IEEE SOCIETY ON MICROWAVE THEORY AND TECHNIQUES

NEWSLETTER

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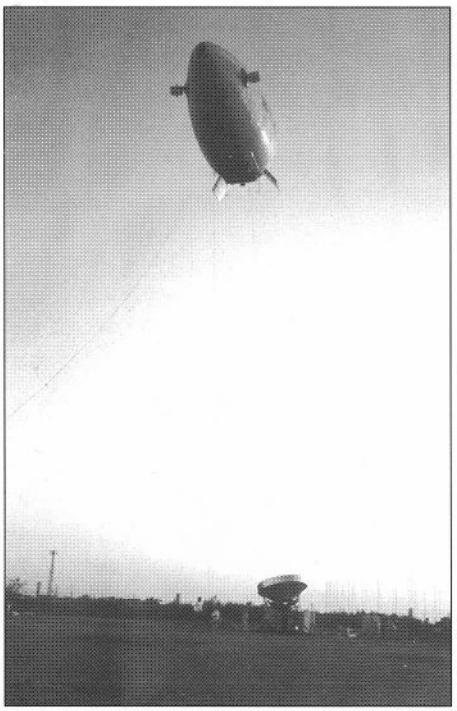
WPT '95: The Second Wireless Transmission Conference

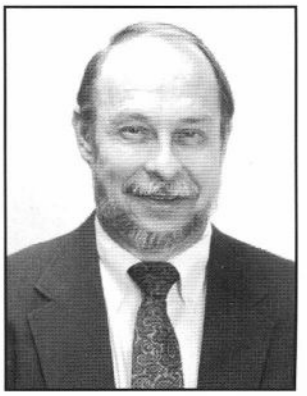
(see page 23)



Thomas Cuthburt on Wideband Direct-Coupled Filters

(see page 27)

President's Message



by John Wassel

The first MTT-S AdCom meeting of 1996 was held in San Francisco on Sunday evening and Monday of 14-15 January. The Technical Program Committee had met earlier on Sunday morning to select papers for the 1996 International Microwave Symposium. A record 810 papers from all over the world had been submitted for review and 466 papers were accepted for the technical sessions. The 1996 IMS Steering Committee headed by Jim Crescenzi has planned an outstanding series of events for Microwave Week, 16 through 21 June, in the Queen city of the Pacific Coast, San Francisco. I think we will have a record symposium this year. The Microwave Exhibition which is held in conjunction with the IMS has sold all the available booths (566). A new feature of the Exhibition is the Microwave Applications and Products seminars to be held on the exhibition floor for manufacturers to present their product application materials. The attendees will have a unique opportunity to complement their technical education and enjoy themselves with the Microwave symposium, the Microwave and Millimeter-Wave Monolithic Symposium, the Automatic RF Techniques Group, the workshops and a full plethora of social functions.

Our outgoing President, Eliot Cohen, opened the AdCom meeting with a review of last year's status before the traditional passing of the President's lapel pin to me. We had an outstanding IMS last year in Orlando, we are in good financial condition, and Bob Trew has reduced the backlog on the *Transactions*. A new technical committee MTT-S-I9 was established to deal with Microwave Technology Business issues and six new joint MTT-EDS chapters were formed in the former Soviet Union thanks to the efforts of Rolf Jansen. Seattle and Philadelphia were chosen for the 2002 and 2003 IMS's respectively. And a special note of thanks for the wonderful job that Eliot did as our 1995 MTT-S President!

We presently have a very healthy surplus, far above our operating needs, and a range of activities like the IMS and our publications that continue to do well financially in addition to being well received by our technical community. This surplus has continued to grow each year and coupled with the investment returns of the last several years has grown substantially. At present, we have a surplus of about 3.1 million dollars which is roughly 50% more than our operating budget of around 2.1 million dollars. Your AdCom is presently reviewing our finances and will be exploring some additional programs to develop.

Roger Pollard, Bob Trew, and Roberto Sorrentino are members of an newly chartered *ad hoc* committee to formulate a position on internet publishing of research papers. It may be possible to move to on-line reviews and decrease the reviewing times for submitted papers. Another proposal is to start a new electronic journal. There are several issues to investigate before a formal policy is initiated. Roger will be soliciting opinions and if you have a constructive idea you wish to sponsor, please see Roger so he can bring it before his committee.

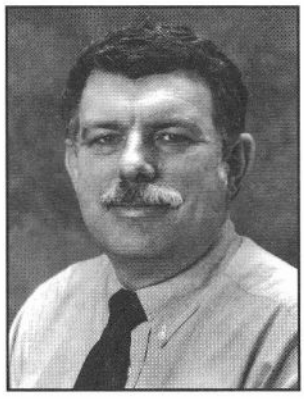
We've joined with the Electron Device Society (EDS) to sponsor several joint MTT-EDS chapters in the former Soviet Union last year and there is a real need to support new chapters in Indonesia, India, and other developing countries. Our support is presently quite modest and usually consists of subsiding the IEEE and society memberships which might be several months of income for some of the engineers in these countries. We will be trying to increase travel support for members of these chapters to travel to the IMS. The funding is being done on a trial basis and we'll be evaluating the effectivity of this program over the next three or so years. Rolf Jansen, Eikichi Yamashita, and Jung-Woong Ra are the AdCom members of the Transnational Committee

responsible for these developments. Andre VanderVorst will be helping Józef Modelski of Poland in coordinating and developing Region 8 activities in the European microwave communities.

MTT-S provides some support for several intersocietal activities such as the GaAs IC Symposium, the Lightwave Technology, and the International Microwave Power Institute. A long standing involvement with the Solid State Council will be ending this year. At the recent IEEE Technical Activities Board in February, TAB accepted the petition for the council to become a society—the Solid-State Circuits Society. The initial support was provided by MTT-S (MTT-17) , the Electron Device Society (ED-15), the Circuits and Systems Society (CAS-04), the Communications Society (COMM-19), the Lasers and Electro-Optics Society (LEO-36), the Computer Society (COMP-16), and the Components, Packaging, and Manufacturing Technology Society (CPMT-21). The Solid-State Council activities have been cultivated over the years to the point where they are self-sustaining. I think it's quite possible that we will need to start another council for the nano and quantum device technologies considering the overlaps that are happening in the microwave and digital domains.

I've only touched on some of the activities covered by MTT-S. I urge you to consult the 1996 Committee Directory for those areas of your specific interest and to contact the committee members directly with your queries and suggestions. We're all interested in improving our Microwave Theory and Techniques Society to provide good value for the members. I also urge you to support your local chapter activities. MTT-S is your society.

ARFTG Highlights Spring '96



by John T. Barr, IV

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

46th ARFTG Conference: Testing for Wireless Applications

The 46th ARFTG Conference was held in Phoenix / Scottsdale, AZ on November 30 & December 1, 1995. The theme of this conference was Testing for Wireless Applications. There were 107 paid attendees and seven exhibits that was held in the concurrent exhibitors' room. Below is a list of the presented papers and the presenters.

- "A Comparative Study of TOSL, TRL and TRL* Network Analyzers Calibration Techniques, Using Microstrip Test Fixtures", M. Shaw
- "Two-Tier Multi-line TRL for Calibration of Low-Cost Network Analyzers", J. A. Jargon
- "Optimizing Time-Domain Network Analysis", D. C. DeGroot
- "T-Matrix De-embedding of IC Metal Transmission Lines to 18 GHz", T. J. Maloney
- "Line-Reflect-Match Calibrations with Nonideal Microstrip Standards", D. F. Williams
- "Load-Pull Characterization and Modeling of Chip and Plastic-packaged HBT's for PCS Amplifier Applications", G. N. Henderson
- "On Wafer RF Testing Characterizes Current Sag on GaAs MESFETs", T. Driver
- "Using Digital-Modulated Signals to Measure the Gain Compression and Phase Distortion of a Radio Frequency Amplifier", J. R. Welch
- "Automated Large-Signal Load-Pull Characterization of Adjacent-Channel Power Ration for Digital Wireless Communications Systems", J. F. Sevic
- "A 10-6000 MHz Receiver and Signal Separation Test Set Development for a Mixed-Signal Automatic Test Equipment System", W. Y. Ali-Ahmad

- "Impedance Matching Probes for Wireless Applications", S. Basu
  *** Tied for Best Conference Paper ***

- "Testing of the 2.4 GHz Band Spread Spectrum Sound Transceiver Unit Using an Elastic Type SAW Convolver", H. Ide

- "Advance Technology Speeds Production RF-Integrated Circuit Testing", A. Kafton
  *** Tied for Best Conference Paper ***

In addition there was a panel session on "Automated Measurements Issues for the Linear Power Products." The panelist were Mark Roos, Joe Staudinger, Gary Simpson, John Barr and Bob Baetan.

The Conference Chair was Bill Pastori of Maury Microwave, and the Conference TPCs were Mike Golio and Dave Halchin of Motorola. A conference digest is available, please contact Henry Burger, ARFTG, 1008 East Baseline Road, No. 955, Tempe, AZ 85283-1314. Cost is $20.00 for an ARFTG Member and $45.00 for a non-member. An additional $9.00 is requested for airmail outside the USA.

Second Microwave Measurements Short Course

For the second year, ARFTG and National Institute of Standards and Technology joint hosted a short course on Microwave and RF Measurements for Wireless Communications prior to the regular ARFTG meeting in Scottsdale. Ninety attendees plus ten instructors cover the basics for RF/Microwave testing on the first day. The second day was focused on topics specifically related to wireless RF testing with emphasis on digital modulation testing. Due to the strong interest, ARFTG has decided to have the short course as a regular part of its Fall meeting.

Upcoming Activities

47th ARFTG CONFERENCE—
High Power RF/Microwave Device Measurements

The 47th ARFTG Conference will be held in San Francisco on Friday, June 21, 1996 in conjunction with the IEEE MTT-S International Microwave Symposium. The theme of this one day technical conference with concurrent manufacture exhibits will be High Power RF/Microwave Device Measurements. High power RF/Microwave devices and subsystems used in today's telecommunication systems have many challenging test requirements and problems. This includes device characterization and modeling at the wafer stage to performance verification at the system level.

Papers are solicited relating to device or subsystem measurements at high power levels, 10 watts or greater. The following areas are suggested:

- Device Characterization

- Distortion Measurements, including Multiple Carrier Intermodulation

- Large Signal Measurements and Temperature Effects

- Device Measurements in "Isothermal" Environment

- Group Delay and Linearity

- System Calibration and Verification

Papers are also invited on other areas of automated microwave and RF testing including improved techniques for calibration and verification, MMIC related measurements issues, CAD, millimeter wave systems and other topics of current interest to the RF/Microwave community.

Along with the technical presentations, the attendees will have ample time for informal discussion among themselves during the breaks and during the provided lunch. There will be time for discussion with vendors and viewing of exhibits to see the latest in automation and measurement products. The registration fee includes technical sessions, exhibits, lunch and break refreshments, one year membership in ARFTG and a post-conference digest of the presented papers. See the IMS-1996 registration materials for more information concerning times and location.

Those interested in participating should contact:

Ken Wong
Conference Chair
Hewlett Packard
1400 Fountaingrove Parkway
Santa Rosa, CA 95403
phone (707) 577-2616
fax (707) 577-5484

or Mohammed Sayed
Conference TPC
Hewlett Packard
1400 Fountaingrove Parkway
Santa Rosa, CA 95403
phone (707) 577-3565
fax (707) 577-2887.

Those interested in exhibiting should contact:

Michael Fennelly
ATN Microwave
11 Executive Park Drive
Billerica, MA 01821
(w) (508) 667-4200 x18
fax (508) 667-8548.

Deadline for earlier paper submissions is March 1, 1996 with the final camera-ready paper submission deadline is April 12, 1996. Potential presenters should request the ARFTG Author's Preparation Package.

EXCOM Activities

At the Phoenix meeting reelected to three year EXCOM terms were Kevin Kerwin, Roger Marks, Pat Nolan, and Gary Simpson. In addition, EXCOM officer elections were held and officers elected were Kevin

Kerwin as President, Ken Wong as Vice-President, William Pastori as Treasurer, and Pat Nolan as Secretary.

One of the more enjoyable activities of any professional organization is the recognition of outstanding achievement. During the 46th Conference, ARFTG recognized; Neil Larsen with the Automated Measurements Career Award; and Service Award for Mike Caldwell.

Measurement Professional? or Interested in Learning More?

We will be looking forward to discussing the latest in measurement automation and accuracy with you in San Francisco. ARFTG brings you the latest in RF, Microwave and Millimeter wave analysis, design and measurement. State of the art papers are presented twice a year. If you are involved in automated measurement techniques, come and join your peers and keep current with our ever-evolving technology. For more information on ARFTG or future conferences, write:

John Barr
Santa Rosa System Division - 3US-Q
Hewlett-Packard
1400 Fountaingrove Parkway
Santa Rosa, CA 95405-1799.

47th ARFTG Conference: *High Power RF/Microwave Device Measurements*

by Harmon W. Banning
Publicity Chairman

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For more information on ARFTG contact Harmon Banning, W. L. Gore & Associates, Inc., 1901 Barksdale Road, Newark, DE 19711, (302) 368-3700, e-mail: hbanning@WLGORE.com.

MTT-S AdCom Nominations and Elections

by Barry E. Spielman
Chairman
Nominations and Appointments Committee

Call for AdCom Nominations and Committee Appointment Suggestions

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

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

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

- Nomination by the Nominations Committee,
- Nomination by petition signed by 25 MTT-S members and submitted to the Nominations Committee prior to July 1, 1996,
- Chapter nomination submitted prior to July 1, 1996.

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

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

Present Elected AdCom (1996): Total = 18

Mid-Atlantic-Eastern U.S.	4
Southeastern U.S.	1
Middle Region U.S.	3
Southwestern U.S.	1
Western U.S.	5
Europe	2
Asia-Pacific Region	2
Industry	11
Government	2
University	5

The Nominations Committee needs your help in suggesting potential nominees to serve our membership as AdCom members. Please submit your suggestion to your local Chapter Chairman and/or to B. Spielman, N&A Committee Chairman, Washington University, One Brookings Drive, Box 1127, St. Louis, MO 63130, or fax (314) 935-7500, by July 1, 1996.

Newly Elected AdCom Members and Officers

AdCom officers and members were elected to serve during the 1996 calendar year at the fall 1995 AdCom meeting. The following individuals were elected to AdCom:

- Roger Pollard (re-elected to second, three-year term)
- Jung-Woong Ra (newly elected to three-year term)
- Ed Rezek (re-elected to second, three-year term)
- Roger Sudbury (re-elected to second, three-year term)
- Glen Thoren (re-elected to second, three-year term)
- Robert Trew (newly elected to three-year term)
- Charles Jackson (newly elected to one-year term)

The following individuals were elected to serve as AdCom officers during 1996:

- John Wassel—AdCom President, 1996
- Richard E. (Skip) Bryan—AdCom Vice President, 1996

The following sections provide brief biographical sketches of the newly elected AdCom officers and members to better acquaint the reader with these outstanding individuals:

New Officers

John Wassel

John Wassel is a deputy manager of microwave and antenna research and development programs for the Advanced Technology Division in the Texas Instruments Defense Systems and Electronics Group. Beginning in 1968, he served as a senior engineer at Texas Instruments, involved in varied microwave design activities such as phase shifters, YIG oscillators, mixers, filters, coupler, amplifiers, and various monolithic microwave integrated-circuit studies. He worked on microwave telecommunication systems at Collins Radio in Dallas, Texas, from 1965-68. From 1960-64, John was employed at LTV Continental Electronics in Dallas, developing high-power radar and radio transmitters.

John has been extensively involved in professional activities. He has served the Dallas IEEE/MTT-S as program Co-chairman, Treasurer, Secretary, and Chairman. He also has served the Dallas IEEE Section as Technical Studies Chairman, Conference Coordinator, and now serves as Historian. He was the Chairman of the 1990 IEEE/MTT-S International Microwave Symposium (IMS) and was a member of the Steering Committee for the IMS held in 1982 and 1987. He has served as the MTT-S Newsletter editor beginning in 1990 until this past year. John was elected to serve on AdCom in 1991 and again in 1994. He is a founding member of the Aerospace and Electronics Systems Chapter in the Dallas Section, which was started in 1988. John is a Senior Member of the IEEE.

He has been recognized for his achievements as a recipient of the following awards: He received the Dallas MTT-S Chapter Service Award for the period from 1987 to 1988, and the Dallas IEEE Section Outstanding Engineer of the Year Award for 1990-91.

Richard E. (Skip) Bryan

Skip Bryan is the manager of cellular phone development for Ericsson, Inc., located in Research Triangle Park, NC, where he has been employed since November 1994. He has also served as a project manager in the space and communications area of Hughes Aircraft Co. from March 1996 through August 1979. From August 1979 to July 1993, he was the department manager for missile systems at Hughes. He then became the Vice President of Engineering for the Systron Donner Corp. from July 1993 to September 1994.

Skip received a BSEE degree from USC in 1969 and the MSEE degree, with a focus on electromagnetics and optics, from USC in 1972.

He has served IEEE in a variety of ways. He has served as the Chairman of the IEEE/MTT-S San Fernando Valley Chapter from 1988 to 1990. He also served as the Treasurer for the IEEE/MTT-S International Microwave Symposium in Long Beach, CA. Skip has served as an MTT-S AdCom member since 1990. During this time he has served as AdCom Treasurer and as the Co-Chair of the Meetings and Symposium Committee.

New AdCom Members

Charles M. Jackson

Charles Jackson serves as a project manager for the TRW Space and Electronics Group. His recent technical activities have involved the development of high temperature superconductors (HTS) for microwave applications. During the past six years this included development of HTS passive microwave devices, HTS SQUID phase shifter devices, and novel phase shifters incorporating HTS and ferroelectric materials. More recently he has been developing a low-noise, cooled receiver for ground terminals and satellite crosslinks. Prior to joining TRW, he worked for the Hughes Aircraft Company on the development of mm-wave mixers and space-qualified mixers. He joined Hughes after receiving his Ph.D. from UCLA in 1982.

His participation in IEEE/MTT-S activities began in 1983. Since then he has filled virtually all of the positions in the Los Angeles chapter of the MTT-S, including Member-at-Large, Publicity, Membership, Secretary, Treasurer, Vice Chairman, and Chairman. He is a Senior Member of the IEEE. He has worked on the Technical Program Committee for the IEEE/MTT-S International Microwave Symposium (IMS) since 1992. He participated on the Steering Committee of the IMS in 1989 as the Exhibits Liaison and Local Chapter Liaison and in 1994 as a member of the Finance Committee. He will be the Finance Committee Chair for the 1999 IMS to bel held in Anaheim, CA. Charles also serves as a technical reviewer for the IEEE/MTT-S, IEEE/ASC, and the Microwave and Optical Technology Letters.

Jung Woong Ra

Dr. Ra is a Professor in the Department of Electrical Engineering at the Korea Advanced Institute of Science and Technology (KAIST) in Taejon, Korea. His current research interests are in microwave engineering, forward and inverse scattering of waves, and electromagnetic geophysical remote sensing. Since joining the KAIST in 1971, he has served as the Director of the Division of Electrical Engineering and Computer Science (1983-86), the Dean of Faculty (1990-91), and Vice President of the Satellite Research Center (1990-92).

Dr. Ra received the B.S. in Electronics Engineering in 1967 from the Seoul National University in Seoul,

Korea. He received the M.S. degree in Electrophysics in 1967 and the Ph.D. degree in Electrophysics in 1971, both from the Polytechnic Institute of Brooklyn, NY.

He has distinguished himself through a variety of professional activities. He served as a Guest Scientist at the NBS in Boulder, CO, from 1982-83. From 1984-88 he served as a Board Member of the Korean Broadcasting system. Dr. Ra served as the Vice President of the KAIST Satellite Research Center from 1990-92. Since 1991, he has served as a member of the National Evaluation Committee of Industrial Telecommunication Technology. Since 1993, he has served as a Commissioner for the Korean Broadcasting Commission. Since 1994, he has served as: President of the Korean Society of Broadcast Engineers, Chairman of the Asia-Pacific Microwave Conference '95 in Korea, and President of URSI for South Korea. Dr. Ra served as the Chairman of the MTT-S Korean Chapter from 1990-91. He has published over 60 technical papers.

Robert Trew

Dr. Trew is the Dively Professor of Engineering at Case Western Reserve University. He currently serves as the Chair of the Electrical Engineering and Applied Physics Department at his university. During the four years prior to joining Case Western, he served as a program manager at the U.S. Army Research Office Electronics Division in Research Triangle Park, NC. In 1974, he received the Ph.D. degree from the University of Michigan, where he first began to work in the microwave area. While working in a position at the North Carolina State University (NCSU), he received the NCSU Award for Distinguished Scholarly Achievement in 1991 and the Alcoa Distinguished Engineering Research Award in 1992.

Bob has made important contributions to the professional field. He currently serves as the Editor of IEEE/MTT-S Transactions, a position he has held since March 1, 1995. He has published about 130 technical papers and holds two patents. He has been involved in many conference and technical meeting organizations. Bob is a Fellow of the IEEE.

Message from the Transnational Committee

by Rolf Jansen

Professor Josef W. Modelski, Poland Chapter, was nominated as the new MTT-S Region 8 Coordinator. Professor Modelski, for some time already, has been an active member of the AdHoc Committee for aiding Eastern Europe and the Former Soviet Union, has just been nominated by the 1996 President, John Wassel, to serve as the new Region 8 Coordinator within the MTT-S Transnational Committee. In this function Jozef Modelski replaces André Vander Vorst, who is serving in a similar function within the Executive Committee of IEEE Region 8. Jozef and André will cooperate in the future for Membership an Chapter formation in Region 8 out of the mentioned respective Society and Region 8 positions. Below please find a brief biography of Professor Modelski:

Jozef Modelski (SM'90) was born in Poland in 1949. He received the M.Sc., Ph.D. and Habilitation degrees from the Warsaw University of Technology, Warsaw, Poland in 1973, 1978 and 1987, respectively.

Since 1991, he has been a full professor at the Warsaw University of Technology. In academic year 1976/77 he was a Fulbright grantee in U.S. with Cornell University, Texas University at Austin, and COMSTAT Laboratories. In 1986-88 he worked with Braunschweig Technical University, Germany. His main areas of research are microwave phase modulators and shifters, dielectric resonators and their applications, integrating waveguide technology and satellite television.

Since 1992, he has been Chairman of MTT/AP/AES Joint Chapter in Poland. He is a Member of the Editorial Board of the IEEE Trans. on MTT, a member of the TPSs of European Microwave Conference and IEEE MTT-S Symposium.

Thanks to Jozef for accepting to serve in this important function. The Transitional Committee Co-Chairman, Professor Yamashita and I would like to wish him success and satisfaction with the new responsibility.

MTT Society Ombudsman

by Ed Niehenke
Westinghouse Electric Corporation
P.O. Box 1521, MS-3K11
Baltimore, MD 21203
(410) 765-4573
(410) 765-2116 FAX
E-mail:e.niehenke@ieee.org

I have been selected by the Microwave Theory and Techniques Society Administrative Committee (ADCOM) to continue serving as your Ombudsman for 1996. It was a pleasure to serve in previous years and I look forward to continuing in 1996. The purpose of the Ombudsman is to receive complaints and assist members in solving problems encountered in obtaining membership services from IEEE and MTT-S.

As your Ombudsman, I have received 3 inquires from MTT-S members in 1996. The first inquiry was from a person who wished to join IEEE and MTT-S and required an application form. The next inquiry was from a member who required missing MTT-S back issues. The last inquiry was from a member who paid his 1995 IEEE dues and was not credited for payment. He also required a 1996 membership application. The necessary steps were taken to resolve these issues and to my knowledge all members have been satisfied

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.

Corrections to the 1996 MTT-S Directory

Please mark the following changes in your 1996 MTT-S Directory:

Hector J. De Los Santos' e-mail address is: hjdelossanto@ccgate.hac.

Larry Wicker has retired from Westinghouse and can be contacted at: 1218 Balfour, Arnold, MD 21012, tel: (410) 647-6034, fax: (410) 647-5136; e-mail: l.wicker@ieee.org.

Skip Bryan's e-mail address is: s.bryan@ieee.org.

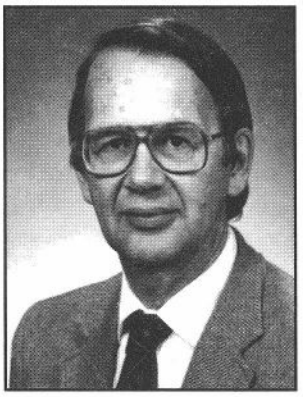
David Zimmermann's e-mail address is: d.zimmermann@ieee.org.

Kikuo Wakino can be contacted at: Murata Manufacturing Co., Ltd., 2-26-10, Tenjin, Nagaokakyo, Kyoto, 617 Japan, fax: +81-75-951-1916, e-mail: wakino@murata.co.jp.

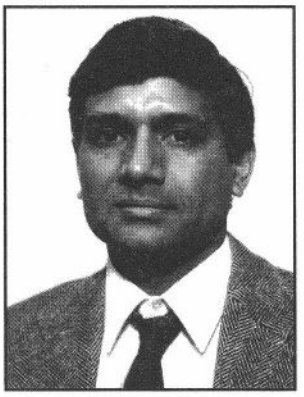
Fazal Ali can be contacted at: Nokia Mobile Phones, R&D Center, Suite 450, 9605 Scranton Road, San Diego, CA 92121-1766, U.S.A.; tel: (619) 450-4020; fax: (619) 677-7980; e-mail: fazal.ali@nmp.nokia.com.

Austin Truitt can be contacted at: 13500 N. Central Expressway, P.O. Box 655474, M/S 245, Dallas, TX 75265; tel: (214) 995-9918; fax: (214) 995-4347; e-mail: a.truitt@ieee.org.

Education Committee Expands Range of Activities



Denis Webb



Aditya Gupta

Graduate Fellowship and Scholarship Programs

The Graduate Fellowship Program continues to grow. Aditya Gupta, who administers the program for MTT-S, reports that twenty-five (25) applications were received for the 1996 award as compared to fifteen (15) for 1995. Of the 25, eleven (11) were received from outside North America, reflecting the true international flavor of the competition. To accommodate the heightened interest, the ADCOM expanded the number of awardees from three to four this year; winners will be announced at the Symposium in San Francisco and in the next Newsletter. An announcement for the 1997 award is made elsewhere in this Newsletter.

A Microwave Engineering Graduate Scholarship will also be awarded in 1997. The amount of the award will depend upon the donations received but will range from $2000 to $5000. The goal of this Scholarship is to support the education and accreditation of worthy future microwave engineers. It relies upon donations from MTT-S members, families and friends of members, trusts of deceased members as well as companies and institutions. See the announcement for the 1997 award elsewhere in this Newsletter.

Student-Teacher and Research Engineer/ Scientist (STAR)

This jointly sponsored MTT-S and ED-S program is now in its second year. The STAR program has four main goals:

1) to provide members to perform educational outreach to the community,

2) to complement existing educational programs in the ED and MTT societies,

3) to bring young girls and women into contact with working engineers and engineering jobs, and

4) to bring teachers into contact with working engineers and jobs.

Programs are currently underway at eight institutions and a steady increase in participation is anticipated. Recent activities include establishing an e-mail network to facilitate communication between volunteers, generation of material to introduce the STAR program to parents and teachers and assembly of a packet of educational tools and resources. Society members interested in learning more about the program should contact Julia Brown at Hughes Research Labs (ph: (310) 317-5068, FAX: (310) 317-5683, e-mail: jbrown@madmax.hrl.hac.com).

Other Activities

The MTT-S is one of three IEEE societies participating in the Center of Excellence for Multimedia Education and Technology (CAEME), being operated out of the University of Utah with the goal of developing software tools to facilitate teaching of various aspects of electromagnetics. Dan Swanson has been representing the MTT-S in this activity. A current proposal being studied involves developing a set of computer modules for a typical two semester sequence in EM field theory.

Finally, a workshop on Design Oriented Microwave Education is being held at the 1996 MTT-S Symposium. The workshop was organized by K. C. Gupta of the University of Colorado and M. S. Gupta of Hughes Aircraft. It will focus on problems associ-

ated with keeping curricula up-to-date and topics appropriate for modern curricula.

1997 Microwave Engineering Graduate Scholarships

- $2,000 to $5,000 scholarship award
- IEEE-MTT-S member in good standing
- Enrolled in or applied for enrollment in a recognized graduate school in microwave engineering or related programs
- Recommended by a recognized faculty advisor
- Award based on need, academic and technical achievements and potential for serving microwave profession and MTT-S

Application Deadline:
30 November 1996

For applications contact:

Dr. Denis C. Webb
Microwave Technology Branch
Naval Research Laboratory
Washington, DC 20375-5347
Ph: (202) 767-3312
Fax: (202) 767-0455
e-mail: d.webb@ieee.org

Requests for application materials must be received no later than 30 September 1996.

1997 IEEE MTT-S Graduate Fellowships

- Several $5,000 fellowship awards each year
- For Graduate research studies in microwave engineering on a full-time basis
- Applicants must have attained high academic achievement in engineering or physics
- Award can be granted in addition to any other support received by student
- Award cannot be used for equipment purchase, travel, supplies, etc.
- Award made to institution for support of named student
- Faculty supervisor must be MTT-S member

Application Deadline:
30 November 1996

For applications contact:

Dr. Aditya Gupta
Westinghouse Advanced
Technology Laboratory
Winterson and Nursery Roads
Linthicum, MD 21090, USA
Phone: (410) 767-9170
Fax: (410) 765-7370
e-mail:
gupta.a.k.%wec@dialcom.tymnet.com

Requests for application materials must be received no later than 30 September 1996.

Editor's Note

by Austin Truitt

I would like to apologize for the late delivery of the Winter '95 Newsletter. We completed the Newsletter and Directory in January, but had troubles in finding someone to bind the Directory into the Newsletter for mailing.

This month's Newsletter features an article I requested from Dr. Thomas Cuthbert on coupled filters. Tom has been a colleague at Texas Instruments and an Instructor at SMU, with a great deal of experience in filter synthesis. I really appreciate Tom taking the time to write the excellent article for the Newsletter. Dr. James McSpadden of Texas A&M University contributed an article on the Second Wireless Power Transmission Conference in Kobe, Japan. The conference was held shortly after the devastating earthquake, and the city appears to have recovered remarkably from that disaster. The conference featured the ETHER airship shown on the cover. I wish to thank Dr. McSpadden for the excellent article. I would appreciate any authors out there that would like to submit or suggest articles, to contact me at:

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New 1996-98 Distinguished Lecturer

Dr. Kikuo Wakino is the new 1996-98 Distinguished Lecturer. Dr. Wakino is a pioneer in dielectric resonator applications. The subject of his lecture is "Minitiarization Techniques of Microwave Components for Mobile Communications Systems Using Low Loss Dielectrics." Members should contact Kris Agarwal:

Krishna K. Agarwal
Texas Instruments, Inc.
3928 Wilshire Drive
Plano, TX 75023
(214) 995-1882 (w); (214) 867-3947 (h)
(214) 995-4583 (fax)
e-mail: k-agarwal@ti.com

or contact Dr. Wakino directly:
Kikuo Wakino
Murata Manufacturing Co., Ltd.
2-26-10, Tenjin, Nagaokakyo
Kyoto, 617 Japan
Fax: +81-75-951-1916
e-mail: wakino@murata.co.jp.

Other Distinguished Lecturers are:
Rahul Dixit
TRW-Transportation Electronics
24175 Research Drive
Farmington Hills, MI 48355
(810) 442-5305; (810) 478-7241 (fax)
e-mail: dixitr@fhsmtp.fh.trw.com
and
Martin V. Schneider
AT&T Bell Laboratories
791 Holmdel-Keyport Road
Holmdel, NJ 07733-0400
(908) 888-7122 (w); (908) 264-3523 (h)
(908) 888-7074 (fax)
e-mail: m.schneider@ieee.org.

1997 IEEE MTT-S International Microwave Symposium

by Ron DeLyser
Publicity Chairman

The 1997 IEEE MTT-S International Microwave Symposium will be held in Denver, Colorado during June 8 - 13, 1997. Initial publicity releases will be comming shortly. The Steering Committee is chaired by Dr. Claude Weil, National Institute of Standards and Technology, MS 813.08, 325 Broadway, Boulder, CO 80303, 303-497-5305. We look forward to seeing you there.

Event Announcement

The IEEE Women in Engineering Committee will host a reception at the 1996 MTT-S International Symposium. All conference attendees are invited to the reception which will be held in the Vista Room of the Hilton Hotel from 6-7 p.m. on Tuesday June 18. Refreshments will be served at the reception. The purpose of the reception is to provide an informal atmosphere for networking and learning more about the IEEE WIE Committee. We hope to see you all there.

If you would like more information about this event or other activities of this committee, please write women@ieee.org or visit our home page:

http://www.ieee.org/
ieee.women.in.eng/women.html.

Book Review: *Best of Both Worlds*

This book by John and Barbara Sangster is a very readable "how-to" manual for writing successful Small Business Innovation Research (SBIR) proposals to the government. The theme of the book is that SBIR contracts can provide hundreds of thousands of dollars for development of exciting new hi-tech products, and at the same time, can give the developer full rights for their commercial exploitation or sale to other customers. Fortunately, the emphasis of this book is on the very small (single-person) business which makes it a valuable guide for consultants or entrepreneurs.

The book covers the majority of the questions that a neophyte or proposal veteran might have. It presents enough material for anyone with a modest business sense to prepare and submit a reasonable cost proposal. It also provides background material and references.

The book is not without fault. It tends to be limited to Department of Defense (DoD) proposals. Other agencies have slightly different procedures.

Overall, however, it is a well-organized and easy to apply publication with a great deal of wisdom and advice on proposal preparation.

This book was published at $49.95, but IEEE members can obtain it from SPHINX Technologies (617) 235-8800 for $29.95.

Master Calendar

MTT-S Sponsored Conferences (1)

1996

Name	Date/Location	Involvement	
• Space Technology and Applications International (STAIF-96)	7-11 January Albuquerque, NM USA	Cooperative	Prof. Mohamed S. El-Genk Institute for Space and Nuclear Forum Power Studies University of New Mexico Albuquerque, NM 87131-1341 Tel. 505 277-5442 FAX 505-277-2814 email: mgenk@unm.edu
• 5th International Conference on Satellite Systems for Mobile	15 - 17 April London	Cooperative	Mr. Terry Oxley "Tremont" Back Lane, Halam Newark Notts NG22 8AG England Tel. 44 636 815510 FAX. 44 636 815865 e-mail: t.oxley@ieee.org
• Ultrawideband Short Pulse Electromagnetics Sysmposia	27-31 May Albuquerque, NM USA	Technical Co-Sponsor	Prof. Lawrence Carin Dept. Of Electrical Eng. Duke University Box 90291 Durham, NC 27708-0291 Tel. 919 660-5270 FAX 919 660-5293 email: lcarin@ee.duke.edu
• MTT-S International Microwave Symposium	17-21 June San Francisco, CA USA	Sponsor	Dr. E. James Crescenzi Watkins-Johnson Co. 3333 Hillview Ave. Palo Alto, CA 94304-1204 Tel.: 415 813-2506 FAX 415 813-2402 email: j.crescenzi@ieee.org
• Microwave and MM-Wave Monolithic Symposium	17-18 June San Francisco, CA USA	Sponsor	Dr. Mahesh Kumar Unisys Corp. 365 Lakeview Road, M/S F8 Great Neck, NY 11020-1696 Tel.: 516 574-3295 FAX 516 574-1244
• Advanced Technolgy Workshop on Wireless Communications	21-23 August Boulder, CO USA	Technical Co-Sponsor	Dr. Roger Marks NIST Mail Code 813.06

			325 Broadway Bolder, CO 80303-3328 Tel.: 303 497-3037 FAX: 303 497-7828 email: r.b.marks@ieee.org
• Directions for the Next Generation of MMIC Devices and Systems	11-13 September New York City USA	Technical Co-Sponsor	Prof. Nirod Das Polytechnic University Route 110 Farmingdale, NY 11735 Tel.: 516 755-4228 FAX: 516 755-4404 email: ndas@prism.poly.edu
• 2nd High Frequency Postgraduate Student Colloquium	13 September Manchester England	Technical Co-Sponsor	Dr. Rob Sloan Dept. of Elect. Engineering UMIST P.O. Box 88 Manchester, M60 1QD England Tel.: +44 0161 200 4640 FAX: +44 0161 200 4820 email: sloan@umist.ac.uk
• Microwaves and RF Conference 1996	8-10 October London	Cooperative	Mr. Terry Oxley "Tremont" Back Lane, Halam Newark Notts NG22 8AG England Tel. 44 636 815510 FAX. 44 636 815865 e-mail: t.oxley@ieee.org
• IEEE International Symposium on Phase Array Systems & Technology	15-17 October Boston, MA USA	Technical Co-Sponsor	Dr. Eli Brookner Raytheon Company Equipment Division 528 Boston Post Road Sudbury, MA 01776 USA Tel. 508-440-5636
• GaAs IC Symposium	3 Nov. - 6 Nov. Orlando, FL USA	Co-sponsor	Elissa Sobolewski ARPA/ESTO 3701 North Fairfax Drive Arlington, VA 22203-1714 Tel.: 703-696-2254 FAX 703-696-2203 email: lsobolewski@arpa.mil
• Automatic RF Techniques Group (ARFTG)	5-6 December Tampa, FL USA	Technical Co-sponsor	Michael Fennelly ATN Microwave 11 Executive Drive Billerica, MA 01821 Tel.: 508-667-4200x18 FAX: 508-667-8548
• International Topical Meeting on Optical Microwave Interactions	3-5 December Kyoto Japan	Technical Co-sponsor	Prof. Tsukasa Yoneyama Tohoku University Research Institute of Electronic Communications

Katahiracho 2 Come 1-1
Sendai 980, Japan

1997

• International Topical Symposium on Technologies for Wireless Applications (WTS)	23-26 February Vancouver, BC Canada	Sponsor	Dr. Reynold Kagiwada TRW Space Electronics Group 3117 Malcolm Ave. Los Angeles, CA 90034-3406 Tel.: 310 475-5255 FAX: 310 475-5483 email: r.kagiwada@ieee.org
• International Topical Meeting on Microwave Photonics	Date TBD (Fall) Duisburg Germany	Technical Co-Sponsor	Prof. Dr. Dieter Jaeger Gerhard-Mercator-Universitaet Geshamthochschule Duisburg Kommandantenstrasse 60, KA D-47048 Duisburg, Germany Tel.: +49 02 03 379-2341 FAX: +49 02 03 379-2409 email: jaeger@ optorisc.uni-duisburg.de
• Intelligent Transportation Systems Conference	8-10 November Boston, MA USA	Co-Sponsor	Lyle Saxton 6108 Browning Lane Broadrun, VA 22014 Tel.: 540 347-9512 FAX.: 540 347-3311 email: l.saxton@ieee.org

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

MTT-S Continuously Sponsored Conferences

- MTT-S International Microwave Symposium (IMS) — Annual (Sponsor)
- IEEE Microwave & Millimeter-Wave Monolithic Circuits Symposium (MMWMC) — Annual (Co-Sponsor)
- Automatic RF Techniques Group (ARFTG) — Semi-annual (affiliated)
- European Microwave Conference (EuMC) — Annual (Cooperate)
- Asia Pacific Microwave Conference (APMC) — Annual (Cooperate)
- MIOP — Biennial - 1993, etc. (Cooperate)
- MIKON — Biennial - 1994, etc. (Cooperate)
- Combined Optical and Microwave Earth and Atmospheric Sensing — Biennial (1993, etc.) (with GRSS-S, LEO-S)
- International Microwave Conference/Brazil (SMBO) — Biennial - 1993, etc. (Cooperate; Co-Sponsor 1995)
- IEEE GaAs IC Symposium — Annual (Co-Sponsor)
- IEEE Conference on the Computation of Electromagnetic Fields — Biennial - 1992, etc. (Cooperate)
- European GaAs Applications Symposium — Biennial - 1992, etc. (Cooperate)
- Topical Meeting on Electrical Performance of Electronic Packaging — Annual (Sponsor)
- 19th International Conference on Infrared and Millimeter Waves — Annual (Cooperate)
- Microwaves in Medicine — Triennial - 1993, etc. (Cooperate)
- National Radio Science Meeting — Annual (Cooperate) (with International Union of Radio Science)
- Int'l Workshop on High Perf. Electron Devices for Microwave and Optoeletronic Applications (EDMO)
  Annual (Cooperate) (with UKRI MTT/AP/Leo Joint Chapter and King's College London)
- Cornell University Conference on Advanced Concepts in High Speed Semiconductor Devices and Circuits
  Biennial (Technical Co-sponsor) (Sponsored by the IEEE Electron Device Society)

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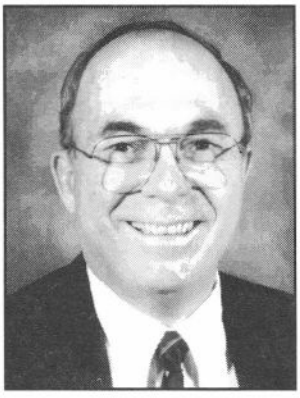
"Bridging the Spectrum" in San Francisco, June 17th-21st 1996 IEEE/MTT-S International Microwave Symposium/Exhibition



E. James Crescenzi, Jr.

E. Joseph S. Barrera

Hopefully by now you have received both the Advanced Program and the full IMS Program, and have already submitted your registration. Many of you must have. At the time of this writing (12 weeks before the Symposium) 37% of the hotel room blocks (increased over previous years) have already been sold! Most of all, we are particularly pleased to report that your response to the expanded Call-for-Papers has resulted in a record 466 papers to be included in the IMS technical program, as well as 26 workshops (another record) before and after the Symposium. Your 1996 IMS Steering Committee has been very active in its efforts to encourage very broad participation, and to add value for our Symposium and Exhibition attendees. We appreciate this opportunity to tell you about this year's Symposium, and in particular, about the contributions of many of the Steering Committee members.

Plenary Session

The Symposium will start with a Plenary session including US Federal Communications Commission (FCC) Chairman Reed Hundt addressing the impact on all of us of the New Telecommunications Law, and Edward Tuck, Chairman of Endgate Corp. and Vice Chairman of Teledesic Corp., speaking on "Telecommunications and the Future of the Extended Microwave Spectrum". Our Technical Program Committee Co-Chairmen (Derry Hornbuckle of HP, and Jerry Fiedziuszko of Space Systems/Loral) expanded and improved the Call-for-Papers in order to encourage submissions by new contributors. The role of the expanded Call-for-Papers was to make our procedures for paper review and selection particularly clear to the new prospective author. We were determined to make the forum as inviting for engineers and scientists in non-defense endeavors as it had been historically for those doing defense funded work. This approach appears to have been a huge success, as the number of papers submitted was up from 1995 to 1996 by 27%!

Technical Program Committee

Special thanks are due to all the members of the Technical Program Committee who graciously accepted the increased burden of paper review

activity. Paper review was completed strictly on the basis of merit—there was absolutely no consideration of limiting the number of papers accepted to conform to a pre-established program format. The percentage of papers accepted was well within the normal range of previous symposia. There were two obvious options available to accommodate the extra papers—increase the number of parallel sessions or extend the symposium day to provide more time for paper presentation. It was decided to lengthen individual sessions from 90 to 110 minutes (start earlier and run longer!), rather than to add a sixth parallel session. The increase in workshops (26 in all) results in more choices for our registrants. One possible explanation for the popularity of workshops is that they meet the demand for smaller and more interactive forums as the general technical sessions have increased in size. Paul Khanna and his Special Sessions and Workshops Committee are well organized and up to the challenge, although no one will relax until all the Workshop notes are printed and ready for distribution. Registration Chairman Vernon Dunn and our friends and partners at Horizon House have also made special provisions to smooth out workshop registration at the peak activity periods.

Focused Sessions

The IMS program includes eight focused sessions, four lunch-time panel sessions, and one evening panel session. Overall, papers show a clear shift towards technology for commercial applications. The interest in digital communications is apparent in this year's Microwave and Millimeter-wave Monolithic Circuits (MMWMC) Symposium, which has fully 1/3 of its papers addressing "wireless" technology. Rounding out the week will be the Automatic RF Techniques Group (ARFTG) Conference, which will also emphasize techniques applicable to the rapidly expanding telecommunications market.

Vendor Exhibits

The Exhibition (the largest in the history of this event) will be located in the North-wing of the ultra-modern Moscone Center in San Francisco. Upon registering, attendees will proceed down a large escalator that provides a dramatic entrance to the exhibition and technical session facilities, which are located in very close proximity. A highlighted new feature offered for the first time this year is the Microwave Applications and Products Seminars—mAPS '96, to be located on the Exhibition floor. There will be 52 applications seminars in two parallel sessions, presented by engineers of the exhibiting companies, and coortdinated by Technical Chair Martin Grace. We are excited about the potential for the mAPS '96 forum to better serve microwave practitioners, including design and manufacturing engineers and marketing and management professionals. Starting a new venture such as mAPS '96 is a real challenge, and we are particularly indebted to Barry Bakner and Gary Koker of our Industry Relations Committee, whose follow through was so essential to successfully launching this event.

Publicity has been a high priority this year. We hope you find the multicolor logo and our "Bridging the Spectrum" theme appropriate—they are both contributions by our Publicity Chairman, John Barr. John worked very closely with our technical committee chairs and with Christine Blanchard of Horizon House to produce a very attractive Advance Program (mailed to over 20,000) and the comprehensive IMS Program. The full program has been distributed to all MTT-Society members and recent Symposium attendees. Overseas (outside North America) mailing costs are very high for the full program, but it was decided we should put service to the members above budget considerations. In a coordinated local effort, our new Industry Participation Committee is making sure that every microwave and RF engineer in the San Francisco Bay Area will be aware of the events. We have even arranged a free shuttle from the local Cal-Train commuter station to the Convention Center, to better serve our South-Bay engineers from "Silicon Valley."

CD ROM Digest

The new innovation for 1996 that may be best remembered in the years to follow will be the introduction of a new CD-ROM Digest & Indices as a gift to all registrants of the IMS and MMWMC technical programs. The CD-ROM will contain this year's papers from both the IMS and the MMWMC Digests. In addition, it will also include searchable indices of all papers for the period of 1989 through 1995 for the IMS and MMWMC Digests, plus the MTT-Society Transactions and Microwave & Guided Wave Letters. Of course, registrants will also receive the hard-bound full 3-volume IMS Digest and MWMC Digest. Those who have seen our IMS Advanced Program have at least an indication of the creativity of Digest Editor Richard Ranson. Richard conducted quite a research effort in archival photo libraries of San Francisco before synthesizing the unique cover art of this year's Digest. The driving force behind the CD-ROM Digest & Indices is Editor Roger Pollard. Although Roger lives in the United Kingdom, we were fortunate to recruit him for this key role on our extended "San Francisco" Steering Committee! Roger is single-handedly responsible for the CD-ROM—it is a result of his vision and perseverance in combating all the typical institutional inertia one experiences when doing something that departs this radically from past precedence. By the way, Roger and Richard are particularly appreciative of the vast majority of authors who submitted their papers in electronic format.

Local Arrangements

Our Local Arrangements Chairmen, George Vendelin and Dan

Swanson, are making sure that your housing accommodations and Convention Center facilities are appropriate to the occasion. We departed from past organizations by forming a Local Arrangements—Convention Center Committee, headed by Dan Swanson. This splitting of responsibilities was in response to the ever increasing workload associated with local arrangements as our Symposium continues to grow. Our hotels have been chosen to represent the highest quality and best value of the many available in close proximity to the Moscone Convention Center. Although busing will be provided from the hotels to the Convention Center, if we have the normal mild weather typical of San Francisco (there are no guarantees—it rained here in June in 1995!), most people will prefer to walk to the events. The Moscone facilities for our technical meetings and exhibits are very modern, spacious, and convenient. Adjacent to the Moscone is Yerba Buena Park (a combination park and plaza) which is a comfortable setting for relaxing and greeting old friends.

Reception & Banquet

The Microwave Journal/MTT-Society Reception will be held on Monday at the Hyde Street Pier, a favorite area right on the San Francisco Bay, with a gorgeous view of Alcatraz Island and the Golden-Gate Bridge (if fog permits!). The annual Awards Banquet (organized by Steve Kenney) will be on Wednesday evening at the Hilton Hotel (including a musical sampling of the acclaimed "Beach Blanket Babylon"), preceded by the traditional exhibitor's reception. There is also an enticing guest program of tours and diversions (courtesy of Ibis Swanson, Guest Program Chairperson), culminating on Saturday with a trip to our famous Northern California wine country.

San Francisco Local Sightseeing

San Francisco is internationally renowned for its Fisherman's Wharf, North Beach, China Town (within walking distance for the energetic), Cannery Row shopping, the Golden Gate Bridge and scenic overlooks, and its numerous outstanding restaurants. Tourist information will be available in the registration area, at our hospitality suite in the Hilton Hotel Vista Room, and in most hotel lobbies. We do advise that you exercise caution when walking in the downtown city area. Inquire at your hotel as to what areas are recommended for recreational walking. This cautionary note is not intended to interfere with your enjoyment of this remarkable city—it's just that we want you to have a safe and happy experience as our guests.

It simply isn't possible to acknowledge all of the key contributors on the 1996 Steering Committee in this article. From Finance to Protocol and Workshops to Transportation, the individual contributions have been outstanding. Many of these individuals have been part of our preparations since the initial San Francisco proposal to the AdCom in 1988, and we are most appreciative of their service! Please refer to the full listing of Steering Committee members in the Digest and in the Program.

In summary, the 1996 International Microwave Symposium/Exhibition and associated activities will be both exciting and well-attended. We are certainly hoping that an attendance record will be set. Speaking for all Steering Committee members, we hope you find that the week's events offer total immersion in microwave and wireless technology, with a special opportunity to renew acquaintances and to socialize with your friends in our exciting industry. It has been our pleasure and privilege to serve the MTT-Society in the preparationsfor the 1996 IEEE MTT-S International Microwave Symposium.

1997 IEEE MTT-S International Microwave Symposium

by Ron DeLyser
Publicity Chairman

The 1997 IEEE MTT-S International Microwave Symposium will be held in Denver, Colorado, during June 8-13, 1997. Initial publicity releases will be coming shortly. The Steering Committee is chaired by:

Dr. Claude Weil
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MS 813.08
325 Broadway
Boulder, CO 80303
303-497-5305.

We look forward to seeing you there.

EAC Survey Studies Members' Unemployment

In June 1995, The IEEE-USA Employment Assistance Committee gathered members through a survey sent to the more than 3000 US members who had renewed their membership at the half-priced rate. The 22 question survey was part of a package of information on IEEE employment assistance services.

Within two months 28%, nearly 900 questionnaires had been completed and returned. A statistical analysis of the responses and a regression analysis of the duration of unemployment produced informative results will be used by the Committee to direct future programs.

Some results

At the time of the survey, six months after their membership renewal, 46% of the respondents reported being employed in some capacity—20% were employed full-time as engineers, 15% were employed full-time as other than an engineer and 11% are either self-employed or employed part-time. Of the remaining 54%, 5% were retired and 48% still unemployed.

The typical respondent to the employment survey is 51 years of age, has 24 years of experience, holds a graduate degree (57%), and was unemployed an average of 84 weeks. In comparison, the typical respondent of the Salary and Fringe Benefits Survey 1995 was 48 years old, has 21 years of experience and holds a graduate degree (53%). Those Salary Survey respondents that reported being out of work at some time averaged 31 weeks of joblessness. The employment survey respondents that reported being re-employed (in some capacity) were slightly younger—47 years of age and 20 years of experience.

Although at first glance, the age of the unemployed member might seem to indicate some degree of discrimination, the comparison with the 1995 Survey shows that age is not out of line with the average US member. The employment survey respondent has been out of work for slightly more that 1.5 years, however, the range for this variable is large (1 to 1100 weeks) and the median is closer to 1 year (57 weeks). Ninety-five percent of the respondents were out of work 200 weeks or less. Most reported finding it "very difficult" to get a job.

Most of the respondents (60%) are aware of some portion of IEEE's employment assistance services, but more than 500 requested a packet of more detailed information. And, it is gratifying to know that when asked what IEEE could be doing to help members, 14% said that we were doing a good job. This was the second most frequent response after "facilitate networking," 19%.

An analysis of industry of previous employment shows that, overall, more respondents worked in the defense and aerospace industries. Following these are computers and electrical/electronics services. And, most of those that remain unemployed were previously in aerospace and defense. Respondents employed in education were more than twice as likely to be working part-time.

Respondents were also asked what they considered to be barriers to re-employment. Overwhelmingly they said age (75%), followed by area of technical competence, decrease in government spending and the economy.

And, finally, to a question of particular interest to the Committee, more than 40% of the respondents have access to the Internet, and hence to the National Job Listing Service. Even when adjusting for current employment status, 39% of the currently involuntarily unemployed have Internet access.

What affects length of unemployment?

A multiple regression analysis of the data on duration on unemployment partially explains why some respondents have been out of work longer than others. This analysis examines what effect a variable such as age has on weeks of joblessness when all other variables are held constant. Age, in particular, has a significant and independent affect on joblessness: for each additional year of age, joblessness increases by two weeks. Having advanced degrees also increases joblessness. For each increase in degree (AA to BA to MA/MBA to MSEE to PhD) duration of unemployment increases six weeks.

On the other hand, respondents with access to the Internet experience 19 fewer weeks of unemployment than those without.

The regression analysis also examined the effectiveness of the various job search techniques. Respondents who indicated "networking" was their most effective job search technique experienced 24 fewer weeks of unemployment. And, those who had success with outplacement experienced 22 fewer weeks. Sending out resumes, answering ads, using a headhunter, hiring a private consultant, going to job fairs and using Internet job listings have no independent effect on duration of unemployment.

The 1995 Asia-Pacific Microwave Conference October 10-13, 1995 Taejon, Korea

by Professor Jung-Woong Ra
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Opening Ceremony: *Prof. Eikichi Yamashita, Dept. of Electronic Engineering, Univ. of Electro-Communication, 1-5-1 Chofugaoka, Chofu, Tokyo 182, JAPAN; Prof. Bao Xin Gao, Dept. of Electronic Eng., Tsinghua Univ., Beijing 100084, CHINA; Prof. Tatsuo Itoh, Dept. of Wlwctrical Eng., Univ. of California, Los Angeles, 66-147A Eng. IV 405 Hilgard Avenue, Los Angeles, CA 90095, U.S.A.; Prof. Jung-Woong Ra, Dept. of Electrical Eng., KAIST, 373-1 Kusong-dong, Yusong-gu, Taejon 305-701, KOREA; Prof. Kenneth K. Mei, Dept. of Electronic Eng., City Univ. of Hong Kong, 83 Tat Chee Avanue Kowloon, HONG KONG; Prof.Ching-Kuang Tzuang, Inst. of Communication Eng., Nat'l. Chiao Tung Univ., 1001 Ta, Hsueh Road Hsinchu, TAIWAN; Dr. Yong Xi Qian, Dept. of Electro Engineering,Univ. of Electro-Communications, 1-5-1 Chofugaoka, Chofu, Tokyo 182, JAPAN.*

It turned out to be quite a successful conference but it began with a lot of worries. Proposal of APMC '95 in Korea was accepted at the 1992 Australian Conference. Until then, I had no idea how to run an international conference of this size except that its preparation takes about two years and we need about 10 active members to push this event. In the 1993 October meeting of the Microwave and Electromagnetic Wave Propagation Group of the Korea Institute of Telematics and Electronics (KITE), APMC '95 in Korea was approved and I was nominated as the Conference Chairman.

Three short courses were planned for the seed fund but it was far short for running the steering committee for one year. Employment of a professional conference organizer was tried for about three months which was not satisfactory and it was decided to employ an experienced secretary working closely with me and the Secretariat, Professor Noh-Moon Myung, at the Korea Advanced Institute of Science and Technology. For the operation and the expenses of the steering committee and the first call for papers, we asked KITE to become the sponsoring institute and lend the steering committee of the seeding fund.

An initial task of the steering committee was the planning of the time schedule and the budget. Time schedule for the first call papers, the exhibition brochure, receipt of abstracts, and the advance program, etc. was set up rather easily by following MTT-S guide book for the conference starting from the conference date, October 10-13. This conference date was chosen since the European Microwave Conference and the URSI meeting were scheduled in September and in late October or in November, respectively. October is the best season in Korea weatherwise and the holidays of the Full Moon (equivalent to Thanksgiving Holidays) were in September quite apart from October 10.

The overall budget plan showed that the income from the registration attendants alone was not sufficient and additional financial supports were needed. Various national foundations

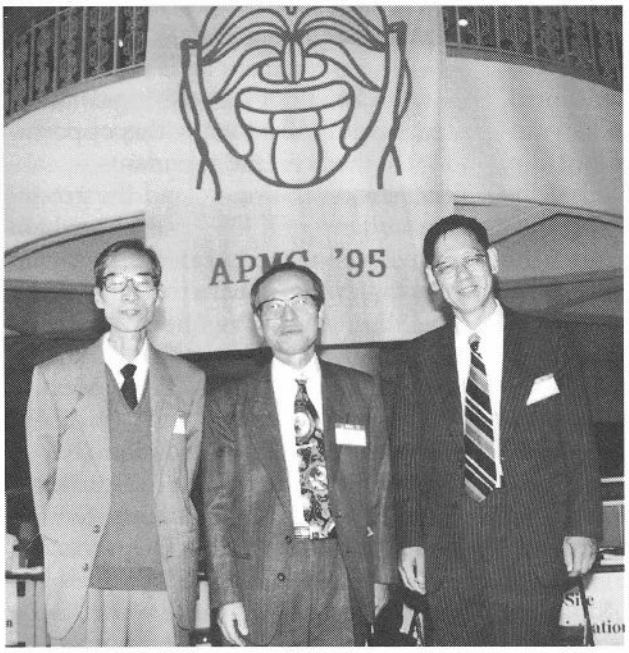
support the conferences of international nature and proposals were made through various co-sponsored institutes, which were the Korea Institute of Communication Sciences, the IEEE Korea Council and MTT Chapter, and the Korea EMC/EMI Society. Donations from a few more industrial companies and the exhibition booths made the conference budget surplus, after all.

We hoped to have about 300 attendants to make APMC '95 successful. In order to send the first call for papers to all the parties, who are interested in coming to the conference, a good mailing data base is needed. I appreciate the helps of chairmen of the APMC's providing their mailing lists. We also appreciate the free announcement through MTT-S Transaction and AP magazine. I appreciate Professor Yamashita's letter encouraging paper submissions to APMC '95 circulated among Japanese MTT-S members.

Table 1. Participants of the APMC'96

Country	Attendants	Papers (Invited)
Australia	4	7(2)
Belgium	1	3
Brazil	1	1
Canada	4	6
China	4	8(1)
Finland	2	0
France	7	8
Germany	7	3
Hong Kong	11	8(1)
India	2	4(1)
Italy	2	7
Japan	109	80(2)
Korea	265	70
Malaysia	1	1
Mexico	1	1
Russia	4	3
Singapore	6	11
Spain	1	1
Taiwan	10	10(1)
Thailand	3	2
U.S.A.	16	19(2)
Ukraine	1	5
Total	**462**	**262(10)**

We were quite happy by having 391 papers submitted from 25 countries. Technical Committee Chaired by Professors Dong-Chul Park and Hyo-Joon Eom, assigned each paper to three members of referees internationally organized and assembled 262 papers including the 10 invited papers into 44 sessions of four parallel, 3 day program without any poster session. Two parallel tutorial sessions were organized by inviting 4 professors, Vijai Tripathi of Oregon State University (High Frequency Interconnects and Packaging), Tatsuo Itoh of University of California (Quasi-Optical Electronics and Active Antenna Technology), Yoshiyuki Naito of Tokyo Institute of Technology (EMC and Electromagnetic Wave Absorbers), and George L. Matthael of University of California (Some Design Techniques for Planar Microwave Filters) on the first day of the conference.



Registration: *Prof. Bao Xin Gao, Prof. Jung-Woong Ra. Prof. Wen Xun Zhang, Dept. of Electrical Engineering, Southeast University, Najing 210042, CHINA.*

The venue was argued most of all among the steering committee members and the auditorium hall of the Korea Advanced Institute of Science and Technology (KAIST) at Taejon was finalized. It is rather inconvenient to come to Taejon since additional surface transportation of more than two hours is needed either from Seoul or other cities where the international airports are available. Taejon was chosen for the efficiency of the preparation and the control of the conference and the auditorium hall of KAIST rather than the hotel for less budget. The local arrangement committee of Professors Youn-Myung Kim and Taek-Kyung Lee arranged students in the Seoul International Airport and the bus stations to give guidances to attendants for the public transportations.

The auditorium hall is spacious enough to have about 22 exhibition booths in addition to the rooms for 4 parallel sessions and the auditorium. Professor Hai-Young Lee and Dr. Se-

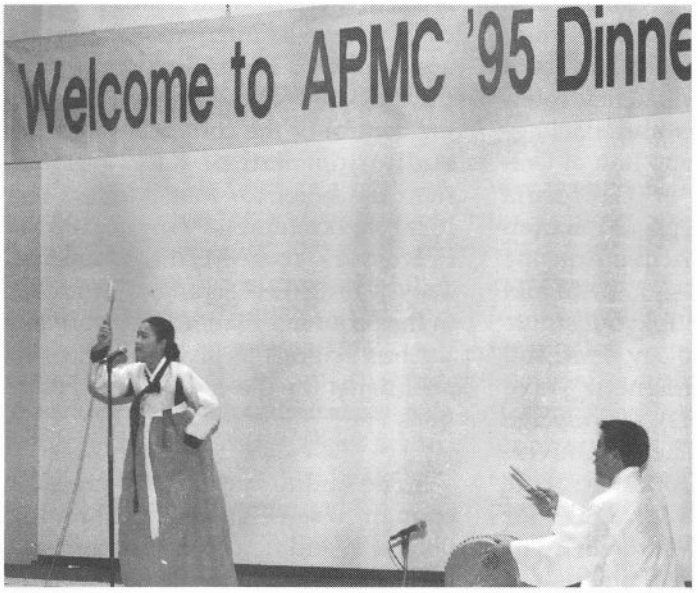
Reception: *Prof. Yoshiyuki Naito, Tokyo Inst. of Tech., 2-12-1 Ookayama, Meguroku, Tokyo, JAPAN; Prof. Jung-Woong Ra; Prof. Tateiba, Kyushu University, Hakozaki 6-10-1, Higashi-Ku Fukuoka, Japan 812, JAPAN.*

Yun Kim filled up this space with microwave products of 11 Korean, 9 U.S., 1 British, and 1 Taiwaneese Companies.

Secretariat, Professor Noh-Hoon Myung, and Miss Suyun Ra put together the manuscript into two-volume proceedings of 960 pages and fought with time to the last moment. One volume book of the tutorial lectures is also published. The tutorial session drew additional attendants mostly from the domestic industries.

Technical papers are distributed almost evenly among the various areas of microwaves, antennas, scattering and propagation, and field theories. Papers are from universities mostly and little from industries. A luncheon lecture on the cultural difference between Korean and Japanese was given by a mathematics Professor, Yong-Woon Kim.

The welcome reception was held at the outdoor backyard of the auditorium hall and the typical autumn weather entertained the attendants of more than 150. The banquest was held in the Hotel Reviera where a traditional Korean musical instruments by Shinawei group, a Korean opera, Pansori, by Sook-Sun Ahn, and the Buddhist dance (Seung-Moo) by Siang-Mook Chae, were introduced. Indian music, shanka tune, was played at the end of the banquet to remind the APMC '96 is in India.



Banquet: *Miss Sook-Sun Ahn (Myung Chang).*

Registration: *Prof. Tappan K. Sarkar, Dept. of Electrical Eng., Syracuse University, 11 Wexford Road, Dewitt, New York 13214, U.S.A.; Prof. E. Yamashita; Prof. Jung-Woong Ra; Dr. S.K. Palit, School of Electronics Eng. & Applied Physics, Univ. of Canberra, P.O. Box 1, Belconnen, Act-2616, AUSTRALIA; Prof. V. Ngyuen Tran, Microwave Technology Laboratory, Royal Melbourne Institute of Technology, Bundoora East Campus, GPO Box 2476V, Melbourne Victoria 3001, AUSTRALIA.*

of Kyeryongsan, and the old ruins of Kongju were carried out during the confernece. Even with the touring, all the sessions were highly attended until the last moment.

On behalf of the steering committee, I would like to take this opportunity to thank all the attendants, speakers, session chairmen, and the graduate students of KAIST and Chungham University who operated and set up the confernece. I would like to thank the daonations by the industries; Hyundai, LG, Samsung, Motorola, Hewlett-Packard, Korean Mobile Telecom, Dacom, and Shinsegi Telecomm, and the foundations; Kosef, Korea Research Foundation, and Korea Information Society Development Institution. The steering committee of APMC '95 decided the surplus money of the conference be donated to the Korea Electromagnetic Engineering Society as a fund to promote and support the future APMC attendants.

KAIST is located in the science town of Taedock and about 70 km away from the old capital city (Kongju) of Packche Kingdom which lasted up to 666 A.D. Tours of the science town, the mountain Park

Conference Review on WPT'95—the Second Wireless Power Transmission Conference

by James McSpadden
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The Second Wireless Power Transmission Confernece - WPT'95 - was held on the campus of Kobe University in Kobe, Japan on October 16-19, 1995. Kobe has bounced back remarkably from the tragic earthquake that struck the seaside city on January 17, 1995. It is a credit to the people of Kobe and Japan to make such a strong recovery. After the earthquake, there was some doubt the conference would take place as scheduled. But the conference's Local Committee Chairman, Dr. Nobuyuki Kaya of Kobe University, kept the itinerary as planned and the conference was a huge success. Other than the main expressway that was still under repair, there were no transportation barriers to the conference site. On further inspection of the city, there was a noticeable amount of construction still occurring on residential, public and private structures, and there were a number of condemned buildings waiting for demolition. But on whole, Kobe was alive and well.

This conference promotes several aspects of wireless power technologies including: commercial potential, technical and non-technical issues, and applications. The conference also encourages the development of strategic and international partnerships for wireless power transmission projects. WPT'95 is the second conference to address these issues, following the WPT'93 conference in San Antonio in 1993.

WPT'95 was sponsored by Kobe University and Japan's Ministry of Education, Science, Sport and Culture. Support for the conference and its participants was granted by the Ministry of International Trade and Industry (MITI) and the Ministry of Posts and Telecommunications in Japan. Approximately 80 registrants from six countries participated in the four day conference.

Solar Power Satellite

The opening address for the first morning session was given by Dr. Akiba, Director of ISAS. Dr. Akiba welcomed everyone to the city of Kobe and urged the use of solar power satellite (SPS) technology to solve the energy needs of the future. The following speaker was Dr. Yoshio of the International Science Division. Dr. Yoshio also encouraged the development of SPSs to meet future energy demands. Dr. Kataoka, Dean of Faculty of Engineering at Kobe University, also welcomed everyone to the conference and reported on the fatal earthquake that occurred in Kobe. Thirty-nine students and two staff members of the university lost their lives in the tragic earthquake. In total, approximately 5,500 citizens of Kobe perished and over 200,000 homes were destroyed. Again, much credit is given to the people of Kobe to rebound from a disaster of this magnitude. Finally, Dr. A. D. Patton, Chairman of the WPT'93 Executive Advisory Committee, from Texas A&M University spoke on different topics regarding wireless power technology. Dr. Patton congratulated the Japanese on their hardware demonstrations and pointed out it is important for these demonstrations to occur. He noted that economics is the driver for WPT to be attractive, and urged collaboration between countries.

History of Wireless Power Transmission

Following the opening addresses, William C. Brown of Microwave Power Transmission Systems in the US lectured on the history of wireless power transmission efficiency at 2.45 GHz. Historically, 2.45 GHz has been the primary frequency used for power beaming because of its minimal attenuation through the atmosphere, location in the middle of an industrial, scientific and medical (ISM) frequency band, and large and inexpensive technology base. Mr. Brown explained the major events that led to early WPT experiments including the US formation of DARPA after the Sputnik satellite, development of the crossed field amplifier, and his 1961 survey paper

on WPT. Mr. Brown also discussed the increases from a demonstrated overall direct current (DC) to DC system efficiency (DC to microwave, transmission, reception, and conversion back to DC) of 54% to a possible 73%.

The morning session ended with two keynote speeches. Dr. Watanabe of the Ministry of Post and Telecommunication emphasized the applications of WPT such as beaming power to remote islands or moving targets and the SPS concept. He also emphasized the importance of mitigating electromagnetic interference with existing communication systems. Dr. Isao Kudo of the MITI's Electrotechnical Laboratory then spoke on the SPS study in Japan. From that study, 1 GW of power would be delivered to the utility grid from a single SPS. The cost of the project, which includes the satellite, transportation costs, and the ground station, was estimated to be $23.6 billion.

Rectenna, Transmitting Antenna, and Laser Power Transmission

The afternoon session consisted of three topics: the rectenna, transmitting antenna and laser power transmission. Nine papers were given on the rectenna that covered different rectenna designs, rectenna modeling, array synthesis, and applications of microwave to DC conversion. For the transmitting antenna topic, two papers were delivered that explained the electronically steerable phased array module and the theoretical approach to a non-continuous antenna with small divergence. The final topic involved two papers on laser power transmission. A review of the technology and recent studies on the direct solar-pumped laser were presented.

That evening, a great buffet of Japanese cuisine was served in the conference hall. Everyone had a relaxing time meeting new people and reacquainting old relationships.

The second day of the conference focused on environmental and frequency issues of WPT, and hardware demonstrations were presented to the conference attendees.

During the morning session, three papers were presented on RF exposure and interference issues. Because microwaves are non-ionizing, heating effects are the only hazard. A method that includes 15 essential items was recommended as the proper procedure for conducting microwave exposure research. US and Russian standards for RF exposure (3 kHz - 300 GHz) were also reviewed. Experiments studying the effects of long term microwave exposure were performed in Japan. This research studied the effects of high power radiation (800 W) at 2.45 GHz on plants, small animals, acarids, and microbes. Important issues such as biological impacts, electromagnetic compatibility (EMC) with existing microwave systems, and control systems for safe WPT operation were also highlighted.

ETHER Airship

The rest of the morning session was dedicated to paper presentations on the hardware demonstrations to follow that afternoon. Two papers were given on the ETHER airship covering the transmitting antenna and receiving rectenna. The ETHER (Energy Transmission to a High altitude long endurance airship ExpeRiment) airship is one of the most promising candidates for a high altitude communications platform. The 3 m transmit antenna was designed to have a Gaussian power distribution, radiate 10 kW at 2.45 GHz, and track the airship's rectenna. A large planer rectenna was placed on the underside of the ETHER to provide 5 kW of DC power to the propeller's motors. The ETHER airship is a small scale model of the planned airship that will stay aloft continuously at an altitude of 20 km.

SABER

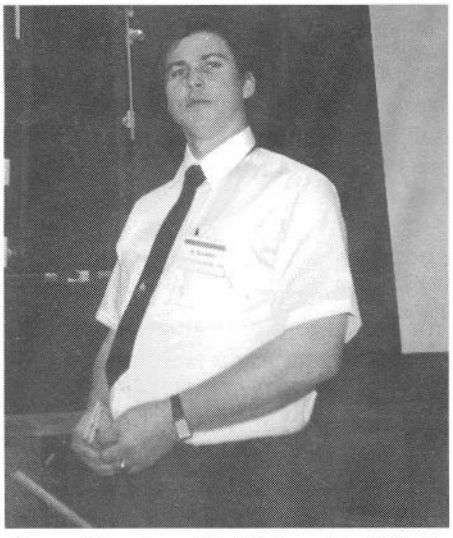
The final presentation was on the SABER (Semi-Autonomous BEam Rider) helicopter. SABER is a model

ETHER airship in flight above the transmit antenna.

Dr. Kaya gives orders to the ground crew before the start of the ETHER demonstration.

helicopter powered by a 1 hp electric motor for driving the 1 m rotor whose purpose is for public demonstrations of microwave power transmission. This system consisted of a 2.45 GHz, 1 kW source feeding a slotted waveguide antenna that is placed under the helicopter. A rectenna array placed underneath the helicopter provides 550 W of DC power to drive the helicopter's electric motors.

The following afternoon the conference attendees were loaded in buses and traveled to the Kansai Advanced Research Center (KARC), a complex that is apart of Japan's Communications Research Laboratory to see the demonstrations. Photo 1 shows the ETHER airship in flight above the dish antenna. The rectenna is barely visible and is located aft of the airship. Also note the light bulb connected to the rectenna that is shown lighted near the center of the airship's underside. Two propellers were used to fly and control the airship, and workers used tie ropes to position the airship over the transmitter. Once the tracking mechanism locked onto the rectenna, power would be transmitted to ETHER. Photo 2 shows Dr. Kaya next to the parabolic dish antenna used to transmit the microwave power. Note that the antenna used two feeds for dual polarization.



Shawn Houston of the University of Alaska Fairbanks and SABER.

Photo 3 shows Shawn Houston and SABER. Houston designed the SABER configuration and demonstrated its operation indoors. A supporting structure for the demonstration is shown to elevate the helicopter above the slotted waveguide transmit antenna. The 1 m rotor blade is shown just above the rectenna array.

Another piece of WPT hardware presented was a Russian cyclotron wave converter (CWC). A CWC converts microwave power into DC power, and operates at a much greater power level than a typical rectenna.

SPS Presentations and Roundtable Discussions

The third day of the conference was dedicated to SPS presentations and roundtable discussions. The morning session began with a video presentation by Peter E. Glaser of the Ather D. Little Corporation. Glaser, originator of the SPS concept, spoke on the global future of WPT and stated that "the peaceful coexistence of all humans will require energy for all." Following the video presentation, seven papers were given on topics such as millimeter wave space propulsion and power beaming, new design implementations of the SPS, large aperture space antennas, space structures and cost models.

The following afternoon in roundtable discussions, leaders in the area of WPT discussed key issues such as current projects, environment and frequency concerns, and international collaboration. Each gave a short speech on their perspective on WPT and offered solutions to barriers that stand before WPT systems. These speakers included:

- Bryan Erb—Canadian Space Agency
- Nobuyuki Kaya—Kobe University, Japan
- Frank Little—NASA Center for Space Power, Texas A&M University
- Ralph Nansen—Solar Space Industries, USA
- A. D. Patton—Texas A&M University

Conference participants in front of ETHER.

- Michael Duke—NASA, Johnson Space Center
- Gregg Maryniak—SUNSAT Energy Council & International Space University
- Henry Brandhorst—NASA, Lewis Research Center
- John Mankins—NASA Headquarters
- Carlos Rodriguez—NASA, Lewis Research Center

That evening all of the participants enjoyed a terrific banquet onboard the Queen Rokko as we cruised around the Kobe bay.

The fourth and last day of presentations involved a wide range of WPT topics. The morning session started off with five papers on space structures and deployment. Various space hardware concepts and hardware modeling were presented. Five papers were then given on lunar power stations. The papers were based on the concept of using lunar resources to provide power. The topics for the afternoon session focused on applications of WPT and space and ground experiments, where a total of nine papers were presented. Applications included the power relay satellite and high altitude communication platforms. Elements of the Japanese SPS 2000 project were also described. The SPS 2000 project involves a low Earth orbiting SPS that transmits 10 MW of microwave power at 2.45 GHz to rectenna sites located along the equator. Space to Earth and point to point WPT concepts were also given.

WPT'95 was a great success in bringing together people from all over the world to discuss WPT. Attendees gained an understanding of the worldwide WPT status, and were encouraged to promote the concepts and technology. Photo 4 shows the conference attendees in front of the ETHER airship.

The proceedings of WPT'95 will be published in the Space Energy and Transportation journal, volume 1, numbers 3 and 4. These proceedings can be ordered from:

High Frontier
2800 Shirlington, Suite 405
Arlington, VA 22206, USA
(or e-mail to highfrontier@bix.com).
Contact Aleta Jackson at
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The cost is $20 for each issue. Or you can obtain a yearly subscription, which includes the proceedings, for $30.

PRELIMINARY ANNOUNCEMENT

ITSC '97

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Boston, Massachusetts
November 9–12, 1997

The **Institute of Electrical and Electronics Engineers** is sponsoring a professional-level conference on basic research and present and future application of leading-edge advances in communications, computers, control and related electronics-based technologies to **Intelligent Transportation Systems** (ITS).

Fourteen **IEEE societies** representing ITS core technologies will host this landmark conference. It incorporates two earlier IEEE conference series that have been held annually in this area — the Vehicular Navigation & Information Systems (VNIS) Conference (since 1989) and the Intelligent Vehicles (IV) Symposium (since 1991).

The **Call for Papers** will be issued in the summer of 1996. All submissions will be subject to peer review before acceptance.

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1996 Frontiers in Education Conference
CALL FOR PAPERS

Theme: "Technology-Based Re-Engineering Engineering Education"
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The 1996 FIE Conference will bring together experts and colleagues who are interested in the fast-growing area of technology-based engineering education and curriculum development. Topics of interest include:

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- Assessment of educational innovations
- Student preparation and curriculum revisions
- Students' Corner — Evaluation of their preparation and the changes in engineering education
- Multidisciplinary undergraduate engineering projects
- NSF coalitions — Where's the beef?
- Communication advances and engineering education
- Corporate participation in engineering education — Programs and impact
- Accreditation and modern curriculum developments
- Engineering design/manufacturing programs
- Educational infrastructure
- General perspectives on engineering education — Past, present, and future

Papers, workshops, and sessions addressing the conference theme and the above topics of interest are invited. The conference will also invite speakers to address the state-of the-art of the topical issues of general interest to engineering education. Abstracts, not exceeding 300 words, should be submitted by mail, fax, or e-mail to the General Chair. Authors of accepted abstracts must submit full papers for review and possible publication in the conference proceedings. Final papers will be submitted on diskette. The proceedings will be converted and put on the World Wide Web. Authors are expected to attend the conference and present their work to their peers. Information about the conference may be obtained from the General Chair. The conference encourages exhibitors to participate and display their latest technology, software, expertise, and services with attendees. Interested parties should contact the Exhibit Co-Chair for more information.

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Deadlines:

FEBRUARY 15, 1996—Submission of abstracts due to General Chair
APRIL 1, 1996—Notification of acceptance to authors
MAY 15, 1996—Full papers due for review
JULY 31, 1996—Submission of final papers on diskette

ANTEM

SYMPOSIUM ON ANTENNA TECHNOLOGY
AND APPLIED ELECTROMAGNETICS

August 7-9, 1996
Montréal, Québec
CANADA

CALL FOR PAPERS

Organized by École Polytechnique and Unversity of Manitoba

ANTEM '96: will provide a combined program of contributed papers and invited seminar speakers. Authors are invited to submit a one page abstract on topics of interest in Antennas and Electromagnetics. Contributed papers will be published in a symposium digest. The following topics are of interest:

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Seminars:

1. Recent European Satellite Antenna Developments: Focus on Semi-Active Antenna Front Ends Antoine G. Roederer, ESA-ESTEC-Noordwijk-Netherlands
2. Characterization ofChiral Composite Materials for Microwave Applications using Free Space Methods Vasundra V. Varadan, Pennysylvania State University, U.S.A.
3. Antennas for Present and Future Wireless Communication Systems Kenichi Kagoshima, NTT Wireless Systems Labs-Japan

Abstract Submission Deadline:	(1 page) 1 March 1996
Acceptance Notification to Authors:	12 April 1996
Camera Ready Manuscript (4 pages)	31 May 1996

(if possible, please submit abstracts via e-mail to: antem@ee.umanitoba.ca)

Contributions and inquiries should be sent to :

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5th Topical Meeting On
ELECTRICAL PERFORMANCE OF ELECTRONIC PACKAGING
October 28-30, 1996
Napa, California

FIRST CALL FOR PAPERS

Co-Chairs: A. Deutsch, IBM Corporation, V.K. Tripathi, Oregon State University

The general subject of the meeting is the electrical design, analysis and characterization of electronic interconnections and packaging for performance-driven, high speed/high complexity electronic systems. A forum will be provided for the discussion of the following topics as they relate to chip-to-chip and on-chip interconnections in electronic systems:

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- New and innovative interconnect and packaging structures and their electrical performance.
- RF/Microwave packaging structures and their electrical performance.
- MMIC modules and high density packaging.
- Experimental characterization techniques and testing procedures.
- EMC/EMI effects; prediction and measurement of radiation from interconnect structures and packaged systems.
- Electrical requirements, limits of performance.
- Novel designs, design methods, wire placement and routing systems.
- Low cost, high volume packaging.
- Optoelectronic packaging; structure and system applications.
- Packaging concerns for wireless communication; design and modeling.
- Current and future issues related to on-chip interconnections; performance limits, interconnect scaling, parameter extractor and performance evaluation tool development.

Additional information may be obtained from A. Deutsch (phone: 914-945-2858, Fax 914-945-2141, e-mail deutsch@watson.ibm.com) or V.K. Tripathi (phone: 503-737-2988, Fax 503-737-1300, e-mail vkt@ece.orst.edu).

Authors are invited to submit papers describing new technical contribution in the areas broadly covered above. The original and three copies of a summary, not to exceed three pages, including illustrations, are required for paper selection. All papers must be written in English. The title of the paper and the names and affiliations of all the authors including complete mailing address, telephone, Fax number and e-mail, must appear on the first page of the summary, as well as a 35-word abstract. Fax and e-mail are absolutely necessary since all paper acceptance notifications and further communications will be done via one of these media. If the paper is accepted, the summary will be reproduced, as is, in the meeting's digest. **AN IEEE TRANSFER OF COPYRIGHT, FOUND IN MOST IEEE JOURNALS, MUST ACCOMPANY EACH SUBMISSION.**

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