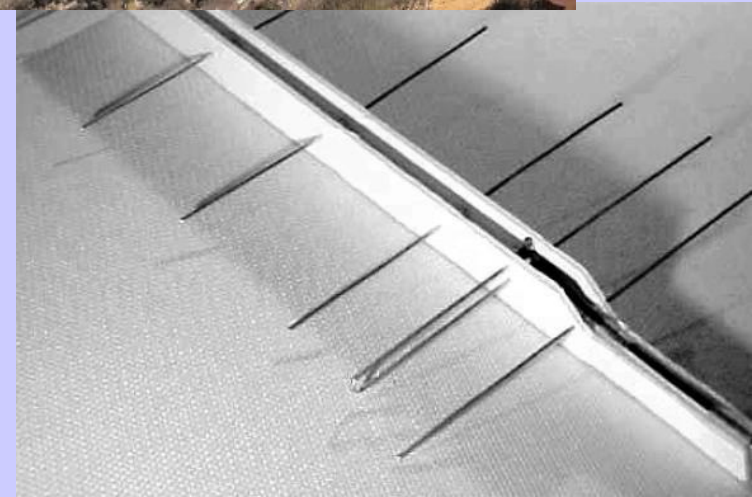
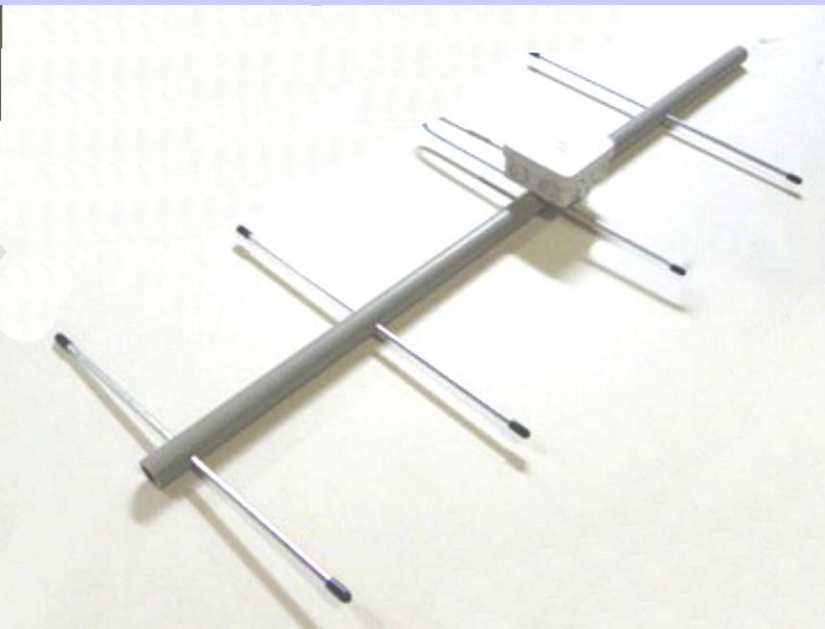


Simple 440 MHz Yagi Antennas

By Pete Rimmel N8PR





But FIRST:

**Let's talk a bit about satellite tracking
since questions were asked on the last
“RF” net on Thursday**

The most info can be obtained at:

[www. amasat. org](http://www.amasat.org)



Launch Pad	Navigator	Sat Status	Keps	Passes	News	Store	Members	Contact Us	Return
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AMSAT Online Satellite Pass Predictions

Please select a satellite and provide your latitude, longitude and elevation or calculate them from your grid square. If you choose we will save your position information in a cookie on your system for future predictions.

Show Predictions for: AO-51		▼	for Next	10	▼	Passes
Calculate Latitude and Longitude from Gridsquare:	<input type="text"/>		Calculate Position			
<i>Or</i>						
Enter Decimal Latitude:*	<input type="text"/>	North	▼			
Enter Decimal Longitude:*	<input type="text"/>	West	▼			
Elevation (Metres):	<input type="text"/>					
Predict						
<input type="checkbox"/> Save my location for later use						

**example XX.xxxxx



850 Sligo Ave. Suite 600
Silver Spring, MD 20910
1-888-322-6728

AMSAT Online Satellite Pass Predictions

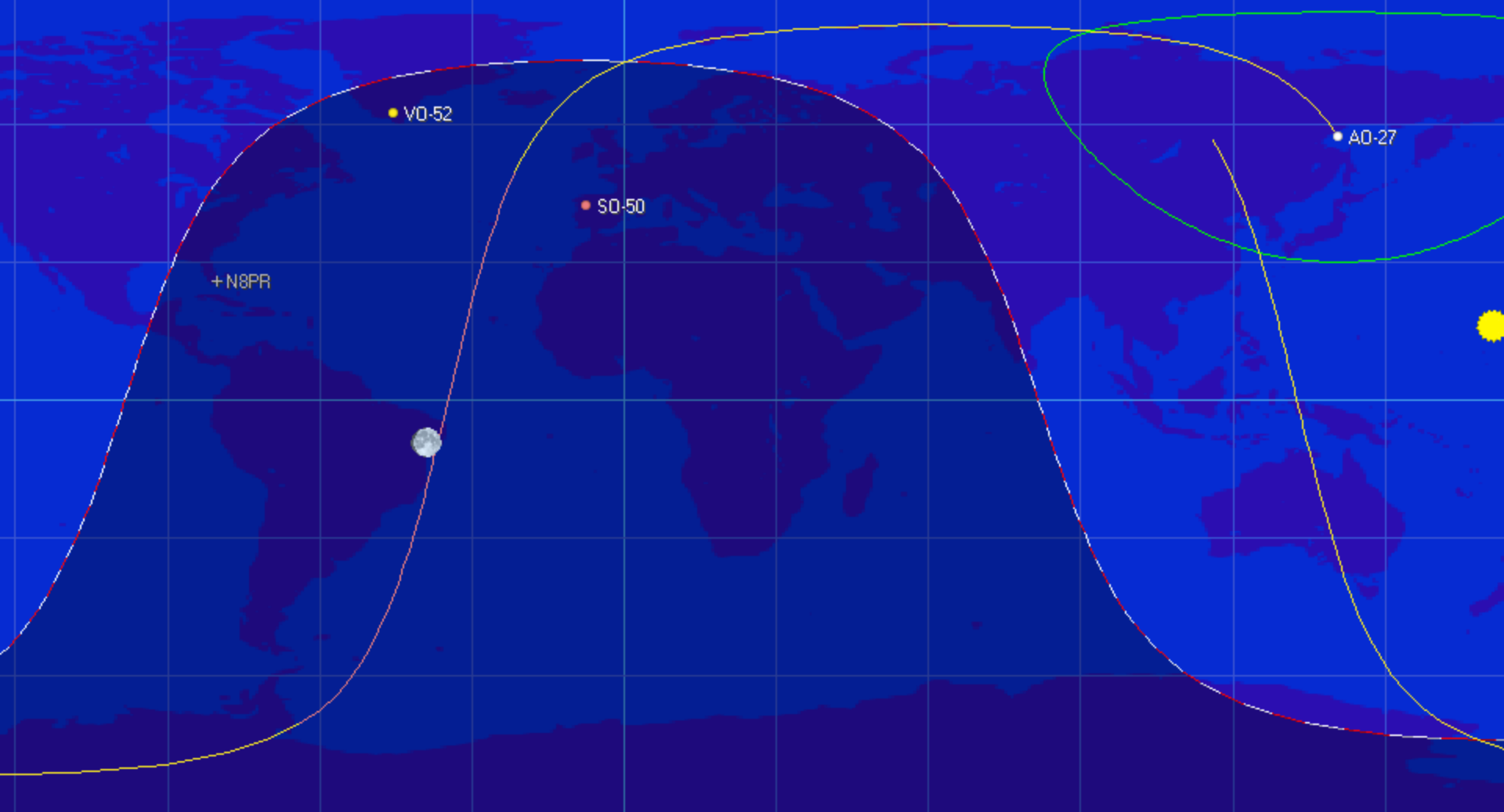
- Launch Pad
- Navigator
- Sat Status
- Keps
- Passes
- News
- Store
- Members
- Contact Us
- Return

AMSAT Online Satellite Pass Predictions - AO-51							
View the current location of AO-51							
Date (UTC)	AOS (UTC)	Duration	AOS Azimuth	Maximum Elevation	Max El Azimuth	LOS Azimuth	LOS (UTC)
04 May 12	08:35:49	00:13:53	16	61	100	185	08:49:42
04 May 12	10:16:03	00:09:55	339	9	297	247	10:25:58
04 May 12	19:40:33	00:14:28	146	35	61	1	19:55:01
04 May 12	21:19:53	00:13:23	202	19	260	326	21:33:16
05 May 12	07:56:47	00:12:30	32	20	92	161	08:09:17
05 May 12	09:35:19	00:12:53	356	26	297	220	09:48:12
05 May 12	19:02:30	00:12:03	123	14	63	15	19:14:33
05 May 12	20:39:21	00:14:59	179	52	260	341	20:54:20
06 May 12	07:19:01	00:08:19	55	5	81	130	07:27:20
06 May 12	08:55:20	00:13:56	10	76	306	196	09:09:16

Your results are shown above
Use the form below to request more pass predictions

Show Predictions for: for Next Passes

Calculate Latitude and Longitude from Gridsquare:



2012-05-03 20:30:53 (UTC -4)

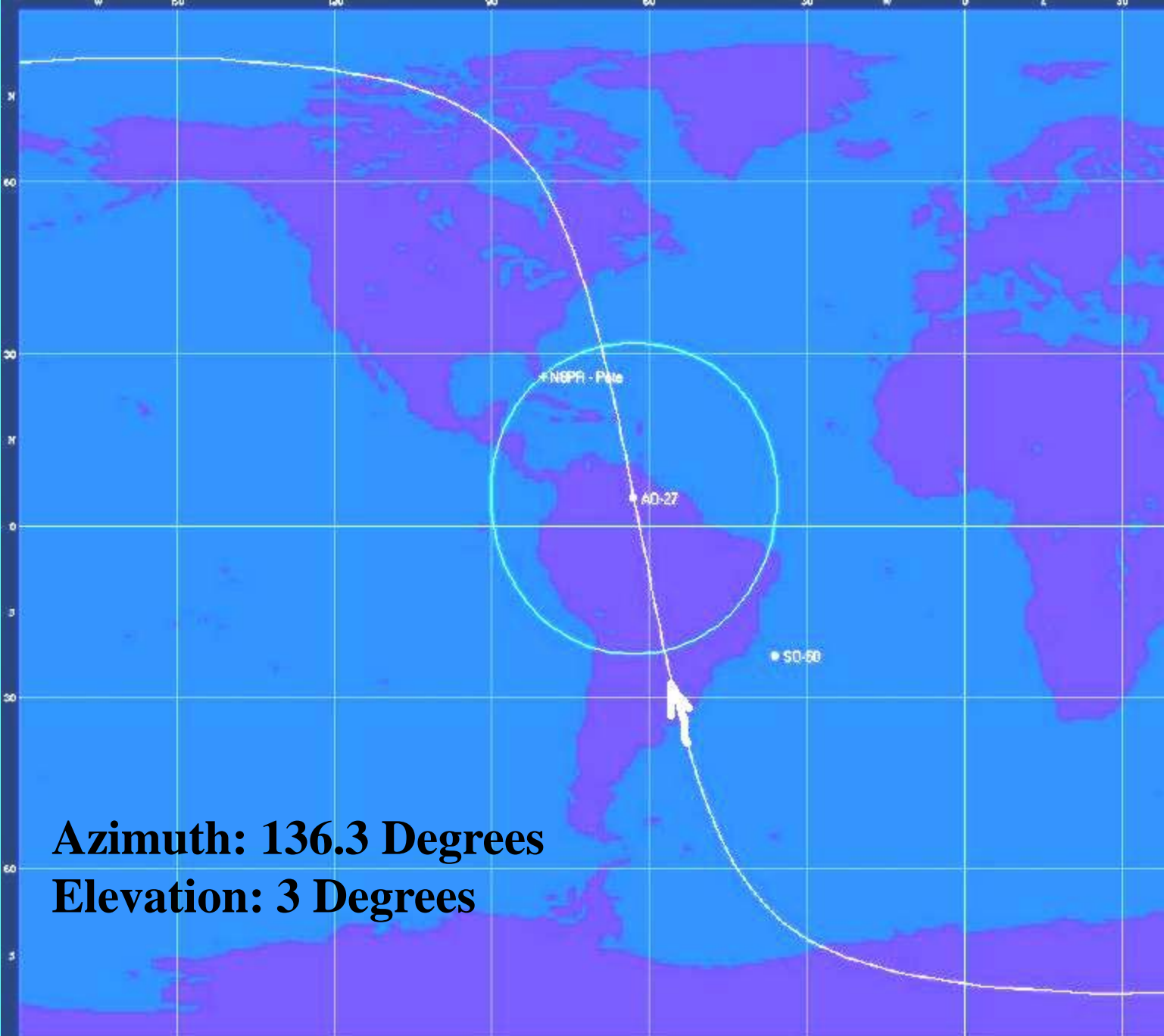
<p>Search period</p> <p><input checked="" type="radio"/> Automatic <input type="radio"/> Manual</p> <p>2 days</p> <p><input type="checkbox"/> Backward</p>	<p>Conditions</p> <p><input type="checkbox"/> Illumination required</p> <p><input type="checkbox"/> Sun elevation < -5</p> <p>Satellite elevation > 3</p> <p>Minimum flare mag 3.0</p>	<p>Extra</p> <p><input type="checkbox"/> Brief output (1 line per event)</p> <p><input type="checkbox"/> Minimum pass magnitude 3.0</p> <p><input type="checkbox"/> Ignore if magnitude is unknown</p> <p>Search passes for</p> <p><input checked="" type="radio"/> All <input type="radio"/> Tracked <input type="radio"/> Active</p>
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Orbitron from:
www.stoff.pl

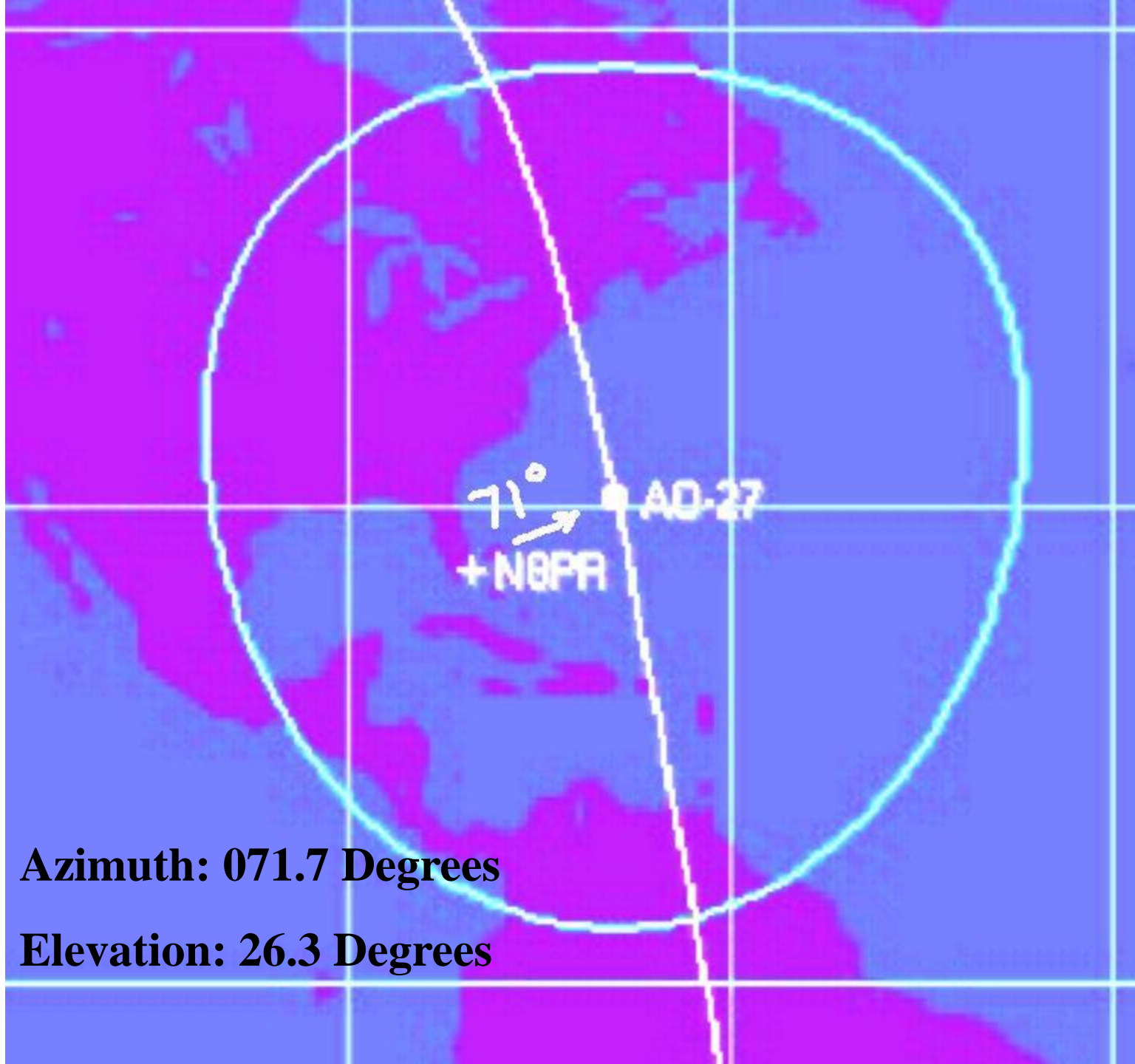
Satellite passes / Orbitron 3.71 / www.stoff.pl

Location : N8PR (80.2917° W, 26.0208° N)
Time zone : UTC -4:00
Search period : 2012-05-04 17:39:51 - 2 days
 : 2012-05-06 17:39:51
Conditions : Maximum sun elevation = None
 : Minimum sat elevation = 3 deg
 : Illumination NOT required

Time	Satellite	<u>Azm</u>	<u>Elv</u>	<u>Mag</u>	Range	<u>S.Azm</u>	<u>S.El</u>
2012-05-05 10:55:33	AO-27	136.3	3.0	13.7	2972	98.9	55.6
2012-05-05 11:01:37	AO-27	71.7	26.3	11.8	1500	99.9	57.0
2012-05-05 11:07:42	AO-27	7.3	3.0	12.2	2985	100.9	58.3
2012-05-05 12:35:00	AO-27	198.1	3.0	13.4	2970	131.6	76.2
2012-05-05 12:41:03	AO-27	262.5	25.0	12.2	1546	136.3	77.2
2012-05-05 12:47:10	AO-27	327.6	3.0	12.5	2985	141.7	78.1
2012-05-05 14:18:32	SO-50	163.1	3.0	15.3	2687	239.1	73.0
2012-05-05 14:23:40	SO-50	107.7	16.7	13.9	1703	241.5	72.0
2012-05-05 14:28:54	SO-50	53.2	3.0	14.2	2768	243.7	70.9
2012-05-05 15:57:53	SO-50	226.1	3.0	15.3	2699	263.9	51.7
2012-05-05 16:03:57	SO-50	300.0	36.7	12.5	1066	264.7	50.3
2012-05-05 16:10:13	SO-50	13.9	3.0	13.8	2783	265.5	48.9

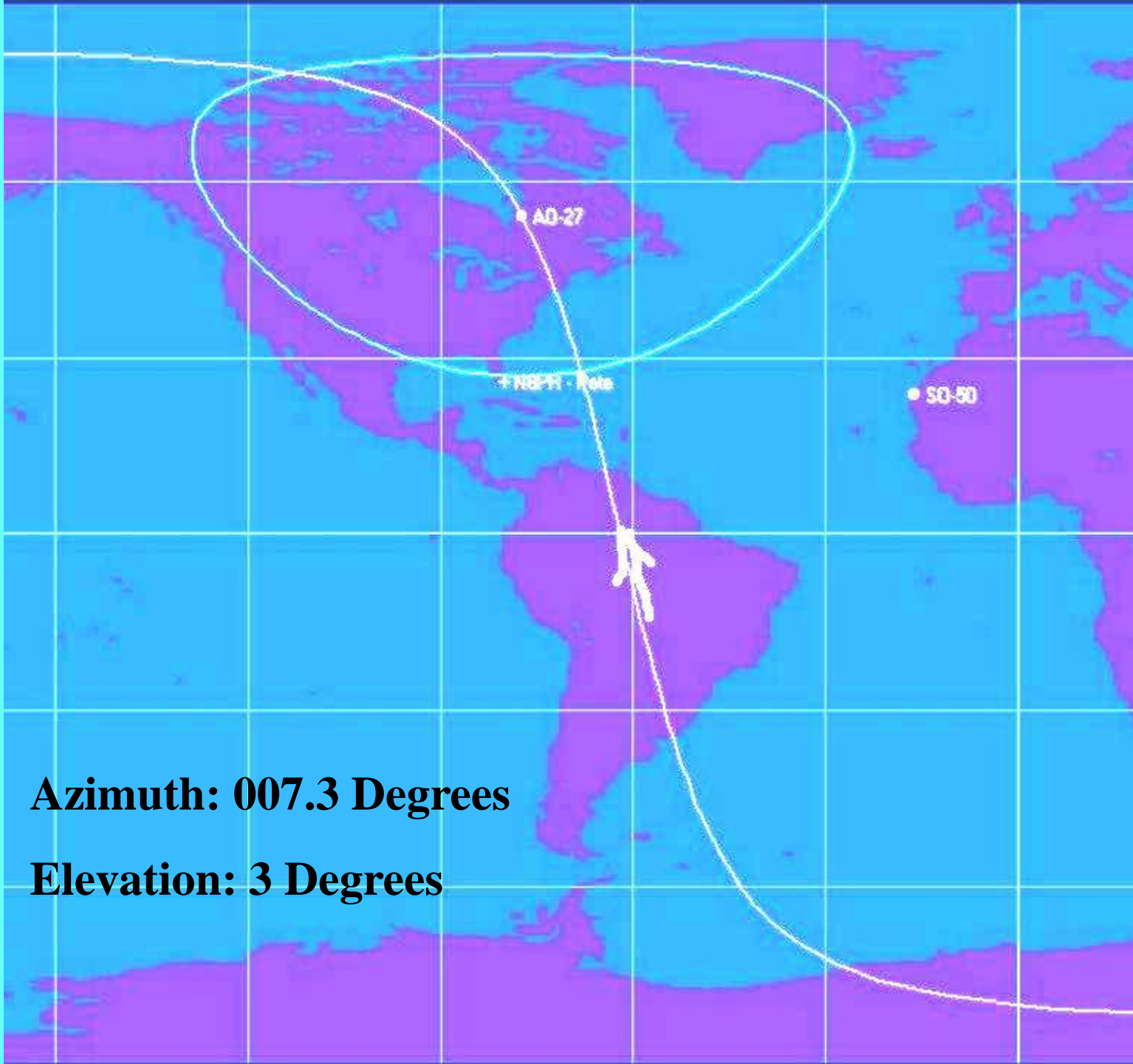


Azimuth: 136.3 Degrees
Elevation: 3 Degrees



Azimuth: 071.7 Degrees

Elevation: 26.3 Degrees



Azimuth: 007.3 Degrees

Elevation: 3 Degrees

AO-27 [+] data

Select new satellite AO-27 [+] ▼

AOS in 04:32:28

AOS at 05:07:12 UTC Az : 141° El : -50°

Range : 6669.0 Mi Doppler : -727.9 Hz

Altitude : 501.9 Mi Eclipse : Yes

Lat : 49.82° S Phase : 126

Lon : 13.55° W Orbit : 97027



Satellite Tracking (Updated : 16 Jan 2008 at 03:5...



Grayline

Satellite

DX Spots

IOTA Spots

View DX



AND NEXT:

**Before we talk about the yagi antennas
lets talk about how to make your
handi-talkie work better:**



Simple Dipole Antenna

Rotate it 90 degrees

Now it is a Vertical
Half Wave Dipole



How about that !

**Your Rubber Duckie can
be Half of the Dipole...
just clip on a $\frac{1}{4}$ wave
long wire to the ground
side of the BNC and you
have a more effective
antenna !**

**For 2 meters this wire is
about 19 $\frac{1}{2}$ inches long.**

**That will work for 440
as well – or clip on a
6” wire as on the right.**



AND N-O-W

**On to the 440 MHz Yagi
antennas !**

Design criteria for a simple 440 MHz antenna:

They can be made using various materials and in various sizes.

We want to keep the design simple.

We want to use readily available materials.

We want enough forward gain to hit the local repeater.

We want enough beam width so aiming is not critical.

It must be inexpensive.

We will look at two antennas a 4 element and 6 element yagi

The BOOM:

The boom can be made from ANY NON-METALLIC material. We do not want to use aluminum or we will have to change the dimensions that we have – and mounting will be much more difficult, since we would then have to isolate the driven element.

Wood is easy to work with, but not weather resistant. 1/2 inch PVC pipe and couplings are our best choice.



The ELEMENTS:

Wire coat hangars (for inside use – they will rust)

**#8 Copper wire ~1/8” diameter - cheap and available
(from Home Depot)**

**1/8 Inch aluminum tube or aluminum welding rod
(local aluminum supplier)**

Bronze brazing rod (welding supplier)

The basic dimensions are:

70 Centimeter 4 element yagi

70 Centimeter 4 element beam 1/8" diameter tubing	Element Length	Element spacing from Reflector
Reflector	13"	0
Driven	12"	8-1/16"
Director 1	11-7/8"	16-3/4"
Director 2	11-3/4"	23-3/8"

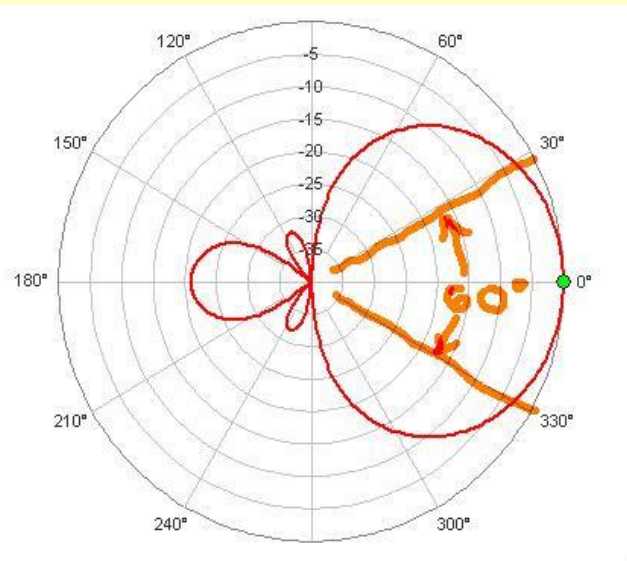
70 CM 4 element yagi dimensions:

Element	Length	Dist. From R
Reflector	13"	0
Driven Element	Special	2.5"
Director. 1	12.1"	5.5"
Director. 2	11.75"	11"
Director. 3	11.75"	18"
Director. 4	10.75"	28.5"

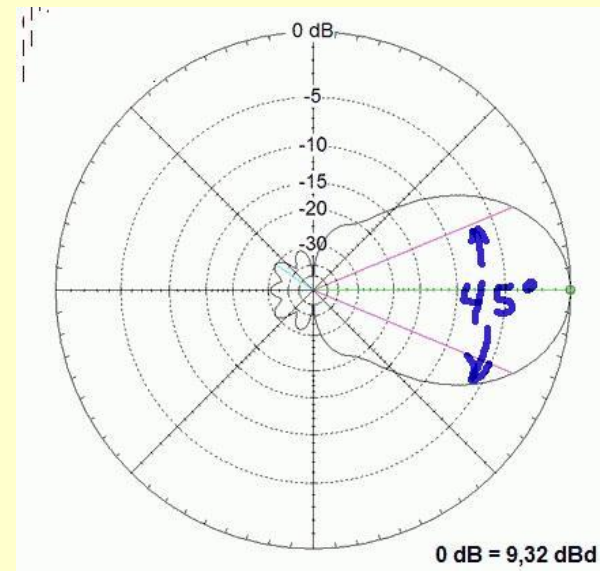
What are the differences?

4 Element yagi has less gain (~8 dBi) but a wider beamwidth for a wider pattern

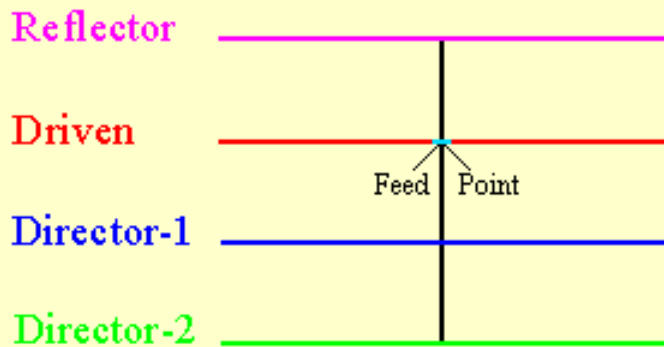
6 Element yagi has more gain (~11 dBi) but is narrower and needs more precise aiming.



4 element yagi pattern

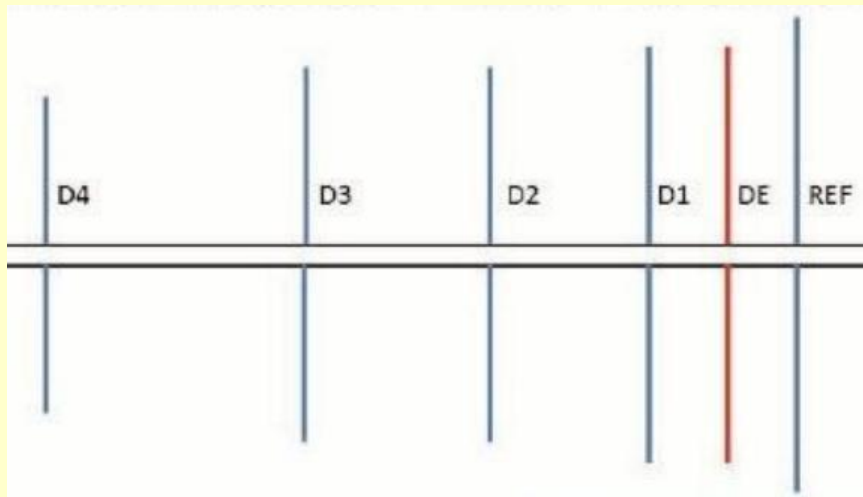


6 element yagi pattern



4 element yagi easy to build and feed directly with 50 ohm coax.

Center of boom has no element and makes for easy mounting.



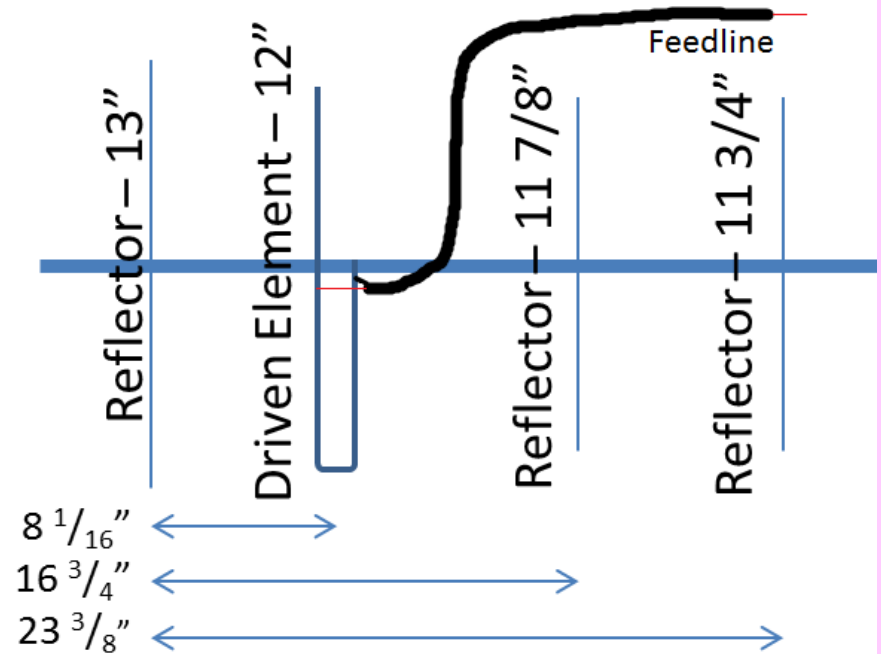
6 el. Yagi a bit more work to build. Directly fed with 50 ohm coax

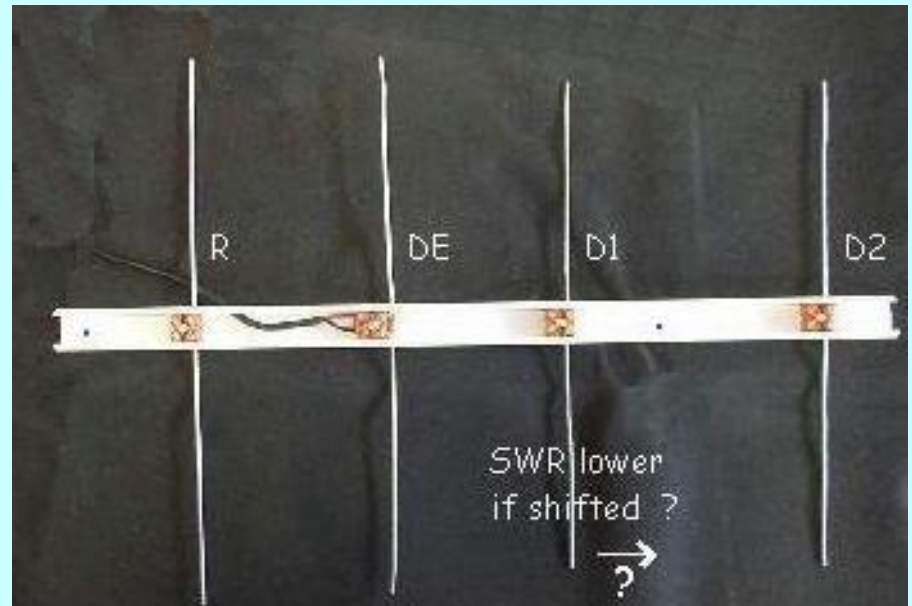
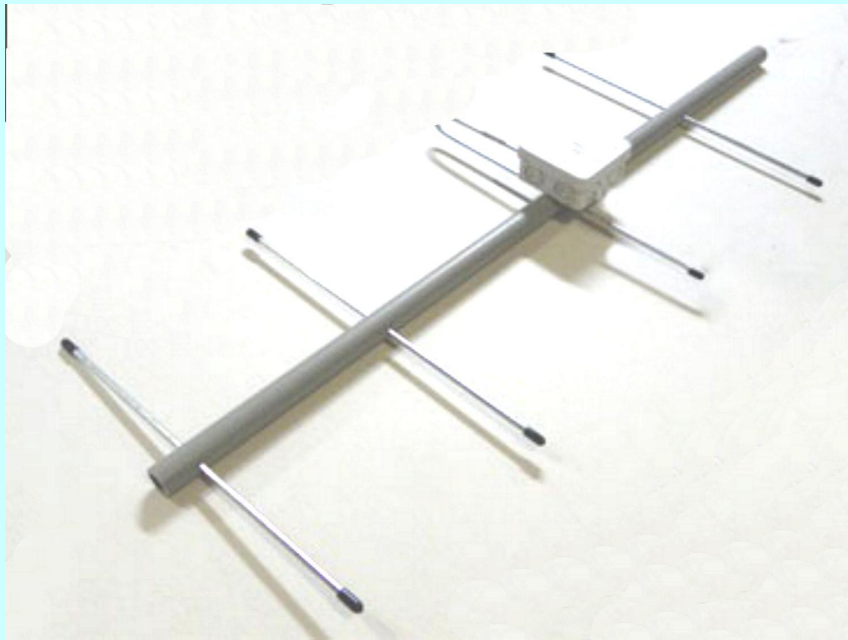
Must decide where the balance point is for mounting.



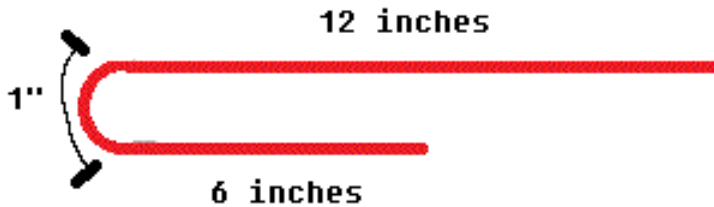
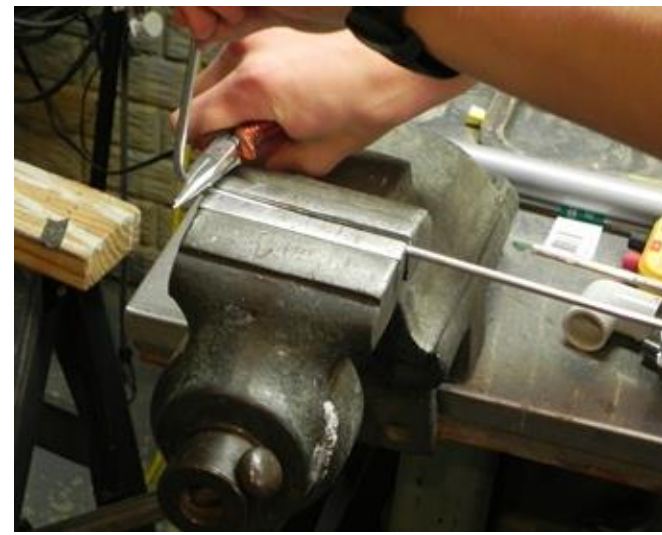
NOTE: Coax must be led away from the antenna at 90 degrees from the boom and elements.

If led from the driven element to the back, it still must leave the antenna at 90 degrees from the elements.





The driven element can be straight or in a half folded dipole configuration. Either way it is fed directly with 50 ohm Coax.



There are many ways to bend the driven element.

The important thing is to have the two parts parallel and spaced correctly when done.



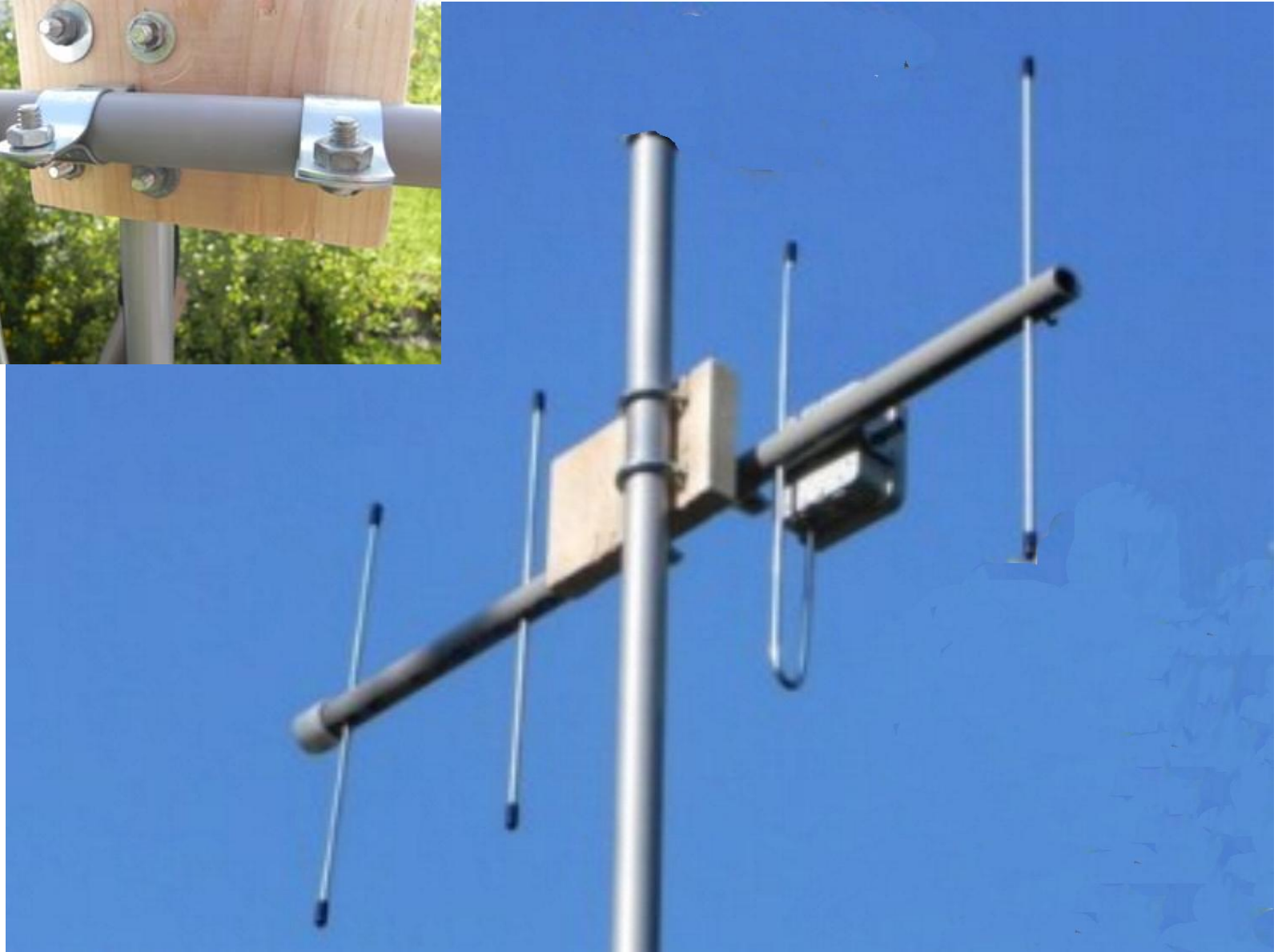


One way to assure proper spacing is to solder the loop part of the driven element directly to a coax or other connector before inserting it into the boom.

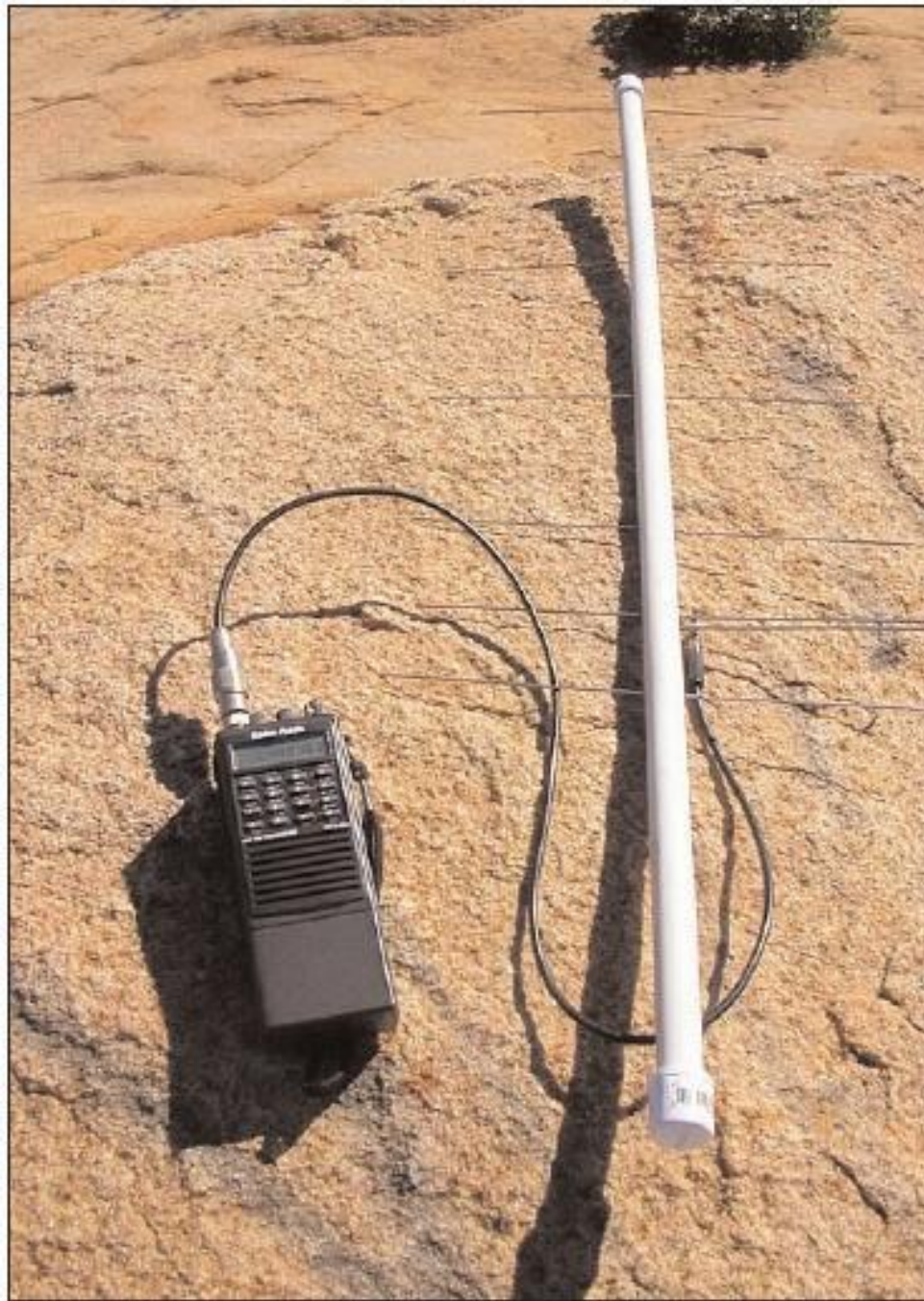
Draw a line the length of the boom to use as a guide for drilling the element holes.

BE SURE the holes are all lined up or your elements will be crooked on the boom.









R

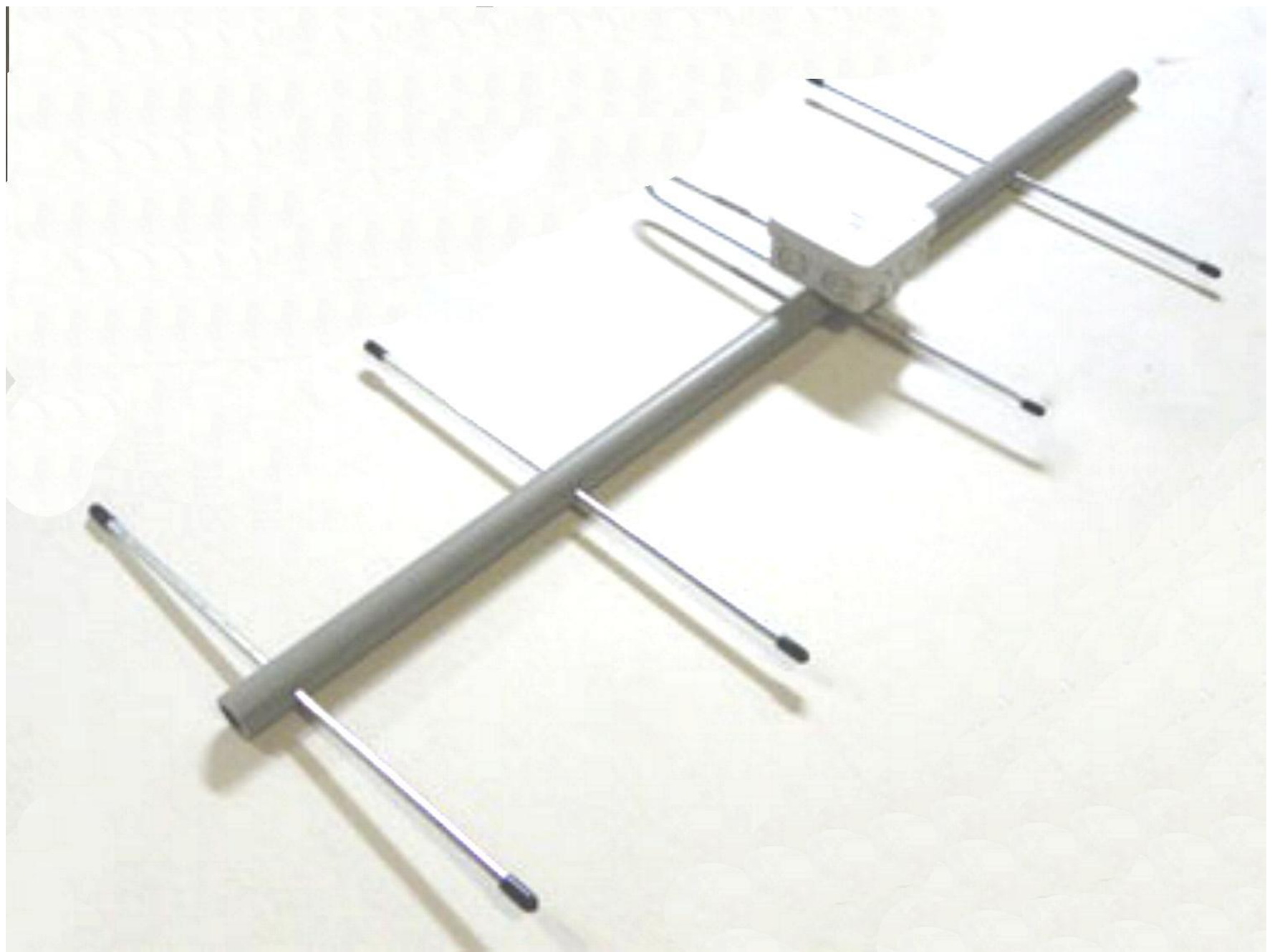
DE

D1

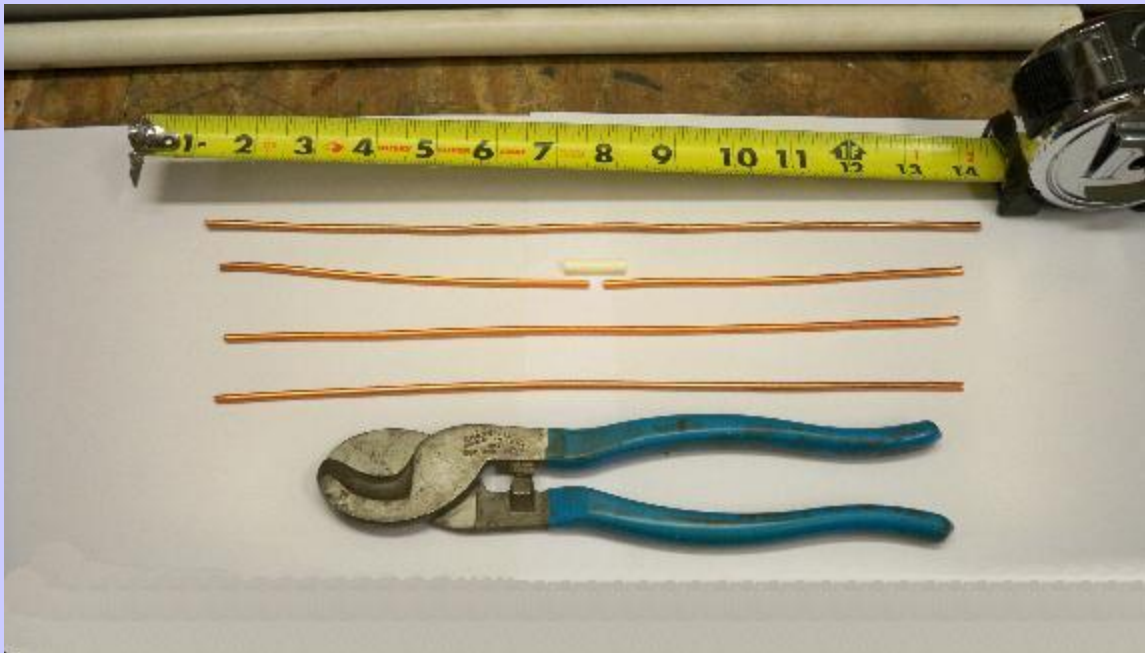
D2

SWR lower
if shifted ?



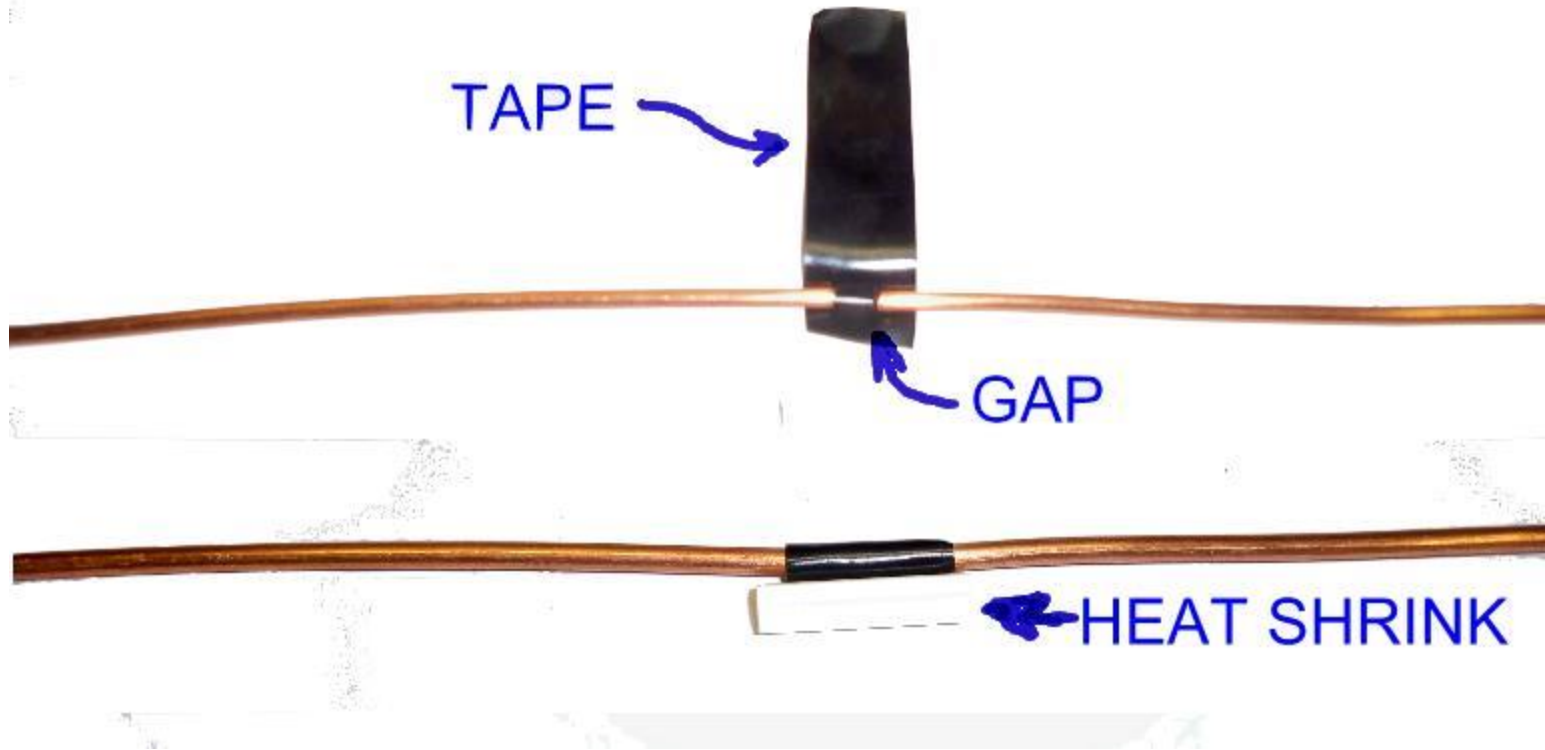


Let's build an antenna !



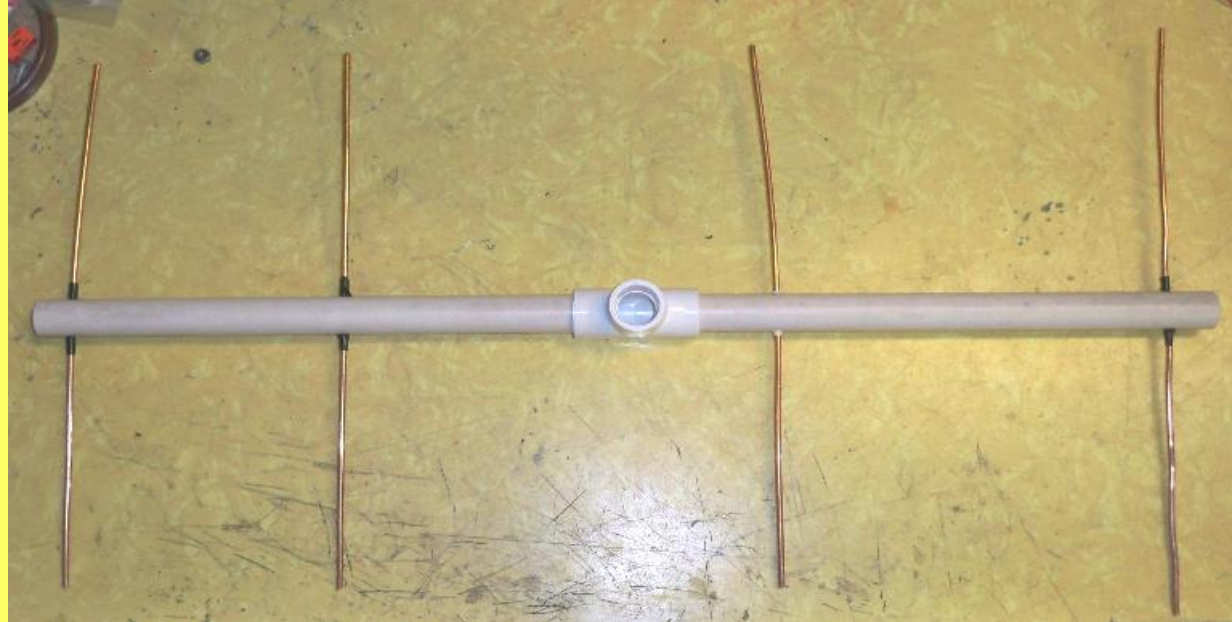
First measure and cut some wire or rod to the dimensions we need.

70 Centimeter 4 element beam 1/8" diameter tubing	Element Length	Element spacing from Reflector
Reflector	13"	0
Driven	12"	8-1/16"
Director 1	11-7/8"	16-3/4"
Director 2	11-3/4"	23-3/8"



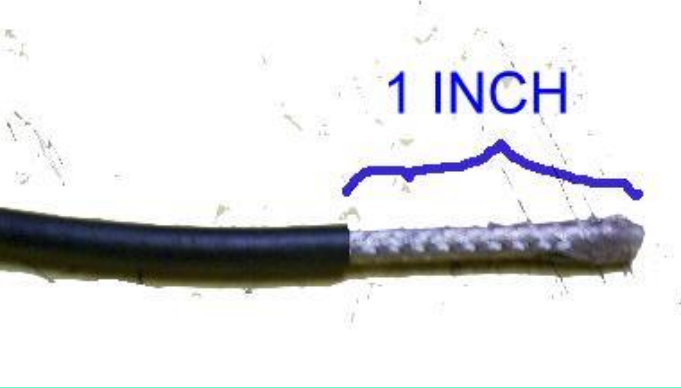
Prepare the driven element leaving a $\frac{1}{4}$ " gap. Tape it and secure it with heat shrink. You may have to re-cut the element to length.

Be sure to re-measure it after this step.



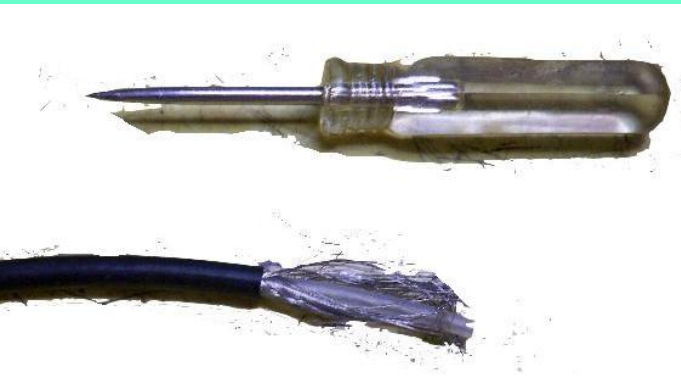
Drill the PVC boom and insert the elements. Note the 'TEE' in the middle for mounting the antenna.





PEPARE THE FEED LINE:

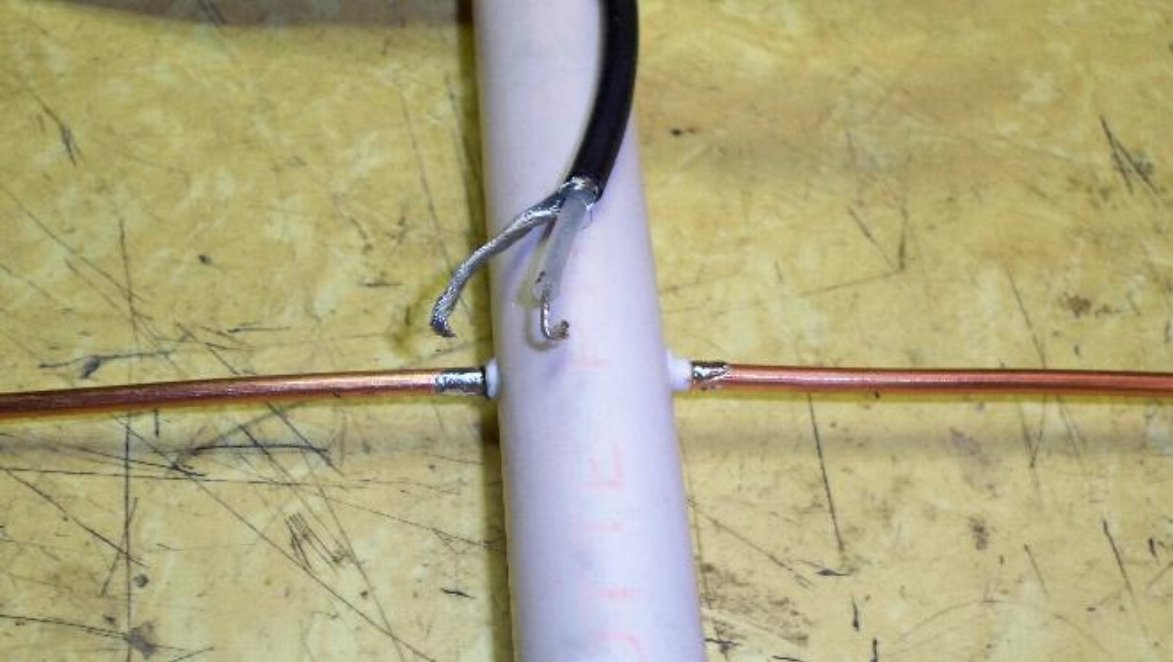
Remove 1” of the outer cover of your Coax - RG-58 or RG-8X 50 Ohm Coax



With a pointed tool, comb out the Braid away from the cener conductor.



Twist and tin the braid. Cut 3/8” Off the center insulation and tin The center conductor.

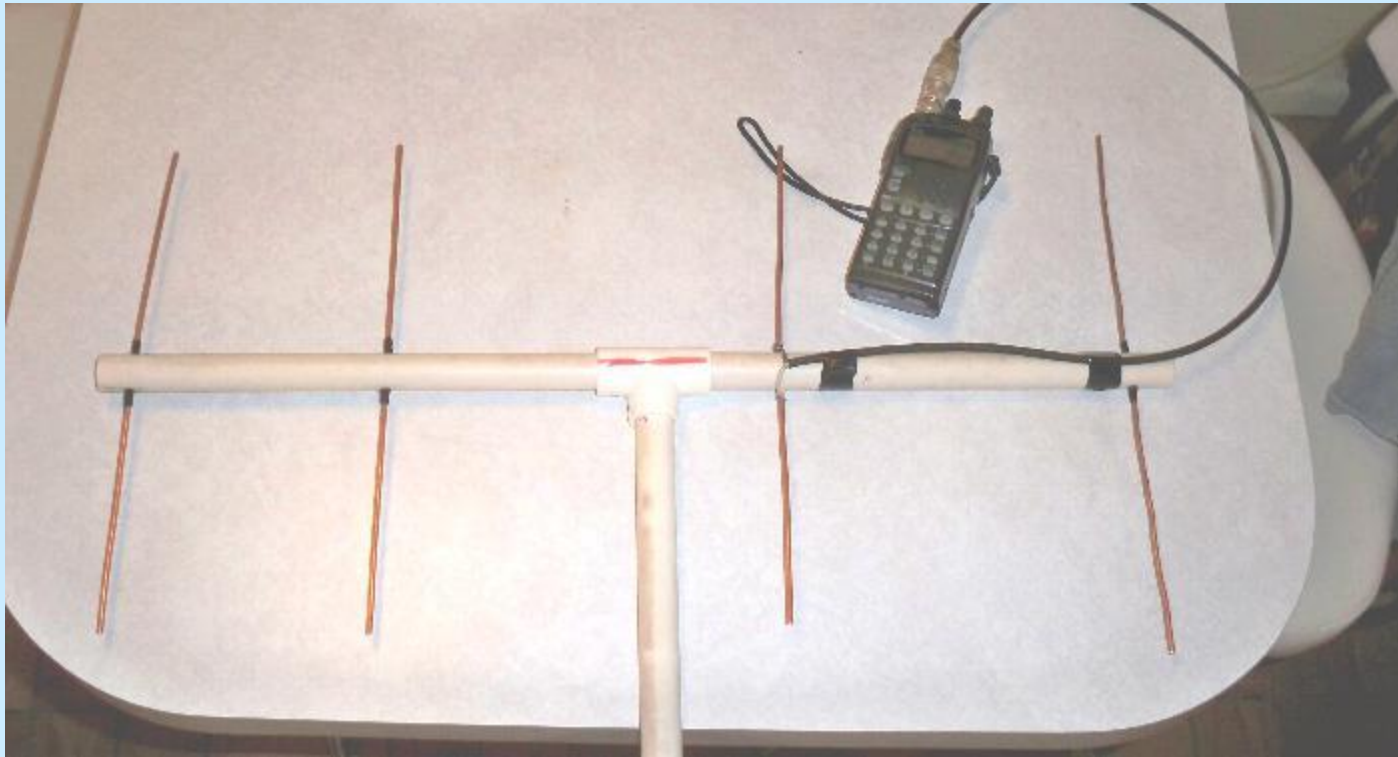


Bend the tinned wires to fit over the driven element... Tin the driven element where you will attach the coax. DO NOT USE EXCESSIVE HEAT !



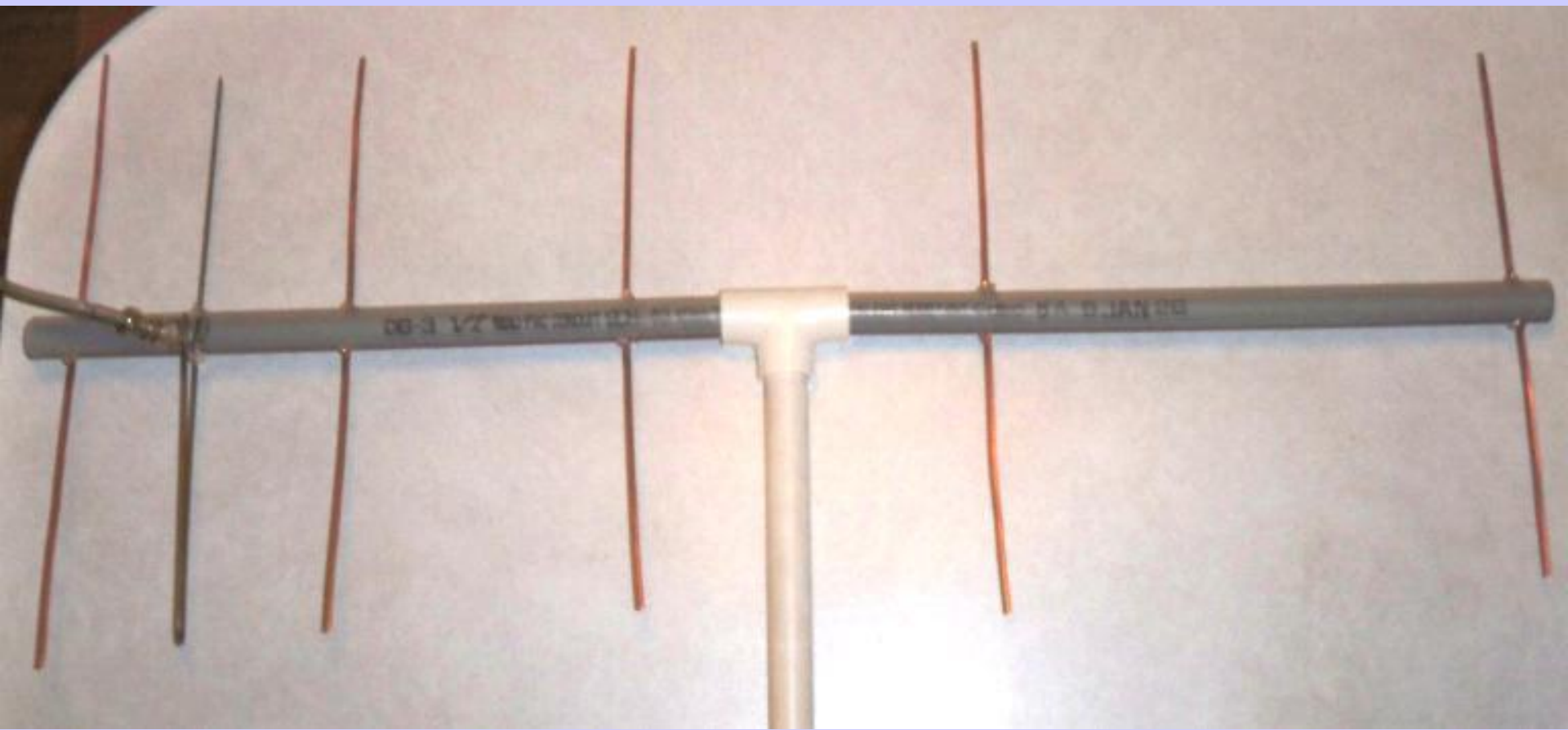
Solder the coax to the driven element and tape the coax to the boom in two places.

The coax should lead toward the reflector.



Here's the finished antenna...

Any questions???





References:

<http://www.qsl.net/w4sat/antlegn.htm>

<http://www.tristantech.net/articles/yagi/1.php>

<http://picaxe.orconhosting.net.nz/yagi433.jpg>

<http://www.nr6ca.org/70cm/yagi.html>

<http://www.amsat.org/amsat-new/information/faqs/crow/JulAug06AmsatJournal.pdf>

Thank you for your interest.

See you (hear you) on the repeater !

73 de N8PR