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# WATTS

06-2011

Year 81 + 6m

Monthly newsletter of the Pretoria Amateur Radio Club  
Maandelikse nuusbrieff 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 08:45 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



## The Begali key collection of Roger ZS6RJ

more on p.4



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- Lede-nuus en Aktiwiteite
- Tegnies
- Bladsy agt

### Next Meeting

Date: Sat 11 June 2011  
Time: 13:30 for 14:00

Building #4  
University of Pretoria.  
S/E corner University  
and Lynnwood roads

## PARC Management team / Bestuurspan Aug. 2010 - Aug. 2011

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## Minutes of the monthly club meeting of the Pretoria Amateur Radio Club held at the South Campus of the University of Pretoria on 11 May 2011.

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

**Present:** See register, 17 members.

**Apologies:** See register, 5 apologies.

**Joys & Sorrows:** Molly ZR6MOL has been on weekend leave from Weskoppies, JB ZR6YV is going for tests on Friday, suspected internal bleeding, Deryck ZS6KQ was involved in a smash and grab at Fountains circle, Whitey ZS6JJJ is in hospital, Elma, sw of Gawie ZS6GJJ is also in hospital, Menno ZS6AGC is also ill. Gladys ZR6GRV, a past member, became silent key recently. Nico ZS6AQ is preparing for transfer to the Cape, Craig ZS6RH will take over the tower from Jack ZS6AQ-SK.

**Minutes:** The minutes of the April meeting were published. Approved by Hans ZS6KR and seconded by Graham ZR6GJR.

**Rally:** The old Total rally will be held this weekend (13-14 May) in the Witbank area, 3 stages on Friday starting at 12:00 and balance on Saturday starting at 07:00. André ZS6BRC will do control as JB is ill.

**Finances:** We have a bank balance of R3713.97. The radio license fees for 2011/12 have been paid. The trailer will need new tyres. Subs are due 30 June, R150 for ordinary members, R50 for spouses, dependants and pensioners.

**SARL AGM:** Richard ZS6UK reported on the league AGM. There was heated discussion on the handling of the motions by council.

**AGM:** The AGM is on August 13. A social was suggested for the AGM, possible at PMC or SAM. Motions must be in 4 weeks before the AGM by the 19:00 committee meeting on July 13. Those attending should advise the committee by the 13 July meeting so that catering for the social can be done. Bulletin announcements will be made. Award nominations are invited before the June meeting on 8 June. Subscriptions are due from 30 June. After the AGM, a new secretary is required.

**RAE:** The lectures have been completed and 6 entrants are writing on 19 May. A vote of thanks was passed for Fritz ZS6ASF.

**Flea Market:** The date of the next flea market is 28 May, and will be held at PMC at 08:00.

**Technical:** The repeater has been well behaved. The Radcliff antenna was moved just after Christmas. The equipment rack was moved away from the position just under the cable entry point. The Icom was run stand alone due to voting system problems. The Kenwood has had many modifications improving performance and is now in operation without interference and running better than the Icom.

**Licenses:** As ICASA has not gazetted the new license fees, the old fees will apply from 1 April 2011 to 31 March 2012, and these have been paid.

**Presentation:** A small presentation on was made by Hans ZS6KR.

**Next meeting:** The next meeting will be on Saturday 11 June 2011 at about 14:00.

## Birthdays

June  
**Verjaarsdae**



Junie

## Anniversaries Herdenkings

- 02 Elma, sw van Chris ZS6LOG
- 07 Chantel, dogter van Martie en 'JB' ZR6YV
- 12 Erna, sw van Whitey ZS6JJJ
- 14 Hilary ZR6HAP, daughter of Molly ZR6MOL and Richard ZS6UK
- 17 Lynette ZR6LHT, dogter van Elize en Pieter ZS6PA
- 20 Malcolm ZR6OLM, son of Retha and Roy ZS6XN
- 22 Richard ZS6UK

24 Marieta en Roy ZS6MI (40)

- 27 Emil ZS6EGB
- 27 Selma, sw of Joe ZS6TB

## Joys and Sorrows | Lief en Leed

Ons **auditeur Elma**, Gawie ZS6GJJ se LV, was 'n rukkie in die hospitaal "**JB**" **ZR6YV** en **Whitey ZS6JJJ** was ook kortliks in die hospitaal **Charl ZR6GN** suffered a light stroke and is reportedly on the mend

**Nico ZS6AQ** gaan hervestig in die Kaap  
**Deryck ZS6KQ** was the victim of a smash-and-grab

## Diary | Dagboek (UTC times)

### June

- 02 Ascension Day
- 04-05 SEANET Contest 12:00-12:00
- 04-05 10-10 Int. PSK contest 00:00-24:00
- 11 Portugal Day Contest 00:00-24:00
- 12 Pentecost / Pinkster
- 16 SARL Youth Day Sprint 07:00-11:00
- 17 World QRP Day
- 18 Programming in windows course Gauteng
- 19 Father's Day 00:00-24:00 !
- 18-19 All Asian DX CW Contest 00:00-24:00
- 24 Schools close
- 25-26 HM of Spain SSB 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 Ordinary members/ gewone lede R150**  
**Branch : 25 20 45 Spouses, pensioners R50**  
**Account : 546 000 426 73**

**Your call sign must appear as statement text! !**

## Snippets | Brokkies

**Pine ZS6OB, Pieter ZS6PA, Wynand ZS6ARF, Willem ZS6WAB, Dick ZS6BUN, Dan HB9CRQ will soon operate V/UHF/ EME in 7P8** We had 6 RAE entrants from our classes given by **Fritz ZS6ASF**. Outcome as yet unknown.

**Mark ZS6USA** made a generous donation to our club and will soon be leaving for another assignment. Thank you Mark.

## AGM | 08-2011 | AJV

Members must please indicate if they will attend the AGM for the purpose of budgeting and catering.  
Lede moet asb laat weet of hulle sal bywoon vir begroting- en spysenieringdoeleindes.

012-333-0612 or [ZS6PTA@QSL.net](mailto:ZS6PTA@QSL.net)

**Trophies that can be presented at the 2011 AGM || Trofeë wat by die 2011 AJV oorhandig kan word**  
**The Committee may have made tentative choices but is open to suggestions with good and relevant motivations. If you wish to nominate anyone for these awards: do it before 11 June and phone or email your motivation to the Secretary at**

012-333-0612 or [ZS6PTA@QSL.net](mailto:ZS6PTA@QSL.net)

**ZS6BLY Trophy** – Best technical lecture / talk at meetings  
**Sonny Don Trophy** – For assisting others  
**Valvoline trophy** – Best DF hunter  
**Ham Spirit trophy** – As the description says  
**Roy Alexander Trophy** – Top support on Rallies

**Hansie Meyer trophy** – For participation  
**Piet Roos trophy** – Best contributions to WATTS  
**Jack Bennet trophy** – 6m Activity  
**ZSL Trophy** – Most progressed ZSL listener  
**Merit awards / Certificates / Honorary membership**

### CALL FOR MOTIONS | AANVRAAG VIR MOSIES

**82<sup>nd</sup> AGM Motions can be submitted by the next Club meeting 11 June or 13 July latest.**  
**82<sup>e</sup> AJV Mosies kan by die volgende klubvergadering 11 Junie voorgelê word of laastens op 13 Julie**

**!! Only paid-up members may nominate and vote at the AGM.**  
**!! Slegs opbetaalde lede mag by die AJV nomineer en stem.**

# The Agony of CW and Paddle-Collecting

Roger ZS6RJ

The beauty of ham radio is aside from the common theme of communication which is the glue that holds the fabric of our hobby together, there are literally hundreds of niche areas associated with this hobby that one can end up being fascinated by and almost exclusively focused on. This allows specialist expertise to flourish which can then be shared with the greater amateur radio audience. Just think of a couple of the well-known areas of expertise and their "mentors" in our own club: Want to know about the secrets of 6 meter success? Hal, ZS6WB would be your man. EME? Look no further than ZS6OB. QRP? ZS6KO's the master. Top band? Talk to Ed, ZS6UT. Feel the need to crack the mysteries of DXCC awards? ZS6KR and ZS6P can tell you a thing or two about that. And the list goes on.

In the past few years, (not so much in South Africa, sadly) there's been exponential interest and growth world-wide in CW. If you doubt that – point your beam toward Europe and put out a CW call. You'll end up going split, feeling like rare DX, and work a couple of hundred stations just about any afternoon of the week at 30+ wpm. I suspect that this interest has been fuelled by a combination of this mode no longer being mandatory (so suddenly it's interesting!) in many parts of the world, along with poorer band conditions in recent years, where CW always wins out. CW ops will relate to this: You'll hear someone talking about how dead 10 meters is, while you've just come out of running JA's on CW at the rate of 100+ stations per hour, which always makes me smile.

Whatever the reasons, this sudden increase in CW interest has had the wonderful side-effect of prompting many individuals and firms overseas to start producing some really amazing modern-day paddles and keys. This area alone gives rise to all sorts of hobby niches in the form of straight keys, bugs, iambic paddles etc. Not to mention all types of vintages. My area of interest lies in modern, ultra-high specification paddles. Think back 10 years – how many really high-spec paddles were available world-wide? You could count 'em on one hand. Today, there are dozens (I won't list them - just have a look at the key and paddle product review section on the Eham website).

I chose to focus on one specific manufacturer of paddles that caught my interest several years ago – Begali. I found I had to narrow my "niche" down to only one supplier, or I'd go bankrupt, hi. My interest in high-end paddles started when I purchased the Begali Signature key just over 5 years ago. I bought it purely because I loved the look of it, not understanding at the time what this key was going to do for my CW speed. Before that I'd been muddling along with a couple of cheap paddles. I'd do okay at a modest 18 wpm with a few errors here and there. Any attempts to send faster resulted in a drastic increase in error rate. I always thought this was down to me having a lousy fist and I'd mentally bought into the idea that I just wasn't that good. So I gave up on trying to improve my speed and settled for using CW simply as a means to collect rare DX.

**Begali signature with customized extra short anodized finger pieces**



Once the Begali arrived I realized a couple of weeks later that I wasn't sending nearly as many errors. Not only was this a terrific confidence-booster, but it made me understand that sometimes a workman must blame his tools! It also showed me why the Begali cost several times more than an average paddle. But given my first Begali increased my CW speed to a reliable 40 odd wpm, gave me many thousands of QSO's and netted me eligibility for many awards, I'd say it was a price well worth paying. Make no mistake – I still don't consider myself a natural – there's many folk out there worldwide who can handle 40 wpm using a cheap paddle! But for me, modern high-end paddles have evened out the odds. They are to CW what a linear is to poor band conditions – an enabler. Their sensitivity in terms of how they can be adjusted can eliminate key-generated errors and make anyone sound good – whether you like pounding the paddles to death or plucking them at the very tops. They also never move out of alignment. I've adjusted my first Begali once or twice in 5 years – only when I took it apart to clean it. I wonder how many out there spent money on 2 or 3 regular cheaper paddles and then made the same call I did about thinking they couldn't improve further?

Anyway, based on that first high-end paddle, I was hooked. This is what prompted me to start a modest collection (trust me; at the prices of these things, it's going to remain a modest collection!) The next paddle was the Begali Stealth. This is a love-it or hate-it key, looks-wise. I'll be honest – it's not pretty in my book (supposedly resembling a jet-fighter – why?!) But man - is it accurate at high speed! And practical - being covered at the top which stops the ingress of dust. It sports a 1:1 arm ratio, precision instrument bearings, has solid gold contacts, and comes with the option of ultra-lightweight carbon fiber finger pieces. This means that moving mass is negligible. Innovation like the finger pieces converging from top to bottom, and the very tops of the finger pieces being angled inwards allow all types of keying styles. "Picking and plucking" at the top ridges for high speed or variable smaller gapping for different finger sizes as you move down. So five years on, it's small continuous innovation like this on high-end paddles that allows CW ops now comfortable with 40 wpm to move toward 50 wpm while reducing the error rate.



**Begali Stealth finger pieces tapered and flats at top**

The final and newest arrival on the scene in my shack was the Begali Stradivarius. I had no excuse really in the speed-stakes for this purchase (the Stealth took care of that), so I had to convince myself that this key's beauty was needed to offset the rather brick-like appearance of the Stealth. From an engineering perspective the Stradivarius had another intriguing trick – the paddle arms are mated to totally frictionless torsion blades instead of bearings. I got to thinking that if one combined this with carbon fiber finger pieces and solid gold contacts you'd have the ultimate in low mass, no friction and reliable gap-contacting all in a key that is beautiful to look at as well. (Piero, the builder was kind enough to customize a Stradivarius to this spec for me without charging extra – he's passionate about keys!) Amazing the justifications one can think up to ease the pain of payment! At the time of writing,



I've owned the Stradivarius for a grand total of 8 hours and around 30 quick QSO's. With the customizing it's easily as fast and effortless to use for prolonged periods as the Stealth, and much prettier to look at!

So to conclude – what I'm sharing is the thought that if you're interested in improving your CW skills (and consequently your chances of awards and rare DX), fire yourself up! Pick a manufacturer of high-spec paddles and if your budget allows, try one. They're well worth saving towards. Only problem is, when you send errors, you'll now only have yourself to blame!

73, Roger, ZS6RJ



**Stradivarius carbon finger pieces serialized and signed underside.**



**Stradivarius detailing**

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## WATTS IN THE AIR FROM WHERE

Condensed from PW 1990 by ZS6KR

Broadcasting absorbs gigawatts of energy across the world. Hundreds of thousands, if not millions of horse-powers are converted from fossil fuels and radiated into thin air all day and every day. You can pour enough power into an antenna to light a small town and nothing can be shown for it unless you tune in!

In the early days the key to successful wireless telegraphy was range and that meant power into the antenna. As early as 1901, Marconi needed 20 kW of power supply to bridge the Atlantic. Early wireless telegraphy transmitters used interrupted electric sparks to generate radio waves which were fed to massive antenna arrays tuned to frequencies between 10 and 100 kHz. These frequencies had world wide range and were immune to day-night effects.

A megawatt transmitter has to feed an antenna with RF currents up to 600 amps at several kV switched on and off rapidly to form dots and dashes. Until 1920, high power transmitters used quenched spark Paulsen arc or the HF alternator. The Poulsen arc provided highest powers of up to 2,5 MW at 11 kHz. The Alexandersson alternator could get up to 250 kW.

Providing reliable power for wireless stations taxed the ingenuity of power plant designers to the limit. The problem was caused by the unique combination of a rapidly cycling load taxing the supply voltage and frequency stability. In fractions of a second the system had to switch full load cleanly into the antenna to form a dot or dash for hours without wandering off tune. This formidable task is mechanically equivalent to setting a 1500 hp load on and off an engine while limiting the speed variation to less than 0,1%.

One of the larger spark stations was the 25 kW Marconi 'Thunder Factory' at Cape Cod. In the transmitting room streams of white fiery flashes one foot long are thrown out by powerful blowers coupled with terrifying noise. Visibility of these sparks were as far 15 miles out at sea through the frosted glass windows.

Wireless stations were generally placed on isolated coastal sites and oil engines were used as the driving force for smaller stations as they did not need a fresh water supply. Bigger stations used steam engines which drove generators connected to huge banks of accumulators. Later, Diesel engines became the preferred prime mover. Petrol engines were never popular as their electric ignition became very erratic in the powerful electromagnetic fields near the transmitter.

The growing commercial importance of wireless telegraphy led to stations being set up in some rather out of the way places such as Manaus and Porto Velto deep in the Amazonian basin. The biggest European station was set up at St. Aussie with an 1800 hp Diesel plant in 1922. In the same year the British GPO set up a 200 kW arc station at Leafield.

The biggest power supply headaches were caused by the Alexandersson HF alternators. These machines generated HF direct. A typical 100 kHz machine had 300 poles and ran at 20.000 RPM. They were very carefully designed and built. The rotor peripheral speed was some 300 m/sec. It had forced oil feed to self aligning plain bearings which were designed to equalize the air gaps as the armature heated up under load. These air gaps were only 0,015 inch!

Speed regulation had to be close to perfect else it would go off tune. Only 0,1% was permitted (100 Hz) between no load (space) and full load (dot or dash). In fact several rows of relays were coupled to the transmit key to weaken the motor field so as to raise the speed to compensate for drag as power flowed into the antenna.

Such heroic engineering was short lived and by 1930 water cooled vacuum valves already capable of 50 kW, won the day. Power and cooling for such installations came from Diesel engines which at the same time produced distilled water by means of a boiler mounted on their exhaust. This water was piped via a long rubber hose to the valve jackets which were live at 12 kV. Furthermore, waste heat kept the station warm and dry. From a viewpoint of lightning protection locally generated station power is more easily protected. Also independence from a national grid makes a station of strategic importance during national disasters.

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# ALC Adjustment Procedure

[Alan Applegate \(K0BG\)](#) on February 8, 2005

From [eham.net](#)

Contrary to popular belief, modern HF amplifiers do not require a full 100 watts to drive them to full output. The truth is, most tube amplifiers only need about 65 to 80 W for full rated output, and some as little as 40 W. Depending on their input circuitry, some solid state designs require just 25 W! Regardless of their design (tube or solid state), over drive produces a lot of negative results. Intermodulation distortion (IMD) is increased, tube (transistor) life is shortened, power supplies are over stressed, and the resulting splatter is anger inducing.

With the exception of most solid state mobile amplifiers, almost every modern amplifier has an ALC output. ALC, which stands for Automatic Level (Linearity) Control, provides an adjustable negative-going DC voltage which is fed back to the transceiver to control the amount of drive to the amplifier. If it is connected, and properly adjusted, ALC can limit or eliminate the aforementioned negatives. The problem is a lot amateurs never connect the ALC believing that the 100 watts PEP their transceiver delivers can't overdrive their amplifiers. This is an erroneous notion. Even when it is connected, all too often it is not adjusted properly.

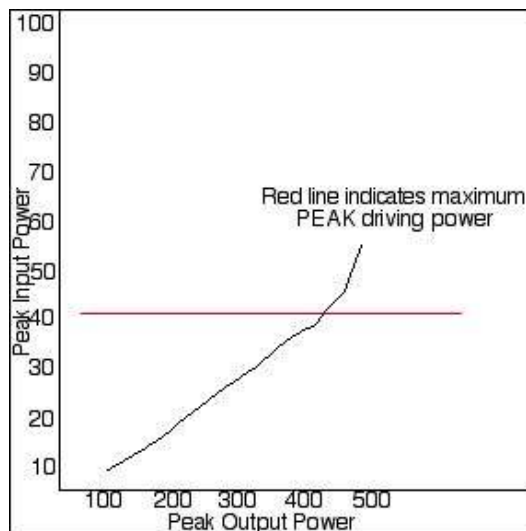
The proper level is easy to arrive at and requires just two pieces of test gear; a dummy load and a peak-reading wattmeter. The dummy load is necessary for obvious reasons. The need for a peak reading wattmeter is less obvious. Without getting into a deep technical discussion about power supply dynamics and other esoteric data, let's just say it is best to adjust the ALC by transmitting via SSB while monitoring the PEP.

Before we start let's go over what we're going to do. We're going to set the ALC just at the level where the power out is just below the point where the amplifier transverses into non linearity (the chart at right was made for a fictitious solid state amplifier, but clearly shows the transverse point). Then we're going to increase the ALC slightly so we're well into the linear portion of the amplifier's power curve. So here we go.

First, set the transceiver to put out its standard 100 watts PEP (into a dummy load). Your speech patterns are important here, and rather than say "test, test", recite your address, city and state.

Next, tune up your amplifier like you normally do, but with the ALC disconnected. WATCH YOUR DRIVE LEVEL! 30 to 50 watts is typically enough for tune up purposes. When you're finished put the amp in standby.

Next, hook up the ALC and turn the amplifier's ALC adjustment pot fully on (usually clockwise). Turn on the amplifier and transmit in SSB again with full drive. If the ALC is working as it should, the peak power out will be well below what it was without the ALC connected. Slowly decrease the ALC level while continuing to talk. At some level, the peak output power will stop increasing. The control should be turned back up until the power again drops. A good rule of thumb is 10% down from the peak power out. This keeps the amplifier well within its linear curve. If you're not going to use any built in speech compression, this is where you want to stop (more on this in a minute).



The last item is to readjust the transceiver's drive level. It should be reduced just to the point where the peak power starts to drop off. Next, turn the amplifier to standby and measure the peak power out of the transceiver. Increase it by about 10%. There's a good reason for this. Using a little more ALC than is required, and with just a little more drive than is required, will provide a moderate amount of RF compression. If you intend to use speech compression, you'd be well advised to increase the ALC level an additional 10%. Remember, compression puts heavy demands on power supplies, no matter how well they are built. Whether excessive IMD is caused by overdrive or power supply dynamics, splatter is splatter!

The aforementioned is applicable to tube or solid state amplifiers alike. However, if you're using an amplifier without an ALC output (SGC SG500, Ameritron ALS-500, etc.) then I suggest you read the article on my web site geared toward those units. Incidentally, most of the new series of solid state amplifiers hitting the market these days, require the ALC to be connected as it is an integral part of their built in self-protection scheme. What's more, solid state amplifiers are much less forgiving of overdrive than most tube ones, and extra caution is warranted.

To close, allow me to add a few bits of wisdom. It is indeed possible to drive any amplifier with more power and get a little more power out of it. What you have to do is ask yourself, is it worth it? Not only does overdriving cause excessive IMD (splatter), it taxes every other part of your station, and shortens the lives of every part in it. And for what purpose? Do you really believe an extra 50 or 100 watts out will make that rare DX station suddenly hear you out of the pile up morass? I seriously doubt it. But I do know this. A good, clean signal with just a hint of RF compression is a prescription for increased contacts, to say nothing of the comments you'll receive about having a clean, clear signal, and one free of trash and splatter. Moderation is the key. Think about it!



**Tuis gebou** Pieter **ZS6PA** het 'n 6m LFA (loop fed array) yagi antenna voltooi met 'n lengte van 6,05m. Hy beplan nou ook 'n antenna vir die 10m band. Die LFA is 'n nuwe konsep en kan op <http://www.g0ksc.co.uk/intro-lfa.html> bestudeer word.

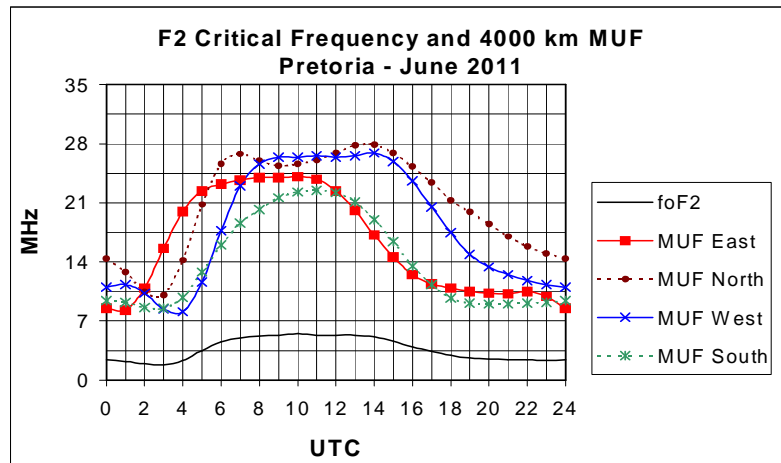
## Radio Spectrum for the London 2012 Olympic and Paralympic Games

The **RSGB** has been approached by **Ofcom** to help determine sections of the 70cm amateur band that could be released for a limited period around the London 2012 games.

As a secondary user of the band, UK radio amateurs have no specific rights to any of those frequencies. Rather than just imposing changes, Ofcom has approached the Society in the spirit of cooperation to work together to solve the problem. The RSGB intends to work constructively on this matter to reach agreement with Ofcom on segments that can be temporarily released.

Ofcom has given clear and unambiguous assurance that the segments used will be returned once the London 2012 Games are over.

The RSGB is looking closely at how the spectrum is used in the designated geographical areas in and around London, Weymouth and South Essex in order to minimise the impact.



## Long Term HF Propagation Prediction for June 2011 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.

### QRV Services offers the following expertise:

- 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 Mate
- Legal limit 40m dipole traps
- Radio power supply OV protection kits
- Nissei SWR/Power meters HF and VHF/UHF
- Connectors RF and DC
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## Amateur Electronic Supplies

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## PHONE REPAIR

Lawrence , Kansas, December 12, 2009.

A Kansas farm wife called the local phone company to report her telephone failed to ring when her friends called - and that on the few occasions, when it did ring, her dog always moaned right before the phone rang.

The telephone repairman proceeded to the scene, curious to see this psychic dog or senile lady. He climbed a telephone pole, hooked in his test set, and dialed the subscriber's house.

The phone didn't ring right away, but then the dog moaned and the telephone began to ring. Climbing down from the pole, the telephone repairman found:

1. The dog was tied to the telephone system's ground wire with a steel chain and collar.
2. The wire connection to the ground rod was loose.
3. The dog was receiving 90 volts of signaling current when the number was called.
4. After a couple of jolts, the dog would start moaning and then urinate.
5. The wet ground would complete the circuit, thus causing the phone to ring.

Which demonstrates that some problems CAN be fixed by pissing and moaning.

Thought you'd like to know.

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## \$25 dollar computer has ARM11 processor and HDMI

13 May 2011

The Raspberry Pi Foundation has set itself the target of promoting education in computer science and related subjects, as well as bring back the fun in working with computers. <http://www.raspberrypi.org/>

*The Raspberry Pi Foundation is a UK registered charity (Registration Number 1129409) which exists to promote the study of computer science and related topics, especially at school level, and to put the fun back into learning computing.*

To make this possible and to ensure that computers are accessible to everyone, the Raspberry Pi Foundation developed an ultra-low-cost computer allowing pupils to easily learn about programming. Of course the computer can have many other uses. The computer is expected to cost only \$ 25 when mass produced.

The little computer system is about the size of a USB stick and includes USB and HDMI connectors allowing a TV and a keyboard to be connected straight away. SD/MMC card connectors are also available. The computing power is supplied by an ARM11 microprocessor running at 700 MHz. 128 MB SDRAM memory is available. The HDMI output is capable of driving a full HD display with 1080p30 resolution. Ubuntu Linux is the suggested operating system.

Provisional specification:

700MHz ARM11, 128MB of SDRAM, OpenGL ES 2.0, 1080p30 H.264 high-profile decode, Composite and HDMI video output  
USB 2.0, SD/MMC/SDIO memory card slot, General-purpose I/O  
Open software (Ubuntu, Iceweasel, KOffice, Python)

