



# **AUTOMATIC RF TECHNIQUES GROUP**

## **CONFERENCE NEWSLETTER**

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### **The 51st Conference**

## **Characterization of Spread Spectrum Telecommunications Components and Systems**

### **OVERVIEW**

The city of Baltimore, Maryland provided a very enjoyable setting for the 51st ARFTG Conference which was held on June 11th and 12th as part of the 1998 MTT-S International Microwave Symposium (IMS). This conference offered an extended and quality technical program featuring two Joint Sessions with the IMS in addition to the full-day ARFTG Technical Program. A listing of papers is given on Pages 3 and 4 with available copies of the text contained in the ARFTG Digest.

Conference Chair Gregory Burns put forth considerable effort to ensure an outstanding conference. In addition to his chair duties, he acted as host in completing arrangements for meeting facilities at the Hyatt Regency Conference Hotel. For several months prior to the conference, Greg served as ARFTG Liaison to the MTT-S Steering Committee for the IMS. Many of the 133 registered made favorable comments about the arrangements.

In addition to the technical program, attendees could appreciate continuing efforts toward the re-vitalization of Baltimore. Many were already familiar with successes such as The Inner Harbor, the Convention Center, and Camden Yards; at this time; many projects to rebuild the downtown area were clearly visible. Attendees also had the opportunity to visit many national points of interest both locally and in nearby Washington D. C. All those hoping to escape "El Niño" were disappointed by the almost daily showers.

Additional conference information is available on the WebSite at: <http://www.arftg.org>.

### **JOINT SESSIONS AT IMS**

The MTT-S and ARFTG arranged two Joint Sessions which were held on Thursday at the Baltimore Convention Center. Topic for the morning session was "Commercial and Industrial Microwave Systems". Included were five

papers of widespread interest for new or improved applications of microwave techniques in industry. Subjects ranged from a chip set for a GPS translator to improvements for multi-media hybrid cable networks. Session Organizers were Roger Marks and George Heiter with Richard Ranson and David Meharry acting as Chair and Co-Chair respectively.

The afternoon session had a topic of "Digital Interconnection Techniques and Characterization at GHz Frequencies". Session Organizers were Dylan Williams and Rick Sturdivant with Dylan also serving as Chair; Ken Wong was Co-Chair. This session covered several subjects of critical interest to facilities working with microwave integrated circuits to 50 GHz. Design and analysis techniques were discussed to improve performance.

### **TECHNICAL SESSIONS**

At the Hyatt Regency Hotel on Friday, technical sessions discussed the conference theme as well as diverse subjects of common interest to the group. Technical Program Chair Paul Oesterle brought together a very good overall program consisting of 12 presented papers and 8 poster papers. In addition to several papers on systems for wireless communications, topics covered included load-pull measurements, thermal noise testing, characterization of high-power devices, phase-noise measurements, and network analyzer calibration techniques.

Selected by attendees as the Best Presented Paper was "Accuracy Improvements in Microwave Noise Parameter Determination" by Martin Schmatz and co-authors. The Best Poster Paper by Randy Fenton was "Vector Corrected Power Sensor Calibration System".

At the close of the morning sessions, Dr. Bruno Weinschel took a few minutes to discuss recent work of the Microwave Connector Committee. The information will be made available to interested parties.

## AWARDS

Also held at the completion of the morning sessions was an awards ceremony that replaced the normal Awards Luncheon. For this conference, President Ken Wong gave Certificates of Appreciation to J. Gregory Burns and Paul Oesterle.

For the 50th Conference, the Best Technical Paper Award was given to Dr. Roger Marks for the paper entitled "Formulations of the Basic Vector Network Analyzer Error Model Including Switch Terms". The Best Historical Paper was given by Gerome Reeve and was entitled "History of Microwave Metrology at the National Institute of Standards and Technology". The Best Exhibitor Award went to the University of South Florida for demonstration of a wireless communications system.

Special awards for the 50th Conference were given to Raymond Tucker, Edward Stevens, and Jim Taylor for the Awards Banquet presentation entitled "Visiting ARFTG's Past". This was an outstanding event to remember the beginnings of ARFTG.

## EXHIBITS

The Exhibits Area at ARFTG Conferences provides attendees with the opportunity to view some newly developed products and to discuss problems with the suppliers. At this conference, products were demonstrated for wafer probing, network analysis, computer interfacing, and precision standards for system verification. Conference exhibitors were ATN Microwave, Maury Microwave, Micro-Coax, National Instruments, RMC Incorporated, and Weinschel Associates. Attendees selected National Instruments as the Best Exhibitor.

Both attendees and suppliers reported favorable results from the interchange. Exhibits Chair Michael Fennelly was responsible for the success of this portion of the conference.

## DIGESTS

Publications Chair Edward Godshalk has always been able to meet the challenge of providing digests to conference attendees with additional copies available for later purchase. Unfortunately some confusion existed at the IMS registration desk so that a sufficient number of copies did not remain for those registering on the day of the conference. Ed was very resourceful in acquiring additional copies to minimize the problem.

Digests for this and previous conferences are available from the Executive Secretary Henry Burger at (602) 839-6933 or E-Mail: "h.burger@ieee.org".

## MESSAGE FROM THE PRESIDENT

In today's highly competitive business environment, time-to-market is a major success factor. The same is true in the research and academic worlds where meeting aggressive project deadlines is the key to success. It is the goal of the Automatic RF Techniques Group to keep our members in touch with the most up-to-date and practical automated methods for RF/microwave design, analysis, and testing to allow timely product launch and project completion. The 52nd ARFTG Conference on December 3rd and 4th in Rohnert Park, California is no exception. The conference theme is "Computer-Aided Design and Test for High-Speed Electronics". We expect to have a full slate of papers related to the conference theme. In addition, a tour of the Hewlett-Packard facility in Santa Rosa is planned as one of the conference activities. Rohnert Park and Santa Rosa are located in the heart of Northern California's beautiful wine country. The DoubleTree Conference Hotel is located next to the California Welcome Center, a wine country visitors center, and a golf course. Our conference chair Kevin Kerwin and technical program chair Brian Hughes are working very hard to bring you a program that you will enjoy and from which you will benefit.

On December 1st and 2nd at the same location, ARFTG will offer, in cooperation with the National Institute of Standards and Technology (NIST), a two-day short course discussing microwave measurement fundamentals, telecommunication component measurements, and basic subjects that relate to the conference theme. The instructors are recognized experts in the industry with the result that the short course has been well received by participants. Past course organizers Robert Judish and Lawrence Dunleavy have done an outstanding job of keeping the course material current and pertinent; David Walker will be joining the team to assist Larry.

I am looking forward to visiting with you and your colleagues at the 52nd Conference and Microwave Short Course. These events will provide all of you with the opportunity to exchange ideas with many of the experts in the RF/microwave design and measurement industry.

Sincerely, Ken Wong President - ARFTG

## EXECUTIVE COMMITTEE MEETINGS

Several months ago Lawrence Dunleavy initiated an ARFTG Fellowship Proposal to establish aid for deserving graduate students; this effort would be funded by group resources. A firm proposal was developed and it was approved unanimously at the Pre-Conference Meeting. Individuals interested in participating can obtain information from the ARFTG Website at the URL listed on Page 1.

## MEETINGS (con't.)

Another matter of interest to members was discussed by Roger Marks. He recommended that ARFTG join the IEEE Book Broker Program to provide improved distribution for conference digests as well as archiving them. A motion was made and unanimously approved. Entrance into the program will require some changes in group policy; however, it will start with the 52nd Conference.

The remainder of the meetings were generally concerned with arrangements for future conferences. Additional details are given below.

## THANKS TO PREVIOUS EXECUTIVE COMMITTEE MEMBERS

This author has been somewhat negligent in failing to note the term completion of two executive committee members with a long history of contributions. Mr. John Barr, IV left the committee after the 48th Conference in 1996 and Mr. William Pastori after the 50th Conference in 1997.

Both individuals served the group as President and filled other capacities including Conference Chair for multiple conferences. Each was also a regular contributor to the technical programs in several ways. John was MTT-S Coordinator for an extended period and continues to support that effort. Bill was Exhibits Chair for many conferences and is currently lecturing as part of the RF/Microwave Short Course.

John and Bill are the kind of individuals that make ARFTG an outstanding organization. As many recognize, they continue to contribute.

## FUTURE CONFERENCES

### 52nd Conference

Main Program on December 3rd and 4th, 1998 in Sonoma County, California. Conference Theme is "Computer-Aided Design and Test for High-Speed Electronics". Contact is Kevin Kerwin at (707) 577-4061. E-Mail: "kevin\_kerwin@hp-sonoma-oml.om.hp.com".

Short Course on December 1st and 2nd, 1998. Title is "Computer-Aided RF and Microwave Testing and Design". Contact Lawrence Dunleavy at (813) 974-2574. E-Mail: "dunleavy@eng.usf.edu".

### 53rd Conference

Programs to be held on June 17th and 18th, 1999 in Anaheim, California. Theme for this Conference is "Nonlinear Characterization". Contact Gary Simpson at (909) 987-4715. E-Mail: "gsimpson@maurymw.com".

Possible Microwave Measurements Short Course on June 13th. Details to be published.

## 51st CONFERENCE TECHNICAL AGENDA

### ARFTG/MTT-S Joint Session Papers

#### Session TH1B: Commercial and Industrial Microwave Systems

##### **Miniature P-Code GPS Translator**

J. Smuk, P. Blount, C. Trantanella and M. Shifrin;  
Hittite Microwave Corp.

##### **A Broadband Linearizer for Ka-Band Satellite Communication**

W.-M. Zhang and C. Yuen; Space Systems Loral

##### **Procedure for Measurements and Statistical Processing of Upstream Channel Noise in HFC-Networks**

K. Haelvoet, J. Vandenbruaene, E. Claus,  
K. De Kesel and L. Martens;  
IMEC-INTEC, University of Gent, Belgium

##### **Novel Microwave Vibration Monitoring System for Industrial Power Generating Turbines**

M. Wagner, A. Schulze, M. Vossiek, N. Vortmeyer  
and P. Heide; Siemens AG, Germany  
C. Stephebauer and R. Weigel;  
Johannes Kepler University, Austria

##### **Integrated 5.8 GHz Phased Array Antenna for Electronic Toll Collection**

G. Villino, C. Passmann, D. Mansen, C. Brenzel,  
T. Wixforth; Robert Bosch GmbH, Germany

#### Session TH4B: Digital Interconnection Techniques and Characterization at GHz Frequencies

##### **50 GHz Interconnect Design in Standard Silicon Technology**

Bendik Kleveland, Thomas Lee and Simon Wong;  
Stanford University

##### **Accurate Characteristic Impedance Measurement on Silicon**

Dylan Williams; NIST  
Uwe Arz and Hartmut Grabinski;  
Universität Hannover, Germany

##### **A Test Board for Multiport Immittance Measurement and Characterization of RF-IC Packages**

Alok Tripathi, Rick Lutz, V. K. Tripathi;  
Oregon State University  
Henry Wu, Jeffrey Meyer; Hewlett-Packard EEsof  
Brian Hutchison; Hewlett-Packard

##### **Analysis of Microvia Interconnects**

Ramesh Abhari and T.E. van Deventer;  
University of Toronto, Canada

##### **Multi-Wire Microstrip Interconnections: A Systematic Analysis for the Extraction of an Equivalent Circuit**

F. Alimenti, P. Mezzanotte, L. Roselli  
and R. Sorrentino; Università di Perugia, Italy

## **ARFTG CONFERENCE AT HYATT REGENECY**

### **Presented Papers**

#### **Technical Session 1:**

**Wideband Frequency-Domain Measurement of Multipath Effects in 2.4 GHz Wireless Channels**  
Anbuselvan Kuppusamy, Paul Flikkema  
and Thomas Weller; University of South Florida

**Satellite Communications Payload Simulator for Mobile and Fixed Satellite Services**  
Patricia Palena, George Silverman, Sam Samani,  
James Hopkins and Stephanie Sroczyk;  
Lockheed Martin

**Flexible, Low Cost, Automatic Emulator for Channel Characterization of Wireless and Satellite Systems**  
César Briso and José Alonso;  
University of Madrid Telecommunications, Spain

#### **Technical Session 2:**

**Vector Corrected Harmonic Measurement of High Power Transistors**  
L. Pattison, A. Greer, D. Linton;  
The Queen's University of Belfast  
A. D. Patterson, J. G. Leckey;  
Merlin Microwave, United Kingdom

**Characterization and Verification of CDMA Power Amplifiers**  
R. Mahmoudi, P. Valk, K. Mouthaan,  
J. L. Tauritz and P. Snoeij;  
Delft University of Technology, The Netherlands

**Characterization and Reduction of Local Oscillator Phase Noise Effects in DSB Radios**  
Edward Godshalk; Maxim Integrated Products  
Vijai Tripathi; Oregon State University

#### **Technical Session 3:**

**Characterization of On-Wafer Diode Noise Sources**  
J. Randa, D. Walker, L. Dunleavy, R. Billinger,  
and J. Rice; NIST

**Accuracy Improvements in Microwave Noise Parameter Determination**  
Martin Schmatz, Hans Benedickter  
and Werner Bächtold; ETH Zürich, Switzerland

**Metal-Insulator-Semiconductor Transmission Line Model**  
Dylan Williams; NIST

#### **Technical Session 4:**

**Advanced TRL Fixture Design and Error Analyses for RF High Power Transistor Characterization and Automatic Load Pull Measurement**  
Chuming Shih; Hewlett-Packard

**Pulsed I-V Diagnostic Measurements for RF GaAs Devices**  
Eric Johnson; Motorola

**Comparison of SOLR & TRL Calibrations**  
David Walker and Dylan Williams; NIST

#### **Poster Sessions**

**New 100 MHz Bandwidth Vector Signal Analysis Measurement Technique for R&D in Wideband Microwave Wireless System Design**  
Robert Matreci and Leonard Dickstein;  
Hewlett-Packard

**In-Line Multiport Calibration**  
Dylan Williams and David Walker; NIST

**Lumped-Element Impedance Standards**  
Dylan Williams and David Walker; NIST

**Vector Corrected Power Sensor Calibration System**  
Randy Fenton; TRW

**1 MHz Loadline System Useful for Quantifying Dispersion in GaAs FETs**  
Tim Driver; Motorola

**The Development of RF Front-End for CDMA Mobile Communication Systems Based on IS-95**  
Xiaowei Zhu, Jianyi Zhou and Wei Hong;  
Southeast University, P. R. China

**A New Measurement Technique and Characterization Tool for Push-Pull Circuit Design**  
Chandra Khandavalli and S.T. Chen;  
Fujitsu Compound Semiconductor

**Close-In Phase Noise Measurements of Injection Locked Oscillators**  
Alberto Rodriguez, Lawrence Dunleavy,  
Thomas Weller; University of South Florida

**An Integrated Simulation, Measurement and Test System for CDMA**  
R. Mahmoudi, P. Valk, J. L. Tauritz, J. W. Slotboom;  
Delft Institute Of Technology, The Netherlands

#### **Additions/Corrections**

Efforts are made to publish correct information where possible. Problems should be reported to the undersigned. Corrections will be made in the final copy of the Newsletter found in the Digest.

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