

The 1998 IEEE MTT-S International Microwave Symposium: "Progress Through Microwaves"

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I. INTRODUCTION

THE Baltimore and Washington DC/Northern Virginia Chapters of the IEEE Microwave Theory and Techniques Society (MTT-S) hosted the second Radio Frequency Integrated Circuits (RFIC) Conference, the 42nd annual International Microwave Symposium (IMS), and the 51st Automatic Radio Frequency Techniques Group (ARFTG) Conference at Baltimore's Inner Harbor beginning on June 7, 1998. During the following Microwave Week, as it has become known, more than 10 000 of the world's microwave experts interacted during the conferences, in the exhibit hall, and while attending numerous ancillary technical and social meetings.

Attendance at the annual Microwave Week continues to grow. This year's attendance numbers, paper submission totals, and exhibitors stretched the resources of both the Steering and Technical Program Committees (TPC's) to accommodate all the requirements with the use of volunteers. Fortunately, numerous companies and government organizations supported Microwave Week by encouraging their employees to participate during working hours and by providing numerous ancillary resources. This support assured that the 1998 IMS would be a success.

The attendance numbers, while less important than the quality of the conferences, are a measure of the growing interest in the radio frequency and microwave fields. The attendance numbers for 1998 are as follows:

IMS	2306
RFIC	802
ARFTG	138
Workshops	3136
Panel Sessions	1525
Exhibits	7434
Total	10 192

Note that people attending multiple events are only counted once in the total.

II. CHANGES IN 1998

One of the exciting aspects of participating in the organization of a major event such as Microwave Week is the opportunity to try out new ideas. We hope that some of these

ideas will be continued in the future Microwave Weeks or modified to better adapt to the local situation.

A. Program Book

The 68-page Program Book distributed to previous years' attendees included some changes. The table of contents was listed alphabetically for ease in finding the subject matter of interest. In addition, wider margins were provided in the technical paper listings for attendees to take notes. The Steering Committee had considered publishing an abstract book with significant white space to allow an attendee to take notes during the technical sessions without having to carry a volume of the digest. This idea was not pursued because it meant another publication with all its administrative problems.

B. Registration

Horizon House Inc. encouraged electronic preregistration to avoid the long on-site registration lines. About 289 attendees utilized the Internet to preregister. All of the remaining attendees preregistered via mail or telephone, or electronically registered on-site using computer terminals to log in their personal data. While some difficulties were found with electronic registration, it is clear that it will be used in the future to avoid on-site delays and to maintain registration accuracy.

The registration form for Microwave Week is very complicated, containing dozens of options. In 1998, we increased the "registration entropy" by allowing registrants for the IMS to just purchase the CD-ROM. The CD-ROM (weighing about 100 g) contains all the information found in the 5+ kg paper IMS digest plus the paper RFIC digest.

C. Plenary Session

The plenary session was moved to the start of the IMS at 8 A.M. To attract attention at this early hour, the Rockville High School Pipe Band marched through parts of the Convention Center and drew the crowd into the ballroom.

D. Rump Sessions

It is possible to attend over 51 h of technical and panel sessions during the six days of Microwave Week. Based on this mentally exhausting schedule and interference to other activi-

TABLE I
SUMMARY OF IMS IN THE BALTIMORE-WASHINGTON AREA

	1961	1971	1980	1986	1998
Location	Washington, DC Shoreham Hotel	Washington, DC Shoreham Hotel	Washington, DC Shoreham Hotel	Baltimore Convention Center	Baltimore, expanded Convention Center
Chair	Robert Stone	Warren Cooper	Larry Whicker	Ed Niehenke	Steve Stitzer
Vice Chair		Hal Schrank	Al Friend	Hal Schrank	Roger Kaul
TPC Chair	Gus Shapiro	Bob Garver	Dick van Wagoner	Marv Cohn	Ed Niehenke
TPC Vice Chair		Marv Cohn		Bernie Geller	Denis Webb
Steering Committee	8	10	23	36	24 - Baltimore 19 - Washington 6 - other
Papers	27	80	157	183	431 in 5 parallel
Workshops				6	24
MTT Attendance	545	460	1,003	1,871	2,306
Exhibitors			123 in 138 booths	256 in 425 booths	430 in 619 booths
Notes	1 st Digest	1 st Student Paper Competition	1 st Historical Exhibit	1 st Crab Feast	1 st Electronic pre- and on-site Registration



Fig. 1. Dr. B. Pontano describing the seamless communications network of the future at the plenary session.



Fig. 2. Dr. A. Rosen at the podium listens as Dr. A. Greenspon at the Jefferson Hospital, Philadelphia, PA, describes open-heart surgery on the center screen. The outer screens show heart signals of the patient.

ties scheduled in the evenings, our TPC decided not to organize formal rump sessions. Rump sessions are similar to panel sessions, but held in the evening. Some informal rump sessions were held during the three receptions and the crab feast.

E. New Meetings

The Education Standing Committee of the MTT-S Administrative Committee held a forum to discuss the problems facing educators of microwave and RF technologies. An overflow crowd indicated a high interest in this area.

The IEEE Professional Activities Council for Engineers (PACE) met in a panel session format on Friday, June 12. PACE deals with matters affecting engineers such as employee benefits, intellectual rights, etc. Pre-registration was not required for this session.

F. Student Papers

The IMS continues to encourage students to submit papers. Within IMS, a competition amongst the 71 student papers selected by the TPC was held and prizes were awarded at the Awards Banquet. The student papers were judged with the

use of an interactive forum format, which allowed the judges to interact directly with the students. The IMS and National Science Foundation, U.S., provided travel funding to some students so they could attend the symposium.

III. KEY EVENTS

A. Plenary Session

The plenary session is the largest single meeting of Microwave Week. The plenary session consists of administrative information, presentation of a small fraction of the annual MTT-S awards (due to time constraints) and, most importantly, the keynote addresses. These addresses established our theme of "Progress Through Microwaves."

Dr. Benjamin Pontano, President of COMSAT Research Laboratories, described how a new generation of satellites will operate with terrestrial networks to provide advanced personnel wireless and broad-band communication services in a seamless global communications infrastructure. He described the systems and technologies being developed to realize such a vision, including those needed for the new *Ka*-band and low earth orbiting satellite systems.



Fig. 3. Dr. A. Rosen (right) enjoys the traditional Baltimore IMS crab feast with his friends following his plenary presentation.



Fig. 4. 21 members of the 1998 IMS Steering Committee. *Seated, Left to Right:* S. Stitzer, E. Niehenke, D. Webb, and R. Kaul. *Standing, Left to Right:* T. Lee, L. Phelps, S. Patel, S. Dalal, G. Burns, F. Kuss, R. Westgate, D. Sheehan, B. Niehenke, M. Axler, B. Sequeira, J. Degenford, T. Nelson, R. Meixner, R. Moore, L. Whicker, and S. Bajpai.

Using a channel on the SBS-6 satellite, Arye Rosen, Ph.D., at IMS and Arnold Greenspon, M.D., at the Jefferson University Hospital, Philadelphia, PA, showed (in real-time) the positioning of a radio-frequency catheter for ablation within the heart. The ablation is used to stop supraventricular tachycardias with minimal complications. Although our schedule did not allow us to see the operation completed, the patient was successfully treated and sent home that same day.

Clearly, both of these addresses demonstrated that with the application of microwaves to both traditional and nontraditional fields, significant contributions to the welfare of people can be achieved.

B. Technical Sessions

The summary of the technical presentations is presented in the Niehenke and Webb paper in this TRANSACTIONS.

There are many more ideas that need to be tried and implemented by future Steering Committees. We in the Baltimore and Washington DC/Northern Virginia Chapters look forward

TABLE II
THE 1998 IEEE MTT-S INTERNATIONAL
MICROWAVE SYMPOSIUM STEERING COMMITTEE

Position	Member
Chair	Steven N. Stitzer (B)
Technical Program Chair	Edward Niehenke (B)
Vice-Chair	Roger Kaul (W)
Technical Program Vice-Chair	Denis Webb (W)
Workshops	Lee Phelps (W)
	Jeff Pond (W)
	Peter Stenger (B)
	Tim Lee (O)
Special Sessions	Bob Moore (B)
	Mike Frankel (W)
Panel Sessions	Shyam Bajpai (W)
	Saurabh Dalal (W)
Interactive Forum	Harvey Newman (W)
	Dan Buck (B)
	Larry Dickens (B)
μ APS	Randy Bruce (B)
	Marge Axler (W)
Student Paper Competition	Greg Wilkins (B)
	Peter Herczfeld (O)
	Marge Axler (W)
	Ronald Hooker (W)
Digest Editor	Ray Meixner (W)
	John Cruz (W)
CD-ROM Editor	Eric Funk (W)
Transactions Special Issue Editor	Roger Westgate (B)
	Ramesh Gupta (W)
Web Page	Jeff Pond (W)
Local Arrangements	David Sheehan (B)
	Frank Halgas (B)
Audio/Visual	Brian Sequeira (B)
Signs	John Sebastian (B)
Food at Convention Center	Jerry Dziki (B)
Registration	Gus Bontzos (W)
	Jim Degenford (B)
Finance	Fred Kuss (B)
Publicity	Natalie Gallet (W)
Secretary	Suman Patel (B)
Historical Exhibit	Ted Nelson (B)
	Jeff Kruth (B)
Guests' Program	Betty Niehenke (B)
	Sally Morse (B)
Gifts	Al Morse (B)
Awards Banquet	Jon Moellers (B)
University Liaison	Kawthar Zaki (W)
RFIC Liaison	Ho-Chung Huang (B)
ARFTG Liaison	Greg Burns (B)
Members-at-Large	Warren Cooper (W)
	John Margosian (W)
	Larry Whicker (O)
	Harlan Howe (O)
	Howard Ellowitz (O)

Legend:

(B) = a member of the Baltimore Chapter

(W) = a member of the Washington DC/Northern Virginia Chapter

(O) = a member outside the local area

to attending these future symposia, beginning with Anaheim, CA, in 1999. We are formulating the plans to host another IMS in Baltimore in the first decade of the 21st Century.

C. Exhibition

The annual IMS exhibition is the largest single exhibit of microwave hardware in the world. In 1998, the exhibits

covered three acres (over 14 000 m²) of the convention center. There were 430 different vendors represented in 619 booths. In addition, eight universities took advantage of free booth space, provided as the MTT-S's continuing support to education.

During the exhibit hours, 38 Microwave Application and Product Seminars were held in parallel with the other IMS activities.

D. Social Events

Every evening from Sunday through Wednesday of Microwave Week had a major reception or social event. These events have become a traditional opportunity to informally meet in relaxed settings.

The RFIC reception on Sunday and the Microwave Journal reception on Monday at the Science Museum drew capacity crowds. Even with a misty rain, Baltimore's traditional crab feast on Tuesday evening at Camden Yards drew over 1000 people.

The key social event is the IMS Awards Banquet held on Wednesday evening preceded by the industry-hosted reception at the Hyatt hotel. At this banquet, the MTT-S honors those who have contributed to our society. MTT-S AdCom President Roger Pollard coordinated the evening's ceremonies. A local resident and Life Fellow Ross Kilgore received the Pioneer Award for his work in the 1930's on split-anode magnetrons. Dr. Kilgore had called his device a magnetostatic oscillator, and this choice of name apparently has caused his work to be overlooked in several histories of early microwave thermionic device development. Dr. Kilgore was one of the first experimenters to use a parabolic reflector antenna to focus microwave beams. He demonstrated this antenna at the 1933 Chicago World's Fair. Other awards presented at the banquet are described in the Staecker paper in this TRANSACTIONS.

IV. A LOOK BACK AND FORWARD

This is the fifth IMS to take place in the Baltimore-Washington area. MTT-S Historian T. Saad and local long-time contributor R. Garver provided some statistics, which are shown in Table I.

The members of the Steering Committees in 1961, 1971, 1980, 1986, and now 1998, are proud of the many firsts they

have contributed to the IMS over the years. The members of the 1998 Steering Committee are shown in Table II.



Steven N. Stitzer (M'74) received the B.S., M.S., and Ph.D. degrees in electrical engineering from Carnegie-Mellon University, Pittsburgh, PA, in 1970, 1971, and 1974, respectively.

In 1974, he joined the Westinghouse Electric Corporation Defense and Electronics Systems Center, Baltimore, MD, where he is currently an Advisory Engineer (now the Electronics Sensors and Systems Division, Northrop Grumman Corporation). He has worked on high-power p-i-n diode and gas plasma control devices, including

receiver protectors, controlled attenuators, and switches. He has also developed ferrite devices operating at both low- and high-power levels. This work includes frequency-selective limiters, signal-to-noise enhancers, phase shifters, and circulators. He holds ten patents in these areas.

Dr. Stitzer has been active with the Baltimore Chapter of the IEEE MTT-S, serving as chairman in 1980-1981. He was committee chairman for the IEEE Standard Definition of Terms for Nonlinear, Active and Nonreciprocal Waveguide Components. He is currently chairman of the IEEE MTT-S Historical Collection Committee and serves on the Board of Directors of the Historical Electronics Museum. He was publicity chairman for the 1986 Baltimore Symposium, and chairman of the 1998 International Microwave Symposium.



Roger Kaul (S'60-M'62-SM'88) received the Ph.D. degree in electrical engineering and applied physics from Case Western Reserve University, Cleveland, OH, in 1969.

From 1969 to 1974, he researched Gunn instabilities at the United Aircraft Research Laboratories. From 1974 to 1981, he performed space system studies at ORI, Inc. From 1981 to 1987, he conducted studies related to electronic warfare and millimeter-wave communication systems at Litton's Amecom Division. Until

recently, he was responsible for developing protection circuitry against intense electromagnetic fields for monolithic-microwave integrated-circuit (MMIC) devices at the Army Research Laboratory. He is currently developing RF and microwave components for communication and radar applications. He is a part-time Instructor at Johns Hopkins University, Baltimore, MD, where he teaches courses dealing with microwave components and systems and wireless communication circuits. He has co-edited *Microwave Engineering and Systems Applications* (New York: Wiley, 1988).

Dr. Kaul is a member of the IEEE MTT-16 Technical Committee on Microwave Systems, is active in the Washington DC/Northern Virginia IEEE MTT-S Chapter, and was vice chair of the 1998 International Microwave Symposium.