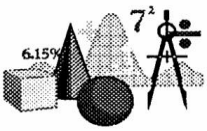
SPARKS

Daytona Section Newsletter
February 2020



SECTION MEETING IN CONJUNCTION WITH ERAU'S ENGINEERS WEEK
Wednesday February 19th at 7:00 PM

LOCATION FOR FEBRUARY'S MEETING
Willie Miller Instructional Center Auditorium
Embry-Riddle Aeronautical University
600 South Clyde Morris Blvd, Daytona Beach, Florida

PRESENTATION
Navigating a Career in Aerospace:
From Jetliners to Satellites & Rockets

CHAIR'S REPORT

Students are highly important to the Institute of Electrical and Electronics Engineers, perhaps better known as the IEEE. The IEEE Daytona Section is fortunate to have a strong student presence at all levels.

The Daytona Section has two student groups, Embry-Riddle Aeronautical University (ERAU) and Bethune-Cookman University (B-CU). The participation in IEEE by the students at these two universities has skyrocketed adding to the high growth numbers of the Daytona Section.

Both universities have been active in the events at the IEEE Southeast Conference (SoutheastCon). There are plenty of student activities at SoutheastCon, which will be held in Raleigh, North Carolina this year. Our section students have done well in the past. Last year, ERAU came in second in the software competition, and B-CU almost won the always-popular robotics competition, except for the loss of one of its four robotic motors. The robotic competition involves machines that go head to head with no human guidance. Both schools plan to compete this March in the same activities.

ERAU also will compete in the Ethics competition and participate in the Social Networking event. Students will also submit and present technical papers.

Moving on to our working members, our Vice Chair for the year 2019 received her PhD last year and is now Dr Helen Hernandez. Unfortunately, at the beginning of this year, Dr Hernandez resigned her Vice Chair position while remaining an active member. Shawn Wilkerson was elected Vice Chair at the January 23rd, 2020, meeting, allowing the Section to maintain a complete slate of officers and complimenting a strong Daytona Section Executive Committee. Mr. Wilkerson is expected to complete his PhD as early as this summer.

Education is good for the individual and for society. IEEE supports developing people at all levels through enhancing their knowledge.

Rich

JANUARY'S PRESENTATION

THE USE OF ARTIFICIAL INTELLIGENCE IN HALIFAX HEALTH INFORMATION TECHNOLOGY

Tom Stafford discussed the architecture of AI-powered encounter documentation with its time-saving components and how it has contributed on other levels, including its positive impact toward the prevention of physician burnout. The AI-powered solution uses cloud-based speech recognition with the aim to make documentation more clinically focused, improve physician engagement with quality initiatives (e.g., the CMS-mandated Merit-based Incentive Payment System), and bring Halifax Health closer to their goal to achieve clinical documentation excellence

Tom Stafford receiving our Daytona Section Travel Mug from
our Section Vice Chair Shawn Wilkerson

FEBRUARY'S ENGINEERING WEEK PRESENTATION

NAVIGATING A CAREER IN AEROSPACE: FROM JETLINERS TO SATELLITES & ROCKETS

The Daytona Section's February meeting will be held in conjunction with Embry-Riddle's celebration of Engineers Week. In place of our regular meeting, we will be attending the February 19th keynote address at Embry-Riddle Aeronautical University delivered by Tamaira Ross. Ms. Ross is Blue Origin's Configuration Design Engineer and Manager. The presentation is sponsored by the College of Engineering and the Honors Program at ERAU.

Ms. Ross is leading the system definition and design for Blue Origin's New Glenn orbital launch vehicle program. Formerly, she was a technical fellow in The Boeing Company's Defense, Space & Security business unit.

In her presentation, Ms. Ross will discuss the parallels between commercial aviation and commercial space as she reflects on her extensive career at Boeing and Blue Origin. According to Ross, the commercial space industry aims to emulate the arc of the commercial airline industry by increasing the life of vehicles, reducing operations and maintenance cost, and increasing the number and types of customers. The drive to reduce cost influences the design of both aircraft and launch vehicles and the systems in which they operate.

ANOTHER TALE FROM THE OLD PROFESSOR

THE UNSUNG TECHNOLOGY HERO OF WORLD WAR II

If you asked someone for three technologies that contributed the most to the Allied victories in World War II, the answer would include RADAR, and the atomic bomb but the third might be a puzzler. If you asked a historian, the third technology would be the radio proximity fuze.

A fuze initiates the explosion of projectiles which could be an artillery shell or a bomb. The simplest fuze is based on impact such as hitting a target or the ground. In most cases, it would be more advantageous or should I say, devastating, for the detonation to occur at a specific altitude or proximity to a target. Some projectiles are intended to penetrate armor and then detonate and special fuzes are used for this purpose.

The earliest "smart fuzes"; to put an old technology in 21st century terms, were introduced in the late 19th century and were to a certain extent "programmable". Most early fuzes were timers that were set by the artilleryman or bombardier before they launched their projectiles. These programmable timed fuzes vastly improved the lethality of artillery shells or bombs. However, before WWII, there were no fuzes that were effective for anti-aircraft artillery or "triple-A". This was due to the fact that the target was fast-moving and very maneuverable. In 1940 it was estimated that it took on average 2500 rounds to shoot down an aircraft. What was needed was a fuze that could determine the proximity of the target to the projectile and when the target was in the field of the shrapnel, detonate.

Several sensor types were considered for triple-A proximity fuzes; optical, acoustic and radio. For a variety of reasons, the radio-based proximity fuze was the clear choice. But there were many difficult hurdles to jump. First, the fuze would have to be small. Triple-A projectiles are much smaller than bombs and space is at a premium.

Second, and very important, unlike bombs that are dropped from an aircraft, triple-A, like all artillery projectiles are ***shot from guns*** and the acceleration is staggering; 20,000 times that of gravity. The gun barrels are rifled so the projectiles spin. Therefore, in addition to linear acceleration there is centripetal acceleration.

WWII electronics were based on vacuum tubes. No ordinary vacuum tube would survive being shot from a gun and would end up looking like Puffed Wheat. Very special tubes would have to be invented. And; just to make the task even more difficult, millions of proximity fuzes would be needed. This implied that inventing rugged vacuum tubes was only the start. Production methods would have to be developed to turn out millions of tubes. And, as if it couldn't get any more daunting; it would have to be done in secret.

In 1940, the National Defense Research Committee, NDRC, started working on a prototype proximity or "variable time"; VT fuze. It was clear that an organization larger than NDRC would be needed to get the prototype ready for full production and Johns Hopkins University was chosen for that task. In 1942 the University created the Applied Physics Laboratory, APL, which was first housed in a vacant used car showroom in Silver Spring, MD.

APL was an academic/research organization and not equipped to manufacture the millions of fuzes required to win the War. One key to the success of the fuze was mass producing the vacuum tubes. Sylvania produced as many as 400,000 tubes a day in its 23 plants while a few other companies added to that total. (Each fuze used 4 tubes.) The Crosley Radio Corporation was a major contributor to the 70,000 fuzes made each day. A total of 2000 companies supplied various components for the VT fuze.

Even with so many companies involved, the VT fuze remained a well-kept secret. The fuzes at first were only used on naval guns over deep water in case a fuze failed to detonate it would be irretrievable and could not be reverse engineered.

Was the VT fuze successful? Absolutely! In the Pacific, the VT fuze improved triple-A against Kamikaze attacks by 400% and doubled the effectivity of non-Kamikaze attacks. Originally approved for use only over deep water, in December 1944, Gen. Eisenhower insisted the VT be made available for conventional land artillery for the European theater. The army version, code-named POZIT, put so much fear in German troops that many would refuse to leave the safety of their bunkers in range of Allied artillery using the POZIT fuze. It was only a matter of months later that the War ended in Europe.

Rating the contributions of electronics to WWII: RADAR? Yeah, it's good; but the little VT fuze deserves plenty of credit for the Allied victories of WWII.

Dr. Al Helfrick, a.k.a The Old Professor

PE CORNER

MENTORING

(Parts of this article are excerpted from an article by Ken Todd, Chair of the FBPE, with permission)

The engineering education that students receive usually prepares them technically for the challenges to come as an engineering professional. However, many do not realize the full extent of what is involved in the practice of engineering. They often express concerns about being in a decision-making position for which they are not prepared due to a lack of practical experience.

Those of us who have been around the block a time or two can help provide confidence to younger engineers through mentoring. Many engineers would be happy to mentor a new engineer if asked, but don't actively seek out the opportunity. Understanding this, Ken Todd, Chair of the FBPE has put forth a challenge to all engineers who are more experienced: He is asking that we take time to mentor those young engineers in your company who are recent graduates. They will appreciate it, and it will be quite rewarding for both you as a mentor and your company through increased productivity.

An experienced engineer, when faced with the challenge of not having previously done the engineering task at hand, can often fall back on past experiences to extrapolate and arrive at the correct answer. However, many young engineers do not have the same level of practical experience needed to make good engineering decisions. Many of us experienced situations as a young engineer right out of college, where we had learned

the theory of various engineering principles, but weren't sure how to best apply what I had learned to solve the problem. Rather than let us struggle to figure it out on our own, many of us had the opportunity to consult with engineers we worked with who took the time to explain the best and most efficient solutions, both technically and administratively, to solve various aspects of engineering projects. This is the type of mentoring where a more experienced engineer can have a positive influence on the career of a younger engineer.

Supervisors of younger licensed engineers should also take care to not place them in a position of making engineering decisions they are not qualified to make. This could lead not only to a problem with the project, but could possibly lead to a disciplinary case against the licensed supervising engineer and the licensed younger engineer. Additionally, the mentoring you do today could help eliminate some bad habits the younger engineer might otherwise carry with them for the rest of their career.

If you aren't already doing so, I encourage those of you who are the more experienced engineers to seriously consider being a mentor to a younger engineer. In the end, I believe you will end up with better projects and you will have an employee who will be an engineer ready to lead our profession in the future.

Whether you are a PE looking to attain required CEHs, or an engineer looking to learn something new or keep current with the latest trends in the profession, IEEE has seminars that will meet your needs. Sign up now!

Art Nordlinger, PE, Senior Member

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 $30, including tax, for S-XL size's, 2XL size is $3 additional.
For more information or to order shirts contact: Allan Jusko 386-671-3706 or a.jusko@ieee.org.

FUTURE MEETING DATES:

Dates for the 2020 spring session are: Mar 26, and Apr 23.

EDITORS NOTES

Visit our Daytona Section website: https://ewh.ieee.org/r3/daytona/

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ENGINEERING HUMOR

FEBRUARY 2020 MEETING

NOTE DIFFERENT LOCATION AND DATE

Wednesday February 19th
Willie Miller Instructional Center Auditorium
Embry-Riddle Aeronautical University
600 South Clyde Morris Blvd, Daytona Beach, Florida

TOPIC– Navigating a Career in Aerospace: From Jetliners to Satellites & Rockets

SPEAKER – Tamaira Ross, Blue Origin Configuration Design Engineer and Manager

AGENDA
6:00 PM Reception
7:00 PM Presentation

THERE WILL BE NO DINNER THIS MONTH

ERAU Campus Map