

Radio ZS

Volume 61 No./Nr 4

July - August 2008
Julie - Augustus 2008



Where to packet radio?

Hula-Hoop Antennas

Force 12, C-3S Improved 17 m Performance

Amateur Radio - Communication Technology in Action



THREE GOOD REASONS TO BE A MEMBER OF THE SARL

The South African Radio League is the National Body of Amateur Radio in South Africa and a direct interface with the Department of Communication, The Independent Communication Authority of South Africa (ICASA) and other government and non-government organisations. In every day life many people belong to associations, some because, the law requires it others because the benefits that accrue to individuals and the profession, sport or hobby. Here are three of many good reasons why a serious radio amateur should be a member of the National Body, the SARL:

REPRESENTATION AT NATIONAL LEVEL

The SARL represents all radio amateurs when working with the authorities to ensure that the amateur spectrum is protected. *It is the number of members that gives the SARL the muscle to speak representatively*

INTERNATIONAL REPRESENTATION

The SARL is a member of the International Amateur Radio Union, representing Radio Amateurs at the International Telecommunications Union (ITU), the organisations that looks after frequency spectrum allocation and usage. The IARU works constantly at World Radio Conferences and behind the scenes to ensure that amateur allocations are protected and even expanded. *The IARU derives its muscle from National Members Societies, such as the SARL, who have strong representation in their country.*

KEEPING ABREAST OF TECHNOLOGY

Through an interactive website, weekly news bulletins, Radio Technology in Action symposia and a bi-monthly publication – Radio ZS – the SARL keeps Radio Amateurs breast of new technologies. *Wouldn't it be great to know that you are part of it and not an onlooker?*



*South African Radio League
Suid-Afrikaanse Radio-liga*

RADIO ZS

July—August 2008

Volume 61 Number 4

**Published by the S A Radio League
Uitgegee deur die SA Radioliga**



PO Box / Posbus 1721
Strubensvallei 1735
South Africa / Suid-Afrika

Mondays Repeat broadcast
Maandae Heruitsending
21:00 CAT - 3 215 kHz

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Front Cover / Voorblad

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Sundays / Sondae

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VHF 2 m & 70 cm BHF

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Youth Day Sprint from ZS4SRK

Rechard Preston, son of Marius Preston, ZS4MP. Nico Potgieter (red top) with Marius, ZS4MP. Markus Potgieter (orange top).

Jeugdag Naelloop vanaf ZS4SRK

Rechard Preston, seun van Marius Preston, ZS4MP. Nico Potgieter (rooi hemp) met Marius, ZS4MP. Markus Potgieter (oranje hemp).

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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."

Eric McMillian, ZS5JM
Peter Carey, ZS6JT ex ZE5JJ
Kobus Olivier, ZS6SIX
Gawie Neethling, ZS1WH
Louis de Wet, ZR6AA
Willem Alberts, ZS6WA
Ross Thom, ZS6FV
Brian Weller, ZS2AB

CQ de ZS1YT

It is the 23rd of July today and I received the good news from our office that our membership for this year already stands at 829!

A great thank you to all out there who have renewed their membership without delay. Those of you who haven't renewed yet, please do so without delay. I am sure that none of you want to interrupt their membership record of the National body for Amateur Radio in South Africa.

In my previous communication I also requested clubs to pro-actively lobby their members to join the SARL.

Great was my surprise when I received news from the Vaalderiehoek Amateur Radio Club in Gauteng, who interpreted this request seriously and managed to convert 4 of their non-SARL members to immediately join the SARL. I sincerely hope that the larger clubs will follow their exemplary action.

Those of you who attended the

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(CQ de ZS1YT from page 5)

most recent SARL AGM might recall that in my Presidential inaugural speech I had chosen three goals that related to the SARL slogan "Amateur Radio Communication Technology in action." One of these was:

Growth in the radio amateur community in South Africa by introducing more young people into the fold, but also focusing on the value that amateur radio has for our senior citizens as a quality pastime.

With the aforementioned in mind and the next RAE exam scheduled for middle October, it is NOW the time for clubs to start off with RAE courses. Please involve as many young people as possible but also try to entice our senior citizens too.

Amateur radio still remains one of the few ideal past times that can be practised from the comfort of home. And with modes like IRLP, ECHOLINK, etc., the erecting of antennas in space restricted areas is not such an obstacle anymore.

Met bogenoemde in gedagte kan ons dit moontlik as ons doel stel om 'n rekord getal inskrywings vir die Oktober RAE te verwesenlik! Vergewis uself in u omgewing of daar nie dalk jong mense is wat belangstel en graag die RAE wil be-meester nie. Neem hulle onder u vlerk en voorsien aan hulle die nodige leiding om die eksamen te slaag. Dit is die beste belegging wat u vir amateurradio kan doen.

Op die administratiewe front is dit tans redelik stil alhoewel die SARL so aktief moontlik amateurradio sake bly bevorder.

Die betrokke raadslede is pal in verbinding met die regeringsowerhede om sake soos radio-regulasies en frekwensie-toekennings te bespreek. Besprekings oor Kraglyn Kommunikasie word ook onverpoos gemonitor om te verseker dat die SARL die nodige insette kan lewer om die radioamateur se belange te beskerm.

In die komende maande is daar heelwat kompetisies waaraan u kan deelneem. Hou SARL-nuus en die webblad dop vir meer inligting oor hierdie aangeleenthede. Ek moedig ook SARL-raadslede aan om aktief deel te neem aan hierdie kompetisies.

Die gebeurtenis van dié kwartaal sal beslis die RTA op 13 September in Johannesburg wees! Hier kry u geleentheid om u kennis oor verskeie amateurradio-verwante aspekte te kom verbreed. Hierdie geleentheid is nie net vir lede van die SARL bedoel nie, maar is oop vir alle belangstellendes. Bespreek dus nou al die datum met u vriende en kennisse en bring hulle saam na die geleentheid. Ek sien uit daarna om u by die Gauteng RTA te ontmoet.

Groete van hok tot hok, Rassie,
ZS1YT

Where to packet radio?

By Henry Chamberlain, ZS1AAZ



Packet radio, once a popular mode for everyone owning a computer and 2M radio, has been declining steadily but clings stubbornly to life. There are still BBSs in many of the main centres and forwarding is done mainly through the Internet, but the number of users has declined to the extent that some operators say it is a dying mode.

I think we need to decide whether we want this mode to become extinct, and how to keep it going if we decide we want to keep it alive.

There is another mode that uses the same protocol as packet, and that is APRS. Originally Bob Bruninga, WB4APR, intended it as Automatic Packet Reporting System, and later amateurs connected their GPS's to the system, so it became the Automatic Position Reporting System, but I would like us to consider using a combination of the two modes, not just to keep packet going, but also because there is, at least in my opinion, an important application for it.

All the other digital modes work on a one to one basis. Using Pactor, or PSK31, or whatever you can think of, one person can communicate with one other person, and while others can monitor, they cannot join the QSO. Using Packet however, several operators can connect to a BBS simultaneously, or join in a QSO. One of the arguments in favour of using radio in an emergency, as against using telephones, or cell phones, is that radio is a one-to-many system.

One person can talk while many

can listen in. Therefore, packet radio may just be the digital mode to use in emergencies.

I suspect that we South Africans generally cannot type well, I certainly had to teach myself and unfortunately still use two fingers today, even if I can get along quite fast. During my school days girls learnt to type, boys were not even considered. Perhaps this is why only voice communication is used during emergencies in the RSA, I have not heard of a single instance where a digital mode was used for emergency communications in this country. In contrast, in the USA, the Winlink system, using mainly Pactor, played a significant role during the Katrina disaster. I somehow have the impression that all Americans can type!

Last year Mike Zwingl, OE3MZC, president of the Austrian Amateur Radio Society, toured Namibia, and placed a message on the Forum on the SARL web page to ask if local amateurs would track him using APRS, and place the data on the Internet so that his friends and family in Austria could monitor his position and receive short messages from him. Three local amateurs volunteered to do so and two of those amateurs placed more than 1700 position reports on servers on the Internet during Mike's tour.

I learnt several lessons from that exercise. We used the 30 m band only, and I was impressed by the

(Continued on page 8)

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good communication we had on that band to distances of about 1500 km.

Afterwards we also tracked local amateurs using the same band, and this band performs very well at shorter ranges as well. The other impressive thing was how well digital communications worked. If I had to choose, I would

use APRS on HF instead of VHF even for local tracking. Size of mobile antennas is of course a problem.

HF packet uses two audio tones 200 Hz apart, and to decode the signals, the transmitter and receiver must be within 10 to 20 Hz of each other, a bit difficult if you are using an older transceiver that tends to drift a bit. Some of the TNCs like the KAM or the PK232 have tuning indicators that you can use to get on to the right frequency, and if you use a sound card to decode the signals, AGW has a tuning indicator as well.

Special Communications Systems, SCS, the inventors of Pactor, came to the conclusion that there is still a good use for packet, and that is for APRS. They investigated HF packet and concluded that the existing AX25 system was not very efficient. So they designed a device they call a Tracker. The Tracker can transmit on 300, 1200, 9600 and 19200 Baud. It can use conventional AX25 packet and SCS's new mode, Robust Packet Radio, RPR. It takes care of the problem of radios that drift by digitizing every packet signal within an 800 Hz wide bandwidth, and decoding them, even if there is more than one signal present.

This when using AX25. Using RPR, the bandwidth is 500 Hz. It therefore does not need a tuning indicator.



I also learnt to use the AGW packet engine. This is freely available on the Internet. It has many features, but the one that I found useful is that I can connect up to eight serial devices to one program in my computer. It can also decode HF and VHF packet, and do some other useful things as well.

The other program I use is UI-View, also available on the Internet. This program can display APRS positions on a map on the computer screen. It can send position reports that it receives by radio, to a server on the Internet for further distribution. In addition, it has a message screen where short messages can be typed and displayed. The message screen can be set up to transmit and receive from radio to radio, HF or VHF, or through the Internet. You just have to open the right port.

Now you can do several things. With AGW and UI-View, you can decode packet signals on HF or VHF, display positions on a map and communicate with other amateurs as well at the same time. If you add a Tracker, you are well equipped for HF, even if your radio is a bit old, as well as VHF.

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(Packet Radio from page 8)

The Tracker's RPR mode, which can run at both 300 and 600 Baud, is as far as data throughput is concerned, much more efficient than conventional packet, giving a speed between Pactor I and Pactor II modes. The ultimate TNC for data on HF is the PTC2 by SCS, but this is an expensive device, the two models are 647 and 861 Euros while the Tracker is 217 Euros.

I believe that there is still a future for the packet mode when it can be applied as a method for communications during emergencies while seeing the position of such stations on a screen. Hard copy of the text can be stored. In the meantime, one can have some fun, using just your radios, and computer with soundcard and free software.

Hula-Hoop Antennas

Electronics Magazine of 11 January 1963

Oliver D'Alton, ZS6BFH

Lately Radio ZS has offered a few articles on antennas for radio hams having restricted space problems. I am offering these fellow hams a solution which has been in my possession "since grandpa fell off the bus". The article appeared in "Electronics Magazine" of 11 January 1963.

I have used this antenna on a trial basis only as I do not have space problems, having lived on a smallholding for many years. I have received good reports from all over. Oliver.

When antenna height is reduced by loading, efficiency deteriorates rapidly. Here is a system of antenna height-reduction where circumferential aperture is substituted for antenna portions lost.

While important for long-wavelength applications, the short-height antenna is also valuable in mobile and portable communications systems in the high-frequency bands where the vertical extent of a resonant quarter-wave antenna is mechanically impractical.

Short Antenna

A naturally resonant, vertical antenna such as the grounded quarter-back radiator is a collinear aperture. Its properties are ideal for general communications, providing an omnidirectional radiation pattern with most signals delivered at low angles. At full height, its radiation resistance is far greater than any electrical-loss resistance in the conductors. Even when operated over soil the vertical's characteristics permit excellent radiation efficiency even with simple wire radial ground networks.

When the height of this classical antenna is sharply reduced and electrical resonance restored by a conju-

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gate reactor its performance deteriorates severely. Fortunately, excellent theoretical contributions on reduced electrical size antennas and modern supergain theory show the reason for this effect. Reduction of physical height removes a portion of the collinear aperture of the vertical antenna. Loss of collinear aperture means loss of radiation resistance resulting in less input power coupled to space. Loss in wire ground planes is severe in low-frequency radiator use.

When dealing purely with a collinear aperture, loss of electrical height means less efficiency.

DDRR Antenna

In the directional discontinuity ring radiator (DDRR) antennas circumferential aperture is substituted for the collinear portion lost in height reduction. Using normalised dimensions and assuming that an antenna is desired whose height is 2,5 electrical degrees at the operating wavelength it is specified that no lumped inductive elements be used to achieve electrical resonance to reduce electrical loss. Radiation efficiency must be within 2 to 3 decibels of a full quarter-wave vertical erected over the same ground plane.

A circular array with a circumference of one full electrical quarter wave results in an antenna diameter of 28 electrical degrees. To attain an in-phase electrical distribution over this circumferential aperture means using a centre-fed radial

waveguide like the flat top antenna. Study of a 28-degree diameter electric array by techniques such as those developed by Chireix shows that even with a 90-degree shift in phase around the aperture, an omnidirectional radiation pattern in the horizon plane will result.

To establish a circular array a conductor one quarter wavelength in length is conductivity joined to the top of a 2,5 degree high vertical element and bent around in the horizontal plane at this height to form a circle as shown in Fig. 1A. If a generator is connected across the slot formed by the circular conductor and the ground plane an energy wave can be launched in this boundary region.

Hoop with a Purpose

Low frequency antennas require either long wires supported by tall masts or vertical tower radiators 60 to 300 feet [18 to 91 m] high. Here is an antenna that looks like a child's hula-hoop and has performance characteristics closely approaching those of a full quarter-wave vertical. The DDRR antenna offers a height reduction of up to thirty-to-one over verticals commonly in use and can range in size from 6 inches to 5 000 feet [15 cm to 1524 m] in diameter and 2 inches to 300 feet [5 cm to 91 m] in vertical height.

A model of this antenna only two feet high recently equalled the performance of a 60 foot [18 m] vertical radiator.

(Continued on page 11)

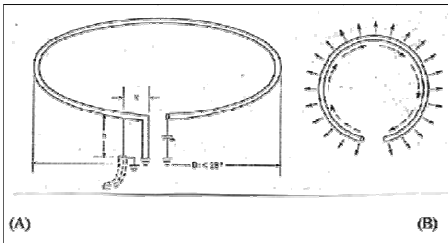


Fig 1. Ring Transmission Line showing feed and tuning, if required (A) and current in ring element (B)

When a change of direction occurs in any electromagnetic waveguide system, higher order modes are established. If this discontinuity takes place in a completely closed system such as a rectangular waveguide, the equivalent circuit of the discontinuity will contain only reactive components because no power is lost in radiation. If, however the fields are not confined, but extend beyond the guide boundaries the discontinuity, equivalent circuit contains resistive and reactive components. Field line fringing or extension effect is present in dielectric waveguides and open-wire transmission lines. The constant-height ring-conductor just described forms a single-wire transmission line with the ground-plane surface. If it runs a straight path rather than in a curve this close-spaced line produces little radiation as shown by King. This condition is true to a first order, because the TEM mode exists over the length of this line, with discontinuities occurring only at the ends.

If the same single-wire line is

bent into a curve, however, a wave launched at its input terminals encounters a different set of conditions. The bent wave-guide is a constant series of directional discontinuities. Thus, the launched wave radiates continuously in a direction transverse to the line-axis throughout its entire length. Radiation occurs from two sources; a horizontally polarised wave is launched from the current-flow in the ring element itself but is cancelled because of the anti-symmetric current relation in the image plane. At the same time, vertically polarised radiation takes place from the higher-order modes established by the direction discontinuity. The launched wave radiates as it moves around the ring until it meets the far end. The energy still remaining at this point reflects, radiating on its path back to the generator. Thus, the DDRR antenna might well be called a leaky-waveguide radiator with radiation being integrated over its entire circumferential boundary or aperture.

The DDRR antenna produces a typical dipole doughnut radiation pattern when its diameter is not large in wavelength. Chireix analysis quickly explains the omnidirectional azimuth plane pattern. In the elevation plane, the zenith null must occur due to the out-of-phase relationship of parallel current components on the ring element and the typical anti-symmetric distribution of electric lines of force around the circular aperture as shown in Fig 1B.

Although the ring-type DDRR

(Continued on page 12)

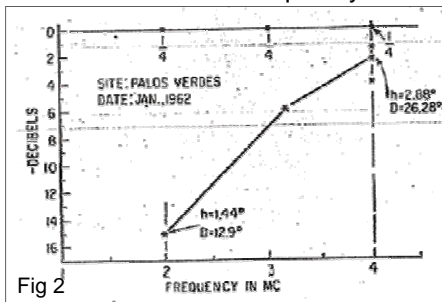
(Hula-Hoop Antennas from page 11)

antenna design simplifies low-height radiator structure by eliminating the large current sheet found in the flat-top model, it has other advantages. Unlike the flat top, the DDRR design is naturally resonant when the diameter of the aperture is approximately 28 electrical degrees. Resonance is relatively unaffected by the height h above the ground plane if kept well below 90 degrees. When size limitations restrict the diameter to less than 28 degrees, electrical resonance can be restored with a low-loss air or vacuum capacitor from the open end of the ring to ground. The DDRR design permits direct connection of transmission lines across the aperture and ground plane. Any line from 36 to 500 ohms may be used if dimension X in Fig 1A is varied to suit its characteristic impedance. Thus, the impedance-matching network required with other short-height designs is eliminated together with attendant electrical loss and additional restriction of bandwidth. When point X has been determined with the transmission line, a DDRR antenna may be capacitively tuned over at least a 2:1 frequency range without input vswr exceeding the 2:1 limit.

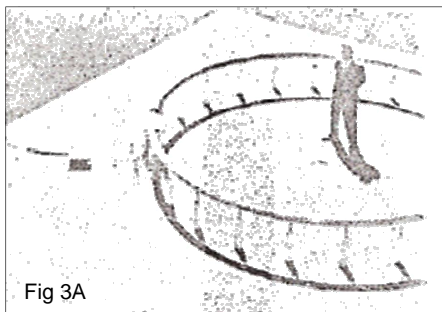
Performance

No single antenna design is a panacea for the problems of communications but the performance and flexibility of the DDRR antenna represents a significant improvement.

Figure 2 shows typical gain variations of a simple DDRR antenna over a 2:1 frequency band.



The magnitudes are the average for many field-strength comparisons to full quarter-wave vertical antennas taken at steadily increasing range over a combination land and sea path where distances ranged from 1 to 132 miles [1,6 to 212 km] in both a North and South path. The model used was small electrically, being only 12,9 degrees and 1,44 degrees high at the 2 Mc limit and 26,28 degrees in diameter and 2,88 degrees high at 4 Mc. This antenna appears in Figure 3A. At the same fre-

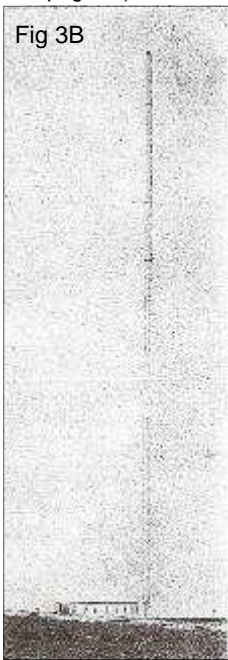


quency limits the comparison test antenna was a 1 foot [30 cm], triangular cross-section tower 110 feet [33,5 m] tall at 2 Mc and 68 feet [20

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(Hula-Hoop Antennas from page 12)

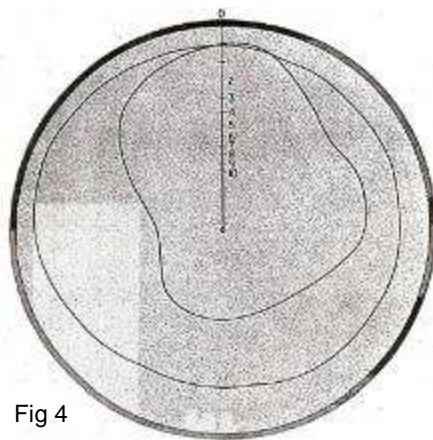
m] high at 4 Mc as shown in Figure 3B. Operation was over rocky soil using 90 radials each one-half wave long. Tests were made under the special call sign KMZXOP by authority of the FCC. Tuning of the test antenna over the entire frequency range was completely remote, using a servo-actuated Jennings vacuum variable capacitor from the transmitter console 500 feet [152 m] away; vswr was under 2:1 in 50 ohm coaxial cable at all frequencies.



both antennas is due to the nonsymmetrical ground plane geometry provided by the metal skin of the car. In addition to increased efficiency, the antenna possesses other important advantages for the mobile service. At high road speeds, there is no signal flutter effect from the DDDR antenna. This wind effect is severe in vertical antennas cut for the same frequency range. Also, the simple DDDR design used in the mobile service acts as a sharp band pass filter centred on the operating channel. Thus, better isolation from adjacent channel interferences as achieved during reception than with conventional designs. Being directly grounded to the car frame, an automatic static drain to ground is provided for static charge induced by fog, dust and precipitation, affording improved receiver signal-to-noise ratio.

Mobile Use

At higher frequencies, the DDDR has proven a convenient and efficient device for mobile communications. A mobile model desired for use between 26,5 and 31 Mc is 27 inches [68,5 cm] in diameter and projects only 3½ inches [8,8 cm] above the vehicle roof. The horizontal radiation pattern of the DDDR and that of a full quarter-wave whip antenna on the same vehicle is shown in Figure 4. Departure from a perfect omnidirectional pattern for



Force 12, C-3S - Improved 17 m Performance

Vidi la Grange, ZS1EL

The Force, C-3S is a very robust Yagi and uses no traps, which has been a buzzword for quite a while amongst DXers. I have had my C-3S for about 2 years and even trying their best, those strong north-westerly winds of last winter could not do it any harm. I was quite surprised when I first noticed that the antenna had slightly more gain off the back than the front! I confirmed this by many front to back checks both on receive and transmit. After completing the modifications described in this article, I have been enjoying a 2-element Yagi on four bands instead of only three. The modification is not very complicated and once all the bits and pieces have been prepared, should not take more than a morning to install and tune.

Discussion

Looking at the C-3S and reading about the principles of operation, it is clear that the basic Yagi design does not make any particular provision for performance on 17 m. It is therefore understandable that the SWR is quite high, but not impossible to deal with by built in antenna tuners of, for example, my TS-930, FT-1000MP or FL-7000. The main issue on 17 m is

that there is no dedicated parasitic element like on the other three bands.

The basic C-3S is a two element Yagi with interlaced reflectors for 20, 15 and 10 m. The driver uses a very efficient, patented, open sleeve system, which gives excellent matching throughout the three main bands. Considering the overall length of the 15 m reflector, which is 7,28 m (23.8 feet) and making a few calculations, I found the answer to the teasing question about direction reversal quite logical. The particular length of the 15 m reflector has a calculated resonant frequency of 20.3 MHz, which is close to the length of a director on 17 m. Using E-ZNEC 3.0 antenna modelling software; I was able to confirm my thoughts about the antenna behaviour.

Now that I understood the antenna better as it came out of the box, I started to do some thinking 'out of the box' in search of a solution. What I had in mind for an ideal solution was an antenna which worked equally well on 4, instead of only 3 bands, without cluttering the already busy boom any further and of course beaming in the same direction on all bands. Since making the modifications I am about to describe, I have been having such a lot

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(Force 12 C-3S from page 14)

of fun that it did not take long for me to become quite addicted to the 17 m band, especially during this low in the sunspot cycle. As the sun sets and the MUF gradually drops, 17 m stays workable well after signals on 15 m have faded completely into ESP levels!

The Solution

With my objective in mind and taking a fresh look at the antenna, I decided to leave the open sleeve tri-band driver as is. The miss match was not so bad that built in antenna tuners could not deal with it on 17m and what is more, the rig did not sound deaf as if there was a complete driver mismatch. The focus of attention was therefore turned to the reflector configuration.

Past experience with linear resonators and successful application to a 20 and 15 m two element Yagi, sent my thoughts in that direction and amazingly, the solution was right there. What if I would change the existing 15 m reflector into a dedicated 17m reflector and add a 15 m linear resonator to the 20 m reflector! To attach a linear resonator is quite simple and a nice thing about it is that there is no need to drill holes in the existing structure. It actually hangs on the element with two clamps and two acrylic hangars as will be-



come clear later.

Referring to the article in QEX of Mar/Apr 2006: An Accidental Discovery Put to Work, I need to once again discuss what a linear resonator is and what its possibilities are in HF antenna applications. The basic principle came from an 'accidental

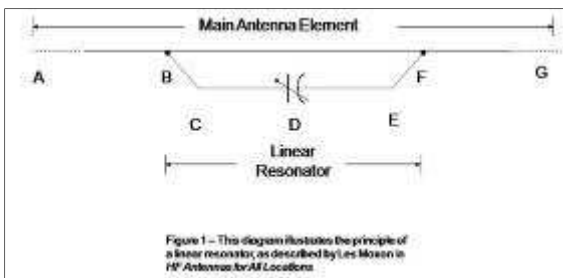


Figure 1 - This diagram illustrates the principle of a linear resonator, as described by Les Moxon in HF Antennas for All Locations.

discovery' by Les Moxon, G6XN, the author of HF Antennas for all Locations, first published in 1982.

A linear resonator is an LC circuit consisting of a one-turn rectangular shaped coil, shown in the schematic diagram, Figure 1. B-C-E-F is the inductor; resonated by the variable capacitor D. Half of the coil is shared by part of the element B-F. Due to this sharing, a second, higher resonant frequency is obtained over and above the natural resonance of the basic element, A-G. One limitation found was that the second resonance should be at least 40% higher than the basic resonance of the element to which it is attached. This makes the 20 m reflector ideally suited for a second resonance on 15 m.

Figure 2 is a photograph showing the
(Continued on page 18)



KENWOOD



Built to Last

The SG-237 is designed with high density surface mount components on a 4 layer PCB, providing high efficiency, reliability and performance. The PCB is mounted on a sturdy chassis plate which provides an excellent electrical and RF ground system. The unit is fully waterproof (under 2 ft of water for 24 hours). The case is weather resistant, high grade ABS plastic that is sealed at the factory.



TM-D710A

Multi Communicator 144/440MHz FM Dual Band

The control head is detached and comes with very easy installation. The TM-D710A is a true dual-band radio so VHF+VHF/VHF+UHF/UHF+UHF operation

- High RF Power Output (50W)
- 1,000 Multifunction Memory Channels
- Dual Receive on Same Band (VxV, UxU)
- EchoLink® MEMORY (Automatic Dialer)
- EchoLink® Sysop Mode For Node Terminal Operation
- Multiple Scan
- Invertible Front Panel
- Choice of 2 Backlight Colors (AMBER/GREEN) For Panel
- 104-Code Digital Code Squelch
- "FIVE-IN-ONE" Programmable Memory



Use for base, mobile, portable, marine or aviation.

The SG-237 is our most popular Smarttuner. It's rugged construction and small size allow maximum flexibility. It has a 100W power rating and additional frequency coverage to 60MHz, matching it perfectly with the most popular HF transceivers. It will work with any balanced or unbalanced antenna including whips, backstays, dipoles, loops and longwires, and requires a minimum of only 28 feet of antenna for full coverage operation.



We are a Garmin agent, please contact us for automotive, marine, aviation

ICOM



Icom and the renowned IC-756PRO series continue to make ham radio history:

First 32-bit floating point DSP transceiver

First transceiver with customizable filter shapes. There were no optional filters to buy, for none were needed.

First mid-class HF transceiver with +30dBm-class third-order intercept point*

First amateur HF transceiver with a large TFT color LCD

KENWOOD

Listen to the Future



The all new Kenwood TS-2000 series transceiver offers today's demanding Amateur operator high performance standards without the compromising limitations found in other similar multi-band, multi-mode transceiver. The TS-2000 offers users three distinct operation platforms, the traditional transceiver with full function front panel, or the high-tech looking "silver box" version that allows mobile operation with the new RC-2000 compact control head, or the ARCP-2000 computer control program making the TS-B2000 functional from your personal computer. The new TS-2000 offers 100 watts on HF, 6 meters and 2 meters, 50 watts on 70cm, and when you install the optional UT-20 1.2-GHz module at 10 watts, you will have assembled the most complete dual receiver multi-mode transceiver ever produced. The TS-2000 is transverter frequency display function ready to work with the latest satellite frequencies available.

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Gallo Manor,

2052

contact us for your
fitness requirement.

(Force 12, C-3S from page 15)

main components of a linear resonator. Note that the antenna is tilted so that the 20 m reflector runs parallel to the ground with the boom pointing up. The inductor part of the resonator is made of 5 mm diameter solid aluminium rod, and consists of 2 identically shaped halves suspended directly below the 20 m reflector. Total length of the inductor is 5.4 m and it is suspended 100 mm below the element. The series tuning capacitor is the neatest part of the whole setup: It is a piston type, made of a 500 mm length of 15.8 mm diameter aluminium tubing which forms the outer electrode. In Figure 2, the rod can be seen clamped in the tube on the side facing the camera. The rod furthest from the camera is the inner electrode. It slides into the tube on acrylic spacers, insulating it from the tube. The dielectric is formed by the air gap between rod and tube. The resonant frequency of the linear resonator is adjusted by sliding the tube left or right over the rods until the required resonant frequency is found and then clamping it in position, but more about this later.

Some Ideas About Construction

17 m reflector

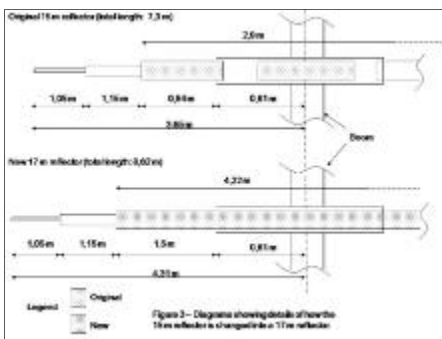
Materials needed

➤ 15.8 mm diameter aluminium tubing, 4.2 m long. Ensure that the wall thickness is such that the other parts of the element will be able to slide into it.

- A dozen or more 3 mm pop rivets.
- Conductive grease.

Installation

Take the element apart by drilling out all the rivets except for those holding together the two end sections on each side. Refer to Fig. 3, which shows the element before and after modification.



Remove the short inner liner of the element originally used for extra rigidity. It will not be used again as it will be replaced by the new 4.2 m length of tubing which will run right through the element centre.

Apply a thin coating of conductive grease to the middle 1.2 m of the new 4.2 m length of tubing, before sliding it through the 19 mm diameter centre section. Position it so that 1.5m is exposed at either side. Drill and pop rivet the new centre part in position.

Replace the tips and put the element together again so that the new total length per side is 4.31 m. Note that the new, longer piece of tubing extends right through the

(Continued on page 19)

(Force 12, C-3S from page 18)

centre as shown in Figure 3 to give extra rigidity to the new, longer element.

15 m Linear resonator

Materials needed

➤ Two lengths of aluminium rod, 1.5 m each and 5 mm diameter. Any available aluminium rod close to these dimensions would do, provided it is not too hard to bend without cracking.

➤ 500 mm length of 15.8 mm diameter aluminium tubing of 1 mm wall thickness. A piece of the tubing removed from the 15 m reflector could be used for this purpose, but if you or someone ever wish to restore the antenna to its original condition, it is best to find a fresh piece.

➤ 25 mm wide by 1 mm thick aluminium strip. High tempered springy aluminium will be ideal for this. Total length needed is about 200 mm.

➤ 1 each 8 mm x 15 mm stainless steel bolt and nut or any suitable hardware close to this.

➤ 2 each 3 mm x 17 mm stainless steel bolts and Nylock nuts. This is not critical and depends on what is available for clamping the aluminium rods to the 20m reflector as will be explained later.

➤ 120 mm x 120 mm x 6 mm clear acrylic.

➤ A small block of acrylic 25 mm x 25 mm x 6 mm.

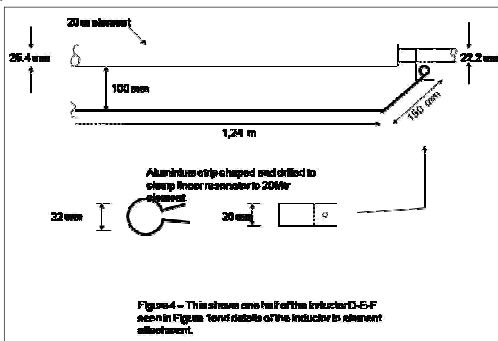
➤ A small piece of self vulcanizing

July–August 2008

insulation tape.

Building and installation

Bend the aluminium rods into 2 identical shapes as shown in Figure 4. The loops at the ends should be just big enough to take the available hardware for clamping to the 20 m reflector.



Bend and drill 2 aluminium clamps out of the 20 mm wide aluminium strip as shown in Figure 4

Cut off the head of the 8 mm bolt and slot its shaft so that it can be turned with a screwdriver. Drill a 9 mm hole through one wall of the 500 mm length aluminium tube, near its tip to take this bolt.

Round the shoulders of the 8 mm nut using an electric bench grinder. Force the nut slightly into the tube by clamping it in a vice and tightening the bolt on to a 5 mm shaft as shown in Figure 5. This is so that the nut will seat a little into the tube and stay in position



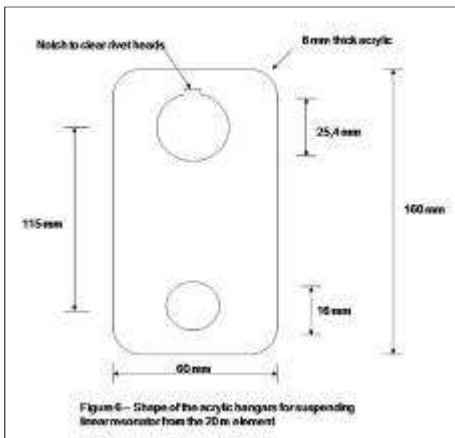
(Continued on page 20)

Page 19

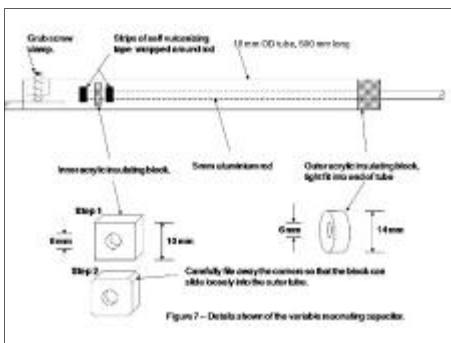
(Force 12, C-3S from page 19)

on its own. This becomes a clamp so that the rod can be secured in position after tuning. Take a look at the end of the tube closest to the camera in Figure 2

Cut and drill the 2 hangars out of the pieces of acrylic as shown in Figure 6. The small notches are there to clear rivet heads when sliding the hangars over the element.



The next 2 items are spacers, which form the guts of the variable capacitor. Shape the outer piece of acrylic as shown in Figure 7 and slip it on to the tip of one of the alumin-

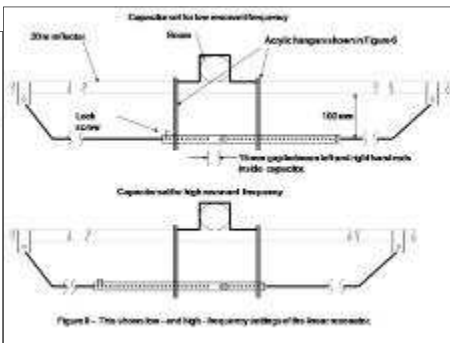


ium rods, which becomes the inner electrode of the variable capacitor. Ensure that the hole in the block is just large enough to allow free movement over the rod. Carefully file the outside of the block to a slight taper for a snug fit in the open end of the 500 mm aluminium tube. This is the end insulator, which supports the aluminium rod inside the 500 mm tube.

Shape the inner acrylic insulating block also shown in Figure 7 and slide it over the rod. Carefully file the tips of this spacer so that it will slide freely into the 500 mm tube. Wind a small piece of self vulcanizing tape around the aluminium rod, one on either side of this acrylic spacing block to keep it in position as close as possible to the tip of the rod.

Attaching the Linear Resonator to the 20 m Reflector

Slip the 2 acrylic hangars on to the 20m element, one on either side of the boom as seen in Figure 8 and on the photograph, Figure 2. Keep



(Continued on page 21)

(Force 12, C-3S from page 20)

them from sliding around by fastening a cable tie to the element, one on each side of a hanger.

Place the 2 aluminium clamps over the element, one on each side of the boom. These will be used to attach the looped ends of the aluminium rods to the 20 m element.

Assemble the linear resonator and carefully string it through the 2 outside holes in the acrylic hangers. Use the 3 mm hardware and clamps made earlier to clamp the looped ends of the aluminium rods to the 20 m reflector as shown in Figure 8. Position the clamps about 1.3 m from the boom in each direction, making the total space between them 2.7 m. Make sure that there will be a gap of about 15 mm between the rod tips where they meet below the boom, inside the 500 mm capacitor tube.

It is noticeable that there is quite a bit of adjustment available for moving the 500 mm tube from extreme left to right over the aluminium rods for capacity adjustment as shown in Figure 8.

Tuning the Linear Resonator

The calculated resonance of a 15 m reflector is 20 MHz. This frequency can be easily picked up by holding the sensing coil of an absorption dip meter near the furthest end of the inductor as shown in Fig. 9 Slide the 500 mm tube to the right to lower the resonant frequency (more capacity) or to the left to increase it. Tighten the grub screw to lock it in

position after finding the 20 MHz resonant frequency.

If everything works out, the inner electrode of the variable capacitor should be a loose fit in the tube to allow lateral movement. The linear resonator is springy and once locked in position, no matter how much the wind shakes the parent element around, it will return to the set frequency. I have checked the set resonance on various occasions over time and it never needed any readjustment.

Testing on the Air

Numerous checks of F/B ratios under various conditions showed a consistent ratio of 2 to 3 S-units on transmit and receive, with very deep nulls off the sides on all 4 bands. There are a few friends in this area using three-element tri-band trap Yagis. Comparative reports from DX stations on the 3 main bands were very encouraging and in most cases, the modified C-3S performed as well as the trap tri-banders. The only notable difference was that the F/B ratio was not as dramatic as in the case of trap tri-banders. All my



(Continued on page 22)

(Force 12, C-3S from page 21)

concerns that the modifications may have had a negative influence on the performance of the antenna on the 3 main bands were ruled out by reports received on the air. I could find no local stations using directional antennas on 17 m to compare with, but from the great success on this band, it soon became my favourite. Many DX stations said that they are looking forward to reading more about the modified C-3S in a published article.

Since I made the changes to my C-3S, two other Force 12 C-3S

Yagis have been modified and used for trials in this area. The one belongs to Kosie, ZS1SR and the other to Sam, ZS1OA. Both are very happy with the performance of their antennas and I regularly hear about the fun they are having and good reports they are getting from DX stations.

Future Plans

Future plans include improved performance on 12 m so that the Yagi will have 2 element performance on 5 DX bands. More to follow later.

The Digital Modes

Eddie Leighton, ZS6BNE

Back to basics



Every year, on the last Sunday of June, the PSK Digital modes competition is held, where competitors compete using PSK under various categories. The categories being high or low lower and single or multi band and combinations thereof. There were well in excess of 30 participants this year, 2008, which was a very good turnout. Not many logs were received though but from the logs received were the following results.

- Single band low power
- Johan Terblanche, ZS1I 140 points
- All band low power
- Tienie Herbst, ZS6MHH 52 points
- Single band high power

- Johan v Aarde, ZS2I 290 points
- Chris Hundling, ZS2CH 224 points
- All band high power
- Pierre v Deventer, ZS6BQS 368 points
- Johan Steyn, ZS4SS 252 points
- Pierre Pienaar, ZS1XE 178 points
- Johan Le Roux, ZS1RX 104 points
- Eddie Leighton, ZS6BNE 68 points

From the results, it can be seen that few try to compete using low power! The points count is not the important thing here but the fact that less than 10 Watts can be used to communicate!

Frequencies used for digital modes.
(Continued on page 23)

(Digital Modes from page 22)
(Note all Upper Sideband!)

HF

80 m - 3.580 MHz USB

40 m - 7.035 MHz USB

20 m - 14.070 MHz USB

VHF / UHF

6 m - 50.290 MHz USB

2 m - 144.144 MHz USB

70 cm - 432.200 MHz USB

It was decided last year to include the VHF and UHF bands in the digital competition but it appears that HF attracts more operators. Maybe we should look into having a separate competition for the VHF and UHF bands. There is definitely a challenge worthwhile taking on!

The digital modes are something that has to be regularly practiced. You need to understand how to set up your particular PC's sound card. In most cases, standard Windows software interfaces are used to set the card up but in cases like the M-Audio Delta 66, it has its own professional software interface. The audio levels are very critical for successful operation especially the audio levels sent to your rig's mic input! If this is too high it causes wide, illegal, SSB transmissions! It sounds really bad! You should know your sound card interface, thoroughly. Know the connections to your rig, PC's sound card and PTT circuitry (COM Port or VOX). Finally, you should understand exactly how your digital modes software works. There are many products, we all have our preferences. Preparation is the key. It

does not help to all of a sudden want to take part in such a competition but are unprepared. Successful digital modes operation comes from constant practice and fine-tuning of both software and hardware. The good news is, once you have set your station up for PSK, well, you are ready for any digital mode! Operation may be different but the setup is the same.

The heading of this edition of Radio ZS's Digital modes says "Back to basics." Maybe a good time to look back and see what digital modes in amateur radio entails. Packet radio (Text messaging systems working with BBS's (Bulletin Boards) using radio and TNC's or software modems like the AGW Packet Engine, was a good place to start. A natural evolution was to APRS (Automatic Position Reporting System). These modes have good modern interaction with the Internet now. The basic knowledge of these two digital modes makes it easier to understand the interfacing of radios and computers, which is what the digital modes are all about.

PSK is another very basic digital mode; it is most common "Sub" mode being BPSK31. RTTY (Radio teletype) and SSTV (Slow Scan TV) are also other very exciting modes. The WSJT software with its various "Sub" weak signal modes is extremely interesting for things like meteor scatter and moon bounce (EME). Note, articles have appeared in earlier editions of Radio ZS going into more detail on all

(Continued on page 24)

(Digital Modes from page 23)

these modes and also much information can be found on the Internet.

I do believe at the time of writing, that Henry, ZS1AAZ is leading the initiative to get packet radio back on track in South Africa and has written an insert for Radio ZS in this regard. The root of all digital modes lies in this area. People with a packet radio background seem to grasp the technical detail of the digital modes a lot easier with this experience behind them.

Refer also to the previous articles in Radio ZS concerning Winlink 2000, PACLINK and RMS Packet, a modernised view of Packet radio allowing SMS's to be sent and received via the packet radio network to the Internet and visa versa.

Packet radio excels with short text data messaging with message

route auditing built in. In areas where an infrastructure has been lost, Internet access to ZS0MEE, operated by Dick ZS6RO, can be achieved using the telnet protocol and it is lightning fast!

Only with a genuine willingness to get packet radio operational again in South Africa, will we truly achieve our goals. Packet radio must and cannot be compared to standard e-mail, it could never compete but it does give hams an effective radio network messaging system. Neither can it be compared to "Public" wireless networks, which have their own strengths and weaknesses. Packet radio is a "Private network" accessible only to radio amateurs. It makes an ideal emergency communication network that is simple but effective and it still used worldwide.

These Really Were the Good Old Days

by Dennis Wells, ZS1AU

The article entitled "These Really Were the Good Old Days" commenced in the January/February 2004 issue of Radio ZS. The second instalment appeared in the April/June 2006 issue of Radio ZS. This is the continuation of the third instalment. Only the author knows why he has kept you in suspense for 4 years!



Another occasion was when Len intercepted the coded morse messages between the German battleship, The Graf Spee and their German HQ. The British battleship HMS Hood that was in battle with the Germans, received a direct hit in the magazine and sank with heavy losses. The

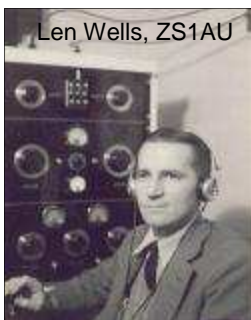
British war ships then chased the German ships into a dead-end and there a huge battle took place.

All distress calls and coded messages were taken down on a typewriter and passed onto intelligence for de-coding. The Graf Spee, the pride of the German

(Continued on page 25)

(The Good Old Days from page 24)

Navy, was trapped in the river La Plate in Argentina and the saga ended when they were ordered to scuttle rather than surrender.



In 1942 we returned to Cape Town and in the period up until 1946 when licences were re-issued a group of radio enthusiasts held monthly meetings in a diamond wire mesh enclosure, in a cordoned off portion of Charles, ZS1T - C.A.W. Rieders Pty Ltd., electronics workshop in lower Loop Street. There was a group of about twelve and Ginger Mathews was a lecturer who amongst many things explained how receivers and transmitters worked. Ginger was a brilliant lecturer who had the ability to explain things in layman's terms. He was in later years employed in the telephone exchange laboratory in Bar-rack Street and sadly, a few years later, he became ill and passed away.

Some of those teenagers that were in regular attendance at Charles Rieders up until the day when licenses were once again re-issued in South Africa are still around today. I can recall seeing Ronnie Gilmour now ZS1K (inherited from his father, the late Peter Gilmour, ZS1K, who was also a pioneer broadcaster from Lake-

side in the early days) and Buddy Mc Cullum, ZSIMP, Len Wells, ZS1AU and myself. We all used to walk up from the old railway station in the heart of Cape Town, to those meetings once a month, in the dark of night, with not a care in the world. When the war ended, a nucleus for the Cape Town branch of the SARRL was in place. In later years, the Relay was dropped and it became the SARL.

When all Radio Amateurs had their licenses restored in January 1946, they were confined to the 28 MHz band. The huge crate was unpacked and License No 82 was issued in the new QTH in Wynberg, Cape. It was not without a few condensers and other components breaking down when switched on for the first time after so many years of very dry conditions in ZS6 and ZS3. This new QTH had a fairly good elevation for going over the south Indian Ocean to Australia, VK and maybe to New Zealand, ZL (which had never been heard in ZS1) but not so good to the north. The sunspot cycle must have been poor too because DX was not that easy to work from this QTH. I always admired the way OM (Major) Guy Swart, ZS1AX, used to get out with his W8JK rotary beam, down at Zeekoe Vlei. I was called the junior engineer in the shack and built entire transmitters and put up just about every antenna seen in the ARRL Handbook, commonly known as the "Ham's Bible". Len enjoyed operating and trying out new things

(Continued on page 26)

(The Good Old Days from page 25)

and I got a kick out of seeing it in operation.

During those years from 1946 onwards, OM Tommy Freeborough came on the scene to take CW lessons with my father and eventually passed his CW test with flying colours. I must admit that I felt left out in the wilderness because I had not taken the CW test. OM Tommy was licensed as ZS1BK and worked plenty of DX and then took part in SARL CW contests. He became the champion and in later years when he went on AM phone, he won the SARL phone section as well.

On 12 April 1950, Len, collapsed in his office at work and on the following day, became a silent Key. Tommy came to me and asked me for Len's D104 mike as a keepsake and in the weakness of the moment; I gave it to Tommy, who became a good friend of our family. It was a sad moment when OM Tommy, ZS1BK, became a silent key 2 years ago. The D104 has now been handed back to me by his family, 50 years later and takes a prominent place in my shack.

A few months later, I realised that I had no option but to take the CW test. As Mr Kovachi, the Radio Inspector in those days, was also a former colleague of my father, I requested that there be another official person present and witness that I did the receiving and then the sending. I passed the CW test and when I handed over the examination fee of 5 shillings, Mr Kovachi said, do not

worry about that and he took 5 shillings out of his own pocket. He said it was his pleasure under the circumstances and he would arrange that I get my fathers call sign, ZS1AU. License No 889 was issued to me on 26 July 1950. THANK YOU, Mr Kovachi.

The Post Office Department controlled the amateur radio experimenter's license fees in the early days, which was 10 shillings per annum, and this covered our transmitting license, which exempted the radio amateurs from paying for a local broadcast listener's license. In later years, it was changed as local broadcasting was coming on stream and we radio amateurs were required to possess a listeners license as well as the amateur radio license.

Bill Sheward, ZS1AN, his QTH in Plumstead, was my first contact to start my first year on CW in 1950. It was an emotional moment for both of us and a start to what has been a fantastic life long experience.

That was 58 years ago.

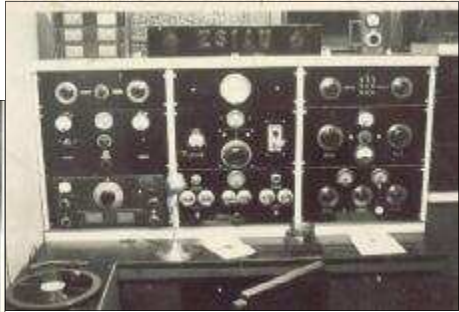


(Continued on page 27)

(The Good Old Days from page 26)
To be continued, 1950 to 2004... and this is another story!



Cape Town Branch Oldtimers 1960



ZS1AU radio rebuilt in 1951



Len, ZS1AU using his D104 microphone



Mr Streeter's headphones

Museum News

Dave Gemmell, ZS6AAW and the Old Timers

Peter Carey, ZS6JT

As was stated in the SARL News, Peter Carey, ZS6JT went silent key on the morning of the 11 July after fighting a long illness. He will be sadly missed. He was an excellent technician and a great ham. I have personally seen him, at

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the age of 80, work on the “insides” of a rig many hams would not even remove the covers.

During WW2, Peter served as a radio technician in the RAF Rhodesian Section and became a radio amateur after hostilities ceased. In

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(Museum News from page 27)

those days a new ham, before he was allowed to use phone, would have to either complete one year on CW or make 200 contacts using the same mode. Peter made the necessary CW QSOs using a Homebrew transmitter connected to a dipole antenna! Those were the days!

The ZS0AWA Visit to ZS6MUS

We thank those members of the Antique Wireless Association who visited the Swartkops Air Base and SAAF Museum on 5 July 2008. We trust you had an enjoyable time.

This visit had a happy outcome! George Honiball, ZS6NE donated a receiver in working condition, which has greatly enhanced the operating conditions in the Wireless Room. Baie Dankie George

The Museum is open Mondays to Saturdays, 09:00 to 16:00. The Wireless Room on the other hand is usually operational on Saturdays only from 08:30 to 12:00. Unless, of course, there is a special event or a special request. I would not mind going more often, there is a lot of work to do, but the petrol price does limit ones range of activities.

Work Party at ZS6MUS

Many thanks to Wendy, wife of Cliff, ZS6BOX for the new curtains! The old ones were up for the past nine years and did very nicely but, as with us all, the march of time took its toll! Thanks to Cliff, ZS6BOX who arranged several work parties. However, such is life in the Wireless Room; much of the time is taken up

cleaning and dusting.

Heritage Day and Block Houses – 24 September 2008

Please support Gerald Smith, ZS6IG and the Sasolburg ARC, ZS4SRK bunch who have gone to quite a bit of trouble to arrange this event. Please remember to support these chaps, as well as any others who plan to operate their own station.

Remember as well that it does not take much planning to be a “demonstration” station neither does one need to be on stand-by the whole time. On that day just be on the air for as much time as you can, when you can. Obviously, it would be ideal if you and/or your club would operate from your “favourite” heritage site.

Museum or Permanent Special “Event” Stations

You may have realized that ZS6MUS has been active for several years now and getting it operational has given me a lot of pleasure. Dick, ZS1AQD and the Oakdale Bunch have been doing the same at Ysterplaats AFB with ZS1MUS.

The concept of a Museum or permanent special event station is ideal for hams who cannot erect antennas (hidden wire or any other type) at the places of residence. How many Old Timers have moved into centres where outdoor antennas are forbidden? How many hams or would-be-hams cannot afford modern equipment and would really like

(Continued on page 29)

(Museum News from page 28)
to get involved?

Is there a possibility of a permanent station at NARC? This is not an insurmountable problem but is one that should be taken seriously. If someone tries out this idea perhaps, they are also able to start a Head Quarters ARC! Sounds crazy at first, but the suggestion has mer-

its! There should be a few hams in the Strubensvallei area who might like to have ago at this.

Correspondence for the Museum column can be sent to PO Box 77, Irene, 0062, e-mail to davegemmell@bmknet.co.za and telephone and fax to 012 667 2153.



Radio Scouting

Dave Gemmell, ZS6AAW
and the Broomstick Warriors

Registration of Special Event Stations

If you have not done so already, DO IT RIGHT AWAY! JOTA and CQ-Hou Koers are less than six weeks away!

The custodian must renew your station call sign every year in June and NOT by the SARL! Then, at least, seven (7) days before the event the other form advising SARL that non-licensed people will be talking on the ham bands, must be submitted as well.

Youth Day at ZS6MUS - 16 June 2008

ZS6MUS was on the air from 09:15 to 12:00 so a few contacts were made and I had a great time! The last two digits of each signal report were really important! Quite a novel feature! That is the age of the station's licence holder! 59/9, 59/10, 59/14, 59/42 and not forgetting a

57/68 with the ultimate, a 59/80. At least in my log there were more under-20's than over! I could but assume that the under-20's were only prospective amateurs.

Next time this type of event is run I hope all modes will be used CW, AM, SSB and a couple of the digital ones as well. The results would be very interesting, indeed!

Scouts Visit ZS6MUS - 30 August 2008

Whilst still on a "youthful note" the Randpark Ridge Scout Group will be spending the day at Swartkop AFB. The main programme for the day, that is, aeronautical matters as applied to scouting will be drawn up by the scout leaders with the aid of the Friends of the Museum.

Demonstration stations will definitely be needed on this occasion as few hams are heard on the air on

(Continued on page 30)

(Radio Scouting from page 29)
Saturdays after about 11:00.

Demonstration Stations

So what is a demonstration station? It is almost the same as operating in a contest merely to give points away. All that is required operator of such a station is to stand-in-by at convenient times to him, and need not necessarily take up the whole day.

I am not going to apologise if I have repeated to subject of demonstration stations and having other modes for very brief periods on small section of probably not more than two bands 80 & 40 metres possibly 160. To me it can only enhance the image of Hams in the eyes of the public.

Request for Permission to Use Other Modes on Phone Sections

With this youth activity on the bands, I do not think I am out of line to ask if we could bend the rules a bit. Should I rather say, "break" the gentleman's band plan agreement? The request is that when any youth station contacts a demonstration station or any other station on the phone section of the band that any demonstration of CW or any digital mode may take place without changing frequency. Of course,

only short both-way messages [about 5 words long at the most] will be allowed. It would be helpful even if the new listener only hears what the digital signal sounds. Music is also another option as well. This privilege would only apply to bona-fide youth stations on Youth Day, CQ Hou Koers and JOTA and then only on those specific days.

I know that many hams are sticklers for correct operation! Quite rightly so, but I must prevail upon you to consider this. This minute or two on special occasions may just enhance the image of amateur radio that little bit extra!

The True Ham Spirit

I was speaking to Gerald, ZS6IG on the landline the other day and asked him to meet him to meet me on 7070. His answer was a classic! "Sorry, Dave it will have to be CW. I can't find my microphone!" Spoken like a true ham! He subsequently found the microphone in his sock drawer still in it's original packing!!! That is the spirit Gerald! Keep it up!

Correspondence for the Radio Scouting column can be sent to PO Box 77, Irene, 0062, e-mail to davegemmell@bmknet.co.za and telephone and fax to 012 667 2153.

2 Metre Soda Pop Can Vertical Dipole

Construction 'Details - Arnold Solomon, KC4ZUA

The original 2 metre Soda Pop Can Vertical Dipole was constructed

for the 2007 Strange Antenna Challenge. After measuring a number of

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different can types, it was determined that a stack of four aluminium soda pop cans was within .2" of the calculated value for a 1/4 wavelength element. After completion of the antenna, a SWR of 1.7:1 was measured during testing.

To construct an antenna, each can is fastened to the can below it with three sheet metal screws to form an antenna element. The secret to fastening the cans together is to use hex head self-drilling #6 x 1/2-inch sheet metal screws. A 1/4-inch magnetic tipped nut setter is used with a 4-1/2-inch shaft extension to reach through the wide mouth opening of the can to drive the screws. Each element consists of four cans.

After the two elements are completed, the tops of the two elements are removed with a set of circular cutting aviation snips. The two elements are joined together with a short piece of 1-1/2 inch schedule-40 PVC pipe. The connection points to the feed line are sanded to remove the can's outer coating. The coaxial feed line is joined to the cans, with sheet metal screws tapped into the PVC pipe. It is recommended that a good quality coaxial cable of foam or Teflon construction be used with VHF antennas to prevent unnecessary losses.

Before installing the completed antenna, it should be tested for SWR on 2 metres using the low power setting of your 2 metre transmitter. As SWR bridges are frequency sensitive, a VHF bridge should be used to insure accurate readings. The

original antenna was designed for only temporary use, so no effort was made to seal the antenna with a coating of protective clear paint.

Used with acknowledgement to WorldRadio, April 2008



The feed point

The ZS4BS version of the antenna, indicating you can use cold drink and beer cans! Andries, ZS6VL says there are not enough beer cans in the antenna.

Use it for serious VHF work? No, but it will work at your JOTA / CQ Hou Koers station or that station you setup at the local shopping complex.



**AUTHORIZED
RADIO
DEALERS:**

AES

Johan ZS6JPL
083 300 8677

**Ham Radio
Outlet**

Donovan ZS2DL
082 852 4885

Keytronics

Kevin ZS6KEY
012 803 0973

Lets Play Radio

Kobus ZS1K
082 881 1164

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