Ham 162 - Mythbusters 13

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***Mission**: Reliable, lowest technical common denominator communications locally and regionally, from a HOA.*

Ham (Amateur) is one of the most tradition-based cultures, bordering on religion. Consequently, many practices do not stand the smell-test considering contemporary advancements. Collins made premier equipment, much better than its contemporary Hallicrafters. Neither can hold a candle to Elecraft, or Icom, or for that matter a low priced TYT 9800. In the tradition of *Myth*-busters, let's shred common misconceptions for a few surprises.

Heretic: Someone whose views differ from yours.

Cellphones are special. Not really. A cellphone is a low-powered UHF handi-talkie with essentially an AllStar Asterisk front end. Remember this in the remaining lines. Busted.

Technology and science are the same thing. Technology comes from technique, a way to do something repetitively. Science is a 7-step method to develop and test a new hypothesis. Much of ham is technology, but radical innovation comes from the scientific method, an entirely different breed of cat.

Believe it or not, it is just possible some people may know something, which others do not understand.

High power is necessary to communicate. QRP (Morse symbol for reduced power) talks around the world. On the local Handi-Only-Net, 1-Watt can carry on a very good conversation. Cellphones are milli-watts. Oh.

50 Watts is much more noticeable then 5 Watts. Two times the power is a 3 dB increase. Four times the power is 6 dB, which is also marked as 1 S-unit on the meter. 10 times the power is 10 db. Now to numbers, start with 5 Watts. How many dB is 50 Watt? 10 dB, that is less than 2 S-units. The difference is barely discernible, unless near the noise floor.

High antennas are necessary for good communications. High antennas are what Marconi had to do trying to get into free space. Then, the mathematics was not understood well enough to operate near earth. Height can increase gain. Any height works with tuning. Now, submarines drag an antenna on the water. How high is that?

Antennas must be long, or must be a quarter wave length. See above. There is no magic length for antennas. The wire is an inductor that tunes to the circuit capacitance. A variety of lengths can be used, with proper tuning. Short coils are very effective.

$f = 1/(2\pi \sqrt{L\ C})$

The counterpoise must have three or four radials. British radar and antenna icon Les Moxon proved 50-years ago that two is preferred, but the marketing myth continues.

Counterpoise radials should be one-quarter wave length (0.25λ). Radials can be shortened from 0.25 wavelength to 0.083. The trick is the radiator inductance must be increased by a coil or lengthening from 0.25 wavelength to 0.31. That is a great trade-off for just a slight increase in the radiator.

This antenna has a gain of 9 dB. An antenna is simply an energy conversion machine. It only puts out as much power as the radio shoves in. Any gain takes the energy from one direction and bends it to another direction. The best nature lets us do is about 7 dB. You can have omni or gain, but not both. It really is that simple. Six dB gain to the east has to come from another direction.

The best antenna is ---. There is no best antenna. Some may have an advantage one way, but it will lose in another. The First Law of Energy states unequivocally TANSTAAFL. Yes, for real, that is a law of thermodynamics (the sum of the energy is zero). EVERY physical system is a trade-off. There Ain't No Such Thing As A Free Lunch.

The less a person knows, the more adamant he is in his beliefs and opinion, because it is what he knows - MOD

The same antenna can be used for DX and local. Effective conventional DX antennas have a different radiation pattern from local, so it works poorly. A somewhat exception is elliptical polarization. Some may do local and regional.

Antenna in the attic does not need to be grounded. Antennas need a single-point ground. Attic does not require a lightning protector, since it is under the house cone of protection. Tuned antennas need the ground connector below the ferrite cores, to prevent the shield becoming a counterpoise. Attic antennas are as safe as the house during weather.

Noise is unsolvable. It is tedious. Bond all metal. Use ferrite snap-on cores for coax. Usually, 4 are adequate but 13 may be required. Place ferrite on power lines. Eliminate arcing from LEDs and electric motors. Suppressors may help.

Busted all. The point is simple. Conventional wisdom is seldom wise or science-based. Do what works. That may change tomorrow because of meteorology and interference. So be strong and of good courage. Be not dismayed.

Many people live in a neighborhood with restrictions. We live on a ranch, but as a pragmatic professor, we design antennas so anyone can use. Similarly, we restrict our radios to fit most people in terms of performance, usability, and cost. Each antenna install is unique. Viable commercial options are sparse. So, hams get to build them.

Life is good. Enjoy!