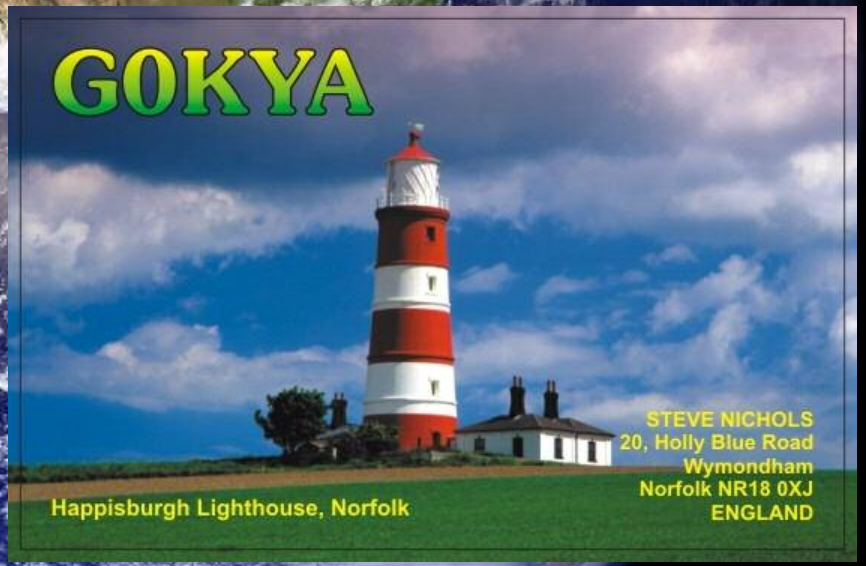
DXing from a small (or even no) garden



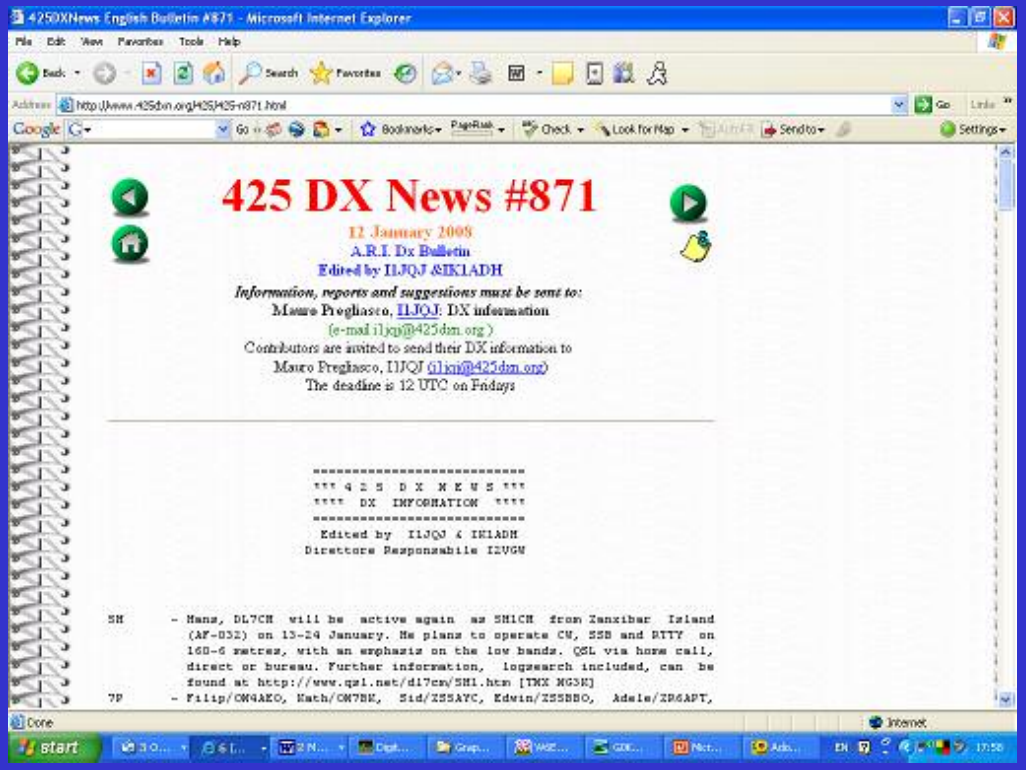
Steve Nichols G0KYA
www.qsl.net/g0kya

What is DX?

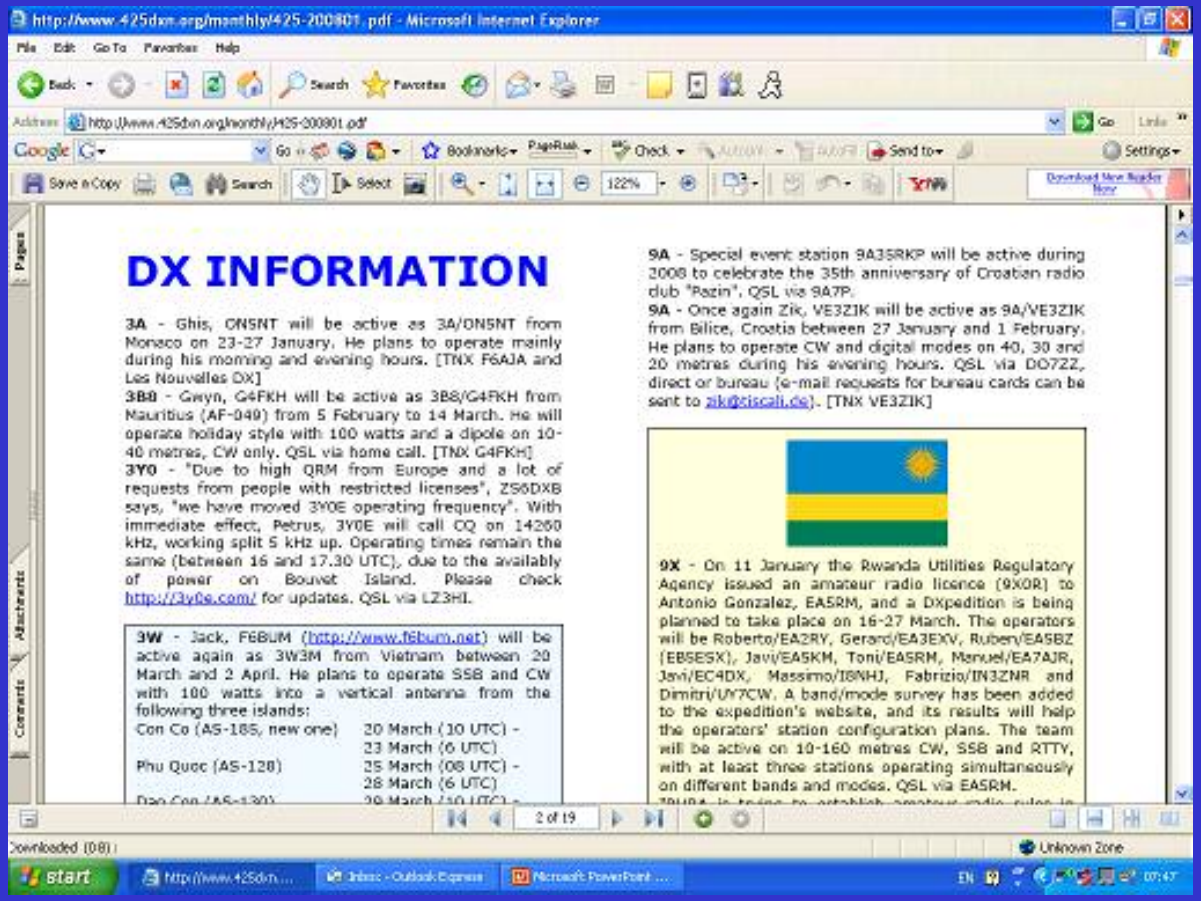
Either distant or rare stations

How do you find DX?

- By using a DX newsletter like 425DXNews www.425dxn.org/



How do you find DX?



DX INFORMATION

3A - Ghis, ON5NT will be active as 3A/ON5NT from Monaco on 23-27 January. He plans to operate mainly during his morning and evening hours. [TNX F6AJA and Les Nouvelles DX]

3B8 - Gwyn, G4FKH will be active as 3B8/G4FKH from Mauritius (AF-049) from 5 February to 14 March. He will operate holiday style with 100 watts and a dipole on 10-40 metres, CW only. QSL via home call. [TNX G4FKH]

3Y0 - "Due to high QRM from Europe and a lot of requests from people with restricted licenses", ZS6DXB says, "we have moved 3Y0E operating frequency". With immediate effect, Petrus, 3Y0E will call CQ on 14260 kHz, working split 5 kHz up. Operating times remain the same (between 16 and 17.30 UTC), due to the availably of power on Bouvet Island. Please check http://3y0e.com/ for updates. QSL via LZ3HI.

3W - Jack, F6BUM (http://www.f6bum.net) will be active again as 3W3M from Vietnam between 20 March and 2 April. He plans to operate SSB and CW with 100 watts into a vertical antenna from the following three islands:

Con Co (AS-186, new one)	20 March (10 UTC) - 23 March (6 UTC)
Phu Quoc (AS-128)	25 March (08 UTC) - 28 March (6 UTC)

9A - Special event station 9A35RKP will be active during 2008 to celebrate the 35th anniversary of Croatian radio club "Pazin". QSL via 9A7P.

9A - Once again Zik, VE3ZIK will be active as 9A/VE3ZIK from Bilice, Croatia between 27 January and 1 February. He plans to operate CW and digital modes on 40, 30 and 20 metres during his evening hours. QSL via DO7ZZ, direct or bureau (e-mail requests for bureau cards can be sent to zik@tiscali.cs). [TNX VE3ZIK]

9X - On 11 January the Rwanda Utilities Regulatory Agency issued an amateur radio licence (9X0R) to Antonio Gonzalez, EA5RM, and a DXpedition is being planned to take place on 16-27 March. The operators will be Roberto/EA2RY, Gerard/EA3EXV, Ruben/EA5BZ (EB5ESX), Javi/EA5KM, Toni/EA5RM, Manuel/EA7AJR, Javi/EC4DX, Massimo/I8NHJ, Fabrizio/IN3ZNR and Dimitri/UY7CW. A band/mode survey has been added to the expedition's website, and its results will help the operators' station configuration plans. The team will be active on 10-160 metres CW, SSB and RTTY, with at least three stations operating simultaneously on different bands and modes. QSL via EA5RM.

How do you find DX?

- By using a DX newsletter like 425DXNews
- Or Ohio/Penn DX Bulletin
- www.papays.com/opdx.html

How do you find DX?

- By using a DX newsletter like 425DXNews
- Or Ohio/Penn DX Bulletin
- Or CDXC News/ forum http://www.cdxc.org.uk/

FH/G3TXF: Mayotte re-visited – January 2006

Nigel Cawthorne, G3TXF nigel@G3TXF.com

Mayotte – an outpost of France

The French possession of Mayotte (FH) which lies in the Mozambique Channel, between the northern end of Madagascar and Mozambique on the African mainland, is somewhat of a geopolitical oddity. Geographically Mayotte is part of the Comoros group of islands. Before independence in 1975, the French colony of Comoros used the FH prefix. When the other islands in the Comoros group became independent and changed their prefix to D6, Mayotte alone decided to stay as part of France and continued to use FH. Both the Comoros (D6) and Mayotte (FH) became new DXCC entities in July 1975. The former French colony of Comoros (FH, FB6) then

Getting to FH

For the FH operation in 2000, we had travelled to Mayotte via the Seychelles, flying from the Seychelles to Mayotte on Air Austral. This option was not available in 2006. In January 2006 the journey was from London to Mauritius (3B8), and then there to Réunion (FR) and on to Mayotte (FH) with Air Austral.

Air Austral have just three jet aircraft in their fleet: two 737s and one 777. On this one trip we flew on all three of them. The direct hop between Mauritius and Réunion was on a 737. However, much to my surprise the two-hour flight on the way out from Réunion to Mayotte was on a massive

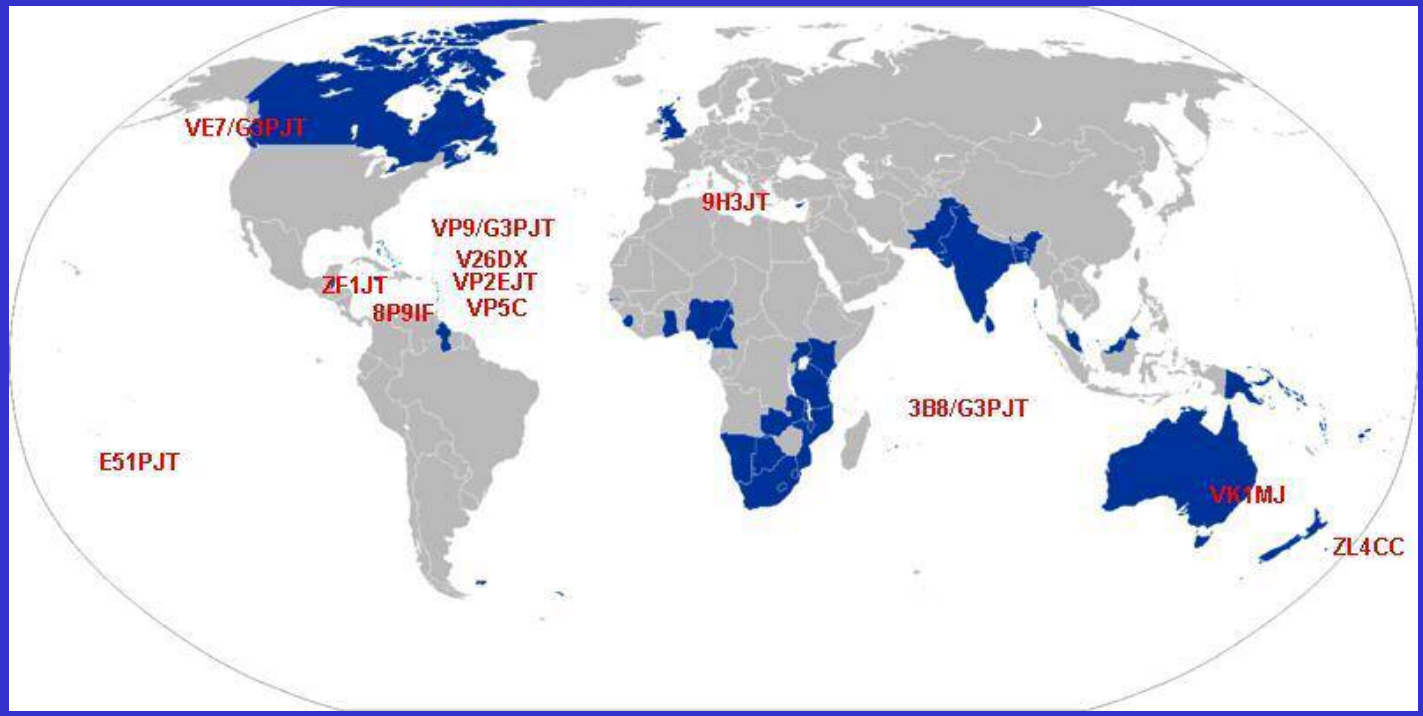
Use the cluster: http://dxcluster.ham-radio.ch/

Use contests

CQWW

Use contests

CQWW *BERU (Commonwealth contest)*



Use contests

Doesn't really matter what antenna you use!

They'll hear you!

Follow the experts

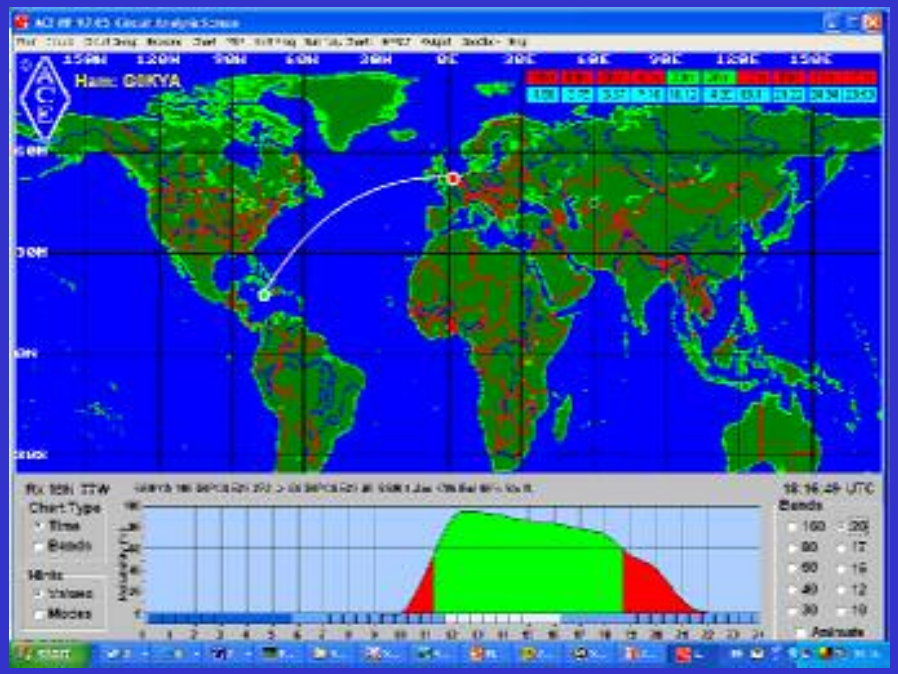
G3TXF (Nigel)

Follow the experts

G3SXW (Roger)

Understand propagation

ACE-HF



VoaProp

W6EL Prop

Choose the right bands

40m, 20m, 15m and 10m good – especially in contests

Choose the right bands

40m, 20m, 15m and 10m good – especially in contests

But 30m, 17m and 12m better – for DXpeditions

Scan the bands

What is the best mode?

- Worst – FM!
- Better – SSB (PSK31/RTTY) (?)
- Best of all – CW every time!

Can you work DX with low power?

"Life's too short for QRP!"

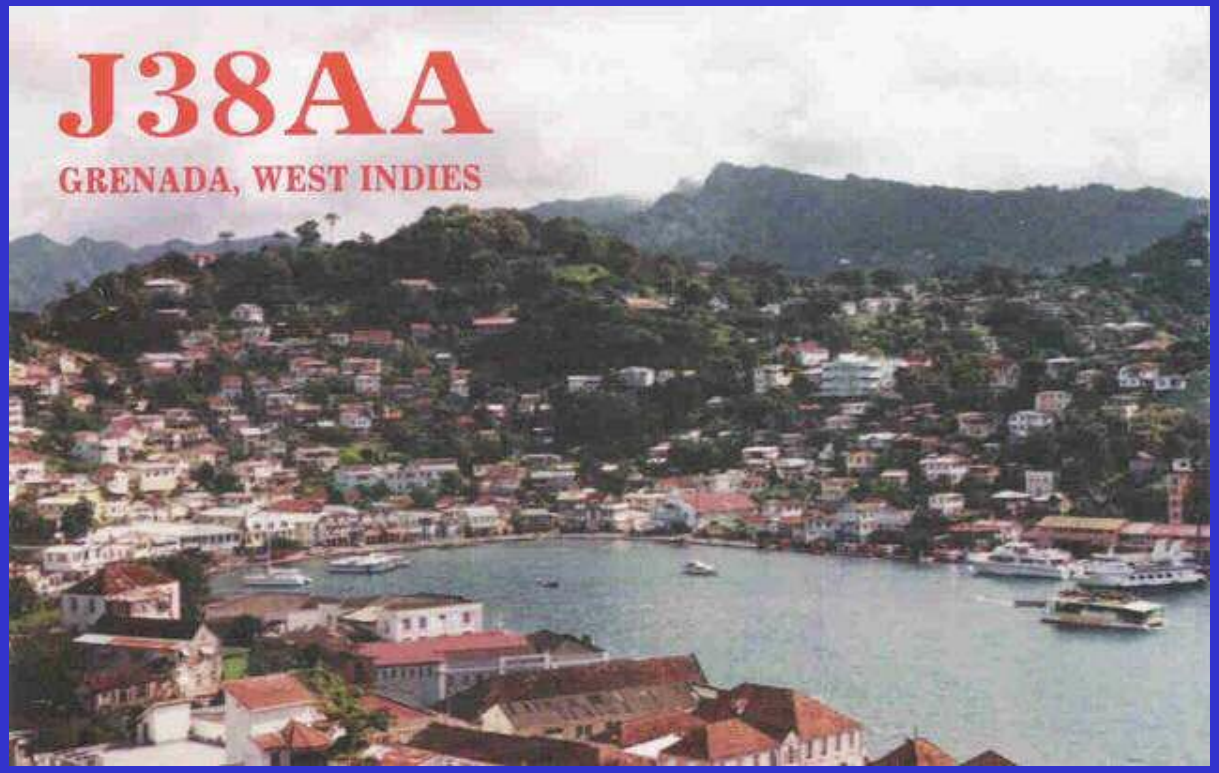
Can you work DX with low power? Yes!

"Life's too short for QRP?"

"It is vain to do with more, what can be done with less"

William of Occam

Why CW – sample QSOs



J38AA – Grenada

100W Hustler vertical (20m)

Why CW – sample QSOs

3B7C
St Brandon

20W
Indoor
dipole (20m)

Why CW – sample QSOs

5A7A
Libya

10W
loft-mounted
magnetic
loop on 30m

Why CW – sample QSOs

J5C – Guinea Bissau

10W loft-mounted dipole

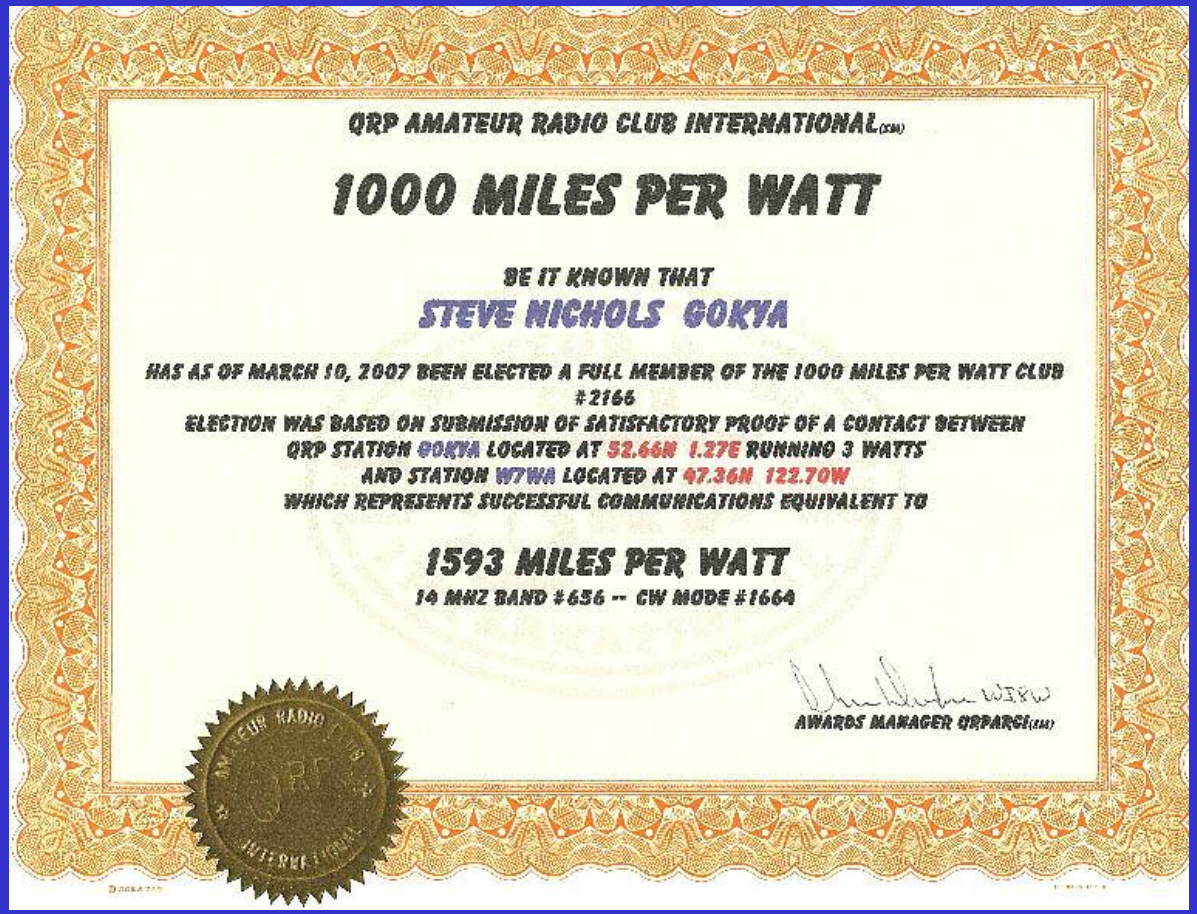
Why CW?

P40LE Aruba 5W FT-817
15m indoor 40m dipole

Why CW?

T77C San Marino 5W FT-817
84ft Long Wire on 30m

How far can you get?



QRP AMATEUR RADIO CLUB INTERNATIONAL(SM)

1000 MILES PER WATT

BE IT KNOWN THAT

STEVE NICHOLS G0KYA

HAS AS OF MARCH 10, 2007 BEEN ELECTED A FULL MEMBER OF THE 1000 MILES PER WATT CLUB #2166

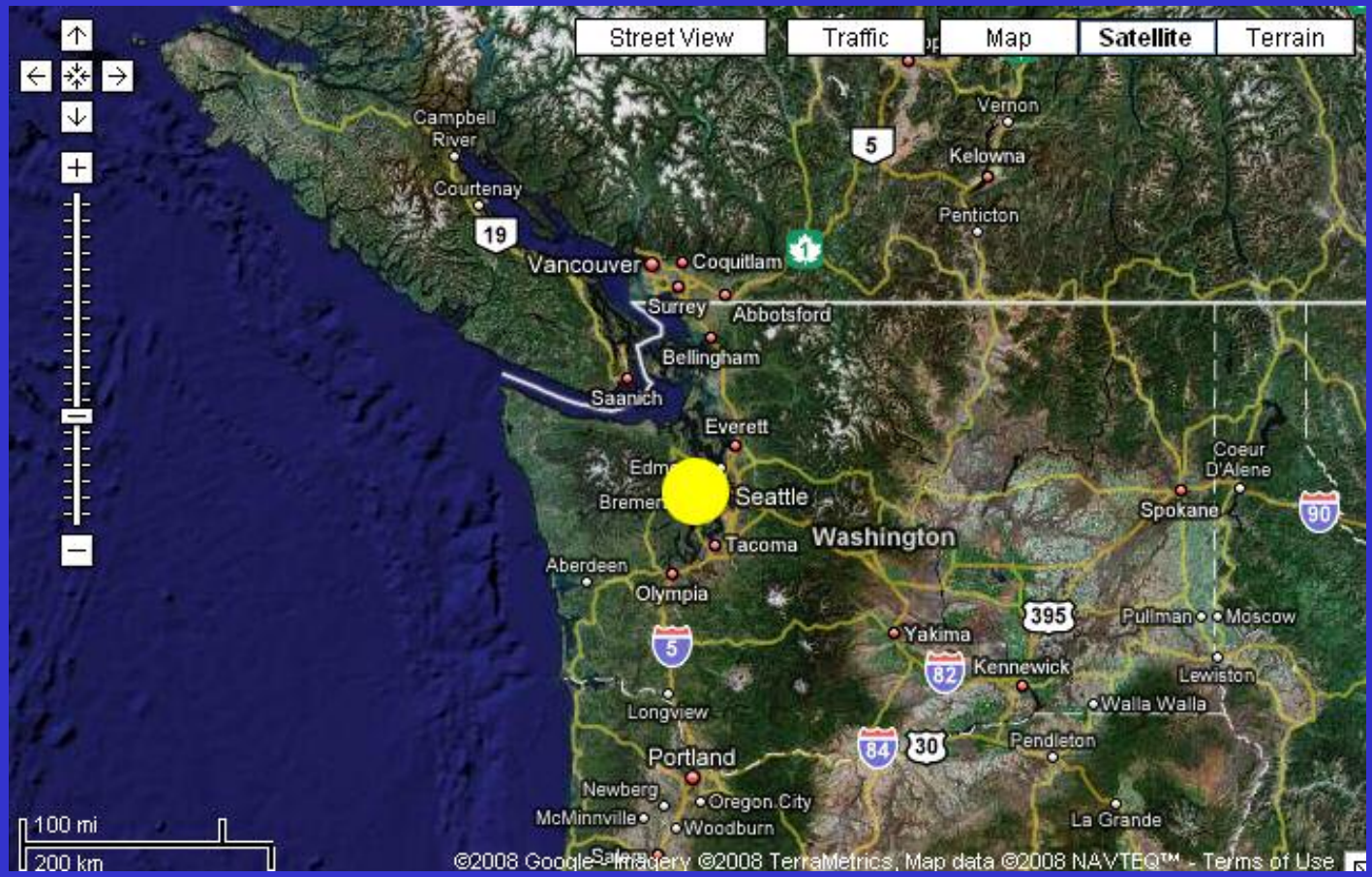
ELECTION WAS BASED ON SUBMISSION OF SATISFACTORY PROOF OF A CONTACT BETWEEN QRP STATION G0KYA LOCATED AT 52.66N 1.27E RUNNING 3 WATTS AND STATION W7WA LOCATED AT 47.36N 122.70W WHICH REPRESENTS SUCCESSFUL COMMUNICATIONS EQUIVALENT TO

1593 MILES PER WATT

14 MHZ BAND #656 -- CW MODE #1664

AWARDS MANAGER QRPARCI(SM)

Seattle, Washington State

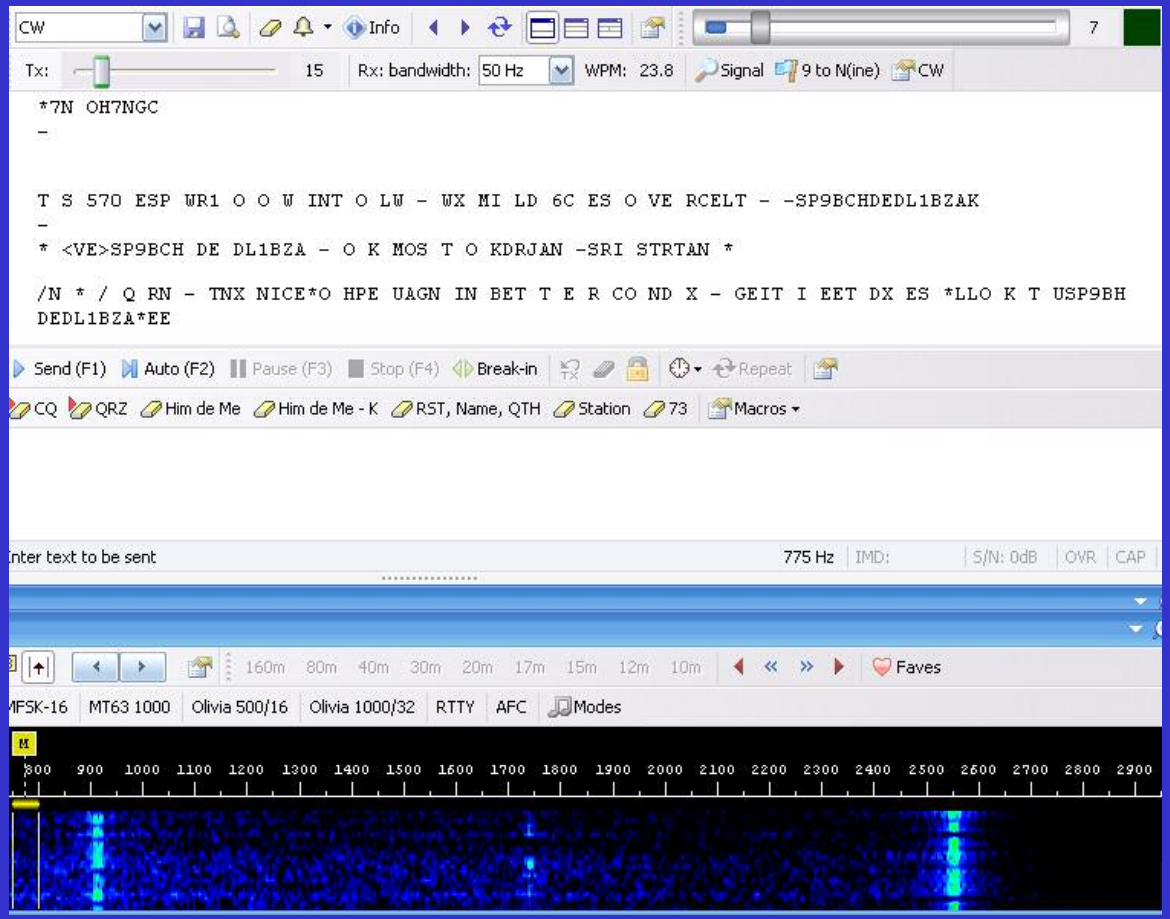


G3YMC Dave Sergeant

- 5W from Elecraft K2
- 222 DXCC countries
- Butternut vertical or 60ft long wire

"Don't be put off by the pundits who say you can only work DX with a big linear amplifier. You too can do it like I have."

Digital Master 780



How hard can it be?

Him: ***CQ CQ CQ DX DE 3B7C UP***

You: ***G0KYA***

Him: ***G0KYA 5NN TU***

You: ***5NN TU***

What about antennas?

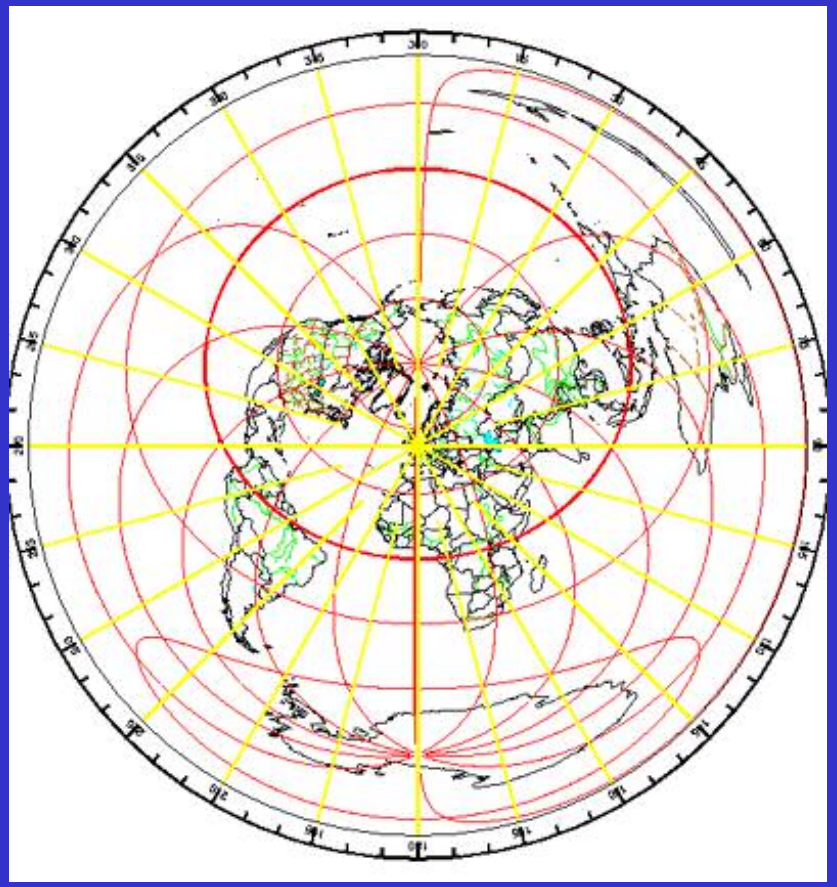
What do you want to work?

North America: North West

Caribbean: West

South America: South West

Australia/New Zealand: Depends on long/short path (NE/SW)

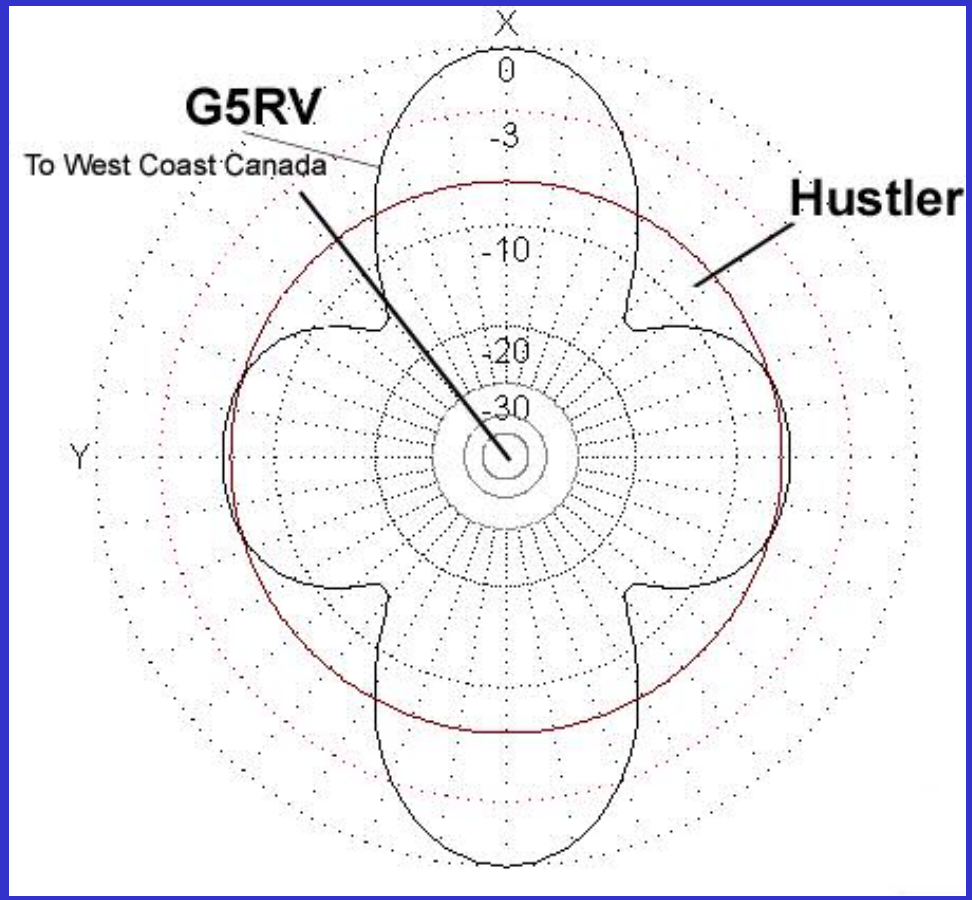


What do you want to work?

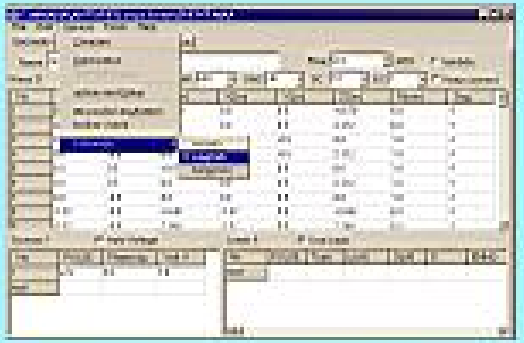
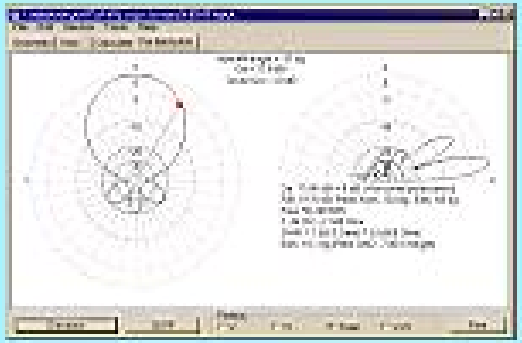
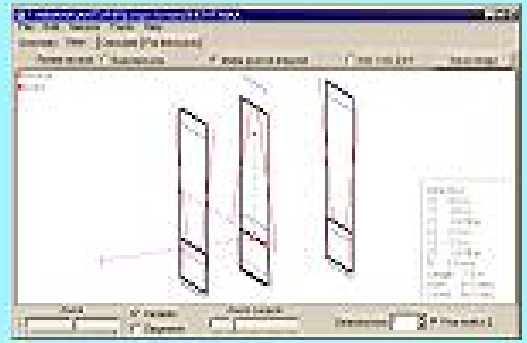
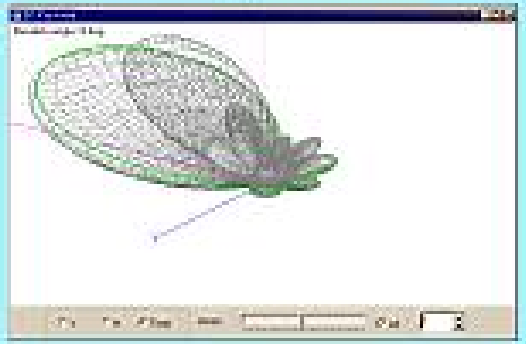
Watch the radiation pattern!

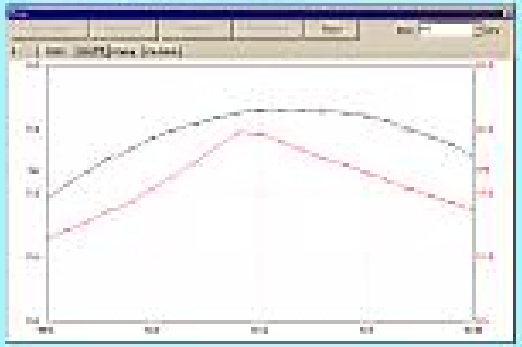
Do you have nulls where you don't want them?

Note: 20m - G5RV as inverted V



How well does it work?



Use MMANA-GAL Free!

What about height?

To work the East Coast of the USA on 20m you ideally need a take-off angle less than 23 degrees

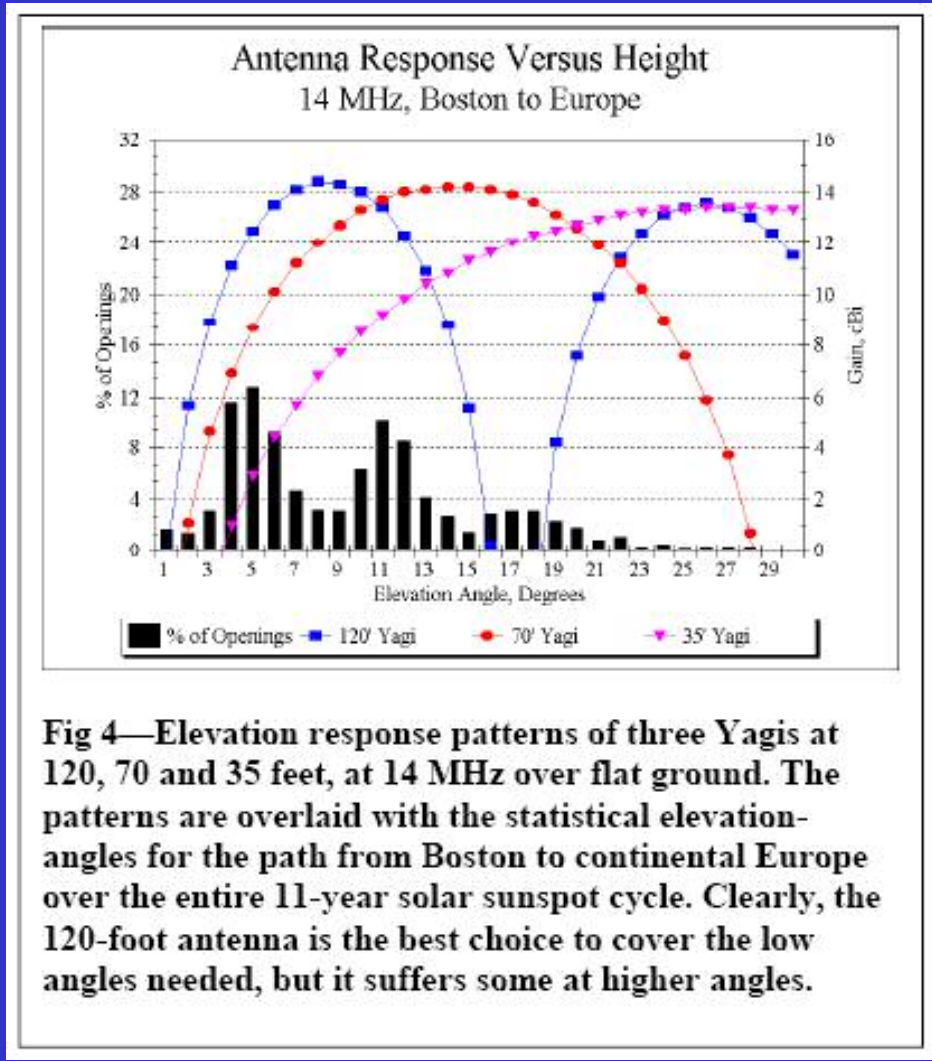


Fig 4—Elevation response patterns of three Yagis at 120, 70 and 35 feet, at 14 MHz over flat ground. The patterns are overlaid with the statistical elevation-angles for the path from Boston to continental Europe over the entire 11-year solar sunspot cycle. Clearly, the 120-foot antenna is the best choice to cover the low angles needed, but it suffers some at higher angles.

What about height?

To work the West Coast of the USA on 40m you ideally need a take-off angle less than 16 degrees

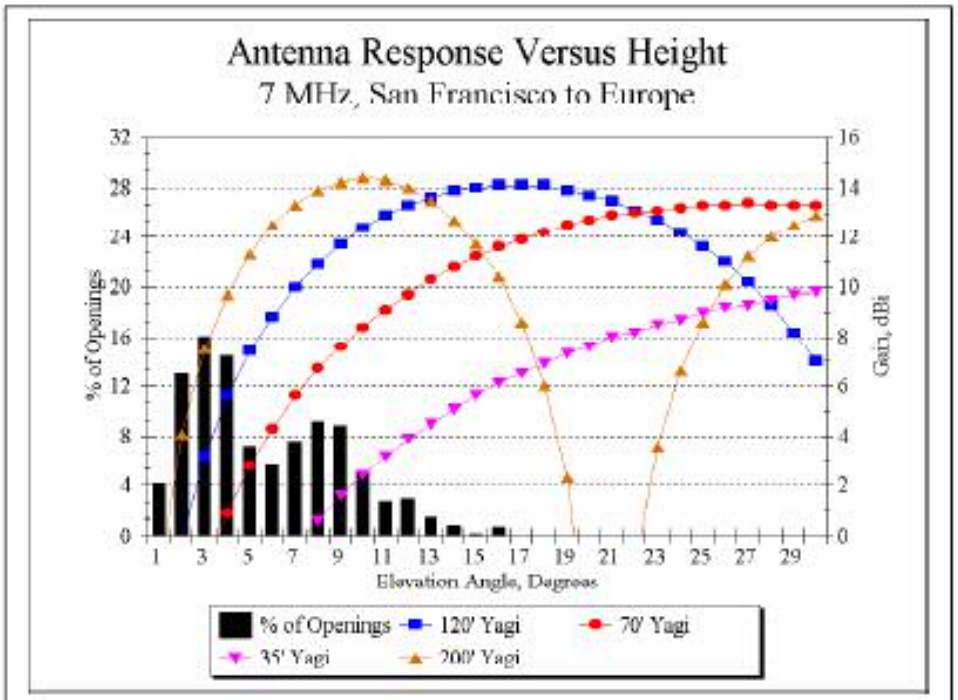


Fig 7—Comparison of antenna responses for another propagation path: from San Francisco to Europe on 7 MHz. Here, even a 120-foot high antenna is hardly optimal for the very low elevation angles required on this very long path. In fact, the 200-foot high antenna is far better suited for this path.

What about height?

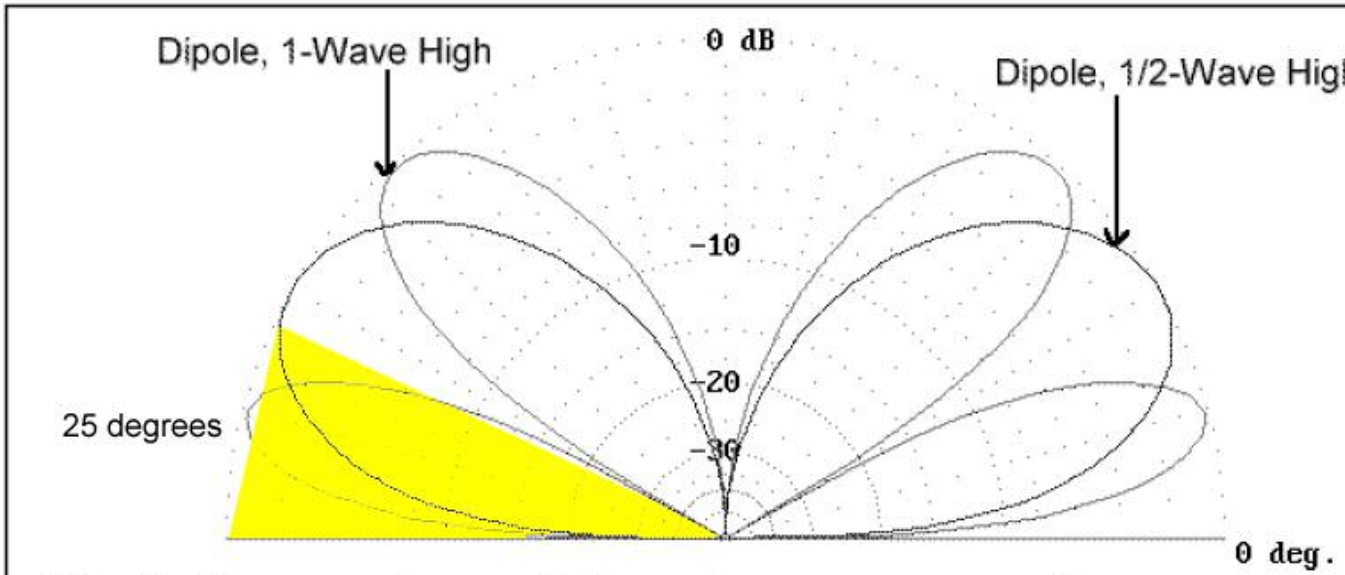
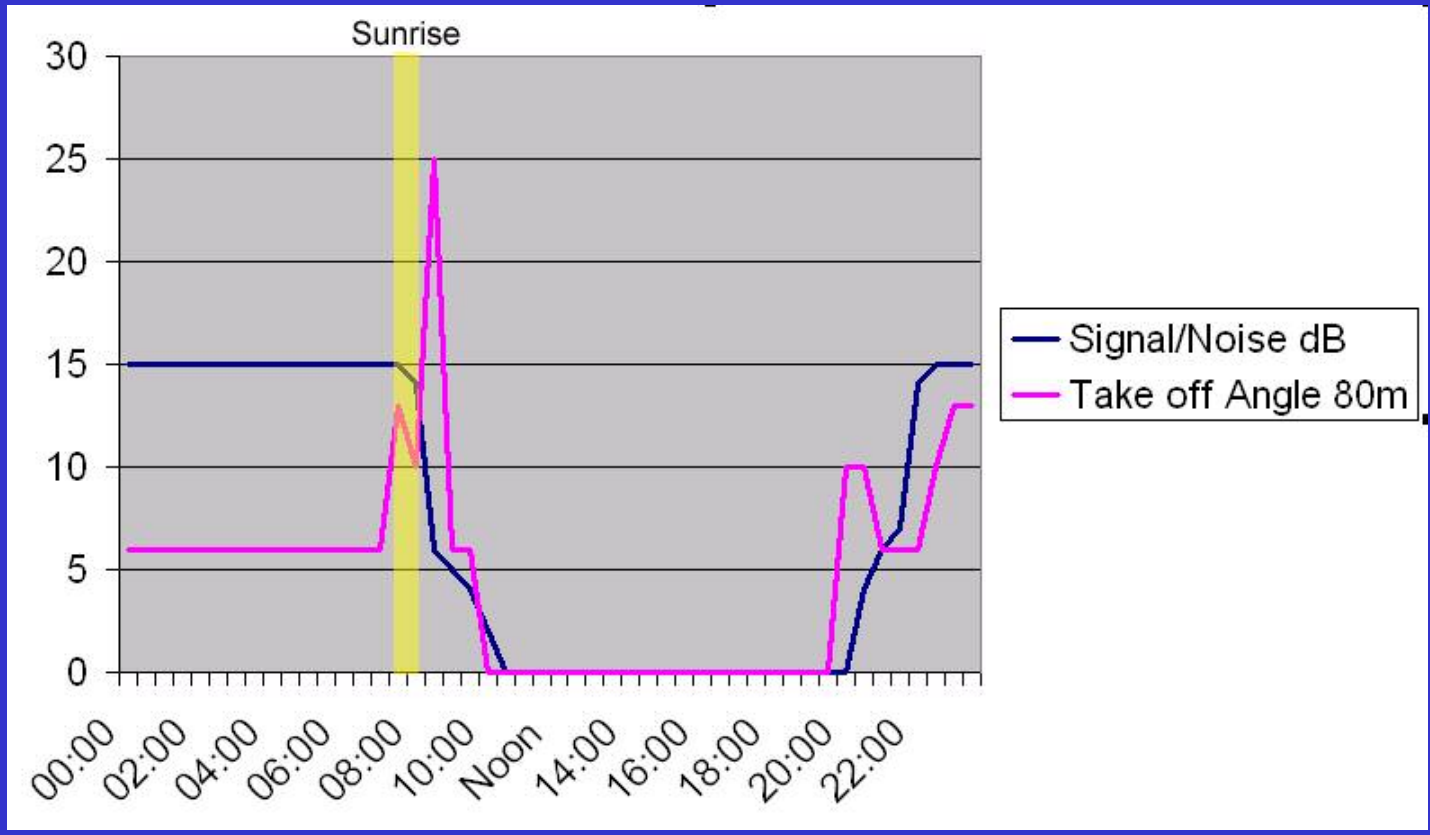


Fig 3–Comparison of elevation responses for two dipoles: one ½-wavelength high, and the other 1-wavelength high.

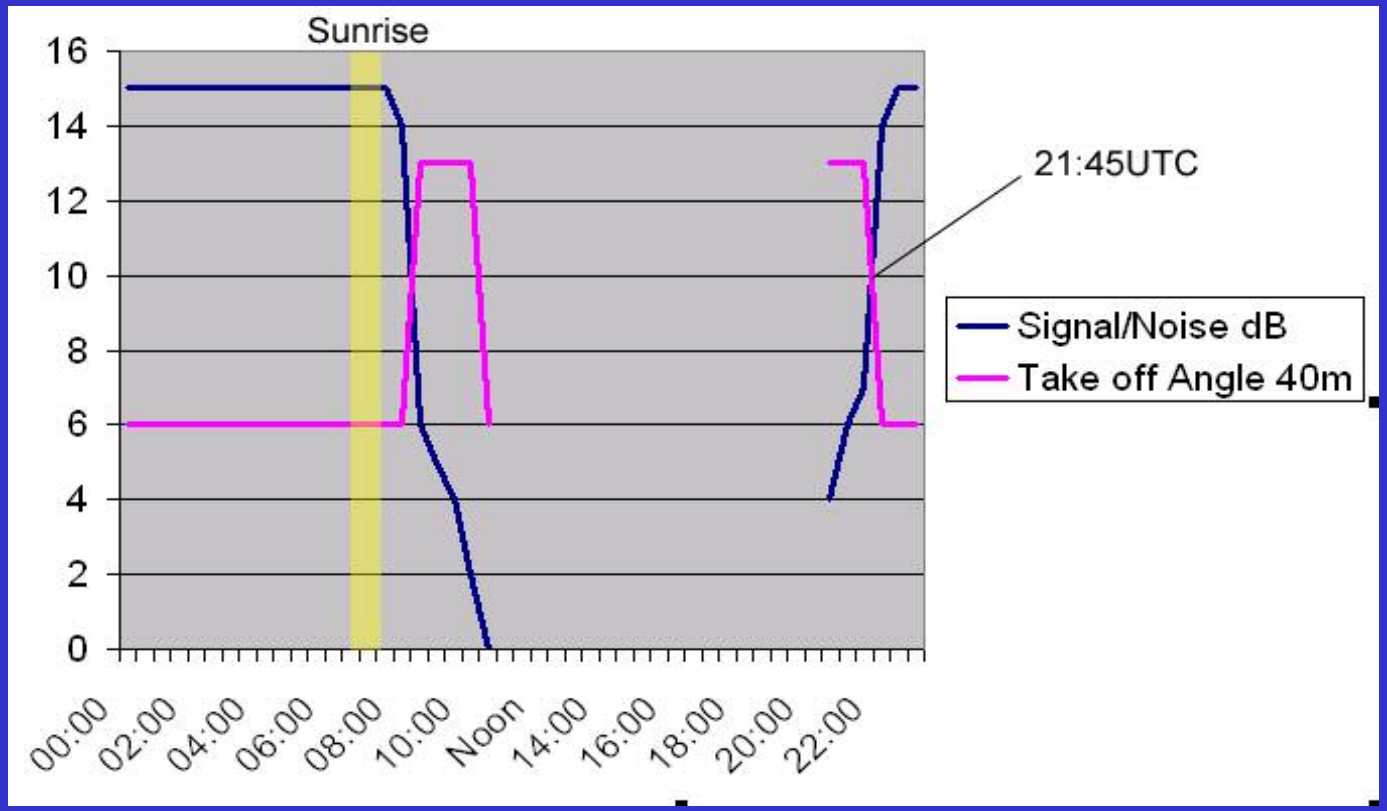
Take-off angles

80 metres - Norfolk to Boston, Feb 2007



Take-off angles

40 metres - Norfolk to Boston, Feb 2007



What about antennas?

Twelve designs tested (so you don't have to!)

- Maldol MFB300
- EH antenna
- G5RV
- Cushcraft R5
- Cushcraft MA5V
- Rybakov vertical
- Magnetic loop
- TGM minibeam
- Hustler 5BTV
- W3EDP long wire
- Inverted V
- Multiband loft dipoles

Maldol MFB300/Comet CHA-250B

"Full 1.8-60MHz frequency coverage, 200W PEP handling, and only 7m tall. Beautifully made in fibre-glass with stainless-steel & alloy fittings. "

Results?

- **Not good!**
- **Signals well down on every band**
- **Use a saucepan!**

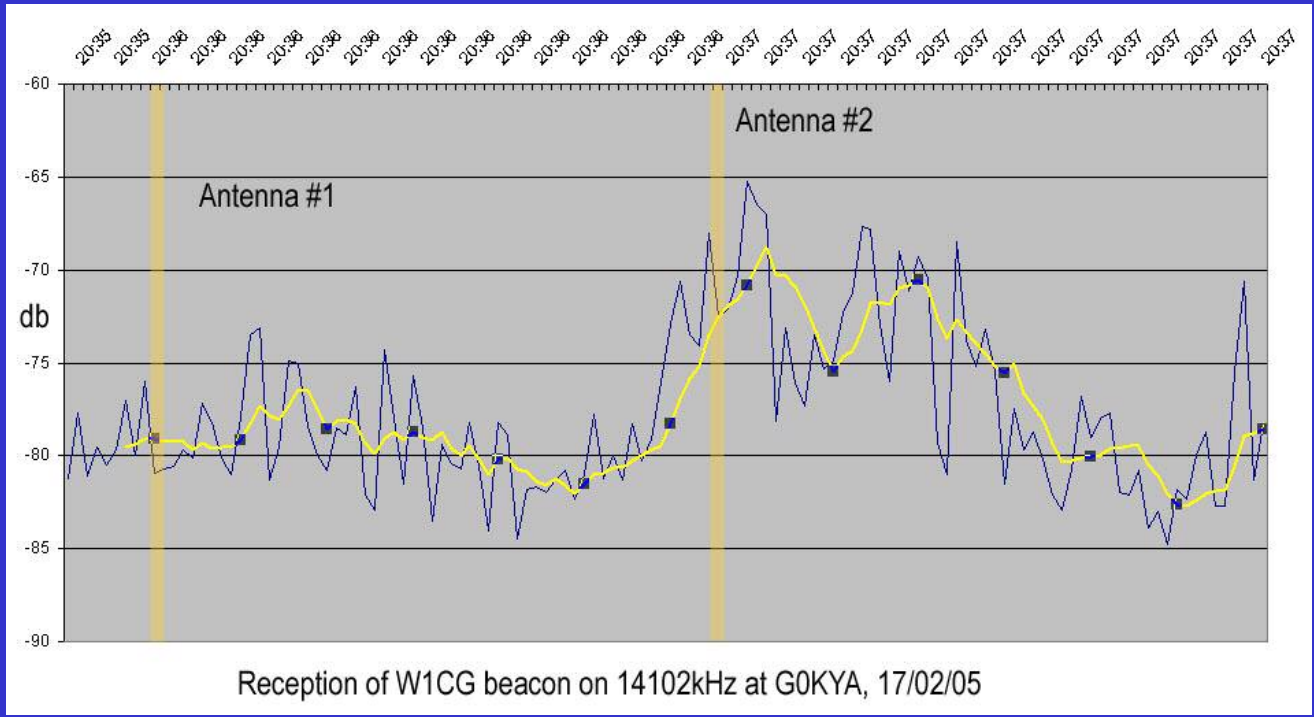
EH Antenna

Results?

- **Not very good**
- **Down –2/3 S-points compared with dipole**
- **Coax seems to radiate most and/or it needs more investigation**

EH Antenna

On tests with W1CG from the UK the EH (#1) was down compared with a Hustler vertical (#2)



G5RV

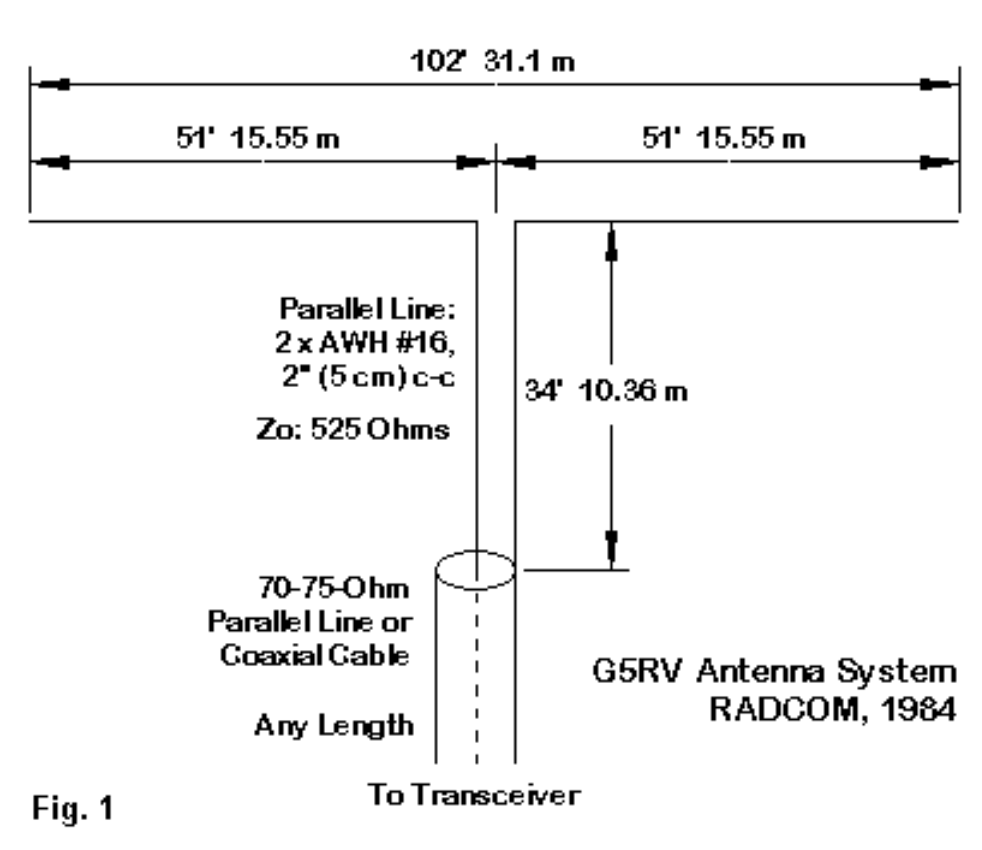
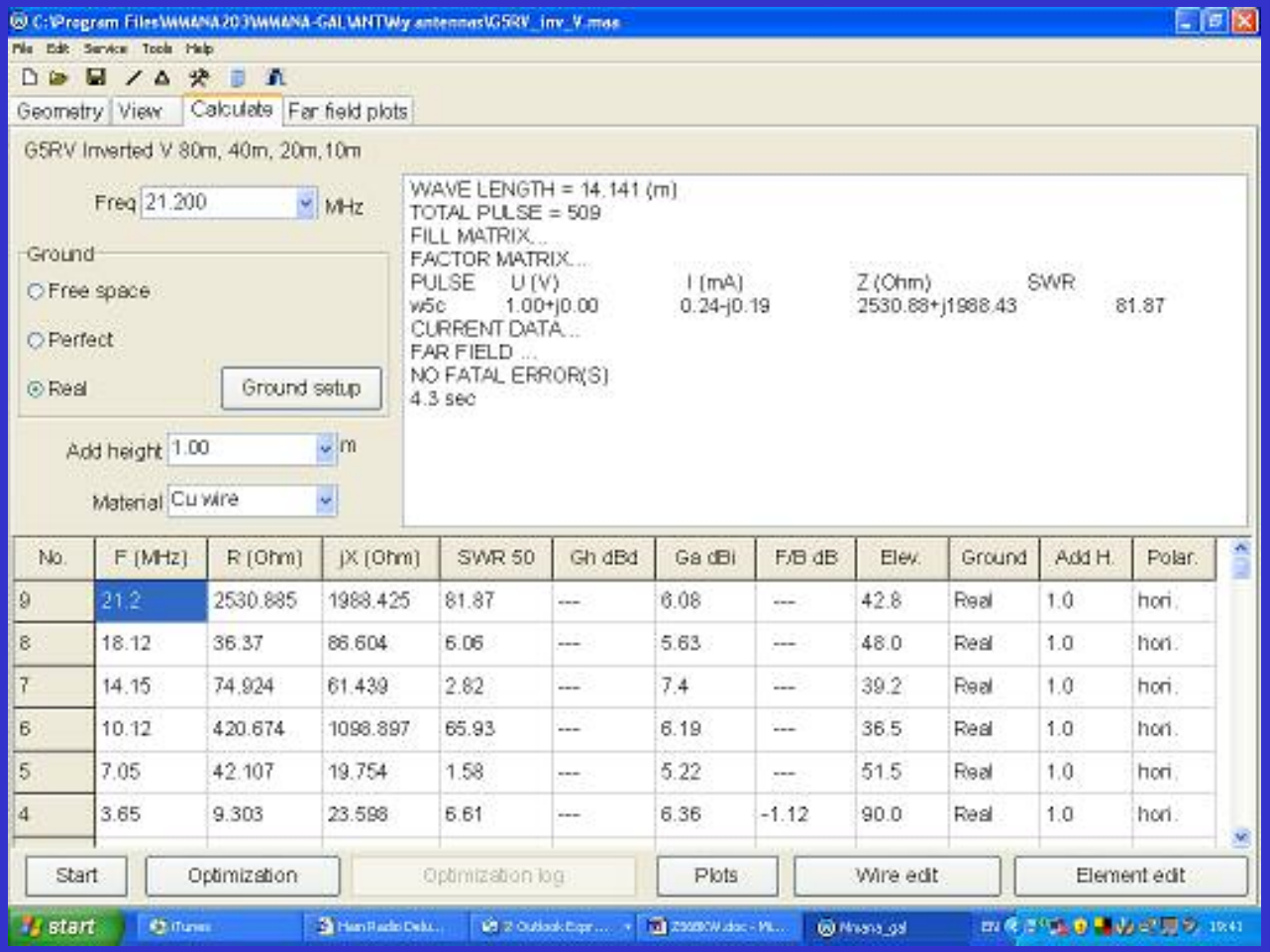

102' 31.1 m
51' 15.55 m
51' 15.55 m
Parallel Line:
2 x AWH #16,
2" (5 cm) c-c
Zo: 525 Ohms
34' 10.36 m
70-75-Ohm
Parallel Line or
Coaxial Cable
Any Length
To Transceiver
G5RV Antenna System
RADCOM, 1984

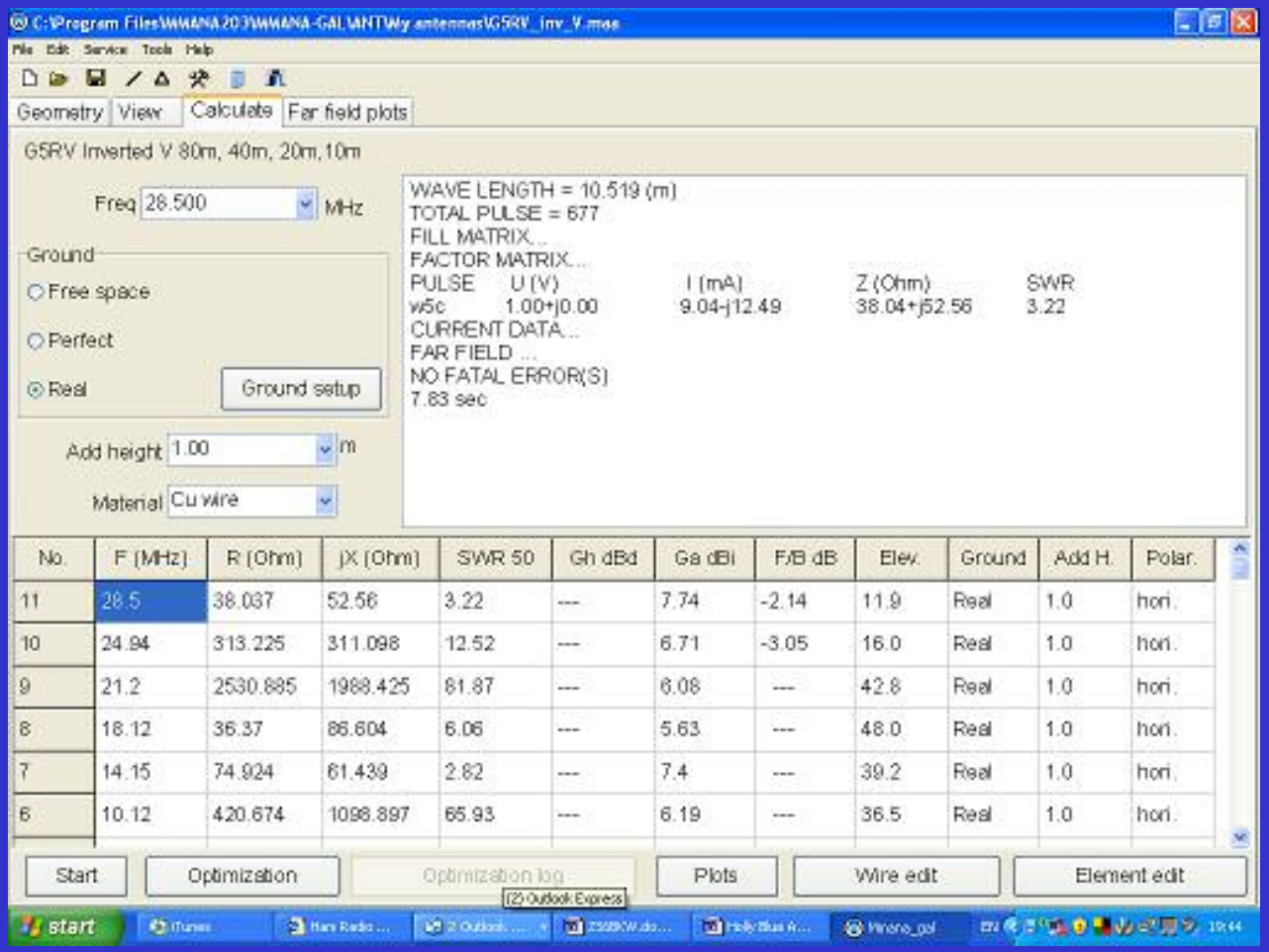
Fig. 1

G5RV



A very poor match on 30m and 15m

G5RV



A very poor match on 12m too.

High reactance can lead to arcing in the ATU on 10m.

I burned a switch out on a G5RV during JOTA

G5RV

SWR measured with MFJ 269 antenna analyser at end of 30ft RG58 coax (and at bottom of matching section), This shows that your coax losses can make your SWR readings look better than they are. The G5RV uses the coax as part of the impedance transformer.

3.5MHz: 2.0 (1.7)
3.6MHz: 3.0 (2.2)
3.8MHz: 4.2 (3.6)

7.0MHz: 2.2(2.2)
7.1MHz: 2.4 (2.3)

10.1Mhz: 7.8 (>31)

14.150MHz: 4.5 (5.7)

18.1MHz: 2.9 (4.8)

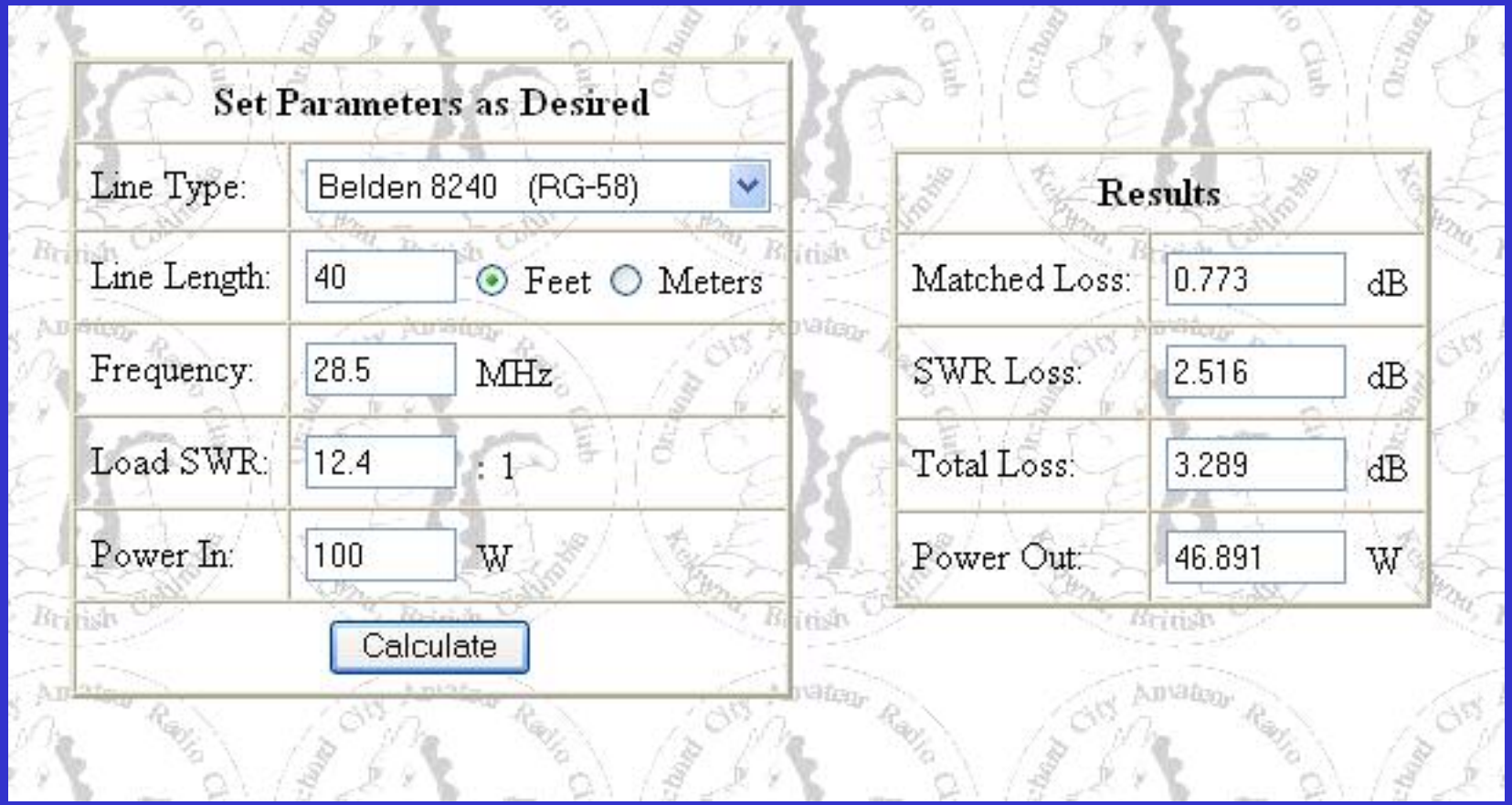
21MHz: 3.9 (9.6)
21.450MHz: 3.8 (9.3)

24.9MHz: 4.6 (14.8)

28MHz: 3.6 (12.4)
29MHz: 3.2 (9.5)

G5RV

High SWR on coax leads to high losses



Set Parameters as Desired

Line Type:	Belden 8240 (RG-58)	
Line Length:	40	Feet / Meters
Frequency:	28.5	MHz
Load SWR:	12.4	: 1
Power In:	100	W

Calculate

Results

Matched Loss:	0.773	dB
SWR Loss:	2.516	dB
Total Loss:	3.289	dB
Power Out:	46.891	W

G5RV

On –air comparison with loft-mounted multiband dipoles/magnetic loop

80m
Identical to multi-band dipoles on inter G-signals during day. Better for EU as noise level lower – signal strengths the same/+1 on G5RV.

40m
Noise level 2 S-points better on G5RV (less TV buzz). Signal strengths no different around EU.

30m
Noise level S4 on G5RV, S5 on long wire, S7 on Mag loop. Signal Strengths equal or +1 to 2 S points compared with mag loop.

Down 1-2 S-points compared with long wire.

20m
Noise levels no different compared with dipoles. Worse 1 S point compared with mag loop. EU signal levels similar or down 1-3 S–points compared with dipoles. Africa: down 2 S-points compared with long wire/dipole.

17m
Noise levels similar. All signals down 1-2 S-points. Caribbean down 1 S-point.

15m
Noise levels 1 S –point better than dipoles. All signals down 2-4 S-points compared with long wire/dipole.

12/10m
Noise levels way down – no signals heard.

Cushcraft R5

"End-fed half-wave vertical for 20 – 10m"

Results?

- Not bad
- About as good as a dipole
- Didn't like high winds

Cushcraft MA5V

"Centre-fed shortened half-wave vertical for 20 – 10m with resonators"

Results?

- Not bad
- -2 S-points on 20m, better on 17m and up
- SWR went up in the wet

Rybakov 806 vertical (7.6m/8.6m+)

Results?

- OK-ish – not good on 40/80m.
- Better on HF
- Lossy Un-Un
- Cheap

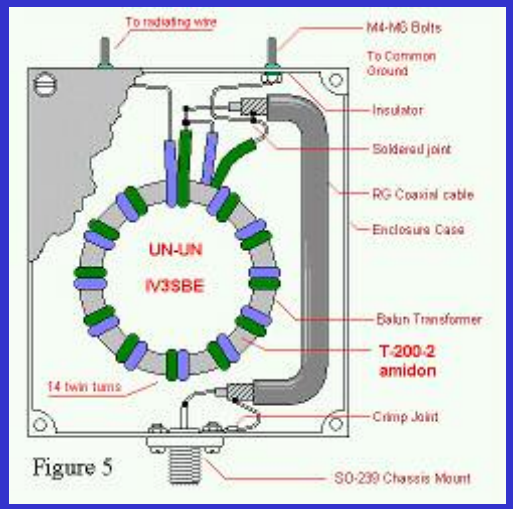


Figure 5

http://www.iv3sbe.webfundis.net/

MFJ 1786 Magnetic Loop

Results?

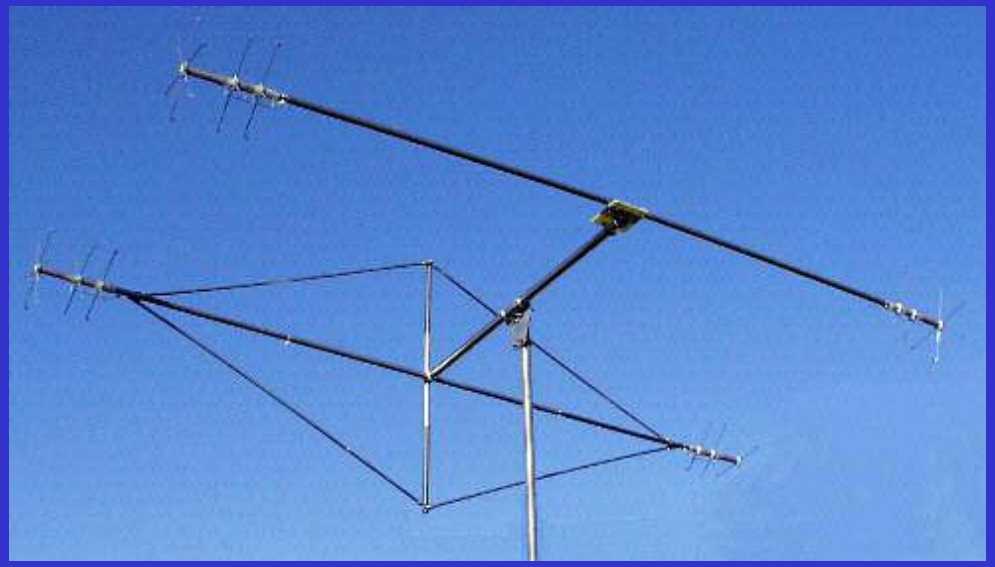
- For size – excellent
- Better outdoors
- Low noise
- Tuning is a pain
- Better on higher bands than lower

MFJ 1786 Magnetic Loop –

TGM Minibeam

"Two / three-element shortened beam with end-loading"

Results?



- **No discernible gain/directivity on 20m**
- **Better on 15m and 10m**
- **Needs decent mast/rotator**

Hustler 5BTV

Trapped, loaded vertical for 80 – 10m

Results?

- Not bad – bandwidth not good on 80m
- Works well for DX, poor for inter-G/close EU working
- Needs ground radials (lots of them!)

Hustler 5BTV

Comparison of signals on Hustler and G5RV

Hustler 5BTV v loft-mounted dipoles (S points)

	Entity	Dipoles	Hustler			
80m	G	S9	S7	**Noise: Hustler 3 S-points better**		
	G	S9+10	S7			
	DL	S7	S5			
	DL	S5	S7			
	DL	S5	S5			
	G	S8	S7			
	G	S6	S6			
	G	S8	S8			
	G	S7	S6			
	G	S7	S5			
	GW	S9	S7			
	DL	S9	S5			
40m	DL	S9	S7	**Noise: Hustler 1-4 S points better**		
	F	S7	S7			
	DL	S9	S8			
	I	S9	S9			
Suriname	PZ	S7	S8			
	DL	S9	S9			
	OE	S9	S8			
	I	S9	S9			
	W	S5	S6			
	OK	S9+	S9+			
	W	S5	S5			
20m	RU	S5	S4	**Noise: Hustler 0-1 S points better**		
	RA	S4	S3			
	I	S6	S5			
	RU	S6	S5			
	DL	S6	S6			
	IT9	S9	S6			
	I	S8	S6			
	EA7	S9+	S9+			
New Zealand	ZL3SV	S4	S4	11/01/2008 09:45	Mag loop S3/Long Wire S3	(0.5km Sloper!
	OH	S9+	S8	mag loop S9		
	UR5	S4	S2			
	YT3	S9+	S8			
	RK3	S7	S5			

Hustler 5BTV

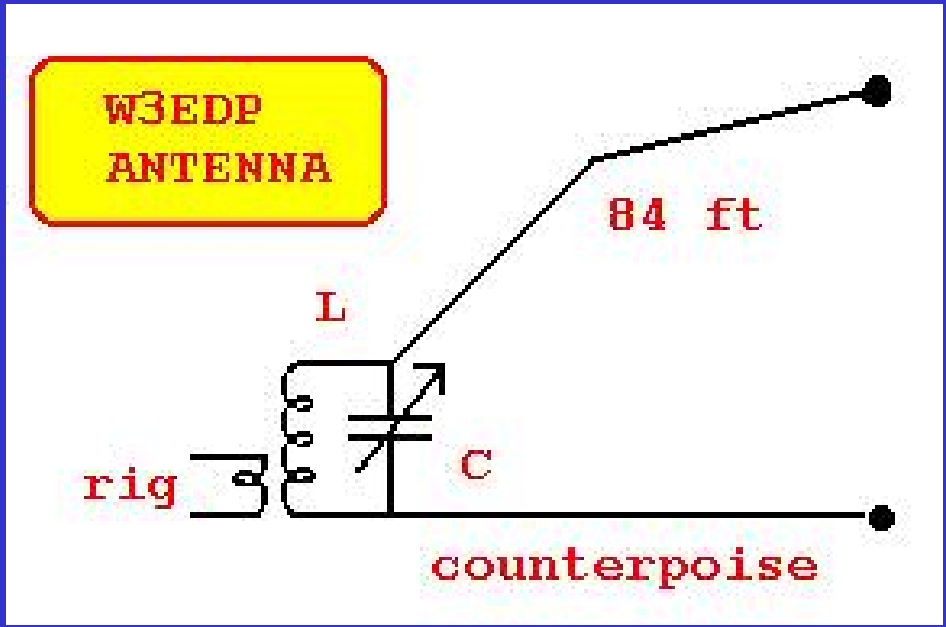
Points to watch:

1. **If your SWR is 1:1, it isn't working properly!**
2. **Ground radials are non-resonant – use radials that are at least the length of the vertical (aim for around 32-64).**
3. **If you can't fit them in, use lots of shorter radials**
4. **Don't cut it to achieve resonance!**

W3EDP 84ft “long wire”

Results:

- Not bad – cheap!
- Watch RF in the shack - use an earth
- Bit noisy
- Good on 80m, 40m and 20m, less so on higher bands



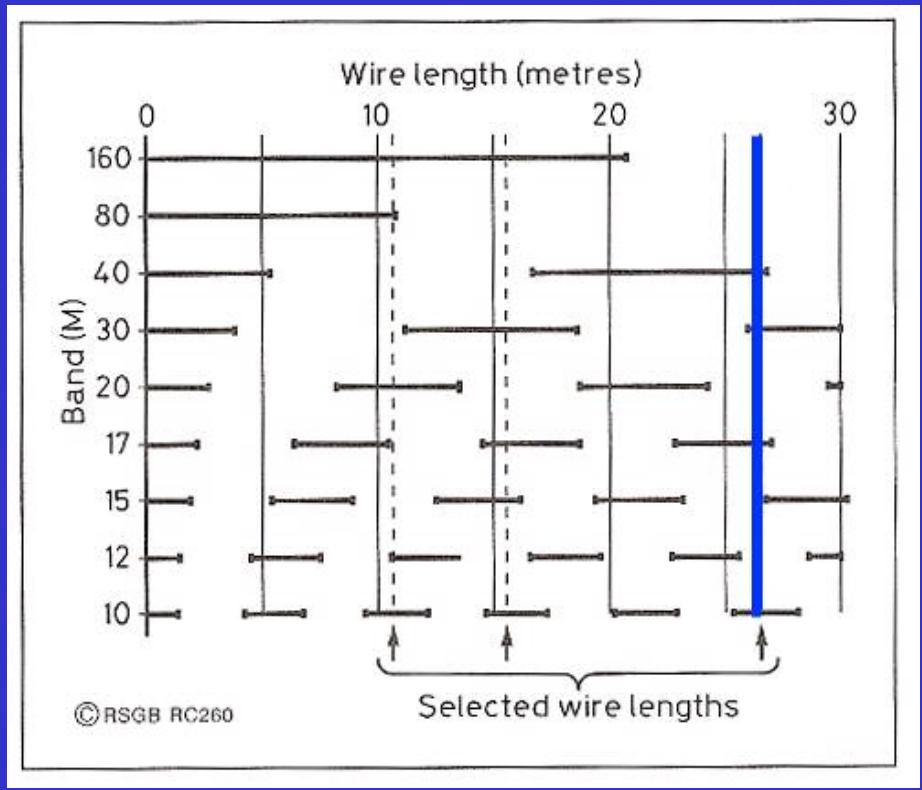
Counterpoise lengths

• 3.5 & 7.0Mhz - 17ft, 14Mhz - 6.5ft , 28Mhz - none

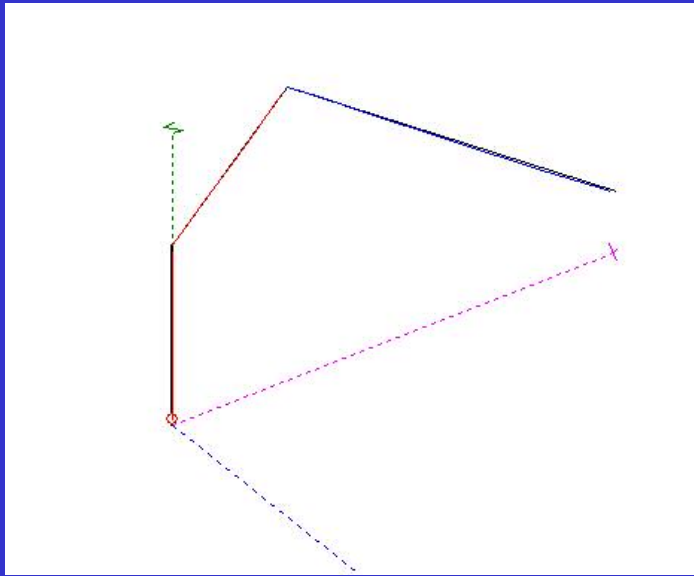
W3EDP 84ft “long wire”

Why 84 feet?

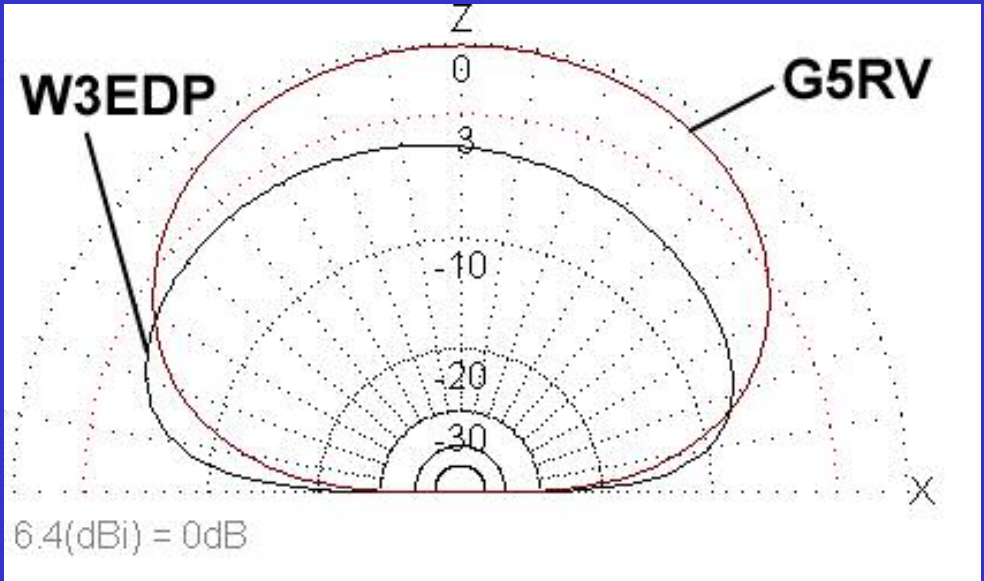
- Offers low impedance (easy) match on most bands
- Gets high current point away from the rig and in the clear



W3EDP 84ft “long wire”

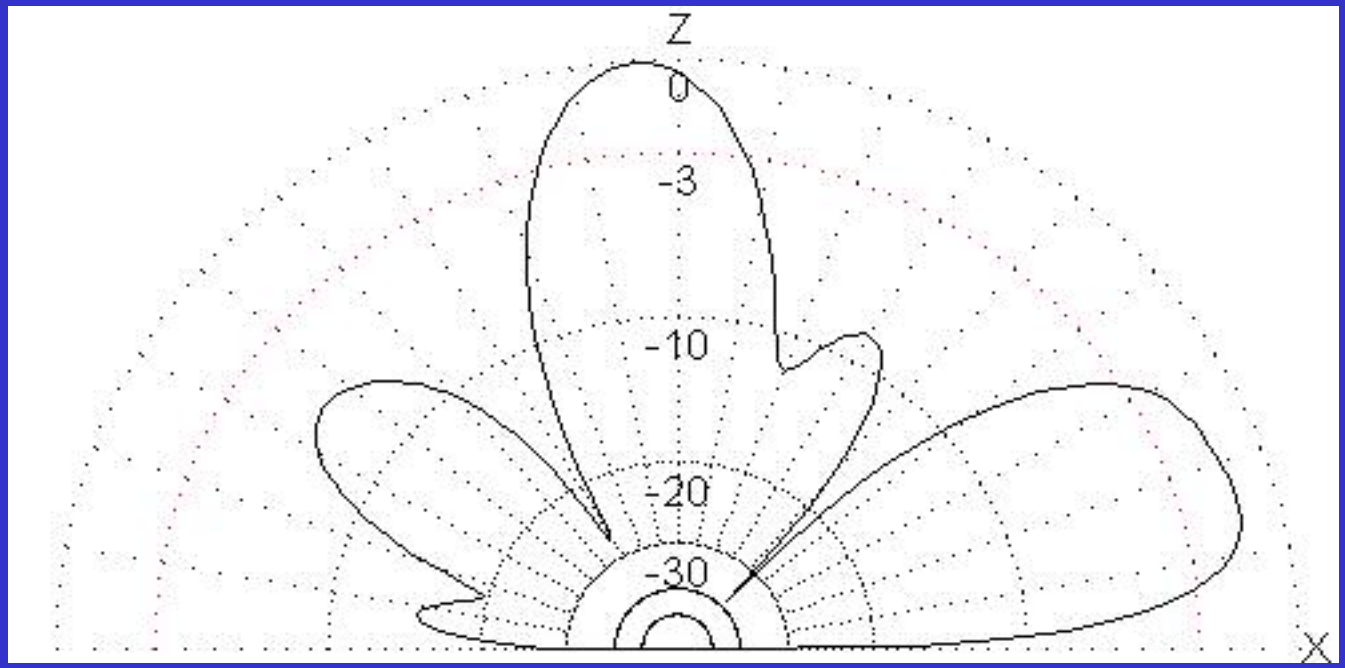


Using MMANA



80m

W3EDP 84ft “long wire”



Great low-angle lobe to south on 17m and above for me – your mileage will vary.

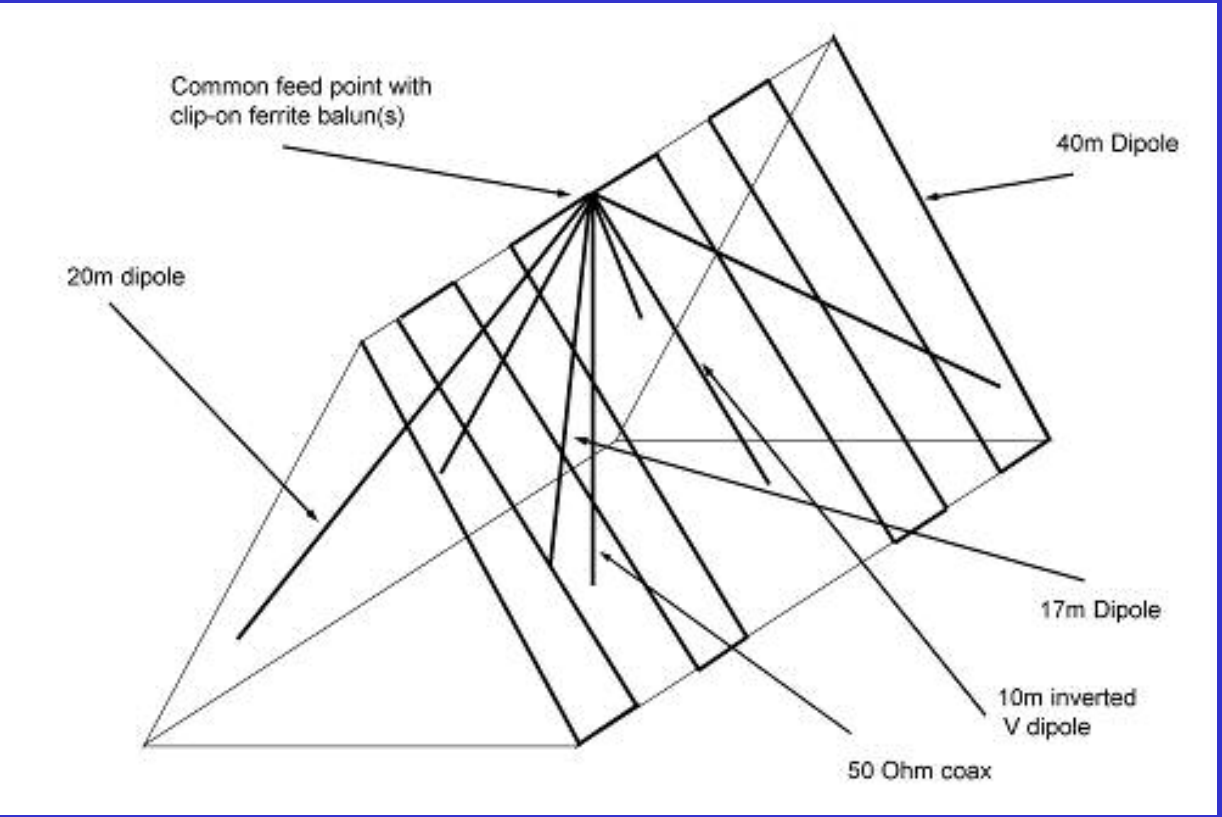
Inverted V (with fishing pole)

- Excellent!
- Cut for half-wave at desired frequency
- Use parallel-fed dipoles for two bands
- Gets high current point up

So what have I learned?

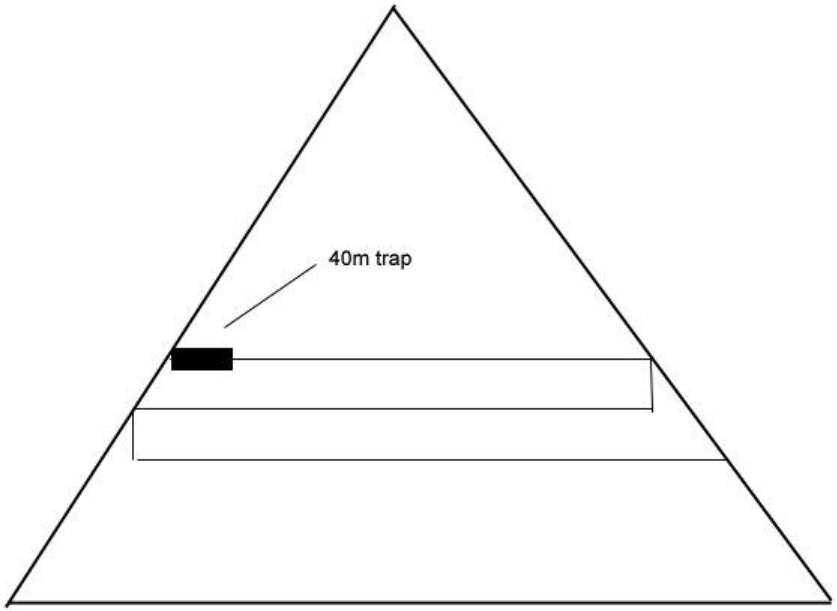
- Resonant antennas work better than non-resonant
- Don’t underestimate the half-wave dipole
- Get your maximum current point as high as you can (if using dipoles). If vertical, use lots of radials
- You can parallel feed dipoles, but keep the wires apart
- You loose about 0-2 S-points using loft-mounted antennas
- So finally …..

The KYA multiband dipole



(80m), 40m, 20m, 17m, 15m and 10m

The KYA multiband dipole



Adding 80m using traps and zig-zag extensions

The KYA multi-band dipole

- Suitable for SWLS, QRP, M3 licensees and PSK31 operating. Occasional use up to 100W. NO LINEARS!
- Uses non-inductive (zig-zag) loading for 40m/80m
- Feed point balun reduces RF pick-up and interference, making for a quieter antenna. This may also help prevent RFI.
- Totally stealthy – no-one need know you are operating
- Totally weatherproof – don't worry about wind, rain or lightning!

The KYA multi-band dipole

- Over the past 12 months have worked:

3X (Guinea)
6Y (Jamaica)
8P (Barbados)
7X (Algeria)
J5 (Guinea Bissau)
V26 (Antigua)
6W (Senegal)
T70 (San Marino)
P40 (Aruba)
7Z (Saudi Arabia)
ZL2 (New Zealand)
JA (Japan)
3B7 (St. Brandon)
A25 (Botswana)
HV (Vatican)
ST (Sudan)
J88 (St. Vincent)
ZS6 (South Africa)
VP2 (Anguilla)
5L (Liberia)
FY (French Guyana)
OY (Faroe Islands)

and others – at sunspot minimum!

Conclusion

1. Find out what is on the bands
2. Optimise your station for your working patterns – eg day, night, winter, summer, bands
3. Use the highest HF frequency you can to minimise absorption
4. Get on the air during contests and Dxpeditions
5. Use CW, learn to work split, use CW memories
6. Have fun!