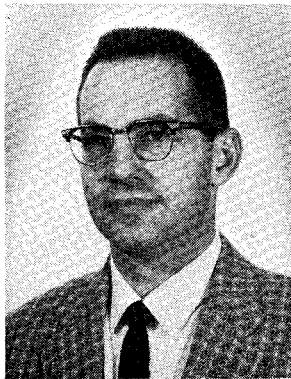


# G-MTT Symposium

Howard Johnson's New Center Motor Lodge, Detroit, Mich.

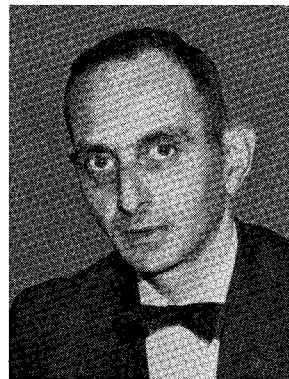
May 20-22, 1968



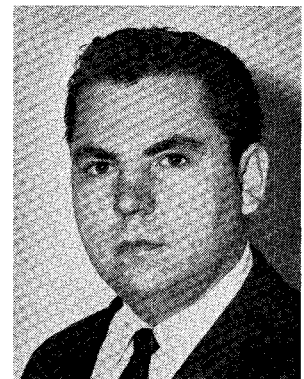
M. C. Horton  
Co-Chairman, Steering Committee



J. E. Rowe  
Co-Chairman, Steering Committee



R. E. Henning  
Chairman, Administrative Committee



R. J. Wenzel  
Microwave Prize

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G. M. Peace, *Finance*  
J. H. Bryant, *Digest*

## GENERAL INFORMATION

On May 20-22, the G-MTT 1968 International Microwave Symposium will be held in Detroit at Howard Johnson's New Center Motor Lodge. The three-day program will include 42 contributed papers and 4 invited papers on topics of current interest to the microwave profession.

The highlight of the symposium will be the banquet, to be held on Tuesday night, May 21. The feature speaker will be W. A. Geoffrey Voss; Bill Bazzy will be toastmaster.

## REGISTRATION

Symposium registration will be at Howard Johnson's New Center Motor Lodge, on the mezzanine, on Sunday, May 19, from 7 to 10 PM and during the day, Monday through Wednesday. The form in the Advanced Program Booklet may be used for advanced registration with a total saving of \$4 if remittance is included and postmarked before May 6.

Conference fees for the symposium are shown below:

Item	Postmarked	
	Before May 6	After May 6
Registration		
IEEE Member	\$10.00	\$12.00
IEEE Non-Member	15.00	17.00
Student	3.00	4.00
Luncheon	4.00	4.50
Cocktail Party	2.50	3.00
Banquet	9.00	10.00
Symposium Digest	4.00	4.00

Remittances should be mailed to:

IEEE 1968 G-MTT International  
Microwave Symposium  
Post Office Box 8905  
Oak Park, Mich. 48237

## SYMPOSIUM DIGEST

The summaries of all papers presented will be published in the *Symposium Digest*, to be presented to you upon formal registration at the symposium. Additional copies can be purchased for \$4 per copy. You can insure the availability of extra copies by so indicating on the advance registration form. For those who may not be able to attend the symposium, *Digest* copies can still be purchased by use of the advance registration form. Please allow several weeks following the symposium for mailing.

## MEETING ROOM

Symposium papers will be presented at the Studio New Center Theater which is in the same building as Howard Johnson's New Center Motor Lodge. This comfortable air-conditioned facility offers modern auditorium seating with excellent visual and acoustical conditions. Coffee will be available in the New Center Ballroom where technical acquaintances may be renewed.

## TRANSPORTATION

Detroit Metropolitan Airport is located 20 miles west of downtown Detroit on Route 1-94. Taxi and car rental service are available at the airport. Bus service to the Downtown Howard Johnson's Motor Lodge is available at all hours and direct limousine service to Howard Johnson's New Center Motor Lodge is available until 8:00 PM. Shuttle service will be provided from the Downtown Howard Johnson's Motor Lodge to the New Center area each day.

## ENTERTAINMENT

On the day before the conference, May 19, at 7 PM, a Dutch treat get together will be held to help renew old acquaintances in the Boulevard Rooms of the New Center Motor Lodge.

On Monday, May 20, at 12:15 PM a luncheon is planned. The luncheon speaker will be Prof. J. E. Rowe of the University of Michigan, who will describe his recent 4-month tour of the Soviet Union. His talk will be accented by colorful slides.

A cocktail party will be held at 6:00 PM on Tuesday, May 21, preceding the banquet. Bill Bazy of Horizon House, Inc., will be the master of ceremonies at the banquet which begins at 7:00 PM. The main speaker will be Dr. W. A. Geoffrey Voss, Vice President of IMPI. This evening promises to be most enjoyable for all. Make a reservation on your registration form to insure your attendance. The 1967 IEEE G-MTT Microwave Prize will be presented to Robert J. Wenzel at this banquet.

## LADIES' PROGRAM

An extensive ladies' program is planned that will fit nicely with symposium activities. This includes visits to well-known landmarks in Detroit and two luncheons. These excursions will take in the River Rouge Plant of the Ford Motor Company, the famed Greenfield Village, and the Detroit Institute of Arts. Additional sights too numerous to mention are also on the schedule.

## ADVANCED TECHNICAL PROGRAM

Howard Johnson's New Center Motor Lodge

MONDAY, MAY 20, 1968

Introductory Session  
Welcoming Remarks  
8:45-9:00 AM

J. E. Rowe, Co-Chairman, Steering Committee, 1968 G-MTT International Microwave Symposium  
R. E. Henning, Chairman, G-MTT Administrative Committee

## Session I

Microwave Networks  
9:00-11:50 AM

Chairman: R. J. Wenzel, Bendix Research Labs., Southfield, Mich.

- I-1 "Non-Minimum Phase Microwave Filters," *T. Fjällbrant, Telefonaktiebolaget LM Ericsson, Sweden.*
- I-2 "Multi-Octave Bandwidth Microwave Mixer Circuits," *R. C. Van Wagoner, Radiation Systems, Inc., McLean, Va.*
- I-3 "A Wideband Stripline Matched Power Divider," *P. C. Goodman, Bendix Research Labs., Southfield, Mich.*
- I-4 "The Calculation of TEM-, TE-, and TM-Waves in Shielded Strip Transmission Lines," *W. Baier, Institute for High Frequency Techniques, Technical University, Munich, Germany.*
- I-5 "Analysis and Synthesis of Waveguide Multi-Aperture Directional Couplers," *R. Levy, Microwave Development Labs., Needham Heights, Mass.*
- I-6 "An Investigation of Sharp Discontinuities in Rectangular Waveguides by Ray Theory," *M. A. K. Hamid, Dept. of Elec. Engrg., University of Manitoba, Winnipeg, Canada.*
- I-7 "A New Finite-Difference Technique for Higher-Order Modes in Arbitrarily Shaped Waveguides," *M. J. Beaubien and A. Wexler, University of Manitoba, Winnipeg, Canada.*

## Luncheon

New Center Ballroom  
12:15-1:45 PM

Master of Ceremonies: R. C. Hansen, KMS Industries.

Speaker: J. E. Rowe, The University of Michigan.

Topic: "A Technical and Educational Tour of the Soviet Union."

## Session II

Solid-State Microwave Power Generation  
2:00-5:10 PM

Chairman: B. C. DeLoach, Jr., Bell Telephone Labs., Inc., Murray Hill, N. J.

- II-1 "Multiple Avalanche, Gunn and LSA Diodes for High-Power Generation," *M. E. Hines, Microwave Associates, Burlington, Mass. (Invited.)*
- II-2 "Power and Efficiency in Avalanche-

Diode Oscillators," *W. J. Evans and G. I. Haddad, The University of Michigan, Ann Arbor.*

- II-3 "Circuit Techniques for the Noise Reduction and Frequency Stabilization of Avalanche Diode Oscillators," *E. F. Scherer, Sylvania Electric Products, Woburn, Mass.*
- II-4 "Microwave Integrated IMPATT Diode-Dipole Radiator," *H. W. Cooper, C. Moskowitz, M. R. Natale, and T. Andrews, Westinghouse Electric Corp., Baltimore, Md.*
- II-5 "Gunn Oscillator as a Frequency Memory Device," *J. Magarshack, La Radiotechnique-Coprim. RTC, Suresnes, France.*
- II-6 "Ultra-High-Speed Diode Switch for the 50-GHz Band Utilizing Avalanche Breakdown of Varactor Diodes," *S. Sugimoto, Central Research Labs., Nippon Electric Company, Kawasaki, Japan.*
- II-7 "Feedback Stabilization and Noise Reduction in Solid-State Multiplier Chains," *C. L. Cuccia and A. Savarin, Philco-Ford Corp., Palo Alto, Calif.*

Informal Parallel Evening Sessions  
8:00-10:00 PM

- a) New Center Ballroom—"Computer-Aided Design of Microwave Networks."  
*Organizer:*<sup>1</sup> W. J. Getsinger, M.I.T. Lincoln Lab., Lexington, Mass. 02173. (617) 862-5500.
- b) New Center Boulevard Rooms—"Solid State Control Devices."  
*Organizer:*<sup>1</sup> D. K. Adams, Stanford Research Institute, Menlo Park, Calif. 94025. (415) 326-6200.

<sup>1</sup> Individuals interested in participating in these sessions are encouraged to contact the respective organizer.

TUESDAY, MAY 21, 1968

## Session III

Microwave Integrated Circuits  
9:00-12:20 AM

Chairman: F. A. Brand, USAECOM, Fort Monmouth, N. J.

- III-1 "Recent Advances in Microwave Integrated Circuits," *R. Webster, Texas Instruments Incorporated, Dallas, Tex. (Invited.)*
- III-2 "Slot Line—An Alternative Transmission Medium for Integrated Circuits," *S. B. Cohn, Consultant, Tarzana, Calif.*
- III-3 "Frequency-Dependent Behavior of Microstrip," *C. P. Hartwig, D. Massé, and R. A. Pucel, Research Div., Raytheon Company, Waltham, Mass.*
- III-4 "Normal Mode Impedances of a Coupled Pair of Microstrip Transmission Lines," *R. G. Bryant, Dept. of Elec. Engrg., University of Maine, Orono, Maine; and J. A. Weiss, Dept. of Physics, Worcester Polytechnic Institute, Worcester, Mass.*
- III-5 "Analysis and Experimental Evaluation of Distributed Overlay Structures in Microwave Integrated Circuits," *K. Wolters and P. Clar, Motorola, Inc., Scottsdale, Ariz.*
- III-6 "X-Band Integrated Circuit Mixer with Reactively Terminated Image," *K. M. Johnson, Texas Instruments Incorporated, Dallas, Tex.*

- III-7 "An Integrated Microwave FM Discriminator," *M. D. Bonfeld, Bell Telephone Labs., Inc., Allentown, Pa., and M. J. Bonomi and E. G. Jaasma, Bell Telephone Labs., Inc., Holmdel, N. J.*
- III-8 "X-Band Integrated Diode Phase Shifters," *R. G. Stewart and M. N. Giuliano, Westinghouse Electric Corp., Baltimore, Md.*

**Session IV**  
**Solid-State Devices**  
**2:00-5:10 PM**

*Chairman:* S. Okwit, Airborne Instruments Lab., Deer Park, N. Y.

- IV-1 "S-Band Integrated Parametric Amplifier Having Both Flat Gain and Linear Phase Response," *H. C. Okean and H. Weingart, Airborne Instruments Lab., Deer Park, N. Y.*
- IV-2 "A Ka-Band Paramp Using Planar Varactors Yields a Noise Figure of Less Than 3 dB," *L. E. Dickens, Advanced Technology Corp., Timonium, Md.*
- IV-3 "A Technique for the Rapid Calculation of Distortion Effects in Varactor Parametric Amplifiers," *D. R. Chambers and D. K. Adams, Stanford Research Institute, Menlo Park, Calif.*
- IV-4 "An Evaluation of Point-Contact Tunnel Diodes as Microwave Circuit Elements," *R. J. Taylor and C. R. Westgate, Dept. of Elec. Engrg., The Johns Hopkins University, Baltimore, Md.*
- IV-5 "The Transistor, A Microwave Filter Element," *D. K. Adams and R. Y. Ho, Stanford Research Institute, Menlo Park, Calif.*
- IV-6 "A Bulk Effect Semiconductor Phase Shifter," *J. F. White, Rensselaer Polytechnic Institute, Troy, N. Y.*
- IV-7 "Microwave Phase Modulation Using Frequency Multipliers," *A. Markovic, B. Schiek, and H. G. Unger, Institut für Hochfrequenztechnik, Braunschweig, Germany.*
- IV-8 "Operational S-Band Traveling-Wave Maser System in a 15°K Closed-Cycle Refrigerator," *J. Wolczok and J. G. Smith, Airborne Instruments Lab., Deer Park, N. Y.*

**Cocktail Hour**  
**6:00-7:00 PM**  
**Boulevard Rooms**

**Symposium Banquet**  
**7:00-10:00 PM**  
**Ballroom**

*Master of Ceremonies:* Bill Bazzy, Horizon House, Inc.

*1967 IEEE G-MTT Microwave Prize:* Robert J. Wenzel, Bendix Research Labs.

*Banquet Speaker:* Dr. W. A. Geoffrey Voss, University of Alberta, and Chairman of the Board and Executive Vice President, International Microwave Power Institute (IMPI).

*Topic:* "Of Baking and Biology: a perspicacious coverage of the new uses of microwave energy in science and industry."

**WEDNESDAY, MAY 22, 1968**

**Session V**  
**Ferrite Components**  
**8:40-12:10 AM**

*Chairman:* J. E. Pippin, Scientific Atlanta Co., Atlanta, Ga.

- V-1 "Propagation in Longitudinally-Magnetized Ferrite Loaded Waveguide," *D. C. Buck, Westinghouse Electric Corp., Baltimore, Md.*
- V-2 "An Improved E-Plane Waveguide Circulator," *M. Omori, Bell Telephone Labs., Inc., Allentown, Pa.*
- V-3 "The Use of Composite Junctions in the Design of High-Power Stripline Circulators," *C. R. Buffler and J. Helszajn, Microwave Associates, Burlington, Mass.*
- V-4 "Recent Advances in Microstrip Circulators," *V. E. Dunn and A. J. Domenico, Melabs, Palo Alto, Calif.*
- V-5 "A Design Theory for Reggia-Spencer Reciprocal Ferrite Phase Shifters," *W. E. Hord, Emerson Electric Co., F. J. Rosenbaum, Dept. of Elec. Engrg., Washington University, St. Louis, Mo.; and C. R. Boyd, Dept. of Elec. Engrg., University of California, Los Angeles.*
- V-6 "A Ku-Band Latching, Reciprocal Ferrite Phase Shifter," *C. R. Boyd, Dept. of*

*Elec. Engrg., University of California, Los Angeles.*

- V-7 "A 500-kW X-Band Air-Cooled Ferrite Latching Switch," *J. P. Agrios and R. A. Stern, Electronic Components Lab., USAECOM, Fort Monmouth, N. J.*
- V-8 "A Waveguide Reciprocal Latching Ferrite Phase Shifter," *I. Bardash and J. J. Maune, Sedco Systems, Farmingdale, N. Y.*
- V-9 "Magnetically-Tunable Microstrip Filter Structures," *R. R. Jones and J. Cunningham, Western Microwave Labs., Santa Clara, Calif.*

**Session VI**  
**Microwave Acoustics and Millimeter- and Optical-Wave Components**  
**1:30-4:30 PM**

*Chairman:* L. Young, Stanford Research Institute, Menlo Park, Calif.

- VI-1 "Ultrasonic Waveguide Systems for Surface Waves," *D. L. White, Bell Telephone Labs., Inc., Murray Hill, N. J. (Invited.)*
- VI-2 "State of the Art in Microwave Acoustic Delay Devices," *W. A. Crofut, Anderson Labs., Bloomfield, Conn. (Invited.)*
- VI-3 "Performance of Ultra-Bandwidth YIG Pulse Compression Networks," *W. L. Bongianini and J. Burnsweig, Hughes Aircraft Co., Culver City, Calif.; and J. H. Polson, TRW, Redondo Beach, Calif.*
- VI-4 "Birefringent Filter for Millimeter Waves," *B. M. Schiffman and L. Young, Stanford Research Institute, Menlo Park, Calif.*
- VI-5 "Low-Pass Quasi-Optical Filters for Oversized or Focused-Beam Waveguide Applications," *G. L. Matthaei and D. A. Leedom, Dept. of Elec. Engrg., University of California, Santa Barbara.*
- VI-6 "Plane Waveguide Mode Effects in the Visible Spectrum," *R. Shubert and J. H. Harris, Dept. of Elec. Engrg., University of Washington, Seattle.*
- VI-7 "Dielectric Waveguides for Infrared Wavelengths," *D. B. Anderson and C. B. Shaw, Autonetics, Anaheim, Calif.*