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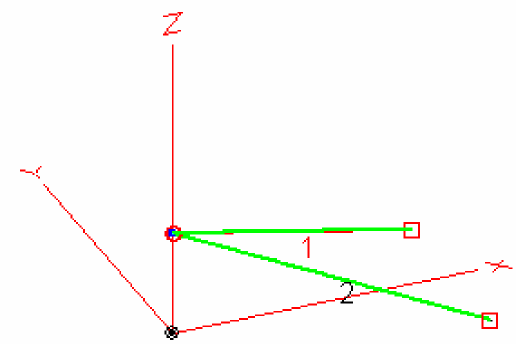
Array Solutions Vee Beam Series AS-Vee-XXX

A VeeBeam can be terminated or non-terminated. Terminating the antennas gives it a uni-directional lobe in the direction of the terminating loads. It also makes the antenna braoad-banded with a VSWR of less then 2:1 over it's useful frequency. This is useful for military ALE radios, and agencies that can go to many different frequencies, it is also useful for amateur radio operation within all the HF amateur radio bands. The basic Vee beam appears as in the following model simulated with NEC 2.



The AS-Vee-XXX Antenna consists of an 800 to 50 ohm Balun, two long legs made of stranded coated Copperweld wire. (stainless steel can be supplied as well), and two terminating high power loads which are grounded to two ground rods (not supplied)

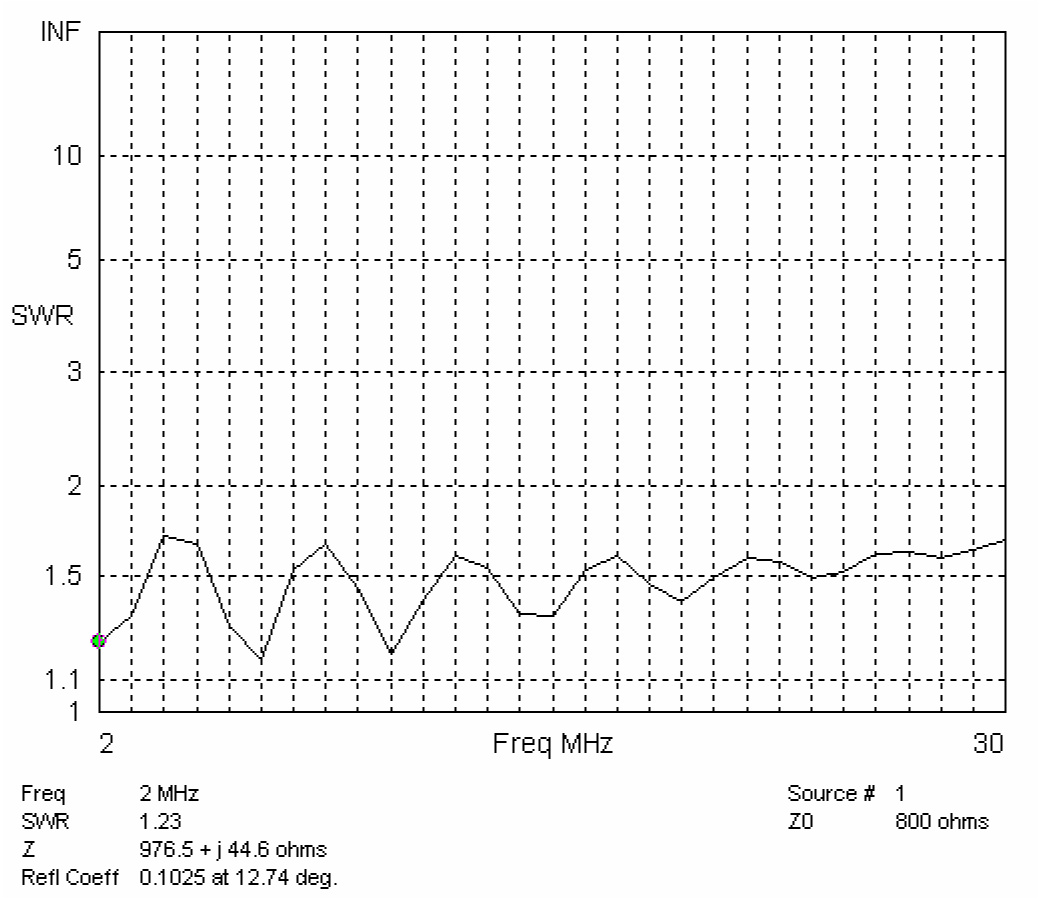
The longer the two legs the better the gain of the antenna. We have chosen several lengths to offer for our customers as standard sizes. Although they will all perform with VSWR under 2:1 the gain at the lower frequencies will be lower with the smaller antennas. The following chart will aid in selecting the right antenna leg lengths for your application. The antenna apex or feedpoint is 70 feet above ground, It can be installed in a recommended range of from 20-100 feet above Average (medium) ground.

Model	Foot print Length “X”	Frequency range	Gain Range
AS-Vee-100	100 Feet	7.0 – 30 MHz	-3 to 6 dBi
AS-Vee-175	175 Feet	3.5 – 30 MHz	-6 to 8.71 dBi
AS-Vee - 350	350 Feet	1.8 – 30 MHz	-12 to 12 dBi
AS-Vee - 600	600 Feet	1.8 – 30 MHz	-9 to 14 dBi

These antennas will display patterns that are directional but vary the high angle from NVIS work at the lowest frequencies, to very low angles of radiation for long haul communications at the higher frequencies.

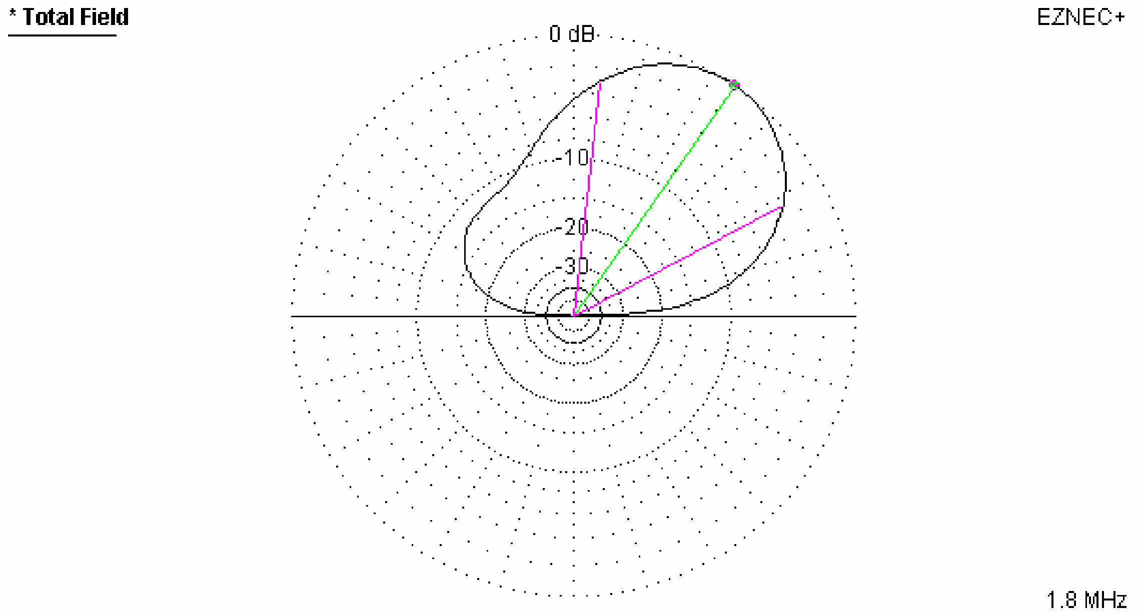
Examples of the plots for the AS-Vee-350 follow.

VSWR Plot typical of all AS-Vee Antennas



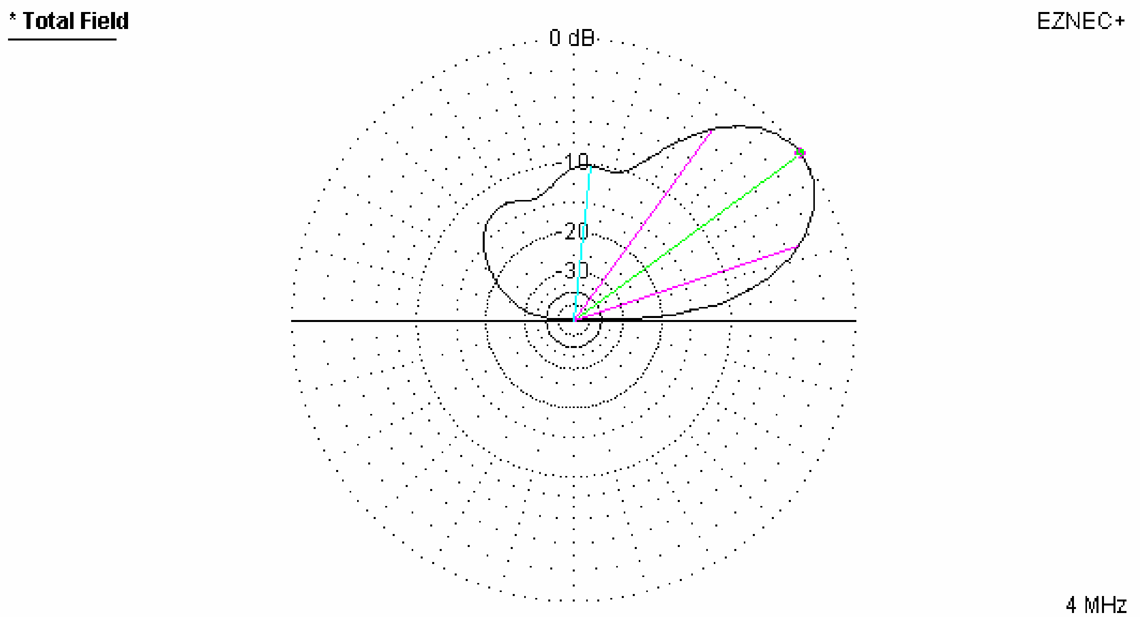
The Array Solutions Vee beam will work to 150 Mhz with VSWR under 2 to 1 typically making them useful for a backup VHF antenna.

Elevation Plots AS-VEE-350 Vs Frequency



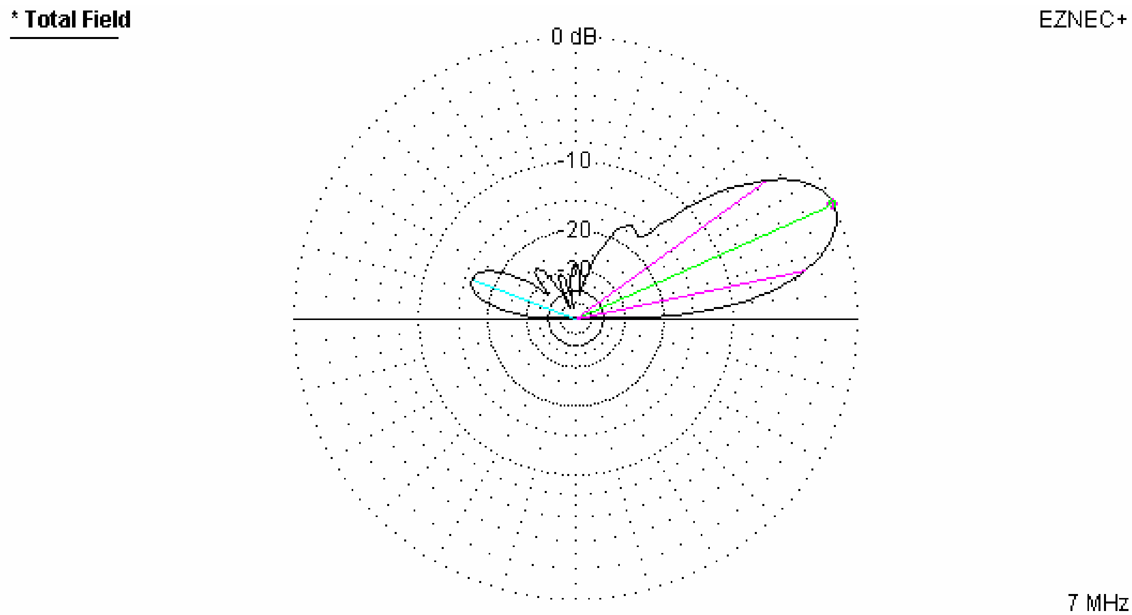
Elevation Plot		Cursor Elev	55.0 deg.
Azimuth Angle	0.0 deg.	Gain	-10.2 dBi
Outer Ring	-10.2 dBi		0.0 dBmax

Slice Max Gain -10.2 dBi @ Elev Angle = 55.0 deg.
Beamwidth 55.7 deg.; -3dB @ 27.7, 83.4 deg.
Sidelobe Gain < -100 dBi
Front/Sidelobe > 100 dB



Elevation Plot		Cursor Elev	36.0 deg.
Azimuth Angle	0.0 deg.	Gain	-0.85 dBi
Outer Ring	-0.85 dBi		0.0 dBmax

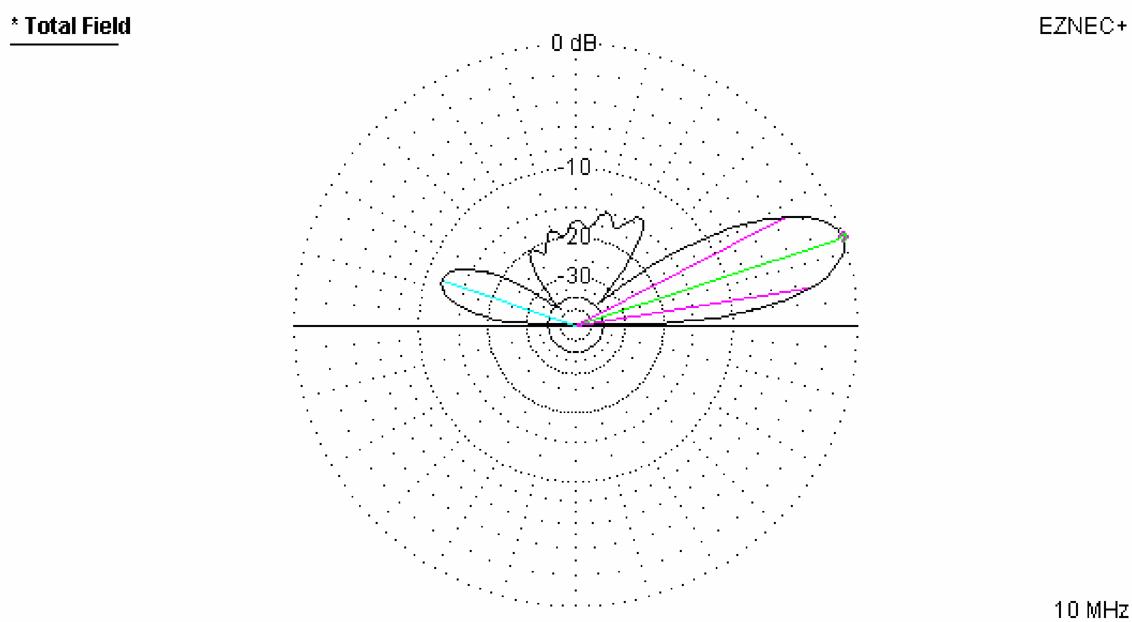
Slice Max Gain -0.85 dBi @ Elev Angle = 36.0 deg.
Beamwidth 35.7 deg.; -3dB @ 18.1, 53.8 deg.
Sidelobe Gain -11.07 dBi @ Elev Angle = 84.0 deg.
Front/Sidelobe 10.22 dB



Elevation Plot
Azimuth Angle 0.0 deg.
Outer Ring 4.43 dBi

Cursor Elev 24.0 deg.
Gain 4.43 dBi
0.0 dBmax

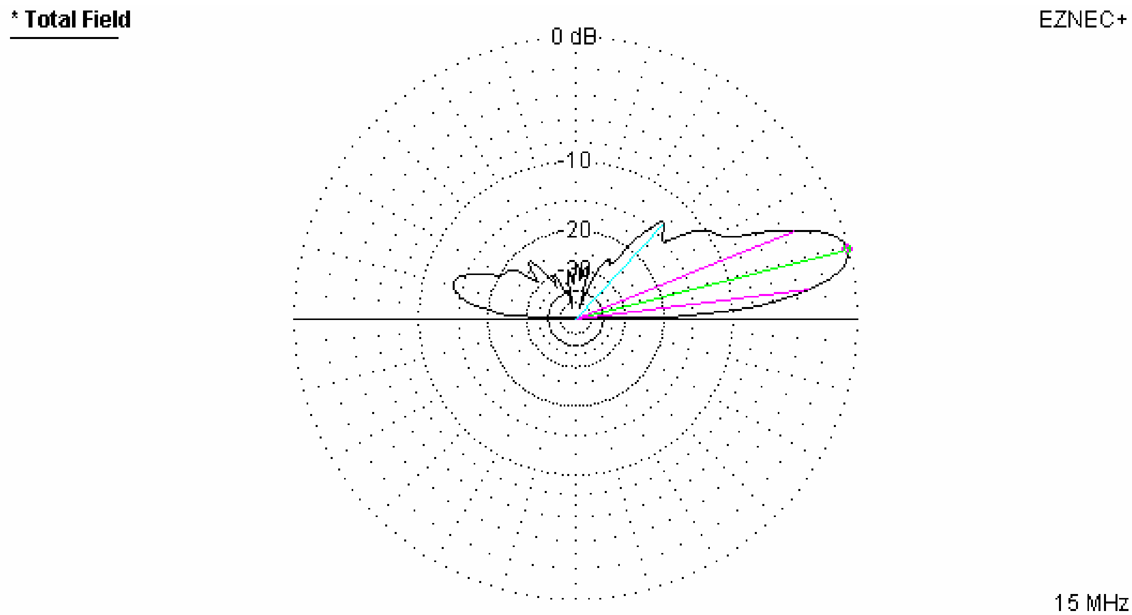
Slice Max Gain 4.43 dBi @ Elev Angle = 24.0 deg.
Beamwidth 23.9 deg.; -3dB @ 11.9, 35.8 deg.
Sidelobe Gain -11.59 dBi @ Elev Angle = 160.0 deg.
Front/Sidelobe 16.02 dB



Elevation Plot
Azimuth Angle 0.0 deg.
Outer Ring 7.06 dBi

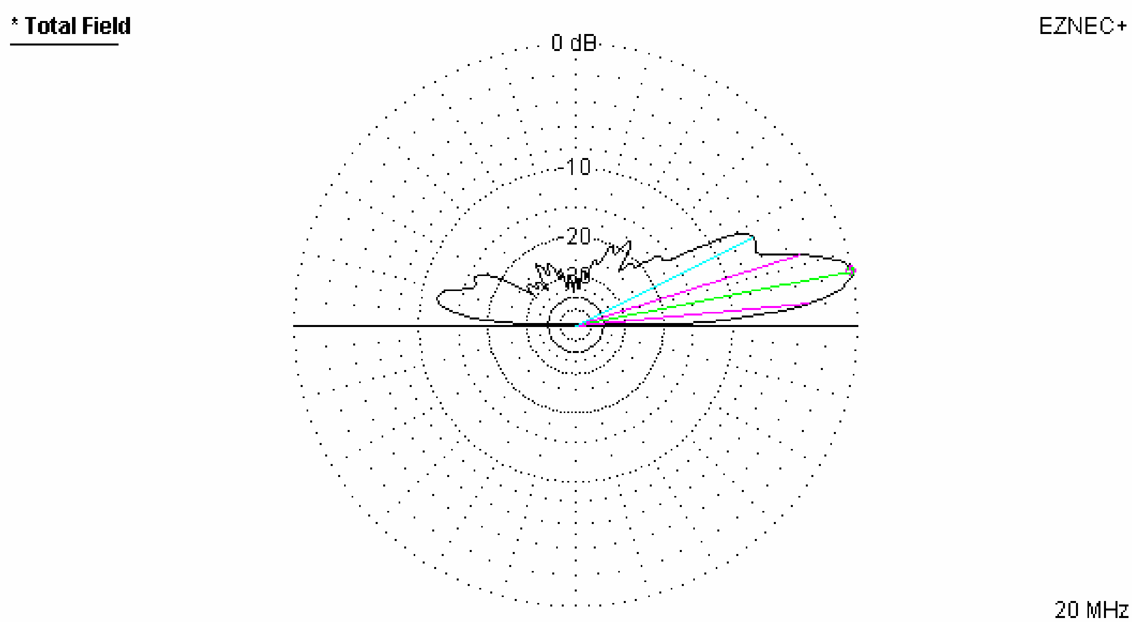
Cursor Elev 18.0 deg.
Gain 7.06 dBi
0.0 dBmax

Slice Max Gain 7.06 dBi @ Elev Angle = 18.0 deg.
Beamwidth 18.2 deg.; -3dB @ 8.9, 27.1 deg.
Sidelobe Gain -4.8 dBi @ Elev Angle = 162.0 deg.
Front/Sidelobe 11.86 dB



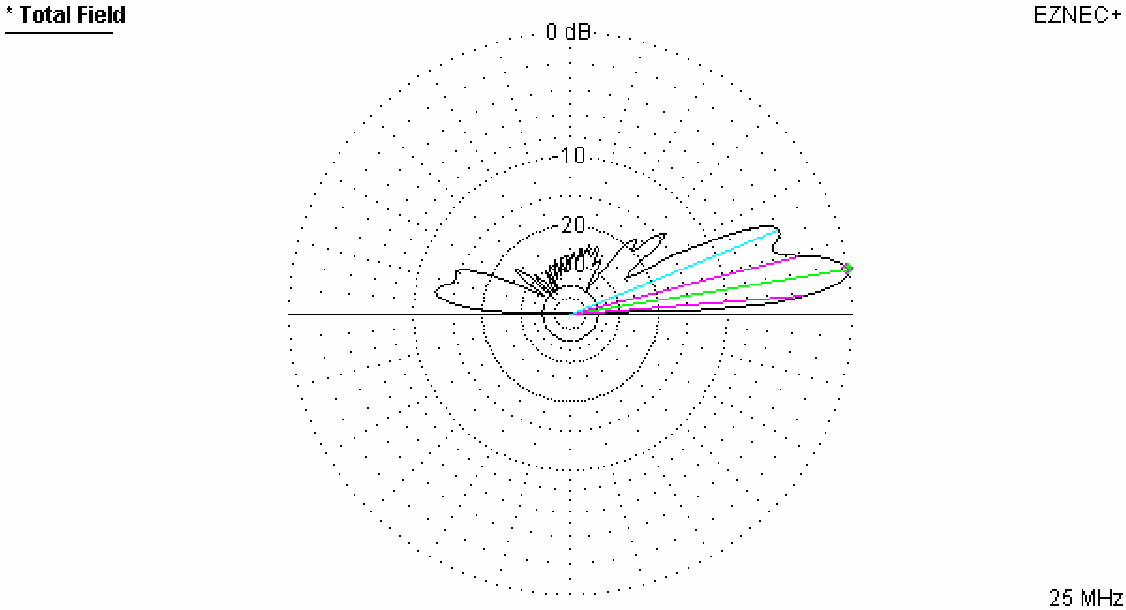
Elevation Plot		Cursor Elev	14.0 deg.
Azimuth Angle	0.0 deg.	Gain	8.99 dBi
Outer Ring	8.99 dBi		0.0 dBmax

Slice Max Gain 8.99 dBi @ Elev Angle = 14.0 deg.
Beamwidth 14.8 deg.; -3dB @ 7.1, 21.9 deg.
Sidelobe Gain -4.3 dBi @ Elev Angle = 47.0 deg.
Front/Sidelobe 13.29 dB



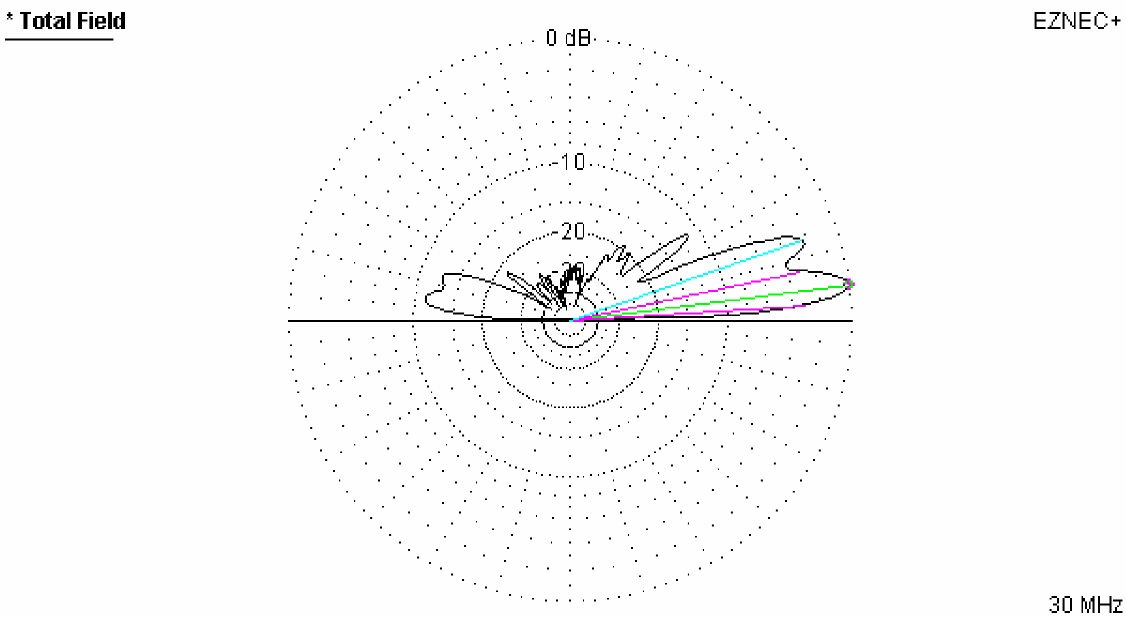
Elevation Plot		Cursor Elev	11.0 deg.
Azimuth Angle	0.0 deg.	Gain	10.91 dBi
Outer Ring	10.91 dBi		0.0 dBmax

Slice Max Gain 10.91 dBi @ Elev Angle = 11.0 deg.
Beamwidth 11.8 deg.; -3dB @ 5.4, 17.2 deg.
Sidelobe Gain 4.92 dBi @ Elev Angle = 26.0 deg.
Front/Sidelobe 5.99 dB



Elevation Plot		Cursor Elev	9.0 deg.
Azimuth Angle	0.0 deg.	Gain	11.83 dBi
Outer Ring	11.83 dBi		0.0 dBmax

Slice Max Gain	11.83 dBi @ Elev Angle = 9.0 deg.
Beamwidth	9.7 deg.; -3dB @ 4.4, 14.1 deg.
Sidelobe Gain	7.96 dBi @ Elev Angle = 22.0 deg.
Front/Sidelobe	3.87 dB



Elevation Plot		Cursor Elev	7.0 deg.
Azimuth Angle	0.0 deg.	Gain	12.15 dBi
Outer Ring	12.15 dBi		0.0 dBmax

Slice Max Gain	12.15 dBi @ Elev Angle = 7.0 deg.
Beamwidth	8.3 deg.; -3dB @ 3.6, 11.9 deg.
Sidelobe Gain	9.89 dBi @ Elev Angle = 19.0 deg.
Front/Sidelobe	2.26 dB

As can be seen this is an effective antenna for NVIS, medium, and long haul depending on frequency chosen. NVIS is usually from 2-10 Mhz, medium haul is from 4-15 Mhz, and long haul is usually accomplished from 10-30 Mhz depending on time of day, and solar cycle. Of course these frequencies are guidelines but it shows this antenna can adapt to the type of communications desired as frequencies are changed.

Specifications:

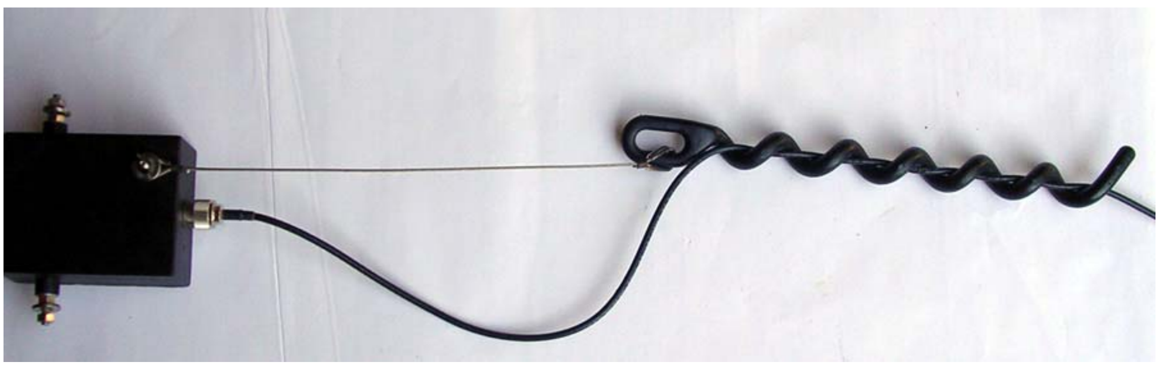
Power Handling	1.5 kW CW / 3,000 W PEP
VSWR	Less then 2:1 under normal ground and open conditions
Connectors on Balun	SO239 or Type N
Termination Loads	Non-Inductive heavy wattage Resistors
Balun	800 ohm balanced to 50 ohm unbalanced coaxial feedline with strain relief
Wire	Stranded Copperweld with UV cover
Environmental	130 MPH – harsh environment – marine environment

Unpacking Antenna

Unpack the antenna, review picture below. You should find the three main pieces of the antenna
1 Balun with attached coax strain relief
2 Terminators with wire attached between them and the balun, also a short grounding wire on the other end of the terminators.

Installation (note-you will need two ground rods, two ground rod clamps, a means to drive the ground rods, and coaxial cable feedline)

1. Unroll the two antenna wires and lay them out in the approximate position they will face. Gain of the antenna is towards the loads so orient the antenna to your communications target.
2. Attach your coaxial cable with appropriate connector to the balun and weatherproof the connection if you intend to leave the antenna set up for a period of time. Wrap the coax around the “corkscrew” strain relief system.
3. Raise the balun as high as possible on the tower/tree/or other antenna mast you are using. Heights from 20 feet to 70 feet will work depending on your communications shot.
4. Stretch out each leg and separate them at an angle of approx. 40 to 60 degrees.
5. Drive ground rods at the approximate ends of the grounding wires on the terminators.
   a. Alternately you could drive say an 8 foot ground rod in 5 feet and attach the terminators to the rod using ty-wraps or tape to secure them to the rod.
   b. Using the ground rod clamp attach the ground wire to the rod securely so that a good electrical connection exists
   c. Note- the terminator cooling holes / weep holes should be oriented down from the termination load. It will normally face downward from the way it is built.
6. The antenna is now ready for use.



Balun with coax attached and wrapped around strain relief “corkscrew”

Feed point showing Balun hoisted into position on mast, Notice the strain relief for coax. Vee wires are pulled out taught to the ground rods.

A permanent termination of the load to a ground rod system, ground wire is clamped to several rods. Notice the Termination floats with the cooling / weep holes down

Quick deploy setup – termination is tied to ground rod, and clamped to ground and also easy to take down. Pull ground rod out or leave it!

Operation

7. The antenna is rated for full power at the lowest rated frequency. You many use it at reduced power at lower then the rated frequency. All AS-Vee series antennas will work at 1.5Mhz with very low VSWR. Use this rule of thumb:

    a. At half the rated lowest frequency reduce power by 50%

8. The AS-Vee Beam antennas will also work at VHF frequencies with low VSWR you may use full rated power at VHF. They make a good backup antenna for your VHF use.