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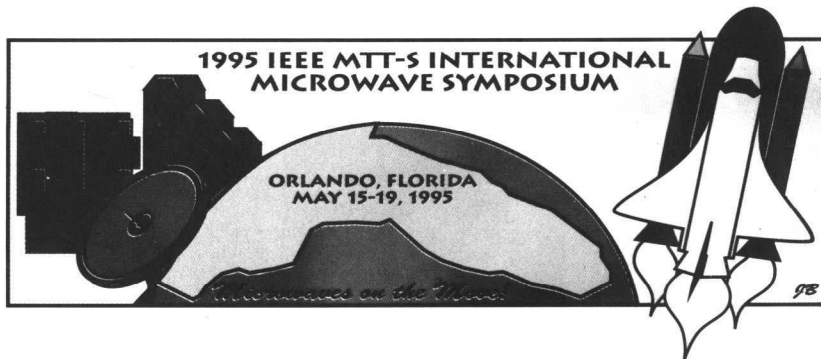
Volume 2

May 16-20, 1995

**Orange County Convention Center
Orlando, Florida**

**Lynn Kirby
Editor**

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1995 Microwave Symposium Technical Program Schedule

Session TU1A (Joint with MMWMC) Systems Applications

8:30 a.m.–10:00 a.m.

Room A1

Tuesday, May 16, 1995

Chairman: A. Gupta—Westinghouse, ESG

Co-Chairman: S. Bharg—Princeton Microwave Technology

TU1A-1	A Family of Low Cost High Performance HEMT MMICs for Commercial DBS Applications	1649
8:30 am	K Hubbard, K MacGowan, C Kau, D Smith and S Maas	
TU1A-2	K-Band T/R-Converter Modules for the IRIDIUM® Satellite Program	1653
8:50 am	D W. Corman, B T Agar, K.V. Buer, D L Cook	
TU1A-3	Performance of a 6 to 18 GHz Frequency Translator Utilizing GaAs MMIC 5-Bit Digital Phase Shifter	5
9:10 am	S R. Mazumder and C M Isham	
TU1A-4	A 1.9 GHz-Band Ultra Low Power Consumption Amplifier Chip Set for Personal Communications	9
9:30 am	M Muraguchi, M Nakatsugawa, H Hayashi and M Aikawa	
TU1A-5	Miniature GPS Translator Module	13
9:50 am	J. Smuk, P Katzin, V Aparin and M Shifrin	

Session TU1B Progress in Time-Domain Techniques

8:30 a.m.–10:00 a.m.

Room A2

Tuesday, May 16, 1995

Chairman: A. Cangellaris—University of Arizona

TU1B-1	The Alternating Transmission Line Matrix (ATLM) Scheme	19
8:30 am	P. Russer and B Bader	
TU1B-2	Compensation of Coarseness Error in TLM Modeling of Microwave Structures with the Symmetrical Condensed Node	23
8:50 am	J L Herring and W J R Hoefer	
TU1B-3	Some Improvements to the FDTD Algorithm for the Analysis of Passive Circuits	1657
9:00 am	R C Tupynambá and A.S Omar	
TU1B-4	Application of the PML Absorbing Boundary Condition to the FDTD Analysis of Microwave Circuits	27
9:10 am	A Bahr, A. Lauer and I Wolff	
TU1B-5	A Stretched Coordinate Technique for Numerical Absorption of Evanescent and Propagating Waves in Planar Waveguiding Structures	31
9:30 am	M.A Gribbons, W P Pinello and A.C Cangellaris	
TU1B-6	A Broadband Absorbing Boundary Condition for the FDTD Modeling of Circular Waveguides	35
9:40 am	T G Jurgens	
TU1B-7	Treatment of Instabilities of One-Way Equation Absorbing Boundary Conditions Using Digital Filters	39
9:50 am	C Eswarappa and W J R Hoefer	

Session TU1C

Photonic Devices

8:30 a.m.–10:00 a.m.

Room 12A,B,C

Tuesday, May 16, 1995

Chairman: C. Gee—Ortel Corporation

TU1C-1	Ultrahigh Speed Cryogenic Laser Diodes for Broadband Optical Fiber Link Applications	45
8:30 am	R.-C. Yu, R. Nagarajan, T. Reynolds, J. E. Bowers, M. Shakouri, J. Park, K. Y. Lau, C.-E. Zah, W. Zou and J. Merz	
TU1C-2	Analytical Model With Empirical Verification for Heterojunction Bipolar Transistors Under Illumination	49
8:40 am	L. E. M. de Barros Jr., A. Paoletta, P. R. Herczfeld and P. Enquist	
TU1C-3	1 × 8 Metal-Semiconductor-Metal Photodetector and HEMT Receiver Array with 5 GHz Bandwidth	53
8:50 am	T. Senuk, Q. Z. Liu and G. D. Cormack	
TU1C-4	A Low Noise Broadband GaAs MESFET Monolithic Distributed Preamplifier	57
9:10 am	A. P. Freundorfer and P. Lionais	
TU1C-5	Measurement of Intermodulation Distortion in Optical Diodes	61
9:20 am	B. Kanack	
TU1C-6	Photonic Switched True Time Delay Beam Forming Network Integrated on Silica Waveguide Circuits	65
9:40 am	K. Horikawa, I. Ogawa, H. Ogawa and T. Kitoh	

Session TU1D

Sources and Control Components

8:30 a.m.–10:00 a.m.

Room A3

Tuesday, May 16, 1995

Chairman: A. P. S. Khanna—Hewlett Packard Company

TU1D-1	A 60GHz MMIC Stabilized Frequency Source Composed of a 30GHz DRO and a Doubler	71
8:30 am	M. Funabashi, T. Inoue, K. Ohata, K. Maruhashi, K. Hosoya, M. Kuzuhara, K. Kanekawa and Y. Kobayashi	
TU1D-2	Dielectric Loaded Gaussian Beam Oscillator in the 40 GHz Band	75
8:40 am	M. Kiyokawa, T. Matsui and N. Hirose	
TU1D-3	Microwave Oscillator Control Using a Switched Delay-Line Technique	79
9:00 am	C. E. Free and C. S. Aitchison	
TU1D-4	Microwave Oscillators and Filters Based on Microstrip Ring Resonators	83
9:10 am	D. K. Paul and P. Gardner	
TU1D-5	The Influence of I-Region Width Modulation on PIN Diode Attenuator Design	87
9:20 am	R. H. Caverly and Z. W. Tang	
TU1D-6	Micromechanical Membrane Switches for Microwave Applications	91
9:30 am	C. Goldsmith, T.-H. Lin, B. Powers, W.-R. Wu and B. Norvell	

Session TU1E

Advances in Ferrite Technologies

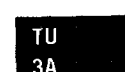
8:30 a.m.–10:00 a.m.

Room A4

Tuesday, May 16, 1995

Chairman: J.M. Owens—Auburn University

TU1E-1	Monolithic Integration of an X-Band Circulator with GaAs MMICs	97
8:30 am	J D Adam, H Buhay, M R Daniel, M C Driver, G W Eldridge, M H Hanes and R L Messham	
TU1E-2	Normal-Mode Analysis of Coupled-Slots with an Axially-Magnetized Ferrite Substrate	99
8:50 am	C S Teoh and L E Davis	
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9:10 am	C R Boyd, Jr.	
TU1E-4	Thin Film Isolators Utilizing MSSW Transducers	107
9:30 am	E -B El-Sharawy and J -S Guo	
TU1E-5	A Reflection Type of MSW Signal-to-Noise Enhancer in the 400-MHz Band	111
9:40 am	T Kuki and T Nomoto	



Session TU2G

(Plenary Session)

Moving Cellular Communications into Space

10:30 a.m.–12:00 a.m.

Hall A5

Tuesday, May 16, 1995

Session TU3A

(Joint with MMWMC)

Mixers and Related Components

1:30 p.m.–3:00 p.m.

Room A1

Tuesday, May 16, 1995

Chairman: A. Chu—MITRE Corporation
Co-Chairman: L Liu—TRW Incorporated

TU3A-1	A Monolithic Broadband Doubly Balanced EHF HBT Star Mixer with Novel Microstrip Baluns	119
1:30 pm	Y I Ryu, K W Kobayashi and A K Oki	
TU3A-2	A PMHFET Based MMIC Gate Mixer for Ka-Band Applications	123
1:50 pm	M Matthes, J -M Dieudonné, W Stuebler, L Klapproth	
TU3A-3	A K-Band Monolithic CPW Upconverter Utilizing a Source Mixing Concept	127
2:00 pm	M Madhuan, L Desclos, K Maruhashi, K Onda and M Kuzuhara	
TU3A-4	Monolithic Mixers with MESFETs Technology to Up and Down Convert Between C and V Band	131
2:10 pm	J P Torres, F Fortes, M J Rosário, J M Dieudonné and J Costa Freire	
TU3A-5	MMIC Active Bandpass Filter Using Negative Resistance Elements	135
2:20 pm	U Karacaoglu and I D Robertson	
TU3A-6	Capacitive-Division Traveling-Wave Amplifier with 340 GHz Gain-Bandwidth Product	1661
2:40 pm	J Pustl, B Agarwal, R. Pullala, L D Nguyen, M.V Le, M J.W Rodwell, L Larson, J F Jensen, R Y Yu and M G Case	

Session TU3B

Leaky-Wave Effects on Planar Transmission Lines

1:30 p.m.–3:00 p.m.

Room A2

Tuesday, May 16, 1995

Chairman: P. Lampariello—"La Sapienza" University of Rome

TU3B-1	The Effect of Substrate Anisotropy on the Dominant-Mode Leakage from Stripline with an Air Gap	141
1:30 pm	D Nghiem, J T Williams, D R Jackson and A A Oliner	
TU3B-2	Simultaneous Propagation of Bound and Leaky Dominant Modes on Printed-Circuit Lines: A New General Effect	145
1:50 pm	H Shigesawa, M Tsuji and A A Oliner	
TU3B-3	Analysis and Design of Feeding Structures for Microstrip Leaky Wave Antenna	149
2:10 pm	Y -D Lin, J -W Sheen and C -K C Tzuang	
TU3B-4	Leaky Dominant Modes and Microwave Circuit Coupling in Layered Symmetric Coupled Lines	153
2:30 pm	C -K C Tzuang and S -P Liu	

Session TU3C

Millimeter Wave Frequency Optical Detectors

1:30 p.m.–3:00 p.m.

Room 12A,B,C

Tuesday, May 16, 1995

Chairman: P Herczfeld—Drexel University
Co-Chairman: N Dietrich—AT&T Bell Laboratories

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TU3C-2	Monolithic High Speed Long Wavelength Photoreceivers Incorporating Photodetectors with Transistor Preamplifiers	*
2:00 pm	S. Chandrashekar and L.M Lunardi	
TU3C-3	Travelling-Wave Optoelectronic Devices for Microwave Applications	163
2:30 pm	D Jager, R Kremer and A Stohr	

*Manuscript not available at time of printing.

Session TU3D

High Density Microwave Packaging (HDMP) Program

1:30 p.m.–3:00 p.m.

Room A3

Tuesday, May 16, 1995

Chairman. T. Kemerley—USAF—Wright Laboratory

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1:30 pm	E D. Cohen	
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2:35 pm	J Wooldridge	

Session TU3E

Superconducting Components and Applications

1:30 p.m.–3:00 p.m.

Room A4

Tuesday, May 16, 1995

Chairman: C. Jackson—TRW

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TU3E-5	Comparison Between Direct and Aperture Coupling Y-Ba-Cu-O Mixer Antennas	*
2:40 pm	K Suzuki, K. Yamaguchi, K. Hayashi, M Ban, S Tokunaga and Y Enomoto	

*Manuscript not available at time of printing

Session TU4A

(Joint with MMWMC)

Monolithic Receiver Components

3:30 p.m.–5:00 p.m.

Room A1

Tuesday, May 16, 1995

Chairman: V. Nair—Motorola-PCRL
Co-Chairman: S. Moghe—Northrop-Grumman

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Session TU4B

Leaky-Wave Effects and Discontinuities

3:30 p.m.–5:00 p.m.

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Tuesday, May 16, 1995

Chairman: S.M. El-Ghazaly—Arizona State University

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Session TU4C

High Speed Optical Modulators Fabricated on III-V Compounds

3:30 p.m.–5:00 p.m.

Room 12A,B,C

Tuesday, May 16, 1995

Chairman: J. Bowers—University of California at Santa Barbara

Co-Chairman: A. Rosen—SRI

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Session TU4D

Field Theory I

3:30 p.m.–5:00 p.m.

Room A3

Tuesday, May 16, 1995

Chairman: A. Beyer—Gerhard-Mercator—University at Duisburg

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**TU
4A**

**TU
4B**

**TU
4C**

**TU
4D**

Session TU4E

Biomedical Applications

3:30 p.m.–5:00 p.m.

Room A4

Tuesday, May 16, 1995

Chairman. P. Yu—University of California at San Diego

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Session WE1A

Microwave Power Devices and Amplifiers I

8:30 a.m.–10:00 a.m.

Room A1

Wednesday, May 17, 1995

Chairman: H.J. Kuno—Quin Star Technology, Incorporated

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9:50 am	J Udomoto, S. Chaki, M Komaru, T Kuniti, Y Kohno, S Goto, K Gotoh, A Inoue, N Tanino, T Takagi and O Ishihara	
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10:00 am	Y Saito, T Kuzuhara, T. Ohmori, K Kai, H Ishimura and H Tokuda	



Session WE1B

Applications of Time Domain Methods

8:30 a.m.–10:00 a.m.

Room A2

Wednesday, May 17, 1995

Chairman: W.J.R. Hoefer—University of Victoria

WE1B-1	3D FDTD Simulation of Superconductor Coplanar Waveguides	349
8:30 am	S Xiao and R Vahldieck	
WE1B-2	Analysis of Anisotropic Conductors on Anisotropic Substrates	353
8:50 am	M A Megahed and S M El-Ghazaly	
WE1B-3	FDTD Simulation of a Microwave Amplifier	357
9:00 am	C -N Kuo, S T Chew, B Houshmand and T Itoh	
WE1B-4	Simulation of HF Circuits with FDTD Technique Including Non-Ideal Lumped Elements	361
9:10 am	P Ciampolini, P Mezzanotte, L Roselli, D Sereni, R Sorrentino and P Torti	
WE1B-5	Modelling of General Constitutive Relationships in SCN TLM	365
9:20 am	L de Menezes and W J.R Hoefer	
WE1B-6	Dispersion Characteristics of the TLM Scheme with Symmetrical Super-Condensed Node	369
9:40 am	M Krumpholz, L Roselli and P Russer	
WE1B-7	Dispersion of TLM Condensed Nodes in Media with Arbitrary Electromagnetic Properties	373
9:50 am	V Trenkic, C Christopoulos and T M Benson	

Session WE1C

Miniaturized Filters

8:30 a.m.–10:00 a.m.

Room 12A,B,C

Wednesday, May 17, 1995

Chairman: Y -C. Shih—Hughes Space and Communications Company

WE1C-1	Narrowband Lumped-Element Microstrip Filters using Capacitively-Loaded Inductors	379
8:30 am	D Zhang, G -C Liang, C F. Shih and R S Withers	
WE1C-2	A New Semi-Lumped Microwave Filter Structure	383
8:50 am	A F Sheta, K. Hettak, J Ph Coupez, C Person, S Toutain and J P Blot	
WE1C-3	A Novel MMIC Filter—Measured and Simulated Data	387
9:10 am	F Mernyei, I Aoki and H Matsuura	
WE1C-4	A Miniaturized Ceramic Bandpass Filter for Cordless Phone Systems	391
9:30 am	S Kobayashi and K Saito	
WE1C-5	Generalized Slot Coupled Combline Filters	395
9:40 am	H -W Yao, K A Zaki, A.E Atia and R Hershtig	



Session WE1D

(Joint with NTC)

Wireless Communications Systems

8:30 a.m.–10:00 a.m.

Room A3

Wednesday, May 17, 1995

Chairman: J.B. Horton—TRW

WE1D-1	Opening Remarks NTC ‘95’ Microwave Systems Conference	*
8:30 am	M A Belkerdid and D C Malocha	
WE1D-2	Recent Advances on Millimeterwave PCN System Development in Europe (Invited)	401
8:40 am	H H Meinel	
WE1D-3	Recent Activities on Millimeter Wave Indoor LAN System Development in Japan (invited)	405
9:00 am	Y Takimoto	
WE1D-4	Advanced MMIC Components for Ka-Band Communications Systems—A Survey	409
9:20 am	J -M Dieudonné, B Adelseck, P Narozny and H Dambkes	
WE1D-5	Microwave and Millimetre-Wave Technology Requirements for the European Fourth Framework Programme	413
9:40 am	J G Gardiner	

Session WE1E

Millimeter-Wave Circuits and Systems

8:30 a.m.–10:00 a.m.

Room A4

Wednesday, May 17, 1995

Chairman: K. Agarwal—University of Bridgeport

Co-Chairman: M. Matloubian—Hughes Research Laboratories

WE1E-1	A W-Band Monolithic 175-mW Power Amplifier	419
8:30 am	H Wang, Y Hwang, T H Chen, M Biedenbender, D C Streit, D.C W Lo, G S Dow and B R. Allen	
WE1E-2	W-Band Integrated Monopulse Radar Transceiver	423
8:50 am	P Toullos, Y -H Shu, J Navarro and R Knox	
WE1E-3	A 40 to 50 GHz HEMT Test Fixture	427
9:10 am	A Prabhu and N Erickson	
WE1E-4	Manufacturable and Reliable Millimeter-Wave HJFET MMIC Technology Using Novel 0.15µm MoTiPtAu Gates	431
9:20 am	Y. Hori, K. Onda, M. Funabashi, H. Mizutani, K. Maruhashi, A Fujihara, K. Hosoya, T. Inoue and M Kuzuhara	
WE1E-5	A High Performance, High Yield, Dry-Etched, Pseudomorphic HEMT for W-Band Use	435
9:40 am	N I Cameron, M R S. Taylor, H McLelland, M. Holland, I G. Thayne, K Elgaid and S P Beaumont	

*Manuscript not available at time of printing

Session WE2A

Microwave Power Devices and Amplifiers II

10:30 a.m.–12:00 p.m.

Room A1

Wednesday, May 17, 1995

Chairman. B Bayraktaroglu—Westinghouse EGS

WE2A-1 10:30 am	Variable Output, High Efficiency-Low Distortion S-Band Power Amplifiers and Their Performances Under Single Tone and Noise Power Excitations A Platzker and S Bouthillette	441	WE 1D
WE2A-2 10:50 am	High-Performance 0.15-μm-Gate-Length pHEMTs Enhanced with a Low-Temperature-Grown GaAs Buffer R Actis, K B Nichols, W F Kopp, T J Rogers and F W Smith	445	WE 1E
WE2A-3 11:10 am	Robust GaAs MMIC Amplifiers Using Planar Ion-Implanted Power MESFETs with Improved Open-Channel Burnout D C Miller, R A Sadler and A H Peake	449	WE 2A
WE2A-4 11:20 am	GaAs/InGaAs Heterostructure FETs with 1.6W Output Power at 1GHz J W Lee, M K Gong, S G Cho and B Kim	453	WE 2B
WE2A-5 11:30 am	A Scalable MMIC-Compatible Power HBT G Jackson, D Teeter, D Bradford and M Cobb	457	
WE2A-6 11:40 am	Three-Dimensional Modeling of Thermal Flow in Multi-Finger High Power HBTs R Hattori, T. Shimura, M Kato, T Sonoda and S Takamiya	461	
WE2A-7 11:50 am	High Performance Millimeter Wave AlInAs/GaInAs/InP HEMTs with Individually Grounded Source Finger Vias K Y Hur, R A McTaggart, M P Ventresca, R Wohler, L M. Aucoin and T E Kazior	465	

Session WE2B

Frequency-Domain Electromagnetic Modeling

10:30 a.m.–12:00 p.m.

Room A2

Wednesday, May 17, 1995

Chairman: R. Sorrentino—University of Perugia

WE2B-1 10:30 am	An Entire-Domain Basis Galerkin's Method for the Modeling of Integrated MM-Wave and Optical Circuits G Athanasoulas and N.K Uzunoglu	471
WE2B-2 10:50 am	Proximity Coupled Microstrip Elements and Interconnects of Arbitrary Shape in Multilayered Media M-J Tsai and N G Alexopoulos	475
WE2B-3 11:00 am	Full-Wave Modal Analysis of Arbitrarily-Shaped Dielectric Waveguides Through an Efficient Boundary-Element-Method Formulation C Di Nallo, F Frezza and A Galli	479
WE2B-4 11:20 am	The Finite-Integration Beam-Propagation Method (FIBPM) M Niederhoff, W Heinrich and P Russer	483
WE2B-5 11:30 am	A New Frequency-Domain TLM Symmetrical Condensed Node Derived Directly from Maxwell's Equations H Jin and R Vahldieck	487
WE2B-6 11:50 am	The Method of Lines for the Hybrid Analysis of Multilayered Dielectric Resonators D Kremer and R Pregla	491