RUMP SESSION

RTUA: Commercial Microwave Product Development: Business Issues

Date: Tuesday, June 18, 1996

Time: 7:00–9:00 PM

Location: Hilton Hotel, Franciscan D

Sponsor: MTT-19, Microwave Technology Business Issues

Organizers: Bert Berson, Berson & Associates
Eliot Cohen, Palisades Institute of Research

Moderator: Bert Berson

Speakers: James DiLorenzo,
Raytheon Microelectronics Center
Brian Flynn, Bachow and Associates
Charles Huang, Anadigics
Don Pezzolo,
Diablo Research Corp.
Jacques Robinson,
Cincinnati Microwave
Peter Staecker, M/A-COM

One of the most difficult challenges facing microwave entrepreneurs is making the transition between an exciting research result and a commercial product. Experiences encountered during this process are described. In particular such issues as the engineering factors that affect product cost, the engineering and manufacturing infrastructures that must be in place to achieve manufacturability, how market potential for various products can be accurately assessed, and the impact of regulatory and safety issues are discussed. The development of a wide variety of microwave frequency products for commercial sale, including MMICs, wireless products, automotive products and digital microwave radios, is provided. The points of view range from that of the investor to the executive to the engineer.

MTT-S SUNDAY WORKSHOPS

WSFA: Digital Cellular Telephones: Systems & Technologies

Date: Sunday, June 16, 1996

Time: 8:00 AM–5:00 PM

Location: Moscone Convention Center, Room 123/120

Sponsors: MTT-6, Microwave and Millimeter-wave ICs
TPC-1996, MMWMC Symposium
MTT-16, Microwave Systems

Organizers: Fazal Ali, Westinghouse
Mike Golio, Motorola
Bernie Geller, David Sarnoff Research Center

Speakers: Istivan Friyes, Hungary Technical Univ.
Bjorn Bjerde, PCSI
Rick Kornfeld, QUALCOMM
Jerry Neal, RF Micro Devices
Darrell Epperson, Ericsson
Joe Staudinger, Motorola
Barak Maoz, Anadigics

Digital cellular and cordless telephones operating in the 900 MHz to 2 GHz frequency band are the most promising candidates to replace analog cellular phones as the premier high volume, highly profitable consumer products. Trade journals and electronic shows are replete with buzz words like GSM, DECT, CDMA and PHP. Specific system architectures and RFIC design, packaging and test requirements for the emerging digital cellular and cordless phones are addressed. Different system architectures and system specifications, RFIC requirements, especially linearity/efficiency tradeoffs, and device technologies of choice, including silicon BJT, BiCMOS, CMOS, SiGe and GaAs, are covered. Modeling, simulation and manufacturing issues related to the low cost, high volume commercial market are also discussed.

MTT-S SUNDAY WORKSHOPS

WSFB: The Application of Wavelets to Electromagnetics

Date: Sunday, June 16, 1996

Time: 8:00 AM–5:00 PM

Location: Moscone Convention Center, Room 124

Sponsor: MTT-15, Microwave Field Theory

Organizers: Linda Katehi, The University of Michigan
Hao Ling, The University of Texas

Speakers: Jim Harvey, ARO
Linda Katehi
Kazem Sabet, EMAGS
George Pan, University of Arizona
Michael Krumpholz, Daimler Benz
Hao Ling
Jaideva Goswami, University of Illinois
Lawrence Carin, Duke University
Eric Walton, Ohio State University

The recently developed multiresolution analysis (MRA) has demonstrated its capability to impact electromagnetics in many aspects. Among the application areas, the most profound are computational electromagnetics and electromagnetic signal processing. The use of MRA has led to dramatic savings in CPU time and memory requirements for complicated EM simulations. New time domain methods generated by using MRA run 10 times faster than the Yee's scheme and have memory requirements two orders of magnitude less than those of the conventional FDTD. These new schemes approach the Nyquist's sampling limit of two grid points per wavelength to achieve errors less than 0.5 percent. Wavelets, or more generally time-frequency representations, have recently also found useful applications in processing electromagnetic data. The joint time-frequency representation of a signal is a two-dimensional space that facilitates the visualization and interpretation of a complex electromagnetic wave for such applications as radar target identification and microwave circuit parameter extraction. Despite its capabilities, MRA has not reached the broad microwave community due to its recent mathematical development and the limited demonstration of applications. The microwave engineer is introduced to the concept of MRA and wavelets transforms through applications to practical microwave problems.

WSHC: Microwave Photonic Systems

Date: Sunday, June 16, 1996

Time: 1:00--5:00 PM

Location: Moscone Convention Center, Room 125

Sponsors: MTT-3, Lightwave Technology

Organizers: Alwyn Seeds, University College London

Speakers: Alwyn Seeds
Charles Cox, MIT Lincoln Laboratory

Intended for microwave systems engineers, advanced mobile communications and wireless systems engineers, radar and electronic warfare engineers, cable television industry engineers, and R&D managers and market planners. No prior experience in photonics is assumed. The fundamental technologies of optical sources, transmission media and detectors leading to descriptions of advanced techniques and applications ranging from optical control of phased-array radar to microcellular radio are introduced. High speed optical detectors; direct modulation of semiconductor lasers; external modulators; advanced signal generation techniques, including optical phase-lock loops and mode-locked systems; noise and distortion in optical links, including linearization techniques; novel modulation techniques; optical control of microwave devices; antenna remoting; optical control of phased arrays; and future trends are addressed.

MTT-S MONDAY WORKSHOPS

WMFA: Nonlinear CAD

Date: Monday, June 17, 1996

Time: 8:00 AM–5:00 PM

Location: Moscone Convention Center, Room 130

Sponsor: MTT-1, Computer-Aided Design

Organizers: Michal Odyniec, Hewlett Packard Co.
Jeff Meyer, Hewlett Packard Co.

Moderator: Michal Odyniec

Speakers: Adalbert Beyer,
University of Duisburg, Germany
Radek Biernacki, OSA
Madhu Gupta, Hughes
Kaneyuki Kurokawa, Fujitsu
Stephen Maas, Nonlinear Techniques
Juan Obregon, University of Limoges
Olgierd Palusinski, University of Arizona
Vittorio Rizzoli, University of Bologna
John Sevic, Motorola
David Sharrit, Hewlett Packard
Christopher Snowden, University of Leeds

Growing demand for high performance and low cost circuits and systems makes the nonlinear design methods more important than ever. At the same time, many methods of nonlinear design remain virtually unknown. Even though the computer tools for nonlinear analysis have become more powerful, it is not well known among design engineers. Different approaches and methods of nonlinear design are brought together to provide a clearer perspective at the current state of the art and future development needs. An overview of the methods of nonlinear analysis and specific applications are provided. A participant-driven discussion of specific work results is encouraged.

WMFB: Electromagnetic Wave Interaction with Water and Moist Substances

Date: Monday, June 17, 1996

Time: 8:00 AM–5:00 PM

Location: Moscone Convention Center, Room 120

Sponsor: MTT-11, Technical Committee
on Microwave Measurements

Organizer: Andrzej Kraszewski, USDA-ARS

Speakers: Udo Kaatze, University of Göttingen
Constantino Grosse,
National University of Tucuman
Craig Dobson, University of Michigan
Kyle McDonald,
Jet Propulsion Laboratory
Clark Topp, Agriculture Canada
Ray King, KDC Technology Corp.
Michael Kent, K&S Associates

Applications of microwave measurement techniques for determining the amount of water in moist substances have been explored for several years. Recent developments in physical concepts and technological means of practical implementation are addressed. The emphasis is on dielectric properties of water and wet materials at RF and microwave frequencies, sensors and methods for density-independent moisture measurements, and theory and practice of indirect multiparameter measurements. The use of microwave theory and techniques for nonmilitary and noncommunication applications is discussed.

MTT-S MONDAY WORKSHOPS

WMFC: Device Field Interactions for Future Advances in Microwave & RF Circuits

Date: Monday, June 17, 1996

Time: 8:00 AM–5:00 PM

Location: Moscone Convention Center, Room 121

Sponsor: MTT-15, Microwave Field Theory

Organizers: B. Spielman, Washington Univ., St. Louis
M. Gupta, Hughes Aircraft Co.
T. Itoh, UCLA
K. Jenkins

Speakers: H. Hartnagel, Darmstadt
K. Wang, UCLA
T. Tokumitsu, NTT
C. Snowden, Leeds
T. Itoh, UCLA
El-Ghazaly, ASU
R. Dutton, Stanford

To date, many active devices have been invented. However, in order for these devices to be used in the circuit environment, the device design and characterization should take into account the environment of microwave and high frequency circuits. As the operating frequency of MMIC is increased toward mm-wave and the packing density is increased, the electromagnetic interactions become important in the circuit design. Although the EM-based field simulators are available for the passive part of the circuits, most of the active circuit designs are carried out with network-based CAD programs. As the device-circuit interactions by way of electromagnetic field is increased, it becomes necessary to consider the electromagnetic interaction in the design of the active circuits. Although many other devices have been invented and there is the potential for more, including nanometer scale devices utilizing the quantum effects, circuit concepts cannot be distinguished clearly. This workshop provides a forum for the exchange of ideas by researchers and engineers from different disciplines of devices, circuits and electromagnetics. As a result, mutual feedback is reflected in circuit design and device design. Results that have correlated well with experimental results vs. what has yet to be confirmed are sorted out. These results benefit not only the advance in MMIC design but also in futuristic devices that may be developed with circuit integration in mind from the outset.

WMFD: Introduction to Digital Wireless Communication Systems

Date: Monday, June 17, 1996

Time: 8:00 AM–5:00 PM

Location: Moscone Convention Center, Room 131

Sponsor: MTT-1, Computer Aided Design

Organizers: John F. Sevic, Motorola
Anthony M. Pavio, Motorola

Speakers: Kamilo Feher, UC-Davis
John Sevic, Motorola
Ken Geisheimer, Anritsu-Wiltron
Sid Seward, Hewlett-Packard
Larry Burns, 3Com
Bob Stengel, Motorola

Digital modulation techniques are a fundamental component of virtually all current and future advanced personal communication systems. Microwave engineers involved with the design of these systems are exposed to modulation techniques, characterization, and simulation methods that are fundamentally different from analog systems. Several of the personal digital communication systems currently in operation are introduced. Basic digital modulation theory is reviewed and compared to analog modulation. Digital signaling methods such as BPSK, $\pi/4$-DQPSK, GMSK and QAM are discussed. Advanced techniques to optimize spectral efficiency and amplifier efficiency simultaneously are also presented. Salient standards, such as EIA/TIA IS-54 and IS-95, are introduced. Measurement and characterization techniques, including concepts such as adjacent-channel power, bit error rate and vector error, are covered. Nonlinear simulation techniques for digital communication systems are reviewed. Time-variant harmonic balance and behavioral modeling with examples of adjacent channel power and bit error rate prediction are presented. Attendees will receive a copy of PC-compatible software that is capable of generating several modulation formats and examining the effects of nonlinear amplification.

MTT-S MONDAY WORKSHOPS

WMFE: Making Accurate On-wafer Measurements

Date: Monday, June 17, 1996

Time: 8:00 AM–5:00 PM

Location: Moscone Convention Center, Room 122

Sponsor: MTT-11, Microwave Measurements

Organizers: Roger B. Marks, NIST
Dylan F. Williams, NIST

Speakers: Doug Rytting,
Hewlett-Packard Company
Roger Marks
Saswata Basu, Cascade Microtech Inc.
Dylan F. Williams
Sunchana Pucic, NIST
Mike Fennelly, ATN
Randy Fenton, TRW
James Baker-Jarvis, NIST
Vahé Adamian,
ATN Microwave Inc.

Basic methods of on-wafer measurement with an emphasis on the accuracy of various approaches are introduced. On-wafer network parameter measurements, including basic microwave circuit theory, on-wafer probing systems and instruments, network analyzer architecture and error models, measurement of scattering parameters and impedance parameters, measurement of characteristic impedance and an encyclopedia of calibration methods, both on-wafer and off-wafer calibration verification, are described. Noise measurements, including basic theory of noise and noise measurement, and on-wafer noise measurement instrumentation, are covered. Dielectric characterization and on-wafer load pull measurements are also discussed. Emphasis is placed on practical procedures that users can conveniently implement on commercial measurement equipment in their own laboratories. Readily available calibration and measurement software, much of which is freely distributed by the US National Institute of Standards and Technology, is discussed.

WMFF: New Directions in Nonlinear RF and Microwave Characterization

Date: Monday, June 17, 1996

Time: 8:00 AM–5:00 PM

Location: Moscone Convention Center, Room 132

Sponsor: MTT-11, Microwave Measurement

Organizer: Marc Vanden Bossche

Speakers: M. Vanden Bossche, Hewlett Packard NMDG
J. Verspecht, Hewlett-Packard NMDG
T. Van den Broeck, Vrije Universiteit Brussel
M. Demmler, Fraunhofer Institute
for Applied Solid State Physics
P. Tasker, University of Wales CARDIFF
J.M. Nebus, University of Limoges
D.E. Root, Hewlett Packard,
Microwave Technology Division
F. Verbeyst, Hewlett-Packard NMDG
D. Schreurs, Katholieke Universiteit Leuven,
ESAT-TELEMIC

Being able to measure, model, simulate and understand nonlinear behavior of RF and microwave components is becoming an important competitive advantage. The state of the art and new directions in these areas are addressed. Characterization of complete nonlinear device behavior by measuring harmonics and intermodulations, generated by nonlinearities is explained. These signals are measured both in amplitude and phase using the sampling principle combined with adequate calibration techniques. From these measurements more complete behavioral models can be extracted than those extracted using only amplitude or small signal measurements. These models can also be linked into simulation engines based on harmonic balance. The new possibilities for model extraction and design strategies using large signal measurements are demonstrated. Large signal models can be extracted directly from large signal measurements. Design for optimal power efficiency can be done directly from large signal measurements under different load conditions.

MTT-S MONDAY WORKSHOPS

WMFG: Multilayer Microwave Circuits

Date: Monday, June 17, 1996

Time: 8:00 AM–5:00 PM

Location: Moscone Convention Center, Room 133

Sponsor: MTT-1, Computer Aided Design

Organizers: K.C. Gupta, University of Colorado, Boulder
Rolf H. Jansen,
RWTH Aachen Technical University

Speakers: R.G. Arnold and D.J. Pedder,
GEC Plessey Semiconductors
Paul D. Cooper, Lockheed Martin
Ph. Dueme, Dassault Electronique
K.C. Gupta
T. Imaoka,
ATR Optical & Radio Communication Research
R.H. Jansen and M. Engels,
RWTH Aachen Technical University
Fred A. Myers,
GEC Marconi Materials Technology
Tony Pavio, Motorola
R. Pengelly, Raytheon Research Laboratory
Jan Snel, Philips Components BV
T. Tokumitsu and I. Toyoda,
NTT Kanagawa
John Wooldridge, Hughes

Multilayer configurations provide another dimension in the integration of microwave components, circuits and systems making them more compact. The other strong reason for employing multilayer configuration is the fact that several circuit functions (like baluns and tight coupling directional couplers) that are difficult to realize in a single-layer planar configuration can be obtained conveniently in two- or multiple-layer configurations. Multilayer configurations also provide a convenient method of integrating circuits and printed antennas in single modules. The state of the art in design and technology of multilayer microwave modules is provided.

WMHH: Microwave/mm-wave Module Integration Technology

Date: Monday, June 17. 1996

Time: 8:00 AM–12:00 PM

Location: Moscone Convention Center, Room 123

Sponsors: MTT-6, Microwave and Millimeter-wave Integrated Circuits
MTT-12, Microwave and Millimeter-wave Packaging

Organizers: Chuck Buntschuh,
Microwave Engineering Services
Jeanne Pavio, Motorola
Frank Sullivan, Raytheon Company

Speakers: Michael Borkowski, Raytheon Co.
Raymond L. Brown,
National Semiconductor Corp.
Frank Lamb, USAF, Wright Laboratory
Jeanne Pavio
Harry Shah, Motorola

State of the art technology in microwave and millimeter-wave module integration and packaging is addressed. Concentration is placed on modules for wireless communications and T/R module applications, where low cost and compact size are crucial requirements. Achieving lower parts count and high levels of integration resulting in final products comparable with manufacturing batch process techniques are emphasized. Integration techniques utilizing multilayer technology are closely examined. The accomplishments that have been made in high density microwave packaging programs to date are addressed and the benefits that will be derived throughout the industry are examined.

WMHI: Propagation Issues in Urban Areas for PCS

Date: Monday, June 17, 1996

Time: 8:00 AM–12:00 PM

Location: Moscone Convention Center, Room 124

Sponsors: MTT-16, Microwave Systems

Organizers: Bernard D. Geller, Sarnoff Research Center
Rainee Simons, NASA LeRC

Speakers: Kai Siwiak, Motorola
Takeshi Hattori, NTT
Elvino Sousa, University of Toronto
Robert Manning, NASA LeRC
Andre Vandervorst, Univ. Cath. Louvain

The implementation of many of the new wireless systems is bringing with it the realization that uncertainties still exist, especially in urban areas, due to propagation effects and the interaction of these effects with the hardware, coding and modulation techniques that are used. The general propagation problem in an urban setting is reviewed. Issues related to particular wireless systems and modulation techniques are addressed.

MTT-S MONDAY WORKSHOPS

WMHJ: Ferrite CAD and Applications

Date: Monday, June 17, 1996

Time: 8:00 AM–12:00 PM

Location: Moscone Convention Center, Room 125

Sponsor: MTT-13, Ferrites

Organizers: Lionel E. Davis
Elbadawy Elsharawy

Speakers: B. Anderson, Ansoft Co.
L. Davis, UMIST, UK
E. Elsharawy, ASU, Arizona
A. Gibson, UMIST, UK
T. Okada, Murata Man. Co.
M. Tsutsumi, Kyoto Inst. Tech.
J.T. Vaughn, EMS Co.

In recent years, it has been recognized that much remains to be done if ferrite devices are to be included in microwave CAD packages. Traditionally, in order to simplify the analysis of these gyromagnetic structures, it has been common to assume perfect magnetic or electric wall boundary conditions and lossless materials, but ideally the designer needs to include conductor loss and electric and magnetic loss tangents. For some components three-dimensional instead of two-dimensional analysis is more appropriate. Also, sensitivity analysis, including mechanical tolerances and thermal effects, may be important. Depending on the application, problems associated with planar structures, ultra-broad bandwidths, materials parameters and technologies, and cost-effectiveness occur. Furthermore, integration and packaging on a common platform are key issues. Work is being carried out in the US, Europe and Japan. Aspects of this work on circulators, phase shifters and filters is provided. Progress is reported and problems are discussed.

WMHK: Wireless Power Transmission

Date: Monday, June 17, 1996

Time: 1:00–5:00 PM

Location: Moscone Convention Center, Room 123

Sponsor: MTT-5, High Power Microwave Techniques

Organizers: Jitendra Goel, TRW-S&EG

Moderator: Don W. Reid, ANPARO Corp.

Speakers: Jim McSpadden,
Texas A&M University
Richard Dickinson, JPL Pasaden
Joseph Hawkins,
University of Alaska
William Brown,
Microwave Power Systems
Nobuyuki Kaya, University of Kobe

Several federal agencies, including NASA, are currently reviewing wireless power transmission. Several on-going study contracts are underway with plans for future study contracts. This field will be of considerable interest in the near future. Current activities in this field are reviewed. The topics will include solar power satellite, electronically steerable beams and microwave powered beam riding helicopters. Information presented at recently held international conference on wireless power transmission is reviewed.

WMHL: Active Aperture/TR Module Architecture and Design

Date: Monday, June 17, 1996

Time: 1:00–5:00 PM

Location: Moscone Convention Center, Room 124

Sponsors: MTT-6, Microwave and Millimeter-wave Integrated Circuits
MTT-16, Microwave Systems

Organizers: David Zimmermann, Texas Instruments
Ed Niehenke,
Westinghouse Electric Corporation

Speakers: Don Parker, Hughes Aircraft Company
Jim Mason, Texas Instruments
Tom Turlington,
Westinghouse Electric Corporation
Donn Harvey, Boeing
Paul Cooper, Lockheed Martin

Active apertures have inherent advantages over conventional phased-array systems, such as high reliability, high effective radiated power, low noise figure, rapid beam switching and small size. The TR module, a key element of the active aperture, has been miniaturized with low cost due to extensive development of the MMIC and packaging technologies over the last decade. Recent trends in MMIC performance, module packaging, substrate technologies, and manufacturing and processing cost reductions are reviewed. The impact of the array architecture through effective design and cost trades are described. Examples from commercial and military applications, as well as future trends are discussed.

WMHM: Technology Selection for High and Low Power Base Stations in Wireless Mobile Communication Systems

Date: Monday, June 17, 1996

Time: 1:00–5:00 PM

Location: Moscone Convention Center, Room 125

Sponsor: MTT-16, Microwave Systems

Organizer: Vinod Kumar, Alcatel Mobile Communications

Speakers: V. Kumar
Prem Sood, Sharp
Kirby Mays, Hewlett Packard
Werner Mohr, Siemens
Colin Rudolph, Alcatel

Large cell coverage for low traffic density areas in wireless networks is implemented with base stations using high power transmitters, directive antennas and high sensitivity receivers. High density microcellular networks use compact base stations and/or remotely located antennas radiating some milliwatts only. Requirements of multiple radio frequency carriers per cell in narrowband FDMA systems, for example, AMPS leads to transmitter/receiver linearity constraints, are quite different from the ones for wideband TDMA systems, such as GSM and US-Digital, and CDMA. Cellular frequency reuse, propagation of co-channel and adjacent channel interference in small and large cell scenariosis briefly reviewed. Spurious emissions, intermodulation generation and the design of narrowband and wideband transit amplifiers are described. The effect of local oscillator phase noise and receiver branch imbalance on blocking performance is evaluated. The utilization of optical to micro-wave transducers for microcell coverage with remote antennas is analyzed.

MTT-S FRIDAY WORKSHOPS

WFFA: Dielectric Resonators in Microwave Active and Passive Circuits

Date: Friday, June 21, 1996

Time: 8:00 AM–5:00 PM

Location: Moscone Convention Center, Room 130

Sponsor: MTT-8, Filters & Passive Components

Organizer: P. Guillon, IRCOM Limoges, France

Speakers: D. Kajfez, Univ. of Mississippi
Y. Kobayashi, Saitawa Univ.
S. Verdeyme, IRCOM Limoges, France
K.A. Zaki, Univ. of Maryland
J. Fiedziuszko, Space Systems/Loral
K. Wakino, Murata, Japan
A. Glisson, Univ. of Mississippi
A. Kishk, Univ. of Mississippi
D. Cros, IRCOM Limoges, France
J. Obregon, IRCOM Limoges, France
D. Reffet, Thompson CSF, France

With their high Q_0, high dielectric constant, high temperature stability dielectric resonators (DR) are now used in place of waveguide components in a large variety of microwave systems to reduce their size for equal electrical performances. The principal applications of the DR are reviewed. Particular attention is given to the choice of the dielectric material. Recent advances in ceramic and its characterization are presented. The electromagnetic behavior of the DR is dependent on its environment, including dielectric support, metallic enclosure and coupling lines. With the availability of powerful workstations, electromagnetic simulators can now be applied to simulate rigorously DR devices. The design of microwave filters applying these methods are described. DR application examples, including material characterization, microwave filters and multiplexers, microwave antennas, classical and superconducting oscillators, and whispering gallery modes power combiners, are reviewed.

WFHB: New Developments in Mixer Design for Microwave and mm-wave Applications

Date: Friday, June 21, 1996

Time: 8:00 AM–12:00 PM

Location: Moscone Convention Center, Room 120

Sponsor: MTT-7, Microwave and mm-wave Devices

Organizers: S.A. Maas, Nonlinear Technologies Inc.
A. Beyer, Duisburg University

Speakers: S.A. Maas
J. Birkland, Motorola
V. Rizzoli, University of Bologna
H.H.G. Zirath,
Chalmers University of Technology
R. McGrath,
California Institute of Technology
Y. Ryu, TRW
A. Beyer

The emerging technology of microwave and millimeter-wave systems is addressed. Latest news on mixer design is elaborated. Capabilities and limitations of well-known methods and the necessity of new solutions are treated. In addition, results on work performed in noise analysis, intermodulation, spurious responses, optimization of the linear and nonlinear part of the mixer, and the aspects of cost for system insertion are described.

WFFC: The Role of Superconducting Technology in Wireless Communications Systems

Date: Friday, June 21, 1996

Time: 8:00 AM–5:00 PM

Location: Moscone Convention Center, Room 125

Sponsor: MTT-18, Microwave Superconductor Applications

Organizers: P. Polakos, AT&T Bell Laboratories
R. Ralston, MIT Lincoln Laboratory
M. Nisenoff, Naval Research

Speakers: Ray Nettleton, US West
Erland Wikborg, Ericsson
C. Mahle, Consultant
J. Curtis,Space Systems Loral
P. Polakos, AT&T Bell Labs
G.C. Liang, Conductus
R. Hammond, STI
J. Hodge, Illinois Superconductors
R. Yandrofsky, Super Core Tech
R. Mansour, Com Dev
K. Suzuki, SRL–ISTEC

The continuing explosion in the demand for voice and data transmission around the world is putting an ever increasing stress on wireless communications technologies. Accordingly, the designs of these systems are being driven by the need for increased capacity consistent with the customer-imposed requirements of service anytime and anywhere. Co-channel and adjacent channel interference, and noise are crucial issues. Since superconductivity has the potential to provide base-station filters with sharp frequency roll-off behavior and low insertion loss and front end with ultra low noise, a number of R&D organizations are developing prototype subsystems for possible insertion into wireless communications systems. The industry is described from the points of view of a service provider and hardware vendor, including its objectives and requirements. Details on emerging equipment is presented. Results of attempts to insert high temperature superconductivity into wireless communications systems are described.

MTT-S FRIDAY WORKSHOPS

WFFD: Microwave/mm-wave Technology for Intelligent Vehicles

Date: Friday, June 21, 1996

Time: 8:00 AM–5:00 PM

Location: Moscone Convention Center, Room 131

Sponsor: MTT-16, Microwave Systems, Subcommittee on Vehicular Technology

Organizers: Lamberto Rafaelli, Arcom Inc.
Richard A. Sparks, ANRO Engineering Inc.

Chairman: Lamberto Rafaelli

Speakers: Holger Meinel, Daimler Benz
Pettenpaul, Siemens
Rahul Dixit, TRW
Hidaka, Mitsubishi
Doug Maki, Raytheon
Tom Rose, M/A-COM
Saito, Fujitsu

The latest trends in microwave and mm-wave automotive and vehicular transportation system applications are addressed. Current and proposed vehicle-to-vehicle and vehicle-to-roadside communication system, automatic vehicle location systems, electronic toll collection systems, collision avoidance sensors, and vehicle navigation and information systems are reviewed. The status of intelligent vehicle highway system architecture designs and the schedule for implementation of activities within the US are presented

WFFE: Photonics for Microwave and mm-wave Antennas

Date: Friday, June 21, 1996

Time: 8:00 AM–5:00 PM

Location: Moscone Convention Center, Room 124

Sponsor: MTT-3, Lightwave Technology and Techniques

Organizers: Ronald Esman, Naval Research Laboratory
Hiroyo Ogawa, NTT Wireless Systems Laboratory

Speakers: Joe Frank, Applied Physics Laboratory
Akis Goutzoulis, Westinghouse S&TC
Michael Frankel, Naval Research Laboratories
Gary Betts, MIT Lincoln Laboratory
Melvin Belcher, Georgia Tech
Steve Pappert, NCCOSC (Navy)
Winston Way, National C-T Univ.
R.P. Braun, Heinrich Hertz Institute
Stephen R. Forrest, Princeton Univ.

The practical viability of photonics for microwave and millimeter-wave antennas continues to increase and fuel interest from the component to the system level. On-going activity is disseminated, updated and discussed to stimulate new developments at several levels. Active optical components, control and processing techniques, system requirements, optical fiber and passive components, demonstrations and modeling, applications, impact on RF systems, and need for new RF components are covered. Broad background material and current status are provided. More focused topics, stimulating observations, issues, and late news items are also described.

WFFF: Everything You Always Wanted to Know About Noise, But ...

Date: Friday, June 21, 1996

Time: 8:00 AM–5:00 PM

Location: Moscone Convention Center, Room 132

Sponsor: MTT-14, Low-Noise Techniques

Organizers: M.W. Pospieszalski, NRAO
J.J. Whelehan, AIL

Speakers: M.W. Pospieszalski
L. Nguyen, Hughes
A. Cappy, Universitité de Lille
P. Tasker, University of Wales
W. Wiatr, Warsaw University of Technology
J. Randa, NIST
A. Niedzwiecki, Hewlett Packard
J. Laskar, Georgia Tech
H. Wang, TRW
S. Weinreb, University of Massachusetts

Basic concepts for linear noisy networks, low noise devices, FET and HFET device noise models, noise parameter measurement techniques, and low noise amplifier and the receiver design are provided. The state of the art in these fields is reviewed. Some current, hotly debated issues, for example, the accuracy of the device noise models, limits on noise performance of FETs, the accuracy of noise parameter measurement and methods to improve it, and design issues in MIC and MMIC wideband low noise amplifiers, are discussed.

WFFG: Wireless LAN – What's Next?

Date: Friday, June 21, 1996

Time: 8:00 AM–5:00 PM

Location: Moscone Convention Center, Room 133

Sponsors: MTT-6, Microwave & Millimeter-wave Integrated Circuits
MTT-16 Microwave Systems

Organizers: Doug Maki, Raytheon
Fazal Ali, Westinghouse

Speakers: David Williams, GEC Plessey
Al Petrick, Harris Semiconductor
Greg Hopkins, Amber Wave Systems
Kin Seto, Xircom
Kaveh Pahlavan, Worcester Polytechnic University
Masaharu Mori, Clarion
Mike Leclere, Hewlett Packard

Wireless local area networks have been pursued heavily for the last four years and commercially viable solutions for point-to-point communications, desktop LAN, notebook computer LAN and a variety of related products such as wireless bar code readers are currently available. These solutions have been achieved with major advances in software, system architecture, protocols and integrated circuits, although the predicted revenue promised by these products has not materialized. Wireless LAN and related markets are covered. The issues and activities that are allowing and/or impeding LAN growth are discussed. New technologies and systems that will impact this market are investigated. Wireless LAN and its applications are reviewed WINForum status, hardware issues and high speed LANs are covered.

MTT-S FRIDAY WORKSHOPS

WFFH: Global EM Simulators for Planar Microwave Circuits

Date: Friday, June 21, 1996

Time: 8:00 AM–5:00 PM

Location: Moscone Convention Center, Room 122

Sponsor: MTT-1, Computer Aided Design

Organizers: Victor Fouad Hanna, France Telecom, CNET
Abbas S. Omar, Technical University, Hamburg

Chairmen: Roberto Sorrentino, University of Perugia
K.C. Gupta, University of Colorado

Speakers: W. Hoefer, University of Victoria
T. Itoh, UCLA
G.M. Rebeiz, University of Michigan
I. Wolff, Duisburg University
H. Baudrand, ENSEEIHT
J. Citerne, INSA
P. Guillon, IRCOM
V. Fouad Hanna
A.S. Abbas, Technical University, Hamburg

During the last several years, much effort has been devoted to the separate development of electromagnetic simulations for analyzing distributed circuits using field theoretical approach, and lumped circuits containing linear or nonlinear passive or active components using network theoretical background. The next natural step in circuit simulation is the elaboration of global electromagnetic simulators that are capable of analyzing a circuit containing both lumped and distributed circuit elements. These global simulators must use powerful field theoretical methods, like finite difference time domain (FDTD), finite element (FE) and integral equations techniques (IET). At the same time, they must have full access to available design techniques for lumped linear or nonlinear active or passive components. The latest state of the art in this subject is demonstrated. The theoretical formulation for the insertion of lumped elements in an electromagnetic simulator or an application of such a global simulation in the design of a test case are described.

WFFI: Statistical-based MMIC and Module Design Techniques

Date: Friday, June 21, 1996

Time: 8:00 AM–5:00 PM

Location: Moscone Convention Center, Room 123

Sponsor: MTT-6, Microwave and mm-wave ICs
MTT-1, Computer-aided Design

Organizers: Arvind K. Sharma, TRW/S & EG
Inder J. BahlITT/GaAs Technology Center

Speakers: T. Winslow, ITT
C. Fullerton, Motorola
P. Bacon, Raytheon
E. Griffin, ITT
P. Hurt, TRW
J. Bandler, Optimization Associates

Monolithic microwave and millimeter-wave integrated circuit (MMIC) technology is now readily available for military, space and commercial communication systems. Successful technology insertions require design of high performance circuits and modules at low cost. The applicability and affordability of MMICs and modules still require considerable emphasis on their producibility. It requires careful consideration in the areas of processing, device characterization and modeling, circuit and package simulations, automated module assembly, and testing. Accurate statistical models of active devices and interacting passive structures are essential in reducing the design risk by enhancing the ability of MMICs and modules prior to fabrication. In-depth tutorial discussions, as well as state-of-the-art modeling, design methodologies and computer-aided design techniques at both circuit and module levels are presented. A forum for discussion on current bottleneck issues, possible solution and future directions is provided.

WFHJ: Design Oriented Microwave Education

Date: Friday, June 21, 1996

Time: 8:00 AM–12:00 PM

Location: Moscone Convention Center, Room 121

Sponsor: MTT-S Committee on Education

Organizers: K.C. Gupta, University of Colorado at Boulder
Madhu S. Gupta, Hughes Aircraft Co.

Speakers: Les Besser, Besser Associates
Bob McIntosh, University of Massachusetts
Allen Podell, Pacific Monolithics
Roger D. Pollard, The University of Leeds

The current microwave education often lacks emphasis on design aspects. In addition, university curricula usually lags behind the state of the art practice in industry. Topics that may need to receive curricular attention due to their importance are investigated. Examples of such topics are CAD methods; statistical design techniques; active synthesis applied at microwave frequencies; design methods for multiple specifications; robustness and yield oriented design methods. The need, pedagogical rationale, and the most effective methods of imparting design education in the microwave area will be discussed and debated.