The Static

An evolving publication of the Hill Country Amateur Radio Club

...and now a word from the prez.

Our President, Terry Hipskind has deployed to West, Texas to help with disaster response through the Red Cross. Here is his post.

April came with heartbreak for many families in Boston and the small farming community of West, Texas. The Boston bombing took center stage in the news, but the West, Texas disaster was far more destructive. A massive blast sent death, destruction and a shock wave that registered as a 2.5 earthquake at a seismic monitoring station 400 miles away in Amarillo, Texas. The blast killed 15 and injured over 200. Most of those killed were first responders to the initial fire at the plant. One hundred forty three homes and a school were destroyed and 53 homes sustained major damage. A large section of the town was evacuated and declared off limits. Even those occupants whose homes had moderate to no damage were temporarily homeless. Two weeks after the explosion, the city is still required to boil its water.

The following picture of the Hot Zone better shows the devastation from the explosion (red – destroyed, yellow – major, green minor damage). This is the Hot Zone only, other homes sustained damage in the adjoining zone to the south. The fertilizer plant is the complex to the right.

For a small farming community of 2,500 this was devastating. But the disaster assessment completed by the Red Cross the day after the blast, resulted in an emergency declaration and many political visits (Senators, Governor, and President). This was good news for the community to recoup costs and get back on its feet. For those of you that participated in the Disaster Assessment exercise a while back – this is not just for Red Cross files. The results of the assessment determine whether the community gets disaster relief through FEMA.

I was hoping to see ARES in action, but no Amateur communications were in operation. The explosion had no effect on communications - the explosion could not do what Mother Nature easily can. The main cell provider for this little town is AT&T which

was working fine until all the various responders started showing up. At one point the number of out-of-towners out numbered the population of West, Texas. AT&T was all but useless at one point. The Red Cross was already prepared for such a situation; we simply installed Verizon equipment at the Red Cross Disaster Response HQ.

The shelters could have used the HAMs (the ARRL-Red Cross MOU states that we provide Safe and Well service during a disaster), but West is a tight community that takes care of its own and the shelters were not required.

Had there been a need for HAM communications, I did find the forms and requirements which we can use during the upcoming exercise with the Red Cross at the end of this month.

This has been my first non-exercise disaster response. I had expected some chaos, but experienced none. Training is the key. Which is why I am looking forward to the upcoming exercise the HCARC will be participating in with the local Red Cross Chapter and Gillespie County. It is not too early to prepare for the next disaster.

73, Terry

W0HIP

If you are interested in making your own printed circuit boards or drawing schematics, here is a site to download a free program
http://www.expresspcb.com/index.htm

Skimming the Surface: The Return of Tesla's Surface Waves

A favorite idea of Nikola Tesla a century ago, the use of waves that skim the surface of the earth to communicate wirelessly is coming back into vogue.

A hundred years ago, electrical pioneer Nikola Tesla was working on a radical new type of radio using waves that skim the surface of the earth rather than radiate into space. Tesla believed he could transmit signals across the Atlantic using these surface waves but never succeeded in his lifetime, and the idea faded into relative obscurity. Today it's back, with the promise of a new system for high-speed data transmission that would combine the benefits of wired and wireless communication.

Surface waves, or electromagnetic waves, which tend to follow the contours of a surface, had been proven to exist mathematically in Tesla's time. But their practical use was debated. Because they follow the curvature of the earth, surface waves can reach a distant receiver on the ground that is beyond the horizon. "An inexpensive instrument, not bigger than a watch, will enable its bearer to hear anywhere, on sea or land, music or song, the speech of a political leader, the address of an eminent man of science, or the sermon of an eloquent clergyman," Tesla wrote in 1908.

Tesla's attempt at long-range radio failed, apparently because the theoretical physicists neglected a factor that meant the waves could cancel themselves out. But these days, thanks to different wavelengths and materials, scientists are overcoming those problems and creating

radio transmissions that can reach over the horizon.

At high frequencies, a type of surface wave called Zenneck waves can propagate along a surface. They travel better on some materials than others, but performance is best with a conductor covered in a dielectric material. As with wires, these surfaces can carry high bandwidth, are secure, do not cause interference, and require little power. But as with wireless communication, physical contact is not required.

Janice Turner and colleagues at Roke Manor Research of Romsey, U.K., have developed a Zenneck wave demo unit. This can transmit high-definition video over a length of conductor covered with dielectric with a bandwidth of up to 1.5 gigabits per second. Because Zenneck waves do not extend far from the surface there is no interference with electronics and no frequency-licensing issues as there are with other radio-frequency systems. Turner says that tears or breaks in a surface do not cut the connection, making it more robust than wiring, and it's inexpensive to manufacture.

One of the first applications for Roke Manor's waves is likely to be onboard communications on aircraft and satellites. For example, sensors embedded in an aircraft wing could easily communicate with a central computer via surface waves that travel along the wing and fuselage. Satellite components could send data to each other at high speed without the need for complex connectors. Ships are another likely market, because their metal walls block wireless communication.

Turner's team is also looking at wearable wireless gadgets. A lapel camera or a pulse-sensing wristband could connect to a smartphone in your pocket. Such gadgets already exist, but communicate with a phone via Wi-Fi or Bluetooth. This approach has lower power requirements and higher bandwidth, Turner says. They have also had enquiries about using surface waves to recharge devices wirelessly, and this is possible—in principle.

Meanwhile, surface waves are also proving valuable for long-range radar, like the new High Frequency Surface Wave Radar (HFSWR) that the defense contractor Raytheon is developing. Some of the first radar operated via surface waves, and the U.S. Navy used surface-wave radar in the 1950s, but the technology ultimately lost out to other types—in particular, the sky-wave radar in which the signal is reflected back from the ionosphere.

However, normal radar has a serious limitation: It operates within line of sight, which makes objects close to the surface difficult to spot. This is why airborne radar was developed, to prevent intruders from slipping in below the radar. But maintaining continuous radar coverage from the air is expensive and requires a lot of manpower.

Surface-wave radar provides an alternative, because the signal clings to the sea surface and follows the curvature of the earth. Tony Ponsford, technical director for HF Radar at Raytheon Canada, says that that latest version can track ships at about 230 miles from land. (The surface waves work best over a conductive surface, so this type of radar has a much longer range over salt water than over fresh water or land.) Raytheon is building the device for the Canadian government to help manage the country's exclusive economic zone, a region that extends to that distance out to sea. It will undergo operational evaluation later this year.

Raytheon's HFSWR incorporates a number of

features to operate safely in the crowded high-frequency band. If it detects another signal on the same wavelength, such as a radio transmission, it automatically switches to a different wavelength. Raytheon says its patented set of algorithms removes clutter so shipping can be picked out more easily.

This type of radar can be used to track cargo vessels, watch for illegal trawling or dumping, and help with search-and-rescue operations. It can also track smugglers, as it is capable of picking up small go-fast boats. It can even detect icebergs; although obviously nonmetallic, they create a disturbance that shows up "like a hole in the sea," Ponsford says.

Beyond what Raytheon and Roke Manor are doing in the field, there is also some classified military work on surface waves. Some of this appears to be focusing on covert communications, using the unique properties of surface waves to send a signal that cannot be intercepted, over either land or water.

Although scientists have known about them for more than a century, these are in some ways still early days for surface waves. They have so far been exploited in only very limited ways compared to other forms of radio wave, but that may be set to change. Perhaps Tesla's faith in surface waves was simply a sign that he was ahead of his time.

Read more: Skimming the Surface: The Return of Tesla's Surface Waves - Popular Mechanics

END FED 6 – 40 Meter Multiband HF Antenna

Introduction

This project produces an inexpensive, multiband, end fed HF antenna matchbox that is quick and easy to setup and use. The end fed feature adds convenience, but does present another issue. The problem with an end fed half wave antenna is that the antenna presents a high impedance, creating a significant miss match with the usual transceiver impedance of 50 ohms. This miss match is significantly greater than typical tuners can accommodate without a matching transformer.

This project creates a trifilar wound, 9:1 UNUN (unbalance to unbalance) toroid matching transformer that will match the high input impedance of an end fed antenna into the range where most antenna tuners can produce good performance. The matchbox handles 100 watts of power. This project requires an antenna tuner to achieve satisfactory SWR.

The matchbox project uses readily available common hardware and materials. For your convenience, Emergency Amateur Radio Club of Honolulu volunteers make fully assembled matchboxes for those who don’t want to construct one. Proceeds support the club and amateur radio. Order information is included below.

ORDERING MATCHBOX AND PARTS FROM EARC

EARC gives you four ways to obtain a 6-40 meter Matchbox Antenna.

A fully assembled 6-40 Meter Matchbox antenna is $44 including priority mail shipping in the U.S.

A kit of parts excluding adhesives is $35 including priority mail shipping in the U.S.

A set of three core components is $20 including priority mail shipping in the U.S.

A matchbox enclosure and cover is $12 including priority mail shipping in the U.S.

Proceeds go to the club to promote amateur radio activities. To order, make payment via PayPal, to our fundraising chairman, chanebuth@yahoo.com . Be sure to include your

name and mailing address in the remarks section with the PayPal remittance.

We will ship promptly and you will likely receive the order in 7 days or less. If you have any questions about the matchbox or your order, please email Mr. Hanebuth at chanebuth@yahoo.com.

Thank you for your interest in the activities of Honolulu Emergency Amateur Radio Club and amateur radio.

Email your experiences with this project to the club at http://www.earchi.org.

If you prefer you can mail a money order with your address to:

Charles Hanebuth
1026 Kiipohaku Wayd
Honolulu HI 96825-2881

Here's the link to the page:

http://www.earchi.org/92011endfedfiles/Endfed6_40.pdf other

I ordered the three component kit just for fun and the chance to learn something. It arrived quickly and was easy to assemble. I'll report on its performance once I connect it.

The toroids for making the 9:1 UNUN is available from www.Amidon.com for $1.80 each but they have a $20 minimum on orders.

...and another antenna project. Ham radio has so many niches to fool around with and this falls into that category. My son-in-law brought me an old CB base station antenna but did not know what it was. A little on line snooping and a couple of e-mails to my Elmer revealed it to be a Hy Gain CLR-2 produced back in the 70s. It is a 5/8 wave vertical with three elevated radials. I found a manual on line which will save the trial and error of finding screw sizes. A little adjustment of radiator and radial lengths should turn this into a 5/8 wave 10 meter vertical that should work on 12 meters with a tuner. Results to follow. Don't write off 10 meters just yet. I worked a German Dxpedition on Tokelau Island last week on the Tech portion of 10 meters.

73 and happy hamming

Bob, K5YB