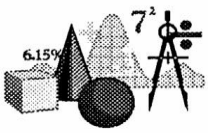

SPARKS

Daytona Section Newsletter
FEBRUARY 2014

MONTHLY SECTION MEETING
Thursday February 27th at the Halifax River Yacht Club, 6:00 PM
331 South Beach Street, Daytona Beach, Florida 32114

PRESENTATION TOPIC – Development of ERAU Minion Autonomous Surface Vehicle

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MEETING NOTE – Our meeting schedule can be seen on the last page of the newsletter

CHAIRMAN'S REPORT

Our January speaker, Dr. Mark Balas, was a great hit. The fact that he is presently a member of the distinguished faculty in Aerospace Engineering at Embry-Riddle Aeronautical University leads one to expect a much more formal presentation. But when the speaker shows up in a cowboy hat you know this is going to be fun. I came to the meeting expecting everything to go over my head - even though in grad school I majored in Control Theory (called Servomechanisms in those days). It did not. The man did a good job of explaining the subject. Even someone as easily confused as I am came away with an appreciation of the technology Dr. Balas has developed. Maybe it was the hat?

I want to draw your attention to last month's newsletter and the article about Engineer's Week. It will come this month and I hope you all support it. Everybody thinks it is hot stuff to be a doctor, fireman, professor, soldier or even lawyer. Engineers should be recognized as people who do good things also. We may not go into harm's way but often what we do keeps other people out of harm. Show your support. It is a great profession and I, for one, am proud and happy to have been in it.

Along those lines Ron Gedney (our Life Member Chair) and I had lunch with a nice lady last week. Her name is Valery Taylor and besides being a pilot she is sponsoring "Engineering 4 Kids". The whole thrust of this organization is to get youngsters, age 4 - 14, interested in becoming engineers. They have a web site (go Google it) which pretty much explains the operation. I don't think our section can get too involved because they are, in part, a profit making entity. They set up classes to teach these children the math and science needed to proceed into engineering and charge tuition. They also push on the educational system to promote these "STEM" courses by offering free internet videos. The need they try to fulfill is to get interest - to get the kids to want to learn. That is probably what the educational system is working on but in the last analysis they are a government organization and we all know how well governments do things. I, for one, am surprised at how well they actually do. I think it is the dedication of overworked and underpaid teachers. These words are meant to instigate a dialog within our section. Think about it. We may not be allowed to participate as an IEEE Section but as individuals we might make a difference.

Tracy

FEBRUARY PROGRAM

DEVELOPMENT OF ERAU MINION ASV

Embry-Riddle Aeronautical University has been selected as one of three schools to represent the United States in the inaugural Maritime RobotX Challenge. This challenge requires teams to develop a fully-autonomous surface vehicle using a 16-foot high-performance Wave Adaptive Modular Vessel. The platform must accomplish multiple complex tasks autonomously, including buoy channel navigation, debris avoidance, docking, target identification and sonar localization. The system architecture consists of software nodes running in parallel to produce the complex behaviors required by the RobotX Challenge. These nodes include state estimation, health monitoring, object classification, map creation and trajectory planning. This method offers a robust and dynamic navigation solution capable of being applied to autonomous systems operating in multiple domains and not just those limited to maritime operations. This presentation discusses the development of the ERAU RobotX platform with a focus on addressing the challenges of autonomy, navigation, and propulsion in a maritime environment.

OUR SPEAKERS

Tim Zuercher holds a B.S. in Aerospace Engineering with a concentration in guidance, navigation, and control. He is pursuing his M.S. and Ph.D in Mechanical Engineering and has been an active member of the Robotics Association at Embry-Riddle (RAER) since spring 2012. Tim has designed embedded circuits and control systems for multiple autonomous vehicles and has been project lead on award winning International Aerial Robotics Competition and Intelligent Ground Vehicle Competition teams. Tim is currently the Control Systems Lead on the Embry-Riddle Maritime Robot-X Challenge ASV.

Hitesh V. Patel holds a B.S in Aerospace Engineering with a concentration on propulsion systems. He is currently pursuing his M.S in Mechanical Engineering and has been an active member of RAER since fall 2010. He has provided mechanical and electrical support for projects such as: RoboBoat, RoboSub, SUAS, NASA Mining Competition, EcoCar 2, SAE Formula Hybrid and NASA Green Flight Challenge. Hitesh is currently the Mechanical Systems Lead on the Embry-Riddle Maritime Robot-X Challenge ASV.

ANOTHER TALE FROM THE OLD PROFESSOR

I WAS AN ANALOG HACKER

The whole idea of being a hacker before the digital age surely needs an explanation. In 1963, after high school I started attending Temple University in downtown Philadelphia.

I had hardly arrived as a new freshman when I learned the position of chief engineer for the school's non-commercial FM broadcast station was open. The position required an FCC commercial license and I was the proud owner of a first class license. I applied and got the job. I was barely 18 years old and the idea that I would be the technical go-to person for a major market broadcast station should have scared me to death but young people don't understand the concept of being in over your head.

I had an assistant, who didn't have that piece of blue paper from the FCC, meaning license, but had worked at the station for a few years. The radio station was in the basement of an old church that served as a theater and a number of classrooms. One of the secrets my assistant showed me was a door at the end of a dark hallway that I assumed was a closet. This door led to the steam tunnel. Nearly all the buildings on campus were connected by a labyrinth of steam tunnels that carried steam from the main steam plant as well as some low voltage AC power and telephone lines. The campus covered several city blocks and this steam tunnel was a nice warm path between buildings. But you always got a funny look when you arrived and left a building from the basement.

Just inside the tunnel, fastened to the wall was a box of electronics that caught my attention. The manufacturer was Simplex Time. There was a telephone line connected to it and it was plugged in to a nearby outlet. I was curious as to what the box did; being connected to a telephone line and apparently nothing else. Then it came to me; the clocks in the building were also Simplex.

Being as curious as cats, my assistant and I removed a clock from the wall and sure enough we found electronics inside. There was an inductor, a pretty good sized capacitor and along with some other minor stuff, a thyratron. But most interesting was a solenoid which we actuated manually to see what the clock did. Upon pressing the solenoid the minute hand of the clock became locked to the second hand and the clock started to advance at 60 times the normal rate. This continued until the clock indicated exactly 3 o'clock and stopped. Then we pressed the solenoid again and the clock started to run normally. But what causes the thyratron to trigger and engage the solenoid? We figured the inductor and capacitor must be a resonant circuit. We injected an audio signal and confirmed it was a resonant circuit tuned to 3.5 kc, kilocycles per second, (Don't forget this was 1963. Hertz wasn't born yet).

Ah-ha! We know how it works. At about 2:45 AM every night a 3.5 kc tone is injected on the power line and triggers the thyratron. All the clocks will now spin at 60 times the normal rate and in 12 minutes or less all clocks will show 3 o'clock. At exactly 3 AM the tone is sent again and the clocks start normally. The box in the steam tunnel was nothing more than a power amplifier that coupled the audio tone from the phone line to the power line.

That gave us the idea of performing the maneuver at some time during the day. Certainly if in the middle of a class the wall clock started spinning out of control it would be noticed and add a little flavor to the class. If the tone were applied to the phone line we could potentially affect every clock on campus. We decided to do this at 2:45 PM. If we did this at some other time, the clocks could be off for hours as they could only be set to 3 o'clock, AM or PM. We were planning a prank not a crime.

At 2:45 PM, the next day we used an audio generator to bridge the phone line in the steam tunnel and applied the 3.5 kc tone for about a second. A quick check of the wall clock in the nearby studio confirmed that we had at least hacked the clocks in our building. At exactly 3 PM we restored normal operation with a second tone.

Pranks are closed loop systems. In other words, if the prankster doesn't get some sort of feedback that the prank was noticed the effort is in vain. It didn't take long until we started to get the feedback. "Man you missed it. You should have been in the 2:30 class. The wall clock started to spin out of control……." reported one of our friends shortly after the deed was done. From other reports we determined we got the whole campus.

Pranksters must understand that pranks are private matters and we listened to the feedback, lamented that we missed it and took no credit for the event. As soon as no one was around we went back to the repair shop and laughed ourselves silly. Now that 51 years has passed, I can now confess; ha, ha, ha, I hacked the clocks!

Al Helfrick, Ph.D

NEWS FROM THE IEEE

2014 CVD Registration is Open

IEEE-USA's annual Congressional Visits Day (CVD) will be held this year on March 25 & 26 in Washington, DC. Any and all IEEE members who are concerned about declining federal investments in basic research, our national labs and our research universities is encouraged to attend.

The CVD offers concerned IEEE members an opportunity to meet directly with your members of Congress and their staff in Washington. This annual event is a crucial part of IEEE-USA's ongoing efforts to protect federal investments in science and engineering.

These efforts are especially crucial in 2014. After three years of tight federal budgets, Congress is looking for additional programs to cut. Basic research and R&D have so far survived the first few rounds

of budget cuts with only modest reductions. But that may be about to change. Programs that the public doesn't know much about or that can be cut without doing immediate damage to too many people are prime targets. R&D fits the bill perfectly. While R&D is vitally important to America's long-term economic prosperity, the fact is, should Congress cut the programs, the country won't feel the impact of these cuts for a few years.

And how many Americans know we have national labs, let alone how they contribute to the country?
If IEEE members want Congress to protect the basic research and R&D budgets, we need to speak up and make sure Congress knows how valuable these programs are to us and our country.
There is simply no better way to get a legislator's attention than to have a voter come to Washington and ask for the legislator's support, especially in an election year.

All IEEE members are welcome and encouraged to attend this year's CVD. To join your colleagues from across the country, go here to learn more and to register: http://www.ieeeusa.org/policy/cvd/
If you would like to speak with your members of Congress, but can't come to Washington, there may be opportunities to hold meetings in your local area. Please contact IEEE-USA staffer Russ Harrison to find out, or if you have other questions about this year's CVD. Russ can be reached at r.t.harrison@ieee.org or (202) 530-8326.

SCIENCE FAIR NEWS

The 47th Tomoka Regional Science and Engineering Fair was held on February 8th at Atlantic High School in Port Orange. Our Section presents a Special Award in both the Junior and Senior divisions for the projects which incorporates the most advanced application or use of Electrical or Electronics Engineering Technology. Tracy Wichmann and Ron Gedney represented the Daytona Section as judges.

The winners of the IEEE Daytona Section Special Awards pictured with Tracy Wichmann were:

Senior Division – Nicholas Fichera
Spruce Creek High School
Project Title - Is a Phototrophic Panel More Efficient then a Stationary Panel?

Junior Division - Elizabeth Nami Pruitt
Ormond Beach Middle School
Project Title - Which Liquid Provides the Best Source of Electricity?

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.

ENGINEERS WEEK 2014
ERAU Engineers Week Keynote Address, Tuesday, February 18, 2014

Dan Korte was President of the Rolls-Royce Defense business and was responsible for the strategy and performance of the $4 billion global defense aerospace business, encompassing 5,500 employees at operations in 17 countries. The business serves 160 customers in 103 countries with over 18,000 engines in service around the world. Dan joined Rolls-Royce in August 2009 and was based at the North American corporate headquarters in Reston, VA.

Dan has more than 20 years of experience in design and systems engineering, integrated product team leadership, as well as supplier, procurement and program management experience.

Prior to joining Rolls-Royce, Dan was Vice President and General Manager for Global Strike Systems, a division of the Boeing Military Aircraft business.

Dan first joined Boeing in 1985 as an electronics engineer. Since then he has held a series of increasingly senior positions to include: V-22 Program Manager and Vice President- Supplier Management & Procurement.

Dan has a BS in Electrical Engineering from Southern Illinois University and an MBA from Lindenwood University, Missouri. He is also a graduate of the Strategic Thinking and Management for Competitive Advantage Program at the University of Pennsylvania's Wharton School of Business. Dan is an active member of the community, serving on the board of directors for United Way of Greater St Louis, on the College of Engineering Industrial Advisory and Foundation boards at SIU Carbondale; and as a member of the board for the St. Louis University Masters of International Business program.

In light of Engineering week, Dan will discuss what has made technical professionals successful in transition from the academic to the corporate world, including insights into successful areas of focus while still in college, how to set oneself apart in a job search and then the factors that can help lead to a successful career. In leading organizations of thousands of engineers, Dan will discuss what sets some apart as leaders in technical and business settings and conversely what are potential career derailers.

The presentation will attempt to be "*PowerPoint Light*" and instead "*Discussion Heavy*". Thus, interactive dialog will be encouraged.

Contact Jeanette Barott at barottj@erau.edu for more information.

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

Region 3 website	**Melbourne Section website**	**Orlando Section website**
http://www.ewh.ieee.org/reg/3/	www.ieeemelbourne.org	www.ieee.org/orlando

FUTURE MEETING DATES:
The remaining meeting dates for the 2013-2014 sessions are: Mar 27th and Apr 24th

2014 SECTION OFFICERS

Chair – Tracy Wichmann
386-673-2753 tracy@alum.mit.edu

Vice Chair - Jeanette Barott
386-226-7405 barottj@erau.edu

Treasurer - Charlie Husbands
386-760-7163 chusbands@ieee.org

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

Membership Development – Dr. Ilteris Demirkiran
386-226-6988 demir4a4@erau.edu

Publicity/Media – Roger Grubic
386-441-8958 roger_grubic@ieee.org

PACE Representatives – Dr. William Barott
386-226-8973 barottw@erau.edu

Jeanette Barott
386-226-7405 barottj@erau.edu

Awards - Dr. Jianhua Liu
386-226-7713 liu620@erau.edu

Life Member Chair – Ron Gedney
386-478-1204 r.gedney@ieee.org

Computer Society Chair – Dr. Keith Garfield
386-226-7081 garfielk@erau.edu

Student Activities, ERAU - Dr. William Barott
386-226-8973 barottw@erau.edu

ERAU Student Chapter Chair- Justin Weltmer
weltmerj@my.erau.edu

Student Advisor, BCU- Dr. Xiaohe Wu
386-481-2673 wux@cookman.edu

BCU Student Chapter Chair- Jennifer Jimenez
321-266-8435
jennifer.jimenez@students.cookman.edu

Webmaster – Charlie Husbands
386-760-7163 chusbands@ieee.org

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

FEBRUARY 2014 MEETING

Thursday February 27th 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 – Development of ERAU Minion Autonomous Surface Vehicle

SPEAKERS - Tim Zuercher and Hitesh V. Patel

February 27th Dinner Menu

Sweet and Sour Chicken with sweet and sour sauce, pineapple and crispy chicken pieces, fried rice and vegetables.

Salisbury Steak with garlic mashed potatoes and vegetables.

Blackened Grouper with garlic mashed potatoes and vegetables.

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 <u>Wednesday the 26th at noon</u> 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

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