



AUTOMATIC RF TECHNIQUES GROUP

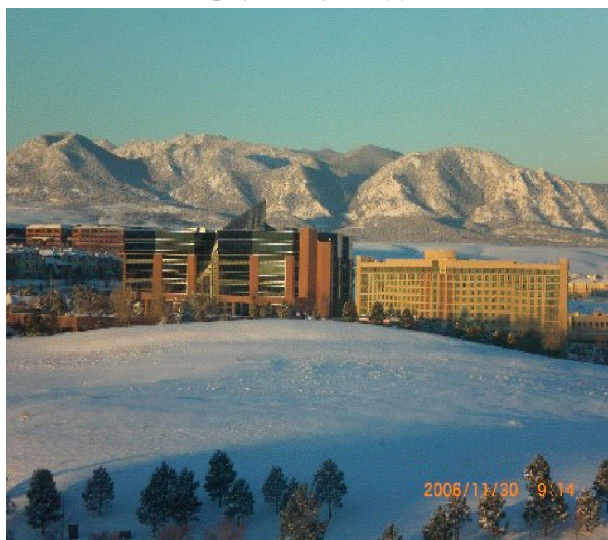
NEWSLETTER

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Fall 2006 ARFTG Microwave Measurement Symposium: “Measurement for Emerging Technologies”

OVERVIEW



The Omni Interlocken Resort, Broomfield, venue for a chilly ARFTG Symposium

The fall 2006 ARFTG Microwave Measurement Symposium took place at the Omni Interlocken Resort, Broomfield, Colorado, over four days from Tuesday, November 28th, to Friday, December 1st. No sooner had events got underway than the snow began to fall making this a most picturesque setting for a fall symposium. As temperatures outside dropped to near 0 °F (-18 °C) the temperature inside started rising as technical debates warmed the atmosphere in both the conference hall and surrounding meeting rooms. As usual, the symposium ‘main event’ was the ARFTG Microwave Measurement Conference, which took place on Thursday and Friday.

However, this was preceded by three other important events: the NIST/ARFTG Microwave Measurement Short Course (held on Tuesday and the Wednesday morning), a Nonlinear Measurement Workshop (held on Wednesday afternoon) and the NVNA Users’ Forum (on Wednesday evening). Taken together, this amounted to four days of exciting activities for RF and microwave measurement specialists.

The following paragraphs review these activities in more detail. There are also brief accounts of other events of relevance to the ARFTG community. To obtain more information on ARFTG and its activities, including details of conferences past, present and future, visit the new improved ARFTG website at www.arftg.org.

SHORT COURSE

The fall 2006 ARFTG Microwave Measurement Symposium began with the 13th annual NIST/ARFTG Microwave Measurement Short Course. This highly successful event provides training, given by acknowledged experts in the field, in most areas of interest to today’s RF and microwave measurement community.

The one-and-a-half day course covered microwave measurement fundamentals, including: VNA error models, calibration and uncertainty; RF connectors and transmission lines; power measurement; phase and thermal noise. Other topics included: uncertainty for complex-valued quantities; optoelectronic and oscilloscope measurements; and, EMC measurement issues.

For information on future ARFTG courses, visit www.arftg.org or contact the Short Course Director, Dave Walker (dwalker@boulder.nist.gov) of NIST.

NONLINEAR MEASUREMENT WORKSHOP

The theme for the ARFTG 2006 Nonlinear Measurement Workshop was “RF Samplers”. It was organized by Jean-Pierre Teyssier, University of Limoges, France, and was held immediately after the NIST/ARFTG Microwave Measurement Short Course.

The workshop contained talks on the following topics: Basics of RF samplers; RF samplers - history, new products and applications; Sampling versus harmonic mixing in VNA applications; RF samplers in oscilloscopes; electro-optic sensors – toward vectorial characterization of microwave electric fields; and, RF samplers - conclusions.

The workshop was attended by approximately 40 people and was a great success. It is planned to hold further workshops on nonlinear measurement related topics at future fall ARFTG events. Thanks are due to all those that were involved in the workshop – especially Jean-Pierre Teyssier who did an excellent job as workshop organizer. A compilation CD containing the presentation material used during the workshop has also been issued and is available for purchase. This CD also contains the presentation materials from all previous ARFTG Nonlinear Measurement Workshops from 2001 and onwards.

Suggestions for future workshop topics should be sent to the ARFTG Workshop Coordinator, Dominique Schreurs (dominique.schreurs@ieee.org).

NVNA USERS’ FORUM - US

The ARFTG NVNA (Nonlinear Vector Network Analyzer) Users’ Forum held a meeting immediately after the Nonlinear Measurement Workshop. This Forum is an informal discussion group devoted to sharing information and issues relating to instrumentation utilized in vector large-signal network analysis of microwave circuits and systems that contain nonlinear elements. On this occasion, 20 people attended the meeting. Specific discussion topics at this meeting included: “Signal measurement and network analysis: when to use which?” and “Behavioral models for digital system PAs extracted from LSNA measurements, verified by VSA”. Current research updates from those working in this field were also given. The Forum organizers were Kate Remley,

Dominique Schreurs and John Wood. A summary of this meeting will be made available at www.arftg.org.

CONFERENCE TECHNICAL SESSIONS

The 68th ARFTG Microwave Measurement Conference began with an introduction by Ronald Ginley, the Conference Chair. Ron then handed the proceedings over to Thomas Ruttan, the Technical Program Chair. Both Ron and Tom are to be congratulated on putting together a first-rate conference program packed with very interesting papers, with the overall theme of “Measurement for Emerging Technologies”. The conference consisted of six sessions one of which was an interactive session featuring papers given as poster presentations. The other sessions consisted of papers given as oral presentations. All papers have been published in the conference digest CD (copies of which can be ordered from www.arftg.org). On this occasion, 73 people attended the conference.



Conference attendees discussing poster papers on show during the interactive session

Voted by the conference attendees as the best oral paper presentation was “Terminology for high-speed sampling oscilloscope calibration” by Dylan Williams et al (NIST, Boulder). The best interactive poster paper presentation was “Comparison of multi-port VNA architectures – measured results” by Thomas Ruttan et al (Intel Corp, Hillsboro). The best exhibitor was voted as Tektronix.

CONFERENCE EXHIBITS

The exhibits area gave conference attendees an excellent opportunity to see the latest range of products available from some of the leading suppliers in the microwave measurements industry. This is also an excellent opportunity to interact with key staff representing these

organizations, so that specific measurement needs can be discussed and solutions to measurement problems identified.



Conference attendees are given ample opportunity to visit the conference exhibits area

The following companies chose to exhibit at this conference: Agilent Technologies, BroadWave Technologies, Cascade Microtech, National Instruments, OML, Rohde & Schwarz, Sonnet, SUSS MicroTec, TEGAM and Tektronix. To exhibit at future conferences, please contact the ARFTG Exhibits Chair at exhibits@arftg.org.

CONFERENCE AWARDS

ARFTG President, John Gregory Burns, presided over the awards banquet, which took place on the evening of November 30th, 2006. Certificates of appreciation were presented to the organizers of the conference, namely: Ronald Ginley, Conference Chair and Conference Host; Thomas Ruttan, Technical Program Chair; and, the session chairs – John Wood, Dylan Williams, Pavel Kabos, Bill Eisenstadt, Kate Remley and Ken Wong. Certificates of appreciation were also presented to Dave Walker, the Short Course Director, Jean-Pierre Teyssier, the Nonlinear Measurement Workshop Organizer, and Joe Tauritz, the ARFTG Exhibits Chair.

The following awards from the previous (67th) conference (held in San Francisco, California) were also given: best oral paper presentation, to Yves Rolain (VUB, Belgium) for the paper, "Tracking the Waveform of Microwave Oscillators"; best poster paper presentation, to Leonard Hayden (Cascade Microtech, Oregon) for his paper "An Enhanced Line-Reflect-Reflect-Match Calibration"; and best exhibitor, to NMDG Engineering.

The following three special awards were also given: the ARFTG Distinguished Service Award, to Brian Pugh,

for his outstanding leadership and dedicated service to ARFTG; the ARFTG Technology Award, to Andrea Ferrero, for the development and implementation of vector network analyzer calibration algorithms and nonlinear measurement techniques; and, the ARFTG Career Award, to John Juroshek, for a career of meritorious achievement and outstanding contribution in the field of automated microwave measurements.



Andrea Ferrero (right) receiving the ARFTG Technology Award from ARFTG President, John Gregory Burns

ANNUAL BUSINESS MEETING

The annual ARFTG Business Meeting was held during the 68th conference and was convened by ARFTG President, John Gregory Burns. A significant part of this meeting consisted of electing five members to serve on the ARFTG Executive Committee (ExCom). Biographies for the candidates were distributed prior to the voting. The election resulted in the re-election of Ron Ginley, Nick Ridler, Dominique Schreurs, Dave Walker and Chip Wilker to the ExCom.

VISIT TO NIST, BOULDER

The 68th ARFTG conference concluded with an afternoon visit to the NIST laboratories in nearby Boulder. Laboratories within the Radio-Frequency Electronics Group were open to visitors, showing some of the state-of-the-art equipment that is currently used for today's measurement research applications at the very highest level.

OTHER RECENT EVENTS: NVNA USERS' FORUM - EUROPE

The NVNA Users' Forum – Europe took place during European Microwave Week 2006. This meeting was co-sponsored by the TARGET European Network of

Excellence (www.target-net.org). 19 participants from industry and the academic world attended the Forum on Thursday evening, September 14th. Specific discussion topics at this meeting included: "Figures of merit for behavioral model comparison" and "Increasing the dynamic range in high power RF measurements using step attenuators". Current research updates from those working in this field were also given. A summary of this meeting can be found at www.arftg.org.

The Forum organizers were Dominique Schreurs, Wendy Van Moer and Kate Remley. A summary of the meeting is available at www.arftg.org.

FUTURE EVENTS

Summer 2007 ARFTG activities

Microwave Measurement Conference

The 69th ARFTG Microwave Measurement Conference will be held on June 8th, 2007, in Honolulu, Hawaii, as part of Microwave Week 2007, which also includes the IEEE MTT-S International Microwave Symposium (www.ims2007.org) and the Radio Frequency Integrated Circuits symposium (www.rfic2007.org).

The theme for the ARFTG conference is "Addressing Metrology Needs for Future High-Speed Information and Communication Systems". For more information, contact the Conference Chair, Dominique Schreurs (dominique.schreurs@ieee.org), of K U Leuven, Belgium, or the Technical Program Chair, Uwe Arz, PTB, Germany (uwe.arz@ptb.de). Alternatively, for up-to-date information on the conference (including dates for submissions of papers, exhibits information, etc), visit www.arftg.org.



The Hilton Hawaiian Village, venue for the 69th ARFTG Microwave Measurement Conference

NVNA Users' Forum – International

The ARFTG NVNA Users' Forum will also hold a meeting during Microwave Week 2007. For more

information, please contact the organizers: Dominique Schreurs (dominique.schreurs@ieee.org), Kate Remley (remley@boulder.nist.gov) or John Wood (john.wood@freescall.com).

Joint ARFTG/IMS Workshops

ARFTG has chosen to sponsor two workshops during Microwave Week 2007. These are: "High speed digital signal integrity workshop", being organized by Thomas Ruttan and Mike Resso; and, "Advances in active device characterization and modeling for RF and microwave", being organized by John Wood and Dominique Schreurs. For up-to-date information on these workshops, contact Dominique Schreurs, (dominique.schreurs@ieee.org) the ARFTG Workshop Coordinator.

NVNA Users' Forum - Europe

It is planned to hold a meeting of the ARFTG NVNA Users' Forum during European Microwave Week 2007, which takes place from October 8th to 12th, in Munich, Germany. More information on European Microwave Week 2007 can be found at: www.eumweek.com.

Fall 2007 ARFTG Symposium

The 70th ARFTG conference will be held in December 2007 in Tempe, Arizona. The conference theme is "High power RF measurement techniques". It is also planned to hold a Short Course on the theme of the conference and a Nonlinear Measurement Workshop alongside this conference. There will also be a meeting of the ARFTG NVNA Users' Forum. For more information, visit www.arftg.org or contact the Conference Chair, Mohamed Sayed (mmsayed@sbcglobal.net), or the Technical Program Chair, John Wood (john.wood@freescall.com) Freescale Semiconductors, Tempe.

CDs, PRINTED DIGESTS AND COURSE NOTES

Two CDs from this fall ARFTG Symposium (one containing the nonlinear workshop compendium of six workshops presentation material, 2001 through 2006, and the other the digest accompanying the 68th conference) are now available for purchase. Paper copies of the course notes from this and earlier symposia are also available as are limited stocks of paper copies of previous conference digests. Finally, the collected ARFTG Digests for conferences during the years 1982 to 2001 are also available on one CD. Additional information can be found at www.arftg.org or by contacting Jim Taylor (jtaylor114@kc.rr.com), the ARFTG Executive Secretary.