



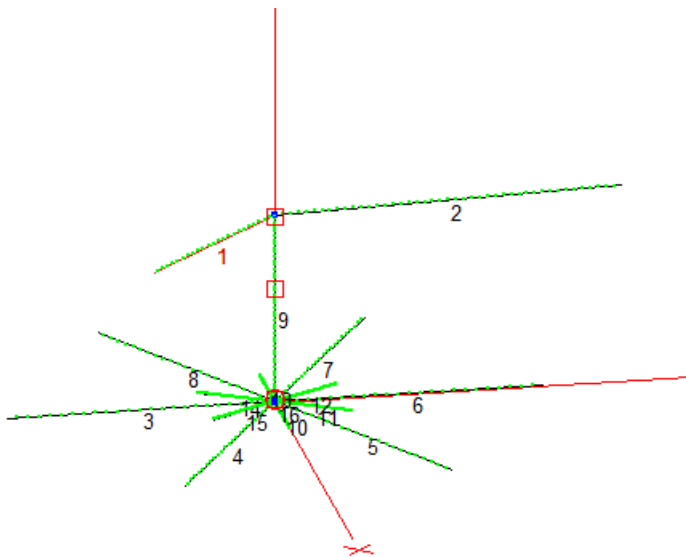
160M antenna improvements

I have some experience with an 80M OCF dipole antenna converted to a flattop Marconiⁱ and worked against a set of inadequate radials from a suburban Halifax, Nova Scotia location, previous to my move to a new QTH in rural Nova Scotia. The Halifax location overlooks salt water and the Atlantic Ocean.

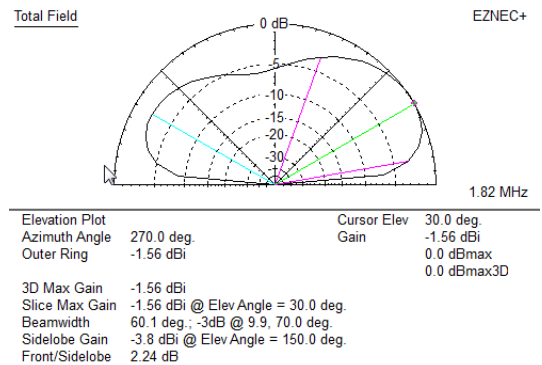
This antenna is surprisingly effective at working on 160M. Mostly used with CW and power, this antenna has sizable ground losses. The radial field is a hodge podge of around 10 random wires laying on the ground, between 30 and 60 feet long. The flat top OCF wire is at 50 feet.

It works fairly well, and favours the NE direction and Europe over the West. Western USA and Western Canada QSO's are rare.

Here is an EZNEC model of this antenna:



1. Length = 130 feet
2. Height = 50 feet at feed point
3. Gain lobe is towards short end of OCF wire
4. Radials modelled 4 inches from poor (rocky) MiniNec ground.
5. LC match located at feed point near ground



In 2018, I moved to a rural location on a lakeⁱⁱ. The new location is not close to the Atlantic Ocean and is closer to the center of the province. The OCF dipole was erected as

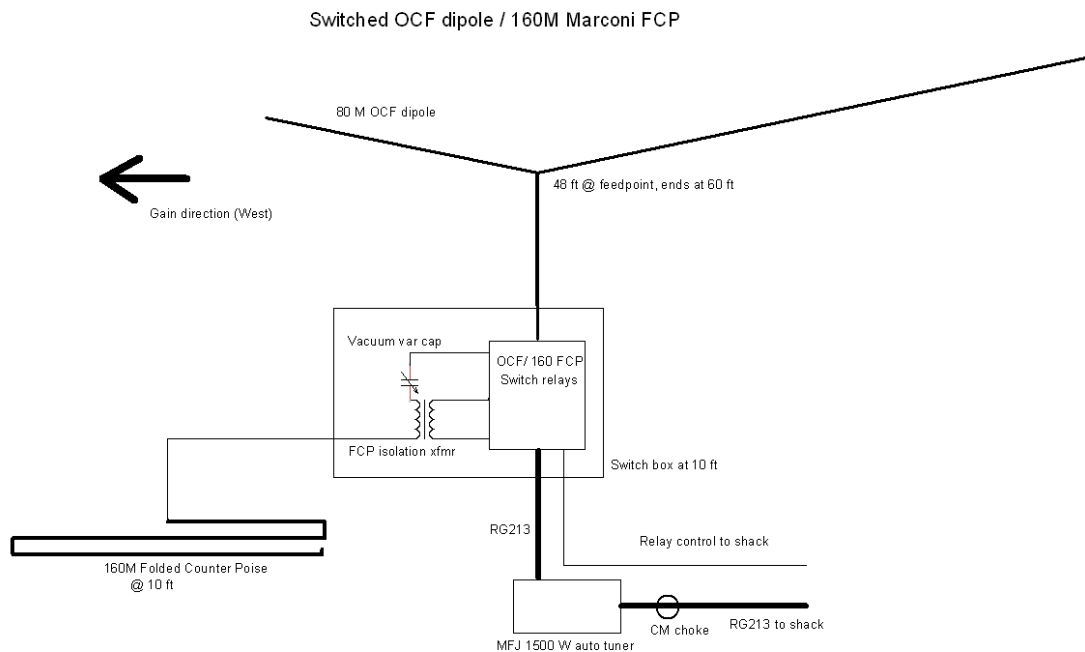
it was at the old QTH, but with slightly less elevation, and the forward lobe aimed to the West. Again, this antenna worked OK and I left it alone until this year.

2021 Upgrades

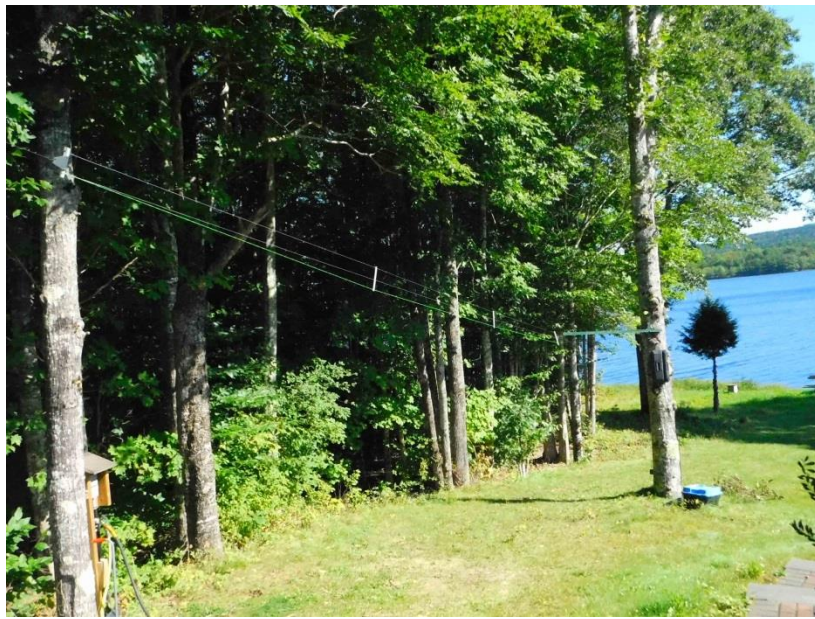
Having some space available at this new location has allowed me to build and upgrade some of my antennas for HF use. It is time for 160M upgrades.

VA1RST installed the 160M Folded Counter Poise (FCP) ⁱⁱⁱ on his inverted L. It previously worked against a limited radial field. Like many others, VA1RST reports substantial improvements in his signal. His L favours the NE direction from Halifax.

I decided to build an FCP, having a particularly convenient setup to do so. The K2AV instructions recommend 10 feet elevation for the FCP. I use my OCF dipole on 80M and up when not in Marconi flat top mode. I chose to build a new switch box mounted on my main OCF support (an oak tree) to allow easily switching between 160 Marconi mode with the FCP, and regular OCF dipole mode. The switch box is mounted at the same height as the FCP. At ground level, below this box is an MFJ high power auto tuner device.



The vacuum variable helps bring the impedance of the flat top OCF closer to 50 ohms. A 4:1 SWR is available at the output coax. The auto tuner matches this to the shack coax. There is a static bleeder network at the top of the match box.

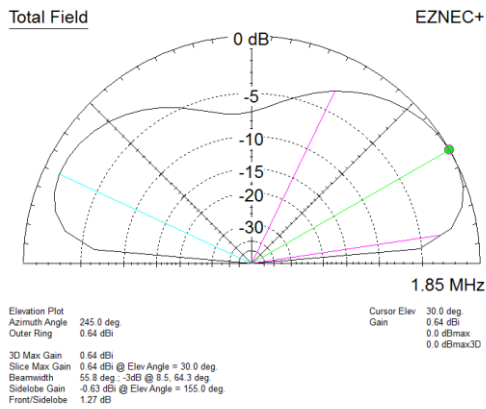
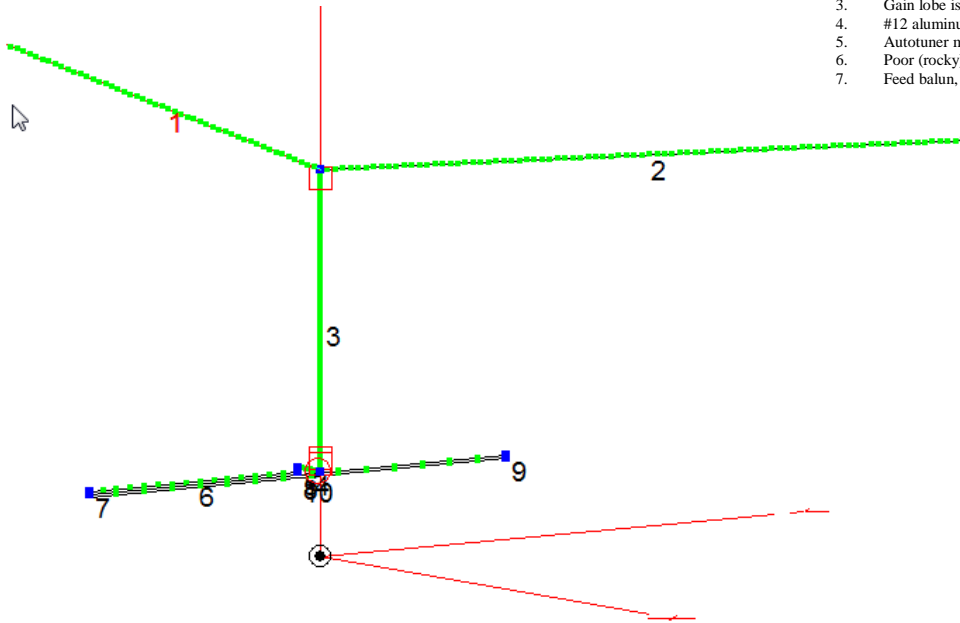


Mk1 and MK II FCP

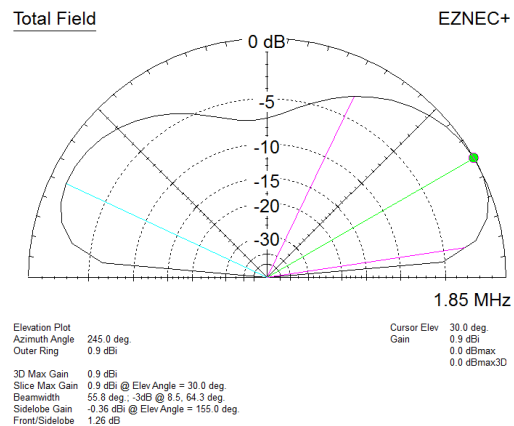
K2AV recommends #12 copper for the FCP. I could not easily locate any #12 copper at the time of building, but I could find #12 aluminum wire.

I modelled the FCP setup with aluminum and copper wire and noticed there was only a .3 dB difference in radiation from the antenna, using the identical ground conditions as my original EZNEC model. I built one with aluminum and trialled it. At same time I ordered #12 hard drawn copper wire for a MKII comparison.

1. Length = 130 feet
2. Height = 48 feet at feed point
3. Gain lobe is towards short end of OCF wire
4. #12 aluminum FCP
5. Autotuner match located at feed point near ground
6. Poor (rocky) MiniNec ground
7. Feed balun, capacitor and FCP transformer included



MK I: Aluminum wire in model



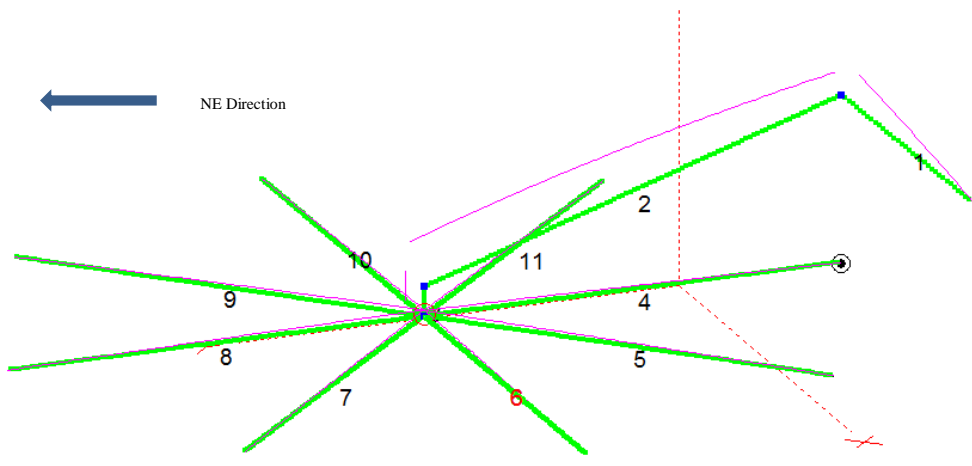
MK II: Copper wire in model

Note the model suggests very little difference in radiation with all copper or all aluminum.

The MK I aluminum counterpoise works quite well. I used the Reverse Beacon Network (RBN) for many tests. SW and W directions are favoured and the RBN testing reveals improved signal strength at the beacons compared to the previous ground radial version.

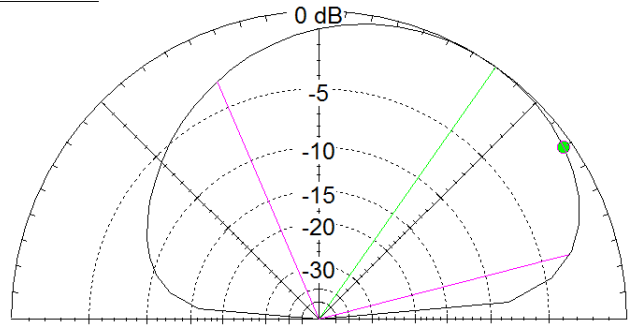
The MKII version is an all copper FCP, and the RBN testing reveals exactly the same signal strengths at the same beacon. From these results, it appears aluminum is OK to use if copper is hard to obtain. Note, all testing is at 800 watts from the rig.

HD8R (Galapagos Island expedition) on 160M answered first call. However, Europe and the NE direction are still a problem.



Total Field

EZNEC+



1.9 MHz

Elevation Plot
Azimuth Angle 90.0 deg.
Outer Ring 5.72 dBi

3D Max Gain 5.72 dBi
Slice Max Gain 5.72 dBi @ Elev Angle = 55.0 deg.
Beamwidth 98.8 deg.; -3dB @ 14.4, 113.2 deg.
Sidelobe Gain < -100 dBi
Front/Sidelobe > 100 dB

Cursor Elev 35.0 deg.
Gain 5.25 dBi
-0.47 dBmax
-0.47 dBmax3D



Testing:

RBN and on the air testing confirms this antenna favours the NE direction. Eu QSO's have been made easily. RBN tests show approx. 5 to 6 dB lower signal strengths to the SW and West compared to the FCP flat top OCF. The EU direction readings with the L sloper were not indicated at all with the FCP OCF Marconi.

What does it all mean ?

I like the results with the switched Marconi mode of the OCF dipole. There is clearly a quantifiable gain in output with the FCP to the West of my QTH.. And the low sloper-L mode antenna with radials, even with it's attendant ground losses is a good antenna to solve my need for an antenna looking to the NE direction at this QTH.

There would be an advantage to having an FCP for this second antenna as well, but since the field location is used for other purposes during the growing season, the roll up radial version is a workable compromise.

Aluminum can be substituted for the FCP if you can't easily locate suitable copper.

Fairly simple, and low lying L antennas can still be effective on 160 M

I am looking forward to the ARRL 160 contest in December to give both of these antennas a better evaluation

CQ WW CW Nov 2021 Results

A single band effort yielded 32 countries and 12 zones. As expected, the L sloper is best antenna to the NE (Europe) and the flat top OC/Marconi with FCP is best to SW and W with 800 watts power to the antenna. Reception varied between transmit antennas, a SAL 20 receive antenna and a mini DADFA^{iv} antenna to the NE.

ⁱ *The Allure of Top Band... and Doing Something About It ! Or.. the Birth of the "WindoVert" :*
<http://www.ve1zac.com/The%20Allure%20of%20Top%20Band.htm>

ⁱⁱ *A New QTH, and a New Loop Array at VE1ZAC / VE1ZU*
<http://www.ve1zac.com/A%20New%20QTH%20and%20Loop%20Array%20at%20VE1ZAC%20Aug%202023%202020.pdf>

ⁱⁱⁱ *Original FCP construction article and notes, updated.* <https://k2av.com/>

^{iv} *DADFA (dual active delta flag array) Notes at*
<http://www.ve1zac.com/My%20Receive%20Antenna%20Compendium.htm>