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# WATTS

08 - 2009

Year 79 +8m

Monthly newsletter of the Pretoria Amateur Radio Club  
Maandelikse nuusbrief van die Pretoria Amateur Radio Klub.



PARC, PO Box 73696 Lynnwood Ridge 0040, RSA



<http://www.parc.org.za> mail: [zs6pta@zs6pta.org.za](mailto:zs6pta@zs6pta.org.za)

Bulletins: 145,725 MHz 08:45Sundays / Sondag

Relays: 1.840, 3.700, 7.066, 10.135, 14.235, 51.400, 438.825, 1297 MHz  
Activated frequencies are announced prior to bulletins

Swapshop: 2m and 7.066 MHz Live on-air after bulletins

Bulletin repeats Mondays | herhalings : Maandae 2m 19:45



High speed wireless data for all. System originally innovated by US hams.

Volunteer PTAWUG users putting up a high-site. For more detail see [www.ptawug.co.za](http://www.ptawug.co.za) or contact Roy ZS6MI



## In this issue

- Minutes July 8 Julie Notules
- Member's pages Lede-bladsye
- Member news / Activities Lede-nuus en Aktiwiteite
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- Technical BACAR flight Tegnies
- Vertical and horizontal antenna comparison
- Page eight Bladsy agt

## In hierdie uitgawe

**Next Meeting  
AGM 1 Aug 2009**

Time: approx 11:30  
PMC Clubhouse  
Keunig street  
Silverton

## PARC Management team / Bestuurspan Aug. 2008- Aug. 2009:

Committee members					
<b>Chairman</b> , Rallies, Hamnet	Johan de Bruyn	ZS6JHB	<a href="mailto:chairman@zs6pta.org.za">chairman@zs6pta.org.za</a>	012-803-7385	082-492-3689
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SARL liason, fleamarket					
<b>Treasurer, Secretary</b>	Richard Peer	ZS6UK	<a href="mailto:treasurer@zs6pta.org.za">treasurer@zs6pta.org.za</a>	012-333-0612	082-651-6556
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<b>Rallies</b>	Johann de Beer	ZR6YV		011-918-1060	082-857-1561
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<b>Contests</b>	Pierre Holtzhausen	ZS6PJH	<a href="mailto:zs6pjh@telkomsa.net">zs6pjh@telkomsa.net</a>	012-655-0726	082-575-5799
<b>Webmaster</b>	Nico v Tonder	ZS6AQ	<a href="mailto:nico@admin.co.za">nico@admin.co.za</a>		082-326-9345
<b>Hiistorian/Awards</b>	Tjerk Lammers	ZS6P	<a href="mailto:zs6p@iafrica.com">zs6p@iafrica.com</a>	012-809-0006	
<b>Public relations</b>	Thobile Koni	ZS6TKO	<a href="mailto:toko40@mweb.co.za">toko40@mweb.co.za</a>		082-493-2483
<b>Social</b>	Molly Peer	ZR6MOL	<a href="mailto:molly@peer.co.za">molly@peer.co.za</a>	012-333-0612	

## Minutes of the monthly club meeting of the Pretoria Amateur Radio Club held at the South Campus of the University of Pretoria on 8 July 2009

**Welcome:** The chairman welcomed all present.

**Present:** See register, 15 members, 1 visitor.

**Apologies:** 8 as per register.

**Minutes:** The minutes of the previous meeting were in Watts, and were accepted. Proposed by Alméro ZS6LDP and seconded by Pete ZS6PJ.

**Matters Arising:** None.

**Finances:** The balance in the current account is now R3055.78 and R1289 in cash. R1605 subscriptions were received.

**Rallies:** Johan ZS6JHB reported that the next rally is Saturday 18 July at Cullinan Zonderwater and that he needs 4 field stations a 3 mobile stations.

**Flea Market:** The next PARC flea market will be held on 1 August at the PMC premises starting at 08:00. It was recommended and agreed that the PARC AGM be held after the flea market at the same venue at about 11:30. A bring and braai will follow the AGM and the club will provide salads. There is rugby at Loftus on 8 August (the diarised date for the AGM), although the international match is in Cape Town.

**Social:** There will be a bring and braai after the AGM meeting.

**Technical:** The repeater is working. Interference comes and goes, especially after rain. The noise floor at Radclif has improved..

**General:** None.

**Next meeting:** The next meeting will be the AGM on Saturday 1 August 2009 after the flea market at about 11:30. The meeting closed at 20:40.

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## Editorial

This electronic issue is now going into its 6<sup>th</sup> year and I ask myself why we still have 40% of our members receiving the paper issue. The printing, folding and inserting into envelopes in such quantity and mailing costs are quite a burden on our people and resources. If any of our members receiving paper WATTS have in the meantime access to email then please advise us so that we can reduce the snail mails. WATTS will reach you more reliably and look a lot better in colour!

## Redaksioneel

Hierdie elektroniese uitgawe beleef tans sy 6e jaargang en ek vra myself af waarom nog steeds 40% van ons lede dit as 'n papier-uitgawe ontvang. Die drukwerk, vouwerk en die invoeg in koeverte in sulke hoeveelhede en posgeld is 'n aansienlike las op mense en hulpbronne.

As enige van u wat die papier uitgawe ontvang, in tussentyd toegang het tot e-pos dan laat ons asseblief weet daarvan sodat ons die slakkepos kan verminder. WATTS sal u meer betroubaar bereik en ook heelwat beter lyk in kleur!

## Birthdays

Aug  
Verjaarsdae



Aug  
Anniversaries  
Herdenkings

- 01 Sue ZS6SUE
- 02 Mairilese, LV van Pierre ZS6PJH
- 03 Paul ZS6BMF
- 04 Ceciël, LV van Flip ZS6BSO/ZS4GE
- 05 Hans ZR6HVG
- 05 Kara, daughter of Rita and Sarel ZS6AC
- 06 Estelle, LV van Simon ZS6AST
- 06 Edwin ZR6ESP, son of Molly ZR6MOL and Richard ZS6UK
- 07 Peggy, SW of Ed ZS6UT
- 08 Ray ZS6ALG
- 08 Marnix ZS6MCM
- 08 Tobie ZS6ZX
- 10 Anne ZS6AUL, daughter of Frances ZS6AUT
- 14 Harry ZS6HRD
- 15 Roger ZS6RJ
- 15 Samantha, daughter of Sue ZS6SUE

- 07 Peggy and Ed ZS6UT ( )
- 18 Zdena and Ivo ZS6AXT (53)
- 20 Bertha en Hans ZS6KR (43)

- 15 Molly ZR6MOL, SW of Richard ZS6UK
- 16 Marie, dogter van Poppie ZS6BCP en Hansie ZS6AIK
- 22 Neville ZRNBA
- 22 Hal ZS6WB                      23 Otto OE6OWV/ZS6OFW
- 25 Doppies ZS6BAQ
- 25 Louise, dogter van Martha Louisa en Attie ZS6REY
- 26 Sinéad, daughter of Heather and Vince ZS6BTY
- 28 Jean ZS6ARA
- 30 Jonathan, son of Sue ZS6SUE

## Joys and Sorrows | Lief en Leed

Pierre ZS6PJH was in hospital a while after a bike boo-boo  
 Ivan ZS6AUT is reportedly doing a little better  
 Richard ZS6UK is atill nursing a broken collarbone

## New members | Nuwe lede

ZS6PVT Philip I.A. van Tonder  
 ZR6SX Shaun M Hand  
 Welcome to PARC!

## Diary | Dagboek (UTC times)

- Aug 01 **PARC fleamarket**
- 01 **PARC AGM 11h30 CAT**
- 01-09 International Lighthouse / Lightship week
- 02 **SARL Phone Contest 15:00-18:30 CAT**
- 08-09 WAE CW DX Contest 00:00-23:59
- 19 Moon Contest CW / Digital / SSB 18:00-20:00
- 29-30 YO DX HF Contest 12:00-12:00
- 30 **SARL CW Contest 16:00-18:00 CAT**

## Forgot ? Vergeet

### Parc subs | Ledegeld 30-06-2009

Please remit your subs in  
 time to our treasurer or  
 by transfer to:

Betaal asb u lede-  
 geld betyds aan  
 ons tesourier of  
 per oorplasing na:

Bank : FNB  
 Branch : 25 20 45  
 Account : 546 000 426 73

Ordinary members | gewone lede R70  
 Spouses, children, pensioners R50

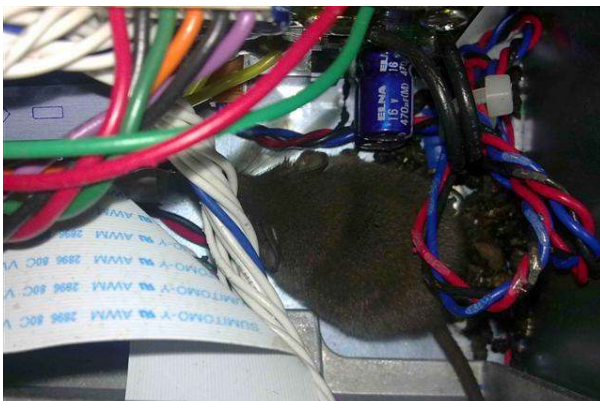
Your callsign must appear on the statement text!

### SARL Subs also due 30-06-2009

Bank : Absa                      R320 (R200 pensioners)  
 Branch : 632 005  
 Account : 407 158 8849

## Snippets | Brokkies

**Rodent damage:** Johan ZS6JEL sent this picture of the mouse that sabotaged his neighbourhood-watch repeater.



**Donkerhoek site break-in.** This site houses the 775 repeater and one of our 725 receivers. No equipment or batteries were stolen – only copper. Our receiver is now temporarily placed on Global Comms' tower.

## Waardevolle aanbod:

Ek wil graag 'n uitnodiging aan julle klublede en ander amateurs rig: Hulle kan my kontak met enige steurnis probleme wat verwant hou met RFI of TVI vanaf hulle uitsendings op enige naburige luisteraars of kykers (radio en TV ).

Ek kan ook aan so amateur 'n brief verskaf nadat ek 'n spektrum- toets gedoen het, wat verklaar dat sy uitsendings geen spurii of steurnis in die uitsaibande ( FM, TV band 3 of UHF ) veroorsaak nie.

So 'n ondersoek sal gratis aan die amateur verskaf word. Dit is veral gemik op amateurs wat in komplekse ens woon.

73 Jaap Lourens ZS6SAI Investigation Officer Sentech Ltd.

Tel: 011 471 4400 Fax: 011 471 4758 Cell: 082 085 2496 Email: lourens@sentech.co.za

## Valuable offer:

I would like to make an invitation to your club members and other amateurs. You may contact me with any complaints regarding RFI or TVI to neighbouring listeners or viewers (radio and TV)

I can also supply the amateur concerned a letter- after I have done a spectrum test, that declares that transmissions emit no spurii or interference in the broadcast bands (FM, TV band 3 or UHF)

Such investigation will be free of charge to the amateur and is especially targeted to those living in complexes.

## Hustler Modification (for stationary use) sent in by Val ZS2VJJ (ex ZS6VJJ)

Coil diameter is 35 mm.

1. Coil should be re-wound with 1,4 mm wire just to fill the space between two contacts. Coil remains cool during transmission.

2. Put over a heat-shrinking tube.

3. Using two 95-100 cm whips to make a capacitive hat like on the photo.

There are two options for mobile and stationary use:

Mobile: Standard Hustler 1,4 m must, modified coil and the capacitive hat.

Distance from the end of the coil assembly to the capacitive hat is +/- 145mm.

Matching capacitor in the base +/- 480 pF.

Stationary: Mast 2,8 m length, modified coil and the hat.

Distance to the hat is +/- 61 mm.

Matching capacitor +/- 360 pF.

That is all. Yours, Val.



## BACAR flight on 8 August

The payload includes an APRS system operating on 144,800 MHz which will be switched on 2 minutes before launch and allow APRS stations to follow the flight of BACAR. The callsign of the APR beacon is ZS6SAT. A VHF beacon on 144,825 MHz will be operating every 2 minutes for the first 30 minutes of the flight on voice, MCW and CW, for the following 119 minutes every 5 minutes and then revert to every 2 minutes. A 40 metre beacon will be operating on 7022 kHz with telemetry information every one minute. The information includes the inside and out temperature and the pressure in millibar. Visit [www.amsatsa.org.za](http://www.amsatsa.org.za) for more information.

Commentary will be carried on 7082 kHz, on 2 metres in Gauteng and on echolink and webcasting. More information will be in SARL news on 2 August. Radio Amateur submitting a telemetry line of the 40 metre transmission together with details of their location will be awarded a BACAR certificate of participation. Telemetry details must be sent to [bacar@sarl.org.za](mailto:bacar@sarl.org.za) on the day of the launch.

### QRV Tech cc offers the following services:

- General equipment repairs and calibration
- Small-scale design and manufacturing
- Technical writing
- 3<sup>rd</sup> Party scrutiny of projects and documents
- Expert TV repairs and second-hand TV sales
- MFJ 259/69 Analyzer repairs and calibration

### and products:

- Morse Reader PCB, PIC and LCD kit
  - Legal limit 40m dipole traps
  - Radio power supply OV protection kits
  - Nissei SWR/Power meters HF and VHF/UHF
  - Connectors RF and DC
  - Plug-in triple sequential industrial timer
- Contact Hans at 012-333-2612 or 072-204-3991



## Amateur Electronic Supplies

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# Vertical and Horizontal Antennas: A Performance Comparison

Author: Vincent Harrison ZS6BTY

Date: 15<sup>th</sup> June 2009

## Introduction

A comment from a newly licensed ZS, Evan ZS6ELI, about his vertical being noisy prompted a suggestion from me that he might be better off using a dipole if he could. There are a number of reasons for my comment, one of which was the reputation of verticals for picking up electrical noise.

Another reason was that although a vertical is said to have a low radiation angle (good for Dxing), the reality is that this rarely occurs, because that requires very good ground conductivity and very few verticals are mounted above sea water. With normal soil the radiation angle of a vertical is much higher than over sea water and South Africa is reputed to have poor ground conductivity.

A vertical antenna has the great virtue of being omni-directional and it is often easy to disguise it where the landlord or the body corporate gets difficult about antenna installations. In such circumstances a vertical may be the only option, but I wondered at what point it becomes worthwhile using a dipole if one is able to do so.

This article compares the performance of a typical quarter wave vertical with a horizontal dipole by simulation on 14MHz with EZNEC antenna modelling software. (EZNEC® is a registered trademark of Roy W. Lewallen.)

## Ground Properties

To start with one needs the ground conductivity in the area around the antenna. The ground directly under the antenna is not important. It is the area in the surrounding 2 km or 3 km that matters.

What is the ground like in South Africa and around Pretoria in particular? From the World Atlas of Ground Conductivity (ITU-Rec 832) comes the following map (Figure 1).

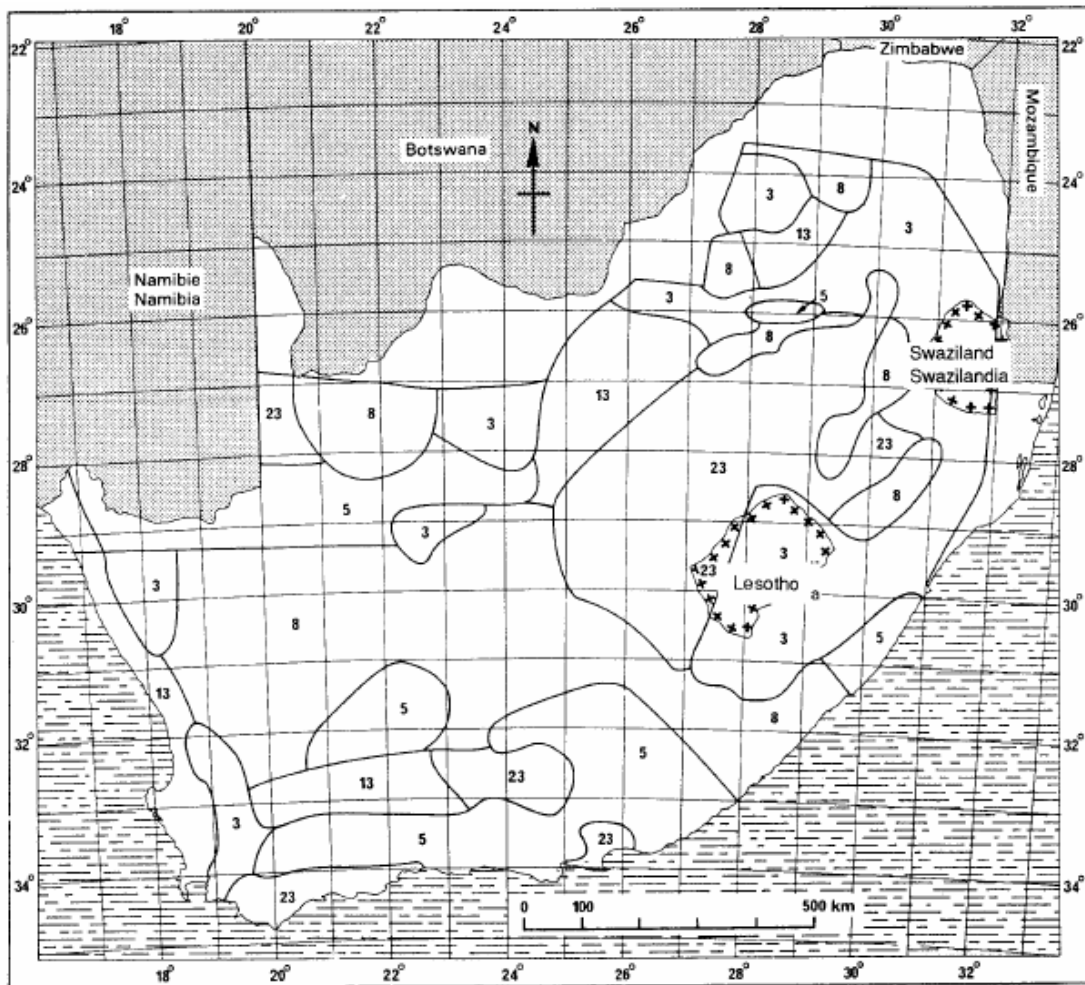


Figure 1: South African Ground Conductivity

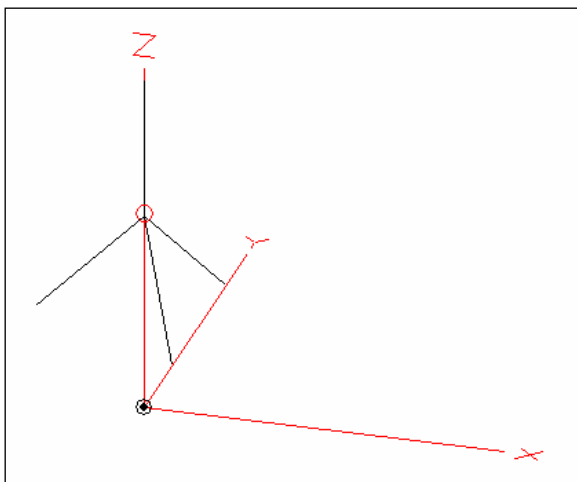
Much of Pretoria and its surroundings have a conductivity of between 3 and 5 mS/m. Table 1 shows ground properties obtained from Eznec. It seems that average might be a reasonable description of the soil in and around Pretoria.

**Table 1: Ground Properties from Eznec**

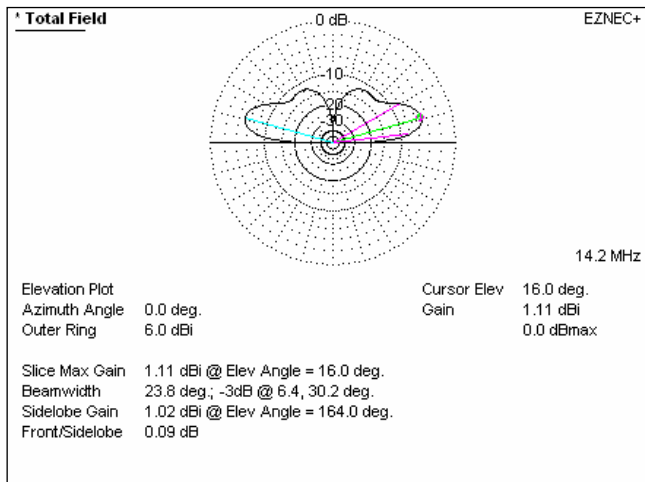
Conductivity (mS/m)	Dielectric Constant	Ground Description
1	3	<b>Extremely Poor:</b> Cities
1	5	<b>Very Poor:</b> cities, industrial
2	10	Sandy, dry
2	13	<b>Poor:</b> rocky, mountainous
5	13	<b>Average:</b> pastoral, heavy clay
6	13	Pastoral, med hills & forestation
10	14	Pastoral rich soil
30	20	<b>Very good:</b> Pastoral, rich
10	80	Fresh water
5000	81	Salt water

**Quarter Wave Vertical Performance**

A quarter wave vertical with the base at 7 m above ground and three radials is shown in Figure 2:



**Figure 2: Quarter Wave Vertical with 3 Radials**



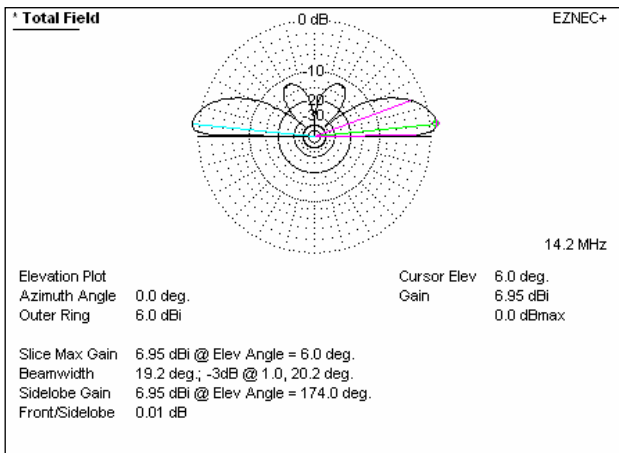
**Figure 3: Elevation pattern of a quarter wave vertical taking average ground properties in Table1.**

Figure 3 shows its predicted performance over average ground:

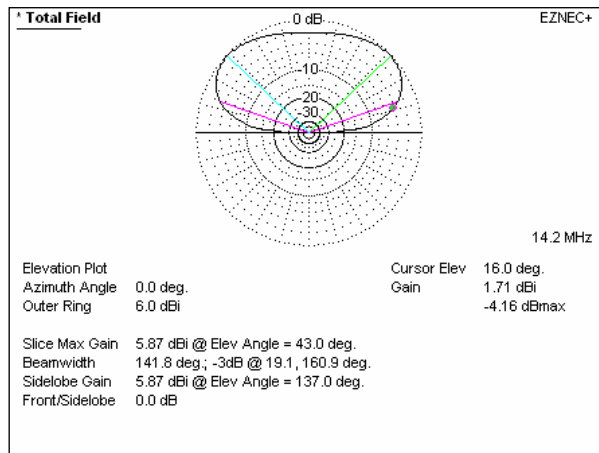
The angle of maximum radiation is 16° with a gain of 1.1 dBi.

Note: dBi means dB relative to an isotropic antenna. A half wave dipole has a gain of 2.1 dBi in free space.

Put the same antenna over sea water and you get the patterns of Fig. 4. You can see where the vertical gets its reputation for low radiation angle, but it is only really applicable over sea water. Even over good ground the radiation angle is 13° with a gain of 1.4 dB.



**Fig. 4: Vertical Ant. Elevation Pattern over Sea Water**



**Fig.5: Horizontal dipole 7m above ground Broadside elevation patterns.**

**Low Horizontal Dipole Performance**

How does the vertical compare to a low horizontal dipole? The elevation pattern of a dipole 7m above ground is shown in Fig.5.

At 16° elevation, where the vertical has its maximum gain, the horizontal dipole at the same height as the base of the vertical has slightly better gain.

This comparison is not entirely fair to the vertical antenna however. Below 16° the vertical antenna's gain does not fall as rapidly as that of the dipole, so at very low angles, the vertical does in fact outperform the dipole!

Having said that, it should be noted that both are equally poor at very low angles. To improve the dipole's low angle performance it can be raised. This is shown in Figure 6, where a dipole at 7m and a dipole at 10 m above ground are compared to a vertical.

For a modest increase in height to 10 m the dipole nearly equals the low angle performance of the vertical. It is essentially the same as the vertical at very low angles and exceeds the vertical for angles higher than 6°.

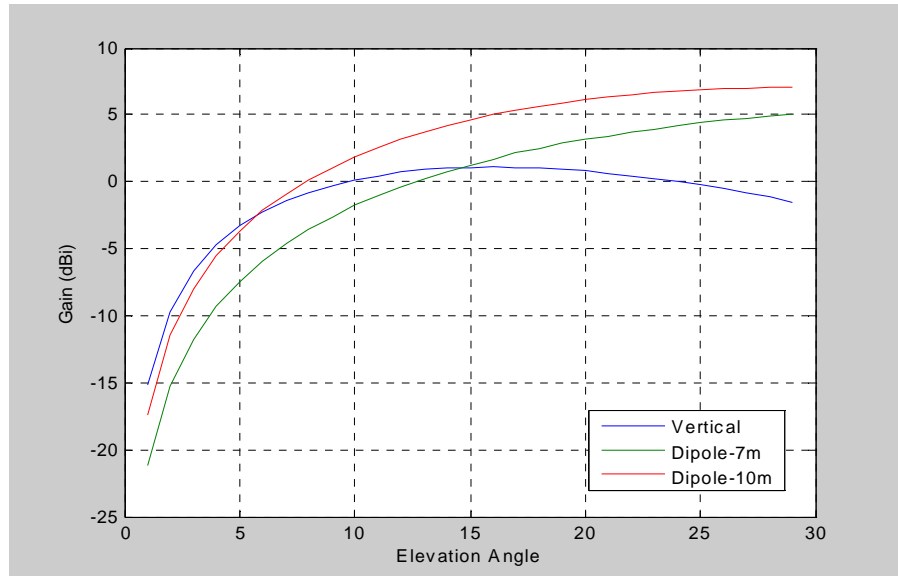


Figure 6: Low Angle Pattern Comparison

Can raising the vertical improve its performance?

The answer is "No, not significantly".

Unlike horizontal antennas, raising the vertical higher above the ground has almost no effect. Taking the base up to 10m, the peak radiation angle goes down to 14° and the low angle radiation improves by 1 dB.

For vertical antennas, the angle of maximum radiation is almost entirely determined by the ground properties, and not by the antenna geometry.

## Conclusion

The vertical antenna's reputation for low angle radiation is only deserved when it is mounted above sea water. Over land, the performance drops of significantly and a horizontal dipole at a relatively low height will outperform the vertical.

For the 20 m band, a dipole at a height of 7 m is better than the vertical at the peak radiation angle of from the vertical (16°). At very low angles, both are equally poor.

A modest increase in height to 10 m has the dipole only slightly worse off than the vertical at very low angles, and better than the vertical for angles above 6°.

The advantages of a vertical are that it is omni-directional and it can be mounted very close to the ground. It is also a quite easy to disguise in places that are unfriendly to antennas.

## Long Term HF Propagation Prediction for Aug 2009

courtesy ZS6BTY

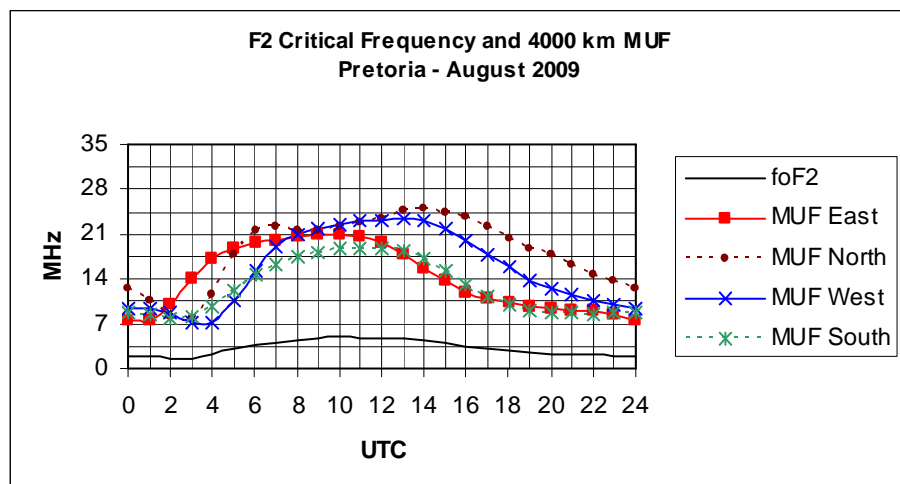
(see also our website prop tab)

### DX Operating

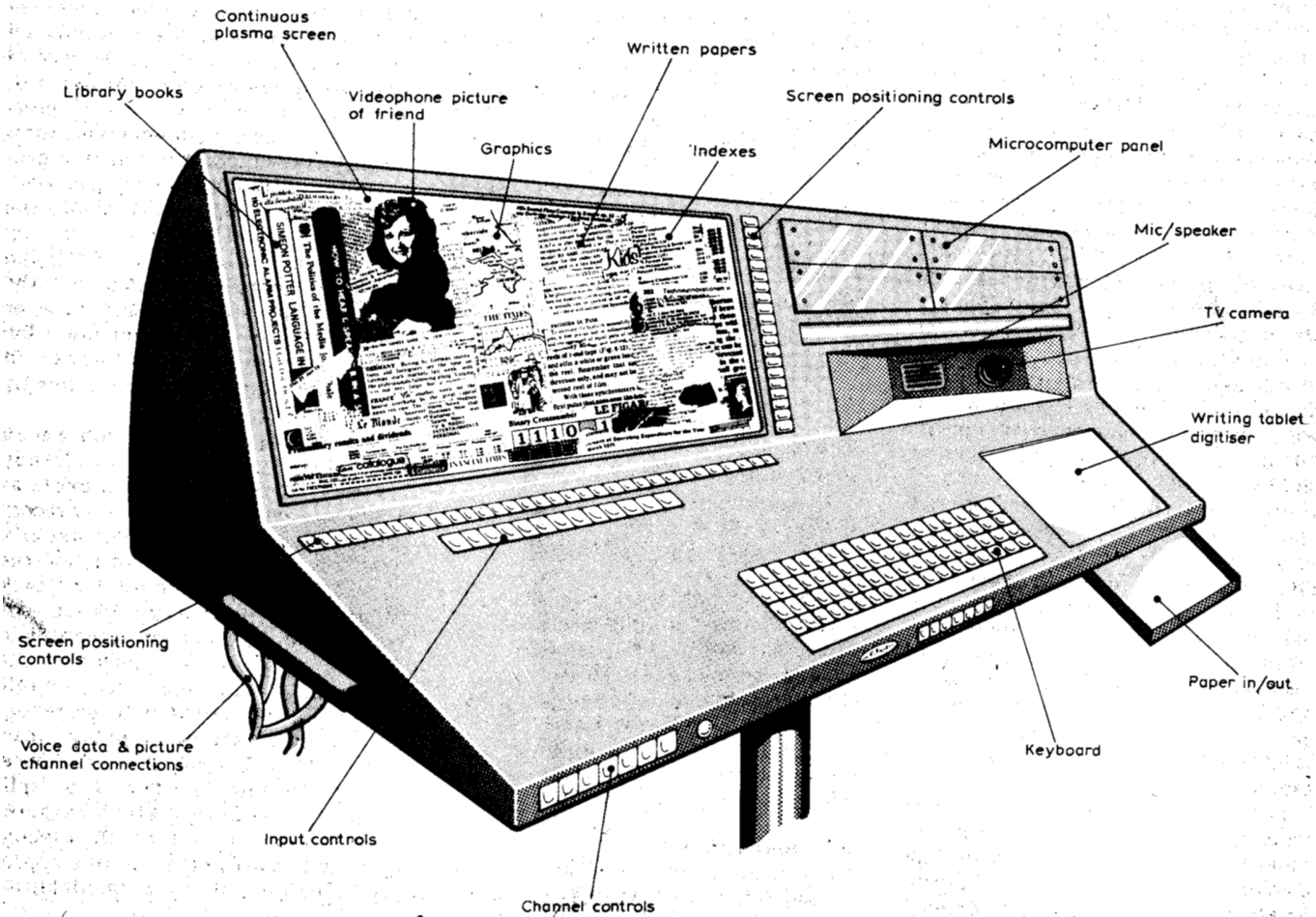
The graph shows the 4000 km maximum useable frequency (MUF) to the East, North, West and South from Pretoria for the first hop using the F2 layer.

### Local Operating

The F2 critical frequency (foF2) is the maximum frequency that will reflect when you transmit straight up. E-layer reflection is not shown.



# Internet forecast – vision of future information system – WW July 1978



## The paperless revolution – the “Consumersole”

"The rate at which electronic information systems will take over from paper depends on technological and social factors. Electronic information systems are expected to develop more quickly in non-domestic areas where incentives and economics are more favourable.

Social forces, such as unemployment, disruption of social activity, fears about intrusion, secrecy, the control of information sources and fears about 'machines taking over' will slow down the introduction of the technology. Engineers should make it their business to understand the issues and publicise the accumulating evidence about trends in this revolution.

The drawing represents an information console as it may exist in any home, or with slight modifications, in any office or workplace in the year 2000. Many human activities involve information processing, and nearly all of them could be performed without leaving the console"

### Engineers – dating and social life

Dating is never easy for engineers. A normal person will employ various indirect methods to create a false impression of attractiveness. Engineers are however incapable of placing appearance above function.

Fortunately engineers are widely recognized as superior marriage material: intelligent, dependable, employed, honest and handy around the house. While it is true that many normal people would prefer not to date an engineer, most will harbor an intense desire to mate with them, thus producing engineer-like children who will have high paying jobs long before losing their virginity.

Male engineers mostly become erotic dynamos in their mid-thirties to late forties. Look at Bill Gates or MacGyver.

Female engineers become irresistible at the age of consent and remain that way until about thirty minutes after their clinical death. Longer if it is a warm day.

### The many qualities of a crossed yagi...

