WATTS

02-2015
Year 85 + 2m

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

I told you... It is not in the 2015 Rule Book!

In this Issue / In hierdie Uitgawe

Next Events

Club Social Meeting :

Thursday 5 February at 7:00PM at SAM's

Club Committee Meeting :

Thursday 19 February at 7:00PM at SAM's

RAE Classes for the May 2015 Examination

Starting on 20th January. Presented by Vincent Harrison ZS6BTY and Etienne Naude ZS6EFN on Tuesday evenings from 19h00 – 21h00 at the Waterlab Training Room, 41 de Havilland Crescent, Persequor Park

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
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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 – February / Verjaarsdae - Februarie

03 Willie Greyling ZR6WGR
03 Nico van Tonder ZS6AQ
04 Louis de Wet ZS6SK
07 Andre, son of Andre Coetzee ZS6GCA
14 Tobile Kani ZS6TKO
20 Ivo Chladek ZS6AXT

23 Peter Smith ZS6PJ

Spouse's Birthdays (Feb)

22 Erika, Spouse of Jan (Pine) Pienaar ZS6OB

Anniversaries / Herdenkings (Feb)

03 Vincent ZS6BTY and Heather Harrison
16 Pierre ZR6ADZ and Dienkie Britz

Lief en Leed / Joys and Sorrows

Fritz Sutherland ZS6SF is recovering well from a back operation
Jan (Pine) Pienaar ZS6OB is undergoing medical treatment
Lyn, the sw of Andre van Tonder ZS6BRC in undergoing medical treatment

Contests and Diary of Events – February 2015 / Kompetisies en Dagboek van Gebeure – Februarie 2015

05	HABEX Mission meeting at ERB Clubhouse
07	SARL@Home
07 - 08	10 – 10 International Winter RTTY Contest : 00h01 – 23h59
07 - 08	Mexico International RTTY Contest : 18h00 – 17h59
07-08	AWA CW Field Day
13	International Radio Day
14 - 15	National Field Day
14 - 15	CQ WW RTTY WPX Contest : 00h00 – 24h00
14 - 15	Dutch PACC Contest : 12h00 – 12h00
15	Closing Date for PEARS VHF/UHF logs
21 - 22	ARRL International DX Contest, CW : 00h00 – 24h00
21 - 22	REF Contest, SSB : 06h00 – 18h00
27 – 1 Mar	CQ 160-meter Contest, SSB : 22h00 – 22h00
28 – 1 Mar	UBA DX Contest : 13h00 – 13h00

Dates for 2015 PARC Flea Markets

28th March ; 2nd May ; 25th July ; 31st October : Please contact Almero Dupisani ZS6LDP for any enquiries

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

Diary of Rallies 2015 : By Johan de Bruyn ZS6JHB

2015 South African National Rally Championship – Proposed Dates

Date	Round No:	Name	Region
27/28 February	1	# Tour Natal	Kwazulu Natal
17/18 April	2	* SASOL Rally	Mpumalanga
15/16 May	3	# Secunda Motor Rally	Mpumalanga
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			

2015 FIA African Rally Championship – Proposed Dates

Date	Round No:	Name	Country
06/08 March	1	Rally Bandama	Cote D'Ivore
17/18 April	2	SASOL Rally	South Africa
15/17 May	3	Zambia International Rally	Zambia
12/14 June	4	Tanzania Rally	Tanzania
31July / 02 August	5	Rwanda Mountain Gorilla Rally	Rwanda
28/30 August	6	Pearl of Africa	Uganda
02/04 October	7	Safari Rally	Kenya
06/08 November	8	Rallye Int du Madagascar	Madagascar

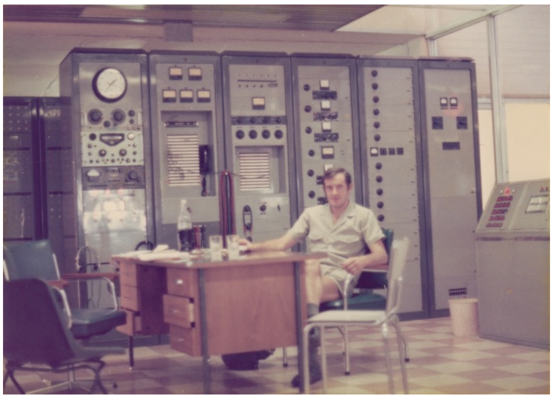
AWASA : Visit to the Bloemendal Radio Transmitter

A visit to the Bloemendal Radio Transmitter Station between Heidelberg and Meyerton, Gauteng, was organised by the Antique Wireless Association of South Africa on the 17th of January 2015. We (Pierre Holtzhausen ZS6PJH, and Louis de Wet ZS6SK, amongst others) were received by Jaap Lourens ZS6SAI and Jacques Scholtz ZS6JPS of AWASA who gave an introductory information session. We were taken inside the transmitter buildings and shown around by Andrew, the Technical Manager of the radio station. We were allowed to take photographs, but were kindly asked to only use utilize these photos for personal use, and not place it on social media. However, I thought that the photos below did not show any strategic information, while the older photo's were obtained from the internet. If you are interested in future site visits of AWASA, visit their website at www.awasa.org.za. Visits are planned for the Brixton Transmitter and the Radio Astronomy Observatory at Hartebeeshoek.

Jaap Lourens ZS6SAI

Radio RSA "Bokmakieres"

1970's photo of antennas



The Bloemendal/Meyerton Short- and Medium Wave Broadcasting relay-station is operated by SENTECH. Transmitters are operated at 25kW, 100kW, 250kW and 500kW. The transmitters are used to transmit international programs for all of Africa, by Channel Africa, the BBC World Service, Radio France International, Voice of America, Deutsche Welle, Adventist World Radio, the Swedish IBRA Radio, NHK Radio Japan, and others. The Afrikaans service Radio Sonder Grense is transmitted on shortwave from here. For more details on frequencies transmitted by Bloemendal, visit http://fmscan.org

What can you do with a Dip Meter?

If you know how to use it, a "dipper" can be one piece of equipment that can replace a whole shelf of expensive gear.

Original article by M. Bradley, K6TAF (QST, May 2002). Condensed by Louis de Wet ZS6SK.

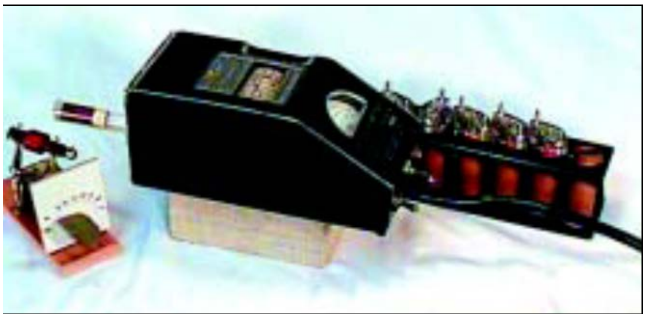
Resonance is a integral part of radio, being in an antenna, a tuned circuit, crystal, an inductor or a capacitor. If the value of an inductor or capacitor need to be determined, or if it needs to established whether a length of ¼ wavelength is at a required frequency, then all these questions can be answered by using a dip meter or "dipper". A dipper is a relatively sensitive absorption wave meter for measuring a signal frequency. Since a dipper is an oscillator, it can also be used to troubleshoot recievers as well.

A dip meter is nothing more than an oscillator with the frequency-determining coil exposed, so that it may be coupled to other electrical circuits. Included is a frequency control so that the approximate frequency of the oscillator is known, and can be adjusted. A meter or digital readout indicates the level of oscillation. Most dip meters come with a set of plug-in coils for wide frequency coverage in several ranges. Most dip meters have a control to adjust the level of oscillator activity. This control allows the operator to keep the meter indication at a convenient level over a wide frequency range. Various types of dip meters with plug-in coils are shown below.

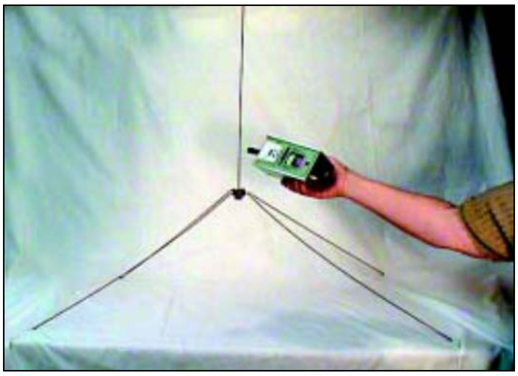
When the coil of a dipper is placed near the resonant circuit under test, some of the energy from the oscillating dipper is coupled to the circuit. This coupling reaches a maximum when the frequency of the dipper and the resonant frequency of the circuit are the same. This coupled energy is supplied by the dipper's oscillator, which causes the amplitude of the oscillator to drop.

Since the meter indicates oscillation level, a pronounced dip in the meter will be seen as the dipper is tuned through the resonant frequency of the circuit. The oscillator frequency at the minimum or bottom of the dip is the frequency of resonance of the circuit under test. The nice thing is that the circuit being tested does not have to be powered up to measure it's resonant frequency.

Placing the axis of the dipper's coil adjacent and parallel to the axis of the coil in the test circuit, results in inductive coupling. This method provides the deepest and most easily found dip on the meter. The dipper's oscillator frequency is "pulled" by the additional load of the resonant circuit – this is one of the major sources of error in making dip meter measurements.



Reading the dipper frequency with loose coupling will reduce this error to acceptable levels. After the dip is found, the coupling should be decreased (move the two coils apart) and the frequency of the dip re-checked.



Capacitive coupling, in which the axis of the coil is perpendicular to the item under test, is useful when there is no inductor present or it is difficult to get to, such as with an antenna. Using capacitive coupling usually produces a shallow dip that is more difficult to see as the dipper is tuned.

Finding the Value of an Unknown Inductor

By connecting a known suitable capacitor in parallel with an unknown inductor creates a resonant circuit. Using the dipper the the resulting resonant frequency can be found. By using fixed-value 5, 20, 100 and 200pF mica capacitors as reference capacitors with a dipper, resonant circuits can be made. Once resonance has been found, the value of the inductor can be found from the following equation:

$$L = \frac{1}{4\,\pi^2 f^2 C}$$

π = 3.1416 or $4\pi^2 = 39.48$
f = frequency in MHz
C = capacitance in µF
L = inductance in µH

Finding the Value of an Unknown Capacitor

Similar to the unknow inductor, a resonant circuit is made with the unknown capacitor and an inductor with a known value. Once the resonant frequency of the circuit made is determined, the value of the unknow capacitor is calculated as follows:

$$C = \frac{1}{4\,\pi^2 f^2 L}$$

π = 3.1416 or $4\pi^2 = 39.48$
f = frequency in MHz
C = capacitance in µF
L = inductance in µH

The frequency range of the dipper and the values of the known inductors may be a limiting factor to which capacitance values can be measured. The largest value of capacitance which can be determined using a dip meter is approximately 1 nF (1000pF).

Measuring Quarter- of Half-Wavelength Transmission Lines

The physical length of ¼ wavelength of a coaxial cable may be calculated using the following equation:

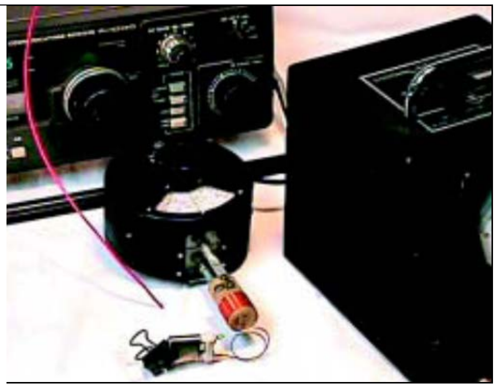
$$1/4L = (246/f)\ VF$$

VF is the velocity factor of the coaxial cable (assumed to be 0.66)
f = frequency in MHz ; L = length in feet

To prepare a ¼ wavelength section of cable, calculate the length of cable using the above equation (including the length of any connectors or adaptors), add a few percent, and cut. Short one end with a loop and leave the other end open circuited. Couple the dip meter to the loop and look for the lowest frequency dip. This is the frequency at which the cable is approximately ¼ wavelength long. Please refer to the ARRL Antenna Book to obtain a more accurate method which replaces the loop with a series tuned circuit that resonates at the desired frequency.

Measuring Crystals

A crystal's resonant frequency can be found by inductively coupling it to the dipper. The Q of a crystal is very high, therefore the dipper must be tuned slowly and watchfully. Because of the high Q, the dipper's frequency may be pulled significantly. To make sure, listen to the dipper on a reciever during a test. A meter of wire lying in the area of the dipper and hooked to the antenna terminal of the reciever is sufficient coupling. Be sure that the BFO of the reciever is on. The crystal frequency found by this method will not be exact, but will usually be within 0.2%. The crystal's frequency can be specified only to operate in a circuit with a specified capacitance.

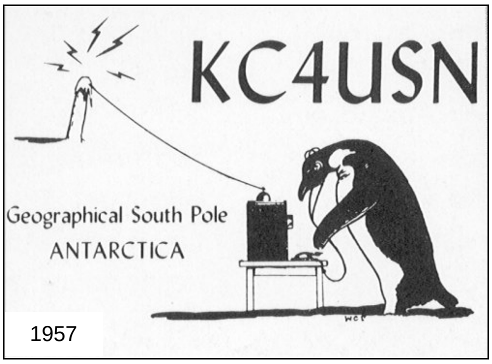


Use a calibrated receiver to monitor the dip meter's exact frequency while a crystal is "dipped"

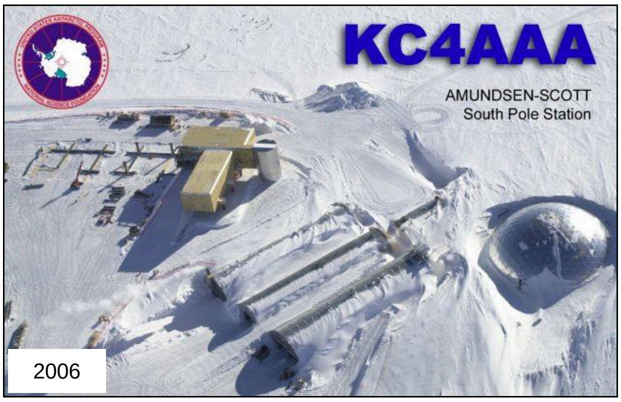
In closing, hopefully this short presentation has created some interest in dippers, and will stimulate the discovery of other applications. For those of us pursuing our amateur radio hobby on a tight budget, the dipper represents great value for money. Although the dipper is not inherently extremely accurate, but with good technique and attention to detail, errors can be reduced to minimal levels.

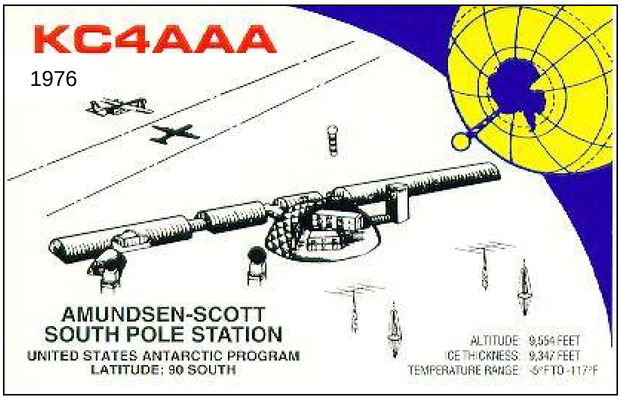
CQ KC4AAA calling form the South Pole

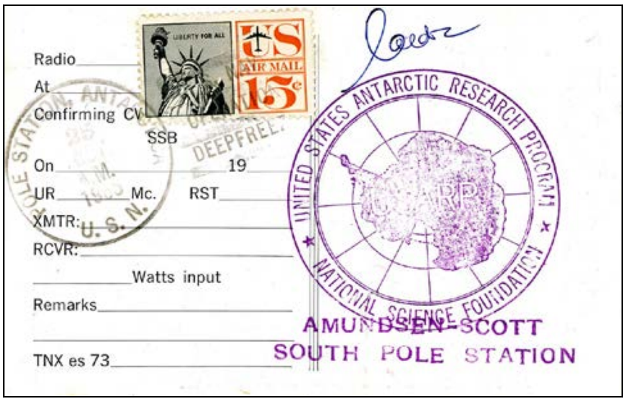
The South Pole must be the most isolated spot on the face of the Earth. After Roald Amundsen reached it in 1911, it was not until March the following year that the world learned of his great feat.



Such was the shortcomings of communications in the heroic age of polar exploration. Even though communications have improved significantly, due to the furthest south geography of the South Pole, the earth's curvature blocks the vast majority of satellites from being visible above the horizon. Currently, the Amundsen-Scott South Pole Station uses two satellites for broadband communication. The first is the GOES (Geostationary Operational Environmental Satellite), and the other a system owned by NASA. These satellites are used for transmitting of science data, telephone calls, internet and medical and administrative activities.





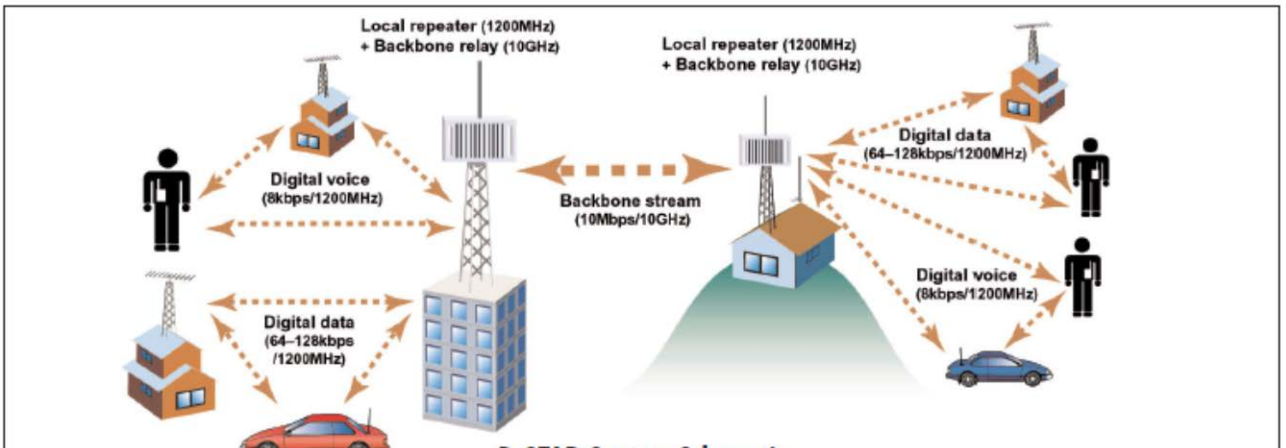


If all other forms of communication fail, the crew at the South Pole Station still has Amateur Radio, if atmospheric conditions are favorable. When the Amundsen-Scott South Pole Station was first established in 1956, amateur radio was the only means of communication, and communication satellites did not exist. The first call-sign was KC4USN, shown by the QSL card from 1957. The current call-sign is KC4AAA, and various beautiful QSL cards have been produced, as shown above. Various contacts were made with the ISS (International Space Station) by Radio Hams from the South Pole Station, and even a moon bounce attempt was successful using a make-shift antenna and a 200W signal aimed at the moon. See https://southpoledoc.wordpress.com & http://antarcticsun.usap.gov

South Pole Station Radio Ham are active in contests, as seen far left with the team who participated in the 2006 ARRL Field Day. On the right, operators Nick Powell, Henry Malgrem and Skip Withrow are seen in the ham room. Ham radio has been in continual use for more than 50 year at the South Pole.

D-STAR : Digital Smart Technology for Amateur Radio

In the following months, we are going to explore what D-STAR is, and which developments in terms of transceivers and repeaters have taken place. This presentation is a short reproduction of illustrations produced by Icom showing the features and advantages of D-STAR. Coming articles will deal with a definition of D-STAR and it's applications, followed by detailed aspects such as equipment and applications.



D-STAR System Schematic

ICOM introduces the next generation digital amateur radio system – the D-STAR system. The D-STAR system provides digitally modulated voice/data communication and high-speed data access over the air. This project has been developed in collaboration with JARL (Japan Amateur Radio League) and is supported by the Japanese Telecommunications Administration. ICOM has begun field tests on D-STAR.

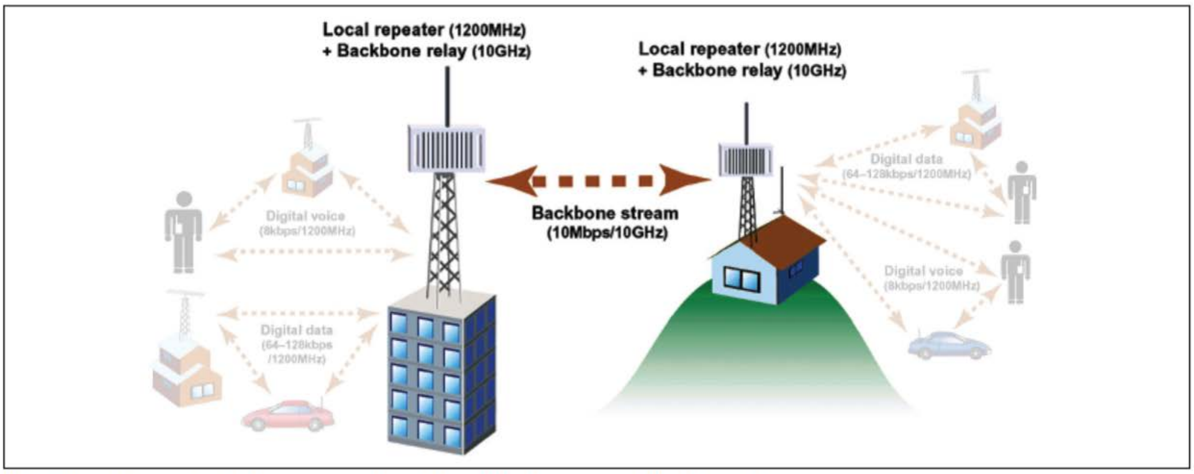
Fundamental Plan of the D-STAR System

The D-STAR system brings the advantages of high-speed digital modulation to Amateur Radio. All of the transmissions including voice and pictures are digitally encoded. Digitally modulated voice is transmitted at 8 kbps and digital data is transmitted at 128 kbps (max.) from terminal to terminal or to a repeater. Repeaters can be linked up with a 10 Mbps backbone in the 10 GHz band, providing a multi-site repeater system. The transceiver can have an Ethernet cable port, which provides direct connection to a PC, router, hub or other network devices. The resulting system seamlessly transmits high-speed IP compliant data and digital voice. Amateur radio operators now have a system that will allow them to explore the benefits of wireless high-speed integrated digital connections. Potential applications are only limited by your imagination, but certainly emergency services and amateur Digital TV quickly come to mind.

Features of the D-STAR System

- Digitally-modulated voice and data communication
- High-speed 64–128 kbps data access
- Complies with IP connection
- Repeaters can handle both digital and analog voice
- System operates on multi-site and backbone connection

D-STAR FEATURES



Versatility and expansion of the system is achieved through local repeaters and backbone relays.

DIGITAL REPEATER

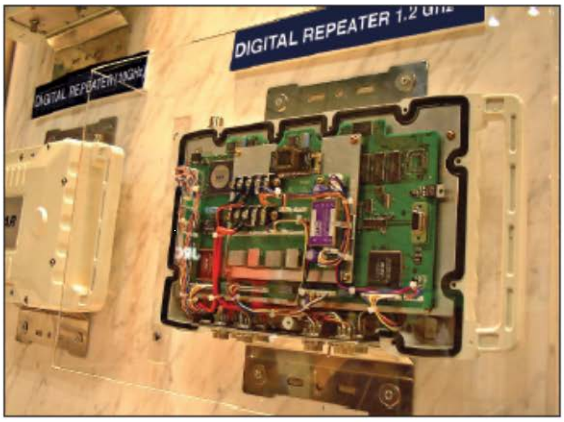
Because the digital repeater is indispensable for the practical use of a digital transceiver, ICOM has also developed a digital repeater for the D-STAR system.

The features of the digital repeater:

- Full-duplex voice service (20 MHz shift)
- Time division multiplexing on data mode
- Repeater handles analog (FM) voice and switches over to digitally modulated voice, and vice versa when necessary
- Multi-site repeater system with 10 Mbps backbone in the 10 GHz band
- Repeater accepts 10Base-T Ethernet cable connection
  - Remote control capability from PC over a network
  - Gateway function from the air to a wired network

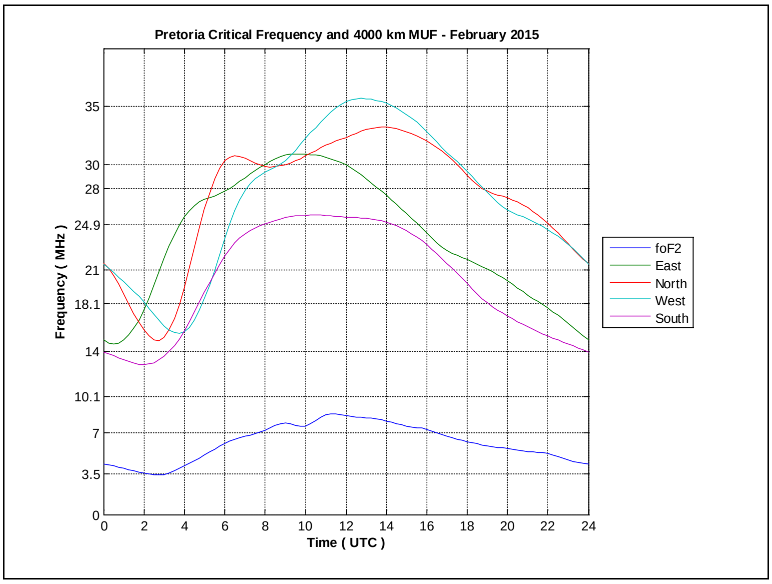
Application example:

- 128 kbps Internet access
- Digital Voice Mobile to traditional Analog FM HT Connection
- Nation-wide high-speed backbone system
- Amateur Digital TV



ICOM's digital repeaters, 10 GHz and 1.2 GHz.

ICOM's Microwave Backbone Digital Repeaters (10 GHz, 1.2 GHz) and Parabolic Antenna



Long Term HF Propagation for February 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

Amateur Radio Hall of Fame : Thor Heyerdahl and the Kon-Tiki Expidition

The *Kon-Tiki* was the raft used in 1947 by Thor Heyerdahl, a Norwegian explorer and writer, to sail across the Pacific Ocean from South America to the Polynesian islands. Named after the Inca sun god Viracocha, the expedition attempted to show that this journey could be achieved using only the materials and technologies available to those people at the time. Although modern equipment such as radio, watches, charts, a sextant and metal knives were carried on the expedition, Heyerdahl argued that they were incidental to the purpose of proving that the raft itself could make the journey.

An amateur radio station with the call sign of LI2B was based on the Kon-Tiki, and operated by two former World War II Norwegian resistance radio operators, Knut Haugland and Torstein Raaby. Regular communications were made with American, Canadian and South American stations. On August 5 1947, Haugland made contact with a station in Oslo, Norway, 16 000km away. Power to the Kon-Tiki transmitters, which operated on the 40-, 20, 10- and 6-meters bands, were supplied by batteries and a hand cranked generator. Each transmitter was water resistant, used 2E30 vacuum tubes, and provided 6W of RF output. Other transmitters included a British 3-16 MHz Mark II and a VHF Gibson Survival radio to communicate with aircraft on 500 and 8280 kHz.