

Radio ZS

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What is this WSPR'ng all about

Getting Started: 2 m SSB Contests

Diplexer 2 m / 70 cm

“Amateur Radio - a Gateway to Science”



Radio ZS

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Journal of the South African Radio League **Editor**

Tydskrif van die Suid-Afrikaanse Radioliga Dennis Green,
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"Amateur Radio - a Gateway to Science"

On the Cover

Operating as ZS4BS/p from the trigonometrical point on Mount Paul, SOTA ZS/FS-012 with the trusty FT-817 and LDG Z100 tuner into an inverted V.

Op die Voorblad

Aktief as ZS4BS/draagbaar vanaf die trigonometriese punt op Mount Paul, SOTA ZS/FS-012 met die betroubare FT-817 en LDG Z100-instemmer na 'n omgekeerde V.

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"Only 28 pages, Mr Editor?"

"Yes, your Honour. The response from the SARL members towards their magazine is very poor. I think there is nothing going on in many of the radio shacks and club houses around the country! Unfortunately they are not using their radio's to communicate."

Someone asked me the other day if Amateur Radio is a secret society? In an editorial some years ago, I challenged radio amateurs to climb out of the closet - tell your spouse and children that you are a radio amateur. Do the people you work with know you are a radio amateur? Have you taken your handheld to work and spoken on the local repeater in front of your colleagues?

Het jy hierdie week iemand vertel van amateur radio? Of gewys hou dit werk? Die 'VHF Alert' Whatsapp groep is besonders aktief. So ook die HAMSATS en WAGS groepe. So daar is iets aan die gang in die wêreld van amateur radio. Ek sien juis V51PJ en PY1MHZ begin weer hulle toetse op twee meter.

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South African Radio League Suid-Afrikaanse Radioliga

Founded 20 May 1925 / Gestig 20 Mei 1925

The National Body for Amateur Radio in South Africa
Member Society of the International Amateur Radio Union, Region 1

Die Nasionale Liggaam vir Amateurradio in Suid-Afrika
Ledevereniging van die Internasionale Amateurradio-unie, Streek 1

ICASA Licence fees for 2017

The new fee structure for Amateur Radio licences has been announced, by ICASA. The fees for 2017 will come into effect from 1 April 2017 and are as follows:

- . 1 year licence R134.00
- . 2 year licence R256.00
- . 3 year licence R367.00
- . 4 year licence R468.00
- . 5 year licence R559.00

Please note, that any licence not renewed by 1 April 2017 will lapse and the licence holder will have to re-apply for a new licence, and this will be subjected to extra costs. No fees will be accepted after 1 April 2017.

ICASA has recommended that Amateur Radio licence holders apply for a 5 year licence. This equates to a current saving of R111.80. You will also save the yearly escalations.

You need to apply in writing specifying the licence you wish to apply for. This must be stated in the subject heading of the relevant email to ICASA. For example, the required number of years licence, your seven digit licence number, and call sign. (e.g. 5 year payment, licence number 544-165-1, ZS6ZU)

If you do not notify ICASA of the required term of licence, you will receive a one year licence, regardless of the amount paid.

For all those who have already paid using the 2016 fee structure, the balance outstanding must be submitted to ICASA before the 1st April 2017, otherwise your licence will lapse.

If your surname starts between A to K then you need to e-mail your payment advice to Mr Kenneth Kgweedi at KKgwedi@icasa.org.za

If your surname starts between L to Z then you need to e-mail your payment advice to Mr Pieter Jansen at PJansen@icasa.org.za

All Amateur Radio licence fees need to be paid directly to ICASA and NOT to the SARL.

The ICASA banking details are:

ICASA

Nedbank account 146 200 292 7

Branch (universal code) 198 765

Deposit reference: Your seven digit licence number

The Ultimate Raspberry Pi Project

[Southgate News](#)

Paul McWhorter, KF5ZBY, has made available a video about a Raspberry Pi balloon project undertaken by school students.

To the edge of space and back with Raspberry Pi on a High Altitude Balloon (HAB). These students have had five successful launches sending the Raspberry Pi to the edge of Space and Back. They maintain telemetry via 2,39 GHz radios and stream live video back to Earth throughout the flight.

Watch The Ultimate Raspberry Pi Project <https://youtu.be/PKceYYBdns0>

The team are preparing for the launch of Eagle VI in early February 2017

<http://www.toptechboy.com/raspberry-pi/the-ultimate-raspberry-pi-project/>

Radio ZS Awards

The Gary Immelman RA Heritage Award Floating Trophy

Awarded by the SARL Council for the best article of a historic nature describing an event that occurred more than five years previously or an interesting personality that has played an important part in the development of Amateur Radio in years gone by. Donated by Gary Immelmann in 1993.



The JJ Pienaar Trophy

Awarded by the Editor of Radio ZS for the best article published in Radio ZS during the past year.



The Radio ZS Shield

Awarded by the Editor of Radio ZS to a South African Radio League affiliated Club or member who best supported Radio ZS during the year. Donated by the Port Elizabeth Branch in 1966.



Prince Philip congratulates the RSGB

Southgate News

HRH the Prince Philip, Duke of Edinburgh, KG, KT has congratulated the RSGB on the 80th Commonwealth Contest, to be run over the weekend of 11 and 12 March 2017.

The Canadian national amateur radio society, RAC, reports the message read, *'I am delighted to send my best wishes to the Radio Society of Great Britain on the organisation of the 80th Commonwealth Radio Contest. To have survived for so many years implies that the authors of the Contest hit on a very successful formula.'*

I would also like to take this opportunity to send my best wishes to everyone taking part in this Contest. I hope that they will all find it a challenging and rewarding experience."

Read the RAC story at
<http://wp.rac.ca/prince-philip-congratulates-the-radio-society-of-great-britain-on-the-80th-commonwealth-contest-march-11-12/>

The rules of the Commonwealth Contest, which is a CW only contest, can be found at
www.rsgbcc.org/hf/rules/2017/beru2017.shtml

BERU is a reference to the contest's old name in the 1930's, the British Empire Radio Union contest.

The Radio Society of Great Britain (RSGB) created the British Empire Radio Union in the late 1920s to support radio amateurs in the Empire. In 1930 a New Zealand radio amateur suggested that a week should be set aside as an 'Empire Radio Week' and that this should be held in February 1931. This was the first BERU Contest.

The British Commonwealth of Nations was established in 1949 and in 1973 the RSGB changed the name of the contest from BERU to Commonwealth. <https://berucontest.wordpress.com/about/>

A few years ago, Bob Whelan, G3PJT, the author of "Reflections in a Rosebowl, A History of the Commonwealth Contest 1931 to 1996" gave me a copy of the book. It is very interesting reading.

4th BERU 1934 - G.A. Shoyer, ZS1H, achieved 8th place in the Junior section.

7th BERU 1937 - H.J. Buckley, ZS5U, achieved 8th place in the Junior section.

8th BERU 1938 - R.G. Henwick, ZT2Q, achieved 3rd place and W.F. Meyer, ZU6P, archived 4th place in the Senior section.



9th BERU 1939 - R.G. Henwick, ZT2Q, achieved 1st place in the Senior section.

10th BERU 1947 - R.G. Henwick, ZS2AL, achieved 1st place, with H.W. Green, ZS6CT, in 5th place and H.J. Buckley, ZS5U, in 8th place in the Senior section. S.W. vd Merwe, ZS2Y, achieved 10th place in the Junior section.

12th BERU 1949 - B.H. Friedman, ZS6GI, in 9th place in the Senior section

13th BERU 1950 - W.P.F. Lawrenz, ZS6YF, in 6th place in the senior section and J.C. van Wyk, ZS6QF, in 2nd place in the Junior section.

14th BERU 1951 - J.C. van Wyk, ZS6QF in 1st place in the Junior section. C.R. Sprighton, ZS6JS, in 7th place in the Senior telephony section.

15th BERU 1952 - J.C. van Wyk, ZS6QF in 1st place in the Junior section. A Sachs, ZS6BW, in 4th place and Arlund Ussher, ZS6Z, in 8th place in the Senior telephony section.

16th BERU 1953 - R.G. Henwick, ZS2A in the 3rd place and C.K. Bradley, ZS2HI, in the 10th place in the Senior section. J.C. van Wyk, ZS6R in the 1st place in the Junior section.

17th BERU 1954 - R.G. Henwick, ZS2A in the 1st place in the Senior section. J.C. van Wyk, ZS6R in the 1st place in the Junior section.

18th BERU 1955 - J.C. van Wyk, ZS6R in the 1st place in the Junior section.

19th BERU 1956 - J.C. van Wyk, ZS6R in the 1st place in the Junior section.

20th BERU 1957 - J.C. van Wyk, ZS6R in the 1st place in the Junior section.

21st BERU 1958 - R.G. Henwick, ZS6DL in 1st place in the Senior section. J.C. van Wyk, ZS6R in the 1st place in the Junior section.

22nd BERU 1959 - J.C. van Wyk, ZS6R in the 1st place in the Junior section.

23rd BERU 1960 - J.C. van Wyk, ZS6R in the 1st place in the Junior section.

24th BERU 1961 - Sid Coosner, ZS4MG, in the 2nd place in the Senior section.

And then South Africa left the Commonwealth!

What is this WSPR'ng all about?

Leon Uys ZR6LU

Our hobby is becoming increasingly peppered with acronyms. The latest Four-Letter Acronym is WSPR. The websites will all tell you what it is, so here is an article to tell you how to do it.

Upfront Apology: This month's article does not have a lot of pictures, sorry. You will have to follow the supplied links, as their pictures are often copyrighted.

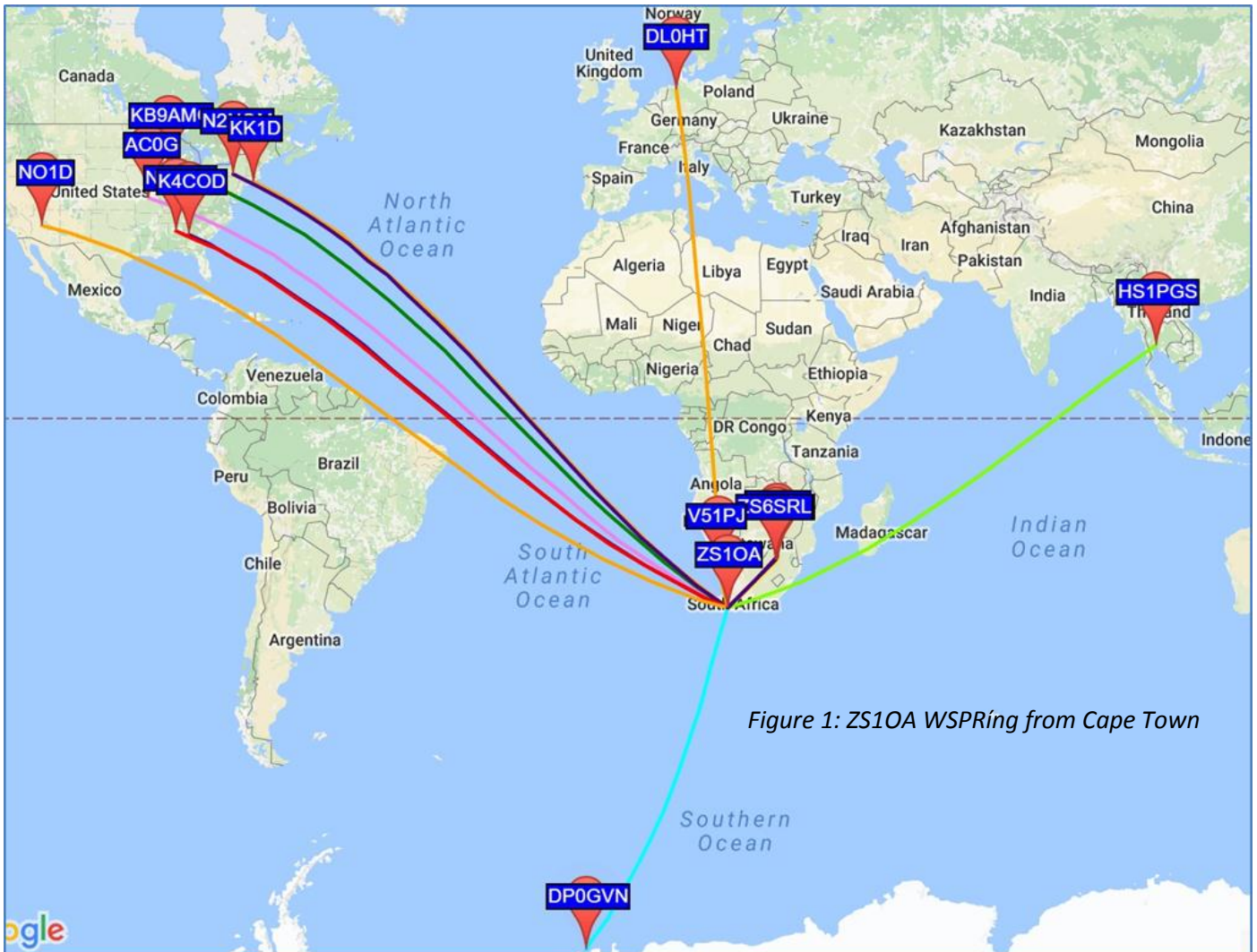


Figure 1: ZS1OA WSPR'ng from Cape Town

I noticed that our hobby is becoming increasingly peppered with acronyms. First there was single letters, for example V (for volts) and A (for amps). However, they soon ran out of single letters and so the two-letter-acronyms started appearing, for example AM for Amplitude Modulation. Since then the three-letter acronyms have become overpopulated (e.g. VHF for Very High Frequencies) and it is no wonder that four- and five-letter-acronyms are already appearing in their numbers. Heck, one can almost make common English words out of some acronyms. When last did you say Digital Smart Technologies for Amateur Radio instead of D-STAR!

So why do we not talk about whispering this month? Whisper is the English-sounding word for a digital mode called WSPR. WSPR-mode tends to use low powers (QRP, see, another three-letter-

acronym!) and therefore the word whisper is a beautiful homophone. On the other hand, is it a homonym or a homograph, or is it a heteronym? My English is not up to scratch, sorry.

Since we started playing with our beacon kits, quite a few amateurs are already playing WSPR on HF, so I thought I might as well make this article interesting by talking about setting up a WSPR station on 2m (144.489 MHz). However, I will try to make the article general-purpose enough so that it will work on just about any radio from 1.8 MHz right up to 70 cm... that incidentally is my next goal.

WSPR on VHF (or any other band, actually)

One of the best things about Amateur Radio is that if your interest level wanes or you are just too damn busy with life to sit at a transceiver and make

(Continued on page 6)

contacts then there is always WSPR. Lately I have been spending less time in front of my radios and more time with the soldering iron and for fear of accidentally sticking the soldering iron up my tonsils thinking it is a microphone, I let the radios run softly in the background behind me. WSPR is perfect for that – it runs quietly in the background while I am in the shack doing other things.

WSPR is nothing new. About three years ago, there was a lot of interest in the 60 m band (around 5,2 MHz) and ICASA allowed the amateurs to experiment on the band. We phrased it in terms of propagation research using WSPR, which is exactly what the experiment was (and is!). Many stations were set up around the country and a notable few are still in operation today. Personally, I found it fascinating to look at the daily propagation charts because interestingly a number of stations would hear each other at low power levels, even when the time of day and weather conditions would have predicted no contacts.

WSPR is not restricted to any one band for one purpose only.

While the ZS amateurs started using WSPR mostly on the HF bands, maybe because that was easy to set up, quite a few are putting their toes in the VHF-waters and I am definitely going to start looking for new contacts on that frequency. My question is simple: If you already have half of a station set up with interfaces and antennas, why not try something new by just plugging into a new radio.

Exotic Uses for WSPR

Because the protocol is so robust and able to resist atmospheric interference, some amateurs have turned to putting WSPR beacons in really exotic things such as extremely low power beacons on board balloons, and then asking amateurs in other countries to track them with their home-based setups. This works very well.

One interesting such project is the ocean going marine buoy by Bob Sutton, ZL1RS. It contains a GPS and QRP-Labs Ultimate3S based transmitter in a PVC drainpipe with a Styrofoam collar. This project is intended to drift in the Pacific Ocean at the mercy of the tides, currents and wind directions while sending its position, battery voltage and temperature information via HF radio telemetry in WSPR and JT9 modes. It has been going for 256 days in the ocean already! More information at

<http://www.qsl.net/zl1rs/oceanfloater.html>

Another exotic application that the amateurs are playing with is to carry a WSPR beacon on a balloon. This has already developed to the point where there are two distinct modes of operation.

The aficionados say either they are taking photos from the edge of space or they are riding the Jetstream.

The first group uses a large latex balloon (weather balloon) that goes straight up, bursts and comes down. The flights are short (hours) and reaches very high altitudes. They may carry video cameras, GSM, etc. These flights get nice 30 000 m altitude edge-of-space photos and videos. A good example is at <http://grp-labs.com/flights/stella4> and the gear is generally available and is often used by other amateurs.

The second group rides the Jetstream. They use very lightweight and cheap Mylar film balloons that might only weigh a few grams and is called a “floater.” Floaters can take a long flight around the world at maybe an altitude of 10 000 m and the flight lasts for weeks and months. They go all the way around the world and for example, VE3KCL S-11 circumnavigated three times but was suffering GPS errors above 10 000 m, but MOXER B-64 is apparently doing 8 times around the world! There is an amazing picture at <http://leobodnar.com/balloons/B-64/index.html>.

Popular current hardware is a party balloon with an assembled PCB weighing in at 1,5 g. Adding battery, solar panel and antenna brings the all-up weight to maybe 10 g total. This hardware is usually custom-made and not commercially available yet. More information at <https://www.grp-labs.com/circumnavigators.html>

Receiving as well as Sending

What makes WSPR interesting for me is that one can decide to only send packets e.g. with the QRP-Labs WSPR kits or one can decide to only receive packets with your regular radio or one can decide to send-and-receive. When doing send-and-receive, one usually allocates time slots to the system. One popular system is to send for one slot and then receive for four slots. This is called 20% transmission time. At 10% TX it will switch to transmit for a two minute block every 20 minutes or so and you will hopefully be heard far far away!

So what is this WSPR stuff, anyway?

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(What is this WSPR'ng all about? from page 6)

WSPR stands for Weak Signal Propagation Reporter and it is just another digital mode like RTTY or PSK31. It is a “sound card” mode of transmission that uses your computer and your radio with a small interface between them. You type on your computer, which sends the signal to the radio and the radio receives a signal and sends it to your computer screen.

The WSPR software that runs on your computer (Windows/Linux/Mac) is freely downloadable and if you are already doing PSK31 or RTTY you probably have all the stuff you need. There are even interfaces and software available for phones and tablets! Visit <http://www.wolphi.com/interface/>

What makes WSPR different is that the software uploads spots automatically and all spots are checked for accuracy. There is no manual upload function, which avoids artificial delays and gives the results of a spot on the map almost immediately. Here is a good example taken from Nic van Duffelen, ZR6AEZ, while I am typing this article.

To see your results, or anybody else's results, just go to <http://wsprnet.org>

WSPR works on all bands, from low-low HF to 2 m and beyond. Indeed WSPR on the HF bands is extremely popular and you will find many amateurs on all of the common HF and WARC bands spotting signals from around the world in real time and uploading their data to the WSPRNet site.

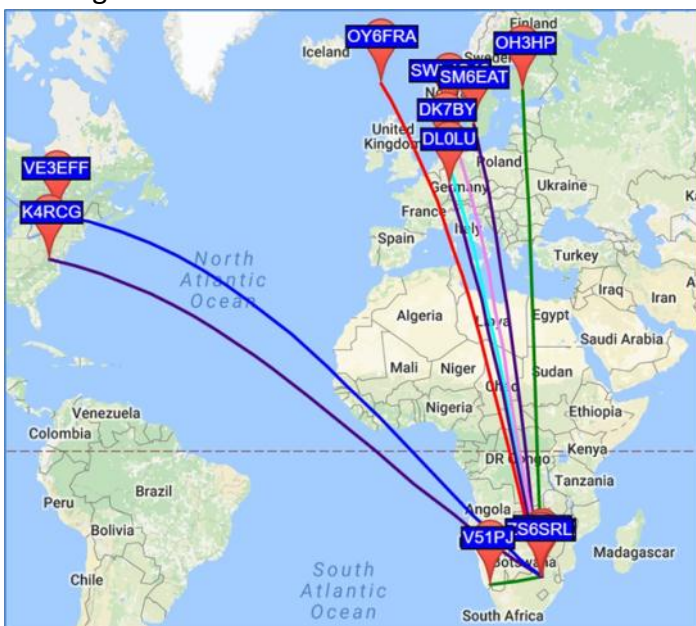


Figure 2: Nic van Duffelen ZR6AEZ on Sunday 29 January 2017

What kind of computer and radio will work for me?

WSPR will run on a fairly entry-level computer

and most shack computers will probably run it fine. My shack computer is a very old and tired Lenovo Thinkpad T61 running Windows XP and it works perfectly. Even a tablet or phone can work.

As for the radio, well, almost anything will work as long as long as you can get audio into and out of it. My first WSPR radio was a Yaesu FT-840 and while I was able to get the audio-out easily from the back, I had to buy an 8-pin mic connector to get it connected to the front, which was the only audio -in receptacle. It worked a charm though! The signal quality was exceptional.

There are hundreds of guides on the internet on connecting a radio to the computer and it is impossible to list every single combination here. More about some options later, though. Just remember you will also need to connect the PTT connection to switch between TX and RX.

Modern radios from ICOM and other already have a USB cable connector, which simplifies things a lot! If you just want to do HF WSPR, then the ICOM 7200 is just about the ideal rig, as it has a built-in USB port that provides a 1-cable solution between the computer and radio.

My only real concern with a radio, any radio old or new, is the frequency stability. It must not drift. For this reason I have never tried older valve or valve hybrid radios and even my ICOM 720A is not stable enough. The bandwidth of a WSPR signal is very narrow and in fact, the entire band from top to bottom is 200 Hz wide – if you are out by more than 100 Hz, you could miss the entire band!

My go to radio of choice is my Yaesu FT-857D, which I have now used on just about all of the bands, running it at 5 watts (or less through an attenuator). Even at 144 MHz, it was reasonably stable once it warmed up, but at 434 MHz it struggled a lot and one would have to take additional steps to keep the output frequency stable.

Higher and Higher

Things get interesting at VHF and higher. The radio needs to be more stable. On my Yaesu FT-857D I modified the local oscillator by gluing a copper heat sink to the crystal and wrapping it in foam. Some radios can be locked to a GPS or Rubidium standard which helps a lot but is not always necessary though.

Drift is often affected by the temperature in the shack and while not an issue on HF it can be an issue on 144 MHz. Try it and see. Some radios such

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(What is this WSPR'ng all about? from page 7)

as the TS2000 drifts too much on 2 m and above to be suitable for WSPR unless modified.

Radio Settings

There are not many radio settings that can prevent you from working, although the following precautions need to be taken care of when using the computer sound card mode with a transceiver – any transceiver.

The universal standard for digital is USB (Upper Side Band), always, regardless (for AFSK).

Make sure any speech processing is turned off, no microphone gain is applied and no VOX is included. You want to get straight from the microphone input to the finals.

Then adjust the radio so there is no ALC indicated when transmitting. Those annoying protectors might protect your transistors, but they really mess with your signal. Really! Even the slightest overdriving causes splattering all over the band and annoys your fellow amateurs. Moreover, in my experience it does not get you 1 kilometre further around the globe.

In-Between

There are many interfaces available to connect between the PC and the Radio. You can very easily build one from the hundreds of kits and circuits available, but I agree that not everyone is handy with a soldering iron and for those with six thumbs on a hand there are complete systems available.

As I mentioned earlier, the Wolphi interface <http://www.wolphi.com/interface/> is one of several interfaces available for phones and tablets.

For a laptop or desktop computer the Tigertronics Signalink is somewhat popular although it is quite expensive for what it does and it requires another separate cable between the computer and the interface for CAT or band switching in case you are inclined to do band-hopping.

My personal preference is the DigiMaster Pro3 which does everything in one box. Perfect companion to the Yaesu, Kenwood or ICOM and I have seen it work with Alinco and Baofeng.

And really, when you are careful to avoid ground loops, a cheap USB Sound Dongle can also work very well.

All of the above work marvellously and you can order it with a cable for your particular radio for a solder free plug and play experience.

Once WSPR is up and running you can just set it

and forget it, especially if you band-hop to catch which band is working best right now. Just look at the WSPRNet page and you will see who is hearing you, and who you are hearing. Have fun!

What to do Now?

Are you ready to start? Is your modem and radio plugged in? Right, let us go!

Download the correct software for your operating system from the site below

<http://physics.princeton.edu/pulsar/K1JT/wspr.html> and install it. Set your call sign and some basic parameters as set out in the manuals, and go!

For Linux, many new options are becoming available. The very aptly named George Smart has some instructions here for getting it to run under Linux

http://www.george-smart.co.uk/wiki/Compiling_WSPR

Personally, I went one step further in my shack. I used my Raspberry Pi 3 as my computer and I am running it as a dedicated WSPR station. It is low power and the built-in WiFi connects to my home ADSL. Small and very convenient.

On time, every time, Please?

Actually, there is one important thing I have to mention about running WSPR successfully. It is documented in all the links I provided before, but let me repeat it here because it is critical.

The WSPR protocol divides time up into 2-minute slots. A transmission MUST start on exactly the 2-minute border, for example at 14:00, 14:02, 14:04, 14:06... etc.

Therefore, if you do NOT start your transmission on exactly the border, or start decoding on exactly the border, you will not be heard and you will not decode anything. That is how it works, klaar. You cannot be out by more than a second or two either way.

Now, to ensure your computer (or phone or tablet or kit) is exactly on time, synchronise it with an internet time-server such as <http://www.timesynctool.com/> (there are others too, use what works for you) or you can just use set windows time and date to sync with a time server.

In my kits, I use a GPS clock reference. It is cheap, is used for lots of other things in the shack and it just makes everything work that much better.

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My Radio's Dial is Wrong?

Once the software is installed and you configured it with your basic info like your call sign and grid locator, soundcard input and output, PTT method, CAT control (if any) and how much power you'll be running, it is time to play with the Big Dial!

Ooh the Big Dial ... decisions time! What band is best! Where to go! Well you can go everywhere but I suggest you play on 40 m for a short while to get familiar with the mode. Set the TX slider to say 10%, make sure upload spots is checked and TX idle is unchecked. Your rig will now listen in 2-minute blocks and if it hears a station and successfully decodes the call/locator/power level information from a transmitting station it will upload the information to the WSPRnet site for display.

You look up the band plan and see the correct frequency for WSPR is listed as 7,040000 to 7,040200 (200 Hz wide). You decide to turn your Big Dial to exactly the middle to give you the best possible chance of being heard at 7,040100 MHz. Moreover, you listen and wait. And you listen and wait. Nothing. You cautiously turn the Big Dial a few hertz up and down in search of the elusive signal and you actually hear a signal far away that almost sounds like a WSPR signal. And you come to the conclusion that you have to take your radio in for repairs because the alignment is out by nearly 1 500 Hz.

But wait! What does your Big Dial say?

7,038600 MHz? Aha! You see, your radio has tricked you. In fact, if your suppressed carrier (the "middle" of the emission) is at 7,038600 MHz which is what your Big Dial says and you set the mode to USB (U = "upper" i.e. plus) and you put an audio signal into the microphone plug so you get AFSK modulation, chances are that your radio will emit its energy around 1 500 Hz higher than the Big Dial at $7,038600 + 1\,500\text{ Hz} = 7,040100\text{ Hz}$. Spot-on.

Always remember this - AFSK digital modes are usually 1 500 Hz higher than the Big Dial. On 144 MHz I found my Yaesu to be out by a little more but I could easily find it as I knew what I was looking for.

Happy Endings

We are regularly hitting thousands of kilometres with our beacons at 200 mW output and with 5 watts from a real radio it only gets further as you can imagine.

The best reason for running a WSPR beacon is to do Antenna Testing. You can immediately see which one of your antennas is working better than others. No more anecdotal stories. The number says it all.

So, in conclusion if you need support with your WSPR'ing and the above links does not make sense, first ask around your Club for someone who can give you hands-on assistance. However, if all else fails, do not hesitate to drop me a e-mail and I will try to assist you as best I can. leonuys@gmail.com

Ordering South African Radio League generic QSL cards Bestel Suid-Afrikaanse Radioliga generiese QSL kaarte

The generic QSL cards are sold in batches of 100 at a price of R75 (postage included) - that is R0,75 per card. Do not make any deposits before confirmation of availability of cards. Deposit the amount in the League's account at ABSA 407 158 884 9, Branch code 632005.

Please use your call sign or initials and surname as a reference during the payments e.g. **ZS6X/WJ Weideman - QSL cards.**

Send me an e-mail to zs6wwj@gmail.com with the proof of payment and I will post the cards to the address as listed on the League database.

Die QSL kaarte word verkoop in bestellings van 100 teen R75 (posgeld ingesluit) - dit is R0,75 per kaart. Moet geen inbetalings maak alvorens jy vasgestel het of kaarte beskikbaar is nie. Betaal die bedrag in die Liga se bank rekening by ABSA 407 158 884 9, Takkode 632005.

As verwysing gebruik asseblief jou roepsein of voorletter en van, tydens die betaling b.v. **ZS6A/PA van Deventer - QSL kaarte.**

Stuur vir my 'n e-pos aan zs6wwj@gmail.com met bewys van betaling en ek pos die kaarte na die adres op die Liga se databasis.



Club Corner

Ideas for Clubs

It would seem that apart from an odd flea market every now and again and the regular Club bulletin on a Sunday, nothing really happens in the local Clubs here in South Africa. Well, we don't hear about it in SARL News, on Facebook or here in Radio ZS.

I have been reading Essex Ham and they have a number of good ideas that I will be sharing with you over the next few issues and hopefully we will also get ideas from local Clubs in share.

If you have a radio that can handle SSB on 2 m, why not try a monthly 2 m contest and see how far you can get? Thanks to Essex Ham member and Monday Night Net regular Terry, G3VFC, for the following.

Break out of the 35 km QSO limit of 2 m FM...

Try SSB! You can routinely get out to 160 km and more.

Try listening to a contest in full swing - you will need an SSB-capable rig, a horizontally polarised antenna (a horizontal dipole is much better than a collinear or other vertical antenna) and maybe a rotator.

Listen on 144,300 and within 100 kHz of that calling frequency – although in contests the calling frequency itself is never used.

A Monthly Club Contest

Arrange a 2 m Club Contest once a month, maybe on a Thursday evening or what suits the Club members. Start with a 2 m FM contest, next a 2 m SSB contest. Later the Club can have a look at a 70 cm FM contest and a 70 cm SSB contest.

Working the 2 m band SSB

Listen to a few contacts – they are short, comprising a report (59, or whatever signal strength is actually arriving at the antenna), a serial number (normally given as three digits, starting at 001 and incrementing by one for each subsequent QSO) and their grid locator.

Then try calling a strong station who is calling CQ Contest (or QRZ?). Have your report, serial number and grid locator ready to give preferably in

Getting Started: 2 m SSB Contests

that order. No other detail is required.

Do it again with another station... and another...

Try listening for weaker stations – and calling them. The range you get will amaze you if you have only been on FM so far. Some signals are so weak it can take five or ten minutes of repeating details to complete the contact – but the elation of beating the noise is definitely worth working for - so are the points!

You will get better with practice!

Submitting Results

Draw up a set of rules – frequency limits, exchange and scoring. Have a time limit – contest Thursday night, logs in by Monday morning and results out by Wednesday.

Encourage the Club members to upload their logs to the SARL Electronic QSL system and LoTW.

In any case, you can improve your VHF range and operating skill by playing this game – and the improvement over the months is measurable.

You can also compete against a friend – who can work most stations, over what distance, covering how much of the country?

Take your portable equipment along on holiday and operate from Swaziland, Lesotho, Botswana, etc.

One whole load of fun...

Why not try it and see how far your 2 m signal will take you... a lot more than “just beyond line-of-sight!”



Thanks to Essex Ham for the idea and the photographs.



Getting wire antennas into the air

Graeme Dowse, VK4CAG

This article describes how I erect wire antennas between trees without leaving the ground.

I live on a country property with plenty of trees, many 20 to 30 metres tall. I have tried several methods of placing a halyard over the trees, strong enough to support wire antennas such as dipole, long wire, double extended Zepp, Windom and the like. I have found 10 mm diameter UV resistant rope to be the most durable. Thinner rope frays with constant movement of the branches in windy weather and eventually breaks after a year or so. Stainless steel wire survives, but it cuts through the branch and drops to a lower level after about the same amount of time. I am resigned to accept that any antenna support using trees is temporary only and needs to be replaced regularly. To this end, I have devised a simple method of doing this.

When I visited Hamvention in Dayton, Ohio in 2006, I brought back with me an 'E-Z-hang' which is a kit consisting of a slingshot with a fishing reel and some brightly coloured sinkers and a roll of fluorescent coloured builder's line. See www.ezhang.com/ (*Slingshot – kettie on steroids. Ed.*)

When I declared this device at Customs at Sydney airport, they informed me that it was considered to be a restricted weapon, because the slingshot was equipped with a wrist brace, making it more powerful than a standard slingshot. It was legal to possess such a device in Queensland, but not in New South Wales (NSW). I landed in NSW to visit family,



intending to drive back home to VK4, so appropriate paperwork had to be made out which permitted me to transport the E-Z-hang back home in the boot of my car, conditional that it not be used in NSW!

The E-Z-hang did the job OK, using 4,5 kg fishing line. Once the sinker was located, it was removed, then tied to the builder's line and wound back over the tree. The builder's line was then tied to the 10 mm rope and pulled over the tree again. The antenna could then be attached and raised. Insulators were found not to be necessary since I used 2,5 mm insulated green/yellow earth wire and the rope insulates well. I use an insulator in the centre of a dipole or other balanced antenna. The lack of end insulators makes for a lighter antenna and therefore less droop over a long span, such as with a 160 metre dipole.

The problem I had with the E-Z-hang system was that the sinker was too small to find, especially if hidden in the branches of surrounding trees. In addition, it was not heavy enough to reliably fall to the ground if snagged in foliage. Later I developed a crook shoulder, making it impossible to pull back far enough to get the range necessary to clear the tree.

So I decided to build a tennis ball launcher based on a design I saw on the internet. See <http://www.antennalaunchers.com/antlaunching.html>. It uses compressed air from a small 12 volt compressor, maximum 90 PSI. It involves no physical effort, is easy to aim and is accurate. Best of all, it uses brightly coloured, cheap, tennis balls available from K-mart. I cut a slot in each ball and half fill it with sand and make a loop of heavy fishing line through

(Na bladsy 12)

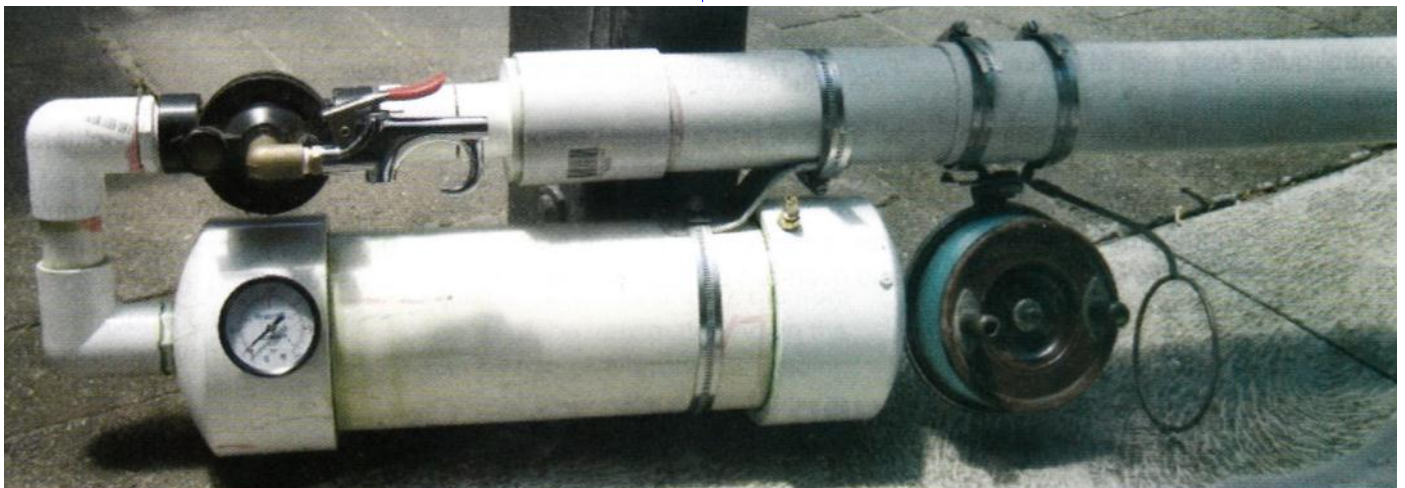


Photo 1: A view of the tennis ball launcher.



Photo 2: Another view of the tennis ball launcher, shown end on

(Getting antennas in the Air from page 11)

the ball via two small holes. The heavy ball drops nicely through foliage and is easy to see. Photos 1 and 2 show my homebrew unit, of which all Parts are available locally.

Putting a line over a tree is the easy part. I found great difficulty in using the small size builder's line to pull the 10 mm rope over the tree. Sometimes it works, but more often than not the large rope snags in a fork and refuses to go any further. I have tried different ways of splicing the two lines together, tapering the join using silicon tape, lubrication, the list goes on.

Recently I stumbled on something that works most of the time. I use a plastic nozzle, the one supplied with Silastic cartridges. I cut off the flange and the tip, leaving a tiny hole, just big enough to thread the builder's line through. The builder's line is then spliced into the 10 mm rope and tied off



Photo 3: The homebrew nozzle and associated workings, shown referenced to a ten cent coin.

around one of the strands. The rope is a tight push fit into the big end of the nozzle, making for a smooth taper from the line to the rope diameter. Refer Photo 3.

(Prior to replicating such a device, readers should check their local firearms regulations. Ed. Amateur Radio)

This article is used with acknowledgement to Amateur Radio November 2013. Amateur Radio is the Journal of the Wireless Institute of Australia.

I suppose you could also use the tennis ball launcher to keep your antennas clear of Bostrychia hagedash and Columba arquatrix. You can also keep the dog busy for hours. Editor.



SA Maritime Net

The South African Maritime Net operates 7 days a week, and provides weather reports from around the coast and maintains contact with boats off the coast of South Africa and up into the Mozambique channel. There are two regular schedule times as follows:

06:30 UTC - starts on 14 316 kHz for 5 to 10 minutes and then moves to 7 120 kHz.

11:30 UTC - starts on 14 316 kHz for approximately 30 minutes and then moves to 7 120 kHz.



Bloemfontein Amateur Radio Club ZS4BFN



Die Klub vergader die eerste Dinsdag van die maand om 18:30 by die Klubhuis te CBC-Skool, Waverleyweg, Bloemfontein. Die Klub se herhalers is die Naval Hill herhaler - 145,600 MHz met Echolink; Brandkop herhaler - 145,650 MHz en eersdaags die Springfontein herhaler - 145,700 MHz op die N1.

The Club has a 2 metre beacon on 144,415 MHz as well as a WSPR beacon on 5 290 MHz. Reports are welcome at zs4bfm@mweb.co.za. The Club holds the call sign 7P8BFN.

Web: www.zs4bfm.co.za

E-mail: zs4bfm@mweb.co.za

Club Chairman: Andre v Rensburg, ZS4APA,

zs4apa@telkomsa.net

Club Secretary: Dennis Green, ZS4BS

Ross Hull, VK3JU, immigrated to the USA where he joined the ARRL as Associate Editor of QST. Being a foreigner, he could not apply for an amateur licence in the USA, but had to operate under the W1AW call sign of the ARRL. He designed and tested many radio circuits, which were printed in the QST magazines and early ARRL Amateur Radio Handbooks.



In the early 1930s the average 5 metre station was capable of working about 24 km. However, in August 1934, Ross Hull amazed his colleagues at QST by announcing that he had worked from Hartford to Boston. The distance was 160 km, a very significant achievement. His secret was the antenna. At the time, everyone used vertical antennas, but Ross put up a beam. It was a simple antenna by today's standards - four quarter-wave radiators fed in phase with four reflectors - but it made a startling difference to station performance. The word spread and before long, the distance records were tumbling. This was a milestone: the beginning of the end for the "Line of Sight" (LOS) theory of VHF propagation. We can still learn from it. Even today, a good many VHF operators would be amazed if they threw out their vertical antenna and put up a beam! The big discovery Ross had observed that signal strengths varied over time: a signal could be strong today and gone tomorrow, or it could be present in the morning but absent in the afternoon. To find the answer, he now turned his attention to a detailed study of VHF propagation.

In March 1935, he built the equivalent of a chart recorder. He fed the output of a receiver to a meter and focused the image of the meter needle through a slit onto a strip of photographic film. The film was drawn slowly past the slit by a gramophone motor. This enabled him to correlate signal strength with other data, and it became clear that signal variations were associated with changes in atmospheric pressure and moisture. This led to the discovery that VHF signals are refracted in the lower atmosphere, in much the same way as light rays. Ross published his findings in QST and they led to greater activity and another dramatic increase in VHF record distances. Within a short time, 5 metre contacts were being made half way across the

country - a far cry from just a couple of years before, when even the most diehard experimenters thought that VHF would never be useful for anything other than chatting across town.

Ross applied the same techniques - stable oscillators and beam antennas to the 112 MHz (2,5 metres) and 224 MHz (1,25 metres) bands. As early as 1934, he had succeeded in working over 120 km on 224 MHz. As more

amateurs adopted his techniques, it was not long before the 112 and 224 MHz bands started to deliver the same kind of DX that had been achieved on 56 MHz. Ross was a man of many talents. Apart from his amateur radio experiments, he was a talented pianist, artist and photographer. His interests also extended to astronomy - he built several reflecting telescopes - and to radio controlled model aircraft. He was particularly interested in television, and caused quite a stir when he received good pictures from the experimental television station operated by NBC on the Empire State building in New York, 160 km away.

Unfortunately, Ross Hull came to a sad and sudden end when he reached for a switch underneath his workbench and accidentally touched the high voltage contact of a 6 000 Volt transformer of the power supply of his TV receiver.

The New Digital Modes

In December 2016, Joe Taylor, K1JT, released the latest version (1.7) version of his WSJT-X software suite, designed to facilitate basic Amateur Radio communication using very weak signals (WSJT stands for "Weak Signal communication by K1JT") <https://physics.princeton.edu/pulsar/k1jt/wsjt.html>. Version 1.7 included the modes MSK441 and QRA64 as well ISCAT (Ionospheric Scatter) MSK441 and QRA64 (and QRA64A) are finding a home within the Earth-Moon-Earth (EME or moon bounce) and Meteor Scatter communities, but QRA64A signals have also turned up on 160 metres, which poses its own challenges to weak signals.

"QRA64A QSOs are being made nightly on 160 metres, of all places and QRA64 activity on 2 metre EME is becoming significant, especially on week-

(Continued on page 14)

ends,” Taylor remarked in a 9 January update posted to the Moon-Net reflector, pointing out that QRA64 is decoding signals down to about -28 dB signal-to-noise. However, Taylor does not advise a wholesale shift to the use of QRA64 on the HF bands – at least just yet. “It’s okay to play with and test QRA64 at HF, if you wish,” he commented recently on the WSJT Development discussion group. “Some of our earliest tests of the mode were done on the 20 metre and 30 metre bands.” He suggested, though, that HF operators stick with JT65, “not least because, at present, we have included no ‘multi-decode’ capability for the QRA64 decoder. It’s made to decode just one signal in the pass band.”

In the WSJT-X Version 1.7 User Guide, Taylor pointed out QRA64’s several advantages over JT65, including better performance on the very weakest signals. “We imagine that, over time, it may replace JT65 for EME use,” he wrote. “JT9 was originally designed for the LF, MF and lower HF bands. Its sub-mode JT9A is 2 dB more sensitive than JT65, while using less than 10% of the bandwidth.” Taylor told ARRL that he expects JT65 and JT9 to remain the preferred modes for making “minimal QSOs” at HF for some years to come. “QRA64 is 1-3 dB more sensitive than JT65 or JT9; this is important for EME, but much less so at HF, because one can usually run 20 W instead of 10 W, when the going gets rough.” These modes use 1-minute timed sequences of alternating transmission and reception, so a basic contact can take up to 6 minutes – two or three transmissions by each station, one transmitting on odd UTC minutes and the other on even.

Taylor said that MSK144 “is quickly becoming the mode for meteor scatter,” at least in North America and Europe. “Unlike FSK441 – the older standard mode for meteor scatter – MSK144 uses strong error correction and JT65-like messages. Messages are displayed in complete form or not at all, and false decodes are rare. Last week, we introduced an ‘SWL’ feature that allows decoding of MSK144 ‘Sh’ (short) messages directed to someone other than yourself.” – An ARRL news item.

Strong Sporadic-E opening on New Year’s Day

Andrew Gray, ZS2G, at Port Elizabeth was the first to report the Sporadic-E opening on 1 January 2017 when he heard the ZS6TWB beacon on 50,044 MHz CW from Polokwane around 11:59 CAT.

Mike Kellett, ZS1TAF, at Cape Town heard the ZS6TW beacon for about 2 hours and it was first audible from about 12:30 CAT, while the ZS6JON beacon on 50,050 MHz CW was heard for almost an hour. During this period, he worked Servaas, ZS6SER, at Louis Trichardt, Willem, ZS6WAB, from Polokwane and Kenneth, ZS6KN, in Onderstepoort, on 50,200 MHz SSB at S9.

Pieter Jacobs, V51PJ, at Rosh Pinah reported that he first heard about an Es warning when the 11 metre band was open. He listened on 50,200 MHz and heard CW, a voice and meteor pings with his beam in the direction of Polokwane. He changed frequency to 50,280 MHz and received a 57 signal MSK441 nonstop from Brad, ZS5BG, who was +13 dB on the screen. He changed to JT65a and hooked up with Brad, ZS5BG, at Pinetown, Hugo, ZS5HV, at Scottburgh and Lee, ZS5LEE, in Durban. It was interesting that V51PJ was beaming NNE when he first heard ZS5BG, but the Es cloud must have moved when they started operating on JT65a as they had to beam at each other. Bernie, ZS4TX, in Bloemfontein could not hear the Es signals but only meteor pings, and felt that the skip distance was between 1 200 – 1 600 km at the time.

S9 Tropo Opening in Gauteng

“We started the year with a busy morning on 144,300 MHz SSB. The highlight I would say is the contact between Willem, ZS6WAB, and Rickus, ZS4A, a distance of 495 km. Gideon, ZS6GJG, in Phalaborwa got his valve linear amplifier working and most of the stations could work him S5 to S9. Turn your Yagi horizontal and join us to work long distant contacts on 144,300 MHz. I logged the following stations on 1 January 2017. I wish everybody a Happy New Year with low SWR and many QSOs on VHF/UHF.

73 Carl Minne, ZS6CBQ, Krugersdorp.”

ZS6WAB Pietersburg 301 km 5/9
ZR4MF Bloemfontein 367 km 5/7-9
ZS6KSG Roodepoort 5 km
ZS4A Bethlehem 236 km 5/9+20
ZS6AVH Krugersdorp
ZR6AMC Pretoria 60 km 5/9
ZR6CMG Pretoria North 68 km 5/9+10
ZR6AUI near Heilbron 151 km 5/9+10
ZS6GJG Phalaborwa 415 km 5/7
ZS6BUU Randburg
ZS6X Florida

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Transatlantic VHF News

Pieter Jacobs, V51PJ, reported the following: "Marcus Jose Da Silva Almeida, PY1MHZ, from Rio de Janeiro will be at his seaside QTH from 20 January 2017 to start their transatlantic tests again. He rebuilt his Yagi antenna array and made it shorter for less wind resistance and easier handling. So yes at this stage they are playing digital modes and test Yagi antenna configurations that side, and have started a Brazilian VHF group that side as well. I think there are now more than 200 participants 24/7 across Brazil. They are starting to break VHF records with Digital and SSB modes on an almost monthly basis, which is very positive and they are changing to horizontal polarization. They are a very active and busy group that side of the Atlantic Ocean. 73 de V51PJ."

Early report of the PEARS National VHF/UHF Contest

At the time of writing (24 January), several logs have been received so far, which indicate that notwithstanding the weather conditions some Tropo propagation was possible at times. Nevertheless, Meteor Scatter from minor meteors enabled digital operators to break all previous contest records on 50 and 70 MHz FSK441 over a new distance of 1 346 km.



Here is a special request to all participants please submit your log sheet in any form, even if you made only a few contacts, as all the logs will provide an analysis of VHF propagation as well as participation across the country. This type of observation can only be made during a countrywide VHF contest. Furthermore, PEARS would treat your log also as a thank you for the efforts in running the contest. The deadline for log sheets is on 15 February 2017.

The first SARL Analogue Records established on VHF and above

50 MHz (6 Metres)

Tropo: "Van" Schalk vd Merwe, ZS2Y, and Jack Drayton, ZS2CI, CW, January 1952, 257 km

Sporadic-E: Guy Swart, ZS1AX, and Ted Cook, ZS6BT, CW/AM, November 1947, 1 265 km

Meteor Scatter: J van der Ley, ZS4SA, and Peter



Lowth, ZE7JX, CW, October 1968, 1 000 km

Tropo Scatter: Mike Bosch, ZS2FM, and Gideon Bothma, ZS6BZT, CW, April 1984, 917 km

TEP: Fred Anderson, ZS6PW, and Costas Fimerelis, SV1DH, CW, April 1979, 7 098 km

F2-layer: Bert Howes, ZS6HS, and Ken Ellis, MD5KW, CW, October 1947, 6 204 km

144 MHz (2 Metres)

Tropo: D.O. Malan, ZS4H, and E.D. Erasmus, ZS6GX, CW, April 1952, 434 km

Meteor Scatter: Mike Bosch, ZS2FM, and Paul Smit, ZS6PJS (ZS6NK), SSB, November 1998, 1 178 km

TEP: Dave Larsen, ZS6DN, and Costas Femerelis, SV1DH, CW, February 1979 7 110 km

EME: Gary Howarth, ZS6ASO, and Dave Olean, W1WHS, CW, November 1979, 12 059 km

432 MHz (70 cm)

Tropo: Denis Richardson, ZS1B, and Albert Solomon, ZS1SW, AM, April 1965, 42 km

TEP: Gerhardt Schlorf, ZS3B, and Fausto Minardi, I4EAT, CW, March 1979, 7 843 km

EME: Wilfred Carey, ZS6JT, and Graham Alderson, ZL3AAD, CW, November 1986, 1 1483 km

1,3 GHz (23 cm)

LOS: J. M. Ross, ZS6BG, and R.B. Gunn, ZS6ML, FM, 1976, 10,5 km

EME: Ivo Chladek, ZS6AXT, and Thomas Ellis, WB0QMN, CW, March 1989, 15 407 km

2,3 GHz (13 cm)

Tropo: N.H. Toferner, ZS6ANL, and Dave Woodhall, ZS6BNT, FM, December 1978, 80 km

EME: Ivo Chladek, ZS6AXT, and Barry Malowanchuk, VE4MA, CW, January 1997, 14 658 km

5,7 GHz (6 cm)

LOS: Gary Howarth, ZS6ASO, and Dave Woodhall, ZS6BNT, FM, October 1978, 1,8 km

EME: Ivo Chladek, ZS6AXT, and Lester Whitaker, W7CNK, CW, November 1992, 14 745 km

10 GHz (3 cm)

LOS: Arthur "Windy" Gale, ZS2CK, and Mike Bosch, ZS2FM, AM, November 1962, 0,5 km

24 GHz (12 mm)

LOS: Tony Reurerman, ZS6AOG, and Dave Woodhall, ZS6BNT, FM, July 1984, 1,8 km

(Continued on page 16)

47 GHz (6 mm)

LOS: Julian Bouttell, ZS6AOU, and Arnold Mynette, ZS6BMS, FM, July 1990, 4,5 km

A new Chip provides telescopes with clear view of Alien Planets

Seeing a planet outside the solar system which is close to its host sun, similar to Earth, is very difficult with today's standard astronomical instru-

ments due to the brightness of the sun. Scientists from The Australian National University (ANU) have developed a new optical chip for a telescope that enables astronomers to have a clear view of alien planets that may support life. The optical chip worked in a similar way to noise cancelling headphones. This chip is an interferometer that adds equal but opposite light waves from a host sun, which cancels out the light from the sun, allowing the much weaker planet light to be seen.

The Poynting Vector Antenna

Ted Hart and Paul Birke

Two Engineers, Ted Hart from Georgia in the USA and Paul Birke from Ontario, Canada have teamed up to write this book. With over 100 years of combined antenna and electrical engineering experience, they have applied the Poynting Vector Theorem of 1884 to fabricate a new antenna technology.

The result is the Poynting Vector Antenna that has a much smaller footprint, only a small fraction of the size of an equivalent Hertz Antenna. The wide frequency tuning range, high efficiency, and large instantaneous bandwidth place this antenna in a unique category all alone.

The book gives theoretical explanations and practical examples, which underpin the engineering basis of this new and unique antenna, which is a radical departure from the conventional Hertz antenna. The evolution of this antenna concept is presented as well as simple examples that may be readily copied, and finally what the authors believe to be the ultimate physical configuration in the shape of a Flute.

The theoretical explanation of Radiation Resistance (based on quantum electrodynamics) and other new Physics concepts are presented, including suggested changes to Maxwell's equations.

Radio Amateurs can enjoy versions of this antenna as well as the Military and other communication services from AM Broadcast frequencies through VHF.

"I now feel that the most consistent application of the Maxwellian spirit is to define 'radiation' to be the flow of energy described by the Poynting Vector."

Professor Kirk T. McDonald, Joseph Henry Laboratories, Princeton University, 7 August 2012

Highlights of what is in the Book

The first five chapters provide both technical

and historical background. Then, Chapter 6 details the antenna suggested for amateurs to copy.

The detailed example is for 40 metres. It includes three alternate feed networks and associated performance parameters to allow the reader a choice. This 40 metre design can be scaled for any amateur band from 160 to 2 metres. There is a 160 metre antenna design detailed also in Chapter 6. For alternative designs the full range (6 – 160 metres) of Flat Antennas (Guillotine) are detailed in Chapter 15. Another alternative design is given in Chapter 16. Chapter 17 covers a new concept antenna developed while writing the book. Chapter 18 details the Flute TM design, the ultimate performance antenna. This antenna could be difficult for amateurs to copy for the relatively small performance enhancement over the Chapter 6 design. The major enhancement is bandwidth.

The book does go into great detail to fully explain the theory behind the antenna as well as the outstanding performance parameters. Comparison to a conventional Hertz antenna illustrates why this antenna is the antenna of choice except for directional beam antennas. The book and the subject of Poynting Vector antennas would not be complete without the detailed theory. Any amateur can build and use one of the antennas; alternatively, the book provides information not previously available to the professional antenna designers. This includes the first ever theoretical explanation of how Radiation Resistance is developed in an antenna. It also blows away the long held concept that small antennas cannot be effective. Specifically the Chu-Wheeler concept is no longer valid. While doing research for the book Paul (the co-author) realised that Maxwell's Equations need revision to cover all cases, a change that has been needed by the Physics community for more than 100 years.

(Continued on page 17)

Conny Winrot, SM6DCO, remarks that Ted and Paul tried to cover all the bases. For that reason, it took them four years of dedicated effort to develop the book.

Chapters in the Book "The Poynting Vector Antenna"

- 1: History Of The Poynting Vector Antenna (PVA)
- 2: Poynting Vector Definition
- 3: Poynting Vector Power Flow Concepts
- 4: The Poynting Vector Antenna Concept
- 5: Poynting Vector Of A Poynting Vector Antenna
- 6: Design and Construction Of A Poynting Vector Antenna
- 7: Contrasting Hertz Dipole and Poynting Vector Antennas
- 8: PVA Ends Chu-Wheeler Limit For Small Antennas
- 9: Low Noise Floor of the PVA on Receive
- 10: Electromagnetic Fields of the Poynting Vector Antenna
- 11: Electric and Magnetic Field Calculation Using

Femm

- 12: Poynting RF Photon Emission and Radiation Resistance
- 13: Free Space: Photons on Soliton Nonlinear Transmission Line
- 14: Poynting Vector Analysis for a Spherical Antenna
- 15: Poynting Vector Antenna Technology in Sweden
- 16: Elmira Amateur Radio Club – Super T PVA Antenna
- 17: Birkehart Poynting Vector Antenna
- 18: Flute Poynting Vector Antenna
- 19: RFID Antennas
- 20: Maxwell's Equations under Revision
- 21: Hints and Kinks
- 22: Background Information
- 23: Computer Program

The Book "The Poynting Vector Antenna" ISBN: 978-1483575766 can be found at Amazon, Barnes and Noble or Bookbaby.

Item from Southgate News

Edsel Murphy's Laws

(With acknowledgement to QST and W5ACL) - Radio ZS, November 1975

Practically the entire scope of our hobby is under the influence of Edsel Murphy's Laws. Without a thorough understanding of his principles, one cannot derive maximum pleasure from his work. In fact, you cannot even get started.

His basic law is, "If anything can go wrong, it will." Alternatively, to state it in more exact mathematical form $1 + 1 = 2$ where $=$ is the mathematical symbol for hardly ever.

To show the all-pervasive nature of Murphy's work, here are a few corollaries of his basic law, which are applicable to amateur radio:

Design

1. In any given price estimate, cost of equipment will exceed estimated expenditure by a factor of three.
2. Dimensions will always be expressed in the least usable term. Velocity, for example, will be expressed in furlongs per fortnight,
3. If the breadboard trial model functions perfectly, the finished product will not percolate.
4. In a mathematical calculation, any error that can creep in will. It will be in the direction that will do the most damage to the calculation.
5. In any given computation, the figure that is

most obviously correct will be the source of error.

6. The probability of a dimension or value being omitted from a drawing is directly proportional to its importance.
7. In specifications, Murphy's Law supersedes Ohm's.

Assembly

1. If a project requires n components, there will be $n-1$ components available.
2. Interchangeable parts will not
3. Components that must not and cannot be assembled improperly will be
4. The most delicate component will be dropped.
5. The construction and operating manual will be discarded with the packing material. The garbage truck will have picked up, five minutes before the mad dash to the rubbish can.
6. The necessity of making a major design change increases as assembly and wiring of the unit approach completion.
7. A dropped tool will land where it can do the most damage. (Also known as the law of selective gravitation).
8. A component selected at random from a group having 99% reliability will be a member of the 1%

(Continued on page 18)

group.

9. Tolerances will accumulate unidirectionally toward maximum difficulty of assembly.
10. The availability of a component is inversely proportional to the need for that component.
11. If a particular resistance is needed, that value will not be available. Further, it cannot be developed with any available series or parallel combination.
12. After an instrument has been fully assembled, extra components will be found on the bench.

Wiring

1. Any wire cut to length will be too short.
2. Milliameters will be connected across the power source, voltmeters in series with it.
3. The probability of an error in the schematic is directly proportional to the trouble it can cause.

Test

1. Identical units tested under identical conditions will not be identical on final test after being buried under other components and wiring.
2. A self-starting oscillator will not.
3. A crystal oscillator will oscillate at the wrong frequency - if it oscillates
4. A p-n-p transistor will be found to be a n-p-n.
5. A fail-safe circuit will destroy others.

Operation

1. If a circuit cannot fail, it will.
2. A transistor protected by a fast-acting fuse will protect the fuse by blowing first.
3. Probability of failure of a component is inversely proportional to the ease of repair or replacement.

Trouble Shooting

1. After the 24th cabinet-to-chassis screw has been removed to replace the under-chassis fuse, it will be observed that the line cord plug has become disengaged from the AC receptacle.
2. After the last of 24 cabinet-to-chassis screws has been assembled, the driver tube will be found under the schematic on the bench.
3. The bleeder resistor will quit discharging the filter capacitors as the operator reaches into the power supply enclosure.

General

1. In an instrument or device characterised by a

number of plus-or-minus errors, the total error will be the sum of all errors adding in the same direction.

2. In any given miscalculation, the fault will never be placed if more than one person is involved.
3. All warranty and guarantee clauses become void upon payment of final invoice.

The man who developed one of the most profound concepts of the twentieth century is practically unknown to most of us. He is the victim of his own law. Destined for a secure place in the Engineering Hall of Fame, something went wrong.

(From the Port Elizabeth Branch)

Wikipedia

According to the book *A History of Murphy's Law* by author Nick T. Spark, differing recollections years later by various participants make it impossible to pinpoint who first coined the saying *Murphy's law*. The law's name supposedly stems from an attempt to use new measurement devices developed by the eponymous Edward Murphy*. The phrase was coined in adverse reaction to something Murphy said when his devices failed to perform and was eventually cast into its present form prior to a press conference some months later — the first ever (of many) given by Dr John Stapp, a US Air Force colonel and Flight Surgeon in the 1950s. These conflicts (a long running interpersonal feud) were unreported until Spark researched the matter. His book expands upon and documents an original four-part article published in 2003 (*Annals of Improbable Research (AIR)*) on the controversy: *Why Everything You Know About Murphy's Law is Wrong*.

* Edward Aloysius Murphy Jr. (11 January 1918 – 17 July 1990) was an American aerospace engineer who worked on safety-critical systems. He is best known for his namesake Murphy's law, which is said to state, "Anything that can go wrong will go wrong."

Diplexer 2 m / 70 cm

Felix Meyer, HB9ABX

In the VHF, UHF, SHF and EHF News column in the January 2017 issue of Radio ZS, Rickus, ZS4A, gave details for the 3 x 6 Element VHF/UHF Arrow Satellite Yagi. To cut down on all the coax cable, you need a diplexer. It will also work with the commercial 3 x 7 element Arrow Antenna. This article (most of it) appeared in the November/December 2002 issue of Radio ZS. In the May/June 2009 issue of Radio ZS, you can read 'A 2 m / 70 cm Diplexer with a Difference' by Frank van Wensveen, ZS6TMV/PA3GMP.

Duplexer – Diplexer

The names Duplexer and Diplexer are very similar and frequently confused. The Duplexer is a device, which separates two frequencies within the same band while the Diplexer is a device, which separates two different bands. The Duplexer requires much more selective circuits while the Diplexer normally requires only low pass and high pass circuits.

This Diplexer separates 2 m from 70 cm on the same coax cable. It allows the use of two antennas over the same cable and permits transmission on one band and simultaneous reception on the other band, when connected on the antennas side. Alternatively, use two pieces of equipment (one VHF and one UHF) when used on the transceiver side.

The following data have been measured on 50 Ohm input and 50 Ohm output:

- ✓ Separation of the two bands is very high (over 70 dB)
- ✓ Insertion loss is negligible (less than 0.3 dB)

It is easily built into a metallic box measuring 8 x 4 x 2 cm or similar (e.g. TEKO 372)

List of components

L1 = 1 turn 6 mm diameter, 1 mm enamelled cop-

per wire

L2 = same as L1 (orientation 90 degrees in respect to L1)

L3 = 3 turns 6 mm diameter, 1 mm silver wire

L4 = 4 turns 6 mm diameter, 1 mm silver wire

L5 = same as L3

C1 = foil trimmer capacitor 15 pf (3 – 15 pf) see text

C2 = same as C1

C3 = same as C1

C4 = foil trimmer capacitor 40 pf (4 – 40 pf)

C5 = same as C4

3 HF chassis plugs 50 Ohm (e.g. BNC)

1 metal box e.g. TEKO 372

The coils can be made of silver plated copper wire, but enamelled copper wire serves equally well.

The coils L3, L4 and L5 have to be oriented in three different orientations to avoid coupling between them. Each one 90 degrees turned in respect to the others.

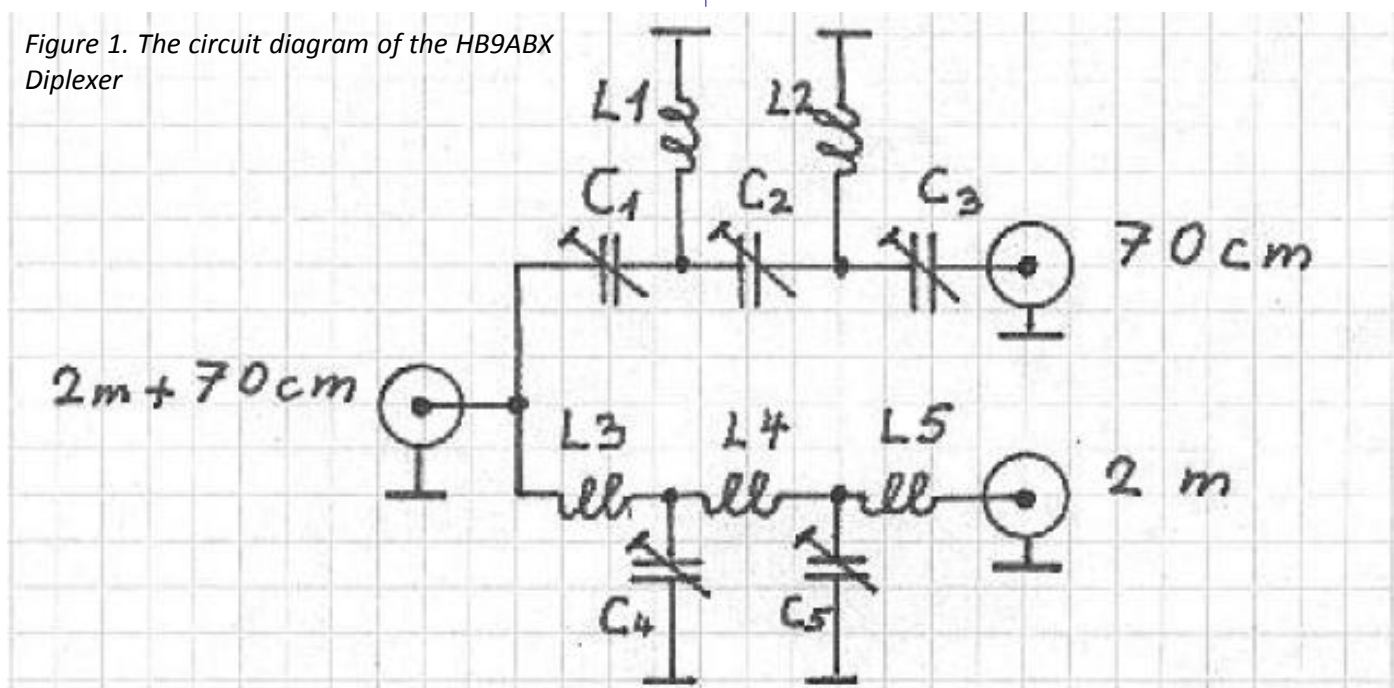
Adjustment

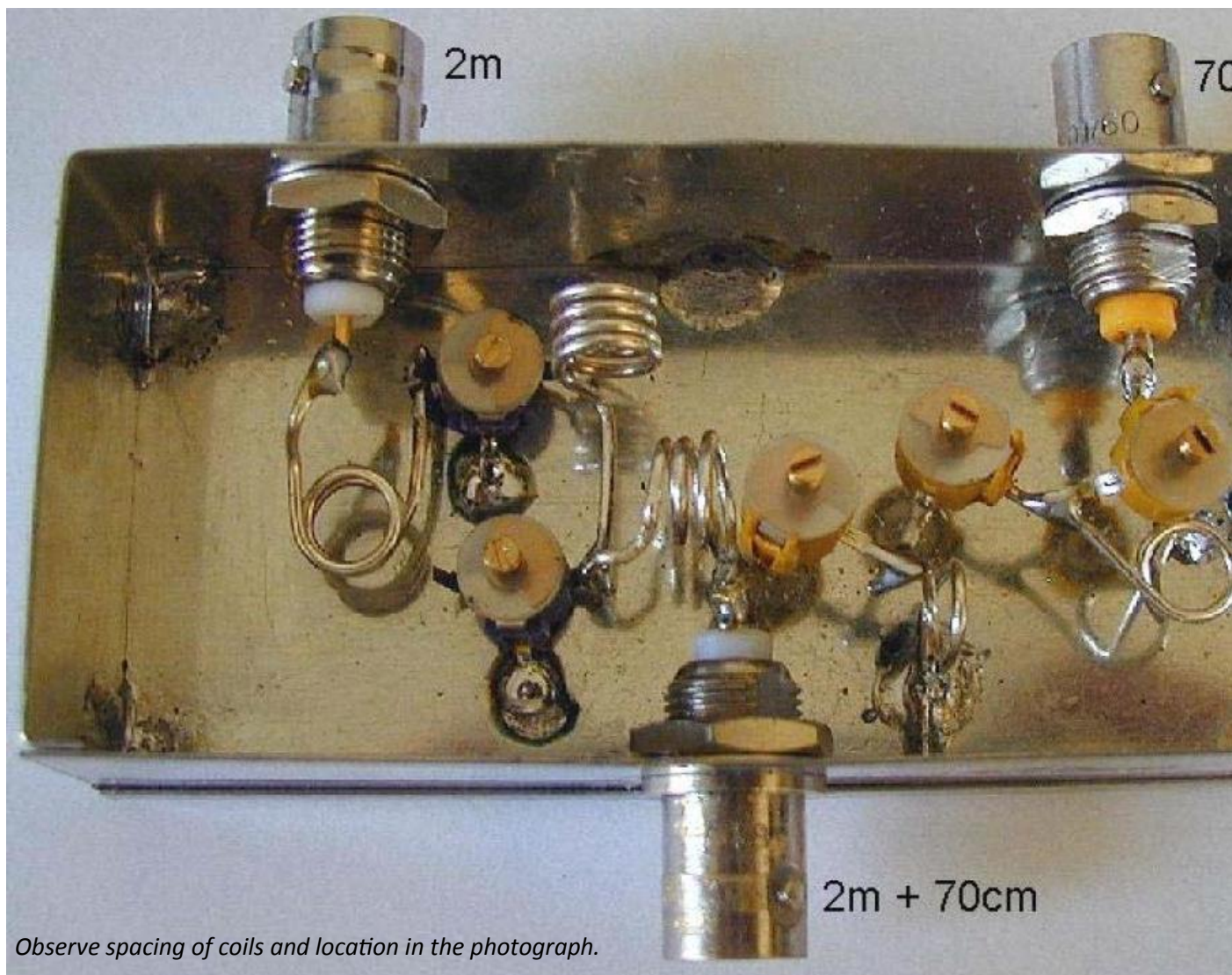
Proper adjustment before use is very important, according to following procedure:

Before doing the adjustment, verify that the

(Continued on page 20)

Figure 1. The circuit diagram of the HB9ABX Diplexer





Observe spacing of coils and location in the photograph.

(Diplexer 2 m / 70 cm from page 19)

SWR meter is calibrated properly on VHF and UHF, that is, it reads 1.0 when terminated by 50 ohm dummy load and fed by TX.

1. Connect a 50 ohm dummy load to the common 2 m + 70 cm plug (make sure that the dummy load is for these frequencies).

2. Connect SWR meter between 70 cm plug and 70 cm TX. Now adjust C1, C2 and C3 to obtain SWR of 1.0 while transmitting low power carrier. C1 and C3 should finally have the same value.

3. Connect SWR meter between 2 m plug and 2 m TX. Now adjust C4 and C5 to obtain SWR of 1.0 while transmitting low power carrier.

4. Repeat steps 2 and 3, as they may interact.

Now your diplexer is ready for use.

Note

The power is limited by the maximum current/voltage of the capacitors.

Foil trimmers can be very different, depending from model; therefore, good elements are required for higher power. (With my trimmers, I tested the unit up to 50 watts).

Use capacitors for higher current/voltage ratings at higher power, e.g. good air trimmer capacitors.

The Antique Wireless Association of Southern Africa - ZSØAWA

Our aim is to facilitate, generate and maintain an interest in the location, acquisition, repair and use of yesterday's radios and associated equipment. To encourage all likeminded amateurs to do the same, thus ensuring the maintenance and preservation of our amateur heritage.

Please visit our website: www.awasa.org.za. Sign up for our monthly newsletter or download any backdated issues at www.awasa.org.za/index.php/newsletters. Membership of AWASA is free and by association.

We are on the air every Saturday morning, starting at 04:00 UTC on 3 615 AM, then 06:30 UTC on 7 140 SSB relayed on 14 140 to the Western Cape and 12:00 UTC on 7 020 CW. You can also connect to our Echolink node to listen to the Saturday SSB nets - ZS0AWA-L

The Wednesday evening AM net is held at 17:30 UTC on 3 615



630 Metres Becoming a "Mainstream" Amateur Band, Experiment Coordinator Says

ARRL News

The coordinator of ARRL's WD2XSH 600-Metre Experimental Group, Fritz Raab, W1FR, said in his latest quarterly report that 630 meters is becoming quite active, with both Amateur Radio and Part 5 Experimental stations taking advantage of the band, which is still not available in the US. <http://500kc.com/>.

"Band activity has been very high, and there are often more WSPR stations, more than 110 stations, on 472 kHz than on 80 or 160 metres!" Raab said. <https://physics.princeton.edu/pulsar/k1jt/wspr.html>. WSPR, which stands for "Weak Signal Propagation Reporter," is software designed for transmitting and receiving low-power transmissions to test propagation paths on MF and HF.

"In a sense, 630 metres has become a mainstream ham band, in spite of not being authorized in the US," Raab said. To boost activity, a second annual Midwinter 630-Metre Operating Activity Night will take place on 4 and 5 February. Details will be announced soon.

Raab also said in his report that MF propagation appears to be improving as the solar cycle declines. "The paths to VK and JA have remained good," Raab said. "This was not the case last year, so perhaps it is an effect of the coming solar minimum. Many reports have been received for WSPR transmissions with relatively moderate power. There have been a number of polar and high-latitude openings to LA2XPA from North America. Many long-time operators say that they have never seen anything like that. There have also been a number of openings from the US west coast deep into Europe."

Countries now permitting Amateur Radio access to the 630-metre band include Germany, Greece, Malta, Monaco, Norway, Philippines, Czech Republic, Ireland, Switzerland, New Zealand, Fin-



WD2XSH Experiment participant Ralph Wallio, W0RPK, employs a homebrew shielded loop for receiving on 630 metres.

land, Spain, France, Poland, Bulgaria, Canada, Vietnam, Japan, Cayman Islands, Reunion Island and Hungary. "It appears that more than 100 DXCC entities have permission to operate on 630 metres," Raab said in his report.

In April 2015, the FCC proposed a new secondary 630-metre allocation at 472 to 479 kHz to Amateur Radio, implementing decisions made at World Radiocommunication Conference 2012 (WRC-12).

At the same time, the FCC allocated a new LF band, 135,7 to 137,8 kHz (2 200 metres), to the Amateur Service on a secondary basis, in accordance with the *Final Acts* of WRC-07.

No US Amateur Radio operation will be permitted in either band until the FCC determines the specific Part 97 rules it must frame to permit operation in the new bands. That process is ongoing at the FCC, but the change in administration and the consequent resignation of the current FCC chairman has put FCC action on *any* proceeding on hold, at least until a new chairman is in place.

Radio ZS acknowledges receipt of the following newsletters -

Hotline - Highway ARC

QUA - Bloemfontein ARC

VERON A22—Zuid-Limburg

De Flevo Rondstraler

BRAC Nieuws

VERON Afd Wageningen en de VRZA Afd Zuid-Velvwe

VERON Hoekse Waards Nieuws

Amstelstraler

CQ Friese Wouden

Ham Nieuws - Alkmaar NL (*not to be confused with Alkmaar SA, which is a hamlet on the Crocodile River some 18 km west of Nelspruit. It is named after Alkmaar in the Netherlands.*)

VERON Gravenhage

Als u wilt kopieën van de Nederlandse nieuwsbrieven te ontvangen, stuur dan een e-mail naar radi-ozs@sarl.org.za

Antique Wireless Association CW Activity Day

The aim of the CW Activity Day is for participants to contact as many amateurs as possible on the 20, 40 and 80 m amateur bands. The Activity Day takes place from 13:00 to 15:00 UTC on Sunday 5 February 2017 with activity between 14 000 to 14 060 kHz, 7 000 to 7 040 kHz and 3 510 to 3 560 kHz.

You can participate as a Single Operator All Band, Low Power (maximum 100 W) station, a Single operator All Band, QRP (maximum 5 W) station, a Single Operator Single Band, Low Power (maximum 100 W) station or a Single operator Single band, QRP (maximum 5 W) station. The exchange is a RST report, your name and Grid Square locator.

Contacts count 1 point for low power and 2 points for QRP. Certificates are awarded to the first places and the highest single band score. Log sheets must be submitted by Monday 20 February 2017 to andyzs6ady@vodamail.co.za.



modes on a band are considered as separate bands. A station may be worked only once per band under this rule. Only one call sign per station is permitted. In the case of multi-operator stations using more than one transmitter, all operators shall use the same call sign.

Class A – Field Station, Multi operator. Such stations must be located in places that are not regular station locations and must comply with the requirements of a field station as defined in the general section of rules. A single licensee or trustee for the entry is responsible for the group entry. All equipment (including antennas) must lie within a circle whose diameter does not exceed 500 metres. All contacts must be made with transmitters and receivers operating independent of commercial mains power.

Class B – Field Station, Multi operator, QRP. All contacts must be made using an output power of 5 Watts or less. Other provisions are the same as Class A.

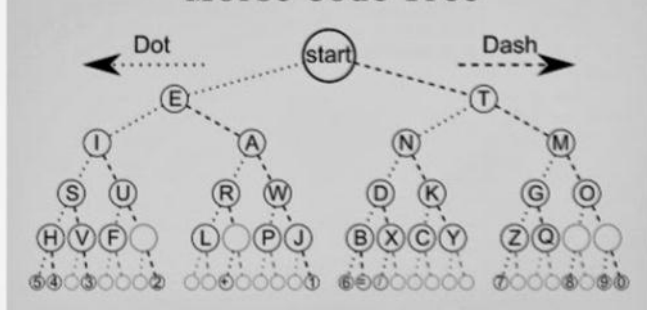
Class C – Field Station, Single Operator. Such stations must be located in places that are not regular station locations and must comply with the requirements of a field station as defined in the general section of rules. All equipment (including antennas) must lie within a circle whose diameter does not exceed 500 metres. All contacts must be made with transmitters and receivers operating independent of commercial mains power.

Class D – Field Station, Single Operator, QRP. All contacts must be made using an output power of 5 Watts or less. Other provisions are the same as Class C.

Class E – Ultra Light Portable. Light weight self-contained stations, operating QRP or low power such as RaDAR, Summits on the Air, Parks on the Air (game and nature reserves), Islands on the Air, Heritage sites, etc. The operator must carry the entire station, antenna included, to the operating site.

(Continued on page 23)

Morse Code Tree



South African Radio League National Field Day

The aim is to work as many stations as possible on all the HF amateur bands (excluding the 30, 17 and 12 m WARC bands). In doing so, to learn to operate in abnormal situations in less than optimal conditions. A premium is placed on developing skills to meet the challenges of emergency preparedness as well as to acquaint the public with the capabilities of Amateur Radio.

The first leg of the National Field Day is on the air from 10:00 UTC on Saturday 11 February to 10:00 UTC on Sunday 12 February 2017. Use can be made of all the HF amateur bands, excluding the 2 200, 630, 60, 30, 17 and 12 metre bands, using phone, CW, PSK and RTTY. Phone, CW and Digital

The distance carried must not be less than 1 km.

Class F- General Stations. Stations operating from permanent or licensed station locations using commercial power.

To encourage more individuals and groups to participate in the National Field Day events, a 6-hour section has been introduced. It need not be for one continuous 6-hour period, but once operation has commenced in the contest, off periods must be a minimum of 60 minutes.

Establishment of Stations. Equipment for Field Stations may only be set up in the 24 hours prior to the starting time of the contest. This restriction applies to antennas, masts, towers and transmitting equipment, but excludes accommodation such as a caravan, tent, etc. Once a Field Station has been established at a site, it may not move to an alternative site after the contest starts, excluding Class E stations.

The exchange is the number of transmitters, the Field Day operating class and your Provincial abbreviation. Examples - A three-transmitter Class A field station in Gauteng would send "3A GP" on CW or "3 Alpha - Golf Papa" on Phone. A general station using a single transceiver located in Cape Town would give the following exchange "1F WC" on CW or "1 Foxtrot - Whiskey Charlie" on phone. DX stations are logged as "1F DX." **NOTE – a RS(T) is not required.**

Scores are based on the total number of QSO points x the power multiplier x the number of provinces worked X the class multiplier.

QSO Points - each contact with a station from one of the South African provinces counts for five points. Each DX contact counts for one point.

Power multipliers - x 6 power 5 watts or less; x 4 power 50 watts or less; x 2 power 100 watts or less or x 1 Power greater than 100 watts. The power multiplier for an entry is determined by the maximum output power used by any transmitter used to complete any contact during the event.

Provinces worked multiplier - A multiplier of one for each one of the 9 South African provinces worked (regardless of band) and one extra for working any station outside of the 9 provinces. EC – the Eastern Cape; FS – the Free State; GP – Gauteng; KN – KwaZulu-Natal; LP – Limpopo; MP – Mpumalanga; NC – the Northern Cape; NW – the North West Province; WC – the Western Cape and DX - used for all others that does not fall in the above group.

Class multiplier - General stations, class multiplier of 1 and Field stations, single and multi, class multiplier of 3

Miscellaneous Rules

A person may not contact for QSO credit any station from which they also participate.

A transmitter/receiver/transceiver used to contact one or more Field Day stations may not subsequently be used under any other call sign to participate in Field Day.

Batteries may be charged while in use. The batteries must be charged from a power source other than commercial mains power.

All stations for a single entry must be operated under one call sign

There is no limitation to the number of transmitters or receivers that may be deployed. The use of more than one transmitter at the same time on a single band or mode is prohibited.

Logs, in ADIF, Cabrillo or MS Excel format and labelled "call sign NFD," shall be sent by e-mail to zs4bfn@mweb.co.za or by post to the South African Radio League National Field Day, Box 12104, Brandhof, 9324. The closing date for log submissions is Sunday 19 February 2017.

Note: A photo(s) of the station in operation (JPG format) MUST accompany every log entry. (So that the Editor has photos for the cover of Radio ZS.)

South African Radio League Youth Sprint



This is a fun activity to celebrate the Youth and to promote contacts between young radio amateurs in Southern African countries. Call "CQ Youth Sprint!" The Sprint takes place on Saturday 18 February 2017 from 08:00 to 10:00 UTC and the exchange is a RS report and the operator's age.

It is a phone sprint on the 40-metre band using 7 063 to 7 100 and 7 130 to 7 200 kHz. Contacts be-

(Continued on page 24)

(CQ Contest from page 23)

tween stations in the age group 25 and younger are worth 5 points, contacts between stations in the under 25 group and over 26 group is worth 2 points and contacts between stations in the age group 26 and older are worth 1 point.

Logs, in ADIF, Cabrillo or MS Excel format and labelled "call sign Youth Sprint," must be submitted by Saturday 25 February 2017 by e-mail to contest@sarl.org.za.

Certificates will be awarded for all logs that are submitted correctly. Prizes will be awarded to the 1st, 2nd and 3rd place in the competition. All logs with more than 10 contacts will entered for a lucky draw.

NOTE - The age of the operator must be shown on the summary sheet. All the logs received will be entered into a draw for a Student membership of the South African Radio League.

South African Radio League Digital Contest

The aim is to establish as many contacts as possible between radio amateurs in Southern Africa using the PSK31 and/or RTTY modes. The contest is open to all radio amateurs in Southern Africa. The Summer Digital Contest is on the air from 13:00 UTC to 16:00 UTC on Sunday 26 February 2017.

Activity takes place between 3 580 to 3 600 kHz, 7 040 to 7 060 kHz and 14 070 to 14 099 kHz with PSK31 preferred at the lower end of the specified frequencies and RTTY preferred at the upper end of the specified frequencies. Please note that USB must be used at all times.

A station may be contacted twice on each band, once on RTTY and once on PSK31. The exchange is a RST report and a sequential serial number starting at 001. Contacts with stations listed in General Rule 1.b are worth 3 points and contacts with stations NOT listed in General Rule 1.b are worth 1 point.

The first contact with each area listed below will be used as a band multiplier - Area 1: ZS1; Area 2: ZS2; Area 3: ZS3; Area 4: ZS4; Area 5: ZS5; Area 6: ZS6; Area 7: 3DA, 7P, 7Q, 9J, C9, A2, D2, V5, Z2, ZD7, ZD9, ZS7, ZS8, FR, 3B8, 5R, FH and D6 and Area 8: Stations in the rest of the world. Band total = QSO points X number of call areas worked per

band. The final score =sum of the band totals

Logs, in ADIF, Cabrillo or MS Excel format and labelled "call sign Digital Contest," must be submitted by Sunday 5 March 2017 by e-mail to contest@sarl.org.za



Monthly SARL Youth Net

The monthly SARL Youth Net is scheduled to take place every second Sunday afternoon of the month from 15:00 UTC onwards on 7 070 kHz thus providing the opportunity for young people interested in the hobby to share in the magic of amateur radio.

Clubs are encouraged to use the opportunity to invite young people to their club to operate under the auspices of a licensed club member.

Pretoria Amateur Radio Club

Home of Amateur Radio/Tuiste van Amateur Radio

The Pretoria Radio Club was formed in 1929/30. In 1935 the PRC was incorporated in Division 6 of the SARRL. The club abandoned all activities during World War II and in 1944, PARC resumes its amateur activities. In 1945, PARC rejoins the SARRL after its own revival. PARC became an independent branch in 1946. The Pretoria Branch became a Club affiliated to the League with its own logo in 1996. In 2015, a new Club logo was accepted.



PARC aims at - Promoting the interest of Amateur Radio - Creating awareness of the club initiatives, through more active public relationship programs both internal and external through various media channels - Providing emergency and public service communications when normal means of communications are disrupted - Conducting programs and activities to increase the general interest and welfare of Amateur Radio within the club and the bigger community through collective initiatives and projects and Supporting lawful, responsible conduct by its members and the amateur fraternity in general.

Regular events - Club flea markets - Monthly club meetings on the first Saturday afternoon of the month at 14:00 CAT - RAE classes in preparation for the May and October Radio Amateur Exam - Club news bulletin every Sunday morning at 08:45 CAT on 145.725 MHz and other HF frequencies including Echolink.

Contact information: Web: www.parc.org.za

Club Chairman: Johan du Bruyn, ZS6JHB zs6jhb@gmail.com

The Museum Piece

Dave Gemmell, ZS6AAW

I was sorting some of my books when I came across an almost complete 1975 set of Radio ZS. The 1975 Jubilee series of Radio ZS has some interesting items, which mention radio amateurs who joined the South African Air Force (SAAF). Unfortunately, two issues are missing. These are the February and April 1975 issues, Vol 29 No 2 and 4. I would be very grateful if any of the readers, who have access to these copies, could send me a copy of any articles, which refer to SAAF wireless activities during the period 1938 – 1946.

Editor Dennis has reprinted a very interesting article and photograph from the November 1975

“Hams go to War!”

issue. It is going to be interesting to see what feedback we get about the photo! It came just at the right time as there were a Permanent Force officer or two who wondered why there was a Wireless Section at the Museum.

Does any Reader have information about the influence that radio amateurs had on the formation wireless or electronic units of the various Arms of the Union Defence Force especially the Navy and Army during the period of 1938 to 1946?

Can anyone identify a few (or all) of the amateurs in the photo? I think they all should be mentioned in the Hall of Fame.



In 1938 the late Major George Ross-Kent, ZS6L (Jos) in consultation with Col Freddie Collins, then Director of Signals, gave birth to the idea of forming a Civilian Wireless Reserve - CWR - consisting of Hams. At this stage I was the RSM of

the South African Corps of Signals and consequently knew little about the functions of the CWR. It was not long before the CWR became a Military Unit known as the Radio Signal Coy, with Jos as

(Continued on page 26)

Commanding Officer, Wally Browning as Second in Command and Bob Taylor as the Adjutant. Being a keen Ham, coupled with the fact that I had had a difference of opinion with the OC SA Corps of Signals, I requested a transfer to the RSC, which was granted. Retaining my rank as WO 1, I became the Regimental Sergeant Major of the unit. The Headquarters were in the basement of Maritime House, Johannesburg. Here lecture rooms, officers and the Quartermaster Stores were erected. One area was set aside as a parade square, where roll call was held and squad drill taught. This could not be used for main parades, as it was too small. The large drill parades were carried out on one of the Wits University Sports Fields.

The life of the RSC was short lived and eventually became the Signal Training School, a branch of the South African Air Force. In May 1940, some 30 prospective NCO's and myself reported to the Central Air Force Training Depot, Voortrekkerhoogte. It was here we were all attested and became the first members of the unit to go on full-time Military Service. Amongst them were the following Hams - Bill Bluett (now ZE2JS), Dody Loquet ZS5X (affectionately referred to as Pop), Viv Krause, Louis Young, Tubby Holloway, Arthur Hemsley, the late Alf Goodman, Alf Zeller, Alf Masters and E.A. Coombe-Davies. Then the following whom I believe are still living - Barney Friedman, Bob Mure, Roy Channer, Syd Forsyth, Vic Harper, Bruce Morrison, Tommy Bradfield, T.G. Taylor and Reg Green, There were several others whom I cannot call to mind, I hope they will forgive me for the omission.

For approximately one month, I put these men through their paces in Squad Drill with lessons in the Military Discipline Code, Permanent Force Regulations, Compliments and Saluting, Military Hygiene and Field Craft. After the course these men were given NCO's rank and several finished up as Signals Officers. On the 10th of June 1940 the Unit as a whole went on full-time Military Service being attested at the Show Grounds Pretoria, which became our new home. Buildings were partitioned off for Billets, Offices, Class Rooms, Tech and Quartermaster Stores and Messes. Classrooms for Morse instruction were wired from the instructors table with an oscillator, key and headphones to each pupil's table with headphones and key all paralleled with the instructor's table.

The Unit consisted of some 600 Officers, Warrent Officers, NCOs, Airmen and WAAFs (Women's

Auxiliary Air Force). Five of the WAAFs became very efficient Wireless Operators and were able to relieve men for service in the theatre of war. One, the late Sue Finnan, became a Wireless Operator Phone instructress and after the cessation of hostilities got her licence ZS6JJ. She later became my wife until her demise. One of the other WAAFs, Airwoman Joy Loquet, daughter of Dody, ZS5X, was a clerk and later became Colonel F.C. Elliot-Wilson's P.A. Joy later married one of the trainees from 64 Air School, who eventually qualified as a very fine Pilot, namely Les Miller, past President of the Aero Club of South Africa.

The Personnel of S.T.S. came from all walks of life. They were hand picked and not all were Hams. However, many became Hams as a result of their training and love of radio and the men who trained them. The late Jack Twine, then ZS6BR, became a WO II in the Technical workshop with Viv Krause, ZS6AU, and Lieut Alexander, ZS6DL. They did a grand job of work in building projects for the training of, in particular, Wireless Operator Mechanics. There were two types of trainees, namely (1) Wireless Operators who were trained to man Signal Stations and maintain communications between all centres of the Republic and various theatres of War including a direct link between Waterkloof Air Station and the Air Ministry in London. They also operated from aircraft. (2) Wireless Operator Mechanics were trained as artisans. Not only could they take over as Wops, but had to be able to maintain and repair all types of Xmitters and RX, install all equipment and erect antennas. All officers and men had to be proficient in the handling of Small Arms, i.e. 303 Rifles and 38 Pistols.

Shortly after mobilization, the late Major (Jos) Ross-Kent became D.D.A.S. (Deputy Director of Air Signals). Major Wally Browning, ZS6A, took over as Commanding Officer of the Unit. Bob Taylor, ZS6CO, was Adjutant. This was a wonderful Unit of which every member was proud to belong.

To fill you in on some of the lighter side of things. One weekend, then A/Cpl Barney Friedman went on weekend leave and only upon reaching Johannesburg did he discover that he had left his wallet on his bed with between £100 and £200 in it. Being a Stockbroker I do not think he was particularly perturbed about it. However, on returning to camp there was his wallet untouched where he had left it. Then the tale is told about OM Dody ZS5X. Having just finished his Monday morning washing

(Continued on page 27)

and hung it on the line to dry, Dody was suddenly sent off by the CO on a special mission. He forgot all about his washing. Imagine his surprise to find it where he had hung it, on his return a week later. Nightly at 10:00 pm the bugler A/M Dave Jackson and A/M Joe Chadford our trumpeter, would sound lights out, after which Joe would play "Abide with Me" the rendering of which was so beautiful that people from all over Pretoria would congregate on the outskirts of the camp to hear it. Will we who were there ever forget it?

One night I arrived back in camp after a very hectic party and consequently ready for bed, As I walked into my cubicle (which was partitioned off from the rest of the NCO's billet) my bed was missing. I looked around and then discovered it complete with mattress securely tied to the roof rafters. Not to give the practical jokers the satisfaction of seeing my annoyance (I knew they must have had peep holes to see my reactions) I put my blankets and pillow on the floor and then undressed and got between the blankets with a smile on my face. Next morning I called a parade of all NCO's and marched them to my billet and after a little quiet discussion, dismissed them to my cubicle with instructions to put my B.....room in order.

Then there was the evening when certain NCO's got information that I was taking a certain nurse out from the Military Hospital at Voortrekkerhoogte. As we were proceeding in the direction of Fountains, minding our own business, suddenly the peace was broken by the hooter of a car behind me sending some very suggestive instructions in CW as to what I should do. Enjoying the fun, I replied suitably. Eventually I shook them off and reached Fountains where we parked in a quiet secluded spot. Imagine my horror when commencing to pet the fair damsel I was rudely rebuked by the following words, "Next time you make a date with a lady find out first of all if she can read morse. I was a PO telegraphist before joining the nursing service." Was my face red? I turned the car, got back on the

road and sped for the Hospital. Do you know who was driving the offending car? It was none other than S.T.S.'s practical joker A/Cpl Loquet, ZS5X! Why I am friendly with him, I will never know! Needless to say, he was instrumental in tying my bed to the rafters.

Another occasion a couple of Sergeants complained to me that a certain individual had gone through their billet the previous night and whilst they were asleep upset their two tier bunks. Whilst they had not seen the culprit, they were certain it was none other than Dody. I sent for him and questioned him as to his movements the previous evening. As per usual, he made all sorts of excuses and asked if anyone had seen him. I replied in the negative but said "everyone knew it was him", I told him in future the Sgts billet was out of bounds to him. His reply was "Gee, Sir, that's pretty hard on me, I have some very good friends in the Sgts quarters, What if they ask me to come in?" My reply, "If any B Sgt is fool enough to invite you in, accept."

Eventually the whole unit was shifted to Bloemfontein where we joined forces with the Electrical and Wireless School from Durban. Colonel F.C. Elliot-Wilson was appointed Commanding Officer. This to me was the end of the finest Unit in the whole of the Union Defence Force. These sentiments I am sure are borne by many of you. Without fear of contradiction there was never a finer body of men than the Officers, WO, NCO's and Airmen of the Signal Training School. It was the greatest honour any man could have wished for to be the Air Sgt Major (Regt Sgt Major – Army) of this wonderful Unit.

Voortrekkerhoogte - now known as Thaba Tswane.

RSM - Regimental Sergeant Major

WO 1 - Warrant Officer Class 1

WO II - Warrant Officer Class 2, both are addressed as Sergeant Major

A/M - Airman

A/Cpl - Air Corporal



Left to right: WO 1 R.A.D. Bert Heydenrych, ZS6AY (now ZSSOM and author of this article), WO II Viljoen, WO II Bill Bluett ZE2JS, and WO II Jack Twine, ZS1A.



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1. Each SARL affiliated club and Hamnet is eligible to place an advertisement of 1/4 page in Radio ZS.
2. The content of all advertisements shall be restricted to Club activities and shall not include any material of a commercial or personal nature.
3. The magazine covers (inside or outside) are not available for Club advertising
4. The location of advertisements inside the magazine is decided during the final layout process and no particular page, or position on a page, can be guaranteed.
5. The publication of the advertisement is always subject to the availability of suitable space, to be decided at the discretion of the Editor.
6. Where two or more affiliated Clubs are acting jointly in organising an event, one larger advertisement may be placed within Radio ZS, by combining the individual club concessions, up to a maximum of half-a-page. This concession is subject to space availability, but early booking can avoid that problem.
7. Clubs seeking to take advantage of this concession are advised to first discuss their requirements with the Editor of Radio ZS at radiozs@sarl.org.za.
8. It is strongly preferred that all advertising copy be delivered electronically by e-mail. All text material should be sent in Microsoft Word and diagrams/photos in tif or jpg format, to ensure that the original is faithfully reproduced during publication.
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Manuscripts with drawings and/or photos are always welcome and will be considered for publication. Articles on e-mail are especially welcome. Material may be submitted in MS Word, Open Office or rtf format, using Calibri 12 pt and English (South Africa).

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