WATTS 07-2013

Year 83 + 7m

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

PARC, PO Box 73696, Lynnwood Ridge 0040, RSA

web http://www.parc.org.za mail: zs6pta@zs6pta.org.za

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

ZR6FD logo

Drukwerk ZS6RH

Papier / Paper ZS6RH

Club history: Bill ZS6KO (SK) shack 1949.

- more on page 2

Photo annotated:

"13 Oct 1949

20-10m fone+CW

6F6 VFO – 6L6 doubler – 807 driver – 813 final

2 L W/S beam (10)m

40m Zepp for (20)m

RX Bendix RA1B

6K7-6K8 10m converter"

In this issue

In hierdie uitgawe

Next club events

Fleamarkets at PMC

Sat 10 Aug **Sat 7 Dec**

Club social at U.P.
Thursday 4 July 7pm
Club committee meeting
Thursday 18 July 7pm

PARC Management team / Bestuurspan Aug. 2012 – Aug. 2013

Committee members

Chairman, Contests	Pierre Holtzhausen	ZS6PJH	zs6pjh@telkomsa.net	012-655-0726	082-575-5799
Vice Chairman, SARL liason	Fritz Sutherland	ZS6SF	fritzs@icon.co.za	012-811-3875	083-304-0028
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Technical, Kits. PR, youth	Rudi van Dyk	ZS6RVD	vdykr@telkomsa.net		082-962-4141

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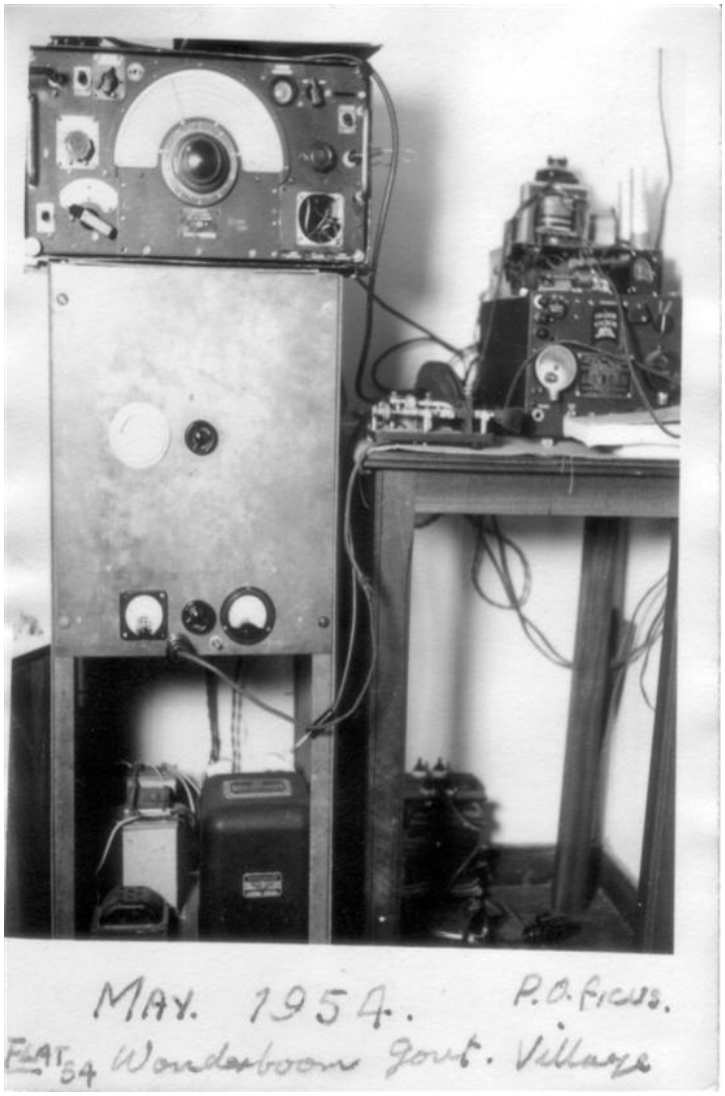
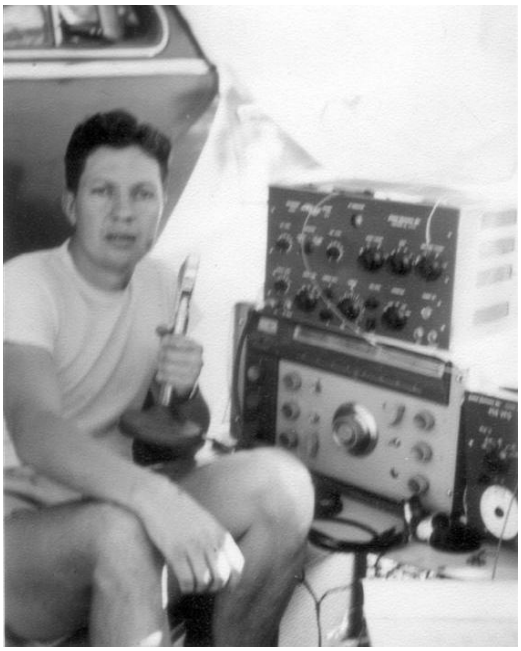
Clubhouse	Pieter Fourie	ZS6CN	pieter2@vodamail.co.za	012-804-7417	083-573-7048
Fleamarket	Alméro Dupisani	ZS6LDP	almero.dupisani@up.ac.za		083-938-8955
Historian, Archives, Awards	Tjerk Lammers	ZS6P	zs6p@iafrica.com	012-809-0006	

More ZS6KO (SK) photos



Right: 1956 - 813 100W – RA1B – BC348 – 67 foot Zepp – 2L beam 10m – ground plane 15m



Swaziland SSB competition 1958

Birthdays July Julie Anniversaries
Verjaarsdae Herdenkings

01 Craig, son of gordon ZS6AGV
06 Julie and Paul ZS6BMF (50)
06 Helen ZR6HN, daughter of Retha and Roy ZS6XN
13 Pieter ZS6PA
17 Lynn, sw of Andre ZS6BRC
17 Pine ZS6OB
19 Sarina, LV van willie ZR6WGR
20 Roy ZS6XN
21 Kevin, son of Gordon ZS6AGV
22 Rozanne, dogter van Sylvia en Tjerk ZS6P
25 Justin ZS6-262, son of Rika and Errol ZR6VDR

15 Ellen and Joe ZS6AIC ( )
28 Pat ZR6AVC and Frank ZS6GE (28)

26 Frank ZS6GE
27 Julie, sw of Paul ZS6BMF
30 John ZR6JAO

Lief en Leed | Joys and Sorrows

Gerda, sw of Roger ZS6RJ received her 4th degree at UNISA. This time BCompt Hons accounting. Congratulations!

Nuwe lede | New members

'n Hartlike welkom aan: A hearty wercome to:

Charles Mills ZS6CJM
Theo Bresler ZS6TVB
Pieter Swanepoel ZS6BOB

Diary | Dagboek (UTC times)

July

06-07 Venezuelan Independence Day Contest 00:00-23:59
06-07 DL-DX RTTY Contest 11:00-10:59
07 DARC Digital Contest 11:00-17:00
13-14 IARU HF World Championships 12:00-12:00
20-21 CQ World-wide VHF contest 18:00-21:00
27-28 RSGB IOTA Contest 12:00-12:00

Be an early bird!

PARC SUBS / LEDEGELD 30-06-2011

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

Betaal asb. u ledegeld betyds aan ons tesourier of per oorplasing aan:

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

Ordinary members/ gewone lede R150
Spouses, pensioners R50

Your call sign must appear as statement text! !

Snippets | Brokkies

- RAE Classes will start 23 July. Contact **Vincent ZS6BTY or Fritz ZS6SF**
- **Roger ZS6RJ** was A25RJ on 15-29 June
- **PARC AGM coming up in August – start thinking of motions and nominations. The deadline for motions is 21 July**

SARL Subscriptions due 1 July

Ordinary member R430
Licensed Senior member R240 (retired persons over 65)

Spouse member R140
Students R70

- **Tjerk ZS6P** was in Mozambique for four days to make arrangements for the upcoming multi-op C82DX DXpedition starting 15 October.
- The 5th of July marks **100 years of the RSGB.** UK hams can apply the letter "V" before the number in their callsign and may use such callsigns until July 31. There will also be a special callsign **GB100.** As part of the RSGB Centenary celebrations Society Members can join a GB friend for just £1:00. This offer is only valid until July 14.

ICASA / SARL news. (from SARL news 15 June)

THE FIVE YEAR LICENCE

The confusion around the five year license was discussed at the ICASA/SARL liaison meeting last week. It was agreed that ICASA will check all R501 payments made and issue a 5 year license accordingly. This process may take four to six weeks.
If you have renewed your license for 5 years and have paid R501 and have not received the 5 year license document by end of July, please send an email to Dewald at dkuhrau@icasa.org.za with a copy to Gareth at gthumbran@icasa.org.za. This information is also available on the SARL web home page.

GUEST LICENSING BETWEEN SADC COUNTRIES.

A draft document proposing that any licenced amateur from a SADC country visiting another SADC country may operate as a guest for up to three months without the need to apply for permission was recently approved and will be laid before the next CRASA meeting.

Iain ZS5IE has restored a complete Collins S-line - (Early Wings emblem)

Grounding Systems in the Ham Shack - Paradigms, Facts and Fallacies

Content provided by: Jose I. Calderon, DU1ANV - Makiling Amateur Radio Society. Member: Philippine Amateur Radio Association (PARA). Second part. Abridged by ZS6KR. Full article at http://kc.flexradio.com/KnowledgebaseArticle50426.aspx

Alternative 1 - The Counterpoise

This grounding technique is as old as the age of Ham Radio. The use of this technique dates back as early as 1895. It is used more effectively when earth ground conductivity is poor. But since your antenna per se also needs an RF ground to propagate efficiently at that higher elevation above earth ground (the reason of which, is beyond the scope of this article but maybe covered in future articles), it can be installed to perform the two functions. That is, to provide an artificial ground for the antenna when elevated high above earth ground and, to keep RF away from the station equipment. The setup is presented in Fig. 5 below.

Let us imagine that you want to operate on 4 amateur bands, namely 40, 20 15 and 10 meters. The installation procedure is given below:

Cut each individual counterpoise wire exactly ¼ wavelength of each operating frequency.
Connect one end of each to the single ground point terminal (see Fig. 5).

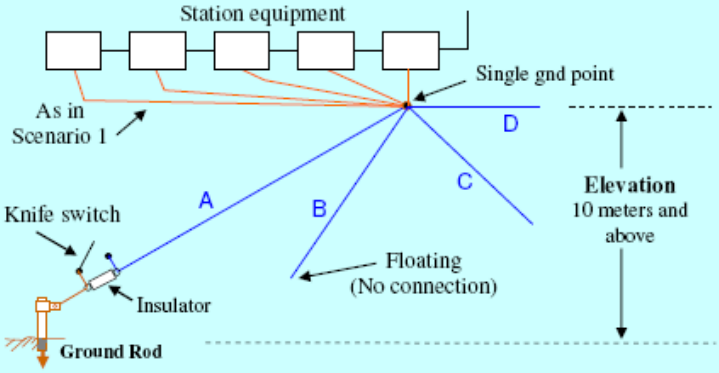


Fig. 5. A counterpoise ground system. Wires A, B, C and D are ¼λ at each operating band.

1. Leave all the opposite ends free and floating (no connection). For better efficiency, stretch and spread each wire in a radial fashion, away from the station equipment as shown in Fig. 5. The position and orientation of the wires is not however critical so that you may want to anchor each at the side wall of the apartment building (of course you have to insulate the ends by using small egg insulators). Another alternate is just to let each wire dangle downwards but still the wires must be spread out. How you will do it will depend on your prolific imagination.

2. Now, look for the longest wire (maybe the ¼ l 40 meter band counterpoise) that can reach the ground rod and designate this as your electrical ground. The idea is to use this wire to connect to your ground rod through a knife switch. When you are operating the station, the knife switch must be in open position. But when you stop operating and for safety reasons, you must provide an electrical ground. Run downstairs and close the switch. Remember however, to always open this switch whenever you sign ON the station.

The Principle of the counterpoise – In the older times, this contraption is used to complete the so called "Marconi antenna" which in effect is a quarter-wave antenna. In order to satisfy resonance, proper matching and efficient radiating properties, a quarter wave element is added to complete the antenna circuit. This is similar to today's radial system that is installed in quarter-wave and 5/8 wave antennas that are elevated above earth ground. We can use the same technique in keeping away RF from the station equipment. The electrical equivalent circuit is shown in Fig. 6 below:

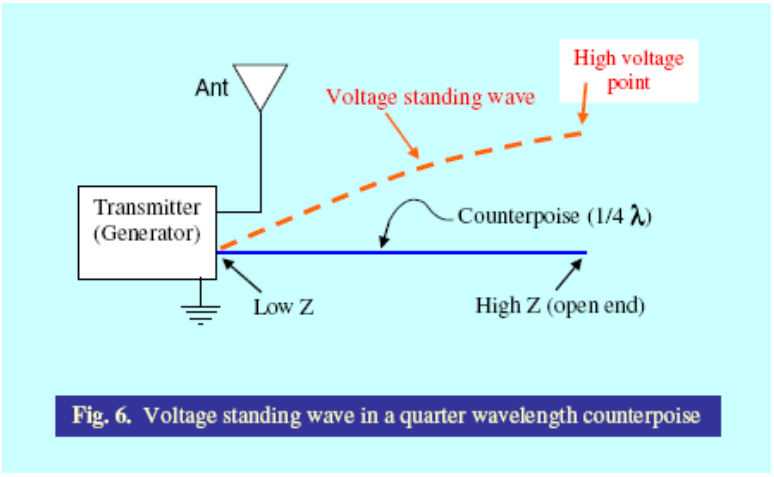


Fig. 6. Voltage standing wave in a quarter wavelength counterpoise

The counterpoise is in effect an artificial ground. One end of the quarter wavelength is connected to the circuit ground of the system (RF generator or transmitter) and the other end is left floating. When the RF generator is active, an image of the signal is developed in this wire and a voltage standing wave is induced. The magnitude of this voltage is similar to a ¼ wavelength antenna at various points along its length. The open end of this wire is high impedance (refer to antenna theory) while the opposite end that is connected to circuit ground of the generator is zero. It follows that the voltage at the generator side is zero (circuit ground) and the open end is high voltage. Notice that the high RF voltage point is now the reverse of the voltage points developed in the case of scenario 2 (See Fig. 4). By taking advantage of this characteristic, the use of the counterpoise will shift the high voltage away from the station equipment. If each operating band has its own separate counterpoise, then each respective counterpoise will function as the operating band is changed, allowing multi-band operation and preventing severe RFI in the shack.
CAUTION! ---- The counterpoise wires will radiate RF energy. Make sure that the end of any of the wires will not extend near home appliances within your house and or near your close neighbors.

Alternative 2 -The RF Suppressor Ground System

This is the modern version of an ingenious device developed and introduced by several hams in recent years, notably by William Chesney/N8SA (See http://www.hamuniverse.com/grounding.html) who published the article in 2003. This grounding system addresses both the electrical ground and RF grounding requirements in Ham radio. The device is intended for long grounding wires. The grounding device utilizes a coaxial line where the ground wire is enclosed by a shield, such as RG-8 transmission line, to prevent the buildup of high voltage standing wave near the station equipment. This ground line is not length sensitive and can be used at any length without concern. It will keep out RF away from the shack. The wiring setup of this practical grounding system is shown in fig. 7.

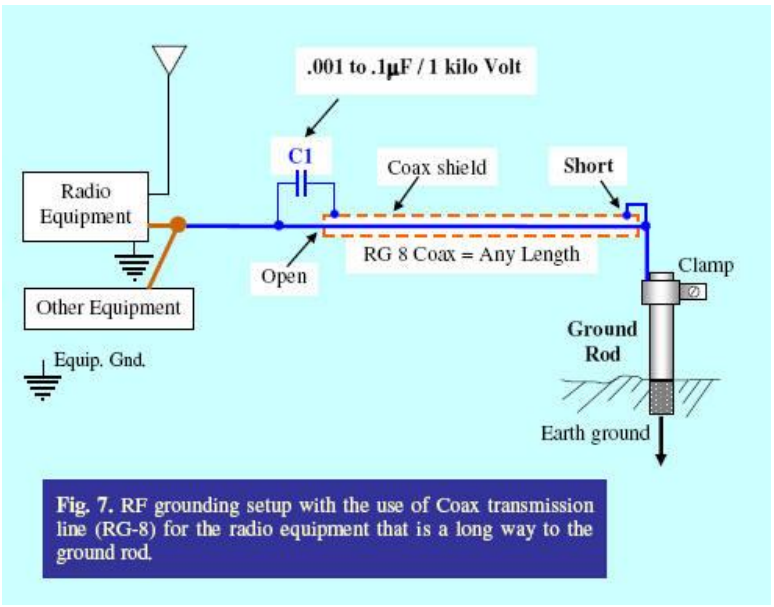


Fig. 7. RF grounding setup with the use of Coax transmission line (RG-8) for the radio equipment that is a long way to the ground rod.

Installation of the RF suppressor – Remove the existing ground wire and replace it with a length of RG-8 coax transmission line, enough to reach the ground rod and into the shack to connect to the ground bus. At one end, short (solder) the coax shield to the center conductor of the RG-8 and the remaining pig tail to be connected (soldered) to a short heavy gauge solid copper wire to reach the ground rod (See Fig. 7). At the other end, strip the coax to reveal the center conductor and remove part of its shield. Connect the center conductor to the circuit ground of the equipment. Leave the coax shield open at this end but connect a ceramic disc capacitor (Marked as C1 = 0.001 to 0.1 µF / I Kilo Volt). One terminal of this capacitor is connected to the coax shield and the other terminal to the center conductor (See Fig. 7). The RF suppressor ground system is now complete.

Of course the capacitor value is selectable depending on the lowest operating frequency band and length of Coax. The correct value is selected until RF disappears in the shack (at the lowest band). Or, when your lips doesn't get to be burned or electrocuted (when touching the metallic mic case) as you speak or transmit. However, YOU MUST USE A HIGH VOLTAGE CAPACITOR RATING, about 1KV minimum, but the higher the better. Otherwise, ZAPPP!!!, this capacitor will explode if a surge of high voltage standing wave will develop instantaneously at or above 500 volts at this terminal.

The circuit shown in Fig. 7 is an effective RF grounding setup. The author's shack is in the second floor and uses the same grounding system which has been in use since 1989 with no RFI in the shack even when the 1 KW linear amplifier is in use. DU1FLA/Estoy uses the same grounding system. We used a .01 µF / 1Kv capacitor for C1.

Principle of the RF suppressed grounding system – By inspection (see Fig. 7), the ground wire is enclosed effectively by the coax shield so no high voltage standing wave can buildup in this wire. However, since the shield is exposed and floating, a high voltage standing wave will appear at the outer surface of the coax shield. This voltage is Zero at the shorted end (ground rod terminal) and high at the open end. When you connect a capacitor between the high voltage end of the coax shield and the center conductor (See Fig. 7), the impedance of this capacitor is very low at the operating frequency, thus acting as a low impedance load (By virtue of its low reactance = Z, in Ohms) between the shield and center conductor. The RF current will flow easily through this capacitor and is diverted to the center conductor enclosed by the shield and finally to earth ground. The buildup of high voltage standing waves between the inside surface of external shield and the center conductor is suppressed because the characteristic impedance of the RG-8 is only 50-52Ω. And, the voltage drop across the external capacitor (C1) between the open end of the shield and center conductor is;

If C1 = 0.01 µF, then the reactance of C1 at 7.035 MHz is

$$X_C = \frac{1}{(2\pi)\ F \times C} = \frac{1 \times 10^{-6} \times 10^{6}}{(6.28)\ (7.035\ \text{Mhz})\ (0.01\mu\text{F})} = 2.26\ \Omega$$

Assuming that the transmit power is 100 watts. Therefore, the voltage drop across this capacitive reactance (2.26 Ω) is;

$$E = \sqrt{P \times Z} = \sqrt{100\ \text{W} \times 2.26\ \Omega} = 15.03\ \text{Volts rms ONLY!}$$

The combined parallel reactance of this capacitor and the total cable capacitance of the RG-8 transmission line will even decrease further the voltage drop. Also, as the operating frequency goes higher, the reactance of C1 will decrease. Hence, the voltage drop will be even lower. That is, as if the long physical length of coax ground wire is just about less than 1 meter long, electrically (See Table 1).

The voltage attenuation curve at higher RF operating frequencies above 7.035 MHz will in fact proceed at the rate of minus 6 dB per octave. This means, when the operating frequency is doubled (14.07 MHz); the voltage that exist across C1 will decrease to ½ the original amplitude. Further, because the center conductor of the coax line is connected directly to earth ground, it becomes automatically your electrical safety ground. How do you like that?

What we have presented and discussed dealt only on how we will keep out the troublesome RF energy near our equipment as far as ground loops and RF un-grounded grounds! But how we will make a good and effective RF earth ground to work with the antenna system during transmitting and receiving (Your system needs it whether you like it or not!) is another matter. In order to have an effective propagation for DX work requires a good RF earth ground setup. Merely having improved your equipment ground to earth ground is not a guarantee that you have also an effective RF earth ground….. Another fact!

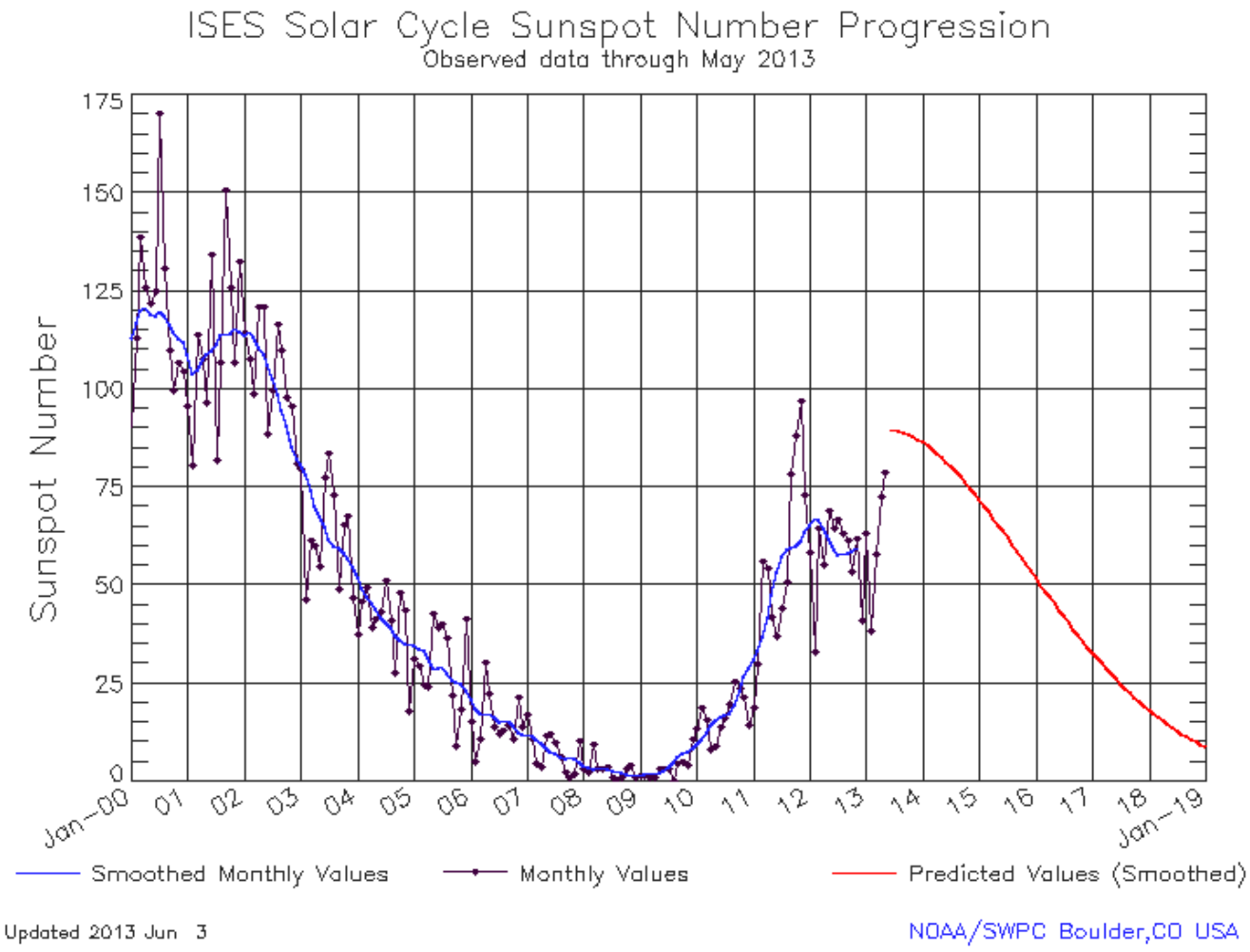
Improving and or making a good RF earth ground to work with your antenna system is another topic that is not covered by this article. Similarly, to answer the anticipated question number 3 also requires a separate topic for another article. Dealing with numerous causes of RFI due to "near field effects" and gross exposure of ham equipment to high RF fields that are not caused by improper grounding systems, though somewhat related, is a separate subject. Available space does not warrant the extension of these topics but hopefully, these will be covered separately in future articles.

It is hoped that this article has enlightened the reader to understand the importance of effective grounding paradigms and, the facts and fallacies of grounding in ham radio. To make a shack RF free coupled with sound electrical grounding technique is a responsibility of the amateur operator to address the aspects of grounding when dealing with high levels of RF energy in the operating environment. Effective grounding of equipment is mandatory to address the issues of personal Safety, damage to sensitive equipment and prevention of severe RFI in the operating community.

Solar Cycle Progression

Presented by the NOAA/Space Weather Prediction Center

The Solar Cycle 24 Prediction Panel has reached a consensus decision on the prediction of the next solar cycle (Cycle 24). First, the panel has agreed that solar minimum occurred in December, 2008. This still qualifies as a prediction since the smoothed sunspot number is only valid through September, 2008.
The panel has decided that the next solar cycle will be below average in intensity, with a maximum sunspot number of 90. Given the predicted date of solar minimum and the predicted maximum intensity, solar maximum is now expected to occur in May, 2013.
Note, this is a consensus opinion, not a unanimous decision. A supermajority of the panel did agree to this prediction.



Long Term HF Propagation Prediction for July 2013

Courtesy ZS6BTY

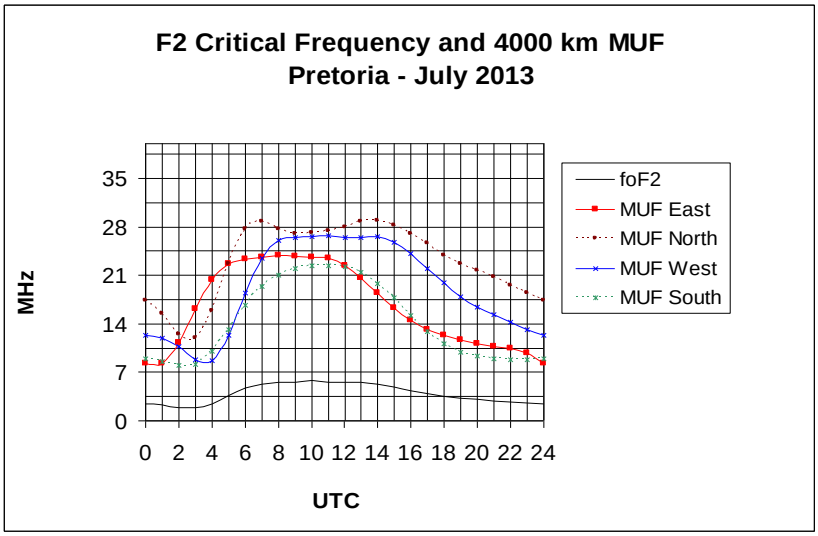
(see also our website propagation tab)

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.



An Interesting History of 1752

In case you haven't noticed, 11 days are simply missing from the month. This was the month during which England shifted from the Roman Julian Calendar to the Gregorian Calendar.
A Julian year was 11 days longer than a Gregorian year. So, the King of England ordered 11 days to be wiped off that month.
So, the workers worked for 11 days less but got paid for the whole month. That's how the concept of "paid leave" was born?
Hail the King!

In the Roman Julian Calendar, April used to be the first month of the year; but the Gregorian Calendar observed January as the first month. Even after shifting to the Gregorian Calendar, many people refused to give up old traditions and continued celebrating 1st April as the New Year's Day. *When simple orders didn't work, the King finally issued a royal dictum; which stated that those who celebrated 1st April as the new year's day would be labelled as fools. From then on, 1st April became April Fool's Day.*