Advanced Antenna Systems for 21st Century Satellite Communications

Speaker: Dr. Sudhakar Rao
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LOCATION: University of Arizona, Room ECE 530
DATE: Thurs, Feb 11, 2015, 6:00 pm
Refreshments Provided

ABSTRACT

The 21st century has so far seen several new satellite services such as local-channel broadcast for direct broadcast satellite service (DBS), high capacity K/Ka-band personal communication satellite (PCS) service, hosted payloads, mobile satellite services using very large deployable reflectors, high power hybrid satellites etc. All these satellite services are driven by the operators need to reduce the cost of satellite and pack more capability into the satellite. Antenna sub-system design, mechanical packaging on the spacecraft, and RF performance become very critical for these satellites. This talk will cover recent developments in the areas of antenna systems for FSS, BSS, PCS, & MSS satellite communications. System requirements that drive the antenna designs will be presented initially with brief introduction to satellite communications. Reflector and array antenna designs will be covered in this talk. Advanced antenna system designs for contoured beams, multiple beams, and reconfigurable beams will be presented. Contoured beam antennas using dual-gridded reflectors, shaped single reflectors, and shaped Gregorian reflectors will be discussed. Multiple beam antenna (MBA) concepts and their advantages compared to conventional contoured beams will be introduced. Various designs of the MBA for DBS, PCS, and MSS services will be discussed along with practical examples. Recent advances in feed technology and reflector technology will be addressed and few examples. Advances in multi-band antennas covering multiple bands will be presented. Topics such as antenna designs for high capacity satellites, large deployable mesh reflector designs, low PIM designs, and power handling issues will be included. Advanced high power test methods for the satellite payloads will be addressed. Brief introductions to TT&C antennas, passive inter modulation products (PIM) and multipaction for satellite payloads will be given. Future trends in the satellite antennas will be discussed. At the end of this talk, engineers will be exposed to typical requirements, designs, hardware, software, and test methods for various satellite antennas.

BIOGRAPHY

Dr. Rao became an IEEE Fellow in 2006 and a Fellow of IETE in 2009. He received several awards and recognitions that include 2002 Boeing’s Special Invention Award for series of patents on satellite antenna payloads, 2003 Bohings’ technical achievement award, Lockheed Martin’s Inventor of Technology award in 2005 & 2007, IEEE Benjamin Franklin Key Award in 2006, Delaware Valley Engineer of the Year in 2008, and Asian American Engineer of the Year Award in 2008. He received IEEE Judith Resnik Technical Field Award in 2009 for pioneering work in aerospace engineering. He is the recipient of the IETE’s 2015 Prof. S.N. Mitra Memorial award. He received best reviewer recognition by the IEEE Transactions on Antennas & Propagation Journal for the years 2014 and 2015. Dr. Rao is appointed as the Distinguished Lecturer by the IEEE APS for a three year period (2014-2016). He was the Chair for the IEEE APS “Industry Initiatives Committee” during 2010-2015, Associate Editor for the IEEE Antennas & Propagation Magazine’s “Antenna Applications Corner”, Associate Editor for the IEEE Transactions on Antennas & Propagation, Special Session Organizer/Chair for the last six IEEE APS/URSI Symposia, Technical Program Committee member for IEEE APS/URSI Symposia from last 10 years, and reviewer for the IEEE AP Transactions, WPL. IEE etc.
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Applications can be found online. You will need the references of three current senior members or fellows. If you need assistance, contact Joseph Wu at joewu@ieee.org.
Save the date....

The next meeting will come sometime in the new year!

We currently don’t have another meeting planned right now. But we’ll be active again soon.

Look for another meeting in March or April. Check the IEEE website for updates!

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In the Tucson Section, there are active student branches. The Student Branch Chapter of the MTT frequently brings in speakers from the distinguished lecturer series.

The U of A main student branch is also active. They have been running an open lab space in the ECE department. They have been running their own meetings and occasionally have game nights.

If you’re interested in finding out what they do, or want to help out with a donation go to:

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Upcoming Conferences

2016 Wearable Robotics Association Conference (wearRAcon)
10 Feb - 12 Feb 2016
Arizona Grand Resort
Phoenix, AZ, USA
http://wearablerobotics.com/wearraconfront/

2016 IEEE International Conference on Image Processing (ICIP)
25 Sep - 28 Sep 2016
Phoenix Convention Center
Phoenix, AZ, USA
http://2016.ieeeicip.org/

2016 14th International Symposium on Modeling and Optimization in Mobile, Ad Hoc, and Wireless Networks (WiOpt)
09 May - 13 May 2016
Arizona State University
Tempe, AZ, USA
http://www.wi-opt.org/
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Even if you only have a little bit of time, there’s sure to be an IEEE opportunity that will interest you. Even if you have no free time at all, but have ideas for meetings or activities that promote engineering and the IEEE, let us know! We’d like to hear from you. Please contact Joseph Wu at joewu@ieee.org.