



ZR6FD logo

Drukwerk Papier / paper  
printing Errol ZR6VDR  
ZS6JPL

# WATTS

11 - 2006

Year 76+11m

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

✉ PARC, PO Box 73696 Lynnwood Ridge 0040, RSA

web <http://www.zs6pta.org.za> e-mail: [zs6pta@qsl.net](mailto:zs6pta@qsl.net)

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

Relays : 1840, 3700, 7066, 10135, 14,200 MHz (Seasonal)

Swapshop : After bulletin 2m and 40m (also on-line)

Bulletin repeats : Mondays 19:45 on 145,725 MHz only

## Die hok van Nico ZR6VT

– nog fotos op bl. 4



### In this issue

- Editorial
- Member news
- Shack pix
- WEE and ROHS
- Technical Time and Frequency
- Let's go complex part 7
- Page eight

### in hierdie uitgawe

- Redaksioneel
- Ledenuus
- Hokfotos
- Tegnies
- Bladsy agt

### Next Meeting 1 Nov. 2006

Time: 19:30 for 20:00  
PARC Clubhouse,  
South Campus,  
University of Pretoria.  
SE cnr University and  
Lynnwood roads.

## PARC Management team / Bestuurspan Aug 2006- Aug 2007:

Committee members

<b>Chairman,</b> SARL liason, Fleamarkets	Alméro Dupisani	ZS6LDP	<a href="mailto:almero.dupisani@up.ac.za">almero.dupisani@up.ac.za</a>	012-567-3722	082-908-3359
<b>Vice Chairman, Secretary</b> Rallies, Social, Hamnet	Johan de Bruyn	ZS6JHB	<a href="mailto:johandbr@absa.co.za">johandbr@absa.co.za</a>	012-803-7385	082-492-3689
<b>Treasurer,</b> Database, DF hunts	Richard Peer	ZS6UK	<a href="mailto:zs6uk@peer.co.za">zs6uk@peer.co.za</a>	012-333-0612	082-651-6556
<b>Public relations</b>	Craig Symington	ZS6RH	<a href="mailto:craigsym@global.co.za">craigsym@global.co.za</a>	012-997-4504	083-259-3233
<b>Repeaters, Technical</b>	Pine Pienaar	ZS6OB	<a href="mailto:janpienaar@ananzi.co.za">janpienaar@ananzi.co.za</a>	012-345-1801	082-447-7823

Co-opted / Geko-opteer:

<b>Repeaters, technical</b>	Johan Lehmann	ZS6JPL	<a href="mailto:jlehmann@csir.co.za">jlehmann@csir.co.za</a>	012-804-6173	083-300-8677
	Hans Gurtel	ZR6HVG	<a href="mailto:adele123@absamail.co.za">adele123@absamail.co.za</a>	082-940-0623	082-940-0623
	Pieter Human	ZR6AHT	<a href="mailto:humanp@telkom.co.za">humanp@telkom.co.za</a>	012-800-2888	082-565-6081
<b>Repeater Maintenance</b> (70cm)	Willie du Plessis	ZS6AEA	<a href="mailto:hesterdup@webmail.co.za">hesterdup@webmail.co.za</a>	012-565-5555	083-653-2101
<b>Auditor</b>	Position open				
<b>Newsletter/Kits</b>	Hans Kappetijn	ZS6KR	<a href="mailto:zs6kr@wbs.co.za">zs6kr@wbs.co.za</a> /arrl.net	012-333-2612	072-204-3991
<b>Asset control</b>	Andre v Tonder	ZS6BRC	<a href="mailto:andre.vtonder@absamail.co.za">andre.vtonder@absamail.co.za</a>	361-3292	082-467-0287
<b>Tydrenne/Rallies</b>	Johann de Beer	ZR6YV		011-918-1060	082-857-1561
<b>Klubfasiliteite, vlooiemark</b>	Willie Greyling	ZR6WGR	<a href="mailto:willie@up.ac.za">willie@up.ac.za</a>		082-940-2490
<b>Webmaster</b>	Edwin peer	ZR6ESP	<a href="mailto:zr6esp@peer.co.za">zr6esp@peer.co.za</a>	012-333-0612	
<b>Hamnet, projects</b>	Roy Newton	ZS6XN	<a href="mailto:newtonr@telkomsa.net">newtonr@telkomsa.net</a>	012-547-0280	
<b>Morse testing</b>	Position open				
<b>Historian/Awards</b>	Tjerk Lammers	ZS6P	<a href="http://zs6p@iafrica.com">zs6p@iafrica.com</a>	012-809-0006	
<b>Public Relations</b>	Jaco Lubbe	ZR6JLL			082-494-1959
	Thobile Koni	ZS6TKO	<a href="mailto:toko40@mweb.co.za">toko40@mweb.co.za</a>		082-493-2483
<b>Tea</b>	Molly Peer	ZR6MOL	<a href="mailto:molly@peer.co.za">molly@peer.co.za</a>	012-333-0612	
	Doreen de Bruyn	ZR6DDB		012-803-7385	

## Minutes of the monthly club meeting of the Pretoria Amateur Radio Club held at the South Campus of the University of Pretoria on 4 Oct. 2006

**Welcome:** Almero ZS6LDP declared the meeting open and welcomed all who attended.

**Attendance:** The meeting was attended by 20 members. No visitors. Apologies were received from Hal ZS6WB, Edwin ZR6ESP, Hillary ZR6HAP, Nico ZR6VT, Joe Katzman ZS6TB, Andre van Tonder ZS6BRC, Pierre Holtshauzen ZS6PJH, Craig Symington ZS6RH and Martinho ZS6BQP.

**Personal Matters/Lief en leed:** Mary Ingleson, sw of Bill ZS6KO to under go an operation .

**Matters arising from previous minutes:** None .

**Minutes of previous meeting:** The minutes of the previous meeting were approved. Proposed by Richard ZS6UK and seconded by Alf ZS6ABA .

### Club Activities/ Klub Bedrywighede

**Rallies/Tydrenne :** Johan ZS6JHB – Volgende tyden – 21/22 Oktober 2006 - Tzaneen Tyden – tyden gaan oor 14 sneltrajekte beslis word in die Tzaneen omgewing . – Johan het lede wat gaan help met kommunikasie bedank vir hulle bereidwilligheid. Daar is n "off road " byeenkoms 'n week na die Tzaneen tyden en lede wat daar behulpsaam kan wees kan Johan ZS6JHB skakel by 082-492-3689 .

**Sosiaal / Sosiaal :** Johan ZS6JHB – Volgende sosiale byeenkoms na afloop van die Jakkalsjag. Die plek waar gebraai gaan word sal later bekend gemaak word

**DF Hunt / Jakkalsjag :** Richard ZS6UK – DF hunt 14 October 2006. Starting time 14.00 at the Botanical Gardens in Silverton .

**Financial report/Finansies :** Richard ZS6UK – reported on finances of club .

**Fleamarket / Vlooiemark :** Almero ZS6LDP – Next fleamarket - 11 th November 2006 at premises of PARC .

**Technica // Tegnies :** Pine ZS6OB – Repeater – still investigating other sites. Tegniiese praatjie op Maandag aande na die heruitsending van die klub bulletin.

**General / Algemeen.** Hans ZS6KR – reminded members of the second leg of SARL Field Day Contest in November.

RAE - Venue is the John Vorster Technical High School .

Johan ZS6JPL – ZU licences – classes to start soon – information available on SARL website .

**Next meeting / Volgende vergadering :** 1 November 2006 .

**Presentation / Aanbieding :** Thanks to Johan ZS6JPL for his presentation on IRLP and Echolink.

## Editorial

From what I have thus far gathered about membership renewal figures for the current FY, it seems that we are again in the same boat as every year has been the case. Up to 20-30% of previous members are blissfully unaware that they have lost continuous membership as from this month. This newsletter has now only gone out to paid-up members and within one or two months some will rejoin. This places added administration on our treasurer, database and distribution process, not to mention a loss of income. Although I am preaching to the converted, your committee would appreciate your help in canvassing any lost sheep you may be aware of and so hasten the re-unification process. It is so important that amateur radio clubs, being the lowest level in the hierarchy, be healthily supported, as their affiliation to the SARL strengthens the cause for Amateur Radio.

## Redaksioneel

Van wat ek onlangs oor ons ledetal hernuwings-syfers verneem het vir die huidige FJ, lyk dit weer dat ons in die selfde bootjie is soos elke jaar die geval is. Tot 20-30% van ons lede is salig onbewus dat hulle aaneenlopende lidmaatskap verloor het vanaf hierdie maand. Hierdie nuusbrief is nou slegs aan opbetaalde lede gepos en binne een of twee maande sal party weer aansluit. Dit plaas 'n ekstra las op ons tesourier, databasis en verspreidingsproses, om nie van verlore inkomste te praat nie. Alhoewel ek nou preek vir die wat alreeds orgehaal is, sal u komitee dit waardeer as u kan help om verlore skape op te trommel en sodoende die herenigings proses te verhaas. Dit is so belangrik dat amateur radio klubs, wat die laagste vlak in die hierargie is, goed ondersteun word, want hulle affiliasie met die SARL versterk die saak vir Amateur Radio.

## Birthdays

## Verjaarsdae

Nov



02 Hennie ZR6LOM  
 03 Blaine, son of Heather and Vince ZS6BTY  
 05 Jan ZR6BKL  
 06 Brian ZR6BJS  
 06 Aba/Frederic ZR6CAB  
 06 Sollie ZS6SV  
 07 Adele, lv van Hans ZR6HVG  
 07 Gerhardt, seun van Bernice en Pieter ZR6KSA  
 07 Andrew, seun van Lynn en Andre ZS6BRC  
 09 Alta, sw of Johnny ZS6BAJ  
 10 Luther ZS6E (96)  
 11 Peggy, sw of Ed ZS6UT  
 16 Jean, dogter van Lynn en Andre ZS6BRC

Nov

## Anniversaries Herdenkings

04 Estelle en Simon (34)  
 11 Aletta en Alf ZS6ABA (39)

16 Hendrik ZR6RPC  
 16 Vlasta ZS6-2501, sw of Ivan ZS6CCW  
 19 Joe ZS6TB  
 22 Heila, sw of Melvyn ZS5MF  
 22 Chris ZS6BGH  
 22 Caitlin, daughter of Heather and Vince ZS6BTY  
 27 Janice, dogter van Ellen en Joe ZS6AIC

## Afleegevoel

Ons meegevoel gaan uit aan die familie van **Jan Wessel Grey** ZR6BKL wat stil sleutel geword het op Woensdag 11 Oktober. Jan was 'n ware klublid en sy kenmerkende stem sal gemis word.

## Sick Parade | Krukkelys

**Mary**, sw of Bill ZS6KO has undergone a back operation **Suzette**, jongste dogter in die van Wyk familie het ook 'n rugoperasie ondergaan.

## PARC Diary | Dagboek

<b>Nov</b>	05	National Marine Day		18-19	LZ DX Contest
	11-12	OK/OM CW Contest 12Z-12Z		25-26	CQWW DX CW Contest
	11	Armistice Day		27	Closing date for HF Field Day logs
	12	Remembrance Sunday		30	Closing date for SARL AGM motions and Council nominations
	18	RSGB 2 <sup>nd</sup> 160m CW Contest	<b>Dec</b>	01	Schools close
	18-19	All-Austrian 160m Contest 16Z-07Z		01-03	ARRL 160m 22Z-16Z
	18-19	SARL HF Field Day		<b>06</b>	<b>PARC Club Meeting</b>

## Snippets | Brokkies

- **Note our club e-mail is now [zs6pta@qsl.net](mailto:zs6pta@qsl.net) and our website relocated to [www.zs6pta.org.za](http://www.zs6pta.org.za) courtesy of our webmaster Edwin ZR6ESP and Richard ZS6UK. Some work still needs to be done.**
- 18 candidates of the DOC trained by PARC will attempt the RAE
- Johan ZS6JPL gaan 'n kursus vir die ZU lisensie aanbied in Afrikaans. Kontak hom vir besonderhede. Die inhoud kan afgelaai word vanaf die SARL webwerf.
- On 14 Oct. the foxhunt again resulted in no fox. Johan ZS6JHB is still not letting on where he hides. Better luck next time! A bring and braai took place afterwards at the home of Pierre ZS6PJH.
- **Malcolm ZR6OLM gets his wings – see below**



**Malcolm ZR6OLM proudly showing his wings standing next to the Jabiru aircraft ZU-JOS in which he did his solo flight.**



**Malcolm receiving the traditional "cooling off" of the Montana High School Flight Academy after his solo.**

The academy is situated at Wonderboom Airport. He is the second student pilot of the academy to go solo but is the first radio amateur at the school, who is doing flight training, to have gone solo. The second amateur at the Montana High School is Bredon van Schoor, ZR6BRE who studied with Malcolm for the ARE at PARC. Malcolm has also recently been elected as a member of the "student's representative council" for Montana High School.

## Shack snaps from Nico ZR6VT



**From  
Vince  
ZS6BTY:  
completed  
Elecraft  
K2 (and  
some nice  
well-  
maintained  
operational  
oldies  
overhead)**

## WEEE and ROHS

( gleaned from Dataweek 4 Oct 2006 )

The European Directive WEEE (Waste from Electrical and Electronic Equipment) attempts to make the recovery and recycling of electrical and electronic equipment easier and less cost-prohibitive. The goal is to encourage designers and manufacturers to create products with recycling in mind, which will lower the amount of hazardous materials in landfills.

ROHS (Restriction of Hazardous Substances) is further legislation supporting the WEEE initiative by prohibiting use of the following materials from electronic devices:

1. Polybrominated diphenyl ethers (PBDE's)
2. Polybrominated biphenyls (PBB's)
3. Hexavalent Chromium Cr(VI)
4. Cadmium (Cd)
5. Mercury (Hg)
6. Lead (Pb) (less than 100ppm Pb by weight)

Components, solder, and other material that remain on electrical devices and electronic equipment need to be free of these specific materials if the end-products are intended to be sold in Europe as from June 2006. The impact on manufacturing and reworking PCB's has been world-wide. The electronic industry has been forced to develop lead-free soldering alternatives. New solders based on tin-silver-copper or tin-copper all have high melting points:

- Hand-solder tips must be heated to 399°C instead of 260°C
- SMT ovens must heat PCB's over 316°C instead of 260°C
- PCB's must be heated for a longer time
- Fluxes need to be more active, increasing the caustic nature of residues.

The degradation of hand-solder tips is dependent on the following:

- Contact with liquid solder, metallic reaction, dissolution: The high tin content is the key factor that increases the dissolution rate. The metallic and chemical destruction of soldering tips is also a question of temperature. 400-500 hrs life can be expected from a tip with 200µm steel cladding excluding the factors below:
- Contact with flux, chemical reaction, corrosion.
- Abrasion due to cleaning and soldering surfaces, mechanical damage.

Proprietary micro-alloy soft solders have minute additives of cobalt and ferrous elements to reduce dissolution rates and are less aggressive towards equipment and materials. Fluxes with a high resin content provide the best protection in machine- and copper-bit soldering. All in all, the lifetime of soldering machines and tools will be degraded. Soldering parameters for soldering processes have to be carefully reconfigured so as to optimize lifetime and not affect the reliability of components and PC boards.

---

## TIME AND FREQUENCY

Summary by ZS6KR

"Currently the stage has now been reached where the rotation of the earth is no longer a standard of time, because we can make clocks which are so much more accurate... the earth has been demoted to a short-term clock" *William Finsen, Union (Republic) Observatory, unpublished interview mid-70's*. The following is an extract from *The National Metrology Laboratory of South Africa – the first 50 years. By M.McDowell*.

South Africa's National Time Service commenced in 1908 when an hourly time signal was sent to the Johannesburg Post Office. Time was determined astronomically to 0,25 second accuracy, but as nightly observations were impossible, the time signal (dependent on pendulum clocks) could be up to 8 seconds early or late. In 1912 the service was extended to Natal, and at noon every day, a time ball on the bluff at Durban was made to drop on a signal from Johannesburg. During 1927 the first hour signals (a 10sec dash) were sent to the then African Broadcasting Company and 1934 saw the introduction of the familiar 'six pips' signal, broadcast by the Johannesburg station, which was very seldom in error by more than 0,1 seconds. The war years and local experiments with SW radio resulted in clocks being rated more accurately using the contiguous signals from WWV (Washington) in 1942. By 1945 quartz clocks evolved and demand for accurate time increasingly came from physicists and engineers, who were interested in its inverse, frequency, rather than the period.

During the war years the SABC was sending the blips on the hour, and the way they did this was to open the window and listen for the chimes of the Post Office clock. Apparently the PO in turn set their clocks using the blips on the radio!

By May 1949 the SABC commenced direct radio transmission of time signals during periods when not in use for other broadcasts. Soon afterwards, a 100W transmitter on 5MHz began 24hr operation from the Union Observatory, being allocated the callsign ZUO. Its basis of time was a quartz crystal clock. Every second a pulse, consisting of 1000Hz tone, was transmitted 100ms, except on the 59<sup>th</sup> second of every minute, when the pulse was omitted. During 1957 the Post Office took over the 5MHz at 4kW and the Observatory changed to 10MHz. The tone was reduced to 5ms duration. Accuracy to WWV was within 20ms.

In the late 1950's involvement in the US space programme required that tracking stations be able to reference to each other and in 1960 South Africa was requested to join in the international time coordination scheme. The ZUO signal was given a step adjustment on 1 Dec.1960 to bring it in line with the US Naval Observatory and was thereafter kept within 1 ms of other international stations. With the introduction of the Caesium standard in 1966 the ZUO frequencies were derived directly from the Standard and broadcast without offset. A portable caesium clock was brought from the US Naval Observatory and ZUO was phased in to bring it in line.

In 1972 the national time standard was transferred to the Precise Physical Measurements division of the CSIR (PPM) in Pretoria and the SABC accepted full responsibility for ZUO. For decades ZUO was still the only such station in Africa. It was also one of only four world stations which operated 24hrs, making it a major international time and frequency transmitter based on a single caesium clock! ZUO ceased transmissions in 1989 for several reasons, the most significant being that the transmitters were obsolete. A new, PC based telephone time service (TTS) had been developed and timeously replaced ZUO. This was operated by the National Metrology Laboratory (NML) in Pretoria and directly linked to the National Time Standard at the PPM, providing subscribers with a time resetting facility accurate to 1ms.

The introduction of UTC (Universal Co-ordinated Time) was heralded to the public by the Pretoria News in June 1972 stating that "at the end of this month every clock in the world should be turned back one second.. South Africa will be kept on time by a special time Standards Section of the CSIR.." Comparisons between laboratories over the world using portable caesium standards were now also normal procedure for several years. The advent of GPS however changed time standardization for ever. The national time standard is still an atomic clock, but it is calibrated daily using GPS to a precision of some 10ns, with a frequency coordination better than 0,1 PPB.

# !NOT AMATEUR COUNTRY PREFIXES! but INTERNET COUNTRY CODES:

AD ANDORRA	CU CUBA	ID INDONESIA	MT MALTA	SK SLOVAKIA
AE UN ARAB EMIRATES	CV CAPE VERDE	IE IRELAND	MU MAURITIUS	SL SIERRA LEONE
AF AFGHANISTAN	CX CHRISTMAS ISLAND	IL ISRAEL	MV MALDIVES	SM SAN MARINO
AG ANTIGUA AND BARBUDA	CY CYPRUS	IN INDIA	MW MALAWI	SN SENEGAL
AI ANGUILLA	CZ CZECH REPUBLIC	IO BRIT IND OCEAN TERR	MX MEXICO	SO SOMALIA
AL ALBANIA	DE GERMANY	IQ IRAQ	MY MALAYSIA	SR SURINAME
AM ARMENIA	DJ DJIBOUTI	IR ISLAMIC REP OF IRAN	MZ MOZAMBIQUE	ST SAO TOME AND PRINCIPE
AN NETHERLANDS ANTILLES	DK DENMARK	IS ICELAND	NA NAMIBIA	SV EL SALVADOR
AO ANGOLA	DM DOMINICA	IT ITALY	NC NEW CALEDONIA	SY SYRIAN ARAB REPUBLIC
AQ ANTARCTICA	DO DOMINICAN REPUBLIC	JM JAMAICA	NE NIGER	SZ SWAZILAND
AR ARGENTINA	DZ ALGERIA	JO JORDAN	NF NORFOLK ISLAND	TC TURKS AND CAICOS ISL
AS AMERICAN SAMOA	EC ECUADOR	JP JAPAN	NG NIGERIA	TD CHAD
AT AUSTRIA	EE ESTONIA	KE KENYA	NI NICARAGUA	TF FRENCH S. TERRITORIES
AU AUSTRALIA	EG EGYPT	KG KYRGYZSTAN	NL NETHERLANDS	TG TOGO
AW ARUBA	EH WESTERN SAHARA	KH CAMBODIA	NO NORWAY	TH THAILAND
AZ AZERBAIJAN	ER ERITREA	KI KIRIBATI	NP NEPAL	TJ TAJIKISTAN
BA BOSNIA AND HERZEGOVINA	ES SPAIN	KM COMOROS	NR NAURU	TK TOKELAU
BB BARBADOS	ET ETHIOPIA	KN SAINT KITTS AND NEVIS	NU NIUE	TM TURKMENISTAN
BD BANGLADESH	FI FINLAND	KP DEM PEOPLE'S REP KOREA	NZ NEW ZEALAND	TN TUNISIA
BE BELGIUM	FJ FIJI	KR REPUBLIC OF KOREA	OM OMAN	TO TONGA
BF BURKINA FASO	FK FALKLAND ISL (MALVINAS)	KW KUWAIT	PA PANAMA	TP EAST TIMOR
BG BULGARIA	FM FED STATES OF MICRONESIA	KY CAYMAN ISLANDS	PE PERU	TR TURKEY
BH BAHRAIN	FO FAROE ISLANDS	KZ KAZAKSTAN	PF FRENCH POLYNESIA	TT TRINIDAD AND TOBAGO
BI BURUNDI	FR FRANCE	LA LAO PEOPLE'S DEM REP	PG PAPUA NEW GUINEA	TV TUVALU
BJ BENIN	GA GABON	LB LEBANON	PH PHILIPPINES	TW TAIWAN
BM BERMUDA	GB UNITED KINGDOM	LC SAINT LUCIA	PK PAKISTAN	TZ UNITED REP OF TANZANIA
BN BRUNEI DARUSSALAM	GD GRENADA	LI LIECHTENSTEIN	PL POLAND	UA UKRAINE
BO BOLIVIA	GE GEORGIA	LK SRI LANKA	PM ST PIERRE & MIQUELON	UG UGANDA
BR BRAZIL	GF FRENCH GUIANA	LR LIBERIA	PN PITCAIRN	UM US MINOR OUTLYING ISL
BS BAHAMAS	GH GHANA	LS LESOTHO	PR PUERTO RICO	US UNITED STATES
BT BHUTAN	GI GIBRALTAR	LT LITHUANIA	PS OCC PALEST TERRITORY	UY URUGUAY
BV BOUVET ISLAND	GL GREENLAND	LU LUXEMBOURG	PT PORTUGAL	UZ UZBEKISTAN
BW BOTSWANA	GM GAMBIA	LV LATVIA	PW PALAU	VA VATICAN CITY STATE
BY BELARUS	GN GUINEA	LY LIBYAN ARAB JAMAHIRIYA	PY PARAGUAY	VC ST VINCENT & GRENADINES
BZ BELIZE	GP GUADELOUPE	MA MOROCCO	QA QATAR	VE VENEZUELA
CA CANADA	GQ EQUATORIAL GUINEA	MC MONACO	RE REUNION	VG BRITISH VIRGIN ISLANDS
CC COCOS KEELING ISL'S	GR GREECE	MD REPUBLIC OF MOLDOVA	RO ROMANIA	VI U.S. VIRGIN ISLANDS
CD DEM REP OF CONGO	GS S GEORGIA/SANDWICH ISL'S	MG MADAGASCAR	RU RUSSIAN FEDERATION	VN VIET NAM
CF CENTR AFR REPUBLIC	GT GUATEMALA	MH MARSHALL ISLANDS	RW RWANDA	VU VANUATU
CG CONGO	GU GUAM	MK MACEDONIA	SA SAUDI ARABIA	WF WALLIS AND FUTUNA
CH SWITZERLAND	GW GUINEA-BISSAU	ML MALI	SB SOLOMON ISLANDS	WS SAMOA
CI COTE D'IVOIRE	GY GUYANA	MM MYANMAR	SC SEYCHELLES	YE YEMEN
CK COOK ISLANDS	HK HONG KONG	MN MONGOLIA	SD SUDAN	YT MAYOTTE
CL CHILE	HM HEARD AND MCDONALD ISL	MO MACAU	SE SWEDEN	YU YUGOSLAVIA
CM CAMEROON	HN HONDURAS	MP NORTHERN MARIANA ISL	SG SINGAPORE	ZA SOUTH AFRICA
CN CHINA	HR CROATIA	MQ MARTINIQUE	SH SAINT HELENA	ZM ZAMBIA
CO COLOMBIA	HT HAITI	MR MAURITANIA	SI SLOVENIA	ZW ZIMBABWE
CR COSTA RICA	HU HUNGARY	MS MONTSERRAT	SJ SVALBARD AND JAN MAYEN	

## Long Term HF Propagation Prediction for Oct. 2006

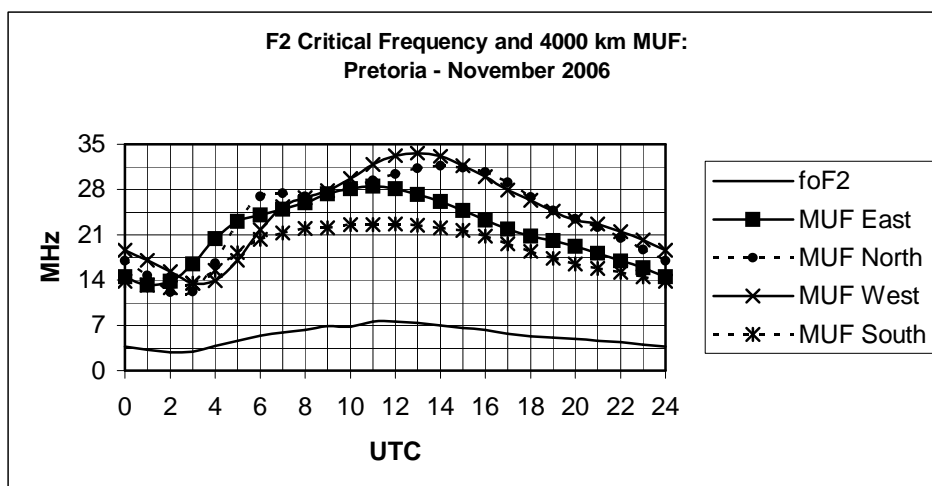
Vince ZS6BTY

### 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.



13. REFLECTION AND STANDING WAVES

We know from Section 9 that an incident wave undergoes a reduction in amplitude and change of phase as it travels from source to load. If the incident energy is not fully absorbed by the load, the remainder will return back to the source and the process will repeat until the energy is fully dissipated. Fig.23 below is an alternative way of illustrating the amplitude phenomenon.

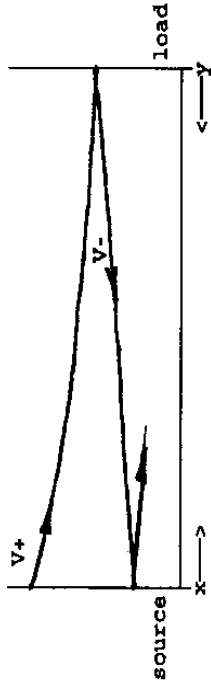


Fig.23 reflection process

Using the subscripts s (send) and r (receive) the voltage can, at any point x on the line be expressed as

$$Vx+ = Vs+ \cdot e^{-\phi x} + Vr+ \cdot e^{+\phi y} \quad [38]$$

Similarly for the reflected wave

$$Vx- = Vr- \cdot e^{-\phi y}$$

This leads to the definition of a REFLECTION COEFFICIENT

$$\Gamma = \frac{Vx-}{Vx+} \text{ which is a complex quantity [39]}$$

It can further be proved that at the load

$$\Gamma_r = \frac{Zl - Z0}{Zr + Z0} \quad [40]$$

The impedance at any point x

$$Zx = \frac{1 + \Gamma x}{1 - \Gamma x} \quad [41]$$

The VOLTAGE STANDING WAVE RATIO

$$S = \frac{Vmax}{Vmin} = \frac{1 + |\Gamma|}{1 - |\Gamma|} \quad [42]$$

S values >1 indicate the presence of standing waves and thus a loss of power at the load due to reflected power not being absorbed. The table below shows the extent:

S	Pload %	Plost %	loss in dB
1	100	0	0
1,25	98,8	1,2	0,1
1,50	96	4	0,2
2	89	11	0,5
3	75	25	1,3

13.1 USEFUL RELATIONSHIPS FOR 'LOSSLESS' LINES

The attenuation constant is considered zero and, if we also assume non-complex loads ie: resistive terminations we can make some important deductions. Firstly a properly matched line will have a constant potential all along the line as shown in fig.23



Fig.23 No reflection

A mismatched line will exhibit a standing wave with a constant amplitude dependent on the amount of mismatch as determined by the reflection coefficient in [41].

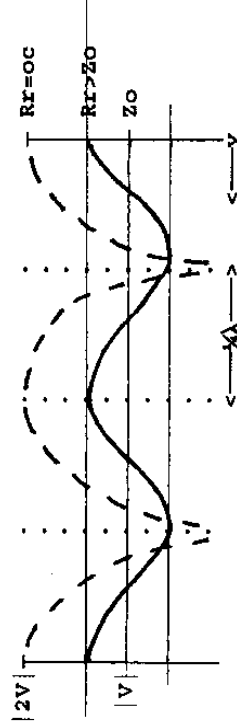


Fig.24 Reflection on a lossless line

Some VERY IMPORTANT RELATIONSHIPS emerge as tabled below:

	Rr>Z0	Rr<Z0
1st Vmax at	Y=0	Y=λ/4
1st Vmin at	Y=λ/4	Y=0
SWR at load	Rr/Z0	Z0/Rr
Vmax maximum	twice Vs	every λ/4
Load 'repeats'	every λ/4	every λ/4
Zmax at Vmax	Z0*SWR	Z0/SWR
Zmin at Vmin	Z0/SWR	Z0/SWR

## TWO-WAY RADIO FOR VEHICLES

**U**ITENHAGE will be the first town of its size in the Union to install two-way radio in general use in municipal vehicles. Permission was given last month by the Post Office for the Municipality to go ahead with this project.

A frequency has been allotted by the Post Office, which has also agreed to licence the equipment, which is being put out to tender.

There will be a central station serving five receiving and transmitting sets in municipal vehicles—one on the works forman's car and one in each of two electricity and waterworks department lorries.

OCTOBER 1956

1925

## The Radio Apparatus Co. —of South Africa, Ltd.—

3, 13 and 18 Old Arcade (opp. Town Hall)

JOHANNESBURG

Phone 4093

Tel.: "Radiola"

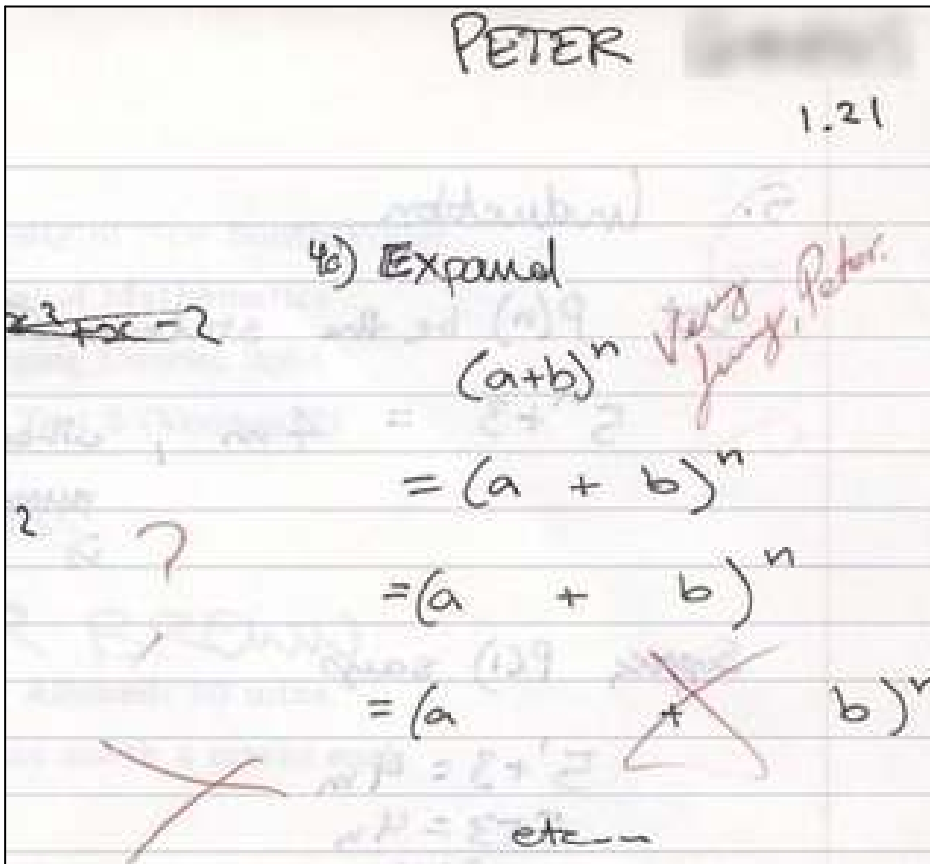
P.O. Box 3295

### Latest Arrivals of New Goods:

Igranic 30 ohm Rheostats	7/9
Dubilier .0001 Fixed Condenser	3/6
American Ever-Ready High Tension Batteries, Heavy Discharge Type, 22½ volts.	13/-
Lissen L.F. Transformers: T1 37/6, T2 30/-, T3 20/-	
Lissen Reaction-Reverse and 5-point Switches	5/- each
American 9-1 ratio L.F. Transformers for reflex and unidyne circuits	21/-
American Loud Speaker (Gramophone Attachment)	27/6

Send for 6th Edition of our Price List just published.

OUR MOTTO "SERVICE WITH EXPERT ADVICE"



## FROM THE 1500's

Most people got married in June because they took their yearly bath in May, and still smelled pretty good by June. However, they were starting to smell, so brides carried a bouquet of flowers to hide the body odor. Hence the custom today of carrying a bouquet when getting married.

Baths consisted of a big tub filled with hot water. The man of the house had the privilege of the nice clean water, then all the other sons and men, then the women and finally the children. Last of all the babies. By then the water was so dirty you could actually lose someone in it. Hence the saying, Don't throw the baby out with the Bath water..

Bread was divided according to status. Workers got the burnt bottom of the loaf, the family got the middle, and guests got the top, or the upper crust.