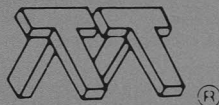
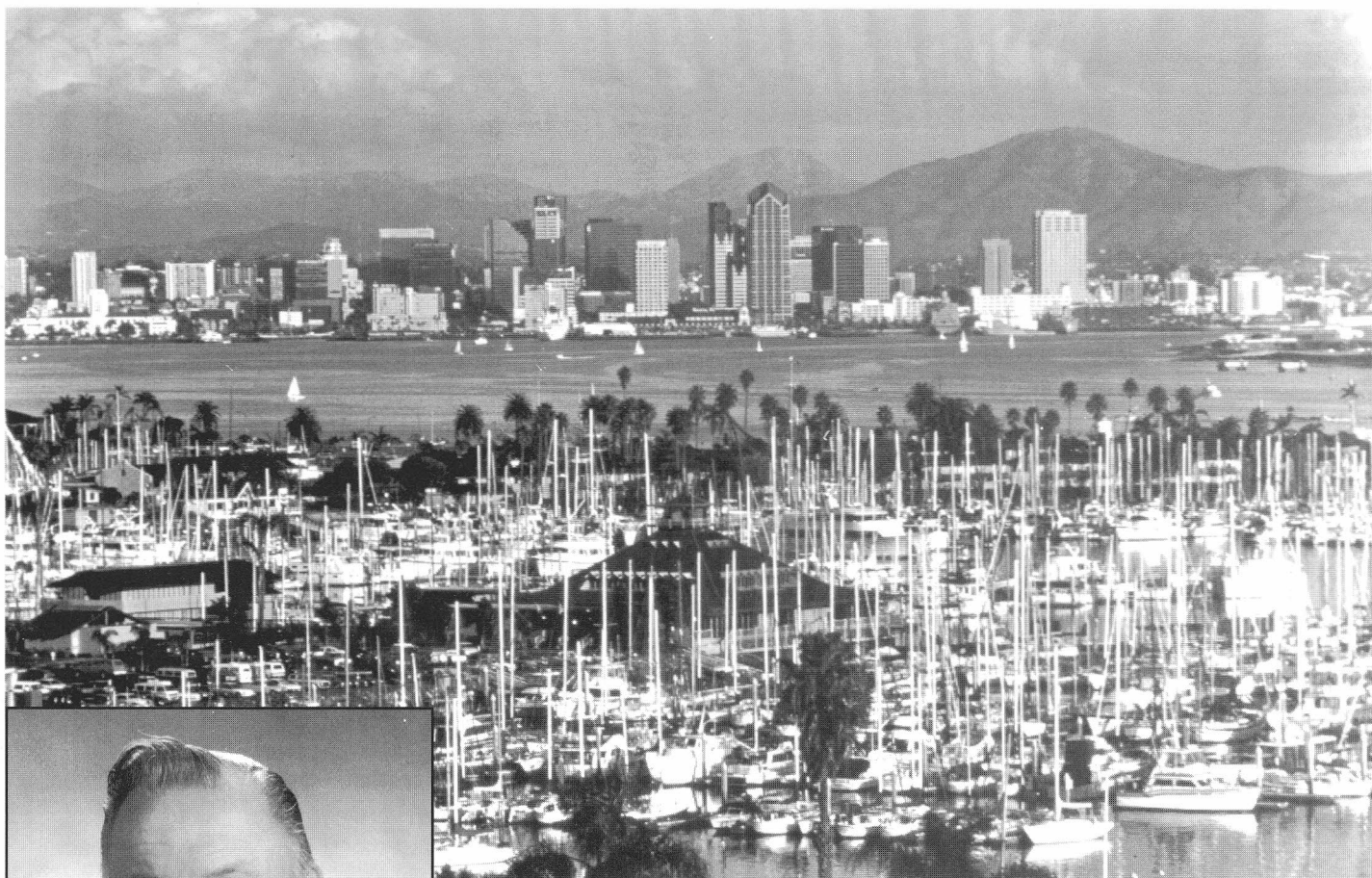


IEEE SOCIETY ON
MICROWAVE THEORY
AND TECHNIQUES



Number 137
Spring 1994

NEWSLETTER



*Dr. Robert A. Pucel
Elected to National Academy
of Engineering (story, page 3)*

**1994 IEEE MTT-S
International Microwave
Symposium
May 24-26, 1994
San Diego, California
“Waves and Microwaves”**

**Chairman's Welcome, page 13
Registration/Hotel Forms, page 17
Symposium Events, pages 14 to 30**

Table of Contents

TAB Report	3
Robert A. Pucel Elected to National Academy of Engineering	3
A Message from the <i>Transactions</i> Editor	4
Highlights of the 1993 Long-Range Planning Committee (LRPC)	5
Message from the 1994 Long-Range Planning Committee	5
Division IV Report—January 1994	6
The Impact of Emerging Technologies on Wireless Communications	6
In Memoriam—Robert W. Beatty	7
MTT-S Meetings & Symposia Committee Report ...	9
Education Committee Announces 1994 Graduate Fellowship Awards	10
Temple of Communication Doom	10
Call for MTT-S AdCom Nominations and Committee Appointments	11
MTT Society Ombudsman	11
MTT-S Membership Services Committee Report ..	12
Waves and Microwaves	13
Special Sessions at the 1994 International Microwave Symposium	14
1994 International Microwave Symposium Local Arrangements	21
1994 IEEE Microwave and Millimeter-Wave Monolithic Circuits Symposium	21
Guest Program	22
1994 MTT-S Symposium Open Forum	23
1994 IEEE National Telesystems Conference	24
Emerging Technologies	25
e-mail and the MTT	27
ARFTG Highlights Spring '94	28

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Corrections

In the Winter 1993 issue of the MTT-S Newsletter, the following corrections/omissions are noted:

1994 Fellow Awards

- **Tom Y. Otoshi**—"For contributions to microwave measurement techniques for deep space communications and radio science."
 - **Jitendra Goel**—"For contributions to the development of microwave and millimeterwave high-power components."
- Our sincere apologies.

—The Editor

Master Calendar

MTT-S Sponsored Conferences¹

1994

- European GaAs Applications Conference April (C)*
- Topical Meeting on Electrical Performance of Electronic Packaging April (S)*
- 2nd International Conference on Ultra-Wideband, Short-Pulse Electromagnetics April 5-7 (CS) Brooklyn, NY
- MTT-S International Microwave Symposium May 24-26 (S)* San Diego, CA
- Microwave & Millimeter Wave Monolithic Circuits Symposium May 23-24 (S)* San Diego, CA
- Automatic RF Techniques Group May 27 (C)* San Diego, CA Affiliated
- National Telesystems Conference May 26-27 (CS) San Diego, CA
- MIKON '94 May 30—June 2 (C) Warsaw, Poland
- IEEE Conference on the Computation of Electromagnetic Fields (C)*
- Topical Workshop on Heterostructure Transistor Technology and Physics August 17-19 (C) Mt. Fuji Resort Area, Japan
- 3rd International Conference on Millimeter-Wave and Far-Infrared Science and Technology August 22-26 (C)
- European Microwave Conference September (C)*
- IEEE GaAs IC Symposium October (CS)*
- 19th International Conference on Infrared and Millimeter Waves November 1-4 (C) Sendai, Japan
- Microwaves '94 October 25-27 (C) London, England
- International Conference on Computational Electromagnetics and its Applications November 1-4 (C) Beijing, P.R. China
- Optical/Microwave Interactions (held in conjunction with the 1994 National French Microwave Conference) November (C)
- INTELCOM November 2-5 (CS) Turin, Italy
- Asia-Pacific Microwave Conference December 6-9 (C)* Chiba, Japan
- Automatic RF Techniques Group December (C)* Affiliated
- National Radio Science Meeting (C)*

¹Meetings listed are those that have been officially sponsored by MTT-S (i.e., AdCom approved). There are many other microwave related meetings (chapter sponsored, commercial, etc.) that are not listed.

²MTT-S conference involvement:

(S) Sponsor, (CS) Co-sponsor, (T) Technical Co-sponsorship, (C) Cooperate, (*) Continuous MTT-S involvement approved by AdCom

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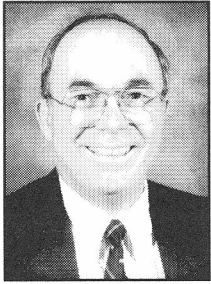
Cover Photo: James Blank/San Diego Confention and Visitors Bureau. Pages 13, 14, 15 and 30: Courtesy of the San Diego Convention and Visitors Bureau.

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

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

John Eisenberg
25 Parson Way • Los Altos, CA 94022 • (415) 941-7426

TAB Report



by E. James Crescenzi, Jr.
1994 MTT-S President

The IEEE Technical Activities Board (TAB) met in Piscataway, New Jersey (headquarters of the IEEE) on January 29, 1994. The TAB includes eleven officers and committee chairpersons, ten Division Directors, and the presidents of the 37 IEEE technical societies. Division IV under Ken Dawson includes AP (Antennas & Propagation), BT (Broadcast Technology), CE (Consumer Electronics), EMC (Electromagnetic Compatibility), Mag (Magnetics), MTT, and NPS (Nuclear & Plasma Sciences). The actual TAB meeting is less than one day long, but it is preceded by about a half-dozen major associated meetings lasting several days. News that particularly affects our society includes:

1. The MTT-Society Microwave Engineering Graduate Scholarship Fund was approved by the TAB. This very important new service is the result of over a year's effort by the fund charter author, Barry Perlman, and by the Education Committee.

2. The MTT-Society revision to the Bylaws (included in the last Newsletter) was accepted by the TAB. This comprehensive overhaul of our Bylaws was accomplished by Robert Moore (Chairman of the 1993 Operations Committee), Aditya Gupta, and Kiyo Tomiyasu.

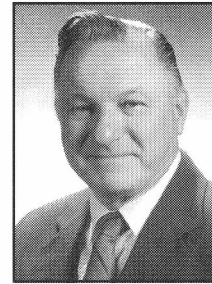
3. The report on the Review of the MTT-Society by the IEEE Society Review Committee was accepted by the TAB. The two year review process was initiated by presentation of a comprehensive report by Peter Staecker and Reynold Kagiwada to the IEEE Society Review Committee in July, 1992. The review subcommittee then generated this report which includes several observations and recommendations.

4. IEEE technical publications income was up for 1993 - both in terms of the revenue and the number of non-member subscriptions. This is particularly good news in that it marks the reversal of a previous downward trend in a difficult economy. The bad news is that one of the publisher representatives (intermediaries between publishers and libraries) is involved in a legal dispute that will delay payment of a portion of the revenue to the IEEE. This problem is receiving a great deal of attention from the IEEE staff.

5. The TAB approved a "one-time" expenditure of \$100,000 for the establishment of an IEEE Electronic Data Repository in 1994, in anticipation of the delivery of electronic information products beginning in 1995. It was widely felt that we must invest in the preparatory

(continued on page 8)

Robert A. Pucel Elected to National Academy of Engineering



Dr. Robert M. White, president of the National Academy of Engineering, announced on February 11, the election of 79 American engineers to membership in the Academy and eight foreign engineers as associates. This brings total U.S. membership to 1,732 and the number of foreign associates to 148.

Among the members elected is Dr. Robert A. Pucel (LF'92) who was cited "for contributions to semiconductor device theory, integrated circuit technology, and microwave system applications." He is one of seven chosen from the New England area.

Election to the Academy is among the highest professional distinctions accorded an engineer. Academy membership honors those who have made "important contributions to engineering theory and practice, including significant contributions to the literature of engineering theory and practice," and those who have demonstrated "unusual accomplishments in the pioneering of new and developing fields of technology."

Elected by their peers, members are drawn from all engineering disciplines and include leading engineers from industry, academia, government, and other institutions. Academy members have led or have been involved in most of the major engineering and technological developments and discoveries that have transformed society in the past half century.

The National Academy of Engineering was created in 1964 as part of the National Academy of Sciences which, itself, operates under the authority conferred upon it by its Charter which was enacted by Congress in 1863.

Formal induction ceremonies will take place on October 5 at the National Academy of Sciences Building in Washington, DC.

Bob recently retired from a senior staff position at the Research Division of Raytheon Company, Lexington, Massachusetts after 42 years of service and now operates as a private consultant under the name RCP Consultants in Needham, Massachusetts.

A Message from the *Transactions* Editor



by Dan Masse

By the time you read this message, you will have noted that the *Transactions* are now being published on schedule. This recovery was made possible by the hard work of the IEEE Publications Department. The December Special Issue was delayed until the end of January only because we had to wait for the Index to be ready.

In 1994, the *Transactions* will publish 16 instead of the normal 12 issues. The extras are Special Issues which have been separated from the regular ones in an attempt to decrease the time delay incurred in the past by regular papers. The number of pages authorized for the year has also been increased by 400, from 2400 to 2800 pages.

In spite of all these measures, the backlog of manuscripts ready for publication has grown to such proportions that it takes now nearly a year between submission of the final version and its appearance in the *Transactions*. This situation has arisen because the number of papers submitted and accepted has increased and also because many authors write manuscripts that are too long.

In order to reduce the publishing time to a more normal level, a new publication policy prevails, started in February 1994. Priority for publication is given to papers with 5 or less printed pages. Longer papers will be placed in a backlog and published on a space available basis, with again the shorter papers having priority. As was the rule before, no papers longer than 10 printed pages are considered. A printed page is equivalent to four double-spaced typed sheets of 8.5 x 11 in. or A4 format, or four simple figures. Figures with "part A" and "part B" count as two sheets. Prospective authors should refer to the "Information for Authors," printed on the inside back cover of most *Transactions* for specific format instructions.

It is not possible to increase further the number of pages published in a year without serious financial and implementation implications. The cooperation of our prospective authors will be appreciated. It is realized that writing a short paper is more difficult than writing a long one, but the final result will be clearer papers and to the point, as well as timely publication.

I would like to take this opportunity to remind the authors that the *Transactions* Editor manages the handling of the manuscripts only. The paper evaluation is left to the reviewers who are the experts. In some cases, when the reviewers' decisions are split, the editor will decide what to do with the manuscript, based on confidential information from the reviewers and their expertise in the field.

In most cases, papers which are judged to be "marginally" or "partially" original or "of little use" will be rejected outright. Application papers will be accepted only if they demonstrate an advance in the "state of the art." Authors of papers which have not been accepted for publication should revise their manuscripts according to the reviewers' comments and resubmit them as new papers to either the *Transactions* or another publication, as they wish. The Editor CANNOT and WILL NOT engage in any discussion about the disposition of papers. In most border cases, the decision will be determined by how well the author has expressed the originality of his work and the suitability of the paper for publication. Written objections of authors to SPECIFIC reviewer comments can, at the discretion of the Editor, be passed on to the reviewers.

I want to remind also the Reviewers of the importance of their task. They are the ones who define the quality of the *Transactions* by accepting only papers of high quality and of greatest interest to the membership. Reviewing papers is a time consuming, thankless task but rewarding by its contribution to the well-being of our profession. Reviewers have to accept some responsibility in the process.

First and foremost is timeliness. Normally reviewers are given 6 weeks to review a paper and are reminded only after a 3-day period of delinquency. If no answer is forthcoming, a new reviewer must be appointed and the process starts all over again. If the paper has to be revised and resubmitted, it takes often a year to get a paper reviewed to a final decision, which now means two years from submission to publication! This is truly an intolerable situation.

All reviewers' inputs are important, otherwise they would not have been asked. Three reviewers are assigned to a paper and in numerous cases, if only one or two respond, a meaningful decision on the disposition of the paper is difficult to make. Reviewers should also be consistent. It is hard to explain to an author that his paper was rejected when the reviewer's report to the author is favorable and his confidential report to the editor is not.

My most heartfelt thanks go to the many reviewers who spend long hours to review a paper and do it on time in spite of their other demanding responsibilities. It is because of them that the MTT-*Transactions* are regarded as the premier publication of our profession in the world. We should all be grateful for their efforts.

Highlights of the 1993 Long-Range Planning Committee (LRPC)



by Ferdo Ivanek, Chairman

Our predecessor, the 1993 LRPC, chaired by Tatsuo Itoh, has done excellent work. Their most valuable contribution was what I would describe as "charting the emerging technologies horizon" for our Society. Since there seemed to be no immediate need for additional work in the same direction, to avoid duplication, we chose to concentrate on what it takes to move toward reaching the main goals that our predecessors have set. This necessarily meant a short-to-medium term orientation. What we actually did can be described as "on the job long-range planning."

I opted for a small committee with transnational participation, consisting mostly of members without other major assignments on the AdCom. The members were Masami Akaike, Derry Hornbuckle, Reynold Kagiwada and John Magarshack; Steve Adam kindly agreed to serve as adviser.

Our approach consisted in formulating ideas and proposals, inviting comments and incorporating them into improved drafts. Our distribution list included all AdCom members, Technical Committee Chairs and Chapter Chairs, as well as the Past Presidents who continue to participate in the AdCom. We received most valuable feedback in writing from (in alphabetical order) Steve Adam, Jim Crescenzi, Derry Hornbuckle, Tatsuo Itoh, Reynold Kagiwada, John Magarshack, Bob Moore, Art Oliner, Terry Oxley, Roger Pollard, Ted Saad, Dick Snyder, Barry Spielman, Kiyoo Tomiyasu, Andre Vander Vorst and Jim Whelehan.

This set of responses and inputs showed that we have addressed challenging issues that require more deliberation to sort out and reach consensus. To get more focused feedback we decided to produce a questionnaire and distribute it to the same composite group during the 1993 Symposium. Derry Hornbuckle produced this questionnaire, distributed it and collected 49 completed forms, which was a satisfactory return of about 50%. There was broad consensus on all issues except changing the society name.

Derry then compiled the amended 1993 LRPC draft and highlights of the collected feedback into the 10-page "MTT-S Long-Range Plan draft with Selected Comments" which is reproduced in Annex W of the Minutes

(continued on page 8)

Message from the 1994 Long-Range Planning Committee



by Reynold Kagiwada

The 1994 MTT-S Long Range Planning Committee consists of Eliot Cohen, Peter Staecker, Reinhard Knerr, Tatsuo Itoh, Roger Sudbury, Derry Hornbuckle, Ed Rezek, Bill Wisseman and Reynold Kagiwada. The committee met on January 8, 1994, to discuss its objectives for this year. It was decided that the Committee would leverage off the outstanding work done by LRPC in 1992 and 1993 which was chaired by Tatsuo Itoh and Ferdo Ivanek. The Committee decided that the first task was to develop technology roadmaps for topics of MTT-S interest. The topics selected were: Wireless, Packaging, Automotive, Optical Microwave, Millimeter Wave Applications, Microwave Manufacturing, Sensor and SATCOM. The format selected was the following:

- I. Technological discussion/Market prediction
 - Where the technology was today
 - What was the vision for the technology in 5 years?
- II. Actions MMT-S should be taking
 - 5 year roadmap
 - Type of publications/meetings
 - Technical Committee involvement
 - Type of joint ventures
 - A competitive analysis of existing meetings and publications
- III. Completion date was 3/15/94.

Dr. E. James Crescenzi, Jr., has also asked the 1994 Long Range Planning Committee to review and make recommendations for the MMT-S Field of Interest Statement.

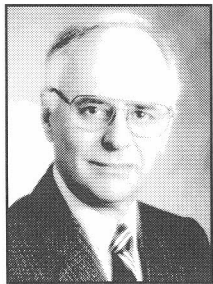
MTT-S Field of Interest:

Microwave theory, technique and applications, as they relate to components, devices, circuits, and systems involving the generation, modulation, demodulation control, transmission, and detection of microwave signals. It shall include scientific, technical, and industrial activities, subject to timely modifications approved by the IEEE TAB.

Microwave theory and techniques relates to electromagnetic waves usually in the frequency region between 0.2-1000 GHz; other spectral regions and wave

(continued on page 8)

Division IV Report — January 1994



by W. Kenneth Dawson

Each year the Technical Activities Board of the IEEE issues a report of its activities for distribution to other IEEE entities and volunteers to keep them informed of events and actions taken on the technical side of the house. Besides containing reports by the Vice President Technical Activities and the chair of the Society Presidents' Forum and the chairs of TAB's major Councils and Committees it includes brief accounts from each Division. Here is what was reported for Division IV.

The seven Societies in Division IV cover a wide range of technical interests ranging from Consumer Electronics to Broadcast Technology, Antennas and Propagation, Electromagnetic Compatibility, and Microwave Theory and Techniques through Magnetics to Nuclear and Plasma Science. About one-third of the members in the Division belong to two or more Societies in the Division. Society membership totals about 40,000 ranging from about 3,000 for Broadcast Technology to slightly over 10,000 for Microwave Theory and Techniques.

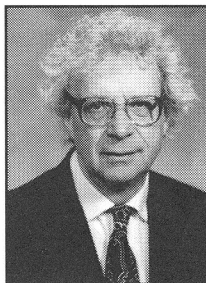
An increasing number of Societies in the Division have adopted or are adopting long-range plans. At each Board of Directors meeting of the Electromagnetic Compatibility Society the regular reports by officers and technical directors always include information on how their area's activities incorporate and reflect the goals of the long-range plan. This procedure helps maintain constancy of purpose despite the annual changes to the Board. The Consumer Electronics Society is forming an Industrial Advisory Board in order to augment the planning process.

The Broadcast Technology Society brought a Newsletter into production during the year and Consumer Electronics finalized plans to do likewise in 1994. At that time all Societies in the Division will publish either a Newsletter or a Magazine (Antennas and Propagation). In 1994 the Microwave Theory and Techniques Society will explore the strength of its publications by unbundling them from membership fees.

The practical versus academic (theoretical) paper dilemma is being experienced by almost all Transactions editors in the Division. There is an increasing

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The Impact of Emerging Technologies on Wireless Communications



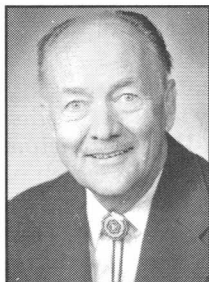
by Martin V. Schneider
1994-1996 MTT-S Distinguished
Microwave Lecturer

As we approach the end of this century, wireless communication is becoming the most pervasive and fastest growing technology. The major cause for this growth is a common need of individuals, industry, government and defense for rapid exchange of information and access to data bases. We expect that the growth will be further enhanced by the creation of the information super highway and the development of an intelligent vehicle highway system (IVHS). Microwave and millimeter-wave technology will play a crucial role in the realization of wirefree and fiberless links that will link people to people and people to machine~ at an affordable cost, thus enhancing economic development and growth.

This talk will give an overview of emerging technologies with emphasis on the specific areas where microwave theory and techniques can contribute to the successful implementation of wireless ventures. We will report on the findings of the IEEE New Technology Directions Committee, which identifies opportunities for significant advances in the field of electrotechnology in general, and the wireless area in particular. The committee, led by the author, created a *Portfolio of Emerging Technologies* which serves as a roadmap for starting fruitful technical activities. It is being updated periodically and can be readily accessed from any individual e-mail internet address. The origins of wirefree communications reach back to Heinrich Hertz and Guglielmo Marconi. Other fundamental contributions were made by Carl Friedrich Gauss and Alexander Graham Bell who were first to use modulated backscatter technology to send both coded and acoustic signals wirefree from a base station to a terminal. It is only recently that wireless means of communications have become economically so attractive that "to be or not to be reachable anytime anywhere" is becoming an option and a reality. This objective is being facilitated by the allocation of portions of the radio spectrum for 38 terrestrial and space radio communication services defined by the International Telecommunication Union. Additional frequencies are being allocated for domestic and worldwide markets for new wireless personal communications services (PCS) and for fixed wireless access networks (LANs, MANs and WANs). Other major

(continued on page 8)

In Memoriam— Robert W. Beatty



Dr. Robert W. Beatty, a distinguished and well-liked member of our MTT Society, passed away on November 25, 1993, in Boulder, Colorado. He was 76 years old, and he had been ill for the past two years.

For most of his professional career he worked in the field of microwave standards at the U.S. National Bureau of Standards, and he was Chief of the Microwave Circuit Standards Section at NBS at Boulder, Colorado, from 1955-1962. He published numerous technical papers, a book, *Microwave Network Analysis*, with Dr. D.M. Kerns (Pergamon Press, 1967), and two NBS Monographs concerned with automated microwave measurements. He also received the Department of Commerce Silver Medal in 1963.

Dr. Beatty was an active member of the MTT Society. He was a member of the MTT AdCom for many years, and was the Editor of the *IEEE Transactions on MTT* during 1963-1965. For his many significant accomplishments, he became the recipi-

ent in 1987 of the Microwave Career Award, which is our Society's highest recognition.

He was also active in URSI (International Union of Radio Science), being a member for many years of Commission 1 (now A), responsible for Measurements and Standards, and a U.S. Delegate to several triennial international General Assemblies of URSI. In addition, he was the U.S. Chairman of Commission 1 from 1957 through 1960, and the Scientific Editor for Commission 1 for the publication "Review of Radio Science" for the 14th and 14th General Assemblies.

He was sent by NBS to Japan in 1970 to be a guest researcher for a year at the Electrotechnical Laboratory (ETL) in Tanashi, Tokyo. During that stay, he presented lectures at each of the twelve prestigious former Imperial Universities in Japan. He received an award from the Director of ETL for meritorious service, and an honorary Doctor of Engineering degree from Tokyo University. While there, he became very attracted to Japanese culture, and he began to study Japanese art and language.

Since his retirement from NBS, he had been a consultant to such organizations as the Jet Propulsion Laboratory and General Dynamics. He also became an active member of the Rocky Mountain Rescue Team and the Lions Club of Boulder, and a lifetime member of the Trail and Timber Rocky Mountain Climbing Club.

He was a very kind and warm person, quiet and mild-mannered, direct and honest, and very likeable. He is survived by his daughter, Sherry Stroh, and by his wife, Nobuko Bowden.

—Art Oliner
January, 1994

Division IV Report

(continued from page 6)

awareness on the part of editors and reviewers that the archival quality of application-based papers is every bit as high as that of theoretical ones. Surveys clearly indicate that readers want more application-based papers but editors can only publish what they receive. Academics live and die by the pen (word plowshares!) while those in industry, whose experience best qualifies them as authors of such papers, are at least doubly handicapped. The difficult economic times make it hard to get support for such work and there is the problem of proprietary information. Editors have been actively soliciting application-oriented papers with varying degrees of success.

The dramatic changes in the political face of the world have led to severe economic difficulties with a consequent effect upon our members. While it is encouraging to see the membership growth in Regions 8

to 10 it is discouraging to note the drop in membership in North America. Most Societies in the Division conduct aggressive membership campaigns at the technical meetings sponsor and all are seeking new services for members that reflect the changing times. For example there is an increasing need for Radiation Waste Specialists, a field well suited to many Nuclear and Plasma Sciences Society members. Hence the Society has formed a group to pursue the development of general certification requirements for this occupation. The skills required blend a strong knowledge of the techniques for handling and disposing of radioactive materials along with a good understanding of all applicable government regulations. The group has participated in the preparation of a proposal for a US defence conversion grant which involves the collaboration of two companies and a university.

During the year the Magnetics Society made great internal progress in its campaign for brevity in reports but is having difficulty spreading the word.

Highlights of the 1993 LPRC

(continued from page 5)

of the 8-9 October, 1993 AdCom meeting. Copies may be requested from the AdCom Secretary.

The constructive results inspired us to organize a meeting for the purpose of reporting to the AdCom, Technical Committees and Chapter Chairs, and conducting an open discussion. This meeting took place in San Diego on 9 January 1994 following the meeting of the Technical Program Committee for the 1994 Symposium.

Steve Adam prepared for my presentation a condensed version of our report in three tables, and I added two more viewgraphs. (These will be included in the Minutes of the 9-10 January, 1994 AdCom meeting and copies may be requested.) This enabled me to minimize the presentation time and reserve most of the available time for an exhaustive discussion in which most of the about 30 meeting attendees took part.

We were first criticized for our short-to-medium term orientation. Significantly, however, most of the discussion focused on the Technical Committees and on the Chapters which the 1993 LRPC characterized as the backbone of the Society. There was general consensus on the following two major goals:

1. Intensify and expand the activities of the Technical Committees through regular, open working meetings at each Symposium. Invite active participation by all interested MTT-S members and proactively support the technical activities of the Chapters.
2. Develop new Topical Meetings, Symposia, etc. outside of the International Microwave Symposium week in close cooperation between Technical Committees providing the lead in organizing the technical program, and Chapters assuming primary responsibility for local arrangements.

I would like to conclude by thanking all who have participated in the work of the 1993 LRPC, either as committee members or as interested Society members. I encourage additional feedback from all interested MTT-S members be directed to the 1994 LRPC under the chairmanship of Reynold Kagiwada.

Message from the 1994 LPRC

(continued from page 5)

types are included within the scope of the Society whenever basic microwave theory and techniques can yield useful results. Generally, this occurs in the theory applications of wave propagation in structures with dimensions comparable to a wavelength, and in the related techniques for analysis and design. Examples are optical waves in suitably scaled structures, as well as the applications of acoustic, magnetic, and domain waves to microwave systems.

The 1994 MTT-S Long Range Planning Committee welcomes your thoughts and ideas on both the topics of interest and the MTT-S field of interest. You can fax your comments to me at (310) 812-7011.

TAB Report

(continued from page 3)

work prerequisite to future electronic data dissemination, even though specific plans for product implementation were frankly minimal.

6. TAB approved funding for the International Symposium on Electronics and the Environment (ISEE). The ISEE organization was led by Ms. Diana Bendz and was exemplary for its multidisciplinary nature and the number of non-IEEE participants. It was generally felt that this is an area in which increased emphasis is needed by many IEEE technical societies. A proposal to make the TAB Environment, Health and Safety Committee a Standing Committee of TAB will be considered at the next meeting.

7. A rare occurrence for any organization was witnessed - the abolishment of a major committee! A new committee, the TAB Management Committee was approved with the proviso that the TAB Administration Council (which has a similar function) will be disbanded effective January 1, 1995.

8. TAB endorsed a guideline that requires society officers traveling outside their normal geographic regions to contact both the Section/Chapter Chair and Regional Director. A visit report should also be filed with the TAB Colloquia Steering Committee.

Although there is a great deal of important business conducted during TAB week, I found the opportunity to meet and become acquainted with officers of the other societies to be the "highlight" of all the events. This has become especially important due to the frequent overlap of interests in emerging technical areas.

Impact of Emerging Technologies

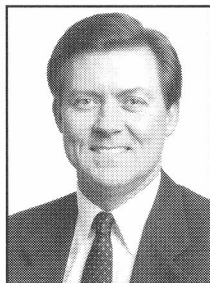
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factors are advances in miniaturization (VLSI, MIMIC), multiple access techniques (CDMA, TDMA), and the evolution from macrocells to microcells and even further to femtocells.

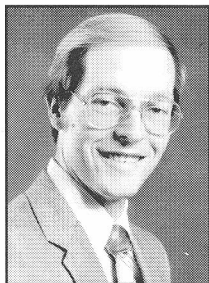
Some new telecommunications ventures which will require the expertise and active participation of microwave engineers are these seven global satellite-phone projects: Iridium66, Inmarsat-P, Globalstar, Odyssey, Ellipso, Constellation Communications, and Calling Communications. Contributions by the microwave engineering community will also be crucial for improving the performance of base stations and terminals needed for providing cellular, telepoint and cordless services. Technologies that permit the miniaturization and cost reduction of cellphones and base stations are ceramic chip filters, homodyne mixers and direct conversion receivers, monolithic and hybrid transceivers, and new types of directional or isotropic antennas. Work in these fields is supported by the growing availability of advanced software tools permitting the design and accurate simulation of devices, circuits and systems.

The importance of early development of standards through the publication and dissemination of *Emerging Practices in Technology* will be emphasized.

MTT-S Meetings & Symposia Committee Report



R.E. (Skip) Bryan



E.A. Rezek

January 1994 AdCom Meeting

Following is a summary of the Committee business concluded at the January 8-10 AdCom meeting in San Diego, California.

Organization Changes

With the start of a new year there has been a change in the membership of the Meetings & Symposia Committee. Eliot Cohen, who has served on the Committee for two years, has taken on the responsibilities of Vice-President and has moved on. We would like to recognize Eliot for his outstanding work on the Committee and wish him the best of luck in his new position. Skip Bryan has been appointed to replace Eliot on the Committee; Skip has assumed Eliot's role as coordinator of the International Microwave Symposium and general operations. Ed Rezek continues on the Committee and is again responsible for all other conferences with Society involvement.

Meeting Sponsorship

MTT-S is continuing its effort to reach out to its members outside of the United States. Major advances have taken place in Regions 8, 9, and 10.

- **Region 8:** The Society has entered into a novel agreement with MTT-S members in France. Every year the French national microwave conference identifies a special focus topic for the event. The 1994 topic will be a workshop on optical/microwave interactions. Since this area has been targeted by the MTT-S as a potential emerging technology, John Magarshack organized an initiative in cooperation with the MTT-S Technical Committee for AdCom to cooperatively sponsor the workshop. The workshop will be held in November 1994 in France. The point of contact is John Magarshack, 52A Chemin des Hauts Benards, 92500 Ruell-Malmaison, France; Fax: +33-1-6019-7695.

- **Region 9:** One of the major highlights of the AdCom meeting was approval of a motion to co-sponsor the 1995 SBMO/IEEE MTT-S International Microwave and

Optoelectronics Conference held in Brazil. This biennial conference was in the past known simply as the International Microwave Conference/Brazil (SBMO) and has been cooperatively sponsored by the Society for a number of years. The upgrade to full co-sponsorship marks the first time the MTT-S has had this level of involvement in a flagship conference held in Region 9. The workshop will be held in July 1995 in Rio de Janeiro, Brazil. The point of contact is Professor Luiz A.R. Silva-Mello, CETUC-PUC, Rua Marques de Sao Vicente, 225 Rio de Janeiro, Brazil RJ 22435-9000, Tel. No: 55-21-529-9384; Fax: 55-21-294-5748. The Society is also involved in a number of other initiatives in Brazil. John Barr is working with the IEEE to allow engineers in Brazil to join the Society as Affiliate members. In addition, Mario Maury, Jr., is taking steps to secure participation of the Distinguished Microwave Lecturers in the 1995 SBMO/IEEE MTT-S International Microwave and Optoelectronics Conference.

- **Region 10:** Cooperative sponsorship was approved for the 3rd International Conference on Millimeter-Wave and Far-Infrared Science and Technology. This conference will be held August 22-26 in Guangzhou, the People's Republic of China. The point of contact for all correspondence and additional information is Professor Bob McMillan, CCRF/RIDL, Georgia Institute of Technology, Atlanta, GA. He can be reached at 404-528-7709; fax 404-528-7749. In addition the Society is continuing its sponsorship of the Asia-Pacific Microwave Conference in this region. We have been involved with this activity for several years and are committed to strengthening our commitment to support our members in Region 10.

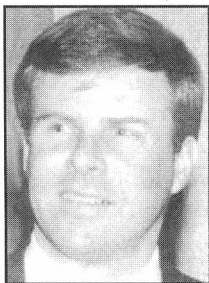
2001 IMS

We have received letters of intent from three prospective sponsors of the International Microwave Symposium in the year 2001. The Dallas, Phoenix and the Seattle Chapters have expressed interest and have begun preparation of proposals for this event. We have mobilized our Site Negotiating Committee to interface with these Chapters to develop formal proposals for presentation to the Administrative Committee. We are planning on finalizing a site by the May 1994 AdCom meeting.

2002 IMS

Even though this seems far off, planning for this conference is overdue and should begin immediately. We have received a formal letter of intent from the Philadelphia Chapter indicating interest in sponsorship. We are soliciting inputs from other Chapters at this time. Please contact Skip Bryan if you need further information at: ST Systron-Donner, 13100 Telfair Ave., Sylmar, CA 91342, Tel. No. (818) 364-7270, Fax No. (818) 362-1035.

Education Committee Announces 1994 Graduate Fellowship Awards



by Glenn Thoren
Chairman
Education Committee

The Education Committee of the MTT-S has chosen three Graduate Fellowship Award Winners for 1994. These awards are granted on the basis of a thorough evaluation of the student applications by five members of the MTT-S. The members represented both academia and industry with two members of the selection committee having been chosen as fellows of the IEEE.

Students were asked to complete an application form, provide an educational research plan, provide their academic credentials and letters of reference.

The award is a fellowship in the student's name of \$5,000 sent to the university. It cannot be used for equipment purchases, travel or supplies.

The award may augment other support provided by the university. The awards are made yearly and must be reapplied for if a student wishes to be considered for a following year.

The MTT-S has a long tradition of supporting academic excellence through continuing education, transactions, publication, seminars and, more recently, graduate fellowship awards. This year's candidates were all outstanding academic achievers. The selection committee is pleased to announce the recipients of the 1994 MTT-S Graduate Fellowships.

•Mr. Chin, Soon Teoh

The University of Manchester Institute of Science and Technology
Manchester, England
Research Topic: Non-reciprocal Planar Microwave Devices

•Mr. Christian Huber

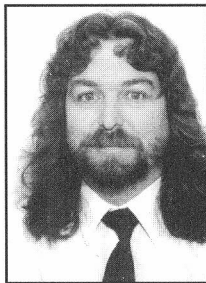
Colorado State University
Fort Collins, Colorado
Research Topic: Microwave/millimeter-wave Detection and Sizing of Fatigue Surface Cracks Under Stratified Dielectric Coatings Using an Open-Ended Waveguide.

•Mr. Jaldeva C. Goswami

Texas A&M
College Station, Texas

(continued on page 11)

Temple of Communication Doom



by Mike Golio, IEEE Press Liaison

The computer screen was blinking a threatening message about unanswered e-mail messages and my pager was buzzing like a dremel tool run amuck when the phone rang. I would like to think it was maturity (as well as four hours of corporate training on proper phone etiquette) that kept me from screaming rude insults into the receiver. My mother would probably want to take some credit, too.

"Hello, this is Mike Golio," I said as the computer stepped up its attempt to get my attention by adding audible tones to the e-mail alerts. The pager had stopped for now and I looked down to assess damages. It hadn't drawn blood. At worst, my hip was bruised.

Neil Garrison, one of our local microwave equipment sales reps was returning my call. "Well, gee, how ya doin', Mike? I haven't heard from ya in awhile. Who ya workin' for now? Have there been any re-organizations I need to know about? Who's important in your building now, and who can I ignore? Have ya got lots-a-money to spend? Am I wastin' my time here?"

It has always been my belief that Neil failed as a used car dealer prior to getting into the microwave equipment business. Unfortunately, I needed to buy equipment through him.

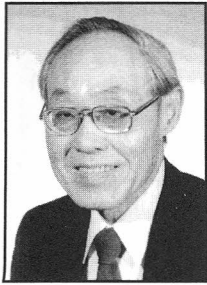
It turns out that Neil was in the lobby of our building when he called. He asked if I could meet him to discuss my purchase requisitions. By now, my computer had taken over the lighting in the office. The room lights blinked off and on in sync with the beeping sound coming from the computer. The second phone line began to flash and my pager was doing its dremel tool imitation again. I decided it might be safest to leave the office and meet with Neil right away. As I walked out the door and headed down the hall, I think I heard the hiss of poison gas valves opening in my office. I turned and noticed a cloud emerging from under the door.

The sense of relief I felt as I left my Temple of Communication Doom was lost entirely when I entered the lobby and saw Neil talking with Milo Lacemore. Milo and Neil were sole mates. Milo would tell Neil anything for a free lunch. For a free software update, he would kill. The fact that Milo's information was wrong more often than not didn't seem to bother Neil. He liked the feeling that he was in on Company Proprietary Information.

As I approached, Neil saw me and put on that polyethylene smile that sales people seem to be able to

(continued on page 26)

Call for MTT-S AdCom Nominations and Committee Appointments



by Kiyoy Tomiyasu
Chairman
Nominations and Appointments Committee

The nomination of candidates for election to the MTT-S Administrative Committee (AdCom) will be conducted by the Nominations and Appointments Committee (N&A Committee) appointed on January 10, 1994. The N&A Committee will handle the nominations with the same procedure as in past years specified in the MTT-S Bylaws and Procedures Manual. In addition to the elections, the N&A Committee seeks interested and qualified individuals who will be recommended to the incoming President for his consideration to serve on various MTT-S committees.

At its Fall Meeting, the MTT-S AdCom elects members to serve on AdCom. The Bylaws state that the Nominations Committee will present a slate of at least two members for each vacancy which will occur the following January 1. The Nominations Committee shall consider in their selection the geographical and organizational distributions, as well as AdCom effectiveness. AdCom members who have served three consecutive terms by the following January 1 are ineligible for nomination by the N&A Committee.

The Bylaws provide three means by which one may be nominated for AdCom consideration. They are as follows:

- Nomination by the Nominations Committee,
- Nomination by petition signed by 25 MTT-S members and submitted to the Nominations Committee prior to July 1, 1994,
- Chapter nomination submitted prior to July 1, 1994.

All nominees will be contacted to ascertain that they will accept the nomination, and will commit themselves for active participation in at least two meetings a year, held at various locations in the United States.

The geographical and affiliation distributions of current AdCom members are given below:

Present Elected AdCom (1994): Total=18			
Eastern U.S.	6	Industry	12
Central U.S.	1	Government	3
Western U.S.	8	University	3
Europe	2		
Japan	1		

The nominations committee needs your help in suggesting potential nominees to serve our membership as AdCom members. Please submit your suggestion to your local Chapter Chairman and/or to K. Tomiyasu, N&A Committee Chairman, Martin Marietta Corp., 366 Hilltop Road, Paoli, PA 19301-1211, or fax 610-644-8521 by July 1, 1994.

Education Committee

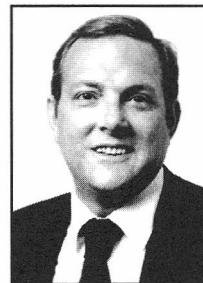
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Research Topic: Application of Wavelet Analysis in Solving Electromagnetic and Microwave Problems
Congratulations to the 1994 Award winners.

For information about the 1995 Graduate Fellowship, please contact:

Dr. Aditya Gupta
Westinghouse ESG
P.O. Box 1521
MS 3K11
Baltimore, MD 21203

MTT Society Ombudsman



Ed Niehenke
Westinghouse Electric Corporation
P.O. Box 746, MS-75
Baltimore, MD 21203
(410) 765-4573
(410) 993-7432 Fax

I have been selected by the Microwave Theory and Techniques Society Administrative Committee (AdCom) to continue serving as your Ombudsman for 1994. It was a pleasure to serve in previous years and I look forward to continuing in 1994. The purpose of the Ombudsman is to receive complaints and assist members in solving problems encountered in obtaining membership services from IEEE and MTT-S.

As your Ombudsman, I have received 14 inquiries, (10 non-US) from MTT-S members in 1993 and to my knowledge all members have been satisfied. In 1994, I have received two inquiries, one from a member who paid his 1994 dues and did not receive his new membership card. The other member did not receive MTT-S subscriptions for June through December 1993. Both situations are being rectified.

Please feel free to contact me by letter or telephone concerning any complaint you may have or any assistance you may need in obtaining membership services from IEEE and MTT-S.

MTT-S Membership Services Committee Report

by Mario A. Maury, Jr., Chairman

1994 Membership Services Committee

There have been some major changes in the committee for 1994. Two members of the 1993 committee have been elected to AdCom, John Barr and Mike Golio. John Barr is now Vice-Chairman and Mike Golio has moved on to other AdCom responsibilities. I know that all Chapter Officers will join me in thanking Mike Golio for all the good work he has done over the past few years as Chapter Activities Co-ordinator and wish him bon voyage.

We have several new members on the committee: J.K. McKinney has replaced Mike as Chapter Activities Co-ordinator and Jitendra Goel has taken over Membership Development for John.

The following is a listing of the committee for 1994.

M.A. Maury, JR. Chairman	tel: (909) 987-4715 fax: (909) 987-1112 e-mail: mamjr@easyst.com 1:2/0
John Barr Vice-Chairman	tel: (707) 577-2350 fax: (707) 577-5644 e-mail: barr@st.hp.com
J.K. McKinney Chapter Activities	tel: (909) 612-1044 fax: (909) 612-1047 e-mail: jkm@easyst.com 1:2/0
Joe Staudinger Chapter Records	tel: (602) 897-4456 fax: (602) 897-4477 e-mail: rymm70@email.sps.mot.com
Austin Truitt Chapter Officers Handbook	tel: (214) 995-9918 fax: (214) 995-4583 e-mail: truitt@ms3.dseg.ti.com
Vijay Nair Chapter Communications	tel: (602) 897-5922 fax: (602) 897-5934
Samir El-Ghazaly Chapter Funding	tel: (602) 965-5322 fax: (602) 965-8325 e-mail: sme@asu.edu
Richard A. Sparks International Chapter Meeting Liaison	tel: (617) 862-3000 fax: (617) 863-0586 e-mail: r.sparks@compmail.com
Kris K. Agarwal Microwave Lecturer Program	tel: (203) 576-4109 fax: (203) 576-4117
Jitendra Goel Membership Development	tel: (310) 814-2031 fax: (310) 812-7011 e-mail: jitendra_goel@qmail4.sp.trw.com

Roger D. Pollard Student Membership Development	tel: (44) 532-332080 fax: (44) 532-332032 e-mail: roger@ee.leads.ac.uk
John W. Wassel Newsletter Editor	tel: (214) 995-3216 fax: (214) 995-3347 e-mail: john.wassel@jugo@timag.csc.ti.com
David Zimmerman Associate Editor	tel: (214) 995-8190 fax: (214) 959-9867 e-mail: zimm@ms3.dseg.ti.com
John Eisenberg Feature Article Editor	tel: (415) 941-7426
Rolf Jansen Region 8 Editor	tel: (40) 2102-83095 fax: (49) 2102-842391

Chapter Communications

One of the major objectives for this year is to improve communications in MTT-S by means of e-mail. As you will notice above, most members of the Membership Services Committee have e-mail addresses. It is our plan to help chapters establish routine e-mail communications. J.K. McKinney and Vijay Nair will be working with Chapter Officers in this regard.

Also, the *TransceiveR*, the Chapter Officers Newsletter, was initiated in 1993 and is being published three times per year. We encourage all chapters to submit articles concerning their activities to Vijay Nair, Editor of the *TransceiveR*.

MTT-S Chapter Chairperson's Meeting will be held at the 1994 International Microwave Symposium in San Diego, California, and plans are already underway for this event. Registration forms and applications for travel funds will be mailed to Chapter Officers. Should you require any additional information, please contact Austin Truitt.

This meeting consists of a reception and dinner followed by the meeting itself. This is a great opportunity to meet your fellow Chapter Officers, AdCom Officers and members.

A key part of this meeting is the presentation of "Certificates of Appreciation" to Chapter Officers. We want to be as accurate as possible on these awards and we need all Chapters to make sure that their records are up to date as to who the Chapter Officers are. Please make sure that you submit your reports on a timely basis. Refer to your Chapter Officers Handbook for reporting instructions, and, should you have any questions, contact Joe Staudinger.

Eastern Europe and Former Soviet Union Chapter Development

Work is currently underway to help form chapters in Eastern Europe and the former Soviet Union. The Membership Services Committee along with the Transnational Committee and an Adhoc Committee under Rolf Jansen has created an initiative to make it possible financially for this to happen. The Electron Dynamics Society is also involved and will provide

(continued on page 26)

Waves and Microwaves



by Don Parker
Chairman
1994 IEEE MTT-S IMS
San Diego, California

Join us the week of May 22-28, and ride the waves in San Diego at the 1994 International Microwave Symposium (IMS). When the steering committee chose the theme "Waves and Microwaves" we wanted to convey the concept of the ocean seaside beauty of San Diego as the site for the symposium and the dynamics of the microwave industry. Little did we know that four months before the symposium, southern California would experience the dynamics of the worst ground wave (earthquake) in the past twenty-three years. Those of us who live in the San Fernando Valley, site of the epicenter, had the ride of our lives. We much prefer the excitement of microwaves and their utilization shifting from military applications to commercial applications—a theme throughout the symposium. We invite you to come and enjoy the symposium, the outstanding climate of San Diego, and the beauty of the ocean waves. Incidentally, we don't expect another ground wave for another twenty-plus years.

The technical program committee has arranged an outstanding program with over three hundred papers scheduled for the regular sessions and over one hundred papers in the Open Forum. Dr. Andrew Viterbe of Qualcomm and Dr. Harold Sobol have been invited to speak at the Plenary Session on the respective subjects "The Wireless Personal Communication Revolution" and "Advances in High Capacity Fiber Optic Systems: Theoretical Concepts to Practical Realizations." In addition,



San Diego is a major home-port to U.S. Navy Ships.

there are seventeen workshops, seven focused sessions, and a rump session. A special session is planned to honor the principals responsible for the research and writing of the book, *Microwave Filters, Impedance Matching Networks, and Coupling Structures* which has been called by some the "bible" on microwaves.

The changes in San Diego since the last Microwave Symposium was held here in 1978 are as dramatic as the changes possible with an earthquake. Most of the downtown section has been renewed with construction of several new modern hotels, restaurants, and the Horton Plaza—a unique shopping mall. The symposium will be held at the new San Diego Convention Center. This unique modern building overlooks the San Diego harbor and is adjacent to the symposium hotel (The San Diego Marriott Hotel and Marina). Adjacent to the hotel is Seaport Village which has many quaint shops and varied food venues. It is a pleasant place to stroll and relax.

All technical sessions will be held on the third floor of the convention center. The rooms are large, spacious, and accessible from one corridor. A person can easily move from room to room, to hear papers of interest in the five parallel sessions. Elevators and escalators go directly to the ground level where there will be over four hundred exhibits including the historical exhibit. You will be impressed with the convenience of this center. When one wants a change of pace, the terraces on the harbor side of the convention center provide one with a fantastic view, fresh air, and sunshine.

Microwave week continues to fill up with more and more activities. In order to fit in all the workshops, we scheduled one on Sunday and multiple workshops on Monday and Friday. The Microwave and Millimeter Wave Monolithic Integrated Circuits (MMWMC) conference is on Monday and is joint with IMS on Tuesday.



Mission Bay, San Diego.

(continued on page 30)

Special Sessions at the 1994 International Microwave Symposium



by Mario A. Maury, Jr.
Special Sessions Chairman

The 1994 International Microwave Symposium will offer a broad range of Special Sessions covering a wide variety of topics of vital interest to attendees. All forms of Special Sessions are being provided including a Sunday Workshop for the first time, which is being held in conjunction with MMWMC.

The following is a brief summary of the thirty-two (32) Special Sessions that will be held during Microwave Week.

- **Workshops.** There is a total of seventeen (17) workshops being held on Sunday (1), Monday (9) and Friday (7).
- **Panel Sessions.** There is a total of seven (7) lunch Panel Sessions being held. One on Monday for



Mission San Diego Alcala in Mission Valley.



San Diego Trolley.

MMWMC and two (2) each on Tuesday, Wednesday and Thursday.

- **Rump Sessions.** There is one Rump Session being held on Tuesday evening with a very provocative topic.
- **Honorary Session.** There is one Honorary Session recognizing several outstanding microwave engineers for a landmark publication.
- **Focused Sessions.** There are six (6) Focused Sessions dealing with 'hot' topics.

All Special Sessions are sponsored by one or more MTT-S Technical Committees or organizations. The Sessions Organizers, Technical Committees and the Special Sessions Committee have worked long and hard to put together a diversified range of topics, outstanding speakers, moderators and panelists to create a quality program.

The Special Sessions listed below are preceded by their letter code used in the Registration Form, Advanced Program and Program so that you can easily identify them. Also, they are coded so you can tell the day of the week on which they're being held. In the case of Workshops, the second letter from the left indicates the day of the week. In the case of Panel and Rump Sessions, the second two letters from the left indicate the day of the week. In the case of Honorary and Focused Sessions, the first two letters from the left indicate the day of the week. Read on to find out more about the outstanding Special Sessions program in 1994.

Workshops

The workshops present an exceptional educational opportunity to learn the current state of the art from industry experts and specialists on specific topics. It is a very interactive environment and provides insight into technology, design and manufacturing disciplines.

There are both full-day and half-day workshops being offered; they are identified in their letter code by the second letter from the right: "F" stands for full-day and "H" stands for half-day. For example, Sunday's workshop is a full-day.

(continued on next page)

All workshops are being held at the Convention Center except for Sunday's workshop which is being held at the Marriott Hotel. Full-day workshops include breakfast and lunch while half-day workshops include breakfast for morning workshops and lunch for afternoon workshops.

Workshop notes will be available at registration for the first time (this is a change from prior years) to make sure all workshop registrants receive a copy.

Sunday—May 22, 1994

- WSFA—Wireless Communications: I-System Concepts and Applications; II-MMIC Circuits and Components—*F. Ali, G. Brehm, B. Geller, E. Niehenke*.
NOTE: It is strongly recommended that you advance register for this workshop before April 22, 1994. This workshop starts before registration opens at the Convention Center on Sunday and it's being held at the Marriott Hotel.

Monday—May 23, 1994

- WMFA—Engineering Applications of Electromagnetic Field Solvers—*D. Swanson*.
- WMFB—Ultra Low Noise Microwave Sources—Part II—*J. Whelehan*.
- WMFC—Measurement of Noise in Amplifiers—*D. Wait*.
- WMFD—High Power Microwave Processing of Materials—*J. Goel, D. Reid*.
- WMHE—CAD Design of Superconducting Microwave Components—*M. Nisenoff*.
- WMHF—Accuracy in On-Wafer Measurements—*D. Williams, R. Marks*.
- WMHG—Lighsats: Microwave Technology Requirements and Opportunities—*K. Bhasin*.
- WMHH—High Power Superconducting Microwave Technology—*M. Nisenoff*.
- WMHI—CAD of Microwave Systems—*R. Hicks, G. Heiter*.

Friday—May 27, 1994

- WFFA—Circuit Level Design and Modeling of Quasioptical Circuits and Systems—*M. Steer*.
- WFFB—Millimeter-wave Technology Applications in Automobiles—*J. Goel, R. Dixit*.
- WFFC—Interconnect and Packaging Technologies and Issues—*B. Berson*.
- WFFD—Designing R.F. Signal Processing MMICs for Commercial Communications Systems—*A. Sharma, F. Sullivan*.
- WFHE—Filters for Mobile Communications Network—*A. Atia*.
- WFHF—Optically-Fed Wireless Communications—*C. Cox, N. Dietrich*.

- WFHG—Theory and Applications of Optically Generated Tera-Hertz Electrical Pulses—*C. Lee, A. Rosen*.

Panel Sessions

There are a total of seven (7) Panel Sessions during Microwave Week. All will be held at the Convention Center during lunch time with a box lunch provided. The panels consist of industry experts discussing topics ranging from directions the microwave industry is headed to technical issues of major current concern, as well as one panel on an ever present issue, "software." The following is a listing of these panels; come and enjoy your lunch while learning at the same time.

Monday—May 23, 1994

- PMON—Can Millimeter-wave Products be Used for Dual Use?—*R. Kagiwada*.

Tuesday—May 24, 1994

- PTUA—Power MMICs for Commercial Applications: Real Products. . . for a Change!—*F. Ali, M. Golio*.
- PTUB—Design and Producibility of Ferrite Components—*D. Webb*.

Wednesday—May 25, 1994

- PWEC—Microwave & Millimeter-wave IC Interconnect Technology—*G. Brehm*.
- PWED—Circuit Design with Direct Optimization-Drive Electromagnetic Simulators—*J. W. Bandler*.

Thursday—May, 1994

- PTHE—Low Noise Amplifier Linearity—*F. Sullivan*.
- PTHF—Software Law From an Engineer's Perspective—*P. Virga*.

Rump Session

On Tuesday evening, a thought provoking Rump Session will be held at the Marriott Hotel from 8:00 to 10:00 PM. Wine and cheese will be served and you will have an opportunity to listen to how the microwave industry will learn how to "beat swords into plowshares." Enjoy a pleasant evening while rubbing elbows with many of your colleagues.

Tuesday—May 24, 1994

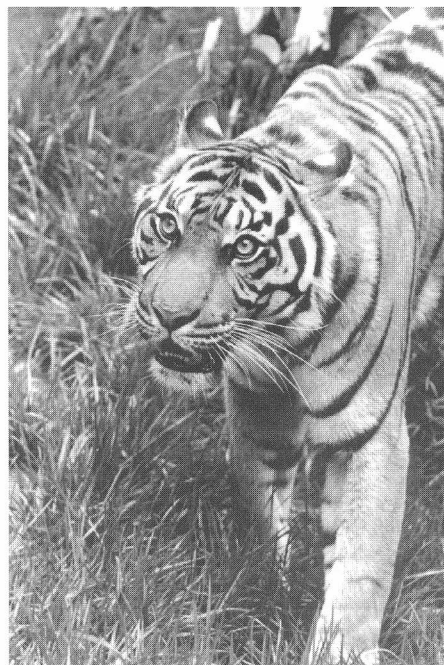
- RTUG—Microwave After the Cold War—*B. Spielman*.

Honorary Session

This session honors the authors of one of the great publications in our industry. I wonder how many of us have used the "Black Book" in our daily work over the years. This is recognition richly deserved.

Tuesday—May 24, 1994

- TU3D—Honorary Session: 30th Anniversary—"Microwave Filters,



Sumatran Tiger at the Zoo.

(continued on page 30)

1994 IEEE MTT-S International Microwave Symposium – Schedule of Events

SUN. – MAY 22	Registration 5:00 PM to 9:00 PM		San Diego Convention Center		
	MMWMC Reception 7:00 PM to 10:00 PM		Marriott Hotel, Marina F & G Rooms		
8:30 AM - 5:00 PM	WSFA Wireless Communications		Marriott Hotel, Marina D Room		
MON. – MAY 23	Registration 9:00 AM to 5:00 PM		San Diego Convention Center		
8:00 AM - 5:00 PM	WMFA EM Field Solvers	Rm. 8	WMFC Noise in Amplifiers	Rm. 7A	
	WMFB Low Noise MW Sources	Rm. 7B	WMFD MW Process of Materials	Rm. 10	
8:00 AM - 12:00 PM	WMHE CAD of MW Components	Rm. 9	WMHF On-Wafer Measurements	Rm. 11A	
	WMHG Lightsats	Rm. 11B			
1:00 PM - 5:00 PM	WMHH Superconducting MW Technology		Rm. 3	WMHI CAD of MW Systems	Rm. 4
12:30 PM - 1:30 PM	PMON: Can mm-Wave Products be Used for Dual Use? Room 6C, San Diego Convention Center				
	Microwave Journal/MTT-S Reception		6:00 PM to 8:00 PM	San Diego Aerospace Museum	
	MMWMC Symposium		8:30 AM to 5:00 PM	San Diego Convention Center	
TUES. – MAY 24	Registration 7:00 AM to 5:00 PM		San Diego Convention Center		
	MMWMC Symposium 8:30 AM to 5:00 PM		San Diego Convention Center		
	RM 1	RM 2	RM 3	RM 6C	RM 6D
8:30 AM - 10:00 AM	TU1A: Signal Control Circuits	TU1B: Time Domain Methods	TU1C: Optical Transmitters	TU1D: Sources and Control Components	TU1E: Ferrite Comps & Techn
10:15 AM - 12:00 PM	TU2G: Plenary Session Dr. Andrew Viterbi and Professor Hal Sobol			Room 6B, San Diego Convention Center	
12:00 PM - 1:30 PM	PTUA: Power MMICs for Commercial Applications: Real Products for a Change			Room 8 San Diego Convention Center	
	PTUB: Design and Producibility of MMIC Compatible Ferrite Components			Room 7A, San Diego Convention Center	
1:30 PM - 3:00 PM	TU3A: Receiver MMIC Components	TU3B: Control of Leakage in Guided Waves	TU3C: Fiber Optic Link Technology	TU3D: 30th Anniversary: Matthaei, Young & Jones	TU3E: Superconducting Comps & Subsystems
2:30 PM - 5:00 PM	TU3F: Open Forum Room 6A, San Diego Convention Center				
3:30 PM - 5:00 PM	TU4A: Novel Monolithic Technology	TU4B: New Guided Wave Structures & Phenomena	TU4C: Lightwave Comm Systems & Components	TU4D: Acoustic Sensors Devices & Applications	TU4E: Biological Effects & Medical Applications
8:00 PM - 10:00 PM	RTUG: Microwaves after the Cold War			Marriott Hotel, Marina D Room	
WED. – MAY 25	Registration		8:00 AM to 5:00 PM		San Diego Convention Center
8:30 AM - 10:00 AM	WE1A: Power Amps for Mobile/Satellite Comm	WE1B: Freq Domain Methods & Applications	WE1C: Active & Passive Planar Filters	WE1D: MW & mm-Wave Applications in PCS	WE1E: mm-Wave HEMT Amplifiers/Receivers
10:30 AM - 12:00 PM	WE2A: HBT & PHEMT Power Amplifiers	WE2B: EM Analytic and Numerical Techn	WE2C: Waveguide and Dielectric Resonators Fillers	WE2D: MW & mm-Wave Comm Applications	WE2E: mm-Wave and sub-mm-Wave Sources
12:00 PM - 1:30 PM	PWEC: Microwave and mm-Wave IC Interconnect Technology			Room 8, San Diego Convention Center	
	PWED: Circuit Design with Direct Optimization-Driven EM Simulators			Room 7A, San Diego Convention Center	
1:30 PM - 3:00 PM	WE3A: MW & mm-Wave Power Amplifiers	WE3B: Active & Quasi-Optical Antennas I	WE3C: FET Based Modeling	WE3D: Practical Applications of Field Theory	WE3E: Passive Components I
2:30 PM - 5:00 PM	WE3F: Open Forum Room 6A, San Diego Convention Center				
3:30 PM - 5:00 PM	WE4A: SAW Filters & Convolvers	WE4B: Active & Quasi-Optical Antennas II	WE4C: HBT Modeling	WE4D: Dual Military & Commercial Use	WE4E: Passive Components II
	Industry-Hosted Cocktail Reception Awards Banquet		5:45- 7:15 PM 7:30-10:00 PM	Marriott Hotel, San Diego Ballroom Marriott Hotel, Marina Hall	
THUR. – MAY 26	Registration		8:00 AM to 5:00 PM		San Diego Convention Center
	NTC		8:30 AM to 5:00 PM		San Diego Convention Center
8:30 AM - 10:00 AM	TH1A: NTC Opening Session	TH1B: mm-Wave Low Noise Recvrs & Amps	TH1C: Device & Circuit Measurements	TH1D: Opto-Microwave Devices	TH1E: CAD Methodology
10:30 AM - 12:00 PM	TH2A: Active Array Radar Systems	TH2B: Receiver Components & Technology	TH2C: Microwave Measurements	TH2D: Integration of Photonic and MW Components	TH2E: Field Theory Based CAD
12:00 PM - 1:30 PM	PTHE: Low Noise Amplifier Linearity			Room 8, San Diego Convention Center	
	PTHF: Overview of Software Law from an Engineer's Perspective			Room 7A, San Diego Convention Center	
1:30 PM - 3:00 PM	TH3A: Phased & Active Array Components I	TH3B: Nonlinear Modeling & Analysis	TH3C: Electro-Optic Measurements	TH3D: Comm Applications of High Power MWs	TH3E: MIC I: Frequency Convtrrs & Amps
3:30 PM - 5:00 PM	TH4A: MW and mm-Wave System Application	TH4B: Propagation in Planar Structures	TH4C: Packaging and Interconnect Technology	TH4D: High Power Sources & Control Components	TH4E: MIC II: Substrates & Applications
FRI. – MAY 27	ARFTG Conference		8:30 AM to 5:00 PM		Marriott Hotel, San Diego Ballroom
	NTC		8:30 AM to 5:00 PM		San Diego Convention Center
8:00 AM - 5:00 PM	WFFA Quasi-Opt Circuits and Systems	Rm. 10	WFFC Interconnect & Packaging	Rm. 9	
	WFFB mm-Wave Applications in Autos	Rm. 8	WFFD RF Signal Processing MMICs	Rm. 5A/B	
8:00 AM - 12:00 PM	WFHE Filters for Mobile Communications	Rm. 11A	WFHF Optically-Fed Wireless Comm	Rm. 11B	
1:00 PM - 5:00 PM	WFHG Optically Generated Terahertz Pulses Rm. 7A				
SAT. – MAY 28	NTC Short Course: Phased and Active Arrays in the 1990s and Beyond			Marriott Hotel, Marina D Room	

Advance Conference Registration



1994 IEEE MTT-S INTERNATIONAL MICROWAVE SYMPOSIUM

May 22 - 28, 1994 • San Diego, California • MTT-S • MMWMC • ARFTG • NTC

Each Conference Attendee must submit a separate registration form. A copy of this form may be used.
To ensure advanced registration, this form and payment must be received by April 22, 1994
On-site fees will be approximately 30% higher.

NAME	<input type="text"/>	<input type="text"/>	JOB	<input type="checkbox"/>	
	Last	First	JOB CATEGORY A. Gen. Mgmt. B. Res./Engr. Mgmt. C. Res./Engr. D. Des./Proj. Engr. E. Manufacturing F. Mkt./Sales/Purch. G. Teaching H. Student I. Government J. Consulting K. Guest L. Other		
AFFILIATION	<input type="text"/>				
	Company, Etc.	Mail Stop			
ADDRESS	<input type="text"/>				
	Street				
	<input type="text"/>	<input type="text"/>			
	City	State	Zip Code		
	<input type="text"/>	<input type="text"/>	<input type="text"/>		
	Country				
TEL. NO.	<input type="text"/>	<input type="text"/>			
IEEE MEMBER	<input type="checkbox"/> Yes <input type="checkbox"/> No	IEEE Membership No.*	<input type="text"/>		
MTT-S MEMBER	<input type="checkbox"/> Yes <input type="checkbox"/> No	* Must be given to qualify for member discount			

Check each function for which you wish to register. Check for the appropriate fees and enter the fees in the Remittance column.
For complete titles, schedules and locations see reverse side.

<p>• MTT-S Symposium (Tue., Wed. & Thur.)</p> <p><input type="checkbox"/> All MTT-S Sessions <input type="checkbox"/> \$215 <input type="checkbox"/> \$300 <input type="checkbox"/> \$_____ (Includes MTT-S Digest and trolley ticket)</p> <p><input type="checkbox"/> Single-Day Registration <input type="checkbox"/> \$100 <input type="checkbox"/> \$140 <input type="checkbox"/> \$_____ (No Digest nor trolley ticket)</p> <p><input type="checkbox"/> Student, Retiree, Life Member <input type="checkbox"/> \$25 <input type="checkbox"/> \$50 <input type="checkbox"/> \$_____ (No Digest nor trolley ticket)</p> <p>• MMWMC Symposium <input type="checkbox"/> \$85 <input type="checkbox"/> \$110 <input type="checkbox"/> \$_____ (Sunday Evening, Mon. & Tue., (Includes MMWMC Reception, Digest and if <u>not</u> registered for MTT-S, a trolley ticket)</p> <p>• ARFTG - Automatic RF Techniques Conference (Fri., (Includes breakfast, lunch, and ARFTG Digest)</p> <p><input type="checkbox"/> ARFTG Member <input type="checkbox"/> \$125 <input type="checkbox"/> \$125 <input type="checkbox"/> \$_____</p> <p><input type="checkbox"/> ARFTG Non-member <input type="checkbox"/> \$150 <input type="checkbox"/> \$150 <input type="checkbox"/> \$_____</p> <p>• NTC - National Telesystems Conference (Thurs. & Fri (Includes Thurs. lunch, proceedings, and if <u>not</u> registered for MTT-S, a trolley ticket)</p> <p><input type="checkbox"/> \$185 <input type="checkbox"/> \$215 <input type="checkbox"/> \$_____</p> <p>• Additional Digests</p> <p>MTT-S Qty___ @ <input type="checkbox"/> \$70 <input type="checkbox"/> \$85 <input type="checkbox"/> \$_____</p> <p>MMWMC Qty___ @ <input type="checkbox"/> \$35 <input type="checkbox"/> \$50 <input type="checkbox"/> \$_____</p> <p>ARFTG Qty___ @ <input type="checkbox"/> \$20 <input type="checkbox"/> \$20 <input type="checkbox"/> \$_____</p> <p>NTC Proceedings Qty___ @ <input type="checkbox"/> \$35 <input type="checkbox"/> \$50 <input type="checkbox"/> \$_____</p> <p>• Panel Sessions (MTT-S registration required to attend, except PMON. Check only one per day. Includes box lunch)</p> <p><input type="checkbox"/> PMON: mm-Wave Products Dual Use <input type="checkbox"/> \$20 <input type="checkbox"/> Mon. Lunch \$_____</p> <p><input type="checkbox"/> PTUA: Pwr MMICs Commercial Apps <input type="checkbox"/> Tues. Lunch \$_____</p> <p><input type="checkbox"/> PTUB: Design Ferrite Components <input type="checkbox"/> \$20 <input type="checkbox"/> \$_____</p> <p><input type="checkbox"/> PWEC: IC Interconnect Technology <input type="checkbox"/> Wed. Lunch \$_____</p> <p><input type="checkbox"/> PWED: Circuit Design Optimization <input type="checkbox"/> \$20 <input type="checkbox"/> \$_____</p> <p><input type="checkbox"/> PTHE: Low Noise Amp <input type="checkbox"/> Thur. Lunch \$_____</p> <p><input type="checkbox"/> PTHF: Software Law <input type="checkbox"/> \$20 <input type="checkbox"/> \$_____</p>	<p>• Rump Session (MTT-S registration required to attend) \$20 Includes beverage and hors d'oeuvres</p> <p><input type="checkbox"/> RTUG: Microwaves after the Cold War <input type="checkbox"/> \$20 <input type="checkbox"/> Tues. Eve. \$_____</p> <p>• Awards Banquet Wed. evening, Marriott Marina Qty___ @ \$40 \$_____</p> <p>• Workshops</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th style="text-align: center;">Attendee</th> <th style="text-align: center;">Student/Retiree</th> <th style="text-align: center;">Life Member</th> </tr> </thead> <tbody> <tr> <td>Full Day (includes continental breakfast and lunch)</td> <td style="text-align: center;"><input type="checkbox"/> \$75</td> <td style="text-align: center;"><input type="checkbox"/> \$75</td> <td style="text-align: center;"><input type="checkbox"/> \$35</td> </tr> <tr> <td>Half Day (AM includes continental breakfast & PM includes lunch)</td> <td style="text-align: center;"><input type="checkbox"/> \$45</td> <td style="text-align: center;"><input type="checkbox"/> \$45</td> <td style="text-align: center;"><input type="checkbox"/> \$20</td> </tr> <tr> <td style="text-align: center;">Sunday</td> <td colspan="3" style="text-align: center;">Monday (cont.)</td> </tr> <tr> <td><input type="checkbox"/> WSFA (Full Day) \$ _____</td> <td><input type="checkbox"/> WMHH (PM only) \$ _____</td> <td colspan="2"></td> </tr> <tr> <td style="text-align: center;">Monday</td> <td colspan="3" style="text-align: center;">Friday</td> </tr> <tr> <td><input type="checkbox"/> WMFA (Full Day) \$ _____</td> <td><input type="checkbox"/> WFFA (Full Day) \$ _____</td> <td colspan="2"></td> </tr> <tr> <td><input type="checkbox"/> WMFB (Full Day) \$ _____</td> <td><input type="checkbox"/> WFFB (Full Day) \$ _____</td> <td colspan="2"></td> </tr> <tr> <td><input type="checkbox"/> WMFC (Full Day) \$ _____</td> <td><input type="checkbox"/> WFFC (Full Day) \$ _____</td> <td colspan="2"></td> </tr> <tr> <td><input type="checkbox"/> WMFD (Full Day) \$ _____</td> <td><input type="checkbox"/> WFFD (Full Day) \$ _____</td> <td colspan="2"></td> </tr> <tr> <td><input type="checkbox"/> WMHE (AM only) \$ _____</td> <td><input type="checkbox"/> WFHE (AM only) \$ _____</td> <td colspan="2"></td> </tr> <tr> <td><input type="checkbox"/> WMHF (AM only) \$ _____</td> <td><input type="checkbox"/> WFHF (AM only) \$ _____</td> <td colspan="2"></td> </tr> <tr> <td><input type="checkbox"/> WMHG (AM only) \$ _____</td> <td><input type="checkbox"/> WFHG (PM only) \$ _____</td> <td colspan="2"></td> </tr> <tr> <td colspan="4" style="text-align: right;">Total for all Workshops \$ _____</td> </tr> </tbody> </table> <p>• Short Course (Full day- includes refreshments) <input type="checkbox"/> \$225 (members) <input type="checkbox"/> \$255 (non-members) SSFA: Phased and Active Arrays in the 1990s and Beyond \$ _____</p> <p>• Guest Programs (Lunch and transportation are included) See reverse side for complete information.</p> <p>GA: City Sights (Tues.) Qty___ @ \$52 \$ _____</p> <p>GB: San Diego Zoo (Wed.) Qty___ @ \$58 \$ _____</p> <p>GC: Tijuana (Thurs.) Qty___ @ \$40 \$ _____</p> <p>Guest Trolley Tickets Qty___ @ \$10 \$ _____</p>		Attendee	Student/Retiree	Life Member	Full Day (includes continental breakfast and lunch)	<input type="checkbox"/> \$75	<input type="checkbox"/> \$75	<input type="checkbox"/> \$35	Half Day (AM includes continental breakfast & PM includes lunch)	<input type="checkbox"/> \$45	<input type="checkbox"/> \$45	<input type="checkbox"/> \$20	Sunday	Monday (cont.)			<input type="checkbox"/> WSFA (Full Day) \$ _____	<input type="checkbox"/> WMHH (PM only) \$ _____			Monday	Friday			<input type="checkbox"/> WMFA (Full Day) \$ _____	<input type="checkbox"/> WFFA (Full Day) \$ _____			<input type="checkbox"/> WMFB (Full Day) \$ _____	<input type="checkbox"/> WFFB (Full Day) \$ _____			<input type="checkbox"/> WMFC (Full Day) \$ _____	<input type="checkbox"/> WFFC (Full Day) \$ _____			<input type="checkbox"/> WMFD (Full Day) \$ _____	<input type="checkbox"/> WFFD (Full Day) \$ _____			<input type="checkbox"/> WMHE (AM only) \$ _____	<input type="checkbox"/> WFHE (AM only) \$ _____			<input type="checkbox"/> WMHF (AM only) \$ _____	<input type="checkbox"/> WFHF (AM only) \$ _____			<input type="checkbox"/> WMHG (AM only) \$ _____	<input type="checkbox"/> WFHG (PM only) \$ _____			Total for all Workshops \$ _____			
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The only acceptable forms of payment are cash, check, money order, MasterCard, or VISA. TOTAL REMITTANCE \$ _____
 • Make your check or money order (U.S. \$ ONLY on a U.S. Bank or Travelers Check) payable to: PAYMENT MUST ACCOMPANY FORM
 "1994 IEEE MTT-S Symposium" • Or charge your MasterCard or VISA: MasterCard VISA

Card # Exp. Date Signature

• Written requests for refunds will be honored if received by April 22, 1994. A \$25 cancellation fee will be charged for processing.

MAIL COMPLETED FORM AND PAYMENT TO:
1994 IEEE SYMPOSIUM, c/o LRW Associates, 1218 Balfour Drive, Arnold, MD 21012, USA
 Fax Number: (401) 647-5136. If this form is sent by FAX do NOT also mail; a Credit Card Number must be included.

PLEASE FAX OR MAIL; DO NOT FORWARD HARD COPY IF FAXED

Workshops

	Number	Time	Title
Sun. Marriott Marina	WSFA	8 AM-5 PM	Wireless Communications I: System Concepts and Applications Wireless Communications II: MMIC Circuits and Components
	WMFA	8 AM-5 PM	Engineering Applications of Electromagnetic Field Solvers
Monday San Diego Convention Center	WMFB	8 AM-5 PM	Ultra Low Noise Microwave Sources- Part II (Part I was held at 1993 IMS)
	WMFC	8 AM-5 PM	Measurement of Noise in Amplifiers
	WMFD	8 AM-5 PM	High Power Microwave Applications in Processing of Materials
	WMHE	8 AM-12 PM	CAD Design of Superconducting Microwave Components
	WMHF	8 AM-12 PM	Accuracy in On-Wafer Measurements
	WMHG	8 AM-12 PM	Lightsats: Microwave Technology Requirements and Opportunities
	WMHH	1PM-5 PM	High Power Superconducting Microwave Technology
	WMHI	1PM-5 PM	CAD of Microwave Systems
	Friday San Diego Convention Center	WFFA	8 AM-5 PM
WFFB		8 AM-5 PM	Millimeter-Wave Technology Applications in Automobiles
WFFC		8 AM-5 PM	Interconnect and Packaging Technologies and Issues
WFFD		8 AM-5 PM	Designing RF Signal Processing MMICs for Commercial Communications Systems
WFHE		8 AM-12 PM	Filters for Mobile Communications Networks
WFHF		8 AM-12 PM	Optically-Fed Wireless Communications
WFHG		1 PM-5 PM	Theory and Applications of Optically Generated Terahertz Electrical Pulses

Panel Sessions • San Diego Convention Center

12:00 Noon to 1:30 PM

PMON	Monday	Can Millimeter Products be Used for Dual Use?
PTUA	Tuesday	Power MMICs for Commercial Applications: Real Products for a Change!
PTUB	Tuesday	Design and Producibility of Ferrite Components
PWEC	Wednesday	Microwave and Millimeter-Wave IC Interconnect Technology
PWED	Wednesday	Circuit Design with Direct Optimization-Driven Electromagnetic Simulators
PTHE	Thursday	Low Noise Amplifier Linearity
PTHF	Thursday	Software Law from an Engineer's Perspective

Rump Session • Marriott Marina

8:00 PM to 10:00 PM

RTUG	Tuesday	Microwaves After the Cold War
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Short Course • Marriott Marina

8:30 AM to 5:00 PM

SSFA	Saturday, May 28	Phased and Active Arrays in the 1990s and Beyond
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Guest Programs

9:30 AM to 3:30 PM

GA	Tuesday	City Sights – Tour includes Cabrillo National Monument, Harbor & Shelter Islands, Gaslamp District, Old Town, Harbor Cruise, Lunch in La Jolla
GB	Wednesday	San Diego Zoo – A behind the scenes tour of the San Diego Zoo with lunch to follow at Cafe del Rey Moro in historic Balboa Park
GC	Thursday	Tijuana – A trip across the border in Mexico for shopping, a trip to Mexitlan, Tijuana's newest attraction and lunch at La Escondida

CONFERENCE HOUSING INSTRUCTIONS

1994 IEEE MTT-S INTERNATIONAL MICROWAVE SYMPOSIUM



MTT-S • MMWMC • ARFTG • NTC



May 23-27, 1994

Hotel locations and rates are shown on the reverse side of this form.

**To make your reservations for MTT-S 94 call:
1-800-4-SANDIEGO (1-800-472-6343)**

6:30 AM – 5:00 PM PT

Reservations must be made by April 22, 1994

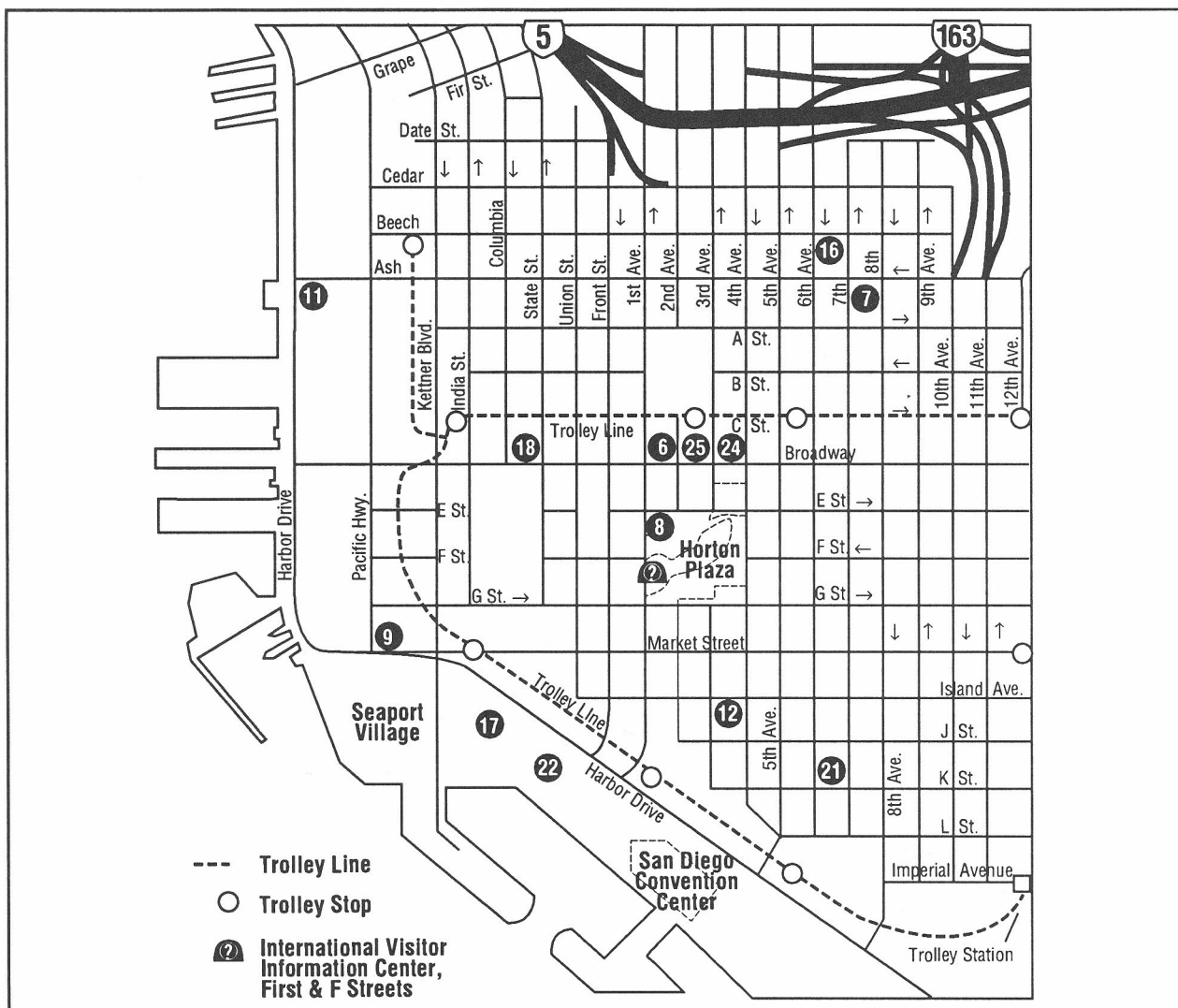
PLEASE HAVE THE FOLLOWING INFORMATION AVAILABLE
PRIOR TO CALLING FOR RESERVATIONS:

1. Name of Convention
2. 1st, 2nd, 3rd Choice
3. Arrival/Departure Dates
4. Number of Rooms Required
5. Type of Room: single, double (cityview, bayview – Marriott only)
6. Number of Persons in Party
7. Name of All Occupants of Room(s)
8. Company Name
9. Address
10. Daytime Telephone Number
11. Credit Card Type, Number and Expiration Date

All changes/cancellations prior to 4/22/94 should be made directly with the HOUSING BUREAU. After this date, please contact the HOTEL directly with any changes or cancellations. **Room cancellations must be received by assigned hotel at least 72 hours prior to arrival for refund.**

Confirmations will be sent to you from the Housing Bureau. **A deposit is required.** In order to guarantee a reservation without a credit card, send deposit amount indicated on the confirmation form directly to the hotel within 15 days of receipt of the confirmation.

International delegates may make reservation by FAXING their information listed above to CONVENTION HOUSING's 24-hour fax number (619) 596-0216. A written confirmation will be faxed back to you. Please be sure to include your fax number.

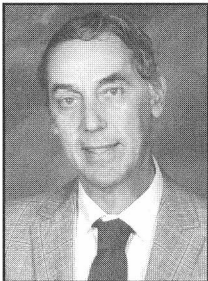


Conference Housing Hotels

Map Ref.	Conference Hotel	Single	Double	*Gov't Rates
6	Bristol Court	\$ 90.00	\$ 95.00	Yes
7	Comfort Inn	\$ 58.00	\$ 58.00	No
8	Doubletree	\$ 99.00	\$ 99.00	Yes
9	Embassy Suites	\$115.00	\$125.00	Yes
11	Holiday Inn	\$ 93.00	\$ 93.00	Yes
12	Horton Grand	\$ 89.00	\$ 99.00	Yes
16	Howard Johnson	\$ 69.00	\$ 69.00	No
17	Hyatt (Bay views)	\$145.00	\$145.00	Yes
22	Marriott (City/Bay views)	\$130.00/\$145.00	\$130.00/\$145.00	Yes
18	Pan Pacific	\$ 99.00	\$ 99.00	Yes
21	Ramada	\$ 95.00	\$ 95.00	Yes
24	U.S. Grant	\$ 95.00	\$105.00	Yes
25	Westgate	\$115.00	\$115.00	Yes

*A limited number of rooms at Government rates are available as indicated.

1994 International Microwave Symposium Local Arrangements



by Dave Rubin
Local Arrangements Chairman

San Diego Area Information

With all the news of earthquakes and fires in southern California, it behooves me to tell you that San Diego is not like Los Angeles. Our fires normally occur in unpopulated areas and we never get big earthquakes. Yes, you can feel them when they happen 100 miles away, but that's the extent of it.

Now that I've gotten that off my chest, let me tell you a little about San Diego, called by the city boosters "America's Finest City."

I. Weather: We certainly have America's finest climate. Expect May weather in the low 70's with morning haze but no rain. We get about 9 inches of rain each year.

II. Attractions: The San Diego Zoo, the Wild Animal Park, the S.D. Aerospace Museum, the Reuben E. Fleet Space Theater, Sea World, the new aquarium at Scripps, Old Town, Coronado Island, UCSD, Baja, Mexico. There's plenty to see and do. The San Diego Visitors' Bureau has a booth at the Convention Center so you might want to check there for brochures and events.

III. Hotels: Our hotel block is with the major hotels (and two motels) that are easily accessible with the San Diego Trolley (free passes to full registrants). The Marriott Hotel, adjacent to the Convention Center, has won awards for its architectural beauty. The Hyatt, the next closest hotel, is the newest in San Diego. Downtown the Westgate and U.S. Grant are famous for decor and restaurants. The two Victorian hotels, The Bristol Court and Horton Grand, will be a delight to those who enjoy beautiful antiques. The Doubletree and the Pan Pacific are modern. Embassy Suites have two rooms. The Embassy, Bristol Court and the two motels (Howard Johnson and Comfort Inn) provide breakfasts. The Ramada and the Holiday Inn on the Bay offer good accommodations at relatively low rates.

IV. Transportation: Only 4-5 miles exist between the airport and the convention hotels. Preferred transportation is by taxi (\$6-7) or the "Super Shuttle" (\$4-5). There is also a city bus (\$1.50) that stops at one location downtown.

All regular attendees (3 days or more) will be given a trolley pass that will provide transportation between

(continued on page 22)

1994 IEEE Microwave and Millimeter-Wave Monolithic Circuits Symposium San Diego, CA May 23-24, 1994

by Dr. Sanjay Moghe, Publicity Chairman
and Mr. Richard Gold, General Chairman

This year's Microwave and Millimeter Wave Monolithic Circuit (MMWMC) Symposium will be held on May 23 and 24 in San Diego, California, in cooperation with the International Microwave Symposium, (IMS), to be held on May 24, 25 and 26. The Technical Program Committee has organized an outstanding program consisting of contributed and six invited papers, as well as a panel session on the millimeter wave subject, "Can Millimeter-Wave Products be used for Dual Use?" In addition to these activities, a workshop on Wireless Communications has been planned.

The theme of this year's Symposium is the Wireless Communication applications of monolithic circuits. This theme is highlighted by the six invited papers. Ron Eward of Martech will give an overview of trends in international telecommunication markets; David Skellern of HP Labs will discuss high-speed wireless LANs; SiGe Heterobipolar Technology for Wireless Applications will be described by Christiann Kermarrec of Analog Devices; while Julio Costa of Motorola will speak on Si bipolar and MOS technologies for wireless applications; Phil Snow of TriQuint will talk about their business in the wireless side; and George Ponchak of NASA will discuss the development of a GaAs MMIC reliability and space qualification guide. All these papers should be of interest to the MMIC community because they represent areas of significant potential growth for MMICs.

The topics of the regular sessions are The Brave New Wireless World, RF Transceiver ICs, Millimeter-Wave MMICs I, RF MMIC Power Amplifiers, Millimeter-Wave MMICs II, RF Subsystems, Amplifiers & Transceivers, Signal Control Circuits, Millimeter-Wave Receiver MMICs and Novel Monolithic Technology.

A lunch time panel session will be held on Monday, May 23. The topics to be discussed are wireless communications, radar collision warning system, millimeter-wave imaging and other selected products. The theme of the panel is to address issues for dual use of millimeter-wave products. Are millimeter-wave products successfully being used in the commercial market? If millimeter-wave products are not being used, what does it take to create a market and when?

On Sunday, May 22, a workshop is planned which is jointly sponsored by MMWMC Committee and MTT-S

(continued on page 22)

Guest Program



by Barbara Levy
and Jan Clavin
(no photo available)

San Diego, the second largest city in California and the sixth in the United States, offers miles of beaches, mountains, deserts, and nearby Mexico. The city itself sparkles with diversity, outdoor life, a rich bicultural heritage, and a sophisticated cultural and evening life. We hope the program we have planned for you will allow you to sample and enjoy the many unique and special attractions San Diego has to offer.

The Guest Hospitality Suite will be at the Marriott Hotel and Marina, and will be open Monday through Friday from 8:00 AM until 5:00 PM. A continental breakfast will be available in the morning, with coffee, tea, soft drinks and snacks in the afternoon. The Marriott Marina is next to the Convention Center and within walking distance of many other hotels. Visitor guides, maps and brochures will be available in the hospitality suite, as well as hostesses to answer your questions.

Organized tours have been arranged for Tuesday, Wednesday and Thursday departing from the Marriott Hotel and Marina at 9:30 AM and returning at 3:30 PM.

On Tuesday, May 24, enjoy "America's Finest City" including Cabrillo National Monument, Harbor and Shelter Islands and the newly restored Historic Gaslamp District. This tour includes a one-hour harbor excursion along San Diego Bay, a drive through Old Town State Historic Park and a delicious California style lunch at George's at the Cove in La Jolla. This tour wraps up with a shopping spree on Prospect Street, featuring various boutiques, import shops, galleries and specialty food shops.

On Wednesday, May 25, special arrangements have been made to go behind the scenes at the San Diego Zoo, providing a fascinating look at how the zookeepers care for one of the world's rarest collections of animals. It includes free time to explore the zoo, lunch at Cafe Del Rey Moro, and free time to explore Balboa Park with its museums, renowned theaters, romantic Spanish Colonial architecture and roving entertainers.

On Thursday, May 26, our tour takes us to Tijuana which is just across the international border and offers the excitement of travel to a foreign country. Guests will stop at Mexitlan, "The Land of Mexico" and Tijuana's newest attraction. Tijuana's status as a tax-free zone has created a shopper's paradise. Designer boutiques, including Ralph Lauren and Guess, offer the latest fashions at incredible savings. Lunch and a welcome margarita will be enjoyed at La Escondida Restaurant.

Each guest is permitted to return with up to \$400 worth of merchandise, tax free, and up to one liter of alcoholic beverages. U.S. and Canadian citizens need a picture ID only. Non-US citizens need a valid passport with a multi-entry Visa stamp.

San Diego's moderate relatively climate contributes to an informal life-style; casual attire is the norm for southern California. For the tours we suggest you wear comfortable walking shoes.

IMS Local Arrangements

(continued from page 21)

the Convention Center and locations near the convention hotels. The pass will be good Monday—Friday, May 23-27. Single-trip downtown trolley tickets can be purchased for \$1.00 at automated machines at the various stops. The trolleys leave every 15 minutes during the daytime and every half hour from 8 PM—midnight. You'll be given a downtown map showing the hotel and trolley stops. These stops are announced over a speaker system a few seconds before arrival. It is important that attendees consult the map and listen for the appropriate stop.

V. Food: There will be food concessions at the rear of the exhibit hall as well as a restaurant on the mezzanine level. The Marriott Hotel (the convention hotel) is only a couple of hundred feet away and has some very nice (somewhat expensive) restaurants. A few blocks further north on San Diego Bay, west of the Hyatt, is Seaport Village. Lots of restaurants, as well as fast food, are in this area. The restaurant at the top of the Hyatt has the best view in town. The Kansas City Barbeque, across from the Hyatt, was made famous by the movie "Top Gun." Just east of the Convention Center is Gaslamp Quarter, reminiscent of early 1900's San Diego, with an abundance of eating and drinking establishments. Two of San Diego's finest restaurants are downtown at the Westgate and U.S. Grant hotels.

VI. Dress: Most southern Californians dress casually. Wear suits and ties if you must, but expect a number of us to wear short sleeves and open collars.

IEEE Symposium

(continued from page 21)

technical committees such as microwave systems, and microwave and millimeter-wave integrated circuits. The topics include system concepts and applications, and MMICs and components.

On behalf of the Steering Committee, we invite you to attend the 1994 MMWMC Symposium. We are sure that you will find the papers and panel session valuable and stimulating. The symposium registration and hotel reservation forms can be found in the forthcoming issue of Microwave Journal as well as in the MMWMC Symposium and MTT-S Symposium abstract booklets. If you have suggestions or comments about the Symposium, please feel free to talk to us at the Symposium or write to us at the address shown on the Call for Papers announcement.

Invitation

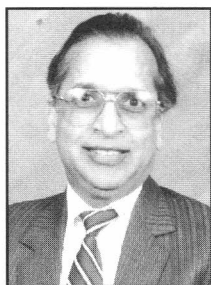
MTT-S members who are Professors, Lecturers or Teachers at a University or College are cordially invited to a lunch meeting at the International Microwave Symposium in San Diego to inaugurate the

MTT-S AdCom Membership Services Committee Campus Liaison Program

Please reply to:

Dr. Roger D. Pollard
Department of Electronic and
Electrical Engineering
The University of Leeds
Leeds LS2 9JT, UK
fax: Int +44 532 332032
e-mail: r.pollard@ieee.org

1994 MTT-S Symposium Open Forum



by Jitendra Goel

I strongly feel that "Interactive" is the more appropriate name for this forum, because this provides you the opportunity to have a face to face interaction with the authors for up to two and a half hours in a comfortable, informal atmosphere. Technically, you will find this forum more stimulating compared to the regular oral presentation where you barely have enough time to ask just one or two formal questions. This year's Technical Program Committee has selected 131 technical papers for this forum including 13 from the MMIC Symposium. The presentations are not limited to the posters only, but will feature video taped presentations, computer simulations and even hardware demonstrations. All the authors will be on hand to discuss any detail you would want to know about their work.

The open forum will be held in two sessions on Tuesday and Wednesday afternoons in a very spacious area in the convention center where you can browse among the presentations and get the cramps out after sitting in oral sessions all day. For your convenience, papers will be grouped by topic and their location will be clearly displayed at the entrance. Open forum papers have been scheduled to ensure they will not conflict with the oral presentation on the same topic.

I look forward to your participation in this opportunity of one-on-one interaction with the presenters.

Notice

Chaos in Microwave Circuits

by Roger Kaul

At the last TPC-16 (Microwave Systems) meeting I suggested that a special session or workshop on Chaotic Processes in Microwave Systems and Components be held at a future symposium. The general feeling was that there was so little understanding of the chaos among the microwave community that I write a tutorial on the subject for the MTT Newsletter. Unfortunately, although I have observed chaotic behavior in a microwave limiter filter circuit, I am clearly not qualified to write such an article. However, the *IEEE Spectrum* has recently published an excellent article on chaos ("Keeping Chaos at Bay," E.R. Hunt and G. Johnson, *IEEE Spectrum*, Vol. 30, No. 11, November 1993, pg. 32), the special issue of the *IEEE Proceedings* (ed by L.O. Chua), August, 1987), and numerous recent books contain interesting tutorial material about chaos in electrical circuits. Therefore, I am just writing this notice. I am interested in organizing a special session or workshop on chaos processes in microwave systems and components at the 1995 IEEE Symposium in Orlando, Florida. I would like to develop a list of potential participants for such a session/workshop to be presented at the TPC-16 meeting in 1994. Any MTTers who would be willing to present a paper or at least a few viewgraphs of their chaos work as it relates to microwaves, please contact me before the 1994 symposium. I can be reached via e-mail rkaul@arl.army.mil, fax (301) 394-4703, voice (301) 394-4775, or mail to Roger Kaul, A.R.L./AMSRL-WT-NF, 2800 Powder Mill Road, Adelphi, Maryland 20783.

1994 Committee Directory UPDATE

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Dr. S. Michael Saad
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Phone: (909) 980-8888
fax: (909) 980-0735

Dr. Klaus Schroeder
North American Antenna Corp.
2540 Villa Franca
Riverside, CA 92503
Phone: (909) 353-8640

1994 IEEE National Telesystems Conference

New Horizons for Advanced Telesystems Applications

NTC '94 will be held concurrently with the MTT-S International Microwave Symposium, May 25 and 27, at the San Diego Convention Center. The program overlaps the IMS program on May 26 and includes joint sessions with IMS in systems applications of active and phased array technologies and communications systems. The theme of NTC '94—"New Horizons for Advanced Telesystems Applications"—builds on the theme of NTC '93—"Commercial Applications and Dual Use Technology." The program features applications of telesystems using advanced MMIC, microwave, and system design technologies. The Opening Session will feature invited papers on commercial applications of dual-use technologies and active electronically scanned phased array antennas. The program includes regular sessions on:

- Active Array Systems
- Aircraft Navigation Systems
- Air Navigation and GPS
- Communications Systems
- Transportation Systems
- Satellite Communications Systems
- Infrared Sensor Systems
- Telerobotics
- Telesystems Architectures
- Systems Simulation and Modeling
- Simulation Diagnostics

At the May 26 NTC '94 luncheon, Rear Admiral John J. Donega, USN, Commander of the Naval Command Control and Ocean Surveillance Center, will present a talk centered around the conference theme on dual-use technologies. On May 27, NTC '94 will have the opportunity to tour an AEGIS cruiser, including the phased array radar AN/SPY-1 radar system. On May 28, a short course entitled "Phased and Active Arrays in the 1990's and Beyond" will be presented. NTC '94 is a part of MICROWAVE WEEK. In addition to joint sessions with IMS, there are workshops on a variety of system topics. All of these activities make for an exciting week in San Diego, culminating with NTC '94.

NTC '94 offers a focused "short-course" on practical, business-oriented telesystem applications. For more information (including a copy of the Advance Program to be mailed in mid-March) please contact Bob Bolger, ARINC Research Corporation, San Diego, (819) 222-7447, fax 225-1750, INTERNET rbolger@arinc.com.

Call for Papers MTT-S International Topical Symposium "Technologies for Wireless Applications"

To complement the annual International Microwave Symposium, the Microwave Theory and Techniques Society of the Institute of Electrical and Electronics Engineers is sponsoring a series of International Topical Symposia in areas of special interest to its membership. The first of these Symposia is scheduled to be held 21 to 23 February, 1995, in conjunction with INTER COMM 95 in Vancouver, B.C., Canada.

The topic of this symposium, *Technologies for Wireless Applications*, is intended to highlight the application of RF, microwave and millimeter wave technologies to all aspects of wireless communications. Contributions of original work are solicited in the field of wireless applications, including personal communication systems, local and wide area networks, stationary and mobile communication systems, global positioning systems and others. Areas of special interest include, but are not limited to:

- System Design Tradeoffs
- Antenna and Path Design
- Devices and Circuits
- Components for Consumer Products
- High Speed Digital Processing
- Design for Manufacturing
- Manufacturing Technologies
- Packaging and Interconnection Technologies.

Prospective authors are requested to submit 10 copies of both, a 50 word abstract and an extended Summary (not to exceed 1000 words) with supporting figures, clearly stating the significant contribution, to be sent to:

Dr. George L. Heiter
c/o LRW Associates
1218 Balfour Drive
Arnold, Maryland 21012, USA
Tel: (410) 647-1591
fax: (410) 647-5136.

A separate cover sheet should include the name, address, telephone and fax numbers of the corresponding author.

Deadline for the receipt of papers is 29 July 1994. Notifications to authors of accepted papers will be mailed by 29 August 1994. For the Digest of Papers, an archived and copyrighted publication of the IEEE which will be available at the Symposium, authors are expected to provide a camera ready manuscript by 21 October 1994. (Instructions for its preparation, including a copyright release form, will be provided).

Emerging Technologies

by Jitendra Goel

The Winter Technical Meeting was held on January 8, 1994, in San Diego, California. All the Subcommittee chairs were invited to submit their inputs for presentation. Only ten out of eighteen decided to submit a summary of emerging and advancing technologies in their areas. All the inputs were evaluated by a committee and time allocated according to the importance of the material. Martin Schneider, our distinguished lecturer was invited to give the opening talk. It was clear from the presentations that with the decline in the military budgets, most microwave companies are looking into the commercial applications. The general consensus was that the communication field is the largest single growing area, which will dominate the microwave field in the 90's. "It is a volcano, getting ready to erupt." This article will only cover the presentation related to the future communications area and the emerging technologies in the other areas will be covered in the next issue of the Newsletter.

As we approach the end of this century, wireless communication is becoming the most pervasive and fastest growing technology, said Martin Schneider. "We expect that the growth will be further enhanced by the creation of the information super highway and the development of an Intelligent Vehicle Highway Systems (IVHS). Microwave & MMW technologies will play a crucial role in the realization of wireless & fiberless links that will link people to people and people to machines at an affordable cost, thus enhancing economic development and growth." He mentioned that it is only recently that wireless means of communication have become economically so attractive that, "to be or not to be reachable anytime, anywhere," is becoming an option and a reality. This objective is being facilitated by the allocation of portions of the radio spectrum for 38 terrestrial and space radio communication services defined by the International Telecommunication Union. Additional frequencies are being allocated for domestic and worldwide markets for new wireless personal communications services (PCS) and for fixed wireless access networks (LANs, MANs, and WANs). Other major factors are advances in miniaturization (VLSI, MMIC), multiple access techniques (CDMA, TDMA), and the evolution from microcells to macrocells and even further to femtocells.

Some new telecommunications ventures which will require the expertise and active participation of microwave engineers are these seven global satellite-phone projects: Iridium 66, Inmarsat-P, Globalstar, Odyssey, Ellipsat, Constellation Communications, and Calling Communications. Contributions by the microwave engineering community will also be crucial for improving the performance of base stations and terminals needed for providing cellular, telepoint and cordless services. Technologies that permit the miniaturization and cost

reduction of cellphones and base stations are ceramic chip filters, homodyne mixers and direct conversion receivers, monolithic and hybrid transceivers, and new types of directional or isotropic antennas. Work in these fields is supported by the growing availability of advanced software tools permitting the design and accurate simulation of devices, circuits and systems.

Mike Golio of Motorola mentioned that, "A major driver for wireless equipment is the need to reduce the size and weight while increasing battery life time." In order to accomplish this task, designers must develop low power/low voltage microwave circuitry. Efficient low voltage design requires specific consideration be given to device development, circuit topology selection and device modeling.

In the device area there are many issues related to low voltage requirements that affect the development of an optimum device. A small signal device operating at low voltage/low power will be affected more dramatically by both the sub threshold behavior and the parasitic resistances of the device than the same device operated at higher power/voltage levels. Similarly, parasitic resistance and breakdown characteristics will be much more significant for low voltage power transistors than for more conventional applications. Since a typical microwave transistor exhibits greater than 2-to-1 degradation in high frequency performance when current is reduced from class A bias levels to those required for low voltage applications, devices must be designed with this in mind.

The circuit topology selection is also affected by the low voltage constraint. With limited voltage available, each device requires that the total supply voltage be applied across its drain-source or collector-emitter terminals. Conventional active bias schemes which apply supply voltage across multiple devices are not effective. In the case of power amplifiers, low voltage operation implies high peak currents and designs that adopt load lines which permit this behavior.

In the modeling area the existing conventional device models are also inadequate for low power/low voltage applications. In particular, devices in low power circuitry often operate in the sub threshold region of the device. This behavior is poorly described by conventional models. Improved breakdown voltage models also become critical for low voltage power amplifier development, since gate-drain breakdown is a key driver of amplifier efficiency.

He concluded his discussion by summarizing the latest results in this area. "There has been significant progress made in the area of low power/low voltage microwave circuitry in recent years. The power consumption of microwave LNAs has been decreasing by approximately an order of magnitude every five years since 1984. Low voltage power amplifier results include 5.8 volt, 32 dBm output power with 13 dB of gain and 78% efficiency. Best reported results at 3 volts bias

(continued on next page)

Emerging Technologies

(Continued from previous page)

with similar power and gain levels exhibit 60% efficiency."

The technical committee on Microwave Systems also iterated the theme of Communications and made several presentations including the one on Mobile Communications. Bernie Geller commented on this important part of the communications as follows.

"Mobile satellite systems may be categorized, at least architecturally, as being fundamentally geostationary or low-earth-orbit." The services that they provide range from voice telephony and data communications to position determination and data collection and control functions. He described the different access formats. They are Frequency Domain Multiple Access (FDMA), Time Domain Multiple Access (TDMA), and Code Domain Multiple Access (CDMA). In FDMA, individual carriers are assigned specific, unique, frequency bands within the satellite total bandwidth. All frequency components related to that carrier must fall within that relatively narrow bandwidth in order to avoid distortion and cross-modulation. In TDMA, customers can have access to the entire transponder band, but only for short periods of time. In CDMA, the individual signals are assigned a unique digital modulation code and the resultant signal is spectrally distributed over a broad bandwidth along with other signals. In FDMA the signal is reconstructed by filtering in the frequency domain, in TDMA in the time domain, while in CDMA the signal is reconstructed by cross-correlation of the received signal with the modulating code."

"Probably the most anxiously-awaited service from the proposed mobile systems is personal global voice communications" Geller mentioned, but he also warned, "Setting aside some of the technical hurdles to be overcome in realizing this goal, which are not insignificant, there are other jurisdictional, regulatory, financial, and political issues to be addressed and solved."

Some of the major players in the mobile satellite sweepstakes are Indium (66-satellite LEO system), INMARSAT (undecided), American Mobile Satellite Corp. (GEO), TRW's Odyssey (12-satellite MEO system), Globalstar (28-satellite LEO), Ellipsat (166-satellite elliptical orbit), Celsat (3-satellite), Constellation Communications, Inc. (N/A), and Calling Communications (840-satellite LEO system). Many of these systems are in an advanced state of development and procurement.

The objective of these systems is to build in overall system reliability, primarily through system design and redundancy, and reduce costs, primarily through the use of low cost technologies and manufacturing methods for both satellites and hand-held units.

The task of providing commercial quality hardware with high reliability at affordable cost, as well as consumer quality applications at extremely low cost is a major challenge ahead of today's microwave engineers.

Temple of Doom

(continued from page 10)

master so well. Milo noticed Neil's response and turned around to see me. His face dropped. He was probably worried that I was going to muscle in on his free lunch. In fact, Neil's first words were: "Mike, can I take ya to lunch? We have a lot to talk about." The thought of spending an hour listening to Milo and Neil plot and scheme turned my stomach. My mind raced. Would Neil believe that I had given up eating? Was it too late to return to the poison gas? I opted to avoid the question and begin discussing my equipment needs.

Eventually, we had covered all the necessary issues. I gave Neil a precise list of equipment that I needed. As he looked over the list, he commented, "Mike, I think we need to put some lab stools on this order . . . I'm just worried about your success. What will happen if you get this equipment and you can't sit down to use it? Why, you know, last week we sold Bubba Auto several of our most comfortable chairs." He droned on for some time about the need for stools.

I assured Neil that most of the people in my organization had been sitting down on the job for years. But the battle wasn't over. Neil was determined to either sell me some lab stools, or take me to lunch. I was about to panic when Bobby Unkle walked into the lobby. Bobby is a program manager from a company down the street. When he saw me, he walked over to let me know he had read my last Newsletter article. It seems he was interested in writing a book.

"I've been thinking about writing a book for a long time," he said. "I write a lot—mostly memos. Do you think IEEE Press would be interested in my stuff?"

MTT-S Membership Services

(continued from page 12)

financial support along with MTT-S. Contact Rolf Jansen for additional information.

Chapter Financial Support

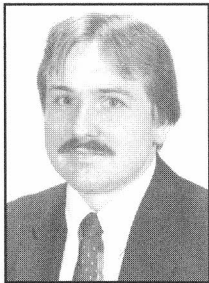
All chapters should take full advantage of the financial support available from MTT-S. The following is a brief summary of this financial support available on a yearly basis.

- MTT-S only Chapter
\$1,400.00/YR = \$500 General Chapter Support + \$700 Travel + \$200 Workshop
- MTT-S Joint (other society) Chapter
\$1,250.00/YR = \$350 General Chapter Support + \$700 Travel + \$200 Workshop

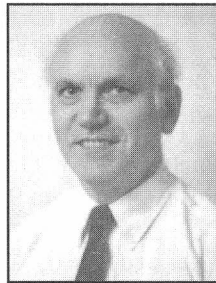
Please refer to the MTT-S Chapter Officers Handbook 1993-94 for eligibility, information, etc. Submit funding requests through Samir El-Ghazaly using the forms provided in the handbook. Remember, we can only provide this support if you request it.

It is the objective of the Membership Services Committee to administrate the services MTT-S provides to its members and chapters and to continually try to make improvements. Please feel free to communicate with any of us if you need any information, assistance or have any suggestions relative to MTT-S activities or benefits.

e-mail and the MTT



Fred Schindler



Roger Pollard

You may have noticed e-mail mentioned more and more in the *Newsletter*. In part this is merely a reflection of our professional lives, E-mail is being used more and more by Microwave Engineers. But there's more to it than just that. We recognize that E-mail affords us new opportunities to serve our members. We're just getting started, but already it is clear that E-mail will be a powerful tool to improve the way MTT does many things and new means to provide members with tangible benefits.

In 1993 many AdCom members started to adopt E-mail as a convenient means of communications with one another under the encouragement of 1993 MTT President Peter Staecker. In 1994, MTT President Jim Crescenzi appointed an AdHoc Committee on Electronic Communications to expand the Society's use of E-mail as well as to establish other electronic facilities such as bulletin boards and conferencing. A number of services have already been established, and more are in the works. We're also interested in hearing your ideas.

How to Get Started

If you don't use E-mail yet, you'll probably find it easy to start. E-mail messages are sent over the Internet, the global electronic communications network. Just about every large company and university has an Internet gateway, and the computer network experts there can easily set you up. If you don't work for a company that has a gateway, your affiliation with a university may be enough to get you an account there. Beyond that there are lots of paid services that can give you access. To find out more, read "Cheap and Easy E-mail," an article by Steve Maas on page 27 of the previous issue (Winter 1993) of the *Newsletter*.

The IEEE is also making extensive use of E-mail. A good way to find out about IEEE E-mail capabilities is to send an E-mail message to e-mail.guide@ieee.org. The IEEE E-mail facility can also be used to forward mail. We've been encouraging AdCom members and other involved MTT members to establish an IEEE alias. If you look at our E-mail addresses below, you'll notice that they're simple and easy to remember. They're actually IEEE aliases which forward our mail to our

actual (and more complicated) addresses. The benefits of the alias should be clear. To find out more, send us a message.

What's Available Now?

An E-mail address has been established for forwarding general MTT questions. If you don't know who to ask, send an e-mail message to "soc.mtt@ieee.org" and it will be directed to the appropriate AdCom person.

A number of MTT specific Auto-response files have been set up, or are in the process of being set up. These files contain information on specific topics of interest to MTT members. To access a specific file you send an E-mail message to the file's address, and the information is sent back to your E-mail address.

info.mtt@ieee.org

index of MTT information (this list)

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list of AdCom members and their responsibilities

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names, addresses, fax, e-mail

info.mtt.ims.call4papers@ieee.org

call for papers for the next Symposium

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steering committee for the next Symposium

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text of the *Newsletter*

info.mtt.conferences@ieee.org

calendar of conferences with MTT involvement

info.mtt.bylaws@ieee.org

text of the MTT Bylaws, Constitution, Procedures

info.mtt.techcomm@ieee.org

MTT Technical Committees organization

info.mtt.chapters@ieee.org

MTT Chapters organization

info.mtt.awards@ieee.org

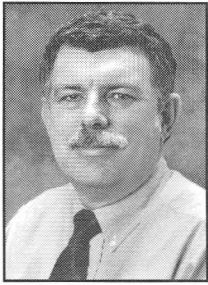
MTT awards and eligibility criteria

Not all of these are operational yet and we're working on new ones; so send a message to info.mtt@ieee.org for the latest list. We're also interested in your suggestions; let us know of any Auto-response files you would find useful.

(continued on page 29)

ARFTG Highlights

Spring '94



by John T. Barr, IV

The Automatic RF Techniques Group (ARFTG) is an independent professional society that is affiliated with MTT-S as a conference committee. ARFTG's primary interests are in computer-aided microwave analysis, measurement and design. ARFTG holds two conferences each year, one in conjunction with the MTT-S International Microwave Symposium and a second in the later fall.

42nd ARFTG Conference *RF and Microwave Testing for Commercial Applications*

The 42nd ARFTG Conference was held in San Jose, California, on December 3 and 4, 1992 hosted by Allen Rosenzweig. The theme of the conference was *RF and Microwave Testing for Commercial Applications*. In attendance were 70 paid technical attendees plus 12 exhibits that were in the concurrent exhibitor's room. The conference focused on the testing needs of commercial RF wireless applications and on-wafer systems. Below is a list of the presented papers:

- *Wireless Market: Implications for RF Test and Measurement*, B. Berson
- *X-Band Insertion Loss Process Control Measurement Systems*, J. Shurtleff
- *Characterization of Electromagnetic Software*, J. Rautio
- *Current Developments in 3-D Planar Electromagnetics*, J. Rautio
- *TEMS-Total Engineering for Microwave Semiconductors*, E. Daw
- *A Pulse Bias/RF Environment for Device Characterization*, B. Taylor
- *A Combined Measurement Stand for Linear, Non-Linear and Noise Measurement of Microwave Devices and Circuits*, B. Roth
- *LRM Probe-Tip Calibrations with Imperfect Resistors and Lossy Lines*, D. Williams
- *Techniques for Automated On-Wafer Measurements of Sub 30 pS Pulse and Data Amplifiers*, R. Fisher
- *NIST Method for Verification of On-Wafer Calibration*, R. Marks

- *Verification of LRRM Calibrations with Load Inductance Compensation for CPW*, J. Pence

Workshops

- *Global Standardization of On-Wafer Calibration*, D. Williams
- *Strategies for Reducing the Cost of RF Test*, J. Grubb

The Conference Chair was Kevin Kerwin, Hewlett Packard—MWTG, 1400 Fountaingrove Parkway, Santa Rosa, California 95403, phone (707) 577-4061, fax (707) 577-4787 and Conference TPC was John Grubb, Hewlett Packard—MID—IURM, 1212 Valley House Drive, Rohnert Park, California 94928, phone (707) 794-4474, fax (707) 794-3844. A post-conference digest is available, contact: Henry Burger, ARFTG, 1008 East Baseline Road, No. 955, Tempe, AZ 85283-1314. Cost is \$20.00 for an ARFTG Member and \$35.00 for a non-member. An additional \$9.00 is requested for airmail outside the USA.

One of the more enjoyable activities of any professional organization is the recognition of outstanding achievement. During the 42nd Conference, ARFTG recognized; Richard Q. Lane with the Automated Measurements Career Award and ARFTG Honorary Life Membership; James C. Rautio with the Automated Measurements Technology Award; and Service Awards for Robert M. Judish and James C. Rautio.

43rd ARFTG Conference *Improving Performance and Quality of Automated Microwave Test Systems*

The 43rd ARFTG Conference will be held in San Diego, California at the San Diego Marriott Hotel and Marina on May 27, 1994, as part of 1994 MTT-S International Microwave Week. The theme of this one day technical conference with concurrent manufacturer exhibits will be *Improving Performance and Quality of Automated Microwave Test Systems*. The need to remain competitive in more demanding markets and to meet increased customer requirements made it necessary for many suppliers of automated microwave test systems to take an in-depth look at their products and services with resulting improvements in both performance and quality. The current market is also international so that new standards such as ISO 9000 must be met. Papers are invited which identify problems and/or solutions in this area. In addition, papers concerning all other areas of microwave measurements and design are welcome.

Those interested in participating should contact Conference Chair: Patrick Nolan, Lockheed Missile & Space, O/48-70 B/1958, P.O. Box 3504, Sunnyvale, California 94088-3504, (408) 756-2144 or Conference TPC: S.D. Phleger, TRW Space Electronics Group, MS S/2767, One Space Park, Redondo Beach, California 90278, (310) 812-4667. Deadline for paper submissions is March

(continued on page 29)

ARFTG Highlights

(continued from page 28)

30, 1994. Also, see the IMS-1994 registration materials for more information concerning times and location.

Along with the technical presentations, the attendees will have ample time for informal discussion among themselves during the breaks and during the provided lunch. There will be time for discussion with vendors and viewing of exhibits to see the latest in automation and measurement products., The registration fee includes technical sessions, exhibits, lunch and break refreshments, one year membership in ARFTG and a post-conference digest of the presented papers.

Looking Forward to the Future 44th ARFTG Conference Scalar Measurements

The 44th ARFTG Conference will be held in Boulder, Colorado, on December 1 & 2, 1994. The theme of this two day technical conference with concurrent manufacture exhibits will be Scalar Measurements. Those interested in participating should contact Conference Chair: Michael Caldwell, Scientific Atlanta, M/S ATL-11Q, 3845 Pleasantdale Road, Atlanta, Georgia 30340-4266, phone (404) 903-2141, fax (404) 903-216. Deadline for paper submissions will be approximately September 15, 1993. Potential presenters should request the ARFTG Author's Preparation Package. Also, see the ARFTG/IMS-1994 San Diego registration materials for more information concerning times and location.

EXCOM Activities

At the San Jose meeting elected or reelected to three year EXCOM terms were Raymond Tucker, John Barr, Edward Godshalk, and Ken Wong. In addition, EXCOM officer elections were held and officers elected were Gary Simpson as President, Kevin Kerwin as Vice-President, Jim Taylor as Treasurer, and Pat Nolan as Secretary.

Measurement Professional? or Interested in Learning More?

We will be looking forward to discussing the latest in measurement automation and accuracy with you in San Diego or Boulder. ARFTG brings you the latest in RF, Microwave and Millimeter wave analysis, design and measurement. State of the art papers are presented twice a year. If you are involved in automated measurement techniques, come and join your peers and keep current with our ever-evolving technology. For more information on ARFTG or future conferences, write: John Barr, Santa Rosa System Division—3US-Q, Hewlett-Packard, 1400 Fountaingrove Parkway, Santa Rosa, California 95403.

e-mail and the MTT

(continued from page 27)

1994 Goals

For 1994 we have some specific goals that are listed below. Our long term goal is to make communication between members more efficient and to provide members with new benefits.

- Establish MTT Auto-response files. These are the MTT information files listed above.
- Establish routine E-mail communications for MTT Chapters. The Chapters are one of MTT's most important assets. They provide numerous services and benefits to the members. Our goal is to provide every Chapter Chair and Vice-Chair with E-mail access so they can communicate more efficiently with one another, with Chapter Activities, and with their members. If you're a Chapter Chair or Vice-Chair and you are already an E-mail user, please let us know your E-mail address.
- Establish an MTT Conference Usenet Newsgroup. This would be a forum for members to post information, to discuss technical issues or to debate policy issues. Stay posted for further details.
- Make E-mail the routine means of communications for AdCom. We hope to improve the efficiency with which we work so that we can spend more time on providing tangible benefits to members.

1994 and Beyond

We think that by increasing our use of E-mail and taking advantage of what E-mail has to offer; we can provide real tangible benefits to fellow members. Our 1994 goals should be just the beginning. We plan to extend what we're doing in 1995. We plan to make E-mail Communications a routine part of AdCom, the Chapters, the Technical Committees, the IMS Steering Committees and all other parts of our Society. We want to make all MTT information conveniently available to our members. And we want to make E-mail a convenient way for members to exchange information and ideas.

We'd also like to know who's out there. If you're already involved in the MTT, in the Chapters, the Technical Committees or in some other capacity, send us a message so we'll know your address. We'll be establishing E-mail forwarding addresses for active groups in the MTT, but we need to know your address to include you.

By now we hope you can see the potential benefits to MTT and members by our use of E-mail. You can see where our ideas are taking us, but more and better ideas could take us farther. We value your ideas and comments. Maybe there is something you'd like to do to help. Please send us a message.

To reply send a message to m.schindler@ieee.org or r.pollard@ieee.org.

Waves and Microwaves

(continued from page 13)

The National Telesystems Conference (NTC) is joint with IMS on Thursday and continues on Friday. NTC is sponsoring tours on Friday and a short course on Active Arrays on Saturday. The Automatic Radio Frequency Techniques Group is holding its conference on Friday.

Transportation from the hotels to the convention center will be unique this year. Every registrant of MMWMC, IMS, and NTC will receive a free five day pass on the San Diego Trolley. The trolley is clean, fast, and a pleasure to ride. The trolley loops past the symposium hotels and the convention center every fifteen minutes throughout the day until 8:15 PM and every half hour thereafter until midnight. Also, the pass will permit one to ride free anywhere the trolley goes including Balboa Park, the San Diego Zoo, and to the U.S./Mexico border. One can even take the ferry across the harbor to Coronado Island. Extra five day passes will be available for guests at \$10 each. Incidentally, several hotels are within walking distance of the convention center.

In addition to the Awards Banquet, the Industry Hosted Cocktail Party, and the Microwave Journal Reception (at the San Diego Aerospace Museum), we have planned three special excursions for guests attending the symposium. Tuesday's tour is "City Sights by Land and Sea with Lunch in La Jolla." Wednesday's tour is "Behind the Scenes at the San Diego Zoo with Lunch in Balboa Park." For Thursday, the Guest Program Committee has planned a special trip to Tijuana, Mexico, where one can haggle with the street vendors over the price of their goods. For the individuals and families who prefer to explore on their own, there are unlimited recreational opportunities and historical points of interest.

We have a full spectrum of waves planned for "Microwave Week." Come join us and ride your special wave.



San Diego-Coronado Bay Bridge.

Special Sessions at the 1994 IMS

(continued from page 15)

Impedance-Matching Networks, and Coupling Structures": George L Matthaei, Leo Young and E.M.T. Jones—*H.C. Bell, J. Horton.*

Focused Sessions

These sessions do what they say; they focus attention on emerging technology areas as well as commercial applications. The range of topics offered are stimulating and diversified which will appeal to a broad cross-section of the microwave engineering community. These sessions are interspersed with the regular sessions and are listed below:

Tuesday—May 24, 1994

- TU4D—Acoustic Sensors Devices and Applications—*T. Lukaszek.*

Wednesday—May 25, 1994

- WE1D—Microwave/Millimeter-wave Applications in Personal Communications—*J Horton.*
- WE2D—Microwave/Millimeter-wave Wireless Commercial Applications—*B. Geller.*
- WE4D—Dual Military & Commercial Use: Technologies & Applications—*F. Ali.*

Thursday—May 26, 1994

- TH2D—Integration of Photonic & Microwave Components—*A. Paoletta.*
- TH3D—Commercial Applications of High Power Microwaves—*J. Goel.*

Special Sessions Committee

The Special Sessions Committee is part of the 1994 IMS Steering Committee and consists of the author and the following members who will be assisting the organizers on the days noted so their sessions will run smoothly.

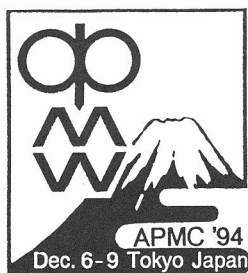
- Gary R. Simpson, Maury Microwave Corp., Workshops/Monday.
- Rick Sturdivant, Hughes Aircraft Co., Workshops/Sunday & Monday.
- Michael Saad, Andrew Corp., Panel & Rump Sessions/ Tuesday, Wednesday and Thursday.

When, Where & What?

We have tried to present above in digested form, the Special Sessions at the 1994 Symposium. For additional information and specific times, please refer to the "Advanced Program" flyer on the "Program" booklet which will be mailed to you soon.

Attending the Special Sessions at the 1994 International Microwave Symposium will be a truly rewarding experience. Try to attend as many as you can to increase your breadth of knowledge and understanding of our dynamic field.

See you in San Diego!



1994 Asia-Pacific Microwave Conference —APMC '94—

December 6-9, Tokyo, Japan

The Institute of Electronics, Information and Communication Engineers

Final Call for Papers

The Sixth Asia-Pacific Microwave Conference (APMC '94) will be held at Nippon Convention Center (Makuhari Messe), Japan, on December 6-9, 1994. This conference is organized and sponsored by the Institute of Electronics, Information and Communication Engineers (IEICE) of Japan, and is co-sponsored by IEEE MTT-S Tokyo Chapter and is cooperatively sponsored by IEEE MTT-S and URSI.

Makuhari Messe is located 20km (30 - minute train ride) east from downtown Tokyo.

CONFERENCE TOPICS

The main conference topics are listed below :

1. Solid State Devices and Circuits
2. GaAs FET, HEMT, HBT and other Devices
3. Low- Noise Devices and Techniques
4. High- Power Devices and Techniques
5. Microwave and Millimeter Wave Monolithic Circuits
6. High- Speed Digital Circuits
7. Microwave Measurement for Gigabit Devices
8. Opto- Electronic Techniques
9. Microwave and Millimeter Wave Packaging
10. Passive Devices and Circuits
11. Microwave Superconductivity
12. Electromagnetic Field Theory
13. Ferrite Devices
14. Microwave Acoustics
15. Millimeter Wave and Submillimeter Wave Techniques
16. EMC/EMI
17. Scattering and Propagation
18. Microstrip Antennas
19. Measurement Theory and Techniques
20. Computer Aided Design
21. Microwave and Millimeter Wave Systems
22. Microwave Terrestrial, Satellite and Mobile Communication Systems
23. Microwave Industrial Applications
24. Microwave Medical/Biological Applications
25. Phased and Active Array Techniques
26. Remote Sensing

However, the above topics should not be considered as the total limits of the conference scope.

SUBMISSION OF PAPERS

Original papers are solicited that have not been previously presented and describe new contributions in the area suggested by the CONFERENCE TOPICS. Authors are required to submit 10 copies of (1) a summary consisting of approximately 500- 1000 words (typed, double- spaced) with supporting illustrations, and (2) a 30- 50 words abstract on a single separate sheet with the title, name of the author(s), affiliation, complete mailing address, phone number (and Fax or Telex number, as appropriate), and a statement specifying the topic from the preceding list most appropriate to the technical content of the paper. The summary must clearly state ; (1) the purpose of the work, (2) the manner and degree to which it advances the art, (3) specific results that have been obtained and their significance.

The paper summary must be received by **June 10, 1994**. Authors are responsible for obtaining all required company and government approvals prior to papers submission. Notice of acceptance or rejection will be mailed to authors by **August 10, 1994**. Authors whose papers are accepted (Oral or Poster presentation) will also receive copyright release forms, conference materials and instructions for preparing camera- ready copies of papers, so they can be printed in the Conference Proceedings. Paper presentation should be in English. Manuscripts should be submitted to :

Prof. Masami Akaike

Chairperson, Technical Program Committee

c/o REALIZE INC.

Cosmos Hongo Bldg. 4- 1- 4 Hongo, Bunkyo- ku, Tokyo 113, Japan

TEL. +81- 3- 3815- 8590 FAX. +81- 3- 3815- 8939



CALL FOR PAPERS

IEEE TRANSACTIONS ON MICROWAVE THEORY AND TECHNIQUES

SPECIAL ISSUE
ON

EMERGING COMMERCIAL AND CONSUMER CIRCUITS, SYSTEMS AND THEIR APPLICATIONS

MTT-S Technical Committees on Microwave and Millimeter-Wave Integrated Circuits (MTT-6), and Microwave Systems (MTT-16) are jointly sponsoring a special issue of the IEEE Transactions on Microwave Theory and Techniques on "Emerging Commercial And Consumer Circuits, Systems And Their Applications," to be published in JULY 1995. The purpose of this special issue is to highlight the diverse commercial and consumer applications of RF, Microwave and Millimeter-Wave integrated circuits (ICs) and systems. Relevant topics of interest include, but are not limited to, the following areas:

- Cellular/Wireless Personal Communication Systems(PCS)
- Satellite Communication and Navigation
- VSAT Systems
- Mobile Satellite Systems
- Automotive Applications
- Digital Satellite Transmission
- Spread Spectrum ICs
- Point of Sales, Personnel Security & Identification
- Dual Use of Technology (Military and Civilian)

Fazal Ali of Westinghouse and John Horton of TRW, will be the guest editors of this special issue. Prospective authors are requested to submit five copies of the paper describing original work in the above mentioned areas by MAY 31, 1994 to:

Fazal Ali
Guest Editor, MTT Transaction Special Issue
Westinghouse Electric Corporation
Advanced Technology Labs.
MS-3K11, P.O. Box- 1521
Baltimore, MD. 21203.
TEL. (410)-765-4540
FAX.(410)-765-7370

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- You'll get a thank you from us and a coupon redeemable on one of the three gift items shown below.

Getting it right

- The campaign extends through the 1994 dues year, ending August 31, 1994.
- The member application must be received at IEEE with full payment (two part payment applications are not eligible).
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I verify that the applicant's information is accurate

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10. Check (✓) a box IEEE DUES <u>Residence</u>	Sept. 1 - Feb. 28 Pay Full Year <u>Total Amount</u>	Mar. 1 - Aug. 31 Pay Half Year <u>Total Amount</u>
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Canada*	\$ 98.00 <input type="checkbox"/>	\$49.00 <input type="checkbox"/>
Africa, Europe, Middle East	\$ 89.00 <input type="checkbox"/>	\$44.50 <input type="checkbox"/>
Latin America	\$ 82.00 <input type="checkbox"/>	\$41.00 <input type="checkbox"/>
Asia, Pacific	\$ 83.00 <input type="checkbox"/>	\$41.50 <input type="checkbox"/>

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Two Half Payments Provision. Applicants paying full year amounts on all items on the application (membership dues and fees for Society enrollment) may remit payment of the total amount in two equal installments, the first payable with the application for membership. A reminder notice will be mailed for the second installment prior to July.

Minimum Income Provision. A fifty percent reduction in full year IEEE dues and Regional assessment and Society fees is granted to an applicant for IEEE membership above Student grade who certifies that his/her prior year's annual income did not exceed \$7,800 (U.S. or Equivalent Funds). A member who qualifies under this provision may join one Society upon payment of one-half the established fee and additional Societies at regular fees. Those applying for this minimum income provision are requested to submit written certification with the IEEE application and the appropriate payment.

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• Broadcast Technology	S-02	8.00 <input type="checkbox"/>	4.00 <input type="checkbox"/>
• Circuits and Systems	S-04	5.00 <input type="checkbox"/>	3.00 <input type="checkbox"/>
• Communications	S-19	23.00 <input type="checkbox"/>	12.00 <input type="checkbox"/>
• Components, Packaging and Manufacturing Technology	S-21	10.00 <input type="checkbox"/>	5.00 <input type="checkbox"/>
• Computer**	S-16	28.00 <input type="checkbox"/>	14.00 <input type="checkbox"/>
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THE 19TH INTERNATIONAL CONFERENCE on
**INFRARED AND MILLIMETER
WAVES**

October 17-21, 1994

SENDAI INTERNATIONAL CENTER, SENDAI, JAPAN

Call For Papers

Conference Chairman : Jun'ichi Nishizawa

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The 19th International Conference on INFRARED AND MILLIMETER WAVES will be held in Sendai, Japan, from October 17 to 21, 1994. The conference will cover progress in all areas of infrared and millimeter wave science and technology, with special emphasis on new fields of research:

- Electron beam devices
- Solid state sources
- Laser sources
- Detectors
- Spectroscopy
- Plasma diagnostics
- Guided wave propagation and components
- Millimeter wave systems and technology
- Application in optical communication
- Technical and industrial applications
- Astronomy and atmospheric research
- Applications in biology and medicine

Authors of contributed papers are urged to submit a one-page abstract on 8 1/2" x 11" paper (A4 size). The abstract should be typewritten on one side of page only and include the following:

1) Title of presentation, 2) Name, complete mailing address and Fax number of the presenting author, 3) Suggested area (as listed above) in which the abstract fits. Place an asterisk before the presenting author's name.

Five copies of the abstract must be received not later than **Tuesday, March 1, 1994**, by

Dr. Kiyomi Sakai
Program Chairman, 94 IR & MM Waves
Kansai Advanced Research Center
Communications Research Laboratory
Iwaoka, Kobe 651-24, Japan

FURTHER INFORMATION:

Professor Koji Mizuno
Chairman, Steering Committee, 94 IR & MM Waves
Research Institute of Electrical Communication
Tohoku University, Sendai 980, Japan
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- Award made to institution for support of named student
- Faculty supervisor must be MTT-S member

Application Deadline: 21 October, 1994

For applications contact:

Dr. Aditya Gupta
Westinghouse Electric Corporation
P.O. Box 1521 MS 3K11
Baltimore, MD 21203
410-765-9170
410-765-7370 (Fax)

Requests for application materials must be received no later than 30 September, 1994.

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