



## ***AUTOMATIC RF TECHNIQUES GROUP***

### **CONFERENCE NEWSLETTER**

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## **63<sup>rd</sup> ARFTG Conference** *On-wafer characterization*

### **OVERVIEW**



*The Fort Worth Convention Center – venue for Microwave Week 2004, which included several ARFTG activities*

The 63<sup>rd</sup> ARFTG conference took place in Fort Worth, Texas, on June 11<sup>th</sup>, 2004. This was during Microwave Week 2004, which included the 2004 International Microwave Symposium (IMS) – the IEEE Microwave Theory and Techniques Society’s premier conference – and, as is customary, ARFTG chose to host its own activities alongside this other prestigious event. As well as the 63<sup>rd</sup> conference, other ARFTG activities included

The 4<sup>th</sup> meeting of the NVNA Users’ Forum and two joint ARFTG/IMS Workshops.

Taken together, the IMS and ARFTG activities ran from Sunday June 6<sup>th</sup> through to Friday June 11<sup>th</sup>. The workshops, including the two co-sponsored by ARFTG and IMS, took place on the Sunday and Monday. IMS2004 took place during Tuesday, Wednesday and Thursday, and the ARFTG conference took place on the Friday. (The RFIC conference and many other meetings also took place during the same week.) This combination of activities led to a week packed with interest and excitement for all those fortunate enough to be there.

A CD of the IMS2004 Digest should soon be available from the IEEE Online Catalog & Store at [www.ieee.org](http://www.ieee.org). This CD also contains the Digest to the 63<sup>rd</sup> ARFTG conference, as well as the earlier 62<sup>nd</sup> conference, held in December 2003.

However, despite the availability of Digests on CDs, etc, there really is no substitute for attending such well organized and well attended events in person. Amongst other reasons, these events give participants considerable scope for interacting with fellow professionals, and thus give rise to ample opportunities to meet and exchange ideas on measurement needs, problems and solutions. The importance of attendance at such events therefore cannot be overstated.

More information on ARFTG and its activities, including details of conferences both past and present, can be found on the ARFTG website at [www.arftg.org](http://www.arftg.org).

## CONFERENCE TECHNICAL SESSIONS



*The meeting room, at the Radisson Plaza Hotel, used for the technical sessions at the 63<sup>rd</sup> ARFTG conference*

The 63<sup>rd</sup> ARFTG conference was held at the Radisson Plaza Hotel, adjacent to the Fort Worth Convention Center, and was initiated by John Cable, the Conference Chair, who in turn introduced Charles Gustof, the Technical Program Chair. Both John and Charles are to be congratulated on assembling a really first-rate technical program for the conference, with the overall theme of “On Wafer Characterization”. This theme further sub-divided into four technical sessions and an interactive session. The four technical sessions comprised papers given as oral presentations. These technical sessions were titled “Power/Pulsed IV”, “General Measurements”, “VNA De-embedding Techniques” and “Calibration Techniques”. The interactive session consisted of papers presented in open forum as posters during the breaks from the technical sessions.

Selected as the Best Technical Session Paper by the conference attendees, was “The ‘Unknown Thru’ Calibration Advantage” by Ken Wong, of Agilent Technologies, Inc. Selected as the Best Interactive Session Paper was “Extension of the Hammerstein Model for Power Amplifier Applications” by Magnus Isaksson, University of Gävle, Sweden, and David Wisell, University of Gävle and Ericsson AB, Gävle, Sweden. Selected as Best Exhibitor was Tektronix, Inc.

As on previous occasions, the ARFTG conference also included an exhibits area and an awards luncheon, both of which are reviewed below.

## CONFERENCE EXHIBITS



*Conference delegates are given ample opportunity to visit stands in the conference exhibits area*

The exhibits area gave conference delegates a good opportunity to see some of the latest hardware and software developments emerging to meet the needs of RF and microwave specialists in industry and elsewhere. It also provides excellent opportunities to discuss test and measurement needs directly with experts representing the suppliers of the equipments on display.

The following companies chose to exhibit their equipment at this conference: Maury Microwave; Tektronix; Agilent Technologies; Micro-Coax; Southwest Microwave; Aphena/Cambridge RF; Noise Com; and, Cascade Microtech. To exhibit at future conferences, please contact the ARFTG Exhibits Chair, Leonard Hayden ([leonard@cmicro.com](mailto:leonard@cmicro.com)).

## CONFERENCE AWARDS

ARFTG President, Brian Pugh, presided over the awards luncheon. The award for the Best Technical Paper from the previous (62<sup>nd</sup>) conference (held in Boulder, Colorado) was presented to Nick Ridler (NPL) for the paper, “Over-determined calibration schemes for RF network analysers employing generalized distance regression”. The award for Best Interactive Session Paper was presented to Jeff Jargon (NIST) for the paper “Repeatability study of commercial harmonic phase standards”. The award for the Best Exhibitor was presented to Maury Microwave.

Certificates of appreciation were also presented to the organizers of the 63<sup>rd</sup> conference: Conference Chair John Cable; Technical Program Chair Charles Gustof; and the Technical Session Chairs Juan Rodriguez, Natalia Bynum, Dr Peter Winson and Sundown Yeoman.

## CONFERENCE INTERACTIVE SESSION



*Delegates discussing papers on show during the conference interactive session*

This conference featured a total of 16 papers presented during the interactive session. All these papers have been published in the ARFTG conference digest, along with those papers presented during the four technical sessions.

### NVNA USERS' FORUM

36 participants from industry and the academic world signed in for the 4<sup>th</sup> ARFTG NVNA (Nonlinear Vector Network Analysis) Users' Forum, which was held at the Fort Worth Convention Center on Thursday evening June 10<sup>th</sup>. The meeting started with two interactive discussions debating the importance of phase calibration and assessing the maturity of large-signal measurement based behavioural models. Next, Peter Blockley from the Macquarie University (Australia) presented his PhD research on "Instrument Architecture for Millimetre-Wave Time-Domain Signal Analysis," after which attendees made suggestions for potential future work. This was followed by three groups presenting their latest research advancements. Finally, there was room for demonstrations and announcements. The Forum organizers were Dominique Schreurs, Wendy Van Moer and Kate Remley. A summary of the meeting should soon be available at [www.arftg.org](http://www.arftg.org).

### JOINT ARFTG/IMS WORKSHOPS

Two joint ARFTG/IMS workshops were held on Monday June 7<sup>th</sup> at the Fort Worth Convention Center. The workshop "More efficient circuit design by means of large-signal models and large-signal measurements" was organized by Jan Verspecht (Jan Verspecht bvba) and Rüdiger Follman (IMST GmbH), and was

co-sponsored by MTT-1, MTT-11<sup>1</sup> and ARFTG. The workshop was well attended and enabled participants to hear from experts in the large-signal modeling and measurements fields presenting their latest contributions to achieving a faster and improved circuit design cycle. A second workshop, titled "Statistical methods and analysis for microwave measurements", was organized by Dylan Williams (NIST), Uwe Arz (PTB, Germany) and Nick Ridler (NPL, UK). This workshop was also co-sponsored by MTT-11 and ARFTG.

### CD-ROM PROCEEDINGS DIGESTS AND COURSE NOTES AVAILABLE TO PURCHASE

Available for purchase are printed digests and course notes from this and previous conferences. Also the collected ARFTG Digests for 1982-2001 conferences are for sale on CD-ROM. Additional information can be found at [www.arftg.org](http://www.arftg.org) or by contacting Jim Taylor ([jtaylor@blitz-it.net](mailto:jtaylor@blitz-it.net)), the ARFTG Executive Secretary.

### FUTURE EVENTS

#### 5<sup>th</sup> NVNA Users' Forum

There is a change of schedule for the 5<sup>th</sup> Nonlinear Vector Network Analysis (NVNA) Users' Forum. In particular, this forum is being held in conjunction with European Microwave Week 2004, taking place from October 11<sup>th</sup> to 15<sup>th</sup>, 2004, in Amsterdam, the Netherlands. (For more information on European Microwave Week, visit [www.eumw2004.com](http://www.eumw2004.com).)

The NVNA Users' Forum is being held at 4 pm on Tuesday October 12<sup>th</sup> and is being co-sponsored by ARFTG and the European TARGET Network of Excellence ([www.target-net.org](http://www.target-net.org)). As on previous occasions, the Forum organizers are, Dominique Schreurs ([Dominique.scheurs@esat.kuleuven.ac.be](mailto:Dominique.scheurs@esat.kuleuven.ac.be)), Wendy Van Moer ([wendy.vanmoer@vub.ac.be](mailto:wendy.vanmoer@vub.ac.be)) and Kate Remley ([remley@boulder.nist.gov](mailto:remley@boulder.nist.gov)). The agenda should become available at [www.arftg.org](http://www.arftg.org) in due course. People wishing to be added to the e-mail distribution list should contact the Forum organizers.

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<sup>1</sup> MTT-1 is the IEEE MTT Society's "Computer Aided Design" Technical Committee and MTT-11 is the "Microwave Measurements" Technical Committee. More details on MTT-11's activities can be found at [www.mtt.org/measurements](http://www.mtt.org/measurements).

## 64<sup>th</sup> ARFTG Conference



*The Wyndham Resort, Orlando, Florida – venue for the Fall 2004 ARFTG activities*

### ***Microwave Measurements Conference***

The 64<sup>th</sup> ARFTG Conference will be held on December 2<sup>nd</sup> and 3<sup>rd</sup>, 2004 at the Wyndham Resort, Orlando, Florida. The conference theme is "Digital Communication System Metrics". As is usual, the conference will offer ample opportunity for participants to interact with leading professionals in fields such as RF telecommunications and microwave techniques. For more information, visit [www.arftg.org](http://www.arftg.org) or contact the Conference Chair, Joe Tauritz ([j.l.tauritz@el.utwente.nl](mailto:j.l.tauritz@el.utwente.nl)) at the University of Twente or the Technical Program Chair, Bill Eisenstadt ([wre@tec.ufl.edu](mailto:wre@tec.ufl.edu)) at the University of Florida.

### ***NIST/ARFTG Microwave Measurements Short Course***

ARFTG, in cooperation with NIST, will offer its 11<sup>th</sup> annual Microwave Measurements Short Course on November 30<sup>th</sup> and December 1<sup>st</sup>, 2004, in conjunction with the Fall 2004 ARFTG Conference being held in Orlando, Florida. This popular one and a half day course provides both grounding in the fundamentals as well as the latest in measurement techniques taught by the experts.

Basic measurement techniques are covered on Day 1, including: VNA error models and calibration methods; on-wafer measurements; RF connectors and transmission lines; noise and power measurements. Additional in-depth topics are covered on Day 2, including: phase noise, uncertainty of measurement and

large signal network analysis. For more information, visit [www.arftg.org](http://www.arftg.org) or contact the Short Course Director, Dave Walker ([dwalker@boulder.nist.gov](mailto:dwalker@boulder.nist.gov)) of NIST.

### ***Nonlinear Workshop***

The theme for this year's Nonlinear Measurements Workshop is "Pulsed measurements: all the good things they can do". It is being organized by Jonathan Scott of Agilent Technologies, Santa Rosa, California, and will be held on Wednesday afternoon December 1<sup>st</sup>, after the NIST/ARFTG Microwave Measurements Short Course. As in previous workshops this is expected to be an informal interactive event aimed at promoting discussion between the participants. For more information, visit [www.arftg.org](http://www.arftg.org) or contact Jonathan Scott ([jonathan.scott@agilent.com](mailto:jonathan.scott@agilent.com)) about becoming involved.

## 65<sup>th</sup> ARFTG Conference

The 65<sup>th</sup> ARFTG Conference will be held on June 17<sup>th</sup>, 2005 in Long Beach, California, as part of Microwave Week 2005, in conjunction with IMS 2005 ([www.ims2005.org](http://www.ims2005.org)). The main ARFTG conference theme is yet to be announced. For more information, visit [www.arftg.org](http://www.arftg.org) or contact the Conference Chair Tom Ruttan ([thomas.g.ruttan@intel.com](mailto:thomas.g.ruttan@intel.com)) of the Intel Corporation.

## **CHECK YOUR MEMBERSHIP STATUS**

Please check the address label attached to this mailing. It indicates your membership status as either "Member in Good Standing", "Expiring", or "Non-member". To maintain your membership in good standing, you must attend at least one conference per year, or send \$25, for membership renewal, to:

**ARFTG, PO Box 228, Rome, NY 13442-0228.**

## **CORRECTIONS**

Every effort has been made to publish correct information in this newsletter. Any significant errors should be reported to: Nick Ridler ([nick.ridler@npl.co.uk](mailto:nick.ridler@npl.co.uk)) so that corrections can be reported in the next issue of the newsletter.