What Can You Learn At Ham Radio's FIELD DAY?

https://www.nf4rc.club/

What is Field Day?

Every year for the past 75+, thousands of amateur radio operators have taken to the fields and other impromptu structures for a unique emergency preparedness extravaganza known as "Field Day." After setting up their communications radios, antennas, and power sources, they commence an intense 24 hours of trying to make as many radio connections to other participants as possible. Although there are no formal awards given, there are many great local rivalries! The rules of this exercise are set by their national organization, the American Radio Relay League, formed in the early 20th century. The rules encourage all manner of skills and radio assets useful in emergency communication. One of the key requirements is that although groups can have multiple transmitters (to increase their number of contacts) everything must physically fit within a 1000 foot diameter circle. Because of the power of their transmitters, receivers are at great risk of being completely overwhelmed -- exactly as they would in a real emergency radio base-camp. These rules force local groups to constantly improve their systems with higher quality equipment, better filtering of signals, and advanced communications techniques. And the teams often arrange some pretty fancy meals together as part of the effort, as well!

Learning is a key part of the exercise. In our world, knowledge is power, and allowing young and old alike to learn more about electronics, radio, radio waves, ionospheric propagation and emergency power creation and distribution is a prime part of Field Day.

Learning Opportunities

Combating Electrical Noise

Electrical noise is always the limiting factor in communications. Advanced electrical engineering courses teach about electrical noise, but at Field Day, ordinary amateur radio operators fight it with practical solutions. Modern "inverter" generators produce enormous amounts of electrical noise that can quash their reception of distant, faint signals from thousands of miles away. Alachua County Amateur Radio Emergency Service volunteers have come up with multiple different solutions to the problem of electrical noise in emergency communications, and you can literally see them at Field Day.

Making Amazing Antennas

The early iPhone had a problem with poor sensitivity of its antenna. While cell phones merely need to hear relatively strong signals from cell towers high above the trees only a few miles away, during Field Day radio amateurs are making communications to hundreds of stations all over the nation and without any use of the Internet. It is all driven by reflections/refraction from an ionized layer of rarefied gases hundreds of miles above the Earth. Their antennas must be efficient and yet portable and easily

installed. The radio waves necessary to perform this magic are much larger than the microwaves used by cellphones, so the antennas are also commensurately larger. Some are made from aluminum tubes, others from simple thin wire. Amateurs often construct their own antennas. Furthermore, our local group has taken this quest much farther and build special high power filtering systems that allow multiple high power transmitters to actually use the same physical antenna at the same time! There is no iPhone that can do that!

Applied Math: Modulation

Amateur radio operators span the entire realm of ways to create, transmit, receive and decode signals. Modern cell phones use advanced modulation systems that place many different digital bit streams onto one radio signal -- and our transmitters use a very similar technique in one of our modulation schemes designed by a Physics Nobel Prize winner and now popular all over the world with radio amateurs. That system is used to send short, efficient text-type messages that are very adept at fighting noise. But we also use plain old microphone voice communications as well! And some radio amateurs act like human computers, on-the-fly decoding the original binary-coded signal signal (Morse Code) with their own ears and brain. Amazingly, the human brain is quite adept at fighting noise and these operators often rack up impressive scores!

Getting Your Own License!

Because amateur radio operators have access to quite powerful radio transmitters capable of spreading signals thousands of miles without any need for infrastructure like the Internet, access to these frequencies is limited to those who have passed examinations on ten different facets of radio. Our Alachua County team will also hold introduction training sessions to help local residents start the process of learning the magic so that they, too, can pass the beginning examination and enter this fascinating field!

Teamwork and Cooperation

It is a big effort to pull off this annual emergency preparedness exercise! Our local team has the honor of having achieved the highest score among a certain class of stations (those formally affiliated with their local government's Emergency Operations Center) throughout the entire nation! We plan and carry out our effort using as much as possible, the same techniques and structures used by their authorities for disaster response all over the nation. And working together in austere conditions for 24 hours straight is a good way for folks to really get to know each other!

Your Invitation to Adventure!

All local radio amateurs and also parents, youth, educators, government officials and everyone are welcome to our local Amateur Radio Emergency Service's Field Day effort on Saturday June 27 and Sunday June 28. Further information about how you can visit our event can be found at our website: https://www.nf4rc.club/