WATTS

05-2015
Year 85 + 5m

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 @ zs6pta@zs6pta.org.za

Bulletins : 145.725 MHz on Sundays / Sondae at 08:45
Relays: 1.840, 3.700, 7.066, 10.135, 14.235, 51.400, 438.825, 1297 MHz
Activated frequencies are announced prior to bulletins
Swopshop : 2m and 7.066 MHz live on-air after bulletins
Bulletin repeats on Mondays / herhalings op Maandae : 2m 19:45

Fritz Sutherland ZS6SF : SARL President 2015-2016

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Next Events

Club Social Meeting :

Saturday 2nd of May at 11:00PM at Pretoria Motor Club after the Fleamarket

Club Committee Meeting :

Wednesday 6th of May at 7:30PM by Skype (Test Run)

PARC Committee Members / Komiteelede : 2014 – 2015

Chairman, Social & Rallies	Johan de Bruyn	ZS6JHB	zs6jhb@gmail.com	012-803-7385	079-333-4107
Vice Chairman	Jan Pienaar	ZS6OB	pienaarja@gmail.com		082-447-7823
SARL liason	Fritz Sutherland	ZS6SF	fritzs@icon.co.za	012-811-3875	083-304-0028
Treasurer	Andre van Tonder	ZS6BRC	andreh.vtonder@absamail.co.za	361-3292	082-467-0287
Web co-ordination	Graham Reid	ZR6GJR	greid@wol.co.za		083-701-0511
RAE, Bulletin co-ordinator	Vincent Harrison	ZS6BTY	zs6bty@telkomsa.net	012-998-8165	083-754-0115
Contests	Pierre Holtzhausen	ZS6PJH	zs6pjh@telkomsa.net	012-655-0726	082-575-5799
Repeaters	Craig Symington	ZS6RH	zs6rh@hotmail.co.za		081-334-6817
Fleamarket	Alméro Dupisani	ZS6LDP	almero.dupisani@up.ac.za		083-938-8955
Clubhouse	Pieter Fourie	ZS6CN	pieterzs6cn@gmail.com	012-804-7417	083-573-7048
Photographer, Technical	Theo Bresler	ZS6TVB	theo@bresler.co.za		082-698-1742
Auditor	Tony Crowder	ZS6CRO	tcrowder@telkomsa.net	011-672-3311	
Historian, Archives, Awards	Tjerk Lammers	ZS6P	zs6p@iafrica.com	012-809-0006	
Secretary, WATTS newsletter	Louis de Wet	ZS6SK	louis.zs6sk@gmail.com	012-349-1044	072-140-9893
Contests	Jaco Cronje	ZR6CMG	jaco.cronje@mobaxgroup.com		076-319-1057

Birthdays – May / Verjaarsdae – May / Mei

01 Amanda, daughter of Martie and Johann "JB" ZR6YV
03 Andries Schoombee ZS6SCH
06 Lourens Erasmus ZS6KRT
10 Roy ZR6RV son of Marieta and Roy ZS6MI
14 Johannes Momberg ZS6BPB
17 Vincent Harrison ZS6BTY
18 Karen, daughter of Pat ZR6AVC and Frank ZS6GE
25 Tjerk Lammers ZS6P
31 David Botha ZSL5387
31 Ian Williams ZS6JW
31 Gawie Basson ZS6GJJ

Please Note : If your Club fees are not paid up to date, birthday details will not be displayed in Watts

Spouse's Birthdays – May / Mei

11 Zdena, sw of Ivo Chladek ZS6AXT

Anniversaries / Herdenkings – May/Mei

01 Ria and Peter Smith ZS6PJ

Lief en Leed / Joys and Sorrows

Bertha, the Wife of Hans Kappetijn is progressing well after hospital treatment
Fritz Sutherland ZS6SF is close to full recovery after a back operation
It is going well with Jan (Pine) Pienaar ZS6OB after medical treatment
Pierre Britz ZR6ADZ was in hospital but has been released and is recovering well
Mollie Peer ZR6MOL is still in hospital receiving treatment. A speedy recovery is wished to her
The father of Andre Coetzee ZS6GCA received hospital treatment and has been released

Contests and Diary of Events – May 2015 / Kompetisies en Dagboek van Gebeure – Mei 2015 (UTC Times)

02	**PARC Fleamarket and Club Social Meeting**
02 - 03	10-10 International Spring Contest, CW : 00h01 – 23h59
02 - 03	ARI International DX Contest : 12h00 – 11h59
09 - 10	CQ-M International DX Contest : 12h00 – 11h59
09 - 10	VOUTA WW RTTY Contest : 12h00 – 12h00
16 - 17	HM King of Spain Contest, CW : 12h00 – 12h00
21	**Radio Amateur Examination (RAE)**
23 - 24	EU PSK DX Contest : 12h00 – 12h00
30 - 31	CQ WW WPX Contest, CW : 00h00 – 24h00

PARC SUBS / LEDEGELD FROM / VAN 30-06-2014

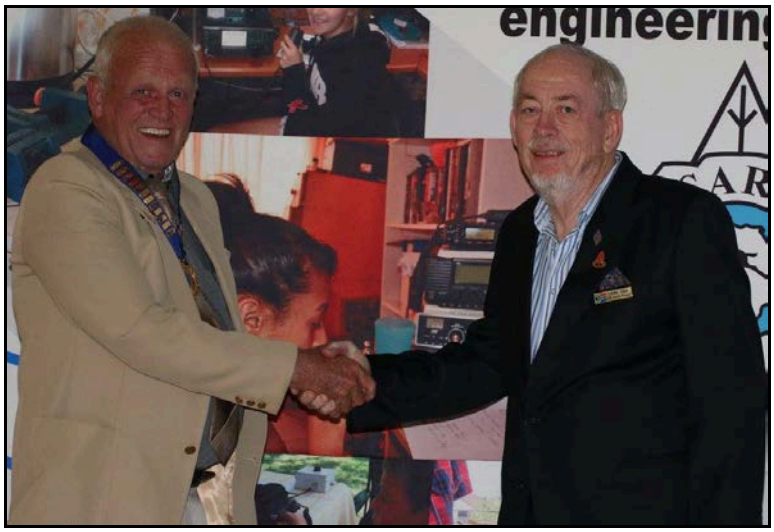
Bank	First National Bank	Ordinary Members / Gewone Lede : R150 Spouses / Pensioners : R50	**Your call sign must appear as statement text!**
Branch Code	25 20 45		
Account No	546 000 426 73		

Please remit your subs in time to our Treasurer, or pay per transfer into the PARC account
Betaal asb. u ledegelde betyds aan ons Tesourier, of betaal per oorplasing in die PARC rekening

Dates for remaining 2015 Flea Markets : 2 May ; 25 July ; 31 October
Please contact Almero Dupisani (ZS6LDP) for any enquiries

SARL Bloemfontein Convention : 16-17 April 2015

Fritz Sutherland ZS6SF was elected as President of the South African Radio League during the recent Bloemfontein Convention. After completing schooling at Afrikaans Hoër Seunskool, Fritz completed his B.Eng degree in Electrical and Electronic Engineering. Fritz worked as Engineering Manager at Iscor Iron & Steel for nearly 24 years. Since then, Fritz has been self-employed as an Electrical Engineer and Technical Editor. Fritz is married to Elsa ZR6KG, and is currently the SARL liaison Committee Member for PARC. We all wish Fritz all the best with his appointment.



During the recent SARL Convention, Tjerk Lammers ZS6P received Honorary membership of the League. PARC congratulates Tjerk on this remarkable achievement.

Other PARC members who have also received this honour include:

Wally Browning (SK)
Andre Leeb-du Toit (SK)
Luther Uys ZS6E (SK)
Don Stewart ZS6IA (SK)
Hans van de Groenendaal ZS6AKV
Fred Anderson ZS6PW (SK)
Gerrit Erasmus ZS6PA (SK)

Congratulations to Theo Bresler ZS6TVB who received the Fred Mills trophy for the highest score by anybody who has not won an SARL HF contest trophy before. Here Theo is seen working HF in his well-equipped radio vehicle.

Results of the QRP Contest held on the 11 April 2015. Three logs were received and the results are as follows:-
1st ZS6WR - West Rand ARC - 700 points
2nd ZS6TVB - Theo Bresler - 93 points
3rd ZS4DZ - Johan van Zijl - 33 points

Radio Amateur Examination : 21st of May 2015

With the RAE looming on the 21st of May, Vincent ZS6BTY is hard at work preparing prospective radio hams, often in semi-darkness by LED light, due to load shedding. PARC sincerely thanks Vincent for his dedication with this task.

SASOL Rally : 16 – 17 April 2015

The SASOL rally gang after two hectic days in the mud and rain. From left: Louis ZS6SK and son Stefan, Irene and Pieter ZS6PAM, Graham ZR6GJR and wife Joey, Ben ZS6BVB, Willie ZR6WGR, Johan ZS6JHB and wife Doreen ZR6DDB, Pierre ZSPJH and Johann ZR6YV and wife Martie. Pieter ZS6CN and Annatjie had to take an early night after an extremely tiring day. Photo by Sarina Greyling. More photos on next page.

The SASOL 2015 rally, which took place from 17 – 18 April around the scenic Sabie, Graskop, Witrivier and Nelspruit was indeed a challenge is many aspects. Nonwithstanding extreme mist, rain, cold and conditions not favourable for radio communications, radio marshals had their work cut out and had to improvise in various ways in order to get information transferred to control in Nelspruit. Despite a number of mishaps in the sometimes thick or slippery mud, and an accident, both competitors and marshals had a magnificent experience. Consisting of 15 stages spread over a period of 2 days, the SASOL once again proved to be top event on the South African rally calendar. PARC hereby thanks all that assited during this rally sincerely for their hard work and dedication.

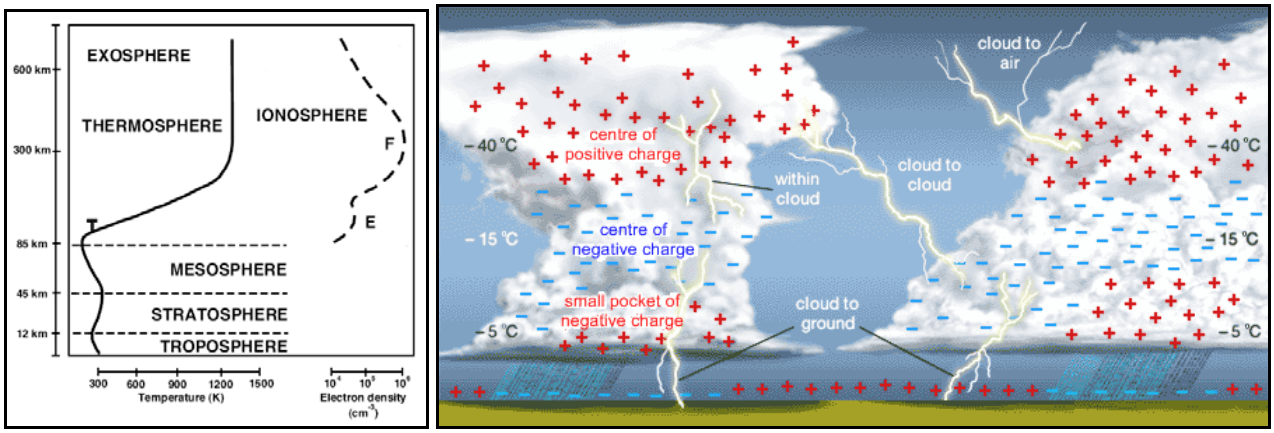
Photos by Stefan de Wet

Atmospheric Electricity : (1) Global Circuit and Lightning

Since experimental proof by Benjamin Franklin in 1752 that atmospheric electricity existed, and that it can be used to ring a bell, numerous attempts have been made to extract usable amounts of electricity from the air. Using atmospheric electricity, power generators have been patended and electrostatic motors utilized this form of electricity. However, practical problems such as the high impedance of the atmosphere, as well as the low energy density as compared with other sources have limited the widespread use of this energy source significantly.

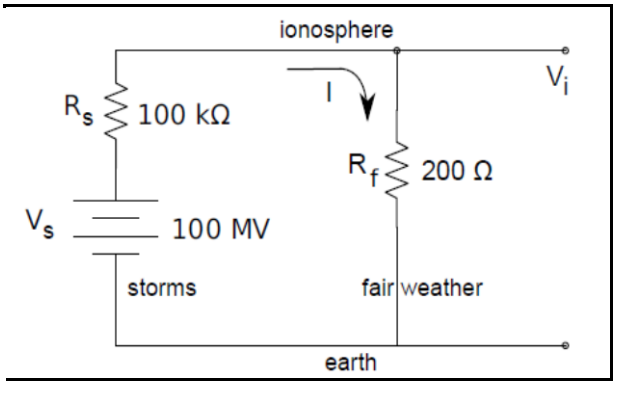
Attempts to collect and storge high voltage lightning discharges have also shown to be extremely difficult and dangerous to attempt. With regards to radio communications and aircraft travel, atmospheric electricity is seen in a somewhat different context, where in many cases lightning bolts have brought down aircraft, or have destroyed expensive radio equipment.

In the context of atmospheric electricity of the earth, the concept of the “global circuit” hereby applies, and is based on the theory of the global sperical capacitor, with the solid (and liquid) earth as one electrode (negative), and the high atmospheric layers (ionosphere) as the other electrode (positive). This global capacitor is continuously charged by the common action of all cloud movements and thunderstorms to a DC voltage difference of several hundred kilovolts. The much smaller, but still existing conductivity of the atmosphere allows a current to flow from the ionosphere to the ground, integrated for all sink areas of the whole earth, roughly in the region of 1.5k Ampere. Subsequently, a global circuit is created with many generators and sink-areas both interspaced and distributed over the whole globe, all connected to two nodes, the ionosphere and ground.



Figures showing the layers of the atmosphere and charge distribution between earth and clouds

A simplified lumped-element circuit is shown, illustrates the vertical arrangement of the ionosphere in relation to the earth. Both are very good conductors, as compared to the atmosphere, and therefore considered as equi-potentials. The voltage and resistance values shown in the figure are quite typical, but can vary daily, seasonally and by location. The left branch of the circuit represents thunderstorms on earth, which are the principal source of atmospheric electricity.



The global electric circuit

By carrying positive charges upwards on rising air currents, thunderstorms subsequently generate tremendous voltages. Generally, the positive charges are attached to large particles of ice or droplets. Due to the relatively large size of the particles, drag is created such that they cannot oppose the updraft, and are unable to recombine with the negative charges closer to the ground. A similar action is found in the van der Graaf generator, where the belt is analogous to the updraft. During the process of charge separation, the voltage across the vertical extent of the storm may reach values in the order of $V_s \approx 100MV$. During this voltage build-up, some of the charge is returned to the ground as lightning, or as ionic flow, while the remainder migrates up towards the ionosphere, which is at a lower potential than the top of the thunderstorm.

The total resistance of the atmosphere above and below thunderstorms is the storm resistance, which has a typical value of $R_s \approx 100k\Omega$. As all thunderstorms on earth are lumped into a single circuit branch, their combined resistance is the parallel combination of all the atmospheric resistances above and below active storms. Once inside the ionosphere, charges spread horizontally, and their combined resistance is far less than 1Ω.

Where no thunderstorms occur, the atmosphere is electrically passive, due to highly resistive air separating the conductive earth and the ionosphere. The charge returns to the earth through the passive, or fair-weather branch on the right side of the circuit. The total fair-weather resistance of the atmosphere is approximately $R_f \approx 200\Omega$. The question may arise why the total resistance above thunderstorms is so much higher than in the fair-weather regions. This occurs because only a fraction of the earth is covered with storms, while most is not. Thus there is a wide area for the fair-weather current flow, which makes the total resistance there much lower. The storm and fair-weather resistances form a voltage divider. The open-circuit voltage between the ionosphere and the earth is given by (1):

$$V_i = \frac{R_f}{R_s + R_f} V_s \approx \frac{R_f}{R_s} V_s = \left(\frac{200}{100 \times 10^3}\right)(100 \times 10^6) = 200\,\text{kV} \qquad (1)$$

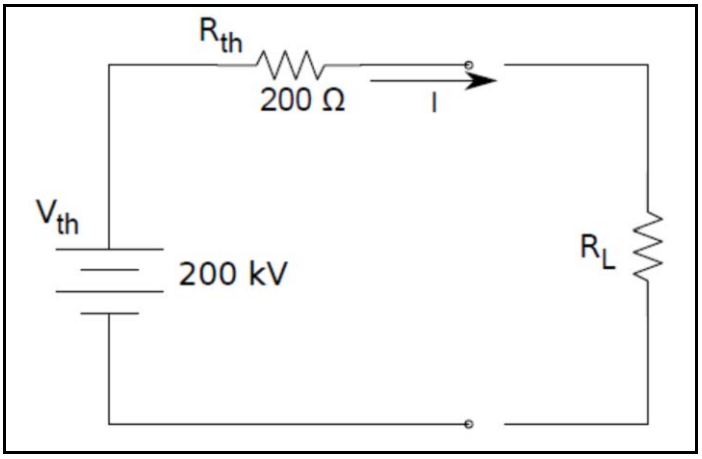
While the steady-state current in the global circuit is (2):

$$I = \frac{V_s}{R_s + R_f} \approx \frac{V_s}{R_s} = \frac{100\,\text{MV}}{100\,\text{k}\Omega} = 1000\,\text{A} \qquad (2)$$

The total power associated with the global electric circuit is thus (3):

$$P = (R_s + R_f)I^2 \approx (1 \times 10^5)(1000)^2 = 100\,\text{GW} \qquad (3)$$

The adjacent figure is a Thevenin equivalent circuit for a connection directly to the ionosphere. In this case, $V_{th} = V_{oc} \approx 200kV$ is the open-circuit voltage and $R_{th} \approx 200\Omega$ is the equivalent resistance. The short-circuit current would therefore be $I_{sc} = V_{th}/R_{th} = 1000A$. The maximum available power is obtained when the load resistor matches the internal resistance of the source. At this point, the voltage would be reduced to half the open circuit value, and half the short-circuit current would flow through the load resistor. Therefore, the maximum power that could be extracted from the ionosphere is (4):



Applying a load resistor from the ionosphere to the earth

$$P = \frac{1}{4} V_{oc} I_{sc} = \frac{1}{4}(200,000)(1000) = 50\,\text{MW} \qquad (4)$$

This article was compiled from a number of literature sources by Louis de Wet ZS6SK. During the following months this article series will focus on (2) Air ions, (3) Anatomy of Lightning, and (4) Lightning protection.

Die BestMed Gesinsfees ten bate van CANSA vind plaas op 16-17 Mei 2015 by Supersport Park Centurion. Pretoria Amater Radio Klub is genooi om 'n stalletjie op te rig wat Amateur Radio uitbeeld. Indien u belangstel om uit te help gedurende die naweek, of meer inligting benodig, kontak gerus vir Johan de Bruyn ZS6JHB by 079-333-4107 of zs6jhb@gmail.com

Short News Items

Norway scraps FM Radio

Norway will become the first country to scrap FM radio after it announced final plans to switch to digital radio in the next two years.

The government said in a statement[1] that it will make the transition to Digital Audio Broadcasting by 2017, following up on a 2011 government proposal. It will be the first country to do away entirely with FM radio, The Verge[2] reports.

The move will allow for roughly 40 national channels, including 22 already in use, compared to five national channels on the FM system. Transmission costs are also eight times more expensive on the FM network than the DAB network.

"Radio digitization will open the door to a far greater range of radio channels, benefiting listeners across the country," Minister of Culture Thorhild Widvey said in a statement. "Listeners will have access to more diverse and pluralistic radio-content, and enjoy better sound quality and new functionality." ***News Item submitted by Hans ZS6KR***

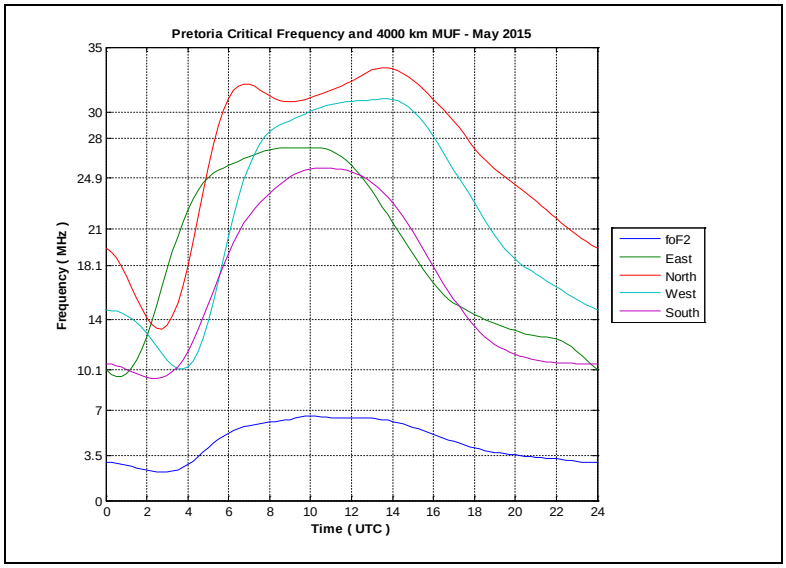
[1] https://www.regjeringen.no/en/aktuelt/radio-digitisation-in-2017/id2406145/

[2] http://www.theverge.com/2015/4/19/8453165/norway-end-fm-radio-2017

The 2015 Secunda Motor Rally will be the first time that this national event will run in this area. It is a very compact event held in a very close proximity of Secunda, with the furthest stage being 17km from the Service Park.

The Rally Headquarters will be at the Lake Umuzi function venue across the lake from the well-known Lake Umuzi complex, which has a hub of eateries and entertainment venues.

The event will be run over two days, being Friday, 15 May and Saturday, 16 May 2015. The event will start on Friday afternoon at Graceland Casino at 12h00 and crews will take on 6 stages before overnighting at the Lake Umuzi complex – it is possible that the last stage on Friday night will be in the dark (3.7kms). Crews will restart on Saturday morning and take on a further 6 stages and finish up at Lake Umuzi on Saturday afternoon. For more information, please contact Johan ZS6JHB.



Long Term HF Propagation for May 2015

DX Operating

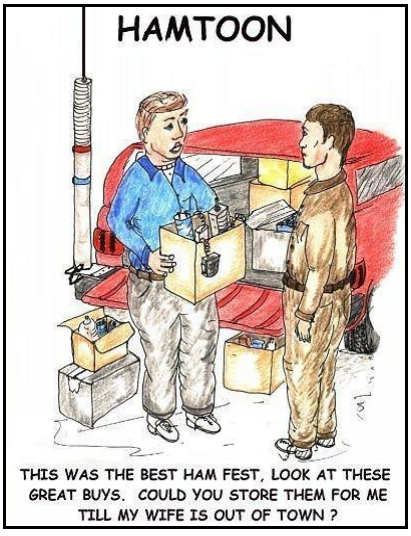
The graph shows the 4000 km maximum useable frequency (MUF) to the East, North, West and South from Pretoria for the first hop using the F2 layer.

Local Operating

The F2 critical frequency (foF2) is the maximum F-layer frequency for short range communications.

See also the Propagation tab at http://www.parc.org.za/

Courtesy Vincent ZS6BTY



When you see something that is technically sweet, you go ahead and do it and you argue about what to do about it only after you have had your technical success. That is the way it was with the atomic bomb.

The optimist thinks this is the best of all possible worlds. The pessimist fears it is true. ***Robert Oppenheimer 1904 - 1967***