

EDITOR: R. S. Kagiwada

TRW ESG, One Space Park, Redondo Beach, California 90278

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## MICROWAVES LINKING NATIONS THE 1986 IEEE MTT-S INTERNATIONAL MICROWAVE SYMPOSIUM BALTIMORE, MARYLAND JUNE 2-4



*by Edward C. Niehenke*

Make your plans now to visit Baltimore, Maryland, the first week of June 1986 for the best International Microwave Symposium ever. The 1986 Symposium committee, some 36 strong, has been hard at work adding its personal touch and innovations to make your stay in "The Land of Pleasant Living" on the Baltimore Inner Harbor technically stimulating, exciting, and simply perfect.

This year the Microwave Symposium extends from Monday through Wednesday, with the Monolithic Symposium on Wednesday afternoon and all day Thursday. Workshops as well as ARFTG are all day Thursday and Friday. See the MTT Symposium Schedule.

Plan to arrive in Baltimore early Sunday, June 1, in order to attend the Microwave Journal Reception at the Maryland Science Center on the beautiful Baltimore Inner Harbor from 6 to 8 p.m. Complimentary wine and hors d'oeuvres will be served accompanied by live music. All Symposium participants, MTT-S and

Monolithic, and all exhibitors are welcome to attend and bring a guest and their families. The entire Science Center will be open, including all exhibits, exclusively for us.

The symposium location this year at the Baltimore Inner Harbor is the best. No other city in the world offers such a convenient and modern facility. The spacious new Baltimore Convention Center will house the technical meetings and the record number of exhibits (over 420). Baltimore, being located on the high tech eastern seaboard, will attract many people. You will meet that long lost friend here and see the latest microwave products at the exhibit. Sleeping accommodations are at 10 modern hotels within walking distance of the Convention Center. We have negotiated excellent rates for you at all hotels with average single \$67 and average double \$76, and we have booked 2300 rooms for the expected record attendance. Only one rate exists at each of the hotels for any room in the hotel.

To make it more convenient for you, a complimentary Continental breakfast will be served at 7:30 a.m. every morning for technical registrants at the Terrace Lounge of the Convention Center adjacent to the technical meeting rooms Monday through Thursday.

The technical program starting on Monday, June 2, is full of innovations with focused sessions featuring technically hot areas, an international session featuring renowned scientists from Europe presenting the latest European microwave technologies, and a presentation, "Microwave Research in China," by the chairman of The Society of Microwave from the Peoples Republic of China. The best papers were selected from the record number of submissions (350) this year, the result being a technical program of the highest quality and technical depth. Six workshops and six panel sessions of the latest technologies and issues complement the program.

The theme of our symposium, "Microwaves Linking Nations," has been selected due to the importance of microwaves in international communications. Also, it is appropriate for Baltimore since it is a place settled

Continued on page 3

# ADCOM HIGHLIGHTS



by  
*David N. McQuiddy, Jr.*

The January 1986 ADCOM meeting was called to order at 8:15 p.m. on the evening of the 14th by President Reinhard Knerr. The meeting was held at the Hyatt Regency Inner Harbor in Baltimore, Maryland. The Hyatt will serve as the headquarters hotel for our International Symposium in June. Seventeen of the eighteen elected members of ADCOM were present, as well as a number of MTT-S members involved in various subcommittee activities.

The hand-off of responsibilities to the new MTT Transaction Editor has been completed and the official transition date was set for the 1st of February. Tatsuo Itoh has done an outstanding job these last three years as editor.

Ralph Levy, the new editor, moved that ADCOM authorize IEEE Headquarters to mail the MTT-S Transactions in an envelope or some other form of protective cover. The additional mailing cost of approximately 4 cents a copy was considered a good investment and should significantly improve the condition of your Transactions after transmission through the postal system.

A committee was established last year to review the Standing Committees of the ADCOM. Hal Sobol, as Chairman of the Review Committee, provided a very comprehensive report that contained several recommendations for ADCOM's consideration. Hal had solicited the assistance of a number of past MTT-S Presidents and the report they provided reflects both their extensive experience and the seriousness with which they viewed the assignment. Action items have been constructed that will serve as the formal mechanism for incorporating their recommendations into operating procedures.

Reports by the Finance and Membership Services Committees attest to the overall continued health of our Society. With an income of \$877,000 and expenses of \$744,000 for the year, we experienced a growth in our surplus of \$133,000. The year-end surplus is approximately \$827,000. At the end of 1985, the number of society members stood at 8718 and represents a growth rate of 8.7% for the year.

The Long Range Planning Committee has been directed by Reinhard Knerr to examine MTT-S future activities in the area of education, philanthropy, budget, etc. The scope of the planning will encompass the next 5 to 10 year span and will provide guidance for future ADCOM decisions. Members agreeing to serve on this blue-ribbon committee are Ted Saad, Fred Rosenbaum, Pete Rodriguez, Hal Sobol, Charlie Rucker, and Harlan Howe. One of the main tasks facing this committee is in determining how to apply the mounting surplus MTT-S has accumulated the last several years to the benefit of our Society and its members. It is time to revitalize our plans to provide more membership services and to spend this surplus wisely.



**1986 MTT-S ADCOM Committee  
Meeting in Action at Baltimore**

Symposium sites have been selected through 1991. Several chapters which have expressed an interest in conducting the 1992 Symposium are Chicago, San Francisco, Albuquerque, Phoenix, Atlantic City and San Diego. The 1992 site will be selected this year.

The meeting was adjourned at 3:10 p.m. by Reinhard Knerr who is to be commended for holding to the agenda schedule. The next ADCOM meeting will be held in Baltimore on Sunday, 1 June 1986, the day before the major Symposium events start.







**Baltimore Inner Harbor  
Site of the 1986 International Microwave Symposium**

Continued from page 1

by people of many ethnic backgrounds from all over the world. Baltimore for many years was the port of landing for U.S. immigrants.

All Symposium registrants and guests are urged to attend the exciting opening events of our 1986 International Microwave Symposium starting at 8:30 a.m. on Monday morning. In keeping with our theme, "Microwaves Linking Nations," we will welcome and honor our 46 MTT-S Chapter Chairmen/representatives from the 11 nations and 23 of the United States. There will be a colorful flag ceremony with a color guard accompanied by live band music culminating in the playing of Francis Scott Key's "Star Spangled Banner," written in Baltimore. Brief welcoming speeches will be given by dignitaries on both sides of the Atlantic Ocean over a live microwave satellite link between Baltimore and West Germany, representing our overseas members. Our Symposium attendees will see and hear the speakers in Europe projected in color on a giant screen and will enjoy the local action in person. The European speakers will include Professor H. Groll who occupies the prestigious Chair for Microwave Techniques at the Technical University of Munich, and who served as the Chairman of the 1983 European Microwave Conference.

For our keynote speaker in Baltimore, Dr. Joseph V. Charyk, the recognized "father" of the U.S. satellite communication industry and founder of COMSAT, will

comment on the importance of microwave technology in modern world-wide communication. Other well-known persons will also participate in this memorable and colorful grand opening. **DON'T MISS IT!**

The social highlight of the 1986 MTT-S Symposium will be the Awards Banquet on Tuesday evening immediately following the industry-sponsored cocktail party. A gourmet international dinner menu has been selected and tested. Professor George Mattaei will receive the Microwave Career Award for his 37 years of meritorious achievements and outstanding technical contributions. Dr. C. Burke Swan will receive the Microwave Applications Award for his introduction of diamond to conduct heat away from high-power microwave IMPATT oscillator diodes. Yalcin Ayasli, Leonard D. Reynolds Jr., James L. Vorhouse, and Larry K. Haynes will receive the Microwave Prize for their paper entitled: "2-20 GHz GaAs Traveling-Wave Amplifier." Dr. Harold Sobol will receive the Distinguished Service Award for his outstanding service for the benefit and advancement of the Microwave Theory and Techniques Society. We will also be honoring our newly elected IEEE MTT-S Fellows.

The entertainment scheduled for the Awards Banquet is an exciting climax to this event. Appearing for your enjoyment will be the Sweet Adelines, a group of 80 women of national reputation, who will perform vocal and precision dance routines. The star of the

# 1986 MTT-S

# Symposium Schedule

	Su 1	M 2	Tu 3	W 4	Th 5	F 6	Sa 7
<b>MICROWAVE SYMPOSIUM</b>							
Complimentary Continental Breakfast		M	M	M			
MTT Symposium		MA	MA	MA			
Panel Sessions		NE		E	E		
Chapter Chairman's Dinner Meeting		E					
Awards Banquet			E				
Workshops					MA	MA	
<b>MONOLITHIC CIRCUITS SYMPOSIUM</b>							
Complimentary Continental Breakfast					M		
Symposium				A	MA		
<b>ARFTG</b>							
Meeting					MA	MA	
Banquet					E		
<b>SOCIAL</b>							
Microwave Journal Reception	E						
Hospitality Suite	A	MA	MA	MA	MA	M	
Guests' Program		MA	MA	MA			
Exhibitors' Reception Cocktail Party			E				
Crab Feast/Bull Roast				E			
(Complimentary to all Monolithic/Microwave/ ARFTG registrants/spouses/families)							

M - MORNING  
N - NOON

A - AFTERNOON  
E - EVENING

program is Ethel Ennis, an internationally recognized jazz-oriented singer. She has performed at the White House and has toured the United States and Europe. Because of her accomplishments, the Mayor has named this native Baltimorean the Official Cultural Ambassador of the City.

All technical symposium attendees (Microwave, Monolithic, and/or ARFTG), their spouses/friends, and their families are invited to a complimentary Crab Feast/Bull Roast on Wednesday evening from 6 to 9 p.m. This is a Baltimore tradition that we want to share with you. Hostesses will be on hand to show you how to eat the crabs. A seven-piece dixieland band will entertain us and provide music for dancing. This will be a fun evening which we guarantee you will enjoy, so don't miss it.

This year's Historical Exhibit is one you will not want to miss. We have expanded the range of artifacts and memorabilia by obtaining major loans from Baltimore's Historical Electronics Museum, the Washington, D.C., Smithsonian Institution, and many commercial

electronics firms. Also take time to visit the Historical Exhibit's Cinema. Films of microwave's historical importance will be shown in a comfortable theatre setting complete with popcorn and refreshments.

For your spouse, a wonderful program has been organized with visits to historic Baltimore, picturesque Annapolis, and Washington, D.C. Children under 12 are included free. A hospitality suite with complimentary continental breakfasts and snacks in the afternoon will be at the Hyatt Regency Hotel. Hostesses will be on duty to help you with your arrangements and needs.

There are many things to see and do at the Baltimore Inner Harbor within walking distance of the Convention Center and hotels. The Inner Harbor contains the National Aquarium, the Maryland Science Center and Davis Planetarium, the World Trade Center, the historic U.S. Constellation, Six Flags Power Plant, and Harborplace, Baltimore's spectacular new dual pavillions that house a never-ending festival of food and fine shops. For those nautically inclined, you can motor or sail around the Inner Harbor, to Fort McHenry, or to the Chesaapeake Bay.

The Symposium Committee cordially invites you to visit us. We guarantee you will have a most pleasant time in Baltimore while attending an outstanding symposium, and you will experience for yourself the

rich heritage and the almost tangible spirit of hospitality that pervades the atmosphere of the city.

We look forward to meeting you and your families.

### 1986 International Microwave Symposium Steering Committee

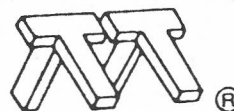
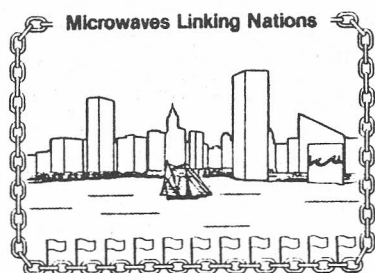


**Standing:** C.R. Westgate, A Estes, L.F. Cooper, J. Blackburn  
M. Zisserson, D.C. Buck, W. Getsinger, J. Lambden, S.N. Stitzer,  
K. Claborn, D. Dawson, M. Whicker, L.R. Whicker, T.M. Nelson,  
A.W. Morse, J.E. Degenford, C. Considine C.L. Malinow.

**Sitting, Top Row:** B. Rubin, T. Klein, H. Malinow, L. Czirjak, E.C. Niehenke, B.  
Niehenke, M. Cohn

**Sitting, Bottom Row:** A. Rubin, P. Wahi, H.E. Schrank, R. Mahoney, A. Sullender

**Not Present:** R. Bernstein, H.W. Cooper, H.I. Ellowitz, B. Geller, G.I. Klein,  
S.D. Patel





## DIVISION IV DIRECTOR'S REPORT



*by Kiyu Tomiyasu*

It was a pleasure to meet with the MTT-S ADCOM on October 14-15, 1985 in Long Beach, California. The ADCOM was given the opportunity to see the excellent Convention facilities planned for the 1989 MTT-S Symposium. I believe the Microwave Theory and Techniques Society is extremely fortunate in having such a large group of dedicated volunteers who are conscientiously serving the Society. Without question the success of the Society is due largely to these volunteers.

During 1985 the IEEE Board of Directors voted to increase the number of IEEE Senior Members who could be elevated to the Grade of Fellow without changing the stringent criteria. Those elected effective January 1, 1986 and who are enrolled in the MTT Society are:

Balanis, Constantine A.	Lin, James C.I.
Campbell, Colin K.	Mattauch, Robert J.
Carr, Kenneth L.	McQuiddy, David N.
Carver, Keith R.	Oakes, J. Barry
Crosswell, William F.	Perlman, Barry S.
Degenford, James E.	Raue, Jorg E.
Fong, Timothy T.J.	Smith, Glenn S.
Horton, John B.	Takaoka, Michio
Kantor, Gideon	Tiuri, Martti E.
King, Ray J.	Vander Vorst, Andre S.J.

Congratulations to these new Fellows!

In November 1985, the IEEE Board of Directors voted to abolish the \$15 IEEE Entrance Fee. This should make it more attractive to join the IEEE. Earlier, IEEE Policy 10.6 of the Policy and Procedures Manual which pertains to Society conferences, technology transfer and classified sessions at symposia was amended. This was enacted to clarify the procedures in implementing the new policies imposed on these matters. The establishment of new scholarships and similar recognitions sponsored by Societies has been delegated by the IEEE Awards Board to the Technical Activities Board with limitations specified in the 1986 IEEE Bylaws and Policies. These amendments were

adopted to streamline the total IEEE approval process on student recognition and support.

The IEEE Board of Directors authorized the publication of the 1985 IEEE FELLOW AND SENIOR MEMBER INDEX. The members are grouped by Societies and by Sections within Regions. A limited number of Indexes were published and these were distributed to all Society Presidents, Society Membership Committee Chairmen, and Society Awards Committee Chairmen. The Index was also distributed to corresponding officers in each IEEE Section. The Index may help officers answer inquiries from members who are seeking potential references for application for the Senior Member grade, and seeking candidates for nominations for IEEE awards. Since the Index is an experiment, your opinion on its value would be greatly appreciated. A convenient Questionnaire has been provided on page ix of the Index. The Questionnaire should be returned to Mr. Don Suppers, IEEE-N.J. at your earliest convenience.

In January 1986, I made appointments of Division IV representatives to some IEEE Committees. Those individuals who are MTT-S members and are appointed for 1986 are:

<u>Name</u>	<u>IEEE Entity</u>
Dr. John Osepchuk	Society on Social Implications of Technology
Dr. Walter Kahn	TAB Periodicals Committee
Mr. Richard Sparks	Transnational Relations Committee
Mr. Robert Hicks	EAB Corresponding Member
Mr. Helmut Schrank	PACE
Dr. Stanley Charap	Publications Board

Last year the IEEE Long Range Planning Committee of the Board of Directors recommended that the Societies be requested to consider broadening their scopes to include more applications-oriented papers in their publications, and to give additional attention to the readability of those publications. This concern has been expressed many times in the past. Any suggestions from the MTT-S membership will be most welcome.

Again, I wish to express my appreciation to MTT-S for the support given to me as Director of Division IV. The year of 1985 was a very interesting one with all of the duties and responsibilities associated with the position.

The next MTT-S Symposium will be held in Baltimore, Maryland on June 2-4. The Symposium General Chairman, Edward Niehenke and his Committee have organized an excellent Symposium, and everyone interested in microwaves should attend. Hope to see you there!

# CALL FOR NOMINATIONS

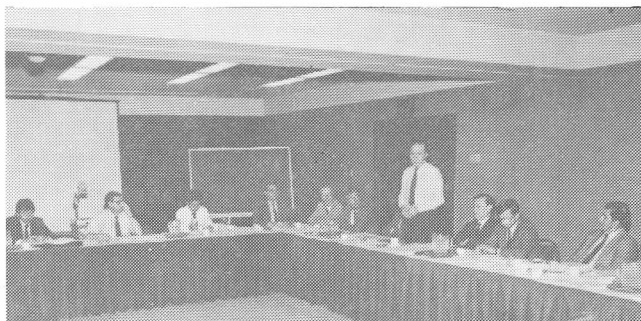


by  
Vladimir G. Gelnovatch,  
Chairman  
Nominations Committee

The MTT-S holds elections annually, usually in the fall, to elect candidates to serve on the ADCOM. The nomination slate is provided by the nomination subcommittee through a number of algorithms which guarantee best candidates and fair representation. The bylaws of the MTT-S state that the Nomination Subcommittee should select a slate of at least two members of the society for each vacancy which occurs on January 1 of the calendar year following the election. Each nominee is personally contacted to assure his willingness to serve and his ability to attend ADCOM meetings. Nominees by the Nomination Subcommittee are selected by the principles of efficiency and geographic and organizational distribution. Elections of the nominees are made by the members of ADCOM who are not eligible for re-election at that time.

The bylaws provide three means by which one may be nominated for the Administrative Committee. They are as follows:

- (1) Nomination by the Nominations Committee.
- (2) Nomination by petition signed by 25 MTT-S members and submitted to the nominations chairman prior to 1 September 1986.
- (3) Informal chapter suggestions.



1986 MTT-S ADCOM Committee  
Meeting in Action at Baltimore.

Note that an informal route described in item 3 above is strictly informal and does not guarantee nomination.

Requests of this type should be pursued between Chapter Chairmen/ADCOM/liaison member/Nominations Chairman. An additional bylaw constraint is that ADCOM membership for three consecutive terms disqualifies that member from re-nomination.

This year the nominations subcommittee consists of 8 society members, half of whom are not current ADCOM members as specified by the bylaws. They are:

C.T. RUCKER, Atlanta, GA	(404) 894-3420
R. MATTAUCH, Charlottesville, VA	(804) 924-6086
R. SNYDER, Butler, NJ	(201) 492-1207
R. KAGIWADA, Redondo Beach, CA	(213) 535-5515
R. LEVY, San Diego, CA	(619) 571-8444
W. WISSEMAN, Dallas, TX	(214) 995-2451
C. SEASHORE, Minneapolis, MN	(612) 931-4839
S. ADAM, Los Altos, CA	(415) 968-4900

The wide geographic distribution of the above members should give a reasonably fair representation to all chapters and members. The geographical and affiliation distribution of the current ADCOM membership is given below.

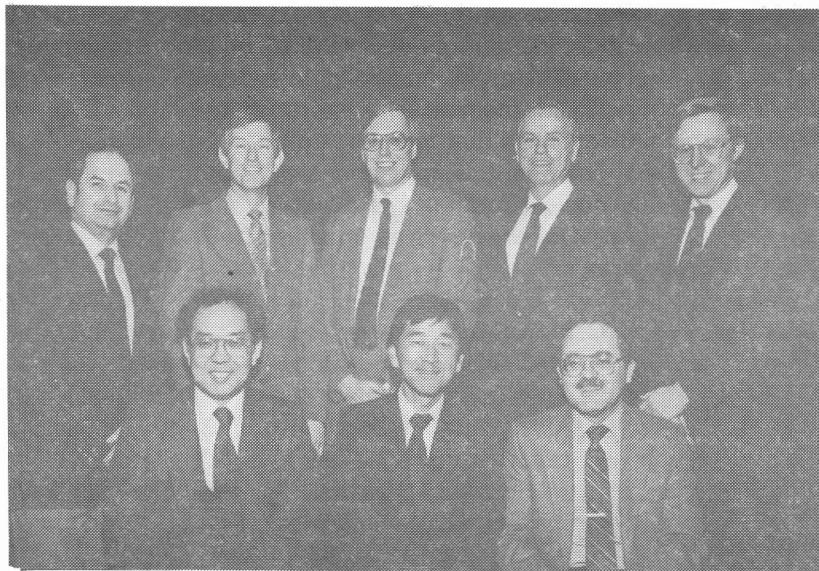
Present ADCOM (1986)				Total = 18
EAST	8	INDUSTRY		14
CENTRAL	2	GOVERNMENT		2
WEST	8	UNIVERSITIES		2

Holdover Members (1987) ADCOM				Total = 12
EAST	3	INDUSTRY		10
CENTRAL	2	GOVERNMENT		1
WEST	1	UNIVERSITIES		1

Term Ends (1986)				Total = 6
EAST	5	INDUSTRY		4
CENTRAL	0	GOVERNMENT		1
WEST	1	UNIVERSITIES		1

The Nomination Committee needs your help and cooperation. Our slate of candidates will only be as good as the membership provides. The schedule for the nominations committee calls for providing a slate of candidates by 1 September 1986. If you have suggestions please get in touch with the nominations subcommittee member nearest you or your chapter chairman. Please keep in mind that potential nominees must be able to commit themselves to at least three meetings a year held across the U.S. Let's all pitch in and help develop a slate of nominees we can be proud of.

**1986 MTT-S ADCOM Committee Members**



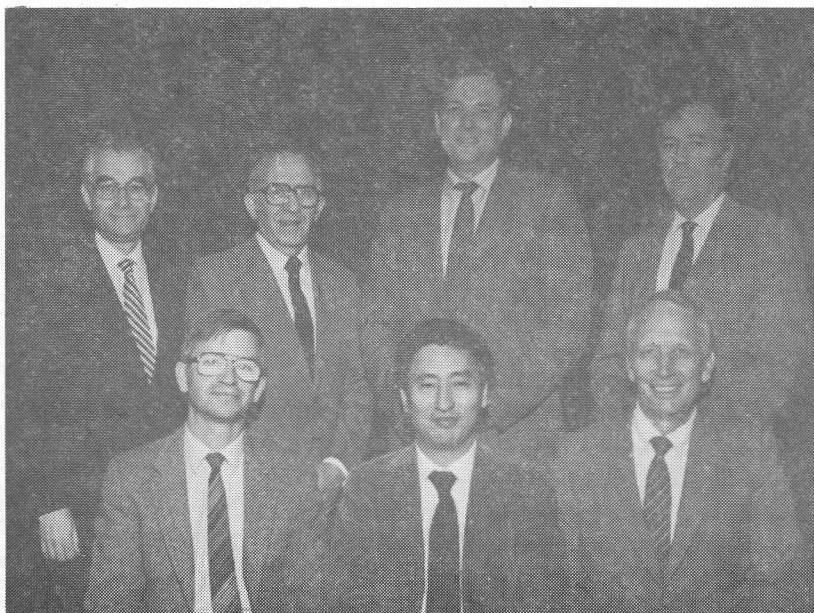
**Top Row:** Z. Galani, N.W. Cox, S.T. Temple, R.A. Sparks, P. Staecker

**Sitting:** R.S. Kagiwada, H.J. Kuno, M.A. Maury Jr.



**Top Row:** K.K. Agarwal, R.A. Moore, R.H. Knerr, D.N. Mc Quiddy, Jr., A. Van der Vorst, F. Ivanek

**Sitting:** B.E. Spielman, S.L. March, R. Levy



**Top Row:** A. A. Oliner, T.S. Saad, E.C. Niehenke, H. Howe, Jr.

**Sitting:** P.T. Greiling, T. Itoh, H.G. Oltman, Jr.



# 1986 MTT-S INTERNATIONAL MICROWAVE SYMPOSIUM

## TECHNICAL PROGRAM COMMITTEE REPORT



*by Marvin Cohn*

A record number of papers were submitted to the 1986 International Microwave Symposium - nearly 350. Although that resulted in an added burden to the members of the Technical Program Committee, it was gratifying to have such a large response. Perhaps it is a manifestation of our theme, "Microwaves Linking Nations", that 170 (nearly half) of these papers were from foreign nations. A total of 183 papers were accepted, consisting of 87 regular length papers, 50 short length papers, and 46 open forum papers. As a result of the record number of submitted papers, only 52% could be accepted, which is of course less than prior acceptance ratios.

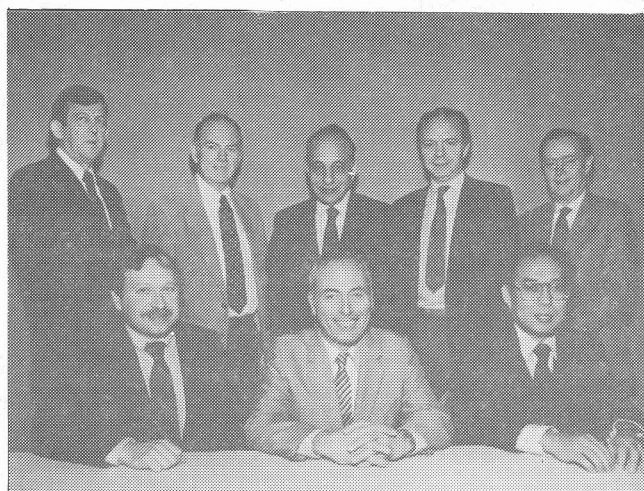
In the continuing evolution of our Symposium, we have retained recent and now proven features such as the Open Forum, short papers, and 90 minute sessions, and we have introduced some innovations. One of these is focused sessions, which this year are on "Advances in Low-Cost Component Manufacturing" (one session) and "Microwave Aspects of GHz/Gbit Optical Transmission" (two sessions). Each of these focused sessions will begin with an invited paper presented by a recognized leader in that area. Another innovation is to provide recognition for especially well presented papers in both the regular and open forum sessions. A third new feature is the inauguration of an exchange of technical sessions with the European Microwave Conference. Four papers by prominent European microwave research people will be presented in a special International Session. Added to that session will be a survey paper on "Microwave Research in China" by the President of the Society of Microwaves, Chinese Institute of Electronics from the Peoples Republic of China. In reciprocation a committee of the MTT-S ADCOM has selected a special group of U.S.

authors, which will present papers at the next European Microwave Conference to be held in Dublin, Ireland, Sept. 8-11, 1986.

There will be changes in the physical layout of the individual spaces provided for presenting each Open Forum paper. Rectangular alcoves for each paper will be arranged to provide some degree of spatial and sound isolation to reduce mutual interference. In addition, groups of papers were to be clustered in separate islands according to general technical areas of interest.

The complete Symposium technical program extends from Monday, June 2 through Friday, June 6 and includes 6 panel sessions, 6 workshops, and 2 joint sessions with the Microwave and Millimeter-Wave Monolithic Circuits Symposium.

This full and hopefully significant and interesting program resulted from the contributions of the many authors and the diligent and dedicated work of the Technical Program Committee members and especially the hard and thoughtful work of the Vice-Chairman Bernie Geller, Special Sessions Chairman Pradeep Wahi, Open Forum Chairman Dan Buck and Focused Session Organizers Norman Dietrich and Mike Malbon. I also want to acknowledge the excellent cooperation with our counterparts on the Monolithic Circuits Symposium's Technical Program Committee and its' Chairman Yalcin Ayasli.



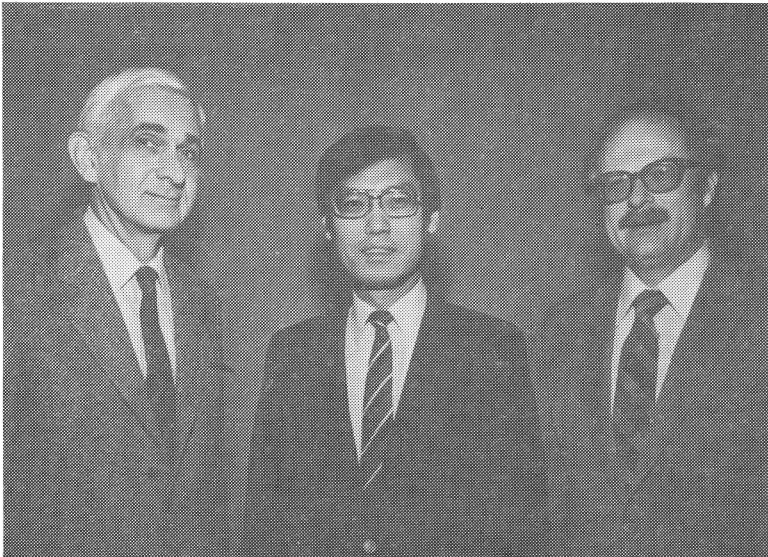
**1986 MTT-S International Microwave Symposium-  
Technical Program Steering Committee**

**Standing: W.E. Hord, J.J. Whelehan,  
Jr., J. Taub, A. van der Vorst,  
F. Ivanek  
Sitting: B.D. Geller, M. Cohn,  
R. Kagiwada**

**1986 Microwave/Monolithic Symposium Technical Program  
Committee Reception**



**1986 MTT-S International Microwave Symposium Technical  
Program Committee Members**



**Left to right: D.C. Buck, J.C. Lin,  
A. Rosen**



**Standing: R.A. Pucel, R. Gilmore,  
L.Q. Bui  
Sitting: K.C. Gupta**



**Standing: J. Barrera, S.J. Temple,  
H. Willing  
Sitting: J. Crescenzi, F.M. Sechi,  
M. Kumar**



**1986 MTT-S International Microwave Symposium Technical Program Committee Members**

**Standing:** E.C. Niehenke,  
P. Staecker, E. Cohen

**Sitting:** R. Dydyk, G. Jerinic,  
J.F. White



**Standing:** J.R. Lane, S. Okwit,  
E.L. Griffin

**Sitting:** J. Cotton, V. Sokolov

**Standing:** R. Neidert, M.W. Cox,  
D.W. Maki,  
E.F. Belohoubek,  
P.T. Greiling,

**Sitting:** M.G. Alexopoulos, J.C.  
Wiltse,  
J. Mink

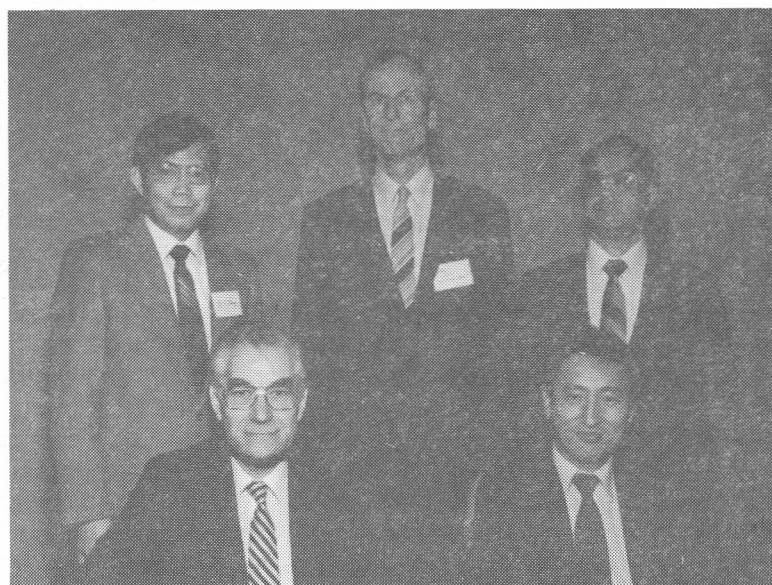


**1986 MTT-S International Microwave Symposium  
Technical Program Committee Members**



**Standing:** J.R. Owens, B.R. McAvoy, G.R. Harrison, D. Webb

**Sitting:** J.C. Sethares, T.J. Lukaszek, C.R. Boyd



**Standing:** S.T. Peng, P. Latourrette, A.K. Sharma

**Sitting:** A.A. Oliner, T. Itoh

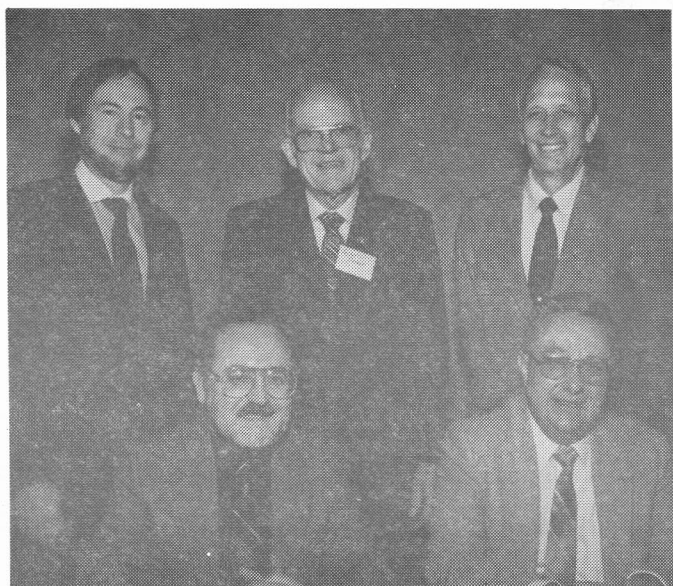


**Standing:** R. Sparks, J.B. Horton, R. Weck, G.L. Heiter, D. Steinbrecher

**Sitting:** D. Parker, H.W. Cooper, J.B. Knorr



**1986 MTT-S International Microwave Symposium  
Technical Program Committee Members**



**Standing:** R.W. Laton, G.F. Engen,  
H.G. Oltman

**Sitting:** M.A. Maury, Jr.,  
S. Adam



**Standing:** R.H. Chilton,  
H. Howe, Jr.,  
R.M. Malbon

**Sitting:** G.I. Klein, C.  
Buntschuh



**Standing:** I.J. Bahl, C.R. Kudsia,  
H.C. Bell, G. Matthaei

**Sitting:** A.E. Atia, A.E. Williams,  
R. Levy



**Standing:** P. Wahi, J. Raue, R.H.  
Knerr, N. Dietrich

**Sitting:** H.F. Taylor, K.T. Yano,  
H. Sobol



# 1986 IEEE MTT-S INTERNATIONAL MICROWAVE SYMPOSIUM SCHEDULE OF EVENTS

## SUNDAY, JUNE 1, 1986

6:00 pm - 8:00 pm  
MICROWAVE JOURNAL RECEPTION  
MARYLAND SCIENCE CENTER

## MONDAY, JUNE 2, 1986

A 8:30 am-10:00 am OPENING CEREMONY CONVENTION CENTER ROOMS 307/308/309		
B 10:30 am-12:00 pm GUIDED WAVE STRUCTURES I Convention Center Room 310	C 10:30 am-12:00 pm LOW NOISE TECHNIQUES Convention Center Rooms 307/308/309	D 10:30 am-12:00 pm IMPATTS Convention Center Room 317
12:00 pm-1:30 pm PANEL ON GOVERNMENT FUNDING OF MICROWAVE R&D Hyatt Constellation A Room		12:00 pm-1:30 pm PANEL ON MANUFACTURING MIC ASSEMBLIES Hyatt Constellation B Room
E 1:30 pm-3:00 pm GUIDED WAVE STRUCTURES II Convention Center Room 310	F 1:30 pm-3:00 pm PASSIVE COMPONENTS Convention Center Rooms 307/308/309	G 1:30 pm-3:00 pm OSCILLATOR TOPICS Convention Center Room 317
J 3:30 pm-5:30 pm OPEN FORUM I Convention Center 200 Level	I 3:30 pm-5:30 pm INTERNATIONAL SESSION Convention Rooms 307/308/309	H 3:30 pm-5:00 pm MILLIMETER-WAVE OSCILLATORS Convention Center Room 317
8:00 pm-9:30 pm PANEL ON MILLIMETER-WAVE SYSTEM DEVELOPMENT Hyatt Constellation A Room		

## TUESDAY, JUNE 3, 1986

K 8:30 am-10:00 am SOLID STATE TOPICS Convention Center Room 317	L 8:30 am-10:00 am MICROWAVE SYSTEMS I Convention Center Rooms 307/308	M 8:30 am-10:00 am DISTRIBUTED FET AMPLIFIERS AND CIRCUITS Convention Center Rooms 309/310
N 10:30 am-12:00 pm FILTERS FOR SATELLITE APPLICATIONS Convention Center Room 317	O 10:30 am-12:00 pm MICROWAVE SYSTEMS II Convention Center Rooms 307/308	P 10:30 am-12:00 pm FET MODELLING Convention Center Rooms 309/310
Q 1:30 pm-3:00 pm DIELECTRIC RESONATORS AND FILTERS Convention Center Room 317	R 1:30 pm-3:00 pm LOW COST COMPONENT MANUFACTURING Convention Center Rooms 307/308	S 1:30 pm-3:00 pm GAAS FET AMPLIFIERS Convention Center Rooms 309/310
T 3:30 pm-5:30 pm OPEN FORUM II Convention Center 200 Level	U 3:30 pm-5:30 pm MICROWAVE ACOUSTICS AND MAGNETOSTATICS Convention Center Rooms 307/308	V 3:30 pm-5:30 pm GAAS FET OSCILLATORS DOUBLERS AND MIXERS Convention Center Rooms 309/310
5:45 pm-7:30 pm INDUSTRY-HOSTED COCKTAIL PARTY Hyatt Regency Hotel Atrium	7:30 pm AWARDS BANQUET Hyatt Regency Hotel Constellation Ballroom	

## WEDNESDAY, JUNE 4, 1986

W 8:30 am-10:00 am APPLICATIONS OF GHZ/GBIT OPTICAL TRANSMISSION SYSTEMS I Convention Center Room 317	X 8:30 am-10:00 am MICROWAVE MEASUREMENTS I Convention Center Room 310	Y 8:30 am-10:00 am MIC SUBSYSTEMS Convention Center Rooms 307/308
Z 10:30 am-12:00 pm APPLICATIONS OF GHZ/GBIT OPTICAL TRANSMISSION SYSTEMS II Convention Center Room 317	AA 10:30 am-12:00 pm MICROWAVE MEASUREMENTS II Convention Center Room 310	BB 10:30 am-12:00 pm PASSIVE CIRCUIT MODELLING Convention Center Rooms 307/308
CC 1:30 pm-3:00 pm OPTICAL DEVICES FOR MICROWAVE APPLICATIONS Convention Center Room 317	DD 1:30 pm-3:00 pm FERRITIES Convention Center Room 310	EE 1:30 pm-2:45 pm DOD MIMIC PROGRAM JOINT WITH MONOLITHIC SYMPOSIUM Convention Center Rooms 307/308/309
FF 3:30 pm-5:00 pm BIOLOGICAL EFFECTS AND MEDICAL APPLICATIONS Convention Center Room 317	GG 3:30 pm-5:00 pm ANALYTICAL AND NUMERICAL METHODS Convention Center Room 310	HH 2:15 pm-5:00 pm MICROWAVE AMPLIFIERS JOINT WITH MONOLITHIC SYMPOSIUM Convention Center Rooms 307/308/309

**WEDNESDAY, JUNE 4, 1986**

8:00 pm-9:30 pm PANEL ON MILLIMETER WAVE INTEGRATED CIRCUIT SOURCES Hyatt Constellation A Room	8:00 pm-9:30 pm PANEL ON GAAS MICROWAVE MONOLITHIC INTEGRATED CIRCUITS Hyatt Constellation B Room	
6:00 pm-9:00 pm CRAB FEAST/BULL ROAST Festival Hall		

**THURSDAY, JUNE 5, 1986**

8:30 am-5:00 pm MONOLITHIC SYMPOSIUM Convention Center Rooms 307/308/309	8:30 am-5:00 pm WORKSHOP ON PROCUREMENT Hyatt Constellation E & F Rooms	8:30 am-5:00 pm WORKSHOP ON GHz/GBIT OPTICAL TRANSMISSION Hyatt Baltimore and Annapolis Room	8:30 am-5:00 pm WORKSHOP ON MICROWAVE CAD Hyatt Constellation C & D Rooms	8:30 am-5:00 pm WORKSHOP ON DIELECTRIC RESONATORS Hyatt Frederick and Columbia Rooms	8:30 am-4:30 pm ARFTG Sheraton Chesapeake II
	8:00 pm-9:30 pm PANEL ON GAAS FET/ MMIC RELIABILITY Hyatt Constellation E & F Rooms				7:00 pm-10:00 pm ARTFG BANQUET Sheraton Chesapeake I & H Rooms

**FRIDAY, JUNE 6, 1986**

	8:30 am-9:30 pm WORKSHOP ON MAGNETOSTATICS Hyatt Constellation E & F Rooms		8:30 am-5:00 pm WORKSHOP ON FILTERS Hyatt Constellation C & D Rooms		8:30 am-11:45 am ARFTG Sheraton Chesapeake II
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# 1986 IEEE MTT-S INTERNATIONAL MICROWAVE SYMPOSIUM

## SYMPOSIUM SCHEDULE

### SUNDAY, JUNE 1, 1986

1:00 pm-9:30 pm Symposium Registration, Convention Center Lobby  
2:00 pm-5:00 pm Guest Hospitality Suite, Hyatt Chesapeake A&B Rooms  
6:00 pm-8:00 pm Microwave Journal Reception, Maryland Science Center

### MONDAY, JUNE 2, 1986

7:00 am-8:00 am Speaker's Breakfast, Convention Center 319  
7:00 am-10:00 am Guest Hospitality Suite, Hyatt Chesapeake A&B Rooms  
2:00 pm-5:00 pm  
7:30 am-5:00 pm Symposium Registration, Convention Center Lobby  
8:30 am-10:00 am Microwave Symposium Opening Ceremony, Convention Center Rooms 307/308/309  
9:00 am-5:30 pm Historical Exhibition, Convention Center, Rooms 301/303/305  
9:00 am-5:30 pm Microwave Exhibition, Convention Center, Exhibit Center  
10:30 am-9:30 pm Microwave Symposium Technical Program, Convention Center Rooms 310, 307/308/309, 317

### TUESDAY, JUNE 3, 1986

7:00 am-8:00 am Speakers Breakfast, Convention Center 319  
7:00 am-10:00 am Guest Hospitality, Hyatt Chesapeake A&B Rooms  
2:00 pm-5:00 pm  
7:30 am-5:00 pm Symposium Registration, Convention Center Lobby  
8:30 am-5:30 pm Microwave Symposium Technical Program, Convention Center Room 310, 307/308/309, 317  
9:00 am-5:30 pm Historical Exhibition, Convention Center Rooms  
9:00 am-5:30 pm Microwave Exhibition, Convention Center Exhibit Center  
5:45 pm-7:30 pm Industry Hosted Cocktail Party, Hyatt Regency Hotel Attnum  
6:00 pm-9:00 pm Crab Feast/Bull Roast, Festival Hall  
7:30 pm Awards Banquet, Hyatt Regency Hotel Constellation Ballroom

### WEDNESDAY, JUNE 4, 1986

7:00 am-8:00 am Speaker's Breakfast, Convention Center 319  
7:00 am-10:00 am Guest Hospitality, Hyatt Chesapeake A&B Rooms  
2:00 pm-5:00 pm  
7:30 am-5:00 pm Symposium Registration, Convention Center Lobby  
8:30 am-5:00 pm Microwave Symposium Technical Program, Convention Center Rooms 310, 307/308/309, 317  
9:00 am-5:30 pm Historical Exhibition, Convention Center Rooms 301/303/305  
9:00 am-4:00 pm Microwave Exhibitions, Convention Center Exhibit Center  
1:30 pm-2:00 pm Microwave and Millimeter-Wave Monolithic Circuits Symposium Opening Ceremony, Convention Center Rooms 307/308/309  
2:15 pm-5:00 pm Joint Session with Microwave and Monolithic Symposium, Convention Center Rooms 307/308/309  
8:00 pm-9:30 pm Panel sessions on MMWIC Sources/GaAs MMIC, Hyatt Constellation A&B Rooms

### THURSDAY, JUNE 4, 1986

7:00 am-8:00 am Speaker Breakfast, Convention Center 319  
7:00 am-10:00 am Guest Hospitality Suite, Hyatt Chesapeake A&B Rooms  
2:00 pm-5:00 pm  
7:30 am-4:00 pm Symposium Registration, Convention Center Lobby  
8:20 am-4:30 pm AFRTG, Sheraton, Chesapeake II  
8:30 am-5:00 pm Monolithic Symposium Convention Center, Rooms 307/308/309  
8:30 am-5:00 pm Workshops on Procurement/GHZ GBIT Optical Transmission/Microwave CAD/Dielectric Resonators, Hyatt Hotels (see agenda)  
7:00 pm-10:00 pm AFRTG Banquet, Sheraton Chesapeake I & II Rooms  
8:00 pm-9:30 pm Panel on GaAs FET/MMIC Reliability, Hyatt Constellation E&F Rooms

### FRIDAY, JUNE 5, 1986

7:30 am-10:00 am Guest Hospitality Suite, Hyatt Constellation A Room  
7:30 am-9:00am Symposium Registration, Hyatt Constellation Foyer  
8:30 am-5:00 am Workshop on Magnetostatics/Filters, Hyatt Constellation E&F/C&D Rooms

## GUEST PROGRAM

The Microwave Journal Reception is on Sunday, June 1, 1986 from 6 to 8 pm at the Maryland Science Center. There will be complimentary wine and hors d'oeuvres accompanied by live music. All Symposium participants, MTT-S and Monolithic, and all exhibitors are welcome to attend and bring a guest and their families.

A wonderful Guest Program has been organized with visits to historic Baltimore, picturesque Annapolis, and Washington, D.C. Tours will be available. Please see the Guest Program and Advance Registration Form. A Hospitality Suite with complimentary Continental breakfasts and snacks in the afternoon will be at the Hyatt Regency Hotel (see above Symposium Schedule for time and place.)

A gourmet international dinner has been selected for the Awards Banquet on Tuesday evening, which is immediately following the industry-sponsored Cocktail Party. On Wednesday evening a Crab Feast and Bull Roast will be held from 6 to 9 pm in Festival Hall, right next door to the Convention Center. The menu includes crabs, crab cakes, beef, corn on the cob, hot dogs and many other dishes. A Dixieland band will provide entertainment.

### MONDAY, JUNE 2, 1986

#### ROOM: 307/308/309 CONVENTION CENTER SESSION: A—OPENING CEREMONY

8:30 am Presentation of Colors with Live Band  
to Presentation of State and Country Flags by the 46  
10:00 am MTT-chapters  
Welcome, E. Niehenke, Symposium Chairman, B. Knerr, MTT-S President, M. Cohn, Technical Program Chairman  
Proclamation of International Microwave Week in Baltimore and Maryland  
Live Satellite Transmission to West Germany, Prof. H. Groll, Technical University of Munich  
Keynote Address, Dr. J. L. Charyk, Founder of COMSAT



**ROOM: 310 CONVENTION CENTER**  
**SESSION: B—GUIDED WAVE STRUCTURES I**

Chairman: A.K. Sharma, RCA David Sarnoff Research Center

- 10:30 am  
B-1 **The Nature of the Leakage from Higher Modes on Microstrip Line**  
A.A. Oliner, K.S. Lee  
Polytechnic Institute of New York, Brooklyn, NY
- 10:50 am  
B-2 **Uniaxial and Biaxial Substrate Effects on Uniform Finlines and Finline Step Discontinuities**  
H.Y. Yang, N.G. Alexopoulos  
University of California, Los Angeles, CA
- 11:10 am  
B-3 **Slow-Wave Characteristics of Ferromagnetic Semiconductor Microstrip Line**  
H. Ogawa, T. Itoh  
The University of Texas, Austin, TX
- 11:20 am  
B-4 **Effects of Transition Waveguide on Dielectric Waveguide Directional Couplers**  
S.T. Xu, S.J. Peng  
New York Institute of Technology,  
Old Westbury, NY  
F.K. Schwing  
U.S. Army CECOM, Ft. Monmouth, NY
- 11:30 am  
B-5 **Mutual Interference Between the Guided Wave and the Leaky Wave Regions and Its Effects on the Performance of Dielectric Grating Filters**  
M. Tsuji, H. Shigesawa  
Doshisha University, Kyoto, Japan

**ROOM: 307/308/309 CONVENTION CENTER**  
**SESSION: C—LOW NOISE TECHNIQUES**

Chairman: V. Sokolov, Honeywell, Inc. (PSC)

- 10:30 am  
C-1 **20 GHz-Band Low Noise HEMT Amplifier**  
K. Shibata, K. Nakayama, M. Ohtsubo, H. Kawasaki, S. Hori, K. Kamei  
Toshiba Corporation, Kawasaki, Japan
- 10:50 a.m.  
C-2 **Low Frequency Noise Measurements of GaAs FETs**  
A.N. Riddle, R.J. Trew  
North Carolina State University, Raleigh, NC
- 11:00 am  
C-3 **Highly Stabilized, Ultra-Low Noise FET Oscillator with Dielectric Resonator**  
G. Lan, E. Mykietyn, E. Hoffman, F. Sechi  
RCA Laboratories, Princeton, NJ
- 11:20 am  
C-4 **Dielectric Resonator Oscillators at 4, 6 and 11GHz**  
K.R. Varlan  
Rockwell International, Dallas, TX
- 11:30 am  
C-5 **Bipolar Translator Ku-Band Oscillators with Low Phase Noise**  
C. Ansoorge  
Technische Universitat, Hamburg, FRG
- 11:50 am  
C-6 **Dielectric Resonator Oscillators Using GaAs (Ga,Al) Heterojunction Bipolar Translators**  
K.K. Agarwal  
Rockwell International, Dallas TX

**ROOM: 317 CONVENTION CENTER**  
**SESSION D—IMPATTS**

Chairman: E.D. Cohen,

Space and Naval Warfare Systems Command

- 10:30 am  
D-1 **X-Band, 125 W, Four Stacked IMPATT Diode**  
R. Dat, M. Ayyagari  
M/A COM, Burlington, MA  
R.J. Weber, D.L. Landt  
Rockwell International, Cedar Rapids, IA
- 10:50 am  
D-2 **Low Cost Modular 100 Watt Peak, 10% Bandwidth Microstrip IMPATT Amplifier**  
J.F. Cushman, M.E. Hines  
M/A COM Inc., Burlington, MA

11:10 am  
D-3

**110 Watt Wideband Microstrip IMPATT Combiner/Amplifier**

B.E. Sigman, T.W. Van Alstyne  
Motorola, Inc., Tempe, AZ

11:30 am  
D-4

**Indirect Sub-Harmonic Optical Injection Locking of a Millimeter WAVE IMPATT Oscillator**

A. Daryoush, P. Herczfeld  
Drexel Univ., Philadelphia, PA  
A. Rosen, A. Sharma  
RCA, Princeton, NJ  
V. Contarino  
Naval Air Development Center, Warminster, PA

**MONDAY AFTERNOON, JUNE 2, 1986**

**Room 310, CONVENTION CENTER**

**SESSION: E—GUIDED WAVE STRUCTURES II**

Chairman: S.T. Peng, New York Institute of Technology

1:30 pm  
E-1

**Analysis and Measurements of Nonradiative Dielectric Waveguide Bends**

T. Yoneyama, H. Tamaki  
University of Ryukyus, Nishihara, Okinawa, Japan  
S. Nishida

1:50 pm  
E-2

**Tohoku University, Sendai, Japan Effects of Air Gap and Finite Metal Plate Width on NRD Guide**

H. Shigesawa, M. Tsuji  
Doshisha University, Kamikyo-ku, Kyoto, Japan  
A.A. Oliner

2:10 pm  
E-3

**Polytechnic Institute of New York, Brooklyn, NY Effect of Complex Modes on Finline Discontinuities**

A.S. Omar, K. Schunemann, J. Piotrowski  
Technische Universitat, Hamburg, FRG

2:30 pm  
E-4

**A Combined Experimental and Theoretical Characterization of Discontinuities in Unilateral Finlines**

A. Beyer, D. Kother, I. Wolff  
Duisburg University, Duisburg, FRG

2:40  
E-5

**Finite Element Analysis of Slow-wave Schottky Printed Line**

C.K. Tzuang, Q. Zhang, T. Itoh  
University of Texas, Austin, TX

**Room: 307/308/309 CONVENTION CENTER**

**SESSION: F—PASSIVE COMPONENTS**

Chairman: I.J. Bahl, ITT/GIC

1:30 pm  
F-1

**Broadband Dielectric Waveguide 3-db Couplers Using Asymmetrical Coupled Lines**

P.K. Ikalainen, G.L. Matthaui, M.M. Monte  
University of California, Santa Barbara, CA

1:50 pm  
F-2

**Printed Circuit Hybrid-Ring Directional Coupler for Arbitrary Power Divisions**

A.K. Agarwal, G.F. Mikucki  
RCA, Missile and Surface Radar Division, Moorestown, NJ

2:00 pm  
F-3

**Design and Performance of a Wideband Multilayer Feed Network**

M.D. Abouzahra  
MIT Lincoln Laboratory, Lexington, MA

2:20 pm  
F-4

**A New N-Way Broadband Planar Power Combiner/Divider**

W. Yau, Y.C. Shih, J.M. Schellenberg

2:30 pm  
F-5

**Hughes Aircraft Company, Torrance, CA An Octave-Wide Matched Quarterwave Impedance Transformer**

F.C. de Ronde  
Bath University, Bath, Avon, England

2:50 pm  
F-6

**Matched, Dual Mode Square Waveguide Corner**

P.K. Park, R.L. Eisenhart, S.E. Bradshaw  
Hughes Aircraft Company, Canoga Park, CA

**Room: 317 CONVENTION CENTER**  
**SESSION: G—OSCILLATOR TOPICS**  
Chairman: P. Staecker, MIT Lincoln Laboratory

- 1:30 pm**  
**G-1** **Inter-Injection Locked Oscillators with Applications to Spatial Power Combining and Phased Arrays**  
K.D. Stephan, J. Hubert  
University of Massachusetts, Amherst, MA
- 1:50 pm**  
**G-2** **A 10 GHz Space Power Combiner with Parasitic Injection Locking**  
R. Dinger, D. White, D. Bowling  
Naval Weapons Center, China Lake, CA
- 2:10 pm**  
**G-3** **Planar Radial Resonator Oscillator**  
M. Dydyk  
Motorola Inc., Scottsdale, AZ
- 2:30 pm**  
**G-4** **Frequency/Temperature Compensated Millimeter Wave Oscillators and Broadband VCO's in Lumped Element and Printed Circuit Forms**  
L.D. Cohen, N. King, Jr.  
Eaton Corporation/AIL Division, Melville, NY

**ROOM: 317 CONVENTION CENTER**  
**SESSION: II—MM WAVE OSCILLATORS**  
Chairman: M. Dydyk, Motorola, Inc.

- 3:30 pm**  
**H-1** **A MM-Wave Microlab Oscillator**  
H. B. Sequeira, J.A. McClintock  
Martin Marietta Laboratories, Baltimore, MD
- 3:50 pm**  
**H-2** **A High Q Cavity Stabilized Gunn Oscillator at 94 GHz**  
H. Barth  
AEG Aktiengesellschaft, Ulm, FRG
- 4:10 pm**  
**H-3** **Barium Ferrite-Indium Phosphide MM-Wave Oscillators**  
Y.S. Lau  
Vairan Solid State, Santa Clara, CA
- 4:30 pm**  
**H-4** **Dual Output Stabilized Gunn Oscillator for Finlines**  
U. Goebel, K. Grimpe  
Technische Universitat, Hamburg, FRG

**ROOM: 307/308/309 CONVENTION CENTER**  
**SESSION: 1—SPECIAL INTERNATIONAL SESSION**  
Chairman: R.A. Sparks, Raytheon

- 3:30 pm**  
**I-1** **Optoelectronic Technology and Devices in Europe**  
(Inited) R. Bates  
University of Ghent, Ghent, Belgium
- 3:50 pm**  
**I-2** **Millimeter Wave Hybrid Integrated Circuits**  
(Inited) J. Citerne  
University Rennes, Rennes, France
- 4:10 pm**  
**I-3** **Microstrip CAD in Europe**  
(Inited) F. Gardiol  
Ecole Polytechnique Federale, Lausanne, France
- 4:30 pm**  
**I-4** **Millimeter Wave Devices and System Work in Europe**  
(Inited) J. Forrest  
Marconi Defense Systems Ltd., UK
- 4:50 pm**  
**I-5** **Microwave Research in China**  
(Inited) W. Lin  
Chengdu Institute of Radio, Chendu, People's Republic of China

**ROOM: 200 LEVEL CONVENTION CENTER**  
**SESSION J—OPEN FORUM I 3:30 pm-5:30 pm**  
Chairman: D.C. Buck, Westinghouse

## FINLINE

- J-1** **Efficient Analysis of Finline with Finite Metallization Thickness**  
J.K. Piotrowski  
Warsaw Technical University, Warsaw, Poland
- J-2** **Asymmetrical Structure Finline: An Alternative for Spatial Applications**  
J.M. Goutoule, P. Espes, P. Fraise  
ATES, Toulouse, France
- J-4** **Modeling of the Apparent Characteristic Impedance of Finned-Waveguide and Finline**  
P. Pramanick, P. Bhartia  
University of Ottawa, Ottawa, Ontario, Canada
- J-5** **Analysis of Finline Discontinuities**  
Y-Y Chen, S-F Li  
Nanjing Institute of Technology, Nanjing, China
- J-6** **Millimeter-Wave QPSK Modulator in Finline**  
G.B. Gajda, C.J. Verver  
Communications Research Centre, Ottawa, Ontario, Canada
- J-22** **A Fet Amplifier in Finline Technique**  
J. L'Ecuyer, G.B. Gajda, W.J.R. Hoefer,  
Communications Research Centre, Ottawa, Ontario, Canada

## DIELECTRIC RESONATORS/WAVEGUIDES

- J-3** **Analysis of the Coupling Coefficient Between a Cylindrical Dielectric Resonator and a Fin-Line**  
F. Hernandez-Gill  
Teleonica, Madrid, Spain
- J-7** **Broadband Dielectric Waveguide Coupler and Six-Port Network**  
J. Perez  
E.T.S. Ing, Telecomunicacion, Madrid, Spain
- J-8** **Design Charts for Shielded Dielectric Rod and Ring Resonators**  
Y. Kobayashi, S. Nakayama  
Saitama University, Saitama, Japan
- J-9** **Coupling of Dielectric Resonators to Rectangular Waveguides**  
K.A. Zaki, C. Chen  
University of Maryland, College Park, MD

## FILTERS

- J-10** **Computer-Aided Tuning of Microwave Filters**  
L. Accatino  
CELT—Centro Studi e Laboratori Telecomunicazioni, Torino, Italy
- J-11** **Realization of Dual-Mode Longitudinal Filters with Arbitrary Polarization of Input and Output Ports**  
J. Frenna  
COM Dev Ltd., Cambridge, Ontario, Canada

## CIRCUITS, ANALYSIS

- J-12** **Dynamic Analysis of Microstrip Lines on Anisotropic Substrates**  
M.R.G. Maia, A.G. d'Assuncao  
Fed. Univ. of Rio Grandedo Norte, Brazil  
A.J. Giarola  
State Univ. of Campinas, Brazil
- J-13** **Analysis of E-Plane Circulators by Eigenvalue Measurements**  
U. Goebel, Ch. Schieblch  
Technische Universitat Hamburg, FRG
- J-14** **Analysis Method for Generalized Suspended Strip Lines**  
E. Yamashita, K. Atsuki  
University of Electro-communications, Tokyo, Japan  
M. Nakajima  
Tokyo Keiki Co., Ltd., Tokyo, Japan
- J-16** **New Types of 3-dB Directional Couplers of Microstrip Transmission Lines**  
L. Dongtian  
Nanjing Research Institute of Electronics Technology  
Nanjing, People's Republic of China
- J-17** **Accurate Characterization and Modelling of Transmission Lines for GaAs MMICs**  
H.J. Finlay, J.A. Jenkins, I.G. Eddison  
Plessey Research Limited, Caswell, Towcester, Northants, U.K.  
R.H. Jansen  
University of Duisburg, Duisburg, FRG
- J-18** **An Analysis of EM Wave Circuit Problems by Networking Boundary Element Method**  
F. Zheng-He  
Qinghua University, People's Republic of China

## NOVEL CONCEPTS

- J-19** **Symmetric Test Fixture Callibration**  
E.R. Ehlers  
Hewlett-Packard Co., Santa Rosa, CA
- J-20** **Microwave Transmission Line Frequency Discriminators**  
H.G. Cho  
Kookmin University, Seoul, Korea  
C.W. Lee  
Seoul National University, Seoul, Korea
- J-21** **Multilayer Planar Structures for High Directivity Directional Coupler Design**  
M. Horno, F. Medina  
Universidad de Sevilla, Sevilla, Spain

## TUESDAY MORNING, JUNE 3, 1986

### ROOM: 317 CONVENTION CENTER

#### SESSION: K—SOLID STATE TOPICS

Chairman: J.F. White, MA/COM, Inc.

- 8:30 am**  
**K-1** **Subharmonically and Fundamentally Pumped Slotline Quasioptical Mixer**  
C.M. Jackson, C. Sun  
TRW Electronics and Defense, Redondo Beach, CA
- 8:50 am**  
**K-2** **50 Watt CW Diode Tuned UHF Filter**  
G. DiPazza  
M/A-COM, Lowell, MA
- 9:10 am**  
**K-3** **High Dynamic Range Video Detector**  
R. W. Shillady  
American Electronic Laboratories, Inc., Lansdale, PA
- 9:30 am**  
**K-4** **Varactor Frequency Halvers with Enhanced Bandwidth and Dynamic Range**  
R.G. Harrison  
Carleton University, Ottawa, Ontario, Canada  
W.D. Cornish  
Telemus Electronic Systems, Inc., Ontario, Canada

### ROOM: 307/308 CONVENTION CENTER

#### SESSION: L—MICROWAVE SYSTEMS I

Chairman: J.B. Knorr, Naval Postgraduate School

- 8:30 am**  
**L-1** **Millimeter-Wave Imaging Sensor**  
W.J. Wilson, R.J. Howard, A.C. Ibbott, G.S. Parks, W.B. Ricketts  
Jet Propulsion Laboratory, Pasadena, CA
- 8:50 am**  
**L-2** **A Distributed Array Antenna System for Space Applications**  
R.W. Shaw  
Lockheed-EMSCO, Houston, TX
- 9:10 am**  
**L-3** **High Efficiency 4 GHz SSPA for Space Application**  
G. Gatti, G. Turgeon, L. Duque, J. Zaichkowsky, R. Dion  
Spar Aerospace Ltd., Quebec, Canada
- 9:30 am**  
**L-4** **A Compact 4 GHz Linearizer for Space Use**  
S. Kitazuma, H. Ogawa, R. Inada  
NEC Corporation, Yokohama, Japan

### ROOM: 309/310 CONVENTION CENTER

#### SESSION: M—DISTRIBUTED FET AMPLIFIERS AND CIRCUITS

Chairman: S.J. Temple, Raytheon Co.

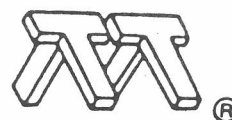
- 8:30 am**  
**M-1** **A Distributed 1-12 GHz Dual-Gate FET Mixer**  
T.S. Howard and A.M. Pavio  
Texas Instruments, Inc., Dallas, Texas
- 8:50 am**  
**M-2** **Internal Microwave Propagation and Distortion Characteristics of Traveling-Wave Amplifiers Studied by Direct Electro-Optic Sampling**  
M.J.W. Rodwell, K.J. Weingarten, D.M. Bloom  
Stanford University, Stanford, CA  
M. Riazat  
Varian Associates, Palo Alto, CA
- 9:10 am**  
**M-3** **Coplanar Waveguides Used in 2-18 GHz Distributed Amplifier**  
M. Riazat, S. Bandy, G. Zdasiuk  
Varian Central Research, Palo Alto, CA
- 9:20 am**  
**M-4** **A 2-18 GHz Traveling Wave Lossless Two-Port Combiner**  
D. Levy, A. Noblet, Y. Bender  
Thomson-CSF, Malakoff, France
- 9:30 am**  
**M-5** **A Complete Small Size 2 to 30 GHz Hybrid Distributed Amplifier Using a Novel Design Technique**  
P. Gamand  
Laboratoires d'Electronique et de Physique Appliquee  
Limeil-Brevannes, France

### ROOM: 317 CONVENTION CENTER

#### SESSION: N—FILTERS FOR SATELLITE APPLICATIONS

Chairman: H. C. Bell, WAVECOM/LORAL

- 10:30 am**  
**N-1** **An 8 Pole Quazi-Elliptic Function Filter Realized in 3 Dielectric Resonator Cavities**  
W. C. Tang  
COM DEV Ltd., Cambridge, Ontario, Canada
- 10:50 am**  
**N-2** **Elliptic Bandpass Filters Using Four TM<sub>010</sub> Dielectric Resonators**  
Y. Kobayashi, H. Furukawa  
Saitama University, Urawa, Saitama, Japan
- 11:10 am**  
**N-3** **Realization of an Exact 5-Pole Elliptic Function Filter Employing Dielectric Loaded Triple-Dual-Mode Cavity Structure**  
D. Siu  
COM DEV Limited, Cambridge, Ontario, Canada
- 11:30 am**  
**N-4** **Analysis of Antipodal Ridge Waveguide Structure and Application on Extremely Wide Stopband Lowpass Filter**  
A.M.K. Saad, J.D. Miller, A. Mitha, R. Brown  
MA Electronics Canada, Mississauga, Ontario, Canada





**ROOM: 307/308 CONVENTION CENTER**  
**SESSION: O—MICROWAVE SYSTEMS II**  
 Chairman: G.L. Heiter, AT&T Bell Labs

10:30 am **Compac CW/Pulsed Microwave Phase Lock Loop Module**  
 O-1 D. L. Allen, R.M. Persson, A.M. Pavio  
 Texas Instruments Incorporated, Dallas, TX

10:50 am **A MM-Wave Miniaturized Phase-Lock Source for Low**  
 O-2 **Noise Receiver Applications**  
 L. Bui, R. Hennegan, N. Ton  
 Torrance Research Center, Torrance, CA

11:10 am **Gigahertz Bandwidth Multibit Phase Sampling and**  
 O-3 **Reconstruction of Microwave Signals**  
 D.G.D. Clark, G.B. Wordsworth  
 THORN EMI Central Research Laboratories, United Kingdom

**ROOM: 309/310 CONVENTION CENTER**  
**SESSION: P—FET MODELLING**  
 Chairman: F.N. Sechi, Microwave Power Research

10:30 am **An Accurate FET Modelling from Measured S-Parameters**  
 P-1 H. Kondoh  
 Hewlett-Packard Co., Santa Rosa, CA

10:50 am **RF Nonlinear Device Characterization Yields Improved**  
 P-2 **Modelling Accuracy**  
 M.A. Smith, T.S. Howard, K.J. Anderson, A.M. Pavio  
 Texas Instruments, Inc., Dallas, TX

11:10 am **Model-Extrapolated S-Parameters Design of MM-Wave**  
 P-3 **GaAs FET Amplifiers**  
 L. Dearden, G. Miner  
 Brigham Young University  
 M. Sayed, Hewlett-Packard

11:30 am **Characterization and Design of GaAs MESFETS**  
 P-4 **Broadband Control Applications**  
 R. J. Gutmann, Rensselaer Polytechnic Institute  
 D. Fryklund, D. Menzer, M/A-COM

11:40 am **Large-Signal Narrow Band Quasi-Black-Box Modelling**  
 P-5 **of Microwave Transistors**  
 F. Filicori, A. Mambriani, V.A. Monaco  
 Universita di Bologna, Bologna, Italy

## TUESDAY AFTERNOON, JUNE 3, 1986

**ROOM: 317 CONVENTION CENTER**  
**SESSION: Q—DIELECTRIC RESONATORS AND FILTERS**  
 Chairman: C.M. Kudsia, COM DEV, Ltd.

1:30 pm **A Simple Experimental Technique for Determining**  
 Q-1 **Coupling Between Dielectric Resonators**  
 J.C. Brand  
 Motorola Inc., Scottsdale, AZ

1:40 pm **800 MHz Band Face-Bonding Filter Using**  
 Q-2 **Dielectric B.D.L.S**  
 T. Nishikawa, K. Wakino, J. Hattori, Y. Ishikawa  
 Murata Mfg. Co. Ltd., Kyoto, Japan

2:00 pm **Two Path Cutoff Waveguide Resonator Filters**  
 Q-3 **with Attenuation Poles**  
 H. Shigesawa, M. Tsuji, K. Takiyama  
 Doshisha University, Kyoto, Japan

2:10 pm **Varactor Tuned Bandpass Filters Using Microstrip-**  
 Q-4 **Line Ring Resonators**  
 M. Makimoto, M. Sagawa  
 Matsushita Research Institute, Tokyo, Japan

2:30 pm **A Bandstop Filter Constructed in Non-Radiative Dielectric**  
 Q-5 **Waveguide**  
 J.C. Olivier, J.A.G. Malherbe  
 University of Pretoria, South Africa

**ROOM: 307/308 CONVENTION CENTER**  
**SESSION: R—FOCUSED SESSION—MANUFACTURING METHODS**  
 Chairman: G. Klein, Westinghouse

1:30 pm **Cost Reduction in Manufacturing Microwave Components**  
 R-1 R.M. Malbon  
 (Invited) Avantek, Inc., Santa Clara, CA

1:50 pm **Automated Interconnect on GaAs Integrated Circuits**  
 R-2 J.S. Pavio, D. Bretzke  
 Texas Instruments, Dallas, TX

2:00 pm **Advances in Low-Cost Manufacturing—Quasi Thin Film**  
 R-3 **Technology Produces Low-Loss MIC Components**  
 M. Leitner, R. Vahldieck  
 Bolriet Technologies, Inc., Ontario, Canada

2:10 pm **A Comparison of Thin Film and Thick Film**  
 R-4 **Ku-Band Amplifiers**  
 A.M. Pavlo, L.L. Cook  
 Texas Instruments, Inc., Dallas, TX

2:20 pm **Advances in Low-Cost Component Manufacturing:**  
 R-5 **Avantek's Die Manufacturing Facility**  
 K. Crowley  
 Avantek, Inc., Newark, CA

2:40 pm **Low Cost TO Packages for High Speed/Microwave**  
 R-6 **Applications**  
 D.A. Larsen, D.E. Heckaman, J.A. Frisco, D.A. Haskins  
 Harris Corp., Melbourne, FL

2:50 pm **Plug-In 11 GHz LNA Module with Ground Plane Tuner**  
 R-7 B.R. Hallford  
 Rockwell International, Richardson, TX

**ROOM: 309/310 CONVENTION CENTER**  
**SESSION: S—GaAs FET AMPLIFIERS**  
 Chairman: M. Kumar, Microwave Semiconductor Corp.

1:30 pm **5 GHz 20 Watt GaAs FET Amplifier for MLS**  
 S-1 K. Hirai, H. Takamatsu, S. Morikawa, N. Tomita  
 Toshiba Corp., Kawasaki, Japan

1:50 pm **High Efficiency One, Two, and Four Watt Class B**  
 S-2 **FET Power Amplifiers**  
 J.R. Lane, R.G. Freitag, J.E. Degenford, M. Cohn  
 Westinghouse, Baltimore, MD

2:00 pm **2.5-watt and 5-watt Internally Matched GaAs FETs**  
 S-3 **10.7-11.7 and 14-14.5 GHz Bands**  
 M. Avasarala  
 Avantek, Inc., Millpitas, CA

2:10 pm **A Low Phase Noise MMIC/Hybrid 3.0W Amplifier**  
 S-4 **at X-Band**  
 T. Dao, S. Huettner, A. Platzker  
 Raytheon Company, Bedford, MA

2:20 pm **60 and 70 GHz (HEMT) Amplifiers**  
 S-5 M. Sholley, A. Nichols  
 TRW, Redondo Beach, CA

**ROOM: 200 LEVEL CONVENTION CENTER**  
**SESSION T—OPEN FORUM II 3:30 PM—5:30 PM**  
 Chairman: D.C. Buck, Westinghouse

**MAGNETOSTATIC WAVES**

T-1 **Magnetostatic-Wave Propagation in a Yttrium Iron Garnet**  
**(YIG) Loaded Waveguide**  
 M. Radmanesh, C.M. Chu, G.I. Haddad  
 The University of Michigan, Ann Arbor, MI

T-2 **Magnetostatic Forward Volume Wave Straight Edge**  
**Resonators**  
 K.W. Chang, W. Ishak  
 Hewlett-Packard Laboratories, Palo Alto, CA

T-3 **A Ku Band MSW Delay Line**  
 D.A. Willems and J.M. Owens  
 ITT Corporation, Fort Wayne, IN

T-4 **Compact Magnetostatic Wave Channelizer**  
 M.R. Daniel, J.D. Adam  
 Westinghouse R&D Center, Pittsburgh, PA

**FET NONLINEARITIES**

T-5 **Frequency Conversion in General Nonlinear Multiport**  
**Devices**  
 V. Rizzoli, A. Lipparini  
 University of Bologna, Bologna, Italy

T-6 **Prediction of Wideband Power Performance of**  
**MESFET Devices Using the Volterra Series Presentation**  
 C.L. Law, C.S. Aitchison  
 King's College, London, England

- T-7 Microwave Device Modeling Using Efficient C1 Optimization: A Novel Approach**  
J.W. Bandler, S.H. Chen, S. Daijavad  
McMaster University, Hamilton, Canada
- T-8 Thermal Characterization of Microwave Power FETs Using Nematic Liquid Crystals**  
M.M. Minot  
Avantek, Inc., Milpitas, CA
- T-9 Determination of the Transfer Function of a Nonlinear Circuit for Prediction of Intermodulation Characteristics**  
J.R. Fayos, S.J. Nightingale  
General Electric Company, Syracuse, NY
- T-10 Nonlinear Circuit Simulation in the Frequency-Domain**  
K.S. Kundert, A. Sangiovanni-Vincentelli  
University of California, Berkeley, CA
- T-11 Full Characterization of GaAs Power MESFET and Accurate Load-Pull Contours Prediction**  
M. Lajugie  
Thomson-CSF, Malakoff, France/UFR des Sciences de Limoges, Limoges, France  
F. Grossier  
Thomson Semiconductors, Massy, France  
A. Silbermann, Y. Bender  
Thomson-CSF, Malakoff, France
- T-12 A Microwave Powered, Long Duration, High Altitude Platform**  
W.C. Brown  
Weston, MA
- T-22 Simulation of Intermodulation Distortion in MESFET Circuits with Arbitrary Frequency Separation of Tones**  
G.W. Rhyne, M.B. Steer  
North Carolina State University, Raleigh, NC

#### POWER COMBINING

- T-13 A 19-Way Isolated Power Divider Via the TE<sub>01</sub> Circular Waveguide Mode Transition**  
M. H. Chen  
TRW, Redondo Beach, CA
- T-14 30-Way Radial Power Combiner for Miniature GaAs FET Power Amplifiers**  
E. Belohoubek, R. Brown, H. Johnson, A. Fathy, D. Bechtie, D. Kalokitis, E. Mykiety  
RCA Laboratories, Princeton, NJ

#### MICROWAVE OPTICAL INTERACTIONS

- T-15 Power Transfer Between Single-Mode and Multi-Mode Optical Fibers**  
H.S. Huang, H-C Chang, J-S Wu  
National Taiwan University, Taipei, Taiwan
- T-16 Flat Microwave Responses of Directly Modulated Laser Diodes**  
M.C.R. Carvalho, A.A. de Salles  
CETUC-PUC/RJ, Rio de Janeiro, Brazil
- T-17 A Microwave-to-Optical Transducer**  
L.F. Jelsma  
Lawrence Livermore National Laboratory, Livermore, CA
- T-18 Design and Performance of the Millimeter Wave DBR Gunn Oscillators**  
L. Zong-Wen, Z Wen-Xun  
Nanjing Institute of Technology, Nanjing, Jiangsu, PRC
- T-23 Analysis of Optically Controlled Microwave/Millimeter Wave Device Structures**  
R.N. Simons, K.B. Bhasin  
National Aeronautics & Space Administration, Lewis Research Center, Cleveland, OH

#### NOVEL COMPONENTS

- T-19 A Combined MMIC/MIC 8-Channel Receive Only Phase Array Demonstrator Operating in I/J Band**  
G. King, S.J. Flynn  
Marconi Defence Systems Limited, Stanmore, UK
- T-20 Medium Power S-Band Rotary Field Ferrite Phase Shifters**  
W.E. Hord, C.R. Boyd, Jr., C.M. Oness  
Microwave Applications Group, Santa Maria, CA
- T-21 Improved Computer-Aided Synthesis Tools for the Design of Matching Networks for Wideband Microwave Amplifiers**  
D.J. Mellor  
Hewlett Packard Company, Meridian, ID

#### ROOM: 307/308 CONVENTION CENTER

##### SESSION: U—MICROWAVE ACOUSTICS AND MAGNETOSTATICS

Chairman: T. Lukaszek, US Army LACOM

- 3:30 pm Microwave Acoustic Devices in Systems**  
**U-1**  
(Invited) B.R. McAvoy  
Westinghouse, Pittsburgh, PA
- 3:50 pm As Overview on Japanese Manufacturing of SAW Devices**  
**U-2**  
S. Fujishima  
Murata Mfg., Co., Japan
- 4:00 pm SAW Convolvers and Signal Processing in a Packet Radio**  
**U-3**  
J. Fischer, J. Cafarella, G. Flynn  
MIT Lincoln Laboratory, Lexington, MA
- 4:20 Wide Band RF Channelization Using Frequency**  
**U-4**  
**Dependent Beam Steering of Focused Bulk Acoustic Waves**  
F. Sabet-Peyman, K. Chau, I.C. Chang  
Litton, Sunnyvale, CA
- 4:30 pm MSSW Transversal Filters Based on Current Weighting in**  
**U-5**  
**Narrow (10  $\mu$ m) Transducers**  
Y.J. Ataliyan, J.M. Owens, K.W. Reed, R.L. Carter, W.A. Davis  
Univ. of Texas, Arlington, TX
- 4:40 pm A Novel MSW Programmable Barker Coder/Decoder**  
**U-6**  
S.H. Talisa, J.D. Adam, T.W. O'Keefe  
Westinghouse, Pittsburgh, PA

#### ROOM 309/310 CONVENTION CENTER

##### SESSION: V—GaAs FET OSCILLATORS, DOUBLERS AND MIXERS

Chairman: E.J. Crescenzi, Jr., Watkins-Johnson

- 3:30 pm Design of a Novel FET Frequency Doubler Using**  
**V-1**  
**a Harmonic Balance Algorithm**  
R. Gilmore  
Schlumberger, Houston, TX
- 3:50 pm Highly Stable 35 GHz GaAs FET Oscillator**  
**V-2**  
G.S. Dow, D. Sensiper, J.M. Schellenberg  
Hughes, Torrance, CA
- 4:00 pm A Unified Design of Dielectric Resonator Oscillators for**  
**V-3**  
**Telecommunication Systems**  
S-W. Chen, L-C. Chang, J.Y. Chin  
Microelectronics Technology, Inc., Hsinchu, Taiwan, R.O.C
- 4:10 pm A New N FETs Oscillator-Combiner Using Tubular**  
**V-4**  
**Dielectric Resonators**  
J.P. Joer, J. Obregon  
Universite de Limoges, Limoges, France
- 4:20 pm A Millimeter-wave Self-Oscillating Mixer Using a**  
**V-5**  
**GaAs FET Harmonic-Mode Oscillator**  
D.H. Evans  
Phillips Research Laboratories, Redhill, England

### WEDNESDAY MORNING, JUNE 4, 1986

ROOM: 317 CONVENTION CENTER

#### SESSION: W—FOCUSED SESSION—MICROWAVE ASPECTS AND APPLICATIONS OF GHz/GBIT OPTICAL TRANSMISSION SYSTEMS I

Chairman: N.R. Dietrich, AT&T Bell Labs

- 8:30 am  
W-1  
(Invited) **Overview of the Applications of Microwave Techniques for Lightwave Systems**  
H. Sobol  
Rockwell Int., Dallas, TX
- 9:10 am  
W-2 **Optical Injection Locking of FET Oscillators Using Fiber Optics**  
D.C. Buck, M.A. Cross  
Westinghouse Electric Corporation, Baltimore, MD
- 9:30 am  
W-3 **Comparison of Indirect Optical Injection Locking Techniques of Multiple X-Band Oscillators**  
P. Wahl, Z. Turski  
LORAL-ATL, Lanham, MD  
A.S. Daryoush, P.R. Herczfeld  
Drexel University, Philadelphia, PA

ROOM: 310 CONVENTION CENTER

#### SESSION: X—MICROWAVE MEASUREMENTS I

Chairman: D.R. Laton, Raytheon

- 8:30 am  
X-1 **A Broadband, Electric-Field Probe Using Resistively Tapered Dipoles, 100 KHz-18 GHz**  
M. Kanda, L.D. Driver  
National Bureau of Standards, Boulder, CO
- 8:50 am  
X-2 **An Automated Measurement Technique for Measuring Amplifier Load-pull and Verifying Large-Signal Device Models**  
M. Pierpoint, R.D. Pollard, J.R. Richardson  
The University of Leeds, Leeds, U.K.
- 9:10 am  
X-3 **Direct Calibration and Measurement of Microstrip Structures on GaAs**  
P.R. Shepherd, R.D. Pollard  
The University of Leeds, Leeds, U.K.
- 9:30 am  
X-4 **A System for Performing Ultra High Resolution Backscatter Measurements of Splashes**  
J.P. Hansen  
Naval Research Laboratory, Washington, DC

ROOM: 307/308 CONVENTION CENTER

#### SESSION: Y—MIC SUBSYSTEMS

Chairman: J.C. Wiltse,

Georgia Tech Research Inst.

- 8:30 am  
Y-1 **A Ka-Band Microstrip Integrated Circuit FMCW Transceiver**  
T.N. Trinh, E. Benko, W.S. Wong  
Hughes Aircraft Company, Torrance, CA
- 8:50 am  
Y-2 **A Ka-Band Dual-Channel Tracking Receiver Converter**  
M.A. Smith, A.M. Pavio, B. Kim  
Texas Instruments, Inc., Dallas, TX
- 9:00 am  
Y-3 **Printed-Circuit Ka-Band Mixer with Compact Filter for Step-Tuned LO**  
P.J. Meier  
Eaton Corp., Melville, NY
- 9:20 am  
Y-4 **A Planar Log Periodic Mixenna for Submillimeter-wave Astronomy**  
P.H. Siegel  
National Radio Astronomy Observatory, Charlottesville, VA

ROOM: 317 CONVENTION CENTER

#### SESSION: Z—FOCUSED SESSION—MICROWAVE ASPECTS AND APPLICATIONS OF GHz/GBIT OPTICAL TRANSMISSION SYSTEMS II

Chairman: H.F. Taylor, Texas A&M University

- 10:30 am  
Z-1  
(Invited) **Microwave and Millimeter Wave Bandwidth Optical Communications**  
J.E. Bowers  
AT&T Bell Labs, Holmdel, NJ
- 11:10 am  
Z-2 **Limitations on Switching Speed in Wideband Semiconductor Lasers**  
R.S. Tucker, J.M. Wiesenfeld, P.M. Downey, J.E. Bowers  
AT & T Bell Laboratories, Holmdel, NJ

11:30 am  
Z-3

#### Linearity Characterization of Connectorized Laser Diodes Under Microwave Intensity Modulation by AM/AM and AM/PM Measurements

W.I. Way, A. Afrashteh

Bell Communications Research, Red Bank, NJ

ROOM: 310 CONVENTION CENTER

#### SESSION: AA—MICROWAVE MEASUREMENT TECHNIQUES II

Chairman: M.A. Maury, Jr., Maury Microwave Corp.

- 10:30 am  
AA-1 **Calibrating a Dual Six-Port or Four Port for Measuring Two Ports With Any Connectors**  
C.H. Hoer, G.G. Engen  
National Bureau of Standards, Boulder, CO
- 10:50 am  
AA-2 **Integrated Finline 6 Ports for MM-Wave Network Analyzers**  
M. Malkomes, R. Walsdorf  
Institute for High Frequency Techniques, Aachen, FRG
- 11:00 am  
AA-3 **Extension of Six Port Theory and Practice**  
L. Kaliouby, R.G. Bosisio  
Ecole Polytechnique of Montreal, Montreal, Canada
- 11:20 am  
AA-4 **Coherent RF Error Statistics**  
R.B. Dybdal, T. H. Ott  
The Aerospace Corporation, El Segundo, CA
- 11:30 am  
AA-5 **Microwave Resonator Circuit Model from Measured Data Fitting**  
W.P. Wheless, Jr., D. Kajfez  
University of Mississippi, University, MS

ROOM: 307/308 CONVENTION CENTER

#### SESSION: BB—PASSIVE CIRCUIT MODELING

Chairman: N.G. Alexopoulos, UCLA

- 10:30 am  
BB-1 **Microstrip Filter Design Including Dispersion Effects and Radiation Losses**  
P.B. Katehi  
The University of Michigan, Ann Arbor, MI
- 10:50 am  
BB-2 **Dispersion of Transient Signals in Microstrip Transmission Lines**  
R.L. Veghte  
Ball Aerospace Systems Division, Boulder, CO.
- 11:00 am  
BB-3 **Characteristics of Multiconductor, Asymmetric, Slow-Wave Microstrip Transmission Lines**  
T.C. Mu, H. Ogawa, I. Itoh  
The University of Texas, Austin, TX
- 11:10 am  
BB-4 **Coplanar Waveguide vs. Microstrip for Millimeter Wave Integrated Circuits**  
R. W. Jackson  
University of Massachusetts, Amherst, MA
- 11:20 am  
BB-5 **Discontinuities in Finline on a Semiconductor Substrate**  
K. Uhde  
Technische Universitat, Hamburg, FRG

### WEDNESDAY AFTERNOON, JUNE 4, 1986

ROOM: 317 CONVENTION CENTER

#### SESSION: CC—OPTICAL DEVICES FOR MICROWAVE APPLICATIONS

Chairman: K.T. Yano, TRW

- 1:30 pm  
CC-1 **10 GHz RF Fiber Optic Links**  
C.M. Gee, I.L. Newberg, G.D. Thurmond, H.W. Yen  
Hughes Research Laboratories, Malibu, CA
- 1:50 pm  
CC-2 **A IGBT/S Optical/Electrical Input Monolithic GaAs Transmitter I.C.**  
M.P. Walton, P.R. Haugen, S.L. Palmquist  
Honeywell, Bloomington, MN



- 2:10 pm**  
**CC-3** **Heterojunction Bipolar Phototransistor for Monolithic Photoreceiver Operating at 140 Mbit/s**  
H. Wang, J.L. Lievin, C. Bacot, C. Chevallier, D. Ankri  
Centre National d'Etudes des Telecommunications, Bagneaux, France.
- 2:30 pm**  
**CC-4** **Self-Oscillating GaAs FET Demodulator and Downconverter for Microwave Modulated Optical Signals**  
C. Rauscher, L. Goldberg, A.M. Yurek  
Naval Research Laboratory, Washington, DC

**ROOM: 310 CONVENTION CENTER**

**SESSION: DD—FERRITES**

Chairman: J.E. Pippin, Electromagnetic Sciences, Inc.

- 1:30 pm**  
**DD-1** **Simultaneous Dual-Polarization Ferrite Phase Shifter**  
W.E. Hord, C.R. Boyd, Jr.  
Microwave Applications Group, Santa Maria, CA
- 1:50 pm**  
**DD-2** **Temperature Insensitive Dual-Mode Phase Shifter**  
H. Asao, M. Matsunaga, F. Takeda  
Mitsubishi Electric Corporation, Kanagawa Prefecture, Japan)
- 2:00 pm**  
**DD-3** **An Adjustable-Phase Power Divider**  
C.R. Boyd, Jr.  
Microwave Applications Group, Santa Maria, CA
- 2:20 pm**  
**DD-4** **Broadband Stripline Circulator**  
E. Schloemann, R.E. Blight  
Raytheon Research Division, Lexington, MA
- 2:40 pm**  
**DD-5** **Isolators in Finline Technique**  
Ch. Schiebllich, U. Goebel  
Technische Universitat, Hamburg, FRG

**ROOM: 307/308/309 CONVENTION CENTER**

**SESSION EE—JOINT WITH MONOLITHICS SYMPOSIUM  
OPENING SESSION**

Chairman: R. Sudbury—MIT Lincoln Lab

- 1:30 pm**  
**EE-1** **Welcome**  
R. Sudbury, Symposium Chairman  
Y. Ayasli, Technical Program Chairman
- 1:40 pm**  
**EE-2** **DOD Microwave and Millimeter-Wave Monolithic Integrated Circuits (MIMIC) Program**  
E. Maynard  
(Invited)  
DOD OUSDRE, Washington, DC

**ROOM: 307/308/309 CONVENTION CENTER**

**SESSION: HH—JOINT WITH MONOLITHICS SYMPOSIUM—  
MICROWAVE AMPLIFIERS**

Chairman: R. Gold, Adams Russell Co., Burlington, MA  
Co-Chairman: V. Nair, Motorola, Inc., Phoenix, AZ

- 2:15 pm**  
**2:20 pm**  
**HH-1** **Chairman's Introduction**  
**High Performance Monolithic Power Amplifier Using a Unique Ion Implantation Process**  
S. K. Wang, K.G. Wang, C.D. Chang  
Hughes Aircraft Co.  
Torrance, CA
- 2:40 pm**  
**HH-2** **A C-Band MMIC Power Amplifier Designed for Manufacturability**  
S.B. Moghe, R. Genin  
Pacific Monolithics, Sunnyvale, CA
- 3:00 pm**  
**Coffee Break**

**ROOM: 317 CONVENTION CENTER**

**SESSION: FF—BIOLOGICAL EFFECTS & MEDICAL APPLICATIONS**

Chairman: A. Rosen, RCA David Sarnoff Research Ctr.

- 3:30 pm**  
**FF-1** **A Three-Band Microwave Radiometer System for NonInvasive Measurement of the Temperature at Various Depths**  
S. Mizushima, Y. Hamamura, T. Sugiura  
Shizuoka University, Shizuoka Prefecture, Japan
- 3:50 pm**  
**FF-2** **Biological Temperature Retrieval by Scanning Radiometry**  
F. Bardati, M. Mongiardo, D. Solimini, P. Tognolatti  
II Universita di Roma, Italy

- 4:10 pm**  
**FF-3** **Instrumentation for Invasive and Non-Invasive Microwave Hyperthermia of Brain Tumors**  
H.W. Paglione, F. Storzer  
RCA Laboratories, Princeton, NJ

- 4:20 pm**  
**FF-4** **Swept Frequency Measurements of Various Coaxial Antennas in a Feline Brain Model**  
G. Neuberth, Nurad Inc.  
M. Salcman, Univ. of Maryland Hospital, Baltimore, MD
- 4:30 pm**  
**FF-5** **Energy Distribution Patterns Within Limb Models Heated with a Mini Annular Phased Array (MAPA) Applicator**

J.L., Guerquin Kern  
National Institutes of Health, Bethesda, MD  
INSERM, France  
M.J. Hagmann, C.K. Charny, R.L. Levin  
National Institutes of Health, Bethesda, MD

**4:40 pm**  
**FF-6** **Cytogenetic Observations on Microwave Exposed Bovine Lymphocytes**  
B. Bisceglia, G. d'Ambrosio, D. DiBerardino,  
M.B. Lioi, M.R. Scarfi  
University of Naples, Naples, Italy

**ROOM: 310 CONVENTION CENTER**

**SESSION: GG—ANALYTICAL AND NUMERICAL METHODS**

Chairman: T. Itoh, University of Texas-Austin

- 3:30 pm**  
**GG-1** **An Improved Transmission Matrix Formulation of Cascaded Discontinuities and Its Application to E-Plane Circuits**  
R.R. Mansour, R.H. MacPhie  
University of Waterloo, Waterloo, Ontario, Canada
- 3:50 pm**  
**GG-2** **Three Dimensional Finite-Element Formulation for Finline Discontinuity Problems**  
O. Picon, V. Fouad Hanna  
Centre National d'Etudes des Telecommunications, Issy-Les-Moulineaux, France  
J. Citerne  
I.N.S.A., Rennes Cedex, France
- 4:10 pm**  
**GG-3** **The Time Domain Finite Difference Method and its Application**  
D.H. Choi, W.J.R. Hoefer  
University of Ottawa, Ottawa, Ontario, Canada
- 4:30 pm**  
**GG-4** **Proposal of Surface-wave Planar Circuit, Formulation of Its Planar Circuit Equations and Its Practical Application**  
J. Itsu, T. Anada, F. Eriguchi  
Kanagawa University, Yokohani-shi, Japan

**ROOM: 307/308/309 CONVENTION CENTER**

**SESSION: HH—JOINT WITH MONOLITHICS SYMPOSIUM—  
MICROWAVE AMPLIFIERS**

Chairman: R. Gold, Adams-Russell Co., Burlington, MA  
Co-Chairman: V. Nair, Motorola, Inc., Phoenix, AZ

- 3:20 pm**  
**HH-3** **A Power Distributed Amplifier Using Constant-R Networks**  
E.M. Chase, W. Kennan  
Avantek, Inc., Santa Clara, CA
- 3:40 pm**  
**HH-4** **A Stable 2-26.5 GHz Two-Stage Dual-Gate Distributed MMIC Amplifier**  
J. Orr  
Hewlett-Packard Co., Santa Rosa, CA
- 4:00 pm**  
**HH-5** **A 12 db Monolithic Distributed Amplifier**  
R. Larue, S. Bandy, G. Zdasiuk  
Varian Associates, Palo Alto, CA
- 4:20 pm**  
**HH-6** **A High Performance 2-18.5 GHz Distributed Amplifier, Theory and Experiment**  
T. McKay  
Teledyne MMIC, Mountain View, CA  
R. Williams  
Texas Instruments, Dallas, TX

## PANEL SESSIONS

### Issues in Government Funding of Microwave R&D

Date: Monday, June 2, 1986, Noon to 1:30 pm  
Location: Constellation A Room, Hyatt Regency Hotel  
Organizer: R.A. Moore, PACE Representative  
Westinghouse Electric Corp.

Moderator: Joseph A. Saloom, M/A-COM  
Panelists: E.C. Maynard, Jr., Director VHSIC & Electron  
Devices,  
Pentagon  
Sven Roosild, DARPA/DSO  
Frank E. Welker, RADC  
Hans Hieslmair, USALABCOM  
James A. Cauffman, Office of Chief of Naval  
Research

#### Abstract:

Pressures on federally funded microwave R&D come from diverse sources such as major systems requirements, from within the microwave community, and from competition for limited available funds from other major thrusts. These can include the need for low cost active aperture modules, a VHSIC-like microwave program, and the advent of SDI. The title for the session has been made broad purposely so that each panel member from the three services, DARPA, and the VHSIC Office can dwell on the issues felt most significant to their area of activity. After a brief presentation by each of the panel members the floor will be open for audience questions and discussion.

Fee: \$10.00; includes lunch. See Advance Registration Form.

### Manufacturing MIC Assemblies for Performance, Reliability, and Profit.

Date: Monday, June 2, 1986, Noon to 1:30 pm  
Location: Constellation B. Room, Hyatt Regency Hotel  
Organizers: Chuck Buntschuh, Narda Microwave Corp.  
Rudy Henning, University of South Florida, Tampa  
Moderator: Chuck Buntschuh, Narda  
Panelists: Bert Berson, ACRAN, Inc.  
Gerald DiPiazza, M/A-COM  
Gary Lerude, Texas Instruments  
Walter Schwartz, Loral Electronic Systems

#### Abstract:

Advances in MIC design and technology are responding to the market pressure for more functions in smaller packages. New advances, led by MMIC developments are, in fact, launching us into a new era of miniaturization.

However, in spite of the elimination of connector interfaces and shortened line-lengths, MICs have generally failed to live up to the promise of improved performance. Also, the track record of MIC reliability leaves much to be desired, and their costs tend to exceed the threshold of pain for both supplies and customer.

How will the MIC industry grow and prosper in the face of these hurdles? What roles will monolithics, robotics, MIL-STD-1772 play? Do we need new organizational approaches, standardization of products, technical breakthroughs?

The panel will address these issues from the vantage points of the MIC designer, the manufacturers, and the customer.

Fee: \$10.00; includes lunch. See Advance Registration Form.

### Millimeter Wave System Development

Date: Monday, June 2, 1986, 8:00 pm to 9:30 pm  
Location: Constellation A Room, Hyatt Regency Hotel  
Organizers: J.J. Whelehan, Eaton Corp.  
H. Paczkowski, Eaton Corp.

#### Abstract:

The future trends of millimeter wave technology and their system applications will be discussed by representatives from both government and industry. EW, smart weapons, radar, and imaging techniques are representative of the areas that will be discussed, as well as the technology drivers. The role of government versus industry in providing the stimulus to develop these emerging areas will also be discussed.

### Millimeter Wave Integrated Circuit Sources

Date: Wednesday, June 4, 1986, 8:00 pm to 9:30 pm  
Location: Constellation A. Room, Hyatt Regency Hotel  
Chairmen: H.J. Kuno, Hughes Aircraft Company  
D.W. Maki, General Electric Company  
Panelists: H.Q. Tserng, Texas Instruments  
Y. Shih, Hughes  
W. Courtney, MIT Lincoln Laboratory  
P.M. Smith, General Electric  
B. Bayraktaroglu, Texas Instruments  
C.M. Krowne, Naval Research Laboratory  
C.O. Bozler, MIT Lincoln Laboratory

#### Abstract:

The applicability of a variety of solid state devices to power generation at millimeter wave frequency for integrated circuit applications will be discussed. The panel members will give the current status of various devices in terms of power and efficiency as a function of frequency and will give predictions as to potential improvements.

### GaAs Microwave Monolithic Integrated Circuits from Research Lab to Production

Date: Wednesday, June 4, 1986, 8:00 pm to 9:30 pm  
Location: Constellation B Room, Hyatt Regency Hotel  
Organizer: Krishna K. Agarwal, Rockwell International Corp.  
Panelists: Allen F. Podell, Pacific Monolithics  
George Kaelin, Rockwell Microelectronics R&D Center  
Jim Schellenberg, Hughes Torrance Research Center  
Phil Terzian, Narda Microwave Corp.  
Jim Oakes, Raytheon Special Microwave  
Development Opr

#### Abstract:

Rapid advances in GaAs material, microwave devices, and fabrication technology have been reported in recent years. These have led to microwave monolithic integrated circuits with increasing complexities. What level of integration is self defeating for performance, yield, and versatility in volume production? What inputs from research labs are necessary to production? What changes in chip-design must be made due to power supply, package, and cost for use by the customer? These are some of the issues in the MMIC producer's mind. Panel members from several MMIC research and production centers will present their experiences—do's and don'ts—in the transition of MMIC chips from research laboratory to production.

## GaAs FET/MMIC Reliability

Date: Thursday, June 5, 1986, 8:00 pm to 9:30 pm  
Location: Constellation E&F Rooms, Hyatt Regency Hotel  
Organizer: Frank Sullivan, Raytheon

### Abstract:

The panel will address the current reliability database status for microwave GaAs FETs and MMICs and will discuss the critical device parameters. Attention will be focused on requirements for current and future activity to establish a more credible database and improve device reliability.

## WORKSHOPS

### Microwave Procurement Challenges of the Late 80's and 90's

Date: Thursday, June 5, 1986, 8:30 am to 5:00 pm  
Location: Constellation E&F Rooms, Hyatt Regency Hotel  
Organizer: Frank A. Walker  
Sanders Associates  
CS 2004, M/S NCAI-1314F  
Nashua, NH 03061-2004  
(603) 885-3979

### Abstract:

This workshop is presented by senior microwave procurement professionals to microwave engineering, sales, and marketing personnel. It is intended to acquaint participants with the procurement processes of large systems houses and provide a forum for procurement and marketing people at the Symposium. It will include a series of presentations directly related to the microwave procurement process and a panel discussion involving procurement representatives and workshop participants. Procurement panelists will include representatives from companies such as Easton AIL, ITT, Loral, MA/COM, Northrop, Sanders, SEDCO, and Westinghouse.

A luncheon speaker will be featured focusing on a topic of interest to the entire microwave community.

### Microwave Aspects of GHz/Gbit Optical Transmission Systems

Date: Thursday, June 5, 1986, 8:30 am to 5:00 pm  
Location: Baltimore & Annapolis Rooms, Hyatt Regency Hotel  
Organizers: Henry K. Taylor  
Dept. of Electrical Engineering  
Texas A&M University  
College Station, TX 77843  
(409) 845-7441  
Norman Dietrich  
AT&T Bell Labs  
555 Union Blvd.  
Allentown, PA 18103  
(215) 439-6757  
Speakers: K. Lau, Ortel Corp.  
R. Olshansky, GTE Labs  
Chin Su, GTE Labs  
J.K. Plourde, AT&T

### Abstract:

The increasing bandwidth and data rate requirements for optical systems have led to an enhanced emphasis on the use of microwave techniques in transmitter and receiver design. This workshop is intended as a forum for the exchange of ideas among those interested in the microwave aspects of wideband analog and digital fiber optics systems. Areas to be discussed include: high-speed modulation of laser diodes, wideband photodetector technology, high bit-rate transmitter/receiver design, analog transmitter/receiver design, microwave characterization of lasers and photo detectors, receiver preamplifier design, MIC/MMIC modulation circuit design and device and circuit packaging. This workshop is intended to complement a Focussed Session on the somewhat broader subject "Microwave Aspects and Applications of GHz/Gbit Optical Transmission Systems".

### Trends in Microwave CAD

Date: Thursday, June 5, 1986, 8:30 am to 4:30 pm  
Location: Constellation C&D Rooms, Hyatt Regency Hotel  
Organizer: K.C. Gupta  
Department of Electrical and Computer Engineering  
University of Colorado - Campus Box 425  
Boulder, CO 80309  
(303) 492-7498  
Speakers: John Bandler, McMaster Univ. and Optimization Systems Assoc.  
Les Besser, Microwave Educational Programs and Les Besser Assoc.  
Walter C. Curtice, RCA David Sarnoff Research Center  
K.C. Gupta, Univ. of Colorado, Boulder  
Tatsuo Itoh, Univ. of Texas at Austin  
Rolf H. Jansen, Plessey Research Center, Caswell  
Juan R. Mosig, Swiss Federal Inst. of Technology, Lausanne  
Vittorio Rizzoli, Univ. of Bologna, Italy

### Abstract:

Computer-Aided Design has become an essential tool for microwave engineers. Although currently available CAD packages are used extensively by microwave circuit designers, the need for improved CAD techniques is becoming well recognized. The aim of this workshop is to provide a forum for discussions of current trends in CAD techniques useful for microwave and millimeter wave engineers. Invited speakers will discuss future directions in microwave CAD, CAD for monolithic circuits, nonlinear circuit design, numerical techniques for characterization of transmission structures and discontinuities, linear and nonlinear MESFET models, and CAD for microstrip antennas.

### Dielectric Resonators

Date: Thursday, June 5, 1986, 8:30 am to 5:00 pm  
Location: Frederick & Columbia Rooms, Hyatt Regency Hotel  
Organizer: A.E. Williams  
COMSAT Laboratories  
Clarksburg, MD 20871  
(301) 428-4067  
Speakers: R.R. Bonetti, COMSAT  
S.J. Fiedziuszko, Ford Aerospace  
J.P. Ganne, Thomson CSF  
Y. Kobayashi, Saitama University, Japan  
C.L. Ren, AT&T Bell Labs  
K. Wakino, Murata Corp.  
R. West, Trans-Tech  
K.A. Zaki, University of Maryland



### Abstract:

The recent development of high dielectric constant ( $\epsilon_r$  = ten to eighty) materials having extremely small loss tangents together with "Invar equivalent" temperature stabilities has revolutionized the miniaturization of microwave components. Spurred by the need for smaller and lighter devices, for both military and commercial applications, significant performance improvements are being realized in components such as filters and oscillators. More than half a dozen international experts working in such diverse disciplines as materials science, resonator field solutions, and filter development will present their views in this workshop. Ample time has been allowed for discussion and audience participation is encouraged.

### Filters and Multiplexers

Date: Friday, June 6, 1986, 8:30 am to 5:00 pm  
Location: Constellation C&D Rooms, Hyatt Regency Hotel  
Organizer: A.M.K. Saad  
M/A Electronics Canada  
3135 Universal Drive  
Mississauga, Ontario, L4X2E7 Canada  
(416) 625-4605  
Speakers: A.E. Atia, COMSAT  
S.J. Fiedziuszko, Ford Aerospace  
R.V. Snyder, RS Microwave Co., Inc.  
A.M.K. Saad, MA Electronics Canada  
J.W. Bandler, McMaster University

### Abstract:

The enormous growth of the commercial communications satellite industry in the recent past has paved the way for significant improvements in the area of microwave filters and multiplexers. This workshop will reflect the state of the art in this multi-natured area of expertise for terrestrial and satellite applications in the following topics: practical aspects of dual model filters, advances in design and manufacturing methods, design techniques of contiguous band multiplexers, bandpass and bandstop filters in the 100-1000 MHz range, planar integrated microwave filters and diplexers, and optimization techniques for design, modelling, and tuning.

### Microwave/Millimeter Wave Magnetics and MMIC Compatibility

Date: Friday, June 6, 1986, 8:30 am to 5:00 pm  
Location: Constellation E&F Rooms, Hyatt Regency Hotel  
Organizer: James C. Sethares  
Electromagnetic Science Division, RADC  
Hanscom AFB, MA 01731  
(617) 861-4663  
Speakers: J. Douglas Adam, Westinghouse Research Center  
Larry Adkins, Rockwell International  
Fred J. Cadieu, Queens College, New York  
Chung Lee Chen, MIT Lincoln Laboratory  
A. Chu, M/A-Com  
John Owens, University of Texas, Arlington  
Carl Patton, Colorado State University  
James Sethares, RADC, Hanscom AFB  
Daniel Stancil, North Carolina State University  
Carmen Vittoria, Northeastern University

### Abstract:

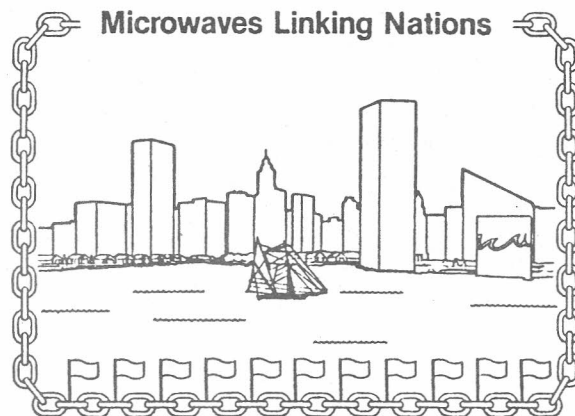
It appears certain that during the next 10 to 15 years microwave and millimeter wave systems operating in the 1 to 300 GHz range will be dominated by monolithic integrated circuits using GaAs, InP or other semiconductors, with both digital and analog circuits playing vital roles. It is also quite certain that if a way is not found to integrate microwave and millimeter wave magnetics into MMICs, it might be left out and a useful technology will be lost for many years. The purpose of this session, therefore, is to address the following questions: What role can magnetic thin films play in monolithic circuits? Is it feasible and will it be possible to integrate them into MMICs? What basic technological problems can be anticipated in such an integration? What ideas and technique are most promising? What benefits are realized and what special functions can magnetic films provide in MMICs?

Particular areas to be discussed include thin film permanent magnets, integrated GaAs/MSW and ferrite components, Brillouin scattering from microwave/MSW excitations, and millimeter wave materials.

☐ **Simple painting guidelines.** To make a room look larger, use the same color on walls, floor and ceiling. Dark colors don't always make a room look smaller, though they can make a large room more intimate. Dark colors on all surrounding surfaces can highlight furniture and give an illusion of spaciousness. Cool wall colors make a room seem bigger. Warm colors make a room seem smaller. A long, narrow room can be visually widened by painting the long sides a lighter color than those at the ends. A ceiling slightly lighter in color than the walls appears higher...a darker one, lower.

Oil-based paint lasts longer and is easier to clean, though it is harder to apply. Latex paint is odorless and washes off with soap and water. Flat paint is best for large wall surfaces. Semigloss paint highlights moldings and architectural details.

*Woman's Day*, 1515 Broadway, New York 10036, 15 issues, \$15.13/yr.



# 1986 IEEE MICROWAVE AND MILLIMETER-WAVE MONOLITHIC CIRCUITS SYMPOSIUM



*by Roger W. Sudbury  
Chairman  
Steering Committee*

The 1986 MICROWAVE AND MILLIMETER-WAVE MONOLITHICS CIRCUITS SYMPOSIUM will be held at the Baltimore Convention Center in Baltimore, Maryland, June 4th and 5th, 1986. The one and one-half day Symposium will open on Wednesday afternoon, June 4 and continue on Thursday, June 5, 1986. The Wednesday afternoon session will be held jointly with the 1986 MTT-S Symposium.

The Technical Program Committee under the chairmanship of Dr. Yalcin Ayasli has selected 23 papers for presentation. In addition to an opening session there are five sessions planned covering Microwave Amplifiers, Optical Communications, Millimeter-Wave Integrated Circuits and Microwave Receivers, Switching and Control Circuits and MMIC Technology. Collectively the papers describe the state-of-the-art in monolithic microwave and millimeter-wave integrated circuits. The paper topics range from milestone accomplishments in research laboratories to advanced engineering designs for specific applications and data on the manufacturing of monolithic circuit components. An invited paper will describe plans of the U.S. Department of Defense to encourage the manufacturing of monolithic microwave and millimeter-wave circuits. Another invited paper will provide information in the otelectronics area where monolithic circuits are expected to be of increasing importance for an expanding industry. A digest containing summaries of the papers presented will be available at the Symposium.

The opportunity to meet informally with colleagues has proved to be a popular part of the Symposium and suitable social activities will be held this year. On Wednesday evening, June 4, 1986 an informal Baltimore evening event is planned for Symposium attendees and guests as well as a continental breakfast prior to the sessions on Thursday, June 5, 1986. Information on the social events and guest program is also provided in this Advance Program.

This fifth annual Symposium is held in conjunction with the 1985 IEEE MTT-S International Microwave Symposium. The registration form provides for registration for either or both Symposia as well as related activities in the Advance Program. Hotel reservation information is also included.

The Advance Program which includes brief descriptions of the papers to be presented may be requested from the Publicity Chairman:

Dr. J.J. Kuno  
Hughes Aircraft Corporation  
Microwave Products Division  
P.O. Box 2940  
Torrance, CA 90509

On behalf of the Symposium Steering Committee, I urge you to plan now to attend. You will find the 1986 Symposium informative and professionally rewarding.

## Symposium Schedule

### Wednesday, June 4

1:30 pm to 5:00 pm Technical Program (Joint Session)  
—Convention Center  
Rooms 307/308/309  
6:00 pm to 9:00 pm Crab Feast & Bull Roast  
—Festival Hall

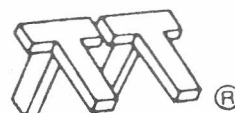
### Thursday, June 5

7:30 am Continental Breakfast  
—Convention Center, 300 Level  
Terrace Lounge  
8:30 am to 11:50 am Technical Program  
—Convention Center  
Rooms 307/308/309  
1:00 pm to 4:30 pm Technical Program  
—Convention Center  
Rooms 307/308/309

## Guests' Program

The Monolithic Symposium will share a special Maryland tradition with all Symposium attendees on Wednesday evening from 6 to 9 pm. A Crab Feast and Bull Roast will be held in the Festival Hall, next door to the Convention Center. The menu will include crabs, crab cakes, beef, corn on the cob, hot dogs and many other dishes. Hostesses will be on hand to teach you how to enjoy eating Maryland steamed crabs. A dixieland jazz band will provide entertainment and music for dancing. All Monolithic, MTT-S and ARFTG registrants are invited, along with spouse/guest and family.

Continued on page 31



**1986 IEEE Microwave and Millimeter Wave Monolithic Circuits  
Technical Program Committee**



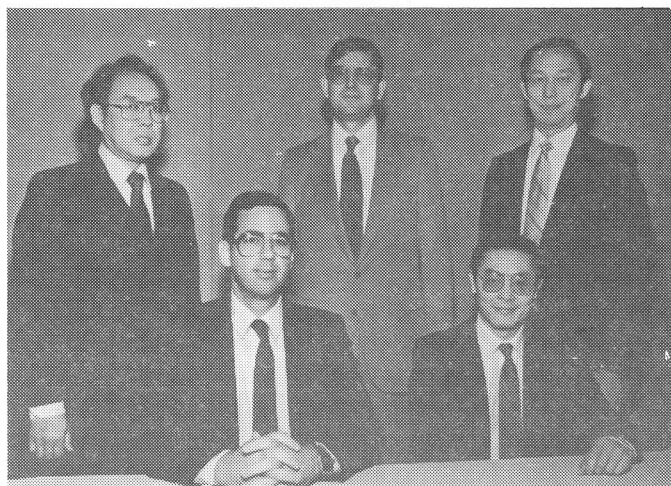
**Standing:** E. Jones, D. Hornbuckle, V.K. Nair,

**Sitting:** H.J. Kuno, W.R. Wisseman, R.W. Sudbury



**Standing:** V.G. Gelnovatch, R. Gilson, O. Pitzalis, Jr.,

**Sitting:** C. Huang, H-C. Huang



**Standing:** R.S. Kagiwada, Y. Ayasli, C. Chao

**Sitting:** D. Holmes, A. Chu



**Standing:** J.E. Degenford, M. Yoder, P. Carr

**Sitting:** D.E. Meharry, R.B. Gold, D.R. Chen



**1986 IEEE Microwave and Millimeter Wave Monolithic Circuits  
Technical Program Committee**



**Standing:** E. Strid, J. Kukielke,  
J. G. Oakes

**Standing:** D.E. Dawson, A. Podell,  
W.H. Perkins



**1986 IEEE Microwave and Millimeter  
Wave Monolithic Circuits  
Steering Committee**

**Standing:** O. Pitzalis, Jr., R.S.  
Kagiwada, D.  
Hornbuckle,  
W.R. Wisseman, H.J.  
Kuno,  
V.G. Gelnovatch, M.  
Yoder, D.E. Dawson,  
J.G. Oakes

**Sitting:** R. Gilson, Y. Ayasli,  
R.W. Sudbury, A. Chu





Left to Right: R. Sudbury, P. Greiling, E. Niehenke

In addition to the Microwave Journal reception Sunday evening and the Crab Feast/Bull Roast on Wednesday evening, guests of participants in the 1986 IEEE Microwave and Millimeter-Wave Monolithic Circuits Symposium are invited to participate in the following:

Hospitality Suite (Monday through Thursday in the Hyatt Regency Chesapeake A&B Rooms, 7:00 am to 10:00 am and 2:00 pm to 5:00 pm; Friday in the Hyatt Regency Constellation A Room, 7:00 am to 10:00 am) providing refreshments and snacks, and information on Baltimore.

On Monday, Tuesday and Wednesday, the MTT-S Symposium guest program tours will be available. See Guest's Program and the Advance Registration Form for further details.

### TECHNICAL PROGRAM

All the technical sessions will be held at the Convention Center  
ROOM: 307/308/309/

WEDNESDAY AFTERNOON, JUNE 4, 1986

#### OPENING SESSION

Chairman: R. Sudbury—MIT Lincoln Lab

1:30 pm

#### Welcome

R. Sudbury, Symposium Chairman

Y. Ayasli, Technical Program Chairman

1:40 pm (Invited) **DOD Microwave and Millimeter-Wave Monolithic Integrated Circuits (MIMIC) Program**

E. Maynard

DOD OUSDRE, Washington, DC

### SESSION: 1 MICROWAVE AMPLIFIERS

Chairman: R. Gold, Adams Russell Co., Burlington, MA

Co-Chairman: V. Nair, Motorola, Inc., Phoenix, AZ

2:05 pm

#### Chairman's Introduction

2:20 pm

#### High Performance Monolithic Power Amplifier Using a Unique Ion Implantation Process

S.K. Wang, K.G. Wang, C.D. Chang

Hughes Aircraft Co.

Torrance, CA

2:40 pm

#### A C-Band MMIC Power Amplifier Designed for Manufacturability

S.B. Moghe, R. Genin

Pacific Monolithics, Sunnyvale, CA

3:00 pm

#### Coffee Break

3:20 pm

#### A Power Distributed Amplifier Using Constant-R Networks

E.M. Chase, W. Kennan

Avantek, Inc., Santa Clara, CA

3:40 pm

#### A Stable 2-26.5 GHz Two-Stage Dual-Gate Distributed MMIC Amplifier

J. Orr

Hewlett-Packard Co., Santa Rosa, CA

4:00 pm

#### A 12 dB Monolithic Distributed Amplifier

R. Larue, S. Bandy, G. Zdasluk

Varian Associates, Palo Alto, CA

4:20 pm

#### A High Performance 2-18.5 GHz Distributed Amplifier, Theory and Experiment

T. McKay

Teledyne MMIC, Mountain View, CA

R. Williams

Texas Instruments, Dallas, TX

Thursday, June 5, 1986

### CONVENTION CENTER

Room 307/308/309

### SESSION II. OPTICAL COMMUNICATIONS

Chairman: Alejandro Chu, M/A-COM, Inc., Burlington, MA

Co-Chairman: Douglas E. Holmes,

Rockwell International Corporation, Thousand Oaks, CA

8:30 am

#### Chairman's Introduction

8:35 am

#### "Optical Technology for Microwave Applications (Invited)"

Huan-Wun Yen, Hughes Research Labs, Malibu, CA

9:05 am

#### "A High Speed GaAs Monolithic Transimpedance Amplifier"

I. Bahl and E. Griffin, ITT GaAs Technology Center, Roanoke, VA

W. Powell and C. Ring, ITT Telecom, Raleigh, NC

9:25 am

#### "Monolithic Optoelectronic Receiver for Gbit Operation"

S. Ray and M. Walton, Honeywell Physical Science Centers, Bloomington, MN

9:45

#### Coffee Break

### SESSION III. MILLIMETER-WAVE INTEGRATED CIRCUITS & MICROWAVE RECEIVERS

Chairman: Paul H. Carr, Rome Air Development Center, Hanscom AFB, MA

Co-Chairman: Chente Chao, Honeywell, Inc., Bloomington, MN

10:05 am

#### Chairman's Introduction

10:10 am

#### "A 30 GHz Monolithic Receiver"

L.C.T. Liu, C.S. Liu, J.R. Kessler,

and S.K. Wang

Hughes Aircraft Co., Torrance, CA

10:30 am

#### "30 GHz Monolithic Balanced Mixers Using an Ion Implanted Fet-Compatible 3-Inch GaAs Wafer Process Technology"

P. Bauhahn, T. Contolatis, and V. Sokolov

Honeywell, Inc., Bloomington, MN

- 10:50 am** "A W-Band Monolithic PIN Diode Switch"  
G.H. Nesbit, D.W. Wong, D. Li, and J.C. Chen  
Hughes Aircraft Co., Torrance, CA
- 11:10 am** "High Volume, Low Cost, MMIC Receiver Front End"  
W.W. Nelson and A.F. Podell,  
Pacific Monolithics, Sunnyvale, CA
- 11:30 am** "Cost-Effective High Performance Monolithic X-Band Low Noise Amplifier"  
D.C. Wang, R.G. Pauley, S.K. Wang, and L.C.T. Liu  
Hughes Aircraft Co., Torrance, CA

#### SESSION IV. SWITCHING & CONTROL CIRCUITS

Chairman: Eric Strid, Motorola, Inc., Phoenix, AZ  
Co-Chairman: Allen Podell, Pacific Monolithics, Sunnyvale, CA

- 1:00 pm** Chairman's Introduction
- 1:05 pm** "Fabrication of Low-Power, High-Speed GaAs LSI On-Board Baseband Switching Matrix"  
R. Yamamoto, K. Ueda, H. Nagao, T. Morimura, I. Eguchi, M. Kudoh, K. Kinuhata, and P. Nuspi, NEC, Kawasaki, Japan
- 1:25 pm** "GaAs Phase-Coherent Microwave Multiple-Signal Generation Using All-Pass Networks"  
S.K. Altes, T.H. Chen, and L.J. Ragonese  
General Electric Co., Syracuse, NY
- 1:45 pm** "A 2 to 8 GHz Leveling Loop Using a GaAs MMIC Active Splitter and Attenuator"  
G.S. Barta, K.E. Jones, G.C. Herrick, and E.W. Strid  
TriQuint Semiconductor, Inc., Beaverton, OR

#### SESSION V. MMIC TECHNOLOGY

Chairman: Ho Huang, COMSAT Labs, Clarksburg, MD  
Co-Chairman: David Meharry, Sanders Associates, Nashua, NH

- 2:00 pm** Chairman's Introduction
- 2:10 pm** "10.6 GHz Frequency Dividers with GaAs Advanced SAINT and Air-Bridge Technology"  
K. Osatune, T. Enoki, K. Yamasaki, and K. Ohwada  
NTT Electrical Communications Laboratories, Kanagawa, Japan
- 2:30 pm** "A Closed-Form Expression for Representing the Distributed Nature of the Spiral Inductor"  
D. Krafcsik and D. Dawson,  
Westinghouse ATL, Linthicum, MD
- 2:50 pm** Coffee Break
- 3:20 pm** "Silicon High Resistivity Substrate Millimeter-Wave Circuit Technology"  
J. Buechler,\* E. Kasper,\* P. Russer and K. Strohm  
\*Institut für Hochfrequenztechnik, Technische Universität München, Munich, FRG - AEG Research Center, Ulm, FRG
- 3:40** "Low Noise, Microwave HIFET Using MOCVD"  
H. Takakuwa, K. Tanaka, K. Togashi, H. Ohke, M. Kanasawa, and Y. Kato  
Sony Corporation, Kanagawa, Japan
- 4:00 pm** "Planar MMIC Hybrid Circuit and Frequency Converter"  
T. Hirota, H. Ogawa, Y. Tarusawa, and K. Owada  
NTT Electrical Communications Labs, Yokosuka, Japan

#### Rent a room in your own house to your company.

Ira Feldman beat the IRS this way. His office at the company was inadequate for the amount of work he did. He was frequently interrupted and needed a place away from the company where he could conduct confidential business. So he rented his home office to his company. *Tax Court:* Feldman could deduct the cost of his home office up to the amount of rental income he received for it. These expenses included

depreciation, utilities, insurance, etc. *Lesson:* If you decide to set up an arrangement similar to Feldman's, make sure you receive market-value rent. The IRS is sure to look into the arrangement to see if the rent isn't really just a disguised form of taxable compensation.

*Ira S. Feldman, 84 TC 1.*

## MEMBERSHIP MATTERS



*by Patrick A. Green*

MTT-S has experienced significant gains in membership growth. The position of MTT-S in IEEE Society growth has continued to remain in the top five among thirty-three societies. Membership in MTT-S increased 8.1% to 8.175% for the twelve month period ending December 31, 1985. For the same period, the growth rate for the Institute was 5.1%.

Increase your Chapter's membership and keep it active by introducing friends and co-workers to the MTT-Society. The first year of membership is free.

Annual awards are given to chapters with the greatest percentage membership increase.

☐ **Dr. Peale, what place should a job or career have in your life?** A job is what you do to support yourself and your family. It lays a foundation for what you're supposed to be. A person isn't supposed to be only a banker or a grocer or a publisher—he's supposed to be a person who helps others.

Sometimes you can do that best on the job, or at home, or in your extra-curricular activities—perhaps just walking along. There's a wonderful gentleman I go walking with who's 91 years old—he works for us. We've been friends for over 50 years. Just the sight of Charlie walking along in the South Orange mountains inspires people. It makes so many of the people we pass feel that all is well with the world.

Marty, you're a good example yourself of what we're talking about. You have a job and you do it well, but you've got human kindness and love and an outgoing spirit and nature. Whether you're sitting on a beach or walking along, you're drinking in life itself all around you...and giving so much to others.



## PRESIDENT'S REPORT



by Reinhard Knerr

### "A Question of Turf"

I would like to take this occasion to offer some comments which relate to our interest in areas of lightwave technology, a rapidly emerging technology which now is of direct interest to several major IEEE Societies. Some recent developments concerning MTT's involvement in the microwave aspects of the lightwave technology are very disturbing to me personally and raise some very fundamental issues about the autonomy of an old, well-established society like ours.

First, some historical notes are in order to set the stage for the recent events:

About four years ago, the Quantum Electronics Society proposed to create a home for Lightwave Technology by creating a council similar to the Solid State Circuits Council with which we all are familiar. In accordance with IEEE rules, all interested societies were invited to participate. MTT-S, following an old tradition, decided to participate, and Fred Rosenbaum and I represented MTT-S in the initial founding phase. We were willing to give up this part of the technology which has been with MTT for a long time since we felt that a council would provide a true focus for this technology and be in the best interest of our members and IEEE members in general.

Bylaws and a constitution for this council were drafted and circulated among the seven participating IEEE societies.

Suddenly, the idea of a council was vetoed by the Quantum Electronics Society because they were concerned that the proposed council could organize conferences which potentially could compete with the very lucrative meetings the Quantum Electronics Society has been organizing for several years on a fifty-fifty basis with the Optical Society of America. There were some turbulent meetings, and the idea of a council was replaced by the Journal of Lightwave Technology (JLT), the purpose of which is to publish papers in that field.

MTT-S reluctantly entered an "Agreement Regarding the Journal of Lightwave Technology Among the Participating IEEE Societies" since we wanted to offer our members the Journal at the reduced member rate.

The document contains a statement, "...the sponsoring Societies shall refrain from preparing publications, including special issues, which intentionally compete with the Journal within its field of interest." We found this statement acceptable, and when in summer of 1985 we started plans for a special MTT issue entitled "Microwave Aspects and Applications of GHz/Gbit Optical Technology", we kept the Editor of the Journal on Lightwave Technology fully informed. The Call for Papers can be found on page 52 of this issue, and I challenge the reader to verify that we made every effort to emphasize MTT's field of expertise and avoid competition in accordance with our Agreement with JLT. Adcom approved the Special Issue in Fall '85 and in January '86, we were officially instructed of JLT's objection to our special issue. MTT Adcom, at the January '86 meeting, confirmed its initial decision but offered JLT to publish the issue jointly, i.e., under our cover and their cover. JLT, without informing MTT, approached TAB and claimed the MTT's action is in conflict with an agreement between IEEE and OSA, which supposedly overrides our agreement between MTT-S and JLT. TAB referred the issue to the TAB Periodical Committee for resolution. We have now reluctantly agreed, mainly because neither Fred Rosenbaum nor I have time for an endless number of meetings and discussion, to publish the Special Issue under the JLT cover with a cover page and editorial clearly pointing out that the issue is a Special Issue of MTT-S.

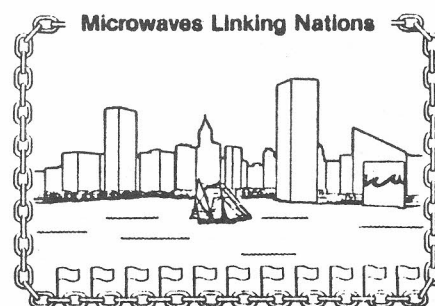
Several points are disturbing to me personally:

If the IEEE/OSA contract, which I have not seen, indeed limits MTT's actions beyond the MTT-JLT agreement, why has MTT not been informed or consulted by Headquarters?

Why is IEEE treating us as troublemakers if we put forward a legitimate concern which affects a basic right of our Society?

While JLT's historical ties with OSA are obvious, we would, in principle, expect understanding and support from IEEE Headquarters rather than being stalled by the newly enforced rule which makes Joint Issues undesirable.

But as I said before, "Once a troublemaker, always a troublemaker"!



## AWARDS



*by Don Parker  
Awards Chairman*

A significant addition to the MTT-S award structure was instituted at the last Administration Committee meeting. A proposal by H.G. Oltman and D. Parker to create a MTT-S Honor Roll was adopted by ADCOM. The purpose of this honor roll is two fold. To provide a means for continuous recognition of those who have made significant contributions to the microwave profession and a means whereby outstanding members who died before they received a major award from the society could be honored. The proposal as adopted by ADCOM is printed below.

### MICROWAVE THEORY AND TECHNIQUES SOCIETY

## HONOR ROLL

### PREAMBLE:

The purpose of the MTT-S Honor Roll is to give continuing recognition to those members of the Microwave Theory and Techniques Society who have distinguished themselves in the microwave profession by significant technical contributions or service over a sustained period of time. Recipients of the Microwave Career Award, the Distinguished Service Award, and MTT-S Life Members are members of the Honor Roll. ADCOM may elect others who have passed away before the Society honored them with a major award.

### DESCRIPTION:

The Honor Roll will consist of a plaque listing the names of those members who are elected by ADCOM. The Honor Roll is suitably displayed in the historical exhibit at the annual symposium.

### ADMINISTRATION:

The Honor Roll is sponsored and administered by the IEEE Microwave Theory and Techniques Society. The list of names of those elected to the Honor Roll is maintained by the Awards Chairman. The Honor Roll Plaque will be maintained by the Chairman of the History and Collection Committee.

### ELIGIBILITY:

Recipients of the Microwave Career Award, the Distinguished Service Award and MTT-S Life member are automatically elected to the Honor Roll at the time they are selected for these awards. Qualified deceased members are also eligible to be on the MTT-S Honor Roll. Candidates must have been members of the MTT-S for at least five years and a member at the time of their death. Their contributions and/or service should be distinctive and well recognized by the microwave community. Generally, they should meet the qualifications for the Microwave Career Award or the Distinguished Service Award.

### RECOGNITION:

Those elected will have their names added to the MTT-S Honor Roll. If a deceased member is elected, the candidate's next-of-kin will receive a suitable Certificate signed by the President and Awards Chairman of the Society.

Announcement of election to the Honor Roll will be made in the MTT-S Newsletter, in the Symposium Digest, and in the Symposium Issue of the IEEE Transactions on Microwave Theory and Techniques.

### TRAVEL EXPENSES:

No cash award is attached to election to the MTT-S Honor Roll. However, ADCOM may authorize travel expenses for one of a deceased recipient's next-of-kin to attend the symposium banquet.

### PRESENTATION:

Notification of election to the Honor Roll is made by the President of the Society. Announcement of the election will be made at the symposium banquet. If the next-of-kin chooses, a deceased member's Certificate will be presented at the banquet. Otherwise the Awards Chairman will arrange for the Certificate to be given to the family.

### SELECTION OF CANDIDATES:

Candidates for the MTT-S Honor Roll will be made by the Awards Committee and approved by the MTT-S ADCOM at its annual meeting. Members of the MTT-S can recommend to the Awards Committee individuals for consideration. The Awards Committee will submit possible candidates to a review similar to that used to select candidates for the Career Award, Microwave Applications Award, and the Distinguished Service Award. Only those determined to be fully qualified will be recommended to ADCOM for approval. There is no limit on the number of candidates elected to the Honor Roll each year.

#### AWARDS COMMITTEE:

The chairman of the Awards Committee will select an ad-hoc committee to review the qualifications of candidates for the MTT-S Honor Roll. The chairman will submit the committee's recommendations to the ADCOM for approval.

#### SCHEDULE:

Candidates for the Honor Roll can be recommended to the chairman of the Awards Committee at any time. Normally, the Awards Committee would present names to ADCOM for approval at the annual meeting. Under special circumstances, candidates can be considered at any ADCOM meeting after thorough and proper review by the Awards Committee.

As chairman of the Awards Committee, I would welcome any recommendations for candidates of the Honor Roll who are deceased. Include as much biographical information as possible along with a description of their contributions. Send the information to:

Dr. Don Parker  
Hughes Aircraft Company  
Bldg. 268, M.S. A55  
8433 Fallbrook Avenue  
Canoga Park, CA 91304

#### MICROWAVE PRIZE:

ADCOM selected the recipients of the Microwave Prize at its January meeting. This prize is awarded annually to the author(s) of that paper, published in the IEEE Transactions on Microwave Theory and Techniques, Proceedings of the IEEE, or other official IEEE publication, which is judged to be the most significant contribution in the field of interest of the Society.

The 1986 Microwave Prize will be awarded to Yalcin Ayasli, Leonard D. Reynolds, Jr., Jame L. Vorhaus, and Larry K. Hanes, for their paper titled: "2-20 GHz GaAs Traveling-Wave Amplifier", published in the IEEE Transactions on Microwave Theory and Techniques, Volume 32, No. 1, January 1984, pp 71-78.

The Microwave Prize will be presented to the recipients during the banquet at the International Microwave Symposium to be held in Baltimore, Maryland on June 2, 1986. The award will consist of a suitable certificate, a cash sum of \$500 for each recipient, and a feature publication in the IEEE Transactions on Microwave Theory and Techniques. Below is a short biography of each author.

## DISTINGUISHED MICROWAVE LECTURER (1985-1986)



*by Kenneth L. Carr*

At the mid-way point of my Lecture Series, it is still a thrill for me to experience the response all audiences have rendered to my lecture. Due to the subject matter involved, I believe that most people can relate both personally and professionally to this material; therefore, their interest level is extremely high . . . and most genuine.

The visit to the United Kingdom (March 10-17) is now firm, and the balance of the month of March as well as a great deal of April is very heavily booked with domestic presentations. A few remaining "once-a-week" bookings in May round out the lectures for the continental United States. September, 1986 begins a swing through New Zealand, Australia, India, Taiwan and Japan. All of the local Chairmen have been most gracious and helpful in arranging schedules for areas with which I am totally unfamiliar. The same holds true for a tentative trip in October, 1986 to visit Spain, France, Italy and West Germany. This latter venture has yet to be finalized.

As of this writing, a total of 35 lectures have been given. Approximately 1390 people have attended, a great many of whom have since called/written with questions and requests for additional lectures. Unfortunately, I am unable to schedule in any additional lectures in the timeframe allotted.

I must say it is most rewarding to witness the attention and interest exhibited by those members and their families attending these lectures. Never have I been as stimulated and, though tiring, the many hours of travel have been well worth the effort. It will be interesting to note at the end of the Series just how many miles, cities, etc. have been covered. I hope that it has been as fruitful for the IEEE and our industry itself as it has been for the writer.

Continued on page 36



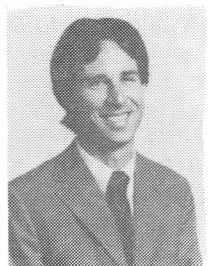


**YALCIN AYASLI**

Yalcin Ayasli received a B.S. degree in Electrical Engineering in 1968 from the Middle East Technical University, Ankara, Turkey. He received an M.S. degree in 1970 and an Sc.D. degree in 1973 in Electrical Engineering from the Massachusetts Institute of Technology.

He was a member of the faculty of engineering at the Middle East Technical University from 1973 to 1979. While there he also served as assistant chairman of the Electrical Engineering Department. From 1979 to 1985, Dr. Ayasli worked at the Research Division of the Raytheon Company, leading a design, measurement, and wafer fabrication group for development of GaAs microwave monolithic integrated circuit (MMIC) technology. In 1985, he founded the Hittite Microwave Corporation in Woburn, Massachusetts to develop GaAs MMIC components and subsystems.

Dr. Ayasli is the author of a number of technical papers and patents. He is a senior member of the IEEE Microwave and Techniques Society. He is the Chairman of the Technical Program Committee of the 1986 IEEE Microwave and Millimeter Wave Monolithic Circuits Symposium.



**LEONARD D. REYNOLDS**

Leonard D. Reynolds, Jr. received the B.S. degree in 1975 and the M.S. degree in 1978 in Electrical and Computer Engineering from Clemson University. His undergraduate and graduate studies were concentrated in Solid-State Circuits and Communication Theory, respectively.

In 1978, Mr. Reynolds joined Raytheon Company, Special Microwave Devices Operation to assist in FET evaluation, modeling, and design. In 1980, he joined the Research Division of the Raytheon Company as a member of the GaAs monolithic circuit group. Since

then he has developed various monolithic microwave circuits including wideband amplifiers, T/R modules and ECM circuits. Most recently, he has been responsible for design of multioctave bandwidth distributed amplifiers for low-noise, small-signal applications and distributed amplifiers having output power levels up to one watt.

Mr. Reynolds is a member of the IEEE, Eta Kappa Nu, and Tau Beta Pi. He is author of a number of published technical papers.



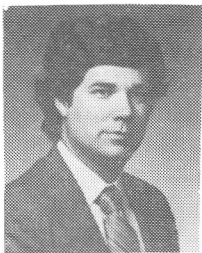
**JAMES L. VORHAUS**

James L. Vorhaus received the B.S. degree in engineering physics from Lehigh University in 1972 and the M.S. and Ph.D. degrees in physics from the University of Illinois at Urbana-Champaign in 1974 and 1976, respectively.

From 1973 to 1976, he was a Research Assistant in the low-temperature physics laboratory at the University of Illinois. His work involved state-of-the-art measurements of the specific heat and thermal conductivity of various materials at temperatures below 4 degrees Kelvin. In 1976, he joined the Research Division of the Raytheon Company as a member of the Semiconductor Laboratory. His work involved GaAs device processing technology and the design and fabrication of Monolithic Microwave Integrated Circuits (MMICs). His most recent position at Raytheon was as manager of the MMIC pilot production line. In 1985, he joined the Microwave Division of Epsco, Inc. He is presently the Director of Operations of the Solid-State Components Group which is responsible for designing and fabricating high-power GaAs Microwave Integrated Circuits (MIC) amplifiers.

Dr. Vorhaus is a member of the IEEE, the IEEE Antennas and Propagation Society, Phi Beta Kappa, and Tau Beta Pi. He has published extensively and holds several patents in the area of GaAs device technology. He is a past chairman of the GaAs Integrated Circuits Symposium.

Continued on page 37



**LARRY K. HANES**

Larry K. Hanes received a B.S. degree in 1976 and a Ph.D. degree in 1982 from the North Texas State University.

He joined the Research Division of the Raytheon Company in 1980. His work included the establishment of a GaAs Monolithic Microwave Integrated Circuit (MMIC) layout design center and the development of CAD tools for MMIC mask layout design. He was responsible for the design of GaAs MMIC mask layouts and also worked on the development of GaAs process technology.

Dr. Hanes is now at Raytheon's Special Microwave Devices Operation where he is responsible for the GaAs direct write electron beam lithography center.

## ARFTG HIGHLIGHTS



*by Mario A. Maury, Jr.*

The Automatic RF Techniques Group (ARFTG) is a professional society that is affiliated with MTT-S. It is primarily concerned with computed-aided microwave measurements and design. The following is a summary of its recent activities.

### 26th ARFTG CONFERENCE

The Fall 1985 ARFTG Conference was held at the Red Lion Inn, Ontario, California on December 5 and 6, 1985. The Conference's main topic was "Computer-Aided Microwave Engineering" and the Conference Chairman was George Oltman, Hughes Aircraft, Canoga Park, California. The local host was Mario Maury, Jr., Maury Microwave Corp., Cucamonga, California. Please refer to the last issue of the MTT-S Newsletter (#114) for a complete report on this Conference.

### ANNOUNCEMENT 27th CONFERENCE

The Spring ARFTG Conference will be held as a workshop as part of the 1986 MTT-S International Microwave Symposium. The Conference will be held on June 5 and 6, 1986, at the Sheraton Hotel in Baltimore, Maryland. Advance registration is recommended utilizing the symposium registration form, although attendees can register directly preceeding the Conference.

The theme of the Conference will be "Pulsed-RF Automated Measurements". Papers are solicited on recent hardware and software developments on this topic, as well as other computer-aided RF design and testing topics. Technical presentations will be informal 25 minute talks using viewgraphs or 35mm slide illustrations. Manufacturers are also encouraged to discuss or demonstrate new products that have been developed for RF design and testing; a separate exhibits area will be available for demonstrations. Authors should submit a one page abstract and a 500 to 1,000 word summary with attachments containing illustrations, etc., providing sufficient technical content to properly evaluate the paper's contribution and its usefulness to the Conference attendees. Two copies of the abstract and summary should be sent to the Technical Program Chairman before March 28, 1986. All accepted papers will be published in the Conference Digest. Please refer to the "ARFTG Instructions to Authors" for additional information.

Submit papers to the Technical Program Chairman (TPC):

Jim Manning  
Westinghouse Electric Corporation  
P.O. Box 746, M/S 282  
Baltimore, MD 21203  
(301) 765-6109

Manufacturers interested in exhibiting their products, contact the Assistant Exhibits Chairman (EC):

Darlene Payette  
Maury Microwave Corporation  
8610 Helms Avenue  
Cucamonga, CA 91730  
(714) 987-4715, x45

For further information, contact the ARFTG Conference Chairman (CC):

Richard Irwin  
Systems for Automatic Text  
1292 Reamwood Avenue  
Sunnyvale, CA 94089  
(408) 734-9447

## MEMBERSHIP SERVICES



*by Martin V. Schneider,  
Chairman and  
Steven J. Temple,  
Co-Chairman*

### NEW MEMBERSHIP COMMITTEE OFFICERS

The 1984/85 Membership Services Chairman, Ed Niehenke, has been elected to serve as Distinguished Microwave Lecturer in 1986/87. Steven J. Temple and myself, Martin V. Schneider have been appointed to run the MTT membership services this year and we will be very happy to assist the 33 Chapters in their efforts to serve the 8718 members of the MTT Society. The officers on our committee are Ali Afrashteh (Coordinated Lecture Series), Patrick A. Green (Membership), Zvi Galani (Chapter Records), Reynold S. Kagiwada (Newsletter Editor) and Richard A. Sparks (International Liaison).

We would like to thank all of you who participated in the activities of your Chapter in 1985 and we hope that, with your continued efforts, the membership of the MTT Society will grow by about 8% again this year.

### FINANCIAL ASSISTANCE AVAILABLE TO MTT-S CHAPTERS

To provide better services to our MTT-S members, a subsidy of up to \$350.00 per Chapter was again approved by MTT-ADCOM this year. The financial assistance will help the Chapters to cover part of the cost of technical meetings, lecture series, one-day symposia and tours. Before requesting assistance, the Chapters should make sure that they have received the full rebate to which they are entitled from their local Section. Chapters should prepare a letter requesting a specific amount describing how the Chapter plans to use the money. Send the letter to:

Steven J. Temple  
Raytheon Company  
Hartwell Road, Mail Stop M15-50  
Bedford, MA 01730  
Phone (617) 274-7100 Ext. 4736

### LECTURE SERIES

Chapters which desire assistance in organizing lecture series are invited to contact Ali Afrashteh. He will help you tailor your lecture series to your Chapter's interest. Ali was the Chairman of the 1985 Benjamin Franklin Microwave Symposium in Philadelphia and is presently the Technical Program Chairman of the 1986 IEEE-APS/URSE Symposium. He will be happy to suggest topics and speakers. Please write or call:

Ali Afrashteh  
Bell Communications Research  
Box 7020, Room NVC 3X337  
Red Bank, NJ 07701  
Phone (201) 758-2872

### MTT-S MEMBERSHIP HITS RECORD HIGH

MTT-S membership on December 31, 1985 was 8,718, surpassing the Society's year end record high set last year by 8.1%. Our Society is the sixth largest and the fifth fastest in growth rate. Your help is needed to keep the ball rolling by encouraging your colleagues to join MTT. Please inform prospective members that they can join MTT for free for one year, and that the \$15.00 entrance fee for new IEEE members has been waived. In addition to these incentives four MTT-S Chapters with the highest percentage annual membership increase will receive \$200.00 each and a plaque at the 1986 International Microwave Symposium.

Patrick Green will be helpful on all questions concerning effective ways to attract new members. Feel free to contact Pat to benefit from his experience. His address is:

Patrick A. Green  
Westinghouse Electric Corp.  
P.O. Box 746, MS-339  
Baltimore, MD 21203  
Phone (301) 765-2832

You can also receive membership development materials and assistance by contacting the IEEE Service Center, Membership Development, 445 Hoes Land, Piscataway, New Jersey 08854-4150, USA. Ask for Roseann Schulz or William C. Hunter on (201) 981-0060, Ext. 300 or 301. Keep your membership growing!

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## DISTINGUISHED MICROWAVE LECTURER



*by Edward C. Niehenke*

It has been a great pleasure presenting my lecture, "GaAs - Key to Modern Microwave Tehcnology," to the first two groups. I had a lot of interesting questions, and the lectures were well received. The first lecture was presented early, on January 16, to my home Baltimore MTT-S Chapter. The 53 people in attendance gave me the biggest and warmest send-off I could ever imagine, complete with a champagne toast. I had my two chief critics there, my wife, Betty, and my boss, Gerry Klein. I passed with flying colors.

The second lecture was given to Drexel University, Department of Electrical and Computer Engineering, on March 3, with a full house, 50 in attendance. This was a wonderful experience for me visitng my alma mater. Professor Peter Herczfeld introduced me to his graduate students who showed me their graduate microwave projects. At Drexel, they are actively doing research on coupling Lightwave and Microwave Technology. This is of significance, since this topic is one of the focused sessions at the 1986 International Microwave Symposium. Many of the students and professors are planning to attend the Symposium in Baltimore this June. Microwaves is alive and well at Drexel University.

The third lecture will be given on July 11 at the Martin Marietta seminar series in Baltimore. I am looking forward to this lecture, since my first job and introduction to Microwaves was at Martin.

The publicity releases have just been received by MTT-S Chapters and IEEE Sections throughout the world. I am receiving many requests daily, and to date, I have received 10 additional requests. I would be most happy to visit your cl.apter or group. Please send me your request now listing your first, second, and third preferred date so I can coordinate the visits. Please mail this information to my new address listed below:

Edward C. Niehenke  
Westinghouse Electric Corp.  
P.O. Box 746, MS-75  
Baltimore, MD 21203  
(301)-765-4573

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### DISTINGUISHED MICROWAVE LECTURERS

The 1985/86 Distinguished Microwave Lecturer, Kenneth L. Carr, has given 35 talks on "The Application of Microwave Technology to the Detection and Treatment of Cancer". He is reporting separately in this Newsletter on his successful lecture series.

The new 1986/87 Distinguished Lecturers are Edward C. Niehenke and John H. Bryant. The lecturers will have a busy schedule. To receive first consideration contact them early. Their topics and addresses are:

#### *"Gallium Arsenide, Key to Modern Microwave Technology"*

Edward C. Niehenke  
Westinghouse Electric Corp.  
P.O. Box 746, MS-339  
Baltimore, MD 21203  
Phone (301) 765-4573

#### *"The First Century of Microwaves 1886-1986"*

John H. Bryant  
Dept. of Electrical Engineering  
The University of Michigan  
East Engineering Building  
Room 2500  
Ann Arbor, MI 48109-1109



Continued from page 37

This ARFTG Conference promises to be an outstanding success with an excellent Technical Program and Exhibits - in an outstanding location rich in American history - plan to atend.

### ADVANCE ANNOUNCEMENT 28th CONFERENCE

For those that like to plan ahead, the 29th ARFTG Conference will be held in St. Petersburg Beach, Florida at the Don CeSar Beach Resort on December 4 and 5, 1986. For further information, contact the Conference Chairman: John Barr, Hewlett Packard - NMD, 1400 Foutaingrove Parkway, Santa Rosa, California 95401 - Phone (707) 577-2350. So shed your winter coats and plan to attend this one - it should be a good one, after all, they have Cuban food down there!



# MICROWAVE THEORY AND TECHNIQUES SOCIETY ADMINISTRATIVE COMMITTEE VISITS HISTORICAL MUSEUM

by E.C. Niehenke

The Microwave Theory and Techniques Society Administrative Committee visited the Historical Electronics Museum located in Baltimore, Maryland, in conjunction with the January ADCOM meeting. Many of the microwave historical displays and artifacts on display here will be loaned to the 1986 International Microwave Symposium for their Historical Exhibit. Bob Dwight, a retired Westinghouse veteran and Curator of the Historical Electronics Museum, has spent many years collecting these historical artifacts and has displayed them in an eye-catching manner. Warren Cooper, also of Westinghouse and past president of MTT-S, is on the Board of Directors of the Historical Electronics Museum.

Ross Kilgore, retired from Westinghouse, invented many magnetrons as a young engineer at the Westinghouse Research Department. Ross was on hand at this visit to meet with John Bryant, Ted Saad, MTT-S ADCOM, and members of the '86 Microwave



**Ross Kilgore, inventor of many magnetrons, shows power tube developments at the Historical Electronics Museum in Baltimore.**

Symposium Steering Committee and show us his early pioneering work on display. At the Century of Progress Exposition of the 1933 World's Fair in Chicago, Ross showed a working model of a microwave transmitter and receiver that demonstrated the reflection of microwave radiation from objects. His clippings of this event will be at the 86 Historical Exhibit.

Mel Zisserson of Litton AMECON is the Historical Exhibits Chairman of the 1986 Microwave Symposium. Mel has gathered a large collection for this year's exhibit. Plan to attend this year's International Microwave Symposium and visit the Historical Exhibit while you are in Baltimore the first week in June.



**MTT-S Administrative Committee Span the Full Size AWACS Antenna at the Historical Electronics Museum in Baltimore.**

**Top Row:** S. Temple, D. McQuiddy, E. Niehenke, R. Kilgore T. Nelson, N. Dietrich, D. Sparks  
**Second Row:** R. Knerr, T. Saad, C. Malinow, H. Malinow, S. Patel, M. Zisserson, R. Kaul, K. Agarwal, M.A. Maury, Jr.  
**Kneeling:** W. Cooper

# INFRARED AND MILLIMETER WAVES CONFERENCE

*by Kenneth J. Button  
Chairman*

**The Tenth Annual International Conference on Infrared and Millimeter Waves was held on 9-13 December 1985 at Lake Buena Vista, Florida, USA.**

The Conference had four parallel sessions, namely, millimeter waves (120 delegates), free electron lasers and gyrotrons (60 delegates), submillimeter waves (30 delegates) and millimeter-wave plasma diagnostics (16 delegates). When the conference is held in the USA, there is a growing participation by the millimeter wave delegation and a shrinking participation by the submillimeter wave delegation. The opposite was true when the conference was held in Japan (1984) and in France (1982). We shall meet in Italy in 1986.

Twenty-five invited papers and 225 contributed papers were presented. These were presented in eleven sessions on millimeter waves, nine sessions on the free electron laser and gyrotron, nine sessions on submillimeter waves, three sessions on plasma diagnostics and two sessions on far infrared measurements on materials.

Although this has been established as an annual conference, it has become clear that the submillimeter wave delegates prefer to attend in even numbered years when they can expect a richer program and a larger attendance by their closest colleagues. The millimeter wave and gyrotron delegates have not adopted this preference.

**The Eleventh Annual International Conference on Infrared and Millimeter Waves will be on 20-24 October 1986 at Tirrenai (Pisa), Italy.**

There will be four parallel sessions which will provide a full week of papers on each of the following topics: millimeter waves, free electron lasers and gyrotrons, and submillimeter waves. A few sessions will cover plasma diagnostics, spectroscopic techniques and millimeter wave measurements on materials. The invited papers in all of these areas will be given in plenary sessions.

## MTT-S CHAPTER CHAIRMEN DIRECTORY



*by Zvi Galani*

The strength and vitality of MTT-S Chapters depends on the involvement and participation of the membership. MTT-S members are encouraged to contact their respective chapter chairmen with suggestions of meeting and/or presenting topics that would be of interest to the members of their respective chapters.

The latest chapter chairmen directory is presented below, and includes the names of the respective ADCOM liaisons. Please notify me of any changes and errors in the directory. My address and telephone number are:

Zvi Galani  
Raytheon Company  
Mail Stop M1-41  
Hartwell Road  
Bedford, MA 01730  
(617) 274-7100 ext 4184

**ALBUQUERQUE**  
**MTT/AP/EMC**  
Adcom Liaison:  
P.T. Greiling

Christopher W. Jones  
Dikewood Corporation  
A Division of Kaman  
Industries  
1613 University Blvd., N.E.  
Albuquerque, N.M. 87102  
(505) 842-6106  
Term of Office: 1/85—12/85

**ATLANTA**  
**MTT/AP**  
Adcom Liaison:  
N.W. Cox

Victor K. Tripp  
GTRI, ECSL/EED  
Georgia Institute of  
Technology  
Atlanta, GA 30332  
(404) 894-3478  
Term of Office: 7/85—6/86

**BALTIMORE**  
**MTT/AP**  
Adcom Liaison:  
E. C. Niehenke

Suman D. Patel  
Westinghouse Electric Corp.  
M.S. 3716  
P.O. Box 1521  
Baltimore, MD 21203  
(301) 765-7348  
Term of Office: 6/85—5/86

**BENELUX**  
**MTT/AP**  
Adcom Liaison  
R.M. Knerr

Prof. Albert Guissard  
Laboratoire de  
Telecommunications  
U.C.L.  
Batiment Maxwell



# PROFESSIONAL ACTIVITIES COMMITTEE FOR ENGINEERS (PACE) REPORT WHAT ARE MAJOR ISSUES IN PROJECTED FUNDING OF MICROWAVE R&D?



*by R.A. Moore,  
Representative*

A recent poll of chapter officers identified the most significant professional concerns and interests of our membership. Although the poll was limited and the chapter officers do not necessarily reflect the views of the majority of the membership; the results show the greatest interest was in projected program funding and industry related questions. The poll was conducted as a mailing and the return was about 15%. The questionnaire was laid out in terms of two subject areas: (1) microwave program related issues and (2) personal career and compensation related issues. There was a clear indication of interest in the following areas:

## Microwave Program Issues

- Trends in Federal Funding of Microwave Programs
- Key Future Microwave Programs Professional/Career Issues
- Intellectual Property - Should employees have greater property rights to their ideas?
- Salaries - How do microwave engineers compare?

To expand on these interests, the PACE sponsored panel session for the 1986 International Microwave Symposium in Baltimore is entitled "ISSUES IN FEDERAL FUNDING OF MICROWAVE R&D". The panel is composed of people from each of the services, DARPA and OUSDRE. Like last year, the panel session is a luncheon the first day of the symposium. (Since it may be crowded you should register early when you

send in your symposium registration. The \$10.00 cost of the meal has to be a "best buy"!!) The panel will consider pressures on systems requirements from the following: (1) the microwave R&D including such diverse sources as major systems requirements, (2) the microwave community, (3) competition for limited available funds from other major modules, a VHSIC like microwave program and the advent of SDI. The title for the session is purposely broad so that each panel member from the three services, DARPA and the Research and Advanced Technology Office of OUSDRE, can dwell on the most significant issues within their area. After a brief presentation by each of the panel members, it will be open to the floor for questions and discussions.

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The conference has been organized under the general chairmanship of K.J. Button who may be contacted for copies of call for papers, hotel application forms and information. Abstracts should be sent to Prof. M. Inguscio and Prof. F. Strumia, Dipartimento di Fisica dell'Universita di Pisa, Piazza Torricelli 2, 56100 Pisa, Italy. Advance registrations and hotel applications should be sent to the Conference Secretary, Nadia Ioli in Italy. The registration fee for IEEE members is \$130 or 230,000 lire. Hotel rates vary between 40,000 and 100,000 lire per day. Write to K.J. Button, Box 72, M.I.T. Branch, Cambridge, MA 02139-0901 for additional information.

**The Twelfth Annual IEEE International Conference on Infrared and Millimeter Waves will be in early December, 1987 in Florida.**

Millimeter waves (12 sessions), free electron lasers and gyrotrons (9 sessions), submillimeter waves (9 sessions) and plasma diagnostics (4 sessions) will be featured in the technical program. A millimeter wave exhibit will be held for two days. The conference is being organized by Ken Button (M.I.T.), James C. Wiltse (Ga. Tech Research Inst.), Richard J. Temkin (Plasma Fusion Center, M.I.T.), Neville C. Luhmann (UCLA), M.N. Afsar (CCNY) and F. Kneubuhl (ETH, Zurich). The abstract (40 words) deadline is July, 1987 and should be sent to Ken Button, Box 72, M.I.T. Branch Cambridge, MA 02139-0901. Inquiries about the exhibit may be directed to Ken Button or Clarence Arnow.

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The panel moderator is Dr. Joseph A. Saloom, Senior Vice President, Corporate Component Center, M/A - COM, Burlington, MA. Panel members are: Dr. E. D. Maynard, Jr., Director VHSIC & Electron Devices, Research and Advanced Technology Office, Pentagon, Washington, D.C.; Mr. Sven Rooslid, Director Electronic Sciences, Defense Sciences Office, DARPA, Arlington, VA; Mr. Frank E. Welker, Chief, Signal Generation & Control Section, Surveillance Div., RADC, N.Y.; Dr. Hans Hielsmair, Chief, Microwave - Millimeterwave Branch, US Army LABCOM, Ft. Monmouth, N.J.; and Mr. James A. Cauffman, Office of Chief of Naval Research, Arlington, VA.

Next down the interest list was pension portability. At a distinctly lower level of concern were such issues as employment stability, retraining, government "wage busting" and representation. Other ideas not included on the poll but suggested in responses were support of college coop, equipment updating for universities, relation between risk taking and remuneration, need for professional liability insurance, need for retraining older engineers and the question of what is a professional - what binds us together.

Though the results clearly suggested the direction for this year's PACE luncheon panel discussion, the poll is clearly nonscientific and in need of augmentation to serve as a basis for planning MTT-S activities in support of member needs. Do you agree with the trends of the responses received to date or do you find them biased? Let me hear from you. My address and phone number are Westinghouse DEC, P.O. Box 746, MS 335, Baltimore, MD 21203, (301) 765-4027.

## SHORT COURSES

A number of organizations are offering short courses this Spring, which will be of interest to some members of the Microwave Theory and Techniques Society.

**The George Washington University, School of Engineering and Applied Science, Washington, D.C. 20052**

**Data Communications Standards: Interfaces and Protocols for Open Systems Network Architectures**, June 2-6, 1986, Course No. 933DC, Fee \$950, Lecturer: Hermann J. Helgert.

**Integrated Circuit Design for Telecommunications Applications**, June 2-6, 1986 Course No. 1258DC, Fee \$950, Lecturers include Edgar Sanchez-Sinencio, Randall L. Geiger, Jesus A. Guinea.

**Introduction to Command, Control, and Communication (C<sup>3</sup>) Systems**, June 9-13, 1985, Course No. 1095DC, Fee \$950, Lecturers: Robert C. Dixon, Ray H. Pettit.

**Application of T Carrier to Private Networking**, June 10-13, 1986, Course No. 1293DC, Fee \$860, Lecturers: Bernard E. Keiser, Robert Emmett O'Neill.

**Surface Acoustic Wave Devices and Their Signal Processing Application**, June 16-19, 1986, Course No. 1176DC, Fee \$860, Lecturers: Colin K. Campbell.

**Wideband Communications Systems**, June 16-20, 1986, Course No. 537DC, Fee \$950, Lecturer: Bernhard E. Keiser.

**Mobile Cellular Telecommunications Systems**, June 23-25, 1986, Course No. 1086DC, Fee \$750, Lecturer: William C.Y. Lee

**Modern Electronics for Nonspecialists**, June 24-27, 1986, Course No. 1132DC, Fee \$860, Lecturer: Nalm A. Kheir.

**Radiowave Propagation for Communications System Design**, June 23-27, 1986, Course No. 249SD, Fee \$950, Lecturers include Roger Lang, Allan Schneider.

**Digital PBXs and PBX Architecture**, June 20-July 2, 1986, Course No. 1297DC, Fee \$750, Lecturer: Marie V. Stella.

**Modern Digital Signal Processing: Analysis, Design and Applications**, July 7-11, 1986, Course No. 852DC, Fee \$950, Lecturer: Anastasios N. Venetsanopoulos.

**Foundations of Modern Telecommunications Systems**, July 21-25, 1986, Course No. 1017 DC, Fee \$950, Lecturers include Robert C. Dixon, George D. O'Clock.

**Digital Telephony**, August 4-8, 1986, Course No. 597DC, Fee \$950, Lecturers include Bernhard E. Keiser, Robert Emmett O'Neill.

**Fiber Optics Technology for Communications**, September 16-18, 1986, Course No. 1026DC, Fee \$750, Lecturers include Frederic Quan, Peter C. Schultz.

For further information call (202) 676-6106, toll free in U.S. (800) 424-9773, toll free in Canada (800) 535-4567.

The Continuing Education Institute - Europe has courses in their "Advanced Science and Technology Education Programs" as listed below:

**Compound Semiconductor Materials - GaAs and Related Compounds**, September 1-5, 1986, Course No. 182, Davos Congress Center, Switzerland, Lecturers include G. McGuire, T. Anderson, J. Arthur, G. Robinson, B. Streetman.

**Lightwave Communication Technology - Optical Communications Systems**, September 1-5, 1986, Course No. 296, Davos Congress Center, Switzerland, Lecturers include C.H. Henry, G.E. Stillman, F.K. Reinhardt, A. Olsson, J.R. Jones.

**Syracuse University provides the following Course:**

**Electromagnetic Analysis of Integrated Circuits**, June 17-20, 1986, Syracuse University Conference Center, Blue Mountain Lake, New York; for further information call Ann Beekman (305) 892-6146.

**The UCLA Department of Engineering and Science is offering the following courses:**

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**NAVSTAR Global Positioning System (GPS): Operation, Implementation, and Applications**, June 16-20, Course No. Engineering 867.62, Fee \$975, Lecturers include Cornelius T. Leondes, Alison K. Brown, Mark A. Sturza.

**Modern Telecommunications Networking: Electronic Messaging, Local Area, Packet Radio, and Satellite Communication Networks**, May 12-15, 1986, Course No. Engineering 885.84, Fee \$975, Lecturer: Izhak Rubin.

**The Techniques and Technology of the Application of Kalman Filters and Nonlinear Filters**, May 19-23, 1986, Course No. Engineering 881.78, Fee \$975, Lecturers include W. Michael Bowles, Alison K. Brown, Vytas B. Gylys, Ken Kessler, Joseph L. LeMay, D.F. Liang, John Lukesh, Peter Maybeck, Roy C. Thraser, James H. Vincent.

**Microwave Circuit Design I-Linear Circuits**, June 16-20, 1986, Course No. Engineering 881.39, Fee \$975, Lecturers include Les Besser, Steven L. March, Robert Wenzel.

**Microwave Circuit Design II-Nonlinear Circuits**, June 23-28, 1986, Course No. Engineering 881.65, Fee \$995, Lecturers include K.C. Gupta, Edward C. Niehenke, Robert A. Pucel.

For registration information, call the Short Course Program office at (213) 825-1295 or 825-3344.

**The following course will be presented at various locations.**

**Fibert Optic Communications, Tools & Techniques for Systems Design**, Course No. 440, May 13-16 in Toronto, June 10-11 in San Diego, June 17-20 in Ottawa, June 24-27 in Boston, July 8-11 in Washington, D.C., July 22-25 in Palo Alto. For further information please call Integrated Computer Systems at (213) 417-8888 or in Ottawa at (613) 727-5585, or (800) 267-7014 for Canada.

**The University of Colorado, Boulder is offering the following:**

**Computer Aided-Design of Microstrip Circuits and Antennas**, May 27-30, 1986. For further information please call (303) 492-5151.

**The Southeastern Center for Electrical Engineering Education (SCEEE) is sponsoring a short course in Mission Bay, San Diego, California, entitled:**

**Antennas: Principles, Design, and Measurements**, September 3-6, 1986, Fee \$695, Lecturers: Gary A. Thiele, Warren L. Stutzman. For further information call Ann Beckman (305) 892-6146.

**The Continuing Education Institute is sponsoring:**

**High Efficiency Power Amplifiers**, May 13-15, 1986, Course No. 171.01, Ramada Old Town, Alexandria, VA, Fee \$825, Lecturer: Frederick H. Raab.

**Technology Associates is sponsoring:**

**Burn In and Accelerated Life Testing of Semiconductor Devices Seminars**, June 23-26, 1986 in Colorado Springs, Colorado: July 21-24, 1986 in Boston, Massachusetts, November 10-13 at the University of South Florida, Tampa, Lecturers: D. Steward Peck, O.D. "Bud" Trapp.



☐ **Show a real need for a home office.** Professor Weissman had a home office deduction even though he had an office at the university. He spent only about 20% of his working time at the university and 80% of his time at his home office. He had very good reasons for not using his on-campus office. Besides teaching, he was required to do research and to write as part of his job. But he had to share his campus office with other professors. It wasn't a safe place for him to leave papers and equipment, and it didn't have a typewriter. *Court of Appeals:* It would have been impossible for Weissman to carry out his duties in the campus office. By working at home, he was saving the college the expense of renting him an office where he could work. *Lesson:* Show the IRS, as Weissman did, that the office is for the convenience of your employer—because the company-provided office is not sufficient.

David J. Weissman, CA-2, No. 84-4031.

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## MEETINGS OF INTEREST

*The following list of meetings of potential interest to members of the Microwave Theory and Techniques Society covers a period of nearly a year. All efforts will be made to maintain a complete compilation of IEEE-sponsored and non-IEEE sponsored meetings. Any additions should be sent to the MTT-S Newsletter Editor.*

### 1986

- **36th Electronic Components Conference (ECC)**, May 5-7, 1986, Westin Hotel, Seattle, WA. Contact: Mr. Leo G. Feinstein, Sprague Electric Company, 115 Northeast Cutoff, Worcester, MA 01606
- **1986 IEEE International Symposium on Circuits and Systems**, May 5-7, 1986, Le Baron Hotel, San Jose, CA. Contact: Professor Shu-Park Chan, Chairman, Electrical Engineering and Computer Science Department, Santa Clara, CA 90503, (408) 984-4482
- **1986 Microwave Power Tube Conference**, May 12-14, Naval Postgraduate School, Monterey, CA. Contact: Mr. Robert L. Woods, Invitations Chairman, Hughes Electron Dynamics Div., 3100 West Lomita Boulevard, Torrance, CA 90509, (213) 517-6149
- **1986 Custom Integrated Circuits Conference — CICC '86** — May 12-15, 1986, Rochester Riverside Convention Center, Rochester, NY, Contact: Laura A.H. Silzars, Convention Coordinating, 6900 S.W. Canyon Drive, Portland, OR 97225, (503) 292-6347.
- **NAECON '86**, May 19-23, 1986, Dayton Convention Center, Dayton, OH. Contact: NAECON, 140 East Monument Avenue, Dayton, OH, 45402, (513) 223-6266.
- **30th International Symposium on Electron, Ion and Photon Beams**, May 27-30, 1986, The Westin Hotel, Copley Place, Boston, MA. Contact Dr. Nick Economou, Micrion Corporation, 30 Tozier Plaza, Beverly, MA 01915
- **1986 40th Annual Frequency Control Symposium**, May 28-30, 1986, Marriott Hotel, Philadelphia, PA. Contact: Dr. John R. Vig, Electronics Technology and Devices Laboratory, DELECT—EQ, Fort Monmouth, NJ 07703, (201) 544-4275
- **1986 VSI Technology Symposium**, May 28-30, 1986, Inter-Continental Hotel, San Diego, CA. Contact: Lewis Terman, IBM Research Center, PO Box 218, Yorktown Height, NY 10598, (914) 945-2029
- **1986 IEEE MTT-S International Microwave Symposium**, June 2-4, 1986, Hyatt Regency Hotel, Baltimore, MD. Contact: Edward C. Niehenke, Westinghouse Electric Corp., PO Box 746, MS 339, Baltimore, MD 21203, (301) 765-4573.
- **1986 IEEE Solid-State Sensor Conference**, June 2-5, 1986, Hotel Intercontinental, Hilton Head Island, SC. Contact: Dr. Kurt Petersen, 6244 Solomon Court, San Jose, CA 95123, (408) 224-8818
- **1986 IEEE Microwave and Millimeter Wave Monolithic Circuits Symposium**, June 4-5, 1986, Hyatt Regency Hotel, Baltimore, MD. Contact: Dr. John Kuno, Hughes Aircraft Company, Microwave Products Division, P.O. Box 2940, Torrance, CA 90509, (213) 517-6378
- **1986 Topical Meeting on Tunable Solid State Lasers**, June 4-6, 1986, Rippling River Resort, Zigzag, OR Contact: Optical Society of America, Meetings Manager, 1816 Jefferson Place, NW, Washington, DC 20036, (202) 223-0920
- **IEEE International Symposium on Applications of Ferroelectrics**, June 8-11, 1986, Lehigh University, Bethlehem, PA. Contact: Dr. Wallace Arden Smith, Phillips Laboratories, 345 Scarborough Road, Briarcliff Manor, NY 10510, (914) 945-6032

- **1986 IEEE International Symposium on Electrical Insulation**, June 8-11, 1986, Key Bridge Marriott, Washington DC. Contact: Dr. David E. Cooper, Southern California Edison Co., Research and Development Lab., Room 497C, PO Box 800, Rosemead, CA 91770, (818) 302-6836
- **1986 International IEEE/AP-S Symposium and USNC/URSI Meeting**, June 8-13, 1986, Wyndham Franklin Plaza Hotel, Philadelphia, PA. Contact: Mr. Charles C. Allen, General Electric Space Div., Valley Forge Space Center, Room U4018, PO Box 8555, Philadelphia, PA 19104, (215) 354-4595
- **Third International VLSI Multilevel Interconnection Conference**, June 9-11, 1986, Santa Clara Marriott Hotel, Santa Clara, California
- **International Quantum Electronics Conference**, June 9-13, 1986, Moscone Convention Center, San Francisco, CA. Contact: Ms. Joan Carlisle, Meetings Manager, Optical Society of America, 1816 Jefferson Place, NW, Washington, DC 20036, (202) 223-0920
- **Conference on Lasers and Electro-Optics (CLEO '86)**, June 9-13 Moscone Center, San Francisco, CA. Contact: OSA Meetings Department, Meetings Manager, 1816 Jefferson Place NW, Washington, DC 20036, (202) 223-0920
- **International Conference on Communications—ICC '86**, June 22-23, 1986, Sheraton Hotel, Toronto, Ontario, Canada. Contact: Hugh J. Swain, Andrew Antenna, Limited, 606 Beech Street, Whitby, Ontario, Canada lin 532, (416) 668-3348
- **1986 17th Power Modulator Symposium**, June 23-25, 1986, Hyatt Seattle, Seattle, WA. Contact: Bobby Gray, Rome Air Development Center, Griffiss AFB, NY 13441, (315) 330-4846
- **1986 Power Electronics Specialists Conference**, June 23-27, 1986, University of British Columbia, Vancouver, Canada. Contact: Mr. W. G. Dunford, Department of Electrical Engineering, University of British Columbia, Vancouver V6T 1W5 Canada, (604) 228-6660
- **1986 Conference on Precision Electromagnetic Measurement CPEM '86**, June 23-27, 1986, National Bureau of Standards, Gaithersburg, MD. Contact: Oskars Petersons, National Bureau of Standards, Electrosystems Division, Bldg 220/Room B-168, Washington, DC 20234, (301) 921-2328
- **2nd International Conference on Conduction & Breakdown in Solid Dielectrics**, July 7-10, 1986, Kongresszentrum, Erlangen, Germany. Contact: Dr. P. Fischer, Siemens AG, Abt.ZFE CWV 2, PO Box 3240, 8520 Erlangen/Germany, Ph: 09131-75690
- **1986 Symposium with Seminars on Antenna Technology and Applied Electromagnetics**, August 13-14, 1986, University of Manitoba, Winnipeg, Manitoba, CANADA. Contact: L. Safai, Dept. of Electrical Eng'g, University of Manitoba, Winnipeg, Manitoba, CANADA R3T 2N2
- **International Symposium on Recent Advances in Microwave Technology and Future Challenges**, August 15-16, 1986, Grand Forks. Contact: Banmali Rawat, Chairman, Symposium Organizing Committee, Department of Electrical Engineering, Box 7165, University of North Dakota, Grand Forks, ND 58202.
- **Intersociety Energy Conversion Engineering Conference (IECED)**, August 24-29, 1986, Town and Country Hotel, San Diego, CA. Contact: Ms. Barbara Hudson, Shirley Blackwell, American Chemical Society, 1155 16th Street, NW, Washington, DC 20036, (202) 874-4401
- **Electronics and Aerospace Systems Conference -EASCON '86**, September 8-10, 1986, Loew's L'Enfant Plaza, Washington, DC. Contact: Charles Schmidt, RCA Astro Electric, B800, Princeton, NJ 08540, (201) 338-2140
- **International Geoscience and Remote Sensing Symposium - IGARSS '86**, September 8-11, 1986, University of Zurich-Irchel, Zurich, Switzerland. Contact: Professor Dr. H. Haefner, Geographisches Institut, Universitat Zurich-Irchel, Winterthurerstrasse 190, 8057 Zurich, SWITZERLAND, PH: 01/2575131
- **Bipolar Circuits and Technology Meeting**, September 11-12, 1986, Hyatt Regency, Minneapolis, MN. Contact: Dr. John Shier, Microcircuits Division of VTC, Inc., 2800 East Oak Shakopee Road, Minneapolis, MN 55420, (612) 853-3084
- **1986 IEEE International Electronic Manufacturing Technology Symposium**, September 15-17, 1986, San Francisco Hilton & Tower, San Francisco, CA. Contact: Paul Wesling, Tandem Computers, Inc. 2550 Walsh Avenue, Santa Clara, CA 95051, (408) 746-2981

- **1986 IEEE International Symposium on Electromagnetic Compability**, September 16-18, 1986, Town and Country Hotel, San Diego, CA. Contact: H.K. Mertel, EMACO, Incorporated, 7562 Trade Street, San Diego, CA 92121, (619) 578-1480
- **XIIth International Symposium on Discharges and Electrical Insulation in Vacuum**, September 22-25, 1986, Hotel Shores, Shores, Israel. Contact: Professor S. Goldsmith, Faculty of Exact Sciences, Tel-Aviv University, Tel-Aviv, ISRAEL, Ph: 03-420303.
- **International Industrial Electronics Conference, IECON '86**, September 28-October 3, 1986, Hyatt Regency Hotel, Milwaukee, WI. Contact: Dr. Richard C. Born, Rexnord Inc., 5101 West Beloit Road, Milwaukee, WI 53214, (414) 643-2704
- **1986 Applied Superconductivity Conference**, September 28-October 3, 1986, Hyatt Regency Hotel, Baltimore, MD. Contact: Richard D. Blaugher, Westinghouse R&D Center, 1310 Beulah Road, Pittsburgh, PA 15230.
- **Western Electronic Show & Convention (WESCON)**, September 30-October 3, 1986, Anaheim Convention Center, Anaheim, Hilton, Los Angeles, CA. Contact: Dale Litherland, Electronics Conventions, Inc., 8110 Airport Blvd., Los Angeles, CA 90045, (213) 772-2965
- **IEEE Military Communications Conference (MILCOM '86)**, October 5-9, 1986, Monterey, CA. Contact: Kenneth L. Rose, Ford Aerospace and Communications Corporation, 3939 Fabian Way, Palo Alto, CA 94303, (415) 852-5550
- **1986 IEEE International Symposium on Information Theory**, October 5-10, 1986, University of Michigan, Ann Arbor, MI. Contact: Professor Frederick J. Beutler, Department of EE & CS, East Engineering Building, College of Engineering, University of Michigan, Ann Arbor, MI 48109, (313) 764-2390
- **IEEE International Conference on Computer Design: VLSI in Computer in Processors**, October 6-9, 1986, Rye Town Hilton, Rye Brook, NY. Contact: ICCD '86 1730 Massachusetts Ave., NW, Washington, DC 20036-1903, (202) 371-0101, TWX: 7108250437 IEEECOMP SO Attn: Gerri Katz
- **1986 International Workshop in Microelectronics Obsolescence**, October 8-10, 1986, Washington, D.C. Contact: Prof. Dave Irwin, Electrical Engineering Dept., Auburn University, A1 36849
- **7th Digital Avionics Systems Conference**, October 13-16, 1986, Worthington Hotel, Fort Worth, TX. Contact: Mr. Randall Moore, Fort Worth Division, PO Box 748, MZ 1768, Fort Worth, TX 76101, (817) 763-2768
- **Int'l Telecommunications Energy Conference (INTELEC '86)**, October 19-22, 1986, Royal York Hotel, Toronto, Ontario, Canada. Contact: Don Reid, Bell Northern Research, PO Box 3511, Station C, Ottawa, Ontario K1Y 4H7, Canada (613) 726-2145
- **Workshop on Charged Coupled Devices**, October 24-26, 1986, Columbia University's Arden House, Harriman, NY. Contact: Prof. Eric R. Fossum, Dept. of Electrical Engineering, 1321 Mudd Building, Columbia University, New York, New York 10027, (212) 280-3115
- **International Conference on Computer Aided Design (ICCAD '86)**, November 10-13, 1986, Santa Clara Convention Center, Santa Clara, CA. Contact: ICCAD Ian Getreu, Tektronix, Inc. MS 94-520, PO Box 4600, Beaverton, OR 97075, (503) 629-1462
- **1986 IEEE Ultrasonics Symposium**, November 17-19, 1986, Colonial Williamsburg Conference Center, Williamsburg, VA. Contact: R.A. Moore, Westinghouse Defense and Electronic Center, PO Box 746, MS-335, Baltimore, MD 21203, (301) 765-4027.
- **Annual Conference on Magnetism and Magnetic Materials**, November 17-21, 1986, Hyatt Regency Hotel, Baltimore, Maryland. Contact: Dr. John T. Scott, American Institute of Physics, 335 East 45th Street, New York, New York 10017
- **Electrical and Electronics Conference & Exposition (IEEEC & E)**, December 1-3, Metro Toronto, Convention Centre, Toronto, Ontario, Canada. Contact: IEEE Canadian Region Office, 7061 Yonge Street, THORNHILL, Ontario, Canada, L3T 2A6, (416) 881-1930

Continued on page 53



## EDITOR'S NOTES



*by Reynold S. Kagiwada*

It is again that time of the year when some MTT-S members start to make plans for the 1986 IEEE International Microwave Symposium. Ed Niehenke's group has been actively planning and working for over four years. Baltimore's Inner Harbor will be a pleasant experience. There will be countless receptions with hors d'oeuvres and live music. The technical programs in the Microwave Symposium, the Monolithic Symposium and ARFTG are filled with exciting breakthroughs. I hope you have the opportunity of visiting Baltimore in June.

For the first time since its inception, John Horton's Special Article is not in the Newsletter. There will be an article in the next issue and John is soliciting articles. Please feel free to contact John Horton if you have any suggestions. His phone number is (213) 535-8372.

Walt Gelnovatch's Nomination Committee is preparing for the ADCOM election in the Fall. Suggestions should be forwarded to members of the committee.

From the Dave McQuiddy ADCOM highlights you see the MTT-S is running well and financially healthy.

## 1986 GaAs IC SYMPOSIUM

*by Ken Sleger*

The 1986 Gallium Arsenide Integrated Circuit Symposium will be held at the Grenelefe Resort and Conference Center in Grenelefe, Florida (near Orlando), 28-30 October 1986. Papers are solicited on a variety of topics related to gallium arsenide integrated circuits, including:

- Monolithic Linear and Power Integrated Circuits
- Monolithic Digital Integrated Circuits
- Electro-Optical Integrated Circuits
- Materials Considerations and Advances
- Processing Technology
- Manufacturing Science and Technology
- Computer Aided Design, Modeling, and Simulation of ICs

- Packaging, Interconnecting, and Testing
- Radiation Effects and Reliability
- Applications and Affordability
- Novel Devices for Integrated Circuits

Attendees should be prepared to discuss the technical aspects of these topics.

The objective of the meeting is to accelerate the successful development of gallium arsenide and related III-V compound integrated circuits by providing a forum for the interchange of technical information relative to the design, fabrication, packaging, testing and manufacturing of such ICs. It is the intent of the GaAs IC Symposium to be responsive to both the current and future needs of the technical community it serves.

The Symposium is sponsored by the IEEE Electron Devices Society and cooperatively sponsored by the IEEE Microwave Theory and Techniques Society. This year the Symposium will offer a short course on GaAs digital design and fabrication in addition to soliciting papers in the area of manufacturing science and technology.

Authors wishing to submit abstracts for consideration by the technical programs committee should mail the original, plus twenty-five (25) copies, of a one page abstract to:

Dr. R. Allen Murphy  
1986 GaAs IC Symposium  
MIT Lincoln Laboratory  
244 Wood Street, Rm. E118E  
Lexington, MA 02173  
TELEX: 923-355

The one-page abstract should clearly state the purpose of the work, how much it advances the art and what specific results have been obtained. Additional supporting material may be submitted at the discretion of the author(s). Please indicate the specific area (as listed in the first paragraph) to which the abstract applies. The deadline for receiving abstracts is May 16, 1986. For further information contact Dr. Murphy at (617) 863-5500, ext. 7873.

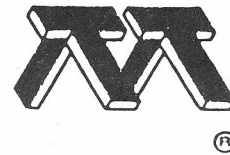
Persons wishing to receive the advance program and registration material for this year's Symposium or be placed on the mailing list for future symposiums should send name, organization, mailing address and telephone number to: Melissa Wi derkehr, Courtesy Associates, 655-15th Street, N.W., Suite 300, Washington, D.C. 20005

For additional information, you may also contact the Symposium Chairman, Dr. James A. Hutchby, at 919/541-5931, or the Publicity Chairman, Dr. Kenneth J. Sleger, at 202/767-3894.

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**MICROWAVE THEORY AND TECHNIQUES SOCIETY**

**SPECIAL TRANSACTIONS ISSUE  
ON**

**"Microwave Aspects and Applications of GHz/Gbit Optical Technology"**

Fiber optical telecommunications systems with data rates of hundreds of megabits per second have become commonplace, gigabit systems are under development, and several gigabits have been demonstrated in research laboratories. Microwave engineering techniques are obviously critical to the design, fabrication, and packaging of the transmitters and receivers for such systems.

Although most of the research and development efforts in wideband optical technology have been directed towards applications in data communications, it has been recognized for some time that there are several attractive applications in traditional microwave systems. For example, optical fibers can replace metallic waveguides for transmission of analog microwave signals. Fibers can be used as delay lines in signal processors for microwave signals, providing orders of magnitude improvement in time-bandwidth product. Novel optical approaches have also been developed for generating microwave signals, and for injection-locking of microwave oscillators.

The IEEE TRANSACTIONS ON MICROWAVE THEORY AND TECHNIQUES is planning to publish a special issue on "Microwave Aspects and Applications of GHz/Gbit Optical Technology" in March, 1987. Topics of interest include but are not limited to the following areas:

**Microwave Aspects of GHz/Gbit Optical Technology**

- o High-speed modulation of diode lasers
- o Wideband photodetector technology
- o High-bit-rate transmitter/receiver design
- o Analog transmitter/receiver design
- o Microwave characteristics of lasers/photodetectors
- o Receiver preamplifier design
- o MIC/MMIC modulation circuit design
- o Devices and circuit packaging

**Microwave Applications**

- o Optical transmission of microwave signals
- o Fiber optic delay line processors
- o Optical generation of microwave signals
- o Optical control of microwave oscillators

Authors are requested to send four (4) copies of their manuscript by July 1, 1986 to:

Henry F. Taylor  
Department of Electrical Engineering  
Texas A&M University  
College Station, TX 77843

- **Global Telecommunications Conference 1986 (GLOBECOM '86)**, December 1-4, 1986, Westin Galleria Hotel, Houston, TX. Contact: Mr. Ross C. Anderson, Southwestern Bell, Room 706, 3100 Main Street, Houston, TX 77002, (713) 521-8244
- **1986 International Electron Devices Meeting - IEDM '86**, December 7-10, 1986, Westin Bonaventure Hotel, Los Angeles, CA. Contact: Ms. Melissa Widerkehr, Courtesy Associations, Inc., 655 15th Street, NW, Washington, DC 20005, (202) 347-5900

## 1987

- **1987 International Conference on Integrated Optics and Optical Fiber Communication IOOFC '87**, January 19-22, 1987, Reno, Nevada. Contact: OSA Meetings Department, 1816 Jefferson Place, N.W. Washington, DC 20036, (202) 223-0926
- **1987 Annual Reliability and Maintainability Symposium**, January 27-29, 1987, Philadelphia Marriott, Philadelphia, PA. Contact: V.R. Monshaw, RCA, Astro-Electronics, PO Box 800, Mail Stop 55, Princeton, NJ 08540, (609) 426-2182
- **Phoenix Conference on Computers and Communications**, February 25-27, 1986, Sunburst Hotel, Scottsdale, AZ. Contact: Robert Douglas, Concord Data Systems, 10640 North 28th Drive, Suite A209, Phoenix, AZ 85029, (602) 863-1472



## PERSONAL POINTS

☐ **The most successful people** use their subconscious to help them solve problems. They spend at least half an hour a day alone in creative thought, focusing on goals. They maintain their perceptions of themselves as unique individuals, regardless of negativism and defeatism, around them.

Scott DeGarmo, editor of *Success!* magazine.

☐ **The ideal bath:** You'll wind up more refreshed with a *warm* bath (85°—95°F.). Although steamy water may seem relaxing, it actually laves the bather drained...and it dries out the skin. *If you insist on hotter water:* Soak for only a few minutes, or start in warm water and gradually add the hot. *Suggestion:* To ease soreness and relax muscles, add a cupful of cider vinegar or a pound of epsom salts to the water.

☐ **Whole wheat** isn't necessarily the only nutritious bread. *Also healthful:* Other whole-grain breads, including pumpernickel, rye and oatmeal. *Key:* Check the ingredient label on the package. The closer whole-grain flour appears to the top of the list, the more nutrients the bread contains.

*Backpacker*, 1 Park Ave., New York 10016, 6 issues, \$14.97/yr.

### ...and your table

☐ **Several small meals** keep weight down better than one or two large ones, even if you consume the same total of calories. *Reason:* Every time you eat, your metabolism temporarily rises and burns off calories. *Also:* Large meals lead to excessive insulin production—and the insulin both promotes fat storage and makes you hungrier.

Maria Simonson, director of the health, weight and stress program, John Hopkins Medical Institute, in *Mademoiselle*, 350 Madison Ave., New York 10017, monthly, \$15/yr.

### ...and your travels

☐ **Jet lag** is far more pronounced after flights going east. *Reason:* Eastbound travel compresses the day/night cycle, disrupting sleep patterns. But westbound travel *extends* the day and is easier to adjust to. You can fly up to three time zones west without feeling *any* jet lag.

Dr. Charles A. Czeisler, assistant professor of medicine, Harvard Medical School, in *Travel & Leisure*, 1120 Ave. of the Americas, New York 10036, monthly, \$22/yr.

☐ **Motion sickness remedy:** Ginger root tea or tablets. In one study, the herb was found more effective than Dramamine. And unlike Dramamine, ginger causes no nausea or sluggishness. (Ginger is also used to treat menstrual cramps and morning sickness.)

*The Lancet*, 34 Beacon St., Boston 02106, weekly, \$68/yr.

☐ **Since managers** no longer expect *any* institution to take care of them for life, they have replaced the goal of *job* security (and company loyalty) with *employment* security. *What managers seek most:* Skills that give them greater job mobility.

Harry Levinson, corporate consultant, Harvard University, Graduate School of Business.

☐ **Creative minds** generally fall asleep fastest, according to psychologist researcher Ingrid Sladeczek, University of Arizona. *Also:* More creative people are more likely to use dreams to solve problems.

☐ **Decisions, decisions, decisions.** *The healthy way to make a decision:* Analyze and integrate your emotional *and* your intellectual reasons. To decide on the basis of feeling alone—or of logic alone—is to invite regret.

Kenneth S. Isaacs, Ph.D., Storm Clinics, Evanston, IL 60201

# 1986 International Symposium on Gallium Arsenide and Related Compounds

## CALL FOR PAPERS

The 1986 International Symposium on Gallium Arsenide and Related Compounds will be held September 28 through October 1, 1986 at Caesar's Palace, Las Vegas, Nevada, USA\*. As for previous symposia in this series, the manuscripts of papers presented at the conference will be refereed and those accepted will be published in the Symposium Proceedings.

Prospective authors are invited to submit abstracts in the fields of material preparation, epitaxial crystal growth, artificially structured materials, material analysis and characterization, microwave devices, opto-electronics, device technology, integrated circuits, quantum well structures and devices, high electron mobility structures and devices, and in any related materials, device and technology areas.

Two copies of a 300-word abstract and two copies of a 100-word summary, which will appear in the advance program if the paper is accepted, should be submitted no later than May 1, 1986 to the Program Committee Chairman, 1986 International Symposium on Gallium Arsenide and Related Compounds:

W.T. Lindley  
Room E118E  
MIT Lincoln Laboratory  
244 Wood Street  
Lexington, MA 02173

Papers to be presented will be selected by the Technical Program Committee on the basis of the 300-word abstracts. Authors will be notified of the decision and detailed manuscript instructions will be mailed by the middle of July.

Registration forms and travel information will be distributed in the middle of July. Those who wish to receive this information should fill in the form below and mail it to the Secretary, 1986 International Symposium on Gallium Arsenide and Related Compounds:

C.M. Wolfe  
Washington University  
Box 1127  
St. Louis, MO 63130

\*Please note this is a change in location from Hilton Head Island listed in earlier announcements.

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Please return this form in order to receive additional information on the 1986 International Symposium on Gallium Arsenide and Related Compounds.

Name: \_\_\_\_\_

Affiliation: \_\_\_\_\_

Address: \_\_\_\_\_

I plan to attend \_\_\_\_\_ Yes \_\_\_\_\_ No

I plan to give a paper \_\_\_\_\_ Yes \_\_\_\_\_ No

Tentative Title: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_



# GaAs IC SYMPOSIUM

1986 IEEE GALLIUM ARSENIDE INTEGRATED CIRCUIT SYMPOSIUM

Sponsored by the IEEE Electron Devices Society  
and cooperatively sponsored by the IEEE Microwave Theory and Techniques Society

## CALL FOR PAPERS.....CALL FOR PAPERS.....CALL FOR PAPERS

The 1986 Gallium Arsenide Integrated Circuit Symposium will be held at Grenelefe, Florida (near Orlando), October 28-30, 1986. Papers are invited on topics related to Gallium Arsenide Integrated Circuits, including:

- Monolithic Linear and Power Integrated Circuits
- Monolithic Digital Integrated Circuits
- Electro-Optical Integrated Circuits
- Materials Considerations and Advances
- Processing Technology
- Manufacturing Science and Technology
- Computer Aided Design, Modeling, and Simulation of ICs
- Packaging, Interconnecting, and Testing
- Radiation Effects and Reliability
- Applications and Affordability
- Novel Devices for Integrated Circuits

**MEETING OBJECTIVE:** To accelerate the successful development of gallium arsenide and related III-V compound integrated circuits by providing a forum for the interchange of technical information relative to the design, fabrication, packaging testing, and manufacturing of such ICs. It is the intent of the GaAs IC Symposium to be responsive to both the current and future needs of the technical community it serves.

## CALL FOR ABSTRACTS...DEADLINE FOR RECEIVING ABSTRACTS IS MAY 16, 1986.

Authors wishing to submit abstracts should mail the original and twenty five (25) copies of a one page abstract and of any supporting material to:

R. Allen Murphy  
1986 GaAs IC Symposium  
MIT Lincoln Laboratory  
244 Wood St., Rm. E118E  
Lexington, MA 02173  
(617) 863-5500, ext. 7873  
TELEX: 923 355

The one page abstract should clearly state: (a) the purpose of the work; (b) how much it advances the art; (c) **and what specific results have been obtained.** Additional supporting material may be submitted at the discretion of the author(s). The abstract, which should be typewritten on one side of the page only, must include the title, name of the author(s), telephone number, mailing address, company affiliation, company address and application area (as listed above). **USA authors should obtain company and government clearances prior to submission of abstracts.** Notice of acceptance or rejection will be mailed to authors by

June 20, 1986. Authors of accepted papers will be required to submit an extended abstract by August 11, 1986 of up to four pages, including figures, in camera ready format for publication in the Symposium Technical Digest. The accepted one page abstracts will be used for publicity purposes and portions of these abstracts may be quoted in subsequent magazine articles publicizing the Symposium. Please contact the Publicity Chairman, Kenneth J. Sleger, (202) 767-3894, if this is not acceptable.

## FOR ADDITIONAL INFORMATION CONTACT:

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