

Amateur Radio

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160 m with a kite

- ▶ Extended Double Zepp Loop Antenna
- ▶ Preparing for travel to EU
- ▶ IARU Region 3 history

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General

Sending QSL cards to the Outwards QSL Bureau 7
John Seamons VK3JLS

Radio amateur and woman fire fighter 11
Fred Swainston VK3DAC/VK4FE

Significant amateur radio equipment exhibits and the WIA archive 22
Peter Wolfenden VK3RV

The Journey to Europe 25
Brian McDermott VK3BCM

IARU Region III Inaugurated in Sydney - 50 years ago 27
David Wardlaw VK3ADW and
Peter Wolfenden VK3RV



This month's cover:

Using a kite to support an antenna for 160 m on Mount Hotham. Warren VK3BYD and Bernard VK2IB/3 operating 160 m SOTA. Photo by Robyn Brown.

Technical

Extended Double Zepp Loop aerial (EDZLA) 8
David "Doc" Wescombe-Down VK5BUG

Work the World with WSJT-X Part 2: Codes, Modes, and cooperative software development 12
Joe Taylor K1JT, Steve Franke K9AN
and Bill Somerville G4WJS

Review: The radiosport RS20S "Dream Edition" headset 20
Peter Freeman VK3PF

Columns

ALARA	51
Board Comment	3, 4, 5
Contest News	54
DX Talk	44
Editorial	2, 5
Hamads	43
Silent Key	11, 19, 43
SOTA & Parks	38
VHF/UHF – An Expanding World	31
WIA Awards	41
WIA News	6
VK2 News	50
VK3 News	53, 60
VK5 News	62
VK6 News	58
VK7 News	46

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.

Back Issues

Back issues are available directly from the WIA National Office (until stocks are exhausted), at \$8.00 each (including postage within Australia) to members.

Photostat copies

If back issues are unavailable, photocopies of articles are available to members at \$2.50 each (plus an additional \$2 for each additional issue in which the article appears).

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

Your chance to be heard

Just after this issue is due to be delivered, many will be gathering at the 2018 Annual General Meeting (AGM) on the Gold Coast. The chances are that you may be reading these comments after the meeting has concluded....

The AGM is one chance for all members to voice their comments regarding the Institute and to raise any questions directly with the Board in a public place – the Open Forum.

We live in a large country and many members may not be able to attend such a meeting. Any member can at least participate by completing the Instrument of Proxy, available on the WIA website. I found it interesting when using the web site search tool that the search term “Proxy Form” produced only results relating to items other than the actual form. The form is easily found if you search for “proxy instrument”....

At this AGM, members are being asked to consider the normal annual reports, as detailed in the Notice of Annual General Meeting (see page 13 of Issue 2 2018 (March April issue) of this magazine. The notice also lists an item regarding some amendments to our constitution. The proposed changes are detailed on pages 30 and 31 of Issue 2 2018 of the magazine.

The form is generic. You have choices to direct the manner in which the form is used and/or may allow the Chair of the meeting to use the proxy as he/she sees fit, or direct the proxy to another WIA member who will be present at the meeting. Whilst space on the actual form is limited, I am sure that more detailed instruction regarding how

your vote may be used would be acceptable, provided that such instructions are included with the form.

Note that the completed form must be received by the WIA Office at least 24 hours prior to the scheduled start of the meeting. You can print out the form, complete the required details and then scan the document and email it back to the email address on the form.

As I prepare these comments, I am unsure if I will be making the long trip to Sea World. I am still considering my options, with only one week until registration closes.

Contributor needed

Are you interested in the Contests scene? Many readers will have noted that the last couple of issues of the magazine have been without a Contests column due to the retirement of the previous contributor. We are still seeking a new contributor to provide information every second month about Contests. Individual managers of Australian Contests usually provide information on their upcoming contest and also at least summary results, and these are published as separate articles. The task should not be too onerous, as we anticipate around one page of content every two months (around 750 - 1000 words). If you are willing to help, please email me at editor@wia.org.au

I note that the Contest Committee is seeking a manager for the VK Shires Contest. See the report on page 54.

Continued on page 5



Board comment

Justin Giles-Clark VK7TW

Year in Review

The objects for which the WIA is established are at the end of each Board meeting's Agenda and Minutes. This is to remind the Board of why it is there. For the purposes of this review I have used these objects to demonstrate what has been achieved, supported and changed in the last year.

1. Promote, advance and represent in any way it thinks fit Amateur Radio and the interests of Radio Amateurs, and without limiting the generality of the forgoing.

The Board is ensuring the foundations are in place for the future. Under the promotion and advancement object, the Board is focused on being open and transparent with members. The WIA is consulting and communicating with members through a wide range of mechanisms. These include the website, Facebook, Memnet, surveys, *AR* magazine and National News broadcasts.

The Board is actively making the organisation more sustainable and lowering the risk profile. The Board will post a loss for 2017 as you will have seen from the Annual General Meeting (AGM) financial reports. The Board has put in place measures to reduce this in 2018. The 2018 budget has a high level of provisioning for a range of areas that need attention. The 2018 budget is on track and balancing.

The 2017 Board suffered from a lack of documented organisational memory especially in the finance area because of an almost complete change of the Board. The Board is addressing this through a revised organisational structure, through

creation and revision of Terms of Reference for each committee and a sensitive volunteer renewal program. This is slowly alleviating the single point risks the Board has identified.

Under the objective of representation, the Board has an excellent working relationship with the ACMA and is actively planning what the amateur radio service will look like under the new *Radiocommunications Act*. The Deed of Agreement for delivery of Australian Communications and Media Authority (ACMA) services by the WIA expires in 2019. It is recognised that any new contractual arrangement with the ACMA will need to be based on the real cost of delivering the service. This will more than likely involve increased cost of services.

In 2017 the Volunteer Charter was released. This is an important defining document on governance, recruitment, retention, managing, supporting and setting expectation levels for both the volunteer and the WIA. The Board has also introduced a Volunteer Agreement.

The Board is actively working toward steering not rowing the organisation - this is a challenging organisational culture change that will take time - especially as the WIA is a volunteer organisation.

2. Protect and enhance the privileges of Radio Amateurs

The Board views the Licence Condition Determination (LCD) submission to the ACMA as an once-in-a-lifetime chance to re-position the hobby for the future. Therefore, the WIA has taken time to fully research and analyse survey

results, comments and inputs to support the submission.

There have been many consultations undertaken, submissions to and meetings with the ACMA:

- Analysis of the draft radiocommunications legislation released in May 2017.
- Three phases of consultation with the amateur radio community for the new radiocommunications legislation and revised LCD: Phase 1 general principles, Phase 2 proposed changes to each licence grade, Phase 3 outstanding issues (May-July 2017).
- 3575-3700 MHz band changes consultation with Amateur Radio community (June 2017).
- Attendance at radiocommunications legislation consultation session (June 2017).
- Consultation with Amateur Radio community on the ACMA Interference Management proposal (August 2017).
- Drafting and submitting response to the ACMA on 3575-3700 MHz band changes using the consultation response (August 2017).
- Drafting and submitting a response paper using the consultation information on the radiocommunications legislation (August 2017).
- Drafting and submitting a response to the ACMA Interference Management consultation (September 2017).
- Attendance and reporting on the RadComm 2017 (October 2017).

- Drafting a response paper using the LCD consultation information (commenced November 2017).
- Spectrum Strategy Committee workshop with Board members on LCD submission.

Supporting both WIA objective two and five is the WIA International Amateur Radio Union (IARU) Monitoring System that is part of the IARU global monitoring activities of the Amateur Service across all three IARU regions. Information is shared with the ACMA and other national societies within the IARU to assist with locating and identifying intruders.

3. Encourage an awareness of the value of Amateur Radio

The Board supports the building of social capital through its affiliated clubs scheme. The local clubs provide networks of relationships among people who live and work in a particular society, enabling that society to function effectively. You have probably seen publicity about Men's Sheds, Maker and Hacker Spaces? Amateur Radio has been providing these spaces and has been building up social capital for well over 100 years!

WIA support of the Amateur Radio on the International Space Station (ARISS) program is a very visible demonstration of the value of amateur radio. To see the wonder on children's faces when they talk to an astronaut is immeasurable. These are the powerful events (powered by amateur radio) that children remember.

The embryonic STEM program within the WIA is certainly an area full of opportunity that the Board is very interested in developing along with alliances with Science, Maker, Hacker and the Schools in Amateur Radio (SARC) groups and gatherings.

The flag ship magazine of the WIA - *Amateur Radio* magazine is still going strong and providing a vehicle for the sharing of a broad range of information to members and the public.

Special events stations like V150IARU and VK100MARCONI are a great way of raising awareness about the hobby. Stations are usually in a visible public place and allow amateurs to demonstrate their passion for the hobby.

There is a constant flow of Amateur Radio News Bulletins sharing the news and views of amateur radio. The podcast of the WIA National News assists the awareness of amateur radio to non-amateur radio enthusiasts.

4. Educate and encourage potential Radio Amateurs

The WIA facilitates training and assessment services through its Nominated Training Organisation (NTO) – Silvertrain – and club Assessors and Learning Facilitators. The voluntary contribution to these activities by the WIA NTO, the Assessors, and the many others at Institute and a club levels, provides a service at a far lower cost than could be otherwise offered, particularly by a commercial for-profit organisation.

It is a welcome trend to see more Assessors and Learning Facilitators becoming available.

Another welcome trend is the higher numbers of assessments being passed and processed.

The revision and republishing of The Foundation Manual – Your Entry into Amateur Radio supports the education and encouragement of radio amateurs. This publication is certainly on the WIA's best seller list!

5. Represent Radio Amateurs both nationally and internationally

The WIA is actively involved in IARU Region 3 and ITU activities and contributes funds to

honour its commitment to send representatives to these activities.

In the last year the WIA has funded, through the IARU or directly, representatives attending these international meetings:

- ITU Working Party 5 meeting in Geneva in May 2017
- APG-2 Meeting in Indonesia in July 2017
- ITU Working Party 5 meeting in Geneva in November 2017.

One aspect of the hobby is its truly global nature. Having an Amateur Radio licence is like having a passport that allows you to travel to other countries via the airwaves. There are virtual international borders subject to an international treaty to which Australia is a signatory. Radio amateurs make many friends nationally and internationally. Amateur Radio provides an opportunity to learn more about different cultures, and contribute to international goodwill and increase social capital.

The WIA maintains the Band Plan. This is a voluntary agreement sponsored by the WIA for the benefit of all amateurs. The band plan is created to give all amateurs a fair go. The band plan also facilitates regional and international band and mode harmonisation.

6. Provide services for Radio Amateurs and those interested in Amateur Radio

Training and assessment services are provided to everyone whether a WIA member or not.

Affiliated clubs services include:

- facilitation of cost-effective public liability insurance for affiliated clubs
- an education and training service for all aspiring and

	Nom. Assessors		WIA Assessors		L/Facilitators	
	2017	2016	2017	2016	2017	2016
TOTAL	25	24	223	217	49	47

Assessments Processed	Year		Assessments Passed	Year	
	2017	2016		2017	2016
TOTAL	832	793	TOTAL	771	741

- current amateur radio operators
- central recording and provision of club information, training and assessment contact details for people to find a trainer and assessor near them.

Weekly National News broadcast and podcast service provide the news and views of amateur radio from Australia and the world. The website and Facebook pages of the WIA provide information, technical reference material and a services portal for the WIA and all amateurs.

The production of an annual callbook is another service the WIA provides for all amateurs.

Callsign Management Services provided on behalf of the ACMA for all amateurs saw 1,031 callsign recommendations in 2017 versus 1,146 in 2016. This is an area where the real cost of service provision is currently being reviewed.

The WIA currently supports seven amateur radio contests and manages the Contest Champions facility which aggregates the scores

from seven popular WIA contests. The WIA also manages over 15 Contest Awards.

WIA Merit awards are presented at Annual General Meetings to recognise significant achievements within the WIA.

The WIA provides a cost-effective inwards and outwards QSL Bureau for members of the WIA.

The Technical Advisory Committee (TAC) provides technical information, advice and recommendations to the WIA in a broad range of modes, frequencies and specialities. The TAC also manages the National Repeater and Beacon planning for all amateurs.

At an operational level the Board is actively seeking to improve the processes and functions using continuous improvement principles. This has seen the introduction of a Ticketing system to provide consistent process and service levels for members.

In 2017 the WIA welcomed 242 new members which is a welcome

trend. However, membership numbers remain a primary concern as the Board continues to see membership numbers drop. Membership engagement is a renewed focus for the Board along with attracting new members in 2018. During 2017 the Board introduced an Associates Program and reintroduced concessional memberships.

A huge thank you to the well over 100 volunteers Australia-wide who perform the various functions of the Institute as well as the two fantastic staff members in Melbourne. Running a complex organisation like the WIA on a shoestring would not be possible without the dedication of all these people.

I finish with a welcome to Aidan Mountford VK4APM and welcome back Brian Clarke VK2GCE to the 2018 Board.

Justin Giles-Clark VK7TW on behalf of the WIA Board.



Editorial

Continued from page 2

ANZAC Day

I had a quiet day at home on ANZAC Day this year, but did a little listening on the bands.

The 40 metre band was certainly very busy, with many stations exercising their right to use the AX prefix instead of the VK prefix. Many stations in southern Australia used the day to head out into Parks and to participate in the VKFF/

WWFF program or to activate a SOTA summit. I worked stations in VK1 through to VK6 call areas and a small number of ZL stations. The activators were kept busy with plenty of callers. The only stations that I know I missed were at locations not too far from my location but beyond ground wave distance – for most of the day there was a lack of NVIS propagation

out to around a hundred kilometres or so. It was a good day for all those chasing the activators. Congratulations to all who used the special prefix, and to those who used part of the day to enjoy the great outdoors in conjunction with some amateur radio activity.

Until next issue,
Cheers,
Peter VK3PF



Wanted



Articles and high quality photographs for **Amateur Radio** and **Callbook**.

See <http://www.wia.org.au/members/armag/contributing/>

WIA meets with ACMA

The WIA meets regularly with the ACMA to ensure it maintains an excellent working relationship.

This took place recently and the following is a brief summary of some of the key topics discussed:

New Legislation and Arrangements:

- The ACMA is deep into consultation and implementation of the new Radiocommunications Bill. A large number of amendments are currently being incorporated and will go out for another round of consultations.
- The WIA expressed concern about the ACMA being under-funded and under-resourced.
- The ACMA will be seeking tenders for the provision services. Discussion was held about the Deed Transition Out Plan including records management arrangements.

Emerging Threat:

- The WIA expressed concern to the ACMA about WRC 9.1.6 agenda item – Wireless Power Transfer (WPT) because of the potential of harmonics and intermodulation products from high powered WPT systems in close proximity to suburban environments. This was presented at the recent Asia Pacific Telecommunity Group WRC Preparatory meeting in Perth. The ACMA welcomed the WIA engagement in the dialogue on this issue.

Conditions and Assessment:

- The WIA outlined the progress on the LCD submission and the ACMA appreciated being kept up to date and is looking forward to receiving the submission.
- The WIA also outlined that there is a body of work being undertaken to identify the implications on the assessment

syllabus in light of the LCD submission.

- The ACMA agreed to place the syllabus review as a standing agenda item.
- Once the WIA makes the LCD submission the ACMA agreed to keep the WIA informed of progress.

Reporting:

- The WIA and ACMA also discussed financial reporting deadlines not aligning with ASIC requirements and the issues this creates. Agreement was reached on sharing exposure drafts to overcome these issues leading up to audited accounts being available.
- Progress reports were provided on the assessment, complaints and performance reporting.
- The ACMA has committed to keeping the WIA informed of key elements and requirements with the introduction of the new RadComm Bill, Deed changes and spectrum roadmaps.

Continuous Improvement:

- The WIA discussed the streamlining of the assessment process and making it an on-line process. There was a progress report presented with over 350 people participating. The ACMA requested updates as the trial progresses.
- The WIA requested a progress update on the ACMA to clarify current requirements for the WIA to manage information captured whilst conducting ACMA business. Particular focus is on third party Software as a Service and Infrastructure as Service providers.
- The WIA outlined that it was instituting Terms of Reference, Position descriptions, Policies, Procedures and Plans to overcome the organisational memory loss in 2017.
 - The WIA defined how it is making the organisation more sustainable with a longer term focus including a high level of

provisioning for future needs in the 2018 budget.

WIA Board Elections 2018

Three positions on the WIA Board will be vacated at this year's AGM on May 19. The vacancies were created by the retirement of David VK4MZ, Brian VK2GCE and Phil VK2ASD. The retiring members were eligible to renominate.

Election Results

I, John Marshall, the returning officer of the Wireless Institute of Australia declare that only two nominations were received, namely:

Aidan Mountford VK4APM

Brian Clarke VK2GCE

Therefore no election was required to be held and the two nominees have been elected unopposed to the board of the WIA for a period of two years from the date of the next AGM, 20 May 2018.

One position on the board remains unfilled.

John Marshall

*Returning Officer
WIA Election 2018.*

Clarification of WIA-IARU relationship

The IARU is the world-wide voice of amateur radio. Under article 2.2 of the IARU constitution only one national society can be a member of the IARU and in Australia that society is the Wireless Institute of Australia.

The WIA as a member of the IARU contributes substantial funding to the operation of the IARU Region 3 organisation for the benefit of all amateurs in Australia. This funding is used to further the objects of the IARU and IARU Region 3 organisations. The WIA also has and supports a Director on the Region 3 Executive Committee.

The WIA as a member society has the right to cast its vote, present proposals, represent the IARU in their country and participate in activities and conferences of its own regional organisation.



Sending QSL cards to the Outwards QSL Bureau

John Seamons VK3JLS, WIA National and Inwards QSL Manager

Have you received that long-awaited rare QSL Card that you requested via the Bureau years ago?

Did you check to make sure there is a QSL Bureau at the distant end?

If not, and if there is no distant bureau, your QSL card may never have been sent, and likely ended up in a bin.

The WIA Outwards Bureau **ONLY** sends QSL cards to IARU QSL Bureaus throughout the world, which are typically maintained by the national Amateur Radio Society of each country.

However, there are many countries (approx. 80!) that do not have a QSL Bureau, and there are some countries that operate Bureaus that are not IARU affiliated. **In both of these situations, our Outwards Bureau does not send cards to those destinations.**

How do you check if there is a Bureau? Simply go to the list of IARU QSL Bureaus which can be found at <http://www.iaru.org/qsl-bureaus.html> Here, you can see the list of IARU bureaus, which also shows which Bureaus have been closed.

In addition to listing the IARU QSL Bureaus, included is a short list showing where QSL bureaus are in operation in countries or territories where there is no IARU member society. *Again, the WIA will not send cards to those Bureaus, but you may send any cards direct to those Bureaus if you so desire.*

So, please check the IARU listing, before sending your cards to a Bureau that doesn't exist!

And finally, a few reminders regarding our Outwards QSL Bureau:

- Don't forget to pre-sort your DX QSLs numerically and alphabetically by call sign prefix (e.g., 5N, 9Y, AP, CE, DL, ES, EZ, F, G, JA, LY, PY, UN, YL, and so on). **We strongly encourage all Amateurs to use the IARU QSL Bureau listing to provide the order of sorting;**
- Canadian and American cards should be sorted by numerical call sign (VE1, VE2, VE3 and W1, W2, W3, etc). Note: Some countries have a parent prefix and use additional prefixes, i.e. G (parent prefix) as well as M, 2E, 2I, 2M, 2W, etc. When sorting countries that have multiple prefixes, keep that country's prefixes grouped with the parent prefix in your alphabetical stack;
- Do not separate the country prefixes by use of paper clips, rubber bands, slips of paper, or envelopes. This only slows down processing;
- Send your cards to the Outwards Bureau on a regular (monthly, or even weekly) basis;
- Don't wait for years of operating before getting your cards printed, and then send bulk cards from years back to the Outwards Bureau; and
- Ensure your cards are no larger than 140 mm by 90 mm, and avoid the use of double fold out cards. If cards do not conform to these requirements, they will be given low priority in sorting and sending.



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Extended Double Zepp Loop aerial (EDZLA)

David "Doc" Wescombe-Down VK5BUG

If, like I do, you operate without a tower and parasitic array (beam, quad, ZL-Special, W8JK etc.) then perhaps this article will be of interest. It's about a do-it-yourself (DIY) loop aerial for 28 MHz that is quite cheap and easy to build, does not require a tall mast or tower, while providing some useful signal enhancement in two directions simultaneously: to the front of the loop plane and to its rear.

When propagation allows, 28 MHz is full of pleasant signal surprises and one does not need a six-element beam to have some fun and click the turnstile toward that DXCC award. For serious DXing however, three and more elements at heights over one wavelength will usually be required. In a previous life as VK4CMY, relying on off-the-grid power on 12 hectares 915 m above sea level, I made a dual band 6-element 28 MHz + 4-element 21 MHz quad mounted at 18 m and with 3 W of CW from Ten Tec and Heathkit QRP transceivers worked 200/202 countries in just over a month, thanks to some big international contest opportunities.

More recently and at an inner capital city suburban QTH, a vertically-mounted, single element, horizontally-polarised 28 MHz loop only 4.5 m above ground, provided the second highest band return during the 11-month VK5MGY/RMS Titanic centenary callsign global activation (May 2011-April 2012).

Only 7 MHz delivered more contacts and due to full-time work commitments, I was unable to devote more daylight hours to 28 MHz or perhaps the band tallies would have been quite different. However and all that anecdotal stuff said, the 28 MHz was no ordinary wire loop



Photo 1: A vertically-mounted, single element, horizontally-polarised 28 MHz loop only 4.5 m above ground.

aerial: indeed, it was a real performer. Inspired by WB3HUZ Steve's article "Simple antennas for Ten Meters", (davegardner.org/Ham/TenMeter.html) I first considered the 10 m band itself. It offers lots of usable frequency space and less QRM than most of the other HF bands. Low

power and simple aerials can yield global QSOs when conditions allow and even a 28 MHz dipole or Ground Plane mounted 6-10 m high will produce results. It means that one wavelength above ground can be suburban backyard achievable and Council compliant at the same time.

Quite compact gain-giving aerials with directivity can easily be built for this band by an amateur constructor. My intention was to utilise some 4 mm aluminium wire at hand (Thanks Donald VK3IT/VK3BIG!), feed it with 450-ohm “dog-bone” open wire ladder line also at hand, all mounted on a single timber mast attached to an existing large trellis in the back garden. It could have been a vertical dipole or ground plane but when I explored the gain-giving Extended Double Zepp (EDZ) “my wheels” started turning! A very easy way to enhance one’s signal is to extend a basic dipole length to become 1.28 lambda (wavelength), thus becoming an EDZ. This is known to potentially produce about 3-4 dBd of gain if all is happy and well at the location. A single quad loop may theoretically produce about 1.13 dBd of gain in free space (w8ji.com/quad_cubical_.htm).

What would happen if I folded an EDZ for 28 MHz into a closed loop and fed with balanced line via a link coupler? Would the EDZ and single quad loop gain figures be additive, perhaps 5 dBd or could some other benefit result from such a configuration? Those rhetorical questions motivated me to straighten some of the aluminium wire, measure and cut it into four pieces: two of 5.155 m and two of 1.65, with an extra 12.5 mm at each end for flattening and joining. The total loop perimeter would be 13.51 m and the loop configuration was likely to provide a lower take-off angle (a very good thing!), while only requiring 90-degrees of rotation because it was already bi-directional (another good thing!).

Initial trials with the loop were encouraging. I arranged it as a tall, skinny rectangle with the lower short side split in the centre and connected to the open wire ladder line and aerial coupler. I requested VK5AAQ Andy to computer model the design, re-jigging its mounting height above real ground and the conductor size from aluminium wire to tubing, resulting in more optimal projected data coming from the computer: viz. 6.1 dBd, which was an improvement over the speculated 5 dBd or so and with a quite acceptable take-off angle of 23.9 degrees from horizontal.

So, my design had theoretical merit which is always a positive starting point for a project. I elected to make a more robust and better performing version from aluminium tubing, there being some likelihood of enhanced bandwidth from using larger diameter conductors. A pair of directors from a 5-element 28 MHz beam (for which I had no tower!) was used for the long sides, and both short ends of the rectangle came from 18 mm store-bought aluminium tubing. The bottom short side was split in its centre and fed with the 450-ohm open “dog-bone” feedline routed and connected to a balanced coupler (a vintage Johnson Matchbox originally) at the operating position. That feed-point was mounted 4.5 m above real ground, with the lowest part of the aerial being 2.93 m above ground, thus out of reach of any humans likely to visit my QTH!



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Photo 2: The feed-point was mounted 4.5 m above real ground.

All the tubing corners were flattened with a hammer and bench vice, rotary wire brushed, smeared liberally with Alminox conductive paste and secured with two stainless-steel bolts, washers and nuts in each corner. The corners were then thoroughly sealed with neutral roof and gutter silicone sealant. The centre feed-point too was rotary wire brushed, coated with conductive paste and two stainless-steel bolts, washers and nuts used to secure the feedline. Extra stainless-steel washers were used to physically separate but electrically connect the copper wire feed wires and alloy tubing to minimise dissimilar metal corrosion risk. A 6 m painted 90x45 mm timber mast was fitted with two lightweight timber cross-arms: one to stabilise the feed-point and another at the mid-point of the vertical sides. Both long sides of the rectangle were firmly secured to the timber cross-arms. The EDZLA was in place and regularly operational for three years, with-standing all of Adelaide's local storms and wind gusts up to 100 km/hr.

The loop design frequency was 28.018 MHz as I only operate with Morse Code. The rest of its story is history and performance was so good that I am in the process

of building another one, having dismantled the first version to supply vertical alloy tubing sections for my MF-HF pedestrian RF trolley (MF Down Under, 2016, Chapter 8). Additional computer modelling by VK5AAQ Andy at my request revealed that the original 28 MHz EDZLA also had real potential for 6 m band operation at the same 4.5 m height: gain of 7.8 dBd @ 50.1 MHz and take-off angle of 32.7 degrees from horizontal.

I hope that this EDZLA aerial's simplicity, ease of construction, comparatively low visibility profile and proven performance encourages you to "roll your own". There is a very nice feeling that comes from making interesting and frequent contacts using something that you have made yourself: aerials are one aspect of amateur radio from which much may be gained with comparatively little input... and cost!

73,
Doc VK5BUG

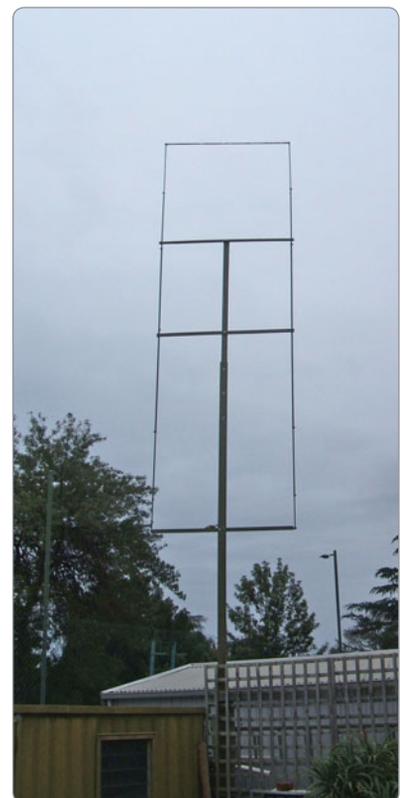


Photo 3: The EDZLA was in place and regularly operational for three years.

Radio amateur and woman fire fighter

Fred Swainston VK3DAC/VK4FE
Historic QSL Bureau Curator

The WIA Historic QSL Bureau has an extensive collection of QSL cards thanks to the very kind donations made to the WIA by family and friends of our SK colleagues.

The pre WWII collection is excellent and many cards are held that date back to the 1920s. The Historic Bureau hold cards up to the present day and donations are gratefully accepted.

The following is one card selected from the Pre-War collection.

Ms Marjorie Hutchings VK3HQ (SK) a radio amateur during the 1930s lived and operated at 'Bryn Avon' in Callawadda. Callawadda is located in a triangle between Horsham, Stawell and St Arnaud in Victoria's Western District. Ms Hutchings and her family were very keen and prolific operators. In the QSL card shown is where Ms Hutchings contacted VK7CK (SK) in December 1932; she was operating using 25 watts into a ½ wave Zepp antenna.

The family home "Bryn Avon" was the site of many pre WWII amateur radio gatherings. The whole family were active in Amateur Radio. After the suspension of Amateur Radio activities during WWII, apparently Ms Hutchings did not take up her licence.

"At the recent fire which occurred in a wheat crop on Mr. H. H. Wettenhall's property at Carr's Plains, amongst the 300 fire fighters who answered the alarm was Miss M Hutchings, daughter of Mr. J. C. Hutchings [VK3HL (SK)]; of "Bryn -Avon" Callawadda. Displaying all the courage and spirit of a veteran fire fighter, this young woman was one of



Woman Fire Fighter – (Source: Horsham Times, 19 January 1932)

the first on the scene with her father's motor truck (with tank and fire pump), which she drove and assisted her brother in directing the water onto the fence posts and timber".

The property known as 'Bryn Avon', Donald -Stawell Road, CALLAWADDA is now on the List of Conservation Desirable Places.

Ref: Northern Grampians Shire Heritage Study, Stage 2, Volume 4 1, 2004.

We all owe a lot to the early pioneers in Amateur Radio. With very limited equipment and low power they achieved remarkable results. In addition many made significant contributions to their family and community.



Silent Key Bob Mockridge VK7BOB

15/07/1943 – 31/10/2017

Robert (Bob) Mockridge was born in Bristol UK. There appear to be two lasting influences in his early life: his mother worked in a post office in the days of Morse Code Telegraphy; and he served an apprenticeship with the company Telephone Rentals. In his early 20s this work took him to South Africa. On return to the UK he was stationed in Wales; there the conditions were not to his liking so he returned to South Africa. Unfortunately illness prompted him to go on a cruise; for this he chose Australia because he had a grandfather resident there.

Australia must have been to Bob's liking because he returned in 1972 with an ambition to settle. Following a period of casual work he was offered a relief job with the Australian counterpart of his old company, TR Services, in Hobart. While there



a permanent position became available in Launceston which he accepted.

Very shortly after arriving in Launceston, he met his future wife Lynne. A fringe benefit of meeting Lynne was she owned a radio with short wave bands; this appears to have further stimulated Bob's interest in radio communications because it was during this time he successfully studied for his AOC.P.

Following the demise of TR Services Bob started his own company 'Avant Garde Security'. Bob met most of his VK7 friends

while operating his security business in Launceston; this he later sold to join his son Robert in a new venture called 'Time Clocks Australia'.

Following retirement Bob was able to spend more time operating his station, concentrating mainly on HF DX; this was interrupted by his battle with cancer which he fought silently and valiantly. During this time Bob regularly took solace with a small group of friends over coffee. He was modest to the last and requested a private cremation.

Bob was known in the community for his fair and honest dealing; he even helped competitors on occasions. He is survived by a daughter in England, a son in Launceston and wife Lynne.

Vale Bob.

Peter Dowde VK7PD



Work the World with WSJT-X

Part 2: Codes, Modes, and cooperative software development

Joe Taylor K1JT, Steve Franke K9AN and Bill Somerville G4WJS

Here's how the weak-signal digital protocols in WSJT-X work, together with an overview of how their software is developed.

Part 1 of this two-part article (1) appeared last issue, covering topics that highlight the capabilities of weak-signal communication program WSJT-X. This software package provides tools for a wide range of Amateur Radio activities including low-power DXing, meteor scatter, moonbounce, and precise frequency measurement – all of them possible with relatively modest station equipment. Based on modern communication and information theory, the WSJT-X protocols and software boost your signal's effective reach by the rough equivalent of 10 to 15 dB of added signal strength.

We begin this concluding Part 2 article by outlining some fundamentals of digital communication theory. We include examples which we hope will make the discussion accessible to most amateurs. We then describe and compare the seven weak-signal protocols in WSJT-X and explain how their impressive performance is achieved. Finally, we describe the tools and informal cooperative practices used for creating the WSJT-X software. In this era of rapidly advancing software-defined radio (SDR) technology, in which good communication engineering generally involves both hardware and software, we think it's important to the health of Amateur Radio that some dedicated enthusiasts devote some of their algorithmic and programming skills and interests

to the good of the hobby. We have found that many other hams – probably a majority of those using the tools we have created – would like to have a deeper understanding of how these weak-signal protocols work, and how they were developed. We hope this article will help to satisfy that desire.

Digital communication fundamentals

Digital communication conveys information in digital form from an originating source to one or more destinations. In the case of interest here the digital information is modulated onto a carrier and the actual transfer takes place over a radio channel. The basic unit of transmitted data is called a *channel symbol*. The modulator may transmit m information bits in each symbol, using 2^m different waveforms to represent symbol values from 0 up to $2^m - 1$. The different waveforms might have distinct amplitudes, phases, frequencies, or even shapes. By design the WSJT-X waveforms all maintain constant amplitudes. The MSK144 protocol uses *Offset Quadrature Phase-Shift Keying* (OQPSK) with waveforms shaped so as to maintain a constant envelope, while all other modes use a different tone frequency to represent each of the allowed symbol values. Binary modulation implies transmitting one bit at a time, i.e., $m=1$. As spelled out in more detail below, modulation

schemes with larger m are used to advantage in all but one of the WSJT-X modes.

Important benefits can be gained by adding controlled redundancy to a digital message so that transmission errors can be recognized and corrected. A trivial form of redundancy might involve the simple repetition of each symbol, say three or more times. But much more powerful redundancy can be arranged by mapping each sequence of k message symbols in a controlled way into a unique and longer sequence of n symbols called a *codeword*. This technique is called Forward Error Correction (FEC). The WSJT-X protocols use *block codes* in which the values of n and k are fixed; the codes are conventionally labelled as (n,k) codes. An integer parameter q can be used to define the range of available symbol values for a code, analogous to the m we used for modulation schemes. Parameter $Q=2q$ is then referred to as the *alphabet size* of the code. The code's symbol values range from 0 up to $Q-1$, and each codeword conveys kq message bits. The amount of redundancy is characterized by the ratio n/k , and its reciprocal k/n is referred to as the *code rate*. We note that the mathematics underlying design of such k -to- n mapping schemes and their corresponding n -to- k reverse transformations forms a major branch of modern communication theory.

Reception of transmitted symbols requires accurate synchronization of time and frequency between transmitting and receiving stations. To make this possible with typical amateur station equipment, each *WSJT-X* protocol includes a unique synchronizing pattern: a sequence of known information interspersed with the message-carrying symbols. The software demodulation algorithm starts by looking for the known pattern, thereby determining any frequency and time offset as well as the locations of boundaries between received symbols.

As a specific example, the JT65 mode uses a (63,12) code with $q=6$ and thus $Q=2q=64$; its code rate is $k/n=0.19$, and its modulation uses $m=6$ and thus $2m=64$ -tone frequency-shift keying, with one additional tone used for synchronization.

As an aid to understanding we divide the overall process of transmission and reception into a sequence of independent steps, as shown in Figure 1. The steps correspond roughly to identifiable blocks of the *WSJT-X* source code. In the following list steps 1 – 5 take place at the transmitting station, steps 6 – 9 at the receiving end:

1. Generate a message
2. Compress message to k symbols of q bits per symbol

3. Add error-correcting redundancy to produce codeword of n symbols
4. Add synchronizing pattern and modulate onto a carrier
5. Transmit modulated waveform over a radio channel
6. Receive, synchronize, and demodulate to yield n symbols, some of which might be in error
7. Decode n received symbols to recover k error-free message symbols
8. Decompress k symbols to recover original message in human-readable form
9. Deliver message to receiving user

Every step in the sequence is important, but arguably the most crucial parts are those in steps 3 and 7. Step 7 is likely to be the one requiring the most computational resources, and is discussed in more detail below.

When developing a protocol we want to choose an efficient code that maximizes the probability of recovering transmitted messages even when the received codeword is corrupted. It's also important to consider likely types of fading, Doppler spread, and interference that may occur on the targeted propagation paths. We need an efficient decoding algorithm that can be executed in reasonable computing time and will ensure that false decodes are rare.

The WSJT-X protocols

Message structure

Steps 2 and 8 in our sequential list involve lossless compression and decompression of data. This process is called *source encoding* the message. *WSJT-X* protocols JT4, JT9, JT65, QRA64, and MSK144 all use structured messages that source-encode human-readable information for basic QSOs into packets of exactly $kq=72$ bits. The packets contain two 28-bit fields normally used for callsigns and a 15-bit field for a grid locator, signal report, acknowledgment, or 73. One additional bit is used to flag packets encoding arbitrary alphanumeric text, up to 13 characters. Special cases allow other information such as add-on callsign prefixes (for example, ZA/KA2ABC) or suffixes (G8XYZ/P) to be encoded efficiently. The essential aim is to compress the most common messages used for minimal QSOs into fixed-length 72-bit packets.

Why 28 bits for a callsign, and 15 for a grid locator? A standard amateur callsign consists of a one- or two-character prefix, at least one of which must be a letter, followed by a digit and a suffix of one to three letters. Within these rules, the number of possible callsigns is equal to $37 \times 36 \times 10 \times 27 \times 27 \times 27$, or somewhat over 262 million. (The numbers 27 and 37 arise because in the first and last three positions a character may be absent, or a letter, or perhaps a digit.) Since 2^{28} is greater than 268 million, 28 bits are enough to encode any standard amateur callsign uniquely. Similarly, the number of 4-digit Maidenhead grid locators on earth is $180 \times 180 = 32,400$, which is less than $2^{15} = 32,768$; so a grid

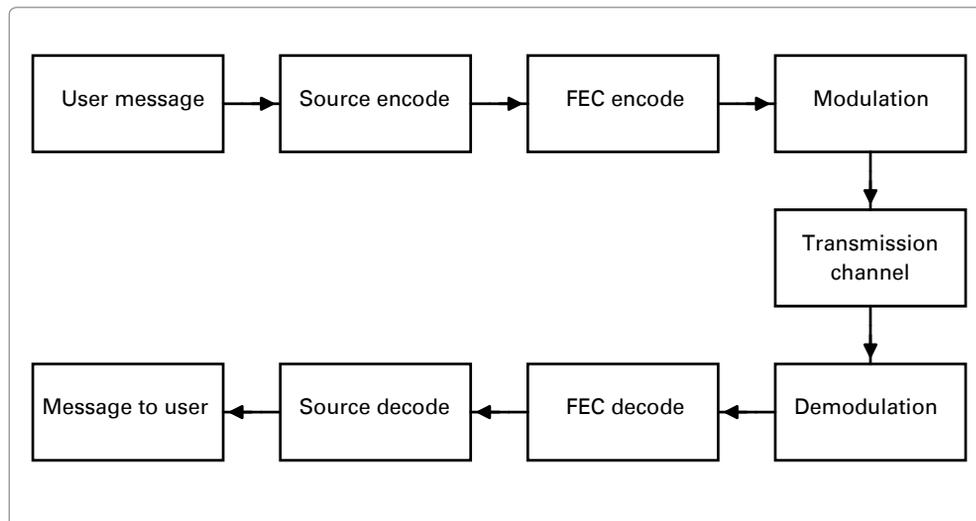


Figure 1: Block diagram showing steps in a typical digital communication process.

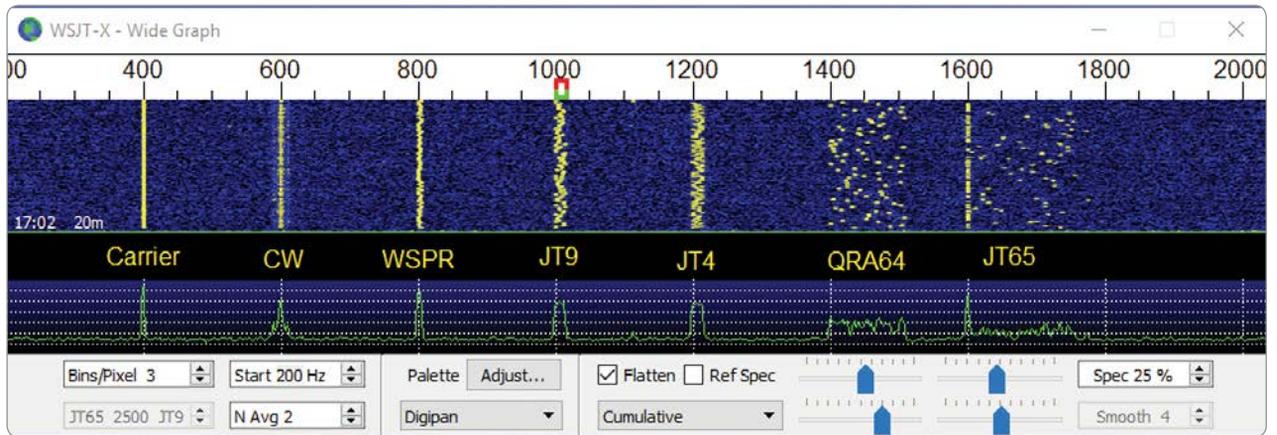


Figure 2: Simulated signals for an unmodulated carrier, a 25 WPM CW signal, and the WSJT-X slow modes WSPR, JT9, JT4, QRA64A, and JT65. The slow modes are shown in their “A” submode, in increasing order of occupied bandwidth. All signals have $S/N = -10$ dB in a 2500 Hz reference bandwidth.

locator can be encoded uniquely with 15 bits.

More than six million of the possible 28-bit values are not needed for standard callsigns. A few of these slots have been assigned to special message components such as CQ, DE, and QRZ. CQ may be followed by three digits to indicate a desired callback frequency. In the meteor-scatter mode MSK144, if KA2ABC transmits on a conventional calling frequency, say 50.280, and sends the message “CQ 290 KA2ABC FN20”, it means that s/he will listen on 50.290 and respond there to any replies. A numerical signal report of the form $\pm xx$ or $R\pm xx$ can be sent in place of a grid locator. As originally defined in JT65 mode, the numerical signal report values “xx” were constrained to lie in the range -30 to -01 dB. Recent program versions accommodate reports between -50 and $+49$ dB for all modes except JT65. A country prefix or portable suffix may be attached to one of the callsigns. When this compound-callsign feature is used the additional information is sent in place of the grid locator, or by using some of the six million available slots mentioned above.

Finally, our compression algorithm supports messages starting with CQ AA through CQ ZZ. Such messages are encoded

by sending the pseudo-callsigns E9AA through E9ZZ in place of the first callsign of a standard message. Upon reception these calls are converted back to the form CQ AA through CQ ZZ. This feature allows users to send directed CQ messages of various easily understood forms such as CQ DX, CQ EU, or CQ VT.

Coding, modulation, and synchronization

Different codes, modulation schemes, and synchronizing patterns have been adopted for each protocol in WSJT-X; the basic goal has been to optimize each mode’s effectiveness for a particular type of propagation. To some extent the final code choices also reflect our own incomplete-but-growing familiarity with historical developments in communication theory. JT65 uses a *Reed Solomon* code, and JT4, JT9, and WSPR all use a robust *convolutional* code (2) first implemented for ham-radio use (3) by Phil Karn KA9Q. These are among the best known types of error-correcting codes, and they have been studied thoroughly for over half a century. In contrast, our latest modes MSK144 and QRA64 use state-of-the-art codes that are close to the forefront of this research field. MSK144 uses a *Low Density Parity Check* (LDPC)

code, and QRA64 a *Q-ary Repeat-Accumulate* (QRA) code, a particular type of non-binary LDPC code. Full technical specifications for each mode can be found in the *WSJT-X User Guide* (4) and our openly available source code (5).

Protocol details for Slow Modes

Figure 2 shows an example of each of the slow modes on the WSJT-X waterfall display. For comparison, this collection of simulated signals also includes an unmodulated carrier and a 25 word-per-minute CW signal. The signals have been degraded to a key-down signal-to-noise ratio -10 dB in a 2500 Hz reference bandwidth, to simulate typical on air reception. Among the WSJT-X modes JT9 has the narrowest occupied bandwidth, 15.6 Hz, and JT65 the widest at 177.6 Hz.

Bandwidths and other design parameters of the slow modes are summarized in Table 1. In column 2 the type of forward error-correcting code (FEC) is denoted by C for convolutional, RS for Reed Solomon, and QRA for Q-ary Repeat-Accumulate. The keying rates have values chosen to make the length of a transmission about 48 s – thereby leaving enough time for a message to be decoded and the receiving operator to decide

how to reply, before the start of the next minute. The exact values were chosen so that the number of digital samples per channel symbol is an integer with no prime factor greater than 7. This choice is advantageous because it makes some of the digital signal processing algorithms more efficient.

The following paragraphs give a few additional details for each of the slow modes, and a brief statement about their typical use.

JT4. Each channel symbol carries one information bit (the most significant bit) and one synchronizing bit. Thus 50% of the transmitted energy is devoted to synchronization. Submodes JT4A through JT4G have tone spacings at increasing multiples 1, 2, 4, 9, 18, 36, and 72 times the keying rate. The wider submodes are useful on propagation paths with large Doppler spread: for example, JT4F is frequently used for Earth-Moon-Earth (EME) communication on the 10 GHz band.

JT9. Eight tone frequencies are used for data, one for synchronization. Sixteen symbol intervals are used for synchronizing. The slow submodes JT9A-H have tone spacings at multiples 1, 2, 4, 8, 16, 32, and 64 times the keying rate. JT9A (often called simply JT9) uses less than 10% the bandwidth of JT65, and for this reason is becoming increasingly popular for low-power DXing on crowded HF bands.

JT65. A detailed description of the JT65 protocol was published more than twelve years ago in QEX (6). Half of its channel symbols are used for synchronization, using a pseudo-random pattern at the lowest tone frequency. The other symbols carry encoded information using $2m=64$ different tones. Special features (used only for EME) can convey the EME-style "OOO" signal report and short messages interpreted as RO, RRR, and 73. Submodes JT65B and JT65C, also used only for EME, use tone spacings 2 and 4 times larger

than JT65A. JT65 has become very popular for low-power DXing at MF and HF, as well as for EME on VHF and higher bands.

QRA64 is an experimental mode intended for EME and other extreme weak-signal paths. Its internal code (7) was designed by Nico Palermo IV3NWW, and we expect to publish a full description in QEX. Synchronization is accomplished by using three 7×7 Costas arrays (8). Submodes QRA64A-E use tone spacings 1, 2, 4, 8, and 16 times the baud rate. Early tests have shown QRA64A to be very effective for weak signal work at MF and HF, and for EME on the VHF and UHF bands. The wider submodes QRA64C-E work extremely well for EME on microwave bands up to 24 GHz.

WSPR differs from other WSJT-X slow modes by using message lengths bits and two-minute T/R sequences. Message packets normally include a 28-bit callsign, a 15-bit grid locator, and 7 bits to convey transmitter power in dBm. Alternative formats can convey a compound callsign and/or a 6-digit grid locator, using a two-transmission sequence. WSPR usage was described in QST several years ago (9).

Protocol details for Fast Modes

The fast modes in *WSJT-X* aim to take advantage of brief propagation enhancements that bring a signal up to useful levels for a very short time. Keying rates and occupied bandwidths are much larger than for the slow modes, because we want the full message to be conveyed in a very short time. Table 2 lists the essential parameter values for these modes. The last column gives the time required to transmit the message once; of course, in these modes the transmitted information is repeated for the full duration of a T/R sequence.

ISCAT messages are free-form, up to 28 characters in length; the

protocol uses no forward error correction other than repetition. ISCAT has proven especially useful for making aircraft-scatter QSOs on the microwave bands.

JT9 Fast submodes JT9E-H differ from their slow counterparts by using much faster keying rates. Otherwise the coding, modulation, and synchronization schemes are the same as for the slow JT9 modes. JT9 fast modes have proven useful for such propagation types as ionospheric scatter and weak double-hop sporadic E on the 6 metre band.

MSK144. Forward error correction is implemented by augmenting the 72 message bits with an 8-bit cyclic redundancy check (CRC) calculated from the message bits. The resulting 80-bit augmented message is mapped to a 128-bit codeword using a (128, 80) binary low-density-parity-check (LDPC) code designed by K9AN specifically for this purpose. Two 8-bit synchronizing sequences are added to make a message frame 144 bits long. Modulation is Offset Quadrature Phase-Shift Keying (OQPSK) at 2000 baud, so the frame duration is 72 ms. Compared to FSK441, the mode widely used for digital meteor-scatter since its introduction (10) in 2001, MSK144 has the advantages strong error correction, an effective character transmission rate about 1.7 times faster, and significantly better sensitivity. MSK144 has rapidly become the dominant mode for amateur meteor-scatter contacts, at least in North America and Europe.

Decoders and sensitivities

Together with additional details published in the *WSJT-X User Guide* and the open source code, Tables 1 and 2 and the preceding paragraphs define the various protocols supported in *WSJT-X*. For these protocols to be useful for transferring information, each one also needs a decoder. The mathematical underpinnings of

suitable decoders are complex and widely discussed in the professional literature, and we will not go into those details here. The algorithms we have implemented all use *soft-decision* decoding, and to the best of our knowledge they are the most sensitive practical algorithm for each code. For JT4, JT9, and WSPR we use the *Fano* algorithm, as implemented (2) by KA9Q, and for JT65 we use the Franke-Taylor algorithm, details of which were recently published (11) in *QEX*. A full description of the QRA64 decoder written by IV3NWV is available online (7), and we expect to publish details of the MSK144 decoder soon.

A few special features of the decoders are worth mentioning. Current usage patterns of JT9, JT65, and WSPR makes it advantageous for the decoders to focus not just on a single frequency, but on a frequency range covering at least several kilohertz. Our decoders for these modes are organized to scan a range of frequencies up to 5 kHz, if the receiving hardware supports it, finding all signals in the specified mode and decoding and displaying the results. For JT65 and WSPR the present decoders go one step further, taking advantage of the fact that when a signal with strong FEC has been decoded we know its transmitted waveform exactly. An amplitude-scaled version of that waveform can be subtracted from the received data and the decoder executed on the remainder to decode weaker, previously hidden signals. This approach has proved very effective: it frequently decodes weak signals lying within 1 or 2 Hz of much stronger ones.

The various *WSJT-X* modes have better sensitivity than traditional modes such as CW for three main reasons. They use efficient modulation schemes tailored to the targeted types of propagation; they use detection bandwidths matched to the protocol's baud rate; and they benefit from *coding gain* provided

Mode	FEC	Type	q	m	Mod	Keying	BW	Sync	Tx
(n,k)	rate	(Hz)	Energy	Duration	(baud)	(s)			
JT4	C(206,72)	1	2	4	-FSK	4.375	17.5	0.50	47.1
JT9	C(206,72)	1	3*	9	-FSK	1.736	15.6	0.19	49.0
JT65	RS(63,12)	6	6*	65	-FSK	2.692	177.6	0.50	46.8
QRA64	QRA(63,12)	6	6	64	-FSK	1.736	111.1	0.25	48.4
WSPR	C(162,50)	1	2	4	-FSK	1.465	5.9	0.50	110.6

* *Modulation includes one additional tone for synchronization.*

Table 1. Parameters of the slow *WSJT-X* protocols. Bandwidths *BW* are specified for the narrowest submodes. “Mod” stands for modulation type, and “Sync Energy” is the fraction of transmitted energy devoted to synchronization.

by each specific error-correcting code. As shown in Table 1, detection bandwidths for the slow modes range from about 1.5 Hz to 4.4 Hz. Noise power is proportional to bandwidth, so each of the slow modes has an advantage of more than 10 dB when compared to the typical 50 Hz “ear-and-brain” bandwidth of a skilled CW operator.

The MSK144 decoder cannot use such narrow bandwidths because the signal is roughly 2.4 kHz wide. However, it can use another trick, namely *coherent* detection. Meteor scatter signals generally maintain signal coherence over the duration of a ping. Our MSK144 decoder measures a received signal's frequency and phase with enough accuracy to maintain coherence over half a dozen or more of the protocol's 72 ms frames. As a consequence, the out-of-phase noise power can be rejected and we gain 3 dB over non-coherent detection for single-frame decodes, and up to 7 dB for seven-frame averages.

Software development

Software engineering involves repeated cycles of designing, writing and testing *source code*: the human-readable instructions that will be converted to patterns

of zeros and ones that tell a digital computer what to do. For all but the most trivial applications it is normal practice to build also on existing software. Such existing software might include tools and utilities for simplifying and organizing the development process, libraries or “frameworks” that can be directly included into the application, and services that cooperate with the application or with the developers themselves. It might also include services used for distribution and support of the software.

WSJT-X is a complex program that operates in a complex environment. As a result, many of the techniques used to design, write, test, deploy, and support it are the same as those used by large corporations marketing computer software. Working practices and disciplines from this corporate world generally require many people and significant capital investment. Here we explain how the same goals can be met when the application is provided free of charge by a small team. We also try to explain why individuals capable of doing this would even consider doing it without financial compensation.

Mode	FEC	Type	q	m	Mod	Keying	BW	Sync	Message
(n,k)	rate	(Hz)	Energy	Duration	(baud)	(s)			
ISCAT-A	42-FSK	21.5	905	0.17	1.176				
ISCAT-B	42-FSK	43.1	1809	0.17	0.588				
JT9E	C(206,72)	1	3*	9-FSK	25	225	0.19	3.400	
JT9F	C(206,72)	1	3*	9-FSK	50	450	0.19	1.700	
JT9G	C(206,72)	1	3*	9-FSK	100	900	0.19	0.850	
JT9H	C(206,72)	1	3*	9-FSK	200	1800	0.19	0.425	
MSK144	LDPC(128,80)	1	1	OQPSK	2000	2400	0.11	0.072	
MSK144-Sh	LDPC(32,16)	1	1	OQPSK	2000	2400	0.20	0.020	

* Modulation includes one additional tone for synchronization.

Table 2. Parameters of the fast WSJT-X protocols. MSK144-Sh is the optional short-message format in the MSK144 protocol.

Free Open Source Software (FOSS)

In the present context the word *free* does not necessarily mean without cost to the user, it means *free as in freedom*. Many successful FOSS products are paid for by users in some way, most often in return for technical support or consultancy. Free-of-cost is also common, but not ubiquitous. A key element of FOSS is that the rights of software authors are protected: no one can legally make profit by stealing or otherwise passing off as their own a product they did not create themselves. This principle is fundamental to how FOSS works; it allows those who wish to share ideas and skills with a community, in a philanthropic manner, while not being taken advantage of by those with less honourable intentions. It should be clear that FOSS fits well into Amateur Radio because some of its principles are the same: in particular, the idea that sharing knowledge with a community of like-minded hobbyists is a Good Thing To Do.

Hierarchy of Components of WSJT-X

We developed the novel data communication protocols in WSJT-X to enable Amateur Radio operators to experiment and use them for over-the-air communication. Obviously the underlying software must handle such tasks as encoding and decoding user messages, which involve a number of mathematically complex algorithms. These essential tasks account for roughly 37,000 lines of code in WSJT-X. Significantly more code is needed to enable effective communication between computer and radio, and to allow user control of the encoding/decoding algorithms and display features in a convenient and intuitive way. Current revisions of WSJT-X are built from a total of about 103,000 lines of our own code. We use FOSS compilers *gcc* and *gfortran*, available from the GNU Free Software Foundation, and *clang* from the University of Illinois, to convert our source code to machine language. We also use the FOSS

libraries *Qt Framework* (from the Qt Company), *FFTW* (Massachusetts Institute of Technology), *SLALIB* (East Asian Observatory), and the *JPL Solar System Ephemeris* (NASA Jet Propulsion Laboratory).

Inter-operation with other software

Most Amateur Radio operators keep a computer log, and many use web services to enhance their hobby. WSJT-X is a source of both log records and “spots” – reports of the reception of someone else’s signal – so one can imagine many possible interfaces to other software and Internet services. In Part 1, we already mentioned the support of WSJT-X for *PSK Reporter* and *WSPRnet*; these services turn a WSJT-X station into reverse-beacon sources with virtually no input from the operator.

There are many other possibilities. Rather than trying to communicate directly with all logging software, WSJT-X implements only basic features – enough for an occasional user who does not mind a bit of manual data transfer to update their station log. The program appends basic ADIF QSO records to a text file that can be imported into other logging software or to QSL matching services such as *Logbook of the World* and *eQSL*. We have chosen not to duplicate what other specialist logging applications already do so well. Instead WSJT-X publishes decoded messages, logged QSO details, and some program status information to a network port. This allows other software authors to receive the data directly or write a bridging application that communicates with logging or other services on behalf of WSJT-X. A notable example is the program *JTAlert* (12) by Laurie Cowcher VK3AMA. *JTAlert* handles logging to most major logging applications and spotting to an associated web service Hamspots.net (13). It also manages a wanted continent, zone, DXCC, US state,

and grid locator database which allows it to alert the user when a decode from one of them is seen. Other application authors are also using this source of data and we expect that many novel uses of it are yet to be discovered and implemented.

WSJT-X requires CAT control for several of its advanced operating features. This requirement can create conflicts with logging software that, like *WSJT-X*, wants to grab exclusive control of the radio. Fortunately the most popular logging applications provide a proxy rig-control facility and *WSJT-X* is able to control a transceiver that way, without conflict. Other possibilities are available such as the *rigctl*d server that is part of the Hamlib package, and the OmniRig control server — both of which are designed to allow multiple compatible applications to share a rig's CAT connection.

Implementation languages

Computer programming languages are many and diverse. Some are best for quick-and-dirty development of small programs, while others are best for large complex systems. Some are targeted for pure number crunching, others come with rich libraries for programming applications that need a user-friendly graphical interface; some are operating system or hardware specific, others try to work everywhere.

A project like *WSJT-X* needs computational performance, a rich graphical user interface, native look-and-feel on several platforms and an implementation language suitable for use in a large complex application. One might hope that a single near-perfect language could be chosen, but it's never that simple. In our case, an important factor is that most of the team are not professional software engineers — so any language they are comfortable and familiar with is a prime candidate. The democratic necessities of FOSS

collaboration often mean that programmers tend to join projects where their experience counts. Another constraint may be that some essential software component requires a particular programming language. These are perennial problems in software development and fortunately the tools to build software usually allow a single project to be implemented in more than one language with at least basic inter-operation between them.

We use this approach in *WSJT-X* for all of the above reasons. We use Fortran and C for the computational heavy lifting, and C++ for access to the platform and operating system abstraction layer and the Qt user interface library. These three languages inter-operate reasonably well, so the mix-and-match approach can be very effective.

Collaborative Tools

FOSS project teams often collaborate over worldwide distances. It is common for team members never to meet face-to-face, or to communicate other than by e-mail. Well-defined processes for collaboration are therefore essential. The FOSS community has solved most of these problems so effectively that even commercial teams working and sitting next to each other often use their mature collaboration tools.

Several large projects offer Internet-hosted platforms to support collaborative software development. Such platforms include a *version control system* that allows many programmers to work on a common set of source code files, resolving potential editing conflicts and recording a full history of changes. They may also include a forum or mailing list for team discussions and application support; file storage for package deployment; a bug- or issue-tracking system; a wiki-style collaborative knowledge base; secure backup of all project data; and so on. We currently use the *SourceForge* project and web site as our collaborative service. Like

many others, this one is free of cost for FOSS projects. It offers extensive services with excellent availability — services that would cost a considerable amount for a project like ours, if we had to purchase the necessary hardware and network bandwidth.

Computing hardware and platforms

Our software is developed on desktop PCs, and the majority of our users run *WSJT-X* on a modern PC running Microsoft *Windows*. However, the platform abstraction layer in the *Qt Framework* enables us to provide *WSJT-X* also as a native application on several other platforms. We support Microsoft *Windows* (currently all versions since *XP*), Apple Mac OS X (versions 10.7-10.11) and macOS (version 10.12 onward), and *Linux* (a recent desktop distribution is best). The capability to run on *Linux* opens up many possibilities for computer hardware including low cost single-board systems like the *Raspberry Pi* (model 2 and 3) and also older PCs like PowerPC Macs. A *Linux* desktop distribution on *Raspberry Pi* allows users to run *WSJT-X* just as they would on full-size PC or laptop, with connection to a transceiver through a cheap external USB soundcard. Another alternative is a basic SDR system like the *FUNcube Dongle* or *SoftRock*, making a very capable, low cost digital receiving station; or, using later devices like the *SoftRock Ensemble RXTX* a fully functional QRP digital station. To do these things you must invest some time in learning about *Linux*, and perhaps construct a basic SDR kit. Add a resonant antenna, and your reward can be an ability to work the world with ease — and with equipment you made and assembled yourself.

Like most successful *Linux* development projects, the *WSJT-X* development team has collaborators who package the program for various flavours or distributions of the operating system. The package

maintainers ensure that all required dependencies are correctly installed and referenced when *WSJT-X* is installed – no small task, as *Linux* comes in many quite different distributions.

The world of Unix-like operating systems extends to more than just *Linux*: some users prefer others, such as *FreeBSD*. For those with some programming experience almost any platform is possible as long as recent versions of the packages *Qt* and *FFTW* are available.

It's possible to generate signals for the *WSJT-X* modes on much smaller systems. Encoding is computationally much simpler than decoding. Enterprising individuals and project teams have implemented beacon generators in small embedded systems using a micro-controller and a DDS chip. These can be used in 24/7 beacon sites or even in high-altitude flights with a few grams of payload hanging from a hydrogen- or helium-filled party balloon. David Beverstein VE3KCL has outfitted balloon-borne systems (14) that include a solar power source, GPS receiver, transmitter for WSPR and JT9, and antenna, the full payload weighing less than 40 grams. These balloons can broadcast their location, altitude, and other information whenever they have sunlight – and at least one of

them has been tracked over a full circumnavigation of the globe!

Summary

We hope that our description of the capabilities of *WSJT-X* and its development process will inspire others to join in and contribute to future developments in digital communication techniques for Amateur Radio. We ourselves have many ideas that have not yet reached fruition: for example, an even narrower-bandwidth mode, probably using 30 s T/R sequences, intended for low-power DXing on crowded MF and HF bands.

Many people have contributed to the development and success of *WSJT-X*. We particularly wish to thank Greg Beam, KI7MT, whose *JTSDK* software development kit has helped many *WSJT-X* users to build the program for themselves, from the source code; and G3WDG, VE1SKY, VK7MO, and W3SZ for comments that helped us to improve earlier drafts of this article.

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Silent Key

Peter Knox Mitchell ex VK3ANX

Born: Bruthen Victoria, 19 Oct 1943

Died: Gisborne Victoria, 15 Feb 2018

Peter's family moved around when he was young, but settled in the South Melbourne/Albert Park area. Peter attended Melbourne High School and later Melbourne University, where he qualified with a Bachelor's Degree in Civil Engineering. He found employment with the (then) Melbourne and Metropolitan Board of Works - the MMBW. It was the role of the MMBW to install and maintain the entire water supply and sewerage infrastructure for the Melbourne metropolis.

Peter's hobbies were sailing and amateur radio. Peter built a Moth sailing dinghy in the dining room of his parent's home while they were on holidays, and had a little trouble getting it out the door. Peter was a coordinator of WICEN, the Wireless Institute of Australia's Civil Emergency Network at the time of the Ash Wednesday bushfires and helped to place radio amateurs with their mobile equipment into position as regular means of communication failed when infrastructure was burnt out. Peter also helped to run the radio communications

for the Murray River canoe marathon over a number of years.

Political change caused the winding-up of the MMBW, and despite his proven skills and experience, Peter was unable to find a new equivalent position as a senior engineer. Peter found contract employment designing and supervising the construction of sewerage systems in Lae Papua New Guinea and in mainland China. In later years Peter contracted cancer and despite good medical care, and the continued support of his sister Christine, he died on 15 February 2018.

Robert Barnes VK3FHAA



Review | The radiosport RS20S “Dream Edition” headset

Peter Freeman VK3PF

The *radiosport* “listen-only” headset (headphones) is a product of Arlan Communications in the US, who produce a range of headsets. The founder of the company is Dave Bottom W16R, who has been licensed since 1962.

The headset is recommended as ideal for CW operations or for operations with either a desk microphone or a studio style boom microphone. It is suitable for all styles of operating.

Opening the box revealed a “Read Me First” sheet which outlines some of the features of the headset. It includes several hints regarding the positioning of the headset on your head and how to make adjustments for the best fit.

The RS20S “Dream Edition” headset is a stereo set of speakers with a rugged but stylish construction. The speakers are housed in carbon fibre finish enclosures mounted on an adjustable matt black metal head band. The enclosures are fitted with gel ear cushions which are in turn fitted with black cloth ear covers. The head band has a removable cover (referred by the manufacturer as “pillow top” cover) which also holds in place the cable between the two speakers.

The headband can be adjusted without tools, having thumb screws fitted to allow for adjusting the size of the headband. The speaker units are swivel mounted, allowing for rotation of the units to fit the individual user’s head shape. Adjustment was very simple and quick. Once correctly adjusted, the headset sits very comfortably on the user’s head.

The headset is fitted with a 3.5 mm stereo phono socket and



Photo 1: The RS20S deluxe “dream” headset.

comes with a suitable 1.8 m long matching 3.5 mm to 3.5 mm stereo cable, together with a 3.5 mm socket to 6.35 mm stereo plug adapter. All audio connectors are gold colour finish. The manufacturer states that the cables are made of Kevlar reinforced wire for maximum flexibility and life.

The headset and cable reviewed have a mass of 522 grams; they feel solid when you pick them up. The mass is barely noticeable when the headset is in use, with the unit

sitting very comfortably on your head. The unit was also comfortable when used for an extended period of listening.

Most of my use was with an Icom IC-7300 transceiver. The radio as a 3.5 mm Phones socket on the front panel, so the adapter was not needed. The reproduced audio sounded excellent. One of the first things that you notice is the reduction in background room noise. Arlan claim noise reduction is 24 dB, which I did not attempt

to confirm by measurement. The reduction in background noise was evident as soon as the headset was worn and did help when listening to weak signals. The speakers required only low audio output setting on the IC-7300 and sounded excellent at all levels that one would wish to use. At the higher output level of the transceiver, I would not wish to listen to the radio via either the internal speaker or via the headset – the level available is quite high.

The headset was used to listen on a variety of signals. Reproduction was always excellent, from broadcast AM signals to many SSB amateur stations. The response was superb when listening to CW signals using a narrow filter on the radio. Music reproduction from a mobile device was also excellent.

As the headset is wired as stereo speakers, the unit would be a perfect match for use with any of the transceivers capable of operating as Dual-Receive or Dual-Watch. You can set up the radio to listen to the DX station on one VFO and the pile up of chasers on the other VFO. You can then listen to the DX station in one ear and the pile up in the other ear, maximising your ability to determine where and when you should transmit in your attempt to work that rare one.

The speakers have a frequency response of 200 Hz to 6000 Hz, more than adequate for all amateur communications requirements plus other uses.

The supplied information sheet indicates that optional foam-filled ear cushions are available



Photo 2: A side view of the headset showing the audio socket on the speaker unit.

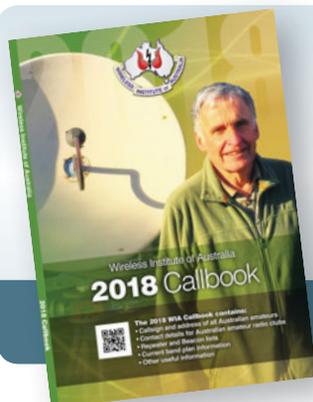
for purchase which may be more comfortable for use in humid summer climates.

A variety of accessories are available for purchase, including a foot operated PTT switch and PTT adapters for different radios.

The headset would be an excellent choice if you are in the market for a high quality communications receive only headset. Arlan also make boom

headsets. We intend to publish a review of a boom headset in the next issue.

Thank you to Carsten VK4OA of RF Solutions for supplying the review headset. The headset is normally held in stock and has a RRP of \$230. Further details can be found at <http://www.rfsolutions.com.au> and at <http://arlancommunications.com/>



Wireless Institute of Australia **2018** Callbook

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Significant amateur radio equipment exhibits and the WIA archive

Peter Wolfenden VK3RV, WIA Historian



Photo 1: Kurrajong Radio Museum, General view (Photograph Author).

The WIA Archive came into existence leading up to the Institute's 100th Anniversary in 2010.

From 2008, historical documentary material was sought by the then WIA Executive (Board) to provide background information for articles about our past, to be published in *AR* magazine during 2010. At that time, much of the WIA historical material was stored at a number of places around Melbourne. Following an initial assessment of the collection and the storage conditions, it was decided to establish a dedicated storage area at *Andersson House*,

the new WIA office in Bayswater.

It was quickly realised these important documents should be held more systematically and where appropriate, scanned, so that individual items and themes could be preserved and hopefully made easily retrievable at a later date.

This basic process has helped research into our hobby immensely over the intervening years and has made possible the availability of appropriate material to amateurs, authors, researchers, family historians, film producers etc. The series of historical articles published in *AR* during 2010 and WIA book

Wireless Men and Women at War would not have been possible without the ability to search out appropriate people and events to enable the preparation of the published stories.

However, the WIA Archive is predominantly a document only archive and our Terms of Reference can be found on the WIA website. Only a few non-document items are held by the Archive, such as badges, trophies etc. The Archive is not structured to collect radio equipment as storage space is limited and also, that activity is not really part of our charter, except for

perhaps very significant Australian items, a matter which has not been pursued to date. But the need for people to access, view and photograph early amateur equipment is becoming more prevalent.

Where are the significant equipment collections?

It is known that some important equipment collections are held by clubs, private museums and public museums around Australia.

Enquires directed to the Institute and the Archive over recent years has encouraged the preparation of a rudimentary data-base containing known significant collections and the type of equipment held. We would like to expand this data-base, as the number of requests for information is increasing from the media and authors. It is also considered to be a worthwhile record for the Institute to have readily available.

How can you help?

Initially we are looking for information about publically available collections which can be easily accessed. They don't have to be major public collections such as the *Sydney Power House Museum* or the *Melbourne Science Museum*, although detailed information about such collections is also of interest. A major 'problem' with these types of establishments, is that, usually, most of their collection is not often on public display, or easily accessible. Often some details are known about such organisations holdings and some items and information can at least be located on museums' websites. Two examples are Max Howden's 1924/25 record breaking short-wave receiver and items from Lay Cranch's early television experiments from the 1920s. We need more of this sort of information.

Community or Private Museums such as Ian O'Toole's (VK2ZIO) *Kurrajong Radio Museum*, just out



Photo 2: Cabinet containing XQA 1913/14 equipment at Mareeba Qld (Photograph Author).

of Sydney, or the *Mareeba Heritage Centre* in the Queensland Table Lands near Cairns, are two very good examples of readily accessible and relevant museums.

The *Kurrajong Radio Museum* has an extensive wireless/radio collection including some WWI Navy equipment made at what was Shaw's Sydney Wireless Works which became the Royal Australian Navy Wireless Telegraphy and Electrical Workshop at

Randwick, during WWI. This is a very worthwhile private museum to visit if you are interested in the development of amateur radio or broadcasting.

Pre-WWI amateur equipment can be seen at the *Mareeba Heritage Centre*. Here, there is a unique collection - although it is not really a 'collection', it is in fact the complete, 1913/14, home-made station of XQA, Marcus Brimms of Mareeba - minus the



Photo 3: Close up of XQA Spark Transmitter, showing Induction Coil, Interrupter and Glass plate capacitor in box underneath (Photograph Kevin Zietz VK5AKZ).

interconnecting wires, battery and aerial!

This station was closed down in 1914 under wartime instruction by the Post Master General's Department and the equipment was boxed up as stipulated. Marcus never re-assembled the station after the war and his equipment remained boxed and intact. It is now all on display in a glazed cabinet within the museum building. This is a 'world class' amateur radio collection made by an operator who resided in the district. The exhibit's curator, Ron Goodhew

VK4EMF, wrote about it in *One Hundred Wonderful Years* (AR, December 2013). Ron and the Heritage Centre's Committee are to be congratulated for the foresight to have this very important early Australian wireless equipment preserved and placed on permanent public display

It is this type of equipment display we are particularly seeking. If you or your club has a museum display of significant items, please let us know about it so that it can be included on the National Amateur Equipment Register. They don't

have to be early items; details of more modern significant items are also sought. Please send us a couple of photographs and any details you have recorded about the gear together with other basic information about the collection including contact details.

Your help will be appreciated. Information about equipment collections can be sent to the WIA Archive, P.O. Box 2042, Bayswater, 3153 or contact me via vk3rv@wia.org.au.



Participate

VK Shires Contest
Winter VHF/UHF Field Day
Trans-Tasman Low-band Contest
Remembrance Day Contest
ALARA Contest

9-10 June
 22-23 June
 21 July
 11-12 August
 25-26 August

The Journey to Europe

Brian McDermott VK3BCM

As a family we usually spend part of our Melbourne summer skiing in the Northern Hemisphere. The last few years have included visits to Japan and the USA. I generally manage to squeeze my Elecraft KX3 into the bag with an antenna, squid pole and battery so that I can activate a couple of SOTA summits.

It's a fairly simple process to operate in Japan, you just apply for a Japanese licence through JARL (1) and make sure that your radio carries Japanese compliance certificate, otherwise a further step to obtain a compliance certificate for Japan. This info is also available on the JARL website (2). This I had to do for the Elecraft.

In the USA a far simpler scenario, you receive reciprocal operating rights in the USA for Standard and Advanced licences. Once again, info is available on the ARRL website (3).

The planning for our 2018 ski adventure started in late July 2017 with the suggestion that Europe may be the destination. Okay, SOTA started in the UK and quickly spread to Europe. There are literally thousands of summits in Europe, not all accessible.

The next piece of research was "...Can I operate on my Standard licence?" simple answer was yes, in some countries, complex answer no. The planned trip would take in Italy and the UK. In both instances you needed an Advanced licence to operate (4).

OK, next question, "How best to upgrade from Standard to Advanced licence over 6 months?" The internet research suggested that the Radio and Electronics School might be the best option with the Advanced Course priced at \$50. I had used this school to upgrade from Foundation to Standard some years back.

The course provides self-paced correspondence style learning with access to a tutor. We were living at Mt Hotham managing a Ski Lodge so I had plenty of time to study. Plus I have a forgiving and tolerant wife.

I enrolled and was allocated VK2GAZ Gary as my tutor. I opted to buy the Reference Book, "Radio Theory Handbook" for \$30. All the necessary study work was also available on the website for free. Gary was very responsive once a paper was completed and was very happy to provide information where I just didn't get it.

The course basically consisted of 20 assignments followed by 14 revision papers and then 5 Trial Exams. Essentially, I needed to complete an assignment a week to meet my deadline.

The approach that RES has taken is to break down the course into 1 or 2 chapters of the book. If you read and absorb the content, the assignments are relatively easy. I supplemented the course material by using Google Search to elaborate on topics that I had trouble grasping. This did help immensely. If in doubt I could refer to the tutor.

I was disciplined enough to continue at a fair pace through the study material. We had my son's wedding in Thailand and a trip to HK during the study period. Once again, I was disciplined enough to set aside time to study.

Once I was into the Revision section I started looking for Trial Exam Papers on the web. The Amateur Radio Victoria website (5) had a couple and there is also an App called HamExam (6) which were my reference points. Unfortunately both resources had a limited question pool to draw on. Perhaps the WIA could consider making a larger question pool

available via the WIA website as a tool for those looking to upgrade?

I had looked at the ARRL Examination process. The majority of the pool examination questions are available in Trial Exam papers. This is a great exam preparation tool for the USA licence accreditation process.

Around Christmas 2017 I felt almost ready to sit the exam. I advised the 2 assessors in our local radio club that I was looking to sit the exam mid-January. I made several approaches without success to set a date and a venue. I was disappointed that they were unable to assist.

By this time it was late January and we had a mid-February departure date for Italy. I contacted Peter Freeman VK3PF and asked if he could assist indicating that I was happy to travel. An examination date was set for 24 January in Morwell with two other assessors available. I was most appreciative of Peter's assistance in helping me get across the line.

The bad news was that I failed the first sitting of the exam, I think I had a score of 58 with a pass rate of 70 required. I made some silly mistakes when sitting the paper. I did find some of the questions a little ambiguous, but I was told in the pre exam briefing that if I needed clarification to a question I should ask. Well I didn't and paid the price.

Driving back to Melbourne that night I felt very disappointed and angry with myself for failing. I partly resigned myself to the fact that the KX3 would not be travelling to Europe and I wouldn't be doing SOTA. To make matters worse I collected a speed camera fine on the way home.

I managed to arrange another Exam time at GGREC Cranbourne

on Australia Day morning with Graeme and Peter: another chance to get across the line. I spent the next two days revising the areas that let me down the first time.

I arrived at GGREC Cranbourne early, ready for the next attempt. I felt better prepared and had taken on board the advice of the both Assessors. The great news is that I passed.

A special thanks to the folk at the Radio and Electronics School and Gary my tutor. If you have an

aptitude for self-study and are fairly disciplined, this is certainly the path to take.

Also a special thanks to Peter Freeman for facilitating an Assessment at short notice and the Assessors who made themselves available.

I will follow up this article with a report on my SOTA activations in Italy and the UK.

Brian McDermott VK3BCM

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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 Australian National Satellite Net is held on the second Tuesday of the month (except January) at 8.30 pm eastern, that's either 9.30 or 10.30Z depending on daylight saving. Please note we will be taking check-ins from 8.20pm-ish. 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. Operators may join the net via EchoLink by connecting to 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 numbers 9558. 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
VK4RRC Redcliffe 146.925 MHz -ve offset IRLP node 6404 EchoLink 44666

In South Australia
VK5TRM, Loxton on 147.175 MHz
VK5RSC, Mt Terrible on 439.825 MHz IRLP node 6278,
EchoLink node 399996

In Tasmania
VK7RTV 2 m. Repeater Stowport 146.775 MHz. IRLP 6616

In the Northern Territory
VK8MA, Katherine on 146.750, CTCSS 91.5, IRLP Node 6800

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 50-50 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.



The annual GippsTech conference is coming. With a reputation as a premier amateur radio technical conference, GippsTech focusses primarily on techniques applicable in the VHF, UHF and microwave bands, especially for weak-signal contacts.

GippsTech 2018 will be happening on the weekend of 7 and 8 July, at Federation University Australia Gippsland Campus in Churchill, Victoria, about 170 km east of Melbourne.

Call for papers

Anyone wishing to share information with others is invited to submit a title and brief summary of your planned presentation to the Conference Chair Peter VK3PF as soon as possible. Please be sure to indicate your expected length of presentation: it could be a short 10 minute item through to a detailed presentation of up to an hour.

We look forward to seeing you at GippsTech in early July.

Further details will be available from the Eastern Zone Amateur Radio Club website: <http://www.vk3bez.org/>



IARU Region III Inaugurated in Sydney - 50 years ago

David Wardlaw VK3ADW and Peter Wolfenden VK3RV, WIA Historian

Just over 50 years ago, on 12 April 1968, representatives from a number of countries within this part of the world, met in Sydney to establish a regional arm for the International Amateur Radio Union - IARU Region 3. This was forty-three years after the establishment of the IARU itself.

But what is the IARU and how did it come about?

The IARU represents all radio amateurs at the highest level and has the ability to feed information into the International Telecommunications Union, which itself is the United Nations' agency dealing with information and communication technologies. The ITU therefore, sets many of the 'ground rules'.

Within the scope of ITU work are communication services, including amateur radio and the amateur-

satellite services. The Radio communication Sector of the ITU (ITU-R) manages the international radio-frequency spectrum and satellite orbit resources.

Looking back - The IARU Comes into Existence

On 14 April, 1925, in the Faculty of Science at Paris University, over 200 delegates attended a conference convened to establish the IARU. Many represented national amateur organisations.

The 1925 Paris Radio Conference was a really far sighted move by those involved and there is little doubt that it helped cement our existence as radio amateurs!

At that time, wireless communications was on the cusp of rapid change. Wireless Telegraphy had been developed to a point where it was profitable and very commercial. Amplitude

Modulation techniques had also been developed to the extent that Broadcasting was established in many countries, albeit, often initiated by amateurs. And to top off all of this expansion and growth, amateurs had just commenced to open up the 'unusable' short wave bands and achieved world-wide communication using very low power. This was rapidly followed by pioneering crystal control techniques which provided stability of their transmissions.

Between 1921 and 1923 amateurs had lowered their wave lengths to 200 and 100 metres, transmitted signals across the Atlantic and Pacific Oceans and by late 1924 two way communication had taken place between Australia, New Zealand, the UK, America and other countries. The spectrum was beginning to be opened up, the world was 'shrinking' and demands



Photo 1: Inaugural Region 3 meeting in session together with the WIA Federal Council. (WIA Archive)



Photo 2: Delegates and Federal Councillors outside of the Wireless Institute Centre, NSW Division. (WIA Archive)

'Europe to have three choices between 115 and 95 metres, between 70 and 65 metres, and between 47 and 43 metres.

Canada to have two choices between 120 and 115 metres and 43 and 41.5 metres.

The United States to have between 83 and 75 metres and 41.5 and 37.3 metres.

And the rest of the world to have between 85 (95?) and 85 metres and 37.5 and 35 metres.'

were increasingly being placed on 'the new' higher frequencies. Major changes were certainly at hand!

According to the Australian magazine, **Radio Broadcast** of July 1925:

'The Paris Conference to Inaugurate the International Amateur Radio Union was attended by over two hundred delegates, representing wireless clubs and associations from twenty-one different countries in all parts of the world.

The primary object of the Congress, as advertised, was to organise the wireless workers of various nationalities into a coherent body having sufficient driving force behind it to safeguard the interests of the amateur against adverse influences, commercial, political, or otherwise.'

The Paris conference closed on 18 April 1925, with delegates returning home armed with considered directions to follow up, but not before an initial IARU management team were elected to office. They were:

Hiram Maxim (America),
International President.

Gerald Marcuse (England),
International vice President.

K. Warner (America), Secretary and Treasurer.

J. Mezger (France), International Councillor.

F. Bell (New Zealand), International Councillor.

Australia as such was not present at that conference; however quite a few amateurs here were members of the IARU. In those early days, individuals could be members of the IARU in their own right. It was not until 1927, according to the 1927 WIA Federal Convention Minutes, that the WIA itself became a 'national member' of the IARU. This was achieved by means of a complex manoeuvre involving some 25 individual IARU members in the WIA Tasmanian Division, who effectively transferred their membership of the IARU to the Federal body of the WIA. This allowed the WIA to become a member of the IARU and represent Australian amateurs as a whole, at the international level.

Returning to 1925, and again, according to the July edition of **Radio Broadcast**, the Conference agreed to recommend the adoption of the following wave bands for amateurs working the various countries:

Then in 1927, an International Radiotelegraph Conference was held in Washington, USA, at which amateurs were nearly forced into bands that would have been too narrow to support future growth. At this conference, allocations were won which we still know today as 160, 80, 40, 20, and the 10 metre bands, with a 5-metre band that was moved to 6 metres in many countries after World War II. Other amateur bands we now enjoy, were the result of decades of patient effort through the work of the IARU.

IARU Regions begin to form

During 1950, the Jubilee Year of the IARU, some thought was given to the establishment of a Region 1 (European) branch. This did not occur immediately for many reasons including difficulties between some of the European countries. However, 1950 is acknowledged as the year that IARU Region 1 was effectively established.

During 1964, a number of amateur organisations met in Mexico City at which the decision was made to bring a Region 2 into existence, covering the Americas.

Region 3 is born

Four years later, in 1968, representatives from countries within our part of the world met

in Sydney to establish a Region 3 organisation.

This Inaugural meeting was held in conjunction and concurrently with the WIA's 32nd Federal Convention, held at the Wireless Institute Centre, Crow's Nest, Sydney, between 12 and 15 April 1968.

Invitations were issued to societies within the region and representatives from Japan, the Philippines and New Zealand attended along with the Australian delegates. Ceylon, India, South Korea, Thailand, and Hong Kong indicated their support for the meeting but were unable to attend. IARU President, R.W. Dennison W0DX attended and was invited to chair the meeting.

This meeting decided to establish an interim Directorate of five, representing the countries present and it was appointed to act until the Plenary (all inclusive) meeting scheduled for Tokyo in 1971.

The interim Directors appointed were:

JA1BK, Kyoshi Misoguchi, Overseas Director JARL.

DU1EA, Emilo Asistores, Wireless Institute of the Philippines.

ZL3AZ, Tom Clarkson, Overseas Liaison Officer, NZART.

VK3OR, John Battrick, President, WIA.

The fifth Director was W0DX, Bob Denniston, President IARU and ARRL.

The meeting felt it appropriate to have the IARU President as one of the initial Directors, to help indicate the sincerity of the region to work closely within the world membership of the IARU and not appear to be 'doing their own thing' in isolation from the existing IARU structure.

One of the issues needing urgent attention was funding for the new organisation. A suitable method of funds remission, cognisant of the complexities of the banking systems in different countries, needed to be resolved before money could be transferred to the Regional organisation's account.

As Director, Emilo Asistores DU1EA travelled the region widely in his employment. He offered to help IARU headquarters in promoting within the new Region, the IARU 'DARE' Program - (Develop Amateur Radio Everywhere).

Following the Conference in Sydney, a Secretariat was put into place comprising members of the WIA Federal Executive. They were:

Chair, John Battrick VK3OR, WIA Director.

Secretary-General, Peter Williams VK3IZ, WIA Federal Secretary.

Members: Michael Owen VK3KI, WIA Federal Vice President.

David Rankin, VK3QV WIA Federal Activities Officer.

David Wardlaw VK3ADW, WIA Intruder Watch Co-ordinator.

In addition, the Secretariat was assisted by George Pither VK3VX, WIA ITU Liaison Officer.

One of the first tasks for the Secretariat was to prepare an Interim Constitution for the new organisation. Its purpose was to enable the commencement of the organisation, fully realising that adjustments would be necessary later, but importantly, enabling the commencement of work, together with providing protection for the members of the Secretariat. Michael Owen VK3KI took on much of this initial work together with Secretariat members and the draft was immediately circulated amongst all appointed Directors.

Plenary Meeting of IARU Region 3, March 1971, Tokyo

March 1971 saw the first meeting of the Region 3 Association following inauguration. It was held in Tokyo and hosted by the JARL.

Australia was represented by Michael Owen VK3KI and George Pither VK3VX.

Peter Williams VK3IZ was retained as Secretary.

Other representatives were from: Japan, New Zealand and the Philippines, all countries which were present at the Sydney meeting. In addition, this meeting was also attended by representatives from India and Hong Kong. The Region 3 association was slowly growing.

A number of topics were handled at Tokyo; the most urgent

THE PARIS RADIO CONGRESS.

A Complete Report of the Proceedings — Of Deep Interest to All Experimenters.

THE Paris Conference to inaugurate an International Amateur Radio Union was attended by over two hundred delegates, representing wireless clubs and association from twenty-one different countries in all parts of the world.

The primary object of the congress, as advertised, was to organise the wireless workers of various nationalities into a coherent body having suf-

class of worker, who, by the way, represents at least 95 per cent. of the wireless public, it will certainly become necessary to organise another international association upon a broader basis.

Apart from the task of drafting the constitution of the new union, the conference discussed ways and means for co-ordinating the experimental work now being carried out by the amateurs of different coun-

Photo 3: 1925 Paris Radio Conference article. (Radio Broadcast 1 July 1925 WIA Archive).

and time consuming was planning for the forthcoming ITU Space Telecommunications Conference scheduled for June that year. Space communications was a 'hot topic' for amateur radio then, as this was a time of great experimentation with satellites, Australis OSCAR 5 having been launched two months earlier. In addition interest in Amateur Television was growing. So the desire to at least retain our allocations, particularly in VHF and UHF was pre-eminent. Region 3 decided to send Tom Clarkson ZL2AZ a highly qualified amateur, to join the IARU team at Geneva as an Observer.

The conference, of course, discussed many other matters, not only relating to the operation of the new Regional Association, but issues surrounding interference to amateurs in the 40 metre band, the 40 metre band allocation, publicity for the hobby and public relations.

Region 3 Today

Like most amateur radio involvements, the voluminous, hard work associated with our hobby over the years is carried out by volunteers. Indeed the hobby would not exist if it was not for dedicated volunteers throughout the entire amateur ranks. Regional activities are no exception and they can be even more stressful due to the travel distances involved, language differences, let alone the often diametrically opposed points of view of some country's authorities to others - even the allowance of Amateur Radio in their domain!

From the humble beginnings at the Inaugural meeting in 1968, IARU Region 3 now has 39 member countries.

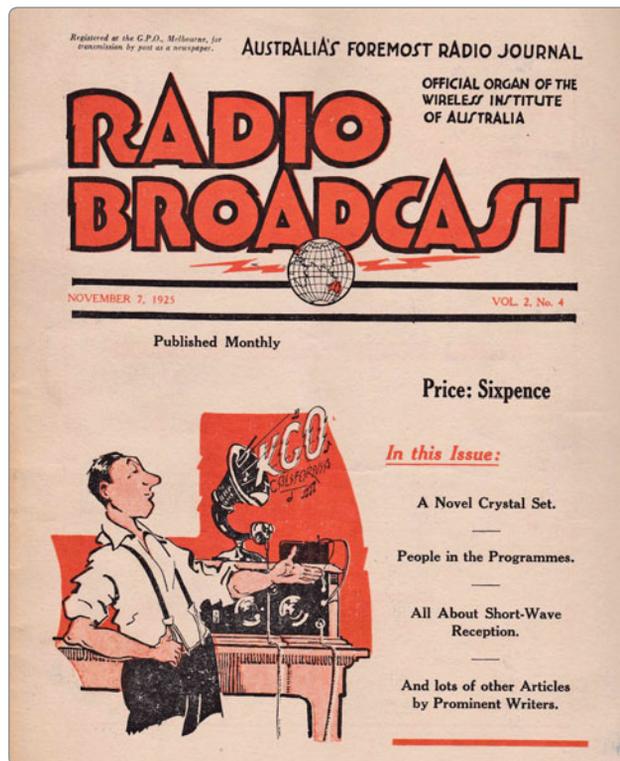


Photo 4: A cover of Radio Broadcast for 1925. (WIA Archive).

The current Region 3 Directors are:

Gopal Madhavan VU2GMN,
Chairman

Joong-Geun Rhee HL1AQQ
Shizuo Endo JE1MUI

Wisnu Widjaja YB0A

Peter Young VK3MV

Ken Yamamoto JA1CJP, Secretary

Directly quoting the Region 3 website – from an extract of the Constitution:

The purpose of the IARU Region 3 is:

'to promote, represent and advance in whatsoever manner IARU Region 3 thinks fit, the interests of Radio Amateurs in all countries of Region 3 of the International Telecommunications Union (and without limiting the generality of the foregoing);

by the furtherance of the objects of the International Amateur Radio Union and having regard to the special interest of radio amateurs in Asia and Oceania which interests are to protect and enhance radio

amateur privileges in all of the countries in the Region;

to encourage an awareness of the value of radio amateurs by the administrations of all the countries in the Region;

to educate and encourage potential radio amateurs in all of the countries of the Region;

to represent radio amateurs both nationally and internationally;

to protect and retain amateur radio frequency allocation as frequencies allocated for the sole use of radio amateurs;

provided always shall exercise its powers in support of IARU and not in substitution for the exercise of power by IARU.'

Every radio amateur needs the IARU!

Dedicated to the memory of Jim Linton VK3PC, SK, who gave freely of his time as the Chairman of the Region 3 Disaster Communications Committee. Jim was planning to write an article about the 50th Anniversary of IARU Region 3, along these lines.

This article also acknowledges the many Australian amateurs who have contributed their time and effort to support our hobby at the IARU, IARU Region 3 and ITU committee levels over the years.

Sources of information

IARU websites, **Radio Broadcast** magazine, 'International Working', April 1925, p4, **Radio Broadcast** magazine, 'The Paris Radio Congress', July 1925, p12, WIA Federal Convention Minutes for 1927, **Amateur Radio** magazine, 'Federal comment', November 1968, p4, **Amateur Radio** magazine, 'IARU Region 3 Conference, Tokyo 1971', June 1971, p21.





VHF/UHF - An Expanding World

David K Minchin VK5KK

Introduction

This month we have Leigh VK2KRR's WSPR report as well as details on a rare late spring 144 MHz Tropo opening to VK6. We also have a report on mmWave Surface Evaporation Ducting, an update on the LimeSDR Mini (finally out!) as well as Kevin's Meteor Scatter notes.

WSPR Propagation Report Jan – April 2018

The second half of summer really fired up with a number of high MUF Sporadic E openings. Tropospheric Ducting was relatively quiet compared to the long-term average although some stations in different locations have been highlighting previously un-exploited paths.

50 MHz WSPR: Nearly every day of January and February saw Sporadic E openings on 6 m WSPR. On the 1 January some surprise signals came through from 5W1SA in Samoa. Furthest distance was with Andrew VK5MR at 5557 km. 5W1SA was also heard by VK2DVM, VK2KRR, VK2YOC, VK3WE and VK1DW. At the same time paths also existed between the mainland stations and Phil 3D2TS at Fiji, and also his remote station FK1TS at New Caledonia. It was interesting to see these WSPR stations in the Pacific all about 1000 km apart and further afield we had Chris N3IZN monitoring in California, but paths never extended to Chris at this point.

There were some interesting occasions during January where paths existed all night between Western Australian stations and those in the eastern states and

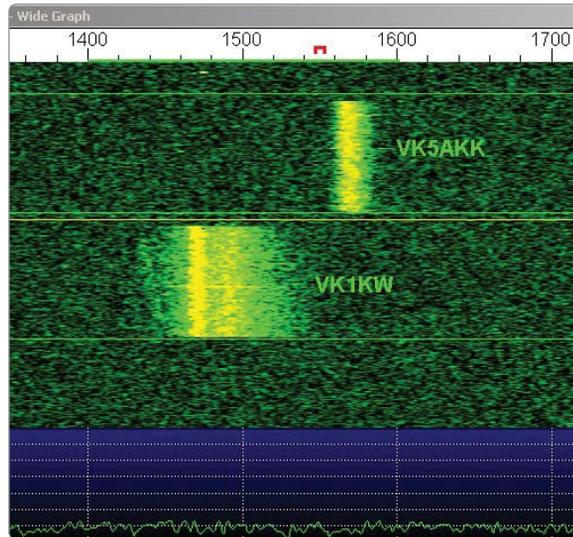


Photo 1: 6 m WSPR waterfall image.

even as far as New Zealand. One such occasion noted on 2 January where Andy VK6OX was through all night to VK2KRR, even with +10 dB signals at 3 am in the morning. Rather than improving with sunrise to provide even bigger signals, the paths would fade away after sunrise, so it was very interesting to observe.

On 7 January, Phil 3D2TS at Fiji was through to areas of VK3, with multiple good signals to Jim VK3II and some to New Zealand including ZL4JW. In the evening of the same day, Doppler shifted and spread signals were observed whilst beaming into the Great Australian Bight. This happened numerous times during January evenings. See Photo 1.

Whilst people using 6 m WSPR are looking for any form of propagation, particularly anything unusual such as paths in excess of normal sporadic E distances, such

as to north America or Europe, but as these paths are quite rare currently due to the low sunspot numbers there are numerous stations watching 6 m WSPR as an indicator for the maximum usable frequency (MUF) rising up to unusually high levels, particularly as it heads towards the 144 MHz band. Many stations scramble for those rare 2 m E paths once this MUF gets close to that

area. It can be really intense and exciting trying to work out where and when the E layer MUF is going to reach the 144 MHz band.

The sporadic E signals on 6m WSPR held up till about mid-February where they started dropping off fairly rapidly.

144 MHz WSPR: During the latter half of summer, tropospheric ducting was not very prevalent for people on 2 m WSPR, but, we did have numerous times where the sporadic E MUF reached the band.

On 4 January, a Tropo opening was running between Derek VK6DZ and Phil VK5AKK over their near 2000 km path, when Alan VK3DXE in east Melbourne was able to push a signal through to Derek VK6DZ (2463 km) at 1340z. At 1406 and 1408Z two more signals got through. Alan suspects that these signals were reflected from high flying aircraft that were on the same azimuth line with VK6DZ, the

signals then coming back down into the duct over the Bight and then through to VK6DZ (I would tend to agree). The signal reports were generally quite weak at -26, -24 and -28 dB. Alan plans to exploit these phenomena further in the future and provide more examples of his work.

On 6 January, a sporadic E opening appeared around midday with paths from ZL3PX to VK2IJM at 2156 km and VK2DVM at 2144 km. ZL2IT heard VK3WE at 2543 km, VK2DCT at 2412 km and VK2IJM at 2380 km. Rhett VK3WE also made it to ZL2TLF. Some of the signals were very large up to +15 dB.

Hayden's VK7HH 2 m WSPR remote station located just west of Hobart and been discovering some amazing openings from Tasmania that have been previously unexplored and unknown, but Hayden is doing an amazing job of bringing all these paths to light showing the extent and amazing strength of these paths. The VK7HH remote station is often heard in many parts of VK3 on 2 m WSPR, and has had paths to VK1, 2, 3, 4, 5, 6, 7 and ZL.

On 7 January, a Tropo path up from VK7HH/r to VK5PJ in the Barossa Valley at 1149 km, signal levels reaching +8 dB. On 9 January, VK7HH/r was decoded by Wayne VK2XN near Narrabri via late evening sporadic E. Signal was -20 dB and was very weakly seen by Len VK4ALF but not decoded.

Early morning on 16 January, a good Tropo path from VK7HH/r to areas surrounding Adelaide, to VK5BC/p at 1231 km, VK5PJ at 1149 km, VK5GF at 1056 km. Paths were also present to VK3ZAZ, VK3JTM and VK3ZTE.

Also on 16 January, a rather good day of high MUF sporadic E occurred. Initially I believe at around 2 pm, paths flared up between VK4FP Townsville to VK2KRR Wagga and VK5PJ Barossa Valley. Then across the same path VK4ALF Brisbane got to VK5MR Roxby Downs then to VK5PJ and VK3JTM. Both VK5MR and VK4ALF

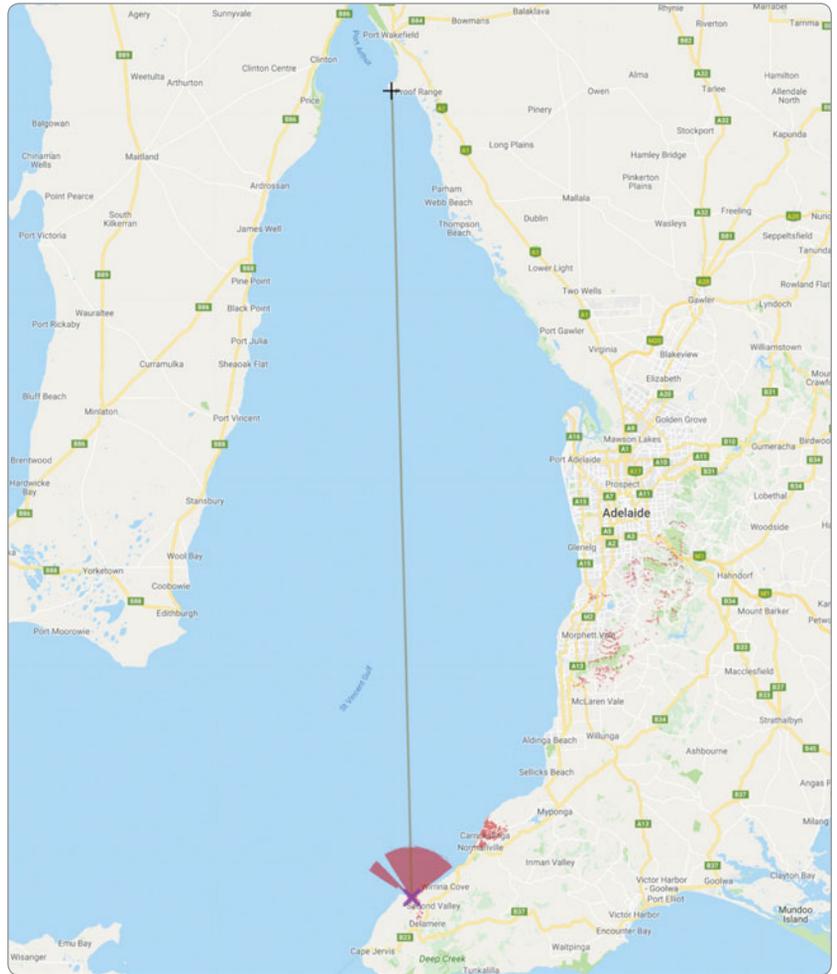


Photo 2: 140 km VK5ZD to VK5KK 47 GHz path over water.

are using Omni directional vertical antennas. Later in the afternoon, paths occurred between VK5MR Roxby Downs to VK2XN Narrabri and then with VK7HH/r. While this was happening there was also tropospheric ducting from VK6DZ across to VK5BC/p and VK5AKK around 2000 km.

On 17 January, yet another day of high MUF sporadic E excitement. The day started with VK4FP to VK2KRR path, and VK4ALF to VK5MR, it then extended to mostly be VK4 to VK3 and VK7. Lloyd VK4FP then had paths with VK3JL, VK3ZTE and VK3DXE. Len VK4ALF had further paths with VK3JL, VK3DXE, VK2KRR, VK7HH/r and VK5PJ.

In the evening of 19 January, Derek VK6DZ was heard on Tropo by Alan VK3DXE at 2463 km. The

following morning VK6DZ again had a path with VK3DXE and Steve VK3ZAZ, and also a rare path with VK7HH/r at 2660 km.

Later in the afternoon of 20 January sporadic E flared up and VK4FP had a path with VK2DVM and VK3ZTE. Matt VK3PP through to VK4KWS.

Morning of 22 January, another Tropo path from Hayden's remote VK7HH station to VK5AKK at 1125 km, VK5GF at 1082 km, VK5LA at 1100 km. Hayden also had shorter paths with VK3BQ, VK3JTM, VK3FFB, VK3PP, VK3SMC and VK3ZTE. A partial decode was also had by David VK2DVM in Sydney, 1079 km. Morning of 8 February saw a Sydney to Hobart path, with VK7HH/r reaching VK2DVM at 1080 km.

Just when we suspected that

the high MUF sporadic E had finished it went one step further on 14 February. Stations had noticed a lot of activity on 6 m WSPR and also then FM Broadcast band, then in the evening a path broke out between VK6DZ and VK3DXE at 2463 km and also to VK2KRR at 2664 km. VK2KRR was also receiving 162 MHz Marine Tracking south of Esperance at the time.

On the evening of 21 and morning of 22 February the best Tropo opening from VK2 to VK7 occurred. VK7HH/r had paths through to VK2DVM, VK2IJM, VK1KW, VK2KRR, VK3DXE, VK3FFB, VK3ZTE, and VK7MO. Rex VK7MO got in on the excitement and also made it through to VK2DVM and VK2IJM.

On 23 February, another big Tropo opening from VK7HH/r and also VK7MO to VK2IJM, VK2DVM, VK2KRR, VK3DXE, VK3FFB, VK3JL, VK3WE, VK3ZTE, VK3MHY, VK7PD. After all these Tropo openings from VK7HH/r, Hayden has really got the system tuned in and in general, any colour showing up on the Hepburn charts will generally show a path to the mainland for the VK7HH/r station. Before the next summer season, Hayden may well make changes at the remote site and add 70 cm and 23 cm bands to the mix.

On 27 February, Tropo covered all the south east area, VK7HH/r was in action again to Sydney, Wagga and Melbourne. A rarer path was established from VK5GF into

Sydney to VK2DVM and VK2IJM which is also over 1000 km. On 10 March VK7HH/r was not available and VK7PD took over from north of the state. VK7PD established paths with VK2DVM, VK2IJM. VK7MO also made it through to the Sydney stations.

Those who utilise WSPR on 6 m and 2 m can see that the WSPR format is highly effective as a beacon system, particularly as it uses only a single frequency and automatically reports band conditions live to the online database. As I've previously written about in the past, WSPR results get better with more stations in operation. There are low numbers in VK1, VK4, VK6 and VK8 and a lot more activity is required in those areas to help further highlight existing paths and detect new or very rare paths.

Keep a look out in the coming months for those rare inland Tropo paths from VK5 and western VK3 to north east VK2 and south east VK4, and perhaps we may also see some of those rare winter Bight Path crossings. Good luck! All contributions on propagation and WSPR are welcome; just email Leigh VK2KRR at vk2krr@wia.org.au or myself.

As a footnote to Leigh's notes, yes the band did open again to Albany on 29/4/2018 between ~1000 and 1744 UTC. VK5AKK copied VK6DZ on 144.490 MHz WSPR with signals peaking +6 dB

at 1316 UTC. The system moved through quickly with WSPR signals between VK5 and VK3/7 out 1000 km.

mmWave Surface Evaporation Ducting Revisited

At regular intervals we have reported on the continued experiments with 10 GHz and above non line of sight water paths utilising low level evaporation ducts.

As we all know, evaporation is water being released as vapour into the atmosphere through some change at its surface, in our case by the action of wind or temperature convection over a lake or sea. Water vapour is simply the "gaseous" phase of water and hence evaporation is no different to boiling water where water is released to the atmosphere as steam. A water molecule transitioning from liquid to gas takes with it a portion of kinetic energy (heat) hence the ability of steam to provide power when it is "constrained". The energy removed "cools" the water surface hence the cooling ability of evaporative (swampy) air coolers or the old water bag.

Evaporation over a water body is no different, the water is slightly cooled but more importantly (for us) the energy imparted on the water vapour released causes this vapour to rapidly accelerate away from the water surface. This creates a zone of rapidly decreasing humidity from just above the water surface to the boundary with more humid air. The duct height is dependent on the amount of wind, the temperature differential between the water and air, and the time of day. The thickness of the duct layer can be between 0 and 40 metres with a typical mean average of 13 metres at our latitudes. The quality of the duct is dependent on the refractive abilities of the upper boundary at the frequency of choice and to a lesser extent a lack of significant wave action on the water over the path.

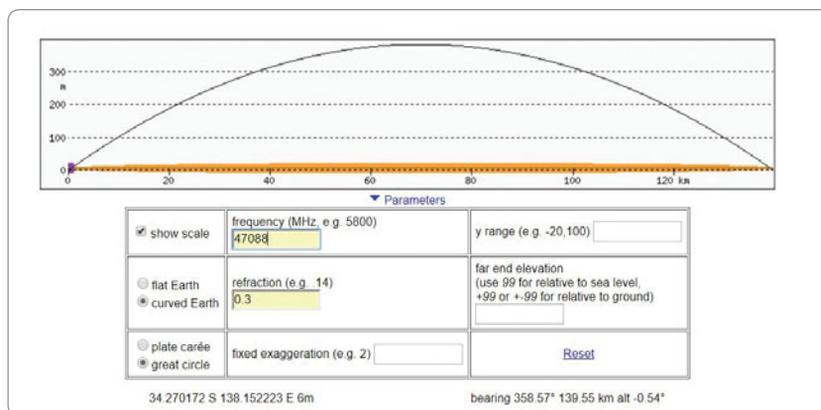


Photo 3: 47 GHz Surface Evaporation Duct Path profile.



Photo 4: VK5KK 47 GHz 600 mm dish flanked by 24 & 10 GHz.

The impact of Evaporation Ducts on propagation on lower microwave bands (1 - 10 GHz) has been studied since the late 1940s as naval research into radar anomalies across water progressed. These studies discovered that evaporation ducting works best around 8 - 10 GHz but also that the same layer can have a detrimental effect on signals above that layer by bouncing signals away before reaching the water surface. This meant that under certain conditions radar systems mounted high up on a ship would fail to detect objects below about 20 metres. The discovery led to missiles being developed that travelled close to the surface of the water (like the Exocet), necessitating additional radar systems to be installed just above water level on ships to detect them. Our experience on 10 GHz with these ducts is that signals can be ballistically strong over 150 - 200 km making dish pointing optional!

Evaporation ducts are also noted to be a bit leaky at the top interface as wind and wave action blows holes in the boundary. These

holes also create very rapid QSB however another side effect is that these holes allow a signal to escape and then be propagated by a higher Tropo duct at 300 - 600 metres. On 10 GHz it is quite common on the east/west path to VK6 (Albany) that a surface duct extends an opening into the VK5 Gulf area late afternoon until early evening well after the main Tropo system has moved south. Sometimes there can be a mix of direct Tropo and the two modes arriving at slightly different times. This can make for interesting hollow (phasing) sound on the signal that changes as you make slight azimuth changes to the dish.

Above 10 GHz there is has been limited research on evaporation ducting as such propagation is of little commercial use other than for radar. Interestingly, the US Navy experimented with 94 GHz over a 40 km path in 1990 giving us some clues of what to expect (Ref. Kenneth Anderson IEEE paper). In the study held over five months in Southern California, they clearly established that an evaporation layer can enhance signals up to

+50 dB greater than free space loss at 94 GHz dependant on the layer thickness and upper boundary. The optimal thickness for 94 GHz was found to be just 3 metres high! Typically this would be a very low humidity duct with a well-defined refractive top boundary and a fairly calm sea. The higher the layer the lesser the amount of enhancement in the mmWave region but up to 15 metres still provided a path loss equivalent to that the LOS free space loss for the same distance.

From our own experience, we do know that evaporation ducting does indeed work over water on 24 GHz and 47 GHz. Over the last few years we have experimented over 140 - 170 km paths around the gulfs in VK5 that are ~150% of radio LOS. The evaporation duct leg has been 30 - 80 km over water with each station at 220 to 400 metres altitude at each end with a radio horizon partly over water at each end. It doesn't seem to make any difference what time of year or sometimes even weather conditions. In this year's JMMFD, VK5LZ worked VK5ZT over 162

km on 47 GHz noise free FM with lightning storms at both ends!

Working from water level (i.e. 1.5 metres antenna height ASL) is a different story. In June 2016, VK5ZD/VK5KK/OE4WOG experimented on 24, 47 & 76 GHz across Lake Konstanz between Germany and Switzerland. On the longest path (44 km) 24 & 47 GHz (25 mW) were strong using just basic horn antennas. 76 GHz was successful but at much lower signals, albeit partially due to lower power and unmodified 38 GHz Nurad antenna. Another factor most likely (from Anderson's findings) is that duct height and quality sets a maximum usable frequency above which path loss increases rapidly.

On 1/5/2018 Iain VK5ZD and David VK5KK decided to go back to one of the paths that had been previously tested on 10 and 24 GHz to see if it would work on 47 GHz. VK5KK went to Rapid Bay (PF95br) and VK5ZD to a point close to the Port Wakefield Proof Range (PF94cl), the elevation at both ends was less than 3 metres ASL. Keith VK5AKM decided to go for a drive and set up 10 GHz inland about 55 km and 130 km from VK5ZD

and VK5KK respectively. The air temperature was ~18 C and dew point ~11 C with a 20 km/h wind from the North. Not quite the best conditions from experience but worth trying.

From around 0100UTC signals on 10 GHz were the usual + 40 to 50 dB above the noise level! 24 GHz was tested around 0110 UTC and provided noise free signals on FM but with the typical sharp QSB drops of 15/20 dB for 1-2 seconds as the duct gets the occasional hole in it. As noted had been noted on previous occasions the signal levels were around 25 - 30 dB below those of 10 GHz, when calculated that is very close to the actual difference in path loss if you factor for fairly dry air.

The next step was the 47 GHz test, equipment used at each end were identical Kuhne 47 GHz transverters with VK5ZD using a 400 mm dish and VK5KK a 600 mm dish. The initial test on 47 GHz that followed was not successful but after some recalculation of headings using solar navigation and Iain's actual location, VK5KK discovered that he was around 1.5 degrees off. Given that the 600 mm dish has a

0.5 degree 3 dB beamwidth that does make a difference under weak signal conditions! After repositioning the dish, Iain VK5ZD worked VK5KK at 0210 UTC on 47088.150 MHz 51 SSB both ways. QSB was not as dramatic as 24 GHz and signals remained fairly constant until 0255 UTC when we packed up.

Analysing the 47 GHz result vs. 24 GHz and factoring the differences of power and antenna gain there was a probable 15- 20 dB increase in path loss on 47 GHz. The calculated free space path loss for 24 and 47 GHz is usually within 5 dB at relatively low humidity over this path so an indicator that this wasn't a good duct. Still this will probably go on record as one of the longest 47 GHz contacts so far anywhere that definitely was not LOS given the 400 metre "wall of water" in the way. Stay tuned, more experiments with surface ducting coming up!

LimeSDR Mini is finally released plus HDSDR is now ported!

The Lime SDR Mini has finally made it to the market albeit four months late! The first impressions are good



Photo 5: VK5ZD 47 GHz system with 400 mm dish.

despite the 30 MHz vs. 60 MHz maximum sampling bandwidth of the full sized LimeSDR. To be honest, unless you have a really good spec PC with plenty of headroom and a good USB 3.0 port most software crashes when asked to sample greater than 15 - 20 MHz bandwidth on narrow band modes anyway so the Mini is better value.

Even better news is that HSDR now has a hardware file for the LimeSDR, so I have had a chance to finally test the LimeSDR as a transverter receive IF. The Software can port to I/Q outputs for directly driving MAP65 software, etc. For the usual bandwidths used with MAP65 PC hardware isn't a big issue and all seems to run OK on a DELL E6520 at least. It does work, in the next column we will have more on the LimeSDR after some real world testing along with the latest from the SDRA 2018 conference in Friedrichshafen in Germany.

In closing

Feel free to drop me a line if you have something to report. Contributions regarding club projects or proposed activities are always welcome. Just email me at david@vk5kk.com and I'll include in the column.

73

David VK5KK

Meteor Scatter Report

Dr Kevin Johnston VK4UH

This month: QRA64 mode:

Does it have a place in Meteor Scatter operation? Report on the Leonids Meteor Shower 2018. Forthcoming Meteor Shower events – the big ones are coming.

Over the last few months a series of interesting trials have been underway in VK using QRA64-D mode which may prove to be of interest for Meteor Scatter operators. Initially led by Rex VK7MO in Hobart and Peter VK5PJ

near Adelaide, QRA64 is being used on both 2 m and 6 m by operators across the eastern and southern states for terrestrial and Meteor Scatter contacts.

As an overview of this mode, QRA64 mode is not new. It has been available within WSJT-x for some time and was introduced as an experimental mode for EME and extreme weak-signal communications as an alternative to JT65. For the computer literate QRA64 uses a 63,12 Q-ary Repeat Accumulate Code that is supposed to offer a 1.3 dB advantage over the Reed-Solomon 63/12 code used in JT65. Further, unlike JT65 which alternates transmission to a single low sync tone with every transition, QRA64 uses a new synchronization scheme based on three 7x7 Costas Arrays. Since JT65 effectively “wastes” 50 % of the transmit period with the sync tone then there is a further potential advantage of 1.9 dB with QRA64 which does not have the “50 % synchronization overhead”. QRA64 uses 64 FSK, 1736 Baud with a transmission period of 50 seconds apparently capable of a minimum SNR of -26 dB in 2.5 kHz bandwidth.

Why, you might wonder, is this “slow-mode” of interest for Meteor Scatter and weak-signal VHF terrestrial use? The answer is that QRA64-D has another very interesting characteristic, apart from its extreme sensitivity, that being its ability to cope with the sudden and intermittent Doppler shifts due to meteor pings superimposed on terrestrial signals. The increased sensitivity of many weak signal modes is achieved by detecting the signals in progressively narrower bandwidths (read narrower bins). Fast modes including FSK441, MSK144 and MSKMS etc., normally used with Meteor Scatter propagation, are specifically designed to accommodate brief signals and large Doppler shifts.

As most familiar with weak-signal “slow-mode” digital VHF operation will confirm, meteor

pings are in general a destructive and unwanted phenomenon which prevent the decoding of VHF digital modes including WSPR, JT65 and FT8 etc. despite otherwise adequate signals being received. The Doppler shift associated with meteor returns pushes the audio tones into adjacent bins in the decoder which prevents successful decoding. A single 100 ms meteor ping will frequently be sufficient to block the decode of a 120 second WSPR signal even when signal strengths are well above the minimum SNR. During periods of high meteor activity, contacts may be impossible to complete.

QRA64, in common with many slow modes in WSJT-x have selectable sub-modes A-E which control tone separation and audio frequency bin-width. Using QRA64-D sub-mode the bin-width is sufficiently wide to accommodate the typical Doppler distortion of signals on both 2 m and 6 m. The effect of this is that meteor pings now “actively contribute” to the decoding process rather than destroying it.

It is early days and there is much work to be done. It seems unlikely that modes such as QRA64 will always show advantages over the existing fast modes specifically designed for Meteor Scatter work. Even in its current form however, QRA64-D is capable of supporting pure meteor scatter propagation providing there are several returns during a 60 second period, particularly on the 50 MHz where pings in general are longer and louder. However, the place of this mode may well prove to be in situations where there is more than one mode of propagation in play. For example, where there is weak Es or tropo with superimposed meteor scatter. The cumulative decoding of all received signals may prove very advantageous, meteor pings actually helping rather than obliterating decoding. It is also possible that QRA64 might expose previously unused modes

of propagation including ion-scatter which can provide extreme weak signal propagation underneath normal meteor-scatter.

Peter VK5PJ wrote:

"In March 2018 Rex, VK7MO and I successfully conducted tests on 144 MHz using a mode from WSJT-X called QRA64. I had not tried this mode before. Our initial contact from Adelaide to Hobart worked first time over the 1170 km path helped by tropo. Initial tests using QRA64-A showed that meteor pings were having a negative impact on decodes. Rex suggested we try the wider tone spaced 'D' sub mode which turned out to be a revelation of improved performance when meteors occurred. Further tests demonstrated that narrow tone modes like JT65A & JT65B and QRA64A & QRA64B, when a meteor occurs in the path, it spreads the tone in frequency (via the Doppler imparted to the signal via the meteor reflection) and the decoder in WSJT sees a tone in more than one spot (two adjacent signal processing bins) which tricks the decoder into seeing a bad tone sequence and the decoding of the message then fails. Subsequent tests on 50 MHz showed that QRA64-D produced easy decodes with only 50 W used at both ends. Direct comparisons at the time with specialist M/S mode MSK144 was a bit hit and miss on the same path. Test were then completed with Scott VK4CZ using 50MHz QRA64 (D) resulting in a good contact between us. In the end, MSK144 will win through on making a faster QSO due to its shorter TX/RX time cycles but if you have the patience QRA64-D can also succeed. I have a repository of screen grabs on <http://www.users.on.net/~pedroj/qra64/> should any reader wish to see what QRA64 looks like with meteors around."

Meteor Showers

As this column was being prepared the Leonids Meteor Shower was underway. The shower is not predicted to peak until the following

week (23.4.18 UTC date). The effects of this shower so far across the weekend activity periods 20/21 April 2018 has been weak. However, the background Meteor Scatter conditions have been so poor recently that even this level of enhancement has been welcome. Although classified as a Class 1 shower the predicted ZHR, at only 18/hour represents one of the less active event of the calendar. So far this year the shower was not even being reporting on the Canadian Meteor radar service although it has not peaked at the time of writing. This shower is due to debris remaining after the passage of comet Thatcher.

The next major shower on the calendar will be the Eta Aquariids around 6 May 2018. Eta is the principal star in the constellation of Aquarius. This is a Class 1 Shower, one of the best in the southern hemisphere and predicted to have a Zenith Hourly Rate of up to 70/hour. The shower occurs on this date as the orbit of the earth around

the sun passes through trails of debris remaining after the passage of Halley Comet. This hopefully will be one of the best events to prepare for in the MS calendar.

Activity Sessions

The weekend activity sessions run on Saturday and Sunday mornings from before dawn (around 20:00 UTC or earlier) until propagation fails.

Frequencies: 2 m 144.230 MHz, 6 m 50.230 MHz Current Preferred Mode MSK144 15 second periods.

Southerly stations running first period beaming North, Northerly stations running second period beaming South.

Register with VK-ZL Meteor Scatter Facebook Page (Closed group of AR operators) for up to the minute advice and information.

Contributions for this column are as always welcome. Please e-mail to vk4uh@wia.org.au

Kevin Johnston VK4UH
Brisbane

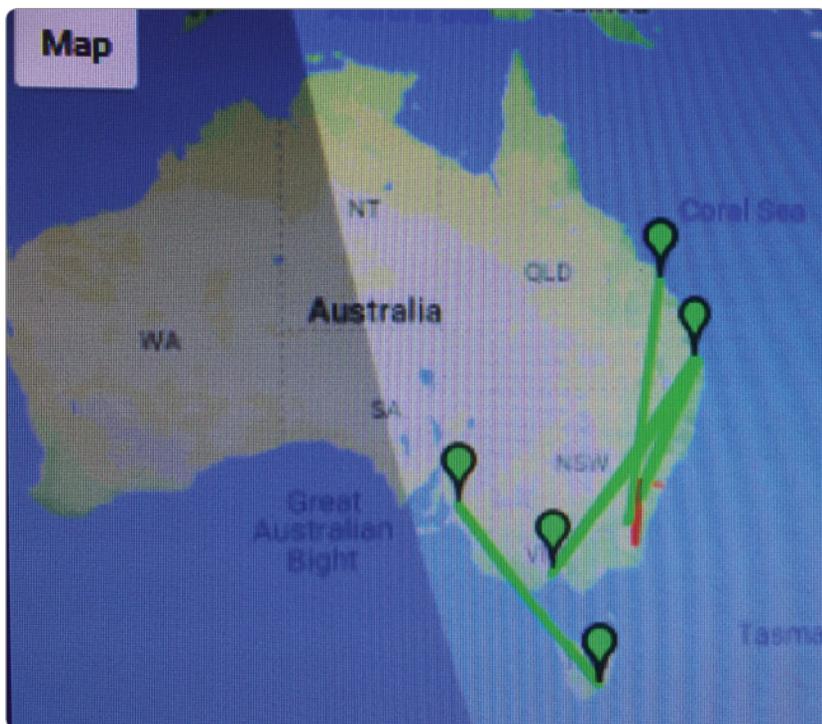


Photo 6: 144MHz meteor scatter paths reported during Leonids Shower 21.4.18.

SOTA & Parks

Allen Harvie VK3ARH
e vk3arh@wia.org.au

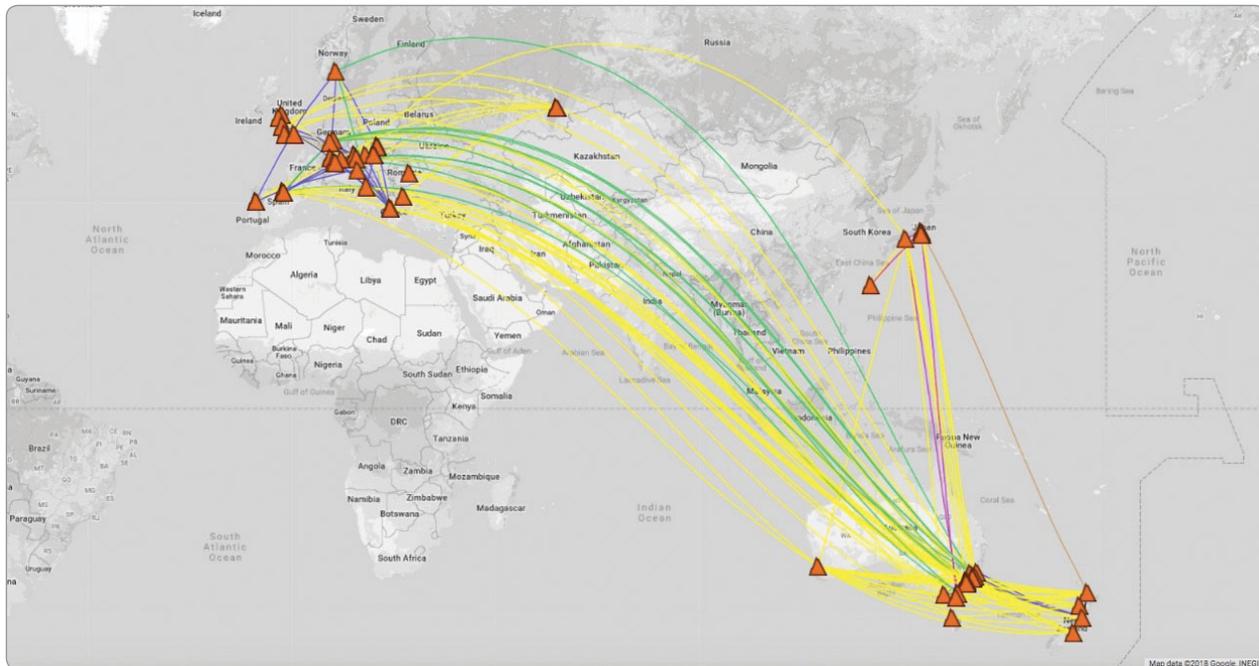


Photo 1: Map of S2S contacts made, showing the short path connections between stations. Many of the contacts between VK/ZL and EU were likely to have been made via the long path. Acknowledgments to Manuel HB9DQM, (<https://neon1.net/sota/s2sviz/20180310/>) and Google Maps.

Challenges

Portable operations present challenges.

There are the standard challenges involved with Amateur radio including, 'Do you really need another radio' or 'why are you inside when the garden needs attention' as well as equipment weight, power levels and antenna selection and deployment.

With challenges to operating come advantages. The pleasures of operating in a low noise floor with million dollar views are some of the rewards. The comradeship you have with people whom you have often never met but know by voice or hand. There is something for everyone; QRP, QRO, wire antennas, phased verticals, beams, CW and even the use of kites; basically anything to qualify the site

will be considered and deployed. It's the path to solutions that makes this an attractive activity.

This is highlighted by two recent activities that presented challenges unique to themselves.

Saturday 10 March at 0630 UTC VK, JA, ZL and EU S2S Party.

SOTA activators in VK, ZL, JA and Europe held simultaneous SOTA activations where the challenge was to complete summit to summit (S2S) DX contacts. This was the third annual SOTA VK - EU S2S event again organised by Andrew VK1AD, Mike 2E0YYY, and Ed DD5LP. This year there were stations from VE, VK, JA, ZL, and ZS and all across EU posting alerts.

Scheduled for 0630UTC, the EU activators had an early start, whilst we (VK, ZL & JA) had a leisurely

afternoon timeline to meet.

The first challenge was to secure a site with access then band and antenna selection next. Propagation predictions were carefully reviewed running up to the event. The predictions indicated 30 m as the optimal band however given the alerts going up; 20 m was going to be the workhorse.

Of the 74 stations logged on the evening 17 were VK facing the challenges and proving a feast of opportunities for SOTA DX chasers.

Multiple techniques were deployed to secure the desired DX S2S contacts, higher power, enhanced antennas, CW or just plain calm persistent listening and calling.

The map projection appears to indicate short path QSOs how when I believe the vast majority of

DX QSOs between EU-OC will have been made long path over central / southern America. Very much an academic discussion as unless you are deploying a directional antenna then you are at the mercy of the propagation and SOTA gods, who do demonstrate a sense of humour.

SOTA VK 160 m

Saturday 31 March saw the now second SOTA 160 m activation day. The core of the challenge is to deploy an antenna into sites that will support the physical boundaries. It has to be relatively lightweight, simple to assemble and deploy and reasonable.

I used a simple approach of taking 80 m of lightweight wire and weaving through the trees into a 1:49 matching transformer. My site (VK3/VG-010) was chosen as it was



Photo 3: David VK3IL portable from Philip Island deploying a loaded 160 m vertical.

reported as having an open summit and with short but challenging access. Whilst deploying the 'get as much wire in the air as you can' philosophy, I was dependent of the

KX3's internal tuner to deal with conditions the deployment brought.

<https://vk3arh.net/2018/04/08/31032018-easter-weekend/>

Peter VK3PF deployed a similar approach deploying squid poles to support lightweight wire as an inverted 'L' from VK3/VT-049.

<https://vk3pf.wordpress.com/2018/04/03/160-m-sota-activity-day-2018/>

VK2IB Bernard and Warren VK3BYD decided to deploy a kite. So this required an open clear site. VK3/VE-006 (Mt Hotham) was selected. 30 m of wire was fed into a 4:1 balun and then coax to the auto ATU on in Bernard's Barret.

<https://vk2ib.wordpress.com/expeditions/2018-2/march-2018/mt-hotham-vk3-ve-006/>

WWFF activations provide unique challenges. Access is again being a major consideration. Parks tend to allow a less hectic deployment supporting higher power and improved antenna configurations. However, as the activators seek the coveted first activation of a site, walk in activations are becoming more frequent. The biggest challenge facing a WWFF activation is the number of contacts. SOTA requires four contacts whilst VKFF only 10, but to qualify a site for WWFF you need 44 contacts. This is where the team component of activations comes into play.

Photo 2: Bernard VK2IB/3 and Warren VK3BYD portable from VK3/VE-006 deployed a kite antenna.



Spotting

Chasers are a crucial component as without them activating would be a rather lonesome business. When you are out there struggling towards 44, it's great to hear those magic words "I'll spot you on ParksPeaks". It's also fantastic when chasers make the extra effort to get contacts on different bands in the same park. This really can make all the difference in getting the numbers in the log.

SOTA Spots are via SOTAwatch2:
<http://www.sotawatch.org/>

WWFF Spots via ParksPeaks:
<http://parksnpeaks.org/addSpot.php>

Valid Contacts

And once you are out and setup, the final challenge, apart from getting home safely, is to ensure

your contacts are valid. Both SOTA and WWFF have rules stating that valid contacts will include an exchange between the activator and the chaser of their respective call signs and signal reports and where possible, the site reference number.

Given the challenges involved the chaser may not be hearing the activator as all well as desired so third parties may be tempted to step in and relay the reports. Whilst this seems helpful, it is key to that the contact that a valid exchange of signal reports be completed between the activator and chaser without third party relaying. If you as the activator are not satisfied that the chaser has copied your signal report then ask to clarify that they have. However should a third party become involved, the contact is invalid and should not be logged.

This will leave the activator short a contact in harsh conditions.

Other news

WWFF and SANPCPA have received two new recently gazetted parks:

- Spaniards Gully Conservation Park VKFF-2251 & 5CP-279
- Wirrabara Range Conservation Park VKFF-2252 & 5CP-280

Upcoming Activities

VK WWFF Gathering – Sunday 12 June 2018 – Barrigo Picnic Ground (WWFF-0972)

VKFF Team Championship, Sunday 21 Oct 2018

KRMNPA Activation Weekend, Friday 9 – Monday 12 November 2018

73 & 44

Allen VK3ARH



S.E.R.G. 54th Annual Convention and Australian Fox Hunting Championship

Sat and Sun 9th-10th June 2018
Scout Hall – Margaret St MOUNT GAMBIER

- Home Brew Comp
- Trading Tables
- \$5 entry + Door Prize
- Strictly Ham
- Come & Try Radio
- Guest Speakers
- Demonstrations
- Tea Coffee and Food avail
- Sunday Night Roast dinner (bookings required)



Web: www.serg.mt.gambier.org
Email: (conv) vk5hcf@wia.org.au (fox hunt) vk5ket@wia.org.au
Mail: PO Box 1103 Mt Gambier 5290



WIA Awards

Bob Robinson VK3SX

Below are listed all New awards issued from 2018-02-15 to 2018-04-14, plus all updates to DXCC awards.

Go to <http://www.wia.org.au/members/wiadxawards/about/> to use the online award system.

New awards

Antarctic

#	Call	Name	Mode
103	VK3KE	Jim Baxter	Open

DXCC Multi-band (1)

#	Call	Name	Mode	Band	Count
199	VK5BC	Brian Cleland	CW	30 m	100
200	VK3KE	Jim Baxter	Open	20 m	307
201	VK3SIM	Simon Keane	CW	20 m	147
202	VK3KE	Jim Baxter	Phone	20 m	283
203	VK3KE	Jim Baxter	CW	20 m	212
204	VK3KE	Jim Baxter	Digital	20 m	185

DXCC Multi-band (3)

#	Call	Name	Mode	Band	Count
122	VK4CC	Colin Clark	Open	20-17-15 m	510
123	VK5DG	David Giles	Digital	30-20-17 m	313
124	VK3SIM	Simon Keane	Phone	20-15-10 m	392
125	VK3SIM	Simon Keane	Digital	40-20-15 m	445
126	VK3AWG	Christopher Belmont	Open	20-17-15 m	473
127	VK3KE	Jim Baxter	Phone	20-15-10 m	566
128	VK3KE	Jim Baxter	CW	40-30-20 m	455

DXCC Multi-band (5)

#	Call	Name	Mode	Band	Count
86	VK3KE	Jim Baxter	Open	40-30-20-15-10 m	975
87	VK2ZQ	Michael Ramsay	Open	40-30-20-15-10 m	787
88	VK4CAG	Graeme Dowse	Digital	40-30-20-17-15 m	544
89	VK3SIM	Simon Keane	Digital	40-30-20-17-15 m	661

DXCC Multi-band (7)

#	Call	Name	Mode	Band	Count
41	VK3SIM	Simon Keane	Open	40-30-20-17-15-12-10 m	1178

DXCC Multi-mode (CW)

#	Call	Name	Count
258	VK5GR	Grant Willis	101
259	VK3KE	Jim Baxter	282

DXCC Multi-mode (Digital)

#	Call	Name	Count
75	VK3KE	Jim Baxter	219

DXCC Multi-mode (Phone)

#	Call	Name	Count
624	VK5SA	Chris Levingston	101

Grid Square

#	Call	Name	Mode	Band
340	YB8XM	Jacob D.c. Sihalale	Open	HF
341	YB8XM	Jacob D.c. Sihalale	Phone	HF
342	VK5BC	Brian Cleland	Digital	6m
343	VK3KE	Jim Baxter	Open	HF
344	VK3KE	Jim Baxter	Phone	HF
345	VK3KE	Jim Baxter	CW	HF
346	VK3KE	Jim Baxter	Digital	HF

Worked All States VHF

#	Call	Name	Mode	Band
219	VK5BC	Brian Cleland	Digital	6 m

Worked All VK Call Areas HF

#	Call	Name	Mode
2378	VK5BC	Brian Cleland	Open

DXCC updates

DXCC Multi-band (1)

#	Call	Name	Mode	Band	Count
4	VK2CA	Allan Meredith	CW	30 m	208
12	VK3EW	David McAulay	CW	30 m	323
97	VK6WX	Wesley Beck	CW	20 m	134
3	VK2CA	Allan Meredith	Digital	20 m	185
54	VK3EW	David McAulay	Digital	20 m	200
106	VK3SIM	Simon Keane	Digital	20 m	180
162	VK3AWG	Christopher Belmont	Digital	20 m	160
164	VK5BC	Brian Cleland	Digital	20 m	154
175	VK3JLS	John Seamons	Digital	20 m	130
186	VK4CC	Colin Clark	Digital	20 m	116
191	VK4CAG	Graeme Dowse	Digital	20 m	122
198	VK2ZQ	Michael Ramsay	Digital	20 m	101
6	VK2CA	Allan Meredith	Open	20 m	316
17	VK6WX	Wesley Beck	Open	20 m	210
20	VK3SX	Bob Robinson	Open	20 m	335
55	VK5BC	Brian Cleland	Open	20 m	262
61	VK4CC	Colin Clark	Open	20 m	242
76	VK3JLS	John Seamons	Open	20 m	219
91	VK2ZQ	Michael Ramsay	Open	20 m	235
104	VK3SIM	Simon Keane	Open	20 m	249
108	VK3AWG	Christopher Belmont	Open	20 m	214
138	VK4CAG	Graeme Dowse	Open	20 m	267

DXCC updates (cont.)

DXCC Multi-band (1)

#	Call	Name	Mode	Band	Count
166	VK3FZ	Roger Stafford	Open	20 m	209
188	VK6BMW	Richard Grocott	Open	20 m	103
200	VK3KE	Jim Baxter	Open	20 m	307
5	VK2CA	Allan Meredith	Phone	20 m	275
21	VK3SX	Bob Robinson	Phone	20 m	335
37	VK5BC	Brian Cleland	Phone	20 m	217
39	VK6WX	Wesley Beck	Phone	20 m	167
62	VK4CC	Colin Clark	Phone	20 m	188
105	VK3SIM	Simon Keane	Phone	20 m	186
107	VK3AWG	Christopher Bellmont	Phone	20 m	148
139	VK4CAG	Graeme Dowse	Phone	20 m	250
167	VK3FZ	Roger Stafford	Phone	20 m	181
169	VK3JLS	John Seamons	Phone	20 m	201

DXCC Multi-band (3)

#	Call	Name	Mode	Band	Count
18	VK2CA	Allan Meredith	CW	30-20-17 m	554
24	VK3EW	David McAulay	CW	30-20-17 m	897
37	VK7CW	Steven Salvia	CW	30-20-17 m	753
66	VK3EW	David McAulay	Digital	30-20-15 m	533
104	VK5BC	Brian Cleland	Digital	30-20-15 m	416
111	VK2CA	Allan Meredith	Digital	20-17-15 m	447
118	VK4CAG	Graeme Dowse	Digital	30-20-15 m	339
4	VK3KE	Jim Baxter	Open	40-20-15 m	680
17	VK2CA	Allan Meredith	Open	20-17-15 m	886
22	VK3EW	David McAulay	Open	40-20-17 m	1007
30	VK3SX	Bob Robinson	Open	20-15-10 m	701
36	VK7CW	Steven Salvia	Open	30-20-17 m	795
48	VK5BC	Brian Cleland	Open	20-17-15 m	721
63	VK2ZQ	Michael Ramsay	Open	40-20-10 m	537
67	VK3SIM	Simon Keane	Open	40-20-15 m	616
69	VK3MEG	Steven Barr	Open	20-15-10 m	546
91	VK4CAG	Graeme Dowse	Open	20-17-15 m	705
102	VK3FZ	Roger Stafford	Open	20-15-10 m	596
112	VK6WX	Wesley Beck	Open	40-20-15 m	471
119	VK3JLS	John Seamons	Open	20-17-15 m	431
122	VK4CC	Colin Clark	Open	20-17-15 m	510
2	VK2CA	Allan Meredith	Phone	20-17-15 m	719
23	VK3EW	David McAulay	Phone	40-20-15 m	984
31	VK3SX	Bob Robinson	Phone	20-15-10 m	693
49	VK5BC	Brian Cleland	Phone	20-15-10 m	604
64	VK2ZQ	Michael Ramsay	Phone	20-15-10 m	495
92	VK4CAG	Graeme Dowse	Phone	20-17-15 m	600
103	VK3FZ	Roger Stafford	Phone	20-15-10 m	476

DXCC Multi-band (5)

#	Call	Name	Mode	Band	Count
20	VK2CA	Allan Meredith	CW	40-30-20-17-15 m	858
21	VK3EW	David McAulay	CW	40-30-20-17-15 m	1393
35	VK7CW	Steven Salvia	CW	40-30-20-17-15 m	1148
76	VK5BC	Brian Cleland	Digital	40-30-20-17-15 m	668
79	VK3EW	David McAulay	Digital	40-30-20-17-15 m	797
29	VK3EW	David McAulay	Open	40-30-20-17-15 m	1662
31	VK5BC	Brian Cleland	Open	40-20-17-15-10 m	1142
34	VK7CW	Steven Salvia	Open	40-30-20-17-15 m	1215
42	VK4CAG	Graeme Dowse	Open	20-17-15-12-10 m	1035
47	VK3SX	Bob Robinson	Open	40-20-17-15-10 m	982
72	VK3FZ	Roger Stafford	Open	30-20-15-12-10 m	881
86	VK3KE	Jim Baxter	Open	40-30-20-15-10 m	975
2	VK3EW	David McAulay	Phone	40-20-17-15-10 m	1605
19	VK2CA	Allan Meredith	Phone	20-17-15-12-10 m	1074
33	VK5BC	Brian Cleland	Phone	20-17-15-12-10 m	942
41	VK4CAG	Graeme Dowse	Phone	20-17-15-12-10 m	888
52	VK3SX	Bob Robinson	Phone	40-20-17-15-10 m	962

DXCC Multi-band (7)

#	Call	Name	Mode	Band	Count
9	VK2CA	Allan Meredith	CW	40-30-20-17-15-12-10 m	1134
10	VK3EW	David McAulay	CW	80-40-30-20-17-15-12m	1794
14	VK7CW	Steven Salvia	CW	40-30-20-17-15-12-10 m	1502
6	VK2CA	Allan Meredith	Open	40-30-20-17-15-12-10 m	1800
7	VK3EW	David McAulay	Open	40-30-20-17-15-12-10 m	2301
15	VK7CW	Steven Salvia	Open	40-30-20-17-15-12-10 m	1593
24	VK5BC	Brian Cleland	Open	40-30-20-17-15-12-10 m	1534
35	VK3FZ	Roger Stafford	Open	40-30-20-17-15-12-10 m	1129
36	VK4CAG	Graeme Dowse	Open	40-30-20-17-15-12-10 m	1329
8	VK3EW	David McAulay	Phone	80-40-20-17-15-12-10 m	2177

DXCC Multi-band (9)

#	Call	Name	Mode	Band	Count
12	VK3EW	David McAulay	CW	160-80-40-30-20-17-15-12-10 m	2117
1	VK3EW	David McAulay	Open	160-80-40-30-20-17-15-12-10 m	2787

DXCC Multi-mode (CW)

#	Call	Name	Count
202	VK2CA	Allan Meredith	310
211	VK7CW	Steven Salvia	302
222	VK5BC	Brian Cleland	188
223	VK6WX	Wesley Beck	198
225	VK4CC	Colin Clark	185
233	VK3SIM	Simon Keane	216
234	VK3MEG	Steven Barr	148
245	VK4CAG	Graeme Dowse	158
249	VK3FZ	Roger Stafford	225
257	VK3AWG	Christopher Bellmont	114
259	VK3KE	Jim Baxter	282

DXCC Multi-mode (Digital)

#	Call	Name	Count
19	VK2CA	Allan Meredith	251
20	VK3EW	David McAulay	290
29	VK5BC	Brian Cleland	222
40	VK3SIM	Simon Keane	217
47	VK3AWG	Christopher Bellmont	167
48	VK2ZQ	Michael Ramsay	153
55	VK3GA	Graham Alston	203
61	VK4CC	Colin Clark	150
65	VK3FZ	Roger Stafford	135
66	VK3JLS	John Seamons	139
67	VK4CAG	Graeme Dowse	180

DXCC Multi-mode (Open)

#	Call	Name	Count
62	VK4CC	Colin Clark	282
333	VK2CA	Allan Meredith	338
346	VK4KEE	Robert Hollis	331
350	VK4CAG	Graeme Dowse	325
354	VK3KE	Jim Baxter	326
376	VK6WX	Wesley Beck	255
383	VK5DG	David Giles	200
388	VK5BC	Brian Cleland	302
393	VK7CW	Steven Salvia	316
394	VK3JLS	John Seamons	242
397	VK3AWG	Christopher Bellmont	242
423	VK3SIM	Simon Keane	287
451	VK3FZ	Roger Stafford	308
452	VK5SA	Chris Levingston	111

DXCC Multi-mode (Phone)

#	Call	Name	Count
463	VK2CA	Allan Meredith	333
502	VK3KE	Jim Baxter	313
554	VK4KEE	Robert Hollis	330
556	VK4CAG	Graeme Dowse	319
573	VK6WX	Wesley Beck	220
582	VK5BC	Brian Cleland	287
591	VK4CC	Colin Clark	227
601	VK3SIM	Simon Keane	228
617	VK3FZ	Roger Stafford	268

Hamads

FOR SALE – VIC

IC 92AD D-STAR radio includes Icom Rapid Charger SMA to PL259 adaptor to suit Comet SMA 24 2/70 cm 4 dB gain antenna. \$400 ono.

LA145 2 m SSB/FM base station linear amplifier never been mobile, 5 watts in 85 W out with fan \$120 ono.

Powertech MP3078 PSU switch mode 13.8V 20AMP never been used \$80.

SWR145 2 m Ocsarblock SWR Power Meter 0-250 W \$70.

Hy Gain trapped vertical antenna 40 m 20 m 15 m 10 6 m, 1 kW cap. EC sorry to sell but upgrading to 10 bander \$150 ono.

Stan VK3BNJ 03 97436708.

FOR SALE – VIC

Shack clearance.

Kenwood TR-7950 transceiver SN 4070886 New in original package \$200.

Kenwood TM-201A transceiver SN 402622 New in original package \$200. Kyokuto Denshi transceiver FM144 – 10SXR11 SN 8064 New in original package \$200.

AWA RT80 transceiver 144-174 MHz inc. control unit SN 203733. Can be converted to 2 m band. New in original package \$150.

RT&H 144 MHz AM transmitter Own make including circuit \$100.

Quansheng TG-25A7 144-148 MHz handheld SN 800807180 complete with spare battery, charger & ext. mic/Spkr \$75.

Kenwood SW-100 SWR Power meter \$45.

RT&H VK Powermaster 13.8 V 20 A power supply \$75.

Channel Master model 9524C 230 V antenna rotator \$30.

QTHR Bill Adams VK3ZWO waadams@dodo.com.au



Silent Key

Anthony Kendricks, formerly VK7ZTK

It is with sadness that we announce the passing of Anthony (Tony) Kendricks on 7 February. He was 84. Tony had an amateur licence for some years about 1970, VK7ZTK. Tony held a TV Operator's Certificate

as well as an LAOCP. He worked at the TV transmitters on Mt Wellington in the early 60s and then as the technician in charge of the Outside Broadcast crew. He went to the ABC in a similar role sometime later. He was

also a champion rose grower and did a lot of work helping ex-servicemen's families. Vale Anthony. (Winston VK7WH)





DXTalk

Luke Steele VK3HJ
e vk3hj@wia.org.au

During April, the sun was mostly quiet, apart from a few periods of geomagnetic storms resulting from coronal hole high-speed solar wind streams. A very impressive aurora was visible from southern Tasmania on 20 April.

One interesting piece of news was that in early April, a sunspot appeared with a polarity suggesting it was one of the first from the next Cycle 25. This isn't entirely unusual, as Cycle 25 spots are expected to appear from time to time even whilst we are still in Cycle 24.

Your author has spent most of his time working 160 m DX in the evenings, with some quite good openings from VK3 to North America and East Asia. Conditions on bands 80 m to 20 m have been poor to fair, with very little activity noted on the higher bands.

DX heard or worked during late March and April includes: 3D2EU Rotuma Island DXpedition, XR0YD Easter Island DXpedition, H40YM Temotu, 9M0W Spratly Island DXpedition, XX9D Macao DXpedition, and 4B4B Revilla Gigedo Island. Other DXpeditions to Africa were 3C3W Equatorial Guinea, 3C0W Annobon Island, TY7C Benin, TJ2TT Cameroon and 7Q7EI Malawi. Poor propagation conditions and other factors made these rather difficult to work. Also in the African region was 3B7A St Brandon Island DXpedition, workable most bands, but it took some work. In Europe, there were two DXpedition teams active in the new DXCC Entity, Republic of Kosovo, Z60A and Z66D. Closer to home we had Tony 3D2AG active

from his home station in Fiji, then later in Tuvalu as T2AR. Grant VK5GR was active from Vanuatu as YJ0GA. Andy VK5MAV activated Cato Reef (OC-265) in the Coral Sea as VK5MAV/9. Rick A15P was active from St Barthelemy in the Caribbean.

During the St Brandon DXpedition, a situation arose where the DXpedition operator was calling on 7082 kHz SSB, and listening up the band for callers. The operator was transmitting on this frequency in accordance with the DXpedition's published operating plans, usually from very early in the morning our time until around midday. Around and after our sunrise, the DX was quite loud. Unfortunately, this clashed with a few Nets that operate daily around this frequency. Thankfully, from the DXer's point of view at least, the Net Control Operators made the decision to move their Nets to another frequency to avoid conflict for the remainder of this DXpedition. Early on, however, there was much confusion and some irritation caused. This situation occurs from time to time; where the DXpedition, by virtue of the Band Plans for the country from which they are operating, are required to use frequencies that will coincide with those that are used by Nets, etc. The DXpedition may be occupying a frequency for some time before propagation to another area results in a conflict. Further complicating the situation is the fact that the DXpedition will nearly always be operating split and not listening on his transmit frequency. It may be prudent for Nets to nominate an alternate frequency, to continue operations in cases where their usual frequency is occupied.

Upcoming DX

DXpedition activity scheduled for May and June includes the following.

KH9/N7NVK Wake Island (OC-053), April - June. Philip N7NVK has been posted to Wake Island. He hopes to get on air when he can on HF, using SSB and FT8. No operating schedule is yet known. QSL via LotW.

H40D Temotu Province, 29 April - 3 May. Cezar VE3LYC will be activating Duff Islands (OC-179) on 40 - 10 m CW and SSB. QSL via Club Log OQRS. For more information see: <http://h44r-h40d.weebly.com/>

C96RRC Mozambique, 29 April - 3 May. Members of the Russian Robinson Club will activate Mozambique Island (AF-088), on 40 - 10 m, CW, SSB and Digital. QSL via R7AL or Club Log. For more information see: <https://dxpedition.wixsite.com/mozambique>

C8T Mozambique, 2 - 15 May. Fourteen members of the Belgian Lions DX-Team will be active from Bilene in southern Mozambique on 160 - 6 m, CW, SSB and Digital. They plan to have four stations active on HF, as well as a 2 m EME station. QSL via Club Log or ON1DX. For more information see: <https://mozambique2018.wordpress.com/>

3F6IC Panama, 4 - 6 May. A team of six operators will activate Cebaco Island (NA-071). They will be on 80 - 10 m, SSB and Digital. QSL via HP1AVS.

C96RRC Mozambique, 5 - 9 May. Russian Robinson Club will then activate Inhaca Island (AF-066), on 40 - 10 m, CW, SSB and Digital. QSL via R7AL or Club Log. For more information see: <https://dxpedition.wixsite.com/mozambique>

3B9RUN Rodrigues Island, 11 - 16 May. Five operators from Reunion Island will be visiting Rodrigues Island with up to three stations on 80 - 10 m, SSB and FT8. QSL via EA7FTR. For more information see: <https://www.qrz.com/db/3B9RUN>

VK9LI **Lord Howe Island** (OC-004), 11 - 18 May. Chris VK3QB, Brenton VK3YB and Luke VK3HJ will be active on bands 160 – 17 m and higher if open, on CW, SSB and Digital modes including FT8. QSL via LotW or request a paper card via Club Log, or VK2CA. For more information see: <https://www.qrz.com/db/vk9li> or follow us on FaceBook “VK9LI Lord Howe Island”.

JW8DW **Svalbard**, 26 - 29 May. LA8DW will be on air from Spitsbergen Island (EU-026) on HF, using CW and SSB. QSL via LotW.

TE6DX **Costa Rica**, 7 - 11 June. Three operators plan activity from Unita Island (NA-155) on 160 - 6 m, CW, SSB, RTTY and FT8. QSL via LotW, or Club Log or TI2CDA.

FO/HB9XBG **French Polynesia**, 7 - 17 June. Walter HB9XBG will be on air from Bora Bora (OC-067) on

20 m SSB. QSL via HB9XBG.

J3/G0JVG **Grenada**, 13 - 27 June. Nobby G0JVG will be active mainly on SSB on HF and 6 m. QSL via G4DFI.

WJ2O's Pacific Tour. Dave WJ2O plans activity from **Samoa** and **American Samoa** in June, 40 - 15 m CW, before he joins the Baker Island DXpedition. After the DXpedition, in mid-July, he plans four days of activity from **Fiji**. QSL via LotW or direct to N2ZN.

KH1/KH7Z **Baker Island** (OC-089), 26 June - 6 July (dates subject to change). A team of fifteen operators will be active 160 - 6 m, CW, SSB and Digital. QSL via LotW, Club Log, or K4TSJ direct. Make sure you get this one in your log if you need it, as it will likely be a long time before it's activated again. Baker Island is located approximately halfway

between Australia and Hawaii. Currently Number 5 on the Most Wanted List, it should be fairly easy to work from Australia. For more information see: <http://baker2018.net/>

3D2CR Conway Reef

Dom 3Z9DX may be activating Conway Reef sometime this year. No other details are yet available. Conway Reef was last activated about five years ago.

Please email me with any DX related news for inclusion in this column. I am particularly interested in hearing about DX worked or heard in other states, and from newer DXers. My particular interests lately have resulted in that of the last hundred or so QSO in my log, approximately sixty of them were on 160 m CW. I do welcome news from other DXers to add to the DX News!

73 and good DX,
Luke VK3HJ



GGREC HAMFEST

Saturday 4 August 2018

Gippsland Gate Radio & Electronics Club invites you to our annual Hamfest at the CRANBOURNE PUBLIC HALL, located on the corner of Clarendon and High St. Melway Ref: 133 K4.

See our web page at ggrec.org.au/hamfest.html for full details.



40 tables of new and used Electrical, Electronic and Amateur Radio equipment.

- All tables are under cover.
- Tea, Coffee and a selection of hot & cold food will be available during the event.
- Great Door Prizes will be drawn at approx. 1:00 pm.
- Doors open to sellers at about 8.30 am and the Public at 10 am.
- Public entry fee is \$7.00 which includes one free door prize ticket.
- Tables are available for \$22.00 each and must be booked in advance. Your booking will include entry for 2 sellers and door prize ticket per person. Tables are allocated on a first in basis, so don't delay your booking.

Anyone wishing to reserve a table position should contact the Club soon, as tables go quickly.

Email to hamfest@ggrec.org.au



VK7news

Justin Giles-Clark VK7TW

e vk7tw@wia.org.au

w <https://groups.yahoo.com/neo/groups/vk7regionalnews/info>

There have been some recent changes to how amateur radio news in VK7 is gathered. There is now a central email address that is accessed by the news team. It is vk7arnews@gmail.com. So if you have any VK7 news for the weekly VK7 Regional News broadcast or these columns then please send it through to the new address.

Save the date: VK7 Biennial Hamfest date has been set to be on Saturday 17 November. It will again be held in the fantastic facilities of the Miena Community Centre in the Central Highlands. If you would like to book a table or three then please contact the new organiser – Dani Street VK7FREQ through the Facebook page [@vk7hamfest](https://www.facebook.com/vk7hamfest), or email on vk7freq@gmail.com. A huge thank you to David O'Brien VK7OB who for many years has organised the Hamfests at Miena.

Meet the Voice event at Ross

<http://meetthevoice.org/>

Thanks to Cedric VK7CL for this report. The Meet the Voice event was held on 18 March 2018 and the weather forecast was not good with rain and damaging winds. Plans B and C proved fruitless with the local pub booked out with the Jazz festival and the town hall market also on. It was suggested that we use the Ross Recreation Ground and after some searching, Eric VK7EV tracked the caretaker down and it was booked. The torrential rain and cyclonic wind eventuated and we retired to the very well-appointed Recreation Ground clubrooms.

Long term organiser Cedric VK7CL handed over the reins to Dani VK7FREQ who will be

organising the event for the next few years. Shirley VK7HSC then presented the Sewing Circle award for the most loquacious amateur for the year and it went to Dick VK7DIK.

Raffle prizes of the dual bander handheld donated by Ross VK7ALH was won by Eric VK7EV. The wine donated by Geoff VK7GW was won by Justin VK7TW. The hand knitted teddy bear donated by Lois XYL of Peter VK7PL was won by Greg VK7GX.

All up 25 licensed amateurs attended and a substantial donation for repeater upkeep was made to the Cradle Coast Amateur Radio Club Inc. which was accepted by Dick VK7DIK. A huge thank you to Cedric VK7CL, Eric VK7EV, Rod VK7TRF, Geoff VK7GW, Lois and Dani VK7FREQ.

Unique South West VK7 SOTA Activations

<https://www.sota.org.uk/Association/VK7>

Thanks to Andrew VK7AW for the following report. On Thursday 8 March, Rik VK3EQ and Mitch VK7XDM activated SOTA summit Maatsuyker Island VK7/SW-162 for the first time. Rik and Mitch were crew aboard the yacht Juliet, skippered by Andrew VK7AW. Rik and Mitch were put ashore and climbed up the haulage track and found the summit. Contacts were made on VHF and HF 40 metres to complete the activation. This attempt had been three years in the planning and the weather and sea conditions cooperated to bring it to fruition.

On the morning of Saturday 10 March, Rik and Mitch rowed ashore in Bathurst Channel then climbed

and activated Mt Nicholls VK7/SW-154. On Saturday afternoon, Juliet anchored in Fulton Cove, Bathurst Harbour. Rik and Mitch again rowed ashore and attempted to climb up the western slopes of Mt Fulton VK7/SW-138 but were repulsed by thick scrub not far from the shore. The Juliet sailed from Fulton Cove to Moulters Inlet late Saturday and on Sunday morning Rik and Mitch again attempted to climb Mt Fulton, this time from the north-east. However after six hours they returned to the boat having got to within 60 m vertical of the summit before being unable to penetrate the scrub. Time ran out but Rik and Mitch are already planning to conquer Mt Fulton next summer.

North West Tas. Radio & TV Group (NWTR&TVG)

<http://www.vk7ax.id.au/atvgroup/>
Congratulations to Ian Ravenwood VK7FICR who successfully got his Foundation licence recently – welcome Ian.

Four NWTR&TVG members - Roger VK7ARN, Tony VK7AX, Bob VK7MGW, Matthew VK7ML and Ross VK7WP, provided communications, between Ride Base and three Checkpoints, for the Kentish Endurance Riders' 80 and 40 kilometre event, based at Sheffield. One of the checkpoints was deep in a valley and proved difficult from a communications perspective. A cross band repeater was setup in a local garage and residents given instructions to turn it on at 0600, unfortunately they slept in HIHI.

A contingency plan was enacted with an alternate checkpoint being setup. However, a rowing event at



Photo 1: Al VK7AN and Ross VK7ALH next to repeater hut on Legges Tor (Photo courtesy of Al VK7AN).

Lake Barrington created a large and fast traffic flow across where the horses crossed. More signage and flashing beacons and traffic management was put in place and all went to plan.

Northern over 70s SOTA Activists

Thanks to Al VK7AN for this report. VK7RBH on Ben Lomond is Tasmania's highest repeater at 1572 m and in late 2017 its performance was poor and on a routine visit to the site, Warren VK7KVA noticed that the antenna was broken. A combination of ice and wind had taken its toll once more.

When planning a SOTA activation to Legges Tor, two members of the local SOTA group, Al VK7AN and Ross VK7ALH decided to contact Warren VK7KVA (who was largely responsible for building the original structure) to see if he might be available to accompany them on Thursday 5 April and replace the broken antenna while there. Whilst the old antenna was removed, the site ladder dent-knocked back into

shape and the new RFI antenna and mounting hardware readied – Al VK7AN setup the linked dipole on 7.090 MHz and made 11 contacts into VK2, 3, 4 and 7 before he was called in to help test the repeater. Reports were good from Flinders Island, St Helens, Burnie and locally.

An interesting facet of VK7RBH is that it serves as an indicator of high altitude tropospheric ducting: it can often be activated by VK3s when no other beacon or repeater in VK7 is audible.

Northern Tasmanian Amateur Radio Club

Over the Easter weekend NTARC participated with safety communications for the 2018 Equine Endurance Marathon event held at Santarina Park, Scottsdale. There were four rides held over the long weekend - 240 km, 120 km over three days and 80 km and 40 km day long rides. This was a precursor for the Tom Quilty ride (160 km/100 mile ride) that will be held in the same location on 6 October 2018. The RFID tracking system worked well. Thanks to

Idris VK7ZIR, Andre VK7ZAB, Bill VK7AWT, Wayne VK7FPWS, Stefan VK7ZSB, Ron VK7RB and XYL Vicinta, Stuart VK7FEAT, Ken VK7KKV, Bernie VK7BR and Norm VK7KTN.

A reminder that all the NTARC 70 cm analogue and digital voice repeaters on the Mt Arthur site are now licensed under the new callsign VK7RJG. This recognises the extraordinary effort that Joe VK7JG has put into not only NTARC's repeaters, but the repeater system generally within VK7.

NTARC have started Wednesday night technical sessions and they are proving popular. There have been analogue oscilloscopes; USB BitScope-Micro-computer based oscilloscope/spectrum analyser, RaspberryPi used as a multi-channel logic analysers, DR-1X repeaters, leaky coax antennas, ham mesh networking, security system programming and troubleshooting transceivers.

Congratulations to Alan VK7BO for making a significant effort in the recent Radio Society of Great Britain Commonwealth Contest



Photo 2: MMDVM Zumspot 70 cm Hotspot covering D-STAR, DRM, P25 & C4FM. (Photo courtesy of Justin VK7TW).

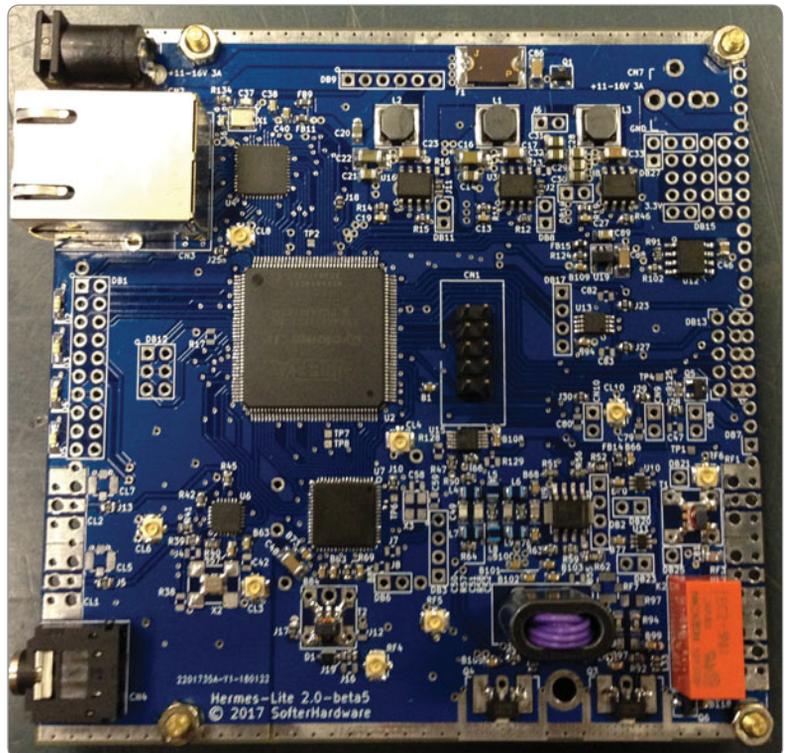
(BERU). Australia entered two teams with Australia Team 1 coming 1st, the Canadian team 2nd and Australia Team 2 came 3rd. Alan was a member of Australia Team 2. Well done Alan.

WICEN Tasmania (South)

<http://www.tas.wicen.org.au>

WICEN Tasmania (South) provide safety communications for the annual Johnny Green Memorial Equine Endurance event at Pyngana in the North East of VK7 on 14 April. This event consisted of an 80 km and 40 km ride. There were three checkpoints and base and the ride went without incident even though the torrential rain and significant wind provided challenging conditions.

Photo 3: Martin VK7MA's completed Hermes Lite 2.0 HF SDR Transceiver (Photo courtesy of Justin VK7TW).



Radio and Electronics Association of Southern Tasmania Inc

<http://www.reast.asn.au/>

REAST's AGM was held on 18 February and the following office holders were elected: President - Tony VK7VKT, Vice-President - Sean VK7FAZE, Secretary & Public Officer - Scott VK7LXX, Treasurer - David VK7FABE and Committee Members - Barry McCann and Larry VK7WLH.

In 2018 REAST is holding Foundation Licence training on the third Saturday of every second month. That is February, April, June, August, October and December. Check out the REAST Website or Facebook page for events. Contact Reg on email assessor@reast.asn.au or phone mobile 0417 391 607 if you wish to participate.

The Experimenter's Nights are continuing to be popular with Trent VK7HRS bringing along his FT-897 mobile arrangement complete with LDG ATU, Sean VK7FAZE bought along a microwave data link dish complete with panel array antennas

and beautifully made PCBs on a sturdy diecast hexagonal box. Scott VK7LXX was playing with his Ettus Research B200 SDR to experiment with LORAWan. Ron Cullen was demonstrating his 5.8 GHz homebrew antennas that are coupled to a diversity AV transceiver that Ron is using for his radio controlled aircraft. Ron has also been putting together an SDR radio kit he received over the internet. Chris VK7HCH brought along his uBITX transceiver that he has recently boxed and a very nice single band ozQRP 40 m QRP kit that he built.

Rex VK7MO has been experimenting with HF magnetic loop antennas and built a hexagonal 30 m aluminium loop antenna. Winston VK7WH had his remotely controlled Flex radio via his tablet. Tom VK7NTK has been working on a stand-alone Broadcast Transmitter that has many neat features like web

control, client server communications for broadcast file distribution and multiple payout in multiple locations. Martin VK7MA brought along his recently populated Hermes Lite 2.0 PCB that was covered in surface mount components and a large FPGA flatpack chip. This board is the next generation of HPSDR HF SDR transceivers complete with a 5 watt PA.

The author brought along his Trimble Thunderbolt GPS Disciplined Oscillator and VK4KRR display unit mounted into a retro hammertone instrument case as well as a Microwave YIG oscillator that he intends to use as a Microwave signal source. The author is also modifying his 10 GHz white box transverter to use a ZLPLL that can be GPS Locked and also brought along his laser-cut case from C4Labs for his ZumSpot and RaspberryPi Zero Digital Voice hotspot. Justin has also started

building his 630 m 500 W German power amplifier that he recently purchased from Alan VK7AM. This will eventually get him to the power limit of 5 W EIRP on 630 m with his 1% efficient antenna. The new DATV studio is being developed and will be back on the air and streaming very soon.

REAST's April Presentation was in two parts. The first was an open forum discussion on DMR, and MMDVM. We covered new devices, radios and modes. The second part of the presentation was by Rex VK7MO and covered Ion Scatter. This is dust that is ionising and leaving a constant trail of ionised particles in the E layer. You can scatter a signal off this layer in the 30-50 MHz frequency range with a about a 2000 km range. Rex then went on to the FT8 revolution, with up to 60% of all QSOs worldwide being FT8 these days. Thanks Rex.





Oxley Region Amateur Radio Club Inc

Port Macquarie NSW

General interest displays

- Trash & Treasure Sunday only
- Trade displays Sunday only
- Fox hunts Saturday & Sunday
- Home Brew Competition
- BBQ breakfast & lunch available
- Free coffee, tea & biscuits
- Soft drinks for sale.
- Entry only \$5.00



43rd Field Day 2018

43LQ 41G1Q DSA 50T8

Wauchope High School

Nelson Street Wauchope

Saturday and Sunday 9th & 10th
of June (Long Weekend)

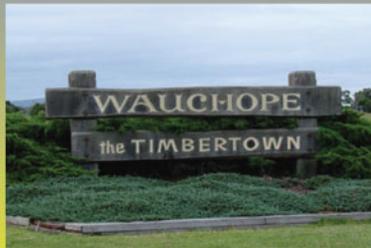
Doors open: Saturday at 9 am
Sunday at 8 am

Website: <http://www.orarc.org/>

Talk-in frequency 146.700 MHz (91.5 Hz CTCSS)
Station Callsign VK2BOR



Field Day dinner Saturday night:
Port Macquarie Golf Club (6 pm)



Contact Field Day Co-ordinator: Henry Lundell VK2ZHE. Email: vk2bor@orarc.org



VK2news

Tim Mills VK2ZTM
e vk2ztm@wia.org.au

As we are coming to the end of Autumn, what can we do in Winter? For those who would like a trip to the Mid North Coast of VK2 could consider attending the Oxley Region ARC Mid-Winter Field Day on the Queen's Birthday weekend in June – Saturday 9 and Sunday 10. The field day and events this year will be held in the hall of the Wauchope High School over the two days. The school is located in Nelson Street. Note - the usual venue of the Surf Club is under renovations this year. The Saturday evening dinner will be at the usual venue, the Port Macquarie Golf Club. Elsewhere in this issue of *AR* you will find more information about the weekend.

Still with the Oxley Region ARC, they are in the final stages of constructing and installing their 6 metre repeater – VK2RCN – which will be on 53.800 MHz. Their regular club meetings are on the first Saturday afternoon and the third Friday evening of each month, all at the SES HQ in Central Road, Port Macquarie.

Another big event this year will be the celebration of the Centenary of the Reception of the First Direct Wireless Message sent to Australia from Great Britain. On 22 September 1918 a message from the [then] Australian Prime Minister, Billy Hughes, was transmitted by the Marconi station in Wales and received at Mr. Fisk's residence at Wahroonga, Sydney. The Hornsby & District ARC, in conjunction with

the Ku-ring-gai Historical Society will be operating special event call sign VK2MARCONI as part of the celebrations. On the actual centenary day, a commemorative event is being planned to be held adjacent to the Fisk residence in Wahroonga from late Saturday morning into the early afternoon and is shaping up to be a large event. More details in the next issue of *AR*.

There are other milestones coming up. The Waverley ARS, established in 1919, will be celebrating their Centenary around May 2019. WARS will be holding their annual auction at their club rooms on Saturday 14 July 2018. The Urunga Radio Convention, held annually at Easter, will be 70 next year. Their committee is planning a major celebration and would like your ideas. There are many Radio Clubs who can trace their origins back for decades, like the Hunter Radio Group in Newcastle, the former Hunter Branch and before that the Newcastle Radio Club.

ARNSW has just had their AGM. There are minor changes with the committee personnel and details will be in the next issue of *AR*. ARNSW is planning a Talk Fest on Sunday 17 June at the VK2WI site. The theme will be antennas with short talks in the morning. Then, after lunch, there will be practical field activities with antennas. More details will be given in the Sunday VK2WI News bulletins. The news transmissions from the Dural site are relayed through provincial region repeaters at Illawarra, Western

Blue Mountains, Central Coast and Newcastle. The audio also is streamed via arnsw.org.au/audio There are also various Echo Link sources and some additional relays provided by other Amateurs.

The VK2RWI, Dural based repeaters, have for several decades used a 30 metre tower for supporting the antennas – which is now to be retired. It will be replaced by a 40 metre pole to see over the tree growth – which has been extensive since the site was obtained by the NSW Division in 1955. Planning has been under way since last year and now it's the waiting game for council approval.

ARNSW provides the Sydney based beacons VK2RSY from 10 metres through to 23 cm. Now, on average, the current generation is more than 10 years old and now they are being progressively upgraded. As these notes were being prepared, 2 metres 144.420 and 6 metres 50.289 had been renewed. Then the 10 metre 28.262, 70 cm 432.420 and 23 cm 1296.420 will follow. While there are licences issued for higher beacon frequencies, there appears to be little demand for these bands. Offers of interest and construction are always sought. The VK2WI Morse transmission on 3699 kHz is a training system and it's almost [off during news bulletins] continuous operation provides a good propagation indicator.

Reports on these services can be made by email to callbacks@arnsw.org.au

73 Tim VK2ZTM.



WIA Contest Website



To keep up to date with all of the major Australian contests, including rules and results, at the WIA Contest Website at: www.wia.org.au/members/contests/about



ALARA

Jenny Wardrop VK3WQ

This month we start with the first half of Lyn VK4SWE's terrific article on what you do if you live on a small remote island and a cyclone threatens!

Bloody Nora!

We've lived on Sweers Island in the Gulf of Carpentaria for over 30 years now, and have been lucky with Cyclones so far. 60+ knots off the outer edge of a Category 3 system is the worst we've had to endure; at that time my tower was tilted over and the TH3Jr Yagi was lashed to the ground. We put the cyclone shutters over glass doors and windows and sat it out. We also have a dedicated Cyclone Shelter (shipping container) but have never had to use it, as most cyclones breed up nearby and move away, or cross into the Gulf and re-form nearby, thus not building up an awful lot of steam.

On Tuesday, March 20 this year, we had very early warning of a Cyclone that was going to form up near Darwin and make a bee-line straight for us, over water all the way, rapidly intensifying into a possible Category 5 by the time it got to the bottom of the Gulf. Not what you want to hear when you've got three staff and two helper friends on the island, getting ready for the start of the tourist season – eight boats just put into the water, stock onto shelves, first guests due

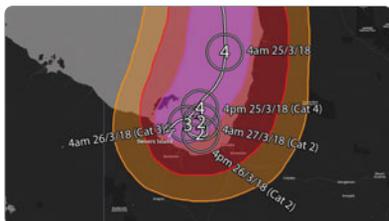


Photo 1: Cyclone Nora, courtesy of Higgins Stormchasing, Friday night.

that weekend!

All the computer models agreed that the system was going to head our way, so on Wednesday, even before it was named Cyclone Nora, we had re-scheduled the weekend guests, taken all the boats back out of the water, and started stacking chairs and loose items into guest cabins.

We kept in close contact with the BOM and the guys at Higgins Stormchasing, who sent us copies of all the various computer models as they were being updated. By Thursday, most of the models were predicting the possibility of a direct hit from Category 3/4 with storm surge. The weather was still fine and calm at that stage, expected to deteriorate rapidly as soon as the system moved down into the Gulf. We made the most of the lull to lop trees, cut down coconut palm fronds (to help the trees survive the storm) and I made the decision to dismantle my K4KIO Hex Beam. It would probably be OK at half height down among the tree level in a Category 2-3 system, but having seen how several Darwin hams lost towers and beams during their Category 2 cyclone the previous week, and with the possibility of a Category 4-5 there was no doubt it would flap itself to bits. Even if I tilted the tower over, I felt that the antenna would be flogged by the cyclonic winds and flying tree branches. I decided that while we had the calm weather, it would be wisest to dismantle it completely. I emailed the manufacturer, Leo K4KIO in the USA, who agreed it was probably best to take it down: "to be sure, to be sure!"

A Hex Beam looks like an upside-down umbrella, or a giant spiders-web. Six thin fibre-glass

poles are bolted onto a base-plate and then connected by a series of wires which in turn are bolted to the central post, from which coax runs down the tower and into the shack. It is lightweight but very ungainly and awkward to manoeuvre, and lots of risk of dropping it or hooking a tree and breaking a spreader. I have one spare spreader in the shack kindly sent to me by Leo's XYL Judy. Birds had damaged the outer 20 m wire, and I had recently purchased a replacement, heavier duty wire from Leo, who had sent it via Bob W9KNI and his XYL (also a Judy!) whom my OM and I had met up with in New Zealand for a holiday. So, as I was going to have to replace the outer wire, I thought the quickest and safest way to dismantle it was to unthread all the wires, then loosen the bolts holding the spreaders to the baseplate and slide them out, leaving the centre post and baseplate in position.

You can look forward to reading the second part of Lyn's article in the next issue of *AR* – we know she survived the cyclone as she has



Photo 2: Resort Vessels lashed together and Hulls filled.



Photo 3: Lyn tilting tower over.

been heard recently on the ANZA net!

Jean VK3VIP – VK3 State Rep.

Our March ALARA lunch was held at the Sandy Hotel in Sandringham with about 19 attending. After lunch we had a tour of the Coast Guard Station, but more of that in the next edition.

On 25 March, the EMDRC held their annual Hamfest. ALARA had our usual information table and a big thank you to Kaye VK3FKDW and my mum, Elsie, who looked after the table for me, while I worked in the kitchen. I was lucky enough to win first prize in the raffle, which was a DMR radio and OM John VK3DQ is now having fun setting it up for me. 33, Jean VK3VIP.

From one of our ZL members “across the ditch” Ngaire ZL2UJT

The ZL VHF Contest was held 2 & 3 December on the Stratford Plateau on Mt Taranaki New Zealand.

Absolutely beautiful weather and a wonderful turnout of eight OMs and two YLs. Ngaire ZL2UJT & Gail ZL2TZG.

We took our Caravan and stayed overnight as the contest ran from 5 pm Saturday evening till 11 pm, and 7 am start till 1 pm Sunday.

We worked on 70 cm, 2 m, and 1296 MHz. Lots of stations on the air, so a really fun contest.

Two new Hams attended that had just passed their exams at the HAM CRAM that was held the weekend before at our club, so that was really great to see.

What an amazing view of the mountain at night with the full moon and waking up in the morning with that view was just magic.

I didn't hear any other YLs on the air, hope more of you can come up sometime.

We have a great video of the weekend on our club website
33 Ngaire ZL2UJT

From the 2020 ALARAMEET Committee

The proposed dates for the 2020 ALARAMEET in Bendigo are Friday 2 October to Sunday 4, with Monday

5 as an optional extra day. This will be a long weekend, which we hope will suit most people.

And while we are still in Bendigo, a word from the ALARA Historian, Jen VK3WQ

On the weekend of 12 and 13 May, Bendigo Amateur Radio and Electronics Club (BAREC) operated in the Mills on the Air Day from Anderson Mill at Smeeton. (Unfortunately I didn't have the information in time to publicise it in the last issue.) Heidi VK3FHID, ALARA member and BAREC Secretary, sent out the information and also put out a plea for good quality “action” photographs required by Neil VK3ZVX and Tony VK3KKP who was making a video from still photos for publicity purposes to encourage YLs (particularly young YLs) to think about taking up amateur radio.

Neil's main thrust was that he wanted pictures of YLs “doing things”, whether it be talking into a microphone, participating in JOTA, SOTA, Field Days, etc. This got me thinking. In the 1990s and early 2000s ALARA had a photograph on the front cover of *AR* once every year. A number of these cover photos were forwarded to Neil for possible inclusion in the video. Being *AR* cover photographs, they were of good quality, and mostly of YLs involved in some sort of amateur activity. That was all around 20 years ago (how time flies!) and I would like to request that next time you are out on a mountain top, or at a Field Day, etc., ask someone to take a photograph of you in action, which would be great to have for the ALARA Archive, or to use in *AR*, or our Newsletter.

Thanks and 33,
Jen VK3WQ



Photo 4: ZL VHF Contest, Left Kyle ZL2KGF, Elton ZI3LT (on mike) Ngaire ZL2UJT (scribe). Rear Jono ZL2JBK & Steve ZL2UV.

VK3news Amateur Radio Victoria

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Mills On The Air

ARV members will be participating in the Mills On The Air weekend to be held on the weekend of 12/13 May helping the Central Goldfields Amateur Radio Club operate their station. In previous years the club operated from the Anderson Mill at Smeaton. This year they will be staying closer to home and are activating the Maryborough Knitting Mill. The Maryborough Knitting Mill was a major employer in Central Victoria and since its closure the site has been re developed as a shopping arcade. Because of the redevelopment the club will be operating the station off site but will be in keeping with the spirit and rules of the event.

Please listen out for the station and make a contact. It's not too late to register a Mill if your club or group would like to enter the event and registrations can be made at www.mills-on-the-air.net/

Homebrew Meetings

ARV runs a regular monthly homebrew group for our members; the group meets on the first Saturday of the month at the Ashburton rooms. All are welcome to come along and see what is happening. A regular monthly newsletter is sent out by the group and if you wish to receive it just log into your account on the



Maryborough Chaff & Flour Mill.

ARV website <https://members.amateurradio.com.au/login> and subscribe to the homebrew news.

Training

Don't forget if you know someone interested in becoming an Amateur Radio Operator ARV runs regular bi-monthly Foundation Courses at the rooms at 40G Victory Blvd Ashburton. Saturday is for instruction and exams are held on the Sunday morning.

Course dates for this year are

June 16 - 17, September 22 - 23 and November 17 - 18. To enrol contact Barry Robinson VK3PV on 0428 516 001 or via email at foundation@amateurradio.com.au

Anyone can book a Standard or Advanced exam upgrade on these weekends just contact Barry. ARV also regularly conducts exams on a needs basis in Central Victoria and if you wish to sit an exam please contact Ross Pittard VK3CE at vk3ce@wia.org.au to arrange a suitable time.



Participate

2018 South East Radio Group's Convention and Australian Fox Hunting Championship

9 - 10 June 2018

43rd Field Day 2018 - Oxley Region Amateur Radio Club

9 - 10 June 2018

GGREC Hamfest 2018

4 August 2018

Contest News

Alan Shannon VK4SN - Contest Committee Leader

At the March 2018 WIA Board meeting, the Board accepted this committee's recommendations to conduct the Trans-Tasman Contest and the VK Shires contests under the banner of the WIA.

This change has immediate effect.

Accordingly, Alan Shannon VK4SN will move from assistant

manager to manager of the VK Trans-Tasman contest, now that Trent VK4TS has stood down.

The VK Shires contest desperately needs an individual or preferably club to manage it.

Management of this contest involves keeping up to date shire records as well as ongoing liaison with software writers.

If any individual or club is interested in managing the VK Shires contest, please send your expression of interest along with any relevant experience in this area, to vk4sn@wia.org.au

Remember to check the contest pages for the latest updates and rules.



John Moyle Memorial Field Day 2017

Denis Johnstone VK4AE - Contest Manager, JMFD 2018

24 Hour Portable Operation – Multiple Operator

Call Sign	Operators	Mode	Band	Contacts	Score	Locator	Place / Award	Cert.
VK6NC	Multi	All	All	216	554	OF88BH	1 /*	1
VK5LZ	Multi	All	VHF	131	2,660	PF96BC	1 /*	2
VK4IZ	Multi	All	HF	716	1,496	QG62LS	1 /*	3
VK4WID	Multi	All	HF	338	676	QG52UB	2 /*	4
VK3DX	Multi	All	HF	116	236	QF22DM	3 /*	5
VK2SRC	Multi	Phone	All	250	3,180	QF69FU	1 /*	7
V12WG50	Multi	Phone	All	209	1,631	QF34RR	2 /*	8
VK3CNE	Multi	Phone	All	611	1,601	QF22JL	3 /*	9
VK4QD	Multi	Phone	HF	772	1,542	QG62EN	1 /*	18
VK2NJP	Multi	Phone	HF	220	440	QF44WO	2 /*	19
VK4BW	Multi	Phone	HF	128	256	QG65CF	3 /*	20

Six Hour Portable Operation – Multiple Operator

Call Sign	Operators	Mode	Band	Contacts	Score	Locator	Place / Award	Cert.
VK2BV	Multi	All	All	116	432	QF48MM	1 /*	24
VK2LE	Multi	All	All	110	230	QF55GX	2 /*	25
VK3BSP	Multi	Phone	All	87	361	QF21MQ	1 /*	26
VK6VF	Multi	Phone	All	13	52	QF77VW	2 /*	27
VK3FRC	Multi	Phone	VHF	23	107	QF21NW	1 /*	28
VK4NBX	Multi	Phone	HF	266	468	QG63GU	1 /*	29
VK2SF	Multi	Phone	HF	96	192	QF55FQ	2 /*	30
VK2A0J	Multi	Phone	HF	82	164	QF560S	3 /*	31

/* Certificate Awarded

** President's Cup

24 Hour Portable Operation – Single Operator

Call Sign	Operators	Mode	Band	Contacts	Score	Locator	Place / Award	Cert.
VK5ZT	Single	All	VHF	53	1,161	PF94GQ	1 /*	35
VK5KBJ	Single	Phone	All	201	860	PF94GQ	1 /*	37
VK50Q	Single	Phone	All	67	339	PF95JI	2 /*	38
VK3ND	Single	Phone	All	21	147	QF21QL	3 /*	38
VK2KCM	Single	Phone	VHF	41	914	QF57RV	1 /*	39
VK6MM	Single	Phone	VHF	14	77	QF77VK	2 /*	40
VK2RR	Single	Phone	HF	694	1,388	QF69AL	1 /*	41
VK6POP	Single	Phone	HF	59	118	PF68GB	2 /*	42
VK2AWJ	Single	Phone	HF	48	96	QF05TR	3 /*	43

/* Certificate Awarded

/* Participation Certificate

Comments on John Moyle Memorial National Field Day 2018

This year's entries came from every Australian call areas (except VK0 and VK9) with several from New Zealand. The total number of eligible logs submitted was 171. This was an increase (6.8%) from the 160 logs received last year.

Well done to all who took part and took the effort to submit a log. This year there were however, only 3 YL or XYL's that entered a log. More were listed as taking part with a club station.

Based upon submitted logs, there were some 13,666 contacts, (a 16.4% decrease from 2017) accumulating some

Six Hour Portable Operation – Single Operator

Call Sign	Operators	Mode	Band	Contacts	Score	Locator	Award	Cert.
VK5AOS	Single	All	VHF	45	1,000	PF94GQ	1 /*	46
VK2IO	Single	All	HF	92	194	QG56NB	1 /*	47
VK3YE	Single	All	HF	68	150	QF21NW	2 /*	48
VK4SN	Single	All	HF	67	142	QG62RK	3 /*	49
VK1AT	Single	Phone	All	51	681	OF44FB	1 /*	51
VK3PI	Single	Phone	All	115	472	QF22EJ	2 /*	52
VK3ANL	Single	Phone	All	85	264	QF22MG	3 /*	53
VK3CWF	Single	Phone	VHF	43	375	QF22NN	1 /*	60
VK2JDH	Single	Phone	VHF	3	96	QF48MM	2 /*	61
VK2KFJ	Single	Phone	VHF	4	43	QF46XM	3 /*	62

/* Certificate Awarded

/* Participation Certificate

Six Hour Portable Operation – Single Operator

Call Sign	Operators	Mode	Band	Contacts	Score	Locator	Award	Cert.
VK3ZPF	Single	Phone	HF	177	352	QF31AP	1 /*	63
VK7LTD	Single	Phone	All	74	148	QE37KV	2 /*	64
VK7FOLK	Single	Phone	HF	45	90	QE29QD	3 /*	65
VK2AKB	Single	CW	HF	2	8	QF56OR	1 /*	78

/* Certificate Awarded

/* Participation Certificate

Home Station – 24 Hour (Part 1)

Call Sign	Operators	Mode	Band	Contacts	Score	Locator	Award	Cert.
VK2AZ	Home	All	All	298	608	QF56IF	1 /*	79
VK5LJ	Home	All	HF	298	498	PF95LN	1 /*	80
VK5GR	Home	All	HF	87	152	PF95ID	2	
VK4NP	Home	All	HF	68	113	QG64IR	3	
VK2XAX	Home	Phone	All	228	459	QF56IF	1 /*	81
VK5MK	Home	Phone	All	182	385	PF94HW	2 /*	83
VK2MRN	Home	Phone	All	59	314	QG61RE	3	
VK6FMTG	Home	Phone	All	21	58	OF78VF	7 /\$	84
VK2WDD	Home	Phone	VHF	67	383	QG61QE	1 /*	85
VK2SLM	Home	Phone	VHF	26	227	QG61MD	2	
VK2ACD	Home	Phone	VHF	53	214	QG60QU	3	

/* Certificate Awarded

/* Participation Certificate

40,247 points claimed, (a 26.6% decrease from 2017). This was successful contesting for an Australian field day contest resulting from 171 logs being received. More than 986 Australian individual call signs were logged during the contest.

Unfortunately, the number of Club Stations who took part in the contest and then not submitting a log as an entry is still a disappointment. Barely 41% of club stations that have participated in recent contests have

Home Station – 24 Hour (Part 1)

Call Sign	Operators	Mode	Band	Contacts	Score	Locator	Award	Cert.
VK2HBG	Home	Phone	HF	145	217	QF55HC	1 /*	86
VK2FHRK	Home	Phone	HF	150	192	QF57TB	2 /*	87
VK2LEE	Home	Phone	HF	105	155	QF57KW	3 /*	88
VK4FNQT	Home	Phone	HF	41	72	QH30IR	12 /\$	89
VK4FRJG	Home	Phone	HF	35	58	QH30JQ	14 /\$	90

/* Certificate Awarded

/* Participation Certificate

Home Station – 6 Hour

Call Sign	Operators	Mode	Band	Contacts	Score	Locator	Award	Cert.
VK4VDX	Home	All	All	63	138	QG62NI	1 /*	91
ZL1TM	Home	All	HF	55	100	RF73ID	1 /*	92
VK2GZ	Home	All	HF	21	50	QG64OF	2	
VK4TS	Home	All	HF	7	28	QG63MI	3	
VK4ADC	Home	Phone	All	146	379	QG62LG	1 /*	93
VK5XD	Home	Phone	All	22	34	PF94GX	2	
VK4NHT	Home	Phone	All	8	20	QG62MT	3	
VK3AVV	Home	Phone	VHF	60	148	QF22MF	1 /*	94
VK3DIP	Home	Phone	VHF	11	127	QF11SI	2	
VK6LB	Home	Phone	VHF	6	24	OF78WA	3	
VK5FBAA	Home	Phone	VHF	9	21	PF95HD	4 /*	95
VK2PR	Home	Phone	HF	269	347	QF55JS	1 /*	96
VK2PWR	Home	Phone	HF	139	278	QF56KA	2 /*	97
VK2ND	Home	Phone	HF	173	245	QF56MB	3 /*	98
VK3FXBR	Home	Phone	HF	8	13	QF14TO	22 /\$	99

/* Certificate Awarded

/* Participation Certificate

bothered to submit a log, though many were logged as active in the contest. Some multiple operator stations did get very big scores and this simply reflects the great and varied planning and implementation efforts required to assemble and operate a multi operator station.

Activity was carried out on all bands permitted under the rules. There was a decrease in activity on HF, and there was less activity on the all HF frequencies as would be expected by the decreasing sunspot cycle. This sunspot cycle is decreasing rapidly to a minimum at the moment and conditions on some bands did appear to change in line with the decrease. The other lower bands seemed to be only marginally affected by the QRM.

In the higher UHF and Microwave bands there was a small increase in activity; since it obviously follows a weather cycle, rather than the solar cycle? The weather in VK3/5 was horrible with gale forced winds and a total fire ban with windy conditions, while in VK2/4 they had quite benign weather so there was increased portable activity. Activity overall was somewhat decreased as many fewer portable stations were out in the field.

The scoring in the VHF range was about the same

compared to last year. Though the scoring as a ratio of contacts per station was down from 2017. The absence of many club stations, because of the miserable weather in VK3 certainly reduced activity, with most stations making such comments.

The other major change noticed this year was the increase in Portable Station operation as seen by the submitted logs.

The '10 Contact Rule' was devised to facilitate the checking and verifying of submitted logs. It was not devised to irritate and anger people who chose, for whatever reason, not to submit a log, but it was designed to encourage those who in the past did not see the need to submit their log – 'as they were not going to win anything'. Submitting their log is really being able to help others as well as themselves.

The participation across the various call areas was patchy. There was an increase in Portable stations in most areas. Home Station logs were increased from last year in most call areas.

All of the portable stations that went to the effort to send in a log will get a certificate. The WIA believes that those who make the effort to set up and operate a portable station should be acknowledged. In line with previous years, the Foundation License logs who did not achieve a placing were instead awarded a Participation Certificate for encouragement.

There were eleven Foundation licensed operators who submitted a log (one from VK2, two from VK3, three from VK4, one from VK5, one from VK6 and two from VK7). There were many more Foundation calls stations were operating and who were logged during the contest, but they chose not to submit a log. All logs submitted by foundation operators were awarded a participation certificate. Logs from club stations did also show that a few 'F' Calls also took part as part of the club station effort, well done.

All stations are reminded that logs must be submitted in one of the formats proscribed in the Contest Rules. Logs in other formats will be rejected or returned to the entrant for translation into an acceptable format.

A note for all HF Stations; - All HF contacts are valid HF scoring contacts, whether they are from VK, ZL or P2 stations or stations from overseas.

Overseas stations cannot submit a log to the contest but can exchange numbers with stations participating in the Field Day Contest. They are to be scored as a Portable station contact.

Comments Regarding this Year's Contest

The comparative difference in score and scoring between HF and VHF/UHF contacts.

In fact, within the John Moyle Contest, the rules allow for some 60 possible alternative categories. Each category is actually completely independent from every other category and so there are in fact 60 parallel contests. In this way, it is completely different from any other contest presently in Australia. This year only 28 of the different categories were contested.

For this reason it is not possible to have overall winner in this contest, as scores from any category, especially between different bands and different modes are not directly comparable. Only scores within the same category are correctly comparable. To reduce the costs to the WIA the number of certificates awarded to Home Stations – the contest is a Field Day after all – only one certificate for every 10 logs received in each category will be awarded again this year.

The award of the President's Cup is a further parallel contest. It is awarded to the highest score from a Club Station, affiliated with the WIA, in any category. This year it was awarded to VK2SRC.

The number of logs submitted to the contest is up compared with last year

The number of logs entered in this year's contest is significantly increased compared to last year but is down compared to previous years of the contest. The number individual stations taking part in the contest and the number of their contacts seem to be down compared to last few years. The additional logs increased the percentage of verified contacts during the contest, making the contest manager's task of checking the logs just a little bit easier.

In 2018, a total of 171 logs were submitted from 81 portable stations and 90 home stations.

The issue of scoring for CW contacts

The number of All Mode logs was significantly higher than in the recent past. A good sign!

While CW is no longer a precondition for obtaining an Amateur licence, it is a skill that is still widely distributed among existing operators and a skill that should be nurtured among the newer licence holders as communications is still possible under very trying conditions.

The rules were adjusted in the past to allow doubling the score for a contact on CW. For HF this was simple. However, for VHF contacts where there is a significant score already for the distance involved, the rules were amended for scoring VHF contacts on CW.

However, the use of computer generated/decoded CW is prevalent and it is felt that hand generated code that is decoded by ear alone should only qualify as true CW. This has caused some concern among the contest aficionados, but as this is a field day contest and so the emphasis on hand sent and ear decoded CW is seen to be preferred and computer sent and decoded CW is not endorsed. This is hard to police however, and it requires the cooperation of the operator to indicate in their log if the CW is

hand keyed or not.

Any computer method is simply just another digital mode and so should not score the same as hand CW, but only the same as any of the other many digital modes.

The number of people who submitted logs claiming 'All Modes' and only logging contacts using SSB or FM.

The Modes allowed in the rules are PHONE (SSB or FM), Morse (CW) (Manual) and DIGITAL (Computer) Mode.

The PHONE (Voice) only Modes are SSB, DSB, FM, PM or AM. That is the modulation is an audio signal derived in the first instance from a microphone.

The alternative is hand CW Mode, which is one where the operator simply turns the carrier on and off according to the Morse code. Digital CW by a computer is still not acceptable as CW and is only another digital mode.

DIGITAL mode is one which uses a computer to control the transmitter and to decode the information to allow the operator to complete the contact. The total number of digital contacts this year was only 31.

ALL MODE, is any combination of the above modes.

Club Stations

Club Stations were well operated and made some very big scores as a result of their combined efforts. Well done

The absence of a more than 41 club Stations (58%) was noted for this year. Some of the missing clubs had their club call sign used during the contest and probably could have achieved significant scores. However, the clubs involved chose not take the time to submit their log. This is a sad reflection upon the efforts made by some, not being fully supported by other members of their club.

One issue that occurred prior to the contest was that a couple of Club Stations said that they could not find sufficient people to man their portable station. This may

have been as a result of a number of reasons, including the forecast atrocious weather in some areas, however, these stations wanted to operate as Multi-Operator Home stations. The rules do not allow this.

Once in the past, Multi-Operator Home Stations were permitted, but there were so many complaints made by others about the very predatory and aggressive operating practices of these stations. In addition, there were the very obvious advantages of permanent antennas and mains power and hence this practice is no longer allowed.

A Home station is only permitted to have a single operator. Of course, a Club Station can operate with a single transmitter and a single operator at any time, this is encouraged, as it provides very good training for the newer operators as they can be readily helped and supervised during the contest.

The purpose of the Field Day is to promote field operation and the Home Station is encouraged to provide contacts for portable stations. There are plenty of all singing and dancing Multi-Operator and Multi-station contests during the year, so it is not felt to be in the spirit of the JMMFD contest to have club stations with Multi-operators and multiple High Power transmitters dominating the contest in a Portable Station contest.

Low Power Contest

The suggestion was again made by a few stations that a QRP category could be allowed. The suggestion was that only a station that can be carried in a backpack should be allowed for the operation of the station. There were again only two logs entered indicating that all of their operation was on low power. They are acknowledged on their certificate. It is still thought not to be necessary to create another category just yet (see above) but if interest grows and it may soon require a rule change.

It is interesting to note, the scores produced by some of the Foundation licensees that submitted a log, does indicate that plenty of contacts were made on the restricted lower power permitted by their LCD.

The Future

Now it is over to you. There are always ways to improve anything, but scrapping something because it does not suit you is not possible. But if benefits are shown to be available, further changes can be made to the contest to better serve the amateur community. But changes to force the majority to follow what suits a small minority is definitely not a good idea.

If you have any contribution to these topics, the Rules for this contest are available at the WIA web site at <http://www.wia.org.au/members/contests/johnmoyle/> which already contains my contact information and please feel free to contact me with your submission for further consideration.

Well done to all of those stations that participated in the contest and well done those who bothered to submit a log. It is hoped that the number of logs to be submitted next year will continue its increase from this year's log numbers.

I wish to thank those who did send in photographs of their equipment set-up and personnel involved for inclusion in the *AR* magazine. These have been submitted to *AR* along with this report, so please give Peter Freeman via e-mail at (editor@wia.org.au) anything else you have for later use for the magazine.

Denis Johnstone VK4AE

Editor's note: Due to space considerations, these results are an abridged version of the complete Results, which are available on the WIA website at:

<http://www.wia.org.au/members/contests/johnmoyle/documents/JMFDC%20Results%202018.pdf>



Northern Corridor Radio Group

This coming month (May), we will begin planning the next WA Hamfest event – scheduled for mid-August. We are planning to build on the success of last year's event, tweak it a little and see if we can't make it more successful this year.

The UB40 Ultra-beam has been ordered and is due for delivery any day now. To mount this on our "G-Tower" that previously housed a 3-element Yagi for 40 m; we are strengthening the rotator mounting and pole attachment.

Alek VK6KCC modified the Carine tower so that the antenna is no longer supported only by the winch cable and is now locked in place once elevated. The Carine tower was our first mast used in the early 90s when the club was still at Carine TAFE and currently supports our SteppIR which is used for the remote station.

NCRG participated in the John Moyle Field Day contest, with 25 members turning up; including our first YL contestant Jenn VK6FSYS participating. Wayne VK6EH's car was hit by a Kangaroo (not the other way around) which precipitated a lot of ribbing over the weekend (Wayne is a Kiwi, so he is used to it!). We had a Triband Yagi mounted on the new club comms trailer (ex-Peel Radio Group comms trailer). We erected 160/80/40 m dipoles in surrounding trees and used a Diamond 7000 vertical for 2 m/70 cm. We got a good score and are expecting to rate well against the other clubs in VK6 in the contest.

The monthly tech night on the second Tuesday of the month is still popular and last month's presentation was on the "internet of things" and was presented by a subject matter expert from Telstra who works with one of our members.

NCRG meets every Sunday morning from 0800 and holds a formal business meeting on the fourth Tuesday of each month. New members are always welcome.

Ham College

The College has been busy with foundation and standard courses. We are pleased that six new to the hobby Foundation licensees were successfully completed, as were eight Regulations assessments by the candidates on the Standard course. Thanks to all the trainers, facilitators, assessors and of course the students for jobs well done.

We have eight new Standard licence course attendees who by the time you read this will have passed their exams.

When you read this we will have held another weekend Foundation course and a further assessment day.

The Advanced licence course starts in July and there are a few places remaining. The next Foundation weekend is 16 and 17 June and an assessment day on Saturday 23 June at the usual venue, Lynwood Scout Hall, inside the whaleback golf course in Parkwood. Please express an interest on the college website, hamcollege.com.au

As is our usual plea, we are always looking for volunteers to assist with teaching and all other aspects of club activities. We meet for a business meeting at 6pm on the second Tuesday of each month at the club rooms and all are welcome.

Andrew VK6AS
Enrolments Officer

Bunbury Radio Club

The Club's March meeting will be held on Saturday 12 May, beginning at 1400. The technical topic will be

a PowerPoint presentation on the optimum ham shack.

Our next QSO party will be held on Sunday 6 May at 1900 on 3.610 MHz. The idea is for each station to provide a report on the quality of the signal of all participants. Not just a basic 59 signal report but an assessment of the audio quality so that participants can get an idea if their rig needs adjustment. In our previous activity those playing found it to be useful exercise in fine tuning their respective set-ups.

The technical activity at our March was the comparison of members' multi-meters to check their relative accuracies. This was run by Paul VK6AMP our resident IT guru and twelve meters were brought along for comparison. The meters showed remarkable consistency all bar one unit being within +/- one least significant digit. The unit that was out was later confirmed to be due to low battery voltage. As a result of the success of this day, Rick Turley has offered, on a date to fit in with his work schedule, to bring along an RF test set where we will be able to test our transceiver.

This is a reminder that our annual get together will be held in lieu of the November monthly meeting. It will be in the form of a luncheon at a suitable venue to be decided. Two suggestions to date are a Chinese meal or a vineyard. Other ideas are welcome. Now, hear this: there will be a raffle with a significant prize, such as a dual band mobile, or something similar. This raffle will only be available to financial members who attend the luncheon.
73 Norman VK6GOM

VHF Group

News from WA VHF Group

As some may know there is noise about an exhibition in the works at

Wireless Hill. It is sponsored and co-ordinated by WA VHF Group in conjunction with Wireless Hill Museum. This one is about amateur radios contribution to the development of wireless communications from 1900 to now. The exhibit is set to open in the Wireless Hill Museum early 2019.

If you have or find any item that can be used, loaned or acquired that illustrates a stage or event in the development of wireless communication since 1900 we would like people to register. This can be done either through our nomination forms, an email to *committee at wavhfgroup.org.au* with the subject line, Exhibit Potential and the items details or via a web form on the group's website, look for the Exhibit tab.

We have our monthly meeting on Monday 28 May. Doors open 7:30 pm for 8:00 start. After the meeting there's normally a short break until the technical talk.

Activity days next month are Saturday May 5 and 19. Members and visitors are welcome to drop in between 12 noon and 5 pm for a cuppa, work the radios or tinker with a group project.

Our venue is the Operators Cottage, Wireless Hill Reserve, Ardross.

More information on the group can be found on our website, www.wavhfgroup.org.au

73 from Ty VK6HTY and the members of the WA VHF Group.

Hills Amateur Radio Group

This month HARG held its annual HARGfest on Sunday 22 April. The day was a huge success with around 180 in attendance. This is a record for the event and bodes well for amateur radio in Perth in general. HARG thanks Altronics, TET-Emtron and Future Systems for



Photo 1: A view of the crowd at HARGfest.



Photo 2: The Future Systems stand at HARGfest.

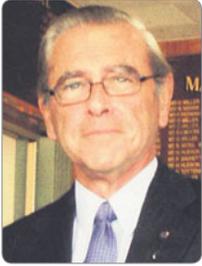
their continued support of the event.

On show was the first Flex6400 in the country which raised a lot of interest as did the remote station demonstration shown at the same table.

HARG also participated in the

John Moyle Field Day contest from Mt Dale. Operated the full contest and made a better score than last year, due to a better location. We were thankful for less insect issues than last year!





VK3news Geelong Amateur Radio Club

Tony Collis VK3JGC



Photo 1: The Raspberry Pi Crew.

Raspberry Pi Open Day

On Saturday 3 March, the GARC held its first open day related to the Raspberry Pi computer featured in last month's article from the GARC in the AR Magazine VK3 column; celebrating the 10th anniversary of its inception in the UK.

Amongst the visitors were several Raspberry Pi users visiting from Geelong. The event was

organised by Cal VK3ZPK, Lee VK3PK, and Nick VK3TY as shown left to right in Photo 1.

The GARC Auction Night

The first Auction Night of the 2018 year was held on Good Friday at the club house in Storrer Street, Geelong, preceded by a sausage and hamburger BBQ and was, as usual, well attended by club members. The auctioneers for the night were Calvin VK3ZPK and David VK3HQ. The items for sale varied between a collection of mobile antennas, mobile radio equipment and a collection of "stuff" that tends to be collected over the years by the Amateur Radio fraternity. By the end of the evening over \$200 was donated to the club funds.



Photo 2: Calvin VK3ZPK and David VK3HQ selling to the audience.

GARC Repeater Group – recent activities

During March - April this year, the Repeater Group members Peter VK3WK

and Bert VK3TU, focused on resolving/completing two significant outstanding tasks in relation to the GARC's Repeater Network.

This report from Peter VK3WK details their efforts to resolve the prevailing issues at the GARC's VK3ROW and VK3RGL repeater sites.

VK3ROW Beech Forest - pager interference mitigation

The VK3ROW 2 m repeater at Beech Forest in the Otway ranges was suffering significant de-sense from a pair of 148 MHz 200 W paging transmitters.



Photo 3: Bert VK3TU.

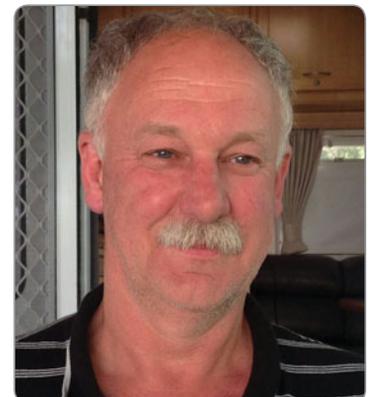


Photo 4: Peter VK3WK.

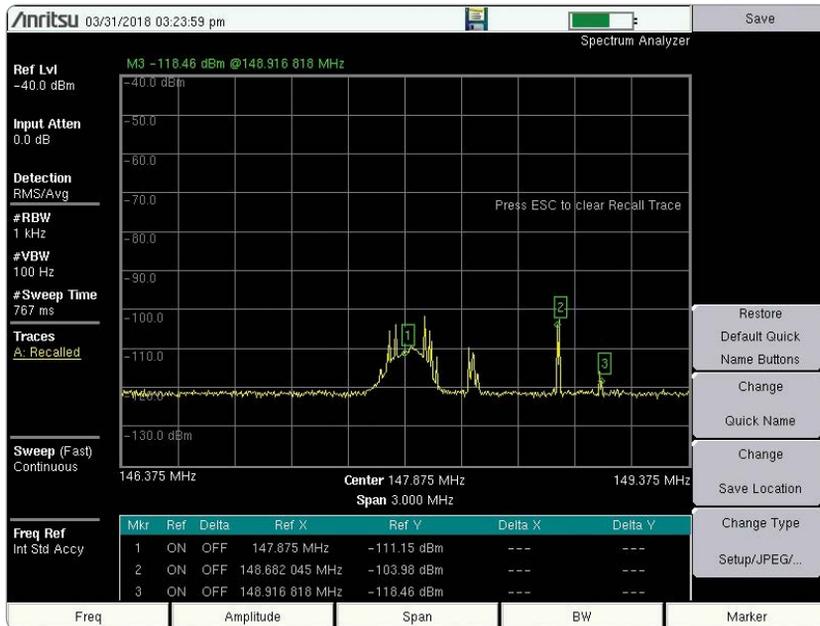


Photo 5: Pager Interference at VK3ROW Repeater.

The paging antenna and the VK3ROW antenna are mounted at the same height with only 8 metres separation between their respective towers, resulting in +10 dBm of pager fundamental signal at the VK3ROW antenna feeder.

The object of the Easter Saturday working bee was to reduce the pager fundamental signal at our receiver input to the point where blocking was completely eliminated as a primary source of receiver de-sense, and then to measure the levels of “on-channel” interference generated by the pager transmitters. This approach was adopted to ensure the “GARC’s house was in order” and that we had a good understanding of the underlying issues before approaching the pager operator.

Our 2 m repeater antenna duplexer/filtering configuration (fitted as standard at all our sites) consists of a 6-cavity notch duplexer, a two cavity aperture coupled bandpass filter in the Rx leg, and a single cavity bandpass filter and isolator in the Tx leg. This configuration provided approximately 35 dB of pager fundamental rejection. A

supplementary filter, consisting of a single bandpass cavity and a pair of notch cavities (one on each pager frequency) was installed to provide an additional 75 dB rejection of each pager, resulting in the level of pager fundamental at our receiver input being reduced to less than minus 105 dBm. This is well below the blocking level of our Motorola MTR2000 repeater receiver.

We were then in a position to measure the “on-channel” interference, generated by the paging transmitters, which was now our primary source of de-sense. When a single paging transmitter was active we measured an increase in the noise floor (de-sense) at our receiver input of 10 dB. When both paging transmitters were active the noise floor increased by an additional 3 dB but the level of passive intermodulation (PIM) showed spikes which were up to 20 dB above our noise floor. The source of noise which raises our receiver noise floor is attributed to the pager transmitter noise sidebands and can normally be mitigated by the addition of suitable notch filtering at the pager transmitter output. PIM at the level we are seeing is normally attributed

to a fault in the transmitter antenna system, but can be caused by the tower or other antenna hardware in the vicinity of the pager antenna.

We are currently talking to the pager operator about the next step towards mitigation of the problem.

VK3RGL Mt Anakie – Tower refurbishment, antenna and feeder replacement

The current tower and equipment building at the GARC/ARV repeater site on Mt Anakie was completed in January 1988 and is home to the VK3RGL 2 m and 70 cm repeaters and beacons and is the hub site for GARCnet, the GARC’s wide area VHF repeater network currently under construction. The tower and antenna systems at the site have remained virtually untouched since the initial installation.

With considerable assistance from Amateur Radio Victoria, a professional team of riggers were engaged to re-furbish the tower and antenna systems.

The scope of the project included:

- Removal of all antennas, feeders and cable tray from the tower.
- Fit new cable tray from the equipment building to top of the tower.
- Install new VHF and UHF repeater antennas and GARCnet link Yagis.
- Install new VHF and UHF spare antennas and node antenna for GARCnet.
- Replace all antenna feeders, re-terminate and fit with grounding kits.
- Install a spare LDF5-50 feeder for futures.

The total refurbishment at Mt Anakie took three days and resulted in a commercial quality installation which should serve the club well for the next 30 years.





VK5news Adelaide Hills Amateur Radio Society

Christine Taylor VK5CTY



Photo 1: The QRP Kits CW transceiver built by Trevor VK5AZQ.

March meeting

This was a Show and Tell meeting and, as usual, the offerings were varied and interesting. The first item was a QRP Kits CW transceiver shown by Trevor VK5AZQ. He was delighted with it and has some QRP contacts with amateurs in the US.

Rod VL5ZRK had built up a 6 metre scanner. Jim VK5JR showed us his laser cutter working and some of the products he has created. This laser cutter was used



Photo 2: Laser cutter product by Jim VK5JR.

to create the boards for his spectrum analysers.

Reuben VK5FE brought along his 24 GHz unit that he had built from scratch and a spectrum analyser for the same band. He may be writing an article about it for this magazine. Keith VK5OQ had built up a signal generator that covers 35 MHz to 4400 MHz that was printed in "Amateur Radio". It uses an Arduino controller. As usual Darryl VK5DS had something to show. He had built a simple QRP Antenna Tuner from a kit.

Steve VK5AIM had another of his portable devices. This time it was a portable HF dipole made of speaker figure 8

flex. He had successfully used it on a number of different frequencies just by adjusting the length and it all rolls up into a very small bundle to take on your portable excursions.

Graham VK5ZFZ took us back to the early days (1977) of computing with a clone of a "Radio Shack" TRS 80. It ran Tiny BASIC. This gave us nine lines of code! Does anyone remember Tiny BASIC?

Last of all was Mark VK5AVQ and his circular antenna for 2 metres; very neat and portable.

The 5RAD repeater

After approximately 40 years the tower is badly in need of repair. Barry VK5BW showed us some

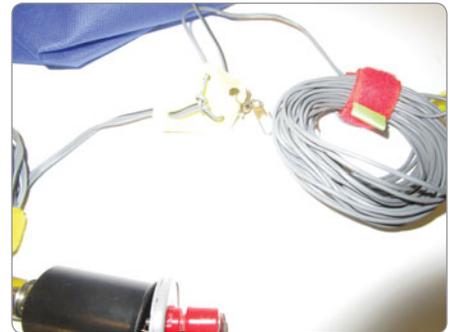


Photo 3: Portable HF dipole by Steve VK5AIM.

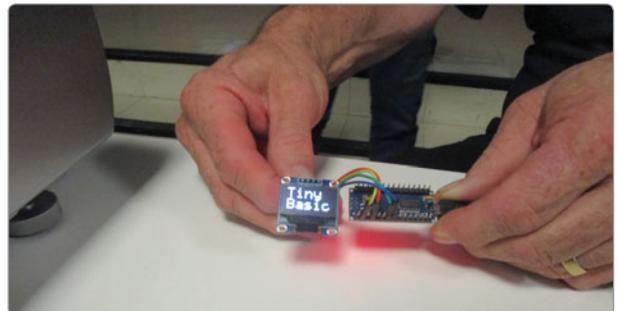


Photo 4: Graham VK5ZFZ holding his Tiny BASIC computer.



Photo 5: Mark VK5AVQ's circular antenna for 2 metres.

photos of the badly corroded bolts, some of which are hardly even there. He said a heavy crane would be needed to lower the tower and several weeks to refurbish it. In the meantime the equipment would be installed on a tower at Summertown so it will still be available during the work.

The April meeting

This was quite different as we heard about the adventures with microwave equipment that Iain VK5ZD and David VK5KK have carried out in the mountain areas of Germany, Austria, Italy and France.

They operate at frequencies from 10 GHz to 134 and even 241 GHz bands. These two, with various other amateurs (as many as 15 or 16), have travelled to Germany for three years, carrying with them all their equipment. They go to the Friedrichshafen Convention to meet and talk with others interested in microwave working and to see all the new components and units' available but that is only part of the story.

What is also interesting is that, because they have been doing this for several years there are a number of European amateurs who arrange "skeds" every year. They had made a large number of long distance records in the microwave bands as they had enjoyed their contacts, Most of these distance records are in the range of 90 -100 km.



Photo 6: Microwave antenna.

When you realise how accurately microwave dishes have to be aimed, to make these contacts, it all becomes much more interesting and amazing. They had several microwave transverters to show us. To change frequencies they simply change the physical unit behind the dish antennas. The plug-in units

have the coupling system built in so one dish serves for any frequency.

This evening was of interest to those who have "played with" microwaves and those who have not.

73

Christine VK5CTY

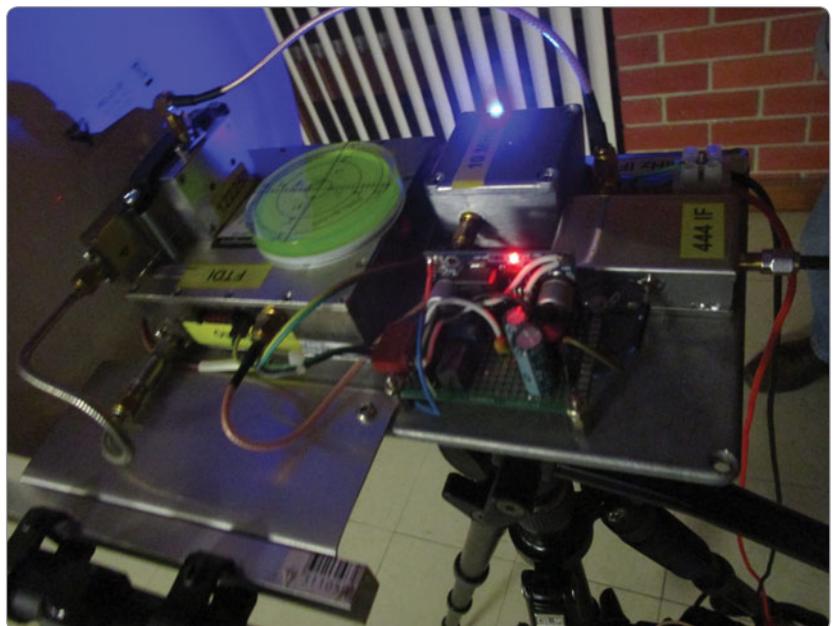


Photo 7: Internals of a microwave transverter.



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Your contribution and feedback is welcomed.

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