

1. Today, Tuesday, 16 Jan, at 1300, Evergreen Comm achieved another very major milestone.
 - a. Four intrepid scouts activated a local, HF (High Frequency) communication net with no support infrastructure.
 - b. Transmission quality was mostly very good.
 - c. My radio had an S1-S2 noise floor with S5 to S9 reception and the squelch was full quieting.
 - d. One station was mobile. The base units were scattered from south of the river to north Broken Arrow and Coweta. That is awesome.
 - e. Initially using 10-meters, we proved that local emergency, 'come-as-you-are' interchange was viable.
2. Why is that such a big deal?
 - a. This is the type communications people have in their mind when they think ham radio in an emergency.
 - b. It is person-to-person, mano-a-mano, no repeaters, no digital, no internet, no extra hardware, no infrastructure.
 - c. While HF works quite easily for long distance, local is much more difficult, because of radiation patterns.
 - d. Transmission is Beyond-Line-of-Sight (BLOS) and very different from VHF and HF distance (DX).
3. The scouts have proven 10-meter works and are working on antennas to evaluate 6-meter, 40-meter, and 80-meter.
 - a. These are bands the military uses when stuff goes south, for many reasons.
 - b. It seems appropriate to consider them for our emergency exchange when weather, comms, or whatever goes bad.
4. What have we learned, so far? *Antenna is king.*
 - a. *ARRL Antenna Book* has over 1120 pages. You can read it, or note what the intrepid scouts observed.
 - b. These are not absolute rules and recommendations may change, but this is consensus *at this time*.
 - c. EFHW is less than ideal, with poor to no communications in some circumstances because of radiation patterns.
 - d. Dipole works, but has lower signal levels.
 - e. Vertical is preferred according to most all theories, and there are many of them.
 - f. Vertical hamstick worked exceptionally on mobile and base and was the best general-purpose choice.
 - g. The successful antennas are almost round-shaped patterns, which means very little gain, an interesting factor.
 - h. Background noise is devastating, and requires correction. Consider gain, location, connections, and surroundings.
5. Our company's specialty design appears to check a lot of boxes to get good performance in a small package.
 - a. It has three active elements, in a traditional drooped counterpoise shape, but very non-traditional science.
 - b. What looks like passive elements are very much key to the circuit, operating at near the wave zero-crossing.
 - c. All three elements are a tuned, loaded inductor. Tests used a circuit element made from a Shark mini-hamstick.
6. Use the underrated 4" electrical box for a mount. See Ham 132 article.
 - a. Drill a 1/2" hole for an insulated 3/8"-24 SO239 antenna adapter. Place at the top to support the vertical radiator.
 - b. Drill a 3/8" hole which will allow 45-degree droop down for the dipole return. The dipole is offset, not straight.
 - c. Drill another 3/8" hole which allows a complementary 45-degree droop for a counterpoise. Yes, they are different.
7. Tuning is intriguing. This is a sharply resonant design. Be careful to follow the order or resonance will be a challenge.
 - a. Mount the radiator and the dipole return at the appropriate angles. Mount feed-point 6' to 15' above earth.
 - b. Connect an RG8 coax.
 - c. Within a foot of the PL259, snap on 3 to 7 ferrite beads, Mix 31. This is critical for tuning!
 - d. Pick a starting length for the whip. About 5" is a good place. Adjust both radiator and return to that length.
 - e. Connect an antenna analyzer (Rig Expert Stick Pro or similar) to coax.
 - f. Read that band ham SWR vs frequency chart.
 - g. Determine desired tuned frequency. See the Band Plan at Ham 102 for 6 & 10-m or Ham 137 for 40 & 80-m.
 - h. If the Desired frequency is higher than the present Antenna frequency, shorten the tuning whips proportionately.
 - i. Recall, higher frequency is shorter wavelength.
 - j. Repeat until SWR is minimum at the desired tuned frequency.
 - k. This is a hi-Q antenna, so the curve will be very steep.
 - l. Now install the counterpoise. It will widen the bandwidth with a less steep curve.
 - m. I shortened the counterpoise whip to zero.
 - n. Recheck SWR vs frequency.
 - o. If acceptable, remove the Analyzer and connect coax to the radio.
8. Check tuning. When changing frequency, if desired, use radio internal tuning for tweaks. Achievable spread is 1 MHz.
 - a. When resetting the internal tuner, set the Radio frequency to the Analyzer frequency for a first pass.
 - b. Avoid external tuners for many reasons. Reset the radiator & return frequency if necessary.
9. This HF application requires a General or Extra license. We can help you get one in 4-weeks. Promise.
 - a. To help you get online, a Hammer Down HF 'local' net will be Monday night after the Evergreen VHF net.
10. Initial frequency is 29.550 MHZ, FM, but that is sure to change.
11. Life is good. Enjoy!

