Amateur Radio

Volume 82
Number 11
November 2014
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WIRELESS INSTITUTE OF AUSTRALIA

Review: ANAN-100D & FLEX-6700 SDRs

Build an Arduino VFO
A loop antenna for restricted space
RD Contest Results

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General

Technical

This month's cover
Our cover shows the FLEX-6700 and Anan-100D Software Defined Radio transceivers, each with a screen shot of the control software. See the review beginning on page 14. Composition by Sergio Fontana VK3SFG.

Columns

Contributions to Amateur Radio

Amateur Radio is a forum for WIA members' amateur radio experiments, experiences, opinions and news. Manuscripts with drawings and/or photos are welcome and will be considered for publication. Articles attached to email are especially welcome. The WIA cannot be responsible for loss or damage to any material. Information on house style is available from the Editor.

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Photostat copies
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Disclaimer
The opinions expressed in this publication do not necessarily reflect the official view of the WIA and the WIA cannot be held responsible for incorrect information published.

Amateur Radio Service

A radiocommunication service for the purpose of self-training, intercommunication and technical investigation carried out by amateurs, that is, by duly authorised persons interested in radio technique solely with a personal aim and without pecuniary interest.

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Editorial

Peter Freeman VK3PF

Conflict in the hobby? What, again?

I seem to have caused some to be upset with my comments last month. From many of the comments that I have seen, it is clear that most have not read my Editorial carefully; rather they have conveniently ignored not just words, but entire sentences.

Part of this furore was precipitated by someone who, one would have thought, should know better. Just prior to the content for the October issue going to press, I received an *Over To You* (OTY) contribution. In my view, I thought that some of the statements being made were being made from a biased position. I responded to the correspondent noting that I **proposed** to publish the contribution with a very few words deleted and some added Editor's comments reflecting my view that the content showed bias. My response was sent to the author within hours. The very same evening, the author responded with an email indicating that he would revise his contribution. The next morning, I received an email from the author indicating that I should not publish his contribution at all. No further discussion, simply a statement that he did not wish his item to be published.

I was willing to publish the contribution, either as I proposed, or as originally submitted but with some Editor's comments added at the end of the contribution. The author gave me no opportunity to discuss such options.

You can imagine my surprise when in very late September (just after the digital edition of *AR* was released) I saw some email traffic via one of the Yahoo groups indicating that I had "refused to publish" the author's contribution. This statement is at least stretching the facts – the author requested that I withdraw the item in any form. He did not discuss the issue at all, simply asked that the item be withdrawn. I am not happy and still believe that the author owes me a public apology via all forums to which he published that statement. He does not believe that he is in the wrong. I strongly disagree. So be it.

It has been very interesting to read some of the traffic following on from the contributor's missive to one forum to which I subscribe. Some of the responses clearly indicate that the traffic has also been circulating on at least one other forum.

What does it all mean? I have no objection to people expressing their personal views. If they wish to express such views in this journal, then they can expect that I as Editor will add comment if I believe that some form of moderation is warranted. This should be obvious to most who read this magazine: whilst this is the official journal of the WIA, the role of Editor has a degree of independence to the WIA Board. My Editorial and my comments are simply that – my personal view, not any official view of the WIA.

It is also clear that many readers of other forums have very limited views of the world. Their comments on those forums clearly indicate that they have limited willingness to consider the position of those that are not totally "in to" their segment/ interest area of our broad hobby. Such is life, unfortunately!

One contributor to one on-line forum suggested that this journal had become *"the ILLW and SOTA monthly"*. I cannot see how has he reached that view: simply because we now have a monthly column covering SOTA, and we had a lighthouse on the October cover? This is a very jaundiced view of the magazine.

Continued on page 5

WIA comment

Phil Wait VK2ASD

The role of the advisory committees

With President Wait attending an electronics fair in Taiwan in his private capacity, this month it falls to me to write the President's Comment.

I would like to touch on the topic of the WIA Advisory Committees.

At the time the Federal WIA was formed, the architects of the Constitution determined that each of the pre-existing State and/or Territory Divisions would initially be replaced by an Advisory Committee. It is interesting too that the use of the word initially in the Constitution provides a level of flexibility for the redefinition of the coverage of the Advisory Committees. It appears that it was contemplated that these Committees may not always be aligned to the areas governed by the pre-existing Divisions. Other geographical or interest based definitions could be applied in the future.

The membership of the Advisory Committees is determined by an election with the term of three years, plus one additional member which may be nominated by the WIA Board. I don't have any recollection of Advisory Committee elections in the time I have been on the WIA Board, particularly with respect to my home state of VK5.

The work of each Advisory Committees is to advise the Board on matters relevant to their area and assist to promote amateur radio. In recent times I cannot recall receiving any advice from an Advisory Committee: it appears that the provision of advice and promotion has largely devolved to the Club level and individual submissions by interested amateurs.

This leads me to question the ongoing role of the Advisory Committees as they are presently constituted. I would have expected that State (or Territory) based Advisory Committees would be a suitable forum for Club representatives to meet and coordinate activities relevant to their geographical area. This might include repeater coverage, maintenance and support, co-ordination of hamfests, club projects (or kits), Foundation and upgrade courses and promotional events such as field days, maker faires, etc.

In my view, State-based communication and planning (in my home State at least) would be of benefit. It would ensure that our efforts are focused on those matters which will provide the greatest return and clubs work to increase overall participation in the hobby rather than cannibalising each other's membership.

It also means that the smaller clubs can work together with the larger clubs to provide support for community based activities which they would not otherwise have the resources (intellectual and physical) to support. One example here was the recent provisions of Communications Services to the River Murray Marathon by Adelaide based AREG and the Riverland Amateur Radio Club.

I guess what I am looking for is feedback from the WIA membership on how you think the Advisory Committees as presently structured are working? Can they be improved, should the present State/Territory based arrangements continue? I look forward to receiving your feedback.

Talking about feedback, I must apologise for not yet having completed the detailed WIA Survey Feedback analysis. I hope to have it included in next month's *AR*.

Happy Hamming.

Chris Platt VK5CP
Vice President

WIA news

IARU Administrative Council plans for WRC-15

The Administrative Council (AC) of the International Amateur Radio Union (IARU) held its annual meeting on 27 & 28 September 2014 in Albena, Bulgaria. The AC is responsible for the policy and management of the IARU and consists of the three IARU international officers and two representatives from each of the three IARU regional organizations.

Here is a summary of the discussions and actions.

The Council reviewed the IARU positions on each of the WRC-15 agenda items that relate to amateur radio or may have an impact on amateur radio. The Council made a number of modifications to the paper related to justifications for the IARU positions. This information will be forwarded to all IARU member-societies.

The Council expressed support for Region 1 in its effort to obtain a CEPT proposal for post-WRC-15 conference agenda items for worldwide harmonization of 160 metres, harmonization of 6 metres and an allocation at 3.4 GHz.

The Council reviewed the participation of IARU at the upcoming WRC-15 and the President announced the members of the team who will represent IARU.

Upon the recommendation of the IARU EMC Coordinator, the Council adopted IARU Resolution 14-1 ("concerning the protection of the radio spectrum as a natural resource") dealing with EMC issues related to the radio spectrum and which encourages IARU member-societies and regional organizations to pursue implementation of this resolution as a matter of high priority, requests standard-setting bodies and regulators to fully support this objective and implores designers and manufacturers to make every reasonable effort to minimize radio spectrum pollution emanating from their products.

The Council expressed the importance of obtaining the ITU Advance Publication Information (API) numbers from administrations for satellite projects operating in the amateur and amateur satellite bands so that information about the number of operating satellites can be maintained, for frequency coordination and for resolving interference issues. IARU will work with administrations to establish protocols for satellite frequency coordination and to raise awareness of the satellite regulations.

The Council adopted the IARU Emergency Telecommunications Guide for use by the IARU member-societies to strengthen amateur radio disaster preparedness, response and mitigation.

The Council also adopted various strategies related to improving amateur radio disaster preparedness, response and mitigation and to promote the role of amateur radio in such activities to the general public and to government and non-government organizations.

The Council created the ad hoc "IARU Member-Society Relations Project Team" and adopted Terms of Reference for the project. This action arose from Minute 10.10 from the 2013 Council meeting Summary Record dealing with "Second Society Issues."

The Council adopted a system to provide more efficient remote monitoring of certain ITU meetings that may impact amateur radio.

The Plan for the Development of Support for Amateur Radio Frequency Allocations 2012-2017 was reviewed by the Council. The September, 2013 version of the IARU Spectrum Requirements which is the working document that sets out the spectrum requirements of the amateur and amateur-satellite services, was reviewed, discussed and updated.

The International Telecommunication Union (ITU) meetings at which IARU representation will be required for the remainder of 2014 and for 2015 were identified, and plans for representation at these meetings were reviewed.

In view of the year 2015 being the 150th anniversary of the International Telecommunication Union, the theme *"ITU & IARU: Celebrating 150 years of Advancing the Telecommunication Art"* was adopted for the next World Amateur Radio Day, April 18, 2015.

The budget for the years 2015-2017 as presented by the International Secretariat was reviewed and adopted. The budget is based upon anticipated financial contributions from the three regional organizations to defray a portion of the expenses, in accordance with previously adopted policy.

The Council received information about the Hamsphere Initiative from Martti Laine OH2BH. The Council will review the initiative and seek further information from the project leaders.

The Council was made aware of an ATV interference incident on the 23 cm band in which the German administration prohibited operation of an ATV repeater because of interference to the Galileo GPS system.

Attending the meeting were IARU President Tim Ellam VE6SH/G4HUA; Vice President Ole Garpestad LA2RR; Secretary Rod Stafford W6ROD; regional representatives Hans Blondeel Timmerman PB2T, Dennis Green ZS4BS, Reinaldo Leandro YV5AM, José Arturo Molina YS1MS, Gopal Madhavan VU2GMN, Wisnu Widjaja YB0AZ and recording Secretary David Sumner K1ZZ. Also present as observers were Ramón Santoyo XE1KK, observer from Region 2 and Don Beattie G3BJ, observer and President-elect from Region 1.

The next scheduled in-person meeting of the AC will be held in the vicinity of Yogjakarta, Indonesia, in October 2015 in conjunction with the IARU Region 3 Conference.

Battle to save the 9 cm band

The WIA has lodged a strong submission to the Department of Communications to save loss of access to two segments of our 9 cm band – a 25 MHz block at 3400-3425 MHz and a 50 MHz block at 3492.5-3542.5 MHz.

In August, the Minister for Communications, the Hon. Malcolm Turnbull MP, issued the ACMA a draft Direction to enable licensing of these two spectrum blocks to the National Broadband Network for fixed wireless services in metro fringe and hard to service areas of the major mainland cities.

The Department of Communications called for comment, with a closing date of 22 September 2014.

The block at 3400-3425 MHz overlays the narrowband, weak-signal and satellite segment in the bandplan at 3400-3410 MHz, which also includes beacons. Many countries throughout the three ITU regions have amateur allocations covering this segment. The WIA has argued for retention of 3400-3410 MHz to maintain harmonisation with amateur allocations across the world.

In summary, the Institute's submission put the case as follows:

1. The WIA seeks preservation of Amateur Service use of 3400-3410 MHz Australia-wide, consistent with international allocations and CEPT footnote EU17 in Region 1, and suggests that a 25 MHz block for the NBN could be found elsewhere in the 3400–3600 MHz band.
2. In addition, the WIA seeks preservation of Amateur Service use of 3492.5–3542.5 MHz (and the repositioned 25 MHz NBN block) outside those geographic areas where NBN fixed wireless services are deployed, such that any likely interference to the NBN service is obviated and subject to the existing provisions of secondary services.

A copy of the WIA's submission can be viewed on the WIA website.

Amateur radio in the news!

"Amateur radio enthusiasts put Tasmania's lighthouses on an international map" was the title of a news report from ABC Rural that talked about the International Lighthouse and Lightship weekend and the efforts of Kevin VK7HKN and Lynne Norris VK7FROG who activated the Cape Tourville Lighthouse. Tourville is an unmanned, automatic lighthouse built in 1971. Read the full ABC news report and listen to the audio, view the link: *http://www.abc.net.au/news/2014-09-17/cape-tourville-lightships-wekend/5739912#.VCD0BqQCXUU. email*

Editorial

Continued from page 2

After all, the Publications Committee can only consider the material submitted for consideration to actually be published! If no one contributes material, either as individual articles, or as contributions to the Contests column, how can the Publications Committee, and me as Editor, show that other aspects of the hobby have information to share? After all, we are a committee of volunteers, all of whom have other things to which we must attend during any given month.

The work for this journal is but one aspect of our lives. If you have an idea that you believe should be published, then get to the task and prepare an article for consideration! Similarly, if you have a good quality, high resolution that might be considered for the cover, then submit it! I can only publish from the material that I have available to consider.

Of course, all of this was started because of a simple OTY contribution, with a follow up from another individual. It seems that we all missed the point! Ian VK3LA responds this month. I urge ALL of you to read his contribution. The substance is about the face that we as amateurs present to the rest of the public. Hopefully we can find a way that is better than a quick contest exchange.

The ILLW clarification

My apologies to all concerned: in my Editorial last month, I implied that Kevin VK2CE was the local co-ordinator of the ILLW. It is more appropriate to describe Kevin as the co-convenor of the ILLW. He certainly does most of the background organisational work. Keep up the good work, Kevin: it is appreciated by many amateurs around the world.

Another volunteer needed

Everyone should note that Luke VK3HJ has indicated that the December *DX News* column will be his last. If readers are interested in having such a column included in this magazine, then we need someone else to "step up to the plate". Expressions of interest can be sent direct to me.

A call for more ANZAC 100 articles

For several months now on this broadcast we have summarised material from the ANZAC 100 series to appear in the WIA journal, *Amateur Radio* magazine.

These include many individuals who served the country in times of war, and their other exploits as a radio amateur.

Most have been written by the WIA Historian Peter Wolfenden VK3RV, and Lloyd Butler VK5BR. The role of women in war has come from the ALARA Historian Jennifer Wardrop VK5ANW VK3WQ.

These illustrated articles are well worth a read, as Australia and the WIA commemorate ANZAC 100 - the Centenary of our involvement on the Gallipoli Peninsula on April 25, 2015.

More contributions are welcome about WWI and WWII. Particularly sought are stories on Australian radio amateurs who served in the Korea and Vietnam wars.

If you can assist with an article or contribution of material to the WIA Archive, please contact the WIA Historian Peter Wolfenden VK3RV at *vk3rv@wia.org.au*

Until next month. Cheers,

Peter VK3PF

Walter King Witt XKW

Amateur radio leader, war-time contributor

Peter Wolfenden VK3RV

Photo 1: The Amateur Wireless Society of Victoria badge.

Walter King Witt XKW was a Vice President and Secretary of the Amateur Wireless Society of Victoria which formed on 30th November 1911. He held membership card number 19 dated 28/1/1912. The WIA Victorian Division grew from the Amateur Wireless Society of Victoria.

He was deeply involved in administrative matters of the Society and in particular issues surrounding the continuance and licensing arrangements for experimenters during the latter half of 1913. Interference to government stations had become quite an issue and almost resulted in the wholesale closure of all experimental stations. Negotiations with the Postmaster General's Department and the Commonwealth Wireless Director, John Balsille resulted in the re-introduction of a licence fee, agreements relating to "syntonic" (tuned) wavelengths below 250 metres and in April 1914, the publication of "Wireless in Australia", Australia's first national Call Book which contained some material supplied by the Wireless Director – all of these actions

Photo 2: Walter Witt's membership card.

were made in a joint attempt to reduce the potential of interference problems.

On 16th September 1914, Walter enlisted with the Navy as a Telegraphist. He was given Service Number 4079. There are other unclear entries on his service card which seem to indicate that he was a CTW Operator (Chief Telegraphist, Wireless, Operator?) and RAN Radio Services. These were dated 1914. Unfortunately the electronic version of his service card is poor and in some areas almost impossible to read. However there is one quite clear entry dated 15th January 1915 which reads "Naval Board expresses appreciation for services rendered in connection with 1st Australian Convoy".

What was this about? In 1979, Walter Witt addressed the Victorian Division of the WIA and during it he made reference to his involvement with the Navy in 1914:

".... Those of us who went to sea in the Navy, or joined up in the Army as wireless operators, found that apparatus we had made as amateurs was quite effective in practical use, and my little Ford spark coil was used in the first fleet between ships at the beginning of the line and end of the line which was about 10 miles [16 km] in preference to the spark provided by the Marconi Company which had a note something like a boy with a stick on a picket fence...."

So was this the reason Walter received the special mention of appreciation from the Naval Board? On the surface it appears to be the case as the normal shipboard Marconi equipment would have been receivable over considerable distances and would have helped give away the convoy's location and other details to the enemy.

Walter King Witt XKW, another notable Australian amateur who served his country and amateur radio well!

Photo 3: Walter Witt XKW.

Arduino based VFO

Gary Gibson VK8BN

By using an Arduino uno R3 and an AD 9850 or AD9851 DDS module, a very stable VFO can be created to add a VFO to any crystal locked radio or to replace the VFO in an older VFO controlled radio that suffers from drift, or to add an external VFO. Give new life to an old Codan that is crystal bound with the ability to switch from upper to lower sideband.

This project can be configured in numerous ways to be a simple RF oscillator that is capable of generating output signals from 1 Hz to 70 MHz or as a VFO with IF offsets. Examples given here are for an RF signal generator, a VFO for a Codan with a 1650 kHz IF and as a 5 to 5.5 MHz VFO for an old six metre rig. The software allows for the frequency to be adjusted in steps from 1 Hz, 10 Hz, 50 Hz, 100 Hz, 500 Hz, 1 kHz, 2.5 kHz, 5 kHz, 10 kHz, 100 kHz and 1 MHz. Pushing the button on the rotary encoder will step through the steps or by holding it down it will scroll through the steps.

The project requires an Arduino uno R3, a 16 x 2 line LCD display, an AD9850 or AD9851 DDS module and a rotary encoder. All these items are readily available on eBay at a total cost of less than $50. If sourced from local Australian suppliers expect to pay a little more.

The AD 9850 DDS has an upper frequency limit of about 40 MHz and is cheaper than the AD 9851 that is capable of output to 70 MHz; if building a VFO the AD9850 will most probably be the one to choose. While the on-board crystal may not be precisely on frequency, minor adjustment to the code that sets the DDS frequency can be made to correct for this; this line of code in the examples is well documented. The output frequency is remarkably stable after just a few minutes after power up so the frequency stability of the DDS module is as good as crystal locked. I did notice that changes to supply voltage can result in a few Hertz change in frequency, so for good frequency stability a well regulated five volt supply rail is suggested.

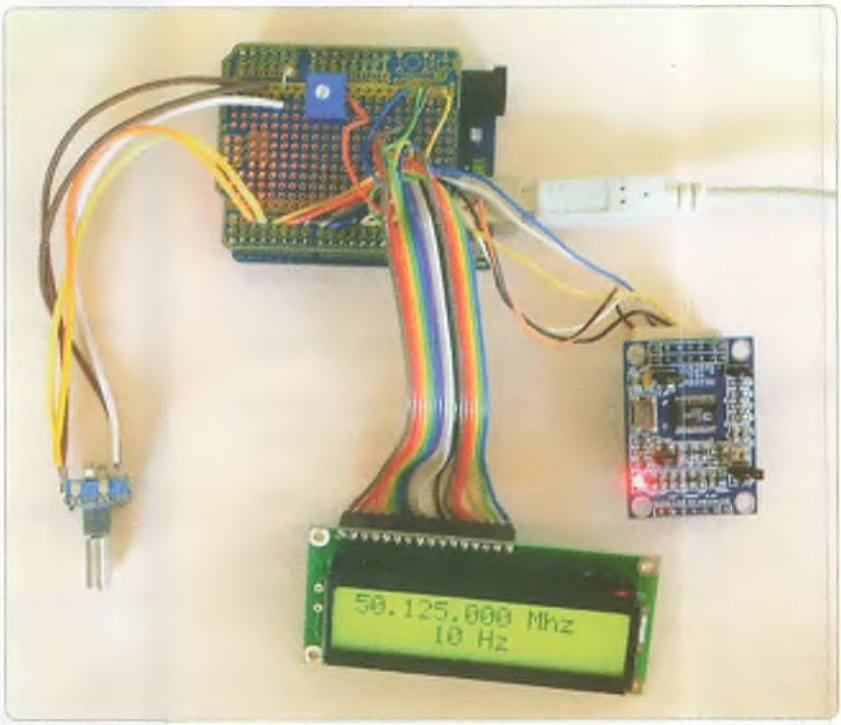

Photo 1: The author's finished Arduino based VFO.

There is only one line of code that requires changing when using the AD9851 as opposed to the AD9850. The 9850 uses a 125 MHz clock, the 9851 uses a 180 MHz clock; it is necessary to enable the six times multiplier of the on board crystal for the 9851 180 MHz clock. This line of code is clearly documented in the supplied examples.

Programming the Arduino is achieved by going to the Arduino site *http://www.arduino.cc* and downloading the Arduino IDE (Integrated Development Environment). Use this to upload the software to your Arduino board via a USB cable. It will also be necessary to load the additional library file for the rotary encoder into the Arduino IDE; instructions on how to do this can be found at *http://arduino.cc/en/Guide/Librarie*. The rotary encoder code is courtesy of Ben Buxton.

None of the main code is of my creation; rather the supplied examples are modified versions of code written by Richard Visokey AD7C and others. I have made a few very minor modifications to Richard's main code for the Codan IF offset and USB/LSB switching as well as minor modifications to his code to allow for the LCD to display the carrier frequency of the six metre radio while outputting five to 5.5 MHz. Anyone with a little knowledge of C programming will be able to make suitable

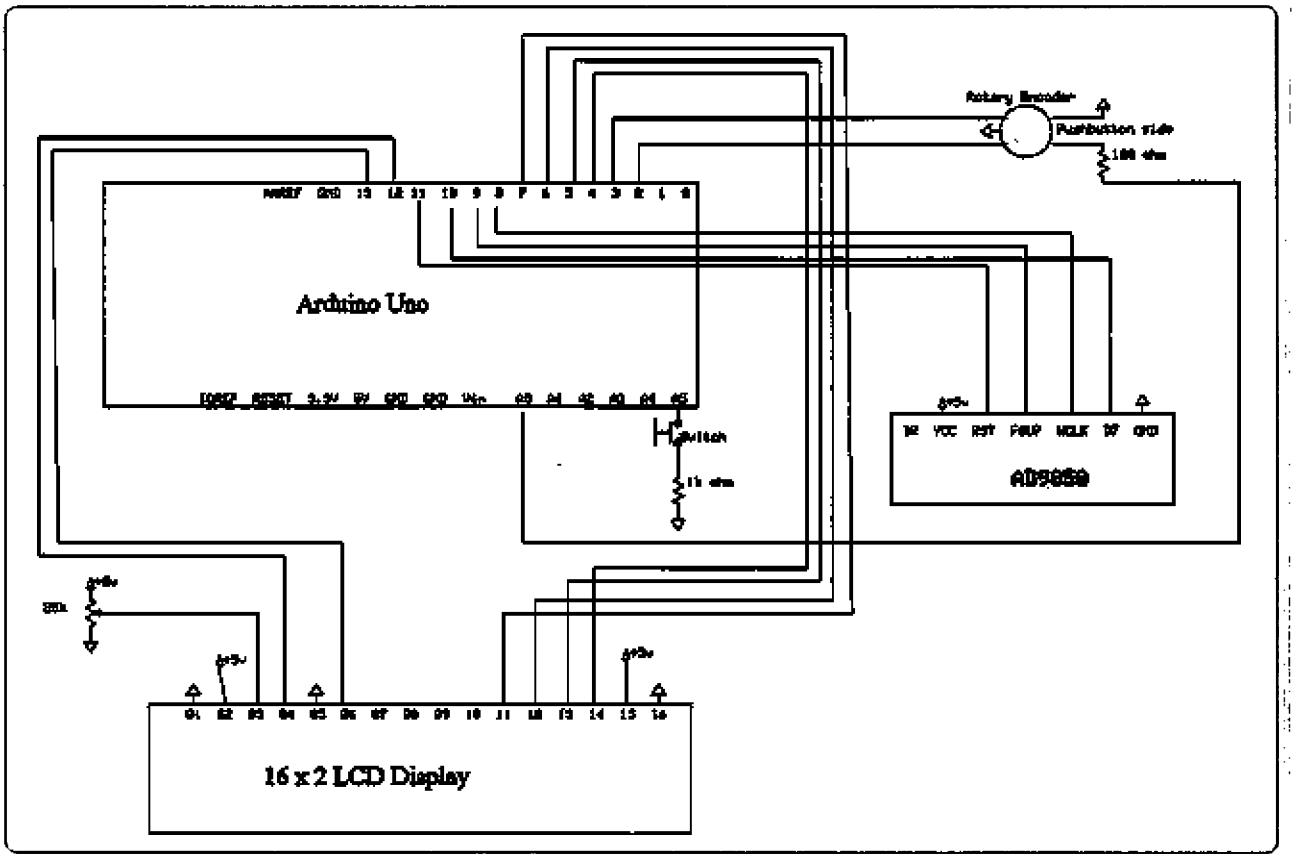

Figure 1: The circuit.

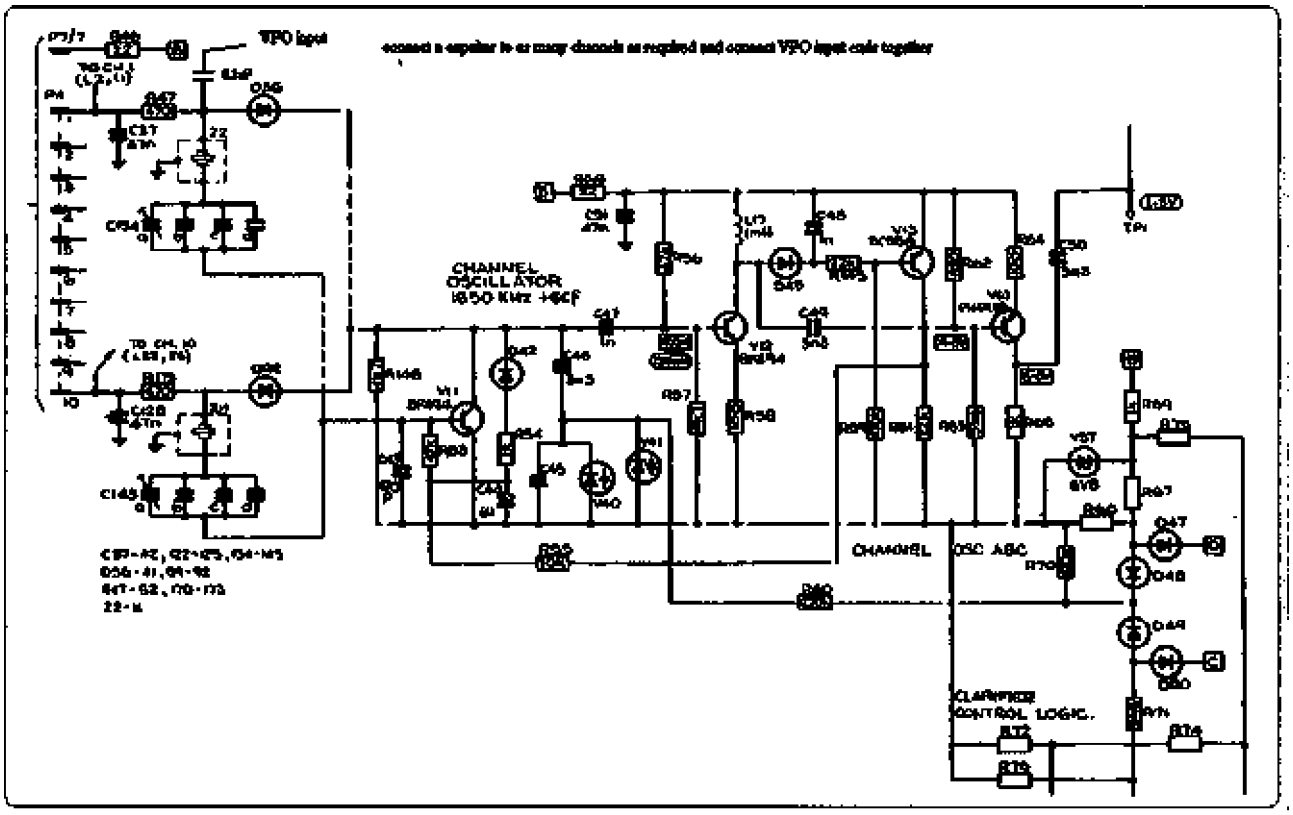

Figure 2: The circuit for the Codan 6801 channel oscillator.

modifications to the code to adapt to their individual requirements as well as add additional features. The code is well documented and allows even a poor C programmer like myself to understand how the program functions.

Upper and lower sideband selection for the Codan radios is a simple matter of changing the frequency of the VFO to either mix on the high side of the signal frequency or on the low side. For example with the Codan's 1650 kHz IF and a signal frequency of 7.193 MHz for an upper sideband signal the VFO would need to be 8.843 MHz; however to produce a lower sideband signal the VFO is set to 5.543 MHz. Both these signals mix with the 7.193 MHz signal to produce the required 1650 kHz IF. The software takes the IF offset into account and the display outputs the actual carrier frequency.

Construction is simplified if you also purchase an Arduino proto shield to mount the couple of components required, this board then plugs into the Arduino. All wiring from the peripheral devices is also made to the proto shield board. Less than an hour will see the project completed.

The circuit

The switch connected to A5 is a toggle switch for sideband selection. Further switches could be added and code written to allow for dual VFO's, band selection and so on - your imagination is the limit.

Connecting the VFO to the Codan radio is also reasonably simple, Make sure the coils fitted are for a frequency somewhere close to your desired frequency of operation. Remove the crystal and feed the output of your VFO via a 0.1 µF capacitor connected to the side of the crystal socket that connects to the diode - not to the side that connects to the capacitors. This is actually feeding the signal into the buffer transistor not into the oscillator transistor.

The oscillator transistor then acts as an AGC control, the actual level of the signal coming from the VFO becomes very non critical. You can connect a 0.1 µF capacitor to as many crystal positions as you wish and simply connect the other ends together; only the selected channel will operate. Crystals left in position will also still operate. To cover the entire 80 metre band will probably require three channel positions as the output will fall off as you move the VFO frequency further away from the frequency the coils are tuned to.

The Codan 6801 channel oscillator

If you are going to use the VFO to feed older valve radios the direct output from the DDS module at -10 dBm will probably be too low in level and will require a buffer amplifier, I am in the early stages of implementing a buffer using the AD811 chip, a device designed as a wideband video amplifier in

television cross point switchers; further development is ongoing. The code for this project will be available on the WIA website.
I have included three versions of the code, a five to 5.5 MHz VFO for a six metre rig, a signal generator from one Hz to 70 MHz and a Codan VFO with sideband selection. From these examples you should be able to work out how to change Richard's code to suit your particular requirement. Please note the downloadable code has been produced by several authors and is by no means my work. Please give credit where credit is due and also feel free to modify the code for your requirements and share your work as it's great to see what others do.

References

- Richard Visokey *http://www.ad7c.com/*
- Ben Buxton *http://www.buxtronix.net/2011/10/rotary-encoders-done-properly.html*

http://www.arduino.cc/

Downloadable code is available on the WIA website.

Band plans update

John Martin VK3KM, Technical Advisory Committee

Several information papers are available on the "Band Plans Update" page on the WIA web site. Comments on these and any other band planning issues are most welcome.

630 metres

Current IARU Region I CW and digital mode frequencies have been incorporated into the band plan as an interim guide, while the plan is being developed. The Region I band plan will be discussed in detail at the IARU Region I meeting, which is taking place at the time of writing.

Planning for CW and digital operation on this band is fairly straightforward, but SSB is less so. Our licence conditions allow the use of any mode with a bandwidth up to 2.1 kHz. But there is no clear spot in the band that can be used for SSB without causing interference to operators using other modes.

6 metres

The 6 metre band plan has been revised to bring it into line with operating conditions since the closure of analogue TV.

50.340 - 50.400 MHz - reserved for future expansion of the beacon segment.
50.400 - 50.500 MHz - reserved as a guard band for proposed Region I beacon segment.
50.500 - 52.000 MHz - reserved with no specific tags as yet.

Further changes await confirmation from ACMA of the full reallocation of 50 - 52 MHz to the Amateur Service.

2 metres

The current policy for redevelopment of the 145.000 - 145.400 MHz segment was first published in 2012 and is now being implemented. This plan provides extra channels for digital modes and aims to achieve better spectrum efficiency with a group of 12.5 kHz spaced channels. Full details are available on the "Band Plans Update" web page. There is also scope for consideration to be given to a further reallocation of former packet radio channels below 145 MHz.

Beacon frequencies

The beacon frequency allocation plan has been revised to allow more flexibility in choice of frequencies. Full details of the beacon plan are on the "About Beacons" page of the WIA web site.

ATV Channels on 23 cm and higher bands

Current channel spacings (20 MHz) allow each channel to be used for AM, FM or digital ATV. Replacement of AM and FM systems with DATV will allow future channel widths to be reduced to 7 MHz.

Equipment Review

SDR transceivers: **Flexradio FLEX-6700** and **Apache Labs ANAN-100D**

Peter Hart G3SJX

Editor: This review appeared in the October 2014 issue of Rad Com, our sister journal published by the Radio Society of Great Britain. Being a review of these two SDR transceivers, it was thought that this would be of interest to readers of this journal.

Photo 1: The FlexRadio FLEX-6700 and Apache Labs ANAN-100D represent the state of the art of amateur radio software defined transceiver technology you can buy today.

Introduction

When software defined radios were first proposed, many years ago now, the ultimate goal of attaching an antenna to an analogue to digital converter chip and performing all processing in software seemed just a pipe dream, a gleam in the eye and way beyond the capabilities of technology at that time. The first practical SDR transceivers for the amateur bands appeared about 10 years ago based on down-conversion to a PC sound card and processing by software in a somewhat restricted bandwidth. It wasn't until more recently, with the relentless march of technology, that analogue to digital converters of sufficient resolution and speed have appeared to realise that ultimate goal. Not only that, but with the latest devices performance levels are achieved even surpassing what is possible with the best analogue designs. Two of these latest high performing direct digital designs are the subject of this review.

FlexRadio was the first manufacturer to bring SDR to the amateur market. After several generations of down-conversion based radios, their latest models, the FLEX-6000 series, are a range of state-of-the-art direct digital designs. The FLEX-6700 is their current top of the range model with dual independent receivers, 100 W transmit output covering HF and 6m, extended receive coverage together with low level transmit output for the 4 m and 2 m bands, and Ethernet connectivity for local or remote operation.

Photo 2: ANAN-100D rear panel.

The HPSDR (High Performance Software Defined Radio) project started in 2006 as an open sourced activity by a multinational group of SDR enthusiasts exploiting the use of the latest technology in a state-of-the-art modular SDR design. The project has been covered in a number of articles in *RadCom* over the years. As part of this project the Hermes module was developed, a single board combining the key elements of the SDR. Together with front end filtering (Alex module) and a power amplifier this unit has been brought to the market as a fully specified SDR transceiver by Apache Labs based in India, the ANAN-10 and ANAN-100. Further development of the Hermes board resulted in the Angelia board allowing dual independent receivers and marketed by Apache Labs as the ANAN-100D. This unit covers HF to 6 m with 100 W transmit output and with Ethernet connectivity for local or remote operation.

The features and functions provided by an SDR are determined in part by the hardware but also by the firmware and controlling software; this also provides the user interface. FlexRadio have developed *SmartSDR* as the Windows software package for the FLEX-6000 series and this was used in the review. A number of controlling packages are usable with the ANAN-100D. *PowerSDR* was created by FlexRadio to control their earlier SDR units several years ago and this has matured and expanded greatly in terms of features under open source code development. The *PowerSDRmrx* version has been developed specifically for the HPSDR and Apache radios and was the package used in this review.

Radio design and architecture

The basic design of a direct digital SDR is now well established and adopts a number of standardised elements. The analogue to digital converter (ADC) is key to achieving performance, with 16-bit resolution necessary for highest performance. The 16-bit Analog Devices AD9467 used in the FLEX-6700 is clocked at a whopping 245.76 million samples per second (Msps, equivalent to sampling rate in MHz), allowing full operation well into the VHF region. The 16-bit Linear Technology LTC2208 is used in the ANAN-100D clocked at 122.88 Msps, allowing operation up to 6 m. Front end filtering protects against strong out of band signals but can be switched out for wideband operation. The FLEX-6700 uses 10 fairly sharp bandpass filters (BPF) centred on each amateur band (except 60 m) and switches automatically to wideband operation outside of the amateur bands. The ANA-100D uses somewhat wider filtering based on automatic or user selectable high-pass filters (HPF) and low-pass filters (LPF) to cover the whole receiver range. There are five HPF, seven LPF and a 6 m BPF. The low-pass filters are also used on transmit to filter the PA output. Separate ADCs are used to provide the dual independent receivers in both radios and a second identical set of receiver filters is used in the FLEX-6700. FlexRadio call these receiver front ends spectral capture units (SCUs). The ANAN-100D does not use front end filtering on its second receiver input. Both radios use relay switching and large size inductors in all filters to ensure the best signal handling. The front ends of both radios also include a selection of preamplifiers and attenuators to cater for differing signal level situations.

Both radios use 1000BASE-T / Gigabit Ethernet for the interface to the PC. This has the advantage of being fast, is plug and play needing no drivers or additional software and is directly compatible with routers, networks and remote operation.

The amount of data output from the ADCs is far greater than can be passed to and processed by a controlling PC. With the FLEX-6700 this rate is over 7.8 Gbps. High speed on-board processing takes these parallel data streams, 32 lines wide with two ADCs, and produces narrower slices of spectrum that can be passed to the PC in a process termed decimation. The decimation process is performed by field programmable gate array (FPGA) chips, which are large fully programmable devices containing logic blocks, memory, processors and other functions.

The FPGA devices in both radios are particularly large with plenty of spare capacity to allow the inclusion of new functions within the radio in future firmware upgrades. Moving functions from the PC to the radio environment can reduce latency or time delays, reducing the Ethernet load and relaxing the demands on the PC. This allows fast QSK on CW which is implemented this way in the FLEX-6700 and also in the ANAN-100D from firmware version 3.1 together with later *PowerSDRmrx* application software.

The FLEX-6700 also uses additional on board processors and digital signal processing (DSP) to support the FPGA and both radios use additional *coding/decoding* (CODEC) devices coupled to the FPGA to provide analogue audio functions for both receive and transmit. The transmit RF waveform in both radios is generated directly by high speed digital to analogue converter (DAC) devices and then amplified to the 100 W power level. There is no ATU in the ANAN-100D but the FLEX-6700 includes an auto ATU, matching up to 3:1 VSWR (2:1 on 6 m) although some of the marketing literature quotes higher levels. Both radios require a nominal 13.8 V external power supply capable of 25 A.

FLEX-6700 hardware

The FLEX-6700 is the larger of the two radios, measuring 330 mm (w) x 102 mm (h) x 305 mm (d) and mass of 5.9 kg. The front panel provides connectors for microphone, headphones and CW key jack, the on/off button, a small blue display and associated LED indicator showing status and for troubleshooting. A 4-way navigation keypad is provided for future expansion. Most microphone types can be accommodated, dynamic or electret, and the 8-pin connector is compatible with Yaesu pinning. A balanced input for microphone level or line level is available on the rear panel and uses an XLR/TRS (tip-ring-sleeve) connector.

There are two SO239 antenna connectors on the rear panel and each SCU receiver input has an associated pair of BNC connectors to allow separate receive antennas or inserting extra filters and amplifiers into the receive path. Comprehensive antenna allocation is possible under the control of SmartSDR. A transverter socket provides a low level transmit signal at nominally 1 mW (0 dBm) output and this socket can also be used as yet another receiver antenna input. Three separate relay outputs are provided for switching external equipment such as linear amplifiers and a fourth is available via the accessory connector, all separately configurable with respect to delays etc. Other sockets provide output to external powered stereo speakers, PTT-in, ALC-in, remote power-on provision, transmit inhibit, Ethernet connection and two USB ports. Speaker and headphone outputs can be used simultaneously. A 15-pin accessory connector (of the type used for VGA monitors) provides audio line in and dual audio line out, keying for CW and FSK, duplicates for PTT and transmit inhibit, and serial I^2C bus control clock and data for external equipment so equipped.

Both receivers (SCUs) cover the frequency range 30 kHz to 72 MHz and 135 MHz to 165 MHz. The transverter output is similar and also provides a source for the LF bands. The transmitter provides 100 W output on the HF and 6 m bands with no mode limitations. Each receiver is able to open four slice receivers and panadaptors, with a maximum frequency span of 14 MHz. A total of eight can be operational at any time. The built-in oven controlled reference oscillator is accurate to within 0.02 ppm and can be synchronised against an external 10 MHz reference. Even greater accuracy is possible by installing the optional GPS-based GPSDO module.

Removing the top and bottom covers reveals two large circuit boards. The extent and large

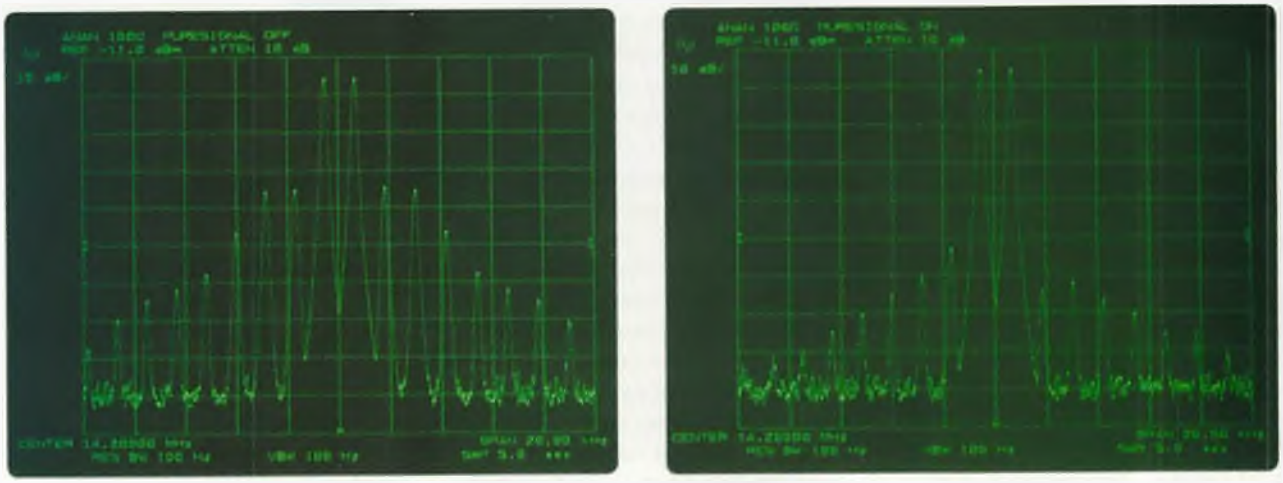

Photo 3: ANAN-100D two-tone Tx spectrum plots. Left: PureSignal off. Right: PureSignal on. The feature makes a visibly significant improvement to the transmitter distortion products when it is switched on.

Photo 4: FLEX-6700 rear panel.

amount of space allocated to the signal frequency filtering for the receivers, transmitter and ATU is immediately evident. The digital circuitry is fully shielded and cooled by two small on-board fans. Two further fans take air in through the sides of the case and out of the rear, primarily to cool the internal heatsink for the power amplifier. Overall, the fans are very quiet in operation.

ANAN-100D hardware

The ANAN-100D is contained in a very sturdy fluted extruded aluminium case that also acts as the heatsink for the transmitter. It measures 265 mm (w) x 88 mm (h) x 230 mm (d) and mass of about 4.5 kg. Inside, the circuitry is contained on two main PC boards, one for the Angelia SDR functions and the somewhat larger board containing the PA and all the RF filters. An internal fan keeps the unit cool. Limited access to the boards, for example to change microphone jumper settings, is fairly straightforward by removing the front panel but full access is a much bigger job.

The front panel provides 3.5 mm jack sockets for CW key, microphone, headphones or powered speakers, together with the on/off button, Ethernet connection and two small status LEDs. There are two carrying handles that don't really help and tend to get in the way. Dynamic or electret microphones can be accommodated, selected by internal jumpers. A further jumper enables the PTT function. Apache Labs do not supply a microphone.

Moving around to the rear panel, an array of eight BNC sockets provides various antenna connection possibilities. There are three user-assignable antenna sockets for transmit or transceive operation and for receiver 1 there are two receive-only inputs that can also be looped through filters or amplifiers and routed to the transmit antenna. There are separate transverter connections for the receive and transmit drive paths. Receiver 2 has a separate antenna input, independent of the routing matrix. An external speaker jack on the rear panel (1 W into 8 Ω) must only be used with balanced, isolated speaker lines otherwise damage is likely. Apart from a phono PTT output switching line, all other interfaces are provided via a 25 pin D-connector. This includes PTT input and output, left and right outputs for headphones, speakers and line level, general purpose inputs such as for data mode audio in analogue and digital formats and seven user assignable open-collector digital output lines. These lines can be used for communicating band data to external units or switching of external transverters. Different data can even be set for receive and transmit.

Both receivers cover the frequency range 10 kHz to 55 MHz, each supporting up to seven slice receivers available at any one time with appropriate software. The transmitter provides 100 W output on the HF and 6 m bands using SSB and CW modes but should be reduced down to 30 W for extended operation on FM and data modes. A low level transmit output of nominally 1 mW (0 dBm) is available in transverter mode across the full frequency range of the receivers. The reference oscillator uses a TCXO accurate to within 0.1 ppm and can be synchronised against an external 10 MHz reference.

Software packages

The various features and functions are determined primarily by the controlling application software working in partnership with the firmware installed in the radio. Although several software programs are available, particularly for the ANAN-100D, I limited this review to *SmartSDR* for the FLEX-6700 and *PowerSDRmrx* for the ANAN-100D. Both are freely available to download and updates are frequent. Installing or updating is straightforward and relatively trouble free but *PowerSDRmrx* will perform an optimisation routine the first time it is run and this can take 10 minutes or more. If the radio firmware needs updating, the process is largely automatic with the FLEX-6700 as the software is included with *SmartSDR*. With the ANAN-100D the process for firmware updating is more complex. The *HPSDR Programmer* software needs to be installed first and, if upgrading from older versions of

firmware, internal jumper links may need to be temporarily moved and alternative bootloader software used. Don't expect the radios to perform satisfactorily with older PCs. Both radios specify a minimum performance of a dual core 2 GHz processor with 4GB RAM but a faster PC will reduce time delays (latency) and provide a faster response to control changes. A high-resolution monitor is also desirable. Windows 7 is the recommended operating system but both packages will operate from Windows XP SP3 or later.

Photo 5: PowerSDRmrx screen – dual receivers active.

Although both the *PowerSDRmrx* and *SmartSDR* software packages largely perform the same basic set of functions, the presentation style and user display interface is significantly different.

PowerSDRmrx adopts a conventional dashboard console style layout with separate buttons and sliders for each control, duplicated when both receivers are active. The central area of the screen shows the panadapter spectrum display, waterfall or various scope functions with both RF spectrum and waterfall being displayed for a single receiver active or one function only if both receivers are enabled. *PowerSDRmrx* allows only a single slice per receiver and a maximum span of around 380 kHz at the highest sampling rate. Other software packages such as *cuSDR*, which is currently receive-only, can offer more slices and wider spans but software is still evolving. There are a huge number of setup adjustments; tailoring of functions is very comprehensive and there are many extra features. One very interesting recent addition is PureSignal that uses adaptive predistortion to reduce very considerably transmitter distortion products on SSB. Up to 14 separate transverters can be supported with fully configurable independent drive settings and offsets to give display readouts up to 99 GHz. Other features include diversity reception support on the dual phase coherent receivers with dual antennas and even support for radio astronomy data collection.

Photo 6: SmartSDR screen – panadapter + waterfall with two slice receivers. Horizontal lines on waterfall are local electric fence ticks.

SmartSDR uses the maximum area of the screen for panadapter spectrum and/or waterfall displays with up to eight open at any one time. Up to eight slice receivers may also be opened, with their position indicated by lines on the relevant spectrum. Flags attached to these lines show key parameters for each slice such as frequency and drop-down menu selection for DSP settings, mode, filters, antenna sockets

etc. Buttons and sliders for transmit functions are grouped down the right hand side of the screen, together with more detailed access to settings for one selected receiver. The maximum span for panadapter displays is 14 MHz. Transverter operation does not provide display offsets.

Both software packages provide all the functions you would expect on a top-flight radio. All the usual operating modes are provided including SSB-based datamodes and synchronous AM, but FM is still to be implemented in a future software release of *SmartSDR* for the FLEX-6000 series. Channel filtering is very comprehensive, widely adjustable with notches, noise reduction modes and much more. *SmartSDR* has a very effective tracking notch filter. Both include extensive audio filtering selection including multi-band audio equalisers on both receive and transmit. For CW, both include Iambic keyers and *PowerSDRmrx* includes comprehensive message storage and keyboard sending. Fast QSK is possible with both but needs a fast PC. *PowerSDRmrx* provides largely unlimited memory storage of name-tagged frequencies with many other associated parameters. Comprehensive storage of audio files from the receiver audio or from the microphone is also provided for playback on receive or transmit. The current version of *SmartSDR* does not include these functions.

On data modes, receive and transmit analogue audio may be passed to and from the PC soundcard in the conventional fashion. Alternatively both software programs allow direct passing of digital audio without the need for physical cables.

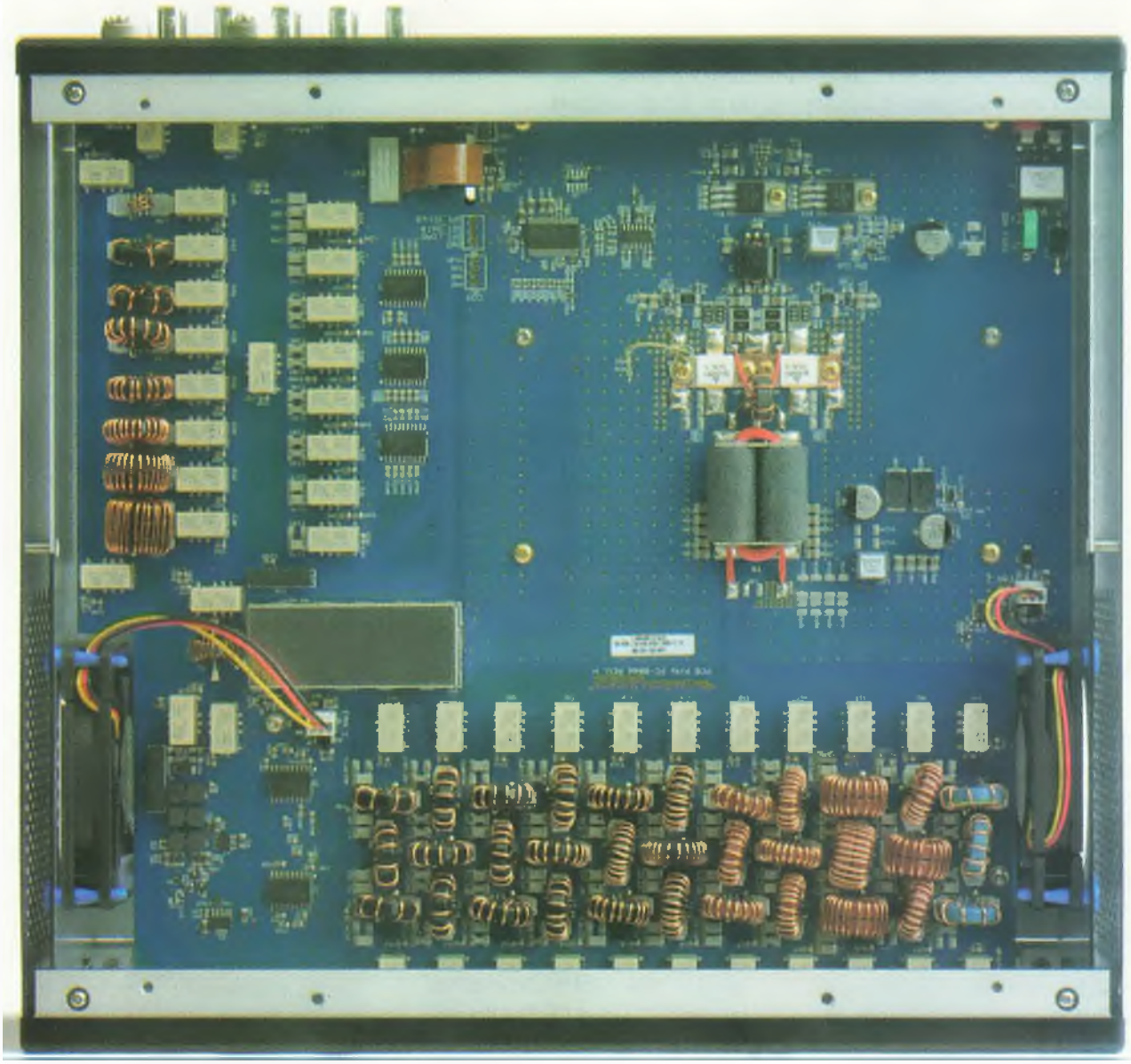

Photo 7: FLEX-6700 TX PA and ATU under top cover

FLEX-6700 Measured Performance

Sensitivity on SSB 2.4 kHz bandwidth for 10 dB s+n:n with wideband front end

	Front-end gain			
Frequency	0 dB	10 dB	20 dB	30 dB
100 kHz	2.8 µV (-98 dBm)	2.0 µV (-101 dBm)	0.9 µV (-108 dBm)	-
1.8 MHz	1.4 µV (-104 dBm)	0.5 µV (-113 dBm)	0.16 µV (-123 dBm)	0.14 µV (-124 dBm)
3.5 – 28 MHz	1.4 µV (-104 dBm)	0.56 µV (-112 dBm)	0.2 µV (-121 dBm)	0.11 µV (-126 dBm)
50 MHz	1.8 µV (-102 dBm)	0.8 µV (-109 dBm)	0.22 µV (-120 dBm)	0.14 µV (-124 dBm)
70 MHz	2.2 µV (-100 dBm)	1.0 µV (-107 dBm)	0.28 µV (-118 dBm)	0.16 µV (-123 dBm)
144 MHz	4.0 µV (-95 dBm)	1.4 µV (-104 dBm)	0.45 µV (-114 dBm)	0.25 µV (-119 dBm)

Frequency	Noise Figure
50 MHz	9 dB
70 MHz	10 dB
144 MHz	13 dB

Filter	Bandwidth		
	-6 dB	-60 dB	-80 dB
USB 2400 Hz	2400 Hz	2472 Hz	2485 Hz
CW 500 Hz	500 Hz	645 Hz	665 Hz
CW 100 Hz	100 Hz	173 Hz	183 Hz
CW 50 Hz	50 Hz	123 Hz	132 Hz

AGC attack time: approx. 5 ms
AGC decay time: 600 ms (fast) 1 s (medium) 2 s (slow)
In-band intermodulation products: -45 dB to -65 dB see text

Reciprocal Mixing		
Frequency	Transmit dynamic range	Noise 7 MHz
Offset	500 Hz BW CW 7 MHz	50 W O/P
1 kHz	113 dB (-140 dBC/Hz)	-125 dBC/Hz
2 kHz	117 dB (-144 dBC/Hz)	-132 dBC/Hz
3 kHz	118 dB (-145 dBC/Hz)	-137 dBC/Hz
5 kHz	118 dB (-145 dBC/Hz)	-139 dBC/Hz
10 kHz	119 dB (-146 dBC/Hz)	-142 dBC/Hz
15 kHz	122 dB (-149 dBC/Hz)	-143 dBC/Hz
20 kHz	125 dB (-152 dBC/Hz)	-144 dBC/Hz
30 kHz	see text	-145 dBC/Hz
50 kHz	see text	-145 dBC/Hz
100 kHz	see text	-145 dBC/Hz

Transmitter Measurements at 100 W Output

	CW power output		Intermodulation products	
Frequency		Harmonics	3rd order	5th order
1.8 MHz	98 W	-60 dB	-34 dB	-50 dB
3.5 MHz	98 W	-65 dB	-40 dB	-42 dB
7 MHz	97 W	-62 dB	-45 dB	-40 dB
10 MHz	94 W	-70 dB	-45 dB	-40 dB
14 MHz	100 W	-70 dB	-38 dB	-38 dB
18 MHz	95 W	-65 dB	-42 dB	-40 dB
21 MHz	98 W	-75 dB	-40 dB	-40 dB
24 MHz	98 W	-55 dB	-34 dB	-40 dB
28 MHz	100 W	-60 dB	-36 dB	-43 dB
50 MHz	91 W	-70 dB	-38 dB	-37 dB

Intermodulation product levels are quoted with respect to PEP.
Microphone input sensitivity: <1mV for full output

Table 1: FLEX-6700 measured performance.

With *PowerSDRmrx*, two virtual audio cables may be set up with various selectable parameters. With *SmartSDR*, DAX (Digital Audio eXchange) allows eight separate audio channels. In addition, DAX provides up to four channels of wideband I and Q baseband data prior to demodulation for passing to additional client programs such as *CW Skimmer*. Neither radio has a hardware CAT interface. However, both programs provide for the setting up of a virtual COM port that is used to pass data to and from logging programs or other applications.

Measurements

The full set of measurements is given in the tables. The sensitivity with preamplifiers in circuit is very good for both radios and reduces by about 10 dB at LF. The figures shown for the FLEX-6700 are for wideband operation. With the front end filters in circuit, sensitivity drops by about 2-4 dB, depending on band. At VHF the FLEX-6700 is less sensitive and would benefit from an external preamplifier for weak signal working. The S-meter calibration shows about 45 µV for S9 with the ANAN-100D and about 70 µV for S9 (wideband) with the FLEX-6700 and is independent of the front end gain and attenuator settings. Both radios show 6 dB per S-unit and calibration holds well across the

frequency range for the S-meter. Spurious responses and birdies are better than 100 dB down with one or two minor exceptions.

The panadapters of both radios clearly show signals that are nearly inaudible. A signal that gives an audible 10 dB signal to noise ratio in the receiver shows up to 30 dB above the noise floor on the panadapters at narrow spans. The amplitude calibration linearity across the extensive display range for both radios is also excellent and within 5 dB worst case.

Both radios exhibit a similar AGC characteristic with an exponential decay but have an attack that inserts a hole in the signal path or the audio. This is a familiar characteristic of some DSP based radios and can degrade weak signal performance under noisy conditions.

SDR receivers using direct digital conversion respond to strong signals in a totally different way from conventional analogue designs. They remain linear up until the point that ADC overload or clipping occurs, at which point the receiver performance totally collapses. This point occurs at about +9 dBm input for the ANAN-100D or +6 dBm for the FLEX-6700 with no front end amplifiers or attenuators in circuit. No blocking occurs up to this point. With multiple strong signals intermodulation can occur at a low level, even for signals less than S9, but then intermodulation levels do not worsen until close to the ADC overload point. This is due (I think) to the quantisation steps introduced by the ADC and the greatest dynamic range is achieved if the full range of the ADC is used for processing signals. This low level intermodulation can cause problems on quiet bands such as 6m and in this situation it might be desirable to increase front end gain so that band noise significantly masks the receiver noise floor. This is completely opposite to the normal advice given for optimising strong signal performance

ANAN-100D Measured Performance

Sensitivity on SSB 2.4 kHz bandwidth for 10 dB s+n:n

	Front end gain	
Frequency	**20dB preamp on**	**20dB preamp off**
100kHz	0.63 µV (-111 dBm)	3.2 µV (-97 dBm)
1.8 – 28MHz	0.2 µV (-121 dBm)	2 µV (-101 dBm)
50MHz	0.11µV (-126dBm)	0.4µV (-115dBm)
AGC attack time: approx. 7 ms		
AGC decay time: 300 ms (fast) 1.5 s (medium) 1.7 s (slow) 2.5 s (long)		
Inband intermodulation products: -50 dB to -70 dB see text		

Filter	Bandwidth (16384 buffer)		
	-6 dB	**-60 dB**	**-70 dB**
USB 2400 Hz	2400 Hz	2503 Hz	2564 Hz
CW 500 Hz	500 Hz	602 Hz	623 Hz

Frequency offset	Reciprocal mixing dynamic range	Transmit noise 7 MHz
	500 Hz BW CW 7 MHz	50 W O/P
1 kHz	114 dB (-141 dBC/Hz)	-133 dBC/Hz
2 kHz	115 dB (-142 dBC/Hz)	-137 dBC/Hz
3 kHz	116 dB (-143 dBC/Hz)	-137 dBC/Hz
5 kHz	118 dB (-145 dBC/Hz)	-138 dBC/Hz
10 kHz	121 dB (-148 dBC/Hz)	-138 dBC/Hz
15 kHz	124 dB (-151 dBC/Hz)	-139 dBC/Hz
20 kHz	126 dB (-154 dBC/Hz)	-140 dBC/Hz
30 kHz	see text	-141 dBC/Hz
50 kHz	see text	-141 dBC/Hz
100 kHz	see text	-142 dBC/Hz

Transmitter measurements at 100 W output

		Intermodulation products			
		PureSignal Off		PureSignal On	
Frequency	**Harmonics**	**3rd order**	**5th order**	**3rd order**	**5th order**
1.8 MHz	-60 B	-37 dB	-40 dB	-56 dB	-60 dB
3.5 MHz	-60 dB	-39 dB	-36 dB	-56 dB	-62 dB
7 MHz	-54 dB	-35 dB	-45 dB	-60 dB	-64 dB
10 MHz	-53 dB	-40 dB	-36 dB		
14 MHz	-50 dB	-39 dB	-37 dB	-54 dB	-65 dB
18 MHz	-54 dB	-40 dB	-36 dB	-55 dB	-66 dB
21 MHz	-54 dB	-38 dB	-36 dB	-56 dB	-60 dB
24 MHz	-51 dB	-38 dB	-36 dB	-56 dB	-62 dB
28 MHz	-52 dB	-30 dB	-35 dB	-55 dB	-66 dB
50 MHz	-60 dB	-41 dB	-37 dB	-55 dB	-64 dB
Intermodulation product levels are quoted with respect to PEP.					

Microphone input sensitivity: <1 mV for full output

Table 2: ANAN-100D measured performance.

with conventional analogue receivers! With the ANAN-100D, intermodulation products appear about 10 dB above the noise floor with input signals around -65 dBm but remain around this level as input signals increase to within about 2 dB of ADC overload. At this level it corresponds to an intermodulation limited dynamic range of 105 to 110 dB and is independent of spacing down to very close spacings. Referencing to the -65 dBm level is a rather pessimistic approach yielding around 65 dB dynamic range. The FLEX-6700 did not exhibit appreciable low level intermodulation until within about 5 dB of ADC overload. This corresponds to a dynamic range of around 105 dB. For both radios, inband intermodulation measured with two tones 200 Hz apart was significantly better with high level input signals than with low level.

Both radios use low noise reference oscillators and as a consequence the reciprocal mixing figures due to phase noise are excellent. I have only ever measured one radio with a better performance, the Elecraft KX3. At spacings greater than 20 kHz the limit is ADC overload. Transmit noise is also very low, a welcome departure from some recent introductions. Measurements of channel filter selectivity showed superb narrow skirts even at the narrowest settings.

Both radios use a similar transmitter power amplifier structure with the popular RD100HHF1 MOSFETs and two-tone distortion products are generally very good. With PureSignal adaptive pre-distortion enabled on the ANAN-100D, distortion products are reduced by some 15 to 20 dB, making it by far the cleanest amateur transmitter available. PureSignal is quite easy to set up but the levels need to be adjusted.

On CW transmit, the characters were nicely shaped with around 3 ms rise and fall times for both radios. Fast QSK requires a fast PC and my 2 GHz dual core unit did not do this justice but semi break-in functioned satisfactorily. Latency in the receiver path is the key factor here. Maximum transverter output was +13 dBm for the ANAN-100D and +15 dBm for the FLEX-6700 with very clean spectrum and reducible down to quite low levels.

On-the-air performance

Both radios are in general easy to use and operate but, as is the nature of SDR, they are not quite the instant use, straight out of the box units characterised by standalone analogue radios. They both require installation of software and a degree of setting up before they are ready to use, which in itself is quite straightforward. Both radios are provided with software and manuals on CDROM but this is a fast moving world and they become rapidly out of date. However, the latest versions are readily available from the FlexRadio and Apache websites. Hardware is reasonably well covered by manuals and the *SmartSDR User Guide* is regularly updated but there is no manual yet covering the use of *PowerSDRmrx*. Searching on the web reveals bits of information but no comprehensive user guide. Fortunately the software is well structured and although there are a huge number of setups and features they are fairly intuitive and time spent playing around will reveal its many delights.

The panadapter display is central to the use of the radio and tuning the receiver can be accomplished in a number of ways. Dragging the receiver display line, dragging the background, clicking on a displayed signal and mouse wheel tuning are all fundamental to the use of both radios. With *PowerSDRmrx*, hovering the cursor over any of the frequency digits allows mouse wheel scrolling in this particular step size and provides a convenient method of fast tuning, but is not implemented on *SmartSDR*. Direct keyboard entering of frequency is also allowed and if you prefer analogue-style round knob tuning, FlexRadio have a useful USB accessory – FlexControl – that operates with *SmartSDR* and *PowerSDR*. This contains a smooth operating round knob with finger indent and three assignable push buttons. The WoodBox Radio Tmate-2 [1] also provides a similar function but software for *SmartSDR* is still in progress.

The panadapter and waterfall displays are most impressive, particularly so in the FLEX-6700. They are excellent for monitoring weak beacons on 6 m and it is surprising what can be 'seen' even under fairly flat conditions. Both receivers sound very clean across the whole tuning range and filters, notches and noise reduction are very effective. The transmit audio quality was also reported as excellent and highly adjustable.

Conclusions

The FLEX-6700 and ANAN-100D are both excellent fully-featured and high performing SDR transceivers at the top end of a growing range of models from FlexRadio and Apache Labs. Supported by software packages that are continuing to evolve adding more and more functions, both bring a new dimension to operation on the amateur bands. The ANAN-100D is priced at £2999 (RRP) with the FLEX-6700 at £5799 (RRP) but the latter also includes coverage of the 4 m and 2 m bands, has extra front end filtering and a built-in ATU.

Acknowledgements

I would like to express my gratitude to Waters and Stanton for the loan of these radios.

Ed: The WIA thanks the RSGB for permission to republish this review.

Reference

[1] Reviewed in *RadCom* April 2014, p33

The UnitLoop: 7 MHz 100 watt magnetic loop for apartments and units

Peter Parker VK3YE

Introduction

Unit and apartment living can restrict HF amateur activity. Often one must make do with fewer and smaller antennas. Higher density also risks interference – both from and to your station. On air operating is a frequent casualty and some are never heard from again.

Others see unit living as a challenge and an incentive to build compact antennas. Amateurs in Europe and Asia where apartments are more common, and the USA, where many housing estates have strict home owner association rules, have been particularly active in developing 'stealth' HF antennas.

Magnetic loops are a popular low-profile antenna choice. It's easy to see why. They are super small and fit in the smallest courtyard or balcony. One can cover several popular bands. Their narrow bandwidth and directivity lessen interference and, if properly built, efficiency can be surprisingly high, even if near the ground.

Photo 1: Magnetic loop for 7 MHz.

The right type of loop

It's tempting to try a lightweight magnetic loop designed for QRP or portable use at home. This is useful to gauge receiving conditions. However be aware that lightness and portability compromise antenna efficiency and restrict operation to low power. Such trade-offs may be acceptable for casual portable use but not for regular home station activity, such as contests, nets and random contacts. You may be 24 to 30 dB down on 100 watt stations using full-sized outdoor antennas and below many peoples' local noise level.

A heavier (yet still small) loop claws back most of these losses. It's better materials and connections may add (say) 6 dB while 100 watts give a 13 dB advantage over five watts. Instead of being four or five S-units below your colleagues you may only be one or two S-units down. And it may not even be obvious to them that you're using a compact antenna. In short, don't write off magnetic loops just because you've heard signals from lighter versions and they've all been weak.

Most 100 watt loops (except for the W2BRI designs referenced below) are fairly involved projects. For instance you will need to obtain a vacuum variable capacitor (preferred) or wide-spaced air spaced transmitting type, neither of which are cheap. There are the challenges of obtaining mechanical reduction for easier tuning, the optional remote control tuning and providing short stout connections between the loop element and the variable capacitor. Also not everyone has a workshop, especially if they live in the sort of

apartment or unit most suited to a loop antenna. As a result many reluctantly consign magnetic loops to the 'too hard' or 'roundtuit' pile.

The UnitLoop presented here overcomes these limitations. It handles 100 watts, uses common hardware store items and RG-213 coax cable in place of the special variable capacitor. Construction requires neither a workshop nor power tools; courtyard/balcony space and hand tools are enough. It can be made in an afternoon and delivers excellent performance. The one major compromise is that the loop is strictly single band. Still, if made for a popular band like 7 MHz contacts should be possible at most times.

How it works

A magnetic loop is nothing more than a large tuned circuit that is rather good at radiating power fed to it. A split copper circle forms the inductor which is brought to resonance on the operating frequency by a high voltage capacitor wired across its ends. A smaller loop couples the signal from the transmitter into the larger loop.

Provided the loop is in the vertical plane it can radiate well even if low to the ground. Critical factors in design include low DC resistance of the main loop and all connections and a high voltage capacitor to prevent sparking (voltages can reach 3 kV with 100 watts).

Capability

The UnitLoop is capable of the following:

Band coverage: Any single HF band 7 to 28 MHz: prototype on 7 MHz

Bandwidth (2:1 SWR): approximately 18 kHz on 7 MHz

Tuning arrangement: Sliding capacitor made from circuit board material. Most of the capacitance is provided by the RG-213 coax cable length.

RF power handling: Up to 100 watts

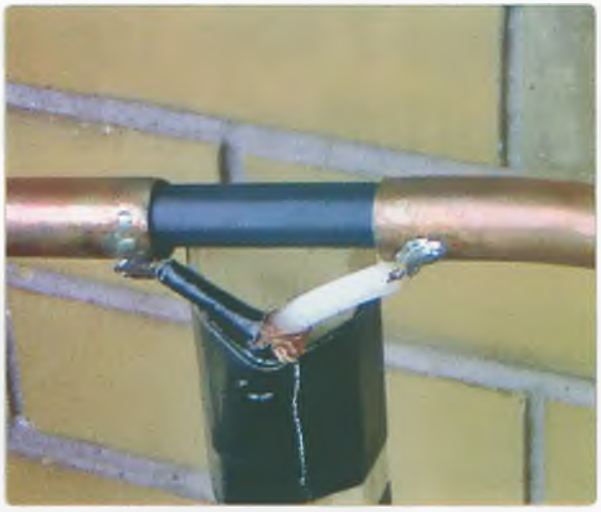

Photo 2: Coax cable capacitor soldered across top of loop.

Efficiency: Online calculators indicate that a one metre diameter copper transmitting loop will be about 9 dB down on a full sized antenna on 7 MHz. On-air tests confirmed a difference of one - two S-points.

Gathering the parts

The main element is a single piece of three metre long 19 mm diameter annealed copper tubing. It is a popular off-the-shelf hardware store length so no cutting is required. The tubing's softness means it can easily be bent from its coil to the desired large loop by hand.

The other major items include timber for the support frame and base, 60 cm of three core mains power cable for the coupling loop, two metres of RG-213 coax cable for the main capacitor and single sided printed circuit board material for the fine tuning capacitor. Minor parts include wood screws, pipe clamps and a rubber band.

All parts are common hardware or electronics store items.

Construction

Unbend the copper tubing from the packet to form a large loop. Keep the loop flat and avoid twists or kinks. When finished you'll have an almost circular loop about 90 cm in diameter. Leave about three or four centimetres between the ends.

Sand both ends of the copper loop, heat with a butane torch

Photo 3: Close up of coax cable capacitor.

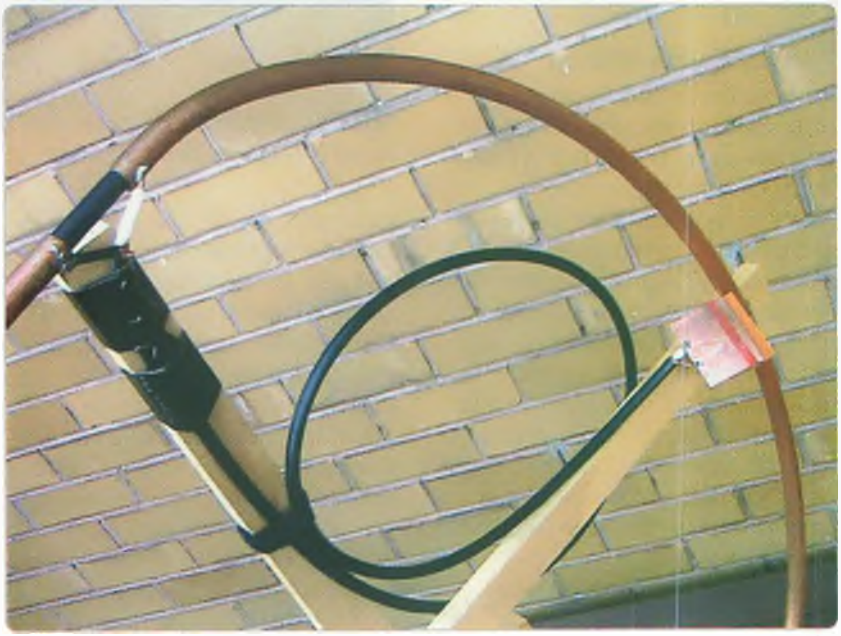

Photo 4: Coupling loop.

and apply solder. The copper should readily take the solder; if not it is either not clean or there is insufficient heat. The normal 15 - 25 watt electric soldering iron is insufficient for this task, so buy or borrow a cheap butane torch for this project.

Take at least two metres of RG-213, separate the inner from the braid a few centimetres both ends and measure its capacitance between braid and inner. The capacitance range on many multimeters should be adequate but you may need to solder short lengths of thin wire to fit the multimeter's terminals. Capacitance should be approximately 200 pF, or 1 pF per centimetre. Solder one end of the coax across the gap in the loop carefully using the butane torch.

Next make the timber support. This consists of two crosses; a large cross to support the loop and a smaller cross to form the base. Clamps hold the copper loop to the frame at the bottom and both sides. Rigidity is sufficient that no support is required at the top of the loop, though it is improved if a short length of black irrigation tubing is put inside the tubing (13 mm tubing provides a snug fit).

Assemble the coupling loop. This is not electrically connected to the main loop. Instead it is mounted at the bottom of the loop directly opposite from the gap and coax capacitor at the top. The coupling loop needs to be fairly heavy wire or tubing but apart from that its material is not critical. I used a section of three-core mains power cable. Its circumference needs to be 1/5 that of the main loop or, in this case, 60 cm. The end of the RG-58 coax feedline to the transceiver is soldered across the coupling loop and insulated with tape or heatshrink tubing.

Finally make the sliding variable capacitor. This is simply two pieces of single sided fibreglass printed circuit board material approximately 5 x 7 cm. With a hacksaw and mitre box lightly saw down the copper side of one piece to divide it into halves, while keeping the fibreglass intact. Make another cut about one mm parallel to form a channel about two or three mm wide. The wider distance between the copper islands is necessary to prevent arcing over on transmit.

Adjustment and testing

Plug the antenna into an HF transceiver, coarsely tune from about five to eight MHz during the day and note a change in background noise. There should be a definite noise peak just below 7 MHz which is the resonant point of the antenna.

Trim a few centimetres from the free end of the RG-213 coax and observe the change in the noise peak; it should now be nearer 7 MHz. Parting a few centimetres of braid from the centre conductor, necessary for the connection to the slider capacitor, will raise its resonant frequency further.

When enough has been cut so that resonance is just above 7 MHz lightly solder the RG-213's braid and inner conductor to the sawed piece of circuit board material. Overlap the other piece of circuit board material (copper not facing to avoid shorting) and note how the resonant frequency falls when the overlap is maximum. Use a rubber band to secure the two pieces of board.

After some cut and try it should be possible to cover a useful slice of the 7 MHz band. Increase the size of the sliding variable capacitor (by using larger PC board pieces) to extend tuning range if desired.

Apply several watts of transmit power with a VSWR meter connected inline. Try for various frequencies across the band. Best SWR obtainable should be close to 1:1, rising steeply either side of the centre frequency. Even tuning 10 kHz off centre frequency should cause the VSWR to rise to 2:1 or more. If not then your antenna's Q is low and there will be added losses. If there is a clear resonance point but you can't get near 1:1, squash or pull the coupling loop slightly and try again.

Repeat for various frequencies, sliding the circuit board capacitor as you go. The prototype achieved a range of 7.1 to 7.2 MHz, indicating that the RG-213 capacitor was cut slightly too short for the busiest part of the band (approximately 7.050 – 7.150 MHz).

Next increase power and see how high you can go without arcing across the circuit board capacitor. Reliable arc-free operation with 100 watts of SSB should be possible. If not slightly widen the slit in the circuit board capacitor. Exercise caution with continuous duty digital modes; 30 to 40 watts may be more appropriate for both transceiver and antenna.

In use

The loop should be set up on a veranda, courtyard or balcony several metres from the operating position to lessen EMR exposure, especially if operating more than five or 10 watts. Having the loop outside also lessens potential interference from or to domestic appliances. The loop is not especially directional except for its sharp null which can be used to minimise local noise on receive.

Photo 5: Printed circuit board capacitor for fine frequency adjustment.

The loop will give reliable contacts around Australia and New Zealand. DX should also be possible occasionally, especially on CW or digital modes. A video demonstration of the loop in use appears at *youtube.com/vk3ye*

Improvements

The most obvious (and simplest) improvement is a better means of adjusting the sliding capacitor so that settings are repeatable. A pointer and frequency scale would be desirable along with something other than a rubber band to hold it together. A motor-controlled slider for control from the operating position would provide easier frequency agility and make the loop much easier to use.

While the three metre circumference is entirely satisfactory on 7 MHz, its peak efficiency is really above 14 MHz. Those wanting top performance on 7 or 10 MHz could try a four to six metre circumference loop if the added bulk is acceptable. Experiment with an online calculator or downloadable loop program such as that by KI6GD to get an idea of the efficiency and capacitor values for different loop sizes.

Notwithstanding increased losses, some may be willing to sacrifice antenna efficiency for multiband coverage. A possibility, not tried by the author, is to fit a SO-239 socket to the top of the loop. Various lengths of RG-213 could be plugged in, one for each band. An alternative, which preserves efficiency on the highest frequency band, is to retain one soldered RG-213 capacitor for the highest band and insert parallel lengths for lower frequencies.

Given how simple and cheap these antennas are, don't discount the possibility of monoband loops for each desired band, selected with an antenna switch. As an example, a larger loop for 7 MHz and a three metre circumference loop for 14 MHz would form a capable two band antenna system suitable for local and worldwide communication for much of the day. They should be positioned 90 degrees apart and at least a loop diameter from one another to minimise mutual coupling.

Conclusion

An effective compact magnetic loop has been described. Easily built from obtainable parts, it demonstrates that a move to a smaller dwelling need not mean an end to HF activity.

References

1. W2BRI website *http://www.standpipe.com/w2bri/index.htm*
2. KI6GD Magnetic Loop Antenna Calculator v1.6, available from *http://www.standpipe.com/w2bri/software.htm*

VHF UHF band plans – are they working?

Grant Willis VK5GR

Editor's Note: This series of three articles represent the personal opinion of the author and not the position of the WIA. I am sure that these contributions will be taken into consideration by the committee approved by the WIA Board to consider the revision of the Band Plans. However, the committee will make its final recommendations to the Board, who will approve release of the final plans.

Part 2 – The Australian two metre band plan

Introduction

In part 2 of this series examining band plan design I take the principles outlined in last month's article and apply them to a proposal for a revamped two metre band plan.

Assessment of the existing two metre band plan

The Australian two metre band plan was most recently reviewed in 2012 when some very interesting decisions were made around how amateurs should use our 144-148 MHz spectrum. That plan appears focused on the desire to improve access to channels supporting emerging digital repeater systems using D-STAR, P25 and the like. It also considered the changes in activity levels observed in other previously popular but now declining operating modes, such as packet radio BBS systems which have today all but vanished.

The main points from that plan were:

a) Introduction of a new repeater input segment between 145.0-145.4 MHz with considerable overlap to existing simplex system allocations to be matched with the existing 146.6125-146.9875 MHz repeater downlink segment.
b) Removal completely of the all modes segment of the band plan.
c) It increased individual channel mode assignments creating unnecessary spectrum scarcity.
d) It also allocated specific simplex channels for internet gateway nodes over and above existing simplex FM spectrum.
e) Preservation of exclusive channels for WIA broadcast relays, which typically only get used once or twice a week, again fostering spectrum scarcity.

While a number of these desires are worthy, particularly attempts to address digital repeater channel capacity, others such as the removal of the general experimental segment and the increase in specific channel mode assignments appear contrary to good band planning theory.

So what alternatives might there be, and have the actual problems within the two metre band plan been described well enough so that complete solutions are found? To assess this, let's go back to first principles and assess the requirements of a band plan for two metres from scratch.

Designing a new two metre band plan – input considerations

Repeater channel capacity requirement

One of the biggest users of spectrum these days on VHF and UHF is repeaters. The question that must therefore first be answered is how many repeaters are actually needed?

The current two metre band plan allows for the following:

- 31 x 25 kHz analogue channels (146.625-147.375 MHz)
- 15 x 12.5 kHz digital channels 146.6375-146.9875MHz)

Next, I am going to calculate the distance from each existing site to all other sites in the area, in order to determine the existing channel occupancy versus channel re-use distances. I chose to base this on the most dense repeater service areas in the country, the greater Sydney basin. Results for Melbourne and the greater Brisbane/Gold Coast area are similar.

The results of this are surprising:

Distance between repeaters	No of two metre repeaters in an area (31 Channels available)	No of two metre repeaters below 147 MHz (16 Channels available)
<150 km	30	16
<200 km	34	19
<300 km	46	31
<500 km	64	46

Firstly, the good surprise is to see that the frequency re-use distance is a lot less than originally perceived. Repeaters are using co-channel allocations as close as 170 km in some cases with 200-250 km not uncommon. The bad news is that those allocation distances mean that available capacity within 150 km of Sydney has fallen to zero.

The fact that this many repeaters are also already licensed in the area does not leave very much room for new digital repeaters of any kind, especially when restricting them to the 146.625-147.000 MHz segment. Interleaving at 12.5 kHz offset, considering the mobile station's receiver limitations only compounds this further.

Surprisingly, Sydney is not the only place where the two metre

repeater band plan is unable to cope with demand. Finding a digital repeater downlink channel in Adelaide below 147.0 MHz, for example, has been extremely difficult, and has resulted in a non-conforming channel of 147.0375 MHz being endorsed for a D-STAR repeater due to the lack of downlink channel space available in the 146.6125-146.9875 MHz segment.

How many two metre repeaters do you need?

The thorny question of how many repeaters is too many also needs to be addressed. This depends on your point of view on whether they are required or not.

The following are the main reasons I see for providing a repeater in an area:

1. Extend coverage to stations who otherwise don't have access to one.
2. Extending coverage to stations of a particular capability (that is, extend handheld coverage as opposed to 50 W fixed stations with 10 metre high antennas).
3. Add a channel to an area due to usage of the existing systems.
4. Add a channel to an area for special interest purposes or alternate operating modes.

Justification 1 and 2 are really obvious cases where if someone is prepared to build one, then the best outcome is for the band plan to have the capacity to support it. In cities with geography like Sydney, there is no real high ground that can provide an all-encompassing VHF service from a single high point. So it is inevitable that multiple repeaters will be built to service the needs of the amateur community in the region.

Justification 3 is considerably harder to assess. Repeaters built because a club or individual wants to build a repeater project are still worthy, but from a spectrum allocation point of view, may need to consider a much higher probability of coverage overlap with an adjacent service. Alternatively, when it is no longer possible to add any more channels to a region on VHF, these projects should be encouraged to look at UHF instead.

Justification 4 is an interesting case too. This, today, is the category with the highest demand for new allocations, particularly considering the growing interest in digital voice within the hobby. To support these new trends, which have been building for some time now, moves need to be made to drive either dual analogue/digital repeaters (that can pass both modes on a common channel) or simply migrate analogue repeaters to digital modes. However, that is clearly going to be a medium to long term strategy and doesn't address the requirements being presented today.

So, now we can answer the question of how many repeater channels are required. Currently we already have up to 30 repeaters operating within a 150-200 km range of each other in high density markets. Let's then assume we have interest in developing an additional 5-10 digital systems in the same area. This, coupled with some clear channels for WICEN portable systems, leads to a figure of 38-40 channels being required today to accommodate expected activity for the next 5-10 years. The problem will be where to find at least another 400 kHz of the two metre band to be reallocated to repeater services!

Underutilized existing two metre allocations

To meet the need for 400 kHz worth of new repeater channels, it is imperative that the existing band allocations be reviewed. Today's technological and usage trends needs to be compared against the current plan to determine how much spectrum existing uses need to retain versus what new emerging technologies require.

On two metres one of the biggest segments for fixed amateur services next to the duplex repeater band is the packet radio segment. At one point, those channels covered from 144.700-145.200 plus 147.550-147.600, a whopping 550+ kHz or 15% of the band. When that allocation was created, the internet was in its infancy and shipping data around at 1200 bps was the norm.

Today the amount of packet radio nodes that remain active has dwindled. Some states don't have a presence at all on the AX.25 BBS network while others have only one or two nodes where once there were dozens. Considering the dwindling interest and new spectrum demands today, it would seem silly to continue to reserve such a large amount of spectrum for this mode when perhaps three or four channels would do. That means that over 400 kHz could be recovered and be reassigned. That would provide the space required to support new services with relatively little pain to existing operations.

Reinstatement of the all mode sections on two metres

One of the great disappointments of the 2012 band plan revision was the removal of the all-modes section in favour of channelling it up into special interest groups. This approach of defining channels for everything has the negative consequence of artificially creating spectrum scarcity.

The solution proposed here is that only modes with a significant following should be granted any special channel status. Currently none of the D*STAR simplex allocations, for example, probably warrant such status. The support for D*STAR as a mode is not well enough established, for example, to justify assigning any dedicated channels.

There could well be modes that people want to experiment with - AM perhaps, or how about other new digital voice or data modes that the current policy simply doesn't leave a spot for. That doesn't foster the experimental nature of the hobby, which is something the band plan needs to promote not restrict.

Shared mode access to all repeater channels

One key platform that should be adopted is that digital and analogue

repeaters can in principle share the same channels. The reasoning for this is that the occasional problems from digital co-channel interference during DX openings is relatively minor versus the problem of not having enough suitable channels at all. The issue can be mitigated to a large extent through the application of CTCSS access on analogue systems as well.

Special use channels – remove mode designators

Another key area to adopt is to stop allocating each potential digital mode its own specific frequency. Initially it was done for D-STAR and computer controlled unmanned VoIP gateway stations however more recently P25 has come onto the amateur scene as well. Does this mean that P25 now needs its own channels allocated as well? What do you then do about the next 'big thing' to come along as well? Do we give it its own channels too?

A policy of not allocating channels to special interest groups formally in the band plan should be adopted. If enough people appear to eventually take up a particular mode over a long period, only then might they finally be elevated to having a special channel.

When it comes to the plethora of call channels, some degree of reason needs to be brought to these as well. Considering that repeaters pretty much replace the function of FM call channels, all of the 'secondary' call channels should be deleted from the band plan. Channels for little used modes like RTTY, FAX and the like should also be removed, leaving those modes to operate in the general use segments.

You may in fact still nominate some central call channels if it makes it easier to use a particular mode, but these should be on a shared basis. That mode or use does not get exclusive rights to the channel. It may be nominated as a focus point for where to go looking for unscheduled contacts, but it should also be kept as generic as possible. For example, replace a D-STAR dedicated call channel with a shared nominated simplex gathering channel for 'Digital Simplex Voice' operation. Such channels could be nominated within the experimental general use segment but they don't lock up the channel from other uses. In that way, the all modes section can be retained and be left as large as possible.

Finally, as an aside, since the NASA space shuttle era has ended, the WIA should remove the restrictions on 145.550 and 144.950 MHz as these are no longer used by any space activity globally.

Proposed two metre band plan

Taking into consideration the design parameters for the different modes and services as well as the general repeater frequency planning issues listed in Table 1, it is clear that with some hard decisions, the problems in the two metre band plan in Australia could be solved.

The proposal I make here (see Table 2) has attempted to address the following key issues:

Table 1 – Two metre repeater segment design considerations

The design of the two metre band plan to cater for repeater services needs to be done from several perspectives. Firstly, let's list the current repeater site design technical challenges:

600 kHz offsets – very narrow and difficult to build filters for, however the knowledge to do so has been around the amateur community for over 40 years now – not insurmountable

Two metre repeater input channel 3rd harmonic interference into 70 cm – this is an often forgotten requirement in two metre frequency planning. For example if you have a repeater operating on 146.775 MHz, an end user's transmitter operating on 146.175 MHz will result in a 3rd harmonic appearing on 438.525 MHz. Any amateur operating in an area where repeaters operate on both 146.775 MHz and 438.525 MHz must turn off their own 70 cm receiver when transmitting on two metres to avoid local site interference

Co-locating a two metre repeater with an AX.25 packet digipeater - As repeater sites are themselves scarce, it is not uncommon to group three or four systems together at one site. With APRS on 145.175 MHz, repeater receivers today have at least one MHz of separation making this co-location relatively simple. (The new two metre digital repeater plan completely overlooked this issue as there is now worst case less than 37.5 kHz of separation between an APRS TX and a digital repeater RX)!

The 12.5 kHz channel interleaving plan originally established for D*STAR repeaters in the 146.6125-146.9875 MHz segment is also an issue in some regions. While D*STAR is only a 12.5 kHz wide mode, typical D*STAR radio receiver filters can't reject a 25 kHz wide analogue transmitter signal only 12.5 kHz away from their centre frequency. As a result, amateur stations listening to D*STAR repeaters need to be afforded frequency protection from adjacent channel analogue repeaters

Co-locating a two metre repeater with high power paging transmitters has also long been an issue. In some areas however the problem today has been lessened by the removal of the worst offending pagers that previously operated on 148.0125 MHz and 148.037 5MHz. Good RF site design can overcome the pager co-site issue in most cases today, and repeater site designers should be encouraged to try first before simply rejecting these channels out of hand. Artificial band plan restrictions (for example not allowing digital repeaters above 147.0 MHz) should be avoided and the technical challenge should be left to the site owners, not the band plan design.

Specific allocation of channels for analogue or digital use should be a guideline only – prescribing this explicitly and inflexibly leads to false spectrum scarcity. The primary argument for separation is that DX interference from a distant digital repeater into a local analogue repeater could be an issue. Sure, that is possible, but the amateur service is not a telecommunications network, and doesn't have the same reliability expectations, so surely such transient issues can be tolerated? They can also be (for the most part) solved at the analogue repeater end through the use of CTCSS.

144.000 - 144.700 NARROW BAND MODES
144.000 - 144.100 EME
144.100 - 144.400 CW/SSB
144.100 - Calling frequency: national primary
144.200 - Calling frequency: national secondary
144.220 - 144.240 Digital DX modes
144.240 - 144.300 guard band: New Zealand beacons
144.300 - SSB chat frequency
144.320 - 144.340 digital DX modes
144.300 - 144.500 space communications
144.400 - 144.600 Beacons

144.700 – 144.725 - PACKET RADIO GENERAL

144.750 – 144.925 - REPEATER INPUTS – Band C

144.950 – 145.325 –WIDEBAND GENERAL USE - DIGITAL Primary
145.000 – National digital simplex call channel
145.175 – National APRS AX.25 packet channel
145.200 – WICEN packet channel
145.300 – ARDF beacon channel

145.350 – 145.525 – REPEATER OUTPUTS – Band C
Primary digital secondary analogue repeaters
15 x 12.5 kHz bandwidth or
8 x 25 kHz bandwidth repeater pairs

145.550 – 145.800 – GENERAL USE ALL MODES

145.800 – 146.000 – SATELLITE BAND

146.025 – 146.400 REPEATER INPUTS – Band A

146.425 – 146.525 – WIDEBAND GENERAL USE – ANALOGUE Primary
146.500 – National FM simplex call channel

146.550 – 146.600 – WIDEBAND GENERAL USE – Unmanned VoIP Primary

146.625 – 147.000 – REPEATER OUTPUTS – Band A
Primary analogue secondary digital repeaters
31 x 12.5 kHz bandwidth or
16 x 25 kHz bandwidth repeater pairs

147.025 – 147.375 – REPEATER OUTPUTS – Band B
Primary analogue secondary digital repeaters
31 x 12.5 kHz bandwidth or
15 x 25 kHz bandwidth repeater pairs

147.400 – 147.550 – WIDEBAND GENERAL USE – Analogue Primary
147.400 – National ATV Liaison Channel

147.575 – 147.600 - PACKET RADIO GENERAL

147.625 – 147.9875 – REPEATER INPUTS – Band B

Table 2 – Two metre Australian band plan proposal

1. As repeater channel capacity has been reached already in high density areas of the continent and seeing that at least an additional 10 clean digital channels are required, this plan sets about creating either 8 x 25 kHz or 15 x12.5 kHz channels completely unencumbered by existing analogue repeater downlink allocations.
2. These new channels would operate in the 145.35-145.525 MHz and 144.75-144.925 MHz band segment using 400 kHz of bandwidth while abandoning the globally non-standard -1.6 MHz offset 145.000-145.400 segment proposed in 2012. What's more, these 15 new full clean digital 12.5 kHz repeater channels occupy the same amount of bandwidth as the 11 x 12.5 kHz bandwidth 25 kHz spaced channels proposed in the previous plan that still suffered from the interleaved analogue uplink and downlink interference issues.
3. Repeater C band has also been allocated such that it straddles the all mode 144.950-145.325 MHz segment so as to avoid interactions between repeaters and most existing simplex activity as much as possible. The issue of co-locating APRS with a digital 145 MHz repeater is improved but will be technically very challenging with this band plan design. This is unavoidable.
4. This new repeater segment would require existing AX.25 repeaters to be either retuned should it not be possible to allocate around them, if they still exist, or have their old dormant frequencies at least cancelled from their licenses. Existing AX.25 repeaters in the Repeater C band can remain but no new ones shall be licensed. Planning of Band C channels shall take into account local use of the band for legacy AX.25 and shall work with the amateur community in each area to achieve equitable outcomes.
5. It also has a much lower impact on existing services which already exist in the 145.0-145.325 MHz segment with no messy interleaved repeaters amongst activity like APRS, ARDF and WICEN packet.
6. All repeater channels should be able to be accessed using either analogue or digital modes, with only a preference given rather than an exclusive definition. Analogue shall be preferred within 146.625-147.375 MHz while digital shall be preferred within 145.350-145.525 MHz.
7. The interleave 12.5 kHz channel

plan in the 146.625-146.9875 MHz segment can continue, but that this be also extended to 147.0-147.3875 MHz.

8. Digital repeaters can also be allocated to the 25 kHz raster channels in bands A and B when no analogue repeater requires the channel in an area.
9. Digital repeaters can be any digital voice mode. Distinctions of D*STAR, P25 or any other future digital mode are not to be made.
10. The new Repeater C band has been designed with a -600 kHz offset, in order to provide the maximum separation between high sited repeaters and the weak signal operating band.
11. Many of the special interest channel allocations have been dropped in this plan. If a particular group of operators using a given mode want to congregate on a given channel in the general use segment, then let that user community establish that as a gentlemen's agreement in each local area where such activity occurs rather than the band plan being prescriptive about it.
12. One new sub-band for 'Voice over IP' un-manned gateways has been defined using re-farmed RTTY and secondary analogue call channels on 146.550-146.600 MHz. Strategically placed just below the repeater outputs, it is deliberately intended that it be grouped adjacent the analogue repeater channels due to the nature of the unmanned/ automated operation of these systems.

Conclusion

The end result of this plan is that new growth in digital, and if required analogue, repeater systems can occur without taking up more spectrum for fixed amateur services than is already allocated. With the de-listing of the many special use two metre channels it also becomes possible to re-establish the general use all modes segment that was lost in 2012, while recognizing the development of unmanned voice activities within the amateur service in a more coherent yet less prescriptive way.

From a capacity standpoint, it should provide for (hopefully) at least another 10 years of service, and do so in a way that has the least impact to all amateurs on the band. I hope that by describing the design process I have followed and the arguments and reasoning behind the decisions I made in preparing this plan that the majority can see the benefits and accept the compromises that will need to be made to move use of the two metre band into the next decade.

Next month

Next month will be the final part of this series when I will examine the 70 cm band. I hope to show how, by taking a step back, we can revise that plan to drastically improve channel capacity and reduce the level of interference currently experienced in many of our 70 cm repeater systems today, as well as providing more room for experiments in the future.

A long time between drinks

Ross Pittard VK3CE – Secretary, Amateur Radio Victoria

Amateur repeater custodians from across the state met at the invitation of Amateur Radio Victoria (ARV) recently at the ARV rooms in Ashburton. The Victorian Technical Advisory Committee met regularly before the introduction of a National WIA and ARV decided it had been too long since we had a meeting of our repeater custodians and representatives from the clubs who have repeaters of their own. Invitations were prepared and surprisingly we were able to find the minutes of the last meeting held nearly ten years ago to the day.

The meeting was chaired by Peter Mill VK3APO and reports came in from across the state on the current state of our repeater network. By far the majority of repeaters in Victoria are licensed by ARV and are maintained by a dedicated team of volunteers on your behalf. Most custodians reside within the service area of the repeaters they manage but some travel a great distance to carry out this important work.

ARV spends over $4000 per year on repeater licences, site fees and power costs. In addition over $15,000 is spent annually in maintaining and upgrading sites. Recently ARV has arranged volunteers insurance for repeater custodians who are ARV members and are working on ARV licensed repeaters.

As well as discussions on common problems with repeater hardware, the open forum discussed topics including digital communications and the associated internet costs, interference from cheap LCD light bulbs and the temporary relocation of commercial users to part of the 70 cm band. The meeting asked Peter Mill to convey our concerns to the National WIA over the increasing noise floor in metropolitan areas predominantly originating from solar inverters and LED globes.

Photo 1: ARV President Barry Robinson chatting with Mark Harris VK3EME.

Alan Devlin updated the meeting on his joint initiative with the WIA to fund upgrading of the beacon network to GPS locking for greater accuracy.

Photo 2: VTAC Chairman Peter Mill VK3APO addresses the meeting.

Photo 3: General shot of attendees.

After a light lunch, Ken James gave us an interesting demonstration on new digital techniques being introduced by Codan in their new series of radios.

Peter Mill informed the meeting that ARV had arranged new sharper filters from Polar to be distributed to sites that have severe interference from ESTA paging systems. These were distributed to custodians of the affected sites and will be installed as soon as possible.

The feeling of the meeting was, as none of us are getting any younger, perhaps ten years is a little long to wait for the next meeting and by consensus bi-annual meetings will be more appropriate.

I would like to invite all amateurs in Victoria to become a member of Amateur Radio Victoria and help support the work done on the Victorian repeater network. Membership only costs $15 per year. Less than eight cents a day!

VK4news Bundaberg ARC

Gail Lidden-Sandford VK4ION

A changing of the guard

Rusty McGrath VK4JM stands down as longest serving official

At a recent AGM a new management committee took office and the members honoured the outgoing President Rusty McGrath.

He was our first member when the club formed in 1961 and remained very active, serving in roles as Secretary and President on and off over the past 53 years.

He also headed the club's training team, the WICEN group and served as a WIA Assessor since the program inception.

Many hams around Australia would know Rusty and his commitment to amateur radio in Bundy.

John (Rusty) McGrath outgoing President at the BARC AGM in August 2014.

Easy steps to working SO-50

Malcolm Pizzey VK2MAL

Those who are new to ham radio may not be aware of this; some amateur satellites can be worked with just your HT and a hand held antenna.

Saudi Satellite SO-50 is one of those satellites. The FM transponder on this satellite receives signals on 145.850 MHz and retransmits them on 436.795 MHz (+/- 9 kHz Doppler shift). In laymen's terms it is a bit like a cross band repeater. The input to the repeater is 145.850 MHz and the output from the repeater is 436.795 MHz. Operation is a little more complex than some satellites since the transponder needs to be initially activated by a CTCSS tone of 74.4 Hz which starts a 10 minute timer. During your QSO you will also need to transmit with a 67 Hz CTCSS tone.

I have put together here a primer with some tips to help you start working SO-50.

1. To start with you will need a dual band handheld radio that can split bands on transmit and receive. Most modern dual band Yaesu radios will let you program into memory the cross band frequencies. Kenwood dual band radios will normally have two VFOs and you may use VFO A for receive and VFO B for transmit.

   Now I don't want to get too technical here but it is recommended that you be full duplex. This simply means you can hear your own downlink when transmitting. The Kenwood TH-D72A has this capability. The other option is use two radios, one for transmit and one for receive. Full duplex is recommended but not mandatory. If you only have one radio, try it out and see how you go.
2. Next you will need to improve your antenna! We are talking QRP signals here so if you cannot hear them, then you cannot work them! The best place to improve your setup's performance is to use a good dual band hand held Yagi. You can try home brewing an antenna. There are number of designs available in the files section of the AMSAT-VK Yahoo group. The other option is importing a commercially made antenna. Arrow and ELK both make custom antennas for working satellites. Some operators use a whip style antenna like the Diamond SRH-771 but I recommend starting out with a hand held Yagi will see you working the satellites more quickly and somewhat more easily.
3. Make sure you open your squelch. SO-50 only transmits 250 milliwatts of power and could be some 2000 km away, so you will need to open your squelch to hear the QRP signal! A lot of operators make the mistake of just blindly calling CQ or whistling into the microphone when they cannot hear the downlink of the satellite. As I said earlier if you cannot hear it, you cannot work it!
4. Know when and where the satellite will be passing. All these amateur satellites usually orbit the earth once every 90 minutes at some 500 kilometres altitude. This means you would only have a 10 or 12 minute window of opportunity each time it comes over where you live.

   You can go to *http://www.amsat.org/amsat-new/tools/predict/* and do an online prediction to find out when and where, for free!

Photo 1: A screen shot from GoSatWatch.

   Or else look around for a program that best meets your needs and budget. I have used 'GoSatWatch' on my iPod/iPhone. You might consider 'SatPC32' or 'Orbitron' on a Windows PC or 'MacDoppler' is available for Macintosh computers as well.

   A live satellite status report is available at *http//oscar.dcarr.org* for Oscar 50 and other satellites as well. This site is helpful when you want to find out what is operational at the time. You even can put your own report here once you have worked a satellite.
5. When programming your radio allow for Doppler. With 2.5 kHz shift on two metres this is not a concern for FM, but there can be up to 9 kHz shift in frequencies in the 70 cm band. See the table below on how I program my radio. When the downlink gets scratchy or fuzzy tune down 5 kHz at a time. You will quickly

get the hang of it. Here is how I programmed my old Yaesu VX-6R radio:

Ch	TX	RX	CTCSS
101	145.850	Timer Reset	74.4 Hz
102	145.850	436.805	67 Hz
103	145.850	436.800	67 Hz
104	145.850	436.795	67 Hz
105	145.850	436.790	67 Hz
106	145.850	436.785	67 Hz
107	145.850	436.780	67 Hz

6. Planning is required. Before the pass, know where the satellite will be rising and where it is travelling. This will help the whole operation run more smoothly. Don't try to work the low elevation passes. Look for satellite passes that will rise above 20 degrees elevation. This will improve your chances of making a contact.

   Until you get the full hang of it, just have a listen to the downlink and get a feel of how the QSOs go around. You will become familiar with the other operators voices this way. Once you are confident, try to jump in on the action by simply announcing your call sign.
7. Don't forget to have fun. You may not have it all together when you start out but don't worry as we all make a lot of mistakes when we start. You will soon get the hang of it and have a lot of fun along the way.

I have a great video on line where I demo using an older satellite, Oscar 51. This is much the same operation as SO-50 with the addition of the CTCCS tones. Have a look at:

Photo 2: The author, circa 2008, having fun working a satellite.

http://youtube/watch?v=48mTtlxVyRc

For more information go to *www.amsat-vk.org*

You can also join our yahoo group at *www.au.yahoo.com/neo/groups/amsatvk/info* where you will find a lot of other operators who can share their experience and help you along the way.

Good luck satellite hunting.

73

Attend

Adelaide Hills ARS Hamfest	2 November
Yarra Valley ARG Hamfest	9 November
Southern Peninsula ARC Hamfest	30 November

DX-News & Views

Luke Steele VK3HJ
e *vk3hj@wia.org.au*

September on the bands

Solar activity generally declined during September, but did pick up later in the month. There was some geomagnetic disturbance for most of the second half of the month.

Some DX was workable on all bands, with a bit more happening on the higher bands at last, and also some contacts made on the low bands.

An unexpected activation occurred in Africa, with Zorro JH1AJT travelling with a delegation to Asmara, Eritrea to develop a sports collaboration project between Japan and Eritrea. Despite a heavy schedule of meetings, Zorro was active from Eritrea as E40FB over several days. There has not been any significant amateur radio activity there since 2001. Zorro plans further visits to Eritrea and a larger DXpedition.

There was some activity from Tristan da Cunha, a very remote island in the southern Atlantic, and the Italian DXpedition Team was active from Benin, in West Africa. VQ94JC was active from Diego Garcia, which has not seen much activity since the club station was shut down a few years ago.

The Czech DXpedition originally planned for Togo was cancelled, and the team went to Sint Eustatius in the Caribbean instead.

Sergio PY3SB has been quite active from Haiti, and will be there till December, so make the most of the opportunity to work this fairly rare entity.

There has also been plenty of activity closer to home, with 4W6LU Timor Leste, 3D2AG/p Rotuma, VK9AN Christmas Island, VK9NT Norfolk Island, C21GC Nauru, YJ0X Vanuatu, and T30D Western Kiribati. Also on air during the month have been several IOTA expeditions.

There has been a station active signing as "ZL9GI, Bruce on Goat Island". This one has been quite active on CW, on several bands. Don't waste your time with this one, as it is a pirate. This may be the "ZL CW pirate" who has been on air from time to time for a number of years, or maybe someone else altogether. It would be worthwhile noting your beam heading on this pirate, when you hear it.

Some upcoming DX operations

The following table summarises some of the DX activations that may be of interest to VK operators.

Date	Call	QSL via	Information
29 Oct – 4 Nov	GJ8DX	LotW	Jersey (EU-013). G8DX, M5RIC, HF, CW, SSB, RTTY.
29 Oct – 11 Nov	8Q7OO	GM0IIO direct	Maldives, Kuredu I (AS-013). HF.
29 Oct – 11 Nov	V5/OE3SZA	OE3SZA	Namibia. OE3SZA, HF, SSB.
29 Oct – 20 Nov	FR/F5UOW, FR/F8FUA	Home Call	Reunion (AF-016). F5UOW, F8FUA, HF, CW, SSB, RTTY.
30 Oct – 10 Nov	FT4TA	LotW	Tromelin (AF-031). Team of six, HF, SSB, CW, RTTY.
1 – 13 Nov	DL7DF/6W	DL7DF	Senegal. DL7DF, 160 – 10 m, CW, SSB, RTTY, PSK31, SSTV.
2 – 9 Nov	E6RQ, E6SG	VK4FI	Niue (OC-040). VK4WR as E6RQ and VK4FI as E6SG, 40 – 10 m.
5 – 10 Nov	V84YL	DJ6US	Brunei. YL group, SSB, CW.
5 – 18 Nov	W1AW/KH8	LotW	American Samoa, Tutuila I (OC-045). Group of four, 80 – 10 m, maybe 160 m.
8 Nov – 5 Dec	J6/DL7VOG	DL7VOG	St Lucia (NA-108). DL7VOG, 160 – 6 m, CW, RTTY.
November	VK0MH	LotW	Macquarie I (AN-005). VK6MH. Activity expected to continue for six months.
15 – 30 Nov	VU4KV	W4VKU	Andaman I, Neil I (AS-001). Team of ten, 160 – 6 m, CW, SSB, RTTY.
17 Nov – 2 Dec	XT2AW	M0OXO	Burkina Faso. DF2WO, CW, SSB.
20 Nov – 02 Dec	FS/K9EL	LotW	St Martin (NA-105). K9EL, 160 – 6 m.
23 – 30 Nov	VP2EIM	LotW	Anguilla (NA-022). JN3FNQ, 80 – 10 m, SSB, CW, RTTY.

GJ8DX, **Jersey**. Jack G8DX and Rich M5RIC will be operating from Jersey on HF, with a focus on WARC bands, using CW, SSB and RTTY. For Bureau QSL, use Club Log OQRS, do not send cards via the Bureau.

8Q7OO, **Maldives**. George GM0IIO will be operating from

Kuredu Island on HF. QSL direct only.

FR/F5UOW, FR/F8FUA, **Reunion**. Stef F5UOW and Alain F8FUA will be operating from Reunion Island on HF, using CW, SSB and RTTY. QSL via each operator's home call.

FT4TA, **Tromelin.** This tiny island near Madagascar has not been activated since 2000, and has moved to number 9 in the Most Wanted list according to Club Log. A team of six operators including Seb F5UFX, Michel FM5CD, Flo F5CWU, Vincent F4BKV, Franck F4AJQ, and Fred F5ROP will be operating four stations on 160 – 10 m, CW, SSB and RTTY. For more information see: http://www.tromelin2014.com/en/

DL7DF/6W, **Senegal**. Sigi DL7DF will be holidaying with his wife Sabine in Somone, near Dakar. He plans some operation on 160 – 10 m using CW, SSB and also RTTY, PSK31 and SSTV. For more information see: http://www.dl7df.com/6w/index.html

V84YL, **Brunei.** A team of YLs including Kyoko JR3MVF, Evelyne F5RPB, Ruth IT9ESZ and Waltraud DJ6US plan operation from Brunei-Darussalam on HF, using CW and SSB. QSL via DJ6US via bureau or direct.

W1AW/KH8, **American Samoa**. Operators Mike N9NS, Paul W8AEF, Cliff KD6XH and John N7CQQ will activate the W1AW Centenary station from Tutuila Island in American Samoa on 80 – 10 m, and possibly 160 m. QSL via W1AW.

VK0MH, **Macquarie Island.** Rod VK6MH will commence a six month posting to the ANARE station on Macquarie Island. Radio operation start and finish dates are yet unknown.

VU4KV, **Andaman Islands**. A team of ten operators led by Krish W4VKU will operate from Neil Island, on 160 – 6 m, CW, SSB and RTTY. They plan to have five stations with amplifiers on air, so should be well heard here.

VP2EIM, **Anguilla.** Masa JN3NFQ/K1GI will be operating from Anguilla on 80 – 10 m, using CW, SSB and RTTY. For more information see: http://qsl.net/vp2eim/

Special thanks to the authors of The Daily DX, 425 DX News, DX World, NG3K's Announced DX Operations, and QRZ.DX for information appearing in this month's column. Interested readers can obtain a free two week trial of The Daily DX from *www.dailydx.com/trial.htm*

Editor's note: This is Luke's second last column – he is retiring from the role after producing the December contribution. Is someone willing to step up to the plate to continue this column in 2015?

AMSAT-VK

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About AMSAT-VK

AMSAT-VK is a group of Australian amateur radio operators who share a common interest in building, launching and communicating with each other through non-commercial amateur radio satellites. Many of our members also have an interest in other space based communications, including listening to and communicating with the International Space Station, Earth-Moon-Earth (EME), monitoring weather (WX) satellites and other spacecraft. AMSAT-VK is the primary point of contact for those interested in becoming involved in amateur radio satellite operations. If you are interested in learning more about satellite operations or just wish to become a member of AMSAT-Australia, please see our website.

AMSAT-VK monthly net

Australian National Satellite net

The net takes place on the 2nd Tuesday of each month at 8.30 pm eastern time, that is 0930 Z or 1030 Z depending on daylight saving. Check-in starts 10 minutes prior to the start time. The AMSAT-VK net has been running for many years with the aim of allowing amateur radio operators who are operating or have an interest in working in the satellite mode, to make contact with others in order to share their experiences and to catch up on pertinent news. The format also facilitates other aspects like making 'skeds' and for a general 'off-bird' chat. In addition to the EchoLink conference, the net will also be available via RF on the following repeaters and links.

In New South Wales
VK2RBM Blue Mountains repeater on 147.050 MHz

In Queensland
VK4RIL Laidley repeater on 147.700 MHz
VK4RRC Redcliffe 146.925 MHz IRLP node 6404, EchoLink node 44666

In South Australia
VK5TRM, Loxton on 147.175 MHz
VK5RSC, Mt Terrible on 439.825 MHz IRLP node 6278, EchoLink node 394996

In Tasmania
VK7RTV Gawler 6 metre repeater 53.775 MHz IRLP node 6124
VK7RTV Gawler 2 metre repeater 146.775 MHz IRLP node 6616

In the Northern Territory
VK8MA Katherine 146.700 MHz FM

Operators may join the net via the above repeaters or by connecting to EchoLink on either the AMSAT or VK3JED conferences. Past experience has shown that the VK3JED server offers clearer audio. The net is also available via IRLP reflector number 9558. We are keen to have the net carried by other EchoLink or IRLP enabled repeaters and links in order to improve coverage. If you are interested in carrying our net on your system, please contact Paul via email. Frequencies and nodes can change without much notice. Details are put on the AMSAT-VK group site.

Become Involved

Amateur satellite operating is one of the most interesting and rewarding modes in our hobby. The birds are relatively easy to access and require very little hardware investment to get started. You can gain access to the FM 'repeaters in the sky' with just a dual band handheld operating on 2 m and 70 cm. These easy-to-use and popular FM satellites will give hams national communications and handheld access into New Zealand at various times through the day and night. Currently only SO 50 is available.

Should you wish to join AMSAT-VK, details are available on the web site or sign-up at our group site as above. Membership is free and you will be made very welcome.

VHF/UHF - An Expanding World

David Smith VK3HZ
e *vk3hz@wia.org.au*

The season's first crossing of the seas to ZL on 2 m occurred in late September. On the morning of the 23rd, Norm VK3DUT reported hearing the ZL2WHO/B beacon in central North ZL peaking at 5x1. In turn, Harry ZL2ADU reported hearing the VK3RGI beacon over a period of several hours peaking to 5x4. However, no contacts were made on that day. The following day, September 24th, at 2215Z, ZL2ADU worked Colin VK2BCC on CW with reports of 529 and 559. They then managed several SSB contacts, peaking to 5x3 before the band closed.

New 76 GHz VK4 Record

Doug Friend VK4OE writes of his recent activities on 76 GHz:

I wish to report that on Wednesday the 3rd of September, Rex VK4REX and I completed what seemed to be an easy contact on 76.0321 GHz over a distance of approximately 91 km. Rex was located at "Howells Knob" in the Sunshine Coast hinterland and I was located at Mt Gravatt in suburban Brisbane. Due to the line-of-sight (LOS) path and the cool dry day, two-way SSB signals were loud and clear at each end, 5x7 and 5x8. We will be making a claim for an initial VK4 distance record for this band.

This result is the culmination of several months of testing and transverter construction and development on both our parts - and the two transverters we are using are completely different in design (single conversion versus double conversion), with different IF frequencies and tuning range of the final radios that we used.

Rex's transverter generally follows the published DB6NT design with an IF in the 70 cm band, and has a Kuhne electronics 76 GHz amplifier that is used in both RX and TX. My transverter is a double conversion design with a first IF of around 4.3 GHz, mixing then down to 1282 MHz. Mixer and pre-amplifier are from "the rf guy" (US eBay) and the pre-amplifier is also used in both RX and TX by way of the WR12 waveguide switch that's there at the 'front' of the assembly.

VK4OE's 76 GHz System

For most of the QSO, my transverter was being used with the "pre-amplifier" in both RX and TX modes by way of the waveguide switch that needs to be changed every time from RX to TX and back. But towards the end, I was clearly hearing Rex's signal with the waveguide switch in the 'straight through' position, meaning no pre-amplifier in circuit. Rex also heard me, although he asked why my signal had just become quite weak compared to before. That demonstrates how strong signals were on the day! Just gotta love copying those weak signals, whatever band they're on!

We believe that there will be significant path length extensions possible in the future, after we get dish pointing accuracy conquered!

We did try a longer LOS path later in the day but, on the day, we could not 'find' each other, such are the vagaries and challenges of getting signals over longer paths on this band in this part of the country! Since then, we have been waiting in vain for another suitable day with cooler and dryer weather.

It is interesting that we VK4 operators chose (some time ago) to use the same 76 GHz operating frequency that is 'commonly' used in Europe (amateurs are a 'secondary service' in VK on this frequency) whereas the VK3 experimenters on this band are using a different frequency around 78 GHz which is also in a 'secondary service' part of the band, the 'primary service' part of the band in VK being from 77.5 to 78.0 GHz.

That experimenters in two parts of the country are using different

One of the 76 GHz transverter units used in the VK4 record contact.

parts of the band GHz away from each other has just developed that way ... at least it's unlikely that there will ever be contacts happening between the two call areas!

Hey everyone, there is lots of fun available for the taking on the mm-wave bands!

Dural Beacons all back on air

After a longer than expected outage, Mark VK2XOF reports that the Dural 2 m and 70 cm beacons are back on air with new antennas. The antennas came down for the renovation of the roof of VK2WI. However, the expected 4 week roof replacement tuned into a 4 month job.

The 6 m and 23 cm beacons have continued to operate throughout the period.

Reports welcomed please.

Please send any Weak Signal reports to David VK3HZ at *vk3hz@wia.org.au*

Digital DX Modes

Rex Moncur VK7MO

New 24 GHZ digital record over 566 km

On 20 September Rex VK7MO, operating about 30 km west of Mannum, South Australia worked David VK3HZ, operating from Mt Macedon, Victoria via aircraft scatter on 24 GHz to extend the VK Digital Record from 461 km to 566 km. Rex was running 20 watts to a 1.14 metre dish and David 4 watts to a 0.6 metre dish. This success followed a number of failures in tests over 600 km even though easy 10 GHz SSB aircraft scatter QSOs were possible. The major difference in going up from 10 to 24 GHz is atmospheric losses due mainly to water vapour. As the distance increases these losses increase both due to the longer distance but also because at longer distances it is necessary to beam lower to the aircraft and thus through denser atmosphere with increased losses. The digital mode ISCAT-B was used as this copes well with the short bursts of signal that are characteristic of aircraft scatter on the upper microwave bands. A more detailed report on this QSO is at: *http://www.vk3hz.net/microwave/566km-24GHz.pdf*

Please send any Digital DX Modes reports to Rex VK7MO at *rmoncur@bigpond.net.au*

Meteor Scatter

Dr Kevin Johnston VK4UH

Most regular meteor scatter operators reported September to have been a disappointing month with generally "flat" conditions compounded by a smaller number of operators making it on-air for the weekend activity sessions - almost a self-fulfilling prophecy. Further there were no major meteor showers in evidence in September. As spring progresses however, we will expect a general up-turn in the return rate from random meteors entering the earth's atmosphere and activity should improve as the Southern Hemisphere leans towards the sun. The start of Daylight Saving in the Southern and Eastern states will also help to push activity back before dawn, when meteor return rates are better, if only for the northern stations.

October will also bring the Orionid Meteor shower, a Class 1 major event, expected to peak on or around 22nd of the month. There may also be some improvement from a number of smaller showers expected around the same time. As Arie VK3AMZ points out *"The Orionids can be an unpredictable event and, like the Eta Aquarids in May, are due to the Earth passing through the "other end" of the trail of debris and remnants of Haley's Comet"*. The ZHR predicted for the Orionids is lower (25/hr) than for the Eta Aquarids but should still provide excellent propagation even up to 432 MHz on MS. Also make a note in the diary for the Leonids shower expected to peak around 18th November, another Class 1 major event. Operators in SE VK4 and Northern VK2 are still looking for some meteor scatter activity from stations to the North and Far North of VK4, and would encourage any digital-ready 2 m operators to join in the Saturday and Sunday morning activity sessions on 144.230 MHz FSK441.

Please send any reports, questions or enquiries about meteor scatter in general or the digital modes used to Kevin VK4UH at *vk4uh@wia.org.au*

Contests

James Fleming VK4TJF
e *vk4tjf@wia.org.au*

There are two contests this month that should be both fun and easy to work. For those who like phone there is the JIDX. Propagation to Japan is always pretty easy, even for the amateur who is just starting out and there are many operators in Japan wanting your contact. This is a good contest to get your feet wet as the Japan amateurs are good operators. I'm also certain that by the end of the contest one could most likely achieve the Japan all districts award which is very nice. Most amateurs at my club will say that you can always find a Japanese station on the bands and that they are very common, I say let that be to your advantage and work a few for this contest. The next contest is the CQ WW contest CW, a great contest to help you increase your CW speed and skill. There will be no shortage of very good CW operators on the bands that want your country multiplier and will work hard to get it. By using CW, it is easier to make contacts with low power. Most operators can make contacts below the noise floor. This is also a great way to increase your DXCC count. So there are two contests this month one for phone and one for CW lovers. Both contests should offer up loads of fun.

This month is the Japan International DX contest that starts on 8th November 2013 0700 UTC and goes to 9th November 1300 UTC, so a total of 30 hours. This contest is strictly phone. Bands are the usual suspects 3.5/7/14/21/28 MHz. Categories are single operator high power over 100 watts or low power 100 watts, and all band or single band, or multi-op with all band high power. You can use the DX Summit and other spotting networks, just no self spotting. Exchange will be RS plus CQ zone number and in return the JA station will supply RS and prefecture number. Only contacts with JA are worth points 2 points for 28 and 3.5 MHz and the rest of the bands are worth one point. Multipliers are the different Japanese prefectures. Email your log to *ph@jidx.org* in Cabrillo format. Certificates this year will be in pdf files so that you can download them and print them off yourself.

There is another good contest for you: In November the CW WW DX contest CW, and this one offers some nice things for those who do things the classic way without computers and for those that like to QRP. So without further ado the goal is to work as many other amateurs in other zones and countries. Bands are 1.8, 3.5, 7, 14, 21, and 28 MHz. Exchange is the RST plus the CQ zone number. You get 3 points for working a station on a different continent, and 1 point for contact with countries on the same continent. The multipliers are the different zones and countries. You can do single operator high-power 1500 watts, low power 100 watts, or QRP 5 watts, assisted or Rookie or classic *(Ed: Of course, always operate within the terms of your licence!)*. Rookie if you have been licensed less than 3 years before the start of the contest. And classic you can only use one radio, no QSO alerting assistance, only operate 24 of the 48 hours, and if you take a break it has to be for at least an hour. There is also multi-operator one, two, or multi transmitter. The dates are November 29-30, starts 0000 UTC Saturday to 2359 UTC Sunday. So have a good contesting month – don't forget to submit a log, and if you hear a contest station on the bands, don't forget to give a contact.

Contest Calendar for November 2014 - January 2015

Month	Date	Starts at	Spans	Name	Mode
November	1 - 2	1200 UTC	24 hours	Ukrainian DX contest	CW / SSB
	8 - 9	0000 UTC	48 hours	WAE DX contest	RTTY
	8 - 9	0700 UTC	30 hours	Japan International DX contest	SSB
	23 - 24	**0100 UTC**	**24 hours**	**Spring VHF/UHF Field Day**	**SSB / CW / FM**
	29 - 30	0000 UTC	48 hours	CQ WW DX contest	CW
December	5 - 7	2200 UTC	42 hours	ARRL 160 metre contest	CW
	13 - 14	0000 UTC	48 hours	ARRL 10 metre contest	CW / SSB
	20	0000 UTC	24 hours	OK DX RTTY contest	RTTY
	20 - 21	1400 UTC	24 hours	Croatian CW contest	CW
	27	0000 UTC	24 hours	RAC Winter contest	CW / SSB
January	**1 - 31**	**0000 UTC**	**Month**	**Ross Hull Memorial VHF-UHF**	**ALL**
	3 - 4	1800 UTC	30 hours	ARRL RTTY Roundup	RTTY
	10 - 11	**0100 UTC**	**24 hours**	**Summer VHF/UHF Field Day**	**SSB / CW / FM**
	17 - 18	1200 UTC	24 hours	Hungarian DX contest	CW / SSB
	24 - 26	1200 UTC	24 hours	BARTG RTTY Sprint	RTTY

Rules for most contests may be found at *www.hornucopia.com*, courtesy of WA7BNM.

Participate **Spring VHF-UHF Field Day** | 23 - 24 November

Remembrance Day Contest 2014 Results

Alan Shannon VK4SN

Congratulations this year go to VK5. Log processing over the four weeks has been interesting, as each time a new log was entered the leader would change. For two weeks the lead changed between VK6, VK7 and VK5. VK5 logs were larger than most and their state raw score was second only to VK2, however VK2 sadly lacked log submission but had an outstanding score of over ten thousand points. VK4 also had a noticeable drop in log submission this year. Once again I stress that for a state to have a chance of winning, logs need to be submitted. No logs were received from P2 or ZL although there were many ZL stations giving out numbers. Log submission time will drop from 30 days to 14 days next year as there are so few logs received in the second fortnight.

Good conditions were had this year for all bands, but there was a noticeable lack of contacts on 21 and 28 MHz. Contacts on these bands were down by approximately 30% on previous years.

A noticeable change for this year is the rapid increase in CW use. There was a good increase in CW contacts on the 160 - 20 m bands. The ratio of SSB to CW is now at 9:1 where last year was 13:1 and the year before 31:1. There were approximately 1,120 stations participating compared to last years 1375. Logs were received from 12 Foundation, 25 Standard and 174 Advanced licensees, making up 18.8% of actual participants. 12 paper logs and 199 electronic logs were received. Of these, five were treated as check logs. 127 logs contained HF contacts only, 70 contained HF VHF & UHF contacts, and 8 VHF and above logs were received.

163 operators used VKCL Logger, 25 RD Logger, two Excel and the rest various non conforming loggers not designed for the RD causing unnecessary work to be done by the manager. Why use loggers that don't do the job is beyond me, as good time and effort has been put into the RD loggers by our own hard-working VK programmers, so lets try and support our own in future. There is no actual 'robot' for QSLing receipt of logs, and due to a windows upgrade the log checking software would not run as expected, so many Excel formulas did a lot of log checking along with quite a bit of manual checking.

Photo 1: Rob VK2MT operating portable at a sheep station 20 km west of Goulburn. Not actually playing for sheep stations, Rob did well gaining third place in the Single Op, Phone category.

This year's logs showed a proud improvement in logging techniques. The use of /P4 instead of /VK4 or similar at the end of callsigns is now almost non-existent and of course logs didn't lose as many points as in the past. Most logging errors were incorrect copying of received exchange or callsign, and failing to pay attention to what is in the entry window before pressing enter.

Interestingly, over half the paper logs received were generated by a computer, then posted to the manager. Again I stress, if you have a computer, download one of the loggers supplied and use it as they make the operators work load so easy and saves the manager many hours of tirelessly typing up your log that you could have done already.

Congratulations to VK5. Comparing results for each state can be done using Table 1.

State	Nr Rcvd logs	Logged contacts	PH	CW	Raw score	Weighted score	Percentage of *licensees* who submitted a log
VK 1	6	956	903	53	1096	2.91	1.6
VK 2	40	7159	5828	1331	10078	2.48	1.0
VK 3	31	3214	3108	105	3785	0.95	0.8
VK 4	23	2969	2761	208	3778	1.39	0.8
VK 5	37	5651	4999	652	8655	5.92	2.5
VK 6	56	5079	5000	78	6421	4.91	4.3
VK 7	16	1963	1656	307	2640	4.68	2.8
VK 8	2	135	135	0	131	0.90	1.4

Table 1: Summary of results.

Photo 2: VK4WIL Multi-Multi shack made up for four positions. A mixture of coax stubs and band pass filters allowed operation on all bands without interference to one another.

Photo 3: VK4WIL 7 MHz position.

Photo 4: VK4WIL 14 and 3.5 MHz position. The big black box contains switchable coax stubs for 160 - 10 m.

Team name	Op 1	Op 2	Op 3	Total
Elizabeth ARC 1	VK5ZD	VK5ZT	VK5NI	1436
NSW Wombats	VK2GR	VK2IR	VK2AWD	963
Elizabeth ARC 2	VK5FDEC	VK5HP	VK5KX	955
Bad Weather	VK2SON	VK2JDS	VK2TUT	385

Table 2: Team scores.

Individual Efforts

The best individual effort goes to Barry VK2BJ in the SO Mixed category with a total of 1030 points, setting a new record for this category under the new rules. Steve VK6IR ran a close second with 996 points with Peter VK2PR in the SO Phone category putting in a great effort of 983 points. No other individual participant came close, so it says something for staying up most of the night to get the big pointers and by working mostly HF with a sprinkle of VHF+ tossed in for good measure.

98 operators were spread over seven Multi Single and 11 Multi-Multi stations.

VK2GGC Multi-Single station operated by VK2ZMT VK2FJ and VK2MOR produced a massive 1076 points to win their section three years running but just missing out on beating their all time record of 1148 for this section. Look out next year when VK2GGC will be using their new antennas. Well done.

The multi-multi category was a very nail biting race for first.

Band	Total contacts	Phone	CW
1800	828	701	127
3500	6429	5619	810
7000	12292	10847	1444
14000	2870	2740	130
21000	234	206	28
28000	217	205	12
50	352	326	26
144	2417	2369	48
432	1213	1176	37
1.2G	126	106	20
2.3G	50	30	20
3.4G	60	40	20
TOTAL	27088	24365	2722

Table 3.

All-time records. 2012 Onwards

Category	Year	Callsign	Score
SOPH	2012	VK7NET	1055
SOCW	2013	VK5NE	542
SOMX	2014	VK2BJ	1030
QRPPH	2013	VK6FMON	448
QRPCW	2012	VK3QB	222
QRPMX	2013	VK5ZT	810
MS	2012	VK2GGC	1148
MM	2014	VK4WIL	1153

Table 4.

A new record of 1153 points was set by VK4WIL operated by VK4QH, VK4SN, VK4MN, VK4FRRW, VK4BYX and VK4BF. VK5LZ operated by VK5KK and VK5FSKS was close behind with 1143 points.

The QRP section was represented by 17 log submissions. Once again the Mixed section saw the best performance by Tim Dixon VK5ZT with 489 points.

Although there is no Rookie category (i.e. first year as an amateur), VKHAM (.com) has kindly sponsored an award for the highest scoring Rookie. This year, VK3FQSO, VK4IMH, VK5FDEC, VK6FMTG, VK6LAB, VK6PXF, VK6VIK, VK6AG and VK6MMB took part. Congratulations to Damien VK5FDEC with 294 points in the QRP Phone section.

The top three Foundation licences were VK5FDEC 294 points (QRP PH), VK2FMAD 253 points (SOPH) and VK2FLJD 96 points (SO PH).

Four teams were submitted with team Elizabeth ARC 1 (VK5ZD, VK5ZT and VK5NI) romping in with 1436 points, followed by NSW Wombats (VK2GR, VK2IR and VK2AWD) with 963 points.

See Table 2.

A full list of statistics, photos and other information is on the WIA RD website in pdf format. Awards will be sent from the WIA office for all major first, second and third place winners. Downloadable pdf certificates for individual state placings are available.

Thanks to VK2MT, VK4DMC (pics in downloadable file) and VK4WIL, for supplying photos. See Table 5 for the complete list of operator results.

Best 73, Alan Shannon VK4SN

Single Op Phone						Single Op CW		Single Op Mixed	
Callsign	Points	Callsign	Points	Callsign	Points	Callsign	Points	Callsign	Points
VK2PR	983	VK2SON	145	VK6MMB	49	VK2GR	482	VK2BJ	1030
VK5CB	894	VK7FB	141	VK3ASU	49	VK5LJ	458	VK6IR	996
VK2MT	694	VK8BN	122	VK6CNL	46	VK2IR	361	VK5ZD	772
VK5DT	501	VK3ADW	119	VK2ZZ	44	VK2IUW	292	VK5KX	577
VK700	477	VK6KTV	116	VK2AH	44	VK7RF	280	VK5ATU	469
VK3SIM	444	VK2LEE	116	VK3ANL	44	VK2AR	268	VK2IO	317
VK6CSW	417	VK6JP	113	VK2DCR	42	VK7AD	234	VK4AMG	301
VK3AVV	376	VK2BAM	111	VK6DF	42	VK2EL	228	VK7GN	227
VK5SFA	351	VK6OX	108	VK6ZGO	40	VK2BJT	208	VK5NI	175
VK1MA	337	VK4ATH	105	VK3BQ	38	VK5AJQ	124	VK2TUT	149
VK7TW	333	VK6LD	103	VK4GQ	38	VK2AWD	120	VK4AHW	119
VK3LDR	320	VK2SS	102	VK5FBBJ	37	VK6NWK	104	VK3QB	109
VK3GC	308	VK6CN	100	VK6WJ	35	VK2KJJ	102	VK5FD	96
VK2HBG	306	VK6GHZ	100	VK4PB	35	VK4XY	82	VK6NU	83
VK4KLC	297	VK2FLJD	96	VK4SR	34	VK7LCW	52	VK3UA	66
VK6BI	295	VK7RM	93	VK3FALC	34	VK5DC	42	VK3ZAP	49
VK2BGL	280	VK2ELF	92	VK6CG	33	VK5UM	40	VK2AFA	46
VK6BK	262	VK2JDS	91	VK4DMC	28	VK5AU	26	VK2YW	28
VK7HW	256	VK7VH	88	VK5NG	27	VK6AFW	25	VK6RZ	28
VK6BDO	253	VK5XY	86	VK6TN	27	VK2PN	22		
VK2FMAD	253	VK5HP	84	VK6AG	23				
VK3TCX	249	VK3DGN	84	VK2ASY	23	QRP Phone		Multi-Single	
VK5MTM	243	VK7ZGK	84	VK5NE	23	Callsign	Points	Callsign	Points
VK4ON	240	VK5AW	83	VK5EU	23	VK5FDEC	294	VK2GGC	1076
VK5NQP	239	VK7WR	82	VK6SO	21	VK5HCF	183	VK3ER	438
VK6NAH	236	VK6MJC	76	VK4GH	21	VK3VIN	99	VK2TS	400
VK3LM	231	VK6RC	73	VK6VA	21	VK3FQSO	87	VK2BOR	309
VK1HW	228	VK4FNQ	71	VK6PXF	19	VK6LO	53	VK3MEG	300
VK7HAL	214	VK3DY	70	VK4VBU	19	VK3YE	49	VK6SH	149
VK5BC	212	VK6TT	69	VK5ZKK	18	VK2VE	38	VK4WIT	54
VK4KKN	185	VK2KDP	68	VK6ZA	16	VK4FAAR	23	VK5BWR	53
VK6MM	184	VK6FDKR	66	VK3PH	16	VK1ATP	22	Multi-Multi	
VK4MON	181	VK3HOW	66	VK6OE	16	VK7RI	20	Callsign	Points
VK6AIF	180	VK6FJA	61	VK6AN	15	VK5FGRY	6	VK4WIL	1153
VK2AFY	177	VK3NCC	60	VK5KDK	12	VK6TWO	6	VK5LZ	1143
VK5PX	174	VK4FLR	58	VK5LOL	12	VK5FKYM	3	VK6YS	865
VK6MB	169	VK6LAB	56	VK6HDX	11	VK3FCEK	2	VK2AWX	782
VK6DT	169	VK6FMTG	56	VK4IMH	10	QRP CW		VK6AHR	597
VK2BBQ	157	VK7FM	52	VK8FHIL	9	Callsign	Points	VK5GRC	563
VK6DDX	157	VK6HV	52	VK2QW	9	VK3AGQ	104	VK4HH	500
VK3LRE	153	VK3CG	52	VK4DA	6	VK1DA	32	VK1MT	405
VK5MK	153	VK6SN	51	VK2SWD	4	QRP MIXED		VK6CLL	386
VK6YA	153	VK6SMK	50	VK6NAK	3	Callsign	Points	VK4WIS	228
VK7KC	150	VK3JWT	50	VK6VIK	2	VK5ZT	489	VK6ANC	83

Check Logs: VK1OC, VK3VTH, VK3WF, VK5MLB, VK5YX

Table 5: RD Operator results.

Silent Key Al Carter VK4LT

Al known as Bertie to most of his friends and family was one of six children to Leslie and Edith Carter who lived in Norman Park Brisbane in a modest Queenslander with his parents who had a wonderful veggie garden and many fruit trees.

He made his own way through bush land and creeks to attend the Norman Park School where he was an excellent student.

Al was offered several scholarships but declined and was employed as an office boy at the Qld Country Traders. He managed to rise to the ranks of second in charge when the war started.

In 1933 he bought his first motor bike and went for his first ride to Noosa. In the same year he had saved enough money to home brew his first valve radio. On 23/6/1938 Al passed his Certificate of Proficiency to start a long life with amateur radio. He also joined the Citizen Military Forces in the same year. When the war started he was called up as a radio operator and was posted to Cowan Cowan on Moreton Island.

With the recent passing of Al Carter VK4LT, amateur radio in this country has lost one of its most active adherents, and a distinguished radio operator from battles within and to the north of Australia in World War II. He was also a successful business man, no mean feat after his war experiences.

Al was then posted to Thursday Island but before leaving managed to catch up with Beryl after being helped over the outer wall at the Brisbane show grounds. This is where he proposed to Beryl and left the next day.

In September 1942 Al travelled from Thursday Island to Darwin down the centre and up the east coast to marry Beryl on the Tuesday 29/09/1942.

After the war they both lived in a flat in Brisbane. After such a long time away things started to happen the first of their children Philip was born. Remembering these were tough times, they eventually saved enough money to buy a house at Wavell Heights.

Against all remarks from an old army mate, Al purchased a grocery store in Coominya, a small town in the Brisbane Valley. As well as running the shop Al delivered groceries to outlying properties. The business ran very successfully and after some years found himself purchasing a poultry farm in the area.

It proved to be difficult times when drought conditions set in they had to buy water to feed the poultry and individually water their crop of strawberry plants. Well, it all happened again. Beryl fell pregnant and their second child Janelle was born. The farm was sold and the family moved to Nanango after securing a manager's job at the Dairy Co-Op in town.

In 1954, after travelling to Oakey to see the Queen on her Coronation Tour, shortly thereafter Al accepted a Manager's job in Brisbane at Hoffnungs kitchen ware wholesalers, the largest in the southern hemisphere. At this stage they moved to Carina in Brisbane and stayed for 19 years, during which time another addition to the family Craig was born.

Al suffered with illness as a result of his island war service and in 1959 was given two years to live. Again in 1973 he was given two years to live, so he decided to retire to the Sunshine Coast and build a home at Sunshine Beach. The family had holidayed in the area since the late 1950s and enjoyed the atmosphere and fishing.

To the family's surprise Al and Beryl moved to a two storey house on acreage in Tewantin where he erected a communication tower and antennas to enjoy his hobby of amateur radio this is where they stayed until Al was 88 years of age. Al and Beryl cooked and delivered for the original Meals-on-Wheels in the Noosa area. They we both involved in many clubs and made many friends. Another decision was to be made in 2005 at the age of 88 years to sell up and move to the Laguna retirement village at Noosaville.

This did not prevent his radio activity as he managed to acquire permission to erect antennas on their unit. It was with thanks to club members who erected the antennas to allow him to talk to the world and continue his love of Morse code. Al had many skeds with club members and others further afield until his passing.

Number one son Phil tells me he was commandeered many times to attach antennas to many trees in the back yard not without mishaps but thankfully no serious damage to life or limb. Many fellow amateurs frequently visited Al to have a chat and to correct any issues with his equipment.

Al and his great friend Peter Brown VK4PJ, an ex-POW from the first action against the Japanese in New Britain, were instrumental in keeping many amateurs together through skeds on various bands throughout the years but principally more recently on 40 metres each morning. Both were active members and office bearers of the WIA throughout their lives as they both recognized that unity led to the achievement of objectives just as in the armed forces. That sked by members of the Club and others continues today.

He was always a stickler for transmitter frequency accuracy and there were many "conversations" between Peter VK4PJ and Al when Peter would use his VFO instead of using transmitter memories as the basis for his transmission. Invariably Al would ask Peter to "get on frequency". This provided many a chuckle to the avid listeners as the so-called argument about the need to use memories in radio equipment went on for years with neither side prepared to give an inch. Again Al would also ask Peter if he still had the warranty for whatever bit of equipment he was using. This discussion about warranties continued unabated through the years. More recently Al would state that he did not need a computer whereas Peter embraced them. More recently this matter was settled as Al's TV had one anyhow. Throughout all this they remained very good mates.

Al was always interested in history. He was approached by historian Vanessa Seekee of Horn Island, North Queensland some years ago to assist with the writing of the WW2 History of Horn Island in the Torres Strait. Vanessa has operated a war museum and accommodation for visitors to the island for many years. Many may not know that the airstrip at Horn Island was a vital link for the Australian and USA air forces during the war. It lies next to Thursday Island and is now the focal entry by air to the Torres Strait. Thursday Island has been a vital centre for Australian forces since World War 1 and remains so today.

Al served there as a communications operator during the many visits of Japanese bombers at the start of the Pacific War and was a mine of information for Vanessa. Incidentally Al always said that the Japanese made a big mistake in not invading the island and taking over the airstrip as early on his team was basically defenceless.

Ian Mowat VK4ZS, a regular on the morning sked, advises that Al's retail site at Kingaroy is now the home of a co-operative that he was involved in; another amazing coincidence that only came to light recently. Al was a man of many talents.

On behalf of the many radio amateurs I would like to conclude by expressing our sadness at Al's passing. He has left a great legacy and a big void on the bands and in our hearts.

Al's generosity was shown by the donating of his equipment to be sold and monies to go to the Sunshine Coast Amateur Radio Club Examination Fund. This account exists to assist candidates having difficulties in exam fees payments. Al was also a founding member of the Sunshine Coast Amateur Radio Club.

My thanks go to the following for their patience and understanding whilst collecting the above information.

Al's wife Beryl
Son Phil & family
Son in law Wayne & family
Laurie VK4LO, Mal VK4ML and Noel VK4NL
Contributed by Noel Jardins VK4NL

SOTA News

Allen Harvie VK3HRA & Bernard Petherbridge VK3AV

VK3 "Show & Tell"

Given the improved weather conditions and a desire to compare the current batch of small SOTA radios, CW paddles, batteries and lightweight antenna, Allen VK3HRA proposed a "Show & Tell" day. The location, Rubicon Valley Historic Area near Alexandra was selected, as it was central to both regional and city based operators, and plans were released to utilise the Kendall's B location.

Arriving the evening before, Warren VK3KS set up in a clearing off Rubicon Rd as the camping sites at Kendall's B were full. Allen VK3HRA arrived late, as he was unable to drive past a second summit on Saturday afternoon!

Photo 1: The campsite.

It was fortunate that at least one Andrew was able to attend, thus qualifying as a SOTA event. Warren VK3KS, David VK3IL, Andrew VK3JBL and Allen VK3HRA were on site Sunday, with Warren and Allen camping overnight after activating summits in the area on Saturday.

Using the Aussie standard of measurement, an Esky lid, you can see the size of these devices. There

Photo 2: This is what we were here for...

were three MTRs, an ATS and a HB1B. The different CW options devices included Pal Pico, Mini and single paddle as well as two American Morse keys. The HB1B with the Palm Pico is on the left with the Palm Mini on the right. There is also a home brew touch paddle and code oscillator. Not shown in the photograph but present was a heavily enhanced KN-Q7A, two FT817s and a 23 cm transverter.

LiPo batteries dominated as the preferred power source. Not surprising given the cost/mass/power ratio.

A focus for Allen was the mini paddles as he is currently seeking another key for use on activations and didn't want to buy a unit sight unseen or rather untouched. Apparently there were no issues with any of the devices present as they were all very well made. The greatest challenge is the lack of mass. Not surprising given the target market. The option of exploiting a "Flight Deck" to provide a stable base and secure the key appears to be the go.

At the meeting location, there was an S8 noise floor. The noise was attributed to the hydro power station nearby.

Photo 3: The HF Loop antenna received close examination.

As there were two FT817s present and one had a DSP board installed, a comparison of the impact of such an enhancement was possible. The DSP equipped unit demonstrated a slight advantage as it softened the noise to a tolerable level.

The End Fed antenna dominated with matching via an 'L' match supporting 80-10 m and David VK3IL produced a trapped end fed. However, it was David's HF loop that attracted great interest. Given Peter VK3YE's success with these devices on the beach we were keen to see how it would perform in the bush.

Squid poles are not the only options for supporting antenna in the scrub. Several activators use throw bags and trees, and several options were on hand.

This represented a broad view of the market. The conclusion is that the thickness of the tip rather than the length of the squid pole is of greater importance as the last couple of segments tend to be very thin for all units. It is a common complaint from a lot of activators that the last segment or two will break. The shorter heavy-duty units are more tolerant of the abuse that activators tend to hand out.

Other items deployed on a SOTA activation including lightweight chairs and a table as well as options for brewing coffee and chai were also discussed, then it was time to activate summits.

Photo 4: L to R: a 7 m heavy duty squid pole, 10 m squid pole, 4.1m mini-pole and 2 x 5 m light duty squid poles.

Activations

Sunday was a big SOTA day, with several stations out taking advantage of the weather meaning that S2S contacts were plentiful. Warren VK3KS went to Mt Proctor VK3/VN-019, Andrew VK3JBL tackled the walk up to Mt Torbreck VK3/VN-001 whist David VK3IL and Allen VK3HRA went to Bill's Head VK3/VN-004 then to Pyramid Hill VK3/VN-005.

Andrew had a run of bad luck on 23 cm. As soon as he got setup the antenna took a fall onto rocks leaving damaged elements and nothing but noise. The summit was qualified on 40 m.

Bill's Head VK3/VN-004 was a dual CW and SSB activation. Being on the same band, the two stations were causing sufficient interference to make operations challenging. After qualifying the summit on CW, Allen left David to work the 40 m pileups without interference. Pyramid Hill VK3/VN-005 was the last summit activated on Sunday using only 40 m SSB and the HF loop. The loop proved its abilities with solid signals reports as the day was closing.

Photo 5: David VK3IL amongst the trees on Pyramid Hill.

Overall, picking grand final weekend and school holidays meant a lot were not able to come but those who did all report having a great day.

A few keen operators and a lot of portable gear made for a great weekend out.

VK2 Activators Award

From VK1DA/VK2UH - SOTA VK2 Association Manager

At the Wyong Field Day in February, I announced an award to be made to the VK2 activators achieving 100 points or more in the period from 1 March to 31 August 2014 and to the chasers who achieved 1000 points or more in the same period. Here are the results,

based on logs entered as at 20/9 in the SOTADATA database.

Activators

The activators who made at least 100 points during the six months are:

Phil VK2JDL who was a new activator during this period and scored 169 points. There were 11 other new activators during the six months.

Old hands: Rob VK2QR notched up 443 new points, Rod VK2TWR - 265, Bernard VK2IB - 212, Justin VK2CU – 171 and Sam VK2AFA - 117 points. In addition to those, honourable mention must be made of Russ VK2BJP - 96, Scott VK2SWD - 88, and old hands Ed VK2JI (now DD5LP) - 93 (despite moving to Germany) and Josh VK2JOS with 91.

Chasers

Kev VK2KEV led the field for new chasers with 647 chaser points, followed by VK2ODD, VK2JDL and VK2BJP. 14 new chasers joined in during the period. In the old hands (existing chasers) category, the leader was Gerard VK2IO who added 4257 points to his score in the six months. Then followed Matt VK2DAG - 2191, Rod VK2TWR - 1561, Adam VK2YK - 1306, Cliff VK2CCJ - 1226 and Paul VK2KTT - 1090. Within sight of the 1000 mark were John VK2YW - 913 and Rod VK2LAX - 815. Overall, a very impressive result from the established chasers.

Conclusion

The number of new activators and chasers and the enthusiasm shown has been encouraging and I can only see it continuing to increase. Thanks to all participants in SOTA. You are all making the hobby more interesting, not only for yourselves but for others too, in the true spirit of amateur radio.

VK6 update

Western Australia SOTA went live 1st September with 261 summits initially listed. Congratulations to Mike VK6MB on first VK6 activation.

Mike picked up Summit to Summit (S2S) with Andrew VK1DA.

John VK6NU, Ian VK6PXF, Andrew VK6LAB, Anthony VK6MAC and Tony VK6FMTG were quick to follow with two summits VK6/SW-036 and VK6/SW-031 being hammered. VK6 will be a DX activity for southern based VK chasers due to the distances involved. We expect this to lead the push for 20 m activations.

VK8 news

Firstly I would like to thank Paul VK5PAS for putting the fire into my mobile setup and getting me out there to break the ice with my first and VK8's first activation back on 1st March this year, even if the weather was over 40 at the pub at the end of the tail of Mount Johns (VK8/AL-153) with some 35 contacts.

We have managed to activate five different peaks up to date with the help of Kaz VK8ZKZ and Steve VK8XR bashing though spinifex, rocks and heat into points which are seldom climbed (apart from Mt Gillen). Calls to the station owners for their permission to enter their land often results in amazement, with them sometimes asking *"why would you wish to climb the hill?"*

In most of the local hills we have to obtain permission to enter the station's land to climb their hills and very few hills have trails up to the summit or any phone coverage, so the need for safety is high as there are no emergency helicopters or teams to help you. The ever large risk of breaking an ankle or limb is there (and yes friends have), you need to be aware of the mulga snakes and cattle, both of which would kill you, but the scenery on the top of these point cannot be beaten. There are no houses or roads for miles and often not to even be seen by eyes but when the first answer for your calls come back, it takes the pain of all that spinifex away and the games on!

We are currently talking with the traditional owners of Uluru (Ayre's Rock) but this takes time and the politics, well you boys down south know about red tape!

With that in mind the summer is coming and the heat is over 40 on most days, so those little two point climbs look great and we love to answer those calls on air.

73 from the centre of Australia (dirt, dust and flies).

Greg VK8GM

SOTA in VK7

As alerted last month, SOTA officially commenced in VK7 on 1 October 2014. This was also the date of the inaugural VK7 activation by Paul VK1ATP/7 on Cape Lodi VK7/EC-045. Paul ended up with 23 contacts including a summit-to-summit contact with Ian VK1DI. VK7 Association Manager Justin VK7TW was out in the afternoon to activate Mt Wellington VK7/SC-001 whilst being snowed upon, and later Mt Rumney VK7/SC-045. Justin reports:

I ended up with 7 x 40 m contacts on Mt Wellington VK7/SC-001 and certainly earned the 3 point seasonal bonus as there was snow on the ground and it tried to snow a few times whilst we were operating!

I also ended up with 5 x 2 m contacts and 10 x 40 m contacts on Mt Rumney VK7/SC-045 and that was a much more pleasant sunny afternoon bushwalk!

A special thank you to Peter VK3PF who I was glad I made contact with on Mt Wellington – Peter was the mover and shaker to get VK7 going and the tree has borne fruit, on ya Peter!

All these activities have given my 12 year old son Reuben the incentive to get his Foundation licence, so you may even hear a new VK7 SOTA activator soon.

I have certainly caught the SOTA bug – hear you on a VK7 summit soon.

Stand by for more activations in the future, with 695 summits initially listed.

Closing comments

Fine weather is approaching, time to get out of the shack and play radio. Daylight savings will be in place by now in some states, providing more opportunities!

VK5news Adelaide Hills Amateur Radio Society

Christine Taylor VK5CTY and Tony Hughes VK5KAT

The Adelaide Hills Amateur Radio Society annual Buy and Sell is rapidly approaching. This year it will be held on Sunday 2nd November, at the Goodwood Community Centre. There will be the usual mix of club, individual, and commercial sellers. If you are having that big clean up, consider having a sales table this year. It is planned that the buy and sell will prove to be the usual success. If you would like more information, or wish to book a table, please contact Roy VK5NRG@wia.org.au as soon as possible.

Weekends at The Shack have been very busy, with both social functions and technical sessions. In the spirit of the regular Saturday tech morning sessions, Hans VK5YX provide an excellent presentation on installing Ubuntu. The September Tech session was a fantastic seminar on Amateur Satellites by Damien VK5FDEC. These sessions additionally demonstrate the large diversity of expertise within our Hobby. The technical sessions are always very well attended during the year, often to a capacity crowd.

In August the AHARS training team facilitated licence training course and assessment, and we welcome 8 new members to our wonderful hobby. Our next training course is being conducted on the 8th and 9th of November, contact Sasi VK5SN@wia.org.au if you would like to attend.

A barbeque breakfast was held on the 5th Saturday in August, which proved to be a well-attended function. The Shack is proving to be a significant asset to AHARS, being a focus point for amateur radio in the Adelaide Hills.

Our August club meeting demonstrated the quality of our members, having Dr David Wescombe-Down VK5BUG as a speaker, his topic being "The negative impacts of the digital technology revolution on humans - including Amateur Radio operators!"

I look forward to the diverse range of activities, both social and technical, planned for the remainder of the year.

73, Tony Hughes VK5KAT
President Adelaide Hills Amateur Radio Society

A Summary of the August Meeting

Dr David 'Doc' Wescombe-Down PhD PhD ScEdD

Adjunct Associate Professor of Education: University of Adelaide, Adjunct Associate Professor, Science & Mathematics Education Centre: Curtin University.

Nothing has more positively impacted modern society, across all sectors and levels of work and recreation, than the proliferation of digital technology. Ironically, nothing may also be more negatively impacting on the participants themselves.

In addition to EMR considerations, amateur radio operators have two other personal hazards with which to contend, based on the amount of time they spend:
In a seated position during any, and all, 24-hour period(s);
Operating screen-based equipment, desktop and hand-held, at work and at home.

During the last decade there has been a progressive increase in diverse personal injury issues arising from chronic postural demands due to people's physical inactivity levels, excessive pre-occupation with, addiction to or interface with various forms of digital technology. For example: an increased risk of some cancer types; obesity and morbid obesity; repetitive strain injury (RSI); psychological disorders, addictions and mental stress; musculoskeletal damage; visual impairments.

Professor Wescombe-Down conducted mixed methods research between 2008 and 2012 in several States of Australia including accessing injury claims data, and has made certain transitional recommendations including limiting digital technology interaction sessions to 20 minutes before taking an ergonomic break, and not more than four hours per day in total (work and recreation combined). His research has been presented internationally as well as nationally, and passed along to Flinders University and The Baker Institute in Victoria for incorporation as background material for their own dedicated research projects in the field. Individual apathy and social stigma arising from the Australian "She'll be right, mate!" attitude have been identified as barriers to ameliorating the alarming and very real injury situation.

September meeting report

The talk in September was given by Grant VK5GR (formerly VK5ZWI) all about mobile telephones over the years. Many of the members can remember right back to the earliest mobiles which were firmly attached to the car or truck. They had a hand piece but otherwise were not a lot different to a mobile radio of the same vintage.

Next came the first portable mobiles, they were known as 'bricks' because in size and weight they resembled a brick. But they were portable, they could be taken out of the car and used truly mobile.

These first phones were all analogue, not digital. There were variations in size over the years but they were all quite large. Later the first digital GSM phones appeared

and the size of the phones continued to shrink.

The next technology to come along was CDMA, also a digital mode. My OM had one and found that it certainly had a much better coverage than the analogue phones. CDMA was replaced when people's thirst for mobile data began to grow in the early days of the third generation networks.

Of special interest was the story Grant told of the surprise shown by the first European technicians to whom the Australian digital system was demonstrated.

In Europe in those days it was normal for base stations to only need a range of a few kilometres. With the large population centres overseas, this was perfectly adequate. In Australia, with our sparse population and scattered cities, we needed a much bigger coverage than that so Australia drove the development of the early extended range capabilities in GSM and other systems.

Australia has led the world in digital phone technology because we had to do so. We still are leaders in many areas because our unique combination of population density and vast open spaces drive us to adopt and push technologies harder than in many parts of the world.

Most recently 3G followed by 4G systems have been developed and today's mobile phone is close to replacing our home and business computers. Wireless data is now the biggest user of the networks today and dominates the ever continuing demand for more radio spectrum and faster speeds.

It was an excellent talk and one with information for everyone.

AHARS continues to run small courses and examination programs as well as technical information mornings at their Shack in the Hills. Listen to the broadcast or look on the website for information about these.

Don't Forget the AHARS **Buy And Sell** on Sunday November 2nd at the Goodwood Community Centre in Rosa Street, Doors open at 9.00 am.

ROSEBUD RADIOFEST

SUNDAY NOVEMBER 30, 2014

Eastbourne Primary School Auditorium Allambi Avenue Rosebud Victoria
Talk in on VK3RSP (146.675) from 8.00 AM - Melways Ref: Map 169 K5
More information on www.rosebudradiofest.com

Traders set-up from 7.00 am
Outdoor displays, Food, & Entry ticket sales from 8.00 am
Entry to the Auditorium and Equipment Sales area from 9.30 am until 2.00 pm
Technical Forums commence at 10.30 am
Door Prizes drawn at 12.00 midday
Lunch available on-site, followed by the ACMA Forum at 12.45 so all can attend
Entry $6.00 (Under 12's free) - Includes one entry into the Door Prize
Additional Door Prize Tickets $1.00 each (optional)

Excellent Catering - Disabled Facilities - Parking onsite

Traders Tables available @ $10.00 each
BOOK YOURS NOW online at :
www.rosebudradiofest.com

Enquiries: Mark VK3PDG
Phone 0407 644 063
markybradio@gmail.com

Featuring:
Technical Forums
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Software Defined Radio
W.I.A.

Silent Key

Dennis Robert Moore VK2XAR

Late of Rankin Street, Bathurst. Dearly loved husband of Sally (nee Fry), loved father and father-in-law of Evan & Daniela. Loved brother, brother-in-law and uncle. Contributed by Lee Hatfield Jr K2HAT

VK3 news Eastern & Mountain District Radio Club

Andrew Scott VK3BQ

SOTA Introduction Activation and Club BBQ

In late September, the club held a successful SOTA Introduction and club BBQ on the summit of Mt Donna Buang, north east of Melbourne. We deployed a simple SOTA station and successfully introduced 5 club members to their first SOTA activation. The members walked approximately 500 m into the activation zone from the lower car park and were able to qualify for the summit working four contacts each. We were able to show just how capable a simple wire dipole and 5 W QRP station can be when you are away from suburban noise, with many chaser and S2S stations working over the course of the morning. We also enjoyed a friendly BBQ lunch with the club members.

3D Printer Talk

Our clubroom meeting in September saw club member Marc VK3OHM talk about and demonstrate a 3D Printer. The ability to produce items only limited by your imagination is amazing: the perfect device for making up a small support bracket/holder, or that broken or lost radio knob. Mark showed a collection of creations his machine had produced, talked through the design and software side of such a device and demonstrated printing an antenna mount for a squid pole he had designed.

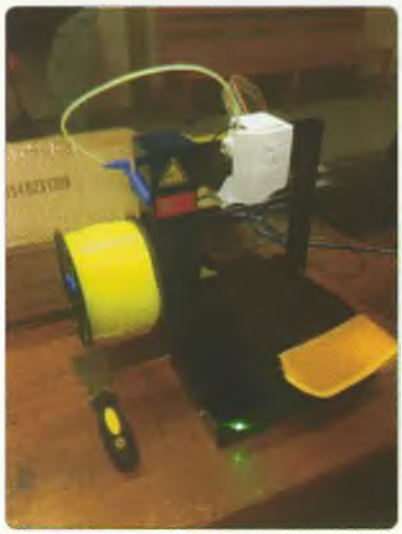

Photo 1: Marc VK3OHM demonstrated the 3D printer.

VK3 Microwave Test and Tune Morning

Only a couple of weeks until the VK3 Microwave users test and tune morning, from 9 am Sunday 9th November at the clubrooms in Burwood. Bring your Microwave gear to shake off the dust from the winter storage in preparation for the spring and summer VHF/UHF field days. Bring your gear for a play, we would love lots of 3.4 GHz gear on the day, but all gear is welcome. Or pop in and just have a look at this interesting aspect of ham radio, talk to some active microwave operators and see how you can become active on the higher bands too. The BBQ will be going for lunch.

Hamfest 2015

Planning has started for the EMDRC Hamfest, 29th March 2015, at the Great Ryrie Primary School, Heathmont. Contact the club if you would like to reserve a table and for more information at *http://www.emdrc.com.au/*

Photo 2: A view from the 2013 test day.

Over to you

ILLW and the RD Contest

Thank you for the additional note in "Over to you" from Kevin VK2CE.

I guess he missed the point I was trying to make in my original note – the public at the ILLW listening to the exchange of numbers for the contest did not find it the least bit interesting or likely to promote a desire to join the amateur fraternity!

The two events have a totally different audience and are (in my view) quite incompatible, if we are trying to entice a person to develop an interest in amateur radio by displaying a typical field day experience with conversation and interesting history etc., then a 10 word exchange of numbers is not going to do it for me or many others. Are we shooting ourselves in the foot by combining these two events on the same day?

The fact that the conflict occurs on 5 of each 10 years indicates that it will continue to not encourage participation for some of either interest group. 140 logs submitted is a very small interest group (more is the pity): we should remember the sacrifice made by too many for our benefit but doing so at a public display may not be the best time to pay that homage. The "conversation" at a public event has to be more interesting than a few numbers to promote the hobby to the public.

Ian VK3LA

Spotlight on **SWLing**

Robin L Harwood VK7RH
e *vk7rh@wia.org.au*

2014 is rapidly drawing to a close. Monitoring has also changed with fewer broadcasting stations actively utilising HF. The Spanish Foreign Radio (REE) left in early October, opting for Internet-based programming. As well, European broadcasters are quickly departing Long wave. Radio 252 in Dublin is scheduled to leave soon, followed by German Long wave broadcasters on the 31st of December. Russia abandoned LW earlier this year. I believe that the historic BBC LW sender at Droitwich on 198 may also close sometime in 2015. Up until 1977, Droitwich was on 200 kHz from the inception of the BBC. There are a few LW stations still left, including Radio Luxembourg and Radio Europe. The latter is in French yet is located in Saar, Germany. It is unclear if this will continue if all German stations cease LW transmissions.

I recently received an email from Jack Haden, VK2XQ at Mount Piddington NSW. He informed me he was hearing Radio Hargeysa on 7.120 MHz He is hearing it daily between 1630 and 1830 UTC. The station is in Somali and well over s9+. Hargeysa is actually located in the former British Somaliland. Somalia was created from the separate Italian and British colonies but has been plagued by civil wars and provinces seceding from the capital, Mogadishu. I think the former Somaliland in the north is known as Puntland and is fairly stable, despite not being recognised as an independent nation. The sender recently re-activated and is rated at 100 kW. I personally have heard it signing on around 0300, via the Dutch webSDR.

I also received an email from Ian, VK3CIS, who mentioned that Radio New Zealand International had axed their fortnightly Mailbag programme, early in August. I did not listen to it a regular basis yet it is sad that a programme designed to maintain contact with their audience is lost.

The Australian Television Network, which has been operated by the ABC for audiences in Asia and the Pacific, ceased operating on September 28th. As you are aware, Radio Australia was integrated with the ATN but thankfully the presence of RA continues over shortwave, beamed primarily to the Pacific. Programming consists of relays from Radio National, Grandstand and the JJ network. One wonders how much longer RA will continue on shortwave.

Radio Ukraine International from Kiev is back on shortwave. It is being relayed by WRMI in Okeechobee, Florida. The target seems to be North America around 2300 UTC and is in English. WRM also has a programme from Moscow but not from the former Voice of Russia.

Well that is all for November, Just one more column remains for 2014 so please keep your news and information coming. Send it to *vk7rh@wia.org.au*

73 de VK7RH

VK7news

Justin Giles-Clark VK7TW
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w *groups.yahoo.com/group/vk7regionalnews/*

The big news in VK7 is that SOTA went live on 1st October 2014 with 695 summits in eight regions being added to the database. There was a wonderful quote that Eric Ferrier sent to the author that he found in a book titled "The Geography of the British Colonies and Dependencies" by William Hughes. Page 181 reads: *"Tasmania has been called the "Switzerland of the South" and is perhaps the most thoroughly mountainous island in the world"*. There are now 695 more opportunities for portable amateur radio operation in VK7...HIHI!

Rex VK7MO has been extreme grid square chasing again in some remote parts of this great land! Congratulations to Rex and David VK3HZ who have been pushing the microwave boundaries using aircraft scatter and digital modes on both 10 and 24 GHz. The 566 km 24 GHz record is simply astonishing!

Repeater and IRLP Node News

VK7RTC on Mt Wellington (439.825 MHz) is back on air with a 91.5 Hz CTCSS tone to access. There are now some DTMF access functions - 1231 will speak the percent of received signal strength, 1234 is a user audio test function, 1235 is the current time and 1238 is the cabinet temperature. As mentioned in last month's AR column – NTARC have now decided to vacate Mt Barrow from 30 June 2015 and move VK7RAA to another location to be determined.

Photo 1: Author testing his SOTA gear on Mt Arthur on a perfect VK7 day. (Photo courtesy of Reuben Giles-Clark)

Photo 2: Author making first SOTA activation from Mt Wellington (VK7/SC-001) on the activation day. (Photo courtesy of Reuben Giles-Clark)

The 2 metre repeater VK7RTV has been relocated to Stowport in NW VK7. The North West Tasmania Amateur TV Group extends its appreciation to Jim VK7JH for making his property available to house and provide supervision and any ongoing maintenance to the 2 m Repeater VK7RTV.

Cradle Coast Amateur Radio Club

Congratulations to Mytchall VK7FPIP who recently passed his Foundation licence assessment. Please make Mytchall welcome if you hear him on air.

Lucas VK7FLSB and David VK7FDAB participated in the Manly Warringa Radio Society Flagpole Contest 2014 on September 20. This was a fun event and a great test of operating portable. Lucas and David operated in the foreshore parking area on the knoll between Preservation Bay and Sulphur Creek in North West VK7.

Northern Tasmania Amateur Radio Club

The September NTARC meeting saw much discussion about the future of VK7RAA and then the show and tell session revealed an interesting small 20 watt 40 metre SSB/CW Chinese VXO QRP rig from Al VK7AN. Bill VK7MX also showed his small QRP Chinese rig covering 5 bands on 5 watt HF SSB/CW X1M. Bill also showed a self-contained DDS based signal generator from 1 Hz to 70 MHz. Joe VK7JG finished up with a slice of the Bass-Link electricity cable and the Unilab 150 repeater and beacon equipment that he uses around VK7.

WICEN Tasmania (South)

The WICEN group was involved in the annual Fonthill - Southern Tasmanian Endurance Riders event which saw 20, 40 and 80 km rides. The property this is held on is very picturesque and the weather was excellent. Two checkpoints were involved making for some frenzied activity as multiple directions, riders and stages were involved.

Photo 3: Rod VK7TRF and the author calling in the Horses. (Photo courtesy of Roger VK7ARN)

The event attracted about 80 riders from VK7, VK4 and VK3. Thanks to all involved.

Radio and Electronics Association of Southern Tasmania

REAST's September presentation was on the imminent SOTA - Summits On The Air going live in VK7. The presentation ran the audience through the SOTA award scheme, the important aspects, rules and reference manual, awards and what to consider when summiting. A typical SOTA kit was also shown consisting of an FT-817ND, portable tuner and squid pole arrangement.

At the DATV nights we showed a simple one LED SWR meter for QRP operation, SOTA testing, the latest edition of Low-Key the VK QRP club magazine featuring Mike Rainey AA1TJ New England Code talker and American Geophysical Union research into ionospheric plasma bubbles. Our videos included the latest Ham Radio Now episodes and robotics themed videos which included some entertaining robot battle bots!

Photo 4: Southern Tasmanian Equine Endurance riders and WICEN checkpoint in background. (Photo courtesy of Roger VK7ARN)

VK3 news Amateur Radio Victoria

Jim Linton VK3PC
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Portable activity on show

A record number of participants are forecast for the third weekend of November, which will be the Keith Roget Memorial National Parks Award (KRMNPA) activity period, and follows a recent Master Class run by Amateur Radio Victoria.

The information session included mini-lectures and equipment displays, coupled with hands-on information on how easy it can be to be involved with portable operation. It attracted a mix of people who wanted tips and advice from those already operating portable.

Award Manager Tony Hambling VK3VTH kicked off by talking about how the activity has grown, due mainly to the combination of smaller equipment being available and publicity.

The long-running KRMNPA has undergone a resurgence to be recently joined by a variety of portable parkland-type awards.

These include the Summits On The Air (SOTA), World Wide Flora & Fauna World Award, its counterpart the VKFF. About two-years ago the VK5 National & Conservation Parks Award began.

The next speaker was Peter Fraser VK3ZPF who explained further the rules of various awards, with him being involved with KRMNPA and SOTA.

At first he used the equipment on hand. *"Don't be held back with equipment - what you have will do at the start,"* Peter VK3ZPF said. Over a period, with more experience he selected an antenna and other gear that are lighter and easier to carry.

Next were Joe Gonzales VK3YSP and his wife Julie VK3FOWL, who enjoy taking amateur radio portable because it's so much fun.

Joe VK3YSP talked about masts, power, digital modes, safety and legality. *"The best solution is your solution. Take your own approach to portable operation, and experience working the DX not available in the suburban environment,"* he said.

Peter VK3ZPF with his KRMNPA No. 1 "Grand Slam" and "Merit" plaques, joined by Peter VK3PF who also has a "Grand Slam" plus the Local Government Award. Presenting them were Amateur Radio Victoria President Barry VK3PV (left) and Award Manager Tony VK3VTH.

Terry Murphy VK3UP, the Amateur Radio Victoria Event Coordinator, spoke of involvement with the ILLW under VK3WI at the Timeball Tower, Williamstown. HMAS Castlemaine at nearby Gem Pier Williamstown VK3RAN had also been active on ANZAC Day, the International Museum Weekend and for Military Vehicle Displays.

All mini-lecture presenters then formed a panel to answer questions posed by the 18 who attended. Joe VK3YSP told the gathering to be prepared to answer the public when they asked what was happening.

His advice included stressing that amateur radio is about having an ordinary conversation. On air contacts involving the public should be who they are and what they are doing, and not about amateur radio, technicalities and jargon.

He said a different approach was needed with rangers, police and those who run establishments or accommodation. Think carefully about the message conveyed about amateur radio, and never fob off inquirers.

There were also various questions about equipment on display. A sample of the audience showed that each had learned a lot of good useful information, with them invited to join in the portable activity.

The afternoon included presentations to Peter Fraser VK3ZPF with his KRMNPA No. 1 "Grand Slam" and "Merit" plaques, joined by Peter Freeman VK3PF who also has a "Grand Slam" and "Merit" plaques plus the Local Government Award.

The latest couple announcing they will be part of the KRMNPA weekend this month are Amanda VK3FQSO and Bob Bauer VK3FLAK, activating Terrick Terrick and Kara Kara National Parks.

They are good friends with Julie VK3FOWL and Joe Gonzales

VK3YSP, who will be trekking to the Wilsons Promontory National Park.

Tony VK3VTH invites everyone, whether in the field or from home, to join the KRMNPA activity period on Friday 14 until Sunday 16 November, 2014. Most portable operation is on 40 m with a popular frequency being 7090 kHz.

Website goes mobile

These days more and more people are accessing websites using mobile devices, yet an estimated 75% of websites are not optimised for those on the go.

Making websites friendly for mobile devices is not only because they are forecast to exceed laptops and home computers, but will in a short time be the only or main way people get information and news.

Experts claim that many current sites that can be accessed on a desktop, cannot easily, or at all, be seen on a mobile device.

You may have noticed changes to the Amateur Radio Victoria website recently. Although little is noticed in a desktop computer, these changes reflect the requirements needed to make it "mobilised" and more accessible.

Behind this work over a number of weeks has been Gary Furr VK3FX, our Internet Development Officer - a volunteer who has been working hard to optimise the website.

Attention from the early days of our web presence has concentrated on the content, type font and size, plus navigation or the intuitive way to find things. Now it is increasingly friendly for mobile devices too.

Material on the website seeks to meet known guidelines for mobile content, which is increasingly involving free WiFi in public places, eateries, accommodation and on public transport.

The whole website was designed by Gary VK3FX, who over the years has become very skilled and enjoys a good challenge.

If you have a mobile device, a home or work computer, take a look at what is on offer, and feel free to send us your comments and suggestions.

World DATV QSO Party

This annual event is the only global gathering of those engaged in the visual medium of television. It has been an overall a great success with contributions from Australia, Europe and the USA.

Anchor and organiser Peter Cossins VK3BFG described as "extraordinary" the number of guests on the British Amateur Television Club (BATC) online streamer.

It involved television repeaters VK3RTV, WR8ATV, W6ATN, VK4RMC, VK5RDC, and GB3HV.

"Without bias, VK3 showed the way with innovative overs and short-prepared videos with excellent quality." he said. The World DATV QSO Party on August 29-30 was initiated by Amateur Radio Victoria and greatly assisted the Melbourne ATV Group.

The transformation to DATV during 2009 in Victoria followed substantial funding by Amateur Radio Victoria, a $1000 grant from the WIA club scheme, plus other amounts, equipment and voluntary time from the ATV Group.

In June 2013, the Eastern and Mountain District Radio Club based in Melbourne's east also gained a WIA club grant to build its DATV transmitter.

Peter VK3BFG was primarily in charge either through local television repeaters, and if that was not possible, then Skype used to reach a local anchor, with that signal being sent on a repeater. Skype worked quite well with reasonable audio and video.

International repeaters were WR8ATV in Columbus, Ohio, with Art Towslee WA8RMC, a designer on the DATV-Express project; the W6ATN Amateur Television Network in Southern California, consisting of nine linked repeaters with Don Hill, KE6BXT, as the local anchor, and the Home Counties ATV Group, London, GB3HV.

Many shown segments are of the show-and-tell variety, with ATVers in their shacks before the camera. On Friday night VK stations had a 'round robin' to display their latest projects or give short talks that were incredibly diverse, with most undertaking vast improvements.

On the night there were telecasts were from VK3BFG, VK3CSJ, VK3PB, VK3WWW, VK5ADM, VK3CH, VK3KQ, VK3CE, VK3JDA, VK3DQ, VK3ATV, VK5ADM, VK7AX, VK2CRJ, VK2XXX plus about 10 more. The activity was hectic.

John Fisher VK3DQ has a huge tower under construction. Peter VK3BFG showed a 200 watt PA being built. Jack Braham VK3WWW had a very amusing pre-produced video with his persona visiting him live on air, a brilliant video indeed.

The usual BBQ teasing between Mick Ampt VK3CH and John VK3DQ was upheld, Mick's dinner looked better than what John displayed. Ross Pittard VK3CE showed us around his well facilitated shack, the only rural country Victoria participant.

Those that pre-recorded video of their projects including from throughout VK were well produced professional productions.

On the Saturday, there were four international net controllers - Peter VK3BFG, Don KE6BXT, Art WR8DMC and Noel G8GTZ.

Overseas ATV repeaters linked to VK3RTV included W6ATN and WR8ATV in the USA and GB3HV in England, as well as other International stations via Skype.

On Saturday it was joined by many more stations, including VK5DMC, VK7TW, WR8RMC plus about six in Columbus Ohio, KE6BXT with two stations in Southern California, W6HHC, G8GTZ, G8ADM, G8DGR, G8ADM, G0KTD, G8LES, G8CKN, G0KTD, G7RLK.

There were 10 more on the BATC Stream - with log-ins showing a wide national and international interest in the event. Peter VK3BFG lost count of the actual numbers, but the event was certainly the most watched to date.

Peter VK3BFG, who started it in 2011 when 13 VK stations and some ATVers in the USA were involved, to the latest outstanding effort with a much wider audience, is reviewing the event to make it even more enjoyable next year.

VK2 news

Tim Mills VK2ZTM
e *vk2ztm@wia.org.au*

This month ARNSW will be holding another field day session on Sunday the 9th at the VK2WI site. The morning session is for those "New to Amateur Radio" and the afternoon is the "Art of Contesting". Bookings are required which can be emailed to *fieldday@arnsw.org.au*

The next and final Foundation course for 2014 at ARNSW is over the weekend Saturday 22nd and Sunday 23rd November at the VK2WI site. On the Sunday all grade licence assessments are available. Bookings required for all activities *education@arnsw.org.au* The first Foundation weekend from ARNSW in 2015 will be 17th and 18th January. The final night of the 2014 Upgrade course will be Monday the 17th November. The 2015 Upgrade course will commence in early March. The next Trash & Treasure at the VK2WI site will be on Sunday 30th November from 0930 hours followed at 1200 by the Radio Homebrew and Experimenters Group gathering. For major equipment items available, check the ARNSW web site *www.arnsw.org.au*

The VK2RSY 2 m and 70 cm beacons were restored during September with new horizontal antennas. Both have two bays of square loop antennas mounted in the former position on top of the VK2WI building. Coverage reports are most welcome by an email to *callbacks@arnsw.org.au* All the renovations are now completed. VK2WI News over the holiday period will for three weeks be morning only sessions.

The ARNSW library team are working through cataloguing the many thousands of magazines. Generally they have no need for further magazines. Once the project is finished there will be a call for some magazines to fill the odd missing issues. Later there will be a surplus of magazines which will be available to ARNSW members at a nominal price.

With the holiday period approaching many clubs drop meetings in December and January. If this applies to your club please have them drop a note to VK2WI News so that listeners can be informed. Do that by an email to *news@arnsw.org.au*

WICEN NSW has several operations this month including association with the Caves Rescue Operational exercise over the weekend of the 8th and 9th. There is also the YMCA Massive Murray Paddle for the week Monday 24th to Friday 28th.

The **Armidale and District ARC** is a recent reactivated club and they are going great guns. There are regular activities in and around their club rooms. Saturday morning is set aside as a get together with sausage rolls to feed the attendees. On the second Saturday it will be the next quarterly meeting of the **Mid-South Coast ARC**. **Waverley ARS** has a training weekend set down for the 15th and 16th. *education@vk2bv.org*

Many clubs take advantage of operating 'sausage sizzles' at their local big hardware stores at weekends as a means of fund raising to help pay those annual licence fees for the club station, repeaters and other club expenses. The day starts about 8 am and finishes about 4 pm after you clean up the BBQ equipment. It takes a team of about four to operate which is best done in shifts. If you are interested, you should approach the store for details and a booking.

73 – Tim VK2ZTM.

Photo 1: The asbestos removal and fire proofing of the ARNSW VK2WI building is now complete along with a new toilet block.

Photo 2: VK2RSY 2 m and 70 cm beacon antennas now installed on the roof of the VK2WI building.

VK3news Southern Peninsula Amateur Radio Club

Tim Conboy VK3TJC

RadioFest 2014

Following the previous two and very successful RadioFests, the Southern Peninsula Amateur Radio Club (SPARC) will once again be holding its RadioFest on November 30th, 2014 at the Eastbourne Primary School, Allambi Avenue, Rosebud, Victoria.

Each successive year has seen a large growth in tables and attendees as well as a very interesting range of technical forums and lectures making this one of the fastest growing amateur radio events during the year.

Tables are available at our generously sized venue for those amateurs and traders keen to sell their wares. At the last two SPARC RadioFests many bargains and rare items were available.

Apart from the usual white-elephant sales of the previous years, a key feature of the SPARC RadioFest is the interesting and relevant technical forums that are presented. Lectures and displays are provided throughout the RadioFest by both amateurs and manufacturers.

The ACMA will provide an update on regulatory issues and FAMPARC will give a detailed talk on their remote-operation-transceiver that they have set up at their club rooms for member use.

In addition we will have two key manufacturers displaying their products and presenting lectures on their latest equipment enabling participants to ask questions directly to the representatives.

Icom will be displaying some of their latest equipment and will no doubt give us an update on the exciting new products released at the Tokyo Ham Fair.

For the first time in Australia we are very pleased to have Apache labs display their range of the very latest Software Defined Radio products (ANAN series) together with a presentation by their key representative in Australia. If you are interested in Software Defined Radio this session is not to be missed.

As the SPARC RadioFest is located on the Mornington Peninsula, with very easy access from Melbourne via the new Peninsula Link, the day's outing to the RadioFest can also provide entertainment for the whole family through the wide range of nearby tourist attractions.

We look forward to seeing you all on Sunday 30th November, starting at 9.30 am. For further details or table booking information refer to the advertisement in this issue of *AR* magazine or go to the SPARC web site: *http://rosebudradiofest.com*

73 from VK3BSP, The Southern Peninsula Amateur Radio Club.

A view of the venue and some of the attendees at the 2013 RadioFest.

VK6news

Keith Bainbridge VK6RK

Welcome to this month's edition of VK6 Notes written just as the contest season starts in earnest, have/will you be having a go this year?

The Hills Group can get us off and running this month

News from **HARG - The Hills Amateur Radio Group**

Quite a few activities are planned for October and will be completed by the time you read this. HARG are planning to enter the Oceania DX Contest from the club shack on October 4th and 5th. Also we have a small sub-committee who are arranging to run JOTA for the Paxhill Girl Guides with whom we share our club rooms. Another group of members will be arranging to install extra guy wires to the mast to enable us to safely wind the HF beam up to an increased height. Finally, our QSL Manager John VK6AU has had to resign his position due to family commitments but Ian, VK6PXF one of our newest committee members immediately volunteered to take on the job. Thanks Ian.

Now for the future news. On Saturday 29th November, club member Mal VK6LC will be entertaining us with an illustrated talk on his recent overseas tours to operate from North and South America during the months of May, June and July this year. Mal will talk about the operating conditions in America and the different ways in which Amateurs approach their hobby in South America. Everyone is welcome. The talk will be held at our club rooms in Lesmurdie.

On Saturday 13th December we will hold our annual Christmas barbecue and I will give more details of that in next month's issue of AR Magazine. As usual everyone is welcome. The new committee is keen to hear suggestions from members and others for practical activities and technical talks at future meetings. The official contact point for the club is *secretary@harg.org.au* or PO Box 367 Kalamunda WA 6926.

HARG Meetings are held twice a month at our club rooms near the corner of Brady and Sanderson Roads in Lesmurdie. Our Social and Practical meeting is held on the second Saturday of the month and our General Meeting, often with a technical talk, on the last Saturday of the month. Doors open at 12.30 pm for a barbecue lunch and the meeting starts at 2.00 pm. More information at www.harg.org.au.

Cheers and 73 until next time from Bill VK6WJ Publicity Manager for HARG.

Thanks Bill, the Hills Group is going well!

Now around to Anthony for WARG.

News from **West Australian Repeater Group (WARG)**

President Anthony VK6AXB provided this update:

WARG members are presently continuing work on a number of fronts in our efforts to maintain and improve our repeater sites.

As I write, bad weather has unfortunately thwarted a working bee planned for September 28th at our Cataby site, 150 km north of Perth. However, site manager Craig VK6FLAM is undeterred, and will schedule a new date as soon as possible. Bob VK6POP, site manager of our Tic Hill site north-east of Perth advises that the working bee to upgrade Tic's solar installation is still on track for early October, and should have taken place by the time this appears in print.

Our Roleystone sites have required some maintenance inspection visits, and discussions with the site owners regarding planned improvement works are continuing. In early September a minor TX issue was corrected with the 70 cm repeater VK6RAP (439.800), thanks to Tony VK6TG. Interference affecting the 6 m repeater is being investigated. Work to repair a faulty transmitter on the HF beacon VK6RBP is also under way, thanks to Steve VK6SJ. The VK6RWN D-STAR restoration is also going well, thanks to the efforts of Joe VK6ZTN – some site issues are being clarified, after which it should be possible to properly get D-STAR back on air.

WARG's website is in the progress of being updated, thanks to the hard work of Chris VK6FCBG, whose initiative in volunteering to take on this task is appreciated.

Long-time WARG member Will VK6UU has been experimenting with Yaesu's Fusion digital radio system, and we hope to feature a presentation from Will on this topic at a future meeting.

WARG meetings take place on the first Monday of every month (or the second Monday, if the first one is a public holiday). Remaining meetings for 2014 will occur on Monday 3 November and Monday 1 December. Our first meeting for 2015 will take place on Monday 2 February, there being no scheduled meeting in January.

Meetings are held at the Peter Hughes Scout Communications Centre, corner Gibbs St and Welshpool Rd, East Cannington. All are welcome to attend. Doors will be open at 7, for a 7:30 pm start. Tea & coffee is available, and there's usually time for socialising before and after the meeting.

WARG's Technical and General net continues every Sunday at 1030 local time, on VK6RLM Roleystone, 146.750.

More information is available on WARG's website which is *www.warg.org.au*, or email *secretary@warg.org.au*

Cheers Anthony, WARG has been busy!

Down south now to our beautiful Wine region, and Norm VK6GOM.

Hello again from **Bunbury** in South Western Australia. I am pleased to report that as part of our new direction as a South West club, our August meeting was held in Busselton. The meeting took place in the Masonic Centre in West Street in the CBD and the attendance was exceptional, with members coming out of the woodwork. Clearly, out of Bunbury meetings have created some interest and clearly have merit. The November meeting is planned for Manjimup and will be held in the SES building.

Congratulations to Danny (VK6FDRW) and Neil (VK6FNKS) on celebrating their respective birthdays. These two are stalwarts of BRC and provide a lot of work for the club in helping the newer members.

Neil (VK6FNKS), Darren (VK6FGWN) and Dicko (VK6FSDU) participated in the International Lighthouse Lightship Weekend at Bunbury. Due to circumstances beyond their control they were limited to the 40 metre band and as a result the numbers of contacts were not record breaking. However, this didn't stop them from having a good time. Their experience raised the old issue of the clash between the Lighthouse Weekend and the Remembrance Day contest. It is understood that the WIA is aware of the matter, but that little can be done to resolve this problem.

We are still planning to hold licence upgrade assessments in November if there are enough people interested. At this stage we have about three amateurs interested, but would like a couple more to make the activity viable. Any club members or non-members wishing to upgrade, or sit for a licence, should please contact Norm VK6GOM on 0438 878 582.

Our esteemed President Neil VK6FNKS is working on providing a link to the ACRM UHF repeater in Dunsborough to carry the WIA News. By disseminating WIA news to a wider audience it is hoped that this will further the aims of the institute and amateur radio in particular.

At our last monthly meeting it was agreed that Dicko VK6FSDU be absolved from paying the annual subscription in recognition of the contribution he makes to the BRC by providing a location for meetings. Having a regular meeting place is very important to the growth and stability of our modest organisation.

Over the last couple of weeks we have had an interesting electronic discussion over rust removal techniques. Apparently, Phil VK6SO has been using molasses to de-rust motor cycle parts etc. for a while now with a good success rate! According to Alek VK6AP you can buy molasses in bulk from farm supply shops quite cheap. Despite some scepticism from some quarters, others are aware of this technique and claim it is very *effective*.

The Club has acquired a number of 7 and 9 element 2 m Yagis from a deceased estate. These are being sold to club members for a modest price; the proceeds will go to the clubs coffers.

Any South West based amateur is more than welcome to join and participate in our activities. The annual fee is only $25.00. Recognising that many SW amateurs do not reside in Bunbury, we are steadily evolving to make the club more attractive to remote members. Amateurs wishing to join can contact the Club via our Secretary, Brian Andrews, on 0403 975 953 or *vk6brc@wia.org.au*

Also if passing through put out a call on our repeaters 146.650 or 438.650.

Thanks Norm, busy, busy down south lately!

And even deeper south an update from the **Southern Electronics Group** from Rob VK6LD:

A number of commemorative events will be taking place in Albany from the 31 October to 2 November 2014 to mark the 100th anniversary of the departure of the first convoy of ships carrying ANZAC troops and the significant role Albany has played in Australia's ANZAC history. Albany was the assembly point for many ships setting sail for Gallipoli and the Western Front. Albany was the last place for many soldiers that they saw Australian soil.

In recognition of this significance the Department of Veteran Affairs (DVA) has given permission for the WIA to use the ANZAC name in special event amateur call signs.

After negotiation with the WIA & ACMA and with many, many thanks to Bob VK6POP who acted as our go-between, SEG has been granted permission to use a special event call sign VI6ANZAC over the weekend of the Albany commemorative events.

Southern Electronics Group (SEG) will be the first club in WA and the second club in Australia to be granted use of an ANZAC Centenary Special Event call sign.

SEG will be restricted using the call sign to one 24-hour period on **Saturday 1 November 2014.**

A number of local amateurs and some helpers from Perth and Manjimup will take part in the event, which will be a great "once in a lifetime" opportunity!

The special event call sign and QSL Card is expected to be highly sought after by VK amateurs and overseas amateurs alike, as use of the ANZAC call sign suffix is being highly regulated by WIA, ACMA and Department of Veteran Affairs.

Depending on propagation, activity will primarily focus on activity on the HF bands (80, 40, 20, 15 & 10) and WARC bands (30, 17 & 12) + 160 m if possible. Also if we can find some interested operators, there is some possibility of digital modes & CW.

We hope that our internet access won't be too slow with the

influx of tourists to Albany and be able to post regular updates on VK Logger & DX Cluster on the day.

In the lead up to the event we will be posting updates to the VI6ANZAC QRZ page, found here: *http://qrz.com/db/vi6anzac*

73's Rob...VK6LD

At this time in our countries history it is very appropriate that these occasions are celebrated, so hopefully you will have the chance to work the SEG on this special day.

The **VHF** group have been busy securing their tenure on the site at Wireless Hill, more from Terry VK6ZLT.

Photo 2: President Stu VK6LSB and Eric VK6FEDS on the tower top.

News from the **WA VHF Group Inc.**

AT LAST after 59 years, Australia's oldest continuous amateur radio club the "West Australian VHF Group Inc." Now possesses a permanent home in the Transmitting Cottage of the Wireless Hill Museum at Wireless Hill, Ardross in West Australia.

All thanks must go to Bob VK6KW (Museum Representative) and Tom VK6ZAF (President) after negotiating the final outcome with the City of Melville.

Signing of the lease took place Sunday 15th June 2014 with Tom VK6ZAF and the City of Melville represented by the Mayor Mr. Russell Aubrey who warmly congratulated all of the members present at the ceremony and commented on the long association with the Wireless Hill Museum and the WA VHF Group.

As the weekend was the inaugural "International Museums Weekend" and with the assistance of Bob VK6KW using the clubs HF setup alongside of the museum under the call sign of VK6WH the Mayor Russell Aubrey acquitted himself admirably in making contact with Joe VK3YSP whose station was set up outside the Melbourne Museum. An excellent contact exchange took place to the satisfaction of all concerned.

That's great news Terry, I know it has long been a concern as to if the group had a future at Wireless Hill, excellent!

Now from Wayne VK6EH the outgoing secretary of the **NCRG**, a much relieved outgoing Secretary after four years:)

Hi once again from NCRG.

This month two brave members scaled the "G" Tower for some maintenance etc. Pictured are President Stuart Bedford VK6LSB (Left) and Eric Simms VK6FEDS on the platform at 60 feet (18.3 m), the boys were attaching a pulley and halyard for hoisting various wire antennas for testing etc. They also took the time to check antenna terminations and also measure up dimensions for a proposed fall arrester system.

We are fortunate to have both Stuart and Eric as members, both have rigging and working at heights qualifications.

This tower houses our 40 m 3 element Beam and 2 m/70 cm repeater antennas.

The "G" tower got its name from a member "G"erald VK6XI who was able to obtain the basic tower from an employer and then carried out the extensive modifications needed to bring it to NCRG requirements including the platform the boys are standing on, rotator mounting and ladder etc. Gerald along with member Brian (Darby) Munro, VK6FONC were instrumental in arranging the large crane used to erect the structure as well as supervise the standing process.

The tower is free standing, and is bolted to a HUGE concrete

Photo 1: VHF Lease signing: L to R: Bob VK6KW, Tom VK6ZAF, Russell Aubrey (Mayor) signing of lease agreement with the City of Melville for the use of the Transmitting cottage Wireless Hill.

base, antenna feed lines and rotator cabling are run in 100 mm underground ducting from the main building and attached to the tower on cable trays to the upper level where they are terminated in a special outdoor distribution cabinet.

Other projects include a remote HF system which is sizzling away on a back burner, we have our SteppIR antenna and making progress with rearranging our antennas to allow the SteppIR to be fitted to our original tower and re site our 20 m monobander to a new tower, all work in progress as time and finances permit.

By the time this is read, NCRG a will have had our AGM and some new office bearers will have taken the reigns and I wish them all the best.

That's about it for this month, hoping this finds you all well and enjoying good DX.

73 de Wayne VK6EH

Secretary NCRG

Cheers Wayne, and I can report that the AGM of the NCRG was held on 28th September and the new committee is Stu VK6LSB remaining as President, yours truly Keith VK6RK as VP, James VK6FJA Treasurer again and Ian VK6ZIC as our new Secretary.

As we have updated our constitution, we now have two more committee members, Larry VK6NOL as a much appreciated Equipment Officer and Anthony VK6AL as a general committee member.

After the AGM we had a BBQ and some visitors arrived while it was happening.

Mirek VK6DXI brought along Luca IK2PFL and his wife, more from Mirek.

Thanks for having us.

Luca was so excited and it was nice to see somebody excited about amateur radio again.

https://picasaweb.google.com/vk6dxi/20140928AtVK6NC?authkey=Gv1sRgCNnDhIPCheacNA

Sorry I did not take more pictures, but things happened so fast and most of the guys disappeared in no time.

Luca is a hard-core contester from Italy and operated many times from a world winning Cape Verde station.

No problems Mirek, it was a pleasure to have a chat with Luca and his wife, lovely people! Luca had a spell in the club main shack and although there had been a major flare earlier that day, managed to work some good DX!

Well folks as Peter Cundall used to say on Gardening Australia, That's your blooming lot for this month!

Hopefully I will catch up with you all next month and I'd appreciate all the Xmas info well in advance.

73 es gud dx de Keith VK6RK

Silent Key

Greg Postuma VK3VOX

Greg obtained a qualification as a Radio Tradesman after studying at Box Hill TAFE, and spent the majority of his working life with Telstra.

He successfully passed the AOCP Standard Operating examinations in 2005 and was allocated the callsign VK3VOX. Greg joined both the Geelong Amateur Radio Club (GARC) and the Geelong Radio and Electronics Society (GRES) and actively participated in the programs of both organisations.

He was a member of the Geelong region's WICEN group and participated in a number of exercises, particularly the annual Great Otway Bike Ride.

On the 27th August 2007 Greg joined the Country Fire Authority's Region 7 Headquarters Brigade.

Greg had a passion of things historical, and read widely on many subjects. He was guest speaker at

the GARC on a number of accession and his talks were absorbing and technically stimulating. His final presentation on March 14th this year included a collection of audio visual advertisements, which those of us old enough to remember, preceded the introduction of Decimal currency on the 14th Feb 1966.

For five years Greg was associated with the Geelong Museum Association his role included cataloguing and classifying information and exhibits, assembling wall displays, acting as a guide on open days, and during special events.

The commendation "Quiet Achiever" is bandied about today often in inappropriate circumstances, but Greg is worthy of that accolade. He was respected by his peers, admired for his fortitude when confronted with particularly difficult circumstances and admired for his technical competency. He will be greatly missed by all his friends, but not forgotten.

The above is extracted from a Eulogy given in commemoration of Greg by Barry VK3SY.

Contributed by Tony Collis VK3JGC.

Hamads

WANTED - NATIONAL

Seeking information about Amateurs who served - Particularly Women

The official badge of the RAAF Wireless Reserve authorised in 1945.

Thank you to all who have responded by forwarding information about amateurs who served, or forwarded other appropriate material relating to wartime activities. Some interesting articles are "in the pipeline" and it is encouraging to hear from amateurs who are preparing material for AR. If you are preparing such an article, please let me know as we may have some appropriate support material in the archive.

Jenny VK5ANW/VK3WQ is writing an article about YLs who served during the war either directly, or by providing training facilities. Some interesting new material has surfaced, and it appears that a few of the ladies were possibly involved in the Japanese code-breaking activities, but definitive information is lacking. Can anyone help? Jenny can be contacted via vk5anw@wia.org.au

We are still seeking information about amateurs who were involved in the Coast Watchers. Some tantilising information has come from Greg VK2SM about a VK9 (Port Moresby) who later became a VK2, but we need more - especially names or callsigns.

As mentioned last month, we are aware of war-time, amateur based emergency Civil Defence communications networks in VK2, VK5 and VK6. Presumably similar groups existed in other states. We would like to know more. Perhaps there is some detail buried away in club histories. Can anyone help please?

Please forward comments or material for this project to the History and Archive Committee c/o the WIA Office or contact the WIA Historian, Peter Wolfenden VK3RV via email vk3rv@wia.org.au

P.S. A typo crept into my article about *Walter Hannam*. He was born in 1885, not 1895. Later in the article, where his Army details are included, it is clear that his dob is 1885.

Peter

FREE – VIC

My entire collection of *AR* magazines from 1942 to present day.

Also collection of amateur radio equipment and antenna catalogues including many instruction manuals.

QTHR Ron VK3OM 03 5944 3019

WANTED – VIC

Icom IC-745 Transceiver.

Contact Fred VK3JM on Email *vk3jm@bigpond.com* or Phone 03 9801 4972, QTHR

WANTED – NSW

Multimeter Uni Volt Type DT - 4500 Instruction Manual or copy.

Please contact Malcolm Sinclair VK2BMS QTHR or Email *vk2bms@bigpond.com* Phone 02 9958 1114.

FOR SALE – SA

Fibreglass whip.

Total length = 3.37 m. (11 ft). Base section is metal tubing, 70 cm in length, Freq = 480-500 MHz. N connector.

Built by Polar Electronic Industries. Model 354. Looks in good condn.

No charge. John VK5EMI, Belair. *dellio2@bigpond.net.au*

08 82781269 or 0411 610 106

FOR SALE – WA

High Performance SDR (HPSDR) Munin 100 W Power Amplifier kit (for Penelope and/or Hermes) compiled by Don K3DLW and covering 160 m to 6 m.

The amplifier suits the Penelope/Penny Whistle low power PA boards or the Hermes transceiver. Specifications from its designer Kjell LA2NI are a PEP output with -30 dB 3rd order intermodulation of >90 W on all bands from 1.5 to 55 MHz.

The gain is within +- 2 dB for the same frequency band. For further details, see *http://openhpsdr.org/wiki/index.php?title=MUNIN* $200. Contact Steve VK6VZ at *vk6vz@arach.net.au*

ADVERTISERS INDEX

Contributions to *Amateur Radio*

AR is a forum for WIA members' amateur radio experiments, experiences, opinions and news.

Your contribution and feedback is welcomed.

Guidelines for contributors can be found in the AR section of the WIA website, at *http://www.wia.org.au/members/armag/contributing/*

Email the Editor:
editor@wia.org.au

About Hamads

- Submit by **email (MUCH PREFERRED)** or if written and mailed please print carefully and clearly, use upper AND lower case.
- Deceased estates Hamads will be published in full, even if some items are not radio equipment.
- WIA policy recommends that the serial number of all equipment for sale should be included.
- QTHR means the address is correct in the current WIA Call Book.
- Ordinary Hamads from those who are deemed to be in general electronics retail and wholesale distributive trades should be certified as referring only to private articles not being re-sold for merchandising purposes.
- Commercial advertising on these pages Contact admanager@wia.org.au
- Copy to be received by the deadlines on page 1 of each issue of Amateur Radio.
- Separate forms for For Sale and Wanted items. Include name, address STD telephone number and WIA membership number.

'Hamads'
PO Box 2042
BAYSWATER VIC 3153
hamads@wia.org.au

WIA Functional Committees

The WIA is a membership organisation with a very wide range of complex functions and member services. Core functions and services are administrative in nature (general administrative functions, membership services, examination and callsign management, financial etc...) and are performed by salaried staff.

Volunteers perform a diverse range of highly specialist functions (ACMA liaison, Frequency Co-ordination, Standards liaison, Interference issues, technical support and training and assessment etc.). These volunteers provide the majority of member services, however they have been loosely organised and often overstretched.

The new committee system attempts to structure the WIA's non-core activities into 10 broad functional areas, each comprising a team of volunteers under the direction of the WIA Board. This structure is intended to spread the workload on our volunteers, improve communications between members and the WIA Board, improve services to members, and encourage more people to become involved in the WIA.

WIA Committee Charters

Spectrum Committee

(Regulatory, ACMA, ITU, IARU, Repeaters & Beacons, Standards, Interference & EME, Monitoring Service)

Geoff VK3AFA, Phil VK2ASD (Director), Peter VK3MV, Roger VK2ZRH (Director), Brian VK3MI, Dale VK1DSH, Peter VK3APO, Richard VK2AAH, Gilbert VK1GH, Rob VK1KRM, Noel VK3NH, Doug VK3UM

- Perform all ITU and IARU liaison activities.
- Liaise with, and act as the 1st point of contact for, the ACMA.
- Advise the Board, and enact Board policy in relation to all radio communications regulatory issues and the LCD.
- Represent the WIA to State and Local Government
- Represent the WIA to Standards Australia
- Provide specialist technical advice and coordinate repeater and beacon licence applications and frequency allocation.
- Develop responses to significant and prolonged harmful interference issues affecting amateur radio operations.
- Provide an information resource for EMC/EMR issues.
- Administer the IARU Monitoring Service in Australia
- Provide a technical resource to other committees and the WIA Office.

Technical Advisory sub-Committee (Tech support, Band plans etc.)

John VK3KM, Doug VK3UM, Rex VK7MO, Paul VK5BX, Walter VK6KZ, Barry VK2AAB, Bill VK4XZ, Peter VK3PF, Paul VK2TXT, Peter VK1NPW, John VK1ET, Peter VK3BFG, Eddie VK6ZSE, Peter VK3APO

Administrative Committee

John VK3PZ (Treasurer), Greg VK2GRJ (Assistant Treasurer), David VK3RU (Secretary), Mal VK3FDSL (Office Manager), Phil VK2ASD (President), Chris VK5CP (Vice President)

- Responsible for the efficient and correct operation of the WIA office.
- Responsible for staffing and workplace safety.
- Provide a specialist administrative resource to the WIA office as required.
- Manage contractual agreements.
- Manage business relationships.
- Ensure compliance with the ACMA Business Rules
- Prepare yearly budgets
- Prepare quarterly financial reports for the Board
- Prepare independently reviewed YE financial reports and balance sheets for circulation to the membership prior to each Annual General Meeting.
- Manage insurances and to be responsible for currency of insurance policies.
- Maintain a complaints register.
- Ensure complaints are handled in accordance with WIA policy and any contractual agreements.

Affiliated Clubs Committee

Ted VK2ARA, Mal VK3FDSL (Office Manager), John VK3PZ (Treasurer), Phil VK2ASD (Director)

Communications, Marketing, Publications and AGM Committee

Robert VK3DN (Director), Phil VK2ASD (Director), Jim VK3PC, Graham VK3BB (Broadcast), Roger VK2ZRH (Director) Publications sub-Committee (AR Magazine, Callbook etc): Peter VK3PF (Editor AR), Peter VK3PH (Editor Callbook), John VK3PZ (Treasurer), Ernie VK3FM, Peter VK3AZL, Evan VK3ANI, Ewan VK3OW, Bill VK3BR

- Communication with members and the public:
- Communicate with the membership.
- Publicise WIA activities and initiatives.
- Develop strategies and resources for the promotion of Amateur radio to the public.
- Develop strategies and resources for the promotion of WIA membership to the Amateur community.
- Supervise and/or perform promotional activities.
- Co-ordinate the yearly AGM activities

Education Committee

Fred VK3DAC (Director), Owen VK2AEJ, Ron VK2DQ, Mal VK3FDSL (Office Manager)

- In association with the WIA's RTO and affiliated clubs offering training services, develop and administer the WIA's training and assessment systems.
- In association with the Spectrum Strategy Committee, develop and maintain the various licence syllabi and associated question banks.
- In association with the Community Support Committee and the RTO, develop and maintain the Emergency Communications Operator scheme.
- Ensure the confidentiality and security of all personal information, question banks and examination papers.

Radio Activities Committee

Chris VK5CP (Director), Geoff VK3TL

Contests sub-Committee

Alan VK4SN, Denis VK4AE/3ZUX, John VK3KM, Tony VK3TZ, Kevin VK4UH, Colin VK5DK, James Fleming VK4TJF

Awards sub-Committee

Bob VK3SX, Marc VK3OHM, Laurie VK7ZE, Alan VK2CA, Alek VK6APK, David VK3EW, Paul VK5PAS, ARDF sub-Committee: Jack VK3WWW, ARISS sub-Committee: Tony VK5ZA

- All activities associated with actual radio operation, such as: contests, awards, distance records, QSL services, ARISS, AMSAT, ARDF etc.

QSL Card sub-Committee

Geoff VK3TL, Alex VK2ZM, John VK1CJ, Max VK3WT, Ray VK4NH, Stephan VK5RZ, Steve VK6IR, John VK7RT, Craig VK8AS

Historical and Archive Committee

Peter VK3RV, WIA Historian, (Leader), Drew VK3XU, Linda VK7QP, Martin VK7GN, Ian VK3IFM, Will VK6UU, David VK3ADW, Jennifer VK3WQ/VK5ANW, Roger VK2ZRH (Director)

- Develop, maintain and preserve the WIA's historical and archive collection
- Encourage access to the collection by WIA members and those seeking historical material for publication.

IT Services

Robert VK3DN (Director), Tim VK3KTB

- Provide an IT resource to other committees and the WIA Board.
- Be responsible for the off-site data back-up of all IT systems information.
- To update and maintain the WIA website as required.
- Advise the Administrative / Financial committee in relation to the MEMNET Cloud Service contract.

Community Service Committee

Fred VK3DAC (Director), Greg VK2GRJ (Assistant Treasurer), Ewan VK4ERM (Director), Paul VK5PH

- Develop, promote and co-ordinate all WIA community support activities

New Initiatives

Phil VK2ASD (Director), Robert VK3DN (Director), Roger VK2ZRH (Director), David VK3RU (Company Secretary)

- Think-tank ideas and initiatives to advance amateur radio and WIA membership.
- On approval by the Board, run proof of concept trials.

Club Grants sub-Committee

Reg VK7KK, Peter VK3KCD, Bill VK4ZD

- Manage all arrangements between the WIA and WIA Affiliated Clubs
- In cooperation with the Administrative / Financial committee, manage the Club Insurance Scheme
- Encourage stronger relationships and communications flow between the WIA and WIA Affiliated Clubs
- Encourage increasing WIA membership ratios in Affiliated Clubs
- Manage the Club Grants Scheme
- Identify and bring regional Affiliated Club issues to the attention of the WIA Board.

WIA **2015** Callbook

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