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Room 307/308/309 Convention Center

Monday, June 2, 1986

8:30 am **Presentation of Colors with Live Band**
to **Presentation of State and Country Flags** by the 46 MTT-S chapters
10:00 am **Welcome**, E. Niehenke, Symposium Chairman, R. 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

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Room 310 Convention Center

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

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V-1	R. Gilmore	
	Schlumberger, Houston, TX	
3:50 pm	Highly Stable 35 GHz GaAs FET Oscillator	589
V-2	G. S. Dow, D. Sensiper, J. M. Schellenberg	
	Hughes, Torrance, CA	
4:00 pm	A Unified Design of Dielectric Resonator Oscillators for Telecommunication Systems	593
V-3	S-W. Chen, L-C. Chang, J. Y. Chin	
	Microelectronics Technology, Inc., Hsinchu, Taiwan, R.O.C.	

4:10 pm V-4	A New N FETs Oscillator-Combiner Using Tubular Dielectric Resonators J. P. Joer, J. Obregon Universite de Limoges, Limoges, France	597
4:20 pm V-5	A Millimetre-wave Self-Oscillating Mixer Using a GaAs FET Harmonic-Mode Oscillator D. H. Evans Philips Research Laboratories, Redhill, England	601

**Session W: Focused Session—Microwave Aspects and Applications of
GHz/GBIT Optical Transmission Systems I**

Room 317 Convention Center **Wednesday, June 4, 1986**
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	607
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	611
9:30 am W-3	Comparison of Indirect Optical Injection Locking Techniques of Multiple X-Band Oscillators P. Wahi, Z. Turski LORAL-ATL, Lanham, MD A. S. Daryoush, P. R. Herczfeld Drexel University, Philadelphia, PA	615

Session X: Microwave Measurements I

Room 310 Convention Center **Wednesday, June 4, 1986**
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	621
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.	625



9:10 am **Direct Calibration and Measurement of Microstrip Structures on GaAs** **629**
X-3 P. R. Shepherd, R. D. Pollard
The University of Leeds, Leeds, U.K.

9:30 am **A System for Performing Ultra High Resolution Backscatter Measurements of Splashes** **633**
X-4 J. P. Hansen
Naval Research Laboratory, Washington, DC

Session Y: MIC Subsystems

Room 307/308 **Convention Center**

Wednesday, June 4, 1986

Chairman: J. C. Wiltse, Georgia Tech Research Inst.

8:30 am **A Ka-Band Microstrip Integrated Circuit FMCW Transceiver** **639**
Y-1 T. N. Trinh, E. Benko, W. S. Wong
Hughes Aircraft Company, Torrance, CA

8:50 am **A Ka-Band Dual-Channel Tracking Receiver Converter** **643**
Y-2 M. A. Smith, A. M. Pavio, B. Kim
Texas Instruments, Inc., Dallas, TX

9:00 am **Printed-Circuit Ka-Band Mixer with Compact Filter for Step-Tuned LO** **645**
Y-3 P. J. Meier
Eaton Corp., Melville, NY

9:20 am **A Planar Log-Periodic Mixtenna for Submillimeter-wave Astronomy** **649**
Y-4 P. H. Siegel
National Radio Astronomy Observatory, Charlottesville, VA

**Session Z: Focused Session—Microwave Aspects and Applications of
GHz/GBIT Optical Transmission Systems II**

Room 317 **Convention Center**

Wednesday, June 4, 1986

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

10:30 am **Microwave and Millimeter Wave Bandwidth Optical Communications** *****
Z-1 J. E. Bowers
(Invited) AT&T Bell Labs, Holmdel, NJ

*Manuscript not available at time of printing



11:10 am **Limitations on Switching Speed in Wideband Semiconductor Lasers** **655**
Z-2 R. S. Tucker, J. M. Wiesenfeld, P. M. Downey, J. E. Bowers
AT&T Bell Laboratories, Holmdel, NJ

11:30 am **Linearity Characterization of Connectorized Laser Diodes Under Microwave Intensity Mod-** **659**
Z-3 **ulation by AM/AM and AM/PM Measurements**
W. I. Way, A. Afrashteh
Bell Communications Research, Red Bank, NJ

Session AA: Microwave Measurement Techniques II

Room 310 **Convention Center** **Wednesday, June 4, 1986**
Chairman: M. A. Maury, Jr., Maury Microwave Corp.

10:30 am **Calibrating a Dual Six-Port or Four-Port for Measuring Two-Ports With Any Connectors** **665**
AA-1 C. A. Hoer, G. F. Engen
National Bureau of Standards, Boulder, CO

10:50 am **Integrated Fin-Line 6-Ports for MM-Wave Network Analyzers** **669**
AA-2 M. Malkomes, R. Walsdorf
Institute for High Frequency Techniques, Aachen, FRG

11:00 am **Extension of Six Port Theory and Practice** **673**
AA-3 L. Kaliouby, R. G. Bosisio
Ecole Polytechnique of Montreal, Montreal, Canada

11:20 am **Coherent RF Error Statistics** **677**
AA-4 R. B. Dybdal, R. H. Ott
The Aerospace Corporation, El Segundo, CA

11:30 am **Microwave Resonator Circuit Model From Measured Data Fitting** **681**
AA-5 W. P. Wheless, Jr., D. Kajfez
University of Mississippi, University, MS

Session BB: Passive Circuit Modeling

Room 307/308 **Convention Center** **Wednesday, June 4, 1986**
Chairman: N. G. Alexopoulos, UCLA

10:30 am **Microstrip Filter Design Including Dispersion Effects and Radiation Losses** **687**
BB-1 P. B. Katehi
The University of Michigan, Ann Arbor, MI
L. P. Dunleavy
Hughes Aircraft Company, Torrance, CA



10:50 am BB-2	Dispersion of Transient Signals in Microstrip Transmission Lines R. L. Veghte Ball Aerospace Systems Division, Boulder, CO C. A. Balanis Arizona State University	691
11:00 am BB-3	Characteristics of Multiconductor, Asymmetric, Slow-Wave Microstrip Transmission Lines T. C. Mu, H. Ogawa, T. Itoh The University of Texas, Austin, TX	695
11:10 am BB-4	Coplanar Waveguide vs. Microstrip for Millimeter Wave Integrated Circuits R. W. Jackson University of Massachusetts, Amherst, MA	699
11:20 am BB-5	Discontinuities in Fin-Lines on Semiconductor Substrate K. Uhde Technische Universität Hamburg, FRG	703

Session CC: Optical Devices for Microwave Applications

Room 317 Convention Center

Wednesday, June 4, 1986

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	709
1:50 pm CC-2	A 1GBIT/S Optical/Electrical Input Monolithic GaAs Transmitter I.C. M. P. Walton, P. R. Haugen, S. L. Palmquist Honeywell, Bloomington, MN	713
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 Télécommunications, Bagneux, France	717
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, D.C.	721



Session DD: Ferrites

Room 310 Convention Center

Wednesday, June 4, 1986

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

1:30 pm	Simultaneous Dual-Polarization Ferrite Phase Shifter	727
DD-1	W. E. Hord, C. R. Boyd, Jr. Santa Maria, CA	
1:50 pm	Temperature Insensitive Dual-Mode Phase Shifter	731
DD-2	H. Asao, M. Matsunaga, F. Takeda Mitsubishi Electric Corporation, Kanagawa Prefecture, Japan	
2:00 pm	An Adjustable-Phase Power Divider	735
DD-3	C. R. Boyd, Jr. Microwave Applications Group, Santa Maria, CA	
2:20 pm	Broadband Stripline Circulator	739
DD-4	E. Schloemann, R. E. Blight Raytheon Research Division, Lexington, MA	
2:40 pm	Isolators in Finline Technique	743
DD-5	Ch. Schieblich, U. Goebel Technische Universität, Hamburg, FRG	

Session EE: Joint with Monolithics Symposium—Opening Session

Room 307/308/309 Convention Center

Wednesday, June 4, 1986

Chairman: R. Sudbury—MIT Lincoln Lab

1:30 pm	Welcome	749
EE-1	R. Sudbury, Symposium Chairman Y. Ayasli, Technical Program Chairman	
1:40 pm	DOD Microwave and Millimeter-Wave Monolithic Integrated Circuits (MIMIC) Program	753
EE-2	E. Maynard	
(Invited)	DOD OUSDRE, Washington, D.C.	



Session FF: Biological Effects & Medical Applications

Room 317 Convention Center

Wednesday, June 4, 1986

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

- 3:30 pm** **A Three-Band Microwave Radiometer System for Noninvasive Measurement of the Tem-** **759**
FF-1 **perature at Various Depths**
S. Mizushina, Y. Hamamura, T. Sugiura
Shizuoka University, Shizuoka Prefecture, Japan
- 3:50 pm** **Biological Temperature Retrieval by Scanning Radiometry** **763**
FF-2 F. Bardati, M. Monglardo, D. Solimini, P. Tognolatti
TI Università di Roma, Italy
- 4:10 pm** **Instrumentation for Invasive and Non-Invasive Microwave Hyperthermia of Brain Tumors** **767**
FF-3 R. W. Paglione, F. Sterzer
RCA laboratories, Princeton, NY
A. Winter, J. Laing
The Hospital Center at Orange, Orange, NJ
- 4:20 pm** **Swept Frequency Measurements of Various Coaxial Antennas In a Feline Brain Model** **771**
FF-4 G. Neuberth, Nurad Inc.
M. Salcman, Univ. of Maryland Hospital
Baltimore, MD
- 4:30 pm** **Energy Distribution Patterns Within Limb Models Heated with a Mini Annular Phased** **775**
FF-5 **Array (MAPA) Applicator**
J. L. Guerquin-Kern
National Institutes of Health, Bethesda, MT, INSERM, France
M. J. Hagmann, C. K. Charny, R. L. Levin
National Institutes of Health, Bethesda, MT
- 4:40 pm** **Cytogenetic Observations on Microwave Exposed Bovine Lymphocytes** **779**
FF-6 B. Bisceglia, G. d'Ambrosio, D. DiBerardino, M. B. Lioi, M. R. Scarfi
University of Naples, Naples, Italy

Session GG: Analytical and Numerical Methods

Room 310 Convention Center

Wednesday, June 4, 1986

Chairman: T. Itoh, University of Texas-Austin

- 3:30 pm** **An Improved Transmission Matrix Formulation of Cascaded Discontinuities and its Applica-** **785**
GG-1 **tion 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 Programs O. Picon, V. Fouad Hanna Centre National d'Etudes des Télécommunications, Issy-Les-Moulineaux, France J. Citerne I.N.S.A., Rennes Cedex, France	789
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	793
4:30 pm GG-4	Proposal of Surface-wave Planar Circuit, Formulation of its Planar Circuit Equations and its Practical Application J. Hsu, T. Anada, F. Eriguchi Kanagawa University, Yokohani-shi, Japan	797

Session HH: Joint with Monolithics Symposium—Microwave Amplifiers

Room 307/308/309 Convention Center

Wednesday, June 4, 1986

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

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

2:15 pm	Chairman's Introduction	
2:20 pm HH-1	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	803
2:40 pm HH-2	A Low Cost, 3-7 GHz, 1/2 Watt MMIC GaAs Amplifier S. B. Moghe, R. Genin Pacific Monolithics, Sunnyvale, CA	807
3:20 pm HH-3	A Power Distributed Amplifier Using Constant-R Networks E. M. Chase, W. Kennan Avantek, Inc., Santa Clara, CA	811
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	817
4:00 pm HH-5	A High Gain, Monolithic Distributed Amplifier Using Cascode Active Elements R. Larue, S. Bandy, G. Zdasiuk Varian Associates, Palo Alto, CA	821
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	825