Radio ZS

Volume 60 No./Nr 1

January - March 2007
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Amateur Radio - Communication Technology in Action

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SOUTH AFRICAN RADIO LEAGUE
SUID-AFRIKAANSE RADIO-LIGA

RADIO ZS

FRONT COVER / VOORBLAD

SARL HF Field Day, November 2006
Beavan, ZS2RL, Garth, ZS2HB, ZS2LR, Donovan, ZS2DL, Chris, ZS2AAW, Dick, ZS2RS, Cyril, ZS2EJ, standing Trevor, ZS2AE and Pieter, ZS2PL

SARL HF Velddag, November 2006
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Hamnet
Francois Botha ZS6BUU

Awards / Toekennigs
Tjerk Lammers ZS6P

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BHF/UHF Bandplan en Herhalers
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Silent Keys Stil Sleutels

They shall grow not old as we that are left grow old
Age shall not weary them nor the years condemn
At the going down of the sun and in the morning
We will remember them."

Hulle word nie oud soos ons wat bly vergrys,
Die jare sal hulle nie raak nog die tyd se eis
En, soos die son sak of die more ontvou,
Eer hul herinnering – ons sal onthou."

Ben van den Berg, ZS6BDU
Keith Fenton, ZS1YC
Bert Belling, ZS5AO
Henry Fourie, ZS4W
John Gandy, ZS4JC, ex ZS5JC
Reg Hartlief, ZS6ALH
Frans Heidler, ZS4AE
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Albert Dragt, ZS6JU

CQ de ZS6GJH

We are well into 2007 and have seen the first success of our focus on the entry-level amateur radio licence. The objective of our focus is to reduce the entry time and complexity of getting into amateur radio yet provide the newcomer with enough knowledge and operating skills to enjoy the frills and fun of amateur radio. The ZU license provides loads of scope for this and for many people it will be the stepping-stone into the full ZS licence.

To bring the ZU call signs in line with the ZS call areas, the SARL has worked with ICASA to achieve this. ZU call signs are now allocated in the ZU1 – ZU9 range. Existing ZU1 call signs have already been reallocated and are now in line with ZS and ZR call areas.

Looking at the first ZU examination held on 1 March, the results are excellent. The youngest student to pass was 12 years old and the oldest between 70 and 80, 10 students under 20 passed and 7 between 20 and 30 years old. Then largest group to pass were between 30 and 40 years old with 21 successful candidates. The pass rate in the examination was 80%.

We are continuing our drive to encourage the younger generation to join our ranks. The SARL is planning an exciting on-the-air event on youth day (16 June) with Mark Shuttleworth joining us from his office in London to give South African youth an opportunity to talk with South Africa's first astronaut. We invite all clubs to plan an open day and to set up amateur stations at schools and local shopping malls. This is an advance invitation to join us on the largest youth for amateur radio event ever held in South Africa.

Our Annual General meeting will take place on Saturday 14 April 2007 at the National Amateur Radio Centre and the Sentech Conference Centre. Full details have been sent by Email and for members who have not yet access to email by ordinary post. While I would like to see all our members to attend, distance and travel logistics make that impossible. We will however be streaming the major portion of the meeting on the Internet and Echolink as well as transmit the proceedings on HF frequencies. Listen to SARL News for the details and frequencies.

We have taken our Radio Technology in Action programme for 2007 to a new level with a number of very exciting topics presented by experts in their field. We have also included the Free State in this year's road show schedule. The dates are as follows: Kwazulu-Natal, 21 April 2007; Eastern Cape, 19 May 2007; Western Cape, 2 June 2007; Free State, 21 July 2007 and Gauteng, 18 August 2007

The RTA is a road show for all amateurs and an ideal opportunity for members to bring non-members and introduce them to the SARL and our activities. The charge is a nominal R20 with students and learners attending free of charge. I look forward to seeing you at the AGM and at the RTA in your area.

73 Graham Hartlett, ZS6GJH

Ham Pride: Our Legacies and Traditions

By Dave Ingram, K4TWJ

We occasionally hear fellow amateurs say they thoroughly enjoy on-the-air operations, but lack an electronics background for fully understanding technical details of modern equipment. Is that a deficiency? Absolutely not. Every amateur has a special place only he/she can fill in our great hobby/service and "technical know how" is not mandatory. The following tale exemplifies that statement. Remember it and pass it on to future generation amateurs later in years as one of our proud legacies.

Although a little known fact, telegraphy and the Morse code were not invented by a technical genius, but by an artist and portrait painter. That's right friends: Samuel F. B. Morse was an internationally recognized artist. While travelling between Europe and North America, he met Joseph Henry plus several other pioneers in electromagnetism. Soon afterwards, he devised an electromagnetic signalling device that worked by moving a metal-cased pin from side-to-side of a painter's canvas while it was being slowly drawn through a windowpane type stretcher. Like every innovation or invention, a series of small and natural steps followed. First, Morse devised a dot/dash code for converting pen movements into letters and words transmitted over wires. Then Morse's assistant Alfred Vail designed and built a full mechanism key to replace the crude strap key Morse had quick-devised to use with his setup. Noting the difference in sound between dots and dashes, Vail also built an electromechanical sounder, to replace Morse's original pen-and-canvas setup. Telegraphy was then off and running. Quick-formed telegraph companies on several continents began installing telegraph lines across sparse lands. Hundreds of small telegraph companies, most without interconnecting lines quickly flourished. In many cases, runners hand-carried messages between companies lacking interconnecting lines. As time progressed, the largest telegraph company purchased hundreds of small telegraph companies and combined then all under the now internationally recognized name of Western Union.

The next big step was Marconi's development of spark gap communications, or wireless telegraphy. A slightly modified form of Morse code - using different combinations of dots and dashes for a few letters to permit easy copy with

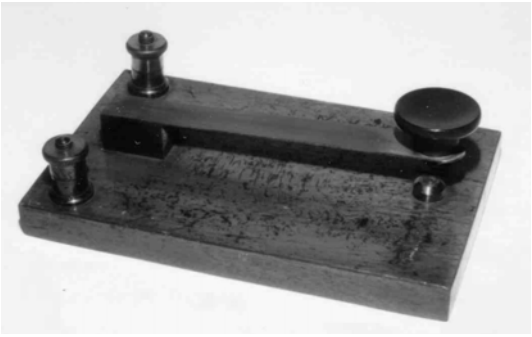
(Continued on page 8)

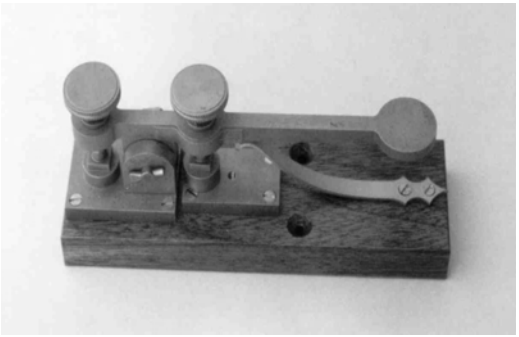
(Ham Pride from page 7)

an earphone followed. That international version of Morse code prevailed, and is still proudly used by radio amateurs today. It has relayed desperate messages by radio, by hammer taps on sinking submarine hulls, via eye blinks by paraplegics and prisoners of war, and more (original text messaging!). Many radio amateurs even carry medic-alert cards illustrating the Morse code and explaining if severely injured, but able to move any body part, they can communicate via Morse code. Simply stated, this is a mode that promises to live forever!

The top key in our accompanying photograph is representative of Samuel F. B. Morse's original "strap key." Although simply a piece of spring brass tapping a metal contact on a wood base, it stands as an easy-to-copy piece of communications history worthy of gracing any office or home desk. The bottom key is an authentic R. A. Kent Company reproduction of the full mechanism key Alfred Vail made, named the "Correspondent" and gave to Morse for use in his work demonstrating of telegraphy (approximately 1844). Adjustment screws are large and coarse, the arm's pivot rod is held in place with a small cotter pin and the arm's end is flattened rather than fitted with a knob, but it represents a piece of telegraphic history you can hold in your hand. The key also inspired over a hundred years of art in brass key designs that continue alive today.

Author Dave Ingram, K4TWJ, is one of today's most active, enthusiastic and well-known radio amateurs, with over 800 articles and 26 books on amateur radio to his credit. He presently writes three columns in CQ Magazine (of the U.S.), designs QRP kits and operates 30 and 20 meters CW daily. You can see more of his work at http://k4twj.blogspot.com.





Horace Dainty, MBE (1916 –2006)

Brian Austin G0GSF (ex ZS6BKW)

Horace Dainty, ZS5C (ex ZS6IY) was born on 6 March 1916 and passed away on 4 December 2006 in Umhlanga.

Horace started the Radio Electro-Equipment Company in Durban before the Second World War and produced numerous radio transmitters and other equipment for the Union Defence Force (UDF). Once British-made equipment started to arrive, he then closed his company and "joined up," becoming a second lieutenant in the South African Corps of Signals (SACS). He served in the Western Desert where he was ultimately in command of a mobile radio repair facility in 3-ton trucks that kept the WS No 19 sets going in the UDF tanks. When the 6th SA Division moved to Italy, Horace was there in the thick of things and his services were recognised with the award of the MBE by the war's end.

On his return home, he restarted his company, which soon expanded and became SMD Pty Ltd. From those beginnings, great things were to follow. SMD, as well as manufacturing a range of domestic radio equipment, produced the RT-422B SSB transceiver in the early 1960s. It went into service with the Rhodesian Army as well as the National Parks Boards of both South Africa and Rhodesia. The RT-422B also provided the backbone of the communications for the Portuguese forces then active in Mozambique. Then, with Dave Larsen as his chief design engineer, the company produced what is arguably the world's first SSB man pack, the RT-14, in the mid-60s. This set became the TR-28 in South Africa and, even more importantly, the Squadcal when Racal UK manufactured it. At about this time SMD became part of the Racal Empire, first as Racal SMD and then as Racal Electronics South Africa when the company relocated from Durban to Pretoria. Horace was its Managing Director and then Chairman until his retirement in the 1970s.

It should never be forgotten too that SMD made the first six pre-production models of the famous Wadley receiver following its invention by Trevor Wadley at the CSIR (NITR). It ultimately became the Racal RA-17 in the mid-fifties. That equipment and the TR-28 / Squadcal man pack actually put Racal UK on its feet.

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A Custom built UHF to VHF Downconverter

By Jacques Roux ZR1ADC

Introduction

This document describes the design, building and testing of a prototype 70 cm UHF down converter to interface to a 2 m VHF radio for the reception of the new Sumbandilasat UHF signals.

Most UHF downconverters uses a harmonic of a crystal oscillator as the mixer driver to down convert a UHF signal to lower frequencies where affordable equipment can be used to demodulate the signal. In this design, an affordable PLL synthesizer using an IC that contains an onboard VCO was used to generate the oscillator.

Specifications

The following specifications were derived for the downconverter.

Input bandwidth	435 – 438 MHz
IF bandwidth	145 – 148 MHz
LO frequency	290 MHz
NF	<1 dB
Gain	>15 dB

Design

Preamplifier (LNA)

A cheap low NF dual gate mosfet was chosen as the preamplifier device. Due to the large input and output impedance of the gate and drain a single stage-matching network can achieve narrowband selectivity, especially at the input to alleviate IMD caused by close by SA Police radios at about 420 MHz.

Mixer

The same dual gate mosfet was used for the mixing circuit where the gate 2 is used to feed the oscillator signal and this provides some isolation between LO and RF ports.

A 47-ohm resistor on the drain of each dual gate mosfets is used to stabilize these active devices.

Local oscillator (LO)

Normal PLL synthesizers consists of an IC which implement most of the PLL functions (phase detector, dividers, etc) and a separate VCO (either designed or COTS) and a reference oscillator. For this 290 MHz oscillator circuit a PLL+VCO IC (ADF4360-8) is used because of the availability and price (about R30). A test was done to investigate its phase noise characteristics as it was thought that it will deteriorate the sensitivity due

(Continued on page 11)

(UHF to VHF Downconverter from page 10)
to mixing of noise into the passband (reciprocal mixing).

The PLL is setup with the following parameters:

Phase detector frequency	2 MHz
Loop filter BW	50 kHz
Core current	3 mA
Power level	-12 dBm
CP gain current	2.5 mA
L10 and L11	2 7 n H

0805 SMD inductors for proper oscillator frequency

The LO signal is amplified to a level of about 7 dBm into 50 ohm load by a matched common emitter BFR93A amplifier.

At UHF frequencies, the oscillator needs to be very stable and therefore a TCXO with 5 ppm stability is used as a reference. Normal crystal oscillators have stabilities of about 50 ppm, which will be inadequate for a narrowband UHF application.

An 8 pin AVR ATTiny12L is used to program the PLL.

Filtering

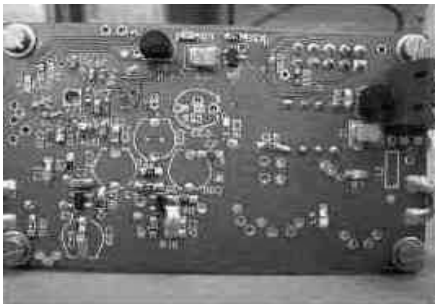
Input filtering is achieved by the matching circuits at the input of the LNA, input of the mixer and IF output. Additional Low pass and high pass networks at the IF is used to improve selectivity more especially if no filtering is found on the 2m receiver.

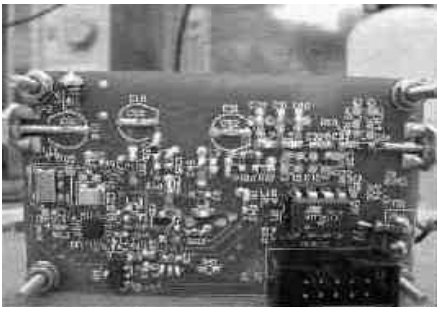
Construction

The whole project was implemented on a double sided through hole plated (THP) PCB using 0805 and 0603 (surface mount) SMD components. SMD components are necessary for proper decoupling of the SMD LO IC. A relative easy solution is used to mount the QFN ADF4360-8 package with the GND paddle underneath on a PCB for proper GND. This IC is actually mostly used on 4 layer boards with the IC being mounted using solder paste on the bare PCB and the PCB baked with a certain temperature profile. A 1.6 mm 2 layer PCB causes grounding problems due to the 1.6 mm length vias. The components that needed proper grounding (especially two dual gate mosfets – Q1 and Q2) were placed on the GND layer side of the PCB.

The following pictures show the populated PCB's two sides (GND layer side left and component side right).

(Continued on page 12)





(UHF to VHF Downconverter from page 11)

To do the soldering of the SMD components, tweezers, glasses and a fine point soldering iron is needed.

Provision was made for tuneable capacitors at all the matching networks and was later replaced by the correct value capacitors and then tuned by pulling and pushing the air core inductors using tweezers.

Firstly, the regulators are soldered and tested to give out the correct voltages. Secondly the LO section is populated and tested using a parallel port and computer software provided by Analog Devices (ADF4360.exe). If the loop filter is correct and the device was soldered properly the LO should lock at 290 MHz for the designed parameters of 2 MHz phase detector frequency. The ATTiny12L AVR can now be programmed with the correct code to setup the PLL whenever power is applied for the first time.

A modification on the PCB was done for the VCO 3V3 supply. The 3V3 supply of the digital part of the PLL was also used as the power supply for the VCO. The "filtered" VCO power supply (Q4) did not allow the PLL to lock at its programmed frequency.

The rest of the components are soldered and tuned for optimal gain and NF.

The total cost of the project is in the range of R300 depending if you take a packaged or open PCB design. Connector types also influence the cost. The prototype uses two SMA connectors (R30).

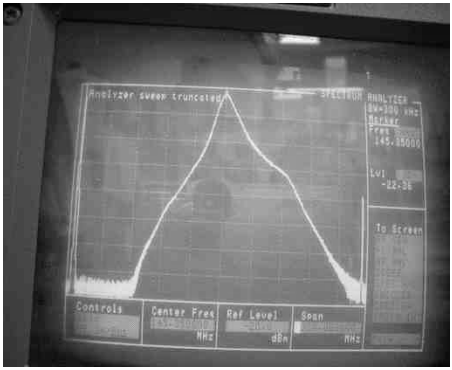
The most expensive components are the TCXO (R60 from Arrow Altech), PLL+VCO IC (R30 from Avnet) and the PCB (about R50).

The DC power supply via the IF line was also not implemented.

A voltage of higher than 10.5V is necessary for the downconverter to operate properly.

Performance

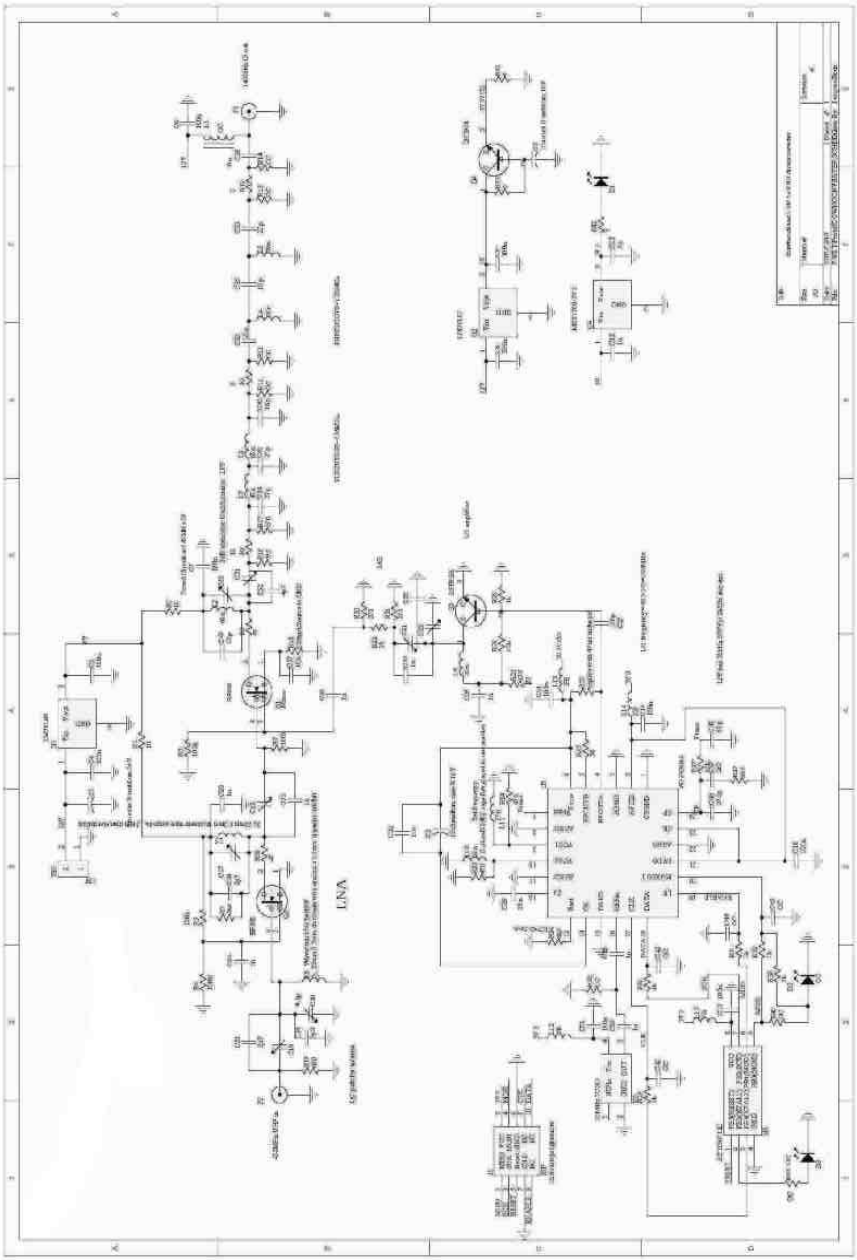
The downconverter gain was measure to be about 17 dB and the NF < 1 dB. A frequency response of the downconverter is provided in the following figure.



When the unit was connected to a 2 m Motorola mobile transceiver, a sensitivity of -118 dBm for 20 dB SINAD was measured.

Spurious ('birdies') were found at intervals of 2 MHz (Phase detector frequency) away due to improper layout and or shielding! At about 420 MHz a -40 dBm signal needs to be injected on the spurious frequency to hear the modulated

(Continued on page 14)


LNA

(UHF to VHF Downconverter from page 12)
tone.

Conclusion

The prototype is working as a solution to the 2006 SA Amateur Radio Development Trust Construction Competition. The only shortcoming is that of the LO spuriouses that can be improved by better PCB layout and proper VCO shielding.

It is suggested that a more affordable single channel FM demodulator be constructed as a cheaper alternative to this UHF downconverter that needs a 2 m receiver. This UHF downconverter can be used as a basis and adding a 21.4 MHz IF demodulator using the MC33xx or NJM33xx range of FM demodulator ICs and audio amplifier can implement a complete single channel receiver which will be a suitable and affordable solution for listening to the UHF Sumbandilasat signals.

References

www.hamtronics.com – R305 schematics and LNG-450 schematics
www.analog.com – ADF4360 programming software

Visit www.amateurradio.org.za to

SARL HF Field Day Expedition PEARS Caravaners & Others

Chris Scarr, ZS2AAW

An idea was raised to gather as many PEARS caravan owners for a possible HF Field Day station to tale part in the November 2006 leg of this national contest. After some email consultation with known caravan owners, the Willows caravan and camping resort was chosen since it has luxury caravan stands and chalets in close proximity. Some non-caravaners showed an interest in joining the activity, so the option of chalets for these members was ideal. As time drew closer, equipment lists were refined, bookings made and deposits paid.

On Friday 17 November, some of the permanent loafers arrived at Willows to start setting up camp. Later that afternoon, the working class managed to arrive after skimping some hours off saltmine duty. Without much delay, the caravans were arranged and a full tent was pitched behind the van of Chris, ZS2AAW. After setting up camp, the all-important socializing was the main priority. Those attending were Garth, ZS2HB and Elize; Beavan, ZS2RL and XYL; Chris, ZS2AAW and ZR2VM; Donovan, ZS2DL and Rosalie, ZR2RL; Dick, ZS2RS; Trevor, ZS2AE and ZR2EY; Ken, ZS2BWB and XYL; Pieter, ZS2PL; George, ZR2GLP and XYL, with a visit from ZS2GRL and ZS2LR and XYL all the way from Uitenhage.

On Saturday morning, a 3 m pole soon replaced the front jockey wheel, with HF vertical attached. An

(Continued on page 15)

(PEARS Caravaners from page 14)
additional 6 m pole carried the multi-band inverted vee and long wire antennas. Two steel tables and numerous 100 Ah batteries, solar panels, earth spike, rigs, laptop and a PEARS banner completed the equipment installation. Being mooted as a family get-together, the younger ops of the various families set about turning the grass area into their playground, while the older ops converted the tent into theirs. The kids soon expanded their little group to include other children looking for something fun to do. It is always great to see children having such great fun (as could be seen on Donovan's face behind the CW key too!).

Final adjustments were made to antennas before the contest got underway at midday. HF conditions were not great, but operators had some success on both phone and CW, although the CW side was definitely left to the likes of Donovan, ZS2DL and Garth, ZS2HB, some of our clubs top CW operators. It was great to welcome Jim, ZS2LR as a visitor to the operating van. Jim runs the club BBS forwarding station, and is a keen HF operator himself. He spent a few hours socialising with the chaps before returning home.

A communal braai area was set up in front of the operating tent, and all the folks gathered around on the Saturday evening for a lovely social chinwag. Donovan, ZS2DL put in a sterling contesting effort late into the Saturday evening, and Dick, ZS2RS took up the reigns from early Sunday morning, raking in a number of voice contacts in his four-hour stint. By mid morning, all the contacts that could be made were made, so we began to slowly dismantle the station.

Notwithstanding the Easterly wind, and spots of rain on Friday, comments on the weekend were all extremely favourable. One ham's comment was that "this was the most fun he had ever had with amateur radio since being in the Eastern Cape." So even if the contest log is not submitted – the weekend was a sure winner for those that attended. Thanks for your support.

'n Harnas vir Sasolburg ARK se herhalers

Johan Steyn, ZS4SS

Soos dit goeie radioamateurs betaam, kuier ek en Frans, ZS4FD op reëlmaat oor en weer en gesels meeste van die tyd oor die stokperdjie. Tydens een van hierdie kuiertjies het Frans dan ook met die gedagte vorendag gekom om 'n agt vlak-dipoolstelsel op te rig by Leeukop. Om agt dipole op te rig is by meeste herhalerpersele onmoontlik weens die feit dat mens 'n mas van 30 tot 40 meter hoog moet hê om hierdie antennas te akkommodeer. Hierdie hoogte mas is wel op Leeukop beskikbaar, die mas daar is omtrent 33

(Vervolg na bladsy 18)

DIAMOND ANTENNA

Radio Accessorie

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bhi NES10-2 Noise Eliminating Speaker
Incorporates Digital Signal Processing to remove unwanted noise and interference
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Noise cancellation 9-35dB
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(Sasolburg ARK vanaf bladsy 15)

meter hoog, en saam met die toerusting, behoort dit geheel en al aan die Sasolburg radioklub.

Frans het eerstens toestemming by die klub gevra om met die projek voort te gaan, en daarna het hy begin bou aan die antennes. Daar is na sorgvuldige oorweging en beplanning besluit om materiaal te gebruik wat 18 mm vierkant is. Die rede hiervoor was omdat hy baie ou televisie-antennes opgegaar het deur die jare en die materiaal by hom rondlê en nie gebruik word nie. Volledige bespreking met diagramme van die antennes verskyn aan die einde van hierdie artikel.

Soos almal seker weet het ons die buite-herhalers voor verlede Kersfees (2005) gediens om alles reg te kry vir die Kersseisoen wanneer daar baie amateurs op die pad is. Die herhalers het net 'n paar weke gewerk, toe is altwee van die lug af.

Aan die begin van Maart het ek besluit dat ons moet gaan kyk na die herhalers en Vrydag 3 Maart is ek en Frans deur om Renosterkop se herhaler te gaan vervang of reg te maak. Die spaar-herhaler is by Ockerd, ZS6LZ opgelaai en daar gaan ons. Daar aangekom, vind ons uit dat die ko-akskabel plus die antenne verwyder is deur een van die tegnici. Renosterkop-perseel behoort aan Hennie, ZS4ZA van Kroonstad en hy bedryf kommersiële radio- en sekuriteitstelsels vanaf die perseel. Die antennes en ko-aks kabel wat in die verlede gebruik was, het aan sy organisasie behoort en was goedgunstiglik aan ons geleen. So keer ons onverrigter sake terug. Op pad terug stel Frans toe voor dat ons vier van die agt antennas moet neem en op Renosterkop gaan installeer.

Vrydag 10 Maart is ons toe weer na Renosterkop. Frans het die toring geklim en ek het onder gebly om alles vas te maak. Een vir een is die antennas opgehys en op hulle regte afstande uitmekaar vasgemaak aan die toring se westelike been. Die rede hiervoor is sodat die antennes aan die kant van die toring is wat na die N1-hoofpad kyk, die hoofdoel van die herhaler is om die N1 te bedien. Later is die harnas wat die antennes verbind opgetrek en gekoppel asook die stuk 13 mm "Cellflex" kabel na die herhalerhuisie. Terwyl Frans die ko-aks vasgebind het aan die toring, het ek opgeklim en die ou 70 cm antenna verwyder en toe weer die nuwe antenne opgetrek en vasgemaak. Hierdie takie het ons ongeveer ses ure geneem en die twee "ou" manne was omtrent pootuit. Op pad terug het ons met soveel as moontlik gesels en die herhaler nog geskakel tot ongeveer so 10 kilometer vanaf Sasolburg.

Viervlak-dipole is die algemeen aanvaarde norm vir herhalergebruik en het in die orde van 8 tot 9 dB wins oor 'n kwartgolf grondvlak. Die antennas is omnidireksioneel, redelik goedkoop en eenvoudig om te bou en het uitstekende wyeband-karakteristieke.

Die 18 mm T-stuk wat die dipool en arm vorm word geheg met driehoekplaatjies en klinknaels aan beide kante en die arm geheg aan die toring met U-boute. Senter tot senter (mas tot antenna) is 0,29 golflengte om die impedansie op 50 ohm te kry. Die lengte van die aangedrewe element is bepaal deur 300 deur die frekwensie te deel en dan die "K" faktor toe te pas om te bepaal hoeveel die dipool korter moet wees as die berekende lengte 300/145.5 * 0.95 = 1.9588 m. Die helfte hiervan is dus 0.979 m. 0.979 * 0.97 = 0.9499 wat

(Vervolg na bladsy 19)

(Sasolburg ARK vanaf bladsy 18)
dan ook die lengte van die dipool is wat ons gebruik het. Sien grafieke en diagramme op laaste bladsy.

Wanneer twee dipole in parallel gekoppel word en elk se impedansie is 50 ohm, dan moet die inset-impedansie verhoog word na 100 ohm per antenne sodat wanneer die twee antennes in een punt eindig, dit weer 50 ohm kan wees. Dit word bereik deur van 'n ongelyke aantal kwartgolflengtes van 75 ohm ko-aks gebruik te maak tussen die antenna en die voerlyn. Die meeste handboeke beveel aan een en 'n kwart golf. Dit maak nie saak hoeveel kwartgolflengtes gebruik word nie, solank dit 'n ongelyke getal is. Om vier dipole op te rig moet dus gebruik gemaak word van twee pare se berekenings sodat die impedansie by die voerlyn se punt weer 50 ohm is. Hier gebruik ons dan 'n verdere stuk 75 ohm ko-aks wat weer 'n ongelyke aantal kwartgolflengtes lank is, volgens die handboeke dan een en 'n driekwart golflengte. Sien berekenings wat by die sketse op bladsy 5 aangebring is.

Om die harnas op te maak is dus van 75 ohm ko-aks gebruik gemaak. Die lengte van die ko-aks word aangegee in die handboeke as een en 'n kwart golflengte vanaf die antennas tot by die eerste las. Van die eerste las tot die laaste las (of voerlyn se punt) word aangegee as een en 'n driekwart golflengte.

'n Golflengte by 145.5 Mhz van ko-aks met 'n stroomsnelheidfaktor van 0.66 = 2.0619 meter.
2.0619 * 0.66 = 1.361 meter.
Vyf kwarte is dus 1.25 * 1.361 = 1.701 meter, Sewe kwarte is dus 1.75 * 1.361 = 2.382 meter

Onthou om die lengte van die verbinderstukke af te trek om die ko-aks op die regte frekwensie te kry. Om die impedansie van die harnas reg te kry is die volgende berekening gevolg.

Die formule wat gebruik word vir hierdie berekening is
$Zo = \sqrt{Zi * Zl}$
Zo = Kwartgolflengte van die aanpassingskabel se impedansie
Zi = Inset-impedansie
Zl = Las-impedansie

Al die laste is vervaardig met N-tipe koppelstukke. Daar is 14 koppelstukke, 3 T-stukke, 8.5 meter 75 ohm ko-aks en 35 meter "Cellflex" geïnstalleer op Renosterkop.

Intussen is daar begin om 'n nuwe harnas op te maak vir Leeukop. Weer is van dieselfde berekenings gebruik gemaak om die lengtes en impedansie reg te kry. Nadat die harnas vervaardig is word dit toe getoets om te sien of die impedansie en frekwensie reg is. Hier word gevind dat die harnas by ongeveer 150 Mhz resoneer, na baie gesukkel om dit reg te kry besluit Frans dat 'n terminaalkassie gemaak moet word sodat daar net van 50 Ohm ko-aks gebruik gemaak kan word. Wanneer van 50 Ohm ko-aks gebruik gemaak word is dit nie belangrik hoe lank die ko-aks moet wees nie. Al die laste is weereens vervaardig met N- tipe koppelstukke en T-stukke, daar is 10 koppelstukke en 5 terminale in die kassie plus 60 meter "Cellflex" geïnstalleer op Leeukop.

Vrydag 7 April is ons toe na Leeukop. Die span het bestaan uit Louis, ZS6BD, Andries, ZS6VL, Ruaan, ZS6RMS, Riaan, ZS4PR, Marius, 'n voornemende amateur, Frans, ZS4FD en Johan, ZS4SS. Frans en ek het vooruit gegaan omdat ons al vroeg klaar ingepak was. Daar aangekom, vind ons dat die kragbron

(Vervolg na bladsy 20)

(Sasolburg ARK vanaf bladsy 19)
oorspanning gegaan het. Riaan ZS4PR is gekontak en hy het vir ons die spaarkragbron saamgebring wat ons dan tydelik ingesit het solank as wat die bes-kadigde een herstel word.

Kamp is opgeslaan, die stoele is uitgehaal en toe begin die groot gesels. Vrydagaand is tradisioneel die kuieraand van enige amateur-byeenkoms. Later is die vuur aan-gesteek, 'n vleisie is gebraai en reuse sake is bespreek en opgelos.

Saterdagoggend vroeg is Frans die mas op en met Ruaan, ZS6RMS se hulp is die vier antennas vasgemaak, die harnas opgetrek, gekoppel en twee "Cellflex" ko-akskabels in die toring op-getrek en vasgemaak. Die 70 cm Yagi is afgetakel en opgeskuif tot amper aan die bopunt van die toring. Jaco, ZR6JCO is geskakel en gevra om spaaronderdele vir die kragbron te bring. Na deeglike ondersoek in daglig is gevind dat die kragbron so beskadig is dat dit teruggebring moes word vir herstelwerk. Dit is gevind dat die 70 cm-skakel geweldig baie stoom trek vanaf die kragbron. Daar is toe besluit om die spaarherhaler te installeer en die ander een terug te bring sodat Ockerd, ZS6LZ dit kan diens. Die per-seel is skoongemaak en al die gras rondom die perseel is afgesny. Die gras staan feitlik skouerhoogte vir die persone wat nog nie op Leeukop was nie. Geweldig gevaarlik tydens 'n brand.

Met ons terugkeer is vele toetse langs die pad gedoen om te bepaal wat die bereik van die herhaler is. Dit werk so goed dat dit nog geskakel kon word naby Deneysville.

Ons innige dank en waardering aan die span wat gehelp het om die projek 'n sukses te maak. Ook wil ons erkenning gee aan die vele handboeke waaruit ons al die formules en grafieke gehaal het vir ons berekeninge.

A Harness for Sasolburg's Repeaters

In the article, Johan, ZS4SS dis-cusses the maintenance of the re-peaters belonging to the Sasolburg Arc and the building of a harness to couple 4 antennas to the repeater. Johan discusses their research and experiments until they arrived at the correct dimensions.

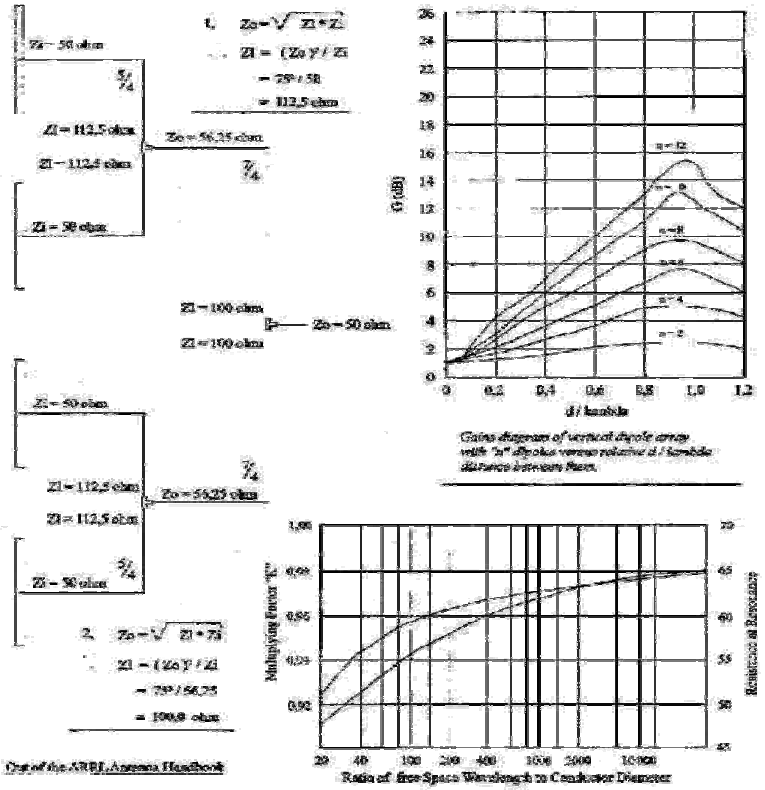
Clubs wanting to know more are most welcome to contact Johan and discuss the harness with him.

Amateur Radio-related WRC-07 Text Survives CPM

Technical report text on two World Radiocommunication Conference 2007 (WRC-07) agenda items of interest to Amateur Radio has survived the WRC-07 Conference Preparatory Meeting (CPM-07). The nearly 600-page Con-ference Preparatory Meeting Report (CPM Report) contains "methods" that satisfy the International Amateur Radio Union's (IARU) desired options for allocations in the vicinity of 136 kHz, 5 MHz and 7 MHz, thanks to the efforts of the IARU delegation.

"The IARU was successful in re-taining these options in the official re-port," said IARU President Larry Price,

(Continued on page 21)



(WRC-07 from page 20)

W4RA, who headed the IARU delegation to CPM-07 19 February until 2 March. "Of course, it is a long step to actually get an allocation at the WRC." Ken Pulfer, VE3PU, also served on the IARU delegation.

Sponsored by the International Telecommunication Union (ITU), CPM-07 drew to Geneva some 1 100 delegates from more than 100 countries to finalise and adopt the massive technical report, in preparation over the past four years. The CPM Report will guide the work of delegates attending WRC-07 22 October until 16 November. It provides background information on each WRC-07 agenda item, various methods of addressing the agenda items and the advantages and disadvantages of each.

Agenda Item (AI) 1.13 addresses the allocation of HF spectrum between 4 and 10 MHz, including the possibility of allocation changes in the 40 and 60 meter bands, while AI 1.15 opens the possibility of a secondary ham radio allocation in the vicinity of 136 kHz. IARU Secretary David Sumner, K1ZZ, concedes that AI 1.13 is "one of the most complex and controversial items" on the WRC-07 agenda.

"It's anyone's guess as to how the

(Continued on page 29)

Long Distance Experiments on VHF

By Mike Bosch ZS2FM
Cell 084 612 9600 mcbosch@telkomsa.net

What has happened to experimental Amateur Radio, as it appeared to have degenerated merely into local chat shows? Today many people, especially the youth, are equipped with miniature handheld two-way transceivers, namely cell phones. Does this mean that Amateur Radio can no longer offer a challenge to the younger generation and therefore has reached the end of its days?

This is a very negative attitude to entertain as a brighter and more challenging future awaits Amateur Radio, when it moves deeper into space after the future Moon and Martian bases are established. These are currently being planned, but what will happen to Amateur Radio during the interim period?

In the 21st century, the fast and weak signal Digital Data modes have replaced the old-fashioned CW and RTTY systems. Morse code served us well as a radio communication mode for a period of about one hundred years. But these modern Digital Data modes greatly reduced the degree of difficulty in communicating over vast distances. Ivo Chladek, ZS6AXT, the doyen of EME in the RSA, says that all active EME call signs are stored in the latest Digital EME programmes, and when it recognises only three digits radiated from the moon then it will establish a two-way contact; he feels that it has taken all the fun and the challenge out of EME. Maybe in the near future it could also become possible to programme your digital station to conduct two-way contacts while you are at work and let the computers talk to each other. Hi!

The Digital Voice modes are superior to SSB, but when it comes into common use then it will at least retain that personal touch with other Hams. Of course, in time Digital modes may replace all analogue modes of communication even on HF and Medium wave. It is a fact that currently only a few Radio Amateurs in the RSA are interested in the Digital modes or equipped for it. Many Amateurs own HF transceivers but the vast majority are still in possession of 2 metre FM equipment; some of them are not likely to change their equipment at all. Several years ago, the writer started a FM long distance net for the latter and it was quite successful as over forty Hams joined in along the eastern seaboard. It encouraged amateurs to become interested in long distance simplex operation; they constructed horizontally polarized beams, a few even built low noise amplifiers (LNA) and linears. Unfortunately, after the writer's trip to the UK his VHF beam antennas were destroyed during a gale and only restored recently. The 2 metre net also folded up.

Many other sports and hobbies have challenges, competitions and degrees of difficulty. For example, mountaineers like to climb the most

(Continued on page 23)

(Long Distance Experiments from page 22)
difficult peaks, yachtsman like to sail around the world single handed, athletes like to establish new records and so forth. All these challenges make their sports very exciting and competitive. What about Amateur Radio are there still any challenges left for us?

The answer is yes, especially on VHF and Microwaves where there are still many fields to explore that could be exciting and challenging! There are also a number of VHF contests held during each year covering different propagation conditions. Amateurs should try and participate in all of them to test the efficiency their equipment and make improvements where needed, as well as sharpen their operating skills. Field stations should be encouraged where Hams could work in groups and simultaneously operate on all the VHF and UHF bands and study the vagaries of propagation throughout the country.

Only a few Hams in the RSA have experimented on Microwaves, so we will have to concentrate on VHF for now. Since World War II, we have been allocated the 50 MHz (6 metre) and 144 MHz (2 metre) bands, but more recently, we acquired the use of the 70 MHz (4 metre) band too. The 50 MHz band with its numerous propagation modes have been covered in great detail in past RADIO ZS issues. So for now we will focus our attention mainly on 144 and 70 MHz and the analogue modes.

Tropo propagation on 144 MHz is very effective, it occurs frequently throughout the year and especially along the seaboard. It is caused by temperature inversions that developed in the troposphere and is therefore weather related. When ducting occurs in the summertime then distances of 4 754 km have been achieved between the USA and Hawaii on both SSB and FM. Other types of propagation are also possible at times on 144 MHz, such as Meteor Scatter and Sporadic-E with a maximum range around 3 000 km. A TEP contact of 7 843 km was recorded between Namibia and Italy.

The propagation on 70 MHz amateur band is completely unknown to Hams in the RSA and therefore it will offer us an exciting challenge. In the UK, records have been set up as follows: Tropo 1 084 km, Sporadic-E 4 405 km and Meteor Scatter 2 092 km. F2 propagation on 70 MHz could appear during the peak of the Sunspot Cycle resulting in short band openings. Under these favourable conditions, two-way contacts should become possible from the RSA to Greece, Luxembourg, Monaco, Somalia, Greenland, Croatia, Denmark & Faroe Is., Slovenia, Eira, UK and Gibraltar. All these countries are now part of the International 70 MHz allocations.

It appears that the 70 MHz equipment generally available to the Radio Amateur in this country is limited to commercial or military type FM transceivers. Since we are saddled with FM, it means that we will have to follow the 2 metre FM route as done before. The first step is to construct a horizontally polarized high gain Yagi beam antenna and a LNA, which will give 70 MHz an excellent kick start and use the maximum permitted power.

The plan is to restart the 2 metre FM nets in the evening commencing at 20:00 CAT (8 pm) on the allocated frequency of 144,400 MHz. The net will be controlled from Port Elizabeth with John, ZS2AH holding

(Continued on page 26)

Radio Scouting

by Dave Gemmell, ZS6AAW and the Broomstick Warriors

100th Anniversary of Scouting

This year marks the date on which Robert Baden-Powell held the famous camp at Brownsea Island, which is taken as the start of the Scout Movement. The first day of the original camp was 1st August 1907 so a "Sunrise Ceremony" has been arranged for the same date in 2007.

The 21st World Scout Jamboree will be held at Hylands Park, Chelmsford, Essex, just NE London from the 27 July until 8 August 2007. They are hoping for 32 000 Scouts and 8 000 Adults including the International Service Team. The Jamboree will feature an amateur station GB100J. GB100BI will be established at Brownsea Island, near Portsmouth, on south coast of England. Both stations will probably use the same frequencies and modes, that is, 80, 40, 20, 17, 15, 10 m, VHF, Echolink, PSK31 and a possibility of slow scan TV.

South African hams who are interested in helping with operating these stations, are welcome but there a few conditions, such as, being over 18 and having to be a member of the SA Scout or Guide Association. Dare say, you will have to pay your own airfare and "chip-in" accommodation costs, and so on. Successful applicants must be available from 24 July to 9 August to include set up and dismantling of the station. If authorised you may extend your period of help on site from 21 July to 14 August 2007. This could be an interesting experience!!

Copies of the Team Member 'Invitation', which states the all the conditions, and application form are obtained from the e-mail address below. Full information about the Jamboree can be found on the UK Scout Association official website www.wsj.scouting2007.org and www.scouts.org.uk/ukcontingent

South Africa's Role

Evan, ZS6EVD in Mafikeng and Eddie, ZS6BNE have expressed great interest in operating from Mafikeng on 1 August and during the 50th JOTA. This station will probably be a very desirable contact. More details will follow in the next issue of Radio-ZS once more definite plans have been arranged.

The Centenary of Scouting Radio Award

An Radio Amateur award has been organised by an English Scout Group for 2007.

The main objectives are to help celebrate and publicise the centenary of Scouting through the medium of radio. Although not intended for profit, any surplus made will go to support Radio Scouting in developing countries.

Duration. The Award will begin at 00:00 on 1 January 2007 and finish at 23:59:59 on 31 December 2007.

Stations are required to contact Scout and Guide stations especially at the World Jamboree, Gilwell Park and Brownsea Island stations. More details can be found at www.scouting100award.org.

The address is PO Box 77, Irene, 0062, telephone 012 667 2153 and e-mail davegemmell@bmknet.co.za

Museum News

by Dave Gemmell ZS6AAW and the Old Timers

Ionospheric Propagation

Some of you may think this Column is not Museum News, but delving into the history a bit makes interesting reading! Many Thanks to Hannes, ZS6BZP for comments.

Some points have arisen over the past year. As most hams know, the SA Antique Wireless Association, ZS0AWA net on Saturday mornings runs from 08:30 to about 10:00 on 7070 kHz. I join in from the "Wireless Room" at the SAAF Museum, using my 30 year old FT-101B and three band Trap Dipole. Like any Ham worthy of this title, I keep a log …….

The following signal report analysis makes interesting reading. The values are very subjective because I "estimate" these values by ear and not the set's S-meter. The explanation will be in the next issue of Radio-ZS.

There are not really many readings to go on but very interesting all the same!!!! As you see I have taken an "average" of several stations of each region. Unfortunately my R/S at the other stations was not given to me very often.

	R/S	Stations
ZS6	3/3 to 5/6	5 (mainly Wits area)
ZS6	5/8	1 or 2 (Magaliesburg)
ZS5	5/9	5 (Dbn & Pmb)
ZS5	5/7 to 5/8	2 (Estcourt area)
ZS4	3/3 to 4/4	1 (ZS4SM Sasolburg)
ZS3	No Stations	0
ZS2	5/6 to 5/7	2 (PE area)
ZS2	5/5 to 5/7	1 (Occasionally Knysna)
ZS1	4/4 to 5/5	1 (mainly Cape Town)
Z22	5/9	1 (Z22JE Dudley)

Is it due to; a) due to poor ionospheric conditions, b) equipment and/or antenna or c) type of antenna d) All three!

The fact that the above summary has stayed more-or-less the same of at least 18 months, if not two years, makes the subject more interesting!

One last point, I've been dealing with JOTA Reports for 10 years now, that's almost one whole sunspot cycle. Invariably these stations complained about poor conditions. I'd accept this reason for two or three years but for 10 ????

The main question is …….. "Are we trying hard enough or just given up before we start???"

Can listening to some of the overseas BC stations give an idea of how ionospheric propagation conditions are behaving. I have listened to BBC transmissions on 6195 kHz from Swaziland and noticed that the signal fades away, completely at times, but does come back again. I know that the signal of this BC station has got a wollop, quite a few kilowatts but it does give you an idea!!!

The address is davegemmell@bmknet.co.za and PO Box 77, Irene, 0062 and telephone 012 667 2153

(Long Distance Experiments from page 23)
the fort in East London from where he is in frequent contact with Durban. John can operate on both FM and SSB on 144 MHz and is already in possession of a 70 MHz FM transceiver. Skeds on 4 metres will be set up during the 2 metre nets; if conditions are poor then those of us who are equipped will switch to SSB as a backup.

It must be pointed out that it is of course a lot easier to work a weak station on SSB, but it is a far greater challenge to try and accomplish it on FM. Since most amateurs are only equipped with FM we have to make the best of it. An efficient FM station with a high gain Yagi, LNA and maximum power will certainly close the gap. The writer in Port Elizabeth has successfully worked John, ZS5J in Richards Bay on 144 MHz FM and SSB during a Tropo opening, while a Meteor Scatter contact made with Paul, ZS6PJS (ZS6NK) in Pietersburg (Polokwame) on 144 MHz SSB, could have been repeated on FM if we only thought about it at the time.

The longest distance DX contact that the writer has ever established on 50 MHz FM was with HB9QQ in Switzerland. All the divisions in the RSA have been logged in Port Elizabeth on 50 MHz FM via Meteor Scatter and Sporadic-E modes. A brief Tropo opening also occurs after sunrise in the summer between Port Elizabeth and Pietersburg. All the above could give us an idea what type of propagation to expect on 70 MHz FM and it means that country-wide contacts should be a cinch. The current SARL Tropo record on 70 MHz FM was recently established between David, ZS1PC and Ken, ZS2OC over a distance of 317 Km.

A new two-way QSO on VHF is always exciting and thrilling, especially when it is from a very distant station. The secret of making VHF challenging and interesting depends on the number of distant amateurs who could be roped in; who are willing to conduct experiments, carry out tests and improve their equipment. An effort should be made by all those interested to learn something about the different types of propagation present on VHF and to keep an eye on weather conditions such as approaching cold fronts, distant VHF beacons and even FM stations.

An interesting challenge has been laid down by Phil, FR5DN of Reunion Island, who is very keen to work ZR/ZS stations in Durban, East London and Port Elizabeth on 144 MHz. The distance from East London to Reunion Island is around 2 000 km and two-way contacts should be possible on both SSB and FM during a good Tropo opening. Phil is currently running a beacon on 144,675 MHz and beamed at the RSA from 14:00 to 05:00 UTC using a 17 element Yagi with 700 Watt ERP.

What will happen to Amateur Radio in the future? When the first moon base is established then the new settlers will undoubtedly also include a few radio amateurs in their midst, who would be very keen to talk to us Earthlings. Efficient VHF equipment currently in use on 50 MHz and 144 MHz would do the trick, providing that the high gain beam antennas can be elevated to track the moon. The first ever moon bounce was done on 144 MHz CW, so do not get rid of your 2 metre equipment, since it could provide you with 400 000 km DX phone contacts. Any radio signal transmitted direct from the moon will be very much stronger than the reflected EME signals and

(Continued on page 27)

(Long Distance Experiments from page 26)
therefore voice modes on SSB or FM would be suitable. A slow QSB caused by Faraday rotation could become a bit of a nuisance. A repeater on the Moon could provide us with a moon satellite system for about 12 hours a day and would cover half of the Earth.

Communication with a Martian base station would call for sophisticated Microwave equipment and parabolic dishes that could track the planet. Digital modes would be a prerequisite and amateurs will have to tolerate a delay of about 15 minutes for their signals to reach Mars. A fascinating future awaits the younger Radio Amateurs of today!

To summarise: Long distance 2 Metre FM nets are scheduled on 144,400 MHz at 20:00 CAT (8 pm), using horizontal polarization. If conditions are too poor for FM then those of us who are equipped will switch to SSB as a back up. Long distance 4 Metre FM tests will be monitored on 70,200 MHz also using horizontal po-

Working Satellites the easy way

By Eddie ZS6BNE

Satellites are pretty easy to work nowadays and a minimum of equipment and antennas are necessary. Pass prediction software like Satscape is freely available and data updates are easily accessed via the Internet. The "Satellites for beginners" presentation at the NARC last year inspired me to have a closer look at satellites. An Icom 706MKIIg opened up a new world for me.

The first place I looked was www.amsat.org/amsat-new/index.php, select "Passes" put in your grid location or latitude / longitude (in decimal), press "Predict" and plan your day according to the predicted satellite flight path. In most cases only two metre and 70 cm equipment are required and simple homebrew satellite handheld antennas will go a long way in assisting you to make contact via the satellites.

Please visit www.protocol.za.org/skeds/default.asp for skeds on satellites, meteor scatter and other digital modes. My hope is that this site will be used to keep all interested parties up to date with activities and to know someone will be operating on the allocated frequencies and modes at the designated times.

As Andrew ZS6AAA (ex ZS1AN) mentioned one day on the SARL forum, "The uplink frequency for AO-51 is 145.920 MHz, downlink is on 435.300 MHz. Due to Doppler shift, you need to start listening 10 KHz higher (435.310 MHz), and then tune down (5 KHz steps is fine) to 435.300 MHz when the satellite is directly overhead, then reduce frequency further by 5 KHz and then 10 KHz as it flies away from you. Because the amount of Doppler shift is proportional to the frequency, the Doppler on the 2 m uplink is only +/- 3 KHz, so you don't have to compensate for it - just leave your uplink rig set to 145.920 MHz."

(Continued on page 28)

(Working Satellites ... from page 27)
Don't forget, the uplink frequency requires a 67 Hz tone to activate the AO-51 voice repeater, much like the 88.5 Hz tone used to activate some repeaters on earth.

Initially I used a 2 metre J-Pole (TX and RX) for a two way contact with Andrew ZS1AN who was my first contact. The next time I used a Diamond 70 cm / 2 m Mobile whip in hand - no radials and that worked OK strange enough. Then I built the new "Wand", the 70 cm loop with reflector up front mounted at right angles to a 3 element 2 m yagi on a wooden boom. The yagi is fed using a T Match system together with a 1/2 wave coax balun. A very effective "Arrow compatible" satellite antenna design can be found at the following web address
www.g6lvb.com/HomebrewArrow.htm

I built the 70 cm antenna (6 elements) and it took me 15 minutes to build - cost, a box of off cut brazing rods, a short length of pine wood and a piece of RG58CU coax and PL259 connector... For rigs I have used the Icom 706MKIIg for the 70 cm downlink, a TH235 handheld for the 2 metre uplink and also sometimes an Alinco DR135 for a 10 watt uplink radio. I have had about 11 original contacts so far via AO-51 and quite a few duplicate contacts. I have discovered "The quieting" ..... AO-51 is a lovely and easy to work satellite but the FO-29 has a lot to offer as well. It is available just about every day and sometimes even two passes per evening. SSB is used and tuning for Doppler is tricky.

A short extract from Denis ZR6DNS

Here's a quick rundown on FO-29 comms. Set RX to USB and TX to LSB. I preset my TX to 145.950 MHz so that when I find the beacon I only have to worry about retuning my RX. Find the beacon (CW telemetry) on 435.795 MHz Doppler (most likely on 435.798 @ AOS). When you hear the beacon you know the sat is in range, remember with SSB there is no 'quieting', then tune to 435.840 MHz and slowly tune up towards 435.850 MHz looking for any other signals (maybe mine as I will be aiming at having the sat retransmit on 435.850 MHz). Remember that SSB needs constant fine tracking and even then expect the QSO to go from 'Donald Duck' to 'Goofy', Hi Hi. On FM your signal just gets weaker and then breaks up if your tracking is off; SSB the pitch changes. If you want to try a QSO when you have found another station in the pass band, leave your RX on his last frequency, start calling and gently retune your TX until you hear your echo. He will be trying to track you on or about where you last heard him. TX 145.950 MHz LSB and RX 435.840 MHz - 435.850 MHz USB

The satellites receiver receives any signal between 145.900 and 146.000 (its very wide band) and converts it, using the super-het principle, to its mirror frequency between 435.800 and 435.900 then retransmits it using a wide band power amp. In the process the frequency's position and side band is inverted. So if you transmit on 145.910 LSB the satellite converts it to 435.890 USB. Seeing as your signal is only 3 KHz wide you are only using a very small portion of the available pass band.

(WRC-07 from page 21)
dust might settle come November," he commented. The CPM Report presents eight methods to satisfy specific parts of AI 1.13. Methods 6 and 7 are favorable to the Amateur Radio Service.

Method 6 would provide a worldwide secondary amateur allocation of 5.260 to 5.410 MHz "to allow communications at times when propagation conditions do not permit the use of the presently allocated bands at 3.5 and 7 MHz." On the down side, the CPM Report said, such a 5 MHz amateur allocation could impact spectrum available for the Fixed and Mobile and the Broadcasting services.

Method 7 provides a primary allocation at 7.200 to 7.300 MHz in Regions 1 and 3 "to globally harmonize the Amateur Service allocations." Among Method 7's disadvantages, the CPM Report said it could reduce spectrum now allocated to HF broadcasting in Regions 1 and 3 and "significantly complicates the problem of identifying" additional Broadcasting Service spectrum.

Adoption of Method 7 at WRC-07 would achieve the IARU's goal of a worldwide, 300-kHz Amateur Radio allocation at 7 MHz, however. It essentially implements the second phase of the work begun at WRC-03, which expanded the Amateur Radio allocation at 7 MHz by 100 kHz (7.100 to 7.200 MHz) by March 2009. It would have no impact on the current 7.000 to 7.300 MHz 40-meter allocation in Region 2 (the Americas).

AI 1.15 Method A would establish a secondary amateur allocation at 135.7 to 137.8 kHz in all three Regions "with footnotes ensuring protection of other services operating in the same band." One alternative footnote would set a maximum radiated power limit of 1 W EIRP and would require that stations not cause harmful interference to radio navigation stations in certain countries. A second alternative footnote doesn't include the 1 W EIRP power limit. Method B would make no changes to the allocations table. The CPM Report lists no "foreseen" disadvantages to Method A.

The CPM Report notes that more than 20 countries have established either domestic amateur allocations or authorized experimental and amateur communication in the low-frequency range, including 135.7 to 137.8 kHz.

"We were able to achieve at CPM-07 the methods that would result in the allocations we seek," Sumner explains. "However, it remains for administrations to propose them if they are to be considered this fall at WRC-07."

Radio amateurs served on some national delegations to CPM-07. Jon Siverling, WB3ERA, and Walt Ireland, WB7CSL, both of the ARRL's Technical Relations Office near Washington, DC, represented the League on the US delegation to CPM-07. Jim Dean, VE3IQ, represented Radio Amateurs of Canada (RAC) on Canada's delegation, while Jay Oka, JA1TRC represented the Japan Amateur Radio League (JARL) on Japan's delegation.

NiCd Batteries – Care for Long Life

Ivo Chladek, ZS6AXT

Many of us are using rechargeable batteries in our handhelds, cameras and other portable equipment. However, after some time of use, we usually find that capacity is not that what it was in the beginning. What is happening, are the batteries faulty or are we doing something wrong? To put you on the right track, the following may help:

From all rechargeable batteries for portable radio equipment, a reputable make of a Nickel Cadmium (NiCd) type is still the best. The only problem is that it has "memory." The NiMH batteries are affected by memory to lesser degree and have higher capacity but also shorter service life. That is for a higher price. The Lithium types are aging quickly and have limited load current. Their price is very high. The Lead-acid battery is bulky and requires long charging time.

Quite a few commercial organizations experienced failures of NiCd batteries after a relatively short service. Their capacity dropped by 20 or more percent after just one year of service. This happened when the battery was routinely charged every day after use. A complicated chemical process in the battery caused it to develop "memory," so that the battery remembered how much power was used on previous discharges. That became then the new, lower battery capacity. Even the improved battery technology did not manage to sort out this problem completely. Thus if we manage to deal with the "memory" problem, NiCd battery would be the best value for money and should give us long service life. Few commercial organizations found two procedures as follows:

1. Periodic discharge of the battery to the level about 1 V per cell,
2. Deep slow discharge of the battery to the level about 0,4V per cell.

The discharge (1) should be done periodically, say once per month, to keep the battery capacity high, while discharge (2) could be done when battery capacity dropped. This must be done by low current to prevent voltage reversal of the battery cells.

Further important rules for the best NiCd battery performance are:

- do not charge the battery after use for more than one day after full charge,
- avoid high temperatures of the battery during charging,
- use a good charger.

Reference: Battery memory: myth or fact? Isidor Buchmann, DATAWEEK 21 / 2006

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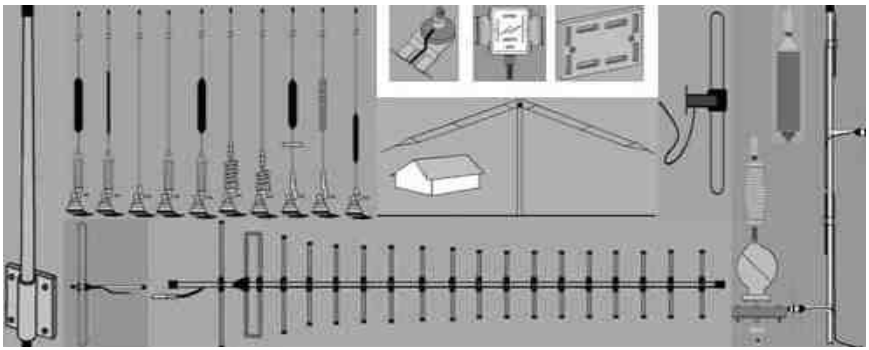

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