



SPARKS

Daytona Section Newsletter
September 2014



MONTHLY SECTION MEETING

Thursday September 25th at the Halifax River Yacht Club, 6:00 PM
331 South Beach Street, Daytona Beach, Florida 32114

PRESENTATION TOPIC – Passive Radars using Ambient Illuminators

CHAIRMAN'S REPORT

I hope your summer has gone as well as mine. Our last meeting in April had the usual program with the BCC and ERAU robot teams briefing us on their devices and their participation in SoutheastCon in Kentucky. We also invited our Science Fair winners and their parents to the meeting to be recognized. As usual this program was pretty well attended. However, the Yacht Club had a big meeting in our usual room so we were given the smaller main dining room. We made up for the lesser accommodations with quality of content. Both robot presentations were excellent.

Summer here is nothing to brag about. All the snowbirds head north and we Floridians run from air conditioned buildings to air conditioned cars and back. I tried to imitate the snow birds and stayed with my cousin in New Jersey, my daughter in North Carolina, my granddaughter in Ithaca (at Cornell vet school) and my brother in Erie PA. I was actually cold in Erie but fortunately my brother had a quilt on the bed. I spent about three times as much on gasoline as I do on air conditioning.

Another thing that happened this summer was the IEEE Sections Congress. It was in Amsterdam (the Netherlands). Jeanette volunteered to attend and as I write this she is still there. I heard that food is one of the things the Dutch are good at. I hope Jeanette is having a good time.

I hope you can attend our September 25th meeting and I look forward to seeing you back.

The best,

Tracy

SEPTEMBER PROGRAM

Advances in signal processing over the last decade have generated a worldwide resurgence of interest in passive radars using ambient illuminators. Although computationally intensive, these radars are attractive for their small size and low cost, and dispense of their own transmitter in favor of using existing transmitters of opportunity. Research at Embry-Riddle Aeronautical University has led to several unique passive radar receivers. Experimental demonstrations have shown aircraft tracking using signals from the XM Radio satellites, local aerial surveillance using a single antenna (moving toward "thumbstick" radars), and using RFID-style tags to embed communications signals within passive radar echoes. In addition to experimental work, Dr. Barott's group at ERAU uses simulated environments to study the effect of different scenarios on the surveillance performance of passive radars. This talk will present an overview of these projects as well as present work and possibilities for the future of passive radar.

OUR SPEAKER

Dr. William C. Barott is an Associate Professor of Electrical Engineering at Embry-Riddle Aeronautical University and a 3-time graduate of Georgia Tech. His research focuses on RF systems to detect weak signals, including both passive radars and instruments for radio astronomy. He has been researching passive radar since 2010, and was awarded a research fellowship to spend the summer of 2012 at Wright Patterson Air Force Base. Billy is the student activities chair for the Daytona section and also the advisor of the Embry-Riddle student branch of the IEEE.

ANOTHER TALE FROM THE OLD PROFESSOR

THE TRANSISTOR

The Old Professor just spent a week in North Jersey not far from the Bell Laboratories in Whippany and Murray Hill. I was reminded of the many contributions to science and engineering that came from those laboratories and most vividly the transistor in 1947.

I remember seeing pictures of the first transistor, a simple slab of germanium with what looked like a reshaped paper clip stuck in its side. It just didn't seem that this piece of semiconductor with its paper clip was destined to revolutionize electronics. Some years ago I had a full-size copy of the laboratory notebook pages in which the inventors had drawn a sketch of the crude device. There they entered data; proof the device actually worked. I remember, back then showing the notebook page to a high-school physics teacher and asking what grade the teacher thought the students, Shockley, Brattain and Bardeen should receive for this lab report. "Clearly, this is not good work. This report is sloppy and disorganized; a D at best". I left the issue at that. I wanted to tell the teacher that the "students" won a Nobel Prize for the D, but I resisted the temptation.

Like so many inventions, proving the concept with a laboratory model is the first, small step in a long journey. This transistor was obviously fragile and certainly could not be a part of a portable radio or military system. Most people never heard of germanium. There was no supply of inexpensive germanium of extremely high purity. Although the transistor exhibited amplification, it was very little, hardly worth the effort. It would take a while before the laboratory version of the transistor was developed into a viable component for making electronic devices. For quite a few years after the invention of the transistor, vacuum tubes continued to reign supreme. It was during this transition period that I, as a young boy, became interested in electronics.

I don't often admit to having been around before certain devices existed. I learned my lesson from some previous mistakes. I remember a number of years ago telling my children that I was five years old before we got our first television set. My kids wondered what horrible fate had caused this. Well, the answer was simple, there was no television. "But what did you do at nights?", they wanted to know. "We listened to the radio", I said. Getting another one of those funny looks, I tried to explain to them that the radio used to tell stories like television but without a picture. But it was to no avail.

To return to my story; when I was first interested in electronics the transistor was just beginning to appear on the scene. In 1955, 3.5 million transistors were sold worldwide. To get a feeling for how this would compare to today, a small computer chip has more transistors on a piece of silicon than were sold in an entire year, 1955, worldwide!

Everything I made used vacuum tubes as transistors were very expensive, about \$5.00 each, if you could get one. Just think, at that price, the transistors on a small computer chip would be worth about 16.5 million dollars, and that's in 1955 dollars! With that amount of money you could buy a thousand houses and with the money left over put two brand-new 1955 Cadillac's in the driveway of each one.

Fortunately my friend Wayne had an uncle who could get us some transistors. Back in those days, everyone seemed to have an uncle that could get things. In New Jersey the most common uncle of this type was the one that could get fireworks from down south where fireworks were legal. Wayne's uncle worked for the telephone company, which invented the transistor.

Wayne received five transistors and gave one to me. It was a strange looking black thing with three wires protruding from the bottom. There were very few transistor project articles in the electronics magazines for hobbyists. Wayne got an article from a professional journal showing a simple transistor amplifier. He used two of his transistors to make an audio amplifier for his crystal set. But this was no easy task. These devices could be very easily damaged, particularly by excessive heat while soldering. We assumed that germanium; the substance of which the transistors were made, must be some sort of wax that melts easily. We also had to be very careful about the voltages we applied, as the devices were easily blown out. I made a code practice oscillator with my transistor which worked well and I thought that maybe someday these devices might be useful.

It is amazing how things have changed. By the time I graduated from college, a new semiconductor device, the integrated circuit was appearing on the market. This device contained transistors, sometimes dozens and the rest of the circuit to go along with it. Like the acquisition of my first transistor, I was able to get some prototype integrated circuits from a friend who worked for Texas Instruments and used them for a number of projects.

Every so often I actually use a transistor for some application that lends itself well to a simple transistor circuit. Yup, I can still design the base bias and the emitter degeneration and make the thing work. Just to keep it authentic I do my calculations on my slide rule.

Al Helfrich, Ph.D

DAYTONA SECTION NEWS

Speakers at our April Section meeting were students from ERAU and B-CU robotics teams who did presentations on their projects and experiences for the 2014 SouthCon robotics competition in Kentucky.

We also introduced the winners of the Daytona Section's Special Awards presented at the Tomoka Science and Engineering Fair held in January. In addition, we had the pleasure of hearing a presentation of two Daytona Beach Homeschoolers presenting their work as a RoboSub team on their SeaPerch (autonomous submersible vehicle) for an upcoming RoboSub competition.

Support of students at all levels is important to encourage development of our future engineers. It is one of the most important functions of our Section. We encourage our membership to work with us in this effort and support the students by attending meetings, especially those involving student's projects and presentations.

PICTURES FROM OUR APRIL 2014 SECTION MEETING



ERAU's IEEE SoutheastCon Hardware Competition presenters:
Leo Ghelarducci, Inacio Dias, Nicholas Antonio, Mark Latil, Evan Richardson.
The remaining members of the team are Inacio Dias, Dominick Tournour, and Carey Pfaff



Bethune-Cookman University's IEEE SoutheastCon Hardware Competition presenters:
Nabil Ahmed, Jennifer Jimenez, Kasongo Munza



Nick Serle and Abby Butka, Daytona Beach Homeschoolers presenting their work as the SeaPerch (autonomous submersible vehicle) RoboSub team for their upcoming RoboSub competition.



The 2014 IEEE Special Award Science Fair Winners: Nicholas Fichera from Spruce Creek High School, Senior division winner, and Elizabeth Nami Pruitt from Ormond Beach Middle School, Junior division winner, are introduced by Section Chair Tracy Wichmann.

ERAU NEWS

Saturday April 26, 2014 marked the installation of Lambda-Upsilon chapter of Eta Kappa Nu (HKN), a new honor society at Embry-Riddle



Charter Members from the College of Engineering
Front row, left to right: Jorge Torres, Jacob Bryan, Bharvi Chhaya, Dominick Tournour, Jason Albano;
Back row, left to right: Chris Mimms, Inacio Dias, Billy Barott, Ahmed Saber, Richard Tubbesing IV,
Charles Chang



DAYTONA SECTION SHIRTS

We are pleased to offer Daytona Section polo shirts for our Section members. The shirts are embroidered with the IEEE Logo and DAYTONA SECTION on the left and your name and grade, if desired, on the right. The shirt is a high quality 5 oz, 65/35 poly/cotton pique in Royal Blue with white embroidery. Available in S - 2XL in men's as well as ladies sizes. Price is \$28, including tax, for S-XL size's, 2XL size is \$4 additional.

For more information or to order shirts contact:

Allan Jusko
3706 Longford Circle
Ormond Beach, FL 32174
386-671-3706 or a.jusko@ieee.org

Indicate shirt size and name and grade if desired. Shirts must be paid for before ordering, typical turn around time is 2 weeks. Arrangements can be made to pick up shirts or have them shipped to you.



DAYTONA SECTION COFFEE MUGS

The Daytona Section has available coffee mugs with the IEEE Daytona Section Logo and are available for \$7.00. Purchase one or more to show you support and pride in our Section.

Contact Roger Grubic at 386-441-8958 or roger_grubic@ieee.org for more information.

EDITORS NOTES

The **SPARKS** newsletter is also available on our website <http://www.ieee.org/go/daytona>

Region 3 website

<http://www.ewh.ieee.org/reg/3/>

Melbourne Section website

www.ieemelbourne.org

Orlando Section website

www.ieee.org/orlando

FUTURE MEETING DATES:

The remaining meeting dates for the 2014 session are: Oct 23 and Dec 4

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SEPTEMBER 2014 MEETING

Thursday September 25th at the Halifax River Yacht Club
331 South Beach Street, Daytona Beach, Florida 32114
Just south of the Fire Station at the corner of Beach and Orange

AGENDA

5:30 PM Cocktails
6:00 PM Dinner
7:00 PM Program

TOPIC – Passive Radars using Ambient
Illuminators

SPEAKER- Dr. William Barott, Associate
Professor, ERAU

September 25th Dinner Menu

Slow stewed Beef Burgundy with carrots, mushrooms and potatoes

Chicken Marsala served with mashed potatoes and carrots

Dover Sole with lemon cream sauce served with fingerling potatoes and peas

All entrees served with rolls and butter, house salad, coffee and tea

Unless noted, dinner entrées are \$20.00 each. Students \$10.00 each

A Veggie plate is available on request for \$10

Please contact Allan Jusko with your dinner selections or for program information.

Selection's must be in by Wednesday the 24th at noon so the club has time to order and prepare

Allan Jusko Secretary/Editor 386-671-3706 a.jusko@ieee.org

**If you make reservations and are unable to attend, call at least 12 hrs prior to the event to cancel.
The Section is charged for all dinners ordered, please let us know if your plans change**
