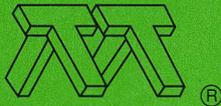


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NEWSLETTER

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1998 CDROM Update Included



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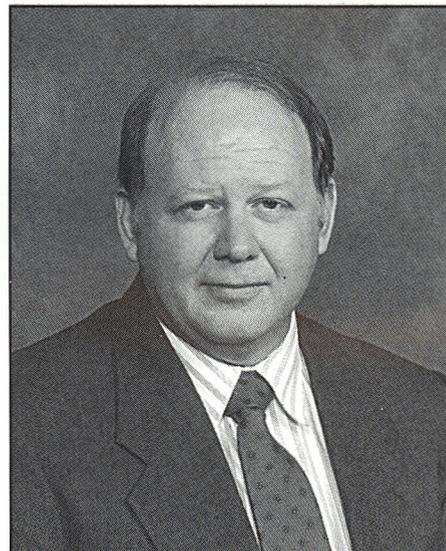
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Editor's Message

First I must apologize to the 1999 Microwave Pioneer Award Honorees Robert L. Eisenhart and Peter J. Kahn for the wrong picture appearing for Peter J. Kahn. I am sorry that the honor that was intended for Peter Kahn deserved did not occur by my mistake. The picture that does appear in place of Peter Kahn's is that of Dr. James Wait, a professor at University of Arizona University who passed away recently. I am very sorry for any pain I may have caused to his friends and family by my mistake.

The IEEE has approved the MTT-S request to replace the newsletter with a magazine and the new editor's will be Michael Golio and Robert Trew. I am excited by the new magazine and know that Mike and Bob will do an outstanding job of including topics that will be of interest to the microwave community. The magazine will be included with the MTT-S membership with no extra charge to the member. The first issue is expected to be in the mail around April 2000. 

Sincerely,
Aust'n

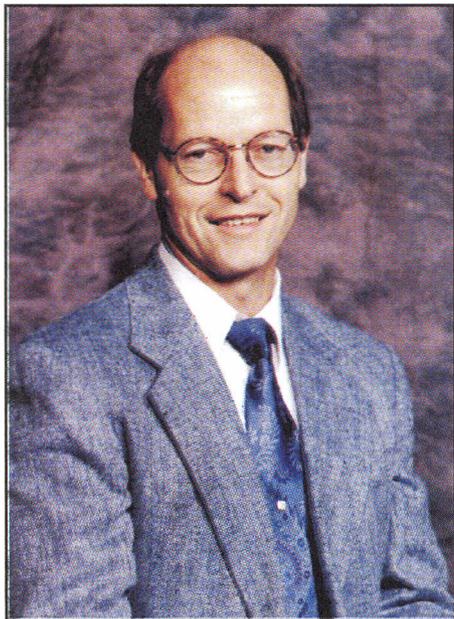


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MTT-S AdCom Liaison: Karl Varian; Industry Relations: Dick Loewecke, Robert O'Rourke; Historical Exhibit: Dave Russell

President's Message



Edward Rezek
President

Having just passed the midpoint of 1999 I thought it would be a good opportunity to reflect on some of the top-level things that have happened to our Society this year. It has been a busy year so far and I'm sure it will continue that way.

I want to begin with a bit of administrative business. This fall you will be asked to vote on a **Division IV Director**. The IEEE groups its nearly 40 Societies into 10 Divisions based on general technical area of interest. The MTT Society is in Division IV "Electromagnetics and Radiation". The Director of each Division has a seat on the IEEE Board of Directors as well as the Technical Activities Board. Since the policies of the IEEE are set and administered by these two entities strong participation is quite beneficial. This year Peter Staecker, a very active member of the MTT Society for many years, is one of the two candidates for the Division IV Director position. Peter is an IEEE Fellow and served as the Society President in 1993; he is the Steering Committee Chairman for the 2000 International Microwave Symposium in Boston. You will be able to read his full biography as part of the election package. I urge you all to vote in the election. After you read Peter's bio and his position statement I hope you will see fit to vote for him.

I want to pass on some very good news about the Society. The MTT Society had the **2nd highest growth rate** after the first 6 months of 1999. We grew at a rate of 11.5%, adding nearly 1,100 members. Only two other Societies added more members than we did. Your Society leadership is trying very hard to provide the members with value-added services that we hope will bring in more new members.

At the June Technical Activities Board meeting the Society received approval to formally retire the Newsletter at the end of 1999 and roll out the **MTT-S Microwave Magazine** in 2000. The plan now is to have the first issue published in January 2000; we will publish 4 issues/year at the start but plan to increase that number as appropriate. The Publications Committee, lead by Bob Trew and Karl Varian, have formed a search committee to select a Magazine Editor. The first issue will feature technical articles based on the 1999 Winter Emerging Technology Workshop at Anaheim. The theme of the first issue will be Digital Receivers.

We have also kicked off an initiative to prepare a complete **MTT Society Directory**. The feeling at this moment is not to publish the Directory in print but to have it available as a password-protected document on the MTT Web Site.

Our Society will celebrate its **50th anniversary** in 2002. We have formed a committee led by H. George Oltman to devise a suitable means to commemorate this milestone. George has a very active group of volunteers brainstorming the possibilities. If you have some suggestions or would like to get involved, feel free to contact George directly.

The Society Administrative Committee approved the release of up to \$20K to the Education Committee in 2000 to organize and/or sponsor **tutorials or short courses** on emerging topics of interest to microwave professionals. Professor Wolfgang Hoefler (w.hoefler@ieee.org) is taking the lead in this initiative. Again, feel free to contact him directly with offers of support or constructive suggestions.

Also in the area of continuing education, the Society has increased the number of **Graduate Fellowships** that it sponsors from 4 per year to 6 per year, beginning in 2000. The Fellowship is valued at \$5000 USD and is for 1 year. Interested student members or graduate student advisors may contact Aditya Gupta (a.gupta@ieee.org) or go to the Society Web Page (www.mtt.org) for additional details.

The **1999 International Microwave Symposium** in Anaheim was, as expected, a tremendous technical and financial success. Bob Eisenhart and his Steering Committee are to be congratulated for setting a new standard of excellence. The future Symposia will be held in Boston (2000), Phoenix (2001), Seattle (2002), Philadelphia (2003), Fort Worth (2004), Long Beach (2005) and San Francisco (2007). One of the items of business at the last AdCom meeting was the selection of the site for the 2008 Symposium. I am happy to announce that the **2008 Symposium was awarded to Honolulu**. Aloha!

There will be some changes in the membership renewal package for 2000. Permanent membership will be offered again for those that chose not to sign up for this last year. Michael Steer and the Technical Coordinating Committee have updated the Society **Technical Interest Profile codes**. Each year upon renewal a member has the option of revising his/her TIP codes. It will be quite important to do so this year because we have gone from ~10 to ~20 TIP codes. Almost all of the old codes have been retired and replaced with the codes. The new codes are better aligned with the current areas of technical interest for our Society.

Also regarding the 2000 membership renewal period, I am pleased to say that the MTT Society will not be increasing its dues or the cost of its publications. The **Society dues** will remain at \$8. This means that we have not increased the cost of membership for 6 or 7 years even while we continue to offer improved membership services and benefits. The new initiatives we have undertaken (Microwave Digital Library, Speaker's Bureau, Microwave Multi-Media Modules, etc.) are being

funded from the Society reserves. We intend to maintain this policy for the foreseeable future.

The IEEE has kicked off an initiative to create a **microwave safety standard**. This is a very topical initiative given the explosion in the wireless communication area. Arye Rosen and Andre Vandervorst of Technical Committee 10 have volunteered to represent the MTT Society in this activity.

Miscellaneous AdCom business:

The Publications Committee has approved two new **special issues of the MTT-S Transactions**. John Sevic and Bernie Geller will serve as editors of a special issue on RF/microwave power amplifications for wireless communications. We will also have a special Transactions issue marking the 50th anniversary of the Society.

We increased the operating budget of the **Society Web Page** by a substantial amount to improve the quality and the content.

In response to a directive from the IEEE, our Society AdCom committees have initiated a **sunsetting review** of their activi-

ties. The intent of the review is to evaluate the scope of the committee work and determine if any activities are outdated and should be retired.

The IEEE has kicked off an initiative to commemorate the start of the 3rd Millennium. The IEEE plan is to award 3,000 **3rd Millennium recognition medals** to Institute members. Each Society has been allocated a certain number of the awards. Peter Staecker is organizing a small committee to recommend medal awardees to the IEEE.

Our Society will also become more aggressive in nominating members for the **IEEE Field Awards**. In recent years the MTT-S has been under-represented in these awards. We are taking steps to correct that situation by establishing a Field Award Search Committee that will be tasked with nominating Society members for the IEEE awards.

I presented a summary of the **IEEE strategic initiatives** to the AdCom. The initiatives are:

- Electronic Publication and Products

- Globalization
- Improve support provided to local Chapters
- Cultivate industrial members
- Student membership

The IEEE has experienced a significant increase in expenses in the last few years. These have not been fully offset by advances in income. So while the Institute is presently very healthy financially, it has initiated an exercise to address the current **financial situation**. The IEEE has directed that all Institute organizations, including the Societies, aggressively review the 2000 budget and identify ways to achieve a net 3% improvement over 1999. Our 2000 budget complies with that directive. As your Society President I am participating in all of the budget exercises. 

Ed Rezek
e.rezek@ieee.org
1999 President

Microwave Digital Archive Status

At the time this short note was submitted in mid- July, over 1470 orders had been placed for the MTT Microwave Digital Archive. By the time this article is read, I hope that all of them will be delivered. The MTT Society has placed an order for 3000 cdroms, and I hope they will all sell soon. The elected officers of the MTT society are striving to provide members with real, tangible, benefits to their IEEE membership.

The MTT Microwave Digital Archive consists of 22 cdroms. All of the reviewed material from 1953 to 1998 is archived in pdf format. The material includes the Transactions on Microwave Theory and Techniques, the Symposium Digests, the RFIC and MCS digests, and the Guided Wave and Optics Letters.

The first CDROM is a master index that is searchable from 1953 to 1998, using the ADOBE search engine from version 3.01. This search feature works for IBM,

Macintosh, and UNIX platforms. For IBM and Machintosh platforms (but not UNIX), you can double click on the title, and the computer will prompt you to remove the master index, and insert cdrom MTT_012 and the next thing you know the article that you want is on the screen. This feature was not available when we started the archive project, and SONY developed the software and architecture that allows this to be possible.

The price structure has recently been changed a little. For IEEE (but not MTT) members the price is \$200. For MTT members, the original price was to be \$100, but to prevent making money off of the CDROM sales, the price will be \$75.

The price of the set is a great deal for members. Aertech House has advertisements out for a two CD set that has the entire Rad Lab Series on it. The two cd set costs roughly \$200 [or \$100/cd]. This is a good value, and

one way to look at the MTT 22 cd set is that it is worth \$100/ cd, or \$2,200!

The shipping date was delayed from August 1 to August 30 because of a number of factors. First, a short delay allowed incorporation of the 1998 material, by using the CDROM that Amir Mortazawi had recently completed. Second, during beta testing it was discovered that the 1996 RFIC digest had been omitted. Third, the packaging had to be redeveloped. During the first complete prototyping a few other changes were implemented that did not delay shipment. One change was the introduction of a "fast" key. When looking for an author in the entire 21 cd set, a last name such as Jackson is easy to find in a few clicks, but a name like Pollard takes 16 clicks to locate. The fast key skips ahead 5 pages. Similarly, a single CDROM had at most 6 or 7 years, so the entire list of publications was only a few

pages long. Well- for the complete set it is over 20 pages long. SONY added a menu to the publications tree that allows selection of the journal type before moving to the journals.

A number of people ask why the set has not been placed on DVD. The main reason is that most members do not have DVD drives. With a goal of providing the set for the lowest price possible, to the largest number of members, there would have been a problem with having two versions, one on CDROM, and the other on DVD. The uncertainty in the number of sales would have meant that a slightly higher price would be selected.

This project has been completed with the help of many people, and I have tried to get all of their names on the list in the acknowledgements, but if I have forgotten to include your name, please drop me a note, so I can fix the list for future editions.

The MTT Microwave Digital Archive can be ordered by calling IEEE at 1-800-678-4333 for US and Canada, or call 1-732-981-0060. Fax 1-732-981-9667.

Or e-mail customer.service@ieee.org.

Mail your order to:

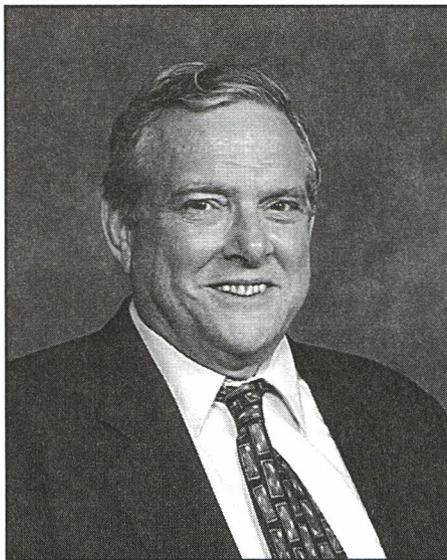
IEEE Customer Service Center
445 Hoes Lane, POBOX 1331,
Piscataway, NJ, 08855-1331

The post publication price is \$75 for MTT members, and \$200 for IEEE non MTT members. We plan to ship them August 30, 1999 (Subject to change)

IEEE Product Number: JP-17-0-0-C-0
ISBN: 0-7803-9906-4

For updates to this information check out the MTT website at <http://www.mtt.org/> and follow the pointers to the CDROM information. Go to <http://www.ieee.org/> to update your membership or to join IEEE-MTT. An order form can be found on the IEEE web site at <http://www.ieee.org/products/ordform.html>, or a tiff file can be found on the MTT website. 

MTT Society Ombudsman



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E-mail: e.niehenke@ieee.org

As your Ombudsman, I received 51 inquiries (25 non-US) from MTT-S members from January 1 to July 16, 1999. In 1998, I received the same number for the same period. All inquiries were typically acted upon within one week, and replies were sent to all MTT-S members. The ease and speed of response was due in a large part to

the fact that the majority of inquiries were received by e-mail.

Fourteen members wanted to receive the MTT-S Transactions and or MTT-S Microwave and Guided Wave Letters and were not receiving them. In checking with IEEE it was found that when they joined MTT-S they had chosen not to receive the publications. The basic MTT-S membership cost is \$8/year (\$4 students) with a \$40 permanent fee good as long as you pay IEEE dues. MTT-S membership includes the MTT-S newsletter and other member services. For an additional cost, members are given the choice of subscribing to the MTT-S Transactions for \$13/year (students \$10), the MTT-S Microwave and Guided Wave Letters for \$8/year (students \$6), or both for \$21/year (students \$16). These way members can choose what they want. I informed the members that they need to request the periodicals from IEEE. Members can call in their order using a credit card. Toll free in US (800) 678-4333 or (732) 981-0060. Members can also FAX in their order with credit card number, type and expiration date to the following number: (732) 562-6380 Attention Member Services. Members can e-mail their order using their credit card number, type, and expiration date. E-mail number is member-services@ieee.org.

Four members wanted information on the MTT-S multi-CDROM Microwave Digital Archive. I informed them that the MTT-S has archived all published material since 1953 into a CDROM set. The Transactions on Microwave Theory and Techniques, the Symposium Digests, and the Microwave and Guided Wave Letters are now available for PC, Macintosh, and UNIX platforms. MTT-S members can now order the multi-CDROM Microwave Digital Archive for \$75. The cost for IEEE non MTT-S members is \$200. These are on CD not DVD. Cost and hardware availability mean that by making the set available on CDROM today, the MTT Society members are best served, and it will be easy to upgrade the set to DVD in the future. Call, Fax, E-mail, or mail your order.

Call IEEE at 1-800-678-4333 for US and Canada, or call 1-732-981-0060.
Fax 1-732-981-9667.
Or e-mail customer-service@ieee.org.

Mail your order to IEEE Customer Service Center 445 Hoes Lane, PO BOX 1331, Piscataway, NJ, 08855-1331

All payments must be US dollars, drawn on US banks.

IEEE Product Number: JP-17-0-0-C-0
ISBN: 0-7803-9906-4

Look for the free 1998 MTT-S CD archival, which is included in this newsletter issue.

Four members needed information concerning the 1999 MTT-S International Microwave Symposium. Two members requested cancellation of IMS99 registration and reimbursement, two members needed the 1997 MTT-S CD-ROM which was mailed to them, and two members had technical questions.

Members had the following requests: information on how to obtain IEEE alias e-mail number, need missing MTT-S Transactions not received, need help to change address, need expense reimbursement, need name correction, requested list of ombudsman duties, need information on how to order MTT-S Transactions, need e-mail address of MTT-S member, need information on how to obtain 98 IMS and RFIC Digest, MTT-S local chapter officer needed help to obtain list of local MTT-S members, requested invitation to attend IMS99 in order to obtain visa for travel, requested MTT-S membership number, requested MTT-S lifetime membership, requested information of IMS review process, requested papers for MTT-S 1999 Emerging Technologies on Digital Receivers and Enabling Technologies, requested MTT-S digital archive on DVD, requested information on how to read publications on MTT-S web page, needed confirmation of IMS99 payment, requested contact for microwave energy transmission through the air, and requested MTT-S 98 archival CD. Finally, one member remarked about the lateness

of the Spring 1999 MTT-S Newsletter. This was brought to the attention of the appropriate people for rectification.

All requests were acted upon. Many of the requested information can be found or was recently put on our web page (<http://www.mtt.org>). All IEEE members can now obtain their IEEE e-mail alias number by contacting <http://elecomm.ieee.org> then under Aliases click register, update or delete. Your alias E-mail number is easy to form. It is your initial of your first name followed by a period, then your last name followed by @ieee.org. For example my e-mail alias number is: e.niehenke@ieee.org. You give out this number and register your e-mail number with IEEE. IEEE then forwards all mail they receive for you to your e-mail number. As you move, you update your e-mail number with IEEE and your mail will be sent to your new e-mail number.

IEEE MTT-S members can see recent MTT-S as well as ED-S publications on the web. Visit and register then read recent MTT-S Transactions, MTT-S Microwave and Guided Wave Letters, ED-S Electron Letters and ED-S Transactions. Many of the IEEE WEB sights require Adobe Acrobat Reader which can be downloaded free by visiting then Get Acrobat Reader.

Concerning MTT-S membership numbers, MTT-S does not issue numbers. Your IEEE number is the number that one uses for identification. Here is information on how MTT-S papers are selected for the International Microwave Symposium (IMS). The Symposium Technical Pro-

gram Committee (TPC) of about 250 headed by a chairman reviews the submitted paper summaries. The committee is broken down into about 31 subcommittees with about 8 members each including a subcommittee chairman. The authors in the call for papers are asked to suggest which subcommittee should review their paper summary (up to 3 choices.) The selections are reviewed by the TPC and adjustments are made. Papers in each technical area are then sent and reviewed by the respective subcommittee. Early January, the TPC meets at the symposium city and each subcommittee selects the papers based on the following:

Originality: The contribution must be unique and significant.

Quantitative content: The summary should give an explicit description of the work with complete supporting data and adequate references to the existing literature.

Clarity: The writing and figures must clearly communicate the author's purpose and results.

Interest to MTT-S membership: Why should this conference and a particular TPC subcommittee support this work?

Language: Text must be in English.

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

Meetings and Symposia Support

Charlie Jackson

The MTT Society and the IEEE offer many forms of support to help us make successful mini-conferences, conferences, mini-symposia, and symposia. The process for obtaining support can be confusing and frustrating, especially when the process has so many options and features. This note will try to address the different methods that MTT uses to provide support for technical meetings.

This short note will describe different aspects of the Meetings and Symposia support process. Each topic will be described in order to clarify the process. Topics to be covered are:

- Types of Sponsorship
- Record Keeping
- MTT Chapter Support
- Book Broker Program
- Conference Approval Process

There are additional means of support that the MTT Society provides, such as the Distinguished Microwave Lecturer Program. These sorts of support would take another whole note to describe.

There is a lot of very good material in the "IEEE Meetings Organization Manual" located at <http://www.ieee.org/conferences/hosting.html> under the link to the Manual. This is a very good document, worth printing out, or requesting a copy.

Types of Sponsorship

MTT-S is generally willing to provide support of technical meetings that would be of interest to its members. We have 4 levels of support:

1. *Cooperative Sponsorship* - general support with use MTT and IEEE logos, access to mailing lists, etc. (Infrequently used, but good for new meeting in remote locales.)
2. *Technical Co-Sponsorship* - same support as above, but MTT requires that it be proportionately represented on the Technical Program Committee. (Most common)
3. *Co-Sponsorship* - Financial responsibility shared with another organization. MTT will loan money up front, but requires a full budget to be submitted, with back up materials and contingency plans. (Quite common, but difficult to approve for an all new meeting in a new locale.)
4. *Sponsorship* - same as above, but MTT-S is solely financially responsible.

The IEEE web has much more on the distinctions between different levels of support at <http://www.ieee.org/conferences/Sect2.PDF>. The most commonly used are Technical Co-Sponsorship and Co-Sponsorship.

Record Keeping Whenever the IEEE provides financial support for a meeting or conference, a number of forms must be filled out and submitted. Some them need to be submitted to multiple places- most notable is the infamous L31 Meeting Record form which should be submitted to the IEEE and copies sent to your section and society (for MTT this is currently Hector De Los Santos at hjdelossantos@mail.hac.com).

For conferences there are a number of forms also. The most tedious form is the conference budget, called the Summary Financial Report. However, this form is one of the most important tools to insure that you have a successful meeting. The conference budget form helps you plan a meeting by listing all of the expenses and incomes that you can expect. I have an ex-

cel version that I can send you, and the IEEE has a pdf version on the web at <http://www.ieee.org/organizations/tab/conflink.html> under the link to IEEE Conference Forms.

There are a number of guidelines, but two are discussed more often. The first is that if there is a member/non-member registration fee differential, then it should be at least a 35% differential. The second is that the conference be planned to operate with a 15% surplus. If grants are requested, then these are treated as income. Loans are treated as incomes and expense.

MTT Chapter Support

MTT has a policy of offering about \$500 to each chapter each year for chapter activities. For joint chapters there is a smaller amount of money for support. This money can be used by the chapter in any appropriate manner, and it can be used for a mini-symposia. The Chapter Activities committee should be contacted to request these funds.

All applications except those from region 8 should be forwarded to:

John Sevic
Spectrian Corporation
350 W. Java Dr.
Sunnyvale, CA 94089 USA
Phone: (408) 745-5716
email: john_sevic@spectrian.com
j.sevic@ieee.org

Region 8 applicants should forward applications to:

Abbas S. Omar
Technical University of
Hamburg - Hamburg
P.O. Box 901052
D-21071 Hamburg, FR 6 Germany
Phone: +49-40-7718-3370
Fax: +49-40-7718-2755
email: a.omar@ieee.org

Book Broker Program Originally, the book broker program was started as a way to provide an additional source of revenue for small or remote conferences. Basically, extra conference digests are printed, IEEE buys the digests, and then

sells them. The conference gets an immediate income, and if all of the digests sell, then the IEEE makes enough money to recover costs, or even make some additional revenue. Recently it has become clear that only large conferences make additional revenue, and that the net income for the conference was less than the eventual loss to the society. Hence, if a small conference wants to participate in the book broker program to raise money, in some cases it might be better for the society to provide an outright grant to the conference.

Future motions for support will be made with an explicit statement that the meeting will or will not participate in the book broker program.

Conference Approval Process

First, assemble your team, your steering committee. Then choose the type of sponsorship that you need. Next prepare call for papers, which in its most simple form is just an abstract and a list of your steering committee. Contact the Meetings and Symposia Co-Chairs (Charlie Jackson at c.jackson@ieee.org and Frank Sullivan at f.sullivan@ieee.org), and request sponsorship. The proposal must be approved by the MTT ADCOM. Sometimes an electronic ballot is held to expedite matters.

I recommend that for at least the next year, that participation in the book broker program not be considered. We are still sorting out the costs and benefits of the program. All motions for any type of sponsorship will require an explicit statement concerning participation in the book broker program for the next few years.

If Sponsorship or Co-Sponsorship are requested, then a Summary Financial Report must be submitted. Remember, when IEEE financial support is requested, it is expected that the conference budget projects at least a 15% surplus. This helps insure that the conference breaks even, or at least is a financial success. It is also expected/recommended by IEEE headquarters that the IEEE member rate will be lower than the Non-Member rate by at least 35%. ❧

Chapter News

Shyam Bajpai,
Chapter News Coordinator,
email: s.bajpai@ieee.org
NOAA/NESDIS/OSD
FB# 4, Room 3010
5200 Auth Road,
Suitland, Maryland 20746-4304
(USA)

The Chapter Chairs are requested to submit one page chapter profile or any interesting news of their chapter to Dr. Shyam Bajpai, Chapter News Coordinator. Dr. Bajpai will also personally contact to invite the chairs. The chapter profile may include: when it was started, number of members, typical number of meetings per year, typical attendance at each meetings, technical areas covered in last five years, do meetings have corporate sponsors, how are the meetings conducted, pictures, workshops, anniversary celebration, any interesting event, etc. This will provide an opportunity to share their activities with other chapters.

Profile of New South Wales, Australia MTT/AP Chapter

The New South Wales, Australia, joint IEEE MTT/AP Chapter was established on February 1, 1989, more than ten years ago. The inaugural meeting was held on January 16, 1989. Dr. Bruce Thomas was the founding Chairman and was responsible for petitioning the IEEE for the establishing the chapter. The chapter now has 99 members

(as of October 1998). There are 4 IEEE Fellows and 14 IEEE Senior Members.

It has been active chapter since inception.

The chapter interacts with university departments by having a representative from most Electrical Engineering Schools on the chapter committees. The industry participation is dominated by CSISRO, which has essentially organized the chapter since its inception. This year for the first time the current Chair, Dr. Karu Esselle is from a industry. The communication among the members is done via news letters distributed twice a year, one in August, another in October. More than two meetings are held every year; the following two meetings were held in the year 1998.

1. 'Future Antenna Needs for Radio Astronomy', Dr. G.L. James - 27 August

This presentation by Graeme James, CSIRO Telecommunications & Industrial Physics, Marsfield, was given at a joint meeting of the Electrical Engineering Institution at Eagle House, North Sydney. The talk had two main themes the development design of wideband antenna components to fulfill future needs, and the proposal of a new radio telescope with an effective collecting area of one square kilometer, the so-called '1 kT array'. CSIRO is involved in both aspects, with the development of new ultra wideband dielectric-lined horns, and the investigation of potential antenna designs for the 1 kT.

Attendance: 8 members 16 Non-members

2. 'Investigation of Wire and Patch Switched Parasitic Antenna Arrays', S.L. Preston - 17 November

Stephanie Preston of the School of Microelectronics Engineering, Griffith University, Brisbane, described her recent work on switched parasitic antenna arrays. These arrays provide an electronically-steerable beam and do not require phase shifters. The design of arrays of wires or patches was outlined, and included a discussion of fast methods for predicting element mutual coupling. Fast approximate methods are used to optimize the design and more accurate but slower methods are used to complete the design. The arrays have been optimized using a genetic algorithm which has resulted in physically-smaller arrays than those obtained by conventional design methods. Potential applications for switched parasitic antenna arrays include mobile communications base stations and low-earth orbit satellite tracking.

Attendance: 8 members 3 Non-members

I would like to thank Dr. Trevor (Trevor. Bird@tip.csiro.au), Recent Past Chair of New South Wales, Australia Chapter to respond to my request to provide us interesting material in this news. Dr. Trevor was chapter Chair for four terms. On December 4, 1998, Dr. Karu Esselle was elected to be the new Chair. 

Status Report for MTT-S Committee 17 on HF, VHF, and UHF Technology

Frederick H. (Fritz) Raab, Ph.D.
Green Mountain Radio Research Company
and H. Clark Bell, Ph.D., P.E.
HF Plus
Cochairmen

1. INTRODUCTION

The IEEE was formed by merging the AIEE (American Institute of Electrical Engineers) with the IRE (Institute of Radio

Engineers). As IEEE grew, however, it drifted away from serving its original constituency. The 26,000 currently practicing RF engineers have generally found the few IEEE papers applicable to work below 1 GHz scattered through the publications of at least seven different IEEE societies. Thus it has not been uncommon to overhear a fellow RF engineer grumbling "What does IEEE do that's of any value to me?"

RF and microwave engineers use different components (e.g., MOSFETs rather than GaAsFETs), and RF engineering has a number of unique applications such as RF heating (plasma), medical imaging (MRI), and RF ID. However, many techniques (power amplifiers, low-noise receivers, couplers, signal synthesis) are analogous and wireless communication is a major application for both. Equally important is the

attitude that the application of theory has to be tempered by practical limits imposed by stray capacitance and lead inductances. The interests of microwave and RF engineers thus have much in common.

With this in mind, the IEEE Microwave Theory and Techniques (MTT) Society is encouraging the participation of RF engineers. To this end, the Microwave and Millimeter-Wave Monolithic Circuits (MMWMC) Symposium has become the Radio-Frequency Integrated Circuits (RFIC) Symposium and a new technical committee on HF/VHF/UHF Technology (MTT-17) was formed at the 1997 IMS in Denver.

2. MISSION

The mission of MTT-17 is to look after the needs and interests of RF engineer within MTT-S and IEEE. In our first two years of existence, we have assembled a technical committee, placed representatives on the International Microwave Symposium (IMS) Technical Program Committee, and sponsored special HF/VHF/UHF sessions at IMS'97 and IMS'98 that were attended by 200+ engineers. We have also signed-up volunteers to review HF/VHF/UHF papers for the "Transactions" and to speak on subjects of interest at local MTT chapters. Next year we hope to sponsor at least one regular session at IMS'99 and to establish a permanent presence there.

MTT-17 now provides a focal point for work that was previously scattered among the publications of seven or more different IEEE societies and numerous trade journals. IEEE publications have the advantage of peer-review, wide dissemination, and long-term availability.

The mission of MTT-17 includes the following:

- Supporting the RF engineer,
- Promoting HF/VHF/UHF within MTT and IEEE,
- Furthering the state of art,
- Looking after professional interests, and Education of the RF engineer.

The MTT-17 committee meets at the annual IMS. In addition to co-chairmen Frederick H. (Fritz) Raab and H. Clark Bell, committee members include: Dr. Murat Eron, MPD Technologies Inc.; Dr.

Arthur Morris, Raychem Corporation; Mr. Daniel P. Myer, Communication Power Corporation; Dr. Richard Campbell, TriQuint Semiconductor; Prof. Dr.-Ing. Rolf H. Jansen, RWTH Aachen Technical University; Dr. Mohamed N. Morsy, Armament Authority, Cairo; Dr. Josef Modelski, Warsaw University of Technology; Dr. John Walker, Semelab, Lutterworth, UK; and Dr. Robert Caverly, Villanova University. These committee members will help to plan future activities of MTT-17. A number of others have also volunteered to review papers on HF-UHF for the "MTT Transactions."

3. ACTIVITIES

Our first activities have been special evening and focused sessions at IMS'97 in Denver and IMS'98 in Baltimore. The topics included driving plasma loads, RF ID, class-E power amplifiers, RF-power MOSFETs, simulation, SSB modulators, and ultra-linear amplifiers. The 200+ attendees at each session is a clear signal that there is indeed interest in these frequency bands!

MTT-17's major activity for this year was a regular session at IMS'99 in Anaheim. The session dealt with HF/VHF/UHF power amplifiers and included the following papers:

C. Trask, "Class-F amplifier loading networks"

P. Kennington, "Ultra-broadband power amplifier using dynamically controlled linearization"

R. Frey, "500 W, class E 27.12 MHz amplifier using a single plastic MOSFET."

A. Mediano, "Frequency limitation of a class E tuned RF power amplifier due to a shunt capacitance."

H. Zirath and D. Rutledge, "LDMOS VHF class E power amplifier"

MTT-17 also sponsored the following papers in the interactive forum:

G. Klahn, "True rms power detector with high dynamic range"

M. Ghanevati et al., "Self-oscillating mixer for front-end UHF electronics."

4. SPEAKERS BUREAU

MTT-17 has also assembled a list of speakers on HF-VHF-UHF topics for local

MTT chapters through the MTT Speakers Bureau. These include:

Mr. Timothy Boles, M/A-COM "A Fully Monolithic HMIC Low Noise Amplifier" "Design of Darlington Based Silicon MMIC Gain Blocks"

Dr. Robert Caverly, Villanova University "RF and Microwave Solid-State Control"

Dr. Steve Cripps "High Efficiency Amplification of Variable Envelope Signals for Modern Wireless Communications Systems: Doherty and Chireix Re-visited"

Prof. Jozef W. Modelski "Microwave Phase Modulators and Shifters"

Frederick H. Raab, Green Mountain Radio Research "High-efficiency RF-power amplifiers" "Kahn-technique (EER) transmitters" "Low-cost high-efficiency HF power amplifiers"

Nathan O. Sokal, Design Automation, Inc. "Class E Switching-Mode High-Efficiency Power Amplifiers - from HF to Microwave" "RF Power Amplifiers, Classes A through S - How They Operate, and When to Use Each" (4-hour tutorial)

5. FUTURE PLANS

What will MTT-17 mean to the RF engineer? The "MTT Transactions" will be a valuable complement to the trade journals by providing peer-reviewed publications with widespread and long-term availability. The IMS will provide a meeting place for RF engineers working from dc to light. Workshops on HF/VHF/UHF topics and speakers for local MTT chapters will contribute to the continuing education of the RF engineer.

We're off to a good start, and we certainly have attracted the interest of the HF-VHF-UHF power-amplifier community. However, we need to continue to spread the word to the HF-VHF-UHF receiver, components, and systems engineers.

What can you do to help? First, start thinking of MTT-S as a society for both RF and microwave. Second, submit a paper on your favorite HF/VHF/UHF topic to IMS'00 (Boston) or the "MTT Transactions". Third — volunteer to help. Fourth — and most important — tell your colleagues! For further information, see <http://www.mtt.org> or contact one of the authors. 

Chapter Records Around the World

By Héctor J. De Los Santos

Dear MTT Chapter volunteers, it was a pleasure meeting you at the Chapter Chairman's Dinner held last June at the IMS'99 in Anaheim, California. Thanks again for your efforts. To do a better job at recognizing you, we'd like to request your help in keeping our records accurate. Since the MTT-S Directory is printed once a year, accompanying the Spring issue of this Newsletter, it is imperative that up-to-date

information on your Chapter Officers be received by December 31st. This, in addition to an accurate Directory, will enable us to present you with your Certificates of Appreciation at the Chapter Chairman's Dinner. To simplify things may I suggest you consider submitting a note calling attention to the fact that there has been a change of officers, who the past officers were and their term of office, and the names of the new Officers. Please be informed that the deadlines for inputs to all of the IEEE

MTT-S Newsletter issues are one month after an AdCom Meeting or Mid February, Mid July, and Mid October. We will continue to use this vehicle for rapid dissemination of information updates. Lastly, I'd like to thank Dr. A. I. Nosich and Mr. J. Weiler for making us aware of some inadvertent omissions.

Thanks for your efforts. Your reports should be e-mailed to: hector.delossantos@hsc.com. Hope to hear from you soon!

MTT-S Directory Additions and Corrections

❖ **Atlanta (AP/MTT):** Mary Lynn Smith, *Chair*; Rickey Cotton, *Vice-Chair*; Jeff Fordham, *Program Chair*; Manos Tentzeris, *Local Arrangements*

❖ **Czechoslovakia (MTT/AP/ED):** Zbynek Skvor, *Chair*; Karel Hoffmann, *Past Chair (Co-Chair)*

❖ **Dallas(MTT):** David Denniston, *Chair*; Peter Winson, *Vice-Chair*

❖ **Foothills(MTT):** Bela B. Szendrenyi, *Chair*, Maury Microwave Corp., 2900 Inland Empire Blvd., Ontario, CA 91764, Phone: 909-987-4715 x238, E-mail:bela@maurymw.com

❖ **Santa Clara Valley/San Francisco(MTT):** Edmar Camargo, *Chair*, E-mail: ECamargo@fesi.fujitsu.com; Steve Kenney, *Vice-Chair*, E-mail: j.s.kenney@ieee.org

❖ **South Africa(AP/MTT):** Dr Johan Joubert, *Chair*, Dept. Electronic Engineering, University of Pretoria, Pretoria, 0002, South Africa, Ph: +27 12 420-2951, Fax: +27 12 362 5000, Email: Johan.Joubert@eng.up.ac.za; Dr Wimpie Odendaal, *Vice-Chair*, Address and fax as above. Phone: +27 12 420-3545, Email address: wimpie.odendaal@eng.up.ac.za

❖ **St. Petersburg Russia(MTT)** Dr Sitnikova Margarita Fedorovna, *Co-Chair*, St. Petersburg State Electrotechnical University, Phone (Office) 234-9672, fax 234-9983,

e-mail rita@mwgroup.etu.spb.ru, Prof. Zagriadski Sergei Victorovich, *Co-Chair*, St. Petersburg State Technical University, Phone (office) 552-9678, e-mail zagr@radio.stu.neva.ru; Dr Sitnikova, *Treasurer*

❖ **Tokyo(MTT):** Prof. Ikuo Awai, *Chair*, Yamaguchi University, Yamaguchi, Japan, phone: +81-836-35-9455, E-Mail: awai@po.cc.yamaguchi-u.ac.jp; Dr. Takashi Ohira, *Vice-Chair*, ATR Adaptive Communications Research Laboratories, Kyoto, Japan, phone: +81-774-95-2710, E-Mail: ohira@acr.atr.co.jp; Mr. Noriharu Suematsu, *Secretary*, Mitsubishi Electric Corporation, Kamakura, Japan, Phone: +81-467-41-2543, E-Mail: suematsu@isl.melco.co.jp; Ms. Junko Akagi, *Treasurer*, Toshiba Corporation, Kawasaki, Japan, Phone: +81-44-549-2061, E-Mail: akagi@mdl.rdc.toshiba.co.jp

❖ **Toronto (MTT/AP/EMC):** Ramesh Abhari, Department of Electrical & Computer Engineering, University of Toronto, 10 King's College Road, Toronto, Ontario, CANADA M5S 3G4, Office: SF4111, Phone: (416) 978-4534, Fax: (416) 978-4425, e-mail: ramesh@waves.utoronto.ca

❖ **East Ukraine:** Yakov S. Shifrin, *Chair*; N. A. Khizhnyak, *Vice-Chair*; A. I. Nosich, *Secretary*

❖ **Santa Diego:** Upkar Dhaliwal, *Chair*; Mark Hoffman, *Vice-Chair*; Red Thompson, *Secretary*

Alvin Clavin, 7090 Bataquitos Drive, Carlsbad, CA 92009. Tel: (760) 431-5032 (W) (760) 431-5082 (F) E-mail: a.clavin@ieee.org

Ralph Levy: Phone: (858) 459-2286 (W) (858) 459-6752 (F); E-mail: r.levy@ieee.org

Richard V Snyder: Phone: (973) 492-1207 (W) (973) 492-2471 (F)

Chapter Activities Summary

❖ **Atlanta:** Dr. Joy Laskar, *Chair*; Mary Lynn Smith, *Vice-Chair*; Rickey Cotton, *Program Chair*.

(1) (Randall W. Rhea (Eagle Wave Corp., GA), "Recent Trends in RF Microwave Design Tools." Date: 02/18/99; Attendance: 12.

(2) John Shaffed (Marietta Scientific, GA), "Understanding Stealth." Date: 03/30/99; Attendance: 27.

(3) Dr. Trevor S. Bird (CSIRO, Australia), "Some Recent Progress in Modeling Reflector Antennas and Feeds." Date: 07/20/99; Attendance: 21.

❖ **Benelux:** K. Van't Klooster, *Chair*; Bart Nauwelaers, *Vice Chair*

(1) Daniel H. Schaubert (University of Massachusetts), "Wideband Vivaldi arrays for large aperture antennas." Date: 04/16/99; Attendance: 35

❖ **Columbus:** Dr. Brian Baertlein, *Chair*; Steven W. Ellingson, *Vice-Chair*; Chi-Chih Chen, *Sec./Treasurer*.

(1) Dr. S.T. "Peter" Li (U.S. Navy SPAWAR Systems Center), "Issues Associated with Advanced Shipboard EMC Methodologies." Date: 02/11/99; Attendance: 28.

(2) Dr. Mun Geon Kyeomg (ETRI - Radio and Broadcasting Technology Laboratory, Taejon, Korea), "Smart Antennas for Mobile Radios." Date: 05/13/99; Attendance: 26.

❖ **Florida West Coast:** Gregory M. Bonaguide, *Chair*; Dr. Tom Weller, *Vice-Chair*

(1) (Dr. Peter Herczfeld (Center for Microwave-Lightwave Engineering, Drexel University), "An Optically-Fed Millimeter Wave Wireless Communications System." Date: 02/09/99; Attendance: 19.

(2) Michael J. Colitz, Jr., Esq., "Wacky Patents." Date: 03/16/99; Attendance: 18.

(3) Dr. Madhu S. Gupta (Florida State University), "New Concepts in RF Packaging and System Integration." Date: 05/11/99; Attendance: 16.

❖ **France(MTT/ED):** Daniel Pasquet, *Chair*; Christian Rumelhard, *Vice-Chair*

(1) Technical Conference: (1) E. Larique (IRCOM), "Application of FEM on Active Components Modelization."

(2) M. F. Wong (CNET), "Toward a Global Modelization."

(3) P. Sagnet (ENSERG), "Global Simulation and TLM."

(4) H. Bandrand (ENSEEIH), "Source Representation in Planar Circuits."

(5) L. Pichon (LGEP), "Finite Element Modeling of Microwave Heating." Date: 05/27-28/99; Attendance: 60.

❖ **Los Angeles:** James Verkade, *Chair*

(1) January 12: Dr. Martin I. Herman (JPL), "Deep Space." Joint with LAC & Foothill MTT-S and LAC Engineering in Medicine & Biology Chapters

(2) 9-Feb: Mark Saffian (Ansoft Corp.), "Advances in High Frequency Circuit Simulation Techniques."

(3) March 23: Dr. William J. Wilson (JPL), "Radiometers." Joint Meeting with Foothill Section AP/MTT-S, LAC MTT-S, LAC AP Chapter.

(4) 27-Apr.: Dennis Olson (Tektronix), "Wireless Measurement Techniques."

(5) May 25: Walter F. Buell and Sarunas K. Karuza (Aerospace Corporation), "Atomic Clock Activities at Aerospace."

❖ **Nanjing:** W. X. Zhang, *Chair*; Z. Y. Hu, *Vice-Chair*

(1) Professor Yan-Chang Guo (Nanjing Research Institute of Electronics Tech.), "Beam Pointing Accuracy Analysis for conformal Arrays." Date: 04/27/99; Attendance: 25.

(2) Assoc. Professor Hua-Li Wang (Nanjing Institute of Commun. Engineering), "Adaptive Beamforming for SatCom." Date: 04/27/99; Attendance: 25.

(3) Dr. Mark Gouker (MIT Lincoln Lab.), "A circuit-fed, tile-approach configuration for millimeter-wave spatial power combining." Date: 05/31/99; Attendance: 52.

(2) Dr. Mark Gouker (MIT Lincoln Lab.), "Extensions to the transmission-line model for microstrip-patch antennas to include proximity-coupled and cavity-backed configurations." Date: 06/01/99 (AM); Attendance: 49.

(3) Dr. Mark Gouker (MIT Lincoln Lab.), "The integrated Frenel zone plate antenna in millimeter waves." Date: 06/01/99 (PM); Attendance: 30.

❖ **North Jersey:** Chandra Gupta, *Chair*; Swilhem Schmidt, *Vice-Chair*

(1) 14th Annual Symposium and Mini-Show. Lectures and Booth Exhibits. Focus: "Microwaves in Wireless and Satellite Communication in 21st Century." Six technical papers. Date: 09/08/98; Attendance: 250.

(2) Dr. Ulrich Rohde (Synergy Microwave Corporation), "Introduction to Single Loop Fractional-N Synthesizers with High Resolution." Date: 03/30/99; Attendance: 34.

(3) Dale E. Jessick (Director of Business Development, Brazonics, Inc.), "Brazing Solutions and Thermal Management for Electronics Packaging." Date: 05/18/99; Attendance: 42.

❖ **Santa Clara Valley:** Edmar Camargo, *Chair*; Steve Kenney, *Vice-Chair*

(1) (Gabriel Rebeiz (University of Michigan, Ann Arbor), "MEMS for Microwave and RF Applications." Date: 03/11/99; Attendance: 86.

(2) Multiple Speakers: "Radio Architectures and Communication Technologies." Date: 04/24/99; Attendance: 160.

❖ **Santa Diego:** Upkar Dhaliwal, *Chair*; Mark Hoffman, *Vice-Chair*; Red Thompson, *Secretary*

(1) Paul Yu (UCSD), "Recent Advances in Components for Analog Fiber Links." Date: 01/21/98; Attendance: 10.

(2) Prof. Krishna Shenai (University of Illinois, Chicago), "Low Power Systems on a Chip Technologies." Date: 02/24/98; Attendance: 12.

(3) Dr. Wolfgang Menzel (University of Ulm, Germany), "Millimeter Wave Packaging and Interconnects." Date: 03/17/98; Attendance: 24.

(4) Christen Rauscher (Naval Research Laboratory), "Microwave Active Filters: Search for New Solutions to a Long-Standing Problem." Date: 05/13/98; Attendance: 15.

(5) Mike Golio (Rockwell), "Low Voltage Microwave Electronics." Date: 09/23/98; Attendance: 14

❖ **San Fernando Valley:** James C. Weiler, *Chair*; H. Clark Bell, *Vice-Chair*

(1) January 12: Dr. Martin I. Herman (JPL), "Deep Space." Joint with LAC & Foothill MTT-S and LAC Engineering in Medicine & Biology Chapters

(2) February 1: SFV MTT-S AdCom "Board" Meeting.

(3) March 23: Dr. William J. Wilson (JPL), "Radiometers." Joint Meeting with Foothill Section AP/MTT-S, LAC MTT-S, LAC AP Chapter.

(4) April 5: SFV MTT-S AdCom "Board" Meeting.

(5) May 20: Dr. J. Mike Golio, MTT-S Microwave Distinguished Lecturer.

(6) June 13-19: 1999 IEEE MTT-S International Microwave Symposium, Ana-

heim. (7) July 26: SFV MTT-S AdCom "Board" Meeting

❖ **St. Petersburg Russia:** Sitnikova Margarita Fedorovna, *Co-Chair*; Zagriadski Sergei Victorovich, *Co-Chair*

Summary of Activities for 1998

Joint chapter activities:

- International student seminar "Applications of HTSC in microwave devices", 24-29.05.98. 29 participants.
- Chapter meeting in connection with the IEEE promotion seminar (meeting Region 8 Director, Dr Maurice Papo) 22.05.98. 30 participants.
- International seminar Day on Diffraction, a seminar on mathematical methods in the diffraction theory (June 2-4, 1998). 54 papers presented.
- Student competition in problem solving for junior students studying radio-engineering (November 13-14, 1998). 60 students from 6 universities of St. Petersburg participated.
- All-Russia student conference in radiophysics (December 1-3, 1998) 53 students from 14 universities and higher-education institutes from 9 cities participated. Web page <http://radio.stu.neva.ru/studconf.htm> (in Russian)
- Technical meeting (November 11, 1998): Dr. A. Slavin (Oakland Univ.,

Rochester, USA) "Self-focusing of spin waves in ferrite films". 15 participants from 3 Universities of St. Petersburg.

- Administrative Chapter meeting (December 15, 1998. Chairman report and elections)
- Moving exhibition of IEEE materials

❖ Toronto: Ramesh Abhari, *Chair*

(1) Professor Robert E. Collin (Case Western Reserve University), "The Minimum Q of Small Antennas (A Discussion of Recent Controversies)." Date: 07/28/98. (2) Richard Dobbs (AMIEE Communications & Power Industries Canada Inc.), "The Klystron - Theory and Applications." Date: 02/26/99. (3) Dr. Rafaat Mansour (ComDev Ltd., Cambridge), "Overview of Microwave Applications of High Temperature Superconductive Technology." Date: 05/12/99.

❖ Washington DC/Northern Virginia: Dr. Roger Kaul, *Chair*; John Margosian, *Vice-Chair*

(1) Hector J. De Los Santos (HSC), "MEMS in Wireless Communications.", Date: 03/09/99; Attendance: 4. (2) RF MEMS Workshop featuring 7 speakers from the local Washington DC/ Northern VA research community:

(1) Dr David Nagel, NRL and GWU, Topic: Overview of MEMS, Nagel@SEAS.gwu.edu

(2) Dr. Michael Gaitan, NIST and GWU, Topic: Silicon Micro-machined Passive Microwave Components in Standard CMOS IC Technology, 301-975-2070, Michael_Gaitan@NIST.gov

(3) Victor Lubecke, Lucent Technologies, Topic: MEMS Inductors, Lubecke@Lucent.com, 908-582-1587

(4) & (5) Dr. Madan Dubey & Dr. Brett Piekarski, Army Research Lab (ARL), Topic: Processing, Fab, and Characterizing PZT RF MEMS Devices. Dr Dubey; 301-394-1186, mdubey@arl.mil.

(6) David Hinzl, Raytheon, Topic: RF MEMS in Communications (update), 703-560-5000 X2813, dhinzl@fallschurch.esys.com

(7) The DARPA-Funded MEMS exchange program, Michael Huff, www.mems-exchange.com Date: 04/27/99; Attendance: 38.

(3) Chapter Officers, subject: Organizational meeting to discuss next year's lecture series topic. Date: 04/27/99; Attendance: 8.

(4) Roger B. Marks (National Institute of Standards and Technology), "Broadband Wireless Access Standards." Date: 05/25/99; Attendance: 9. (2) Chapter Officers, Subject: Planning meeting for 1999-2000 Lecture Series. Date: 07/22/99; Attendance: 5. ❖

ED/MTT/AP St. Petersburg Chapter

Sergei Zagriadski
zagr@radio.stu.neva.ru

St. Petersburg, one of the most beautiful cities in the world, is especially attractive in the period of so called "white nights", when in May - June the day light continues from 3 a.m. to 12 p.m. The view of raised bridges at night with ship traffic on the Neva river between the granite embankments — worlds famous St. Petersburg landscape, majestic palaces and architectural monuments of the city and its suburbs, a lot of

famous museums — all leaves unforgettable impressions for visitors of the great cultural center. In 1999 in this period several scientific conferences co-sponsored by the St. Petersburg ED/ MTT/AP Chapter took place here enabling participants to wonder the beauty of the city.

The International University Conference "Electronics and Radiophysics of Ultra-High Frequencies" (UHF'99) was held on May 24-28, 1999. It was supported by the IEEE MTT Transnational Committee,

Russian Foundation for Basic Research, Russian Ministry of Education and the St. Petersburg ED/MTT/AP Chapter. Latest results of experimental and theoretical investigations, novel achievements in design and development of microwave devices and physical applications of electromagnetic waves from meter to submillimeter wavelengths were presented in lectures of invited speakers and contributed papers structured in oral and poster sessions. More than 110 people from 10 countries (including 3 from CIS) attended the Con-

ference and presented 50 oral and 89 poster reports. A seminar on modern problems of the university education in the field of microwave electronics was also held in the framework of the Conference. Not only scientists representing universities or educational institutions participated in the event, but also experts affiliated with governmental research centers, industrial enterprises and other organizations dealing with microwave electronics.

Contributions concerning the following main topics were presented: Vacuum Electronics of Ultra-High Frequencies (conventional, relativistic and high-power microwave devices and system; devices with controlled emission using photo-, field and secondary electron emission cathodes; systems of formation of electron beams for microwave devices, diagnostics of these beams and control of their parameters); Vacuum Microelectronics of Ultra-High Frequencies (field electron emission sources for VM devices; VM microwave amplifiers and oscillators; systems using microwave VM devices); Plasma Electronics of Ultra-High Frequencies (microwave oscillators and amplifiers using plasma-beam interaction; plasma cathodes as electron emission sources for microwave devices); Devices and Techniques of Ultra-High Frequency Radiophysics in Vacuum and Plasma Electronics (electrodynamic structures and passive components for vacuum mi-

crowave electron devices); Applications of microwaves (in technologies; medicine and biology; scientific instrumentation; thermonuclear fusion research; ecology and environmental science; systems of information processing and communications; household equipment, etc.).

International Seminar "Day on Diffraction" (June 1- 4, 1999) - an annual seminar on mathematical methods in the diffraction theory was organized here by the St. Petersburg State University, St. Petersburg Branch Steklov Mathematical Inst., Euler International Mathematical Inst. and co-sponsored by the Russian Foundation for Basic Research, URSI Mode-A and the St. Petersburg IEEE ED/MTT/AP Chapter. This year the Seminar was timed to the celebration of the 275-th anniversary of the St. Petersburg University (founded January 28, 1724). The Seminar brought together over 80 scientists working in the area of mathematical theory of diffraction and propagation and researchers interested in applications of wave phenomena of various nature. Over 60 oral reports were presented by participants from Russia, Belarus, U.K., USA, Israel, Japan, Mexico, France, Iran, Canada, Czech Republic, Italy, Finland. Topics of the Seminar were traditional: Asymptotic Methods, Mathematical Aspects of Wave Phenomena, Inverse Problems, Scattering and Diffraction, Boundary-Contact Problems, Waveguides and Resonators, Rays and Beam Waves in Non-Uniform Media, Boundary

Layers, Nonlinear Waves, Propagation in Random Media, Numerical Approaches. The Seminars "Day on Diffraction" are annually held in late May or early June from 1960-s. Since that time the sessions always concluded by friendly picnic parties with camp fires and traditional Russian games in beautiful suburbs of St. Petersburg. This year such informal traditional party took place in Peterhoff where the campus of the Physics Department of the St. Petersburg State University is located.

6th International Student Seminar on High Temperature Superconductors (HTS) at Microwaves was held on May 29 - June 4, 1999 in Hailuoto (Finland) and was organized by Microelectronics and Material Physics Laboratories of the University of Oulu (Finland), Empart research group of Infotech Oulu, St. Petersburg State Electrotechnical University and co-sponsored by the St. Petersburg ED/MTT/AP Chapter. There were 5 invited lectures presented by distinguished lecturers from 3 Universities of Russia and Finland and 12 oral reports by students from 6 Universities of Russia, Finland, Germany and England which were devoted to theory and microwave applications of HTS. The total number of participants was over 40.

For further information about conferences annually organized in St. Petersburg and its region, please contact Prof. Sergei Zagriadsk. ☞

Microwave Theory and Techniques Society's Technical Committees

Tim Kemerley
t.kemerley@ieee.org

Technical Coordinating Committees (TCC)

During 1999, the MTT-S Technical Coordinating Committee Co-Chairman are Tim Kemerley and Michael Steer. Their job is to lead the Technical Committees and to coordinate activities of the twenty Technical Committees with activities of other AdCom related functions. One of the TCC's primary objectives is to assure that the MTT-S membership receives the best and most current

information about all relevant technical activities within the society's area of interest. To this end, the TCC shall work with the Technical Committees to:

- Maintain and improve technical information exchange between MTT-S members
- Identify new and emerging technology areas and foster their investigation and development (and de-emphasize and/or eliminate outdated areas)

- Assure that all Technical Committees contribute to the required development and information exchange in areas of interest by assisting them in developing appropriate workshops, symposia and other meetings, and by encouraging frequent submissions of Technical Committee reports on their activities. Assure, by monitoring Technical Committees activities, that they are active contributors to advancing RF, Microwave, Millimeter Wave, and Sub-Millimeter Wave activities.

The activities listed above are carried out by TCC meetings, MTT-S Newsletter/Magazine articles, Winter Technical Meetings, International Microwave Symposia, interactions with local chapters, Distinguished Microwave Lecturers, Speakers' Bureau, and the MTT-S website.

Technical Committees (TCs)

The Technical Committees are charged with carrying out all necessary tasks to assure a strong technical program for the MTT-S. The work of the committees directly impacts MTT-S publications, Symposia, Chapter meetings, membership growth/decline, and ultimately the MTT-S role both within the IEEE and with related societies. Technical committees shall provide the leadership and motivation in organizing technical activities in various areas including:

- Sponsorship, co-sponsorship and participation in technical meetings, conference sessions and workshops
- Organizing special sessions at meetings which meet on an international, national or regional basis
- Securing competent papers for presentation and publication
- Cooperating with the MTT-S Standards Coordinating Committee in developing and establishing IEEE standards in the microwave and millimeter-wave field.

The TC membership should consist of technically qualified MTT-S members who demonstrate initiative and a willingness to actively pursue the collective interests of that TC. Membership should be representative of all IEEE Regions with international participation encouraged and solicited. Each TC shall have a Chairman, Vice-Chairman (or Co-Chairman) and other members

TABLE 1: LIST OF TECHNICAL COMMITTEES & CHAIRMEN

TC COORDINATING CHAIRMEN:

Robert T. Kemerley Tel: 937-255-2911, Fax: 937-255-6942, 4192, e-mail: t.kemerley@ieee.org, Michael Steer, Tel: 44-113-233-2070, e-mail: m.b.steer@ieee.org

Administration: LRW Associates (Larry Whicker): Tel: 704-841-1915, Fax: 704-845-3078, e-mail: lrwassoc@sprintmail.com

TECHNICAL COMMITTEES:

MTT-1: Computer Aided Design

Chairs: C. Snowden, Tel: 44-113-233-2001, e-mail: c.m.snowden@elec-eng.leeds.ac.uk J. Bandler, Tel: 905-525-9140, e-mail: j.bandler@ieee.org

MTT-2: Microwave Acoustics

Chairs: R. Weigel, Tel: 43-732-2468, e-mail: weigel@mechatronik.uni-linz.ac.at, and r.weigel@ieee.org

MTT-3: Lightwave Technology

Chairs: A. Seeds, Tel: 44-171-380-7978, e-mail: a.seeds@ee.ucl.ac.uk, R. Knerr, Tel: 610-391-2129, e-mail: r.knerr@ieee.org.

MTT-4: Submillimeter-Wave Techniques

Chairs: K.K. Agarwal, Tel: 972-995-1882, e-mail: k-agarwal@raytheon.com, E. Sobolewski, Tel: 301-975-3620, e-mail: elisa.sobolewski@nist.gov.

MTT-5: Microwave High Power Techniques

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MTT-6: Microwave and Millimeter-Wave Integrated Circuits

Chair: G. Brehm, Tel: 972-994-8571, e-mail: gbrehm@tqtx.com

MTT-7: Microwave and Millimeter-Wave Solid State Devices

Chairs: H.J. Kuno, Tel: 310-320-1111, e-mail: kuno@quinstar.com, M.S. Gupta, Tel: 850-410-6450, e-mail: m.gupta@ieee.org

MTT-8: Microwave Network Theory

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MTT-9: Digital Signal Processing

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MTT-10: Biological Effects and Medical Applications

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MTT-12: Microwave and Millimeter-Wave Packaging and Manufacturing

Chairs: V. Tripathi, Tel: 541-737-2988, e-mail: vkt@eceorsted.edu

MTT-13: Microwave Ferrites

Chairs: L. Davis, Tel: 44-161-200-4801, e-mail: l.davis@umist.ac.uk, D. Adam, Tel: 412-256-1965, e-mail: adam.jd@postal.essd.northgrum.com

MTT-14: Microwave Low-Noise Techniques

Chair: J. Whelehan, Tel: 516-595-6602, e-mail: jwhelen@ail.com

MTT-15: Microwave Field Theory

Chairs: W. Hoefler, Tel: 250-721-6030, e-mail: whoefler@ece.uvic.ca, J.Mink, Tel: 919-513-1803, e-mail: j.mink@ieee.org

MTT-16: Microwave Systems

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MTT-17: HF/VHF/UHF Technology

Chairs: F. Raab, Tel: 802-656-9670, e-mail: f.raab@ieee.org, H.C. Bell, Tel: 818-882-7811, e-mail: h.c.bell@ieee.org

MTT-18: Microwave Superconductivity

Chairs: M. Nissenoff, Tel: 202-767-3099, e-mail: m.nissenoff@ieee.org, G.-C. Liang, Tel: 408-523-9419, e-mail: gochun@conductus.com

MTT-19: Microwave Technology Business Issues

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MTT-20: Wireless Communication

Chairs: B. Geller, Tel: 609-734-2629, e-mail: bgeller@sarnoff.com, J. Horton, Tel: 310-375-5032, e-mail: j.horton@ieee.org

as required to perform the functions of the committee. Membership lists shall be reviewed at least yearly by the TC Chairman to assure that the committee members are active participants and that appropriate new members are added. The term of service for the Chairman should be three years with a regular periodic rotation of the Committee Chairman. The term of membership for each committee member shall be two years; at the end of each period, the committee member may be re-appointed by the Chairman.

Each TC shall:

- Maintain mailing lists of other persons currently interested in their work. These individuals should be kept informed of that committee's activities through correspondence.
- Regularly publish their activities through the MTT-S Newsletter/Magazine. Each TC shall submit at least one report of its activities to the Newsletter/Magazine each year.
- Hold at least one meeting per year (preferably during the IMS week).

Table 1 lists current information for the 1999 TCC and TC leaders. For more information concerning the committees, please contact the MTT-S website (<http://www.mtt.org>). Much of the information discussed in the article came from the MTT-S Handbook; please review it for more detailed information.

If you are not member of the a TC, please consider joining one of the twenty committees. A key aspect of successful TCs is vitality. New members bring this vitality to the organization with added energy, new perspectives, and possibly new technologies. Participation on the TCs is a great way to learn more about the MTT-S and to participate in shaping its future. 

The ARFTG Microwave Measurement Student Fellowship

The Automatic RF Techniques Group (ARFTG) announces a new Microwave Measurement Student Fellowship. The purpose of this fellowship is to recognize and provide financial assistance to graduate students who show promise and interest in pursuing research related to improvement of radio frequency and microwave measurement techniques.

One or more \$7,500 awards may be granted each year, based on available funding and on the number and quality of applications received. The next deadline is October 1, 1999.

Eligibility: Applicants must have a bachelor's degree in engineering, physics, or computer science, and must be enrolled as a full-time student in a graduate degree program at a suitably qualified institution of higher learning. Applicants must be car-

rying out research as part of the degree program, rather than just taking course work. The proposed research project must clearly involve RF/microwave measurements, and be supervised by a full-time faculty member. The faculty advisor or supervisor must be an ARFTG member, or the proposal must be sponsored by an ARFTG member.

For more information visit our website at www.arftg.org/fellow.html or contact:

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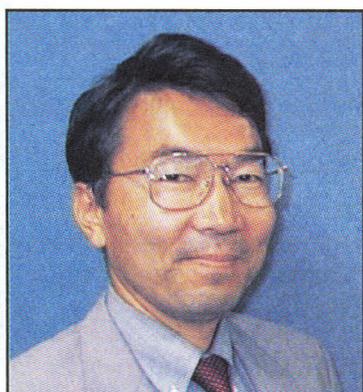
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Report of the 1998 Asia-Pacific Microwave Conference



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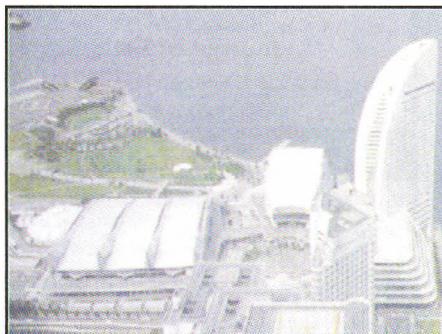
1. Foreword

There are two international conferences related to microwave; "IEEE MTT-S International Microwave Symposium"

which the United States of America has been taking a leading part and "European Microwave Conference" which has been based on European countries. On the other hand, "Asia-Pacific Microwave Conference (APMC)" was planned aiming at the development of microwave technologies in Asia-Pacific regions, and APMC has been held as below,

- 1st 1986 New Delhi (India)
- 2nd 1988 Beijing (China)
- 3rd 1990 Tokyo (Japan) at Ikebukuro Sunshine City
- 4th 1992 Adelaide (Australia)
- 5th 1993 Hsin-Chu (Taiwan)
- 6th 1994 Tokyo (Japan) at Japan Convention Center, Makuhari Messe
- 7th 1995 Taejon (Korea)
- 8th 1996 New Delhi (India)
- 9th 1997 Hong Kong (China)

Especially APMC'90 and '94 held in Japan were greatly succeeded and contributed highly to the development of further APMC conferences. APMC'98 was the 10th memorial conference. It was determined at the international steering committee of APMC'90 that APMC would be held in Japan every four years. APMC domestic committee was organized under IEICE. APMC domestic committee decided to hold "Microwave Workshops and Exhibition (MWE)" in Japan to prepare each year, while waiting, for APMC to arrive in Japan. APMC'94 was planned and managed based on the results and experiences of MWE'91, '92, and '93. The established committees for MWE '95,



Pacifico Yokohama, Yokohama MM21

'96, and '97 helped prepare for APMC'98, which moved to Pacifico Yokohama, Yokohama city from Tokyo. A total of 304 papers from 24 countries were presented and 794 people participated in the APMC'98. It ended as the biggest APMC held yet.

2. Sponsors and Technical Sponsors

Sponsor: The Institute of Electronics, Information and Communication Engineers (IEICE) Technical Sponsors: IEEE MTT-S, IEEE MTT-S Tokyo Chapter and URSI

3. Conference schedule, venue, and participants

3.1 Schedule

The schedule from Tuesday, December 3, 1998 through Friday, December 11, 1998 is shown on Tab. 1.

3.2 Venue

Opening Ceremony, Keynote Address, Technical Session, Open Forum, and Workshop were held at the Convention Center, Pacifico Yokohama, Yokohama MM21.

3.3 Participants

794 people participated in APMC Technical Sessions, Workshops, and Short Courses. Each country and its participants are shown on Tab. 2.

Country	Participants	Country	Participants
Australia	14	Poland	4
Brazil	1	Portugal	5
Canada	6	Russia	3
China	25	Singapore	7
Czech	1	Spain	2
Finland	4	Sri Lanka	3
France	5	Sweden	5
Germany	5	Switzerland	2
Hungary	1	Taiwan	14
Israel	1	Thailand	5
Italy	2	U.K.	6
Japan	615	Ukraine	1
Korea	31	U.S.A.	26
		Total	794

Table 2. Countries of overseas participants and the number.

4. Program Structure

4.1 Paper Selections and Program Structure

4.1.1 Paper Selections

The deadline for submission was June 1, 1998, and 447 papers were submitted from 30 countries including Japan. Submitted papers were divided to 21 sub-groups under 4 main groups, A: Active Devices and Circuits, B: Passive Components, C: Systems, and D: Basic Theory and Techniques. Each paper was viewed by the reviewers of each divided sub-group. Each sub-group was composed of 7 to 9 reviewers and one reviewer living overseas. 19 out of the 176 reviewers were overseas residents. 304 papers were accepted, and 208 papers were organized for oral presentation and 96 for open forum. 316 papers were presented, and 12, of which, were invited papers. These papers were organized to 44 oral sessions and 2 open forum sessions. A visual demonstration was allowed to use for open forum.

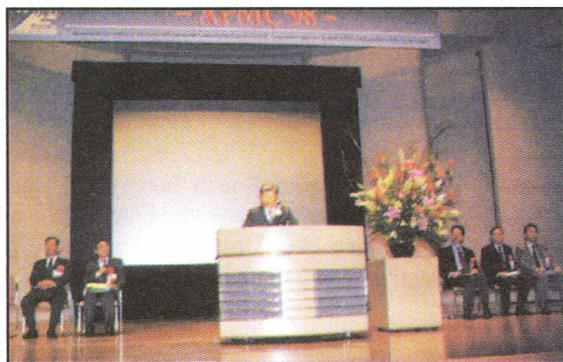
4.1.2 Program Structure

Outline of the session structure is also shown on Tab. 1. APMC web page was provided in IEICE web page, and information as First Call for Papers and Final Call for Papers was noticed successively. Advance Program was also available on the web page <http://www.ieice.or.jp/iinkai/apmc/index.html> 4 oral papers and 4 open forum papers were canceled on the day of the conference.

4.1.3 Open Forum

The total number of open forum was 96 and there were 6 papers out of 96, presented with both poster and demonstration.

4.2 Opening Ceremony and Keynote Address



Opening Ceremony.

Modelator: Dr. Tsuneo Tokumitsu, Ceremony Committee Chair

4.2.1 Opening Ceremony

Date & Time:

December 8, 1998 (Tue.) 10:50-11:40

Opening address:

Prof. Eikichi Yamashita,

Organizing Committee Chair Speakers:

Michiyuki Uenohara,

Conference Chair

Masami Akaike,

International Steering Committee Chair

Prof. R. Sorrentino, EuMC Representative (University of Perugia)

Prof. Yoshio Kobayashi,

Steering Committee Chair

Dr. Hiroyo Ogawa, Technical Program

Committee Chair

4.2.2 Keynote Address

Date & Time: December 8, 1998 (Tue.)

11:40-12:30 Speaker: Dr. Moriji

Kuwabara, NTT Title: "Microwave Com-

munication Technologies toward the 21st Century"

4.3 Invited Speakers

12 invited talks were given.

Prof. Asad A. Abidi, UCLA, "Wireless Transceivers in CMOS IC Technology: The New Wave"

Dr. Youhei Ishikawa, Murata Mfg. Co., Ltd., "How Dielectric Filter Technologies Respond to the Requirements of Future Communication Systems"

Dr. Stephen A. Maas, Nonlinear Technologies, Inc., "Broadband Planar Monolithic Mixers and Frequency Multipliers"

Dr. Raafat R. Mansour, COM DEV Ltd., "Superconductive Microwave Technology for Space Applications"

Prof. Kenneth K. Mei, City University of Hong Kong, "The Development, Evolution and Future Direction of the Measured Equation of Invariance"

Prof. Wolfgang Menzel, University of Ulm, "Interconnect and Packaging Techniques for Complex Millimeter Wave Front-Ends"

Dr. Delma Novak, University of Melbourne, "Fiber-Optic Net-

works for Millimeter-Wave Wireless Communications" Prof. David Rutledge, California Institute of Technology, "Active Quasi-Optics" Prof. Christopher M. Snowden, University of Leeds, "Non-Linear Microwave CAD using Physics-Based Active Device Models" Prof. Ching-Kuang C. Tzuang, National Chiao Tung University, "Leaky Mode Perspective of Antenna" Prof. Shanxia Xu, University of Science and Technology of China, "Modeling and Design of Satellite Beamforming Network Consisting of Rectangular Coaxial Line" Prof. Tsukasa Yoneyama, Tohoku University, "Properties of Guided Waves and Leaky Waves in NRD-Guide"

4. 4 Proceedings & CD-ROM

Proceedings were composed of 3 books with soft covers and CD-ROM publication. The CD-ROM contains the same contents as the proceedings. It was published experimentally and distributed along with the proceedings.

4.5 Workshops and Short Courses

4.5.1 Workshops

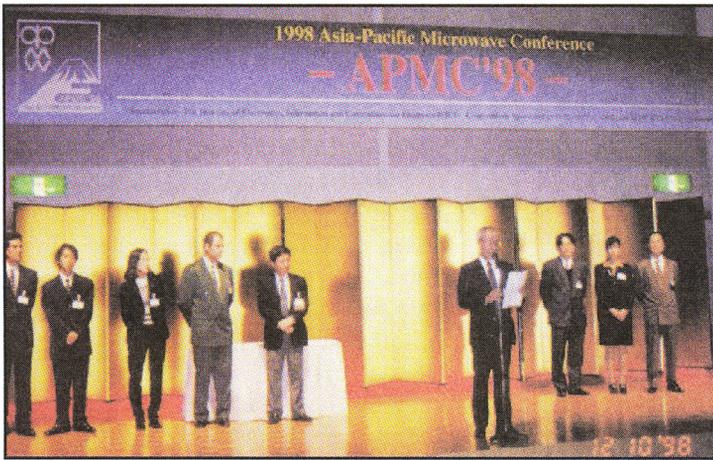
Workshops were held on 10 themes shown on Tab. 1. The workshops were held on the final day of the conference, and the total number of speakers was 57 (34 speeches from Japan, 23 from overseas, and 4 cancellations). The total number of the participants for each session was 562, and the workshops ended successfully, even on the final day. The themes were selected extensively from Basic Theory to Applied Systems, and the number of themes increased by 2 to 10, comparing with APMC'94.

4.5.2 Short Courses

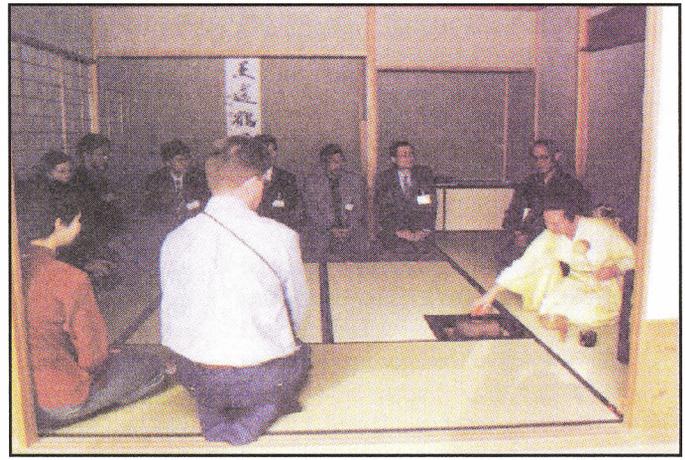
Aiming at providing lectures by overseas' best educators to young researchers and engineers, 2 short courses were held along workshops. The themes were "Microwave Photonics" by Prof. Dieter Jaeger of Gerhard-Mercator-University, Germany and "Active Antennas -Integration of Microwave Circuits with Antennas-" by Prof. Tatsuo Itoh of UCLA, USA.

4.6 Japan Microwave Prize

To encourage research development of microwave field in Asia and Pacific region, 5 papers shown below were awarded for the



Japan Microwave Prize at the banquet



Tea Ceremony at the Japanese style room

best papers in the APMC'98. Y. Qian, F.R. Yang, and T. Itoh, "Characteristics of Microstrip Lines on A Uniplanar Compact PBG Ground Plane" A.K. Lee, J.S. Kim, H.D. Choi, and K.Y. Cho, "Electromagnetic Energy Absorption in a Human Head for a Cellular Phone at 835 MHz" B.Y. Banyamin, J.Y. Liang, and C.S. Aitchison, "A New High Gain-Broadband Amplifier Using Cascaded Single Stage Distributed Amplifier" N. Sahri and T. Nagatsuma, "Practical Millimeter-Wave Optoelectronic T. Kaho, H. Okazaki, and T. Ohira, "A GaAs Monolithic Intermodulation Controller for Active Phased Array Systems"

4.7 Support Program Financial Support Program has been established to encourage research papers from developing countries and to support participants financially, who wish to present their papers. Support Program provides exemption of registration fee and assistance of expenses during their stays for the conference. The qualifications to apply for the program are 1) Nationality of the applicant must be a developing coun-

try(or equivalent) and 2) Applicant himself must submit the paper to APMC'98. At the Steering Committee meeting held on July 9, 25 papers were accepted with Financial Support Program. The contributors and the places of their affiliations are; 12 people from China, 3 from Russia, 3 from Poland, 1 from Ukraine, 1 from Czech, 1 from Hungary, 1 from Thailand, 1 from Brazil, 1 from Taiwan (Nationality was China.), and 1 from U.S.A. (Nationality was Greek.) It was 23 contributors who actually participated in the APMC'98 and presented their papers. Absentees were only 2 people (Nationality was China).

4.8 IEICE Transaction (C) Special Issue

Special Issue on "Microwave and Millimeter Wave Technologies", basically from APMC'98, was planned at English Transaction (C) of The Institute of Electronics, Information and Communication Engineers. Editorial Committee was mainly composed of reviewers of APMC'98, and Dr. Hiroyo Ogawa, Chairperson of Technical Program Committee, has been serving as Guest Editor.

5. Events

5.1 Reception

Reception was held on "Hikawa-maru", a ship in Yokohama Yamashita Park, on Dec. 8, Tue., 18:30-21:00. Having the reception on the historical passenger ship was a great

success with over 500 participants from domestic and overseas.

5.2 Banquet

The banquet was held at the 5th floor of the Conventional Center on Dec. 10, Thu., 18:15-20:50. Speeches and entertainment were performed and over 600 people were participated. Japan Microwave Prize, the highlight of this banquet, was also awarded to the authors of 5 best papers, and certificate of commendations and gifts were given. After awarding Japan Microwave Prize, the commendation of Prof. Yamashita's contribution to IEEE MTT-S AdCom was also announced by the proposal of Dr. Spielman, the former president of IEEE MTT-S.

5.3 Tea Ceremony

Tea Ceremony was held at the tea room on the 65th floor of Royal Park Hotel Nikko on Dec. 10, Thu., 12:00-16:00. Participating guests were approximately 130 people and about a half of the guests were from overseas.

6. Exhibition

Microwave Exhibition '98 in association with the APMC'98 was held at Exhibition Hall B in Pacifico Yokohama.

6.1 Exhibitors

There were exhibitions of 317 companies from Japan, the United States, and 17 countries from all over the world.

6.2 Contents of exhibition

6.2.1 Regular Exhibition



Hikarimaru in Yokohama Yamashita Park



Microwave Exhibition '98 at Exhibition Hall B in Pacifico Yokohama

In microwave and related field, research development of latest technologies, new products, and related books & magazines were exhibited and promoted.

6.2.2 Historical Exhibition

History of Japanese comprehensive microwave technology was exhibited, in-

cluding historical exhibitions held in past 4 years (APMC'94, MWE'95, MWE'96, and MWE'97) and contents mentioned in "Catalog of Historical Microwave Arti-facts Preserved in Japan" published by IEICE in March, 1998. It was exhibited with 114 panels and a few demonstrations.

6.2.3 University Exhibition

15 universities and 1 technical high school participated in this year's university exhibition.

6.2.4 System Exhibition

There was exhibition on Wireless System of 25GHz and 60GHz from MMAC Council and a model of the large communication satellite was also exhibited by Steering Committee, as the main example of microwave satellite communication.

6.3 Basic Lectures

10 lectures were held at the exhibition hall for four days. The themes were device, circuit analysis, CAD theory, design of each amplifier, and circuit techniques for mobile communications/satellite mobile communications. Approximately 300 people participated in each lecture.

6.4 Exhibitors' Seminar

17 of the new products and techniques were shown by exhibitors', whom had presented a seminar at the exhibition hall.

6.5 Participants and Participants' List

The total number of participants in the exhibition was 4,180, participants in the APMC'98 was 794, and the gross total of participants was approximately 5,000. It ended as the largest conference ever. Participants' list was distributed at the end of February. 

The First IEEE European Workshop on "Non-Linear Device Characterisation and Use in RFIC and MMIC Power Amplifier Design"

5th-6th July 1999, University of Surrey, UK

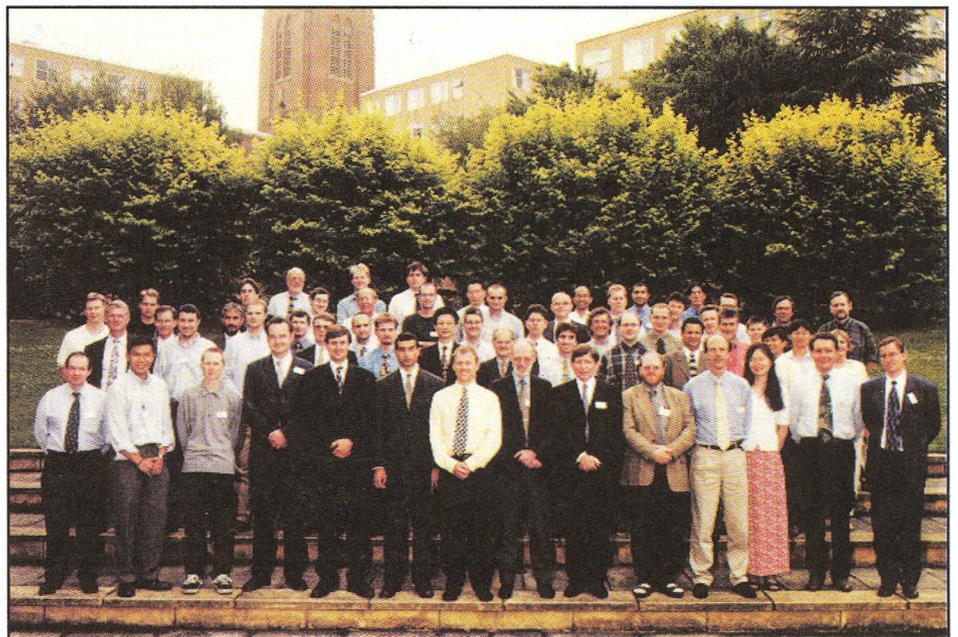
Organised by IEEE UK and Republic of Ireland MTT/ED/AP/LEO Joint Chapter

This workshop was organised in co-operation with the University of Surrey, and received technical co-sponsorship from the UK, IEE Electronics and Communications Division PGE12.

Workshop Chairman: **Steve Marsh**, BSc
PhD SMIEEE

63 delegates made their way to the green hilltop campus of the University of Surrey at the beginning of July to take part in the first IEEE European Workshop on the subject of "Non-Linear Device Characterisation and Use in RFIC and MMIC Power Amplifier Design". Under the watchful gaze of the angel atop the spire of Guildford Cathedral, which dominates the Surrey campus, the delegates from all over Europe congregated in the lecture theatre for the opening session and chairman's address.

The chairman, Steve Marsh from Marconi Materials Technology, Caswell, UK, remarked that the radio frequency and mi-



crowave market place is well on its way down the road from mainly military applications towards commercial systems and consumer products. Civil radar and communications systems are demanding higher output power levels with higher efficiency, which will facilitate the design of improved phased array and reconfigurable antennas. Other demands come from the highly competitive mobile communications products, where reduced size and weight, and shorter time-to-market, can make the difference between the success and failure of a product.

The monolithic integrated circuit, whether it is at radio or microwave frequencies, is one solution that has the potential to be ideal for all these applications. Radio frequency integrated circuits (RFICs) and monolithic microwave integrated circuits (MMICs) inherently meet the small size and weight requirements, and have the potential to be manufactured repeatably and cheaply in large volumes. The two hurdles that need to be overcome to make them ideal are maintaining high power and efficiency against process variations, and a short time-to-market. The design of efficient high power amplifiers requires the non-linear devices to be accurately characterised, taking account of the DC, RF and thermal behaviour of the device, and this behaviour be reproduced within a simulation design tool. To achieve a short time-to-market, the non-linear behaviour must be implemented within a user-friendly commercial simulator, and right-first-time design techniques must be used to take adequate account of known process variations.

The workshop did not presume to solve all these substantial, but not insurmountable problems, but began pulling together the starting point -accurate non-linear characterisation- with the required end point - MMIC design of competitive products.

The workshop was arranged with three sessions, and each session had two or three invited presentations, followed by an hour

set-aside for informal presentations from the floor and open discussions.

The first session, entitled "Accurate Non-linear Characterisation", heard from Paul Tasker (University of Cardiff) on transition analyser measurement and table based models, Tom Brazil (University College Dublin) on parameter extraction techniques and equation based models, and Peter Ladbrooke (GaAsCode) on circuit models configured using physics. Thereafter followed a lively discussion period with the delegates putting questions to the invited speakers and then informed debate involving the whole assembly. Each technique had their pro's and con's exposed, but the major theme that came through was that the simulators used by the majority of the microwave community imposed limitations on the topology or code that the modellers could use, and this lead to inaccurate models.

In other words there was very much the call for a "new simulator", which led very nicely into the second session which focussed on "Implementation of Non-Linear Behaviour in Commercial Simulators". Here we heard from Joe Barnard (Barnard Microsystems) on predicting the transient non-linear behaviour of GaAs MMICs using a new time domain simulator, and Mike Brookbanks (Marconi Materials Technology) on implementing foundry models in commercial simulators. Again, the interaction in the discussion hour was very open and fruitful, and much criticism was directed at the well-known simulators, particularly regarding the way that graphical data was presented. A great deal of interest was also paid to the general idea of time domain simulation which could handle s-parameter data and approach real-time interaction (now that fast computing is common) and that it could supersede harmonic balance. There was also a call for an industry standard model for FETs and HEMTs, that should be developed from close collaboration between the simulator vendor and foundry, that would

appear to the user at only the schematic level.

The format of the workshop, starting about midday Monday and finishing at lunch on the Tuesday, was arranged this way to allow delegates to travel to and from the venue in just the two days, and cater for social interaction and a workshop dinner during the evening between. Several delegates mentioned that the open bar, in the style of an IEEE reception, after the workshop dinner kept everyone chatting together until the small hours of the morning and added greatly to the overall camaraderie and spirit of open discussion throughout the workshop.

The third session addressed "Non-linear Design Techniques in RFIC and MMIC Power Amplifier Design", and we heard from Ernesto Limiti (University of Rome) on high efficiency and harmonic tuning, Frank van den Bogaart (TNO) on optimisation using non-linear models, and Thomas Emanuelsson (Ericsson) on linearising power amplifiers. There was a general consensus that controlling the harmonic terminations could be beneficial for both efficiency and linearity, and that a good non-linear model was required to simulate the best situation. Even so, and given all this focus on modelling and simulation, there was still strong support for power amplifier design using load-pull information (some coming, unsurprisingly, from Steve Cripps) which still betrays an underlying distrust of non-linear modelling and simulation.

In conclusion, the organisers were very pleased with the workshop, and satisfied that the objectives had been met. The level of interaction and discussion was very high and many delegates stayed chatting after the formal close for over an hour. The UK and Republic of Ireland Joint chapter are considering holding a similar event next year. If anyone wishes to be put on an e-mailing list for this event, or has ideas for a different slant on the subject material, then please contact Steve Marsh via the e-mail address: steve.marsh@gecm.com. 

1999 MTT-S Awards

By Peter Staecker
Chair, MTT-S Awards Committee

The International Microwave Symposium of the IEEE MTT Society draws nearly 10,000 participants to its annual location, and is an ideal venue for the recognition of the service and technical excellence of its members. The following summarizes the awards and recognition activities in Anaheim: June 13-16.

IEEE Technical Field Award

The IEEE Technical Field Awards are publicized in *IEEE Spectrum* and *The Institute*. The process and nomination forms are also available on the web (<http://www.ieee.org/awards/tfalst.htm>). Nominations can be made by anyone to recognize deserving individuals for the various awards. The selection process for the 1999 IEEE Technical Field Awards started after the nomination deadline of 1 January 1998.

At the Plenary Session of the 1999 IEEE MTT-S International Microwave Symposium in Anaheim, CA on June 15, 1999, IEEE President Ken Laker presented the IEEE Electromagnetics Award to Professor Robert E. Collin.

1999 IEEE Electromagnetics Award: Robert E. Collin

The IEEE Electromagnetics Award was established in 1996 to recognize outstanding contributions to electromagnetics in the areas of theory, application or education.

The award, which consists of a bronze medal, certificate, and cash honorarium, is sponsored by the IEEE Antennas and Propagation Society, IEEE Microwave Theory and Techniques Society, and the IEEE Geoscience and Remote Sensing Society. Professor Collin's citation reads:

For significant contributions to electromagnetics as a multi-disciplinary engineering profession.

Esteemed author, groundbreaking researcher, and distinguished educator Robert E. Collin (M'54, SM'60, F'72, LF'94)

has influenced electromagnetics engineering for over three decades. There is hardly an electromagnetic engineer who hasn't read Professor Collin's books. He wrote or co-wrote five titles, including the *Field Theory of Guided Waves*, published in 1960, and *Foundations for Microwave Engineering*, published in 1966. Read in several languages worldwide, both were reissued recently by popular demand. Professor Collin has pioneered research into numerous areas of electromagnetics. He has published over 150 papers on topics including guided waves, random surface scattering, theory of small antennas, Dyadic Green's functions, small aperture coupling and others. Long regarded as a skilled educator and source of ideas, Professor Collin started teaching at Case Western Reserve University in 1965. His lectures all over the world have inspired generations of young engineers in a field that was once crucial to winning the Cold War, and is now integral to wireless communications.

Born on 24 October 1928 in Alberta, Canada, Robert Collin received a BS from the University of Saskatchewan in 1951. After winning a fellowship to study in England, he received a Ph.D. from the Imperial College of the University of London in 1954. Professor Collin's dedication to quality has reaped extensive honors and professional appointments. Among them are election to the National Academy of Engineering in 1990, the Case Western University's Diekman Award for Distinguished Graduate Teaching in 1982, the Outstanding Educator of America Award in 1975 and the Junior Achievement Award from the Cleveland Technical Societies in 1964. Professor Collin has served on the Army Research Advisory Board of the National Research Council Committee, the editorial board of *Electromagnetics Waves and Applications*, the Advisory Board of the University of Cincinnati's Department of Electrical Engineering, and has been chair of both the CAEME Technical Advisory Board and the Army Research Office External Review Board. A Fellow of the IEEE since 1972, Robert Collin was made a Life Fellow in 1993. He has been an ac-



tive participant in Institute activities throughout his career, most notably in the IEEE Antennas and Propagation Society, which honored him with both the Distinguished Career Award and the Schelkunoff Prize Paper Award in 1992.

IEEE Fellows

The IEEE Board of Directors bestows the Member grade of IEEE Fellow on Members of unusual distinction. The nominations for 1999 IEEE Fellows were due 15 March 1998 and the results of the Fellow Evaluation process were announced by IEEE on 1 December 1998.

At the Plenary Session of the 1999 IEEE MTT-S International Microwave Symposium in Anaheim, CA on June 15, 1999, IEEE President Ken Laker presented Fellow Awards to the 10 Fellows who had elected to receive their awards at the Symposium. The Fellows and their citations are:



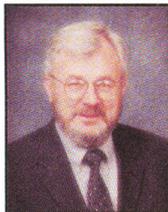
Fazal Ali, *For contributions to the design and development of monolithic microwave integrated circuits (MMICs) and providing leadership in commercial applications of the same.*



Raymond L. Camisa, *For contributions to the development of microwave GaAs transistor power devices and circuits.*



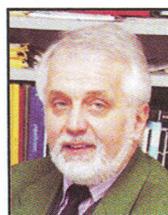
Afshin Samimi Daryoush, For contributions to the field of nonlinear microwave photonics with applications to high-speed fiberoptic links.



John Aiden Higgins, For contributions to development of GaAs transistor technologies for microwave and high speed integrated circuits.



Yoshio Kobayashi, For contributions to the analysis of dielectric resonators and their applications to material measurements and filter designs.



Reinhold Pregla, For contributions to the analysis, modeling and design of microwave and optical components.



Michael Bernard Steer, For contributions to the computer aided engineering of non-linear microwave and millimeter-wave circuits.



Ching-Kuang Clive Tzuang, For contributions to the analysis and design of complex wave guiding structures and the design of integrated leaky-mode arrays.



Ruediger Vahldieck, For contributions to the modeling and design of microwave and millimeter-wave circuits.



George David Vendelin, For contributions to millimeter-wave and millimeter-wave monolithic integrated circuits design.

MTT-S Technical Awards

The nomination processes for the MTT-S Awards are publicized in the *MTT-S Newsletter*. Nomination Forms for the MTT-S Awards are available on the web () Nominations can be made by anyone to recognize deserving individuals for the various awards. The selection process for the 1999 MTT-S Awards started after the nomination deadline of 1 July 1998 and the results of the selection process were first announced in the Fall AdCom meeting held in September 1998. A listing of the annual MTT-S Awards was published in the official program of the 1999 International Microwave Symposium and in the *1999 International Microwave Symposium Digest*.

At the Awards Banquet of the 1999 IEEE MTT-S International Microwave Symposium in Anaheim, CA on June 16, 1999, MTT-S AdCom President Ed Rezek presented the MTT-S Technical Awards to the following recipients:

Microwave Career Award Mr. William C. Brown



The Microwave Career Award is the highest honor bestowed by MTT-S. It recognizes an individual for a lifetime career of meritorious service and technical excellence in the field. Our

honored recipient for 1999 is Mr. William C. Brown, an internationally recognized expert on microwave power generation, amplification, and transmission.

The award consists of a plaque, a certificate, and a cash honorarium. The Career Award Citation reads:

For a Career of Leadership, Meritorious Achievements,

Creativity and Outstanding Contributions in the Field of Microwave Theory and Techniques.

William C. Brown (IRE Fellow 1959) received the BSEE from Iowa State University in 1937 and the MSEE from MIT in 1941. At the time of his death in February 1999, he was a Life Fellow of the IEEE.

He joined Raytheon Co. in 1940, and became involved in the design of magnetrons that were used in World War II microwave radar. In 1952 he made a major contribution by converting the magnetron oscillator into a broadband amplifier. This device is variously referred to as the "Platinotron," "Amplitron" or simply as the "CFA" (crossed field amplifier). It found immediate applications that included the Navy Aegis radar, the Hawk and Patriot Missile Systems, commercial air route surveillance radar, and the high data rate communications system in the Apollo lander that sent televised images from the moon to earth. Mr. Brown's work led to the development of a super power CFA that generated 425 kW of continuous power with an efficiency of 76% at 3 GHz. This represented a power increase by two orders of magnitude. For his development of the CFA, he received the MTT-S Pioneer Award in 1995.

He proposed the use of microwaves for Wireless Power Transmission (WPT) and wrote the first published article that explored the possibilities in 1961. Under an Air Force contract he demonstrated in 1964, helicopter flight powered solely by a microwave beam. The demonstration was featured on CBS News with Walter Cronkite. Key to this flight was the "rectenna" which was invented to absorb the microwave beam and simultaneously convert it to DC power. In the 1969 - 1975 time period, Mr. Brown managed pro-



grams to significantly increase the overall efficiency of the rectenna. He was technical director of a JPL Raytheon program that beamed power over a distance of one mile to a rectenna and converted 30 kilowatts of DC power with 84% efficiency.

Mr. Brown formally retired from Raytheon in 1984, but continued there as a consultant. Recognition for his efforts during his career include the Naval Ordnance Development Award (1945), Presidential Certificate of Commendation (1947), Citation for Meritorious Civilian Service, Department of Defense (1968), Professional Achievement Citation, Iowa State University (1972), Fellow, International Microwave Power Institute (1978), and IR-100 Awards in 1964, 1982. Four volumes of his papers have been preserved in the MTT-S Museum in Baltimore. These same papers, over 2000 pages of final reports, four EBM-sponsored videotaped lectures at Northeastern University, and numerous historical physical artifacts have been transferred to archives at Texas A&M. Microwave magnetrons and CFAs are on exhibit in the Raytheon Museum.

1999 Distinguished Educator Award

Prof. Peter J. Herczfeld

This Award was inspired by the untimely death of Professor F. J. Rosenbaum (1937-1992), an outstanding teacher of microwave science and a dedicated MTT-S AdCom member/contributor. The award is given to a distinguished educator in the field of microwave engineering and science who exemplifies the special human qualities of the late Fred J. Rosenbaum.



Fred considered teaching a high calling and demonstrated his dedication to MTT-S through tireless service.

The awardee must be a distinguished educator, recognized, in general, by an academic career coupled to many years of service to the microwave profession. The effectiveness of the educator should be supported by a list of graduates in the field of microwave science who have become recognized in the field. The candidate shall also have an outstanding record of research contributions documented in archival publications. The candidate shall also have a record of many years of service to MTT-S.

The award consists of a plaque, certificate, and a cash honorarium. The citation reads:

For outstanding achievements as an educator, mentor and role model of microwave engineers and engineering students.

Born in Budapest, Hungary in 1936 and now a U.S. citizen, **Peter Herczfeld** (S'66, M'67, SM'89, F'91) received his BS degree in Physics from Colorado State University in 1961, his MS in Physics in 1963, and his Ph.D. in Electrical Engineering in 1967, both from the University of Minnesota. Since 1967 he has been on the faculty of Drexel University, where he is the Lester Kraus Professor of Electrical and Computer Engineering. Professor Herczfeld received numerous teaching honors including the Mary and Christian Lindback Distinguished Teacher Award at Drexel. He has advised twenty-seven Doctoral students and over seventy Masters students over his career. His former students are outstanding professionals; four of them are Fellows of the IEEE. The majority of his former graduate students are affiliated with Universities in the US, Europe, Asia and South America, where they continue to excel.

1999 Microwave Pioneer Award Robert Eisenhart and Peter J. Khan

The Pioneer Award recognizes contributions that have had a major impact on the microwave engineering field and have stood the test of time. The basis of nomination is an archival paper in the field of interest of MTT-S, published at least 20 years prior to the year of the award.



The award consists of a plaque and a cash honorarium. The citation reads:

For applying a general theoretical formulation and measurement technique of driving-point impedance to a device-mounting structure in rectangular waveguide, and developing a validating measurement technique.

Robert L. Eisenhart (M '71, SM '92, F '95) was born in San Antonio, Texas, in 1938. He received the B.E.E. degree from Rensselaer Polytechnic Institute, Troy, New York in 1960, and the M.S.E. (1966) and Ph.D. (1970) degrees from the University of Michigan, Ann Arbor.

After graduating as a ROTC Distinguished Military Graduate from RPI, he spent two years as a Project Officer with the Research and Development Division, U.S. Army Security Agency (ASA), Arlington, Virginia, participating in the development of electronics equipment. Upon discharge in 1962, he remained with ASA as a civilian Staff Engineer in their European Headquarters, West Germany. During this period, he received a special letter of commendation from the Asst. Secretary of Defense, Eugene G. Fubini, for outstanding contributions to ASA. He returned to school in 1965, and became engaged in design of microwave circuitry, leading to waveguide circuit modeling as the basis for his thesis work. Upon completion of the doctorate, he went to California to work for Hughes Aircraft Company where his principal work was TRAPATT and IMPATT amplifier circuits. This evolved into power combining investigations, which led in 1977 to a transfer as head of the Solid State Transmitter Section, Mi-

crowave Laboratory of Hughes Missile Systems. He retired as a Chief Scientist from Hughes in 1994 and started a consulting business. While at Hughes he was honored with two Group Patent Awards and five Superior IR&D Awards for innovation and project management.

He taught a microwave course at Loyola University of Los Angeles, and was a Guest Lecturer at the University of California, Los Angeles and at the University of Michigan. He directed the research on five MSc. theses at UCLA and one at California State University at Northridge. He also has 38 papers in the field of microwave circuits covering a wide variety of subjects and ten patents with three pending. He is the inventor of the widely used "Eisenhart Connector".

Dr. Eisenhart is a member of Sigma Xi, Tau Beta Pi, and Eta Kappa Nu. He was elected IEEE Fellow in 1995 "For contributions to the modeling, design, and measurement of microwave circuits and antennas." His personal interests include golf and tennis. He was a professional tennis official, highlighted by working a Davis Cup Match in 1979 and the U.S. Open in 1989. He lives in Woodland Hills, California with his wife Nancy, and has two grown sons.

Peter J. Khan (M'61-SM'79) received the B.Sc. degree in mathematics and physics, and the B.E. and Ph.D. degrees in electrical engineering, all from the University of Sydney, Australia in 1957, 1959, and 1963 respectively. Following completion of his doctoral studies in parametric amplification, he came to the University of Michigan in Ann Arbor, Michigan, in 1963 on a Fulbright Postdoctoral Fellowship. He remained there until 1976 as an



Associate Professor of Electrical and Computer Engineering and as Head of the Microwave Solid-State Circuits Group of the Cooley Electronics Laboratory. In 1976 he returned to Australia, and was Reader and Associate Professor of Electrical Engineering at the University of Queensland, carrying out research into microwave and millimeter-wave circuit design for oscillators and frequency converters, using GaAs semiconductor devices. During this period his special interests included the application of nonlinear mathematics in the analysis of microwave circuits, and the analysis of radial-line structures in rectangular waveguides. In 1983 Dr. Khan joined the staff at the Bahá'í World Centre in Haifa, Israel, as a religious volunteer. Since 1987 he has been a member of the Universal House of Justice, the nine-person international elected body which coordinates the activities of the 179 National Assemblies of the Bahá'í Faith throughout the world.

1999 Microwave Application Award Christen Rauscher

The Microwave Application Award is presented to individuals for an outstanding application of microwave theory and techniques. The eligibility requirements are creation of a new device, component or technique, or a novel use of components, or both.

The award consists of a plaque, certificate, and a cash honorarium. The 1999 recipient is Christen Rauscher, whose citation reads:

For proposing and demonstrating innovative approaches to the design of microwave filters and frequency channelizers.

Christen Rauscher (S'73, M'75, SM'82, F'89) received his diploma in electrical engineering and his doctorate degree in 1969 and 1975, respectively, both from the Swiss Federal Institute of Technology, Zürich, Switzerland. From 1976 to 1978 he held an international fellowship from the Swiss National Science Foundation, studying the nonlinear behavior of GaAs field-effect transistors at Cornell University, Ithaca, NY, and at the Naval Research Laboratory, Washington, DC. Subsequently, he joined the Naval Research Laboratory as a member of the technical staff, where he currently heads the Solid-State Circuits Section. On sabbatical leave from 1985 to 1986, he investigated the application of high-speed photoconductor technology to the on-chip characterization of microwave monolithic circuits and millimeter-wave devices at the Los Alamos National Laboratory, Los Alamos, NM. His present research interests remain centered on the pursuit of new high-frequency filter concepts and on the exploitation of nonlinear signal interaction in semiconductor devices at microwave, millimeter-wave, and optical frequencies.

Dr. Rauscher has received several notable awards, including the 1987 IEEE Microwave Prize for his work on microwave distributed active filters, and the 1991 NRL Sigma Xi Applied Science Award from the Scientific Research Society of America. He has published numerous articles on his findings and holds ten patents on inventions of his in the area of microwave and millimeter-wave circuits. Dr. Rauscher is currently serving a three-year term as IEEE Distinguished Microwave Lecturer.

1999 Microwave Prize Christopher M. Snowden

The Microwave Prize is awarded annually to the author or authors of a paper published in the IEEE Transactions on Microwave Theory and Techniques, or any other IEEE publication, that is judged to be the most significant contribution in the field of interest to the Society in the calendar year preceding that in which the selection is made. The 1999 recipient is Christopher Snowden, whose citation reads,

For a significant contribution to the field of endeavor of the IEEE MTT Society in



the paper entitled "Large-Signal Microwave Characterization of AlGaAs/GaAs HBT's Based on a Physics-Based Electrothermal Model," *IEEE Trans., MTT-45*, pp. 58-71 (1997).

Christopher Snowden (S'82, M'82, SM'91, F'95) received the BSc (Hons), MSc and Ph.D. degrees from the University of Leeds, England. He is a Fellow of the IEEE, Fellow of the IEE and a Chartered Engineer. He is currently a Distinguished Lecturer for the IEEE (Electron Devices Society).

After graduating in 1977 he worked as an Applications Engineer for Mullard (now part of Philips), near London, England. His Ph.D. studies were later conducted in association with Racal-MESL (Microwave Equipment Systems Limited) and were concerned with the large-signal characterisation and design of MESFET microwave oscillators. In 1982 he was appointed Lecturer in the Department of Electronics at the University of York. He joined the Microwave Solid State Group in the Department of Electrical and Electronic Engineering at the University of Leeds in 1983. During 1987 he was a Visiting Research Associate at the California Institute of Technology. In 1992 he was appointed to the Chair of Microwave Engineering at Leeds. During the period 1995-98 he was the Head of School and the Director of the Institute of Microwaves and Photonics in the School of Electronic and Electrical Engineering. He joined Filtronic ptc. as Executive Director of Technology in October 1998, where he is responsible for the company's global technology and engineering.

He was a Consultant to M/A-COM Inc., Corporate Research and Development between 1989 and 1998. During 1989-91 he represented M/A-COM as Senior Staff Scientist, developing their semiconductor road-maps and laying the foundations for process-oriented design of devices and monolithic circuits based on physical modeling. His other major consultancies have included Lucas-Varity (automotive radar applications) and Filtronic Comtek (communications technology). He has many links with industry in the UK and USA and a hallmark of his work is the strong international support and investment which underpins his university research.

He is a member of several Technical Programme Committees for International Conferences and serves on the organizing committee of a number of IEEE conferences. He was Chairman of the 6th IEEE Terahertz Electronics Conference held in the UK in 1998 and was Chairman of the 1995 international Microwaves and RF Conference. He is Co-Chairman of the IEEE MTT-1 Committee on Computer Aided Design and a Member of the IEEE MTT-S Technical Program Committee. He is a member of the IEEE Compound Semiconductor IC Technical Committee. He is a Member of the MIT Electromagnetics Academy. His personal research interests include compound semiconductor device modeling, advanced semiconductor device design, microwave, millimeter-wave and optical nonlinear circuit design.

He has written 8 books, over 200 refereed journal and conference papers, and many other articles. He has supervised 39 successful PhD candidates to-date all of whom have moved into successful careers in the international microwave industry.

MTT-S Service Awards

Distinguished Service Award H. Warren Cooper III

The Distinguished Service award is presented to honor an individual who has given outstanding service over a period of years for the benefit and advancement of MTT-S. This year's honoree is H. Warren Cooper III, whose citation reads:

For his outstanding dedicated service to the Society.

Herbert Warren Cooper III (S'48 SM'55, F'70, LF'86) was born 19 July 1920. He entered the University of Wisconsin, majoring in Chemical Engineering, then during World War II volunteered for the U. S. Army Enlisted Reserve Corps and was assigned to electronics courses at the American Television Laboratories and Northwestern University. During his advanced course at Northwestern he was recruited by the Office of Strategic Services (OSS) and after training in Morse code and cryptography was assigned to OSS HQ, South East Asia Command (SEAC) in Kandy, Ceylon (now Sri

Lanka). As head of OSS Radio Communications in Kandy during 1944-1945, Cooper was responsible for building the station from a single low-powered transmitter to a large base station with five high powered transmitters, extensive antenna systems, and a remote six position receiving station, as well as for training the radio operators and transmitter technicians. For this he received a letter of commendation from the OSS Communications Officer for the India-Burma Theatre.

This electronics experience changed Cooper from Chemical to Electrical Engineering and under the GI Bill received his BS in EE in 1947 from New Mexico State University and his MS in EE in 1948 from Stanford University with the help of a Research Assistantship in their Microwave Laboratory. On suggestion by Professor Frederick Terman he accepted a position at Airborne Instruments Laboratory (AIL) to which many of the electronic countermeasures engineers and managers who had been at the Harvard Radio Research Laboratory (RRL), directed during WWII by Terman, had moved. He was involved in the design of octave bandwidth microwave countermeasures antennas and in AIL met Marie Jameson, another microwave antenna engineer, who had been at RRL during the war. They were married in 1950 and have two sons, Robert Warren Cooper, born in 1955 and Herbert Warren Cooper IV, born in 1959. Their daughter, Clarissa Marie, born in 1957, was killed by a motorcycle in 1976.

In 1954 he moved to Maryland Electronic Manufacturing Corporation (MEMCO) (subsequently Litton-AMECOM) as Director of Research and Development. MEMCO provided Instrument Landing Systems to the FAA and foreign customers.

In 1958 Cooper joined Westinghouse Electric Corporation, Defense and Electronic Systems Center (DEC) where he remained until he retired in 1986. His engineering managerial positions in DEC research and development contributed to Westinghouse research, development, and production of aircraft landing, radar, electronic warfare, and space systems. He published or presented more than 20 papers and was awarded 15 U. S. Patents for microwave integrated circuits, surface acoustic waves, antennas, and aircraft navigational systems. His Fellow citation reads

"For contributions to antenna development, microwave integrated circuit development, and the application of microwave techniques to aircraft instrument landing systems."

He has been a Member of the IEEE Microwave Theory and Techniques Society (MTT-S) since 1955, and served as its President in 1975. He also served as President of the IEEE Aerospace & Electronic Systems Society (AES-S) from 1986 to 1987, and was the Editor-in-Chief of *AESS SYSTEMS Magazine* from 1988-1994. He served as Division IX Director from 1990-1991. He served as VP Operations and as member, Board of Directors of the Historical Electronics Museum from 1986-1998. He has been a member of Veterans of Office of Strategic Services (VOSS) and OSS Commvets since 1950, was a member of the Rotary Club of College Park, MD beginning in 1961, and served as President from 1979-1980, and was Chairman Scholar Counselors for Rotary District 7620 from 1990-1998.

N. Walter Cox Award Daniel J. Massé

The N. Walter Cox Award has been established in recognition of the qualities of N. Walter Cox and his service to the MTT Society prior to his untimely death in 1988. It is given to a Society volunteer whose efforts on behalf of MTT-S best exemplify Walter's spirit and dedication. The 1998 recipient is Daniel J. Massé, whose citation reads: *for exemplary service, given in a spirit of selfless dedication and cooperation.*

Daniel J. Massé (M'58, SM'82, LS'95) received his diploma in Electrical Engineering in 1951, from the Ecole Centrale de TSF in Paris France. Following graduation, he started work on a remote control system for substations of electrical power distribution. In 1953, he joined CSF, now merged with Thomson-CSF, to work on microwave communication links for telephone and television.

He came to the US in 1957 and joined the Research Division of Raytheon Company to work on the development of ferrite devices. This group became later the Special Microwave Device Operation, within the Power Tube Division. In 1967, he returned to the Research Division and assisted in the development of integrated circuits.

This group studied the microwave propagation and losses of microstrip with dielectric and ferrite substrates, developed new materials and devices such as miniature filters using temperature stable dielectric resonators. Later on, he became involved in the development of IMPATT diodes and circuits, especially for operation at millimeter waves. Subsequently, his activities included the development of field effect transistors and microwave monolithic integrated circuits. He retired from Raytheon Company in 1993 as Manager of the Semiconductor Laboratory.

He is the author or co-author of more than 25 papers and a book chapter. He also presented several talks at Conference and Symposia. He was one of the three co-recipients of the 1976 Microwave Prize.

He has served on the International Microwave Symposium Technical Program Committee from 1989 to 1995 and was its co-chairman in 1991. He was a member of the Military Microwave Conference Technical Committee in London, UK, in 1990 and 1992. He was chairman of the IEEE Standard Committee for Definition of Terms for Planar Transmission Lines from 1983 to 1987. He served on the MTT-Transactions Editorial Board from 1968 to 1992 and was the Transactions Editor from 1992 to 1995.

MTT-Administrative Committee Awards and Recognition

In addition to the MTT-S Awards and Fellows, the Awards Committee and the President, in consultation with AdCom Committees, recognize the achievements of those key individuals who have given extraordinary service to the Society by presenting them with Certificates of Recognition. These awards were announced during Microwave Week and were presented during the AdCom Dinner, the Symposium Plenary Session and the Awards Banquet by President Ed Rezek.

Outgoing Editor, IEEE MTT-S Transactions on Microwave Theory & Techniques Dr. Robert J. Trew

Editors of the Society's archival publications serve for three long years, exercising equal and inordinate amounts of attention

to detail and deadlines, patience with jilted authors, and persuasion of late reviewers. The recognition for Bob Trew's efforts consists of a certificate and plaque, with the citation:

In Recognition of Distinguished Service as 1995-1997 Editor, IEEE Transactions on Microwave Theory and Techniques

Robert J. Trew serves as Director of Research, Office of the Deputy Undersecretary of Defense for Science and Technology in the Office of the Secretary of Defense. He is responsible for providing scientific leadership, management oversight, policy guidance and coordination of the \$ 1.1 billion yearly basic research programs of the Military Services and Defense Agencies. In this capacity Dr. Trew has cognizance over the complete spectrum of efforts in research including physics, materials, chemistry, biology, electrical engineering and electronics, computer engineering and science, mathematics, environmental sciences and aerospace. In addition, he is responsible for science, mathematics and engineering education, and policy for grants, and cooperative agreements. He has responsibility for management of the University Research Initiative, including the Multi-Disciplinary University Research Initiative (WRI) and Defense University Research Instrumentation (DURIP) programs, and other research efforts administered by the Office of the Secretary of Defense. He also has management oversight of the Infrastructure Support Program of the Historically Black Colleges and Universities/Minority Institution (HBCU/MI) initiative and the Defense Experimental Program to Stimulate Competitive Research (DEPSCoR).

Dr. Trew has extensive experience in industry, academia, and government. Dr. Trew is a Fellow of the Institute of Electrical and Electronic Engineers (IEEE) and serves on the Administrative Committee of the Microwave Theory and Techniques Society (MTT-S). He is currently serving as Chair of the Publications Committee and was the Editor-in-Chief of the IEEE Transactions on Microwave Theory and Techniques from 1995 to 1997. Dr. Trew was the recipient of the 1998 IEEE MTT Society Distinguished Educator Award. From 1976 to 1993 he was on the faculty of North Carolina State University where he served

as Professor of Electrical and Computer Engineering. From 1993 to 1997 he was George S. Dively Professor of Engineering and Chair of the Department of Electrical Engineering and Applied Physics at Case Western Reserve University. He was a visiting Professor at the University of Duisburg in Germany in 1985. Dr. Trew received the 1992 Alcoa Foundation Distinguished Engineering Research Award and a 1991 Distinguished Scholarly Achievement Award from NCSU. He has published more than 130 technical articles, 13 book chapters, and given over 200 scientific and technical presentations.

Outgoing Distinguished Microwave Lecturers

The MTT Society established the office of Distinguished Microwave Lecturer as a service to its Members in 1967. Qualified speakers are chosen to bring topics of current interest to the microwave community, specifically, to MTT-S, student, and other Society Chapters. These speakers have multi-year commitments and make 6-7 lecture trips per year. Two Distinguished Microwave Lecturers finishing their terms of service this year are Kikuo Wakino and Rahul Dixit.

Kikuo Wakino (M'72, SM'85, F'92, LF'92) was born in Kyoto, Japan on August 30, 1925. He received BS in Physics and Doctor of Science in Engineering from Osaka University, Osaka, Japan in 1950 and 1980, respectively. He joined Murata Manufacturing Co., Ltd. in 1952, where he served as a leader in the development and engineering of electronic ceramics and their applications, especially for ceramic capacitors, piezoelectric and semiconducting ceramics. Since 1970, he has concentrated his research and engineering effort in the development of the temperature stable and low loss dielectric ceramics for microwave applications and the development of dielectric resonator devices. He retired from Murata Manufacturing Co., Ltd. in 1991, and he is now serv-

ing as a Corporate Adviser of Murata and teaching as a Visiting Professor at Ritsumeikan University, Shiga, Japan.

Dr. Wakino received The Minister of Science and Technology Agency Award (1988) and Award of the Blue Ribbon Medal from Japanese Government (1988) for his research works and leadership in development of dielectric resonator and microwave filters. He received Fourth Class Order of the Sacred Treasure in 1998 from Japanese Government. He has been a Fellow member of the American Ceramic Society since 1987. He was elected as an IEEE Fellow member in 1992, "for the development of high quality ceramic dielectric materials, and for contribution to their application". In 1996 he received the Microwave Application Award, "for pioneering the development of low-loss, temperature-stable, ceramic dielectric resonators."

Citation: In Recognition of Distinguished Service as 1996-1998 MTT-S Distinguished Microwave Lecturer for his lecture entitled

"Miniaturization Techniques of Microwave components for Mobile communications Systems"

Rahul Dixit is Chief Engineer, TRW Automotive Electronics, working on advanced products. He has been working since 1973. His previous assignments included several years at TRW Space & Defense — where he worked on RF and communications technologies. Prior to coming to TRW, he worked at Rockwell International, supporting commercial development of GaAs ICs. Still prior to that, he worked at RCA/ SPAR in Canada on Communications Satellite payload hardware.

He has authored numerous papers, and has given many lectures and technical presentations at various symposium and journals. His interests include Automotive Radar, vehicular communications systems and III-V based technologies.



He has a BE from McGill University (Montreal), and additionally a ME and an MBA. He is currently working on his Ph.D. at Wayne State University in Detroit.

Citation: In Recognition of Distinguished Service as 1994-1997 MTT-S Distinguished Microwave Lecturer for his lecture entitled "Automotive Electronics Challenges & Opportunities"

Others receiving certificates of recognition included:

MTT-S Administrative Committee:

Roger Pollard, 1998 President
Jung-Woong Ra, Member 1996-1998
Glenn R. Thoren, Member 1993-1998
Scott Wetenkamp, 1998 Secretary

1998 IEEE International Microwave Symposium:

Steve Stitzer, General Chair
Roger Kaul, Vice-General Chair
Edward C. Niehenke, Technical Chair
Denis Webb, Vice-Technical Chair
David Sheehan, Local Arrangements Chair

Other Symposia and Meetings:

J. Gregory Burns, Conference Chair 1998 ARFTG Conference
Vijay Nair, General Chair, 1998 RFIC Symposium
Service to the IMS Technical Program Committee:
William E. Hord, for contributions during the years 1984-1999
Ingo Wolff, for contributions during the years 1992-1999 

Wireless and Microwave Advisory Meeting and Forum



Les Besser,
Besser Associates,

with contributions from
Larry Miller,
Trak Microwave,
Larry Dunleavy,
University of South Florida,
and Ray Pengelly,
Raytheon Commercial Electronics

Prof. Larry Dunleavy invited me to participate in the third annual Wireless and Microwave Instruction (WAMI) Industrial Advisory Board meeting on last February at the University of South Florida, in Tampa, Florida. This annual meeting represents two-way communications between WAMI's curriculum/research and the wireless and microwave industry. Professors Henning, Weller, Gordon and Dunleavy also organized a one-day Industry/ Government/ Academic forum on wireless technology, to follow the Advisory Board meeting. This forum featured prominent speakers from the Department of Defense, the National Science Foundation (NSF), the National Institute of Standards and Technology (NIST), along with other noted industry and academic speakers. Over 30 companies and universities were represented by nearly 100 participants. The Forum was co-sponsored by the Florida West Coast Chapter of IEEE Microwave Theory and Techniques (MTT) Society,

The Advisory Board meeting was highly successful, with over 30 visitors providing input to USF's electrical engineering faculty and students. Among the highlights was the Institute of Electrical and Electronics Engineers (IEEE) Student Luncheon, featuring six industry and government speakers. It was attended by more than 60 USF students, representing the largest IEEE Student chapter meeting in recent history.

While it was great to meet some future engineers, I learned some alarming news. The four-year EE curriculum is being cut to be more competitive with computer-science programs that are taking students away from engineering. Most of us involved with continuing engineering education feel that recent BSEE graduates are already poorly prepared to face the technical challenges of the next century. Therefore, I wonder what will be the effect of reducing the number of units required for graduation.

On the positive side, it was great to see that not all the universities eliminated practical, hands-on courses. Witnessing the real-life communication projects in WAMI's labs gave me re-assurance that some of our new engineers will still know "which end of the soldering iron to grab." Seriously, it was good to see the students build communication sub-systems and systems, and develop a real understanding how theory works in practice.

The Forum's opening presentation was made by Magdy Iskander from the National Science Foundation and its newly created wireless initiative. Within this initiative, fourth generation wireless goals were presented that stressed the need for a "multidisciplinary approach" that couples an integrative technology to achieve an adaptive wireless communications system.

Elissa Sobolewski of NIST next outlined government-sponsored projects under the Advanced Technology Program (ATP). Such projects are selected explicitly for broad-based benefit of the U.S. economy,

and are evaluated both for their technical and economic merits. Industry and government share the cost of these projects, although they are conceived, developed, managed, and executed by private industry. Additional information is available under the web-site <http://www.atp.nist.gov>.

Barry Perlman from U.S. Army Applied Communications-Electronics Lab presented the DOD's new commercialization plan for military communication systems. Under this philosophy, custom designed communication systems are out, and reliance on commercially available hardware will be employed by our troops. Strategic application of commercial assets such as satellites, repeaters, cell stations will be employed as needed for national security. Future wireless networks called "smart dust" will provide surveillance and security on the 21st century battlefield. Another emerging device technology is "MEMS" or microelectromechanical systems. These devices, based on micromachined structures in silicon offer improved RF performance in such components as switches and filters within substantially smaller sizes.

Industrial speakers Ray Pengelly and Leland Langston representatives from Raytheon Commercial Electronics and Raytheon Systems presented the status and challenges facing future wireless systems below and above 6 GHz respectively. The former talk covered such applications as mobile 'phones, wireless LAN, GPS, small boat radars and satellite communication systems while the latter stressed Local Multipoint Distribution Systems (LMDS), DSS, Teledesic and the Halo localized communications project.

George Morgan from Virginia Tech presented current developments and difficulties implementing "Local Multiple Distribution System" (LMDS). Virginia Tech owns four FCC licenses to implement this new technology between the lo-

cal user and fiber optical cables that offers 1150 MHz of bandwidth.

Craig Sapashe and Joel Dunsmore both from HP-EEsof, and Charlie Wooding of ATN, as well as Gailon Brehhm of TriQuint, participated in a panel session on the status and progress of current wireless simulator software. Enhanced linear, non-linear, digital, EM field simulators capable of handling complex modulation schemes are a must to achieve rapid, correct first time, designs. The newest simulation software tools can handle these problems in integrated form, eliminating the need for separate programs. S-parameter tech-

niques and measurements, introduced over 30 years ago can now be extended to balanced circuits. Mixed-mode design and measurements are readily available for RFIC applications.

In the area of university and continuing education, Misty Baker of GWEC, Anh-Vu Huynh Pham from George Tech, and I discussed trends and problems in training, involving rapidly changing technologies that may become obsolete within years. An engaging panel session on educational issues followed which also brought three more educators to the front of the room for this interactive discussion. The session clearly

pointed out that we cannot expect to develop and maintain professional engineering competency without a cooperative effort between industry and teaching institutions, with the "blessing" of government.

A post-conference electronic digest has been prepared which contains postings of the presentation materials for this forum, under the website: http://ee.eng.usf.edu/research_labs/WAMI/workshop/. In my opinion, meetings like these are vital to establish and maintain communication between industry, government agencies, and academia. I wish that other schools would follow the lead provided by USF's EE Department. 

Book Review of *Phased Array Antennas*

by Robert C. Hansen
Wiley Interscience, 1998
ISBN 0-471-53076-X,
486 pages

Upon reading the book, it is clear that Bob Hansen's new contribution to the phased array literature is directed primarily to practicing antenna engineers and radar engineers. Array hardware designers will find a wealth of information and insight into their various aperture and feed problems, and so it is an "indispensable tool-of-the-trade", to quote Wiley's advertisement on the back cover. Furthermore, even the most intensely theoretical "antenna array analyst" should enjoy the many photographs of real array hardware and performance curves. Hansen knows how to parameterize and graphically display the important relationships between the various design parameters and performance measures of the many array components and accessories. Wiley wants to stretch the audience of this reasonably specialized book to include "PCS and communications engineers", and *predictably* bill it as a textbook for "advanced undergraduate and graduate-level courses...". It is ideal for an industrial short course on phased arrays, especially considering that not many universities presently offer a specialized course on a *class* of antennas. Academics who teach such a graduate course would likely select a more theoretical or fundamental book as a primary text.

The layout of the book is attractive, it is a nice size and most importantly Hansen's style is succinct and enjoyable to read. For example, in describing the operation of beamforming networks, a couple of sentences accompanying well thought-out diagram give a lucid explanation of the workings of the various architectures. Throughout the twelve chapters, the text points out comparative advantages and limitations of different implementations using realistic, quantitative data. Hansen knows just where to stop, usually. Some of his personal favorites, such as Taylor synthesis, finite array mutual-coupling analysis, and conformal arrays are covered in some depth. That is expected and welcome. Undoubtedly, many users of *Phased Array Antennas* will benefit from these original and timely summaries. Such a well-rounded perspective and insight can come only from a seasoned antenna engineer who understands both the physical theory and its practical realization. This book is a balanced account of the important aspects of phased array hardware and design from feeds to radiating apertures. Hansen sticks to his stated scope of main-stream arrays and resists any temptation to stray into adaptive arrays and other peripheral signal processing and systems engineering topics.

Not the last word on any of the topics, each chapter supplies a comfortable number of pertinent references for background and further study. The references are assem-

bled with great care. The valid or final papers have been culled out of the literature, resulting in a useful bibliography for practicing engineers. Hansen maintains historical accuracy without attempting historical completeness or "paying homage" to every contributor to the field. Such long lists can be found in standards such as Collin & Zucker. When Hansen does refer to a classic, such as Schelkunoff's 1943 Bell System Technical Journal paper, it is because the referenced work is still the best account of the subject. If you or one of your local colleagues (or library) have managed to amass the digests and proceedings from the many AP/URSI, tri-service radar, Illinois antenna applications, Boston phased array, and assorted meetings, then *Phased Array Antennas* is your key to some of the unindexed gems in the field. For cultural and political reasons, novel array concepts and hardware developments by the creative cold war engineers were first chronicled in internal industry and government reports, some classified, and later disclosed to the community at large via meetings and symposia. The company reports and conference papers that Hansen refers to record important events in phased array evolution. For example, Dick Kinsey's tandem series feed and the way he exploits symmetry and plain physical insight in feed-line synthesis is a source of inspiration and a great example of innovative "engineering design". Except for Hansen's chapter references, citations for many such works

have heretofore been unavailable in a standard antenna reference. Another example, the origin of the often photographed bent-back or vee dipole that equalizes scan impedance behavior is refreshingly credited to its inventor Jack Reale, Reale's original Tri-Service Radar Symposium paper on the PAR (Perimeter Acquisition Radar) dipole is cited.

The only specific prerequisite background required of a BS engineer or physicist is some introduction to basic antenna theory and definitions. The mathematical level is that of & typical BS electrical engineer. Some chapters use an occasional series or integral, and these are all explained or suitably referenced. Definitely written by a serious engineer, the single excursion from pure, no-nonsense technical prose is the statement on page 49: "In the days BC (before computers), aperture distributions were chosen..." After reading this passage, I was hopeful (but ultimately disappointed) that the author would chare more of the little engineering idioms that he surely has accumulated over his career of fifty years.

The perceived clarity of a given section depends, of course, on the reader's background and expectations. The chapters on elements, synthesis, feeds, mutual coupling, lenses, and conformal arrays are outstanding. Hansen provides a thorough summary of the

effects on scan impedance of finite arrays, versus infinite arrays. Some of that data is the result of his own recent papers where he introduces the Gibbsian model, in reference to the Gibb's phenomenon in a truncated Fourier series. It is intriguing.

A confusing part of the book is the beginning of section 10.4 on beam orthogonality. The results and conclusions are valid, but it takes a bit of work to straighten out the abbreviated development, due partially to notational changes (even though he carefully and explicitly calls attention to these.) together with several unfortunate typos in the intermediate mathematics. In addition to Hansen's reference to a 1970 book by Harmuth, the parenthetical inclusion of the usual name *Parseval's theorem* would be sufficient to keep the typical reader in step. One note on the notation: Throughout the book, limits on sums and integrals have sometimes, almost randomly, been omitted. This can be an acceptable style, provided the actual limits are clear from the context, and mature readers can adapt to the omissions. Given Hansen's usual meticulous attention to detail and concerted adherence to consistency, such omissions are likely typos. On the other hand, *sornetimes* the meaning of an integral such as

$$\beta_{ij} = \int E_i(\theta, \phi) d\Omega \quad (10.4.3)$$

is actually clearer as stated, without the explicit limits which would introduce distracting and irrelevant detail.

Systems engineers who get deeper into arrays than elementary pattern and directivity calculations will find this book accessible and appropriate. They should feel at home with Hansen, as his style reflects some obvious "systems tendencies" and influences. Witness the, me of three-letter variable names (acronyms!) in the last chapter on measurements; and tolerances:

$$P(SLL \leq SLL_0) = \int_0^{SLL_0} PDF dSLL \quad (12.17)$$

Another delightful feature throughout the book is that Hansen tells us how to actually compute numbers for many of the formula and methods. Such words of advice from an experienced work-or axe invaluable. Phased Array Antennas will be a primary reference for such antennas and systems. Browsing through the book, I can't help but think what a pretty and fun field it is.

Reviewed by: Robert W. Scharstein
Electrical Engineering Department
University of Alabama

IEEE Completes Sloan Project, Produces Multimedia Career Resources

PISCATAWAY, NJ, 14 May 1999 — Many students are so immersed with technical subject matter that they often overlook what is needed for success in the "real world." To provide students with the necessary information to plan for their careers, the IEEE has produced the following multimedia resources that take an in-depth look at careers for electrical engineers and computer scientists:

- The IEEE Student Career Web site at <http://www.ieee.org/organizations/eab/sloancareers/sloancareers.htm>
- The CD-ROM, *Careers for Electrical Engineers and Computer Scientists*
- And two videos, *What's Out There* and *Getting Ready*

"Although aimed at the college student, these materials are also helpful to high school students who are contemplating technical careers," said Peter Wiesner, director of continuing education for IEEE Educational Activities. "We want to encourage students to think about careers early, and provide them with the appropriate resources to do so."

The IEEE was one of eleven professional associations to receive funding from The Alfred P. Sloan Foundation to create products that explore the various career opportunities open to scientists, engineers, and mathematicians. To obtain information about the other participating associations, visit the Sloan Web site at www.careercornerstone.org.

The CD-ROM and videos are available for purchase from the IEEE Customer Service Department, 445 Hoes Lane, PO Box 1331, Piscataway, NJ, 08855-1331; E-mail: customer-service@ieee.org; Phone: 1.732.981.0060

To order the CD-ROM — \$29.95 list and \$19.95 for IEEE members — use code EC100-QVE; to order the *What's Out There* video — \$24.95 list and \$19.95 for IEEE members—use code EV5526-QVE; to order the *Getting Ready* video — \$24.95 list and 19.95 for IEEE members — use code EV5522-QVE. For more information on any of these products, visit IEEE Web address www.ieee.org/organizations/eab/careeresource.htm. 

IEEE Standards Association (IEEE-SA) — Year One

Members of IEEE's Technical Societies rightly have been anxious to know more about the IEEE-SA. We are well into the second year and are better positioned to assess its accomplishments, unresolved issues, and future challenges.

When the SA was launched, our promises to you included: 1) an election of the governing body, 2) expanded opportunities for standards development under the Standards Board, and 3) even further standardization opportunities outside of the Standards Board. How did we do?

We've given IEEE-SA members a voice in the governance.

The IEEE-SA Board of Governors (IEEE-SA BOG) developed an election process for its members-at-large and for the IEEE-SA President. This was approved by the IEEE Board of Directors in November 1998. Now members of the IEEE-SA can elect the members-at-large of the IEEE-SA BOG, and members of the IEEE-SA who are also IEEE members may elect the IEEE-SA President. The position of President-Elect was also created to allow for continuity of leadership.

The first elections will be held this year as part of the IEEE annual election process. IEEE-SA members will see their ballots in the fall.

Issues and challenges.

Some volunteer standards developers don't see the value of being part of a constituency with the above-mentioned electoral privileges. The goal of an election is to bring forward individuals with leadership abilities, industry involvement, and strong interest and experience in the standards activities of the Institute. The more vested the interest, the better for the standards constituency.

IEEE standards developers have new voting options.

The Standards Board approved entity balloting (e.g., corporate balloting) as a part of the traditional IEEE standards consen-

sus process. Remember, the IEEE-SA By-laws include several new membership categories, such as company, government, and organization. Now, an IEEE committee can declare at the outset of its project (PAR) that it will proceed with a corporate-level ballot, as distinct from an individual-based ballot. IEEE hosts a broad range of standards programs, coming from diverse industry sectors. Now we have started to enable IEEE to embrace that diversity with options for proceeding rather than a "one size fits all" policy.

Issues and challenges.

1) There is strong interest in a mixed balloting process, which could include individuals and company representatives, as an example. The Standards Board is working on this during 1999.

2) Some IEEE standards developers have shown resistance to joining the SA (we have approximately 3500 individual members). The requirement for membership is directed toward the consensus ballot privilege. If you want to ballot, you must join the SA. However, if you want to work on the writing of the standard, you have no SA membership requirements. Our balloting statistics show an increase in activity, which indicates that overall, SA membership has not been a deterrent for that level of participation.

A new organization has been formed that allows IEEE to provide a full range of standards services to its members and their industries.

Over the last several years, we have been keenly aware of the proliferation of industry groups that have formed for the purpose of developing industry standards and running related programs. These groups formed because they found that the IEEE was not able to respond adequately and quickly enough to the market demands of their technologies. We had to ask ourselves, Why shouldn't this work be done in the IEEE? These are IEEE technolo-

gies! And as a result the IEEE-SA developed the IEEE Industry Standards and Technology Organization (IEEE-ISTO), which was approved by the IEEE Board of Directors in November 1998 and launched on 1 January 1999.

The new organization's goals complement the activities of the IEEE-SA. It provides a forum in which development processes and related activities can be tailored to the technology, market, and participants. It also offers support for industry-specific post-development activities, including marketing, certification, branding, and conformity assessment. The Medical Device Communications Industry Group is the first group to organize within the IEEE-ISTO. Several additional programs are expected as 1999 progresses.

Together, the IEEE-SA and the IEEE-ISTO enable the IEEE to offer industry an unprecedented level of choice through a complete menu of standards activities and services.

Issues and challenges.

1) IEEE's ability to change its culture in its standards activities toward one that focuses on identifiably market-relevant initiatives.

2) The IEEE ISTO must provide proof of concept that it is functioning as a supplier to the Societies and the Standards board, not a competitor.

Our goals for this year include an aggressive globalization program, new product and service opportunities, and increased communication and improved relationships with the IEEE Technical Societies. We will keep you informed through this newsletter and other media, and we welcome your thoughts and comments. 

Judy Gorman
Managing Director
IEEE Standards

New IEEE Video Prepares Engineers for P.E. Exam

PISCATAWAY, NJ, 27 July 1999 — The IEEE has released *P.E. Review: Electronics*, a video tutorial that will prepare engineers to take the Electronics portion of the Professional Engineering (PE) Licensing Examination in October, 1999 or April, 2000.

P.E. Review: Electronics focuses on the essential concepts required to analyze and design complex circuits and provides valuable hints on maximizing test scores. State licensing boards use examinations prepared by the National Council of Examiners for Engineering and Surveying (NCEES). Expanding on the sample problems put forth in the NCEES's *Principles*

and *Practice of Engineering (PE)*, this video tutorial covers the following topics:

- Bipolar junction transistors (BJTs)
- Field effect transistors (FETs)
- Switching power supplies
- Operational amplifiers (Op-Amps)
- Frequency Response, and much more

Presenters Dr. Martin S. Roden and Dr. Sidney Soclof have utilized their combined 65 years of experience, including courses presented through instructional television networks, to anticipate the types of questions viewers will have. Both Roden and Soclof are professional engineers and university professors.

Run Time: 2 Hrs./15 Mins.;
IEEE Order #: HV7044-QVE;

List Price: \$199.00;
IEEE Member Price: \$125.00

Order from IEEE Customer Service, 445 Hoes Lane, PO Box 1331, Piscataway, NJ 08855-1331, USA; e-mail: customer-service@ieee.org; phone: 1.800.678.4333; Web: <http://www.ieee.org/eab>.

For more information on this video tutorial, contact Patty Mickus, IEEE Media Producer, at p.mickus@ieee.org. To learn more about P.E. licensure, visit the NCEES Web site at www.ncees.org. 

Best-Selling IEEE Book Series Goes Electronic!

PISCATAWAY, NJ, 24 March 1999 — Now available on CD-ROM from the IEEE is the best-selling Engineers Guides To Business Series. Originally produced and still available in book format, this series seeks to develop within the business-minded engineer an awareness of non-technical skills. Titles in the series include:

Presentations That Work

Writing for Career Growth

High-Tech Creativity

Winning the New Product Development Battle

Building Internal Team-Partnerships

Teaching on TV and Video

Starting a High-Tech Company

Working in a Global Environment

Starting to Manage: The Essential Skills

Marketing for Engineers

Practicing Engineering Ethics

Highly applications oriented, this CD-ROM is meant to be used on the job to close the gap between the working engineer's technical knowledge and business know-how.

IEEE Product Code: EC105-QVE;
1 CD-ROM;

IEEE Member Price: \$79.99;
IEEE List Price: \$99.99

Order from the IEEE Customer Service Department, 445 Hoes Lane, PO Box 1331, Piscataway, NJ 08855-1331, USA. For single sales, call 1-800-678-IEEE (1-732-981-0060 outside the USA and Canada); for company or institutional sales, call 1-800-701-IEEE; or fax 732-981-9667. Shipping and handling charges apply. E-mail: customer-service@ieee.org. 

IEEE Publishes Self-Study Course On Radar

PISCATAWAY, NJ, 4 June 1999 — The IEEE announces the release of *Fundamentals of Radar*, its first self-study course on this advancing technology. Designed to serve as an introduction to radar for engineers entering the field as well as assist practicing engineers in upgrading their skills in radar design and analysis, this course comes complete with a textbook and exercise/solutions manual. Topics covered include functions and parameters, the radar equation, detection of targets, tracking and track-while-scan, radar hardware, signal processing introduction, and case studies.

Participants will gain an understanding of:

- radar principles
- fundamental calculations necessary for the design, analysis, evaluation, and testing of radar systems
- modern radar and trends in radar development
- modern analytic techniques appropriate to radar design, analysis, and evaluation, and much more!

Those who successfully complete the course may earn 8 CEUs (Continuing Education Units) from the IEEE.

List Price: \$384.00;
IEEE Member Price: \$307.00;
IEEE Order Code: HL5723-QVE

Order from the IEEE Customer Service Department, 445 Hoes Lane, PO Box 1331, Piscataway, NJ 08855-1331, USA; E-mail, customer-service@ieee.org; Phone: 1-800-678-IEEE (1-732-981-0060 outside the USA and Canada). 

IEEE and Global Resources Collaborate To Offer MBA PowerPak™ Course To IEEE Members

PISCATAWAY, NJ, 23 June 1999 — The IEEE has collaborated with Global Resources, a global management training and consulting firm, to offer MBA PowerPak™ to IEEE members at a special discounted price. IEEE members who attend the eight-day, two-part program are eligible to receive 6.3 IEEE Continuing Education Units (CEUs).

MBA PowerPak™ is designed for technical/scientific managers who are working across and between business functions and organizations; middle and high-performance junior level managers who are interfacing with all management levels; and managers who want to expand their business knowledge and are seeking a useful toolkit of skills and resources. The program offers instruction in the most critical MBA disciplines, including Business Strategy and Planning, Marketing in a Global Economy, Mastering Financial Analysis, and Managing in the New Millennium. Upcoming MBA PowerPak sessions that will honor the special IEEE member rate include:

- Chicago (Lisle, IL): Sept. 21 - 24 and Oct. 26 - 29, 1999 (10% off to IEEE members)
- Somerset, NJ: Oct. 19 - 22 and Nov. 30 - Dec. 3, 1999 (10% off to IEEE members)
- Plus, a special IEEE member-focused session to take place in the Boston area:

Nov. 16 - 19 and Dec. 14 - 17, 1999 (15% off to IEEE members)

Many of the nation's leading corporations—including AT&T, Johnson and Johnson, Loral Skynet, and Lucent Technologies—have enrolled their employees in MBA PowerPak™. *"The program prepares the manager for the innovative business environment and the challenges and technologies of the New Millennium,"* says Global Resources President Di Landau. *"Accelerating rates of technological change, new forms of competition, and complex social forces are just some of the business issues that Global Resources and the IEEE foresee in the landscape of business in the twenty-first century."*

Designed in partnership with Northeastern University's College of Business Administration, MBA PowerPak's content structure is modeled from the course curriculums of the top MBA programs in the U.S., including Northeastern's, Harvard's, Stanford's, and Wharton's. All MBA PowerPak instructors have advanced degrees in addition to their minimum fifteen years of high-technology business and overseas field experience. In the classroom, the instructors blend traditional academic models with case studies and examples.

MBA PowerPak™ offers:

- The chance to learn core MBA skills without having to enroll in a formal MBA program

- The opportunity to discuss real-world management challenges and obtain experiential input from classroom peers and MBA PowerPak's™ specialized teaching staff
- Program certification through Northeastern University's College of Business Administration
- 6.3 IEEE Continuing Education Units (CEUs)

To register or obtain additional information regarding the course curriculum, training staff, scheduling, and pricing, managers are encouraged to visit the MBA PowerPak™ Website at www.MBA PowerPak.com, or to call the MBA PowerPak™ Registration Center at 1-877-GRTRAIN (1-877-478-7246). For more information about the IEEE and how to become a member, contact Christy Bouziotis at c.bouziotis@ieee.org.

Global Resources is a nine-year-old consulting and training firm specializing in global business planning and management. The company is based in Bridgewater, NJ and Irvine, CA, and has worldwide affiliates. 

IEEE/ABET Seek Evaluators for Accreditation Programs

The IEEE Educational Activities Board seeks engineering professionals from industrial, government, and academic sectors to serve as program evaluators for accrediting engineering and engineering technology programs at U.S. universities. Nominations will be accepted through 1 November 1999.

The IEEE members selected will attend a one-day training seminar on the IEEE/ABET accreditation process, the first of which to take place at the June 2000 ASEE convention in Saint Louis. The IEEE and ABET, through their pool of trained program evaluators, will be able to visit engineering and engineering technology departments across the country. Evalua-

tion sessions take place each fall and generally run for two to three days. "Participation in the accreditation process for IEEE/ABET engineering programs is a major responsibility," said Rae Toscano, manager of IEEE EAB Administration. "Service as a program evaluator provides IEEE members with the opportunity to contribute to the achievement of high

quality educational standards in engineering programs.”

Nomination packages are available from: Accreditation Administrator, IEEE Educational Activities, 445 Hoes

Lane, Piscataway, NJ. 08855-1331; accreditation@ieee.org (e-mail); or 1.732.562.5484 (phone). Complete information packages, including the application and nomination forms, are available on the WWW at: [http:// webstage.](http://webstage.)

[iee.org/organizations/eab/accengineer.htm#Engineering](http://www.ieee.org/organizations/eab/accengineer.htm#Engineering) (for engineering programs), and <http://webstage.ieee.org/organizations/eab/accengtech.htm#Technology> (for engineering technology programs). 

International Journal of Subsurface Sensing Technologies and Applications

Announcement and Call for Papers

Kluwer Academic/Plenum Publishers announces a new quarterly journal, the *International Journal of Subsurface Sensing Technologies and Applications*.

Articles relating to subsurface sensing technologies and applications scatter in a number of journals across many different scientific and engineering disciplines. There are many engineers, researchers, manufacturers and users involved in these technologies but there is no single central source for them. The journal serves as an international forum for reporting advances and progress in the research and development of subsurface sensing technologies and their applications in many scientific and engineering disciplines.

The journal's scope is broad and multidisciplinary, covering all areas of subsurface sensing technologies, such as radar, interferometer, ultrasonics, acoustics, microwaves, millimeter-waves, submillimeter-waves, infrared, optics, etc., and applications, such as nondestructive testing, medicine, biological sciences, forestry, communications, law enforcement, civil, agriculture, environment, geology, construction, railroads, maritime structures, archeology, petroleum, chemistry, food, surface metrology, unexploded ordnance and mines, mining, utilities, industrial process monitoring, drying, materials, RFID (Radio Frequency Identification), etc. The journal publishes peer-reviewed original research and review articles, both full-length and short papers, addressing theory and practice on topics including but not limited to sensing techniques, systems, subsystems, antennas,

circuits, signal and data processing and modeling, target modeling, propagation and interaction of sensing signals in media, material evaluation, subsurface sensing applications, and related topics. It will also feature news relating to subsurface sensing technologies, applications, equipment, and conferences.

Currently, there is no single journal devoted for the subsurface sensing technologies and applications and covers the broad scope of this journal. The journal is the first of its kind. It brings together all the activities relating to subsurface sensing technologies and applications under a unique publication.

The inaugural issue will appear in January 2000. The first two issues are planned to include regular papers as well as those providing a critical assessment of the present status of some subsurface sensing areas.

Please send your manuscript and three copies for possible publication to:

Cam Nguyen, Editor
Texas A&M University
Department of Electrical Engineering
College Station, Texas 77843-3128 USA
Tel.: (409) 845-7469
Fax: (409) 845-6259
E-mail: cam@ee.tamu.edu

The following special dead lines for manuscript submissions are requested only for the first two issues:

First issue: July 10, 1999
Second issue: August 31, 1999

Please note that **these deadlines are very firm** to allow timely publications of the first and second issues.

Suggested Topics

The *International Journal of Subsurface Sensing Technologies and Applications* will publish papers in all areas of subsurface sensing technologies and applications, including but not limited to the following topics:

A. Subsurface Sensing Systems and Techniques

- Ground penetrating radar
- Surface penetrating radar
- Interferometer
- RF, microwave, millimeter-wave and submillimeter-wave sensors
- Acousto-ultrasonic sensors
- Infrared sensors
- Optical sensors
- Impulse radar
- FMCW radar
- Stepped-frequency radar
- Synthetic aperture radar
- Multi-channel radar
- Resonator sensors
- Transmission sensors
- Reflection sensors
- Magnetic resonance imaging system
- Medical ultrasound imaging system
- Thermography
- System design and analysis

- System integration, packaging, test, manufacturing and implementation
- Others

B. Components for Subsurface Sensors

- Antennas
- Antenna arrays
- Circuits
- Receivers
- Transmitters
- Pulse generators
- Samplers
- Others

C. Subsurface Sensing Signal and Data Processing

- Signal and data processing techniques
- Image processing
- Data interpretation
- Others

D. Applications of Subsurface Sensing

- Civil engineering
- Agricultural engineering
- Wood engineering
- Environmental engineering
- Petroleum engineering

- Archeology
- Geology
- Inspection of highways, roads, bridge decks, and pavements
- Inspection of underground utilities
- Detection and inspection of pipes and cables
- Nondestructive evaluation
- Nondestructive testing
- Sink-hole detection
- Detection of unexploded ordnance and mines
- Mining
- Building construction
- Inspection of aging railroads
- Inspection of aging maritime structures
- Detection of buried objects and subsurface contamination
- Measurement of liquid level
- Evaluation of wood products
- Industrial applications including drying (papers, leathers, wood, concrete, polymers, tobacco, etc.), process monitoring, fusion, nuclear waste treatment, etc.
- Applications in the food industry
- Surface metrology (inspection of surface roughness and defects, etc.)

- Biological effects and medical applications
- RFID (Radio Frequency Identification)
- Other existing and new applications

E. Guided-Wave Structures and Propagation of Sensing Waves

- Propagation of waves in media
- Interaction of waves with matter
- Propagation of waves on waveguides and transmission lines
- Modeling of targets and buried objects
- Time-domain transient analysis of signals
- Dispersion and distortion of signals
- Others

F. Properties of Materials

- Properties of materials
- Microwave aquametry
- Measurement techniques of materials
- Others

G. Other Related Topics to Subsurface Sensing and Applications

Mikon 2000 General Information

Recently the traditional International Microwave Conference MIKON have been organised as a biannual event, widely opened to all scientists and engineers throughout the world, particularly to the large group of participants from the Central/Eastern European region.

We are pleased to inform you that International Conference on Microwaves Radar and Wireless Communication MIKON-2000 will be held in Wroclaw, on May 22-24, 2000.

Papers describing original, unpublished work on the utilisation and application of microwave theory and techniques, concerning many aspects of radar technology, microwave and optical communication systems are solicited. Instruction and re-

quirements for submission are listed on the "Contributions" page.

Acceptance of the papers will be based on the following three criteria (with equal weighting): originality, technical or scientific value, clarity and suitability. In addition to the regular scientific papers, application oriented papers are solicited to highlight new applications and implementations in the microwave and millimeter wave domain. Commercial presentation will not be accepted.

Authors can also request that their papers be considered for poster or exclusively oral type of presentation. We will respect the authors preference where possible but reserve the right to place the paper in the category we consider most appropriate,

consistent with the constraints of the technical program.

During the MIKON-2000 Conference we plan to organise a Technical Exhibition, Workshops as well as Young Scientists Contest.

The conference will be held in the old and charming capital of Lower Silesia - Wroclaw which may be conveniently reached by plane, train or car. Climate in Poland is usually mild and very pleasant at the end of May. The city of Wroclaw has an average temperature in May about 15 to 20 °C and humidity of 75%.

Additional information and a template for the required format are available in the "Contributions".

Do not miss an opportunity to meet people fascinated by microwaves and their many applications.

TOPICS LIST

1. Antenna Design, Modelling and Measurement
2. Active Devices and Components
3. Passive Devices and Components
4. Microwave and Optical Integrated Circuits
5. Millimeter and Submillimeter Technology
6. Photonics, Microwave - Lightwave Interaction
7. RF, VHF and UHF Technology
8. Field Theory
9. Microwave Acoustics
10. CAD Techniques, Modelling and Simulation
11. Microwave Measurements
12. Industrial, Environmental and Medical Applications
13. Microwave and Optical Communication Systems
14. RF Wireless and Cellular Communication Systems
15. Radar Technology
16. Radar Polarimetry and Signatures
17. Sensors, Detectors and Vehicular Radars
18. Electromagnetic Compatibility
19. Packaging and Interconnects

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CONTRIBUTIONS

A complete manuscript in English describing new work in the areas of Conference Topics should be prepared to camera ready copy standard and should be received with five additional copies by December 15, 1999. Full text of the paper should occupy no more than four (but no less than three) A4 pages including figures, tables and references.

The title (in capital bold letters) should be centered 25 mm from the top of the first page and the author's name should also be centered two lines below the title.

Abstract, typed single-space and occupying no more than six lines (about 50 words) should start three lines below the title. The text should start three lines below this and be typed using a 10 point font, single-space and all margins of 25 mm.

Author's affiliation and address should be typed at the bottom of the first page and should be related to the name of author by reference marks, like *, #, +, etc.

An example of "Format of paper" is available for download here. Please make pagination in pencil on the reverse and send one Author Information Form for each paper submitted. Please use number 20 for topics which are not listed.

All contributions presented in oral and poster sessions will be included in the Conference Proceedings.

All correspondence from the organizers will be addressed to the first author of the paper. Notification of acceptance will be sent by e-mail. Manuscripts of the papers will not be returned to the authors.

Fax or e-mail submission can not be accepted.

WORKSHOPS and TECHNICAL EXHIBITION

Two workshops are planning for Sunday afternoon, May 21, 2000. Information about topics and organisers will be given in October 1999 on homepage and in the Second Announcement.

Interested Companies are invited to exhibit their products and to advertise their services.

YOUNG SCIENTIST CONTEST

Young scientist competition will be organized as a part of the Conference. Papers will be reviewed in the same manner as all other conference papers. Papers accepted for the competition will be judged for content, presentation and visual materials. First, second and the third prizes will be awarded. Additional prizes will be also founded by the Polish IEEE chapters. Eligible candidates i.e. PhD students or young engineers, must be under 35 years

of age. The candidate must be the lead author of the paper and must present the paper during the Conference in either an oral or a poster session. In the case of a paper co-authored by an advisor, a letter stating that the work is primarily that of the candidate, signed by the candidate's advisor, must be included with submission.

IMPORTANT INFORMATION

Official language of the Conference is English

Important Dates:
Return of the Pre-registration Form:
15.12.1999

Deadline for the manuscripts: 15.12.1999
Notification of acceptance: 15.02.2000

All mail should be addressed to:

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The next information about the Conference will be sent to the authors and preregistrated participants in the Second Announcement in March 2000.

FORMAT FOR PAPER - Title Page

THE TITLE OF THE PAPER

Name of first author*, name of second author#....etc.

Abstract

end of the abstract.

Beginning of the text at the first page
(single-space, 10 point font and all margins 25 mm)

A-4
(210 x 297)

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Next pages

Beginning of the text at the second and next pages
(single-space, 10 point font and all margins 25 mm)

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The text must not extend below here.

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I intend to present a paper: Yes*¹ No

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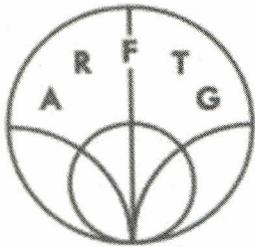
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Type of Presentation oral poster

Check, if young scientist paper age of presenter _____
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54th Conference • Characterization of Broadband Access Technologies

Westin Peachtree Hotel, Atlanta, Georgia • December 2-3, 1999

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The Automatic RF Techniques Group will hold its 54th ARFTG Conference in Atlanta, Georgia on Thursday and Friday, December 2-3, 1999. We invite you to submit a paper on RF and microwave measurements to our 54th ARFTG Conference. We particularly seek original papers related to characterization of RF/Microwave components and systems for broad-band access. Examples of topical treatments of interest include:

- channel characterization and modeling
- LMDS, MMDS & other Broadband Wireless Access Systems
- digital cable and broadcast television
- wireless local loop
- wireless LAN

Contributed papers focusing on measurement requirements for broad-band access technologies are especially encouraged. Papers are also invited in other areas of automated microwave and RF measurements, including network analysis, calibration techniques, on-wafer measurements, power, and noise.

Planned Special Sessions

Vector Network Analyzer Measurement Accuracy Broadband Measurements for High-Speed Digital Interconnects Characterization Techniques for Printed Circuit Boards

Deadlines

September 3 Abstract/Summary Due (send to Joy Laskar: joy.laskar@ece.gatech.edu)
October 18 Final Paper Due (send to Brian Pugh: bpugh@siliconwave.com)

Instructions to Authors

Contributed papers will be presented as 20 minute talks or in an interactive poster session, and published in the 54th ARFTG Conference Digest. By the stated abstract/summary deadline we request authors to submit a one page abstract and a 500 to 1000 word summary, including illustrations, to allow for evaluation with regard to the interests of the participants and the quality and novelty of the work. Please make your submission electronically to the Technical Program Chair. Follow the *Abstract/Summary Submission Instructions* found on our conference web site, <http://www.arftg.org>.

Authors of accepted papers must submit their full publication electronically for future inclusion in CD-ROM or web-based conference records and printed digest. For further details on electronic paper preparation and submission, please read the *Instructions for Authors* found on our web site.

Exhibits & Short Course

The 54th ARFTG Conference also offers an outstanding exhibition opportunity. Please visit our web site, or contact our Exhibits Chairman directly for further information.

The 6th annual ARFTG Short Course will be held November 30 and December 1 at the conference hotel. For information see the web site or contact the Short Course Coordinator, Dave Walker, at 303-497-5490 (walker@central.bldrdoc.gov).



www.arftg.org



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