



WATTS

06-2015
Year 85 + 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> @ zs6pta@zs6pta.org.za



Bulletins : 145.725 MHz on Sundays / Sondag 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



Theo Bresler ZS6TVB receiving the Fred Mills Trophy from Tjerk Lammers ZS6P

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Next Events

Club Social Meeting :

Saturday 6th of June at 11:00 AM
at the Pretoria Motor Club

Club Committee Meeting :

Thursday 18th of June at 19:00 per
Skype

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
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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 – June / Verjaarsdae – Junie

07 Chantel, daughter of Martie and Johann "JB" ZR6YV
 11 Nadia, daughter of Pat ZR6AVC and Frank Schneider ZS6GE
 14 Hillary, daughter of Molly ZR6MOL and Richard ZS6UK
 14 Adriaan Reynecke ZR6REY
 22 Richard Peer ZS6UK
 26 Pieter Stronkhorst ZR6PSR

27 Emil Bohme ZS6EGB

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



Spouse's Birthdays – June / Junie

01 Fiona, sw of Etienne Naude ZS6EFN
 12 Erna, sw of Whitey Joubert ZS6JJJ
 21 Engela, sw of Jan Volschenk ZR6JJV

Anniversaries / Herdenkings – June/Junie

24 Marita and Roy Alexander ZS6MI

Lief en Leed / Joys and Sorrows

Bertha, the Wife of Hans Kappetijn is progressing well after hospital treatment
 Mollie Peer ZR6MOL is still in hospital receiving treatment. A speedy recovery is wished to her.

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

06	KARTS & Antique Wireless Association (AWA) Flea-market (see AWA website)
06 - 07	International Open Season PSK Contest: 00h01 – 23h59
06 - 07	IARU Region 1 CW Field Day : 15h00 – 14h59
06 - 07	RSGB CW Field Day: 15h00 – 15h00
14	SARL ZS4 Sprint
17	World QRP Day
20	SA AMSAT Space Symposium : Innovation Hub
20 - 21	All Asia DX CW Contest : 00h00 – 24h00
27 – 28	Ukranian DX Digi Contest: 12h00 – 12h00
27 – 28	His Majesty King of Spain Contest: 12h00 – 12h00
27 - 28	ARRL Field Day: 18h00 – 21h00
25 - 29	SARL Top Band QSO Party

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 : 25 July ; 31 October
 Please contact Almero Dupisani (ZS6LDP) for any enquiries**

Welcome to the following new PARC Members

Ryan Gibson ZS6GGR
Mervyn Schmidt ZS6MES

Adriaan Reynecke ZS6REY
Dennis Howe ZS6DEH

Louw Erasmus ZS6LME
Marc Vanoverbeke ZS6ON

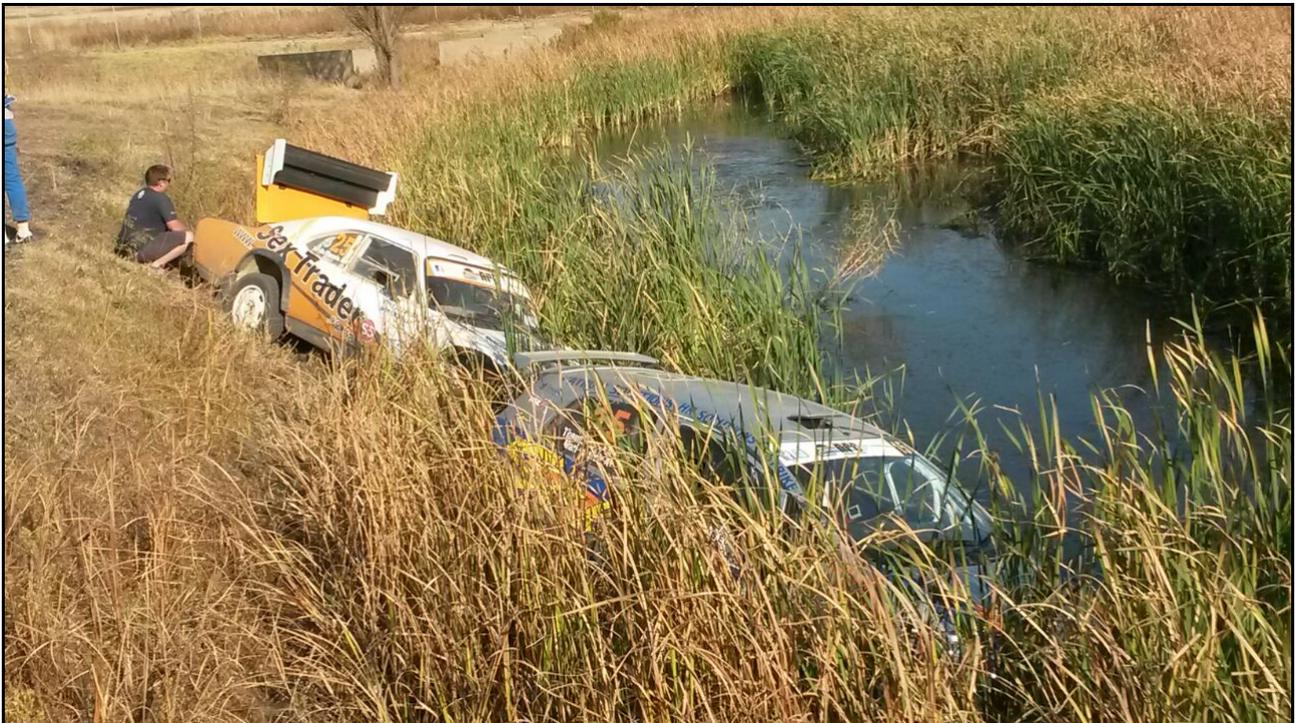
Rally News : Johan de Bruyn ZS6JHB

The Secunda Rally on the 15th – 16th of May proved to be a most enjoyable event, which was supported by a fairly large team from PARC. As seen in the photograph below, the rally had good action and quite some interesting entry names. Johan de Bryun received the email below from the organisers of the Secunda Rally, which clearly shows their satisfaction with the team from PARC. Well done everybody!

Dear Johan and team,

We would like to extend our sincere thanks to you and your team for assisting us on this past weekend's Secunda Motor Rally. Your contribution to the event was extremely valued and contributed to the event being the huge success that it has turned out to be. Please can you convey our thanks to your team. We look forward to working with you all again on the Bela Bela Motor Rally in June.

Richard and the NRC Team



2015 South African National Rally Championship – Proposed Dates

Date	Round No:	Name	Region
19/20 June	4	# Toyota Bela Bela Rally / Total Tara	Limpopo / Namib
17/18 July	5	Volkswagen Rally	Eastern Cape
14/15 August	6	# Cullinan Rally	Gauteng
18/19 September	7	Toyota Cape Dealer Rally	Western Cape
16/17 October	8	# Polokwane Rally / Garden Route	Limpopo / WC
*Part of the African Rally Championship			
# Dates are confirmed – Venues/Regions to be confirmed pending sponsorship			

Please remember that PARC will only be involved with the Bela Bela, Cullina and Polokwane rallies.

The following regional rallies will also take place:

25 July : HMC Rally Cullinan
05 September : SAM Regional Rally
24 October : All Tar Rally SCC/ER Pretoria/Johannesburg

PARC Flea Market : 2 May 2015



Digital Mobile Radio (DMR)

With the development of various new digital modes, such as D-Star for radio transmission, the possibilities of transmitting over longer distances using less power, are becoming more available. In this short overview, Digital Mobile Radio (DMR), which was developed by the European Telecommunications Standards Institute (ETSI), will be presented. Digital Mobile Radio is a standard which has been developed by ETSI which sets out a digital radio specification for professional, commercial and private radio users.

The ETSI standards which define DMR are as follows:

- TS 102 361-1 : DMR air interface protocol
- TS 102 361-2 : DMR voice and generic services and facilities
- TS 102 361-3 : DMR data protocol
- TS 102 361-4 : DMR trunking protocol

The above standards can be obtained in pdf format from the ETSI website.

DMR is available in three Tiers. DMR Tier I is a single channel FDMA with a 6.25 kHz bandwidth. The standard supports peer-to-peer (mode 1), repeater (mode 2) and linked repeater (mode 3) configurations. The Tier I standard is applicable to consumer- and low-power commercial applications, where power consumption does not exceed 0.5 Watt of power. Originally intended for the European unlicensed dPMR446 service, the Tier I standard has been expanded into radios for use in other than the dPMR446 service. No commercial launches of DMR Tier I products have been done up to date.

The DMR Tier II standard covers licenced conventional radio systems, mobile- and hand portable radios operating in frequency bands from 66 to 960 MHz. Tier II is a two slot Time-Division Multiple Access (TDMA) 12.5 kHz wide peer-to-peer repeater mode specification, resulting in a spectrum efficiency of 6.25 kHz per channel. The Tier II standard is suitable for users requiring spectral efficiency, advanced noise features and integrated IP data services in licenced bands for high-power communications.

Tier III, which builds on Tier II, operating in the 66 – 960 MHz frequency range, adds trunking operation involving multiple repeaters at a single site. The Tier III standard also specifies a two slot TDMA in 12.5 kHz channels, as well as supports voice and short messaging handling similar to TETRA and MPT-1327. Tier III also supports packet data service in a variety of formats, which includes for IPv4 and IPv6.

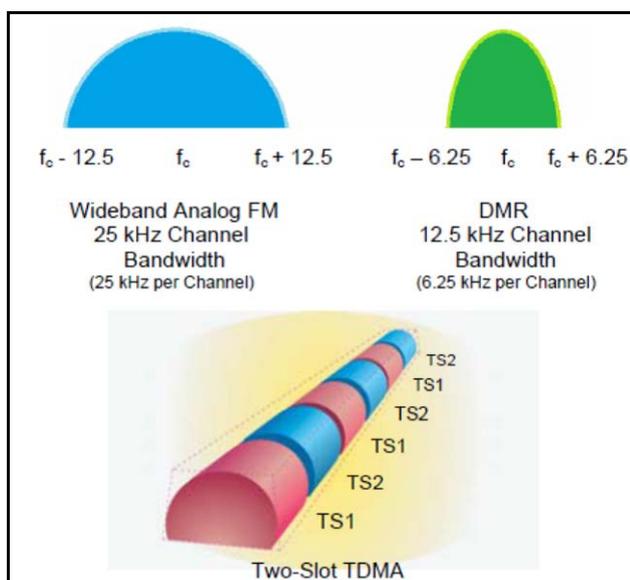


Figure by John S. Burningham, W2XAB

Sharing two channels using Time-Division Multiple Access (TDMA), both DMR Tier II and III occupy a 12.5 kHz bandwidth, resulting in a spectrum efficiency of 6.25 kHz per channel. In comparison with wideband analog FM, DMR only uses 25% of the bandwidth per talk channel, when the spectrum efficiency of DMR is considered.

Depending on the system design, each channel can carry either voice and/or data. The two channels or time slots are called Time Slot 1 (TS1) and Time Slot 2 (TS2). This implies for the amateur a single repeater which can handle two separate channels simultaneously. Currently, most amateur DMR repeaters use both channels for voice and some limited text messaging.

For repeater purposes, a single two-slot repeater offers a significant saving over two standalone repeaters, as it offers two separate communication channels, as only one repeater, one duplexer, and one antenna system is required. (Burningham W2XAB, 2014)

The two-slot TDMA for DMR uplinks (portable/mobile to repeater) uses a 30ms window for each time slot. This 30ms window is divided into a 27.5ms frame and a 2.5ms gap. Thus when transmitting, the transmitter is only turned on for 27.5ms every 60ms, resulting in up to a 40% battery savings during transmit. The DMR repeater (downlink) transmits a continuous data stream even if only one timeslot is being used; the 2.5ms uplink gap is replaced with a CACH burst (Common Announcement Channel) which is used for channel management and low speed signalling.

Typically the 27.5ms frame consists of a total of 264-bits, consisting of a 108-bit payload, a 48-bit SYNC or embedded signalling, and a second 108-bit payload for a total of 216-bits of payload per frame. The vocoder compresses 60ms of audio with FEC (Forward Error Correction) into 216-bits of data for transmission. The 2.5ms gap is used for guard time to allow PA ramping and propagation delay.

The question may inevitably be asked: in which ways are DMR more advantageous to conventional FM radio? Using analog FM repeaters, the audio quality generally degrades as a station's signal into the repeater (uplink) gets weaker. Often heard is an increase in noise bursts intermixed with the audio until the signal gets so weak that the station can no longer access the repeater, and the audio becomes so mixed with noise that no conversation can be heard.

In contrast to analog repeaters, digital repeaters ensure to a greater extent that the audio quality remains the same on the uplink and downlink until the very end of the coverage range; the audio then starts to sound broken (missing portions of the speech). This is due to lost packets on the DMR system. The Internet can also drop the UDP packets used for moving traffic between repeaters and bridges, causing the same broken audio effect. Analog static is a thing of the past using DMR.

DMR utilises Forward Error Correction (FEC) which can correct small bit errors, slightly extending the usable range and improving communication quality.

Next month will cover more on Talk Groups, Color Codes, Roaming, Simplex and Accessing a DMR Repeater.

For more information on DMR, please access the following documents which were consulted for this article:

Amateur Radio Guide to Digital Mobile Radio (DMR) by John S. Burningham, W2XAB : w2xab@arrl.net

ETSI World Class Standards : Digital Mobile Radio (DMR). www.etsi.org

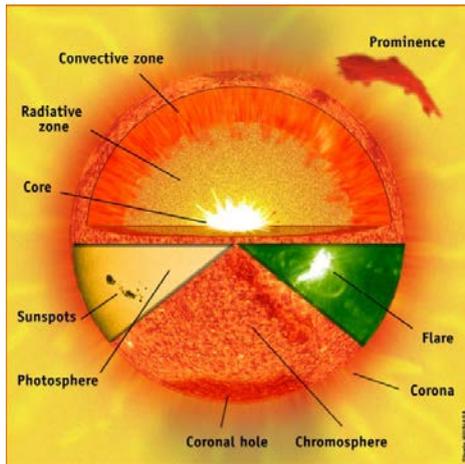
Geomagnetic and Radiation Storms resulting from Solar Activity

This subject will be covered in a series of articles condensed from a report written by a good friend who only wishes his first name, Johann, to be published. The articles in the following months will cover a variety of interesting aspects about the sun, and will include the solar cycle, coronal mass ejecta and solar winds, space weather, geomagnetic storms, solar radiation storms and protection against solar activity.

The Sun is a star. It is a rather ordinary star - not particularly big or small, not particularly young or old. It is the source of heat which sustains life on Earth, and controls Earth's climate and weather. It is the closest star to Earth, and the most closely studied. Even though astronomers have been studying the Sun for centuries, there are still some mysteries that they are perplexed by. One of the problems with studying the Sun is that scientists can only clearly observe what is on the surface. When scientists want to see what is going on inside the sun they are really limited in their methods and ways to work around these limitations are still in process.

Only the Sun's outer layers, collectively referred to as the solar 'atmosphere', can be observed directly. There are distinct regions to the solar atmosphere: the photosphere, the chromosphere, and the corona. These three regions have substantially different properties from each other, with regions of gradual transition between them. This article will focus on the regions of the Sun's atmosphere which

can be observed and measured. It's in these outer layers that the sun's energy, which has bubbled up from the sun's interior layers, is detected as sunlight.



The Photosphere

The Sun has the same chemical elements as found on Earth. However, the Sun is so hot that all of these elements exist in the gaseous state. The lowest layer of the sun's atmosphere is the photosphere. It is about 500 kilometers thick. This layer is where the sun's energy is released as light. Because of the distance from the sun to Earth, (149 million km) light reaches our planet in about eight minutes. There is not really a "surface" to the Sun. Moving from space toward the solar core the Sun is a cluster of gas which gets denser and denser. The photosphere would then represent the depth at which scientist can see no deeper toward the core.

Figure 1 Composition of the Sun

The photosphere is marked by bright, bubbling granules of plasma and darker, cooler sunspots, which emerge when the sun's magnetic field breaks through the surface. Sunspots appear to move across the sun's disk. Observing this motion led astronomers to realize that the sun rotates on its axis. Since the sun is a ball of gas with no solid form, different regions rotate at different rates. The sun's equatorial regions rotate in about 24 days, while the polar regions take more than 30 days to make a complete rotation.

The Sun's atmosphere changes from being transparent to being opaque over a distance of only a few hundred kilometers. This is remarkable given the size of the Sun, and represents such a huge change that it is often thought of as a true boundary. The photosphere is slightly different from one place on the Sun to another, but in general is has a pressure about a few hundredths of the sea-level pressure on Earth, a density of about a ten-thousandth of the Earth's sea-level atmospheric density, and a temperature in the range 4500-6000 Kelvin.

The photosphere is also the source of solar flares: tongues of fire that extend hundreds of thousands of miles above the sun's surface. Solar flares produce bursts of X-rays, ultraviolet radiation, electromagnetic radiation and radio waves.

The Chromosphere

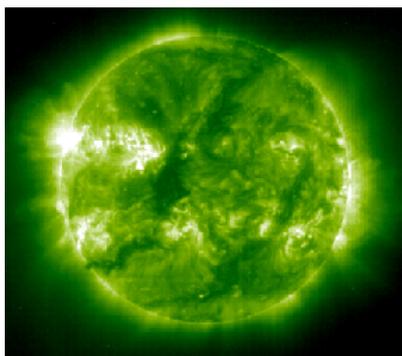


Figure 2 Chromosphere of the Sun visible with the SOHO satellite

The gases which extend away from the photosphere make up the next layer: the chromosphere. These gases are transparent to most visible radiation. The chromosphere is about 2500 km thick. The density of the gases decreases moving away from the photosphere into the chromosphere, but the temperature increases. From the bottom to the top of the chromosphere, the average temperature goes from 4500 to 10,000 Kelvin. The chromosphere emits a reddish glow as super-heated hydrogen burns off. However, the red rim can only be seen during a total solar eclipse. At other times, light from the chromosphere is usually too weak to be seen against the brighter photosphere. The most common view today is with the SOHO satellite (see Figure 2) that has several ultraviolet filters that are tuned specifically to view the chromosphere. The gas is thinner in the chromosphere and harder to detect with most Earth based telescopes.

The Corona

The third layer of the sun's atmosphere is the corona. The chromosphere merges into the outermost region of the Sun's atmosphere, the corona. The corona extends for millions of miles into space above the photosphere. Usually, the corona is not visible because of the brightness of the photosphere. However, during a total solar eclipse, the corona shines beautifully against the dark sky. It appears as white streamers or plumes of ionized gas that flow outward into space (Figure 3).



The corona has a density about 0.0000000001 times that of the Earth's sea-level atmosphere. Temperatures in the sun's corona can get as high as 2 million degrees C and because of this high temperature, the bulk of the radiation from the corona is emitted at ultraviolet and X-ray wavelengths. As the gases cool, they become the solar wind.

Figure 3 The Solar Corona seen during a solar eclipse

Temperature of the Sun

As indicated in Figure 4, the temperature of the Sun steadily increases throughout the Chromosphere and peaks in the Corona. The temperature is at it's lowest point, near 4800K in the Photosphere.

The outer layers of the Sun are hotter than the photosphere. Logic dictates that as the atmosphere thins out (gets lower in density) further from the photosphere, so should that the temperature decreases. This is one of those mysteries about the Sun that was only recently solved. There are mechanisms that pump energy below the surface of the Sun extending all the way to the Corona, particularly through the interaction of the Sun's magnetic field with these upper layers. The end result is very high temperatures far from the surface of the Sun. The photosphere is the coolest layer of the atmosphere and the corona is the hottest - rather strange, but that's the set up.

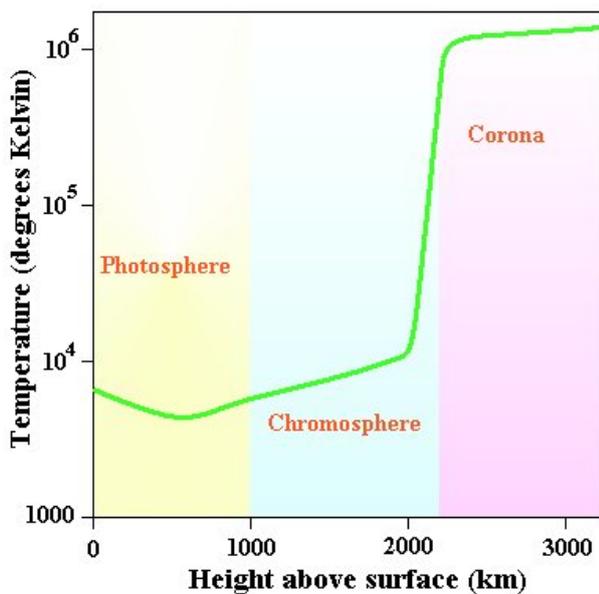


Figure 4 Temperatures in the various layers of the Sun's atmosphere

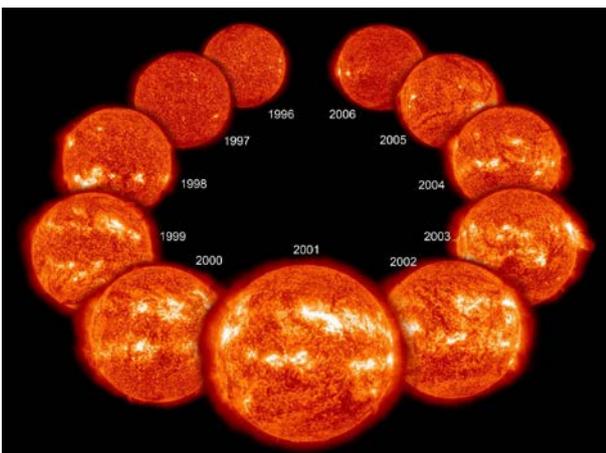


Figure 5 Photographs of the Sun during a solar cycle

The Solar Cycle

The solar cycle as depicted in Figure 5 stretches over 11 years with a period of inactivity followed by increased solar activity followed by a period of decreased activity. Records show that not all solar cycles are the same.

The variations seen within the past 50 years of the space age do not reflect the full extent of solar variability and extremes. Archival records of events in ice cores and specific modelling of the infamous 1859 Carrington event indicate that more severe space weather has frequently occurred.

It is important to collect long-term records of space weather events and space climate.

Even the ongoing and benign solar cycle minimum is unusual compared to all cycles spacecraft have encountered so far; it lasts longer, and at the same time, the solar polar magnetic field is significantly weaker than in the three previous solar minimum periods.

As a result, the Earth's ionosphere has reached its coldest state ever recorded, and the solar wind output of the Sun, which has waned over the course of the past decade seemingly independent of solar activity, has reached an historic low.

The Rookie Radio Amateur Program : By Etienne Naude ZS6EFN

The word “Rookie” means a person in his or her first year of a sport, or someone who is new to a profession, training or activity such as a rookie police officer, rookie pilot, a recruit, or occasionally a freshman or a person or in our case someone who is a newly licensed Radio Amateur.

The American Radio Relay League (ARRL) classifies a Radio Amateur Rookie as radio operators who received their first amateur license during the current year or preceding two calendar years. Well, irrespective of the letter of the definition of a Rookie, 146 prospect radio amateurs wrote and pass their RA Exam in May and will see them all being a Rookie Radio Amateur for at least the following two years.

It is also fitting to congratulate all of you who successfully passed the May RA Exam, congratulations and may you enjoy hours, days, weeks, months and years of fun filled Radio Amateur experiences and a hearty WELCOME to the Radio Amateur fraternity. Remember you are now part of a handful of licensed amateur radio operators with a unique and very exciting world ahead of you.

After an investigation and evaluation of putting together a Rookie Radio Amateur Program Etienne Naude, ZS6EFN, approached the SARL President Fritz Sutherland, ZS6SF, with a proposal of starting a Rookie Radio Amateur Program. The SARL President tabled this proposed initiative at the SARL committee meeting held on 13 May 2015. Fritz reported back after the meeting announcing that the councilors were all positive about the proposed initiative. According to the SARL President this proposal directly addresses a problem the SARL has had for years, i.e. that the majority of RAE candidates that pass, disappears and only comes back to amateur radio years later (or never).

Etienne is currently busy developing a manifest which will be forwarded to the SARL management committee for their final approval after which the program will be launched. Etienne said that he investigated similar Rookie programs under which the ARRL (American Radio Relay League) and RSGB (Radio Society of Great Britain) and that he don't want to redesign the wheel in this regard, but rather taking the opportunity to develop a unique Rookie program on a national and international level that will give Rookie Radio Amateurs a platform upon which they can build a sustainable interest and ensure future engagement.

Etienne will manage the Rookie Radio Amateur Program under the auspices of the SARL. Should you be interested to get involved and assist Etienne with the success of this great initiative, and first of its kind in South Africa, you can contact him by email at etienne@afriqid.com. This is a national program and is not aimed at a specific geographic region. Your involvement will aid in making this SARL initiative a big success.

Keep an eye on all radio amateur media and other social media platforms for news and developments on the Rookie Radio Amateur Program.

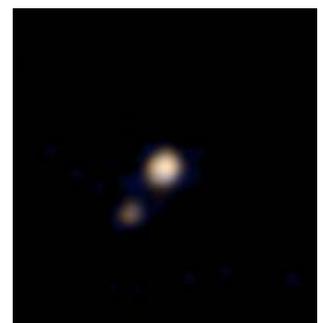
Short News Items

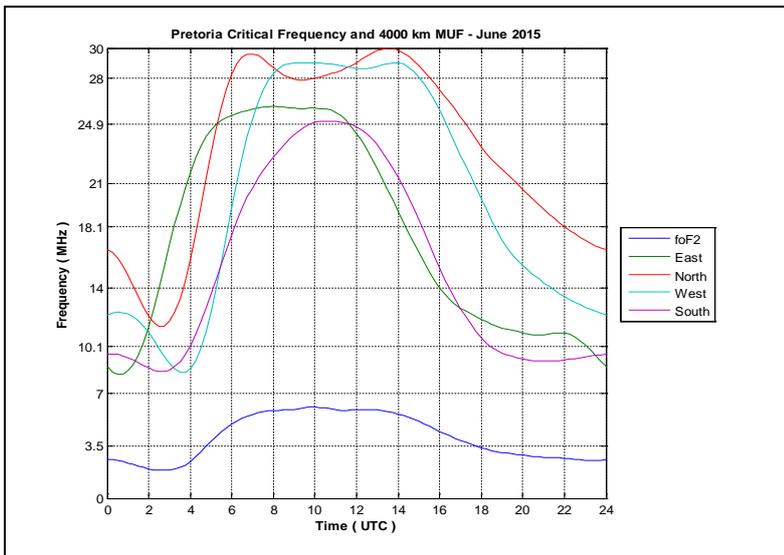


The SA AMSAT space Symposium will take place on Saturday, the 20th of June, at the Innovation Hub, Pretoria. The theme of the symposium will be “Space: the ultimate technological challenge” : *make space your technology partner in work and play*. To book for the symposium, visit the www.amsatsa.org.za website and get a discounted rate before the 10th of June. More information on sponsor opportunities for a speaker, student or learner can be obtained from Hans van de Groenendaal ZS6AKV.



The image to the right of Pluto and its largest moon, Charon, was taken on the 9th of April by the Ralph color imager on the New Horizons spacecraft. This is the first ever color photograph taken of Pluto by an approaching spacecraft. This image was taken from a distance of 115 million kilometers, which is roughly the distance from the sun to Venus. As the New Horizons spacecraft approaches its flyby with Pluto on the 14th of July, color images showing more distinct features of Pluto will be shown.





Long Term HF Propagation for June 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

C/O NELSPOORT & 801 MALMESBURY STR, WINGATE PARK, PRETORIA [S25.49.36 & E28.16.07]

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- Contact Hans at 012-333-2612 or 072-204-3991

Two antennae met on a roof, fell in love and got married. The ceremony wasn't much, but the reception was excellent.

A dyslexic man walks into a bra.

A man walks into a bar with a slab of asphalt under his arm and says: "A beer please, and one for the road."

"Doc, I can't stop singing "The Green, Green Grass of Home." "That sounds like Tom Jones Syndrome." "Is it common?" Well, "It's Not Unusual."

An invisible man marries an invisible woman. The kids were nothing to look at either.

Deja Moo: The feeling that you've heard this bull before.

I went to a seafood disco last week... and pulled a mussel.

What do you call a fish with no eyes? A fsh.

Two eskimos sitting in a kayak were chilly, so they lit a fire in the craft. Unsurprisingly it sank, proving once again that you can't have your kayak and heat it too.

Two peanuts walk into a bar, and one was a salted.

Mahatma Gandhi, as you know, walked barefoot most of the time, which produced an impressive set of calluses on his feet. He also ate very little, which made him rather frail, and with his odd diet, he suffered from bad breath. This made him "A super calloused fragile mystic hexed by halitosis"