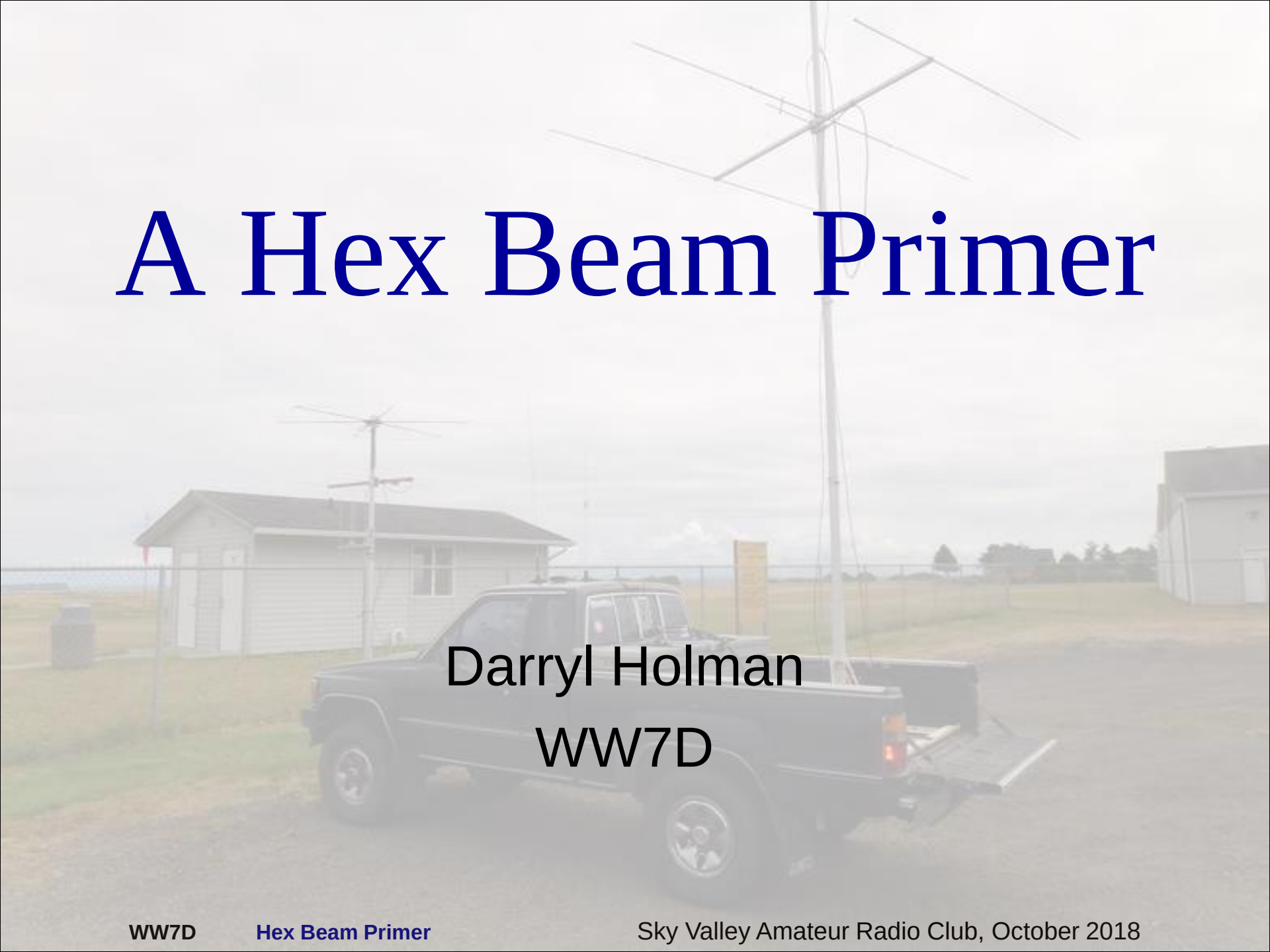
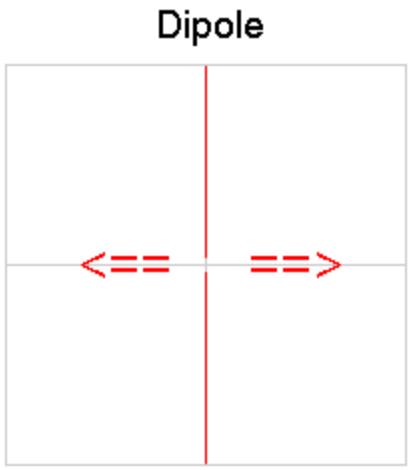
A Hex Beam Primer



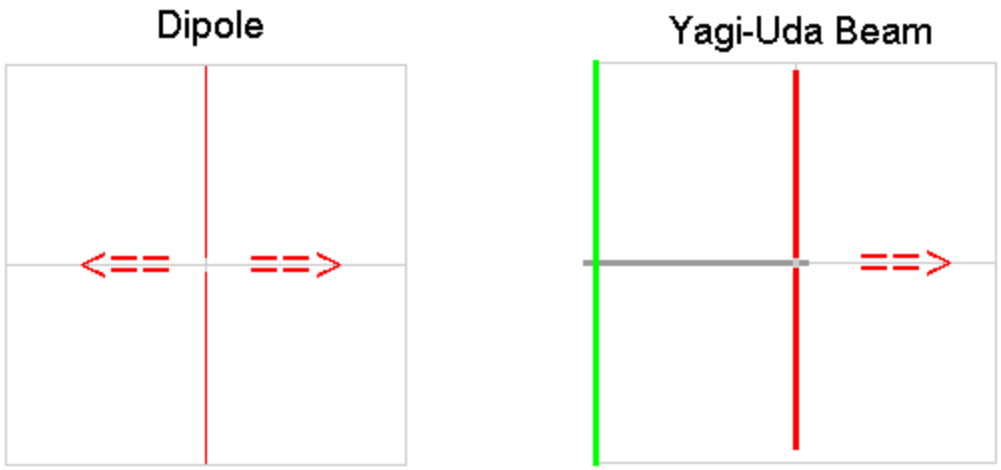
Darryl Holman
WW7D

Evolution of the hex beam



Credit: **Dick Stevens, N1RCT,** http://inbody.net/ad0k/rtty/rttyinfo/ant/geo/beamgeom.html

Evolution of the hex beam



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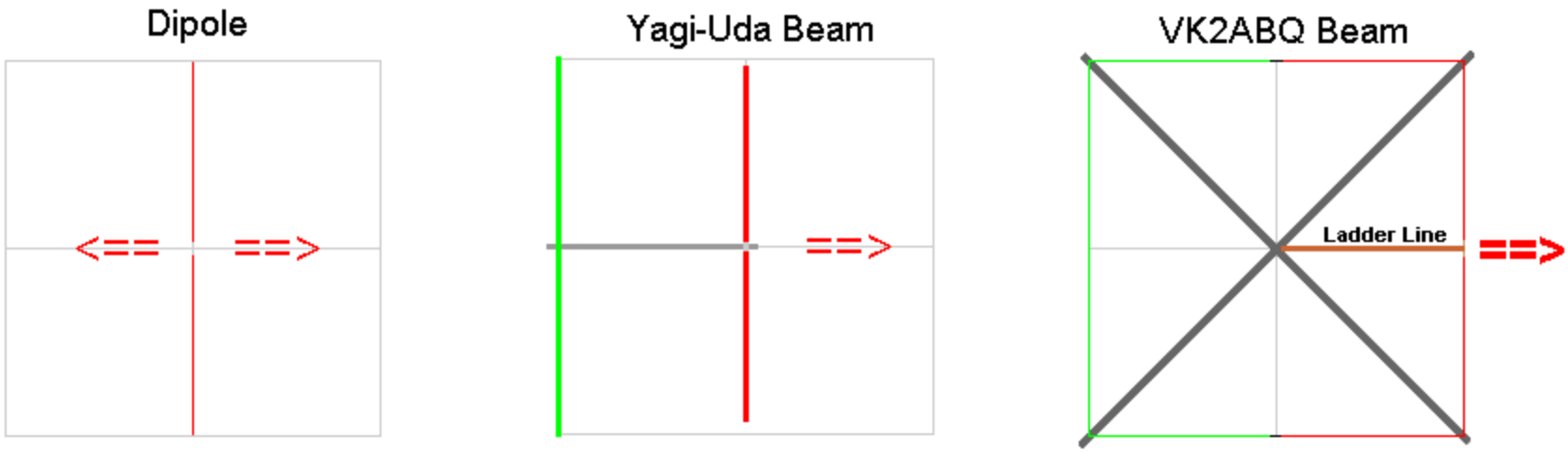

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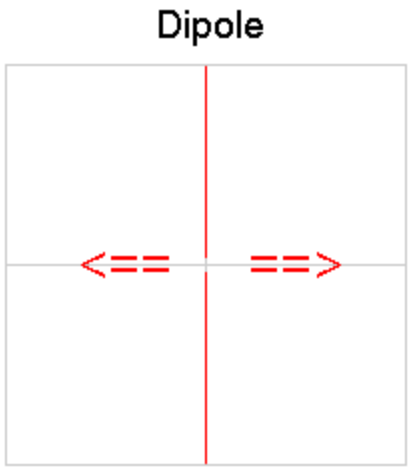

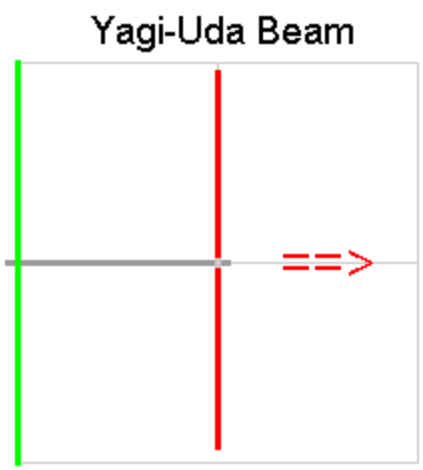

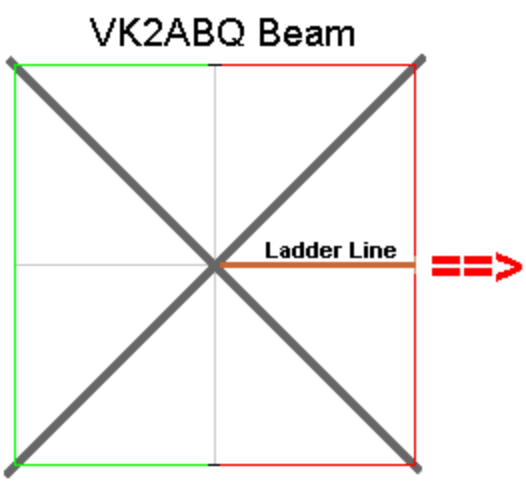

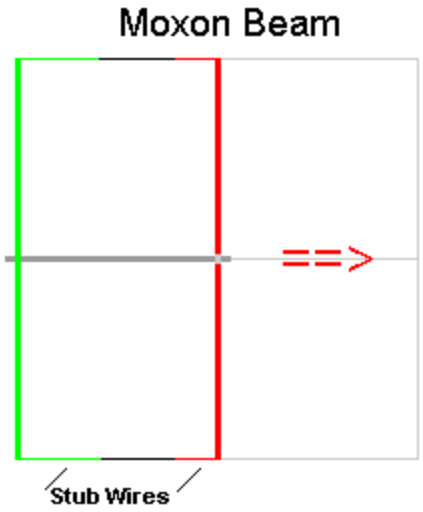

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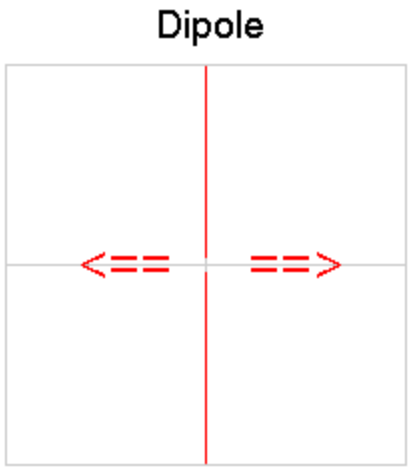

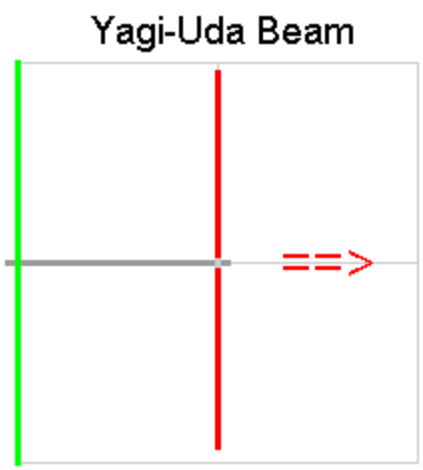

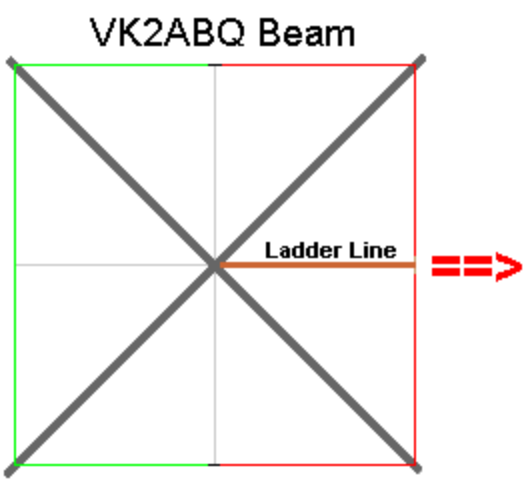

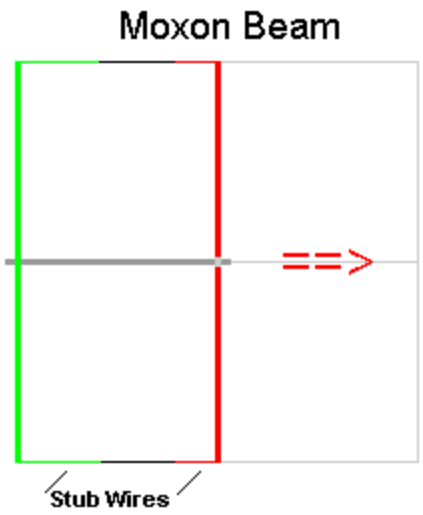

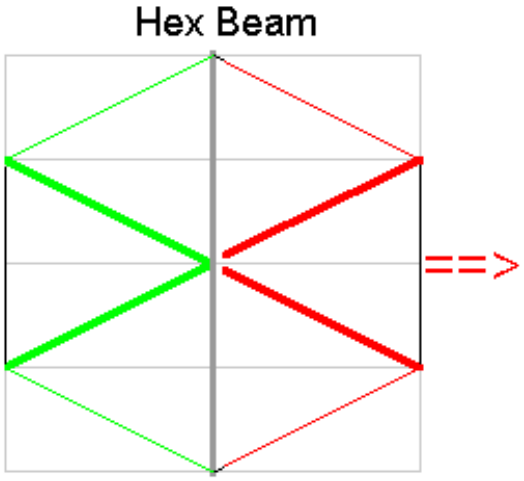

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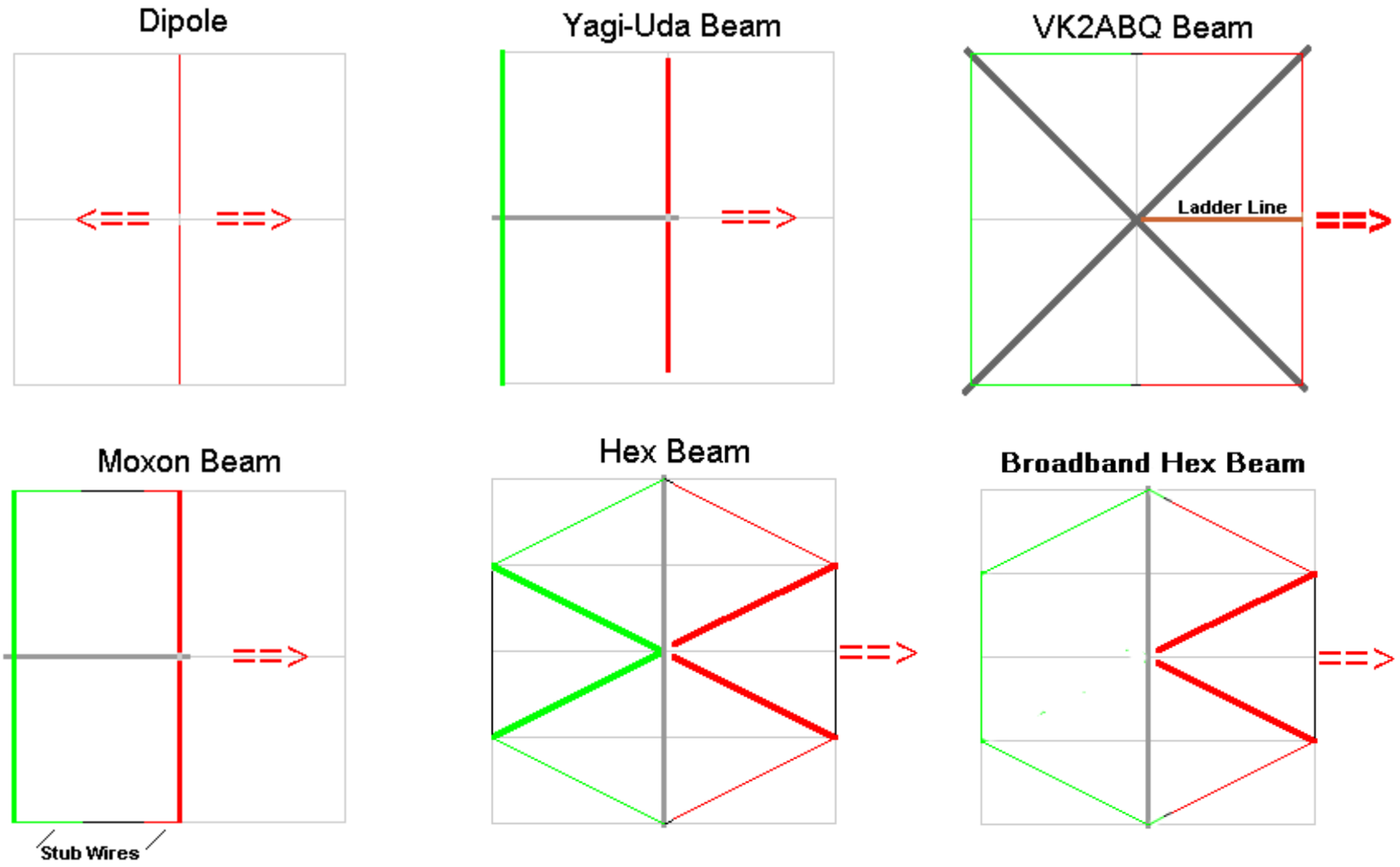
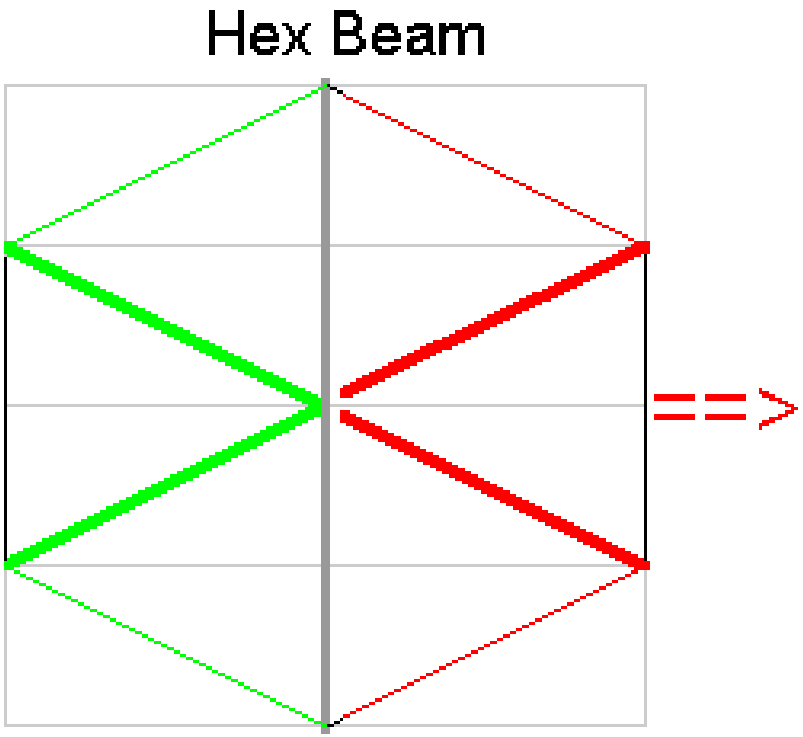


Credit: **Dick Stevens, N1RCT,** http://inbody.net/ad0k/rtty/rttyinfo/ant/geo/beamgeom.html

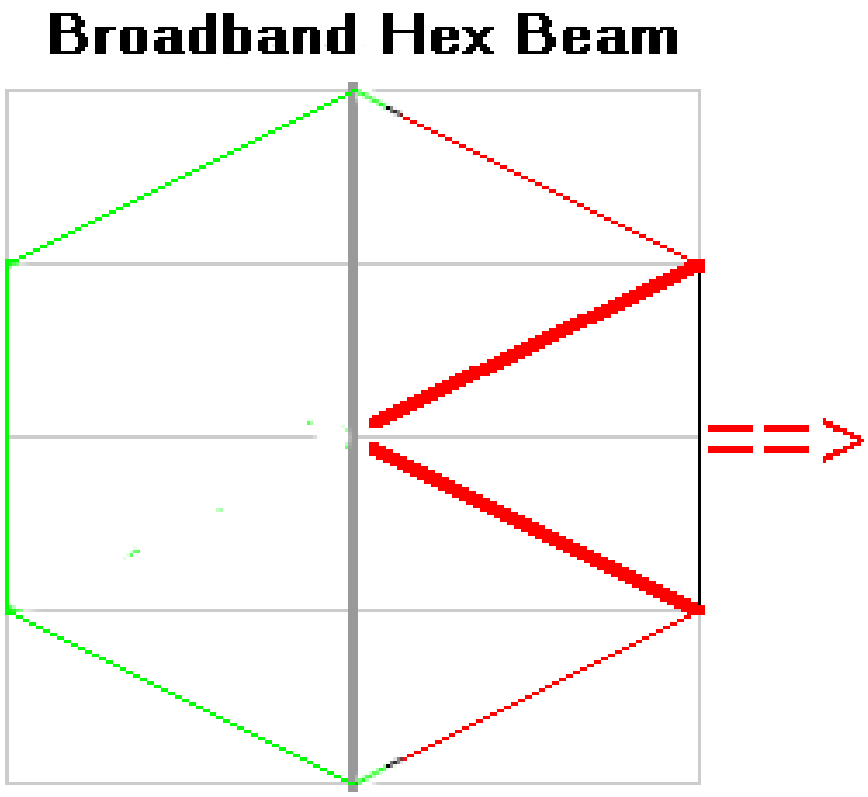
Hex Beams:

Mike Traffie, N1HXA (early nineties)
Classic Hex Beam



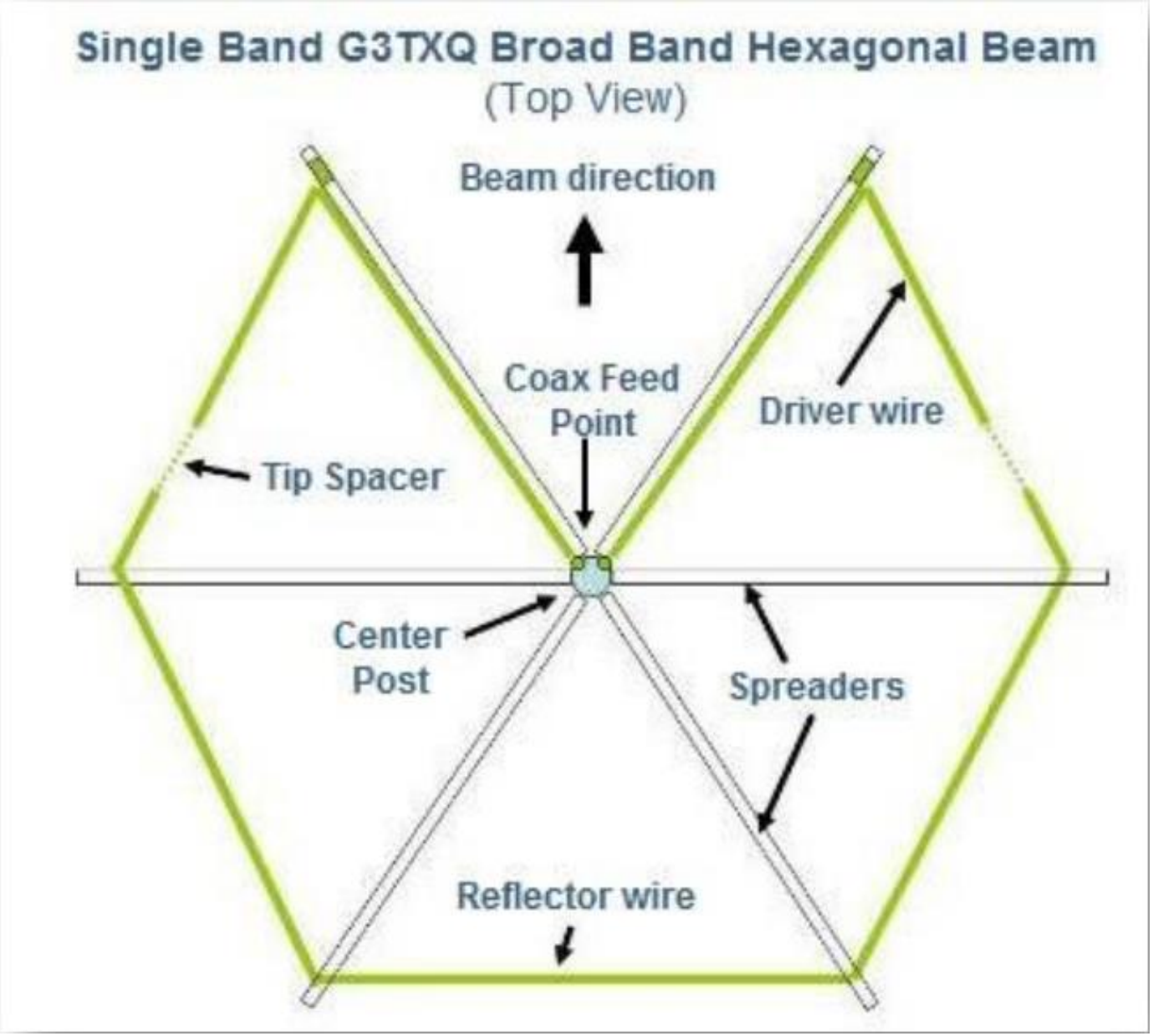
19 foot diameter

Steve Hunt, G3TXQ (2007)
Broadband Hex Beam



22 foot diameter

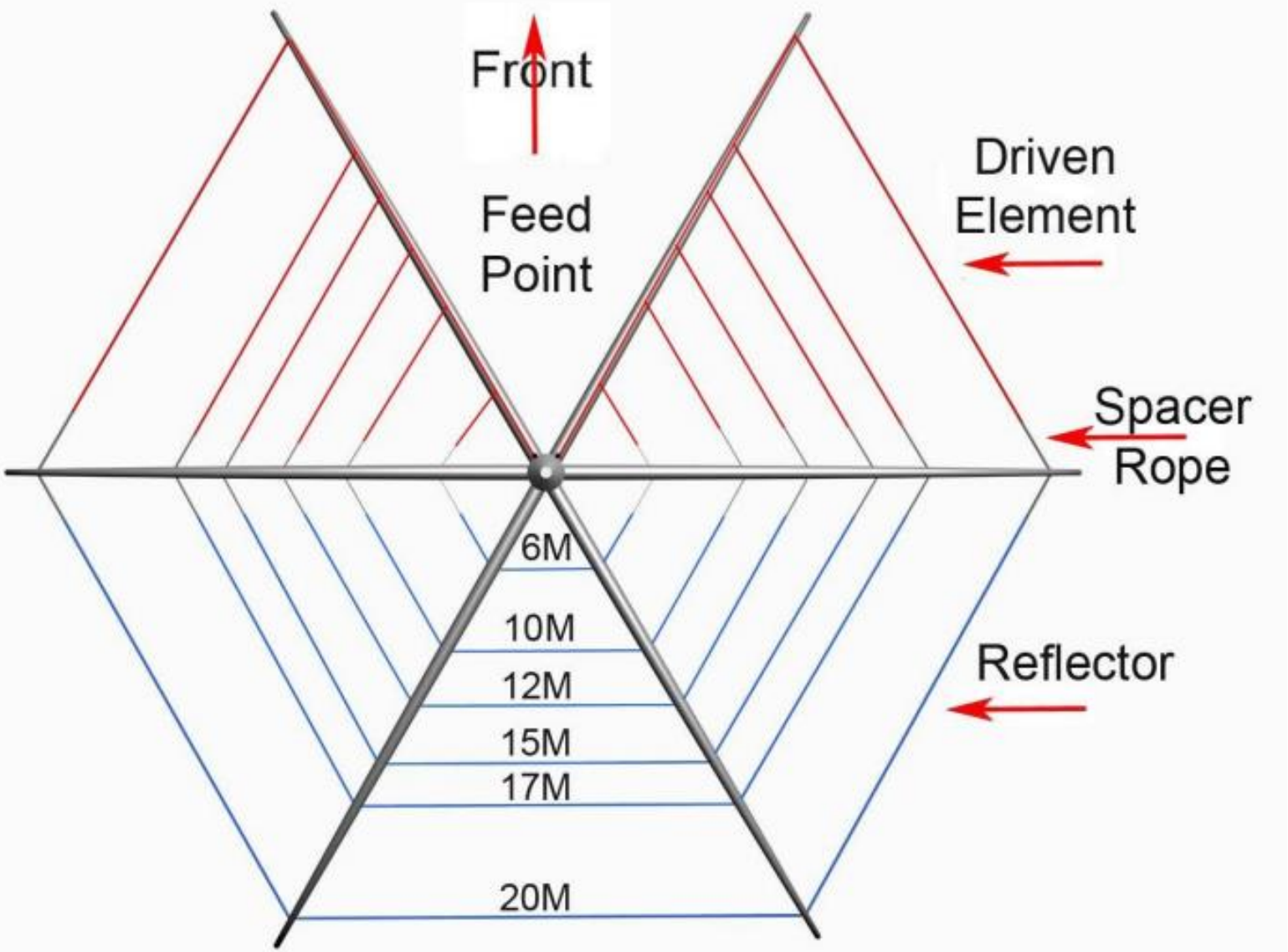
Credit: **Dick Stevens, N1RCT,** http://inbody.net/ad0k/rtty/rttyinfo/ant/geo/beamgeom.html


Single Band G3TXQ Broad Band Hexagonal Beam
(Top View)
Beam direction
Coax Feed Point
Driver wire
Tip Spacer
Center Post
Spreaders
Reflector wire

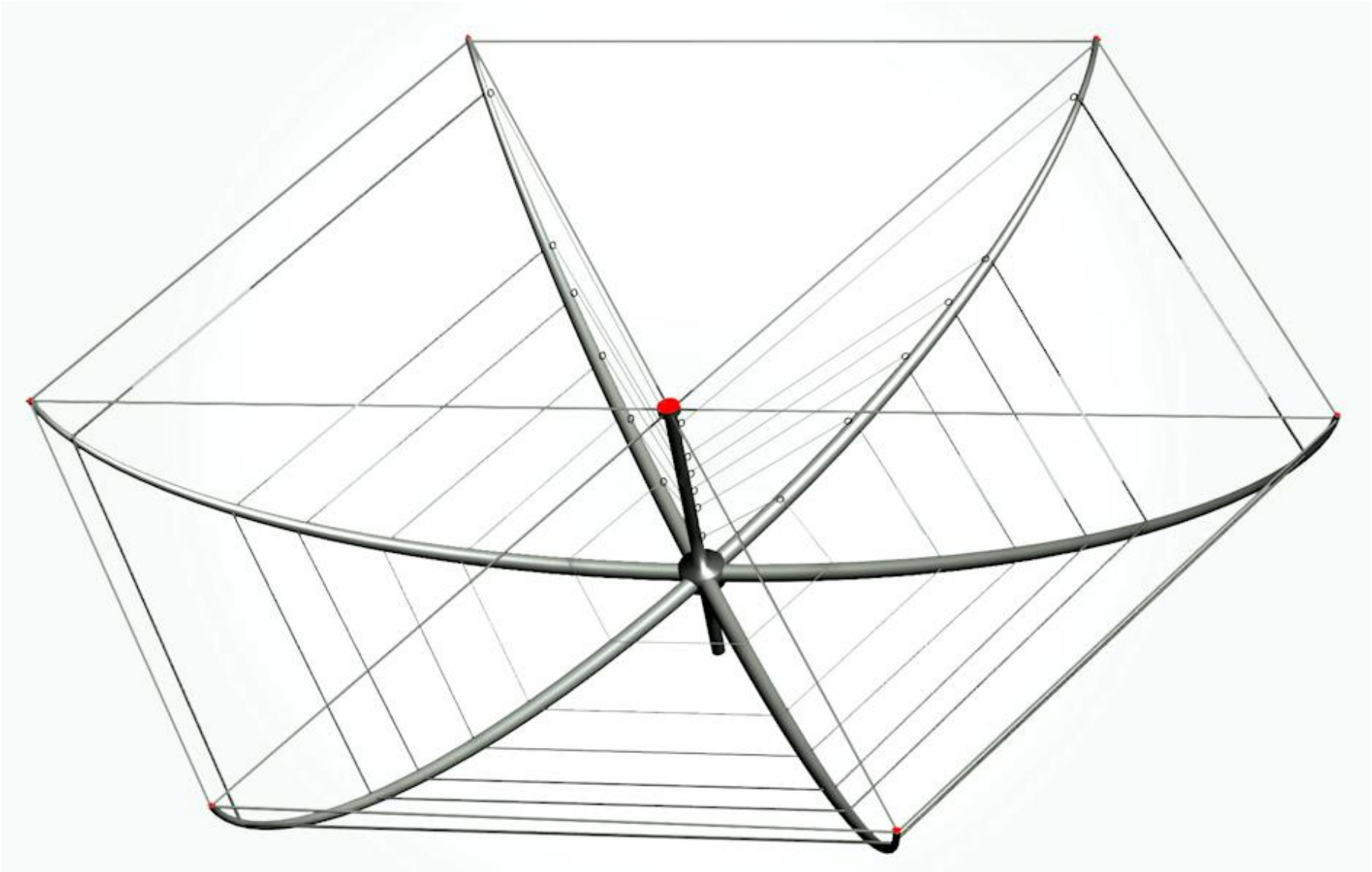
Credit: WN8U

Hex beams are frequently built for five or six bands:

20m, 17m, 15m, 12m, 10m and sometimes 6m



Credit: WN8U



http://shop.hamsphere.com/

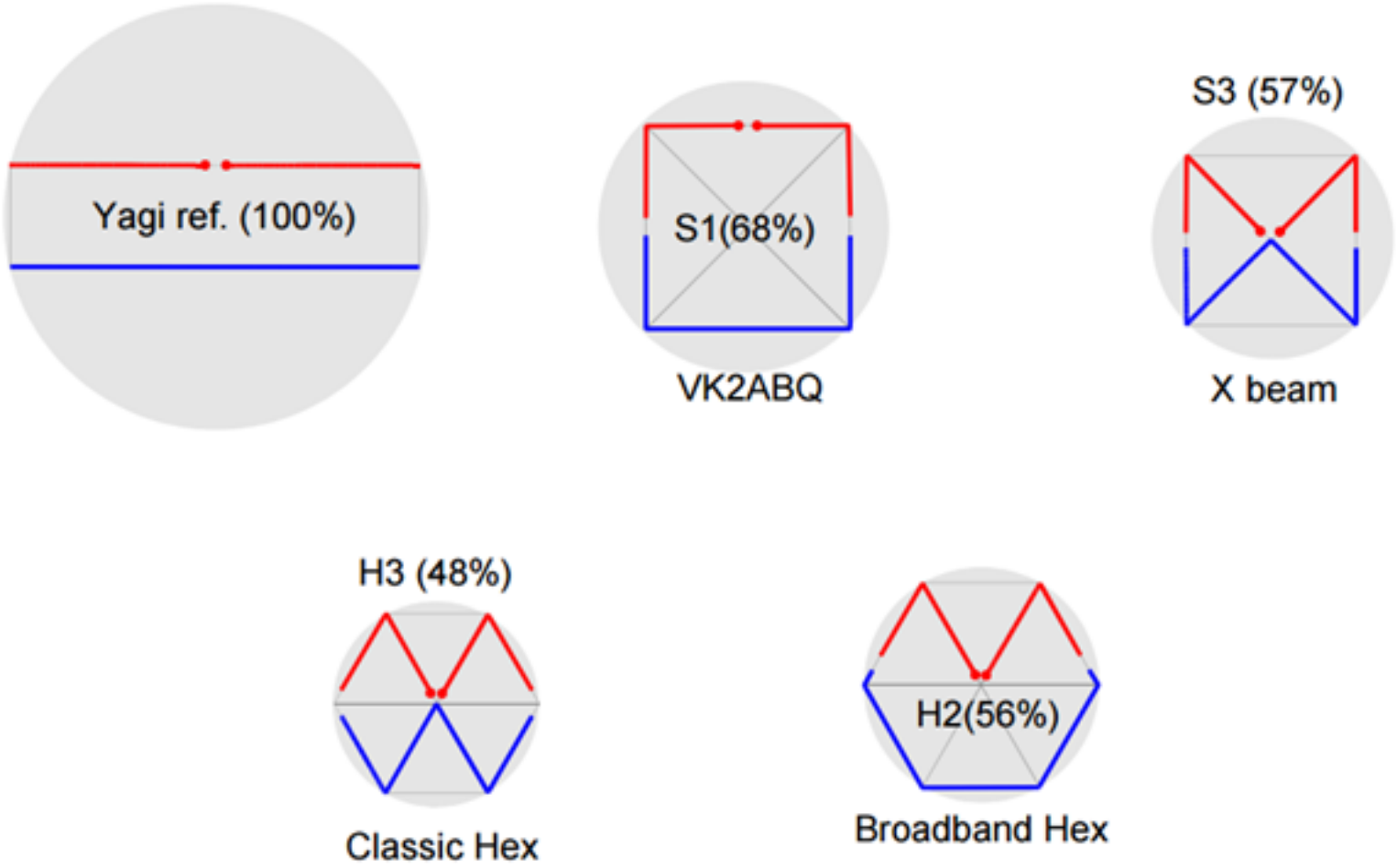
Two must-have documents on the hex beam:

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



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

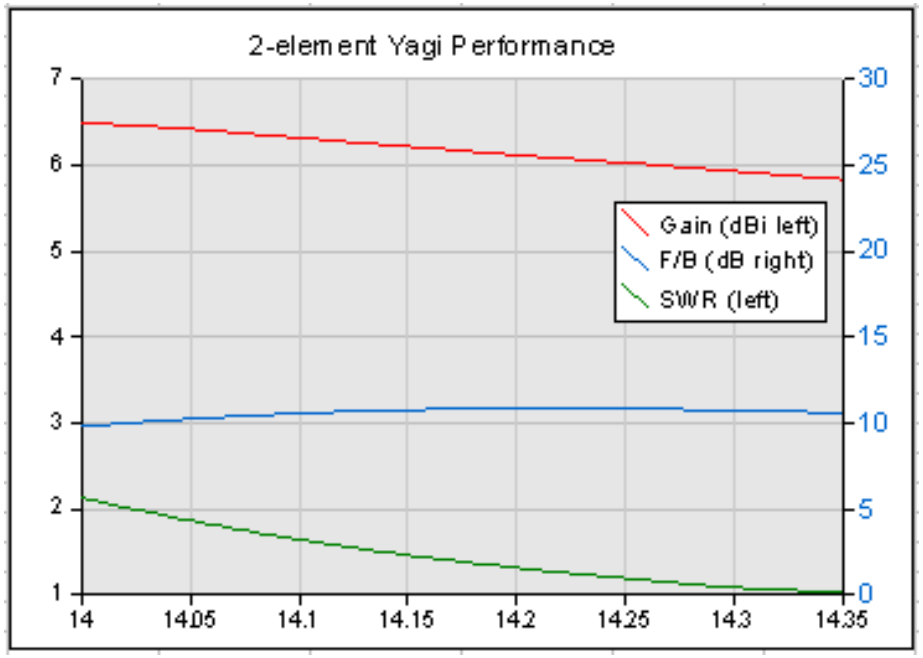
How does the hex beam do compared to other popular antennas?

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

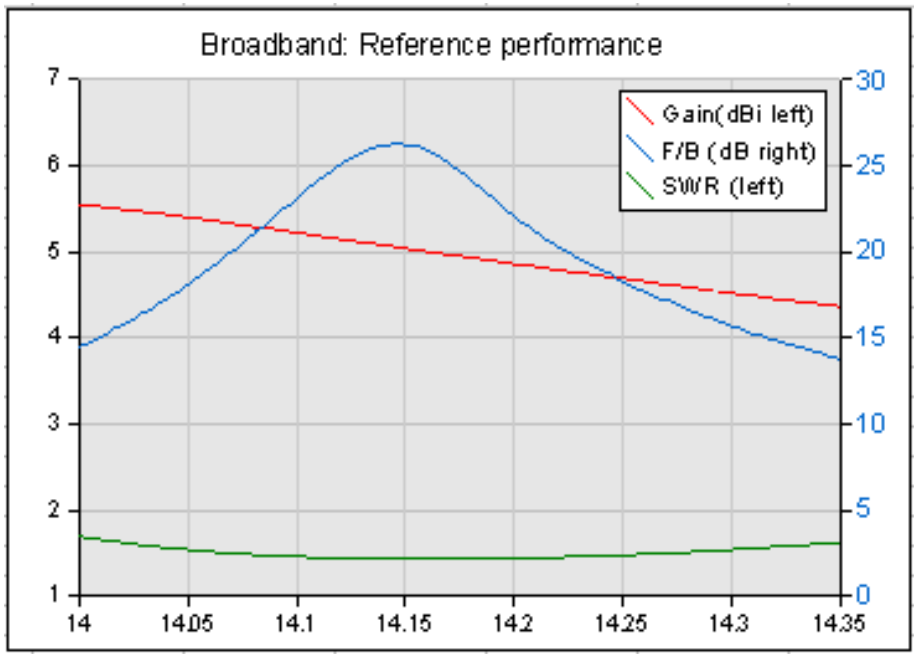
Source: G3TXQ, http://www.karinya.net/g3txq/hexbeam/broadband/

Broadband performance

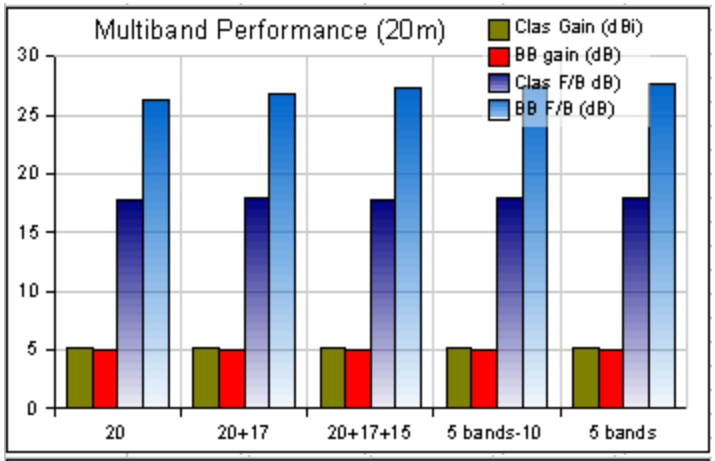
Yagi

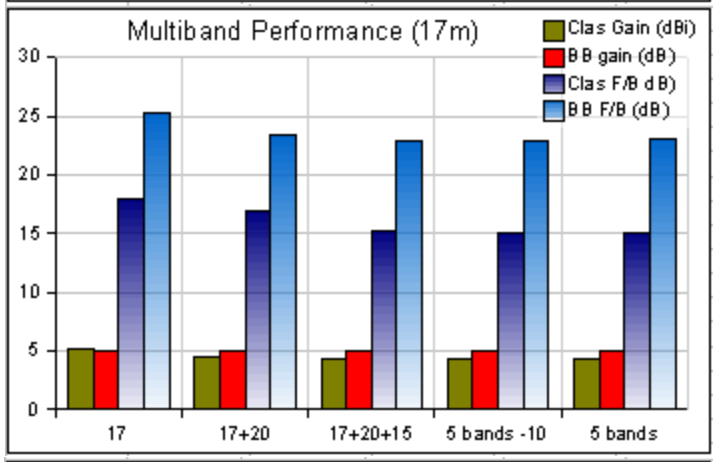


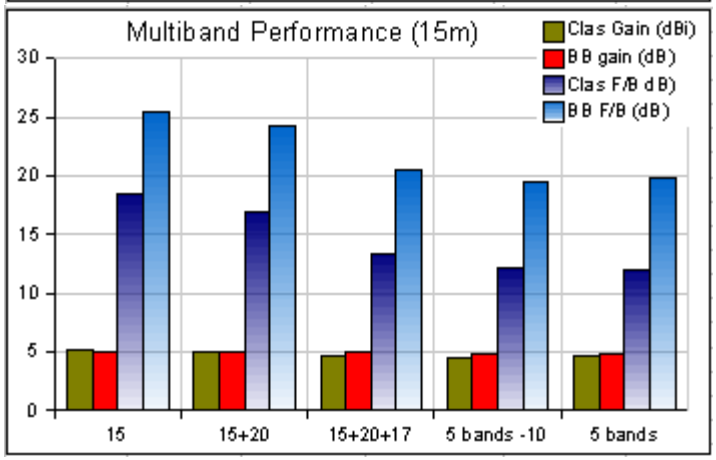
Hex beam



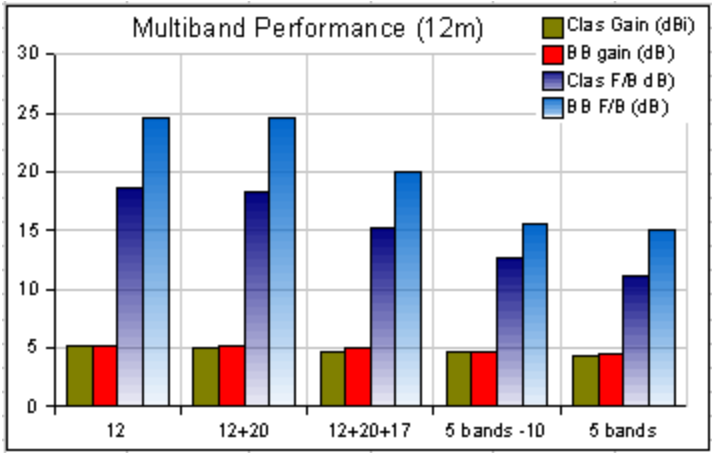
Source: G3TXQ, http://www.karinya.net/g3txq/hexbeam/broadband/

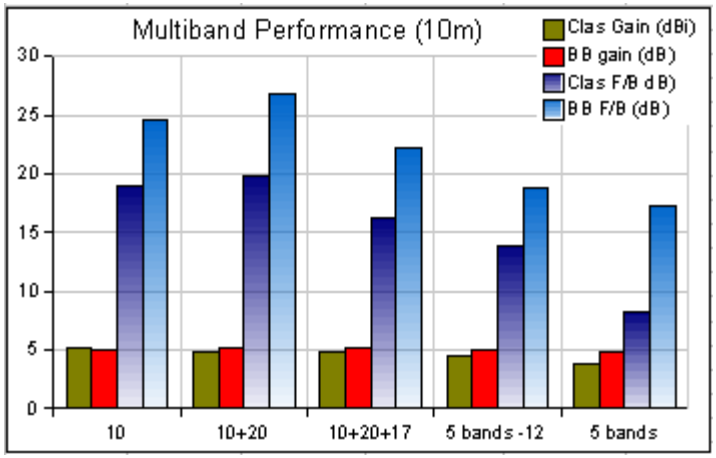






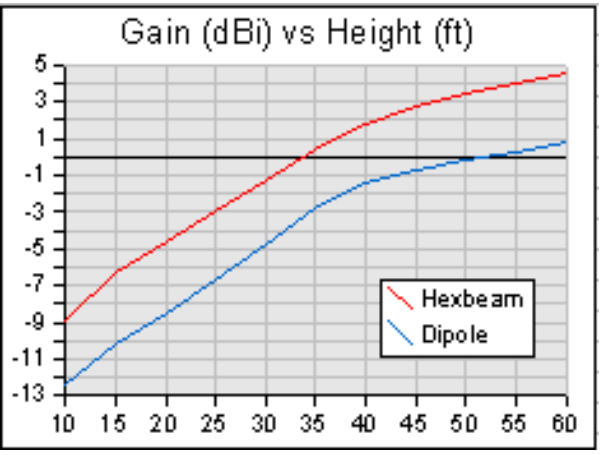
- **No significant forward gain loss (red) going to 5 bands**
- **Some loss of F/B going to 5 bands on 15m, 12m and 10m (blue)**

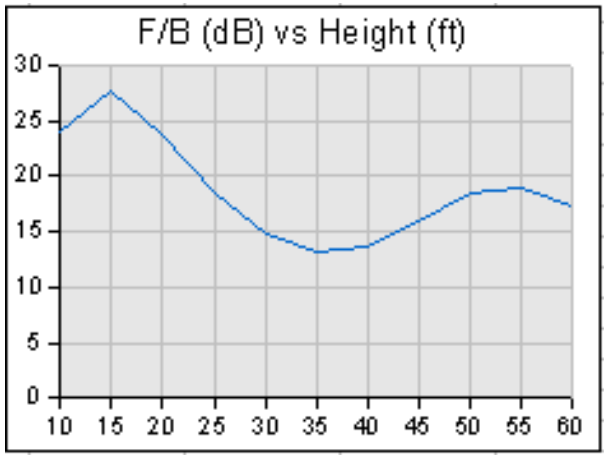


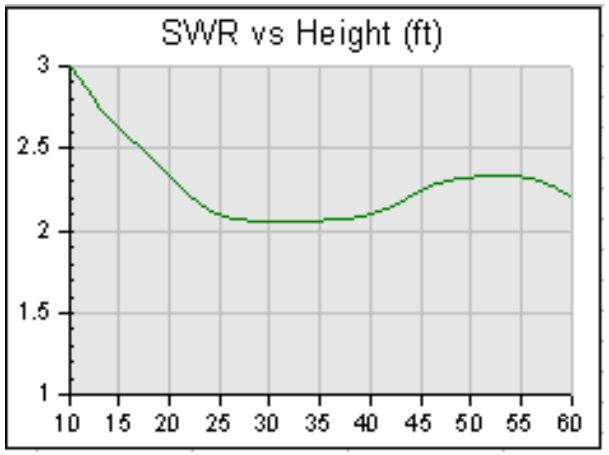


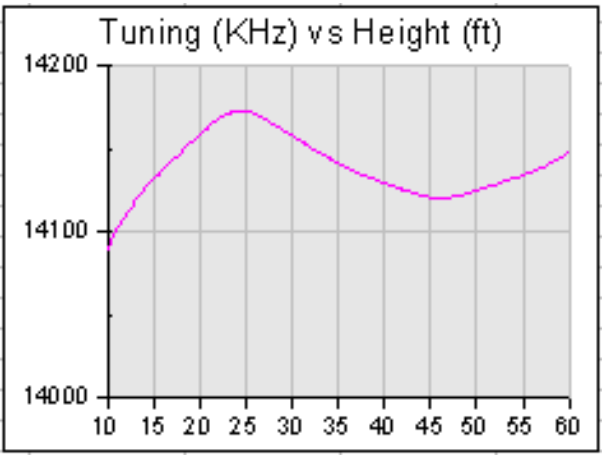
Source: G3TXQ, http://www.karinya.net/g3txq/hexbeam/broadband/

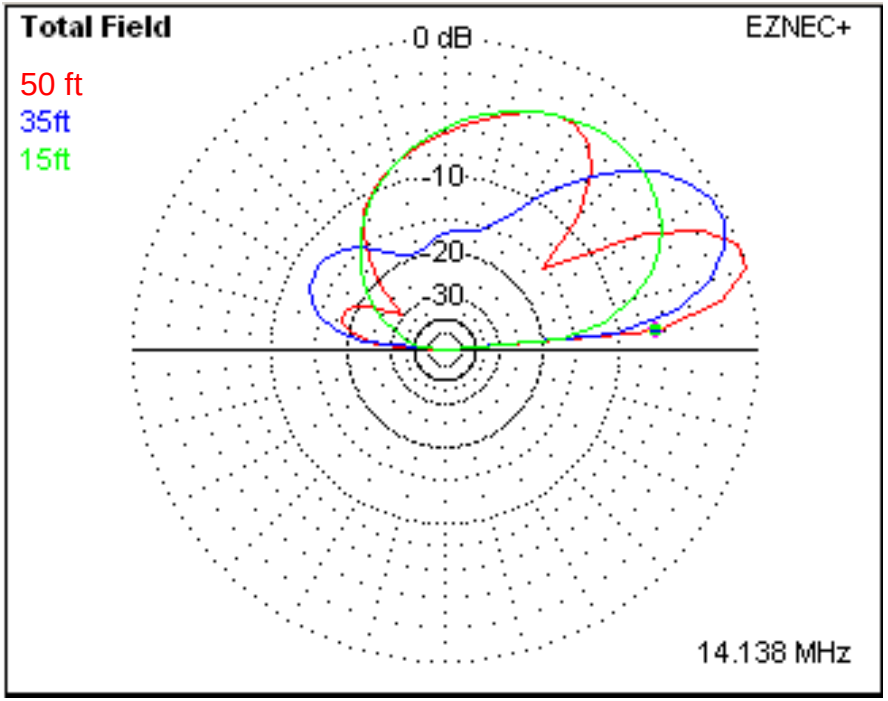
Height and the Hex Beam





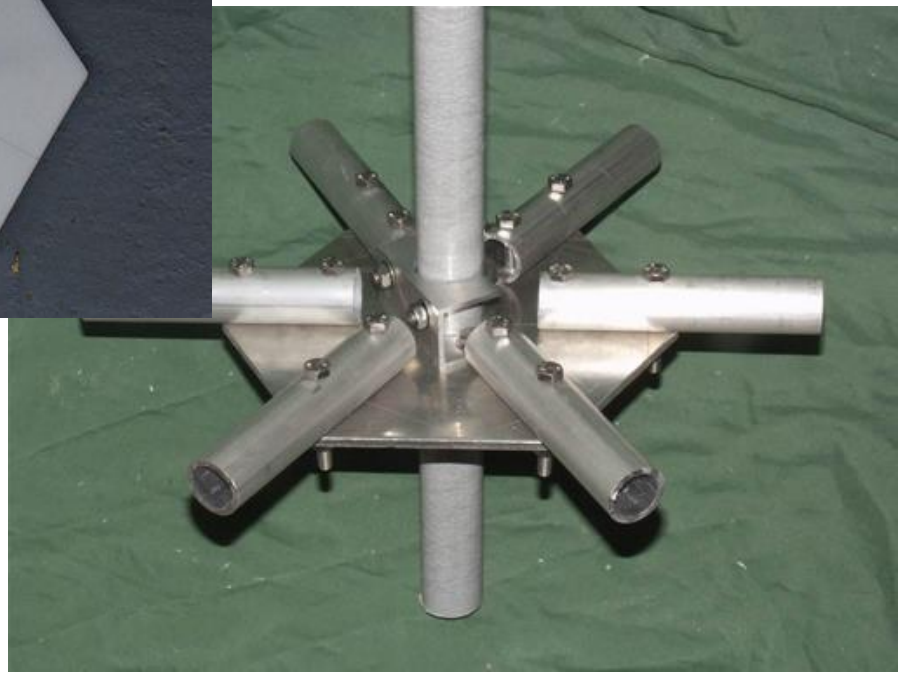


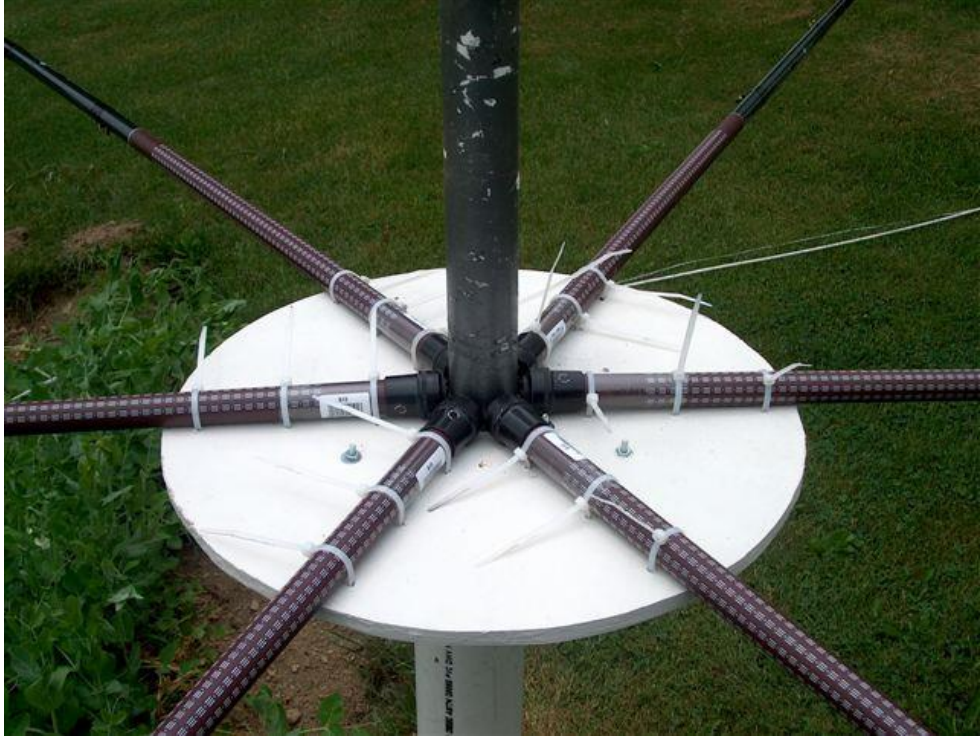




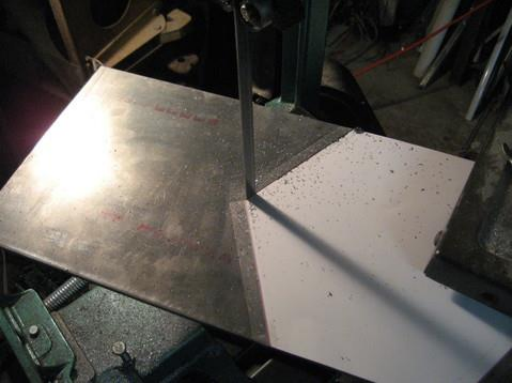
Source: G3TXQ, http://www.karinya.net/g3txq/hexbeam/broadband/

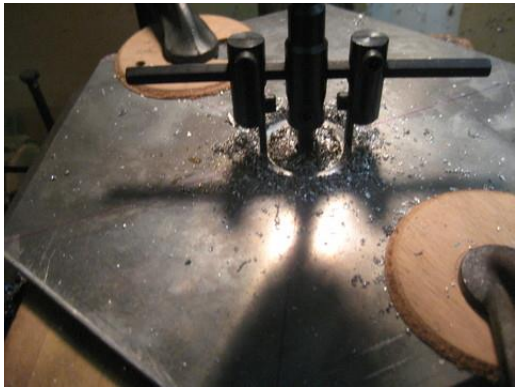
DX Engineering

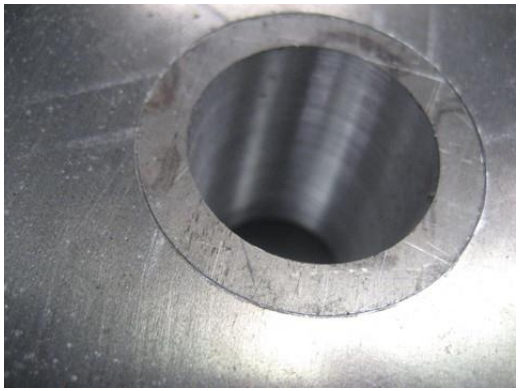


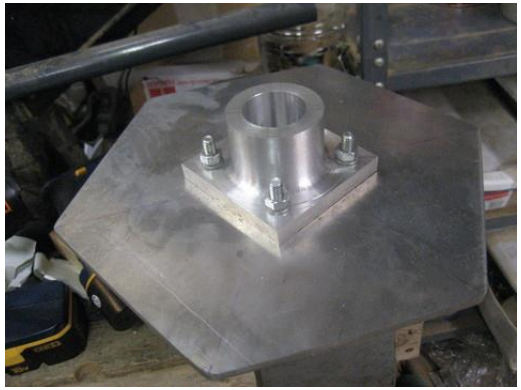


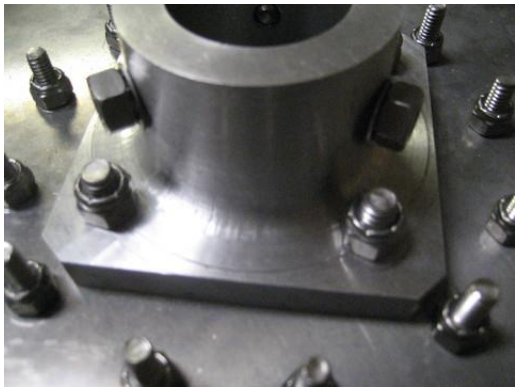

ZSI Beta Clamps











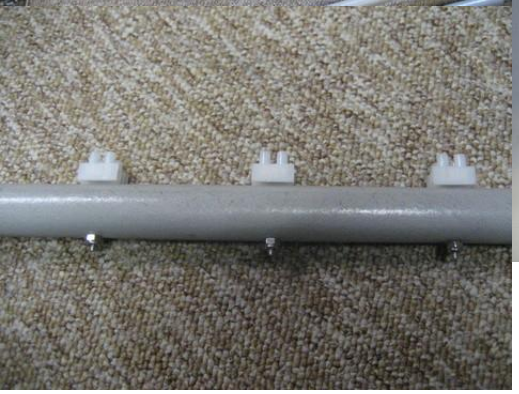


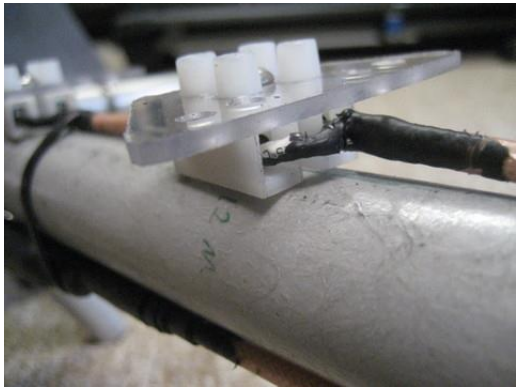


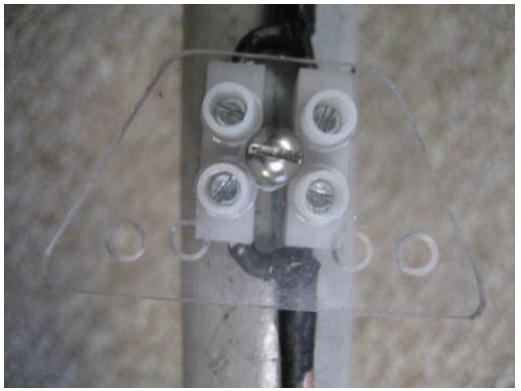


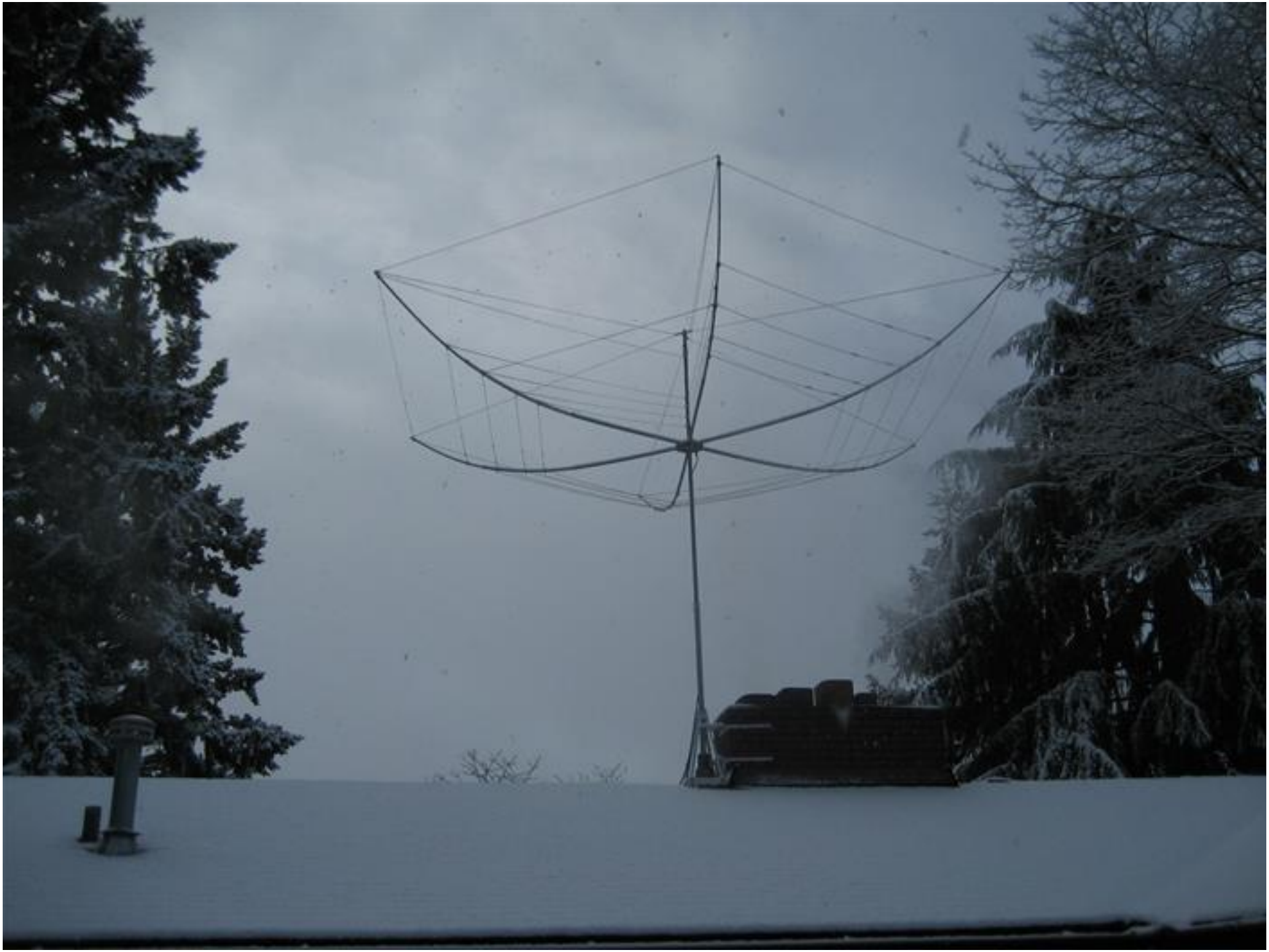










Parts for home built:

- **See full parts list at www.hex-beam.com/parts/**
- **Base plate and mast material: onlinemetals.com (will call pickup in Seattle!)**
- **Fiberglass tubes for spreaders and center post: Max-gain systems ($120): 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**

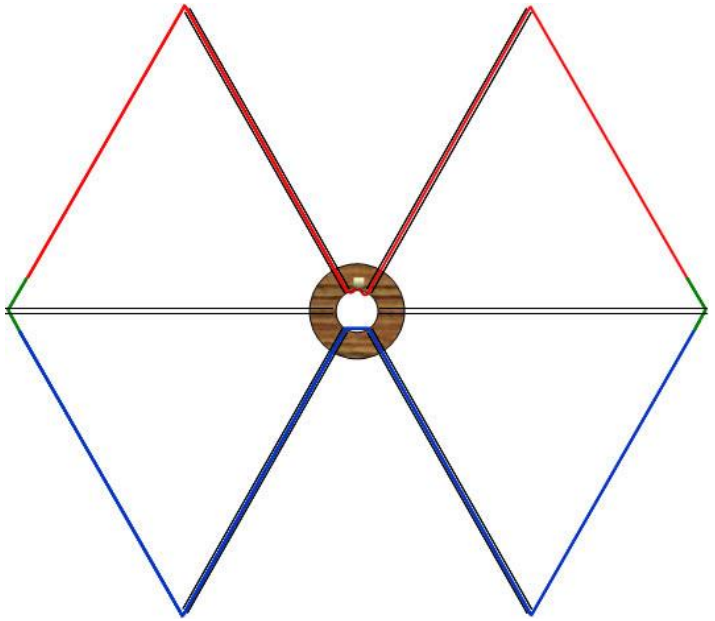
How does the Hex Beam stand up to weather? Usually, quite well

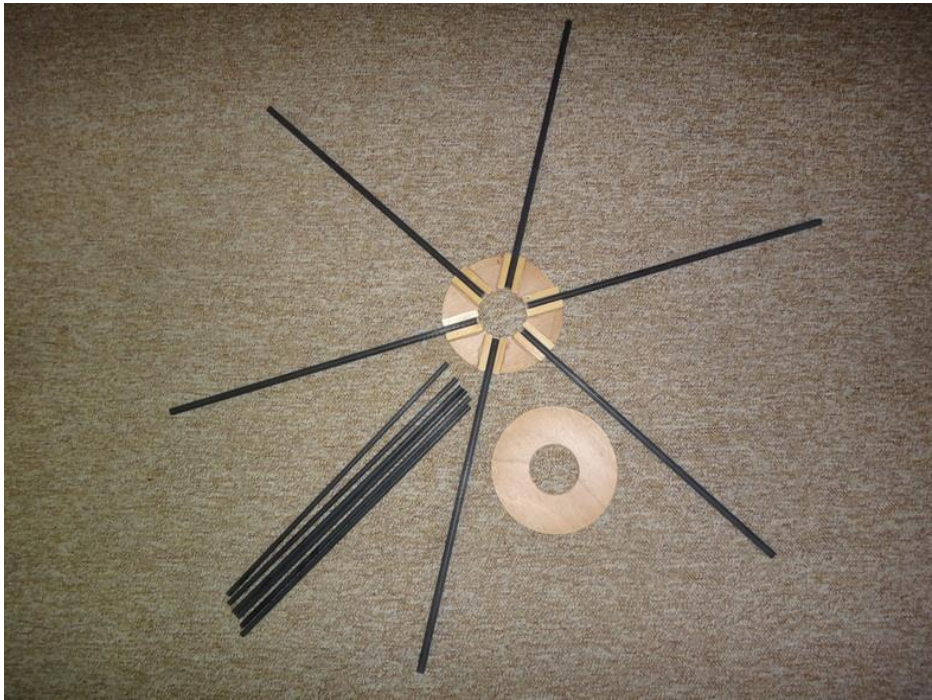
Most failures seem to be from using fishing poles as spreaders

Simple 6m directional antennas

The Hexbeam (2 el)

Small turning radius (< 3’)

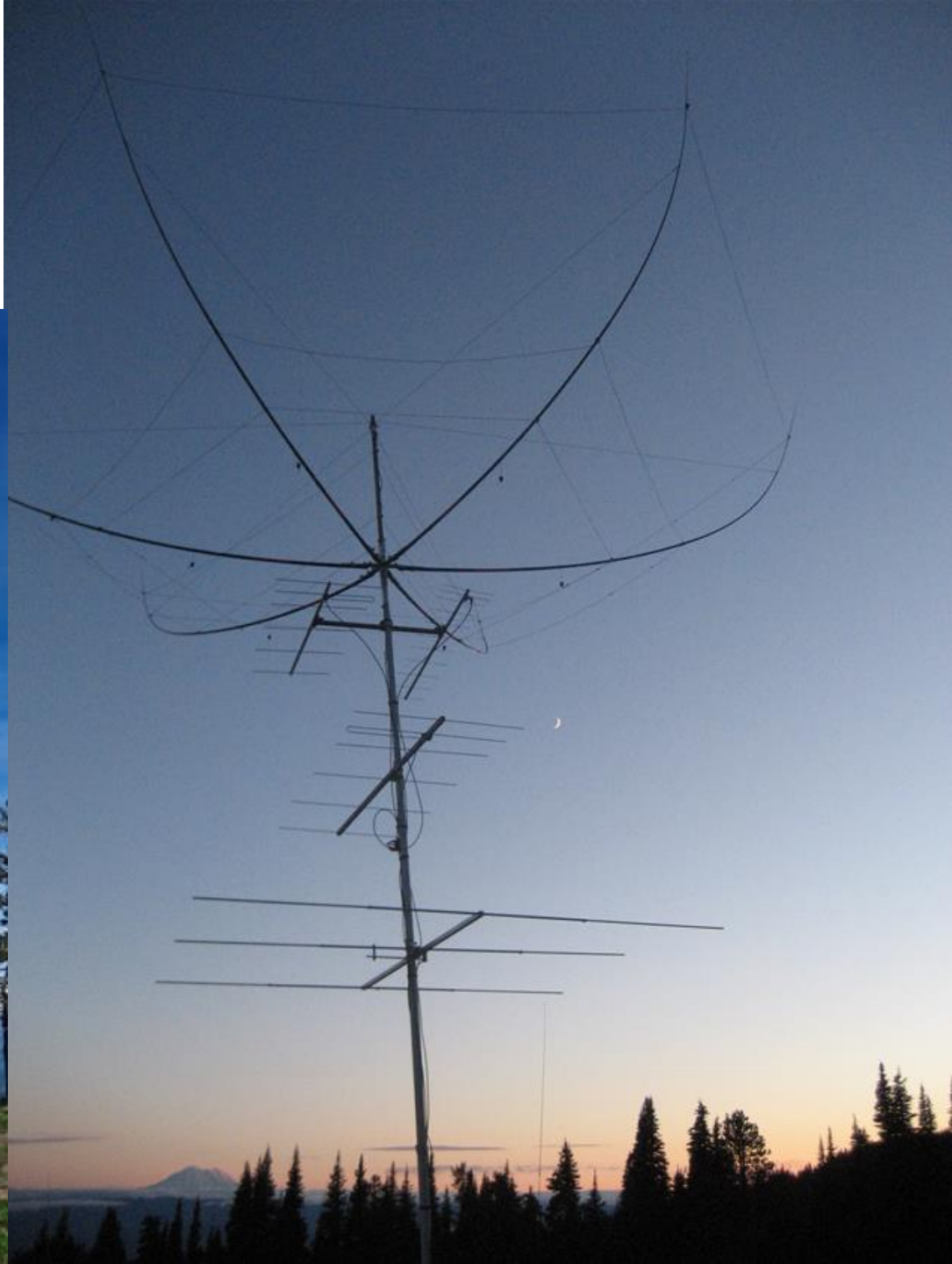




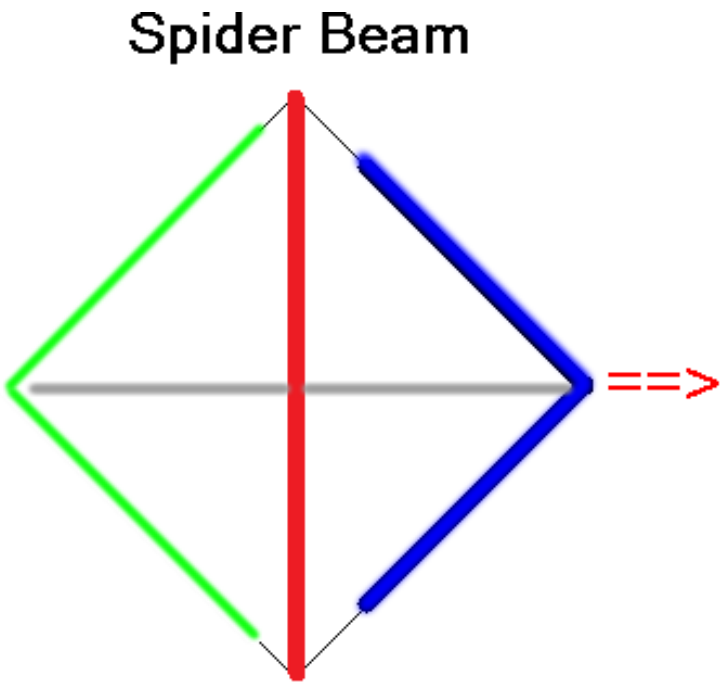
Contact me (WW7D) for construction information

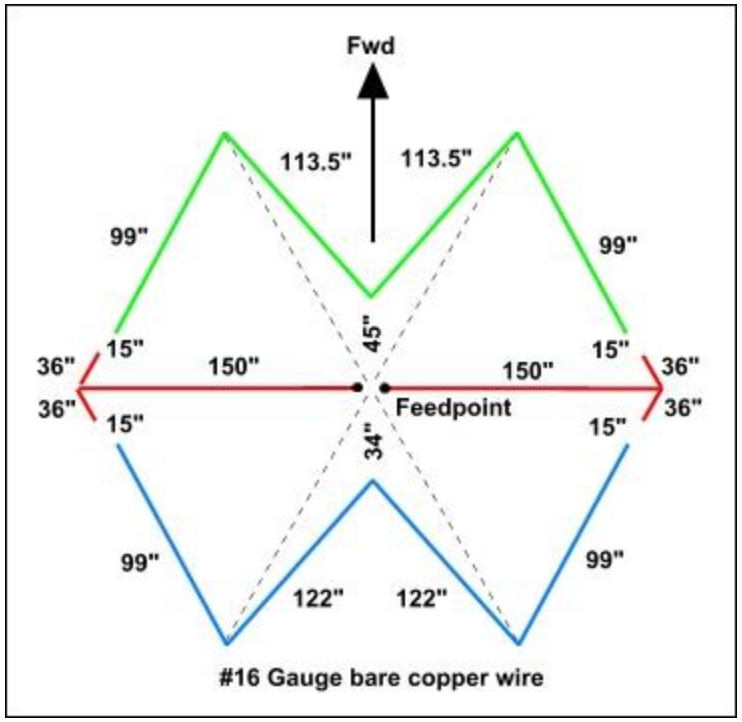

DEWALT

Questions?

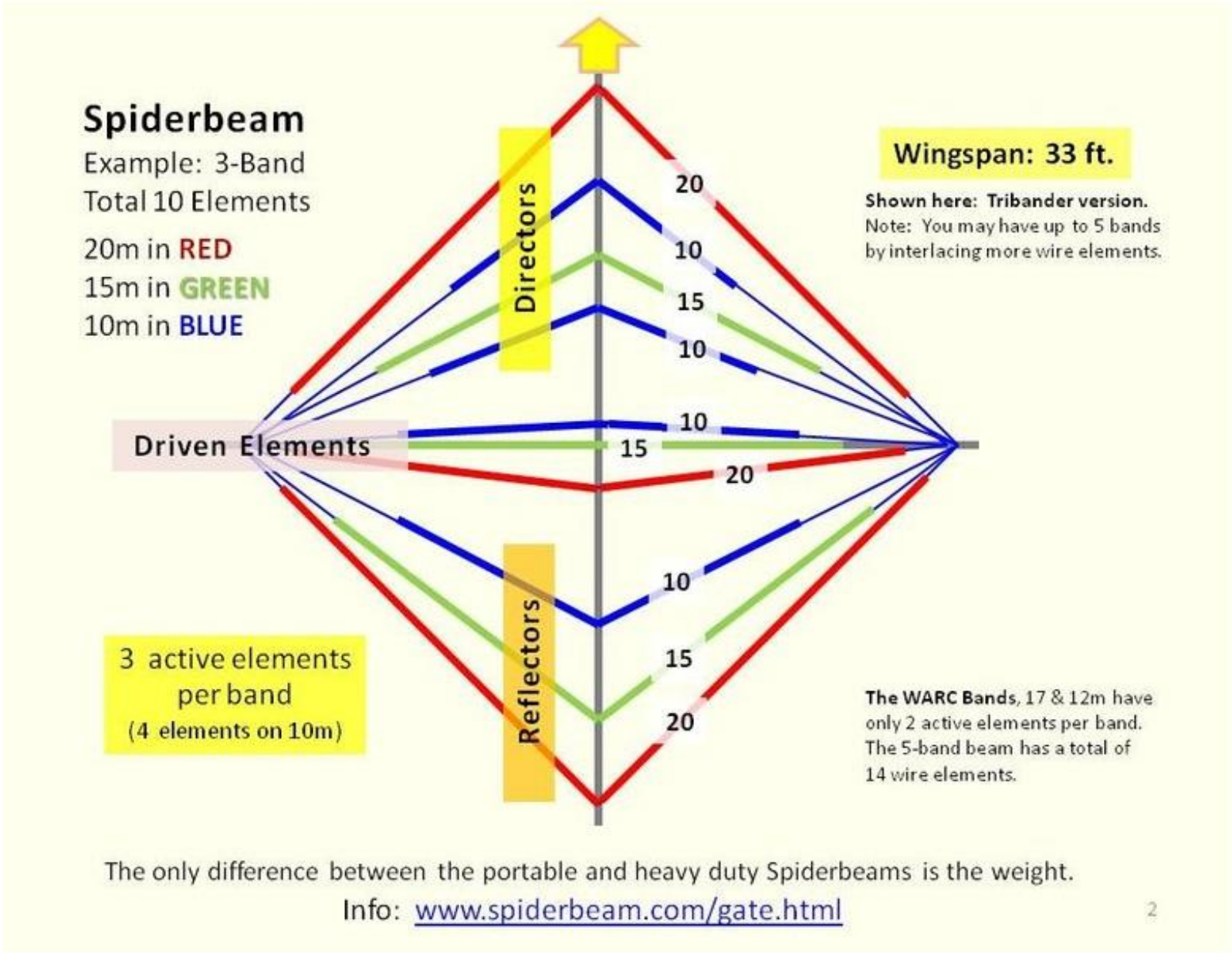


3 element “hex beam”

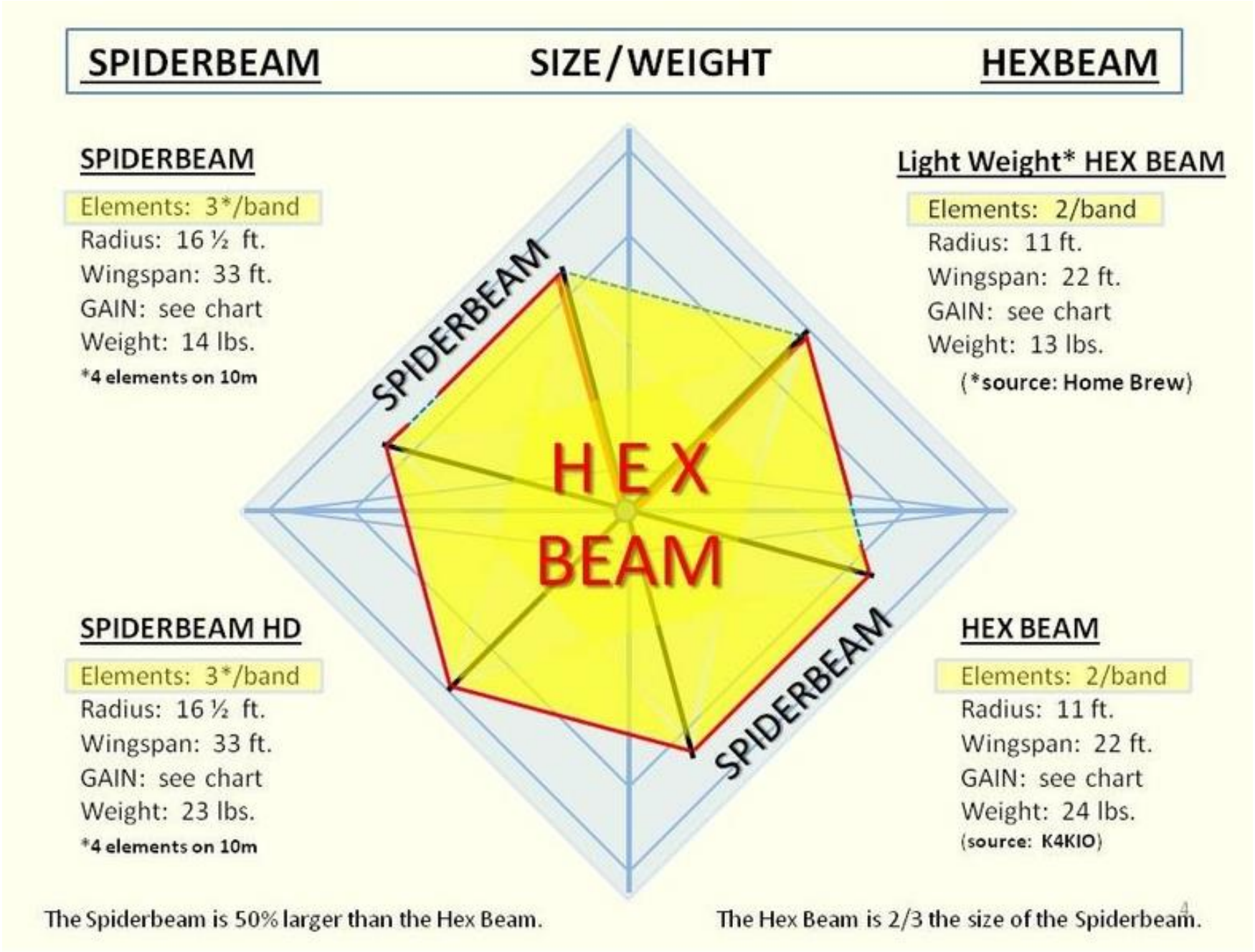




Broadband Hex beam versus the Spiderbeam



Source: http://www.dj0ip.de/wire-beams/spiderbeam-vs-hex-beam



Source: http://www.dj0ip.de/wire-beams/spiderbeam-vs-hex-beam

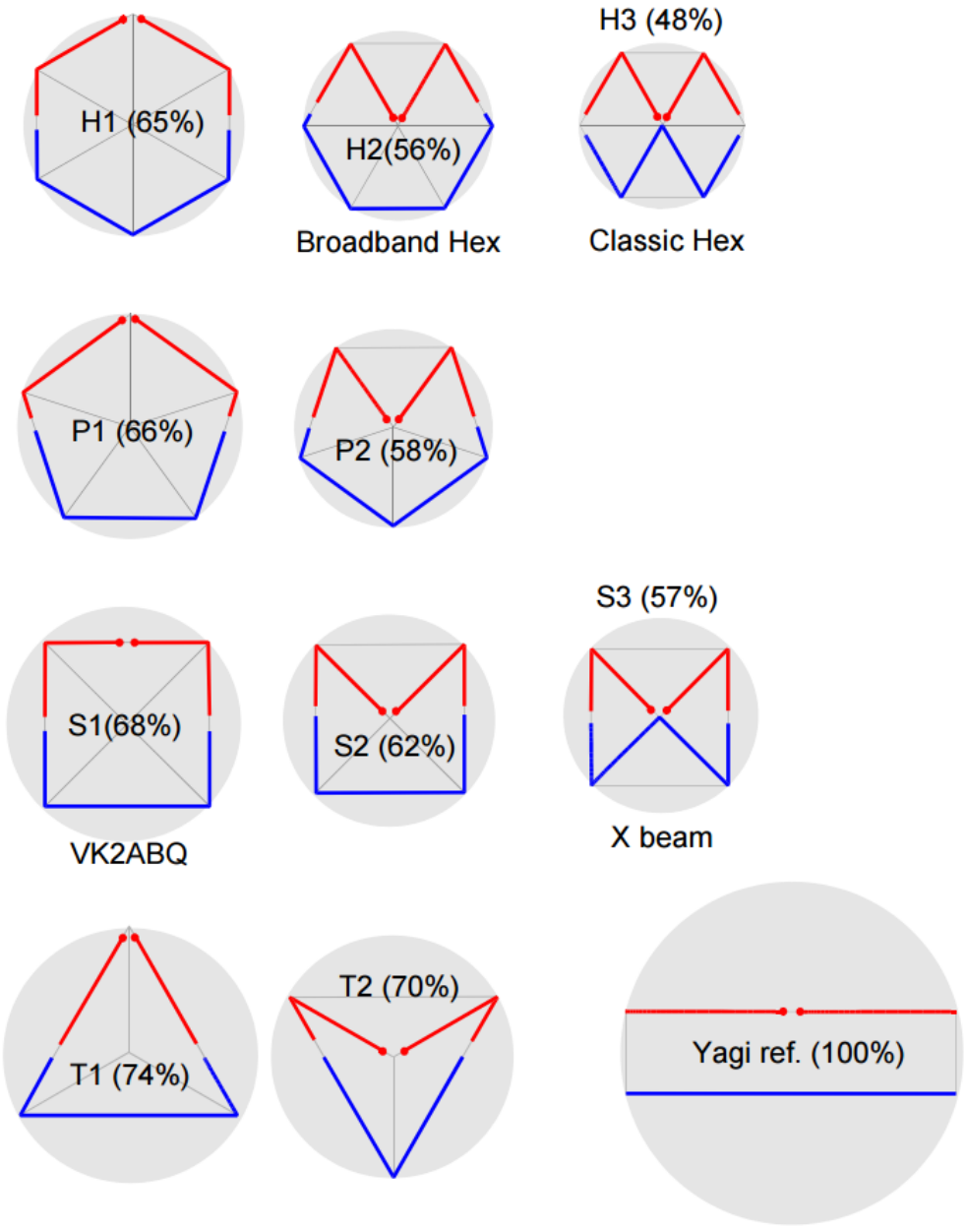
Performance & Measurements

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?coID=35
- Hex Beam: http://www.karinya.net/g3txq/hexbeam/broadband/
  http://k4kio.com/performance.html

Source: http://www.dj0ip.de/wire-beams/spiderbeam-vs-hex-beam


H1 (65%)
H2(56%)
Broadband Hex
H3 (48%)
Classic Hex
P1 (66%)
P2 (58%)
S1(68%)
VK2ABQ
S2 (62%)
S3 (57%)
X beam
T1 (74%)
T2 (70%)
Yagi ref. (100%)