

TECHNICAL PROGRAM  
1971 IEEE - GMTT  
INTERNATIONAL MICROWAVE SYMPOSIUM  
Marriott Twin Bridges Motor Hotel, Washington D.C.

**INTRODUCTORY SESSION**  
0900-0930 MONDAY, MAY 17

**Welcoming Remarks**

H. Warren Cooper, Chairman Steering Committee  
1971 IEEE G-MTT International Microwave Symposium

**Keynote Address**

Sy Okwit, Chairman, G-MTT National Administrative Committee

**TECHNICAL SESSIONS**  
MONDAY MAY 17

**I - FILTERS AND COUPLERS**

**0940-1230 (Persian I)**

Chairman, R. A. Moore, Westinghouse, Baltimore, Md.

I-1 "A Technique for the Realization of Optimum  
0940 Bandpass Filters," A. K. Johnson, Bell  
Telephone Labs, Whipppany, N. J.  
I-2 "A Graphical Method for the Design of Stepped  
1005 Impedance Transformers," F. C. Chang, H. Y.  
Yee, and N. F. Audeh, University of Alabama,  
Huntsville, Ala.  
I-3 "Microwave Doppler Invariant, Pulse Compre-  
1030 sion Filters," J. D. Rhodes, University of Leeds,  
Leeds, Great Britain.

**II - APPLICATIONS OF MICROWAVE INTEGRATED  
CIRCUITS**

**0940-1230 (Persian II)**

Chairman, J. B. Horton, Electronic Resources,  
Los Angeles, Calif.

II-1 "An Integrated, X-band, Image and Sum Fre-  
0940 quency Enhanced Mixer with 1 GHz IF," J. B.  
Cahalan, J. E. Degenford and M. Cohn, Westing-  
house Defense and Space Center, Baltimore, Md.  
II-2 "Integrated Mixer for 18 and 26 GHz," D.  
1005 Dobramysl, Siemens Aktiengesellschaft,  
Munchen, Germany.  
II-3 "A 90-dB Microstrip Switch on a Plastic Sub-  
1030 strate," B. R. Hallford, Collins Radio, Dallas,  
Texas.

**COFFEE BREAK**

I-4 "The Virtues of Mixing Tandem and Cascade  
1115 Coupler Connections," E. Carpenter, Radiation  
Systems, McLean, Va.  
I-5 "Multi-Port Lattice-Typed Hybrid Network,"  
1140 T. Kuroda, T. Usui, and K. Yano, Nippon  
Electric, Yokahoma, Japan.  
I-6 "Design of Hairpin-Line and Hybrid Hairpin-  
1205 Parallel-Coupled-Line Filters," E. G. Cristal  
and S. Frankel, Stanford Research Institute,  
Menlo Park, Calif.

II-4 "Miniature Multi-Kilowatt PIN Diode MIC Digital  
1115 Phase Shifters," P. Onno and A. Plitkins, Bell  
Labs, Whippanny, N. J.  
II-5 "Electronically Tuned Integrated X-Band Super-  
1140 heterodyne Receiver," P. J. Meier, H. C. Okean  
and E. W. Sard, AIL, Cutler Hammer, Long  
Island, N. Y.  
II-6 "Alumina Sandwich Line Filters for High Per-  
1205 formance Integrated Circuit Application," A. F.  
Hinte, G. Kopcsay and J. J. Taub, AIL Cutler  
Hammer, Melville, N. Y.

**LUNCH**

TECHNICAL PROGRAM  
MONDAY MAY 17

---

III - TRANSMISSION LINES AND MEASUREMENTS

1400-1700 (Persian I)  
Chairman, J. Cheal, Omni Spectra Inc., Farmington, Mich.

III-1 "Fence Guide for Millimeter Waves," F. J.  
1400 Tischer, N. C. State University, Raleigh,  
N. C.  
III-2 "Propagation in a Shielded Microslot with A  
1425 Ferrite Substrate," J. C. Minor, NRL, Wash.,  
D. C., and D. M. Bolle, Brown University,  
Providence, R. I.  
III-3 "The Ring-Loaded Corrugated Waveguide,"  
1450 Y. Takeichi, T. Hashimoto and F. Takeda,  
Mitsubishi Electric Corp., Kamakura-city,  
Japan.

IV - MICROWAVE ACOUSTICS

1400-1700 (Persian II)  
Chairman, N. Lipetz, U.S. Army Electronics  
Command, Ft. Monmouth, N.J.

IV-1 "The Role of Acoustic Surface Waves in Signal  
1400 Processing," (INVITED) E. Stern, MIT Lincoln  
Labs., Lexington, Mass.  
IV-2 "Design Data for Microwave Acoustic Surface  
1435 Wave Devices," A. J. Slobodnik and T. L. Szabo,  
Air Force Cambridge Research Labs., Bedford,  
Mass.  
IV-3 "Properties and Applications of the Acoustic  
1455 Wave Junction Between Plated and Unplated Sub-  
strates," R. C. M Li, A. A. Oliner, K. H. Yen,  
and H. L. Bertoni, Polytechnic Institute of  
Brooklyn, Farmingdale, N. Y.

----- COFFEE BREAK -----

III-4 "Errors in  $S_{11}$  Measurements Due to Residual  
1540 SWR of the Measuring Equipment," R. Garver,  
D. Bergfried, S. Raff, and B. Weinschel,  
Weinschel Engineering, Gaithersburg, Md.  
III-5 "MIC Techniques in the Design of Extremely  
1600 Broadband Reflectometers," S. Hopfer, S. A.  
Rinkel, and M. Balfour, General Microwave  
Corp., Farmingdale, N. Y.  
III-6 "Characterization of Packaged Varactor  
1620 Diodes," Y. S. Lee, J. W. Getsinger, COMSAT  
Labs, Clarksburg, Md.  
III-7 "Impedance Measurement of a Waveguide  
1640 Mount," R. L. Eisenhart, P. J. Khan, University  
of Mich., Ann Arbor, Mich.

IV-4 "An Electronically Variable Surface Acoustic  
1540 Wave Phase Shifter," B. E. Burke, MIT Lincoln  
Labs, Lexington, Mass.  
IV-5 "Modified Equivalent Circuit Model for Ultra-  
1600 sonic Surface Wave Interdigital Transducers,"  
W. S. Jones, C. S. Hartman, and T. D. Sturdivant,  
Texas Instruments, Dallas, Texas.  
IV-6 "Acoustic Surface Wave Sequence Generators and  
1620 Matched Filters With Adjustable Tape," D. A.  
Gandolfo, G. D. O'Clock, and C. L. Grasse, RCA  
Advanced Technology Labs, Van Nuys, Cal.  
IV-7 "Wideband Microwave Acoustic Delay Line with  
1640 Exceptionally Smooth Phase and Loss Response,"  
W. R. Sperry, E. K. Kirchner, Teledyne Mec.,  
Palo Alto, Cal., and T. M. Reeder, Stanford  
University, Stanford, Cal.

DINNER

---

PANEL DISCUSSION

1930-2200 Commonwealth Room

Session Organizer: Robert Rivers, AIRCOM Inc., Union, New Hampshire  
TOPIC: "CHANGING PRIORITIES AND ENGINEERING"

TECHNICAL PROGRAM  
TUESDAY MAY 18

V - FERRITE MATERIALS AND CIRCULATORS

0900-1200 (Persian I)  
Chairman, A. Clavin, Hughes Aircraft Co., Canoga Park, Calif.

V-1 "Ferrite-Dielectric Composite Integrated Micro-  
0900 wave Circuit Development," (INVITED) C. G.  
Aumiller, D. H. Harris, M. C. Willson, Y. S. Wu,  
F. J. Rosenbaum, D. L. LaCombe.

V-2 "Effect of Rare-Earth Impurities On the Peak  
0930 Power Capability of Garnet Type Low-Field  
Microwave Devices," R. G. West, A. C. Blanken-  
ship and L. P. Domingues, Trans-Tech.,  
Gaithersburg, Md.

V-3 "Lithium Ferrites For Microwave Devices,"  
0950 D. H. Temme, G. F. Dionne, and W. E. Courtney,  
Lincoln Lab., Lexington Mass. and G. Argentina  
and P. D. Baba, Ampex, Redwood City, Cal.

VI - AVALANCHE DIODES

0900-1200 (Persian II)  
Chairman, G. I. Haddad, University of Michigan, Ann Arbor,  
Mich.

VI-1 "High Power, Low-Noise Avalanche Diode  
0900 Oscillators," F. Ivanek, V. Copala, and K.  
Reddi, Fairchild, Mountain View, Cal.

VI-2 "Distributed Unidirectional Microwave Amplifi-  
0925 cation," R. N. Wallace and M. E. Hines, Micro-  
wave Associates, Burlington, Mass.

VI-3 "High-Power Microwave Amplifier Using Anti-  
0950 Parallel Avalanche-Diode Pair," H. Kawamoto,  
RCA Labs, Princeton, N. J.

----- COFFEE BREAK -----

V-4 "Review of Circulator Technology," (INVITED)  
1025 G. P. Rodrigue, Georgia Inst. Tech., Atlanta,  
Ga.

V-5 "Stepped Ground Plane Circulator," E. J.  
1100 Denlinger, D. H. Temme, and J. A. Weiss,  
Lincoln Lab, Lexington, Mass.

V-6 "A New Concept For Broadening The Ferrite  
1120 Substrate Circulator Based on Experimental  
Model Analysis," T. Miura, and T. Hashimoto,  
TKD Electronics, Ichikawa, Japan.

V-7 "Theoretical and Practical Characteristics of a  
1140 Broad Tuning Range Y. I. G. Sphere Circulator,"  
S. R. Longley and D. H. Paul, Mullard Research  
Labs., Redhill, Surrey England.

VI-4 "Second Harmonic Tuning Effects on Impatt  
1025 Diode Oscillator Noise Characteristics," F. J.  
Sullivan and W. H. From, Raytheon, Bedford,  
Mass.

VI-5 "Reduction of FM Noise in Microwave Diode  
1050 Oscillators By Cavity and Injection Stabilization,"  
J. R. Ashley, University of Colorado., and F. M.  
Palka, Sperry Rand, Clearwater, Fla.

VI-6 "A Cascaded-Impedance-Inverter Model of  
1115 Wide-Band Frequency Triplers," J. C. Redd and  
K. L. Kotzebue, University of Cal., Santa  
Barbara, Cal.

----- LUNCH -----

## TECHNICAL PROGRAM

TUESDAY, MAY 18

---

### VII - FERRITE LIMITERS AND PHASE SHIFTERS

1300-1630 (Persian I)

Chairman, F. Reggia, Harry Diamond Labs.,  
Washington, D.C.

VII-1 "Partially Magnetized Ferrites," (INVITED),  
1330 J. J. Green, F. Sandy, C. E. Patton, Raytheon,  
Waltham, Mass.

VII-2 "A New Reciprocal Phaser for Use at Millimeter  
1400 Wavelengths," L. R. Whicker, Naval Research  
Lab, Wash., D. C., and C. R. Boyd, Microwave  
Applications Group, Chatsworth, Cal.

VII-3 "An Accurate Analog Ferrite Phase Shifter,"  
1420 C. R. Boyd, Microwave Applications Group,  
Chatsworth, Calif.

### VIII - COMPUTER ORIENTED MICROWAVE PRACTICES

1330-1630 (Persian II)

Chairman, D. Varon, Dialdata Inc., Newton, Mass.

VIII-1 "The Application of the Theory of Equivalent  
1330 Circuits To The Computer-Aided Design of  
Microwave Circuits," (INVITED), M. A. Murray-  
Lasso, Ciudad Universitaria, Mexico D. F. Mex.

VIII-2 "Gradient Razor Search Method For Optimiza-  
1400 tion," J. W. Bandler and A. G. Lee-Chan,  
McMaster University, Ontario, Canada.

VIII-3 "Computer-Aided Characterization of Millimeter-  
1420 Wave Semiconductor Devices," H. J. Kuno, T. T.  
Fong and D. L. English, Hughes Research Labs,  
Torrance, Cal.

---

### COFFEE BREAK

---

VII-4 "The Application of Periodic Loading To  
1510 Ferrite Phase Shifter Design," W. G. Spaulding,  
McMorrow Labs, Redstone Arsenal, Ala.

VII-5 "Ferrite Phase Shifters and Multi-Port Circu-  
1530 lators in Microstrip and Stripline," M. E. Hines,  
Microwave Associates, Burlington, Mass.

VII-6 "A 100 Kilowatt, X-Band, Ferrite-Diode  
1550 Limiter," W. W. Sickanowicz, R. W. Paglione,  
and R. Steinhoff, RCA Electronic Components,  
Princeton, N. J.

VII-7 "X and Ku-Band Ferrite-Diode Limiters,"  
1610 H. S. Maddix, and R. Kalvaitis, Varian, Solid-  
State Div., Beverly, Mass.

VIII-4 "Working with Automatic Microwave Circuit  
1500 Analysis Programs," (INVITED), W. J.  
Getsinger, COMSAT Labs, Clarksburg, Md.

VIII-5 "Computer-Aided Determination of Equivalent  
1530 Circuits for Waveguide Discontinuities -- A  
New Technique," C. C. Han, and A. E. Smoll,  
Philco-Ford, Palo Alto, Cal.

VIII-6 "Computer-Aided Design of Parametric Ampli-  
1550 fiers," M. Maeda, A. Sumicka, and Y.  
Kinoshita, Hitachi, Tokyo, Japan.

VIII-7 "Finite Element Techniques for the Solution of  
1610 Poisson's Equation," A. Wexler and D. J.  
Richards, University of Manitoba, Winnipeg,  
Manitoba, Canada.

---

### COCKTAIL HOUR

1800-1900 Persian III

### SYMPOSIUM BANQUET

1900-2200 Chesapeake Bay Room

Master of Ceremonies	:	Dr. Robert A. Rivers
1971 GMMT Microwave Prize	:	Dr. William J. Evans
Banquet Speaker	:	Walter R. Hinchman Office of Telecommunications Policy Executive Office of the President

Topic: "Changing National Priorities: A New  
Challenge for the Communications Engineer"

TECHNICAL PROGRAM  
WEDNESDAY, MAY 19

IX - WINNING STUDENT PAPER

0900-0940 Persian Room

Session Chairman, M. Cohn, Westinghouse Electric Corporation  
Baltimore, Maryland

"Generation of Confined Spectrum Pulses Using An Absorption PIN Diode Modulator"  
T. A. Saponas, Univ. of Colorado, Colorado Springs, Col.

X - MICROWAVE APPLICATIONS FOR THE 70's

0950-1230 (Persian I)

Chairman, S. W. Rosenthal, Polytechnic Institute of  
Brooklyn, Farmingdale, N.Y.

X-1 "Channel Multiplexer for a MM Waveguide  
0950 Transmission System," (INVITED), T. A. Abele,  
Bell Telephone Labs, N. Andover, Mass.

X-2 "State of Art in Microwave Sensors for Measur-  
1020 ing Nonelectrical Quantities," S. S. Stuchly, and  
M. A. K. Hamid, University of Manitoba,  
Winnipeg, Canada.

X-3 "The Status of the Technology and Applications of  
1040 Free-Space Microwave Power Transmission,"  
W. C. Brown, Raytheon, Waltham, Mass.

X-4 "Microwave Ice Thickness Sensor," W. Koppl,  
1125 Martin Marietta, Denver, Colo.

1145 LATE NEWS PAPERS - 10 MINUTES EACH

XI - GUNN DEVICES

0950-1230 (Persian II)

Chairman, F. A. Brand, U.S. Army Electronics Command,  
Ft. Monmouth, N.J.

XI-1 "Gunn Diode Impedance Measurements Using A  
0950 Single-Tuned Oscillator," P. W. Dorman, Bell  
Telephone Labs, Murray Hill, N.J.

XI-2 "Experimental and Computer Simulation Analysis  
1015 of a Gunn Diode," Y. Ito, H. Komizo, T. Meguro,  
Y. Daido, and I. Umebu, Radio Fujitsu Labs,  
Kawasaki, Japan.

XI-3 "Gunn Effect Wide Band CW Waveguide Ampli-  
1040 fier," A. Sene, and F. J. Rosenbaum, Washington  
Univ., Saint Louis, Mo.

COFFEE BREAK

XI-4 "Multi-Parallel Operation of Gunn Diodes For  
1125 High RF Power," Y. Kaneko, K. Kimura,  
J. Nakagawa, Hitachi, Tokyo, Japan.

XI-5 "New Alarm Circuit Used for Injection Locking  
Oscillator of Microwave Communication Equipment,"  
K. Sakamoto, Nippon Electric, Yokohama,  
Japan.

LUNCH

XII - CIVIL RADAR SYSTEMS

1330-1630 (Persian I)

Chairman, T. S. Saad, Sage Labs. Inc., Natick, Mass.

XII-1 "Microwave Applications to Transportation,"  
1330 (INVITED), L. W. Roberts, U.S. Dept. of Trans-  
portation, Cambridge, Mass.

XII-2 "Application of Radar to Automobile Control and  
1400 Sensing," W. P. Harokopus, Bendix Research  
Labs, Southfield, Mich.

XII-3 "Automobile Radars," E. J. Baghdady, Info  
1420 Systems, Weston, Mass

XIII - SOLID STATE MICROWAVE DEVICES

1330-1630 (Persian II)

Chairman, C. L. Cuccia, Philco-Ford Corp., Palo Alto, Cal.

XIII-1 "Broadband Diode Phase Shifters," R. V. Garver,  
1330 Harry Diamond Labs, Washington, D. C.

XIII-2 "Octave Band MIC Electronically Variable Atten-  
1355 uators Using PIN Diodes," H. C. Okean and R.  
Pfleiger, AIL, Melville, N.Y.

XIII-3 "Negative-Impedance-Converters (NIC) For VHF  
1420 Through Microwave Circuit Applications," A. F.  
Podell and E. G. Cristal, Stanford Research  
Institute, Menlo Park, Cal.

COFFEE BREAK

XIII-4 "Gigahertz Rate Counter Logic and Clock Genera-  
1510 tion Using High  $F_T$  Transistors," T. Doak,  
J. Ville, S. Zuckswart, and C. L. Cuccia,  
Philco-Ford, Palo Alto, Cal.

XIII-5 "Microwave Integrated Tunnel Diode Amplifiers  
1530 for Broadband, High Performance Receivers,"  
H. C. Okean and P. J. Meier, AIL Cutler Hammer,  
Long Island, N.Y.

XIII-6 "A Mixer and Solid State L. O. for a 60-GHz  
1550 Receiver," L. E. Dickens, J. M. Cotton and B. D.  
Geller, Westinghouse Defense and Space Center,  
Baltimore, Md.

XIII-7 "Variable-Permittivity Artificial Dielectrics,"  
1610 H. T. Buscher, R. M. McIntyre, and S. Mikuteit,  
General Dynamics, San Diego, Cal.