Crappie Pole Crossed Dipole Antenna

This as an antenna I have been using for some time for portable operation. I often call dipole antennas the "workhorse" of HF antennas. I have tried all kinds of wire antenna configurations and have found dipoles to give the most consistent results, so I tend to gravitate to them for most of my operating.

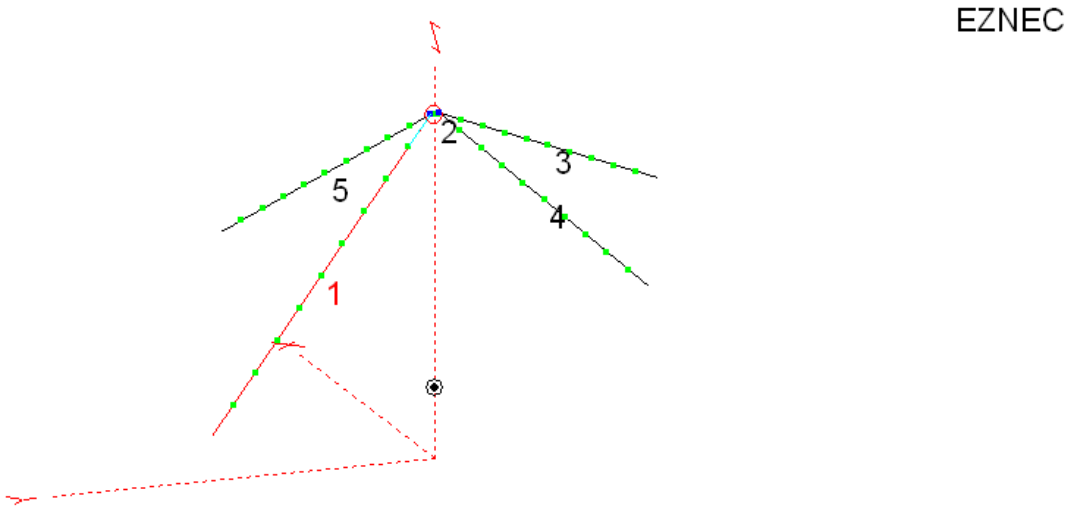
The antenna has actually been around longer than the crappie pole. I bought the 20' Black Widow crappie pole some time back and like so many other portable operators have discovered the virtues of the "crappie pole portable tower". Oh, and it makes a pretty good fishing pole too.

The antenna definitely works, but I don't have enough experience with it to draw conclusions about propagation. The low mounting height would indicate high takeoff angles and more omni-directional patterns (and that will be demonstrated below).

The following includes an analysis using EZNEC. As a general disclaimer, the results of a modeled antenna are never perfect. The model will give a pretty good feel for antenna performance, but actual results will probably vary from the output of the model.

General

The antenna is a three-band portable antenna mounted about 17’ to 20’ above ground. There are two dipole antennas set up at approximately right angles to each other; a 20 meter and 40 meter dipole. The 40 meter dipole will be almost resonant on 15 meters as well. The feed point is located at the center of both antennas and feeds both dipoles simultaneously and is designed for coax feed.



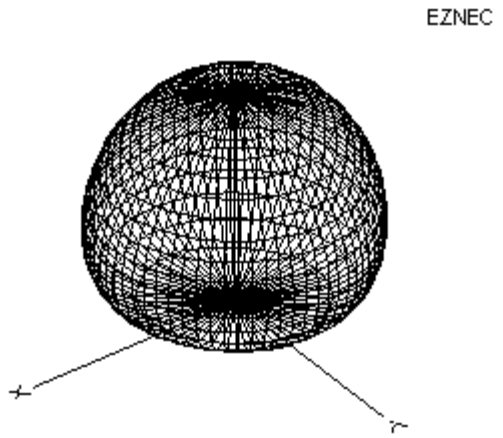
The analysis on the following pages includes the 3 dimensional plots, maximum gain azimuth plots and plots at lower angles. Average ground conditions are modeled. Although the antenna is not really resonant on 10 meters, I also ran plots for that band just for edification.

Conclusion:

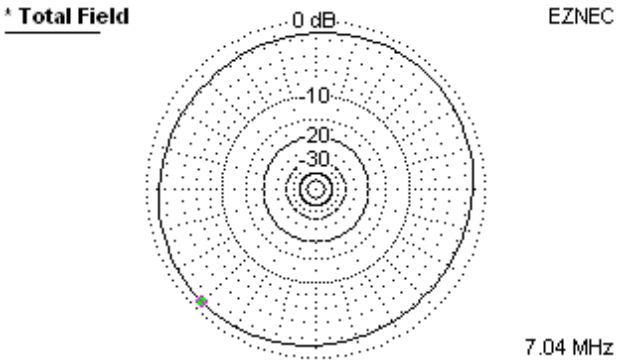
As expected on 40, 20 and 15 meters this antenna has a high takeoff angle, but still some energy at lower angles. On 15 and 10 meters the pattern develops some directional lobes, but still has gain at useable angles. In practice, the antenna will tune up on 10 meters but I would expect noticeable coax loss.

Performance at 40 Meters (7.04 MHz)

3D Plot:

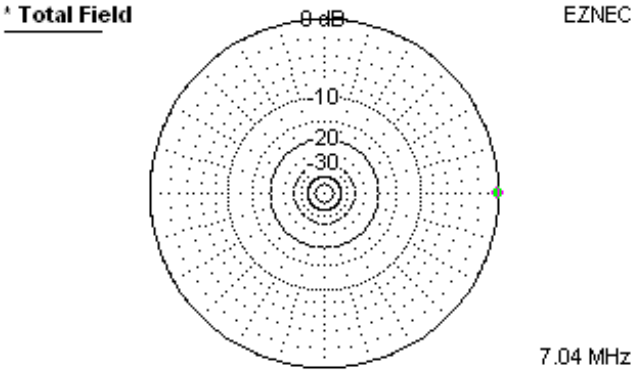


Plot at 60 Degrees Elevation:



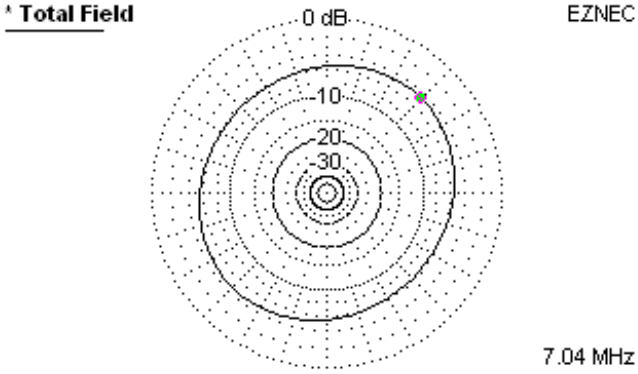
Azimuth Plot		Cursor Az	225.0 deg.
Elevation Angle	60.0 deg.	Gain	6.2 dBi
Outer Ring	7.03 dBi		0.0 dBmax
			-0.83 dBmax3D
3D Max Gain	7.03 dBi		
Slice Max Gain	6.2 dBi @ Az Angle = 45.0 deg.		
Front/Side	0.86 dB		
Beamwidth	?		
Sidelobe Gain	6.2 dBi @ Az Angle = 225.0 deg.		
Front/Sidelobe	0.0 dB		

Maximum Gain Plot (90 degrees elevation):



Azimuth Plot		Cursor Az	0.0 deg.
Elevation Angle	90.0 deg.	Gain	7.03 dBi
Outer Ring	7.03 dBi		0.0 dBmax
			0.0 dBmax3D
3D Max Gain	7.03 dBi		
Slice Max Gain	7.03 dBi @ Az Angle = 0.0 deg.		
Front/Side	0.0 dB		
Beamwidth	?		
Sidelobe Gain	< -100 dBi		
Front/Sidelobe	> 100 dB		

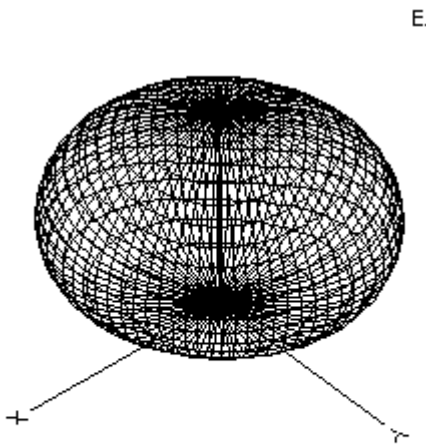
Plot at 30 Degrees Elevation:



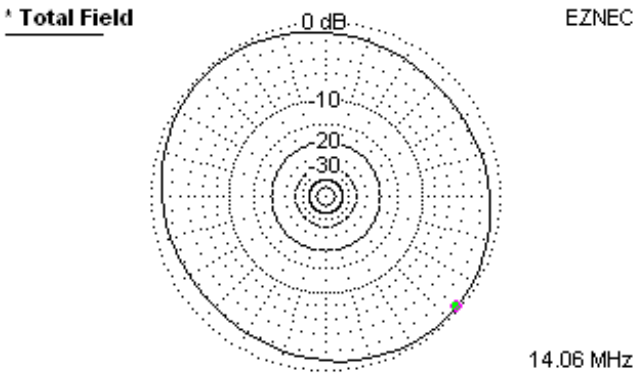
Azimuth Plot		Cursor Az	45.0 deg.
Elevation Angle	30.0 deg.	Gain	2.46 dBi
Outer Ring	7.03 dBi		0.0 dBmax
			-4.57 dBmax3D
3D Max Gain	7.03 dBi		
Slice Max Gain	2.46 dBi @ Az Angle = 45.0 deg.		
Front/Side	1.71 dB		
Beamwidth	?		
Sidelobe Gain	2.46 dBi @ Az Angle = 225.0 deg.		
Front/Sidelobe	0.0 dB		

Performance at 20 Meters (14.06 MHz):

3D Plot:

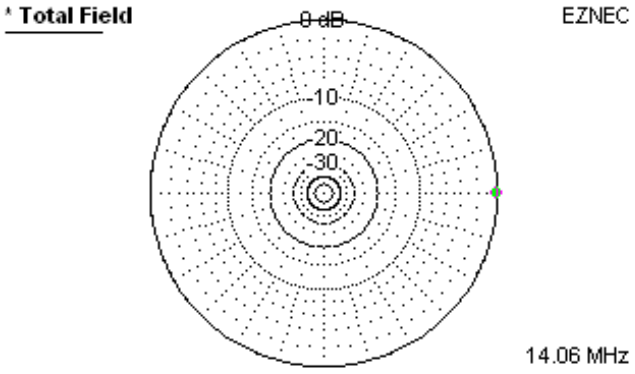


Plot at 60 Degrees Elevation:



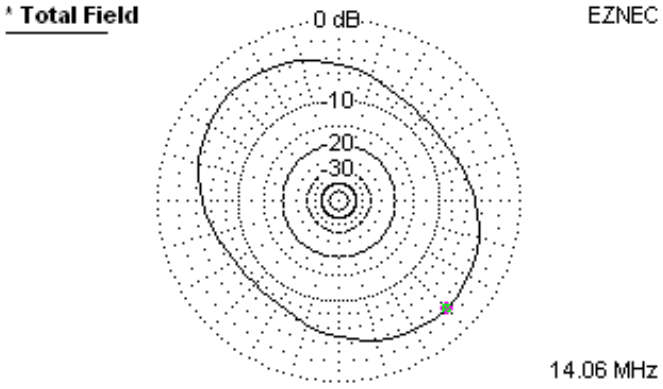
Azimuth Plot		Cursor Az	320.0 deg.
Elevation Angle	60.0 deg.	Gain	4.72 dBi
Outer Ring	5.02 dBi		-0.01 dBmax
			-0.3 dBmax3D
3D Max Gain	5.02 dBi		
Slice Max Gain	4.73 dBi @ Az Angle = 315.0 deg.		
Front/Side	1.51 dB		
Beamwidth	?		
Sidelobe Gain	4.73 dBi @ Az Angle = 135.0 deg.		
Front/Sidelobe	0.0 dB		

Maximum Gain Plot (90 Degrees Elevation):



Azimuth Plot		Cursor Az	0.0 deg.
Elevation Angle	90.0 deg.	Gain	5.02 dBi
Outer Ring	5.02 dBi		0.0 dBmax
			0.0 dBmax3D
3D Max Gain	5.02 dBi		
Slice Max Gain	5.02 dBi @ Az Angle = 0.0 deg.		
Front/Side	0.0 dB		
Beamwidth	?		
Sidelobe Gain	< -100 dBi		
Front/Sidelobe	> 100 dB		

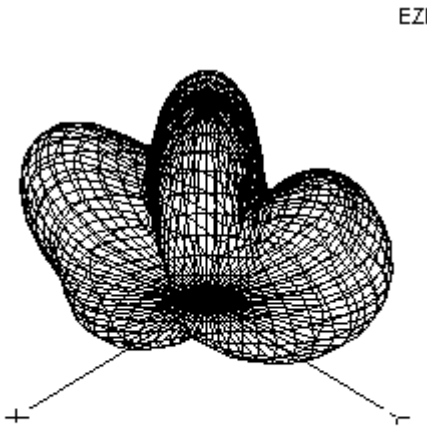
Plot at 30 Degrees Elevation:



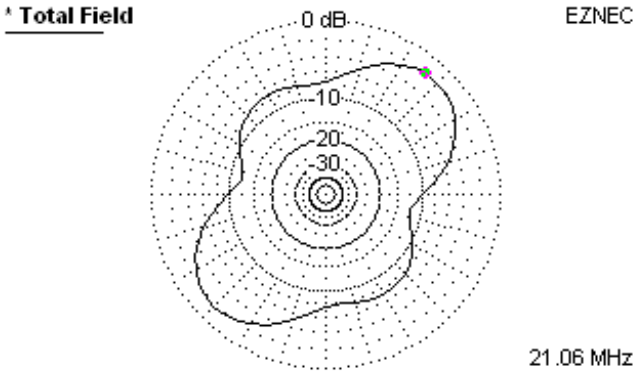
Azimuth Plot		Cursor Az	315.0 deg.
Elevation Angle	30.0 deg.	Gain	2.1 dBi
Outer Ring	5.02 dBi		0.0 dBmax
			-2.93 dBmax3D
3D Max Gain	5.02 dBi		
Slice Max Gain	2.1 dBi @ Az Angle = 135.0 deg.		
Front/Side	4.42 dB		
Beamwidth	119.1 deg.; -3dB @ 75.2, 194.3 deg.		
Sidelobe Gain	2.1 dBi @ Az Angle = 315.0 deg.		
Front/Sidelobe	0.0 dB		

Performance at 15 Meters (210.06 MHz):

3D Plot:

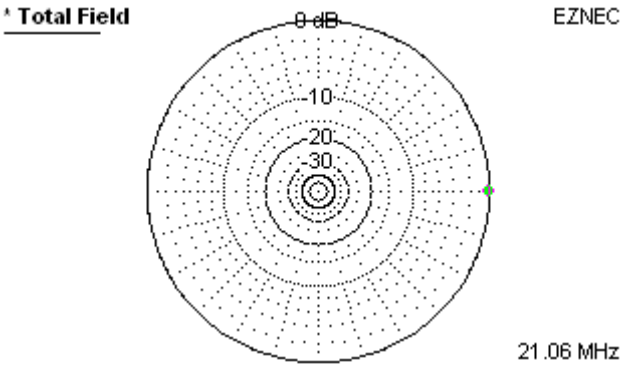


Plot at 60 Degrees Elevation:



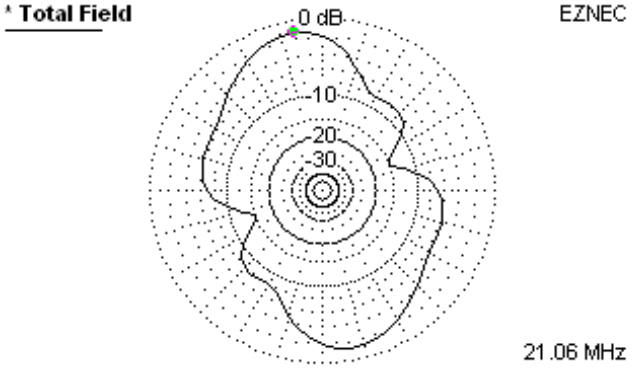
Azimuth Plot		Cursor Az	50.0 deg.
Elevation Angle	60.0 deg.	Gain	4.93 dBi
Outer Ring	6.73 dBi		-0.12 dBmax
			-1.8 dBmax3D
3D Max Gain	6.73 dBi		
Slice Max Gain	5.05 dBi @ Az Angle = 225.0 deg.		
Front/Side	5.96 dB		
Beamwidth	54.7 deg.; -3dB @ 198.1, 252.8 deg.		
Sidelobe Gain	5.05 dBi @ Az Angle = 45.0 deg.		
Front/Sidelobe	0.01 dB		

Maximum Gain Plot (90 Degrees Elevation):



Azimuth Plot		Cursor Az	0.0 deg.
Elevation Angle	90.0 deg.	Gain	6.73 dBi
Outer Ring	6.73 dBi		0.0 dBmax
			0.0 dBmax3D
3D Max Gain	6.73 dBi		
Slice Max Gain	6.73 dBi @ Az Angle = 0.0 deg.		
Front/Side	0.0 dB		
Beamwidth	?		
Sidelobe Gain	< -100 dBi		
Front/Sidelobe	> 100 dB		

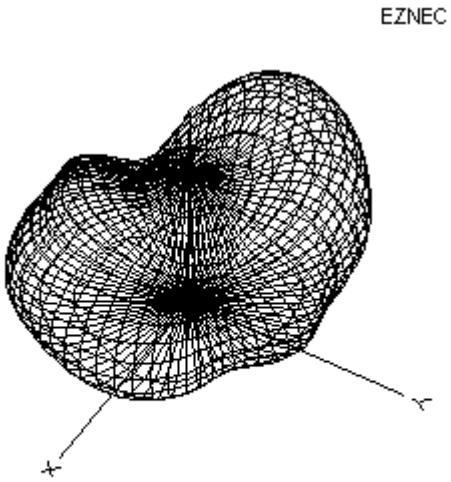
Plot at 30 Degrees Elevation:



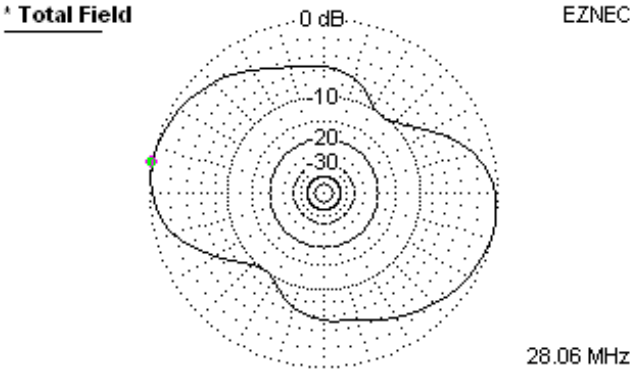
Azimuth Plot		Cursor Az	100.0 deg.
Elevation Angle	30.0 deg.	Gain	5.47 dBi
Outer Ring	6.73 dBi		-0.01 dBmax
			-1.26 dBmax3D
3D Max Gain	6.73 dBi		
Slice Max Gain	5.48 dBi @ Az Angle = 280.0 deg.		
Front/Back	0.01 dB		
Beamwidth	56.5 deg.; -3dB @ 257.6, 314.1 deg.		
Sidelobe Gain	5.47 dBi @ Az Angle = 100.0 deg.		
Front/Sidelobe	0.01 dB		

Performance at 10 Meters (28.06 MHz):

3D Plot:

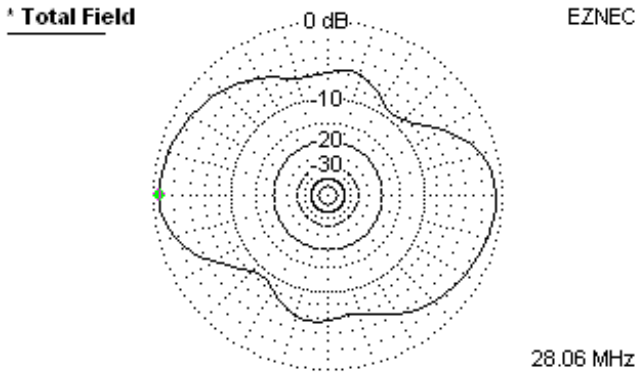


Maximum Gain Plot (40 Degrees Elevation):



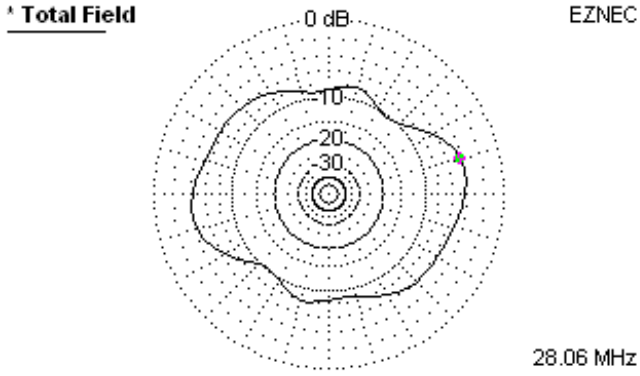
Azimuth Plot		Cursor Az	170.0 deg.
Elevation Angle	40.0 deg.	Gain	5.4 dBi
Outer Ring	5.4 dBi		0.0 dBmax
			0.0 dBmax3D
3D Max Gain	5.4 dBi		
Slice Max Gain	5.4 dBi @ Az Angle = 170.0 deg.		
Front/Back	0.01 dB		
Beamwidth	76.8 deg.; -3dB @ 123.6, 200.4 deg.		
Sidelobe Gain	5.39 dBi @ Az Angle = 350.0 deg.		
Front/Sidelobe	0.01 dB		

Plot at 30 Degrees Elevation:



Azimuth Plot		Cursor Az	180.0 deg.
Elevation Angle	30.0 deg.	Gain	4.88 dBi
Outer Ring	5.4 dBi		0.0 dBmax
			-0.52 dBmax3D
3D Max Gain	5.4 dBi		
Slice Max Gain	4.88 dBi @ Az Angle = 180.0 deg.		
Front/Back	0.02 dB		
Beamwidth	79.4 deg.; -3dB @ 126.3, 205.7 deg.		
Sidelobe Gain	4.86 dBi @ Az Angle = 0.0 deg.		
Front/Sidelobe	0.02 dB		

Plot at 15 Degrees Elevation:



Azimuth Plot		Cursor Az	15.0 deg.
Elevation Angle	15.0 deg.	Gain	1.11 dBi
Outer Ring	5.4 dBi		-0.22 dBmax
			-4.29 dBmax3D
3D Max Gain	5.4 dBi		
Slice Max Gain	1.33 dBi @ Az Angle = 190.0 deg.		
Front/Back	0.01 dB		
Beamwidth	94.3 deg.; -3dB @ 118.9, 213.2 deg.		
Sidelobe Gain	1.32 dBi @ Az Angle = 10.0 deg.		
Front/Sidelobe	0.01 dB		