THE BEEET

IEEE Bulletin of the IEEE Tucson Section

March 2013
Volume 13, Issue 2

Tucson Meeting Sponsored by Student Branch of Microwave Theory and Techniques:

Characterization of Space Shuttle Ascent Debris Based on Radar Scattering and Ballistic Properties – Evolution of the NASA Debris Radar (NDR) System

Speaker: Brian M Kent, Ph.D, Air Force Research Laboratory (AFRL)

LOCATION: University of Arizona, Room ECE 530
DATE: Tuesday March 19, 6:00 pm

Refreshments Provided (pizza and soft drinks)

This is a presentation that introduces the NASA Debris Radar (NDR) system developed to characterize debris liberated by the space shuttle during its ascent into space. Radar technology is suited for characterizing shuttle ascent debris, and is especially valuable during night launches when optical sensors are degraded. The shuttle debris mission presents challenging radar requirements in terms of target detection and tracking, minimum detectable radar cross-section (RCS), calibration accuracy, power profile management, and operational readiness. I initially describe the NDR system consists of stationary C-band radar located at Kennedy Space Center (KSC) and two X-band radars deployed to sea during shuttle missions. Various sizes, shapes, and types of shuttle debris materials were characterized using static and dynamic radar measurements and ballistic coefficient calculations. Next, I discuss NASA Debris Radar (NDR) successes, which led to a new challenge of processing the large amount of radar data collected by NDR systems and extracting information useful to the NASA debris community. Analysis tools and software were developed to visualize shuttle metric data in real-time, visualize metric and signature data during post-mission analysis, automatically detect and characterize debris tracks in signature data, determine ballistic numbers for detected debris objects, and assess material type, size, release location and threat to the orbiter based on radar scattering and ballistic properties of the debris. Future applications for space situational awareness and space-lift applications will also be discussed.

INSIDE THIS ISSUE

BIOGRAPHY

Dr. Brian M. Kent, is Chief Scientist, Sensors Directorate, Air Force Research Laboratory. He serves as the directorate's principal scientific and technical adviser and primary authority for the content of the science and technology portfolio. He also collaborates on interdisciplinary research problems that encompass multiple AFRL directorates, groups from other DOD components, as well as NASA's manned space program.

Dr. Kent joined the Air Force Avionics Laboratory in 1976 as co-op student from Michigan State University. He received a NSF Fellowship in 1979, working at both the Air Force Wright Aeronautical Laboratories and the Ohio State University Electroscience Laboratory until completing his Ph.D. Dr. Kent spent two years in the Passive Observables Branch of the Avionics Laboratory, later transferring to the AFWAL Signature Technology Office. From 1985 to 1992, Dr. Kent was involved with classified research efforts, managed through the Air Force Wright Laboratory, now the AFRL.

Dr. Kent has authored and co-authored over 85 articles and technical reports and has written key sections of classified textbooks and design manuals. He has delivered over 200 lectures and developed a DOD Low Observables Short Course that has been taught to more than 2,000 scientists and engineers since 1989. Dr. Kent has provided technical advice and counsel to a wide range of federal agencies, including the Department of Transportation, the Department of Justice and NASA's Space Shuttle Program. He is also an international technical adviser for the DOD and has provided basic research guidance to leading academic institutions.

Message to the Tucson Section

By Joseph Wu

I'd like to invite everyone in the Tucson Section to participate in IEEE. In the last year, we've conducted activities for schools, the University of Arizona, and for you, the membership. These activities are a great way to get involved in IEEE and show the impact of engineers in our community.

We have a great core of volunteers but we could always use your help. I'm asking people to get involved. With more people the Tucson Section could do so much more for the membership and this community.

If you're interested in helping out or becoming an officer, contact us through the following website:

http://ewh.ieee.org/r6/tucson/

Become an IEEE Senior Member!

Do you want to become a senior member of the IEEE? The IEEE wants to promote qualified candidates to senior membership! If you have 10 years of professional experience of which five years of significant professional performance, you are qualified for a senior member upgrade. Educational experience such as a bachelor's degree in an IEEE-designated field counts 4 years to that number, a master's degree counts 5 years and a doctorate counts 6 years. In order to find out more, point your web browser to www.ieee.org and search for senior membership!

Senior Membership:

http://www.ieee.org/web/membership/senior-members/

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....

Next Meeting – Sponsored by the Microwave Theory and Techniques Student Branch Chapter

"Implantable Wireless Medical Devices and Systems"

Speaker: Dr. J.C. Chiao
University of Texas at Arlington

Location: University of Arizona, ECE 530

Date: April 2, 2013

Time: 6PM

Keep Up with the Tucson Section: Join our email list!

The Tucson Section email list delivers the latest IEEE Tucson news right to your email box. To join, simply send an email to

listserv@listserv.ieee.org

Put the following in the body of the message:

subscribe TUCSON-SECTION-ALL yourfirstname yourlastname

You'll receive an email with instructions for confirming your new subscription.

Other News

Upcoming Conferences

2013 Wireless Telecommunications Symposium (WTS 2013)
17 Apr - 19 Apr 2013
Ocotillo Golf Resort
Chandler, AZ, USA
www.csupomona.edu/wtsi

U of A Student Branches

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, helping out various senior projects, and even putting together an Arduino workshop in their spare time. If you're interested in finding out what they do, or want to help out with a donation go to uaieee.com.

IEEE Tucson Section
2626 E Malvern St.
Tucson, AZ 85716

Tucson Section, Institute of Electrical and Electronics Engineers
2626 E Malvern St.
Tucson, AZ 85716

Section Chair:
Brenda Huettner(bphuettner@ieee.org)
Joint AP/MTT/Com/EMC Chapter Chair:
Hao Xin (hxin@ece.arizona.edu)
Newsletter Editor:
Joseph Wu (joewu@ieee.org)
Section Website:
http://ewh.ieee.org/r6/tucson/
Student Chapter Information:
uaieee.com

To report address changes:
address-changes@ieee.org
Other record changes (typographical errors)
record-changes@ieee.org
Other membership issues including subscriptions
member-services@ieee.org
General IEEE Information
1-800-678-IEEE(4333)

We're on the Web!
Visit us at:
http://ewh.ieee.org/r6/tucson

We need to hear from you!

How can we make IEEE a better organization? We can only do it with your help. As a volunteer organization, IEEE depends on your participation to accomplish all of our goals.

As you can see from this newsletter, there are lots of activities where you can actively contribute. Are you good at organization? Volunteer to head one of our Chapters or to help organize our general meetings. Want to show off or improve your internet skills? Volunteer to help with our Web site. Interested in promoting our field to the next generation of engineers? Help with Engineers Week, or as a judge for any of our student competitions.

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.