# SPARKS

**Daytona Section Newsletter**
**February 2016**

## FEBRUARY SECTION MEETING

**SPECIAL ENGINEER'S WEEK PROGRAM**

****** NOTE DATE AND LOCATION ******

**Wednesday February 24th**
**Embry-Riddle Aeronautical University**
**Lehman Bldg. Atrium, 1st floor**
**600 N. Clyde Morris Blvd**
**Daytona Beach**

**PRESENTATION TOPIC**
Overview of Cloud Computing
**Dinner 5:30 PM-** Italian Buffet; **Presentation**- **6:15 PM**

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## CHAIR'S REPORT

Happy Impending Engineers Week to All ! According to Wikipedia, the source of knowledge for all things for lazy people, National Engineers Week is "always the week in February which encompasses George Washington's actual birthday." (This is factually inaccurate, since in at least a couple of years in the past decade it has been hosted with the federal observance of Presidents' Day, as opposed to George Washington's birthday.) The same source shows that it was started in 1951 by the National Society of Professional Engineers in conjunction with President Washington's birthday, since he was considered as the nation's first engineer, due to his survey work. As electrical engineers, computer scientists, and every discipline in between and surrounding, survey work might not sound overly related, or easy to incorporate into our celebration; I suggest that, as an international organization, the IEEE additionally (and perhaps not quietly) observe that February 22 is also the birthday of Heinrich Hertz (who conclusively proved the existence of electromagnetic waves, in addition to a few other things somewhat important to our disciplines and overall quality of life.)

Some, however, remember a different origin and celebration date for Engineers Week. I have heard from a highly reliable source that during the early 1960s, at least on one University campus, Engineers Week was celebrated to coincide with the feast day of St. Patrick, the patron saint of engineers (and, perhaps not coincidentally, beer). He earned this distinction by teaching the Irish to use lime mortar instead of dry masonry when building arches, leading into ceramics and organized crafts. Coincidentally, the week encompassing St. Patrick's Day often encompasses the birthday of Albert Einstein (which occurs three days before), so can also be

treated (quietly, or not) as a celebration more directly related to the IEEE.

Since 2008, we as a Daytona Section have been sponsoring the Engineers Week dinner at Embry-Riddle Aeronautical University (even going so far as to make it our monthly meeting), and the student branch at ERAU has been developing an ever-increasing base of activities for raising awareness on-campus of the IEEE-related disciplines, and assisting in promoting related concepts to visiting K-12 students. While we may quietly raise a glass (or several) to the patron saint a month later, or simply adjust the traditional observance of civil engineering feats to ones more aligned with the IEEE disciplines, I think we can all agree that it's important to not only pat ourselves on the back for our accomplishments, but to serve a role in mentoring and developing the pipeline of future engineers.

Join the section as we celebrate Engineers Week in conjunction with Embry-Riddle Aeronautical University the last Wednesday of February, and let us know what little steps we can take to help you shape the future of engineering.

*Jeanette*

## IEEE MEMBERSHIP RENEWAL

***Remember to renew your membership for 2016***

## FEBRUARY EWeek SECTION PRESENTATION

### OVERVIEW OF CLOUD COMPUTING

Cloud computing is moving from meaningless buzz word to daily reality. People have questions about the nature of the technology, and the control and security they will have over their data. This talk will provide an overview of the challenges and benefits of this new technology, specifically as applied to the international aviation community's Next Generation Airspace mission.

### OUR SPEAKER

Charles Chen is a co-founder and CEO of Skymantics, LLC. He is an expert in the area of System Wide Information Management (SWIM) research and development with a focus on the Flight Information Exchange Model (FIXM) and Flight Object concepts. He is an award-winning author of technical papers published in the Air Traffic Control Association (ATCA) Proceedings, Integrated Communications Navigation and Surveillance (I-CNS) conference, and Open Geospatial Consortium (OGC) testbeds. Charles holds a Bachelors of Electrical and Computer engineering from Auburn University and a M.S. in Systems Engineering from Florida Institute of Technology.

Charles has worked in various testbeds such as the Florida NextGen Testbed, the Open Geospatial Consortium Interoperability Testbed, and the NASA SMART NAS testbed. He has expertise in service oriented architecture with the use of Cloud infrastructure and platform applications to provide advisory and solution services to the FAA, Eurocontrol, NASA, and commercial aviation companies around the world.

## ERAU NEWS

# Tuesday, February 23rd at 6:30 PM


ALL MEMBERS AND GUESTS ARE WELCOME TO ATTEND

In addition, many events are taking place throughout ERAU with faculty, students and staff. For more information contact Kathleen DiLeo, Administrative Assistant, Associate Deans Office, 386-226-6351

## JANUARY'S PRESENTATION

Dr. Tony Hagar's presentation titled "Systems Thinking: Apple Pie and the Sorcerer's Apprentice" discussed how the science of systems thinking forms a framework for grappling with the increasingly challenging issues emerging in our increasingly complex world.

## SECTION NOTES

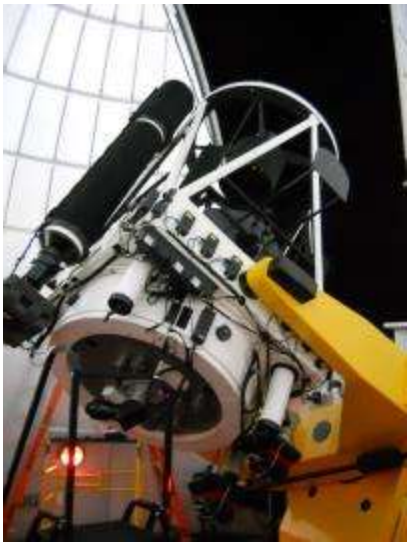
The IEEE is offering loyalty pins to reflect landmark years of membership for members. If you would be interested in receiving one of these pins, please contact the Section Chair, Jeanette Barott (barottj@erau.edu).

## LIFE MEMBER MEETING

Life Members Meeting Friday, Feb. 5 – ERAU Observatory

Dr. Peter Erdman hosted the Life Member meeting on Feb. 5 at the new ERAU Science Building and Observatory. ERAU has a substantial number of degree programs in Astronomy, Astrophysics, and Engineering Physics. Faculty and students carry out research projects in both areas, some using the new one meter telescope. The telescope control center is on the fifth floor of the Science building.

Prof. Erdman showed us a number of large photographs of various constellations that he took from home using a smaller telescope. It was impressive to see what could be accomplished with a knowledgeable researcher.



The one meter telescope is mounted on its own foundation, separate from the building, to minimize vibration. The scope is mounted on huge support beams (six stories high) that go down to this foundation. The platform for the instrument itself, is visibly isolated from the building floor that we were on. The scope is accessed by a curved stairway. When moving the telescope, the whole system turns, including the platform and stairway. This necessary mounting and control system cost approximately $1 million.

Our tour was followed by an Open House and, in spite of the cool and cloudy evening, there were a lot of visitors come to see the Observatory. A few IEEE members stayed to utilize the available, smaller, telescopes made available to the public.

*Ron Gedney*

## ANOTHER TALE FROM THE OLD PROFESSOR

### GOODBYE SPOTS: A REQUIEM

Our sun; our only source of energy is responsible for all the energy we consume today. Fossil fuels are from organic matter that grew millions of years ago fueled by the light of the sun. Even the so-called “renewable” energy such as wind and solar are products of our sun.
We often hear of “energy producers” when referring to electrical power production. Let me set that straight. No organization “produces” energy; they only change the form of the energy. Generating electricity from hydro power is an example of converting the potential energy of water that was lifted up by evaporation and then raining on the reservoir. Nuclear power is converting the potential energy of mass to generate steam to power turbines. Nuclear power, however, is a source of energy not from our sun. Perhaps the only other source of energy not from our sun is the use of the tides which gets is energy from the moon. Depending on which theory of evolution you subscribe to even that energy may have come from our sun.

But the sun hurls all types of energy at us; some of which we are very thankful does not reach us on earth. These energies are ultra violet light, X rays, gamma rays and energetic particles. The short wavelength radiation is absorbed by our atmosphere while the charged energetic particles are deflected away from the earth and sometimes trapped into an earth-orbiting band, the Van Allen belts, due to our magnetosphere.

The atmosphere is affected by this continual bombardment of energy from the sun, most notably a high altitude layer called the ionosphere. The ionosphere does some really cool stuff and some really bad stuff. (This Tale started out sounding very scientific. Of course you weren’t expecting that to last very long.)

The cool stuff is the ionized layer of the atmosphere interacts with radio signals. This was first discovered in the early part of the 20th century. At that time only a few souls were experimenting with radio; which included the military, some commercial ventures and radio amateurs. Those with power and money; that would be the military and commercial guys, were not happy with sharing the radio frequencies with amateurs so the US Government declared they wielded power over the airwaves and banned amateur radio operation to the “short waves” which were deemed to be worthless. Essentially all wavelengths shorter than 200 meters were available to radio amateurs.

But let me make something clear. Those “amateurs” were not amateurs at all. In fact, they knew more about radio than the so-called professionals and before long the “amateurs” had built short wave transmitters and receivers and were talking to each other worldwide.

Well! This got the attention of the so-called professionals. How can such low power home-made equipment communicate long distances when the megawatt apparatus of the so-called professionals could not?

Of course long distance propagation was via the ionosphere which requires shorter wavelengths than that being used by the so-called professionals. Needless to say the US government realized its mistake in giving the entire short wave spectrum to the amateurs and completely revised the frequency assignments.

The use of short waves by amateurs gave insight into the nature of the ionosphere. The state of the ionosphere changes from day to night. Distances achievable during the night are not

achievable during the day and vice versa depending on frequency. That was obvious as it is the sun that affects the ionosphere and the ionization caused during the day dies down at night.

The ionosphere is not very predictable. This remains a problem with the latest technology such as GPS. The radio signals from GPS are slowed down in the ionosphere and the condition of the ionosphere cannot be accurately predicted. Therefore it must be measured in real time and the generated data are used to correct for the slowing.

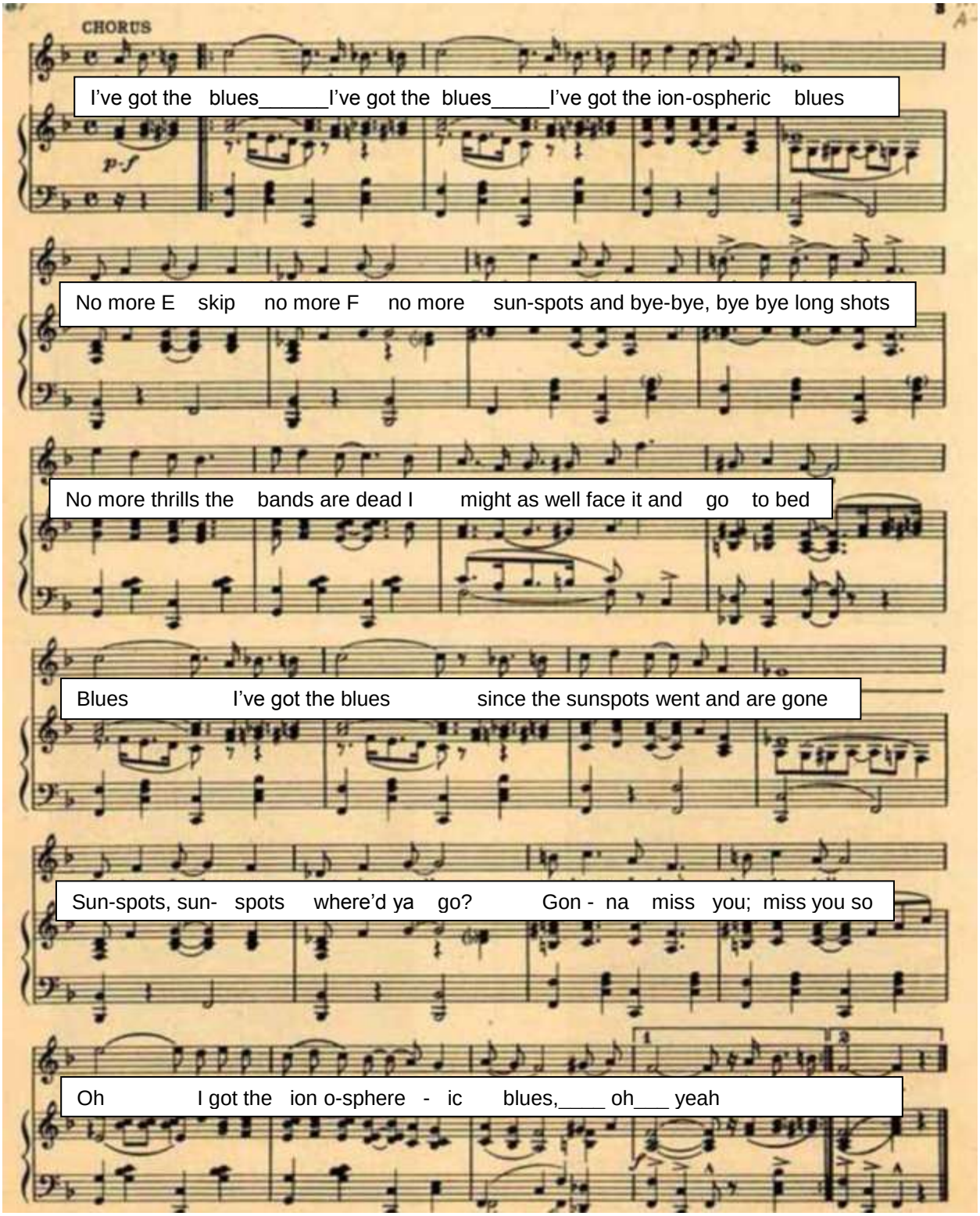
In the early days of radio it was discovered there was a basic cycle to the amount of ionization and that was correlated to the number of visible spots on the sun. Astronomers knew about sunspots for centuries and that they had a cycle of about 11 years.

We are currently on the down slope of sunspot cycle 24. There have been sunspot cycles for millions of years but only 24 have been measured and characterized. Cycle 24 had a double peak and the second peak occurred early January 2014. At the time of this writing the sunspot number is about 25; down from its peak of over 100 and heading to zero in the next few years.

How does the sunspot number affect a person's life? For most people; none. But in the case of the Old Professor, he has taken down all his antennas for frequencies higher than about 15 MHz and has put up antennas for wavelengths shorter than about 2 meters and longer than 160 meters. This is because the shorter wavelengths are not propagated by the ionosphere, and the longer wavelengths are propagated by the ionosphere but can survive with fewer ions.

However the Old Professor has the blues over the departure of the sunspots and has written words for an old prohibition-era blues tune, "Alcoholic Blues"

# Ionospheric Blues




https://www.youtube.com/watch?v=aWgY7YjoH0I

*Al Helfrick*

## 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 $29, 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

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 Ron Gedney at 386-478-1204
or r.gedney@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.ieeemelbourne.org

**Orlando Section website**
www.ieee.org/orlando

## FUTURE MEETING DATES:

The remaining meeting dates for the 2016 spring and fall sessions are: Mar 24, Apr 28, Sep 22, Oct 27, Dec 1. February's meeting will take place Wednesday February 24th at Embry-Riddle

## 2016 SECTION OFFICERS

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# FEBRUARY 2016 MEETING

**Wednesday** February 24th at Embry-Riddle Aeronautical University
Lehman Bldg. Atrium, 1st floor
600 N. Clyde Morris Blvd
Daytona Beach

**TOPIC** – Overview Of Cloud Computing

**SPEAKER -** Charles Chen, CEO of Skymantics, LLC

**AGENDA**
**Dinner 5:30 PM-** Italian Buffet; **Presentation**- **6:15 PM**

A donation is suggested for the buffet
**Members and guests $20.00 each. Students $5.00 each**

**Please contact Allan Jusko by Tuesday the 23rd at noon**
**to give us a count for dinner or for further information**

**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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