

# Amateur Radio

Volume 87  
Number 5 ▶ 2019  
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## Arduino DIY Celestial Tracking Controller

- ▶ Meteor Scatter Radio Propagation
- ▶ BUILD – A simple VHF RF pre-amplifier
- ▶ Chasing 122.5 GHz Distance Records
- ▶ BUILD - An Oblong Loop VHF Antenna

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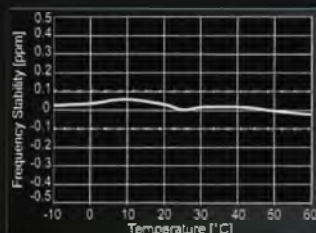
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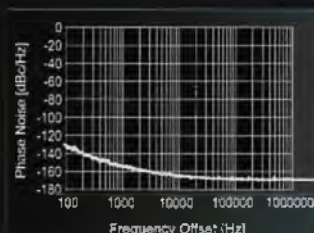
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# Amateur Radio

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*Geminids Meteor Shower. Photo by Jeff Dai.*  
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## Contributions to Amateur Radio



Amateur Radio is a forum for  
WIA members' amateur radio  
experiences, experiences,  
opinions and news. Manuscripts  
with drawings and/or photos are  
welcome and will be considered  
for publication. Articles attached in  
email are especially welcome. The

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### Disclaimer

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

## Amateur Radio Service

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

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## Editorial

Dr Harry Edgar VK6YBZ

We are striving to significantly increase the amount of technical content and are constantly seeking technical articles for AR magazine.

This is YOUR magazine and we want YOUR input. It will make you famous – well, probably not....

Whether it is a half page tip for, say, working with SMD, or crimping an Anderson 0/1 AWG connector. Or perhaps a review of some technology you have used or an article on a building a new **fantasmagoric** home brew gizmo or kit – please send it in. With more people now living in apartments, particularly in the bigger cities, innovative antenna approaches to help with space constraints are of particular interest – as are mobile antenna reviews for HF and VHF/UHF. If you have a friend or colleague that you know has something worth writing about – ask them, and help by reviewing their article.

Most articles are 2 to 6 pages, we can spread longer articles over 2 or 3 issues. Don't assume your article won't be of interest; even stories on "home-brew" experiments that haven't worked can make good reading on what **not to do**.

### About Dr Harry Edgar

Dr Harry Edgar has a Bachelor degree in electronics and a PhD in Telecommunications from what is now Northumbria University UK. He spent four years as Senior Lecturer, then Head of Department and Acting Dean of Faculty of Engineering and Communications at what is now Leeds Beckett University UK teaching to final year degree telecommunications students, research and PhD student supervision.

He then spent eleven years at Curtin University Perth teaching to final year telecommunications students and PhD student supervision. Harry has spent many years in engineering, technical development, management and troubleshooting in power control and process control systems.

He has a post grad Certificate in Law specialising in Contract Law from Notre Dame University and has spent 13 years in state government Main Roads in Contract Management, Contract Superintendent and Contract Development and Writing. He has experience in business management, organisation and operational troubleshooting, investment and start up development experience.

Please send your article with text in editable format only – ideally MS Word .docx, although .rtf or even .txt is acceptable. Attach photos, at least one per page of text, in as high resolution as possible separately – refer to them in text as Photo 1, etc. No pdfs or embedded photos please – these make the article very difficult to edit and use. Carefully hand drawn circuit diagrams are fine too, as long as isn't too complex.

We have received expressions of interest for the Digital Technical Editors and Technical Editor roles and have gratefully offered those who applied volunteer editor roles. We still have two vacancies, and if you are technically inclined (as are most Radio Amateurs, unsurprisingly) and would like to work with a collegiate team of editors in re-inventing our content, we would like to hear from you. Please contact the Publications Committee via email [armag@wia.org.au](mailto:armag@wia.org.au).

Finally, if you sent in a technical article to the magazine in the last two years or so that hasn't yet been published, can you re-send it please? We will (re)review it for future publication or let you know otherwise. Email as above.

The Editor



# Board comment

Greg Kelly VK2GPK

I start this issue's Board Comment with a question: **Amateur Radio: A hobby or a service?**

The short answer is that it is a **service, not a hobby.**

## Why is that important?

Because as a hobby alone, the continuing right to radio spectrum globally that is worth commercially millions of dollars is not easy to justify, if at all. And we don't have to look hard or long to see current commercial pressures for more 100 MHz – 10 GHz RF spectrum.

## Amateur Radio & Amateur Satellite Services - some background

Amateur and Amateur-satellite are fully recognised radio communication services defined in the Radio Regulations (RR) of the International Telecommunication Union – ITU, which is a specialized agency of the United Nations.

In 1912, amateurs could use any frequency above 1.5 MHz, as these frequencies were regarded "of no value for marine, governmental and commercial communications" or "undesirable and scarcely useful".

By 1924, amateurs made way for other services in bands above 1.5 MHz. So there is nothing new about Radio Amateurs losing access to the RF Spectrum!

The Radio Amateur Satellite service was first noted at the 1963 World Administrative Radio Conference (WRC-63).

This is a useful reference: <https://www.itu.int/pub/R-HDB-52-2014>

## Amateur Radio as a Service (ARaaS)

So what comprises the "service" within Amateur Radio?

Applied Research and Development: Amateur Radio exists today because it is first and foremost a platform for electro-technology experimentation. Self-training is an important purpose of the amateur services, as articulated in the definition of the amateur service by the ITU.

Radio amateurs have made, and continue to make, significant technical contributions to the fields of radio propagation, high frequency single sideband radiotelephone, HF data communications, packet radio protocols and communication satellite design. The "HeyPhone" used in the Thai Cave rescue is a very recent example of Radio Amateur innovation helping society. Amateur radio satellites are the pre-cursors of today's "cube-sats" – small satellites that can be launched inexpensively into space.

Amateur Radio Emergency Services: The ITU encourages administrations to allow amateur stations to support disaster relief. Amateur radio continues to provide basic radio communications especially in the early days of a disaster following the loss or overloading of normal telecommunications networks.

Radiosports, such as contests and ARDF indirectly support both the above two services, by honing operating skills, leveraging antenna design and utilisation, undertaking portable operation plus the use of transmitting and receiving equipment under pressure.

## The ACMA definition

*"An amateur apparatus licence is issued to authorise a station that:*

- *is operated for the purposes of self-training in radiocommunications; intercommunication using radiocommunications; and*

*technical investigation into radiocommunications by persons who do so solely with a personal aim, and who have no pecuniary interest in the outcome of the operations of the station*

- *is operated on amateur frequencies or amateur frequency bands*
- *may participate in the amateur-satellite service."*

Note references to "hobby" (Hint -There aren't any!).

## ACMA LCD Consultation 2019

Since the last issue, the consultation period has closed. The WIA has submitted its response to the consultation, which is available on the WIA website. The WIA submitted this to the ACMA as a joint submission in co-operation with ALARA, ARNSW and ARVIC.

We also received letters of support and constructive comment from many of the WIA affiliated clubs, which is sincerely appreciated – and to the single club that responded that they did not support the WIA submission – it was unhelpful that no reason was given for with-holding such support.

We note that there was no general support from submissions that have been made public for a single licence grade, nor for 400W for all Licence classes. There was general support for digital modes for Foundation holders and also a power increase for Foundation holder – although this ranged from 30W PEP to 100W PEP with 50W being the most common. The WIA did propose the ACMA consider an increase for all modes (not just SSB) to 400W for Advanced licence holders. The WIA believes that increases to higher power levels, such 1 or 1.5kW, remains unlikely at this time due to the failure of the high power trial conducted some years ago, a situation where a few

Continued on page 4

## Board comment

recalcitrant trial participants have spoiled it for the many .....

### WRC-19 World Radio Conference

The WIA continues its commitment to international representation in the lead up to the ITU World Radio Conference (WRC-19) which is being held in Egypt later this year (October 28 –November 22). As I noted last issue, WRCs are held every 3 to 4 years and this year will be attended by over 3000 delegates from over 100 countries.

There are a number of preparatory (APT) meetings held in Asia-Pacific prior to the actual conference, with the fifth preparatory meeting just completed. The WIA nominated two representatives to represent the WIA and the Australian Amateur radio service – the WIA attends these meetings as part of the Australian delegation at the invitation of DOCA. The WIA international representatives are Dale Hughes VK1DSH & Peter Pokorny VK2EMR.

Australian Radio Study Group 5 (ARSG 5) met for the final time this WRC study cycle on August 23. ARSG 5 studies terrestrial systems and networks for the fixed, mobile, radiodetermination, amateur and amateur-satellite services in Australia and provides key technical inputs to meetings of ITU-R Working Parties 5A, 5B, 5C and 5D, APT and WRC.

The meeting was held across three ACMA sites: Sydney, Canberra and Melbourne linked via the ACMA video conference facility. Approximately 20 people attended across the three sites. The main purpose of the meeting was to review progress toward relevant WRC-19 agenda items and to discuss the outcomes of recent international meetings, as well as decide on any required follow-up actions.

The agenda item coordinators for each WRC-19 agenda item briefed the meeting on the progress of work at the ITU-R and the outcome of the APG19-5 meeting. This led to discussions about tactics for negotiation at WRC-19 and how Australia might best work toward

achieving its objectives and that of the Asia-Pacific Telecommunity (APT). Close liaison with the Department of Communications and the Arts (DOCA) will be necessary at WRC-19 to adjust to the dynamic nature of WRC-19 negotiations.

The ARSG 5 meeting also discussed the upcoming final meeting of the DOCA Preparatory Group WRC-19 (PG WRC-19) which will be held on 16 September 2019. The PG WRC-19 meeting will finalise the Australian positions on all WRC-19 agenda items and provide security and operational information for the Australian delegation to WRC-19. Attendance at this meeting is compulsory and non-attendance will result in exclusion from the Australian delegation to RA-19, WRC-19 and CPM23-1.

### CISPR (Translates as Special Committee on Radio Interference)

As part of the review of WRC-19 agenda items there was discussion about agenda item 9.1.6 (Wireless Power Transmission (WPT) for electric vehicles) and how the focus of this work will likely shift to various standards organizations like CISPR.

The WIA's representative Peter Pokorny will be attending the CISPR meeting in Shanghai just prior to WRC-19 representing the IARU. Note that planning for the preparatory work for WRC-23 is already underway. The Comité International Spécial des Perturbations Radioélectriques (CISPR; English: International Special Committee on Radio Interference) was founded in 1934 to set standards for controlling electromagnetic interference in electrical and electronic devices, and is a part of the International Electrotechnical Commission (IEC).

### WRC-19 Donations

The WIA has recently received several (unsolicited) substantial donations towards our international representation which are very much appreciated. These donations help in offsetting the non-trivial costs. These donations have been received from

both WIA affiliated clubs as well as individual donors.

The WIA board sincerely thanks these donors for their contribution to the Australian amateur radio service and the WIA. By the way, a small donation of just \$5 per member of all the WIA affiliated clubs would offset about 50% of the total costs we incur with each WRC commitment every 3 to 4 years. This amounts to the cost of a large coffee or a meat pie, once every 3 or 4 years per member. So if you or your club can see their way clear to assist financially with a "once every blue moon WRC-19 donation", the WIA board would be most appreciative. There is precedent for the WIA to ask for donations towards WRC costs, which helps spread the cost across the wider Radio Amateur cohort.

Funding the WRC commitment – which includes more than 6 APT preparatory meetings across Asia-Pacific – is a non-trivial cost for the WIA, and it is a struggle. The WIA, as the sole Australian peak body recognised by the IARU / ITU, views this international representation as one of its most important responsibilities, if not the most important. This view has been consistently supported by member surveys.

### In Summary

Without international representation, we can expect regulators globally and locally to succumb to the ever increasing commercial pressure to release more of the amateur spectrum. Whilst some losses are inevitable, especially in the GHz bands, maintaining a presence at these forums is the only way to minimise these losses. We also cannot assume our own regulators fully understand what the Amateur Radio Service is and its value to the community – hence why Dale VK1DSH gave a presentation to the Australian delegation on this subject at one of the earlier meetings of the Australian delegation.

On behalf of the WIA board  
73

Greg VK2GPK  
WIA President

## Two-metre band WRC Update

When CEPT meet in Turkey it finalised its positions on a wide range of WRC-19 Agenda Items, including proposals for WRC-23. At 144 MHz, after a major effort by the IARU, the 144 to 146 MHz frequency range primary access "grab" was successfully withdrawn from the French / Thales WRC-23 aeronautical proposal. This hot topic had been the subject of detailed submissions by the IARU, France and Germany.

In most microwave bands the CEPT positions adopted should result in no further regulatory change to the amateur 5GHz Secondary and 47GHz Primary allocations. However, for the 23cm band, following intense discussions, a WRC-23 proposal was considered necessary to ensure the protection of new satellite navigation systems such as Galileo from amateur emissions in the 1240 to 1300 MHz range. The draft Resolution that would guide such studies excludes the removal of the existing amateur Secondary allocations, which is part of the French / Thales proposal. IARU Region 1 President Don Beattie, G3BJ praised the IARU team of volunteers and their contributions; and was pleased that regulators had recognised the strength of the amateur case.

*Ed: The more cynical might conclude that the 2M "grab" was intended to divert attention from the "real" goal of removing amateur secondary access to the GHz bands used for aeronautical navigation, including 23cm.*

## New WIA DX Award – Islands of Australia

The WIA DX Awards Program is pleased to announce that the new award, the "Islands of Australia Award" is live and available now.

This new award recognises contacts with Amateur Radio

stations on any of the 56 qualifying Islands of Australia.

The WIA Islands Of Australia Award is an award, which compliments the RSGB/IOTA Ltd Program. The WIA wholeheartedly endorses this Program and hopes this award will encourage members to extend their "IOTA chasing" skills and achievements, and apply for further RSGB/IOTA world-wide awards.

20 confirmed contacts qualify for the award. And with possibly our best looking WIA Award Certificate to date!

More information at: <http://www.wia.org.au/members/wiadxawards/islandsofaustralia/>

## Joint response to ACMA Consultation Paper - Omnibus changes to Amateur LCD

The Australian Ladies Amateur Radio Association, Amateur Radio New South Wales, Amateur Radio Victoria, in conjunction with the Wireless Institute of Australia have released a joint response to the "Proposed changes to amateur licence conditions" and "Draft Radiocommunications Licence Conditions (Amateur Licence) Omnibus Amendment Instrument 2019".

We would collectively like to thank those clubs from around Australia that have offered letters of in-principle support.

The WIA thanks the ACMA for taking the opportunity to consult with the users of the Amateur Service and look forward to the ACMA's early adoption of the principles.

For details of the joint submission, go to the WIA website "News & Events" or directly at: <https://www.wia.org.au/newsevents/news/2019/20190817-1/index.php>

## Antarctic AMSAT ground station under construction

AMSAT-DL is hurriedly building a ground station for Antarctica that will link to QO-100. The purpose for the

installation is to provide a scientific platform to engage students in studying climate change and its effects in the polar regions.

The antenna is a decommissioned Sea-Tel Radome, which is used on ships to receive satellite TV. The AZ/EL tracking and also the polarization (skew) of the feed is done automatically by complex actuators and electronics, which evaluate the received signal and keep the antenna at its maximum signal position.

The rotationally symmetrical parabolic mirror has a diameter of 1.2m and an F/D of 375. The typical gain is 41 dB at 12 GHz.

The construction and financing of the equipment is largely financed by the means of the AMSAT-DL association and its members, membership fees, donations and sponsors. Part of the revenue from the sale of the QO-100 kits for the receive and transmit converters also flows into this project in accordance with the statutes. The board members and the project team are all volunteers!

Read the (very interesting) complete article at <https://amsat-dl.org/en/wie-wird-die-antarktis-auf-qo-100-qrv/>

## IARU ITU Update

IARU Secretary, David Sumner, K1ZZ, has contributed to the latest edition of ITU News Magazine, published by the International Telecommunication Union. The issue is devoted to "terrestrial wireless communications," which includes the Amateur Radio and Amateur Satellite services.

David's article, "Self-training, intercommunication and technical investigations: the amateur service in the 21st Century," discusses *Amateur Radio within the context of a global network of experimenters and communicators who, in his words, "expand the body of human knowledge and technical skills that are essential to development and offer a resource that can literally save lives when natural disasters disrupt*

Continued on page 18

# A GaAs FET preamp for 2 meters

Peter Kloppenburg VK1CPK

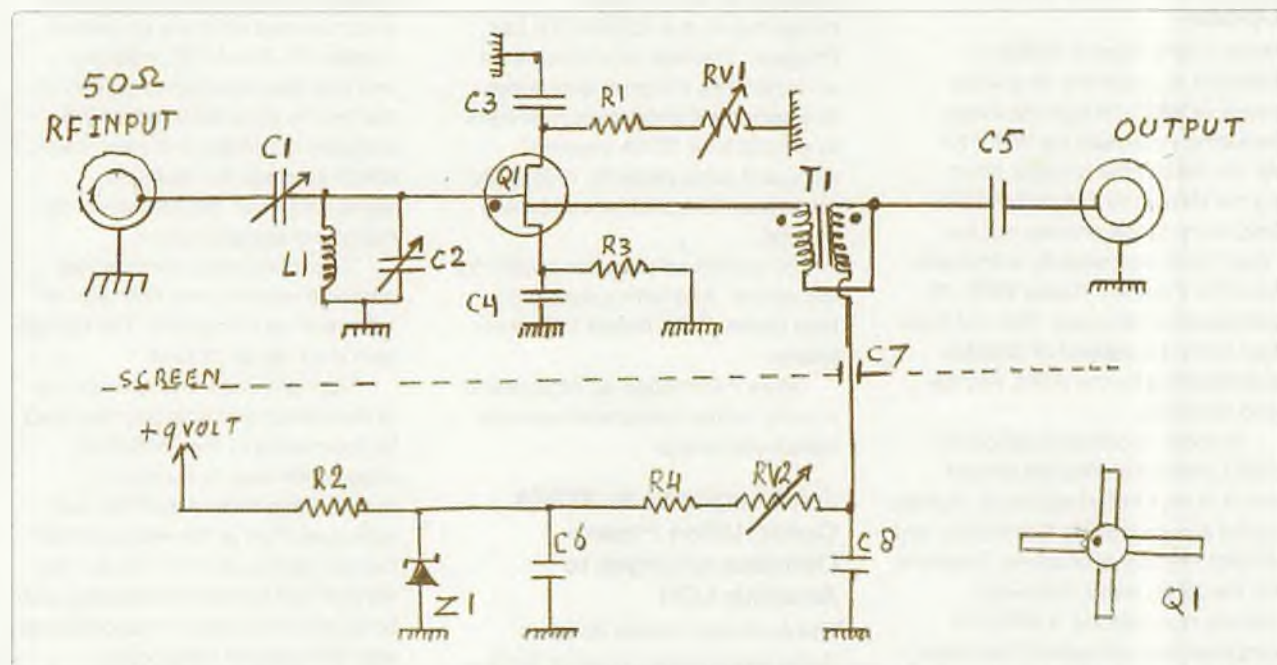


Figure 1: GaAs FET preamp.

## Summary

The following is a description of a preamplifier that I built for the 2-meter band using the new GaAs FET transistor type ATF10136, other devices may also work well, such as the Mitsubishi MFG 1200, 1300, or the 1400 family.

The circuit is simple and can be modified to suit the bands higher in frequency. The unit produces 24 dB of RF gain. 1 microvolt in, 15 microvolt out.

## Construction

Part of the RF circuit is built on a small piece of printed circuit board that holds Q1, C3, C4, R1, and R2.

Capacitors C3 and C4 need a solid ground to prevent self oscillation of the circuit. The cold ends of L1 and C2 are connected directly to the case. C1 connects between the RF input socket and L1, C2, and Q1.

The operating voltage for the FET is set with RV2 at 4 volt. RF gain can be varied with RV1. Refer to Photo for layout details.

## Application

The preamp has found its use in amplifying the RF output of a 2-meter quadrifilar helix antenna\*. Its design precludes much RF gain and the GaAs FET pre-amp ensures useful signal strength for receiver operations.

\*\*QST August J996, pages 30-34

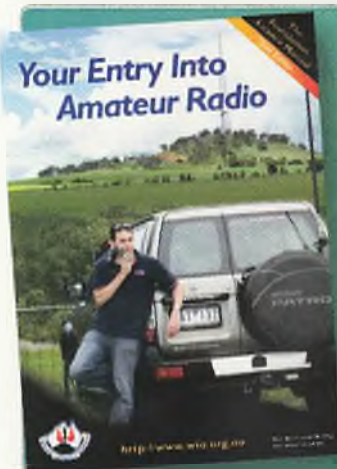
## Parts list

- C1, C2 1-14 pf air variable.
  - C3, 4 330 pf ceramic caps (leadless disc or chip caps)
  - C5 470 pf
  - C6 0.1 mfd
  - C7 0.001 mfd Feed thru
  - C8 0.01 mfd
  - L1 5 turns, type 18 wire, 1/8 inch internal.
  - R1 50 ohm
  - R2 100 ohm
  - R3 270 ohm
  - R4 82 ohm
  - RV1 200 ohm var.
  - RV2 200 ohm var.
  - Q1 GaAsFET ATF10136 Down East Microwave Inc. (US\$8)
  - Z1 4.7 volt, 0.5 Watt zener. Jiode BZX79/C4V7
  - T1 6 turns, bifilar wound, type 28 enameled wire on balun core. Jaycar LF 1220.
- PCB mount for 9 volt battery Jaycar PH9218  
Alu case Jaycar HB5067





Photo 1: GaAs FET preamp for 2 meters.



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# K3NG Based Azimuth / Elevation Rotator Controller for Microwave and EME Application

Justin Giles-Clark VK7TW

## Introduction

This paper was sourced from a presentation originally given at Gippstech 2019. The author had been looking for an automated way to track the Sun, Moon and satellites for a while and a friend and fellow 10GHz Earth-Moon-Earth (EME) experimenter Richard VK7ZBX purchased a rotator controller off an amateur that used the K3NG software. The author looked into this open source software and found it to be easy to use and it certainly met many of the criteria he was looking for. It was originally written by Anthony Good K3NG who advocates that Radio Amateurs should actually be called "Radio Artisans" and his website is called just that: <https://blog.radioartisan.com/>

The criteria included the need for it to be Open Source software. The K3NG software is freely shared through the Github platform just search for K3NG. There are many contributors including Matt VK5ZM from AREG in VK5. Many other amateurs have adapted the software to their needs and they have Github branches. The other criteria included that the software needed to be very flexible, modular and easy to read and configure for experimenters. Further investigation exposed a fantastic project that was too good not to share! I must acknowledge Rex VK7MO's enthusiasm and crusade for accurate az/el pointing as this was definitely infectious.

The K3NG software features include:

- Azimuth only and azimuth / elevation rotator support
- Serial interface using the standard Arduino USB port
- Control Port Protocol Support - Yaesu GS-232A & GS-232B & Easycorn
- Support for position sensors:
  - Potentiometers / Analog Voltage, Rotary Encoders, Incremental Encoders, Pulse Output, HMC5883L digital compass, ADXL345 accelerometer, LSM303 digital compass and accelerometer, HH-12 / AS5045, A2 Absolute Encoder (under development)
- LCD display (2 or 4 rows, at least 16 columns)
- Directional indication on LCD display (North, South, North Northwest, etc.) along with degrees
- Intelligent automatic rotation (utilizes overlap on 450 degree rotators)
- Support for both 360 degree and 450 degree azimuth rotators or any rotation capability up to 719 degrees
- North Center and South Center support
- Support for any starting point (fully clockwise)
- Optional rotation smooth ramp up and optional brake engage/disengage lines for azimuth and elevation
- Buttons for manual rotation, Command timeout, Timed interval rotation
- Overlap LED Indicator, Help screen
- Speed Control, both single PWM output (compatible with Yaesu controllers) and dual PWM rotate CW and rotate CCW outputs
- and dual elevate up and elevate down outputs
- Variable frequency outputs
- Preset Control using either potentiometers or rotary encoders with optional preset start button
- DC, AC or Stepper motor support
- Speed Potentiometer, Manual Rotation Limits & Park button
- Optional tenth of a degree support with Easycorn protocol (i.e. 123.4 degrees)
- Azimuth and elevation calibration tables
- Host unit and Remote unit operation for remotely located sensors using two Arduinos or ATmega chip
- Works with hamlib rotctl/rotctld libraries, N1MM, PST Rotator, and many more programs
- Built in Moon and Sun Tracking
- GPS Interfacing
- Realtime Clock Interfacing and
- Ethernet Shield Support

The controller uses a common Arduino platform, Arduino modules & the Arduino Integrated Development Environment.

## Application

- Anything requiring azimuth and elevation control or just azimuth control
- Earth - Moon - Earth application - tracks sun for noise measurements and moon for EME and
- Can be computer controlled using standard rotator protocol commands so it can be driven by satellite tracking software for terrestrial to satellite work.

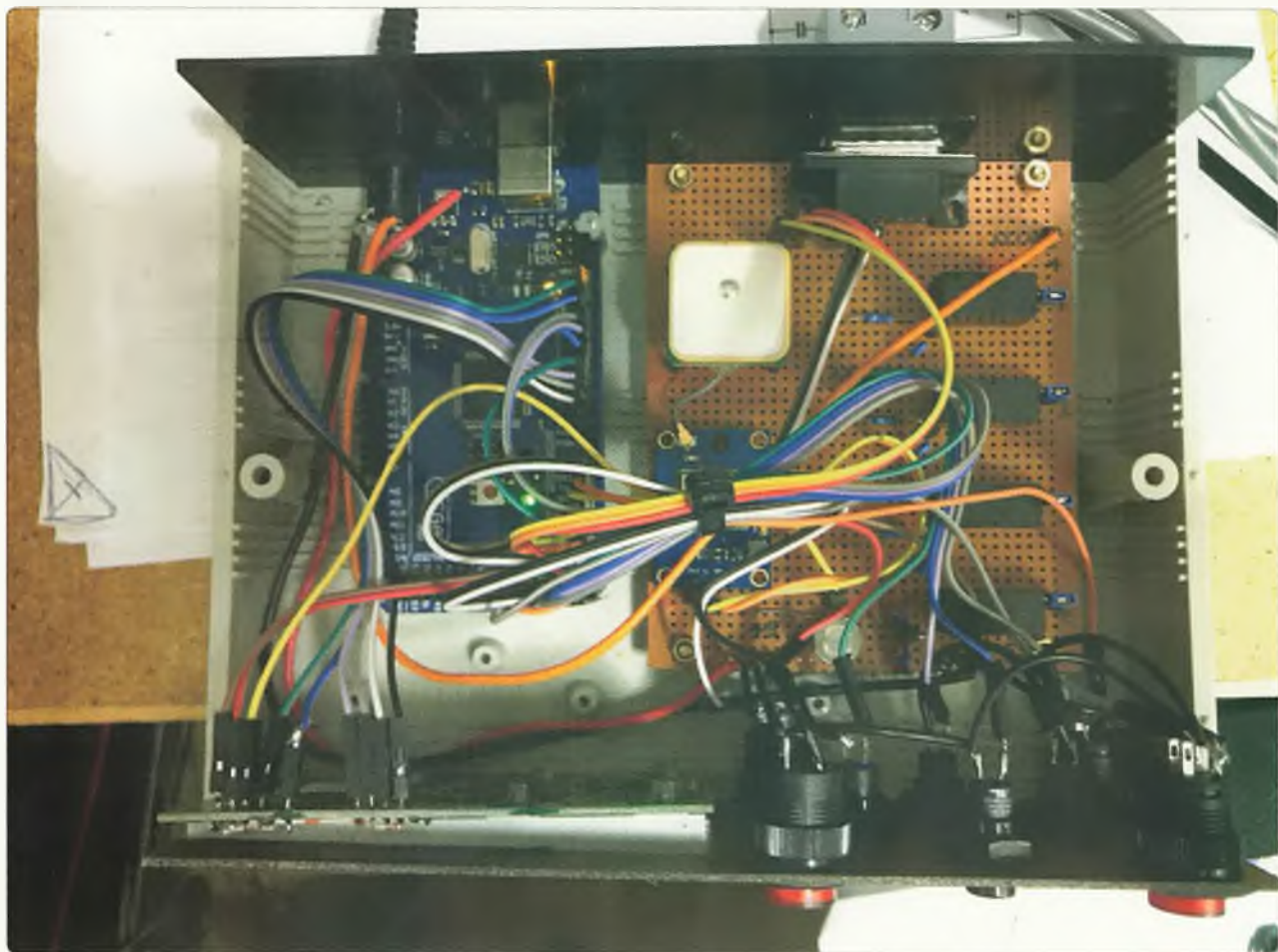


Photo 1: Inside the box.

### Controller

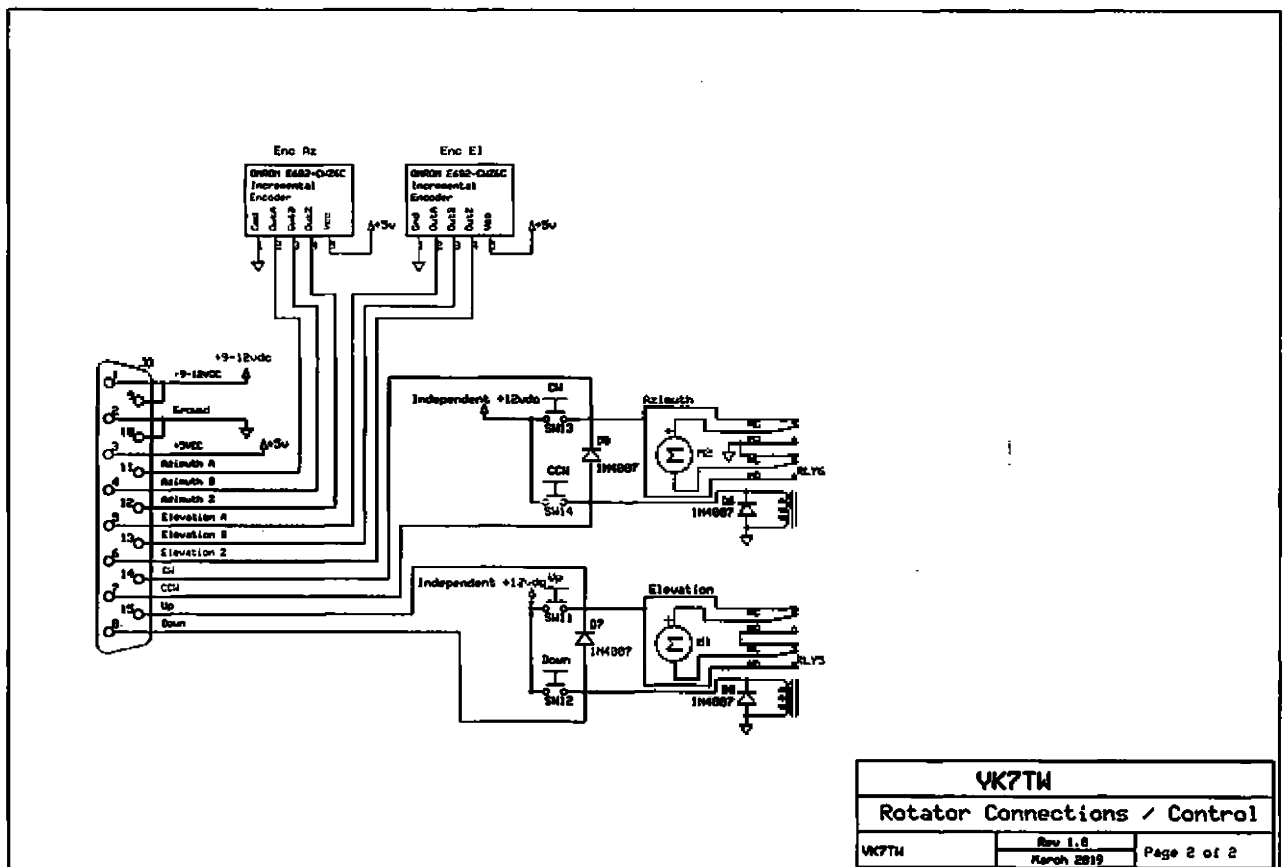
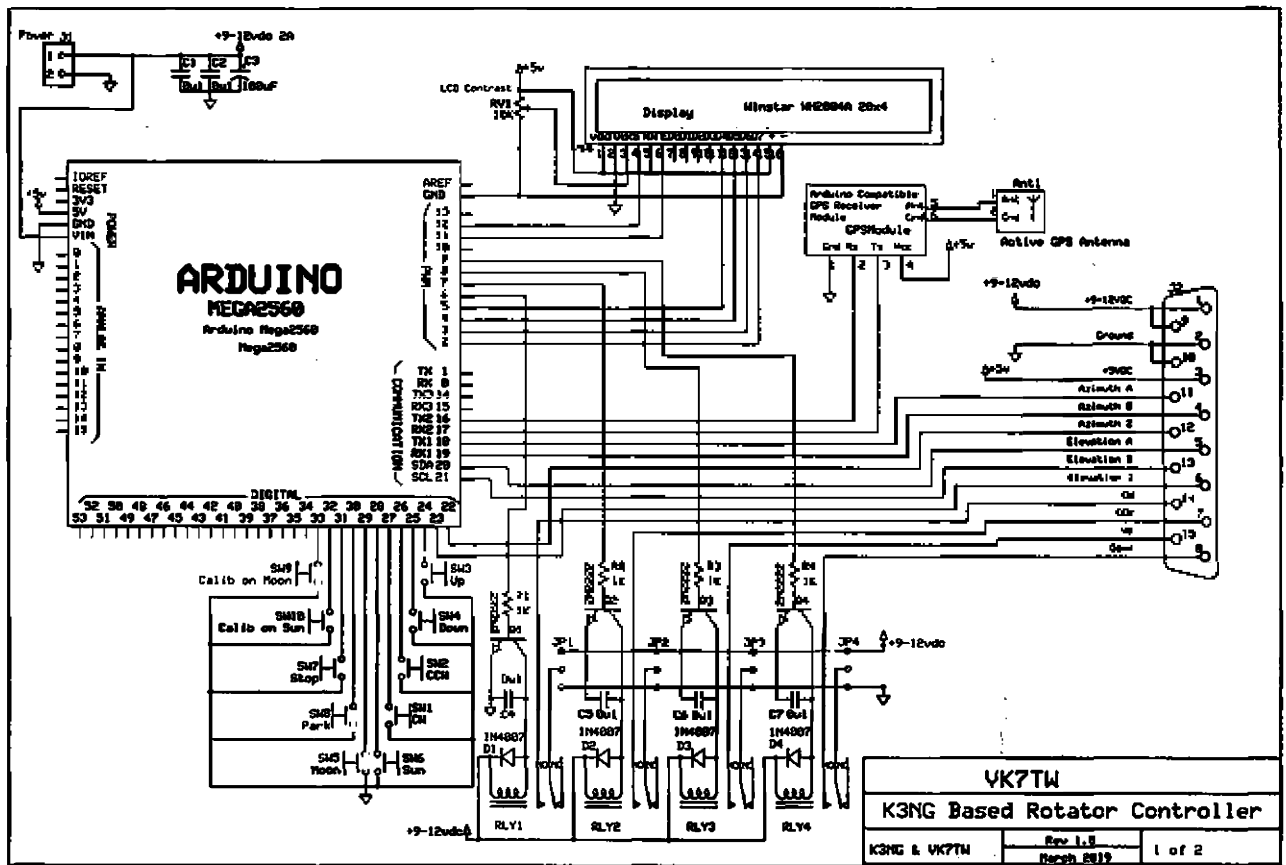
Starting from the basic schematic it was quickly realised by the author that more pins, interrupts and serial ports would be needed and therefore an Arduino Mega was used. The standard Arduino GPS module was also purchase. The author used matrix board and breadboard fly-leads (M-M, Fe-Fe & M-Fe) to connect it all together.

### The Front Panel



Photo 2: Front Panel – Blue button is calibrate on Moon and yellow button is calibrate on the Sun. Black buttons are up/down and white buttons are counter clockwise/clockwise.

# Schematics



The software is modular with each Arduino sketch containing different configuration elements:

- Main definition sketch – *k3ng\_rotator\_controller*
- Main features sketch – *rotator\_features.h*
- Main pins config sketch – *rotator\_pins.h*
- Main settings config sketch – *rotator\_settings.h*
- Some standard hardware configs – *rotator\_hardware.h* sketch and select: M0UPU or EA4TX\_ARS\_USB or WB6KCN

These sketches are configured by removing the `///  
#define` comment to activate and if you not using a function then it is set to 0 (zero). A few libraries are needed and you need to ensure they are installed.

See Table below.

## What else needs to be configured?

### Buttons & Control Lines

To configure the buttons as per the schematic wiring define the following functions and pin numbers in the *Sketch - rotator\_pins.h*:

- `#define rotate_cw 6`
- `#define rotate_ccw 7`
- `#define rotate_up 8`
- `#define rotate_down 9`
- `#define button_cw 26`
- `#define button_ccw 27`
- `#define button_up 25`
- `#define button_down 24`
- `#define button_stop 30`
- `#define button_park 31`
- `#define moon_tracking_button 28`
- `#define sun_tracking_button 29`
- `#define pin_sun_pushbutton_calibration 34`
- `#define pin_moon_pushbutton_calibration 35`
- GPS defaults to using the Serial 2 port pins (Tx2 – 16, RX2 - 17)

Library Name	Comment
FaBoLCD_PCF8574	LCD Library
HMC5883L	Restructured Library Directory
LCD_CO220BIZ	LCD Library
LSM303	Restructured Library Directory
Mecha_QMC5883L	Library
PCF8583	Fix path to Wire.h
RTCLib	Restructured Library Directory
TimerFive	Restructured Library Directory
TimerOne	Library
TinyGPS	Restructured Library Directory
hh12	Library
k3ng_remote_rotator_controller	Restructured Library Directory
moon2	Restructured Library Directory
sunpos	Restructured Library Directory

### Incremental Encoders

The author used the already supported incremental encoders from OMRON – E6B2-CWZ6C – 2000 step for 360°.

To configure the encoders as per the schematic wiring define the following functions and pin numbers in the *Sketch - rotator\_pins.h*:

- `#define el_incremental_encoder_pin_phase_a 20`
- `#define el_incremental_encoder_pin_phase_b 21`
- `#define el_incremental_encoder_pin_phase_z 23`
- `#define EL_POSITION_INCREMENTAL_ENCODER_A_PIN_INTERRUPT 3`
- `#define EL_POSITION_INCREMENTAL_ENCODER_B_PIN_INTERRUPT 2`
- `#define az_incremental_encoder_pin_phase_a 18`
- `#define az_incremental_encoder_pin_phase_b 19`
- `#define az_incremental_encoder_pin_phase_z 22`
- `#define AZ_POSITION_INCREMENTAL_ENCODER_A_PIN_INTERRUPT 5`
- `#define AZ_POSITION_INCREMENTAL_ENCODER_B_PIN_INTERRUPT 4`

To get the accuracy down to the 0.1 degree the author needed to update *Sketch - rotator\_settings.h* with:

- `#define AZIMUTH_TOLERANCE 0.1`
- `#define ELEVATION_TOLERANCE 0.1`

To configure the features that needed in the controller you use the *Sketch - rotator\_features.h*:

- `#define FEATURE_ELEVATION_CONTROL`
- `#define FEATURE_EASYCOM_EMULATION`
- `#define FEATURE_AZ_POSITION_INCREMENTAL_ENCODER`
- `#define FEATURE_EL_POSITION_INCREMENTAL_ENCODER`
- `#define FEATURE_MOON_TRACKING`
- `#define FEATURE_SUN_TRACKING`
- `#define FEATURE_SUN_PUSHBUTTON_AZ_EL_CALIBRATION`
- `#define FEATURE_MOON_PUSHBUTTON_AZ_EL_CALIBRATION`
- `#define FEATURE_CLOCK`
- `#define FEATURE_GPS`
- `#define FEATURE_4_BIT_LCD_DISPLAY`
- `#define LCD_COLUMNS 20`
- `#define LCD_ROWS 4`
- `#define OPTION_DISPLAY_BIG_CLOCK`

### The AZ/EL Mount

The author was able to get hold of a heavy duty CCTV mount that originally had 24V AC motors. These were too fast and were replaced with 12VDC motors with a 1:40 gearing ratio and very little play. This slowed the movement down and meant the mount could run on 12VDC when portable. The picture on the right shows the incremental encoders for azimuth and elevation feedback.

## Dish Mounts



Photo 3: K3NG dish mount with sighting tube – note peg is to hold the azimuth scale whilst the mount is moving.



Photo 5: 850 mm Offset Feed dish – first decodes from the DL Beacon.



Photo 4: Shows the two silver 12VDC motors and the two black OMRON incremental encoders.

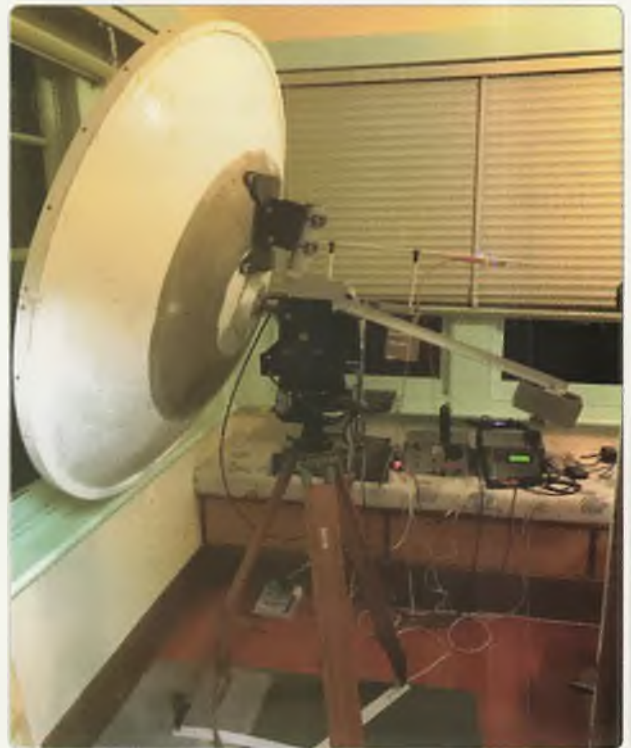


Photo 6: Prime focus 1.13 m dish with counter weight as used in the RD Contest 2019.



Photo 7: Satellite Az/EL control on the actual mount.



Photo 9: Moon tracking test – moon through the sighting tube.



Photo 8: K3NG control of AZ/EL.



Photo 10: K3NG display whilst tracking the moon.

## Operation

There are three modes of operation:

1. Manual
2. Semi Automatic
3. Automatic

Each of these use combinations of manual control or control using the USB/Serial port (or Ethernet if shield and settings configured) on the Arduino Mega for communications. There are Yaesu, Easycomm and built in Backslash protocols and commands available.

## Manual Operation

1. Setup the optical scope whilst peaking on sun noise (W1GHZ sun noise meter kit)
2. Use the scope to manually track the moon (if you can see it!!)
3. Use either the manual push buttons on the controller or the author has wired in a satellite control on the mount that only needs 12VDC and does not need the K3NG controller. The schematic for this satellite controller is included on page 10.

## Semi Automatic Operation

This mode can be used if you cannot see the moon and the process is:

1. Manually pointing the dish to a known land mark (or heading) and known zero elevation or just point at the Sun (if visible). Do not look directly through the scope at the sun!
2. Using backslash commands through a serial/USB terminal to set the azimuth and elevation. \A 143.1 (set azimuth) \B 23.1 (set elevation)
3. With GPS locked (can be shown on display – top right hand corner)
4. Send \M1 (activate Moon Tracking) or push the Moon Track button!
5. If sun visible, use it (\XS) then activate moon tracking

If you can see the moon then the process is simplified to:

1. Manually point the dish to the moon using the scope
2. Issue command \XM (Calibrate az/el to current moon)
3. With GPS locked (can be shown on display – top right hand corner)

4. Issue the command \M1 (activate Moon Tracking) or push the moon tracking button

## Automatic Operation

This mode is used for permanent installation where you can calibrate the installation.

1. K3NG can be setup to remember the last AZ/EL position therefore it knows where it was
2. With GPS locked (can be shown on display – top right hand corner)
3. Send \M1 (activate Moon Tracking) or \XS (activate sun tracking)

## Learnings and Conclusions

The author learned early that he needed an Arduino MEGA for the more pins, interrupts and serial ports. The move to 12VDC geared motors enabled 12VDC only operation, using already supported Incremental Encoders speed up the development and troubleshooting. Spend the time calibrating your rifle scope using Sun Noise – it really pays off later. The AZ/EI rotator mechanism is a stand-alone element of the portable EME rig

which makes it easier for a single person operation in the field.

The author concludes that an automated mount does certainly free-up EME operation so you can focus on WSJT and transverter operation. The K3NG software is flexible and easy to configure and setup for the experimenter. There is also a great support community that includes VK amateurs. There is a good WIKI with the K3NG software and it is the first place to look for information. Suggest that anyone interested subscribes to the radioartisan@groups.io group and watches for any changes on the K3NG Rotator Github site.

## References

- [https://github.com/k3ng/k3ng\\_rotator\\_controller/wiki](https://github.com/k3ng/k3ng_rotator_controller/wiki)
- <https://blog.radioartisan.com/yaesu-rotator-computer-serial-interface/>
- <http://www.egloff.eu/index.php/en/la-technique/antennes/rotor-via-ethernet>
- <https://remoteqth.com/single-rotator-interface.php>
- [http://www.pa0ehg.com/dl0shf\\_beacon.htm](http://www.pa0ehg.com/dl0shf_beacon.htm)

# TAC Notes: 30 M Bandplan change

John Martin VK3KM, TAC Coordinator  
e tac@wia.org.au

## 30 Metres

As FT8 activity continues to increase, there is not much room to move on 30 metres.

Back in 2017 the 30 metre band plan was modified to address an interference issue between CW and SSB operators. It was recommended that whenever possible, SSB activity should be within the segment 10.125 - 10.135 MHz.

In other words, whenever it is possible - and bearing in mind the time of day - preference should be given to filling this segment before spreading down into the

CW segment, or up into the digital modes segment.

This has been working moderately well, but the issue has arisen again due to a further increase in FT8 activity. There are now three FT8 frequencies in use, and the lowest of these is 10.131 MHz. Unfortunately this clashes with the recommended SSB segment extending up to 10.135 MHz. To keep the two modes apart, it will be necessary for SSB stations whenever possible to keep clear of frequencies above 10.130 MHz. For USB operation, this means a dial

(suppressed carrier) frequency no higher than 10.127 MHz.

So the proposal is to change the preferred (core) SSB segment to 10.120 - 10.130 MHz.

This is inconvenient for SSB stations, and for CW operators who also have to share the remaining band space with SSB. But there is no real alternative. The frequencies used for FT8 are internationally co-ordinated, so we cannot tell the rest of the world to move. The only way to avoid QRM is to avoid the frequencies where it is happening.



# SWR - And The Meaning Of Life

Jim Tregellas VK5JST

## Introduction

We all know about SWR, because over our lives we have all gathered a lot of data on the subject from our ham and CB friends, and other reliable sources such as the American educational film series entitled "Smokey and the Bandit" :-)

All of these sources clearly demonstrate that unless the "SWAR" of our antenna system is less than 1.05, then we will not be heard, our finals will blow up, we will get rf burns from the metal parts of our microphones and transceivers, and we may actually end up sterile due to the excessive rf in the shack. Right?? Errrr, well, not quite. Amateur radio is full of tall tales and true, and nothing has more nonsense spoken about it than the SWR of antenna systems. So, let's look at some hard facts and try to establish the truth.

## Signal Strength

Back in the 1930's, it was generally agreed that 50 microvolts rms at the input terminals of a radio was an S9 signal (large), but that was about the extent of the agreement because receiver input impedances varied widely, and so did the receiver AGC characteristics, noise performance and overall gain. It was not until the early 1980s that an attempt at some standardization was made by the IARU, and signal levels were defined which should produce particular readings on a receiver S meter. The receiver input impedance assumed for these "standards" was 50 ohm and the voltage levels defined are shown in Figure 1.

Note that a change of one S point doubles or halves the voltage to be found at the receiver input (or a 6dB change). This logarithmic scale has some interesting consequences. Say a distant transmitter of 100 watts

is producing an S7 level in your receiver. To boost the received signal to S8, the voltage at the receiver input must double, and so the transmitter power must be quadrupled to 400 watts to cause this. An S9 signal level will require a transmitter power of 1600 watts!

And also note that this quadrupling of transmitter power produces a fairly minor change in the received audio level due to receiver AGC action. It is worth noting that even in these days of very advanced receivers, AGC action is seldom exactly logarithmic, and S meters still typically tell the small lies which salesmen love, as they boast about the behavior of their products.

"S" READING	INPUT SIGNAL-MICROVOLTS
S1	0.2
S2	0.4
S3	0.8
S4	1.6
S5	3.2
S6	6.3
S7	12.5
S8	25.0
S9	50.0
S9 +10dB	160.0
S9 +20dB	500.0

Figure 1: IARU Standard Signal Levels.

## Power Loss at Various SWR Levels

The next item which must be addressed, is what power loss is implied by various SWR figures. Have a look at Figure 2 and prepared to be surprised. Even at a SWR of 3.0, the power loss in the antenna system is just 25%, which given the fourfold increase

in power level needed to move one S point, only represents a change of a very small part of a S point, and essentially no change in the received audio level at all. For an SWR of 1.5 or less (4% loss) you will not even see the S meter needle move, and you will certainly not be able to detect any change at all in receiver audio level.

So given the above, why all the fuss about SWR??

SWR	POWER LOSS %
1.0	0
1.1	0.2
1.2	0.8
1.3	1.7
1.4	2.8
1.5	4.0
1.75	7.4
2.0	11.1
2.5	18.4
3.0	25.0
5.0	44.4
10.0	66.9

Figure 2: SWR Effective Power Loss.

## Standing Waves in an Antenna System

Standing waves develop in an antenna system as a result of the impedance of the system not matching the output impedance of the transmitter. As the output of the transmitter moves through a series of cycles of a (hopefully) good clean sine wave, each cycle moves down the transmission line toward the antenna and away from the transmitter at either the speed of light (open wire lines) or some

fraction of light speed. In the case of coaxial cables with solid plastic dielectrics such as RG58, these wave fronts move at around 66% of light velocity. Cables with foam dielectrics have lower losses and faster moving wave fronts (typically 0.8-0.9 of light velocity). The speed of propagation relative to the speed of light is known as the velocity factor.

When each wave front reaches the system termination, its energy may be totally absorbed and radiated by the antenna (a perfect match of 50 ohms), or some energy may be reflected back towards the transmitter. In the first case as there is no reflected energy, no standing wave can develop, and the rf voltage along the transmission line will be exactly the same at all points on the line. This is illustrated in Figure 3 by the yellow trace in the graph.

In the second case, the amount of reflected energy will be determined by how close the terminating impedance is to 50

ohms. For a SWR of 1.5 (little reflected energy) the terminating resistor in a 50 ohm system can be either 75 ohms or 33.33 ohms as both of these generate this SWR figure. This same idea of two different loads generating the same SWR also applies to a system with either a shorted or open circuit load. No energy can be absorbed in these loads and so the SWR is infinity. (the black trace).

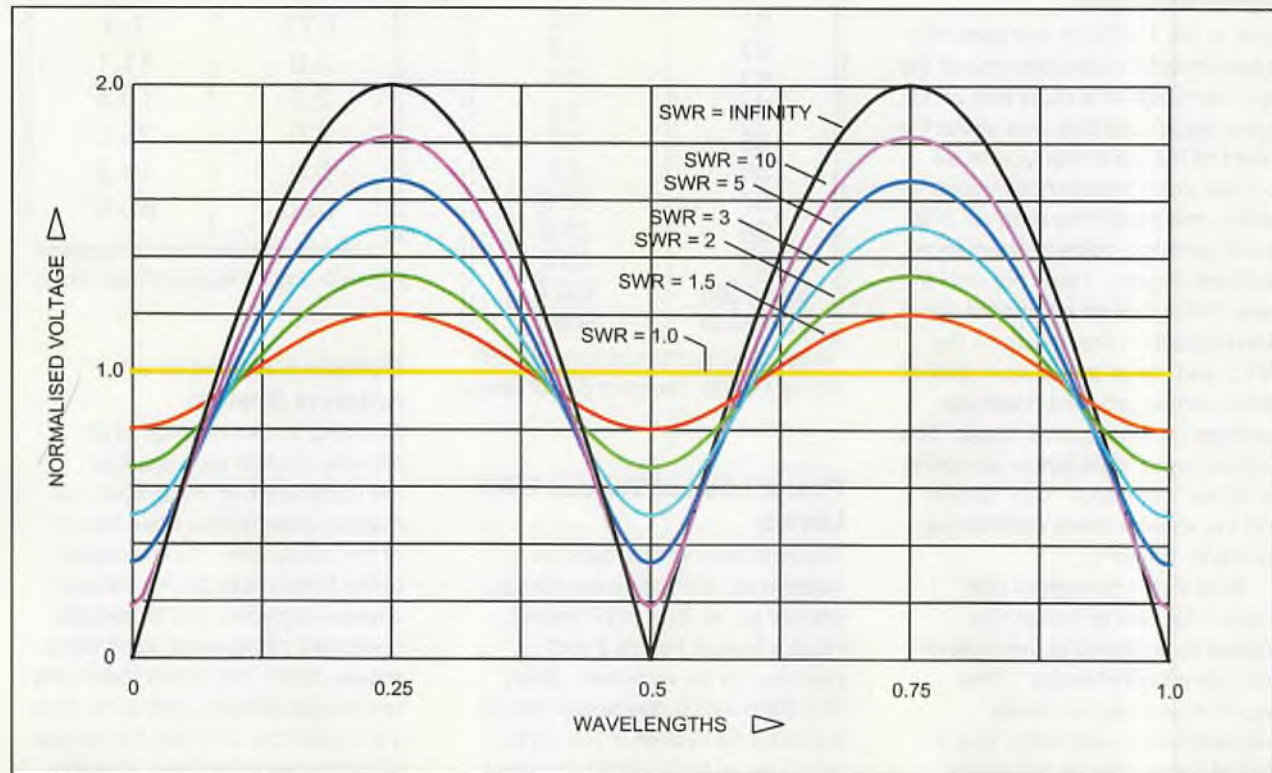
In Figure 3, note that as the load SWR moves away from the perfect 1.0 in either direction (either greater or lesser impedances than the perfect 50 ohm termination), the voltage maximums and minimums along the transmission line increase as the forward and back waves interact. And this is what causes the concern with SWR figures. It is also worth reflecting on what happens to the rf current along such a transmission line. It has the opposite shape to the standing wave for voltage. As power is being transmitted, when the voltage is maximum then the current is

minimum, and vice versa.

The final part of the picture is that transmission lines are seldom of the right length. It is entirely possible that the transmitter output might just be coupled to a line with a voltage or current maximum which appears right at the transmitter output and so places the output devices under the maximum possible stress.

And so it is worth looking at Figure 3 in more detail, because it clearly shows the compromise a design engineer must make when designing an rf output stage. On one side is a sales engineer screaming that to compete with the opposition, he needs the maximum possible output power, and on the other side is an accountant moaning about the costs of expensive rf output devices. The nett result of all this pressure is that the rf output devices in a transceiver are generally flogged to within an inch of their life, and little safety margin is left. Typical industry practice is therefore to provide full output

Figure 3: SWR and Transmission Line Voltages.



power up to an SWR of 1.5 (25% over voltage) and after this to back off the drive to the rf output stages with ALC. And this protection happens fast. If you happen to have an antenna system with a SWR of 3.0 then you will be lucky if your modern 100 watt transmitter is actually putting out 20 watts.

Of course, a lot of the mythology about SWR stems from the early days of CB, when output stages were totally unprotected (costs again), and even the shortest exposure of a transceiver output stage to an open or shorted line would result in either 200% overvoltage or current which would immediately destroy the output transistors.

It should also be pointed out that the tube output stages of old "boat anchors" are way less likely to be damaged by these factors. First, these output stages almost always have "Tune" and "Load" controls which allow impedances other than 50 ohm to be perfectly matched, and secondly, tubes have far greater margins available to deal with overloads anyway. Most "boat anchors" will happily deal with SWRs of 3.0 or more without complaint. Finally, it is interesting that many international broadcasting stations which have to be very frequency agile above the 40 metre ham band to take advantage of current propagation conditions use antenna systems with SWR figures of up to 9.0. Why?

Because it is cheaper to design a very tolerant transmitter output stage than to design and construct a very wide band antenna system.

So in summary, provided your SWR is less than 1.5, there will be no ill effects at all- and with most "boat anchors" you can get away with murder. BUT, if you want to be heard, all of the preceding discussion assumes that you have an EFFICIENT antenna system. You can easily get a very low SWR at two metres by connecting a 2 metre transceiver to a 100 metre length of RG58 with the far end being open circuit. Lots of hot plastic, no reflected power back to the transceiver, and a SWR of less than 1.1.....



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normal communications channels.”

“Amateur licensees are grateful that ITU member-states continue to recognize the benefits of providing direct access to the radio spectrum to qualified individuals,” said David. The International Amateur Radio Union (IARU) is an ITU sector member.

He points out that access to frequency bands “spaced throughout the radio spectrum” is critical to Amateur Radio’s future. He notes that the initial pattern of amateur allocations dates back to 1927 and the International Radiotelegraph Conference. Allocations have been expanded at subsequent conferences, most recently at World Radiocommunication Conference 2015 (WRC-15), when amateur radio obtained a tiny secondary band near 5.3 MHz. An earlier WRC was responsible for the Amateur Service’s two lowest-frequency allocations, 135.7 - 137.8 kHz and 472 - 479 kHz.

The 1979 World Administrative Radio Conference (WARC) extended terrestrial allocations above 40 GHz to include amateur allocations.

## Stranded Texas ham ‘saved by a satellite’

Ham radio played a starring role in a recent drama, this one in the United States.

August 27 and Clayton, W5PFG, and his father Jack, AC5DI, were traversing the Chihuahuan Desert in Big Bend National Park, Texas, USA, when their vehicle became stuck in mud from recent monsoonal rains.

Being stuck up to the axles, they were unable to self-recover from the situation, requiring assistance from Park Rangers. August temperatures in this desert reach upwards of 110-115 degrees Fahrenheit.

There is no mobile phone coverage outside park headquarters.

Clayton called on the AO-92 satellite and reached Kevin KK4YEL in Florida who notified park authorities of the emergency.

In this remote part of the park,

with no access to mobile phone coverage or radio repeaters, ham radio still came through for Clayton.

## New 3.4GHz Digital Mode Record

John Martin VK3KM - WIA keeper of the records lets us know that there is a new 3.4GHz Digital Record that has been set in VK7.

The record was set between Hayden VK7HH on Mt Wellington in Southern Tasmania and Peter VK7PD and Andre’ VK7ZAB on Mt Barrow in Northern Tasmania over a distance of 168.7km.

The digital record was used the WSJT mode - FT8 and was set on the 2nd of September 2019.

The latest lists of current and past HF-UHF records are available on the WIA Records Update web page at <http://www.wia.org.au/members/records/data/>

## FlexRadio in Defence partnership

In a strategic partnership with Raytheon, US Amateur Radio SDR equipment manufacturer FlexRadio has been selected by the US Air Force to adapt its off-the-shelf SmartSDR/FLEX-6000 architecture for HF modernization of airborne communications platforms.

The new radio will provide beyond line-of-sight, long distance communications for air crews.

The Raytheon-FlexRadio team is but one of two recipients for this development program. After a 31-month period of performance, one team will be named to move on to production.

## NZART Taranaki Award

The Award will run from Thursday 3rd October till Monday 7th October 2019 Inclusive.

It is open to all Amateurs and short wave Listeners. Contacts may be made on any band, any mode. Each station may be worked ONCE ONLY for each separate application for the Award.

Copy of log and fee of \$5.00 to arrive before the 21st October

Refer to NZART website for details: <http://www.nzart.org.nz/nzart/>

## United Nations Amateur Radio Club Update

MANHATTAN UN Headquarters’ 4U1UN IS Making Slow but Steady Progress in Returning to Air.

Responding to inquiries noting the lack of 4U1UN activity, the United Nations Amateur Radio Club (UNARC) indicated on its Facebook page this week that it’s making slow but steady progress in its efforts to get the station back on the air from UN Headquarters.

The main difficulties in getting 4U1UN up and running again following its displacement by renovations at UN Headquarters have been administrative and organizational, the UNARC team said. The club explained that as a result of UN Headquarters renovation, the room on the 41st floor housing the 4U1UN radio equipment was reallocated to the UN Broadcast and Conference Support Section (BCSS) and is now off limits.

## USA Reactivates Band Planning team

ARRL report that in an effort to more effectively address HF digital technology issues, ARRL President Rick Roderick, K5UR, has reactivated the ARRL Board of Directors’ HF Band Planning Committee.

This will primarily focus on spectrum allocation issues that have gained increased visibility with discussions on accommodating automatically controlled digital stations. The committee will also discuss operating frequencies for FT4, FT8, and other digital modes.

Read the ARRL story at [arrl.org/news/view/arrl-hf-band-planning-committee-reactivated-to-address-spectrum-issues/](http://arrl.org/news/view/arrl-hf-band-planning-committee-reactivated-to-address-spectrum-issues/)

# Amateur Foundations

## The Regulator

Onno Benschop VK6FLAB

From time to time our hobby changes. While the idea that we're all a bunch of old men playing with spark gap transmitters, or using strange noises to the annoyance of others, the reality of amateur radio is markedly different from that stereotype.

The changes we experience come from many different sources. As amateurs we're always trying something new, inventing things and building stuff. That type of change is integral to the hobby and in many ways it's why our community exists in the first place.

Other changes are external. A new product arrives into the marketplace and we gleefully take possession of a new gadget. That in turn creates other changes which are incorporated into our day to day life as amateurs.

A more structured change happens when the regulator makes a proposal, instigates a new rule, enforces an old rule or does something else that affects us.

In the time I've been an amateur, I've seen changes happen that originate from the regulator that both benefit and impede our activities. Things like the introduction of new bands, the trial of high power, but also the removal of frequencies, the restriction on modes and across the globe this happens in every single jurisdiction.

For example, in Sweden the regulator proposed and then implemented a reduction in transmitter power, from 1 kW down to 200 Watt. I'm sure it made lots of noise in Sweden, but here in Australia there was hardly a squeak.

In France proposals have been drafted to reallocate the 2m band to the Aeronautical Mobile Service, to

be discussed as an agenda item at WRT 2023. The 2m band is a band that is widely used, often as the first band for most amateurs, a band that offers local communication, hosts local discussion nets, has many options of affordable equipment, uses small antennas commonly installed on vehicles.

In Australia the regulator is looking at removing access to the 3.6 GHz band for specific areas and defining more precise access restrictions, removing emission mode and bandwidth restrictions and removing specific Foundation restrictions, such as the ability to build radios, connect radios to the Internet and use digital modes.

The Australian regulator is also of the opinion that any station should be able to use 400 Watts, regardless of the license level, since it's unlikely to increase interference. Interestingly, the local representative bodies are at odds with this, since they appear to believe that we need multiple levels of licence, even though I've never actually heard a coherent argument to support that.

There's more, but let's move on. What strikes me is that the benefits are celebrated and the impediments are bemoaned with hardly any thought expressed on how these changes happened and what brought them about. There are representations made by representative bodies, but most of that is at arms-length.

We're a tiny community in the scheme of things, we always have been, but we have access to one of the richest resources available and we have a regulator who is required to consider our existence when new rules are made and old rules retired.

In discussion with other amateurs

I hear time and time again that making a submission is hard, it's a waste of time and takes too long. For me that makes no sense. The notion that our tiny community has no impact is not credible in the face of the evidence, so why is it that the idea of making submissions to the regulator is such a waste of time and so difficult?

Why is it that we give up before we even start? What is it in our DNA that leaves these submissions to others and what is it that makes us think we're unworthy or unable or unheard of if we never even try.

A submission doesn't have to be a book, it doesn't need to have more than one page. You can write a letter to your regulator that says: Hey, I'm an amateur, I'm affected by your proposal and I think the following.

My point is this. If amateur radio is important to you, if it gives you joy, if it teaches you stuff, if it gives you a community, if it justifies buying gadgets, then why don't you express that to the regulator when they announce a request for consultation?

What are you waiting for? Share your opinion, make your voice count, you can be part of the change.

I'm Onno VK6FLAB

*This article is the transcript of the weekly 'Foundations of Amateur Radio' podcast, produced by Onno (VK6FLAB) Benschop who was licensed as radio amateur in Perth, Western Australia in 2010. For other episodes, visit <http://vk6flab.com/>. Feel free to get in touch directly via email: [cq@vk6flab.com](mailto:cq@vk6flab.com)*

*If you'd like to join a weekly radio net for new and returning amateurs, check out the details at <http://ftroop.vk6flab.com/>, the net runs every week on Saturday, from 00:00 to 01:00 UTC on Echolink, IRLP, AllStar Link, Brandmeister and 2m FM via various repeaters, all are welcome.*



# The Outward QSL Bureau Process

John Seamons VK3JLS - National and Inwards WIA QSL Bureau Manager

Recently, the Inwards QSL Bureau received a pack of QSL cards from a VK amateur, that were destined for the Outwards Bureau. On a cursory examination of the cards, they were returned to the amateur with the following note (slightly edited from the original):-

*"I'm sorry to be returning these cards, but I am doing so to deliver a couple of messages to assist you and the Bureau in the QSL process."*

- I note the bulk of these cards are destined for overseas destinations, and therefore should have been forwarded in the first instance to the Outwards Bureau. The Outwards Bureau address can be found on the WIA Website at <http://www.wia.org.au/members/qs/about/>

In sending cards to the outwards bureau, we ask that cards be sorted as follows:

*"Cards should be sorted alphabetically (A-Z and 1 to 9) into DXCC country order. Do NOT separate the country prefixes with paper, clips, rubber bands etc. Rubber bands should only be used to keep a large stack of cards together. Where cards are received at the Outward QSL Bureau that have not been sorted by the sender into preferred DXCC country order, these cards shall take the lowest priority for sorting and delivery to the overseas Bureaus."*

*Your cards were not sorted in this manner, which would have*

*delayed their sorting at our Outwards Bureau.*

- *It is noted that there is one QSL card for VK9HR. This card (as addressed) would normally end up in the VK Inwards Bureau, however if we had received that card, it would have gone straight into the WPB. If you go to QRZ.com and lookup VK9HR, you would find that QSLs for that callsign are to be sent to the QSL manager, in this case EB7DX. The card should have been marked "via EB7DX".*

*This is a major problem for all Bureaus, in that many cards are addressed incorrectly, because QSL details are not looked up by the originating amateur. I have just sorted through 262 cards for VK9 and VK0 callsigns, and 243 of those cards are going into the WPB. We take a hard line on incorrectly addressed cards, as do many overseas Bureaus. As another example, we receive many cards back from overseas Bureaus, as those cards were being sent to a ham who is not a member of that country's Bureau Organisation.*

*Doing a quick check on QRZ.com for some of your other cards;*

1. B3C should be "via DL8UI"
  2. DR1A should be via "DL6FBL"
  3. OK4RQ indicates "Bureau only via OQRS"
  4. etc
- *Finally, I note your card dimensions are 150 x 105mm.*

*All QSL cards received at the Outwards Bureau must conform to the IARU specification of being no larger than 140mm by 90mm. Larger sized cards cause issues in both sorting and packing. As such, oversized cards are given the lowest priority in sorting and sending.*

*I hope this helps you understand some of the issues in the Bureau, and if you follow the guidelines as above, and note our policy; <http://www.wia.org.au/members/qs/about/documents/Approved%20WIA%20QSL%20Bureau%20Policy.pdf>*

*I'm sure that you will have a greater success rate in both sending your cards, and receiving confirming QSL cards, via the Bureau process."*

The messages contained in this letter are appropriate for all Amateurs to note. Aspects such as highlighted above impact not only on our Outwards Bureau, but also on International Inwards Bureaus. To contain the Bureau costs, the hard line that we take on incorrectly addressed cards continually sees a large amount of cards (particularly Special Event and DXpedition cards), ending up in our "Dead Letters" box.

I encourage all users of the Bureau process to associate themselves with the processes contained on the WIA website as listed above. Adhering to these processes will help ensure the Bureau process can operate as efficiently as possible.

## 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](http://www.wia.org.au/members/contests/about)



Tony Collis VK3JGC



Photo 1: Ken VK3DQW receiving the Award from President Lee VK3PK.

Club Awards – PHONE and CW	Awarded to	Sponsor	Recipient
AUSTRALIA Club Plaque	Local club from Australia with the greatest number of member stations participating in the Contest	VK Contest Club	Geelong Amateur Radio Club
NEW ZEALAND Club Competition Plaque	Local New Zealand NZART Branch, DX club, or contest group with the greatest number of single operator entries	Phil Holiday ZL3PAH	No eligible entry for 2018

Photo 2: Extract from the Oceania Web Site - Plaque awards for 2018.

## Ray Cowling Award 2019

The award for 2019 went to Ken Asplin VK3DQW for his exceptional dedication and solo work on the GARC Antenna Systems during 2019 so that the club can operate from 160 meters to 10 meters, in the new Ken Jewell Radio Room, without having any complex antenna couplers and related equipment.

## Oceania Award

For the 7th consecutive year the GARC has won the Oceania

AUSTRALIA Club Plaque award

## The 2019 AGM and The New GARC Committee

President Lee ( 2017 - 2019 ) gave his annual report on activities of the club during the last 12 months.

## The newly elected GARC Committee for 2019

President	Tony Collis VK3JGC	Vice President	Dennis Haustorfer VK3BQZ
Secretary	Ian Rouse VK3BFR	Treasurer	Nick Buckley VK3FNXR
Member	Barry Abley VK3SY	Member	Nick Kasperov VK3TY
Member	Bruce Stokes VK3HAV	Member	George Patterson VK3AGL

Amongst the many activities covered by Lee in his detailed report were :

1. The recognition of the key members of the team responsible for the extensive refurbishments that took place at the GARC in 2019 ( detailed in the July August VK3 column) by Rex VK3ARG and Bert VK3TU.
2. A big thanks to Greg VK3JIY who for the many years that he provided internet to the GARC.
3. Recognition of the work undertaken by Nick VK3TY who in addition to being the

Club Secretary also took on the additional role of Treasurer for most of the year, due to unforeseen circumstances.

4. The ongoing work by Bert VK3TU and Peter VK3WK with improvements to the GARC repeater chain.

Finally a list of actions that the new committee should consider in the promotion of RADIO at the GARC.

# The Good, the Bad and the Ugly, chasing 122.5 GHz distance records

Noel Higgins VK3NH



Photo 1: VK3CV at the Cerberus car park, pointing to Sandringham Yacht club.

The title above is not to do with appearances I hope. Andrew Anderson (VK3CV/WQ1S) and I have been friends both professionally and in amateur radio for many years. The answer to the question "Why the hell 122.5 GHz?" "Because we can!" Back in the 1980s we set up VK3RSE (along with Glenn Percy VK3PE) as a privately sponsored repeater. I sourced the transmitter and receiver, Andrew supplied the controller and identification box and Glenn provided the diplexer. The

"RSE group" (with no committee) has been meeting for many years and works well, thanks to Jack Bramham VK3WWW who arranges meetings fifth Friday in the month at Mountain View Hotel.

In the 122.5 GHz endeavours, I am one of the helpers along with Karl Harbeck VK3LN, in fulfilling this project started by Andrew, VK3CV in November 2018. In a quest to develop and learn about ever higher frequency radio systems, he researched the issues for this band and successfully re-purposed

a product made for vehicle radar systems to his application. Andrew will be making the design details et cetera, available to all and that will be the subject of a separate article. Some technical points however are noted here so you can appreciate the challenges involved. The transmitter powers are around -3dBm (0.5mW). Communication relies on both systems mixing their carriers and the frequency offset between the two units provides an IF frequency which is then demodulated by separate receiver. The re-purposed Foxtel dishes provide around 50dB gain each and have a beam width of 0.3 degrees (in both planes) so Andrew fitted 25x50 rifle scopes to help aim accurately enough. (GOOD) He also built a portable unit which is just the feed head with a low gain horn and no dish. He then optimised the scope and dish setup initial line ups to the portable unit on a 25 metre test site.

Andrew and Karl did the first attempts at Sandringham and proved it worked, with records obtained on 11/2/19 for VK3CV VK3LN of Home/portable 2.8 km, mobile 0.4 km and digital mode 0.1 km.

Andrew then involved me in his adventure and during testing we set a record at Sandringham on 3/4/19 for mobile to fixed using wideband FM. (GOOD) However when using the fixed to fixed equipment over 2.8km distance at Sandringham, we both noticed aiming inaccuracies. (REALLY BAD)

Andrew then realised that far field formed about 400 metres away and so he had to go and set up the beacon at a new location and realign the system at distance.





Photo 2: The Portable / Mobile / Beacon System.

For the next trials, I nominated what has become our easy to access test site in Endeavour Hills near Churchill Park, which is 1.6 km in length between two points down the centre of the 250KV power lines. We can park at each end at any time of the day or night and see each other, or our lights, with no path obstructions.

Here we set the VK3 and National digital modes record on 22/3/19 **AND THEN MORE FUN BEGAN.**

Andrew drives a Tesla X 70D (a "GOOD" environmentally friendly vehicle) and I, being a long time

Holden fan decided to scratch an itch and purchase a second hand 2016 HSV Senator Signature 6.2 litre supercharged V8 which in my view, is not at all UGLY and is lots of fun but CAN have BAD fuel economy. Since it was in Canberra, Andrew offered to drive me there with the dual purpose of us attempting to get some records in multiple states, noting that we are not the only ones doing that.

We left for Canberra on Wednesday April 10th. Andrew asked his Tesla to calculate the route to Canberra and it displayed the suggested route, adding in

details of necessary charge point locations, waiting times and overall travel time. VERY GOOD! It was great weather travelling up and the charge point breaks, about three hours apart, were useful for us as well to have a drink and a snack and stretch our legs. On the way through NSW, we looked for possible locations to use in our tests.

We arrived in Canberra and I finalised the purchase of the car and arranged a permit to drive it back to Melbourne the following day. That night after checking into accommodation and having



Photo 3: Night time Digital record 1.6 km range.

dinner, Andrew took me with one set of equipment up to the top of Mt Ainsley and then went down to a point on the side of road near old Parliament House. I could easily see Andrew but we could not communicate as my cheap Chinese handheld could not handle all the RF nearby. (BAD) Instead we used our mobile phones to coordinate when testing started in order to minimise the time stopped beside the road. I used a flashing high power LED torch with an orange cone on it, to give Andrew my exact location on the hill. At just over 4 km the contact on wideband FM was 5/9 both ways. (VK1 record 10/4/19 4.0 km.) I then answered the questions of a number of curious young scouts and the group leaders of the two groups who had descended on the location and had been running around during our record attempt. After all, a tripod mounted dish with a rifle sight on it plus the wires, GPS and VHF radio hanging off it plus a flashing orange light looks a bit weird. But at least I wasn't wearing my tin foil hat THIS TIME.

The equipment setup at my location and on the right Andrews location in front of the old Parliament

We picked up my HSV and left Canberra around 09:00am. Driving back in the car without plates in tandem with Andrew, I thought might attract attention and get ugly, but that proved no problem.

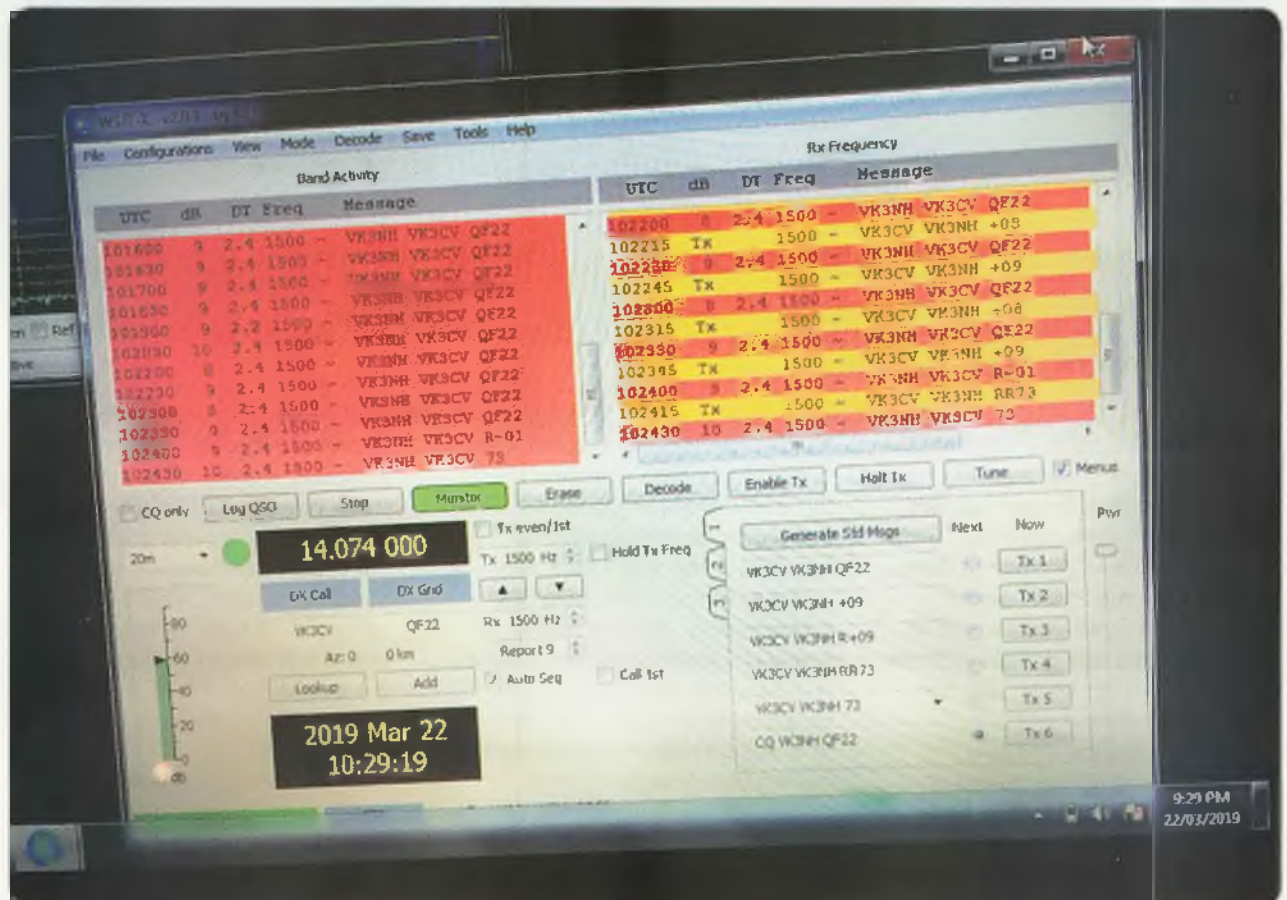


Photo 4: Digital screen data log.

What did attract attention was when we stopped just across the border in NSW to do a quick "short" VK2 record. (VK3CV/2 VK3NH/2, 11/04/19 0.8 km.) The contact was not as easy as anticipated and we ended up using Morse code one way as my microphone connection failed. A car with a trailer behind it pulled up and we thought it might be a farmer, but it was Andrew Davis VK2UH (VK1DA) a friend of some of the others competing on this band, who noticed the dish setup and was curious.



Photo 5: Canberra equipment on Mt Ainslie.

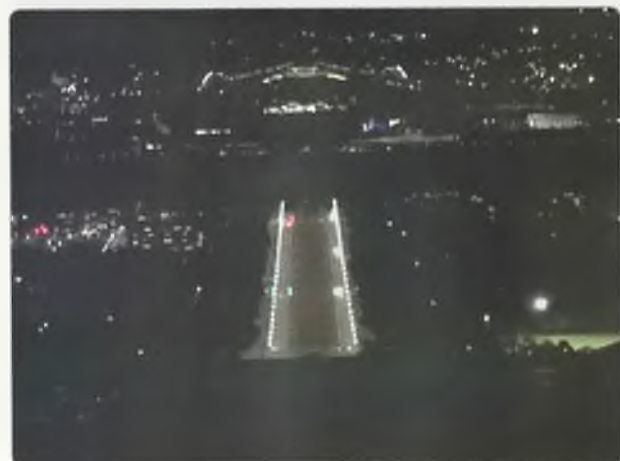


Photo 6: Canberra Parliament house view.



Photo 7: Andrew VK3CV at NSW record location.



Photo 8: VK2UH and VK3NH after we packed up.

The rest of the trip was a glorious drive and uneventful. On the way home at 110 km/hr, I even managed economy 9.4 litre/100 km over a 100 km distance which I have not been able to do since.

On May 4<sup>th</sup> Andrew displayed his equipment to the VK3 home brewers group and gave a brief talk noting

the design details and some phase noise limitations in the system. In mid-May we did a preliminary test from Sky high restaurant on Mt Dandenong to Kangaroo ground but I had no luck at all seeing where to aim, but then Andrew had some inspiration on how to improve the design to greatly reduce the phase noise. This also meant dropping back from a wide band FM modulation with the I.F. in the FM broadcast band to a 144 MHz I.F. narrow band FM or pseudo CW (actually FSK) monitored on SSB. Andrew used Yaesu FT-817 multiband radios minus microphones for this purpose.

We scheduled a test from Mt Dandenong again. I arrived and set up at 10:00 am on the observation balcony at Sky High but then realised I was missing the GPS unit. (BAD) We still tried to do a contact but no luck. I did a sweep running beacon mode in the direction of Kangaroo ground and Andrew thought he could hear me about 8kHz low in frequency and directed my efforts via simplex on 2 metres but from my end I ended up pointing at trees. So I did a quick trip home to get the GPS and we resumed tests around 11:45 am.



Photo 10: 435 MHz loop antenna fitted over waveguide feed.



Photo 9: VK3NH at one end of 1.6 km test range.

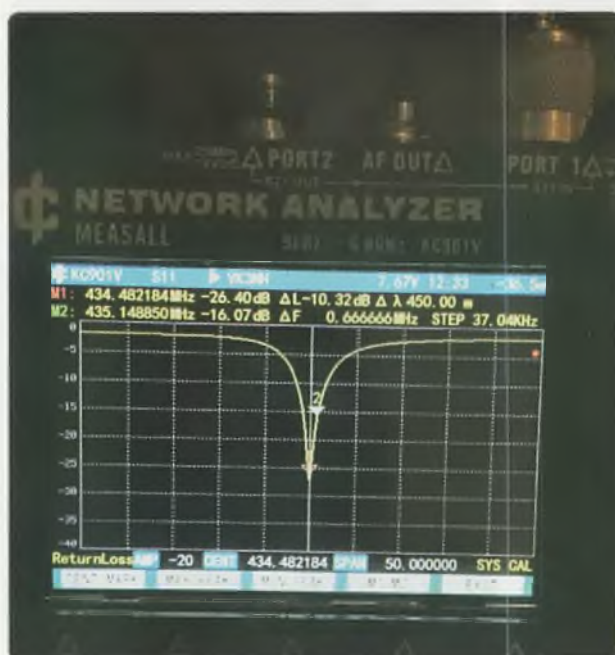


Photo 11: KC901V 435 MHz loop return loss plot.

Shortly after, I noted that the PLL lock indicator was red indicating my unit had failed for some reason. (REALLY BAD) So we packed up

and went back to my house and Andrew collected the equipment. He found that one of the battery cells in my unit had gone faulty

reducing a five hour operating time to less than an hour and he then repaired and tested both systems. Andrew also now thinks what he



Photo 12: The location on Pretty Sally that was used for the 122.5 GHz band, 59.6 km record.



Photo 13: From Pretty Sally looking at Sky High restaurant on Mt Dandenong through the scope.

heard at Kangaroo ground were emissions from his portable unit which was accidentally left switched on in his car. (Thank you for your help Mr Murphy.)

So back to the drawing board with some more planning of how best to set the equipment up and locate and sight Kangaroo ground from Mount Dandenong. On Monday June 3 we scheduled our next test run with a system test at the 1.6km test site on a Wednesday for me to get familiarity with driving both the updated system and trying to practice a Morse code contact using the press button switch on the side of the transmitter box. The conditions started bad as it was a cold day and then got just plain ugly, as at my end misty rain started to soak both myself and the equipment.

Andrew on the peak of the hill at the high side of the range had to contend with a brisk wind moving the dish. None the less we proved out the alignment and dish to dish symmetry in performance

and established the gain margins, by using a HP stepped attenuator combination in the I.F. path. (GOOD)

Yours truly at the bottom of the "test range" and Andrew's location at the top (over my car roof)

For alignment, we thought of using 435 MHz feeds on the dishes and I built up two UGLY 435 MHz loops set at 45 degrees to offset the null and overlay the wave guide feed at the dish focal point.

On Monday 26 June, it was a cold but we trialled the new "alignment" system at our 1.6 km "test site" I used my KC901V as a signal generator to give Andrew a 435 MHz carrier to DF too. It was a dismal failure, beamwidth way too wide, probably not helped at that frequency by the effects of the parallel runs of towers and power lines running each side of the test range. (BAD) Nonetheless, throwing the loop antenna additions aside, we decided to try for a long distance contact again, so we packed up the gear and proceeded to our respective locations.

It was a beautiful day and the clouds and mist had cleared by the time I arrived at Mt Dandenong around 11:00 am. (GOOD) We established our liaison communications through VK3RSE. To accurately point we had done some research. Using the website <http://www.heywhatsthat.com> I managed to get accurate details of the path between Mt Dandenong and Kangaroo Ground. The path length is 19 km and from Mt Dandenong the bearing is 324 degrees and the angle of declination 1.24 degrees. Andrew had purchased an inclinometer which I used to set the angle of downward tilt at thus make the contact search a scan in the horizontal plane rather than both horizontal and vertical. I initially set up the dish with tripod and equipment in the car park. I had to wait until Andrew got all his gear set up in a fire tower above his original location. The mobile phones compass application was generally inaccurate. To get a correct reading, Andrew suggested

I walk in a circle slowly twice then do the reading. Fairly soon we had made contact. Not ideal however, as I was pointing near some trees so I moved to a better spot in the car park and got further improvement.

Having the right declination angle of around 1.3 degrees worked perfectly as from my site Andrew was in the foreground with a number of ridges behind him and peaks in the distance. So now having clearly established the target, I moved up to the observation deck, but whilst I could see the location, no contact. (Bad) The view optically however was the best I had seen, with the city clearly visible and hardly any clouds. I looked down to the next level outside the café and saw that amongst the tables I could set up and see the same location though a gap in the trees, so I moved there.

I pointed at Andrew's location between the trees and success! (VERY GOOD) We achieved the contact and I could even make

out the tower that Andrew was in optically. Originally signals seemed to peak a little to the left of him and slightly down. But later I pointed directly at his location and that achieved the peak signal. Andrew was running the beacon at the time and we then had a Morse contact, alternatively then using VK3RSE from time to time to plan our next moves. Andrew used an attenuator on the IF frequency at his end to see what margin we had in the contact and it was over 30dB. So that meant the longer contact to Pretty Sally Hill near Wallan was on the cards, so Andrew packed up and drove there whilst I had a cup of tea and waited, answering questions from the local gardens manager, security staff and interested tourists.

View toward Kangaroo ground, through the trees and Andrew's location indicated by a red dot.

Andrew arrived at Pretty Sally and set up. Once we achieved contact we took turns at aiming to achieve the best signal. The signal varied slowly between S1 and S6

over a time of around 5 minutes. Whilst Andrew got his best signal pointing at me, I got the best result pointing lower in the foreground of his previous location at Kangaroo ground. When I pointed above that to where I could see he was located "visually" I had no signal. We achieved our contact at 1:20 pm using Morse code with a margin of what Andrew determined was about 10dB initially but peaking with QSB to 20dB. (EXTREMELY GOOD) **122.5 GHz VK3 & National record, VK3CV/3 VK3NH/3 24/6/19 59.6 km**

We were rapt to say the least and so decided to call it a day, pack up and return home.

Andrew has provided information on his design to others including some active amateurs overseas, plus there are later versions of the transmitter becoming available. Persistence pays and the results of our day's work plus some ideas since, make us believe this is just the start of our adventures.

# WIA Contest Champion Results - 2018

[www.wia.org.au/members/contests/contestchampion](http://www.wia.org.au/members/contests/contestchampion)

The WIA Contest Champion is awarded annually for the best combined effort in WIA Sponsored Contests. It recognises those who have participated in multiple WIA contests and submitted logs throughout the year. There were a total of 373 entrants during 2018, just 2 short of the record of 375 entrants in 2012.

The winner of the Peter Brown VK4PJ trophy for 2018 is Lawrie Mew VK5LJ with a record score of 660 points. Lawrie entered 7 out of the 9 eligible contests and won 1st place in all but 1 of the contests he entered. Congratulations to Lawrie, an amazing effort!

2nd place went to **Gerard Hill VK2IO** with a score of 420 points.

Year 2018												
Callsign	Name	Robb Hill	John Moyle	Harry Angel	RD Contest	Oceania Phone	Oceania CW	VHF UHF FD	Trans Tas	VK Shire	Total Score	
VK5LJ	LL Mew	0	100	100	100	50	100	0	100	100	660	
VK2IO	GA Hill	0	100	0	100	20	20	80	100	0	420	
VK2MT	RC McKnight	0	20	100	80	0	0	0	80	60	340	
VK4TS	Trent Sampson	80	100	0	60	48	0	0	60	0	328	
VK2AZ	Hilary Bridel	80	100	20	20	0	0	0	20	80	320	
VK4SN	Alan Shannon	60	60	20	60	0	60	0	60	0	320	
VK5GR	Grant Willis	0	80	80	60	48	0	0	48	0	296	
VK2PR	Peter Richardson	0	100	80	48	36	0	0	0	0	264	
VK4NEF	Eric Fittack	0	0	0	60	48	0	60	80	0	228	
VK4QH	Kenneth Bowden	0	0	0	0	100	0	0	100	20	220	

3rd place went to **Rob McKnight VK2MT** with a score of 340 points.

4th place was **Trent Sampson VK4TS** with a score of 328 points.

Equal 5th place was **Hilary Bridel VK2AZ** (who was the 2017 trophy winner) and **Alan Shannon**

**VK4SN**, both with scores of 320 points each.

Top 10 results are shown in the list below and full results can be viewed at [www.wia.org.au/members/contests/contestchampion](http://www.wia.org.au/members/contests/contestchampion)

# Build a 50 ohm oblong loop for 144 MHz SSB or WSPR

Peter Parker VK3YE

Some might think that an antenna that is taller than it is wider would be vertically polarised. Not this one! The Oblong Loop is a slim horizontally polarised loop that can be fed directly with 50 ohm coaxial cable. It's bidirectional with one or two dB gain over a half wavelength dipole.

This loop is light enough to be supported on a squid pole. Lightness allows height which can give it an edge over larger but lower antennas. And its bidirectional pattern halves the number of directions you need to try if doing WSPR tests with stations all around you.

Why wouldn't you build a square loop? The main reason is its awkward impedance. A square loop has a 100 to 120 ohm feedpoint impedance. That requires you to make a quarter wavelength matching transformer from 75 ohm coaxial cable to get it down to 50 ohm.

A rectangular loop like this is already 50 ohm so can be directly fed without a matching section. Another benefit, if you're mounting it on a flexible fishing pole, is mechanical. At one-sixth of a wavelength, rectangular loop is only one third the width of a half wavelength dipole. It's tied to the pole at the top (which is thin) as well as lower down where the pole is thicker. Both the reduced width and extra tie-off point make the loop more stable than a horizontal dipole.

You won't be the biggest signal on the band with it. But the oblong loop is very cheap, uses just wire and timber dowelling and is quick to adjust and build. It could be mounted on a pole or hung from a tree. This makes it an ideal portable

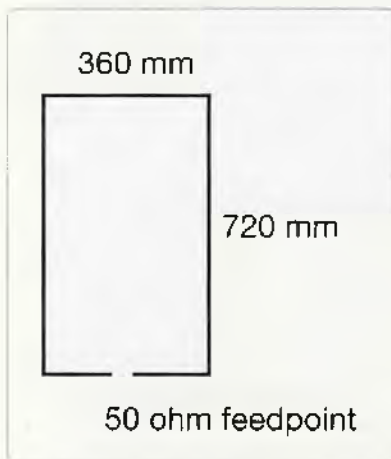


Photo 1: Oblong loop diagram.

or field day antenna for 2m SSB or weak signal digital modes. If you operate portable and already carry a multimode transceiver and squid pole then packing this loop to give 2 m SSB capability won't be much of an extra burden.



Photo 2: Oblong loop.

## Construction

Gather the parts. Less than a metre of 9mm diameter dowel and just over two metres of thick plastic covered stranded wire is all that's needed. I used wire about 3mm outside diameter, although you could probably use something thinner, such as from an old mains extension cable.

Cut the dowel into two lengths about 460mm long. Drill two holes, slightly larger than the wire diameter, about 50mm from the end of each dowel so that they are spaced 360 mm apart. You might drill centre and/or end holes in the top dowel for support strings.

Start with a little over 2.2m of wire. At over a wavelength that is longer than you need. But it's better to start long and cut it short than have to add joins later.

Thread the wire through the holes in the dowel so it forms a narrow U. Bend the ends of the open sides of the U in so they almost meet. Solder these to a BNC coaxial socket or directly to the 50 ohm cable to the transceiver.

## Testing

With a VSWR meter connected in line, or using your transceiver's internal indicator, transmit at low power on various frequencies from just above 144 to just below 148 MHz. Your aim is to get close to 1:1 in the 144 – 145 MHz region.

Note VSWR readings at various frequencies while holding the antenna in the clear. Because the length specified is too long the VSWR should be higher near 148 MHz than near 144 MHz. Snip off bits of the wire (less as you get nearer the desired centre frequency) and measure each time to see



the VSWR come down. Each time realign the dowel spacers to form an even oblong.

I ended up with a total wire length of 2160 mm, ie a loop 360mm wide and 720mm high. That's one-sixth by one-third wavelength, for a total one wavelength perimeter, just like a quad or delta loop. Yours might be nearer to 710 or 730mm in height, especially if its wire is a different thickness.

## Results

I tested this antenna with 5 watts of 144 MHz WSPR during a winter's day. It was positioned about five metres high on a telescopic pole overlooking a beach. There was some enhancement with my signal decoded by stations up to nearly 700km distant. Reports received on SSB were also encouraging.

Either build the lightweight portable antenna described here or

make a heavier version for home. This would make a good 'listening around' antenna for when you don't need sharp directivity or high gain. It's a good starter antenna for 2m SSB or digital modes. Or you could scale up for 6 or 10m. With few materials required and quick construction you can't go wrong!



## Its on again!! Yarra Valley Amateur Radio Group VK3 Hamfest 2019

Sunday 13<sup>th</sup> October 2019  
10am to 2pm at the  
Gary Cooper Pavilion, 16 Anzac Av. Yarra Glen. Melway 274 K 1  
Entry \$7.00

Open to traders from 8.30am.  
Call in on VK3RYV the Yarra Valley  
Repeater 146.725MHz  
Ample Parking.  
BBQ, light refreshments available.  
Free tea and coffee.

Table Hire \$15.00

For table bookings and further information contact :  
Craig - vk3war@gmail.com (0409 448 510) or  
Col - vk3cnw@wingersoftware.com (0423 535 988)

Yarra Valley Amateur Radio Group. VK3YVG. PO Box 346 Healesville Vic 3777. [www.yvarg.org.au](http://www.yvarg.org.au)

## Silent Key

Doug McEachern VK2DKM

It is with regret that the Fisher's Ghost Amateur Radio Club advise of the passing of their friend and fellow club member Doug McEachern VK2DKM, on the 14th of July 2019, aged 73 years, following a brief illness.

Doug was a regular on the club's weekly Thursday night net; he was always first to call in when the net started and always had plenty to contribute. He also occasionally ran the net when the regular net controller was unavailable.

Doug joined the Fisher's Ghost Amateur Radio Club in 2013 and most recently he served on the committee



in 2017. It was rare for him to miss a meeting or an important club event, and he was also keen to attend social events with his friends from the club, including BBQ's, and 10-pin bowling where he would call himself "The Gutter-Ball King".

Doug was a colourful chap and almost always wore Hawaiian style shirts as seen in his photo.

Vale Doug McEachern VK2DKM

Submitted by Peter VK2PR on behalf of the Fisher's Ghost Amateur Radio Club

# International Lighthouse Lightship Weekend 17-19 August 2019

Mike VK4MIK and Bob VK4BOB

## VK4GHL – Grassy Hill Lighthouse Cooktown AU0019 - Tableland Radio Group TRG

The Tablelands Radio Group once again set up at the Grassy Hill Lighthouse above Cooktown for the 15<sup>th</sup> consecutive year with Bob, VK4BOB, Jamie VK2YCJ, Dennis VK4JDJ, Eoin VK4CCI, Tarsi and Mike VK4MIK. Tarsi flew in from PNG. We had support from Dave ex VK4FUJ and Pat VK4MUY and Jean and Marge from the Cooktown Historical Society.

The Cook Shire Mayor, Mr Peter Scott, once again supported our operation and the Council gave us formal permission to operate from Grassy Hill which is a major tourist attraction with great views over the town and all around. Grassy Hill was climbed by Leut James Cook RN whilst his vessel HM Barque

Endeavour was undergoing repairs on the bank of the Endeavour River during 17 June to 4 August 1770, and was where he recorded seeing his first kangaroo. When the Federal Government de-commissioned the lighthouse and wanted to remove it, fortunately the locals recognised its historical importance. The Cooktown Council purchased the small building and restored it as a monument and tourist site.

The pergola, battery, solar panel, mast and antenna were set up with the operating equipment being an Icom IC-7300 transceiver and a MAT-tuner auto tuner. The mast was on its first outing, Bob's experiment of using two aluminium pool poles end on to give a height of about 9 metres mounted in a speaker tripod, holding up a 40 metre OCF worked well but a set of guys at the top will be used next time to prevent

the inevitable bowing under load. This antenna was erected almost directly above the solar panel and battery, picking up lots of controller noise until ferrite clip-ons were employed on all the leads. A four-band Ripplettech TZ-V-4 vertical was attached to a star picket with just two radials laid along the ground and generally gave better performance on 40m than the OCF.

Band conditions were not going to be great so we were pleasantly surprised that we had contacts into all Australian States except VK8 – where we were hoping to contact the Famous Todd River Lighthouse. Contact was also made with several New Zealand and one Malaysian lighthouses plus USA, Japanese and Solomon Islands stations. Power out was 100 watts daytime but the night-time QSOs saw our power drop to 80 watts as our



Photo 1: The view out to the west - Cooktown is below us.

battery oomph gradually depleted.

We had reasonable weather at our site and not the usual strong winds and it was regularly commented upon by many at the other lighthouse stations where our efforts in staying intact were recognized. We are on our 3<sup>rd</sup> pergola after the previous 2 were eventually blown beyond repair due to wind damage over the years.

We had quite a lot of visitors and they were impressed with the aims of the event plus the fact that our team would be on site for a couple of days, and night. Our location is a favourite with the tourists to watch the sunset way out in the distance with Cooktown and the winding Endeavour River laid out below us. Jean, a member of the Cooktown Historical Society, baked us a very nice fruit cake which was much appreciated whilst Marge took photos for an article in the local newspaper.

This Amateur Radio International event is very good PR for Amateur Radio as it ties our Hobby into the Historical Lighthouses and the public get to see Amateur Radio in operation in the International Event with over 400 other similar clubs, groups and Individuals. Thanks must go to Kevin the organiser of the worldwide event, for many

years, and the many others who assist him or take part – in all manner of weather.

Lighthouse stations worked were:

- VK2BV Macquarie Lighthouse AU0022 on 20M
- VK2EP Smoky Cape Lighthouse AU0031 on 40M
- VK2MB Barrenjoey Lighthouse AU0046 on 40M
- VK2CLR Clarence Head Lighthouse AU0013 on 20M
- VK2FRE Crowdy Head Lighthouse AU0044 on 20M
- VK2JCC on a PRC30W Clansman on his climb to Barrenjoey Lighthouse on 20M
- VK3CSH Cape Schanck Lighthouse AU0012 on 20M
- VK3DX Whaler's Bluff Lighthouse AU0117 on 20M
- VK4CQR Sea Hill Lighthouse AU0060 on 20M
- VK5BWR Lowly Point Lighthouse AU0021 on 40M
- VK6CLL Cape Leeuwin Lighthouse AU0008 on 20M
- VK7NET Table Cape Lighthouse AU0039 on 20M
- ZL1AB Tiritiri Metangi Lighthouse NZ0021 on 40M

ZL2X Pencarrow Lighthouse NZ 0012 on 20M

ZL6CC Cape Campbell Lighthouse NZ0001 on 40M

9M4LHJ Bukit Segenting Lighthouse MY0008 on 40M.

Many RD Contest stations were worked along with H44MS, JA5BIN, AF6TC and NR6Q all on 40M.

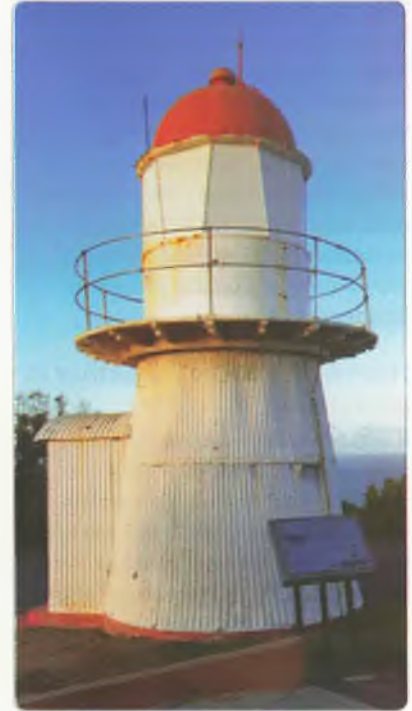


Photo 3: The lighthouse.



Photo 2: Even the sign banner was getting blown.



# VHF/UHF - An Expanding World

David K Minchin VK5KK

## Introduction

This month we have a special report on web resources for atmospheric path loss predictions along with details of more 76 and 122 GHz VK distance records that have been extended. Also we have some information on the upcoming release of a new ICOM all band portable IC-705 as well as Kevin VK4UH's ever popular Meteor Scatter notes.

## Having the RIGHT weather is everything!

If you have ever worked or attempted to work over any distance past line of sight on the VHF and above bands you will know that it is all about the weather. And depending on what weather factor you are attempting to utilise (or avoid) the access current weather information is important. Luckily our

reliance on specific meteorological services is not too different to many other commercial and private requirements so a great deal of data is now available. The challenge then is how to quickly translate this data into a format that then relates to what we are trying to achieve.

The William Hepburn's "Tropospheric Ducting Forecast" is a good example where weather data is used to predict boundary ducting enhancement of VHF/UHF and SHF signals. The analysis is based on mapping areas in modelled lower atmosphere conditions that show known enhancement factors. Atmospheric modelling is based on data is collected from fixed weather stations and vertical sounding balloons launched twice daily from major airports and daily from some regional airports. There are also a number of vertical sounding

stations providing data in specific areas. Upper atmosphere data is collated globally by the University of Wyoming, the information and analysis is well worth looking at if you want to look beyond what is available on the Hepburn site. Go to <http://weather.uwyo.edu/upperair/sounding.html>

As we go higher in frequency the Hepburn analysis is still relevant but more usually we are more concerned about area specific factors. If you are operating close to a major airport then analysing actual balloon vertical sounding data can be more useful. Australian balloon atmospheric sounding data can be easily accessed from this site set up by Mark Newton in 2001 for the Gliding community. Go to <http://slash.dotat.org/cgi-bin/atmos>

Alternatively, you can view balloon data in real time in some



Photo 1: Habhub website showing Weather Balloon tracking.

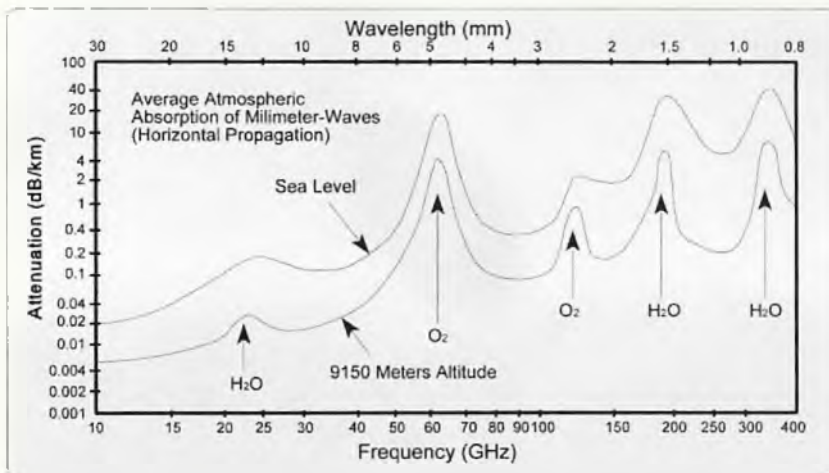


Photo 2: Average atmospheric absorption rates (db) for 10 to 400 GHz.

areas where it is being received (on 400 MHz) and uploaded by amateurs using software developed by Mark VK5QI. Data is uploaded to the Habhub website in the UK that can be found here <https://tracker.habhub.org/> To find local information simply navigate to your area on the map to see if someone is locally uploading data. Each receiving station uploads every 30 seconds however when multiple stations are uploading data is updated a much quicker rate so you will see quite detailed temperature

profiles for each launch. The data can also be accessed after it is uploaded by sliding your mouse pointer along the track of the balloon.

One step further, you can set up your own weather balloon receiving station using a \$25 RTL-SDR dongle and a Raspberry Pi or similar small format PC. In normal operation the Raspberry Pi is setup to run 24/7 uploading however you can also output the balloon data (sent every second) to a local screen or text file for more detailed analysis of low

level temperature inversions, etc. To download software and/or find out more details on how to set up your own station go to [https://github.com/projecthorus/radiosonde\\_auto\\_rx/wiki](https://github.com/projecthorus/radiosonde_auto_rx/wiki)

All of the above is mostly relevant for operation up to 10 GHz, above that band the impact of the atmosphere has on propagation is more one of degradation than an enhancement. Whilst local area ducting does occur up to 76 GHz, water vapour and oxygen absorption are more significant limiting factors that can more than negate any enhancement. The first resonant frequency of a water molecule is just below 24 GHz hence path loss is significantly higher than 10 GHz. Similarly, the bond between two Oxygen molecules resonates around 59 GHz. The combined impact of these factors are visualised in the graph showing average atmospheric absorption from 10 to 400 GHz at sea level (and Mt Everest!). Whilst oxygen attenuation varies only 5 – 10% according to air pressure, the amount of water can vary significantly. Dew point is a good

ACT NSW VIC QLD SA WA TAS NT INFO by VK5ZD

Atmospheric Gas Attenuation - ITU Rec 676-11 ..... db/100km

Station	Date Time	Temp	RH %	AH g/m3	Dew Point	Wind Direction	Speed kph	Gust kph	Barometer mB	Rainfall Since 9am	24GHz	47GHz	76GHz	122GHz	134GHz	241GHz
<a href="#">Alva Beach</a>	04 13:30	25.7	28	6.7	5.8	↘	13	15	1016.8	0	15.1	20.3	26.2	73.6	64.2	220
<a href="#">Amberley</a>	04 13:30	32.8	9	3.17	-4.2	↑	15	22	1012.2	0	7.6	14.8	16.2	41.6	27	89.5
<a href="#">Archerfield</a>	04 13:30	33.2	10	3.6	-2.5	↗	22	39	1011.9	0	8.5	15.1	17.2	44.4	30.5	101.9
<a href="#">Avr</a>	04 13:30	29.7	9	2.69	-6.5	↘	15	28	1013.1	0	6.7	14.7	15.6	39.9	23.9	78.2
<a href="#">Ballara</a>	04 13:30	32.8	4	1.41	-14.5	↘	20	33	1015.3	0	4.1	13.1	12	30.3	12.8	39.3
<a href="#">Barcaldine</a>	04 09:00	22.9	28	5.72	3.5	•	0		1013.1	0	13.2	19.5	25.9	67.3	55.7	189.9
<a href="#">Beadesert Aws</a>	04 13:30	32.5	11	3.81	-1.7	→	15	30	1011.9	0	9	15.5	17.9	46.2	32.5	109.1
<a href="#">Bedoune</a>	04 09:00	20.3	19	3.34	-3.7	↙	2		1018.4	0	8.3	17.2	19.4	49.9	33.1	109.8
<a href="#">Beerburum</a>	04 13:30	32.6	9	3.14	-4.3	↗	15	28	1013.1	0	7.6	14.8	16.2	41.6	26.8	88.9
<a href="#">Bilcoo</a>	04 13:30	31.3	7	2.28	-8.6	↙	11	20	1015.3	0	5.9	14.1	14.3	36.5	20.1	64.9
<a href="#">Birdsville</a>	04 13:30	33.3	6	2.17	-9.1	↓	26	46	1014.7	0	5.6	13.7	13.7	34.9	18.7	60.3
<a href="#">Blackall</a>	04 13:30	31.9	5	1.68	-12.4	↓	17	24	1016	0	4.6	13.5	12.8	32.4	15.1	47.3
<a href="#">Blackwater Airport</a>	04 13:30	31.6	7	2.31	-6.3	↙	11	17	1015.8	0	5.9	14.1	14.4	36.6	20.3	65.5
<a href="#">Bollon</a>	04 09:00	21.5	60	11.31	13.4	↘	2		1019.2	0	24.9	28.2	46.7	122.9	123.6	427.5
<a href="#">Bowen Airport Aws</a>	03 21:00	15.7	76	10.17	11.5	•	0	0	1018.3	0	22.8	28.1	45.4	119.4	117.3	404.7
<a href="#">Brisbane</a>	04 13:30	32.9	9	3.19	-4.1	↗	13	28	1012.1	0	7.7	14.8	16.2	41.7	27.1	90

Photo 3: Iain VK5ZD's mmWave atmospheric path loss prediction website.



Photo 4: Andrew VK3CV's 122 GHz Station at Mt. Dandenong.

indicator however it is the actual amount of water (Absolute Humidity measured in grams/m<sup>3</sup>) that determines path loss.

Accurately relating this to path loss on the fly is not simple so in an effort to provide real time information, Iain VK5ZD has created a website to display the calculated path loss for 24, 47, 76, 134 and 241 GHz. The website can be found here <http://weather.vk5microwave.net/Weather.aspx?State=H>

The data provided is per 100 km but can be scaled for any distance by linear scaling i.e. half the distance = half the path loss, etc. For convenience there are Red and Green indicators in the AH g/m<sup>3</sup> column. Green is triggered for readings for reading of 3.5 g/m<sup>3</sup> and under when conditions are best for 76 or 122 GHz. Red is for readings over 7.5 g/m<sup>3</sup>. Just how these losses play out can be seen

in the screenshot for QLD. On this day, Brisbane shows a very low 3.19 g/m<sup>3</sup> which translates to a path loss of 41.7 db per 100 km on 122 GHz. In comparison, up the coast at Bowen on a humid day the AH = 10.17 g/m<sup>3</sup> translating to 119.4 db loss. The extra 77 db path loss is more than a deal breaker!

From Iain VK5ZD "The site is designed for mmWave operators and shows the expected atmospheric attenuation (db/100km) on the amateur allocations from 24 GHz upwards.

*Note: These figures are in addition to the normal free space path loss which you will need to determine for the path you are using. The atmospheric loss figures shown here are directly proportional to the distance. I.e. half the distance, half the loss.*

*The attenuation figures are calculated using the*

*method described in Annex 1 of 'Recommendation ITU-R P676-11 (09/2016) Attenuation by atmospheric gases'. You can get a copy from here [https://www.itu.int/dms\\_pubrec/itu-r/rec/p/R-REC-P.676-11-201609-!!!PDF-E.pdf](https://www.itu.int/dms_pubrec/itu-r/rec/p/R-REC-P.676-11-201609-!!!PDF-E.pdf)*

*The site obtains weather observations from the Bureau of Meteorology web site. I use a Windows service to read the weather observation pages for each state and then pick the data out of the html. This is then written to a SQL Server database which is used as the data source for the web site.*

*The Bureau provides the temperature, relative humidity, dew point, wind speed/direction, barometric pressure and rainfall. Not all sites provide barometric pressure data. In these cases, a standard pressure of 1013.1 is used for the loss calculations (shown in italics on the web page). The Absolute*

*Humidity is calculated from the temperature and relative humidity. More information can be found here [http://www.vk5microwave.net/Humidity\\_Conversion\\_Formulas\\_B210973EN-F.pdf](http://www.vk5microwave.net/Humidity_Conversion_Formulas_B210973EN-F.pdf)*

The total path loss prediction is then a combination the figure from Iain's website plus the free space loss for a path. Free space loss is fairly easy to calculate when the distance and each station's antenna gain are both known. The loss increases as the square of the distance between two stations. It is simply the change of surface area of a sphere radiating from one end, i.e. doubling the distance adds 6 db of free space path loss. The formulae to work this out is long-hand complex however an online calculator can be found here <https://www.everythingrf.com/rf-calculators/free-space-path-loss-calculator>

As an exercise, let's use the current VK 122 GHz record distance (70km) and work out the total path loss. The record was in the Brisbane area so using the screenshot example data the water/oxygen would be  $41.7 \text{ db} \times 0.7 = 29.2\text{db}$ . The free space path loss between the two 122 GHz stations, each with 50 db gain antennae, is 71 db according to the online calculator. Total path loss is therefore  $71 + 29.2 \text{ db} = 100.2 \text{ db}$ .

As the data on Iain's website is from only from a single point, the actual loss will vary according to the conditions along the path. The rapid and sometimes deep QSB that occurs on signals at mmWaves is more often than not a patch of damp air rising from vegetation or going across a path. Still, it will give you some data so you get an idea of the expected signals if you know your power output and noise figure. For 122 GHz, that may be an even bigger guessimate!

## **76 GHz and 122 GHz Australian Records crumble again!!**

In what is making the space race look like a side show, 76 GHz and

122 GHz is in the news again.

Andrew VK3CV provides some more information on his 59 km record; the last section gives some more perspective of the challenges faced with weather. *"We started the day (mid morning) at a much less ambitious distance of 19km from Mount Dandenong to the memorial tower in Kangaroo Ground with the two 50dB gain dish systems and had signals at 30dB plus above the noise.*

*As the weather forecast was for dropping barometric pressure, dropping humidity and dropping temperatures, we decided to try to push it out further. The Higher location at Mt Dandenong has significant tree cover and we had previously tried the 19km path twice and failed which was puzzling at the time. This failure was found to be due to dish pointing errors and local foliage blockage at Mt D which we solved with an accurate digital elevation inclinometer. This was just common sense elimination of every possible variable. Once we got it all pointing in the right places it worked beautifully as expected and as the numbers suggested it would.*

*The 59km DX locations were Mount Dandenong at 620m elevation, Dew point - 9C, and near Pretty Sally Hill at 480m elevation and Dew point -8C. Sea level barometric pressure was falling and around 1010mB, Humidity was also falling, Sun with high cloud. There was a cold front approaching from the West but winds were only around 10Kmh. We made the contact using CW with a signal strength peaking up to around 20dB above the noise, FM would have been possible at the peaks in signal but we didn't try, the slowish QSB was taking the signal right down below the noise. My partner in crime Noel, VK3NH reported that there seemed to be some sort of diffraction effect at his end (Mt D), his optical sight was pointing slightly lower (approx 0.2 Deg) than we had expected to get peak signal. Mine end was pretty much dead on.*

*Noel also noticed some other variable loss effect from what we think is evaporation from trees close to below the path at his end, by moving his location slightly to point through sideways gaps in foliage rather than significantly above foliage gave a better result."*

There is keen interest in the Silicon Radar 122 GHz chips. Andrew's 122 GHz transceiver (using the 002 variant) will be published in Dubus 3/2019. This should be out by the time you read this. More on the subject in the next column!

**Meantime, the weather has been favourably dry in the Brisbane area with extensions to the existing records made.** Stefan VK4CSD and Roland VK4FB have set a new national distance record on the 76 GHz band on 18/7/2019, distance = 170.1 km. On 24/7/2019 they also set a record on the 122 GHz band, distance = 69.6 km. The digital record for 122 GHz was also extended on 11/08/2019 to 92.1km. Of note the dew point on these days was in the region of -6 to -9 deg C!

## **IC-705 – SDR for mountain tops?**

Since becoming available almost six months ago, the Icom IC-9700 has been the centre of conversation amongst the general VHF/UHF community. Despite some initial shortcomings around the ability to externally lock the transceiver it is probably safe to say that the transceiver has stamped its mark on the "Home station" side of operations. Equally for field use the transceiver is quite usable for field operation and with a little bit of effort (interfacing) it can be used for driving microwave transverters. The ability to reliably set the power level below 5 watts and not have to worry about any significant overshoot from the 100W PA is an improvement over all other transceivers to date. The 0 to 100% scale is not quite linear but typically the IC-9700 outputs 0.5W on the 1% and 2.5W on the 4% settings on 432 MHz.



Photo 5: ICOM IC-705 prototype at the Tokyo "Ham Fair 2019".

Power outputs are similar on 144 MHz. All that is required then is to interface the PTT to the transverter using your preferred method. In the case of + volts up the coax on TX, that can be a simple interface in-line with the IF cable.

So just when we thought we had seen it all, Icom has sprung a surprise at the Tokyo "Ham Fair 2019" on the 31<sup>st</sup> of August, 2019. A new portable HF + 50 + 144 + 432 MHz SDR Transceiver! This is something of a new area for Icom who have had limited offerings to date in the "all mode portable" area. The Yaesu FT817/ND has had this area cornered for the last 18 years. More recently the KX-3 has appeared although not with 144/432 MHz. The majority of FT817's and KX-3's are used for SOTA operation.

Details are still preliminary on the unit however it has been quoted to have a 10 Watt output using an external 12VDC supply (5 watts on the internal battery). The battery is a Lithium Icom ID-50 handheld battery pack that clips on the back so it can be easily changed. All modes including D-Star are available. It has a single receiver strip vs. the twin receivers in the IC-9700. Whilst it is an SDR it will only be direct sampling to 25 MHz. Above 25 MHz it is presumed that

it will use single conversion front ends. In comparison, the IC-9700 is direct sampling up to and including 430 MHz.

The IC-705 will have a built in GPS for location reporting with D-Star as well as GPS location logging of QSO's. It also has WiFi and Bluetooth connectivity with an Icom APP probably on the way. Despite its small size, it has the same size screen (4.3") as the IC-9700. No mention of the ability to lock to an external 10 MHz reference is made. That would be expecting too much of such a small unit wouldn't it?!

There has been some comment about the suitability of its brick shaped form factor that is about the same size and shape as a KX-3. Looking back the unique vertical form of IC-202, IC502 and IC402 received much the same comments in the 1970's. That did not stop them from becoming the mainstay of VHF/UHF operation for many years, some of which are still in use in Eastern Europe for driving transverters!

SOTA operators will no doubt buy these up by the container load however so will VHF and above operators as it will be equally useful as a microwave transverter IF. The transceiver is scheduled to be released March/April 2020. More

information as it comes to hand!

## New VK VHF/UHF Logger - VKSpotter

Last column I reported the new VKSpotter was now live at <https://vkspotter.com/> with some new features. Tim VK2XDX reports... "The person who should receive most of the recognition is Hilary Bridel, VK2AZ. Hilary is a web programmer by trade and is responsible for the bulk of the work that is vkspotter.com. I built the server that hosts the development and test site, code repository server and the bug & issue tracking services plus coded background tasks like daily database backups etc. The production service is hosted by Brendan Pratt VK4BLP.

As you can see, this is a team effort to bring the service to life. Bugs, Issues and Feature requests are tracked on our Kanban here... <https://tree.taiga.io/project/vk2xax-vkspotter/kanban>

Many others have contributed ideas and suggestions and we thank the user community for their feedback. Development of vkspotter.com is an ongoing task with many other features and enhancements to come."

## VK Microwave Operators Directory

The updated version of the list can be found online here <http://www.vk5microwave.net/VKMicrowaveOperators.pdf> If you aren't on the list or have information updates please email Iain VK5ZD at [iain@vk5zd.com](mailto:iain@vk5zd.com). It would be good to include any information on ZL operators as well as this will be most useful during summer DX!

## In closing

Feel free to drop me a line if you have something to report especially on VHF as we currently do not have a "VHF Editor"! It doesn't talk much to put a few lines together and helps spread the load. Just email me at [david@vk5kk.com](mailto:david@vk5kk.com)

73's

David VK5KK



# Meteor Scatter Report

Dr Kevin Johnston VK4UH

## THIS MONTH

Trans-Tasman Meteor Scatter, More on SH mode in MSK144, Report on SDA Meteor Shower, Forthcoming Meteor Showers, MS Activity session information.

## VK-ZL Meteor Scatter operation

Let's start this month with some discussions about Trans-Tasman MS operation. When I started out as coordinator of this column six or seven years ago, meteor scatter contacts were commonly reported during the summer peak seasons between stations in New Zealand and the southern VK call areas. Indeed, there were, at that time, dedicated (FSK441) activity sessions running on Saturday mornings to encourage Trans-Tasman MS operation. These sessions were run early, prior to the normal VK MS sessions, using FSK441 mode. From memory, all VK's ran first period and ZLs ran 2nd period on 144.330 MHz, the secondary focus frequency. For VK stations further north, MS QSOs across the ditch has always been problematic since all the major ZL population centres lay beyond the usual 2300 km distance limit (horizon) for "normal" meteor scatter propagation. This effective limit is determined by the geometry of the curvature of the earth itself and the 100km height of the E-layer, where the majority of meteor ablation occurs. At that critical distance signals had to be reflected from ionised meteor trails crossing exactly at right-angles to the midpoint of the path between the two stations and would be "horizon grazing" at both ends of that path. For meteor scatter propagation to go beyond that normal MS Horizon requires the assistance of another mode of propagation, including

Es or tropo-ducting at one or both ends of the path to fill in the gaps. In those intervening years, from here in VK4, I have only completed a small handful of MS contacts with ZL stations on 144 MHz, the most memorable being with Steve ZL1TPH/p at Cape Reinga at the most northern tip of North Island NZ. Even that contact required the presence of some tropo-ducting at one end of the path. I have yet to complete a 50 MHz MS QSO to ZL from here in QG62. I have not seen a report of a VK-ZL MS contact for some years. This is not to say that there is not MS activity in ZL, there is plenty, however from the recent posts it appears that ZL operation is now based around 144.260 or 144.360 MHz although now employing MSK144 mode. I was confused as to how or why this shift in focus frequency had occurred and posed this very question on various common forums. Over the last few years the VHF band-plans in both countries have been reviewed and updated. Meteor Scatter activity is almost unique in being focussed, with simultaneous transmission, on a single frequency. Even WSPR, JT65 and FT8 employ small variations around a central frequency. In VK the vast majority of meteor scatter operation occurs on 144.230 MHz and 50.230 MHz, the primary focus frequencies. There is a secondary focus frequency on 2 m 144.320 MHz used for special purposes including Special Event or DX-pedition stations, experimentation with new or incompatible digital modes or for

crossed period operation during normal activity sessions. The secondary 6m MS focus frequency in VK was lost in last band-plan update.

In the current WIA VK band-plans these focus frequencies correctly lay in the spectrum allocated for "DX digital modes" (144.220-144.240 MHz, 144.320-144.340 MHz and 50.220-50.240 MHz). In the corresponding notes on Narrow-Band Modes 50.230 and 144.230/144.330 MHz are specifically identified for "High Speed Meteor Scatter modes with bandwidth up to 3 KHz". In the current NZART band-plan these frequencies lie in the spectrum allocated "all-mode less than 16 KHz bandwidth" or "all-mode less than 6 KHz bandwidth". These frequencies are thus entirely compatible with Trans-Tasman MS operation under both band-plans. The recently reported MS activity in ZL, particularly on 144.260 MHz, however is not.

Under the current NZART band-plan the spectrum between 144.250 – 144.300 MHz is allocated for "Beacon Use" only, indeed the Hamilton beacon is licensed on 144.260 MHz. Under the WIA band-plan the spectrum 144.240 – 144.300 is designated as a "guard band" for the ZL beacons with all activity being severely discouraged in VK on these frequencies - for good reason.

It is hard to understand how have we come to this position? Clearly, it is easy to make a strong case for coordination of Meteor

Scatter frequencies and operation in both countries. This would encourage attempts at Meteor Scatter communication between our neighbouring countries and minimise the risk of any mutual interference. The strongest suggestion from this keyboard would be a "back to the future" scenario with the adoption, at least during the normal weekend MS activity sessions, of 144.320 MHz, the secondary MS frequency, for Trans-Tasman MS operation. ALL VK call-areas running FIRST period beaming East, ALL ZL stations running SECOND period beaming West with MSK144 mode and 15 second periods. The intention is also to forward this proposition to the NZART for publication in their journal.

In the previous column, some options were discussed for making use of the 'Sh' sub-mode within MSK144. The following was forwarded by Matt VK1MT including more in-depth observations, information and advice:-

"A full MSK144 frame can be decoded with as little as 72ms and 0dB SNR. Shorthand (Sh.)

Mode can be selected, which limits the reporting choices but will further reduce time required for a frame decode down to 20ms. This helps tremendously during poor conditions outside of official documented showers or on 2m and above.

The possible advantages of Sh mode include: -

Decoding of shorter duration meteor pings openings down to 20ms, Speeding-up of contacts during poor conditions, making use of smaller meteor fragments entering the atmosphere outside of documented showers, improving chances of making MS contacts throughout the entire year and opening opportunities for MS on higher bands.

Limitations of Sh mode include:- It cannot be used for the following message strings-

CQ VK@XXX QFYY

CQ ing

VK@XXX VK@ZZZ QFYY

Calling a station directly

VK@XXX VK@ZZZ +00

Sending first report

Encoding in Sh mode involves a data string made up of a 12-bit hash of the two callsigns. In SWL Mode, if you did not receive both stations in the clear before they go to Sh mode then they will not be properly decoded. Instead you will decode something like <0792> R+00 or <3127> R+00 etc.

Further, signal reports are limited to 7 choices. From -03dB through to +16dB

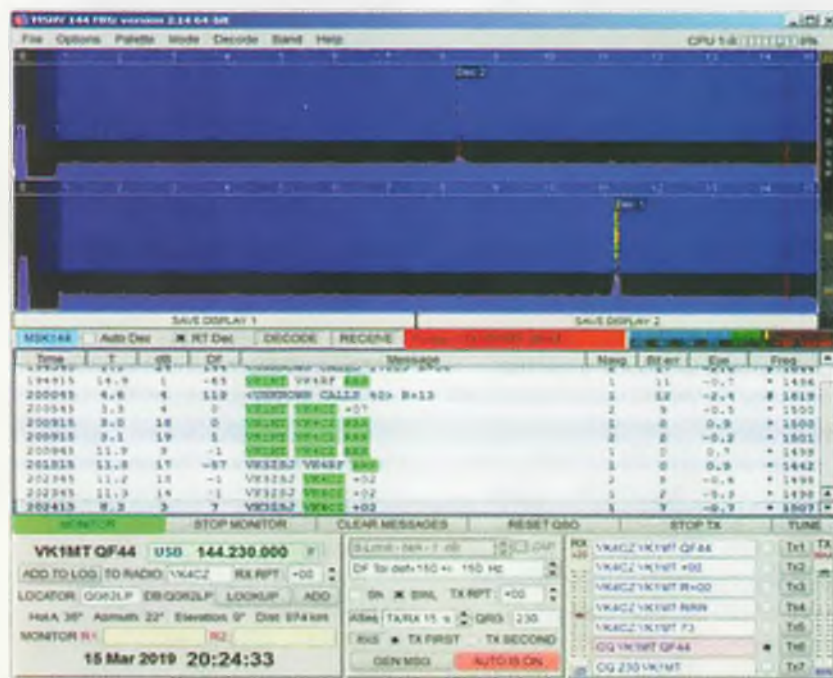
I recommend that stations routinely select SWL mode in MSK144 mode on 2m and above, this will allow the other station to make use of Sh. Mode as required.

Matt Bowman - VK1MT"

## Meteor Showers

Since the last report there have been two Major Meteor Showers. Firstly, the Perseids, which peaked around the 13 August. Although this is one of the most active showers each year, because of its high northern Zenith its effects are very modest for operators here in the Southern Hemisphere. In North America and Europe this is a major Meteor Scatter event each year, however here in Region 3 it is easy to miss any enhancement at all. Even in VK4 the zenith is so far north on our horizon and visibility so short lived that, even at the peak of enhancement, there is usually little effect on returns from stations in the southern call areas.

Secondly, the end of July and through the early part of August saw the appearance of the Southern Delta Aquarids (SDA) shower. On paper this might appear to be of little significance with a predicted ZHR of only 16/hour, but not so this year. The enhancement of background conditions, extending over almost two weeks, were outstanding and superimposed on the general improvement in conditions as we approach the Spring season. Several operators posted log extracts and video clips on the VK-ZL MS Facebook page and on the VK-Spotter site. It's worth looking back on these sites if you have never experienced



burns extending over tens or even hundreds of seconds at a time.

There are no significant Major Meteor Showers anticipated now until the Orionid Shower expected to peak around the 22<sup>nd</sup> October. There will be another report before that date. The Orionids is a Class 1 Major shower and has a predicted ZHR of 25/hour. This shower is the result of the Earth passing through debris remaining after the last passage of Halley's Comet through our solar system.

### 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 Version 2.0 15 second periods.

Southerly stations (VK1,3,5,7) ALWAYS run 1<sup>st</sup> period beaming North, Northerly stations (VK4) ALWAYS run 2<sup>nd</sup> period beaming South.

Stations in the middle call-areas VK2 and VK1 change period depending on the day. Saturday run 2<sup>nd</sup> Periods beaming South, Sundays run 1<sup>st</sup> Periods beaming north. Please stay in your correct

transmission period, on both 2 m and 6 m, during the weekend activity sessions. Crossed periods cause havoc to both local and distant stations all operating on a single frequency – even when that frequency appears quiet.

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](mailto:vk4uh@wia.org.au)  
Kevin (KJ) VK4UH



## AMSAT-VK

AMSAT Co-ordinator  
Paul Paradigm VK2TXT  
email: [coordinator@amsat-vk.org](mailto:coordinator@amsat-vk.org)

Group Moderator  
Judy Williams VK2TJU  
email: [secretary@amsat-vk.org](mailto:secretary@amsat-vk.org)

Website:  
[www.amsat-vk.org](http://www.amsat-vk.org)

Group site:  
[group.amsat-vk.org](http://group.amsat-vk.org)

### 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" chit. 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 number 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 Radcliffe 146.925 MHz -ve offset IRLP node 6404 EchoLink 44666

**In South Australia**  
VK5TRM, Loxton on 147.175 MHz  
VK6RSC, Mt Terrible on 439.825 MHz IRLP node 6276,  
EchoLink node 398998

**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 either EchoLink or IRLP enabled repeaters and links in order to improve coverage. If you are interested in carrying our net on your system, please contact Paul via email. Frequencies and nodes can change without much notice. Details are put on the AMSAT-VK group site.

### Become involved

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

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

## WIA DX & operating Awards



WIA offers a range of operating awards, including DXCC, VHF & UHF and many other awards.

Details can be found at: <http://www.wia.org.au/members/wiadxawards/about/>

# Coreflute radial/counterpoise pads: convenient, lightweight & effective

'Doc' Wescombe-Down VK5BUG (Member Australian Society of Authors)

For both fixed and transportable MF-HF station operation, these adaptable, easily stored and conveniently connectable pads have proven to be very useful for more than a year thus far. They may have detractors for any number of reasons but seeing and using them in action 'is believing'!

The pads are made by 'hand-sewing' insulated wire stripped from defunct power extension cords on to convenient sized pieces of Coreflute, often used

for signage attached to roadside fencing, political party advertising, real estate placards and other hoardings. I sourced mine from recycling centres, Op Shops and outdoor Flea Markets/car boot sales at very low cost or as 'freebies'.

Working from one (upper) corner I first drew a permanent marker 'maze track', reducing in size as it worked its way from near the pad perimeter towards the pad centre. Line spacing is approximately 40mm. Once the track had been

completed, I used a heavy steel spike with a fine point to punch holes spaced about 75-100mm apart progressively around the track line. The holes became the recycled wire 'sewing holes'.

A quarter wavelength of wire was cut, the first 1200 mm left hanging free at the top left hand corner (your choicel) of the pad: this was later fitted with a banana jack and a link dipole or spade connector fly lead in parallel for joining pads when required during

Photo 1: Steath Corflute 400W antenna.



operations (see below). The remainder of the wire was then 'sewn' by hand, under-over, through all the track holes until it had all been consumed. A banana socket and another spade connector was then be fitted to that distant end, by now near the centre of the pad: also for joining pads if required later.

To date I have made sets of four pads for each band 40-30-20-15m, and simply plug two 40m pads in series to create an 80m band Coreflute radial pad, or four of 40 m pads to enable Top Band 160 m operation.

To use the pads, the 1200 mm fly leads are parallel connected to the antenna coupler ground terminal for the desired band of operation, e.g. four by 40m pads all separately ground lug attached. The set of four is then fanned out on the ground just like the cardinal compass points' pattern, though that actual precision is not required, of course: it is just a template analogy. Other conventional radials may be added to increase radial density if desired. In some scenarios I have successfully applied pads in both vertical and horizontal planes due to space constrictions (National and Conservation Park understory for example).

I have conjointly and separately used these configurations on home base HF verticals for 40-30-20-15m and in tandem with a single 40m/130ft long radial for 160m. 1:1 VSWR has been achievable on all bands separately, and unplugging one or more pads provided evidence of the measurable impact they had on matching in every case. No sign of RF feedback has occurred. Power levels from 10W (TS-120V portable) to 400W (base station amplifier testing) have been used successfully.



Photo 2: Nobody would guess this is a 400W antenna!

When the use for a specific band set of pads has concluded, they are simply unplugged, stacked together and stowed in the vehicle or radio room as appropriate. An entire stack of monoband Coreflute radial pads is 'a doddle' to carry, easy to connect and use, and a worthwhile adjunct to transportable operation. I don't do SOTA, stream

or creek crossing, kayak operation or mountain-goating, so am unable to comment on pad suitability for those scenarios. Please give them a test and report your experiences. Experimentation remains the essence of ham radio: it has just more recently taken a buffeting from the evolution of a different, wallet-driven more impersonal hobby.



Photo 3: Shape isn't limited to rectangular forms.

Participate

**BARG Hamvention**  
**Rosebud RadioFest 2019**

27 October  
17 November



# DXTalk

Luke Steele VK3HJ

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HF conditions are reflecting solar minimum, with only the occasional small sunspot group appearing very briefly. Coronal holes periodically disrupt HF propagation further.

Spaceweather.com reports that 67% of the days so far in 2019 have been spotless, and for all of 2018 it was 61% spotless. In the previous solar minimum in 2008 and 2009 the spotless days were 73% and 71% respectively.

## Around the bands

As the northern hemisphere is in summer time, the storm static deters all but the most determined. There is still some DX to be worked on 160 m, including North America, but 80 m has been more productive. Forty and 30 m has been good at times, and 20 m still shows some life. Most activity seems to be on FT8, but there is still some CW DX. A few locals are working on 160 m and 80 m SSB, even as far as North America.

## DX Heard or Worked

During July, Tony 3D2AG was active from Tuvalu as T2AR, and since then back at home in Fiji. E44WE was Janusz SP9FIH, active from Palestine. There was a DXpedition CY9C on St Paul Island in the north Atlantic, late July into early August. Rick AI5P was operating from Lord Howe Island as VK9APX, and then for a little while from Qld as VK4/AI5P. Johannes 5T5PA has been active daily, and is workable on 40 m FT8 most afternoons. Bernhard DL2GAC has been active again from Malaita as H44MS, and will be there until 24 September. TO5M was a DXpedition to St Pierre & Miquelon

Islands in the North Atlantic. VP8EME has been active on FT8 again recently.

## Upcoming DX

DXpedition activity scheduled for July and August includes the following.

**6O7O Somalia**, 14 – 28 September. Ken LA7GIA plans activity on 160 – 10 m, mainly CW and some SSB and digital. QSL via LotW or via M0OXO. For more information see: <https://www.la7gia.com/where-next/>

**EX6QP Kyrgyzstan**, 2 – 15 September. A team of Polish operators plans activity on HF using CW, SSB RTTY and FT8. QSL via Club Log OQRS. For more information see: <http://www.ex6qp.dxpeditons.org/>

**K7TRI USA**, 6 – 9 September. N3QQ, VE3LYC, VE7NY and KO8SCA plan activity from **Tillamook Rock** (Oregon, IOTA NA-211). This will be only the second ever activation from this IOTA. Operations planned 40 – 17 m, CW and SSB with two stations. QSL via Club Log OQRS. For more information see: <https://k7tri.weebly.com/>

**T30L Western Kiribati**, 6 – 15 September. YL2GM, YL1ZF, YL2KL and YL3JA plan activity from Tarawa (OC-017), 160 – 6 m, using CW, SSB, RTTY, and FT8. QSL via LotW, Club Log OQRS and YL2GN. For more information see: [http://www.lral.lv/c21w\\_t30l/](http://www.lral.lv/c21w_t30l/)

**9G5QU Ghana**, 8 – 21 September. KB1QU plans operation on 40, 30 and 20 m using CW, FT8 and FT4. QSL via N4GNR direct.

**WH0RU Mariana Islands**, 15 – 22 September. JG7PSJ plans activity from Saipan Island (OC-086) on 40 – 10 m, CW, SSB and RTTY. QSL via LotW or JG7PSJ direct.

**3DA0AO eSwatini**, 16 – 30 September. HA5AO plans operation from Mbabane on 80 – 10 m, using CW, RTTY and FT8. QSL via HA5AO direct or OQRS on his web page: <https://www.ha5ao.com/>

**C21W Nauru**, 16 – 25 September. After their Tarawa activation, YL2GM, YL1ZF, YL2KL and YL3JA plan activity from Nauru (OC-031), 160 – 6 m, using CW, SSB, RTTY, and FT8. QSL via LotW, Club Log OQRS and YL2GN. For more information see: [http://www.lral.lv/c21w\\_t30l/](http://www.lral.lv/c21w_t30l/)

**MD/OP2D Isle of Man**, 21 – 27 September. ON4ANN leads a team of twelve Belgian hams with activity planned on 160 – 6 m, with a focus on Low Bands, using SSB, CW, FT8 and RTTY. For more information see: <http://users.telenet.be/on4ann/MD/>

**A35JT Tonga**, 24 September – 7 October. VK5GR, VK5XDX, VK5AKH and VK5SFA plan activity from OC-049 (AG28hw) on 160 – 6 m, using SSB, CW, FT8, RTTY, and 6m EME. They will operate in the OCDX SSB and CQ DX RTTY contests. QSL via LotW, or via M0OXO. For more information see: <https://vk5gr-iota.net/category/2019-a35jt-oc-049-tonga/>

**JD1BNA Minami Torishima**, 29 September – 5 October. JD1BNA will be active from Marcus Island (OC-073) on 160 – 17 m using mainly CW. QSL via JL1UTS direct.

5H3MB **Tanzania**, 29 September – 5 October. IK2GZU plans operation on HF using SSB, CW and RTTY. QSL via IK2GZU bureau or direct, or Club Log OQRS.

A82X **Liberia**, 30 September 11 October. The Italian DXpedition Team plans activity on 160 – 10 m using CW and SSB, and with the callsign A82Z on FT8 and digital. QSL via LotW or OQRS on their website: <http://www.i2ysb.com/idt/>

7P8AO **Lesotho**, 2 – 18 October. HA5AO plans operation on 80 – 10 m, mainly CW and FT8. QSL via HA5AO direct, or via the OQRS on his website: <https://www.ha5ao.com/>

ZK3A **Tokelau**, 2 – 11 October. A large team is getting ready for activation of OC-048. They plan operation on 160 – 6 m, using CW, SSB, RTTY, PSK31 and FT8 with up to six stations. QSL via LotW, or via instructions on the website: <https://tokelau2019.com/>

TO80SP **Pierre & Miquelon**, 2 – 14 October. A DXpedition team of seven operators is planned for NA-032. They plan operation on 160 – 10 m, using CW, SSB and Digital modes, with three stations. QSL via LotW. For more information see: <http://www.d17df.com/tp/>

T30GC **Western Kiribati**, 7 – 23 October. LZ1GC, OK2WM and LZ3NY plan activation of Tarawa Island (OC-017) on 160 – 10 m,

using CW, SSB and RTTY. QSL via LotW, or Club Log, or LZ1GC direct or bureau. For more information see: <http://www.c21gc.com/>

VK9N **Norfolk Island**, 18 October – 4 November. A group of three Polish operators will be active from Norfolk Island (OC-005) as follows: VK9NE (SP5EAO) Jacek operating SSB from 18 October to 4 November, VK9NC (SP7VC) Mek operating digital from 18 to 28 October, and VK9NG (SP5ES) Marcin operating CW from 28 October to 4 November.

They will be operating HF bands, and Jacek will also participate in the CQ WW DX SSB Contest. QSL via LotW, or SP7VC bureau or direct. For more information see: <http://vk9n-2019.dxing.pl/>

FH/DJ7RJ **Mayotte**, 15 October – 3 November. DJ7RJ plans to focus on the Low Bands, using CW and SSB. QSL via DJ7RJ.

VP6R **Pitcairn Island**, 18 October – 1 November. A large DXpedition team plans activity from this remote island (OC-044) with eight stations operating HF, all modes. QSL TBA. For more information see: <https://pitcairndx.com/>

VU7RI **Lakshadweep Island**, 19–31 October. M0KRI, VU2OB and VU3XTG are planning activity from AS-011 on 80 – 6 m using SSB, CW and FT8. QSL via LotW, or via instructions on their website: <https://vu7ri.com/>

D68CCC **Comoros**, 20 October – 1 November. An international team plans activity on HF with a focus on Low Bands and WARC Bands, mainly digital modes, with up to five stations active 24 hours/day. QSL TBA.

There are many other activities planned in a very busy season of DXpeditions, and these are just some of them. For a complete list visit NG3K's "Announced DX Operations" website: <https://www.ng3k.com/misc/adxo.html>

### Tanzania DXpedition

The Italian DXpedition Team has announced a DXpedition to Zanzibar Island (AF-032) Tanzania in February 2020. They will be using the callsign 5I5TT for CW, SSB and RTTY, and 5I4ZZ for FT8 and FT4. The team will comprise ten operators, and five stations are planned. For more information, including a bands/mode wanted poll, visit their website: <http://www.i2ysb.com/idt>

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.

73 and good DX,  
Luke VK3HJ

## Hamads

### WANTED – VIC

"Sailor"(S.P.Radio.Denmark)Gear as follows:  
-R1120 Communications Receivers-  
-R1121 Scanning Receivers.These need not be going as internal parts are required-  
-T1130 Transmitter-  
-Table Top 19" Rack that goes with this Series 1000 gear(Takes Rec/Exciter/Transmitter)-  
Contact Ian on [vk3ian@hotmail.com](mailto:vk3ian@hotmail.com) or phone 0427 149 339.  
Main Ridge.Vict.

### FOR SALE – SA

Icom NO. 490 A 430 MHz. All Mode. With a full 11 Watts output. The radio works well and is in excellent condition. Comes with a spare Chip, Books etc. Offers please. No reasonable offer refused. Mervyn Millar VK5MX  
[arvk5mx@gmail.com](mailto:arvk5mx@gmail.com)

# SOTA and Parks

Allen Harvie VK3ARH

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Despite cold and wet conditions in southern Australia, activity has continued through the winter period. The weather systems also impacted up the eastern seaboard and into southern Queensland. Such conditions tend to reduce portable radio activity, but many amateurs picked the opportunities to enjoy the drier days out in the field.

Most notable during the July and August period have been Gerard VK2IO continuing his trip to VK5 and beyond, plus several focus activities promoted by VKFF National Coordinator Paul VK5PAS.

Propagation continues to be mainly fair to poor, with a lack of NVIS on 40 m. Most activators have been including 80 m operation, even in the middle of the day. From central Victoria, activators within VK3, southern VK2, VK1 and northern VK7 have rarely been heard if they have not used 80 m. The 40 m band continues to be the prime band for Activators, but those who have not ventured to 80 m often note the lack of closer in contacts.

The growing group of activators in VK1 have been very active, especially on weekends and on VHF and UHF bands.

SOTA activators have been carefully grabbing opportunities to access 8 and 10 point summits during the seasonal bonus period. With the days lengthening and weather becoming warmer, one can expect more SOTA activations to the higher value summits as we approach the end of the bonus season (14 October) in VK1, southern VK2, VK3 and VK7.

## Extended trip to VK5 and VK8

After commencing a trip to Mount Gambier in early June, Gerard



Photo 1: The obligatory selfie of Gerard VK2IO and Uluru.

VK2IO continued his expedition after the SERG Convention and explored south-eastern SA before making his way to Adelaide. His journey continued around Adelaide before he worked his way north to Port Augusta for a few days prior to heading into Northern Territory (NT). Throughout his trip, Gerard undertook many Park and some SOTA activations.

Gerard ventured out to Yulara to activate both Uluru-Kata Tjuta National Park VKFF-0505 and Uluru / Ayres Rock VK8/UL-043 – the

first activation of the SOTA summit. This was followed by several Park activations in southern NT.

Gerard then started his trip home, again moving from Park to Park and activating a few summits when the opportunity arose.

His route included the Oodnadatta Track, The Outback Highway, Ikara-Flinders Ranges National Park and south to Peterborough before heading east via the Barrier Highway to Broken Hill and then back towards Sydney. It was an epic trip from the perspective of Park Activations, many first activations, and give Hunters many new Parks towards their WWFF tallies.

Gerard reported: "Many thanks to all those who worked me, met me, supported and spotted me



Photo 2: Gerard's station on Uluru summit VK8/UL-043.





Photo 3: An over view of the route taken by Gerard VK2IO.

during my Red Centre trip. Some stats for the curious:

Days: 66 (3/6/19 - 7/8/19)

Distance: 11928 km APRS posits: 5541;

Parks: 114 (VK2 2, VK3 16, VK5 81, VK8 15);

SOTA peaks: 11 (VK3 2, VK5 7, VK8 2);

QSOs activating: 5349, Park-to-Park: 378;

Mobile QSOs: 145."

We hope to encourage Gerard to prepare a more detailed report for possible publication.

It is interesting to note that Marcus VK5WTF also activated Uluru in early August. Opportunities for Chasers to make the summit a Complete will be limited, with a ban on climbing Uluru coming into effect in late October.

### World Ranger Day

Paul Simmonds VK5PAS reports on World ranger Day, which commemorates Rangers killed or injured in the line of duty and celebrates the critical work Rangers do to protect the world's natural and cultural treasures. World Ranger Day is observed annually on 31 July.

"The VKFF program has a special activator certificate on offer for any amateur who activated a VKFF reference on World Ranger Day.

My digging around shows that a total of 23 amateurs took part as Activators. A total of 29 different parks were activated.

Andrew VK1DA: Red Hill Nature Reserve VKFF-0860

Ian VK1DI/2: New England National Park VKFF-0385, Oxley Wild Rivers National Park VKFF-0406

Gerard VK2IO/5: Wabma Kadarbu Mound Springs Conservation Park VKFF-1114, Lake Eyre National Park VKFF-0276

Ken VK2KYO: Murray Valley Regional Park VKFF-1785  
Brett VK3FLCS: Lerderberg State Park VKFF-0763

Mark VK3PI: Heathcote-Graytown National Park VKFF-0624

Peter VK3PF: Tarra Bulga National Park VKFF-0480, Traralgon South Flora Reserve VKFF-2465, Traralgon South Flora & Fauna Reserve VKFF-2464, Callignee Wildlife Reserve VKFF-2287 and Gormandale Nature Conservation Reserve VKFF-2325

Peter VK3TKK: The Spit Wildlife Reserve VKFF-2452

Rob VK4AAC/3: Dandenong Ranges National Park VKFF-0132

Neil VK4HNS: Tamborine National Park VKFF-0475

Grant VK4JAZ: Pooh Corner Nature Reserve VKFF-2878

Steve VK4JSS: Daisy Hill Conservation Park VKFF-1525

Ade VK4SOE: Sundown National Park VKFF-0471

John VK5BJE: Mylor Conservation Park VKFF-0785

Adrian VK5FANA: Upper Gulf St Vincent Marine Park VKFF-1755

Marija VK5FMAZ: Mount George Conservation Park VKFF-0784



Photo 4: The World Ranger Day certificate.

Keith VK5OQ/3: Alpine National Park VKFF-0619

Paul VK5PAS: Mount George Conservation Park VKFF-0784

Peter VK5PET: Tolderol Game Reserve VKFF-1752

Mike VK6MB/3: Wychitella Conservation Reserve VKFF-2032, Wychitella Nature Conservation Reserve VKFF-2236

Phil VK6ADF: Burma Road Nature Reserve VKFF-2800

Hans VK6XN: Stinton Cascades Nature Reserve VKFF-2940

Angela VK7FAMP: South Arm Nature Recreation Area VKFF-2929.

Thanks to everyone who took part. It certainly turned out to be a very popular day. The VKFF program will be running similar activation days on future special dates."

### National Parks and Wildlife Service SA Award

Paul VK5PAS advised of another special Award available for August 2019:

"The new National Parks and Wildlife Service South Australia is officially being launched on Saturday 27th July 2019.

To celebrate the new Service in VK5, the VKFF Team announce a new award available during August 2019.....

National Parks and Wildlife Service SA Award.

It will be issued (only in August 2019) for activators and hunters:

- work 5 different VK5 VKFF references
- work 10 different VK5 VKFF references
- etc. or
- activate 5 different VK5 VKFF references
- activate 10 different VK5 VKFF references
- etc.

The award will only be available during 2019 and only relates to



Photo 5: The National Parks and Wildlife Service SA Award certificate.

activations undertaken/contacts made during August 2019.

For an activation to qualify, you must have attained 10 QSOs, qualifying the park for VKFF.

The award is not implemented within Logsearch. All applications should be sent via email to the VKFF National Co-ordinator Paul VK5PAS at vk5pas@wia.org.au

All applications must include sufficient details including date, reference activated/worked, station worked, etc."

### National Wattle Day

Paul VK5PAS also announced another special Award in late August:

"National Wattle Day is celebrated on 1 September each year. A certificate will be issued to any activator who activates a VKFF reference area on Sunday 1 September 2019.

All applications via email to VK5PAS.

For an activation to qualify, you must have attained 10 QSOs, qualifying the park for VKFF."

A quick search of the History function on the ParksNPeaks site shows that 14 amateurs activated a total of 18 different VKFF references on the day.

### Coming events

Keith Roget Memorial National Park Award activity weekend Friday 8 to Monday 11 November 2019.

VKFF National Get Together: Saturday 31 October and Sunday 1 November. The first event is to be held in Renmark, South Australia. It is planned that this will become an annual event which rotates around the states and territories. The program outline has various presentations and displays on Saturday morning followed by lunch. Saturday afternoon will be free time to explore the area and/or activate one of the regions numerous Parks. A dinner function is planned for Saturday evening, together with a breakfast on Sunday morning. Keep a look out on the WWFFAustralia group and Facebook page for further details.

VKFF Activation Weekend Saturday 30 November and Sunday 1 December 2019.

### Plan ahead

Operate within the band plans: <http://www.wia.org.au/members/bandplans/about/>



Tim Mills VK2ZTM  
e vk2ztm@wia.org.au



Photo 1: ARNSW President Mathew VK2YAP Presents a donation of \$5000 to WIA President Greg VK2GPK to go towards the expenses of attending the WRC-2019 conference. Photo by Eric VK2VE.

## ARNSW donates to WRC 2019

ARNSW holds their bi-monthly Trash and Treasure on the last Sunday of the odd numbered month at their Dural site. In July ARNSW President Mathew VK2YAP and WIA President Greg VK2GPK were in attendance and addressed those in attendance about the WRC 2019 conference being held in late November this year in Egypt. They covered the importance to being entitled to have an Amateur attend with the Australian delegation - which the WIA has to fund. At the conclusion of the talk ARNSW President presented the WIA President with a donation to go towards the expenses of attending. In presenting the cheque for \$5K Mathew explained that the Trash & Treasure days produced a turn over which enables ARNSW to provide the free BBQ and leaves a small surplus of funds. While the WIA

funds to attend these International activities comes from a levy included in WIA membership, it was with great pleasure that ARNSW was able to contribute towards this important operation and encourages all Australian Amateurs as either individuals or through their clubs to contribute.

## ARNSW launches bi-monthly Bulletin

In the middle of the last Century there was a large printed Bulletin in VK2 produced by the NSW Division. This reduced down to a Mini-bulleting as an insert in AR Magazine and it then faded away. We were then informed that the magic internet would be the answer to the paper copies and the new way to distribute information.



Photo 2: WIA President Greg VK2GPK and ARNSW President Mathew VK2YAP addressed the attendees at the ARNSW Trash and Treasure meet about the importance of the WRC-2019 conference, being held in late November this year, in Egypt. Photo by Eric VK2VE.

Recently a newsletter was trialed, which is being distributed – by email and mailed copies – to ARNSW members. There was a good response and it will be produced a week or two before the bi-monthly Trash & Treasure, like mid September and mid November. Later it will be added to the ARNSW web site. The Editor is Ray VK2ASE who can be reached by email at [editor@arnsw.org.au](mailto:editor@arnsw.org.au) Its title is All Access.

### ARNSW promoting DMR

After years of various digital modes being presented in a range of repeaters it now appears that the DMR mode is becoming an acceptable format. The Board of ARNSW has decided to make available - on a loan basis - some new DMR repeaters to duly constituted VK2 clubs who make an application and fit within the specifications for such loans. Expressions of interest in the first instance should be made – in writing - to the ARNSW Secretary at [secretary@arnsw.org.au](mailto:secretary@arnsw.org.au) or by mail to ARNSW P.O. Box 6044 Dural Delivery Centre NSW 2158. The offer is for a short time only so do not delay inquiring. The first repeater on loan has been made to HADARC to restore VK2RHT at Chatswood where the previous repeater had failed beyond repair. The intention is to help establish a chain of DMR systems along the east coast of VK2 but clubs west of the Great Divide will also be considered.

### Education

A round of the Ve exams were conducted at VK2WI in late August. There are Foundation and assessment weekends scheduled at VK2WI Dural in early September and the last for the year will be

the weekend of the 9<sup>th</sup> & 10<sup>th</sup> of November with the bookings closing on Friday the 25<sup>th</sup> October. Many other clubs are back on line with training and assessments. Their dates, where known, are included in VK2WI News.

### Activities

The Summerland ARC at Lismore has just conducted their annual SARC Fest. They have a network of repeaters within their region which keeps them busy with maintenance and site improvements. Their membership dues remain at \$40. The Oxley Region ARC held their AGM in early August with little change in the management committee. Following the success of their annual two day field day held last June at the Wauchope Showground - they have booked the venue again for next year in June.

ARNSW produces an annual magnetic backed A5 sized calendar and it is planned to release the 2020 edition mid November – a reminder to ARNSW members to ensure their postal address is up to date. Send any changes to [membership@arnsw.org.au](mailto:membership@arnsw.org.au) The recent name change of the previous NSW Division to ARNSW is being advised to the various suppliers. The new lawn in front of the Centenary Building at VK2WI Dural was constructed to take vehicles but while it settles down it was decided that there would be no parking. It has now been found that at major activities eg Trash & Treasure, the lawn is becoming a popular gathering and talking location. It will remain no parking. After delays with various authorities the new 40 metre VK2RWI repeater antenna pole will soon be cabled and fitted with the antennas. The 2020 AGM for

ARNSW has been set for Saturday the 18<sup>th</sup> April 2020.

In recent AR notes the status of beacons was raised which has produced a few replies. Thank you. Most responses found they have various uses and the UHF ones at Dural are most handy to check out receiver and antenna performance. The ZL Amateurs find the Sydney VK2RSY 23 cm beacon on 1296.420 MHz. most useful for openings across the 'pond' The beacon, located at Dural on the old VK2RWI repeater tower, will be relocated soon to a new mounting when the tower is demolished once the new pole and antenna system is commissioned. After a period of absence the VK2RSY 6 metre beacon [50.289] antenna was restored. For some time VK2RHV [50.288] Newcastle has been off line, so it's a chance to hear RSY due to the adjacent allocation.

For more than 10 years VK2WI News has also been transmitting the morning bulletins on a licensed 5 MHz commercial channel - 5425 kHz USB VKE 580 - in a point to multipoint format to provide linking coverage to relay points. The license fee is a 'little' more than an Amateur license fee. This operation is not to be confused with and is totally separate from our hoped for 60 metre allocations.

Its now 51 years since repeaters became legal in VK. With more – like DMR – always coming on line - is some one in our repeater group keeping the WIA Technical committee informed so the list is kept up to date? Since we are talking of history and records – which will last the longest – the printed copy or the hard drive or some flaky server some where in outer space? 73 – Tim VK2ZTM / VK2UJ.



### Plan ahead

Operate within the band plans:

<http://www.wia.org.au/members/bandplans/about/>

Tony Hambling VK3XV

e [arv@amateurradio.com.au](mailto:arv@amateurradio.com.au)

w [www.amateurradio.com.au](http://www.amateurradio.com.au)



KRMNPA Activation Weekend November 8-11.

## VK3 Operating Awards

July and August have again been busy months in the VK3 Portable operating arena, with Two Keith Roget Memorial National Parks Awards (KRMNPA) being issued.

One **Grand Slam** Award has been claimed and Awarded. The Grand Slam is having Activated and Worked all 45 VK3 National Parks.

This is a major achievement, taking much dedication and perseverance in gaining the prestigious award.

The latest **Grand Slam** proudly goes to **Mike VK6MB/3**.

Mike has notched up many Kilometres in his portable Activities, activating Parks for both VKFF and KRMNPA.

**David VK5DG/3** has also claimed the next level endorsement of VK3 Parks activated..... with the difficult and challenging task of activating 37 Parks Via satellite!

Great effort and well done to you both!

Further details on KRMNPA activities can be found in the SOTA & Parks pages of AR magazine.

Full KRMNPA rules and information can be found on the ARV website. [www.amateurradio.com.au](http://www.amateurradio.com.au)

## ARV Homebrew Group

The Homebrew Construction Group of Amateur Radio Victoria aims to promote the good fellowship and exchange of ideas between amateurs who are enthusiastic builders of their own equipment. It does this through monthly meetings in the A.R.V rooms located at 40g Victory Blvd., Ashburton on the first Saturday of each month (excluding January), at 2.00pm.

The meetings are generally very informal but commence with a "Show and Tell" session where projects can be displayed and described. The following discussion usually generates a wealth of ideas for the new comer and experienced constructor alike. The session is followed by a guest speaker, when possible.

Homebrewing encompasses almost every aspect of our hobby and those who might not necessarily regard themselves as dedicated

homebrewers will find something of interest in this group.

## 2019 meeting dates

5th October, 2nd November and 7th December

Contact Rob: [vk3mq@amateurradio.com.au](mailto:vk3mq@amateurradio.com.au)

## KRMNPA activation period 2019

The popular annual Keith Roget Memorial National Parks activation period will take place across 4 days in 2019, Friday November 8- Monday November 11.

This is the ideal method of increasing your VK3 National Parks tally for this prestigious Award.

VK3WI will get the ball rolling with an activation of the Brisbane Ranges National Park on Friday November 8.

Keen Satellite activator, **David VK5DG** will be participating in the 2019 VK3 National Parks Award activation weekend. David will be heading to the East Gippsland region to get a few more Parks in the bag. At the time of writing David has successfully Activated 37 Parks using the various Amateur Satellites. With "only" 8 to go, it appears David will secure the very first KRMNP Merit Award with a Satellite endorsement. Best wishes to David in his endeavours.

All members are encouraged to participate in the Activation event. Please contact Tony: [vk3xv@amateurradio.com.au](mailto:vk3xv@amateurradio.com.au) for further information.

## Log Books

Many amateurs still prefer the "old style" paper Log Books: The Amateur Radio Victoria web shop is the place to visit to secure yours!

Visit [www.amateurradio.com.au/](http://www.amateurradio.com.au/) and click on "shop".



# WIA Awards

Marc Hillman VK3OHM/VK3IP

Below are listed all New awards issued from 2019-06-15 to 2019-08-14, 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
108	VK3BDX	David Burden	Open
109	VK3BDX	David Burden	Digital

### DXCC Multi-band (1)

#	Call	Name	Mode	Band	Count
222	VK2NN	Peter Garoufalas	Digital	20m	111

### DXCC Multi-band (3)

#	Call	Name	Mode	Band	Count
142	VK4SN	Alan Shannon	CW	40-20-15m	329

### DXCC Multi-band (5)

#	Call	Name	Mode	Band	Count
99	DD0VU	Jens Knoepchen	Open	80-40-30-20-17m	641

### DXCC Multi-mode (CW)

#	Call	Name	Count
263	VK3BDX	David Burden	106
264	DD0VU	Jens Knoepchen	100
265	VK2NN	Peter Garoufalas	100

### Grid Square

#	Call	Name	Mode	Band
393	VK3BDX	David Burden	CW	HF
394	DD0VU	Jens Knoepchen	Digital	6m
395	DD0VU	Jens Knoepchen	Open	6m
396	VK1MES	Malcolm Stephens	Open	HF
397	VK1MES	Malcolm Stephens	Digital	HF

## DXCC updates

### DXCC Multi-band (1)

#	Call	Name	Mode	Band	Count
97	VK6WX	Wesley Beck	CW	20m	151
219	VK3KTT	Steven Barr	CW	20m	101
54	VK3EW	David McAulay	Digital	20m	229
89	VK3OHM	Marc Hillman	Digital	20m	152
190	VK3BDX	David Burden	Digital	40m	202
198	VK2ZQ	Michael Ramsay	Digital	30m	116
221	VK3MH	Brendan Bryant	Digital	20m	128
17	VK6WX	Wesley Beck	Open	20m	227
34	VK3KTT	Steven Barr	Open	20m	239
80	VK2NN	Peter Garoufalas	Open	20m	177
189	VK3BDX	David Burden	Open	40m	215
215	VK3MH	Brendan Bryant	Open	20m	152
39	VK6WX	Wesley Beck	Phone	20m	177
42	VK7CW	Steven Salvia	Phone	20m	265
114	VK2NN	Peter Garoufalas	Phone	20m	151

### DXCC Multi-band (3)

#	Call	Name	Mode	Band	Count
66	VK3EW	David McAulay	Digital	40-30-20m	609
132	VK3BDX	David Burden	Digital	40-30-20m	577
22	VK3EW	David McAulay	Open	40-20-17m	1009
63	VK2ZQ	Michael Ramsay	Open	40-20-10m	551
69	VK3KTT	Steven Barr	Open	20-15-10m	576
112	VK6WX	Wesley Beck	Open	40-20-15m	538
131	VK3BDX	David Burden	Open	40-30-20m	606
64	VK2ZQ	Michael Ramsay	Phone	40-20-10m	503
68	VK3KTT	Steven Barr	Phone	20-15-10m	516
72	VK7CW	Steven Salvia	Phone	20-15-10m	507

### DXCC Multi-band (5)

#	Call	Name	Mode	Band	Count
35	VK7CW	Steven Salvia	CW	40-30-20-17-15m	1186
79	VK3EW	David McAulay	Digital	40-30-20-17-15m	936
96	VK3BDX	David Burden	Digital	80-40-30-20-17m	825
29	VK3EW	David McAulay	Open	40-30-20-17-15m	1666
34	VK7CW	Steven Salvia	Open	40-30-20-17-15m	1250
87	VK2ZQ	Michael Ramsay	Open	40-30-20-15-10m	821
94	VK3BDX	David Burden	Open	80-40-30-20-17m	880
98	VK6WX	Wesley Beck	Open	40-30-20-17-15m	782
2	VK3EW	David McAulay	Phone	40-20-17-15-10m	1611

**DXCC Multi-band (7)**

#	Call	Name	Mode	Band	Count
10	VK3EW	David McAulay	CW	80-40-30-20-17-15-12m	1823
14	VK7CW	Steven Salvia	CW	40-30-20-17-15-12-10m	1546
7	VK3EW	David McAulay	Open	40-30-20-17-15-12-10m	2305
15	VK7CW	Steven Salvia	Open	40-30-20-17-15-12-10m	1634
8	VK3EW	David McAulay	Phone	80-40-20-17-15-12-10m	2185

**DXCC Multi-band (9)**

#	Call	Name	Mode	Band	Count
12	VK3EW	David McAulay	CW	160-80-40-30-20-17-15-12-10m	2160
1	VK3EW	David McAulay	Open	160-80-40-30-20-17-15-12-10m	2814

**DXCC Multi-mode (CW)**

#	Call	Name	Count
223	VK6WX	Wesley Beck	221
234	VK3KTT	Steven Barr	165
263	VK3BDX	David Burden	106

**DXCC Multi-mode (Digital)**

#	Call	Name	Count
20	VK3EW	David McAulay	303
48	VK2ZQ	Michael Ramsay	178
50	VK2NN	Peter Garoufalis	124
71	VK3BDX	David Burden	236
79	VK3KTT	Steven Barr	148
82	VK6WX	Wesley Beck	132
85	VK3MH	Brendan Bryant	161

**DXCC Multi-mode (Open)**

#	Call	Name	Count
376	VK6WX	Wesley Beck	275
409	VK2NN	Peter Garoufalis	210
417	VK2ZQ	Michael Ramsay	299
458	VK3BDX	David Burden	250
470	VK3MH	Brendan Bryant	191

**DXCC Multi-mode (Phone)**

#	Call	Name	Count
573	VK6WX	Wesley Beck	227
586	VK7CW	Steven Salvia	286
594	VK2NN	Peter Garoufalis	184
626	VK3BDX	David Burden	124
628	VK3MH	Brendan Bryant	131

**Ballarat Amateur Radio Group Inc. (BARG)****HAMVENTION****Sunday 27 October 2019**At the Ballarat Greyhound Racing Club's  
Function Room, Rubicon St. Redan, Ballarat**Display and Sales** (setup from 8am on the day)Trade Table \$20.00 includes one admission,  
extra tables \$10.00 each

(Space for 70+ tables, this is the big one!)

**General Admission \$ 7.00** (under 15 free)

STRICTLY 10:00 AM START

Food and drink will be available on the premises

Enquiries To:

Email: [hamvention2019@barg.org.au](mailto:hamvention2019@barg.org.au)or BARG on the web [www.barg.org.au](http://www.barg.org.au)

# VK6 and The Dish

Keith VK6EME, Dean VK6DSL and Larry VK6UM



Photo 1: Goonhilly Cornwall UK.

"How do you fancy trying 5.7 GHz EME soon" Dean VK6DSL asked us.

"I'm in" was the answer from myself Keith VK6EME and Larry VK6UM.

Priorities dealt with I asked what we were going to use for a dish and none of us have a transverter for 5.7 GHz either.

Dean said "I have a cunning plan".

That's how it all started about 5 months ago at a get together on a Sunday morning at the NCRG clubhouse.

Dean told us about the upcoming Apollo 50 year celebrations and as he is commercially involved with Satellite Comms and has contacts all over the world we started to set a plan into place.

Dean had been contacted by Brian G4NNS who had used the 32 mtr dish at Goonhilly Downs in Cornwall UK for some EME contacts a year before.

It just happened that the 27.5 mtr dish at the Telstra Earth Station in Gnangara WA was not being used commercially at the time of the celebrations.

Dean made some enquiries and with one of the Techs on site Ryan, they started looking into the possibilities of this monster being used to track the Moon. The dish has a feed for Tx on approx 6000 MHz and RX on approx 4000 MHz so it would be possible to use the same feed for both Tx and Rx on 5.760 GHz.

Larry started looking at

transverters, modifying a commercial Codan to our frequencies and the other bits required. We soon realised that a Kuhne transverter from 5.7 GHz to 144 MHz would be so much easier. So Dean took the plunge and bought the transverter and a Kuhne LNA as well.

Ryan had a good look at the control software for the existing dish, and promptly wrote his own to control it :), clever guy!

Some tests were carried out and it seems the dish was going to be useable.

Next step was some power, well the 700 watt TWTA was very close in frequency so it was wound down to 400 watts and the transverter with Deans old FT-290R tried out,



success but Rx was very noisy.

During this period contacts with the UK were moving along nicely and it was worked out that tests on Friday/ Saturday 19/20 July would establish if it was going to work, ready for the big day sat/ Sunday of the Apollo 50 years landing celebrations.

GB6GHY at Goonhilly only had access to the dish on their Friday/ Saturday of the weekend, but we had the dish to use at our end for a couple of weeks before.

So we set up some skeds on HB9Q Logger and had a go. A very successful contact with Dan at HB9Q resulted, his report was 59++, as did many other stations hearing us, but us not really being able to pick them out of the noise.

It was suggested our TWT was causing the noise on Rx so we did tests and found out it actually made no difference if it was completely turned off.

More head scratching resulted in trying different ports on the feed, repositioning the LNA, extra waveguide switches terminated with

loads etc etc, no difference.

At this point I should add we were not interested really in trying digital modes, this had to be SSB or nothing!

Our own signal back off the moon was 59+++ and clear as a bell, so what was going on?

We asked on Moonnet and experts gave their opinions but it didn't make any difference, Rx signals were at best 4-3, more often 3-2 :(

Maybe a better radio ? Well I had been wanting to buy an IC-9700, just waiting till the drift issue was sorted out, so I bit the bullet and bought one.

Yes it made a difference when we did more tests a week later, but still no where near as good as our transmitted signal was.

A suggestion from Rex VK7MO to switch from circular to linear polarisation and accept the couple of db loss was not possible as the dish only has feeds for circular, I'm sure this will fix it, but.....

The day before the big event came around, still no substantial

improvement in the received signal but it was useable.

We arranged a sked with GB6GHY at Goonhilly for 22-30 hrs UTC Friday and we had successful contact, but with a few issues.

One being our dish puts a footprint on the moon about 175 kms in diameter, Goonhilly's slightly less, we were missing each other on the moons surface.

That sounds like a nice problem to have, so much gain etc, but in reality it isn't a lot of fun.

We peaked up on each others signals and discovered the slight offset in direction needed to both hit the same spot.

At that point SM6FHZ commented we were the closest he had ever heard to "armchair copy" off the moon in nearly 40 years of EME. A very nice compliment to receive :)

We also worked W5LUA and he reported our signal as 5-7 to 8 so not bad at all.

The big day arrived, Goonhilly had a large stage with bands, etc set up and a crowd of over 3000

people, it was a huge thing in the UK and USA, we had the three of us, Ryan and a couple of visitors, not quite as spectacular at our end but we had asked for the official publicity machine to grind into action, but with a negative response :(

The dish as GB6GHY is located about 700 mtrs from the visitor area where the stage was, so a link on UHF was set up. The idea was we would transmit the famous Neil Armstrong message via the Moon and the Goonhilly crowd would listen to it.



Photo 2: Moon in our sights - Gngangara WA.

Then Murphy stepped in at their end.

The UHF link was not receiving our audio to re broadcast, even though the guys in the Dish control room were hearing us 59++

For nearly 15 minutes Dean was calling and calling while they attempted to establish a link to the stage.

NOTHING :(

Via our mobiles Brian G4NNS told us it was going to have to be abandoned after all the effort etc.

We were totally devastated, all that work.

We just looked at each other, blank, then the mobile rang again, it was Brian G4NNS " You wont believe this but all the time you were calling and the sound guys were messing around the audience was listening to you loud and clear"

But it was too late to try it again as the next band on the stage had fired up and were well into their set.

So we did it, albeit not as planned, but we were heard in the UK by the biggest audience we've ever transmitted to on Amateur Radio.

We have since had reports from radio hams in the audience that the audio was outstandingly clear and easy to listen to so there is a lot of satisfaction in that.

We have received comments about us signing / Portable. Well this is definitely not our personal station, and I don't think we can sign /A for alternative location in Australia like you could in the UK, so we were portable in that we took the radios, power supplies, transverters etc to the site and borrowed the dish ;)

What next ? Well its a bit long to wait for the 100<sup>th</sup> anniversary so we need another challenge.

It's not that simple though as the Dish has now gone back into commercial service for at least three months, but we have been told we



Photo 3: The Operators.

will be able to use it again.

Now we have to work out why the received signal is so far down on the transmitted one, but we have a few months to do it, not rushing with days to go.

A few good things have come out of it for us, Ryan is looking at going for his ham licence, we have reinstated our VK6UW (VK6Microwave) callsign which had expired so we can standardise on one call next time.

We may have set some 5.7 GHz EME SSB records ? Not sure about that but I am sure that when we use the dish again we will certainly attempt to break records on SSB, Dean has a nice transverter and both Larry and I now have IC-9700's to play EME with.

I showed what a poor videographer I am I'm afraid, all my video is somewhat lacking in quality and sequence but it showed we did it. We have also received an audio file from Goonhilly of our received audio, and I'm impressed ;)

The video is on youtube and the audio file will be available on request.

Personally I'm looking forward to the next chance to use the dish and to have fun with SSB on EME rather than WSJT modes, Dean is vowing to improve his CW skills to help out with that mode if all else fails, and Larry is inspired to go on to bigger and better things on EME.

The NCRG is attempting to modify two Seatek 2mtr steerable dishes for perhaps 10 GHz and 24 GHz, and we may have scored a 7 mtr dish to be installed at NPSARC, the clubs premises in Whiteman Park which is only a few kms down the road from the Telstra Earth Station.

Then we will be able to operate hopefully from 1.2 to 24 GHz EME from the club.

If your interest lies in these " funny frequencies" and you live in WA please look us up on our facebook group " VK6 Microwave group"

Vy 73

From Keith VK6EME, Dean VK6DSL and Larry VK6UM.

Join your local club

Look under Radio Clubs at  
[www.wia.org.au](http://www.wia.org.au)

Interact with local amateurs.

Participate on regular meetings and functions.

Training and further education for amateurs, new and experienced.



# ALARA

Jenny Wardrop VK3WQ

This month I am including some news that should have been in the previous issue, but was held over due to lack of space.

VK3 State Representative, Jean VK3VIP reported on the following..

## Moorabbin Hamfest

On Saturday May 11th Jean VK3VIP, her Mum Elsie, and OM John VK3DQ attended the Moorabbin Hamfest. She was looking forward to catching up with some of the VK3 members, and also our recently appointed ALARA President, Linda VK7QP. Linda and OM Martin, VK7GN were on their annual holiday "On the Big Island".

Kaye VK3FKDW and her OM Denis VK3BGS were taking the Entrance money and selling raffle tickets. This time Jean didn't win anything, for a change!

Jean and Linda had a good chat about ALARA matters, and Jean then introduced Therese, a new ALARA member, who is studying for her license, to Linda, who also caught up with Julie VK3FOWL.

Jean and her Mum, Elsie, ran the ALARA Table selling some souvenir items, and accepting one member's subscription renewal.

## VK3 Alara lunch at Carnegie

On Saturday 25th May, an ALARA lunch was held at the Ross Town Hotel in Carnegie, with a better attendance than the previous one.

There was much chatting between the members, but also some serious talk about next years ALARAmeet, and some fresh ideas were considered.

A big thank you to Margaret VK3FMAB for organising the venue.



Photo 1: ALARA Members who attended the Moorabbin Hamfest Back row: ALARA member Therese, Sarah VK3SD, Linda VK7QP, Jean VK3VIP. Front row: Elsie, and Kaye VK3FKDW.

## Who says we ladies can't keep a secret?

Back in May this year Shirley VK5YL stepped down after her term as President. It had been a fairly

turbulent ride for Shirley. She and OM Jim VK5TR both had quite serious medical problems during that time and added to that, there had been a few difficult issues that



Photo 2: ALARA Lunch at Carnegie. Back row: Jean VK3VIP, Pam VK3NK, Pat VK3OZ, Judy VK3FJAG, Margaret VK3FMAB. Front: Elsie.



Photo 3: Shirley VK5YL with her Certificate of Appreciation.

had cropped up in ALARA, giving her more headaches than she needed!

It was decided by the rest of the Committee, in secret, to present Shirley with a Certificate of Appreciation. Marilyn VK5DMS designed the certificate and it was presented to Shirley at the VK5s' monthly lunch in June, at the Police Club in Adelaide.

To say Shirley was surprised would be an understatement! I'm told she was speechless and that's not something we witness often! Congratulations Shirley – well deserved.

### ALARAmeeet Update

Decisions are being made and things are progressing with the organisation of the 2020 ALARAmeeet in Bendigo. Having looked at several venues, and taken advice from the Tourist Information Bureau, we have finally decided on, and have a firm booking for The Shamrock Hotel which is right in the centre of Bendigo. It is a genuine "Gold Rush Era" building with many attractive historical features.

Keep an eye on our Website [alara.com.au](http://alara.com.au) for further updates.

### The Other Einstein

In 1896 a young girl began her first class in Mathematics and Physics at the Polytechnic in Zurich. She was the only girl in a class of six students, and only the sixth female

to be accepted into Section Six (the Physics and mathematics classes) ever.

One of the men in that group was bushy-haired Isaac Einstein. Like Mileva Maric, Albert was an 'outsider'. Mileva came from Serbia and Albert was a Jew and both were looked down upon by many

Europeans.

In the coming months it became clear that Mileva was as capable as, or even better than the men in her class, especially in mathematics. Unfortunately because she was female, it was along time before she was accepted into the coffee-club culture of the other students, where all the latest discoveries were discussed and analysed, but it did come about eventually.

The end of the 18th and beginning of the 19th centuries were exciting times in the scientific world. Newton, Maxwell, Rutherford and

Heisenberg had been publishing papers on a wide range of subjects, all of which were of deep interest to the students of the Polytechnic. It was all very stimulating including the mathematics on which so much of it was based.

The relationship between Albert and Mileva had grown into a more Bohemian one of mental and physical stimulation so they became lovers as well as students.

During 1901 Albert published his first scientific paper, "On the Phenomena of Capillarity," which he and Mileva had developed over the past few months. He published it under his name only. He wanted to impress their Professor into giving him a job. Mileva was hurt but accepted the situation.

Unfortunately Mileva realised she was pregnant and urged Albert to marry her but he refused as the professorship he was seeking was for a single man, not a married one. Mileva stayed with her parents and had a daughter Lieserl whom she left with her parents.

Albert and Mileva were married in January 1903 by which time Albert was employed in the Patents Office and then they had two



Photo 5: VK5 YLs at the Birthday Lunch. L to R: Christine VK5CTY, Amanda VK5FAAJ, Lesley VK5LOL, Marilyn VK5DMS, Diedre XYL of VK5EMI, Shirley VK5YL, Myrna VK5YW, Meg VK5YG, Tina VK5TMC and Jenny VK5FJAY. (With some of their OMs in the background).

boys. Mileva always wanted to have Lieserl with them but it never happened and Lieserl died of scarlet fever when she was four years old.

Little by little Mileva found herself more and more a housewife and less a collaborator although she may have actually started Albert thinking along the ideas that lead to his most important publication "The Theory of Relativity," when she missed a train.

Sitting on the station watching the people in the train and those on the platform she realised that everything is observed from the place from which it is observed. We see and live relative to everything around us and how fast they are moving relative to us.

Albert never added Mileva's name to the list of authors of the papers he wrote although she certainly was the mathematics wizard. He came to see her just as a wife to iron his shirts and put a meal on the table.

Meeting with Marie Curie made Mileva realise what their marriage could have been like — a genuine Bohemian relationship of work and love. Then Albert began a relationship with a woman he had known since childhood.

In June 1914 Mileva left Albert but before she did so she forced him to sign a document that, in the event of him being awarded a Nobel Prize for his work (he had been rejected several times because he was a Jew) he would give her half the money in acknowledgement of her contribution. Albert Einstein was awarded the Nobel Prize in 1923.

Mileva Maric was always the 'other' Einstein.

My thanks to Christine VK5CTY for her précis of the book "The Other Einstein" by Marie Benedict.

### ALARA's 44th Birthday lunch in VK5

Lunches to celebrate ALARA's Birthday are held in many States, on

or near 25th July each year.

In VK5 this year the Birthday Lunch was held at the Police Club in the city.

### A Special Birthday Lunch in VK3

Those of you who read this column regularly, will often notice Jean VK3VIP's reference to "Mum Elsie" and see this petite white-haired lady in the front row of the group photos. Since Elsie came to live in Australia with Jean and John, from New Zealand, a few years ago, she has become a firm friend of the VK3 YLs and their OMs, and attends our bi-monthly lunches. So it was with great pleasure that many of us accepted invitations to attend her surprise 95th Birthday lunch on July 13th at the Glen Waverley RSL. And surprised she was; the look on her face when she saw the huge group of family and friends was priceless! Elsie, I just hope that I'm as spritely and "with it" as you when I'm 95!



Photo 6: OMs and YLs at Elsie's 95th Birthday.



## Wireless Men & Women at War

Young men and women brought about largely by their interest in private radio communications.

Read more and visit the WIA Bookshop at:

[www.wia.org.au/members/bookshop/page\\_data.php?id=258](http://www.wia.org.au/members/bookshop/page_data.php?id=258)



## VK7news

Justin Giles-Clark VK7TW

e vk7tw@wia.org.au

w <https://groups.io/g/vk7arnews>

### Congratulations

To David VK7OB and Marilyn VK7FMAZ who recently celebrated two milestones – their 50th wedding anniversary and Dave's 70<sup>th</sup> Birthday. Ross VK7ALH and wife Merilyn have also recently celebrated their Golden Wedding Anniversary. Congratulations! A regular net controller on the Sewing Circle Net Cedric VK7CL, also celebrate his 80<sup>th</sup> birthday recently in Launceston.

### VK7 Amateur Radio News

The VK7 AR News broadcast occurs each Sunday after the WIA National News at 9:30am and the DMR broadcast is proving popular. It used to be on Talk Group 3809 and has now moved to Talk Group 5.

### VHF/UHF Winter Field Day 2019 – VK7 participation

The winter solstice weekend of 22-23 June 2019 was the Winter Field Day and the author is aware of the following VK7s being involved - Richard VK7ZBX, Murray VK7ZMS, Hayden VK7HH and Rex VK7MO in Southern VK7 and in the North - Peter VK7ZPE, Allen VK7AN, Peter VK7KPC, James VK7JAM and partner Jasmin. Frank VK7DX in central highlands was also involved.

### North West News

#### North West Chat & Show Group

Saturday 6 July 2019 saw the bimonthly "Chat N Show" at the Penguin Sports Centre where Amateur Radio Operators are encouraged to bring items for show and tell, socialise and enjoy a scrumptious afternoon tea. These shows are hosted by Shirley



Photo 1: Richard VK7ZBX on Mt Wellington in the snow. (Photo courtesy of Richard VK7ZBX)

VK7HSC and there were three presenters, Jonathon VK7JON and Helen VK7FOLK on park activations, Terry VK7JAI with old test gear and Les VK7OT with inductance meters. Pictures of the equipment can be seen on the VK7 Amateur Radio Face book page.

### North West Tasmanian Radio and Television Group (NWTR&TVG)

<http://www.vk7ax.id.au/atvgroup/>

The NWTR&TVG held a winter luncheon at the Light House hotel in Ulverstone on Saturday 20th July, there was a great roll-up and lunch and dessert was enjoyed with much radio discussion.



Photo 2: Luncheon attendees. (Photo courtesy of Kirsty VK7FKKK)

### Northern News

#### Northern Tasmanian Amateur Radio Club (NTARC)

<http://www.ntarc.net/>

The NTARC clubrooms for many years enjoyed the heat from a wood heater affectionately named

Hearth Vader. Unfortunately Hearth Vader suffered heat death and was cremated and has been replaced with a slow combustion heater named Skywarmer...HIHI! The technical nights have been in full swing and the following is a small sample of some of the activities – Ross VK7ALH with his AR7 receiver rack, Trevor VK7TB and Ross gave potted history of the AR7. Colin VK7ZCF brought along his new Ukrainian antenna analyser to show with a range up to 1400 MHz. The nights have been getting regular updates from Peter VK2MPK who is in VK7 and involved with the Cattle Hill windfarm logistics. Peter VK7KPC was playing with 1090 MHz ADS-B reception and an STC broadcast radio from 1949. Trevor also gave a master class on antenna matching and interpreting results from measurements.

## Southern News

### WICEN Tasmania (South)

<https://wicentas.org/>

The WICEN web site has been moved, the new website address is <https://wicentas.org/>. The VK7 repeater map is still available at: [https://wicentas.org/SOPs/Rpt\\_Map.htm](https://wicentas.org/SOPs/Rpt_Map.htm)

### Radio and Electronics Association of Southern Tasmania Inc.

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

<https://www.facebook.com/reasttas/>

We congratulate the following who were successful at the May Training and Assessment Event –John, VK7FREE, Alex, VK7FAAD, Alexander, VK7HA, Alexey, VK7FAAA, David, VK7FAAB and Tony, VK7LOR.

In July REAST held a GPS Disciplined Oscillator (GPSDO) Forum. The night started with a presentation from Rex VK7MO and Justin VK7TW – covering crystals and crystal ovens, TCXO, OCXO and DOCXO. Rex then went into a comparison of the different GPSDOs and then the issues with

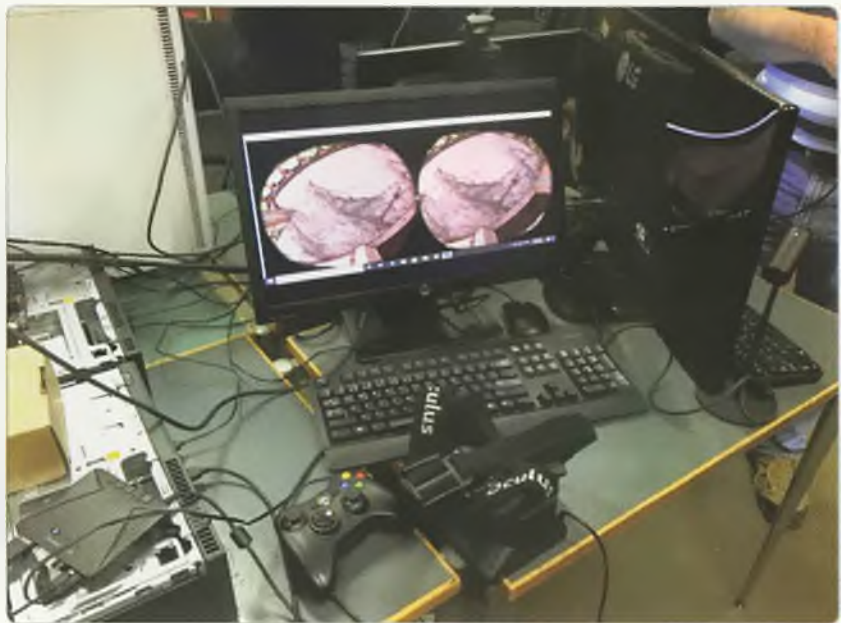


Photo 3: Oculus Rift VR demonstration station. (Photo courtesy of Justin, VK7TW)

the ICOM IC-9700 and the Glenn VK1XX's locking board. There were nine different GPSDOs on display at the forum.

REAST's August presentation was on Virtual Reality (VR) Archeology by Ian Mackintosh. Ian covered the history of VR, the key players and developers, examples of developments, equipment and technology advances. Ian has been experimenting with Oculus Rift development kits DK1 & DK2 and the Consumer Edition 1 and he bought along all three with working examples that the audience could experience. The presentation and demonstration was recorded and is available on the REAST Youtube channel. Thanks to Ian Mack for the excellent presentation.

The DATV Experimenter's Night's have continued with a quick summary of some of the items covered - Warren VK7WN with the arduino snake kit that is sold at workshops at Jaycar for Nerd Perks subscribers. There was a Grid Dip Oscillator night where there 5 different GDOs and Steve VK7OO gave a presentation on the Hobart City Integrated Parking System. Paul VK7FPCL bought along a LED

lighting panel, Rex VK7MO gave us some presentations on 10 & 24GHz terrestrial microwave contacts and the author gave a talk on his recently purchased NanoVNA.

## Silent Key

### Charles Spiegel, VK7KS

We have the sad task of reporting the passing of Charles (Kaspar) Spiegel, VK7KS. Charley will be remembered particularly by the more senior members of our fraternity as he was active from the late 1950s. Charles was one of several southern hams who had the gliding bug, and was we believe, a gliding instructor. Charles was a member of the Luftwaffe in Germany and came to Australia after the war and worked for the Hydro Electric Commission in the Hydro Laboratories. He went on become involved in the Department of Veterans Affairs. A true Gentleman, he was always helpful and generous with his time to encourage young people to join our hobby.

Vale Charles  
(Winston VK7WH, Bill VK7MX,  
Mike VK7FB, Robin VK7RH)

## Silent Key

### Ron VK7VDL

Ron was an incredibly generous person who would always be giving people things – like a 6 inch Faber Castell slide rule when Cedric VK7CL lamented not having one anymore. Anything Ron built was built to last and was usually well over spec'd. If you needed a 20 amp power supply Ron would build a 40 amp supply! The Ron philosophy was, if it was twice as strong as it needed to be it was under half the load and should never give you issues. Ron was a straight shooter type of guy, not a lot of grey with Ron for when he made his mind up it was written in stone unless proven otherwise.

Vale Ron

(Cedric VK7CL and Leigh VK7FLAR)

## Silent Key

### Barry Riseley formerly VK7RS

Barry Riseley VK7RS fell Silent Key on 6th August 2019 at the age of 76. Barry was well known to many in the telecommunication industry in Tasmania. He was the Secretary of the A.T.E.A., the union for technicians in Telecom from



Photo 4: Barry Riseley VK7RS reading the VK7 Regional News Broadcast on ATV in 2007. (Photo courtesy of Justin VK7TW)

the 60s through to the 2000s. The ATEA office is still on the main road in New Town and for a time it was the meeting place for the WIA Tasmanian Division – Southern Branch.

Barry worked in the PMG with many including Max Loveless who was one of the Sparrow Force group in East Timor who built Winnie-the-War winner that features in the Australian War Memorial. Barry built

a replica that is in the Anglesea Barracks Military Museum.

VK7RS first appears in 1985/86 callbook and was still licenced in 2013. Barry read the VK7 Divisional Broadcast for many years and even read it on ATV in the early studio on the Queens Domain.

Vale Barry Riseley  
(Justin VK7TW, Richard VK7RO and Mike VK7FB)



## Gold Coast Amateur Radio Society HAMFEST 2019

**Saturday 16 November 2018**

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**See you there!**



# Silent Key

Bill Scheele VK4TWS

Bill Scheele began his Australian adventure when immigrated to Melbourne Australia with his new wife, via South Africa. He began in the building trade and edged his way north working for various companies before he landed in Brisbane. Bill was known for his attention to detail and excellent building standards which he carried forth when building his own home and Octagonal Radio Shack complete with a steel sectioned tower at Rochedale

Bill was an integral member of BARC for many years serving in various positions of the club and was always involved in club activities and assisting members wherever he could

After many years of club meeting rooms that all proved unsatisfactory, Bill used his friendship with Rochedale Scout Master and arranged for us to hire the Rochedale Scout hall twice a month as well as the use of two rooms available for storage of club equipment and is now our permanent home for the foreseeable future

When another club member donated a windup mast for the Club to use. It was Bill who delivered it to the Scout Den where



it was then decided to erect it. Bill then spent many hours digging a foundation hole and provided a concrete base for the tower by hand mixing the cement for the base all by himself.

With Bill living just down the road from the club he had ample opportunity to set up more

antennas and aerials including the rotator and Yagi and early repeater antennas for the club

Bill was also very active with slow scan TV and eagerly put on demonstrations for the Scouts on Jota days, and he was also the Monday night net controller for the club HF nets for a number of years.

Bill had great pleasure in showing his builder skills with his self built octagonal radio shack and tower mast at this home to members and was a regular Dixer on HF

Bill loved to wheel and deal, telling tales to all who would hear of his luck with swaps of work for radio gear over the years

Nothing was too much trouble for Bill if he could help he was always there for members and the club and he still made an effort to attend meetings regularly at all events though his health was failing

Bill was also well known for his love of Stainless steel and used it on his Projects whenever he could

Thanks Bill for all your work and friendship you are missed by us all of us here at BARC.

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### INFORMATION AND TABLE BOOKINGS

Contact Roy Gabriel VK5NRG Phone: 0438 362 049 Email : vk5nrg@wia.org.au



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Your contribution and feedback is welcomed.

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

Email the Secretary:  
[armag@wia.org.au](mailto:armag@wia.org.au)

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