Llanelli Amateur Radio Society

HF ANTENNA REQUIREMENT

my justification to home brew

Presented by Roger Jenkins GW4VZG

DESCISION INFLUENCING FACTORS.

- Small garden.
- Low TV signal area.
- Antenna size.
- 6 telephone lines crossing the property.
- Poor soil conductivity.
- Planning restrictions and fees.
- Nosy neighbours.
- Cost.

HF ANTENNA WANT'S

- 5 Band operation 14, 18, 21, 24, 28 MHz bands.
- Over 95% radiation efficiency on all bands.
- Low losses – No Traps.
- Low Interference.
- Horizontal polarisation.
- No Rotator - Omni Directional.
- Small – Strong.
- Low Cost.

Pros and Cons of Multi-band Antennas for HF

Horizontal End Fed Wire

Simple and Cheap

Requires a very good ATU due to high voltages at feed point

Unbalanced with respect to earth so vertical polarised radiation will occur possibility of EMC problems.

Pros and Cons of Multi-band Antennas for HF

Doublet

Simple and Cheap with a few dBs of gain.

Requires a very good ATU balanced with a balun transformer added on the output.

Polar diagram will contain many deep nulls as is the case with any long wire antenna. Negates the few dBs of gain.

Pros and Cons of Multi-band Antennas for HF

G5RV

Cheap to make.

Requires a good ATU.
because it is only resonant on one band.
Polar diag becomes very “petal” shaped
With many deep nulls on higher bands.

High SWR on all bands (except 14 MHz about 2:1 at resonance), so the use of co-ax can cause high losses.

Pros and Cons of Multi-band Antennas for HF

Trap Dipole

Use where space is restricted.

Traps act as loading coils on the lower frequency bands. 4 pairs of traps required for a 5 band dipole

Pros and Cons of Multi-band Antennas for HF

Trap Vertical

Use in restricted space.

Requires good soil conductivity. Being at ground level prone to Signal attenuation by surrounding Objects – particularly at higher frequencies.

Potential for EMC problems due to vertical radiation pattern.

Introducing the CobWeb

[or my wife's new clothes line]

14, 18, 21, 24, 28 MHZ

No Loading Coils

Horizontal Polarisation

Full size half wave dipole on each band.

Less than < 1-5 : 1 SWR across the 5 bands. 2 : 1 at extremes.

Omni-directional – 50ohm co-ax feed – built in co-ax choke balun to prevent feeder radiation.

Small size and weight 8.5 ft sides approx 14 lbs

Cheap Cost : approx £35

Constructing the CobWeb

50 meters of 300 ohm ribbon cable

4 x 3 meter fishing rod fibreglass blanks

4” x 2” waterproof box

1 x 15 electrical connector block

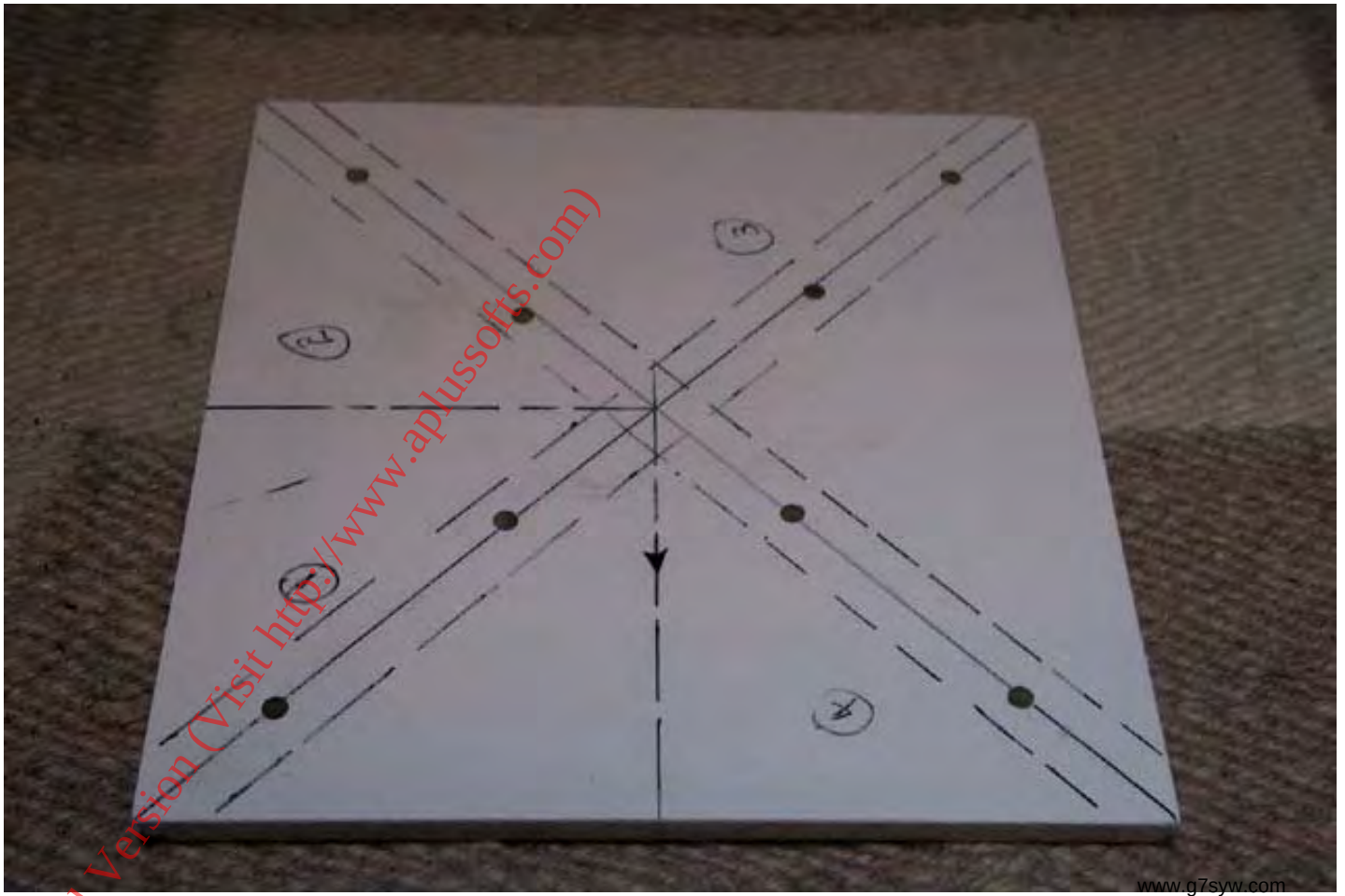
1 x 3 ft half inch fibreglass blank

galvanised wire, silicon sealer, cable ties Etc, length of 1” aluminium

FIBREGLASS 3m BLANKS

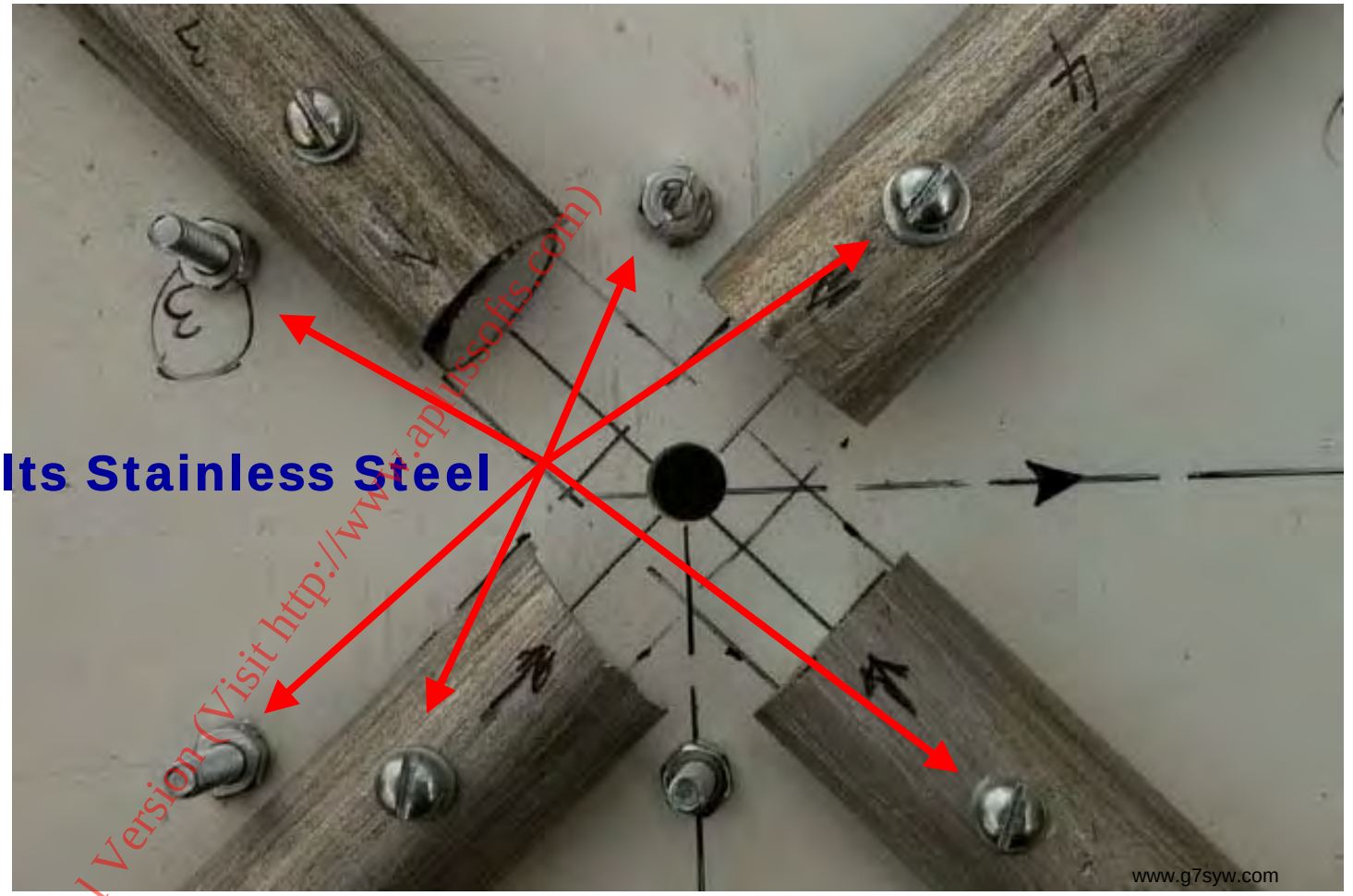
MOUNTING PLATE

12” x 12” UPVC or Aluminium



SPREADER FIXINGS

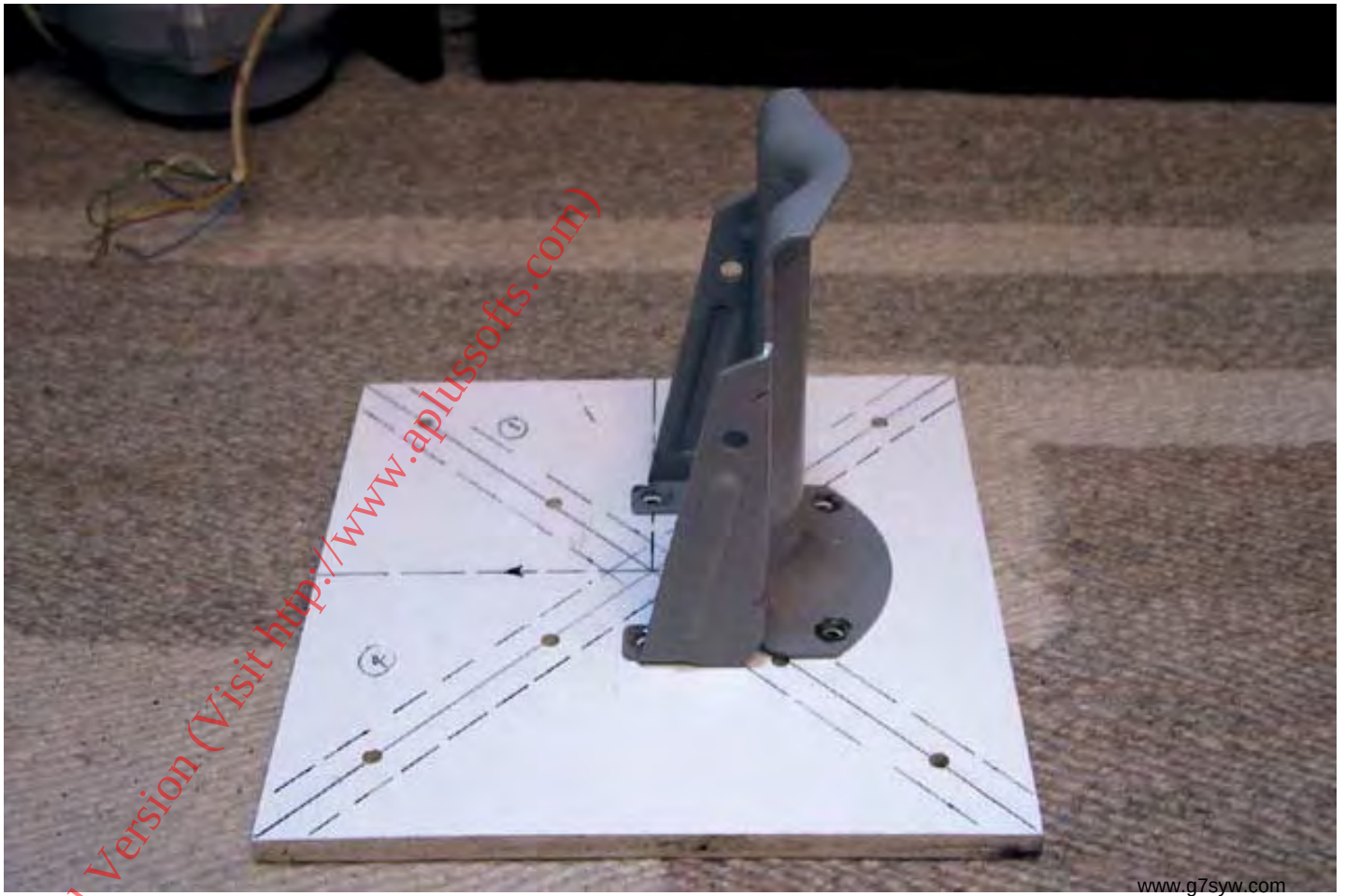
SPREADERS FIXED TO MOUNTING PLATE



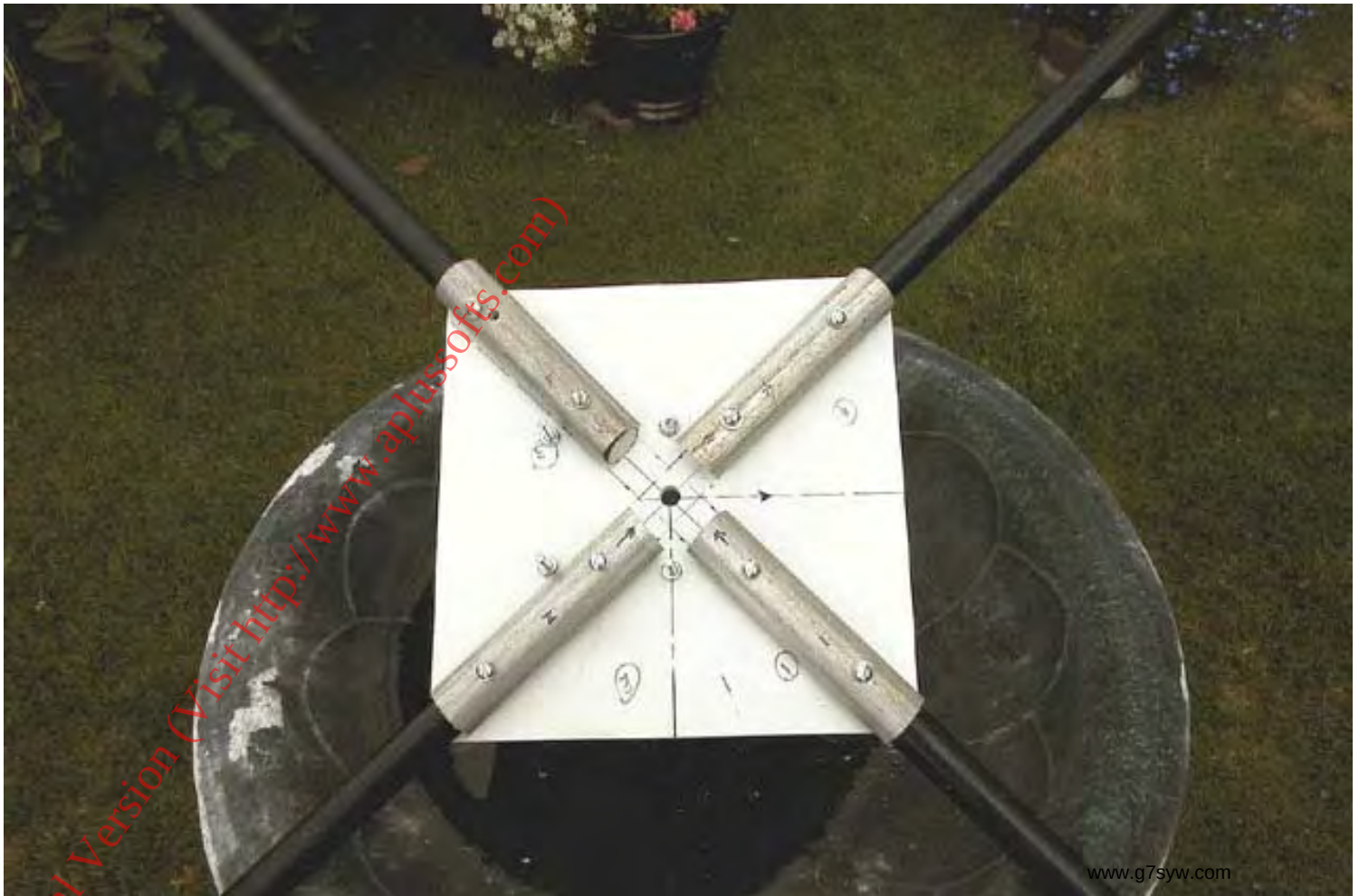
All Bolts Stainless Steel

MAST BRACKET FITTING

Surplus Rotator mount

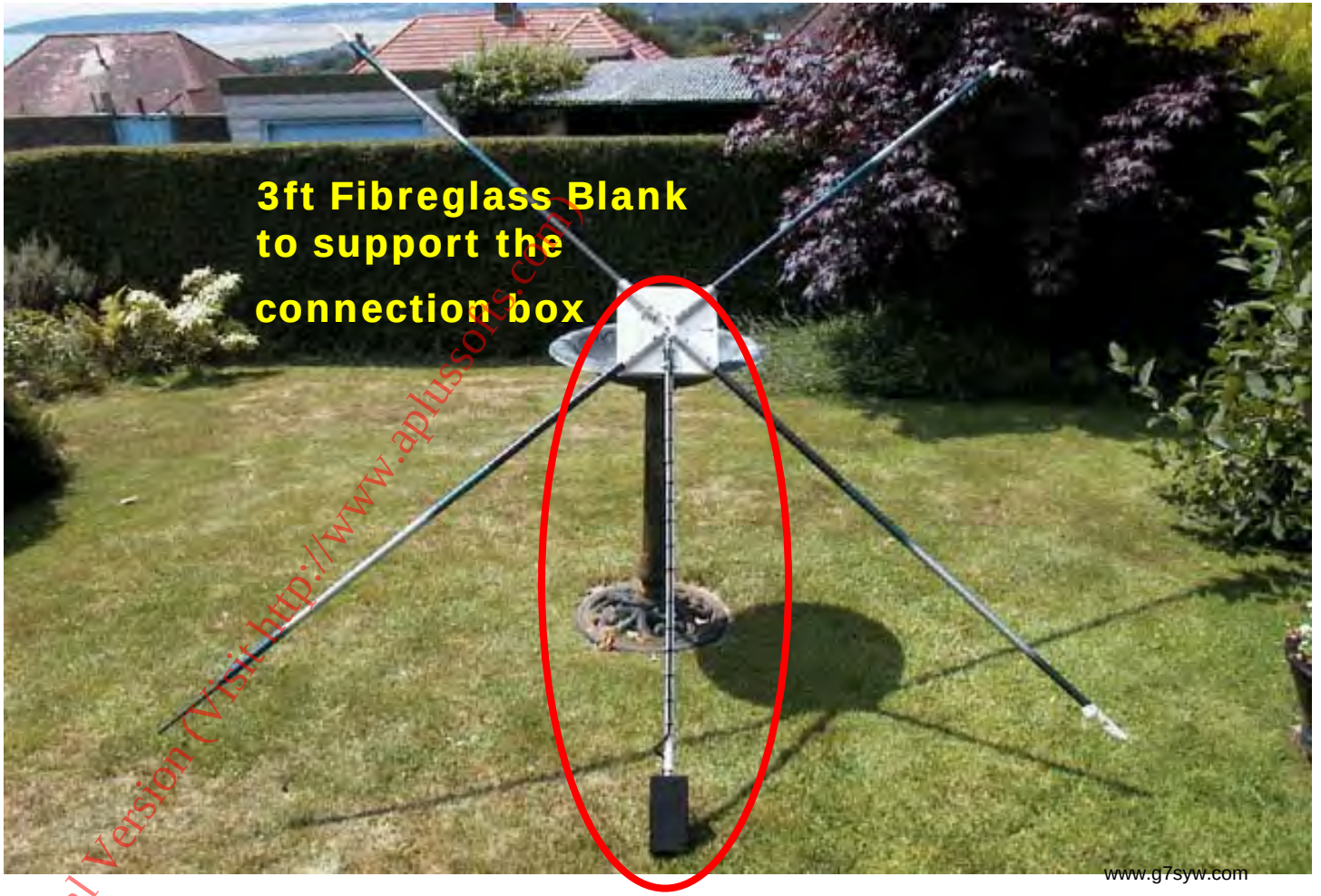


ALTERNATIVE VIEW

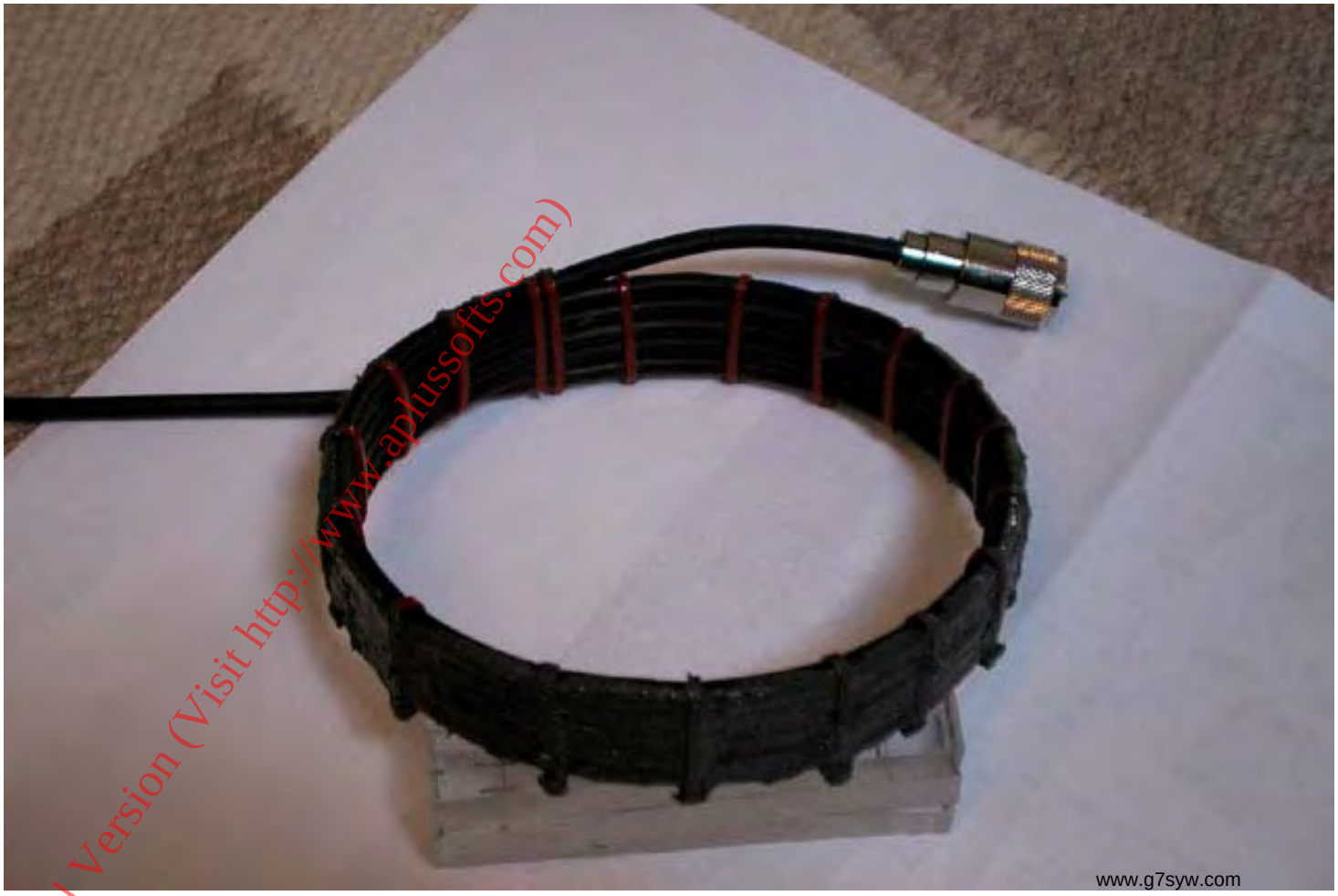


SPREADERS ASSEMBLED

ASSEMBLED SPREADER
with connector box



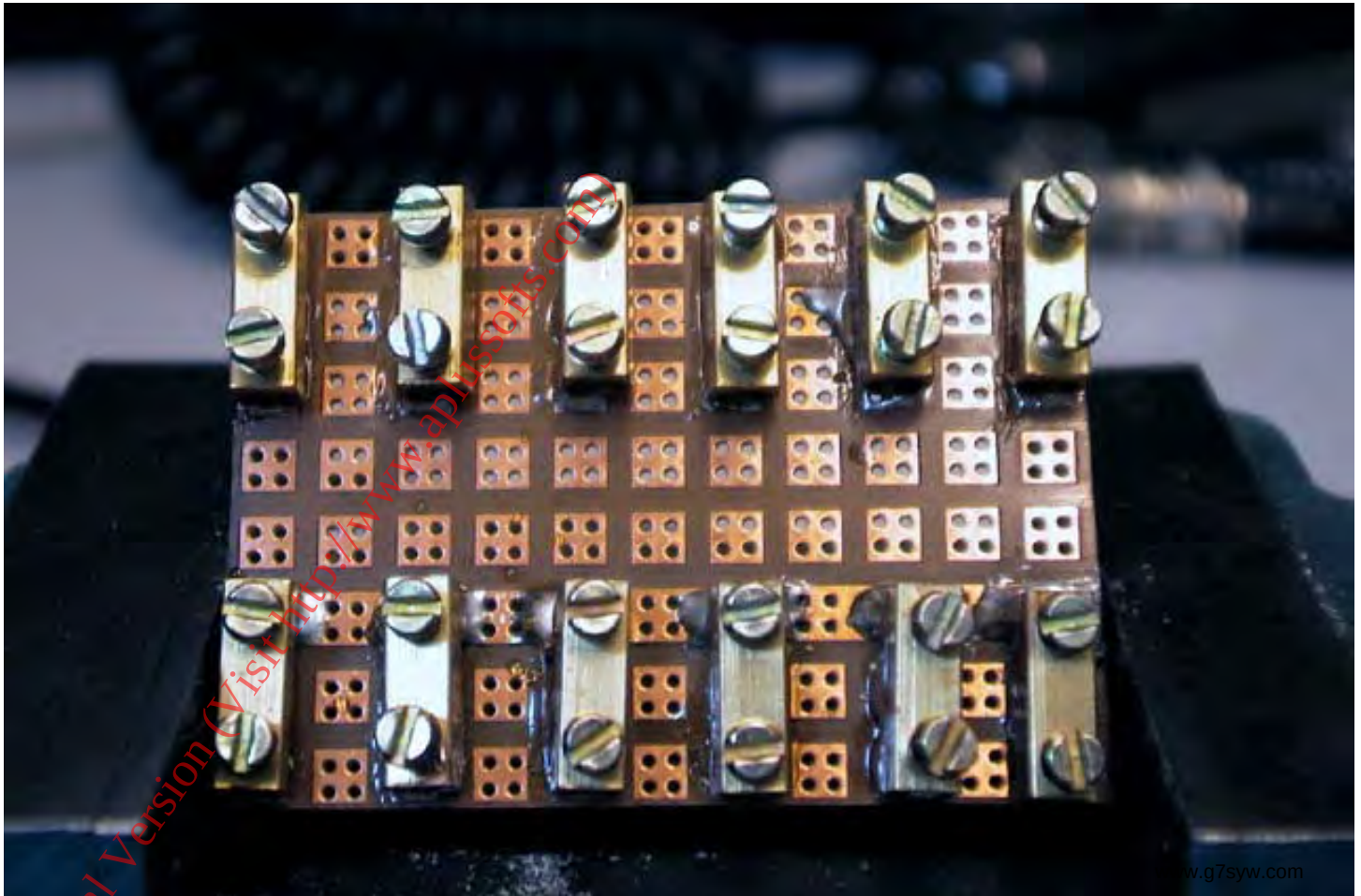
BALUN 6 turns 5-6 inch Diam



BALUN LOCATION

ASSEMBLED SPREADER with BALUN

CONNECTION FIXINGS



CONNECTION BOX ASSEMBLY

CABLE FIXING

ASSEMBLED MOUNT

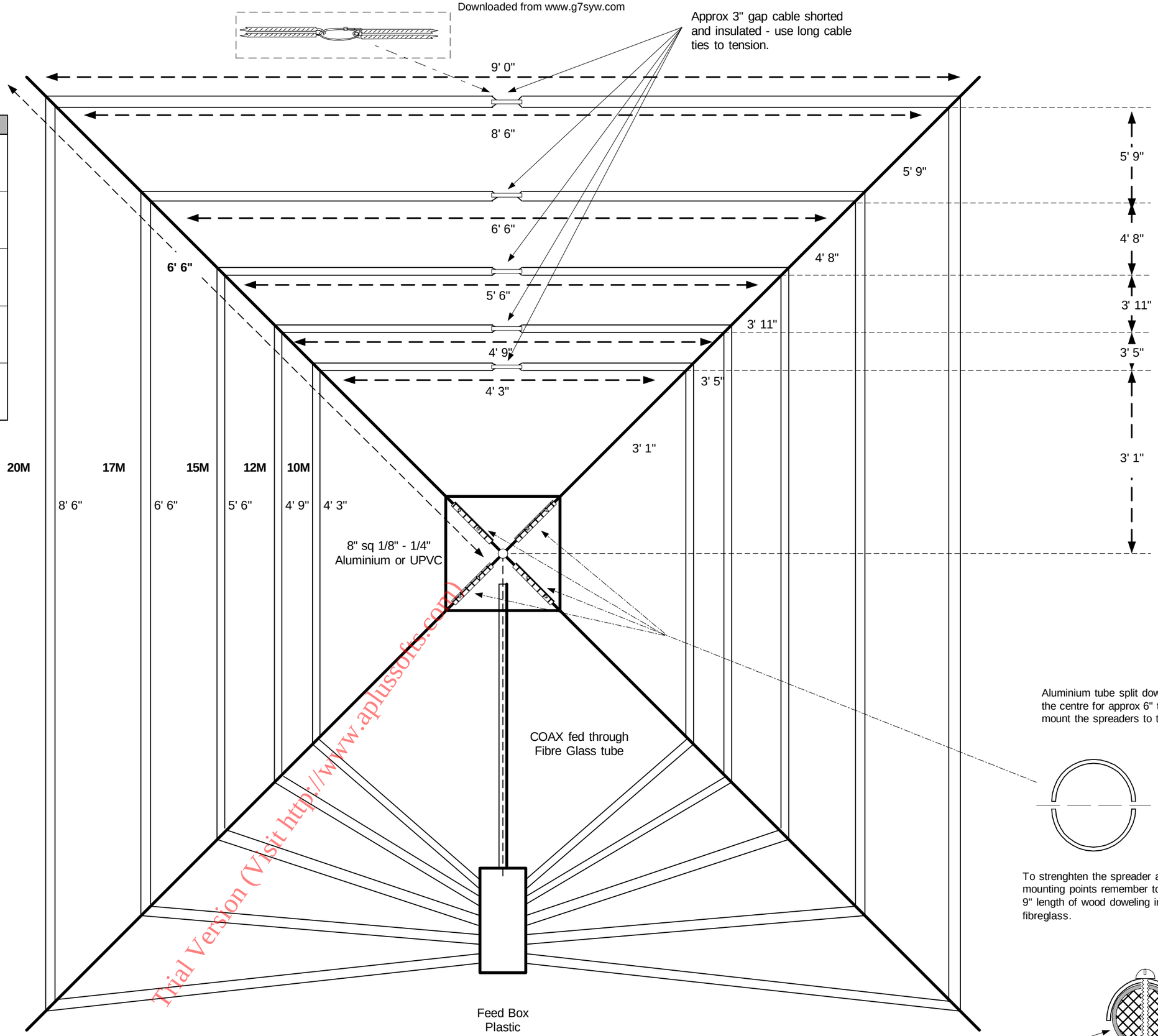
Complete with balun

COMPLETED ANTENNA

TEST LOCATION

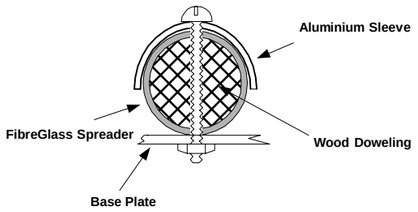
3ft Above ground

Band	O/All	Loop	Side
10M	17' 0"	8' 6"	4' 3"
12M	19' 0"	9' 6"	4' 9"
15M	22' 0"	11' 0"	5' 6"
17M	26' 0"	13' 0"	6' 6"
20M	34' 0"	17' 0"	8' 6"



Aluminium tube split down the centre for approx 6" to mount the spreaders to the base plate.

To strenghten the spreader at the mounting points remember to insert a 6-9" length of wood doweling inside the fibreglass.



COBWEB Antenna Dimensions [Page 1]

Drawn by Roger Jenkins GW4VZG

About a 3" gap

Trim both ends equally to tune to resonance for each dipole

Remember to short each cable after trimming.

Co-Ax

Co-Ax Inner

Co-Ax Braid

Do NOT cut this cable this continues under the box to complete the loop

Break in ONE wire ONLY

Shorted ends

Each Loop consists of a folded dipole arranged in a square formation

Feed Point

COBWEB Antenna Dimensions [Page 2]

Drawn by Roger Jenkins GW4VZG