-coupled logic) circuitry. The company is not saying when a gallium arsenide-based computer might finally be developed.

CENTERS OF EXCELLENCE

Cornell University, Carnegie-Mellon University, and the University of California at Berkeley have been awarded the first research grants awarded by the Semiconductor Research Corp., which was founded last February.

Cornell was awarded $1 million for research into semiconductor structures with features smaller than one micron, including studies of devices, processing, and materials. The funding will cover 19 research projects conducted by 18 faculty members from the School of Electrical Engineering, Laboratory of Atomic and Solid-State Physics, Department of Materials Science and Engineering, and the School of Applied and Engineering Physics.

The University of California and Carnegie-Mellon University will split $1.75 million for research of computer-aided-design of integrated circuits. Eight to 10 colleges and universities will be funded by Semiconductor Research Corp. over the next three years. In addition, research contracts of about $100,000 will be awarded to a number of research groups throughout the US for smaller projects. The first recipients to be announced are Stanford University, the University of Minnesota, Mississippi State University, the University of North Carolina, and the University of Illinois.

Semiconductor Research Corp. was organized by 13 members of the semiconductor, computer, and telecommunications industry, including Advanced Micro Devices, Control Data, Digital Equipment, E-Systems, General Instrument, Hewlett-Packard, Honeywell, IBM, Intel, Monolithic Memories, Motorola, National Semiconductor, and Silicon Systems. Semiconductor Research Corp. is headed by Larry Sumney, formerly the VHSIC program manager of the Department of Defense.

SPECIAL TRANSACTIONS ISSUE SCHEDULED

The IEEE Transactions on Microwave Theory and Techniques will publish a special issue on **Electromagnetic Wave Interactions with Biological Systems.** The issue is scheduled for July 1984 and the deadline for manuscripts is October 12, 1983.

It is the purpose of this special issue to provide current information on the most recent advances regarding both the manifestations and mechanisms of electromagnetic wave interactions with biological systems. Therefore, high quality manuscripts presenting information not previously published are invited in subject areas such as those listed below and in related areas not specifically listed.

Areas of interest include: dosimetry, dielectric properties of biological materials, measurement techniques and bioinstrumentation, standards for safe exposure, exposure facilities, pulsed versus CW effects, experimental designs, microwave imaging and radiometry, electrohyperthermia, and growth mediation.

To submit a manuscript, or for further information, contact the guest editor, James C. Toler, Georgia Institute of Technology, Engineering Experimental Station, Atlanta, GA 30332, (404) 894-3964.

ANTENNA THEORY

The following book review by W. F. Croswell of Harris Corporation Government Electronics Systems Division originally appeared in the December 1982 IEEE Antennas and Propagation Society Newsletter. The book, **Antenna Theory, Analysis, and Design** by C. A. Balanis, was published in 1982 by Harper and Row, New York, NY.

I have wondered for years what Constantine Balanis was really doing back in the hills of West Virginia. The publication of this excellent book on antennas proves to me that he has not wasted his time! Before delving into the details, perhaps I can give you an overall impression. The antenna field has long needed a text book that is academically thorough in detail, gives practical examples useful for teaching design, uses the developments of modern analysis such as the moment method and GTD, instructs the student in the use of the computer, covers the subject from the elementary to the complex, gives the student a feel for how antennas interact with media and objects, provides useful summary type design data, and most importantly, provides the student with specific examples in detail and useful exercises for further investigation. For those of you that want a text to introduce the antenna field to seniors and graduate students, this book is ideal. For the young and, perhaps older, practicing antenna engineer, this book is essential for private study to improve your skills. The writing style and presentation reminds me of the clarity in the antenna text book by John Kraus that I had read in my early years.

Now for some details. This text assumes that the reader has a basic knowledge of EM theory at the undergraduate level. The basic radiation principals and fundamental parameters that apply to all antennas and radiation integrals are covered in chapters 1 through 3. The linear wire and loop antennas are described in chapters 4 and 5 where effects of infinite ground planes and earth ground upon antenna radiation properties are introduced. Elementary array theory is described in chapter 6, while the author uses the subject of self and mutual impedance of wire antennas to introduce the principles of the moment method in chapter 7.

Chapters 8 and 9 treat the areas of broadband techniques, matching methods, traveling-wave such as the longwire, VEE, rhombic, helical, and yagi-uda antennas. Chapter 10 concentrates on the subjects of frequency independent antennas and the subject of antenna miniaturization. The author uses chapter 11 on aperture antennas and ground plane edge effects to introduce the subject of the geometrical theory of diffraction (GTD). Chapters 12 and 13 are devoted to horns, reflectors, and lens antennas, while chapter 14 is devoted to the more or less classical subject of synthesis. Finally, chapter 15 is devoted to antenna measurements.

This text is nearly 800 pages in length. The author has included a number of Fortran computer programs and subroutines and makes extensive use of computer graphics which, in my opinion, emphasizes the important 3-dimensional nature of radiation from an antenna. While all authors in this field are confronted with the serious problem of how to cover the breadth of the subject of antennas, I think this author has performed the task well.

NEW THESIS

Karl D. Stephan has submitted *Study of Microwave and Millimeter-Wave Quasi-Optical Planar Mixer* for his doctoral dissertation at the University of Texas in Austin. His thesis advisor, Dr. Tatsuo Itoh, advises that the degree will be conferred in May.

BELL LABS FELLOWSHIPS

Bell Laboratories will offer 25 fellowships annually, beginning this year, to support doctoral students in technical fields important to the information age. Each fellowship will last an average of four years or for the time required to complete the Ph.D. program. When in full operation, the program will have 100 fellowships in effect annually at a cost of $2 million a year.

Bell Labs fellows will be chosen from candidates in fields such as electrical engineering, computer science, physics, and chemistry who have been recommended by their department chairpersons. Candidates must be citizens or permanent residents of the United States. Each fellowship will cover stipend, tuition, books, and living and other expenses, and Bell Labs will provide the opportunity for each fellow to work at a Bell location during the summer with a scientist or engineer working in the student's field of study.

AT&T chairman Charles Brown, in announcing the program, said, "If American business is going to be competitive, if we are to retain our technical leadership, we need strong academic institutions that not only extend and deepen our knowledge base but also provide the talent for our high-technology businesses. We understand that we benefit ultimately from the strength and capabilities of our technically based academic institutions."

He noted that there are "no strings attached" to the fellowships, such as requiring students to come to work at Bell Labs.

TRANSACTIONS DELAYS

As a member of MTT-S, your dues entitles you to receive the IEEE Transactions on Microwave Theory and Techniques on a monthly basis. You probably, however, received your December 1982 issue in February 1983 and your January 1983 issue in late March 1983.

The untimeliness of these issues is NOT the fault of the Editor; the problem lies at IEEE Headquarters. It appears that nearly every Transaction, Journal, and Newsletter printed by IEEE is experiencing inordinate publication delays. The IEEE hopes to eliminate the problem in the near future. Until then, please have patience.

COMMUNICATIONS CONFERENCE

The 1984 International Communications Conference will, for the first time, be held outside North America. To emphasize the increasing international scope of the telecommunications field, the IEEE Communications Society has decided to spread its conferences worldwide. The first overseas conference will be held in Amsterdam, the Netherlands.

The theme if the conference surrounds science, systems, and service and will include discussions of new developments in all relevant fields of communication, modern developments in communications, systems, new services, and communications-policy issues.

There will be a technical exhibit to which leading firms and organizations in the field of communications will be invited to contribute. They will show new equipment, systems, and services.

The conference is sponsored by the Communications Society of the IEEE and cosponsored by the IEEE Benelux Eurel and the local Dutch Societies KIVI and NERG will also participate.

For more information write to Dr. T.A.C.M. Claasen, Secretary of the Executive Committee, NV Philips Research Laboratories, P.O. Box 218, 5800 MD Eindhoven, the Netherlands.

REGION 9 LECTURE TOUR

This is a call for lecturers to apply for a 1983 IEEE Distinguished Lecture Tour of Region 9. This approximately two week tour is scheduled to begin in late November; the proposed itinerary includes visits to some or all of the following countries: Brazil, Chile, Colombia, Mexico, Peru and Venezuela. Participants will interact with IEEE Section officers and members throughout the tour. Funding is the responsibility of the individual lecturer.

IEEE members who wish to be considered as potential lecturers should send letters, accompanied by resumes, indicating their interest in this visit and the technical topic on which they would be prepared to lecture, to their respective Society/Council President. A copy should also be sent to Dr. M. E. Van Valkenburg, Chairman, IEEE Transnational Relations Committee, c/o Ms. Barbara Ettinger, TRC Administrator, IEEE, 345 East 47th Street, New York, NY 10017.

The deadline for submission of applications is **August 1, 1983.**

IEEE GUIDELINES FOR TRANSNATIONAL EXCHANGES

The following guideline is reprinted from Section 2-6 of the IEEE Policy and Procedures Manual (January 1983):

A. **Frequency of Delegations.** Unless authorized by the IEEE Executive Committee, official IEEE delegations with national societies with whom IEEE has technical exchanges shall be limited to one such delegation in a calendar year. Additional visits or exchanges with national societies shall have a status other than an official IEEE delegation.

This policy shall not preclude transnational exchange visits (e.g., Study Groups or Visit Teams) sponsored by IEEE Societies or other technical entities.

B. **Qualification of Delegates.** Delegates should have recognized technical competence in some areas of electrical and electronics engineering or related arts and sciences. Preference will be given to those IEEE members who have demonstrated technical competence and rendered service to the Institute (e.g., Fellows or Senior Members).

C. **Composition of Delegation.** The delegation should be reasonably represented (1) with respect to academe, industry, government, and other segments of the profession, and (2) with respect to the technical theme for the delegation.

Each delegation should contain at least one member with a good knowledge of the language of the country visited. Each delegation shall have a leader designated as head of the delegation.

D. **Approval of Delegates.** The recommendation for the selection of delegates is the responsibility of the Transnational Relations Committee of IEEE. The Committee will recommend the technical field to be considered and, where possible, coordinate with the respective Society of the Institute and the countries concerned with the exchange visits. This Committee will recommend the membership and leader of each delegation to be endorsed by TAB OpCom, reported to the Technical Activities Board and referred to the Executive Committee for approval.

When the visit is to be made by a study group or visit team, the sponsoring technical entity will recommend to the Transnational Relations Committee an appropriate group or team. The Transnational Relations Committee shall then forward their recommendations to TAB OpCom for submission for final approval by the IEEE Executive Committee.

E. **Call for Delegates.** The Institute shall attempt to give sufficient notice in IEEE SPECTRUM and/or Society / Group / Council newsletters when the study group is involved in a single technical area, for members to apply to their Society Presidents mentioning their interest in participating as an IEEE delegate in upcoming technical exchanges.