

After-Action Report: EOC Jan 26 2021 HF Antenna Improvement

by Gordon Gibby KX4Z NCS521



LEGEND: (yellow lines denote deployed wire antenna segments)

ANT #2 = 130 foot end fed, **newly placed**. Feedpoint is at ground level at the EAST end.

ANT #1 = 270 foot off-center fed. The WEST (longer) end of this antenna was very significantly raised, from its sag @ 15 feet, to heights up to and including 80 feet. (Feedpoint is 35 feet above ground, at the “break” shown in the two segments.)

Background:

High Frequency (“HF”, 3-30 MHz) Antennas provide the Alachua County EOC with backup communications directly to the Florida Div of Emergency Management, Tallahassee, by way of frequencies licensed under the DHS/CISA SHARES program. These allow both voice and digital radio-email in and out of the EOC building without any requirement for an Internet, public switched telephone, or any other local infrastructure. They also provide access to volunteer communications resources throughout the United States. Due to an extremely high ambient radio frequency interference noise profile of the Alachua County EOC building, our HF antennas were moved scores of yards south of the building in 2019 with much improved radio reception. A previously-installed costly HF antenna strung over the EOC building provides an alternative transmitting antenna, but is beset with large amounts of reception noise.

Problem Statement:

1. EOC HF Antenna in woods south of building was sagging along the longer length of its off-center-fed 270-foot span. (This antenna was installed in 2019 and was in a significantly lower noise field than the EOC HF antenna on top of the roof.)
2. EOC HF Antenna in woods south of building is considered at high risk for damage in the event of high winds causing falling trees.

Plan:

1. Add additional higher supports for the longer length (westward 2/3 of entire span) of the off-center-fed 270-foot antenna.
2. Add a new end-fed multiband half-wave antenna of 130-foot length.
3. Add an entirely new 130-foot end-fed half-wave multiband antenna as a backup antenna, such that manual switching of coax connectors at the back fence would allow a choice of either of the antennas.

Events:

Leland Gallup AA3YB, Col. David Huckstep W4JIR, and Gordon Gibby KX4Z assembled at 10:30 AM Jan 26 2021 and began work, continuing until approximately 1:30 PM.

Leland and David were able to thread the longer span through intervening tree obstructions and establish two additional high support points – literally moving the antenna from its sag of only about 12 feet above ground, to soaring 80 feet above the ground, with the majority of its length now at or above the feedpoint height. This work was done with an air-powered “potato rifle,” lead weight and braided fishing line. This significantly reduces its vulnerability to falling limbs as it is above them.

Gordon was able to thread a completely new 130-foot wire under and over tree branches just 5-10 feet south of the fence, starting from ground level and sloping upwards, reaching 40 feet at the westward end. This work was done with a slingshot, lead weight, and braided fishing line.

Due to an oversight, an end-fed 49:1 Balun was not immediately available for the new 130-foot antenna. One will be installed soon, and is not expected to be any difficulty.

Total manhours = 10 volunteer man-hours.

Observations:

1. Vines had grown along the nylon rope supporting the off center fed Balun of the 270-foot antenna, making repositioning of the Balun problematic. The rope is in no danger of breaking, but we were unable to fully lower the Balun. As much as possible, the vines were severed to prevent further growth.

2. At a later date, we intend to remove some of the excess RG-8X coaxial feedline cable still remaining on the 270-foot antenna.

Impact:

1. Ground absorption of signal from the longer (previously sagging) end of Antenna #1 is significantly reduced. This may increase our signal level for both receive and transmit by a modest but significant amount.
2. Takeoff Elevation angle from Antenna #1 is now probably lower and will reach farther, due to the effect of additional height on ground reflections. At frequencies below 8 MHz the antenna will continue to provide excellent service within Florida.
3. Expected to reduce the risk of tree damage to Antenna #1
4. Addition of a new backup alternative HF antenna, the 130-foot Antenna #2. This antenna will have good coverage inside Florida and adequate coverage across continental USA
5. No cost at all to the EOC.

ADDENDUM: Balun Installed and working (1/27/2021)

2 turn/14 turn, autotransformer, two 200pf 1kV capacitors in series to make 100 pf compensation on the 50 ohm port:

