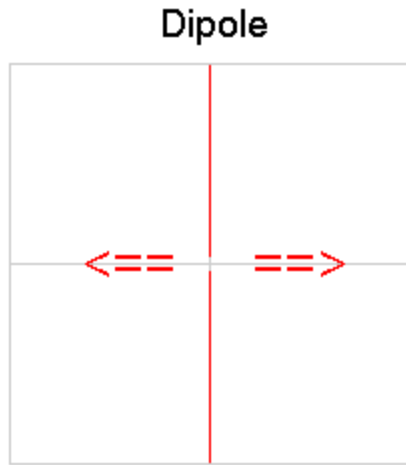


# A Hex Beam Primer

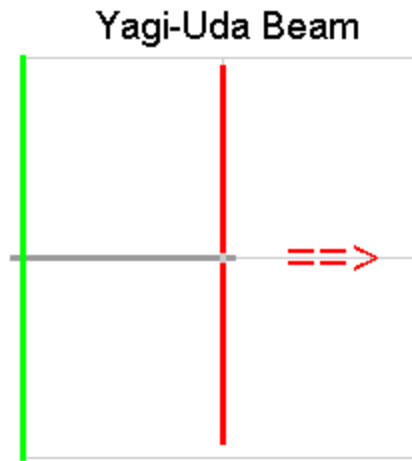
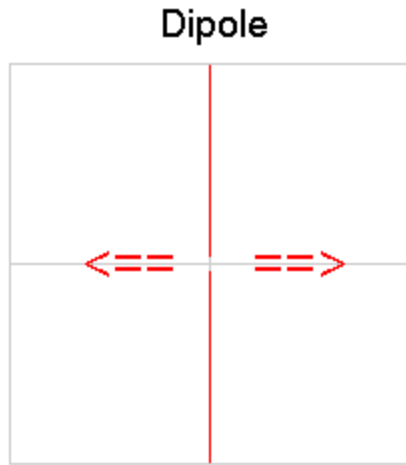
The background image shows an outdoor radio station site. A tall, silver metal tower stands prominently, supporting a large hex beam antenna with six horizontal arms. To the left, a small, light-colored building with a gabled roof has a smaller hex beam antenna mounted on its roof. In the foreground, a dark-colored pickup truck is parked on a gravel surface. The sky is overcast and grey.

Darryl Holman  
WW7D

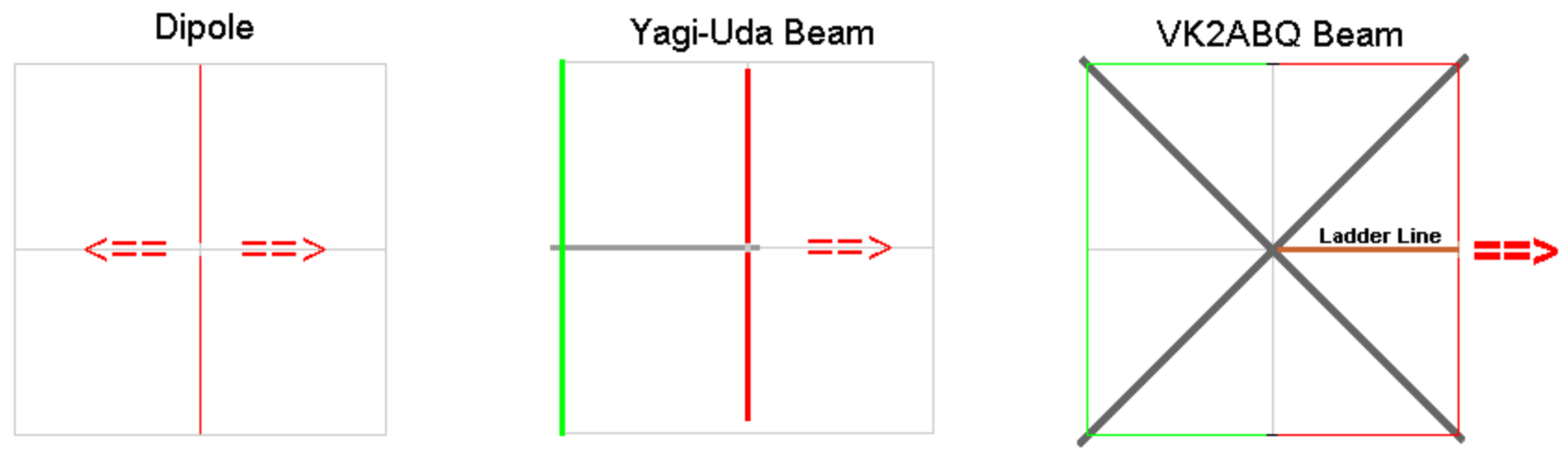
# Evolution of the hex beam



# Evolution of the hex beam

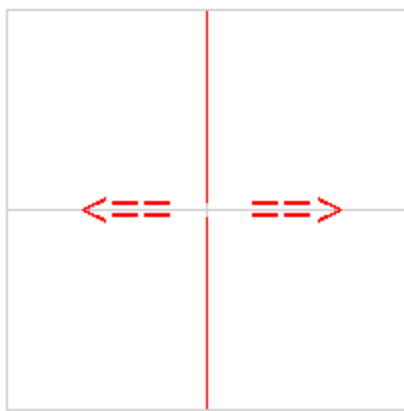


# Evolution of the hex beam

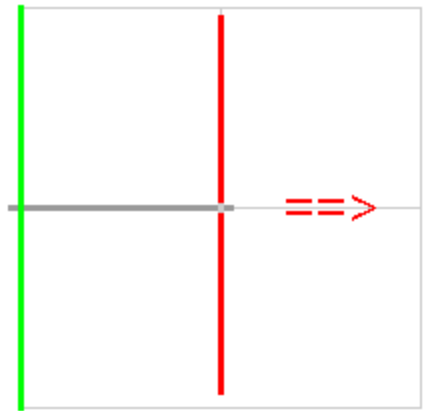


# Evolution of the hex beam

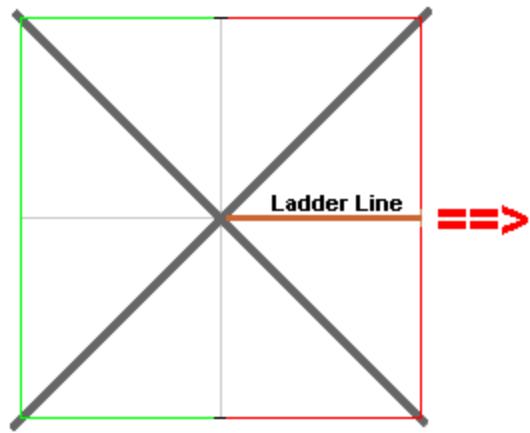
Dipole



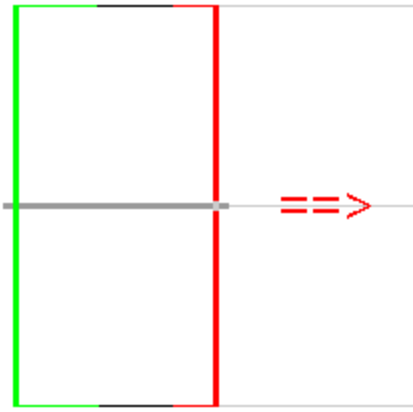
Yagi-Uda Beam



VK2ABQ Beam



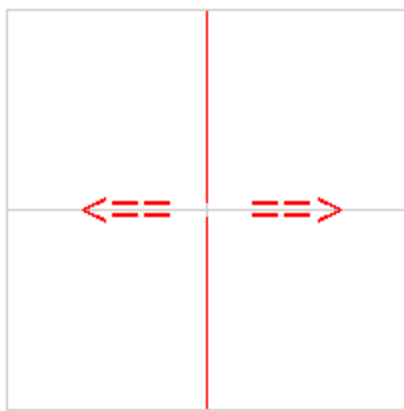
Moxon Beam



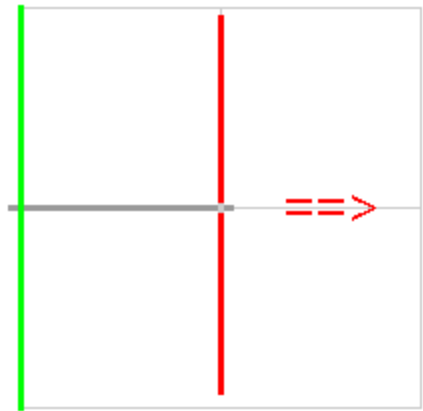
Stub Wires

# Evolution of the hex beam

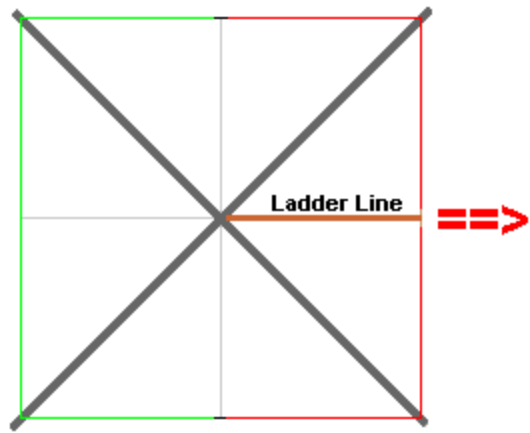
Dipole



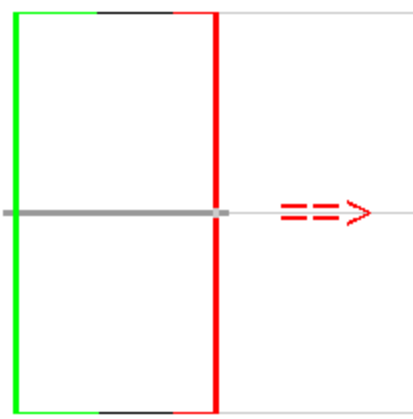
Yagi-Uda Beam



VK2ABQ Beam

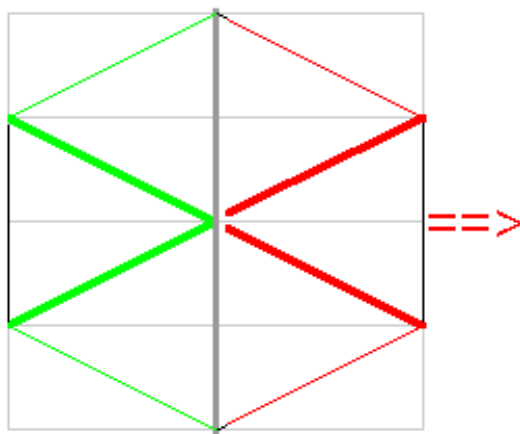


Moxon Beam



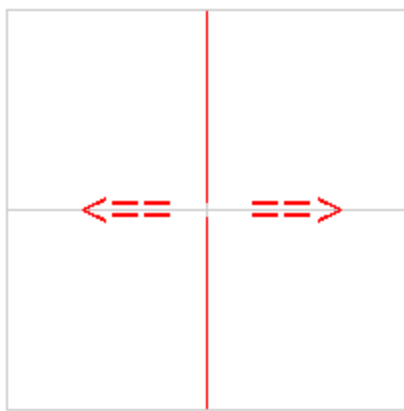
Stub Wires

Hex Beam

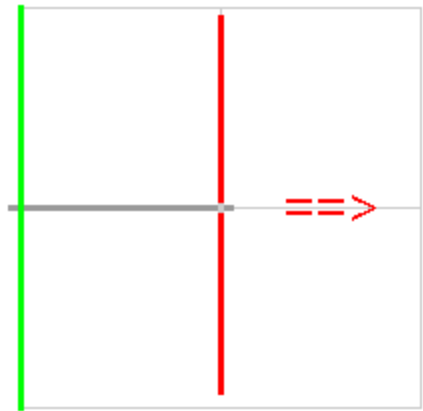


# Evolution of the hex beam

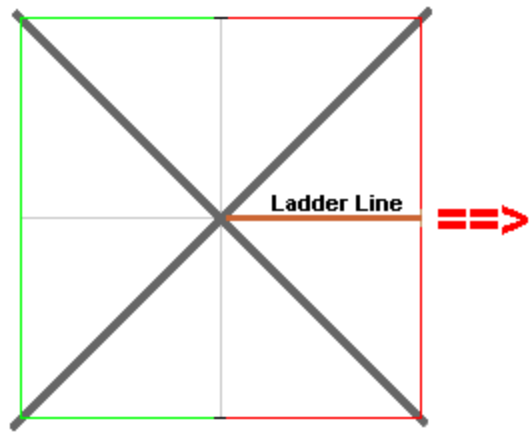
Dipole



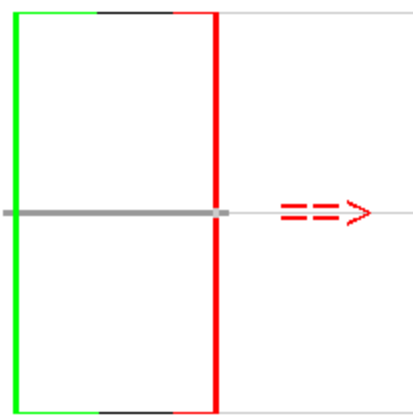
Yagi-Uda Beam



VK2ABQ Beam

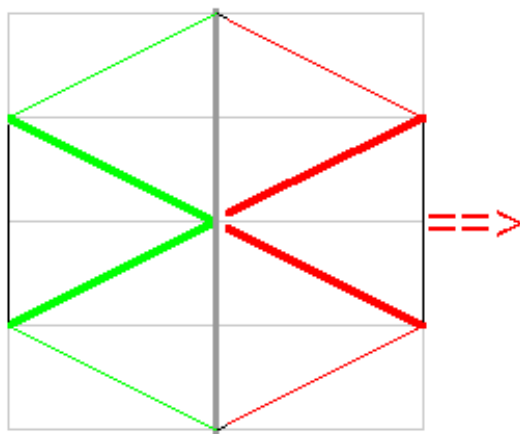


Moxon Beam

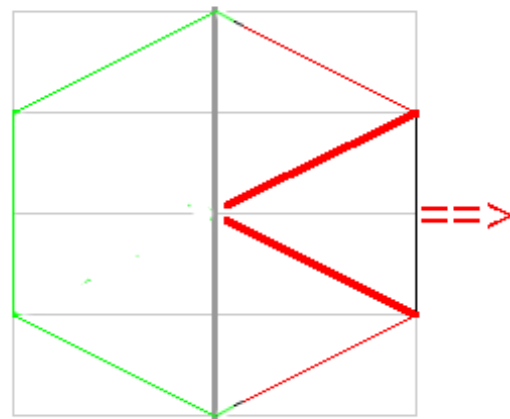


Stub Wires

Hex Beam

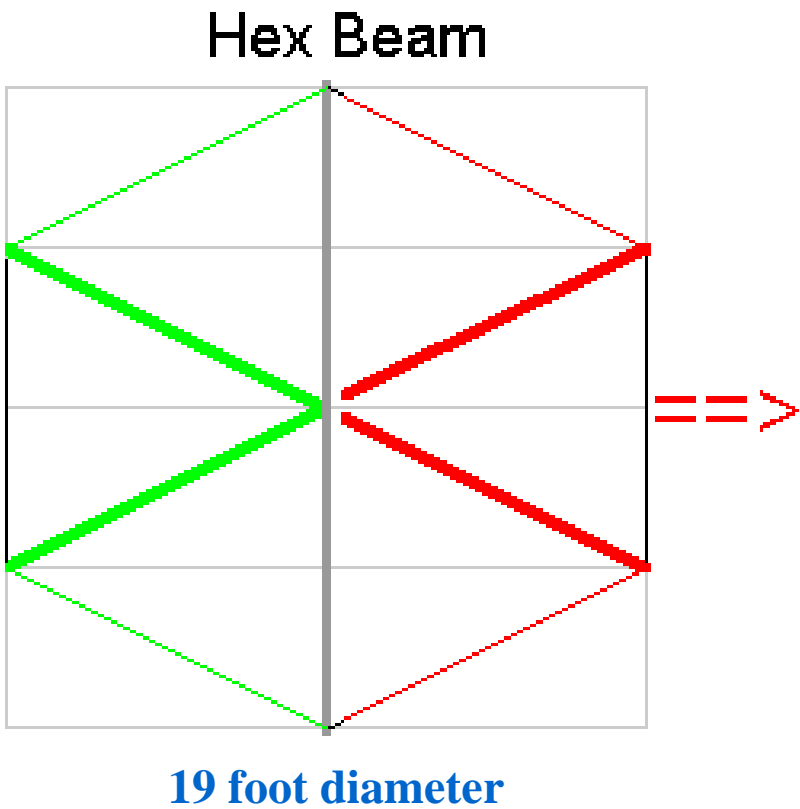


Broadband Hex Beam

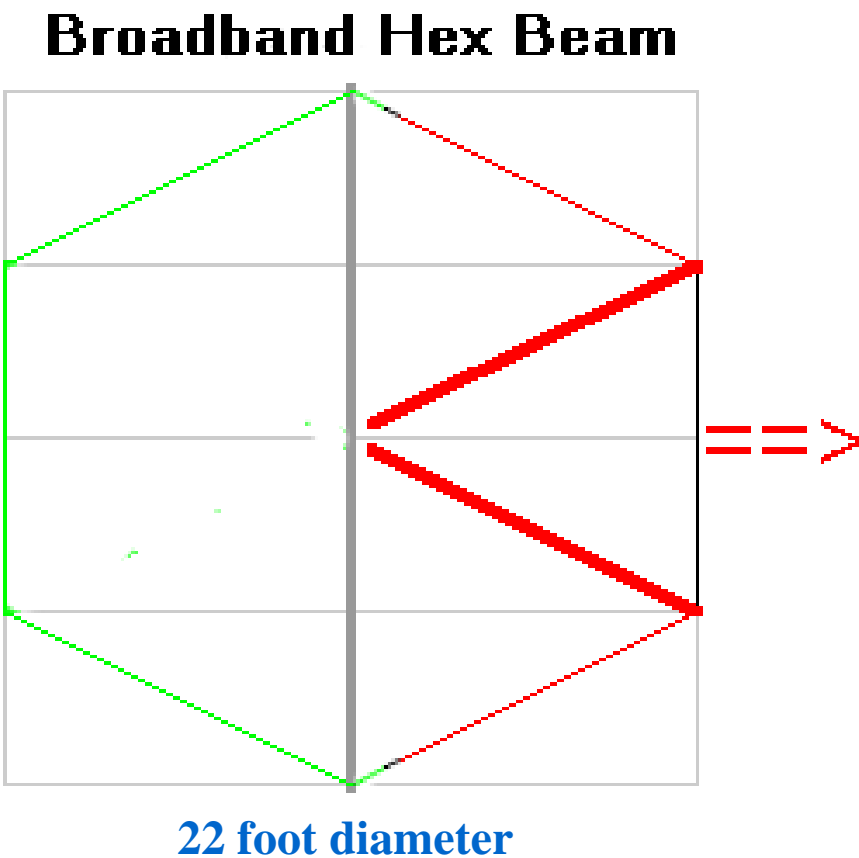


# Hex Beams:

**Mike Traffie, N1HXA (early nineties)**  
**Classic Hex Beam**

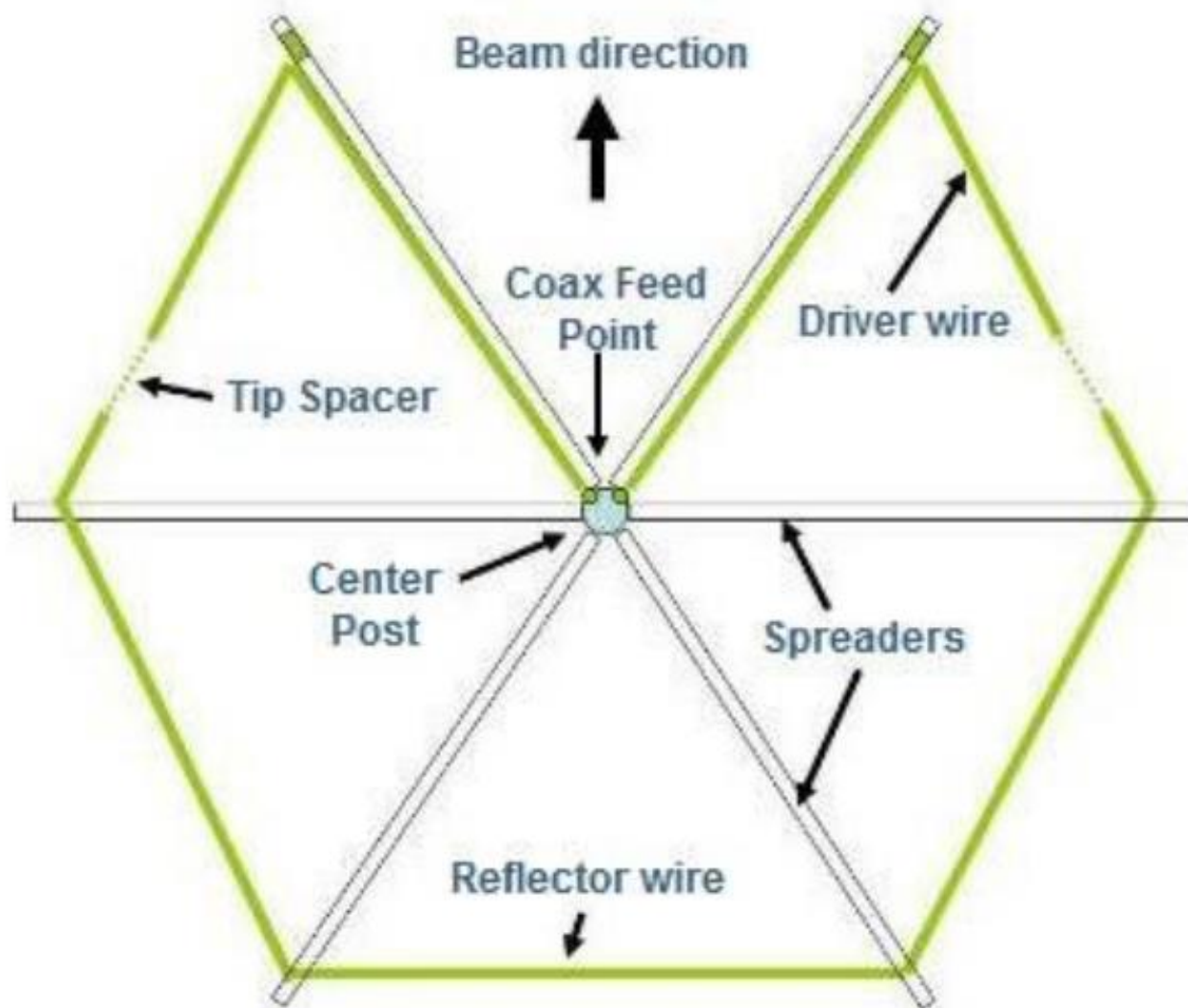


**Steve Hunt, G3TXQ (2007)**  
**Broadband Hex Beam**

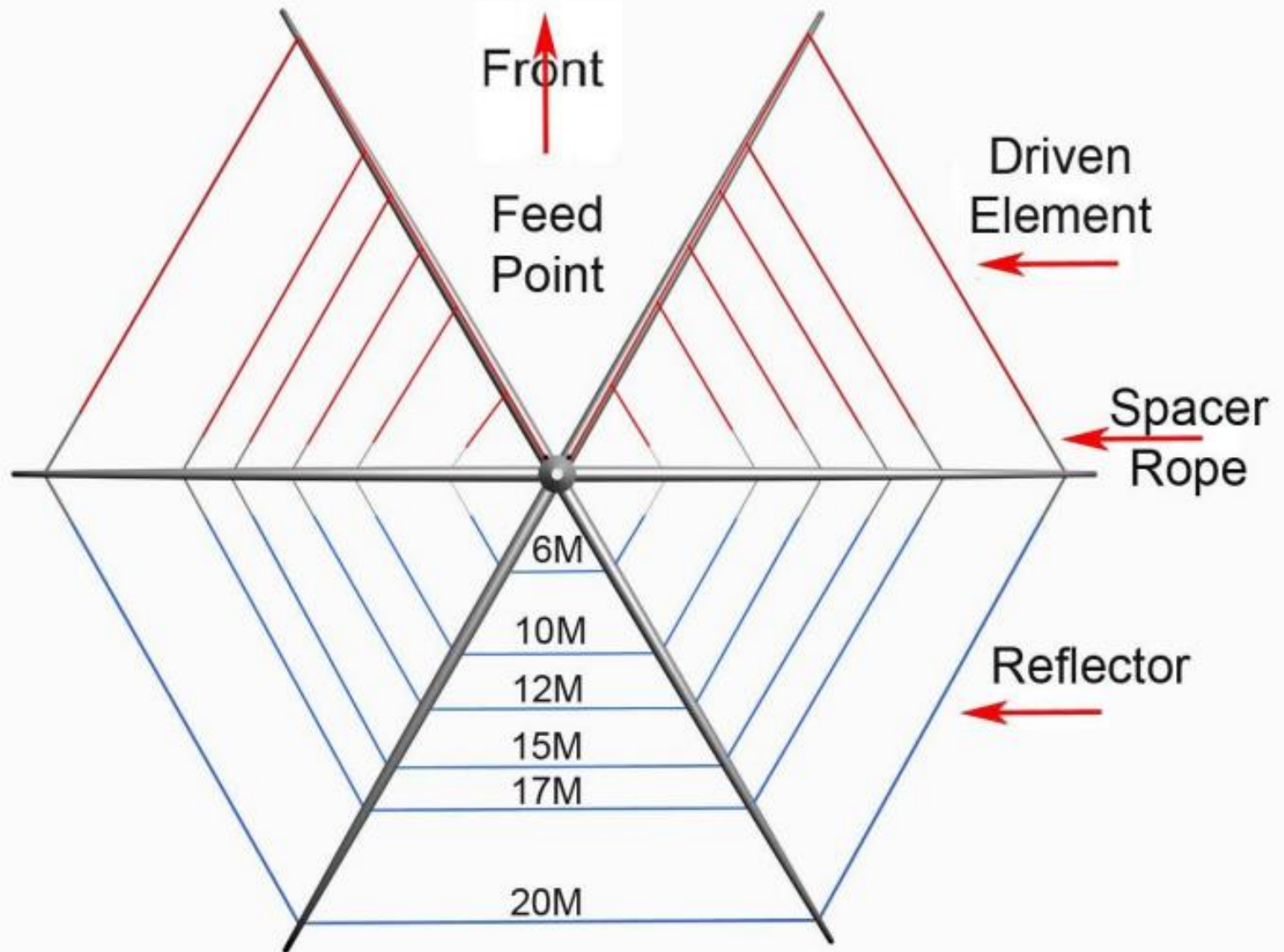


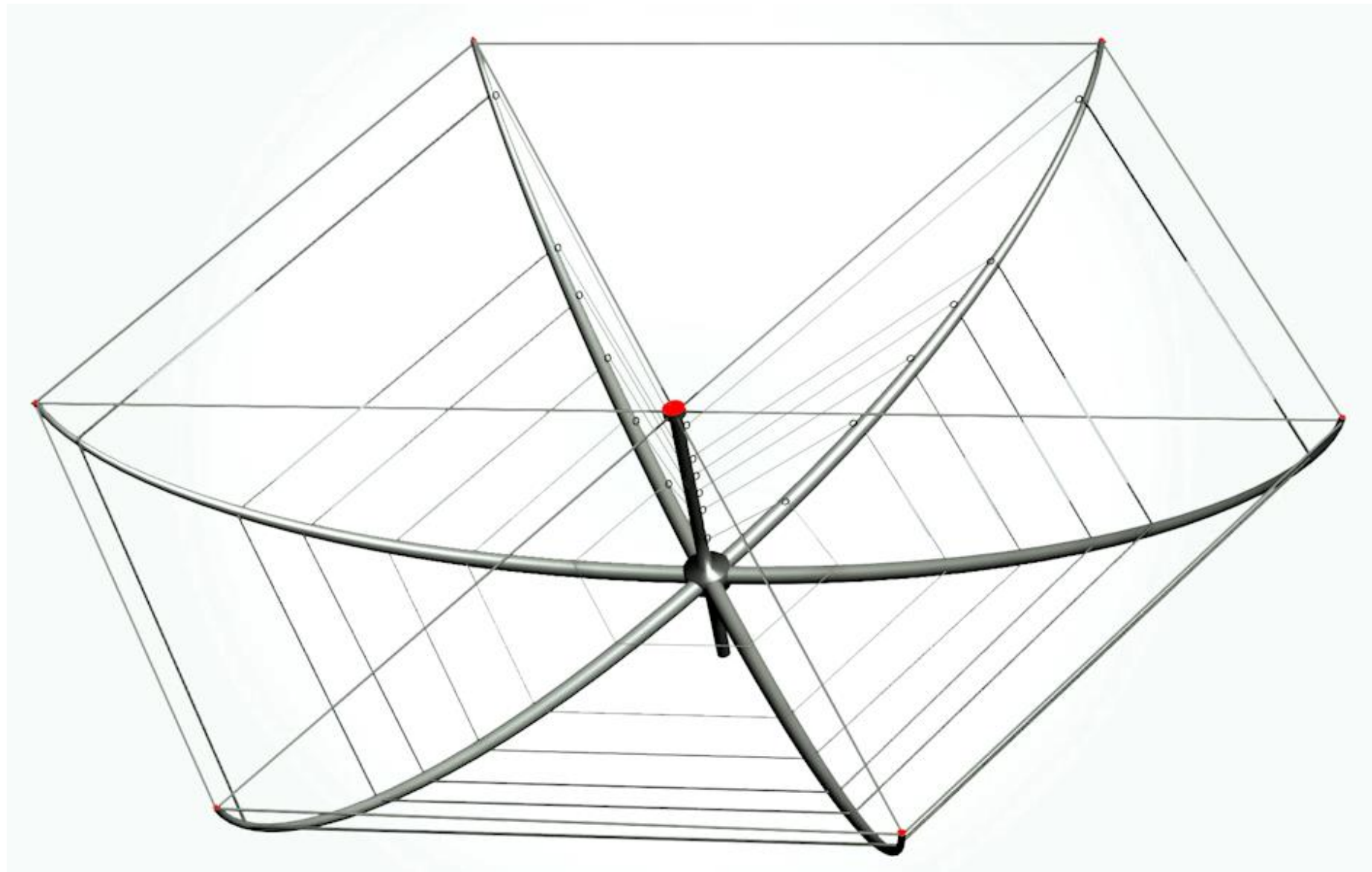


## Single Band G3TXQ Broad Band Hexagonal Beam (Top View)



**Hex beams are frequently built for five or six bands:  
20m, 17m, 15m, 12m, 10m and sometimes 6m**





# Two must-have documents on the hex beam:

**UNDERSTANDING THE HEX BEAMS (G3TXQ)**

<http://www.karinya.net/g3txq/hexbeam/>

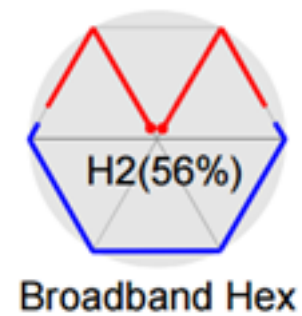
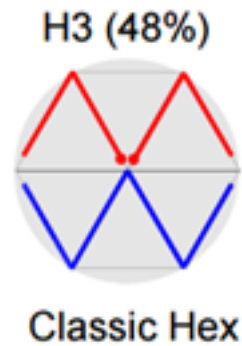
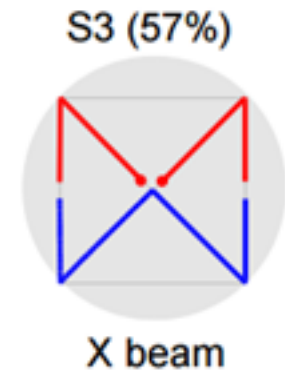
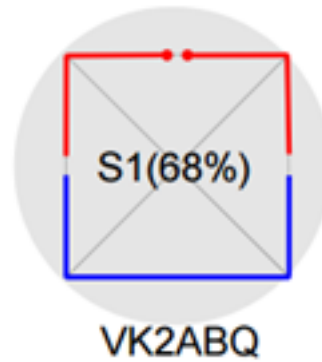
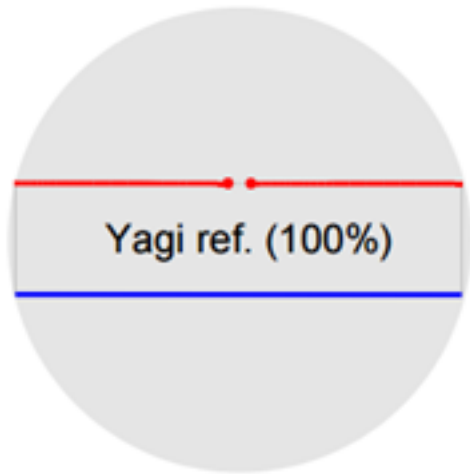
**BUILD YOUR OWN HEXAGONAL BEAM (K4KIO)**

<http://www.hex-beam.com/>



# Why a (broadband) hex beam?

- Gain and front/back performance is comparable to a 2 element full size Yagi: typically > 6db gain
- Five or six bands with low SWR (no tuner, coils)
- Single feed point (no antenna switches)
- Broadband characteristics on each band
- Small turning radius (11 ft.)
- Low weight (< 25 lbs) & low wind load (< 6 sq ft ) for economical support and rotation
- Built from easy-to-acquire components
- Empirically, works well at low to modest heights
- Maintenance-free for many years

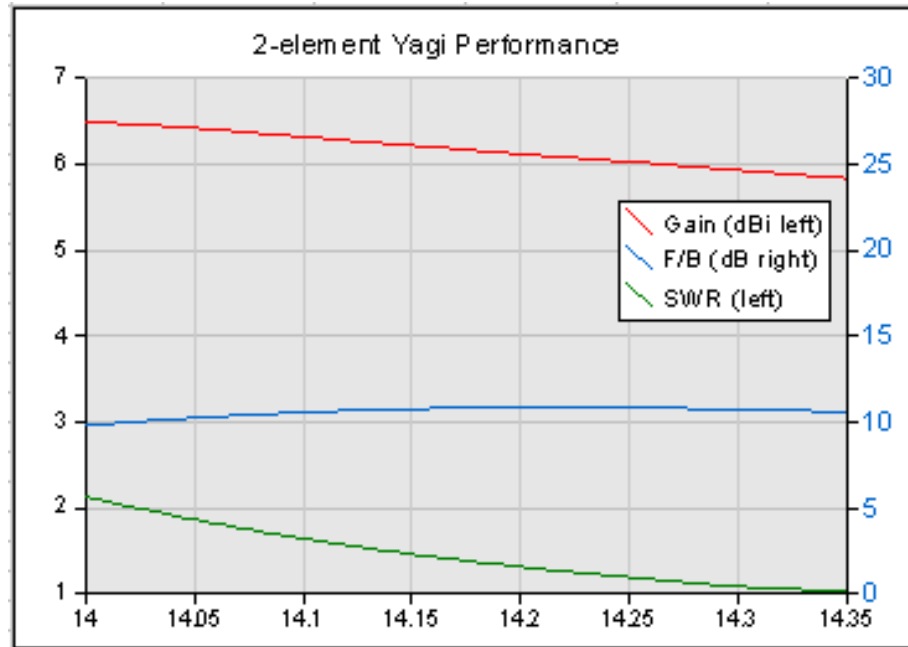


How does the hex beam do compared to other popular antennas?				
Performance		HyGain TH11DX	Broadband Hexbeam	Cushcraft MA5B
Peak Gain (dBd)	20m	6.4	3.8	1.5
	17m	6.2	3.2	-1.1
	15m	5.9	3.5	2.7
	12m	5.3	3	-1.1
	10m	7	3.6	3.2
Peak F/B (dB)	20m	27	22	22
	17m	22	19	0
	15m	25	16	12
	12m	15	13	0
	10m	19	16	10
2:1 SWR B/W (kHz)	20m	350	350 <1.7	90
	17m	100	100 <1.2	100
	15m	450	450 <1.4	255
	12m	100	100 <1.7	110
	10m	1200	1400	665
Turn radius (ft)		22	10.7	8.8
Weight (lbs)		88	13 to 22	26.5
Wind area (sq ft)		12.5	6	3.2
Price		\$1200	~\$200 and up	\$500

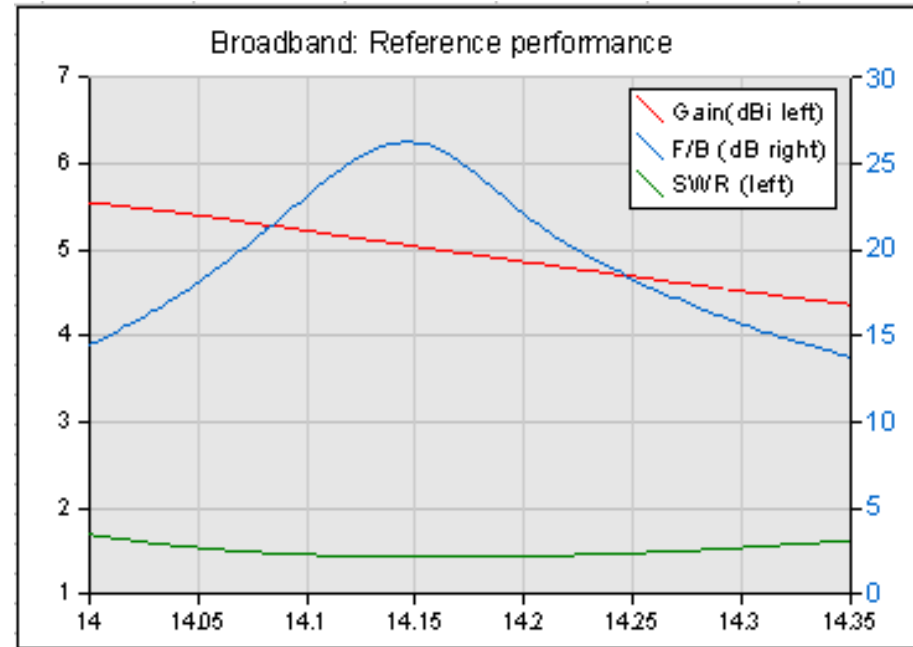
Source: G3TXQ, <http://www.karinya.net/g3txq/hexbeam/broadband/>

# Broadband performance

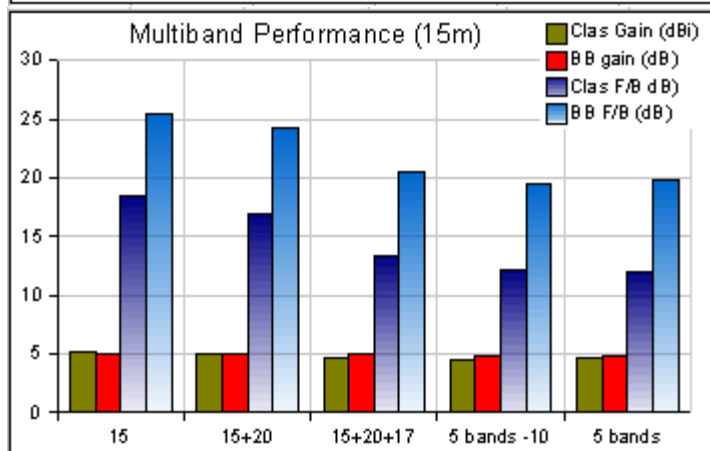
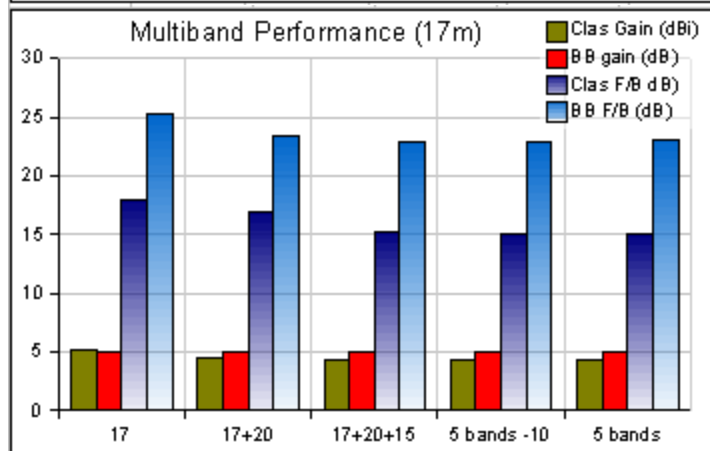
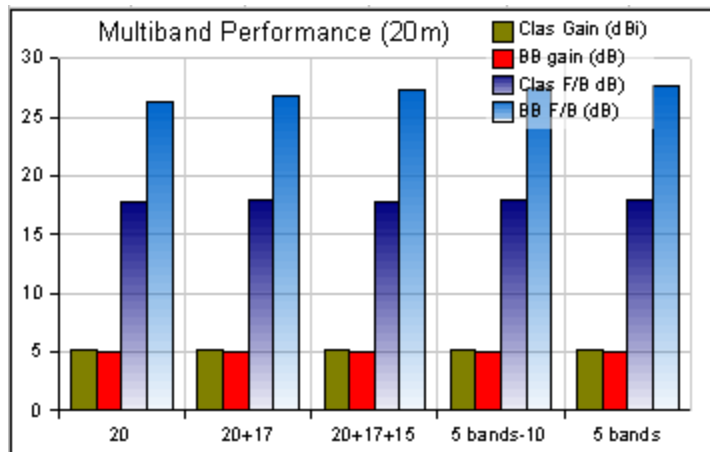
## Yagi



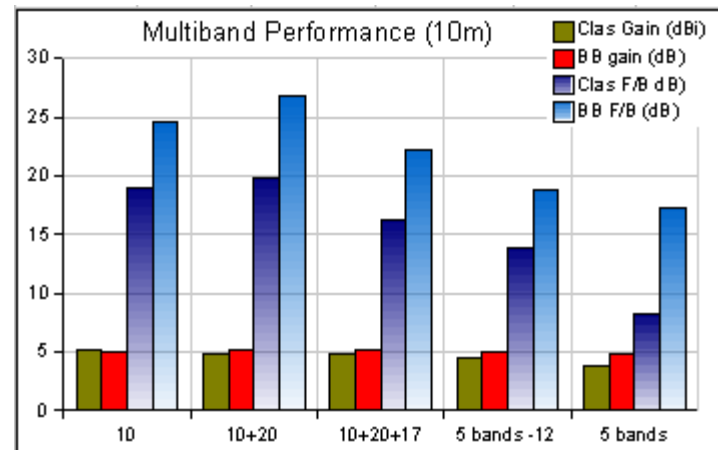
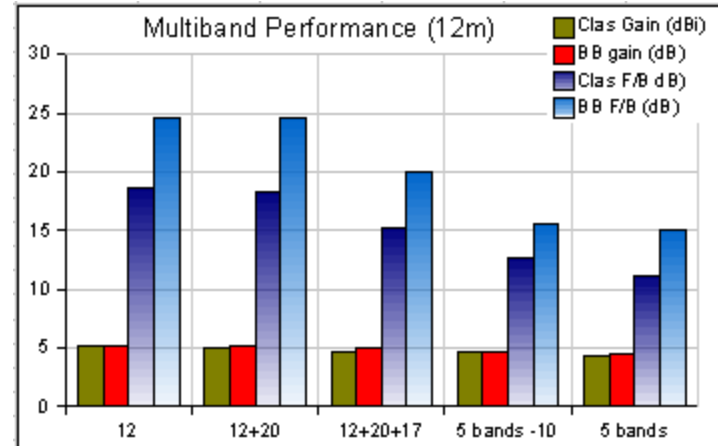
## Hex beam



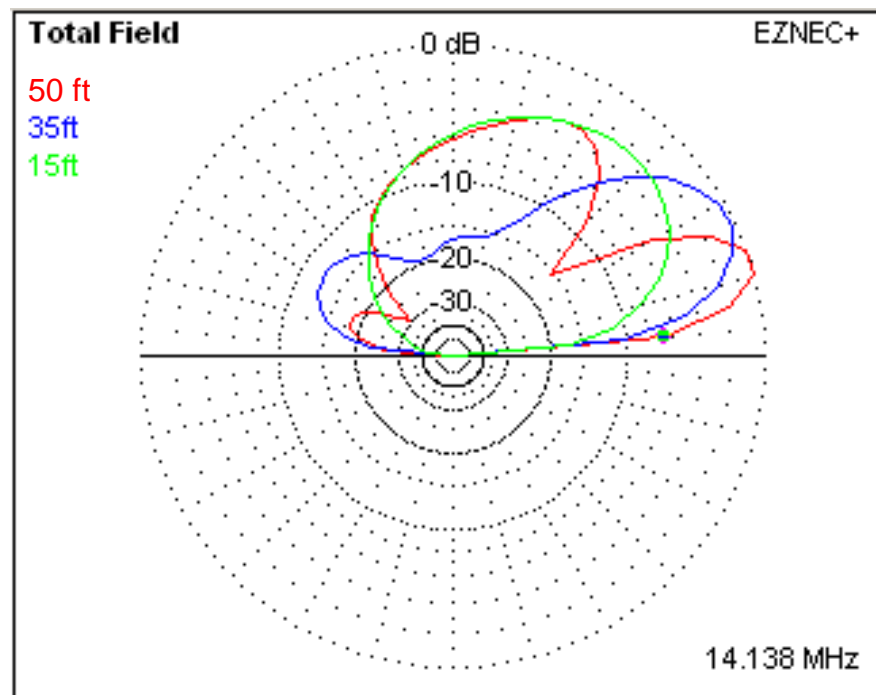
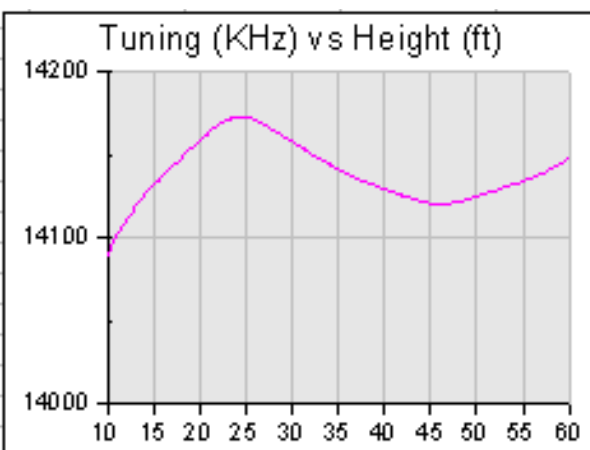
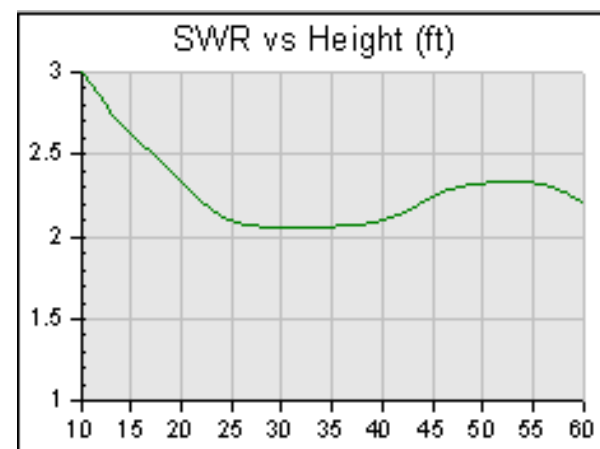
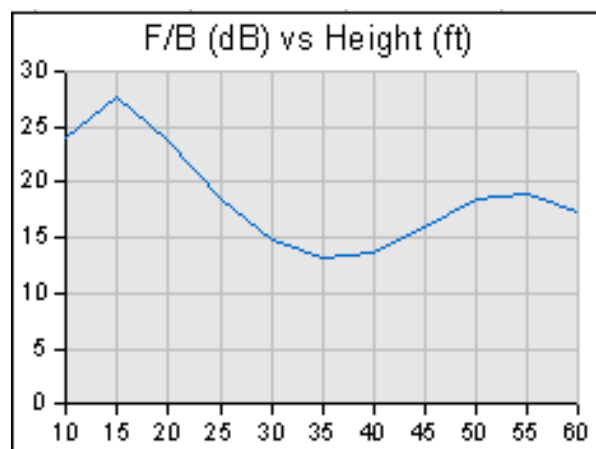
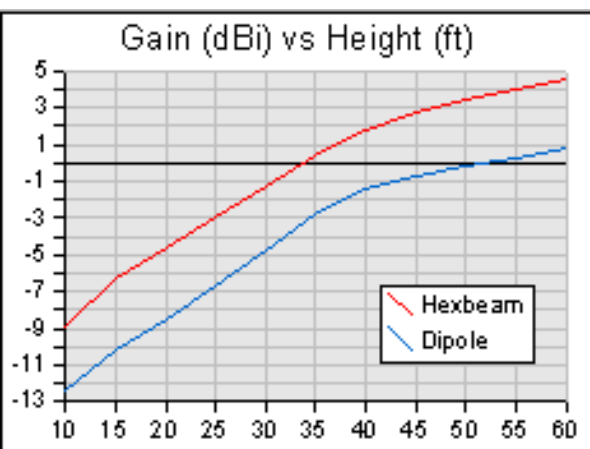




- **No significant forward gain loss (red) going to 5 bands**
- **Some loss of F/B going to 5 bands on 15m, 12m and 10m (blue)**



# Height and the Hex Beam



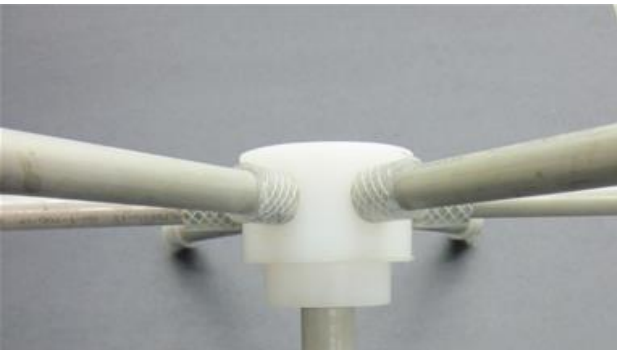
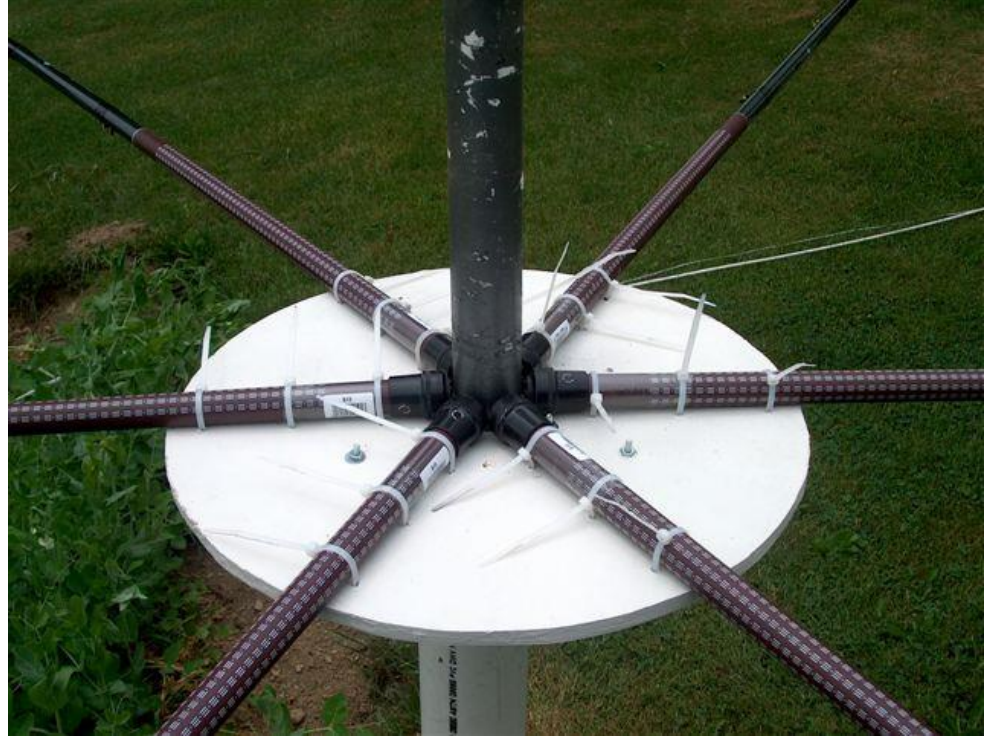
<http://www.k4hex.com/>

MW0JZE

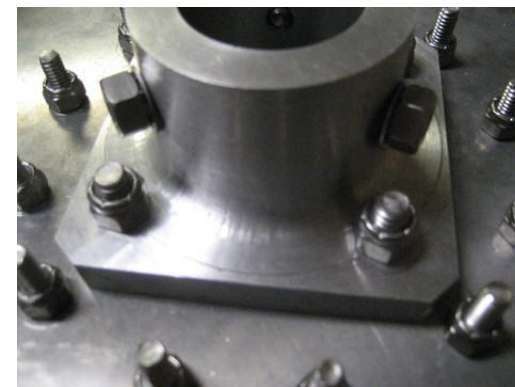
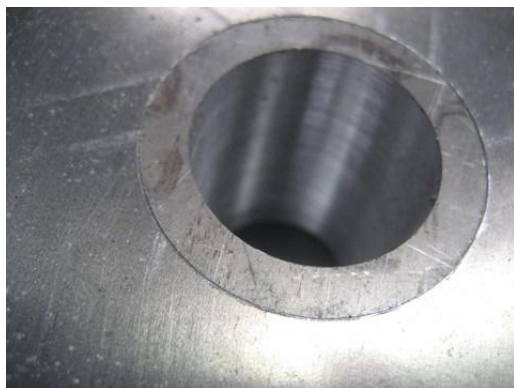
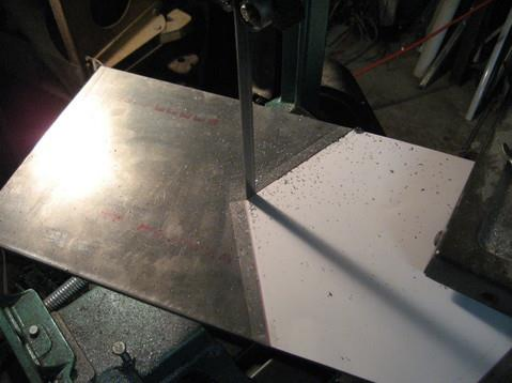


**DX Engineering**























## Parts for home built:

- See full parts list at [www.hex-beam.com/parts/](http://www.hex-beam.com/parts/)
- Base plate and mast material: [onlinemetals.com](http://onlinemetals.com) (will call pickup in Seattle!)
- Fiberglass tubes for spreaders and center post: Max-gain systems (\$120): [mgs4u.com](http://mgs4u.com)
- Use #14 gauge Flexweave (uninsulated) for antenna wires

## Construction notes:

- <http://www.hex-beam.com/>
- <https://static.dxengineering.com/global/images/instructions/dxe-hexx-5tap-2.pdf>

# How does the Hex Beam stand up to weather? Usually, quite well



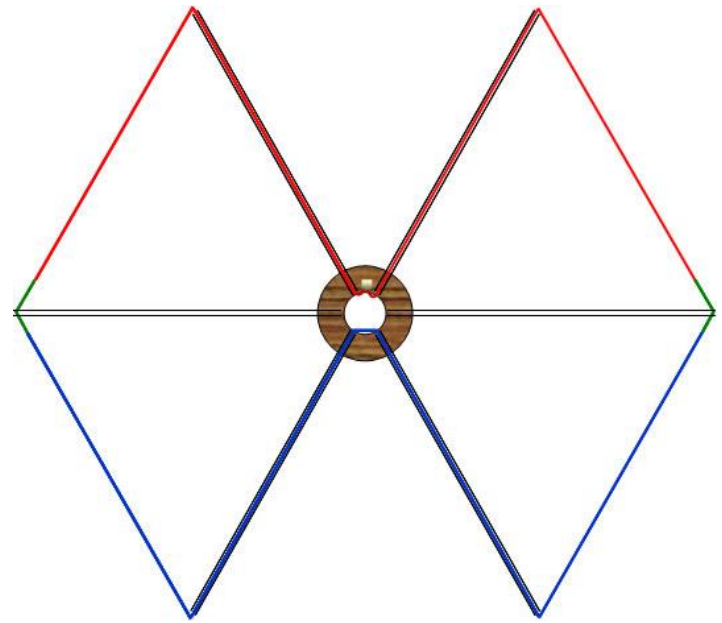
**Most failures seem to be from using fishing poles as spreaders**



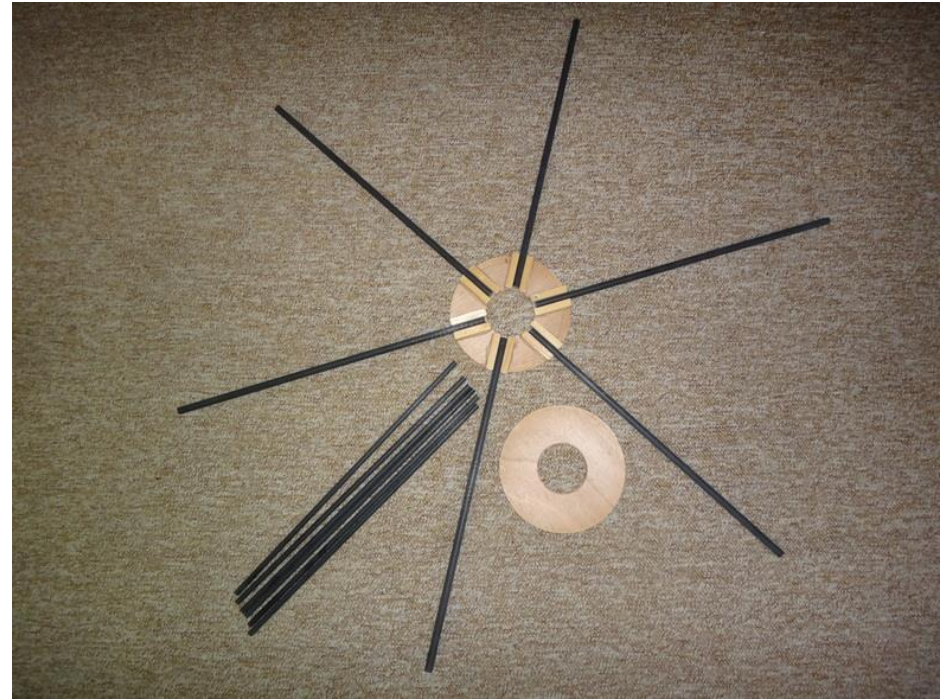
# Simple 6m directional antennas

## The Hexbeam (2 el)

Small turning radius ( $< 3'$ )



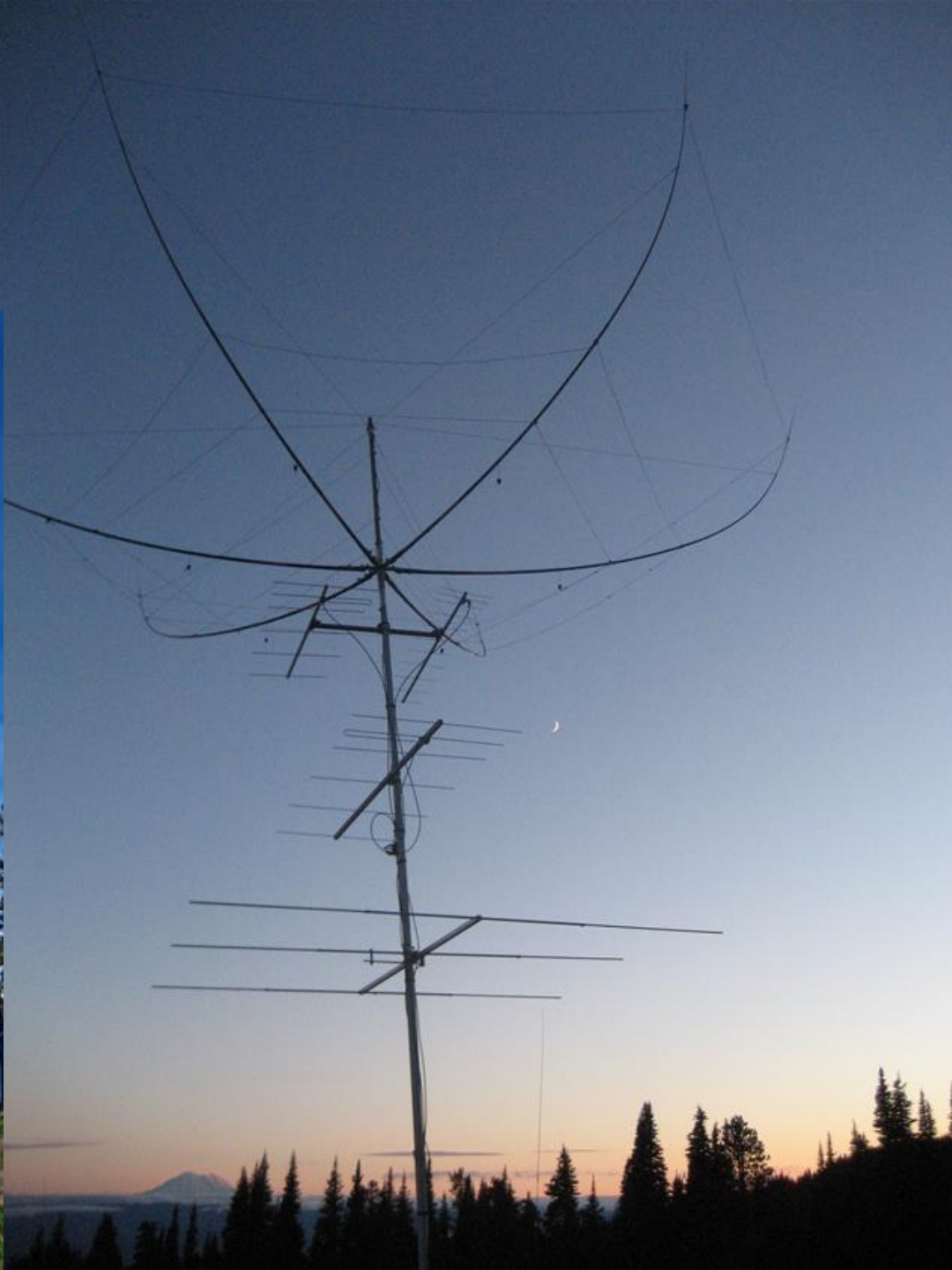
*Contact me (WW7D) for construction information*





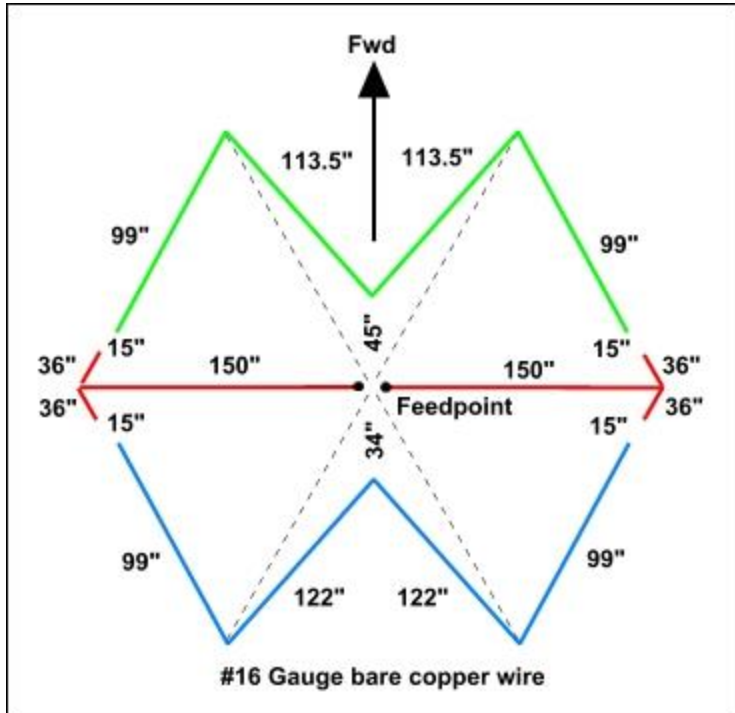
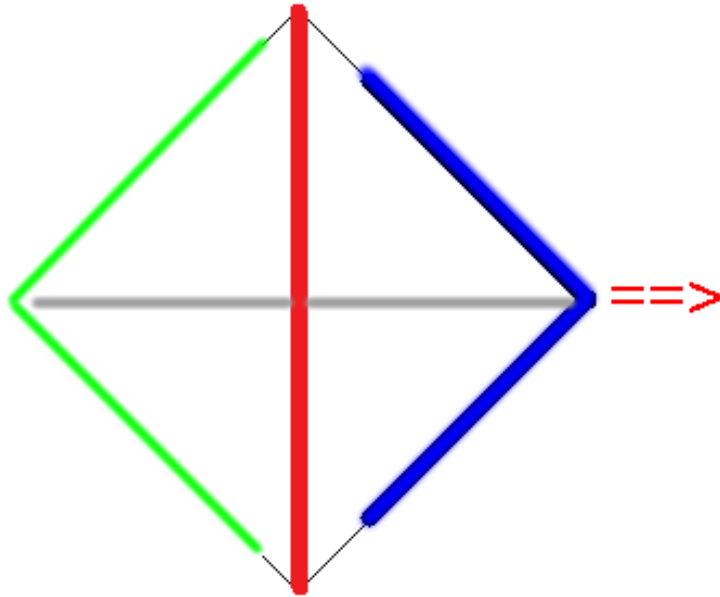


# Questions?



### 3 element “hex beam”

## Spider Beam



# Broadband Hex beam versus the Spiderbeam

## Spiderbeam

Example: 3-Band  
Total 10 Elements

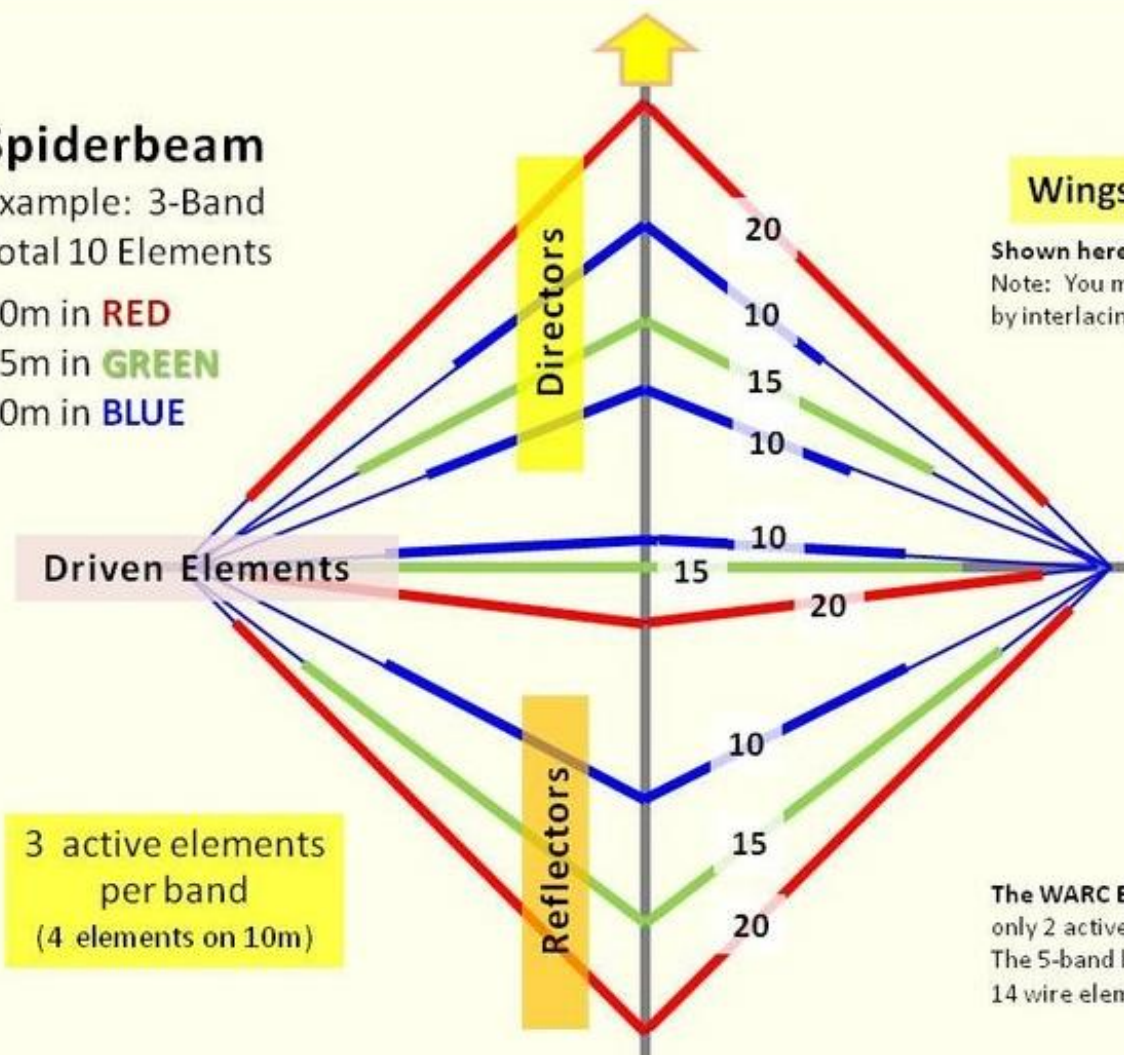
20m in **RED**

15m in **GREEN**

10m in **BLUE**

**Wingspan: 33 ft.**

Shown here: Tribander version.  
Note: You may have up to 5 bands  
by interlacing more wire elements.



3 active elements  
per band  
(4 elements on 10m)

The WARC Bands, 17 & 12m have  
only 2 active elements per band.  
The 5-band beam has a total of  
14 wire elements.

The only difference between the portable and heavy duty Spiderbeams is the weight.

Info: [www.spiderbeam.com/gate.html](http://www.spiderbeam.com/gate.html)



## SPIDERBEAM

## SIZE/WEIGHT

## HEXBEAM

### SPIDERBEAM

Elements: 3\*/band

Radius: 16 ½ ft.

Wingspan: 33 ft.

GAIN: see chart

Weight: 14 lbs.

\*4 elements on 10m

### Light Weight\* HEX BEAM

Elements: 2/band

Radius: 11 ft.

Wingspan: 22 ft.

GAIN: see chart

Weight: 13 lbs.

(\*source: Home Brew)

### SPIDERBEAM HD

Elements: 3\*/band

Radius: 16 ½ ft.

Wingspan: 33 ft.

GAIN: see chart

Weight: 23 lbs.

\*4 elements on 10m

### HEX BEAM

Elements: 2/band

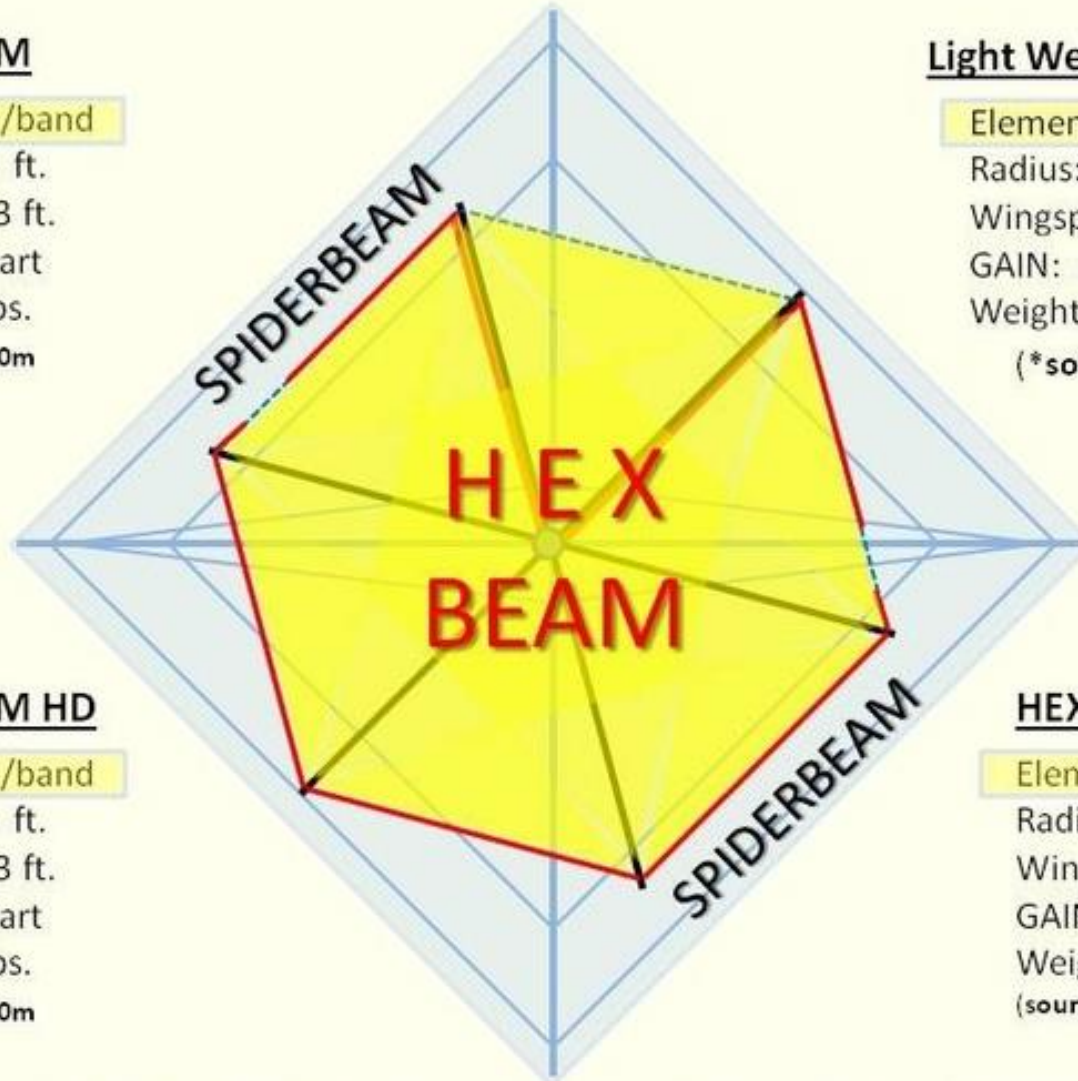
Radius: 11 ft.

Wingspan: 22 ft.

GAIN: see chart

Weight: 24 lbs.

(source: K4KIO)



The Spiderbeam is 50% larger than the Hex Beam.

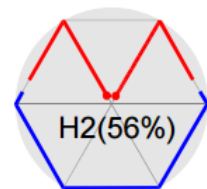
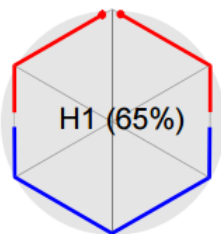
The Hex Beam is 2/3 the size of the Spiderbeam.<sup>4</sup>

# Performance & Measurements

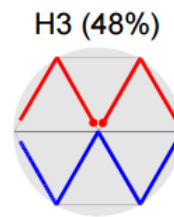
PERFORMANCE	SPIDERBEAM			HEX BEAM		
BAND	# of Ele.	Gain dBi*	F/B	# of Ele.	Gain dBi*	Pk F/B
20m	3	6.7	14 - 20	2	5.5	26
17m	2	5.4	20 - 25	2	5.3	21
15m	3	6.9	20 - 25	2	4.7	17
12m	2	5.2	10 - 12	2	4.3	14
10m	4	7.1	18 - 22	2	4.9	14
6m	N/A	N/A	N/A	2	4.8	11
Comments	* Manufacturer's Published Gain Figures, Antenna in Free Space					
FEATURES	SPIDERBEAM			HEX BEAM		
Wingspan	10m / 33 ft.			6.6m / 21.6 ft.		
Turning Radius	5m / 16.5 ft.			3.3m / 10.8 ft.		
Wind Area	3.8 sq. ft.			6 sq. ft.		
Weight	Portable: 14 lbs. / HD: 23 lbs.			24 lbs. / Lightweight*: 13 lbs.		
Comments				* Using Spiderbeam Poles		

## FOR DETAILED PERFORMANCE SPECIFICATIONS:

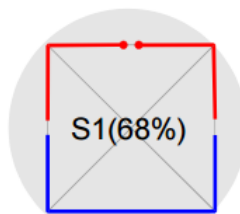
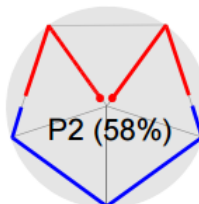
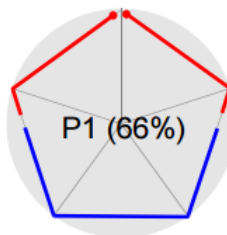
- Spiderbeam: <http://www.spiderbeam.com/documents/index>  
<http://www.spiderbeam.com/documents/index.php?colD=35>
- Hex Beam: <http://www.karinya.net/g3txq/hexbeam/broadband/>  
<http://k4kio.com/performance.html>



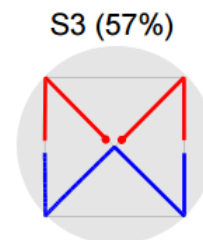
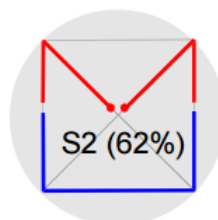
Broadband Hex



Classic Hex



VK2ABQ



X beam

