Amateur Radio

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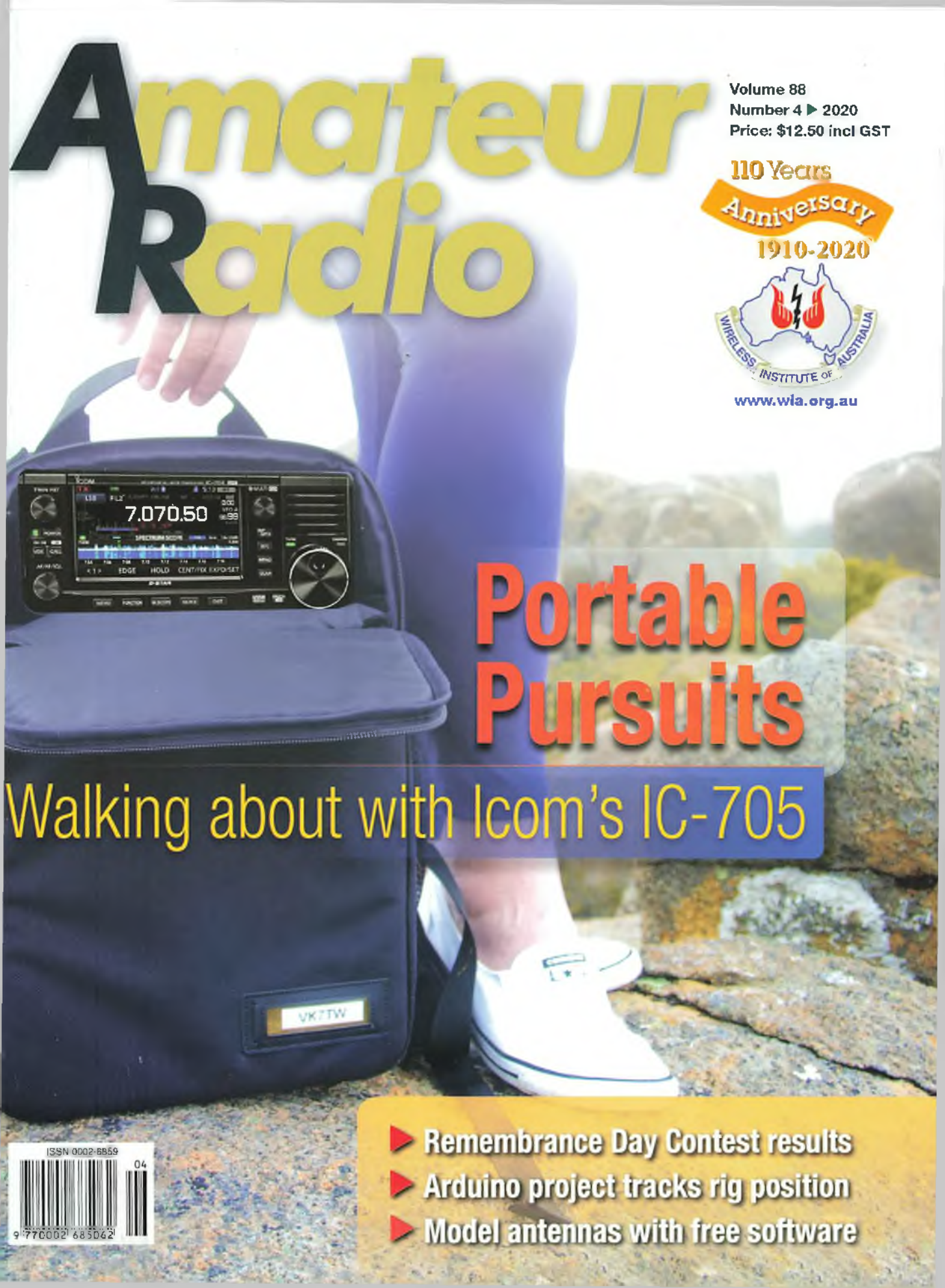

Portable Pursuits

Walking about with Icom's IC-705

- Remembrance Day Contest results
- Arduino project tracks rig position
- Model antennas with free software

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Technical

General

This month's cover:
There's no doubt that, over recent years, the amateur fraternity has been getting out and about, enjoying the pleasure of portable operation. This issue, we have three contributors abandon their shacks to get playful with Icom's latest rig for the portable market!

Columns

Contributions to Amateur Radio

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

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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.

Wireless Institute of Australia

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Member of the International Amateur Radio Union

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Editorial

Roger Harrison VK2ZRH

Lo the roving ham!
Mighty are their preparations.
They riseth early and go forth,
Full of great expectations.
Then returneth late,
Smelling of strong drink,
And the truth is not in them!
(after *anonymous* 'Ode to fishermen').

There's little or no doubt that, over recent years, the amateur fraternity has been getting out and about, enjoying the pleasures of portable operation. It's not really a "new thing", as there's photographic and documentary evidence of efforts at portable operation from the "heroic era" a century ago. But, today, the facility to 'get up and go' portable is so much greater than in the past.

Portable ham radio pursuits have burgeoned through such drawcards as SOTA and Parks, VHF-UHF hill-topping, MADs (microwave activity days) and specialty field days. There is hardly a weekend free across the 12 months of the year where portable activities and contests don't feature.

Playing up to this escalating interest and activity, commercial rig manufacturers and you-build-it kit producers have spent considerable development time, effort and dollars to produce small, low-volume, low-weight, low power multi-band, highly-featured rigs, which have been gaining a foothold amongst amateurs right across the world.

A particular exemplar of this genre would be Yaesu's FT-817, recently joined by the FT-818. Covering from the 160m band through to 70cm, the '817 set a benchmark when it was released around two decades ago. It quickly garnered a dedicated following, and not just among the QRP crowd, which has hardly diminished with time. Prices for the '817 on the second-hand market seemingly defy conventional economics. The '817 has also claimed a secondary market as an IF rig among microwave enthusiasts, to drive their transverters.

So, where has "the shack" of yesteryear gone? Have amateurs abandoned the home-QTH shack?

Not a bit of it. The pleasures of portable operations has become an additional pursuit among the many available to today's amateurs. The relentless march of developments in technology has enabled the commercial manufacturers, the you-build-it kit producers, and not to mention the hard-bitten homebrewers, to meet the needs and challenges of operating away from the home shack – even leaving their vehicles behind! Communing with nature has taken on a whole new meaning.

The on-air and online chatter surrounding the launch, and later release, of Icom's fully-featured portable QRP rig – the IC-705 – has been impossible to escape. So, when it became available locally, the opportunity to garner a review, or two, from some prominent users was too good to miss. As it happened, I was offered two reviews within days of each other, and then took the opportunity to ask another colleague if they'd care to contribute their tuppence-worth on the subject.

Hence, this issue, we have three contributors abandon their shacks to get playful with Icom's latest rig for the portable market! Nothing like covering all bases, as the sporting parlance goes. Enjoy!

Board comment

Greg Kelly VK2GPK

As I compose this issue's board comment, the state of Victoria has just announced some welcome relaxation of the Stage 4 lockdown pandemic restrictions for Melbourne following an impressive reduction to-date in the rate of new SARS-CoV-2 virus infection rates. This bodes well for the near future.

This announcement follows on from relaxation of lockdown restrictions in Victorian regional areas a few weeks earlier. While there is some way to go for life to be close to normal for Melbourne residents, this feat of bringing down the infection rates to single digit levels is a credit to the community and a far better achievement than similar overseas jurisdictions dealing with a "Second Wave".

The disruptive impact of these "Second wave" restrictions in Melbourne, on both home and work life, has been huge. However, the sensible majority has complied with the onerous restrictions for the benefit of the wider Australian community.

As in the earlier New South Wales "Ruby Princess" event, there are many painful lessons that have been learnt, and hopefully, the wisdom gained will minimise the risk of such extreme later stage lockdowns being required in Australia again during this pandemic. Yet, throughout this period, the noticeable increase in "On The Air" activity, greatly increased sales of amateur radio products, and increased numbers interested in gaining Foundation Licences, has been some of the few upsides during the pandemic lockdowns.

Space Research: In the last year, the WIA Board has been requested to endorse the use of amateur radio spectrum by two Australian satellite projects. The WIA, as the official member of the International Amateur Radio Union (IARU), is required to endorse such applications before they are considered by either the International Amateur Radio Union's Satellite Frequency Co-ordination panel and/or by the Australian Communications and Media Authority (ACMA)[1].

Director Peter Clee, recently summarised the WIA's involvement with assisting space research in Australia: "The WIA has recently endorsed the Binar-1 CubeSat project being developed by the Curtin University's Space Science and Technology Centre and is to be launched early next year (2021). The Curtin team has managed to put all the systems required to operate the satellite, including the power, computer, steering and communications, on a single eight-layer printed circuit board, which measures only 10 cm by 10 cm!

"Having everything on a single circuit board means there is more room for carrying sensors, which in this case will be a camera that will capture images of Australia taken from orbit. These images will be sent back to ground using amateur frequencies. Information on receiving and decoding these images will be published in a future issue of Amateur Radio magazine.

The WIA has also provided conditional support for the CSIRO's CubeSat project, CSIROSat1. This "NanoSat" will be a three-unit CubeSat, about the same size as a loaf of bread! It will carry an infrared sensor that will allow researchers to 'see' features that can't otherwise be seen using satellite imagery in the visible spectrum."

These requests have highlighted the need for a consistent treatment of these research requests by the WIA and its volunteers. The WIA is currently developing a draft policy on Amateur Satellites and the criteria hurdles for their endorsement, such as the level of radio amateur visibility and access. This will be published for general availability once peer-reviewed by the WIA Spectrum committee and has final approval from the WIA Board.

Social Media: In September, Director Scott Williams commented on the state of social media and Amateur Radio as part of his experiences of becoming a new WIA director. He states: "Common feedback received is how do we stop, suppress, or control all the negative social media chatter that seems to go on daily undermining the hobby and creating divide. It is

Continued on page 8

1 The WIA is the sole national Radio Amateur peak body recognised by the IARU (International Radio Amateur Union). In turn, the ITU (International Telecommunications Union), a specialist agency of the UN (United Nations) which governs the global use of the RF spectrum, recognises the IARU as responsible for the Radio Amateur sector of the RF spectrum, including use of that RF spectrum for space satellites.

WIA news

Trial Foundation assessments features instant results

To aid those studying for their Foundation licence, a new Online Foundation Trial Exam system was launched by the WIA in late August.

The system provides immediate results to enable potential candidates to check their knowledge and see how they're progressing.

Each trial exam consists of 25 Questions randomly selected from a vast question pool with answers randomly arranged each time for the candidate. Incorrect answer choices are shown with the correct answer highlighted for reference.

The WIA has received many requests lately, from newcomers to the hobby, about where to find trial exams to help improve progress with their Foundation licence studies.

It is recommended that potential candidates buy a copy of the WIA's "Foundation Licence Manual Rev 3" from the WIA bookshop or from your local radio club.

The online assessment system can be accessed here: *www.wia.org.au/licenses/foundation/onlineexams/foundation.php*

Candidates who gain their Amateur Operators Certificate of Proficiency (AOCP) – for *any* of the three licence grades – can apply for a FREE one-year WIA membership.

Next Generation amateur radio flies on the Space Station

Operating as a 2m/70cm cross-band FM repeater, the "Next-Gen" (next generation) radio system was installed recently aboard the Columbus Module of the International Space Station (ISS). System activation was first observed at 01:02 UTC on 2 September 2020.

The uplink frequency is 145.99 MHz, requiring an access tone of 67 Hz to open the system, and the downlink frequency is 437.800 MHz.

Installation of the Next-Gen system is the culmination of an incredible five-year engineering achievement accomplished by the ARISS hardware volunteer team to design, develop, build, test and launch it.

Dubbed the InterOperable Radio System (IORS), it replaces the Ericsson radio system and packet module that were originally certified for spaceflight 20 years ago, in July 2000.

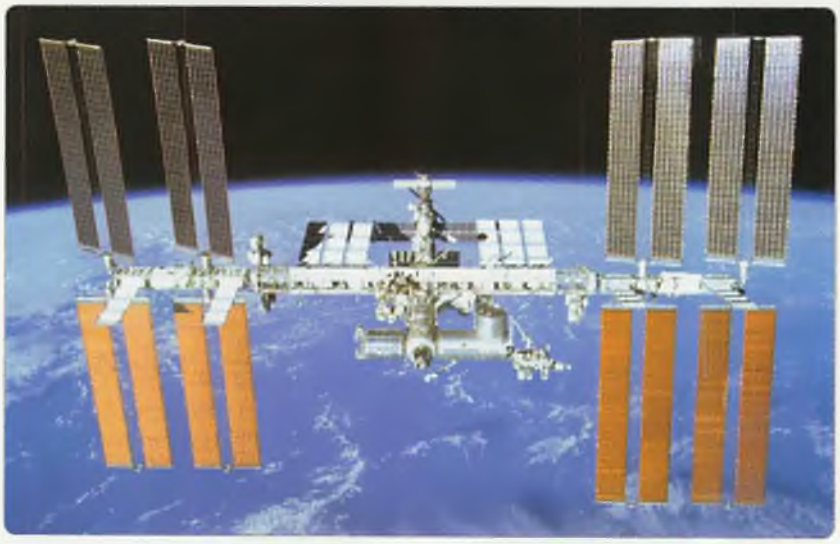
It will enable new, exciting capabilities for ham radio operators, students, and the general public. Capabilities include a higher power radio, voice repeater, digital packet radio (APRS) capabilities and a Kenwood VC-H1 slow scan television (SSTV) system.

A second IORS is undergoing flight certification and will be launched later for installation in the Russian Service module. This second system enables dual, simultaneous operations (e.g. voice repeater and APRS packet), providing diverse opportunities for radio amateurs. It also provides on-orbit redundancy to ensure continuous operations in the event of an IORS component failure.

The Next-Gen IORS is an ARISS project – Amateur Radio on the International Space Station. ARISS is a cooperative venture of international amateur radio societies and the space agencies that support the International Space Station (ISS).

In the United States, sponsors are the Radio Amateur Satellite Corporation (AMSAT), the American Radio Relay League (ARRL), the ISS National Lab-Space Station Explorers, and NASA's Space Communications and Navigation program.

The primary goal of ARISS is to promote exploration of science, technology, engineering, the arts, and mathematics topics by organizing scheduled contacts via amateur radio between crew members aboard the ISS and students. Before and during these radio contacts, students, educators, parents, and communities learn about space, space technologies, and amateur radio.
Visit: *www.ariss.org/*



The next generation amateur radio system installed on the International Space Station went live on 2 September.

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WIA news

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New award for Oceania

Announced in August, the new Oceania DX Award recognises participants who have worked and confirmed at least 25 of the 60 DXCC entities in Oceania.

The Award targets Foundation licensees and beginner DXers who may have modest stations, particularly those using wire antennas and/or low power.

Contacts can be made on any band and any mode, with endorsements for 30/35/40/45/50/55 entities, plus an Honour Roll award for contacting 57 entities, and Excellence for all 60.

Developed and launched by the WIA DX Awards Committee, the new Oceania DX Award complements dozens of other awards available to WIA members and non-VK DX members via the WIA Awards system. Visit: *https://www.wiaawards.com/*

Youngsters On The Air camp postponed

To engage youth and younger members in the wonderful range of experiences and facets that amateur radio offers, the WIA board has been in discussions with the International Amateur Radio Union's committee for Youngsters On The Air (YOTA).

One of the major activities planned is a YOTA camp, being developed by the International Amateur Radio Union's (IARU) Region 3 YOTA committee.

The first ever IARU Region 3 YOTA camp was scheduled to be held in Thailand this October but, unfortunately, is now postponed due to Covid-19 restrictions and will be rescheduled for a later date.

The IARU region 3 organisers had a wonderful program planned for the attendees with training sessions, practical activities, entertainment, meals and sightseeing included.

Information on this YOTA Camp event can be found online, here: *www.iarur3yota2020.com/*

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Build this Arduino-based APRS tracker to report your rig's position

Dale Hughes VK1DSH

Use of the Amateur Packet Reporting System (APRS) is very popular around the world and it is used by many amateurs in Australia for **indicating their position**, transmitting **weather data** and **other information** through a more-or-less national network of digipeaters that relay the packet messages. Real time global information about APRS user positions can be seen on the APRS.fi website. APRS messages are also sent from a variety of satellites and the International Space Station (ISS).

Over the years, there have been many implementations of APRS equipment and this article describes a transmit-only APRS tracker based on the popular Arduino platform.

This design uses the Arduino APRS library by Baris Dinc TA7W/OH2UDS for generating the AX.25 APRS packets and provides some additional features which have been found useful:

- measurement and display of battery supply voltage
- determination and display of the Maidenhead Grid Locator.

The APRS tracker keys and modulates a handheld 2m transceiver; an elderly FT-23R in this case, though almost any other 2m transceiver could be used and the APRS tracker is a good application for otherwise unused handheld radios. An APRS message is sent every five minutes or at the request of the user when the 'Send now' button is pressed. The timing and the content of the APRS messages can be easily changed by modifying several lines in the Arduino sketch. The tracker, GPS receiver/antenna and transceiver are shown in Figure 1.

Figure 1: The APRS tracker, GPS receiver and FT-23R transceiver. The GPS receiver module can be positioned to give best reception of the GPS satellites.

Device description

This design uses an Arduino Uno microcontroller and the schematic diagram of the tracker is shown in Figure 2. The 12 Vdc input to the tracker is protected against reverse polarity and over-current by diode D1 and a 'Polyswitch' resettable fuse (F1).

Power at 8 VDC for the Arduino is provided by a standard three-terminal regulator and power at 3.3 Vdc for the GPS receiver, and display is derived from the 8 V supply through two 1N4001 diodes, to keep the 3.3 V regulator input voltage within its specified limit. The input voltage (nominally 12 V) is also sampled by a 4:1 voltage divider, which enables the Arduino to measure and display the supply voltage. The microcontroller analog input is protected by a 5.1 V Zener diode, which will clamp any spikes.

Position and time data are read from an inexpensive GPS receiver that outputs a $GPRMC message; note

1 See *http://www.aprs.net.au/* for details of Australian APRS activities.
2 See *http://www.ariss.net/*
3 See *https://github.com/barisdinc*, the APRS library can be downloaded from this site.
4 Development of the code to determine the Maidenhead locator was an interesting exercise and the curious reader is directed to an article by Edmund T. Tyson N5JTY in the January 1989 edition of *QST* magazine.
5 A U-Blox NEO-6M GPS Module from Core Electronics was used in the prototype tracker.
6 See *http://aprs.gids.nl/nmea/#rmc* for $GPRMC message details.

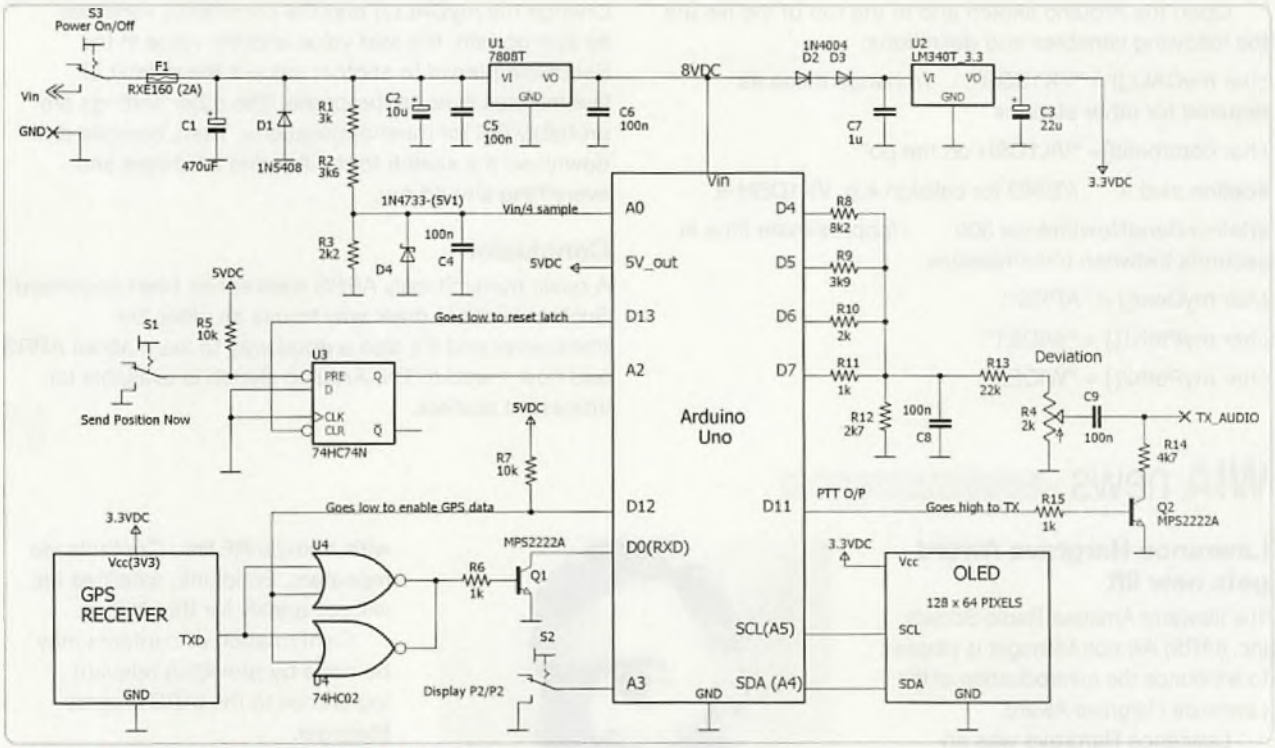

Figure 2: Schematic diagram of the APRS tracker.

that the GPS receiver is mounted in a separate small plastic box so that it can be placed in a position with a clear view of the sky.

The GPS receiver serial output port connects to the Arduino serial input port through some circuitry (U4 and Q1) which only connects the GPS receiver serial port when the APRS software is running; this is done so that the Arduino serial port can be properly shared between programing the microcontroller and reception of GPS data. Switch S2 selects between two 'pages' of information on the Organic Light Emitting Diode Display (OLED); either the current time (UT), latitude and longitude, or the battery voltage and Maidenhead locator can be shown.

The Arduino code takes the $GPRMC string (which contains time, latitude and longitude data) from the GPS receiver, combines it with the station call sign, message string and formats it into an AX.25 APRS packet, which it then sends as a 1200 bps AFSK packet signal. The tones of this signal are generated by a simple 4bit digital-to-analog converter (DAC) made up of resistors and capacitors connected to the Arduino digital output ports D4 through D7. The DAC works surprisingly well for such a simple circuit. The resulting (more-or-less) sine wave tones are sent to the transmitter and the deviation of the FM transmitter can be set by adjusting R4, noting that less deviation is a lesser evil than too much deviation.

Press-To-Transmit (PTT) control of the FT-23R (and probably many other transceivers) can be implemented by switching a DC path to ground in the microphone input; transistor Q2 provides that DC path to ground through resistor R14 when transmission is required. Other forms of PTT control can be easily implemented if required.

The remaining circuitry is the display and a 74HC74 latch (U3) to store a user request to transmit an APRS message. The latch-on push button S1 simplifies the software so that it doesn't have to always poll the switch; when the transmission commences the latch is reset by the Arduino program.

The display is a 128 x 64-pixel OLED which connects to the Arduino processor via the I2C interface. The circuitry was built onto a piece of Veroboard and mounted inside a small diecast box with connections to the transceiver, GPS receiver and power supply.

Software

The source code for the project was written using the Arduino Integrated Development Environment, which is readily available and easy to use. Make sure you have the *LibAPRS_Tracker* and *U8glib* display libraries installed before proceeding to modify or upload the Arduino sketch.

Before use, it is necessary to change the station call sign and (if necessary) the timing of the APRS beacon transmission.

7 A Jaycar XC-4384 display was used in the prototype and there are many other similar types readily available.

Open the Arduino sketch and at the top of the file are the following variables and definitions:

```
char myCALL[] = "VK1DSH";   //change these as required for other stations
char comment[]= "VK1DSH on the go";
#define ssid 9    //SSID for callsign e.g. VK1DSH-9
#define SendNowInterval 300    //approximate time in seconds between transmissions
char myDest[] = "APRS";
char myPath1[] = "WIDE1";
char myPath2[] = "WIDE2";
```

Change the *myCALL[]* and the *comment[]* variables as appropriate, the *ssid* value and the value in the *SendNowInterval* to another value if the default of five minutes is not appropriate. The other settings are probably OK for most applications. Then, compile and download the sketch to the Arduino hardware and everything should run.

Conclusion

A basic transmit-only APRS tracker has been described. Such a device is great way to use an older 2m transceiver and it's also a good way to learn about APRS and how it works. The Arduino sketch is available for interested readers.

WIA news

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Lawrence Hargrave Award gets new lift

The Illawarra Amateur Radio Society Inc. (IARS) Awards Manager is pleased to announce the reintroduction of the Lawrence Hargrave Award.

Lawrence Hargrave was an early experimenter in the field of aviation. He made his findings freely available. His experiments were critical to the development of powered flight. Hargrave famously experimented with box kites at Stanwell Park – a part of the Illawarra district.

This award recognises participants who are DX non-Australian Stations, having worked and confirmed at least five (5) IARS members. Australian stations need to have worked and confirmed at least twenty five (25) IARS members as from June 2020.

Lawrence Hargrave, who appears on the $20 note, was an Australian engineer, aeronautical pioneer, inventor, explorer, and astronomer.

Contacts can be made on any band and any mode but only with a single RF link. Contacts via repeaters, EchoLink, satellites etc, will not qualify for this Award.

Confirmation of contacts may be done by providing relevant log entries to the IARS Awards Manager.

Participants may count the stations worked during the IARS weekly radio net held on 3.666 MHz, Tuesdays at 22:30 hrs local time. Please note that the net is not held on the second Tuesday of the month as the Society meets that night.

This award is for all radio amateurs of any ability.

Rob Heyer VK2XIC
Awards Manager,
On behalf of the IARS
vk2xic@wia.org.au

Board comment

Continued from page 3

certainly not the role of the WIA to act as a watchdog in the industry and challenge varying views – even if that was feasible. It is the author's belief that robust discussion is always healthy but my view is, when it involves personal attacks and borders on bringing the hobby into disrepute, that is a tremendous shame."

This unhelpful social media behaviour, often involving expletive-laden language, misogyny, defamatory, and/or discriminatory statements, appears to be stemming from a relatively small subset of the Australian radio amateur fraternity, some using pseudonyms. Yet these few miscreants – whom appear to have a very limited vocabulary, especially of non-four letter adjectives – have a substantive damaging impact on the perception of the Radio Amateur Service brand. The WIA respectfully calls on our members not to engage these "trolls" in an escalating exchange, and for moderators to remove offending posts.

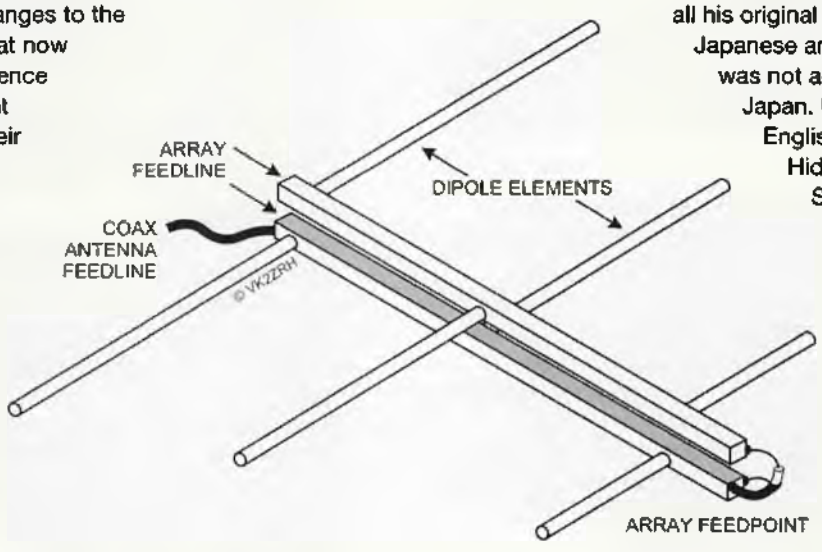
73

Greg VK2GPK, *WIA President.*

So you want to use software for antenna modelling?

Brian Clarke VK2GCE

Before the recent changes to the licence conditions that now allow Foundation Licence holders to experiment with all aspects of their radio station, the only things all radio amateurs could 'play' with were their antennas. Another change to the licence conditions allows Foundation Licence holders to use digital modes. So, more radio amateurs are getting exposed to computer code.



Model your antenna 'thoughts' in software before obtaining the materials.

Some of the really useful code that has emerged recently is for antenna modelling. But, caveat emptor: some code is written by software experts and requires a degree in mathematics or computer science before you can use the code, let alone modify it for yourself. This article is a plea for more articles on your experience of antenna modelling software.

My introduction to antenna design

When I studied for my Bachelor of Engineering at Auckland University, Gordon Bogle was the Professor of Electrical Engineering. Gordon was one of the RAF's back room boys developing radar during WW2. (He was recruited to head Auckland University's new School of Engineering). So, it should be no surprise that we got filled up on the radar range equation, target resolution vs frequency and pulse repetition frequency (PRF). We also got a chunk on UHF antennas in our final year.

In those days, 50 MHz was UHF. The Chain Home radar system on the south-east coast of England worked up to that frequency. Around 50 MHz was also the frequency used for early commercial TV broadcasting. Radar equipment was being installed in aircraft for target acquisition and navigation.

Japanese academic, Professor Shintaro Uda, developed a multi-element directional antenna and published his design in the early 1920s. However, all his original papers were in Japanese and so the design was not accessible outside Japan. Uda did not speak English, but his student, Hidetsugu Yagi, did. So, Yagi wrote the papers published in English in 1926. Professor Uda's and Yagi's work on multi-element beam antennas was lapped up by the British and used for some of the radar antennas installed in aircraft nose cones.

Back to Gordon Bogle. He showed us how to calculate the square root of the sum of squares on a slide rule – nifty stuff. Through collaboration between him and Cecil Segedin, our Professor of Maths, we learned how to do Finite Element Analysis (FEA) – by hand. The school also had some NCR comptometers where you entered numbers and churned a handle. The nearest we got to using *electronic* computers was learning how to solve quadratic equations using Fortran; we had to punch the cards, verify them, package them up, send them off to the university's main computer and then wait for the results. As I recall, I got my results back

A popular calculator for technical work of yesteryear was the slide rule. This Japanese-made Hemmi slide rule represents a product that was widely used in Australia through the 1940s to 1970s. From the Museum of Applied Arts & Sciences, Sydney. https://collection.maas.museum/object/378620

a week later with a curt note saying the processing time for my 'project' had been 0.8 sec.

Of course, Gordon had the last laugh. In our end-of-final-year theory examination, we had to estimate the impedance of a 1/8th-wave ground-plane antenna. The only tool we knew was FEA. That meant we had to apply the sine-squared law to estimate current distribution along the antenna, draw up curves of equal voltage (like equal-elevation contour markings on a map), and then cross them with lines showing equal flows of current (iso-clines). Then we applied Ohm's Law, dividing voltage by current to get impedance. Looking back now, I am glad we were not asked to calculate the impedance of a Yagi-Uda antenna!

Nowadays

FEA, also often referred to as Finite Element Method (FEM), is the basis for many antenna modelling software packages. But it is not the only method. Over the recent months, I have scanned the literature on antenna modelling and I have attended seminars and tutorials extolling the virtues of various software packages.

Several radio amateurs are using software packages to model intended antennas. Modelling is a much cheaper way of getting close to antenna design than cut-and-try methods. The really adventurous use several models and compare results before heading off to acquire materials to build their antennas.

What to consider

If you plan to use antenna modelling software, here are some matters you need to consider:

- Computer requirements:
  - hard drive space required for the engine (SSD or HDD)
  - compatibility of the engine with your existing operating system
  - space required for the processing (RAM)
  - how many cores to employ
  - speed of the CPU
  - resolution and size of the monitor
- Assumptions about element size vs accuracy of the result (Ls compared with r)
- Assumptions about field (or ground) definition – infinite, flat, curved, soil conductivity
- Variables that can be manipulated – frequency, directivity, gain desired, height above ground, shape and size of antenna elements
- Required output, eg: impedance, gain, Q, bandwidth, efficiency, a directional pattern, near field, far field, dangerous voltage gradients
- Time for convergence to a solution
- Error rate
- Mathematical skills required to understand what the engine is doing
- Cost of the software
- Availability of pre-solved examples, eg: dipole, G5RV, Yagi, Zepp.

Some antenna modelling software packages available

- Computational Electromagnetics (CEM)
- Computer Simulation Technology (CST) – commercial; owned by Dassault systems
- ElectroMagnetics Professional (EMPro) – commercial; owned by Keysight
- Finite Difference Time Domain (FDTD) – a commercial version, XFDTD, is available from REMCON; OpenEMS is a free version of FDTD
- Finite Elements Method (FEM) – a version of FEA
- Finite Integration Theory (FIT) – a time domain solver
- Generalised Regression (Radiation?) Analysis Spatial Prediction (Simulation Package?) (GRASP) – commercial; owned by TICRA – focussed on reflector antenna designs
- High Frequency Structure Simulation (HFSS) – uses FEM – commercial; available from Ansys – you probably need to attend an Ansys tutorial
- Higher Order Basis Based Integral Equation Solver (HOBBIES) – commercial; available from Antenna Software, NJ – good for EMC and EMI issues
- Method of Moments (MoM) – used in many antenna software packages, eg, AToM from MATLAB
- Numerical Electromagnetic Code (NEC) – many variants are available, eg: ELNEC, EZNEC, NEC2, 4NEC2, NEC4; many are free
- Pseudo-Maximum Likelihood (PML) – a process modelling language
- Radiation Boundary Conditions (RBC)
- Transmission Line Model (TLM) – a time domain solver

Information sources on antenna modelling

Major journal authors are Vandenbosch and Vasylchenko (some in Russian):

https://www.ansys.com/products/electronics/antennas - this webpage lists many solvers

https://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=8 – the IEEE Antennas webpage, eg, Standard Test Procedures for Antennas.pdf

https://www.qsl.net/4nec2 - free 4NEC2 software

https://gs2.variousnewinfo.com – offers several antenna modelling packages

https://ac6la.com – offers AutoEZ, a version of EZNEC

https://www.youtube.com/watch?v=xXhfl5JmCPc – an Idiots Guide to Antenna Modelling

ac4m.us/antenna_software.html – antenna software for radio amateurs

https://www.hamradiosecrets.com/antenna-software.html - antenna software for radio amateurs

https://listoffreeware.com/free-antenna-design-software-windows - 10 best free software for antenna design

https://groups.io/g/antenna-research - an antenna software discussion group; membership is free, but you need to contribute.

Some caveats

There is a major issue with taking a narrow focus on just the electrical/digital/analog characteristics of an antenna. You also need to consider the mechanical design:

- Have you calculated:
  - the Euler critical load for your vertical antenna? (buckling)
  - the stresses on the boom of your Uda-Yagi antenna when you drill through the boom to support the antenna elements? (Aircraft fuselage manufacturers glue the panels rather than rivet them now)
  - the electro-potentials developed between the different metals in your boom, antenna elements and transmission line? (corrosion)
  - the wind loading on your mast, boom and elements using the latest BoM wind speed estimates for your area?
  - the resonant frequencies of the elements and hence their likelihood to fracture? (Think: closed and open-ended organ pipes)
- If elements of your antenna (up at 10 m) break off, they will reach 45 km/hr when they hit the head of a 2 m tall person.
- If ice can form on your antenna (VK2, VK3, VK7, VK0?), should you use round or rectangular section boom/elements?

What next?

I thank John Thyrd VK2BBC for introducing me to ELNEC as we operated at Orange in the John Moyle Memorial Field Day, ever so many years ago. One potential author has offered to give us a tutorial or two on 4NEC2. If you have used antenna modelling software, please share your experience with your radio amateur colleagues by submitting an article for publication in this magazine.

Pages from the Past

From the Western Australian Division's, WIA Bulletin

MUSIC ON THE AIR - A.P.R.A. AGREEMENT

In the October 1931 issue of the Bulletin, members were advised not to broadcast vocal numbers from the Gilbert and Sullivan operas as no clearance was available for the words. The music itself presumably was permissible. Members were also advised to ensure they had A.P.R.A. [Australian Performing Rights Association] licences if they were using gramophone records in their 'phone transmissions as recent court cases in the Eastern States had proved the necessity of this and A.P.R.A. was becoming active in W.A.

Then in the December 1931 Bulletin the following announcement was made:-

Under an agreement with the Australian Performing Rights Association, transmitting members of the Institute have enjoyed the privilege of being able to transmit phonograph records for experimental purposes upon payment of £1/1/- (One Pound and one shilling) a year, compared with £5/5/- (Five Pounds and five shillings) in the case of non-members. The matter had been arranged in the past between Federal Headquarters and the A.P.R.A. and it has agreed to leave the matter in their hands.

Portable Pleasures: Icom IC-705 Reviewed

Justin Giles-Clark VK7TW

For the future portable op: A suitable (Icom accessory) backpack.

Is it an FT-817/818 Killer?

In true detective style, I was naturally interested in whether the new Icom IC-705 would really replace the Yaesu FT-817/818. Full disclosure to start with – I own and uses both rigs. Yaesu has sold many tens of thousands of their popular rigs and it has become the staple of the Summits on the Air (SOTA) community. It has also become the rig of choice for the microwave community as an intermediate frequency (IF) rig. The author wanted to see if the IC-705 was a worthy adversary!

Let's start at the beginning with a comparison of the specifications in Table 1.

To get the most out of the IC-705, there are a few settings you probably need to work on. These include setting the UTC offset for the time. Setup the Wireless LAN login and then you can set the time to Network Time Protocol (NTP), and then you don't have to worry about the time anymore. It is certainly handy to have the time on the screen when you are operating if you run a manual/paper log.

If you are using the HM-243 plug-in microphone, then you will need to screw-on the strain relief bracket to the earth screw. This enables the attachment of the strain relief ring to take the strain off the microphone lead.

You will need to set all the display units to metric and most likely slow the waterfall speed.

Another nice feature is the automatic charging of the internal battery when you plug in an external supply or battery. Although you need to be careful with this feature

Icom IC-705	Yaesu FT-818
Direct up/down RF Sampling with down-conversion above 25 MHz	Double conversion superhet (SSB, CW, AM & FM). Single conversion superhet (WFM).
Rx: 30 kHz to 199.99 MHz & 400-470 MHz Tx: 160-6m, 2m & 70cm; No 2200m & 630m	Rx: 100 kHz – 56 MHz, 76-154 MHz, 420-470 MHz Tx: 160-6m, 2m & 70cm; No 2200m & 630m
PA: 10 W on external battery 5 W on internal battery pack	PA: 6 W on external battery 2.5 W on internal battery pack
Min Steps: 1 Hz (all modes)	Min Steps: 10 Hz (SSB & CW) 100 Hz (AM/FM)
Noise Blanker, Noise Reduction, Notch Filter and Digital Twin PBT	IF Shift & Noise Blanker
500 Memory channels	208 Memory channels
Rx Current: 0.3-0.5 A Tx Current: 3 A @ 10 W	Rx Current: 0.3-0.45 A Tx Current: 2.4-2.7 A
Display: large 4.3" colour TFT LCD touch screen, including spectrum display and waterfall	Display: small monochrome (3-colour) LCD, Spectrum scope function available
Bluetooth and Wireless LAN (WLAN) connectivity	Not applicable
Modes: SSB-CW-AM-FM-RTTY-DSTAR-DV-Digital SSB	Modes: SSB-CW-AM-FM-Digital SSB
GPS & Antenna built-in	Not applicable
DSTAR includes DR function and Terminal Mode/Access Point Mode	Not applicable
HM-243 Speaker-Microphone included	MH-31A8J Hand Microphone included
MicroSD port for updating & GPS logging data	Not applicable
AM and FMW broadcast and Airband receive	AM and FMW broadcast and Airband receive
Size: 200w x 80h x 85d mm	Size: 138w x 38h x 165d mm
Weighs about 1kg without battery pack	Weighs 0.9 kg without battery pack
GPS built in – however, only for time and navigation and DV modes – no GPS locking available at this stage	GPS locking was available; however, VK3HZ boards are no longer being produced. VK1XX *AllLocker* boards may be available.
7.4 V/1880 mAh BP-272 Battery Pack included	9.6 V/1900 mAh SBR-32 Battery Pack included
RRP: AU$2365 (same as IC-9700). Intro offer special: AU$1849	RRP: AU$950 / AU$999. Second-hand: – AU$500-$800 (more if GPS-locked)

Table 1. Specifications compared.

A pair of sensible shoes.

A tripod. and an armchair.

when going portable as this does drain your external battery and it doesn't automatically change back to the external supply when plugged in. The user supplied Micro-SD Card needs to be installed and formatted.

Pleasurable features

Now to some of the nice features of the IC-705. Many of these functions I will outline will be familiar to owners of the IC-7300 and IC-9700.

Multi-function menu items is how the IC-705 implements the multi-layer menu functionality that the FT-817/818 sports. Instead of having to remember which menu number the function is located under, the 705 has contextual menus for each physical knob and many touch screen buttons. Push the knob or button and it provides certain functions – press them for longer and other functions become available. These functions are dependent on what frequency and mode (etc) that you are currently in.

The noise filtering is impressive with four levels available:

1. Noise Blanking – you can select the level, depth and width of the blanker function.
2. Noise Reduction – you can select the level of noise reduction.
3. Notch Filter – you can select a wide, mid or narrow notch and then shift the notch filter through the pass band.
4. Digital Twin Band Pass Tuning (PBT) – enables you to digitally narrow the IF passband by shifting the IF frequency above and below the IF centre frequency. There are three PBT filter widths available.

The advantage of having a large colour touch screen is the ability to display most of the user interface on a screen

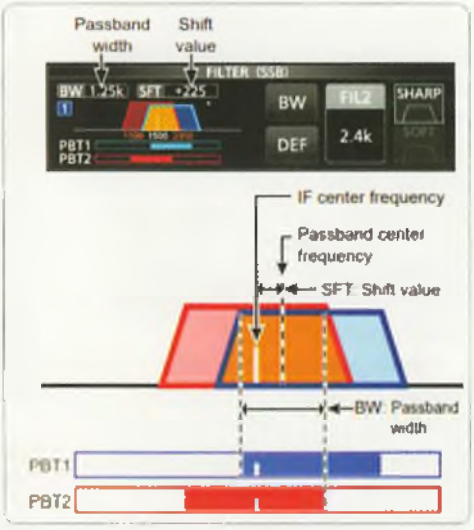


Figure 1: The IC-705 sports digital twin passband tuning – outfox the QRM!

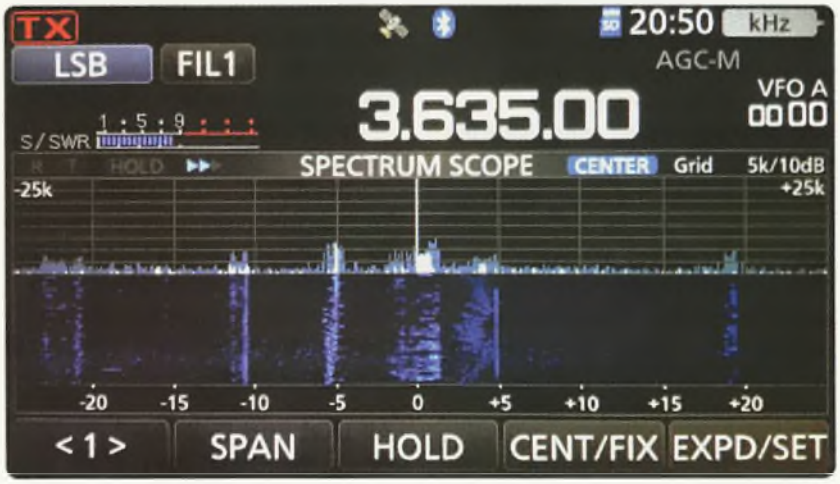


Figure 2: The spectrum display echoes features of the 705's bigger stable mates.

and substantially improve the user experience (UI/UX). It is obvious that Icom has put significant development into the user interface and this results in an intuitive, easy to use transceiver. The screen also provides a control surface to display a variety of scopes, including spectrum with waterfall, audio scope and RTTY decode screens. The contextual menus become available on the screen as the different functions are selected.

Further nice features of the IC-705 include the ability to store recordings of QSOs on the MicroSD Memory card, along with location data from built-in GPS. You can also take screen grabs, which are then stored onto the MicroSD card.

The GPS is used for time and location information (D-STAR Position Reporting System, DPRS) with the D-STAR Digital Voice (DV) mode. Unfortunately, the GPS does not appear to be used for frequency locking, which may be disappointing for 144 and 432 MHz weak signal digital mode operation. The 705 appears to suffer from frequency stability / temperature drift issues, evident here in Figure 3.

Some other nice features that will be familiar to owners of the IC-7300 and IC-9700 are the SWR Graph function and speech/ lock button. The SWR feature allows the user to quickly scan the connected antenna and see where it is resonant, without needing to use an antenna analyser. For the vision-impaired amateurs there is the speech / lock button that, when pressed, the Japanese woman inside the rig announces the frequency and mode; and if long-pressed, it locks the dial/frequency.

New in the IC-705 is Bluetooth™ pairing of headsets, speakers, CI-V control, Digital Voice Data, and Smartphones. The author has used the VS-3 Bluetooth™ Headset in the field and it certainly frees your hands for writing or typing log entries. On-air reporting on the quality of the voice via the VS-3 headset was good.

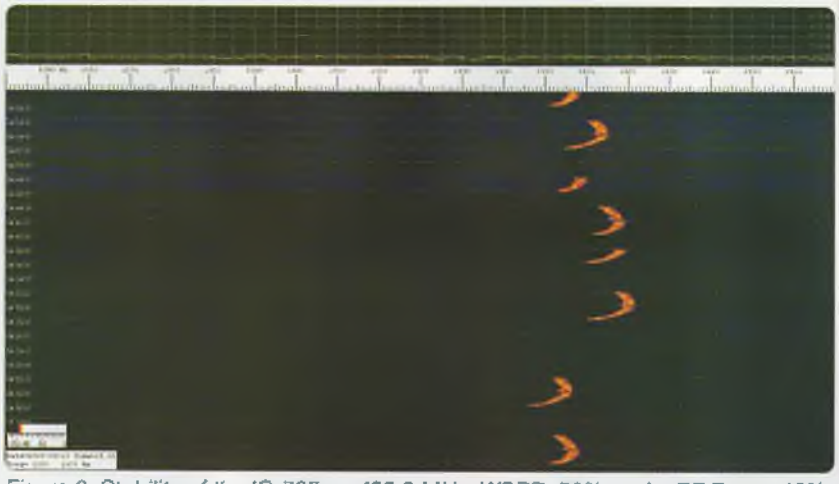


Figure 3: Stability of the IC-705 on 432.3 MHz, WSPR, 50% cycle, RF Power 10%, received on local GPS locked receiver.

Remote control?

Another new feature is WLAN, which comes standard with the IC-705. This is used for remote control via the Icom RS-BA1 V.2 IP Remote Control Software and other remote control offerings. At the time of writing there was an Android application called "705 Remote" from Ikeda Shogouki, which controls the radio via Bluetooth™. There is not an IOS version available yet. Couple the 705 Remote and VS-3 Headset and you can almost operate the radio without seeing the radio!

This issue's cover photo shows the Icom LC-192 backpack, made specifically for the IC-705. This is a high quality backpack with some great features, like reinforced side panel with multiple tags to hold vertical man-pack antennas. There are also many feed-through holes with Velcro flaps and movable segments to enable the feeding of power and coax connections through the backpack.

The IC-705 has a quarter-inch Whitworth screw mount on the base for a standard camera tripod mount and there is a special quarter-inch screw in the back pack to secure the transceiver and stop it falling out of the backpack.

All that and D-STAR?

Finally, the IC-705 has D-STAR built into the radio and supports D-STAR Repeater (DR) mode, along with Terminal and Access Point mode operation. In DR mode – local, gateway and simplex RF calling is supported, and in Terminal and Access Point modes, this enables you to use the internet via the WLAN feature in the IC-705 to make calls via the internet. The setup of D-STAR is not for the faint-hearted. However, there is excellent support from the Icom IC-705 Advanced Manual, which is freely available.

There has already been a minor firmware update (V1.11) since the radio's release in VK. This updated the battery indicator and is uploaded using the freely available Icom programming software CS-705. There are also free Picture Utility Software applications available for Android, IOS and Windows that enable the uploading of pictures to the IC-705 for transmission through the D-STAR DV mode.

Having investigated what the IC-705 has to offer in comparison to the Yaesu FT-817/818, it is now time to work out if this new offering from Icom will, in fact, replace the FT-818 in the market.

The key differences I see, are:

- intuitive user interface and experience
- waterfall, spectrum, audio and RTTY decode displays
- advanced noise filtering – NB, NR, Notch and PBT

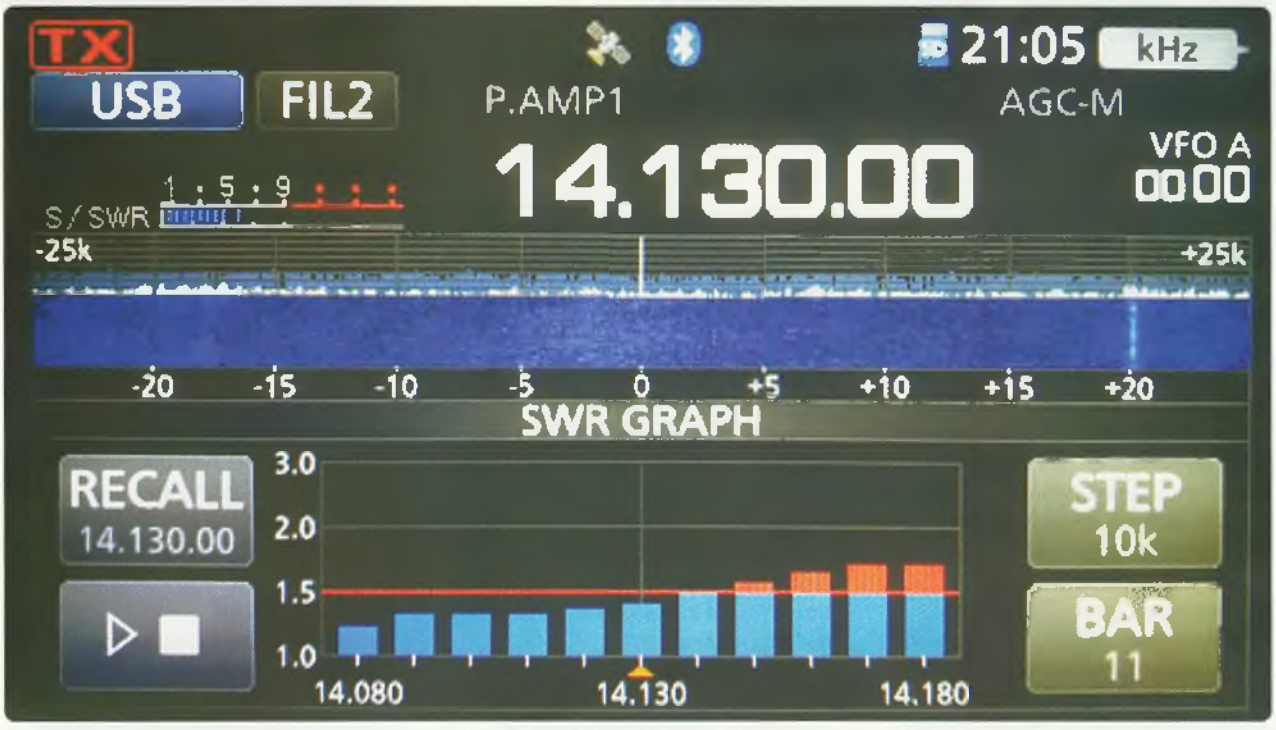


Figure 4: SWR Graph function showing a scanned antenna result. Neat!

- D-STAR Digital Voice modes built in
- Bluetooth and WLAN available – headset and remote operation
- 10 Watts RF out on external battery – almost double the FT-818
- In-built GPS receiver and antennas for time and position information
- IC-705 has only one antenna port, where the FT-818 has two.

Is it worth paying between two and two and half times as much for the IC-705 to get the above features? It depends on what you are going to use it for. If you are wanting a state-of-the-art rig for SOTA or WWFF that has the features we have come to expect from a contemporary software defined radio, then the IC-705 is a good choice.

If you are intending to use the rig only for 2m and 70m weak signal digital modes, then the jury is currently out on whether it is worth spending the additional money. Early indications, as shown in Figure 3, are that the IC-705 appear to suffer from frequency / temperature drift issues. However, this depends on which weak signal mode you are using and how much drift the mode can tolerate.

Given there are existing options for GPS locking the FT-817/818, and the lower cost of these rigs, I suggest that they may still be valid and cost-effective options for weak signal digital modes and microwave IF rigs. However, if there is a GPS locking option for the IC-705 on the horizon, all bets are off!

Portable Pleasures: Icom IC-705 Reviewed

Scott Watson VK4CZ

Photo 1: Icom has finally made the move away from the traditional cardboard box.

What's it really like?

With all new radio releases, there's the hype and the reality. So what's the new Icom IC-705 really like?

I've seen it written that the IC-705 is the 'little radio that can', 'it's the 'Yaesu FT-817 killer', or 'it's simply amazing' (that may have been me!), but for the average amateur operator, what does the Icom IC-705 bring to the table that others don't?

I'll take a practical approach to describing the IC-705 from an operator's perspective, as there's no end to the on-line commentary, and no doubt and hopefully) the ARRL will complete an exhaustive technical review at some time in the very near future to further remove any post-purchase dissonance.

And, as I'm a keen 'parks activator' (under the WWFF and VKFF programs), as well as an active microwave operator, I'll look at the IC-705 from both portable operating as a HF transceiver, and as an IF for microwave activity – the reason I actually purchased the transceiver.

Its arrival

As the owner of two (2!) Yaesu FT-817NDs that are approaching end-of-life due to the ever increasing faults (one having just had new PLL and processor boards fitted to extend its life just a little longer) that are causing ever more loss of contacts on microwave bands, it was time to update.

My plan wasn't to upgrade completely and I had started looking to get another second-hand FT-817ND. But the imminent arrival of the Icom IC-705 resulted in my plan shifting. Having a portable, fully SDR HF/VHF/UHF transceiver with Spectrum Scope was just too good to pass. And with that, the order was placed almost as soon as it was possible.

Once done, I can't deny that I wasn't looking forward to the arrival of the IC-705. By that stage, I had read all of the pre-release commentary, watched every YouTube review, and was left waiting patiently for their arrival in VK. Once released in VK, it was just a matter of days before I was luckily able to unbox and hold it. First impression . . . Surprise!

The IC-705 is well packaged in a nicely designed, full colour illustrated box. While it looked good, what about the important stuff?

Upon opening the box, you see that internal packaging is well considered, and the contents well protected. The IC-705 is supplied with three manuals (English, Spanish and French) as well as the bare essentials to get it on air (microphone/speaker, power lead, spare fuses, etc).

Second impressions are about the radio itself. It's certainly a little larger and feels heavier than the FT-817. But the larger screen, higher power output and ease of operating easily make that fade away. And while the touchscreen is the same size as its stable-mates 7300/9700, the front panel is smaller.

The overall physical design of the IC-705 itself is well considered, with nice additions like the quarter-inch mount to suit a camera tripod on the base. The rubber flaps over the various plugs, while practical now, will no doubt in time perish. But, they're clearly designed to allow for a simple replacement.

I'm not typically a 'hand mic' operator, and don't like hand mic's at the best of time [use headsets exclusively in home station]. That said the supplied speaker microphone whilst small, is quite usable. The microphone speaker sound quality is OK, but not to the quality of the internal speaker on the front panel [which can only be used, if the speaker lead for the speaker mic is not plugged in]. The VFO is smooth and easy to use. And the remaining 'knobs' on the front panel are all rotary encoders, with the obligatory 'click' movement.

Getting on air

Once unboxed and the battery installed, it's quite a simple process to get on air. As the owner of both the Icom IC-7300 and IC-9700, getting the IC-705 up and running was a breeze. The menu and settings across the three radios are very consistent.

The rubber feet attached, microphone connected and a microSD card inserted and formatted, and then a few of the basic parameters set.

For those unfamiliar with the Icom menu system, it's very logical and user friendly – all easily accessible via the front touch screen. A quick read of the manual and you'd also be on air in no time.

At the time of scribing this, I'm yet to set up the CS-705 programming software and create the memory database. But with 500 memories, 25 scan edge settings and further call channels available, it's not an exercise that I will be completing through the touch screen.

Once the basics were established, I had noted that Icom had already release new firmware for the IC-705. This was downloaded, copied to the microSD card and updated and is now on version 1.11. (An easy process, and all steps described in the manual, on both the radio and at the Icom web site).

From there, it was a matter of a quick on-air test. 40m was the band of choice – and after a few CQs with

Photo 2: Setting-up digital operation was straightforward.

just 10 W [external 13.8vDC supply], I worked two YB stations.

Preparing for digital modes

With the IC-705 being very new, the various software solutions for digital modes don't yet include the IC-705. But until they do, it's a quick fix. Initially, I have set up the 705 for use with WSJT-X. Within the rig's menu the following settings needed to be set.

CIV menu – CIV **94h;** Transceive **ON;** Echo back **ON**

And within WSJT-X, these were selected.

Rig **IC-7300**; Serial post (to suit your situation); Baud rate **9600**; Data Bits **Eight**; Stop Bits **Two**; Handshake **None**; PTT **CAT**; Mode **USB-D**; Split **None**

The 705 as a microwave IF

The first test was using the IC-705 as an IF for microwave. As there wasn't any planned activation events, I just set up the 3.4 GHz transverter on the front lawn and used it to listen for the VK4RBB beacons, just on 50 km from my home QTH.

Instantly, I knew it was a big step up from the FT-817. In full sunlight, the screen was totally legible. I could easily see the frequency and signal meter – no squinting for this one. At first, the beacon was RST539 and the trace on the Spectrum Scope wasn't very clear. A few quick adjustments of the rig's SPAN, and I found that, at 2.5K, it dramatically improved the clarity to the point that the JT4 tones could be easily seen.

On CW, the ability to shift the pass band tuning to improve receive clarity was also a big plus, and bringing in the narrow CW filters allowed for very easy copy.

I'm now very much looking forward to the next MAD (Microwave Activity Day) and using the FT-817 and IC-705 side-by-side!

Portable pleasures, operating HF from a park

This is what the IC-705 is all about, and why I purchased it! As the radio is less than a week old as I write this, my time has been limited to get out, but I did 'force' myself to.

Photo 3: A tangle of tripods! The 705 working as an IF for my 3.4 GHz transverter.

Photo 4: Set up on 442.439.61 MHz.

help, something in the 50-80 W range.

So, after only a week, and just a few hours of operating, what do I think?

The Icom IC-705 is as good as I expected. It has clear advantages over the FT-817 when used as a microwave IF, and performed really well. I'm now very much looking forward to getting out and on-air again with it.

Is it an FT-817 killer? Maybe . . . time will tell. But for now, I'll keep my FT-817s, but can see the IC-705 being the first choice when operating outdoors.

This test with the IC-705 was conducted by activating North Pine Dame Nature Refuge [VKFF-2876] under the WWFF/VKFF program. My normal park activations are completed with an FT-991A, running approximately 80 W RF out and link dipole antennas, so the IC-705 at just 10 W was going to be a good experience.

I set up and was on air around 01:00Z. Not the best time for 40m, but it was only a short activation to test the radio, and needed to fit into other commitments.

On turning on the radio, instantly you could tell the band was flat. Very few stations seen on the Spectrum Scope, and the few on weren't strong.

I had earlier posted an Alert on parksnpeaks.org, so was still surprised that, after the first couple of CQs, Gerard VK2IO in Sydney replied. Gerard was a genuine RS59, and I received RS57. I was pretty happy with that.

I operated for just on two hours, logging 16 stations – VK2, 3, 4 and 5 – and all on 40m. Best distance was Paul VK5PAS (RS55 both ways).

Again, the large display and the clear audio from the front speaker were a big plus when operating outside. I had turned on the compressor and the reports of the audio were good – and no wind noise detected. The IC-705 was mounted on a small SLR camera tripod, making for a very comfortable operating position – and I didn't need the usual table!

A small amplifier would certainly

Photo 5: A tripod is the must-have accessory for operating the 705 portable.

Homebrew HF Transceiver project

Part 3 VFO System

Luigi Destefano VK3AQZ

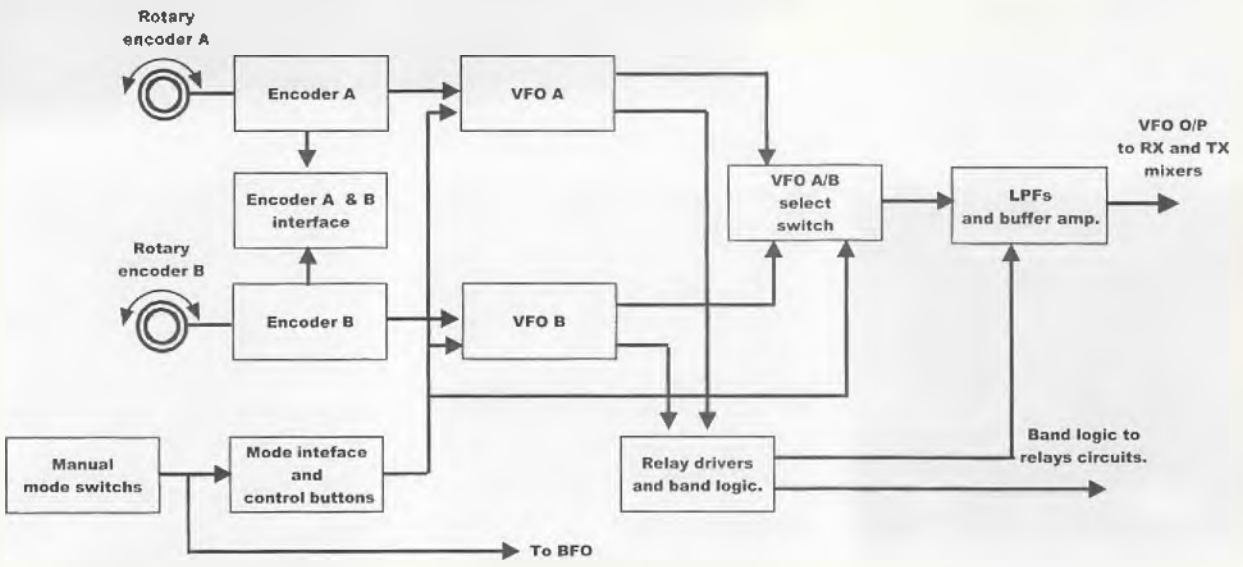
The VFO system comprises two independent VFOs. The main reason for separate VFOs is for the future addition of spectrum and waterfall displays. Implementing two independent VFOs, however, makes the design considerably more complex and requires more space in the cabinet. The front panel alone requires two sets of tuning controls since I wanted to use the second VFO for full coverage and in lieu of the RIT function. VFO B can be synced to VFO A and tunes with the main VFO knob. A simplified block diagram was shown in **Figure 2, Part 1A** (*AR*, Vol. 87, No.6 2019, page 9), which is reproduced here for convenience.

The VFO system is made up of several modules, making it easy to try different circuits (**Photo 3AA**). The heart of the VFO system is the Arduino ATmega 2560 processor. Each VFO consists of a Silicon Labs Si5351A programmable clock generator. This IC, mounted on a clock module, is readily available at a reasonable cost (**Photo 3AB**). The Si5351 is programmed by the Arduino via the I2C bus. All the connections to the Arduino are made through an interface board (referred to as a "shield"), which plugs into the Arduino mega board (**Photo 3B**). Boxed IDC male headers are mounted on the shield, which simplifies connections to boards and modules. A drawing of the shield is shown in **Figure 29B** (later).

I should mention that I initially started this project using DDS modules. However, the output of DDS units falls away for each octave increase in frequency, necessitating some form of level control when used in a rig designed to go to 54 MHz. Also, trying to cover such a wide range makes it difficult to work around the alias frequencies which can pop up inside some amateur bands. Some of the cheap eBay modules are also noisy and have unsatisfactory D-to-A output filters. On the other hand, the Si5351 oscillators give the same level output all the way to 160 MHz.

In theory, the carrier jitter may not be as good as the DDS chips, but I found the signal good enough for my applications. Tuning across a carrier produces a nice clean tone and, comparing the sideband noise around the carrier to a good analogue VFO (a Yaesu external unit), I could not tell any difference on my narrow band receiver or spectrum analyser. I guess if I had some high-grade laboratory gear I may see the difference, but for amateur use the Si5351 is pretty good.

The circuit of the processor, with the connected modules, is shown in **Figure 29A**. Each VFO is tuned by a good quality optical encoder feeding pulses to the processor using the interrupt pins. The display, control buttons, external signals, power etc, are shown on the circuit diagram.



Simplified block diagram of the VFO system.

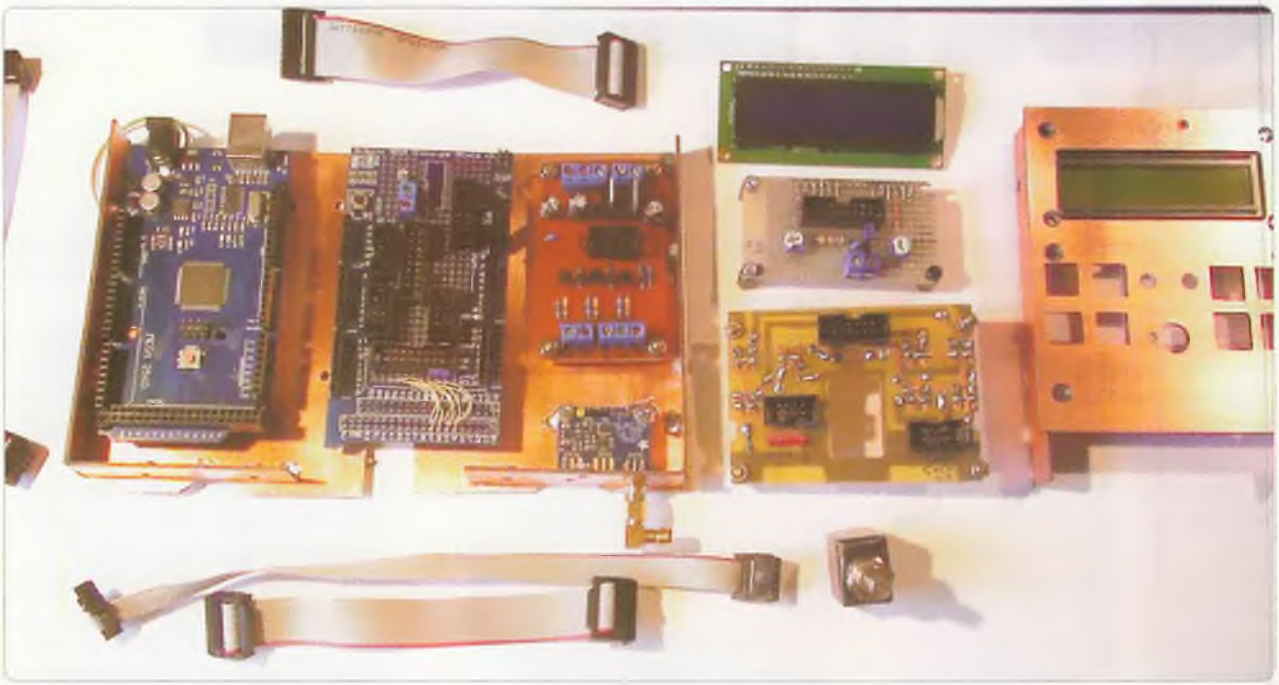


Photo 3AA: The VFO system components laid out. The Arduino ATmega 2560 board is seen on the left, with the "shield" to its right. Note the LCD display at top right.

Display

The LCD display is commonly available on the web. VFO A uses a 20x4 display and VFO B, a 16x2 display. Only two lines are used at present and the same software works on both displays. The Arduino software used is open source, with contributions from several amateurs (these are credited in my version of the software).

The original software I downloaded was written to produce a basic VFO using the common Arduino UNO processor. For a multiband transceiver, I added code to provide switching to cover the amateur bands with transmit disable outside these bands. More tuning steps were added, and some bugs that must have crept in during distribution on the web had to be tracked down and fixed. Libraries for the rotary encoder, the Si5351, and long number memory handling are also added to the program.

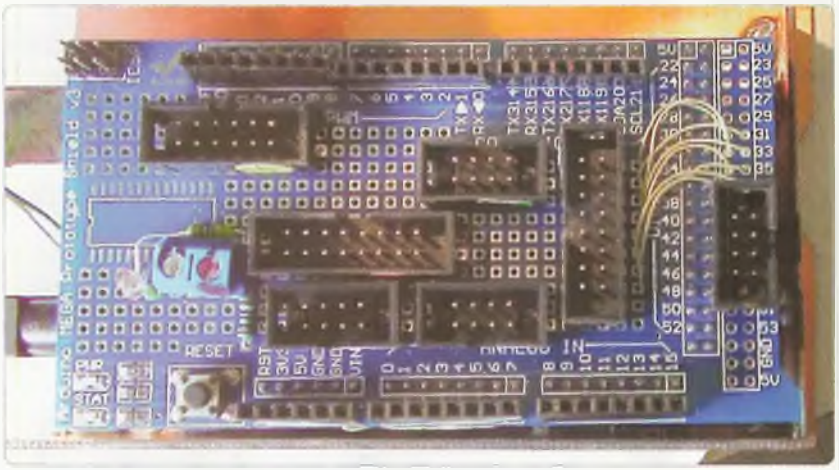


Photo 3B: The Arduino interface board, dubbed a "shield".

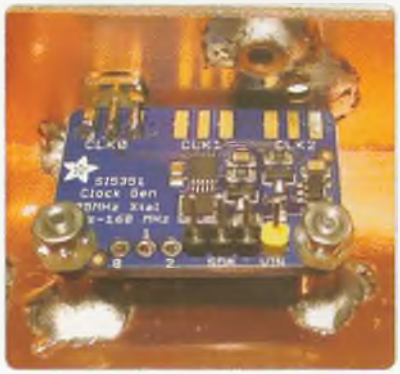


Photo 3AB: The Silicon Labs Si5351A programmable clock generator board.

Programming

The free Arduino programming software, known as the Integrated Development Environment or IDE, is used to handle the sketch and load it into the processors via the USB port of a computer. The VFO software will work on several types of Arduino, including the mini, UNO and others. However, for a multiband rig, I found it easier to use the 2560 since it has 54 programmable pins and is not much bigger or more expensive than the UNO. Just to be aware, the encoder connections on the 2560 are different to the UNO.

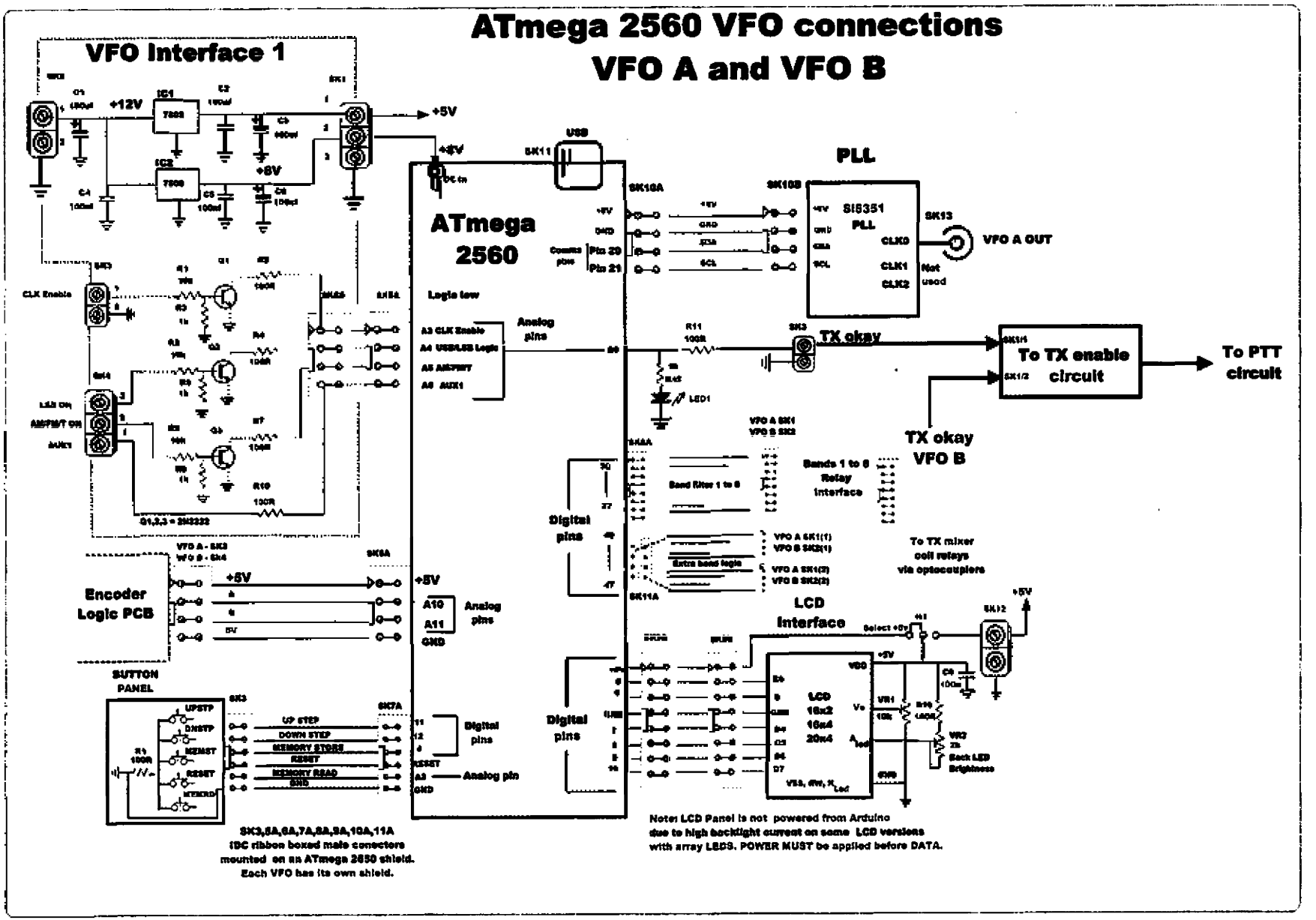


Figure 29A: The ATmega 2560 VFO control system circuit.

Figure 29A VFO A and B processor circuit components		
Reference.	**Value**	**Notes.**
Main processor	Arduino Atmega 2650	
NOTE: There are several PCBs associated with the processor.		

Figure 29A VFO interface 1		
Reference.	**Value**	**Notes.**
C1,3,6	100uF 25v	Electrolytic
C2,4,5	100nF	Monolithic
IC1	LM7805	
IC2	LM7808	
Q1,2,3	2N2222	
R1,5,8	10k 5% 0.6W	
R2,4,7,10	100R 5% 0.6W	
R3,6,9	1k 5% 0.6W	
Sk1,4	3 way 5.08mm	Screw block terminals
SK2,3	2 way 5.08mm	Screw block terminals
SK5	4 pin boxed mate PCB IDC header.	

Figure 29A LCD interface. Small perf board holding parts and LCD module.		
Reference.	**Value**	**Notes.**
LCD display	16x2, 20x4, etc	To suit Arduino, HD44780U or similar
C6	100nf	Monolithic
H1	3 pin male PCB header	LCD power select
R10	100R 5% 0.6W	
SK12	2 way 5.08mm	Screw block terminals
SK9B	2x8 pin PCB mount male boxed header.	
Suitable strip conector to LCD module.		
VR1	10k	Contrast
VR2	2k	Back light brightness

Figure 29A PLL module		
Reference.	**Value**	**Notes.**
Adafruit Si5351A Clock Generator		
SK10B	1x4 pin PC male header on Adafruit module	

Figure 29B Atmega 2560 shield V3 or XC4416 or equivalent. Blank holes.		
Reference.	**Value**	**Notes.**
LED1	3mm Green LED	
R11	100R 5% 0.6W	
R12	1k 5% 0.6W	
SK3	2 way 5.08mm	Screw block terminals
SK5A,6A,10A,11A	2x4 pin PC male boxed header.	
SK7A	2x6 pin PC male boxed header.	
SK8A,9A	2x8 pin PC male boxed header.	

Table of components for the VFO control system.

In order to add my code to the open source VFO program, I had to learn the basics of C programming. I used some readily available books to figure out the C language (see **REF.7**). I do have experience in assembly, PIC, and Basic, so it was not that hard to figure out the basic C commands. However, I do not have much knowledge of the more complex C, or C++ coding. So my additions are pretty basic, and to experienced programmers might seem crude or inefficient. However, I have managed to make the software work for me. Anyone wishing to use my version can alter it to suit their design. I am sure it can be improved a lot!

One thing I discovered with the original software was that the pins programmed to provide a logic high, used to select relays and other modules, went low for a few milliseconds at a frequency of around 77 Hz. As far as the relays were concerned, the pulse was too short to cause a problem. But for logic going to non-relays (solid state circuitry), it was unacceptable. This was discovered while probing the logic lines with a CRO.

The Arduino processor software runs in a program loop. It runs through the code producing the various functions, then starts again. The rate, or frequency, at which this happens depends on the length of the code and how it handles routines. In essence, the processor was resetting pins when it did not need to. This action was not evident in the code. I managed to remove all the output 'glitches' by using a lot of individual subroutines (called "functions"). So, essentially making sure the program only diverts to subroutines when actually needed, rather than quiz the command, then try to enact a result during the main loop. This removed the glitches and improved the responsiveness of the code, including performance of the frequency tuning.

I found that trying to do too much in one processor can cause the tuning to feel sluggish, giving a backlash feel. My VFO tuning responds very quickly and is as good as any analogue tuning I have used.

My encoders are the optical type, with very smooth movement. I do have some low cost mechanical encoders that will be okay for testing and basic rigs. However, the optical encoders have a much nicer feel. My encoders are 120 pulses per revolution. So with a step size of 10 Hz one revolution causes a frequency change of 1.2 kHz. And the 100 Hz step, which I use more often, changes the VFO by 12 kHz per revolution. So, encoders with 120 pulses per revolution suited me best.

The ATmega 2560, as well as having a lot more pins, also has 4k of EEPROM memory compared to the UNO's 1k.

My software has 10 memories accessed by a memory store and a memory read button. Unfortunately, I did not have enough front panel buttons to give me a memory up/down function. Hence, the memory store and read is cyclic in one direction. To add an up/down function will need some more code to reuse one of the

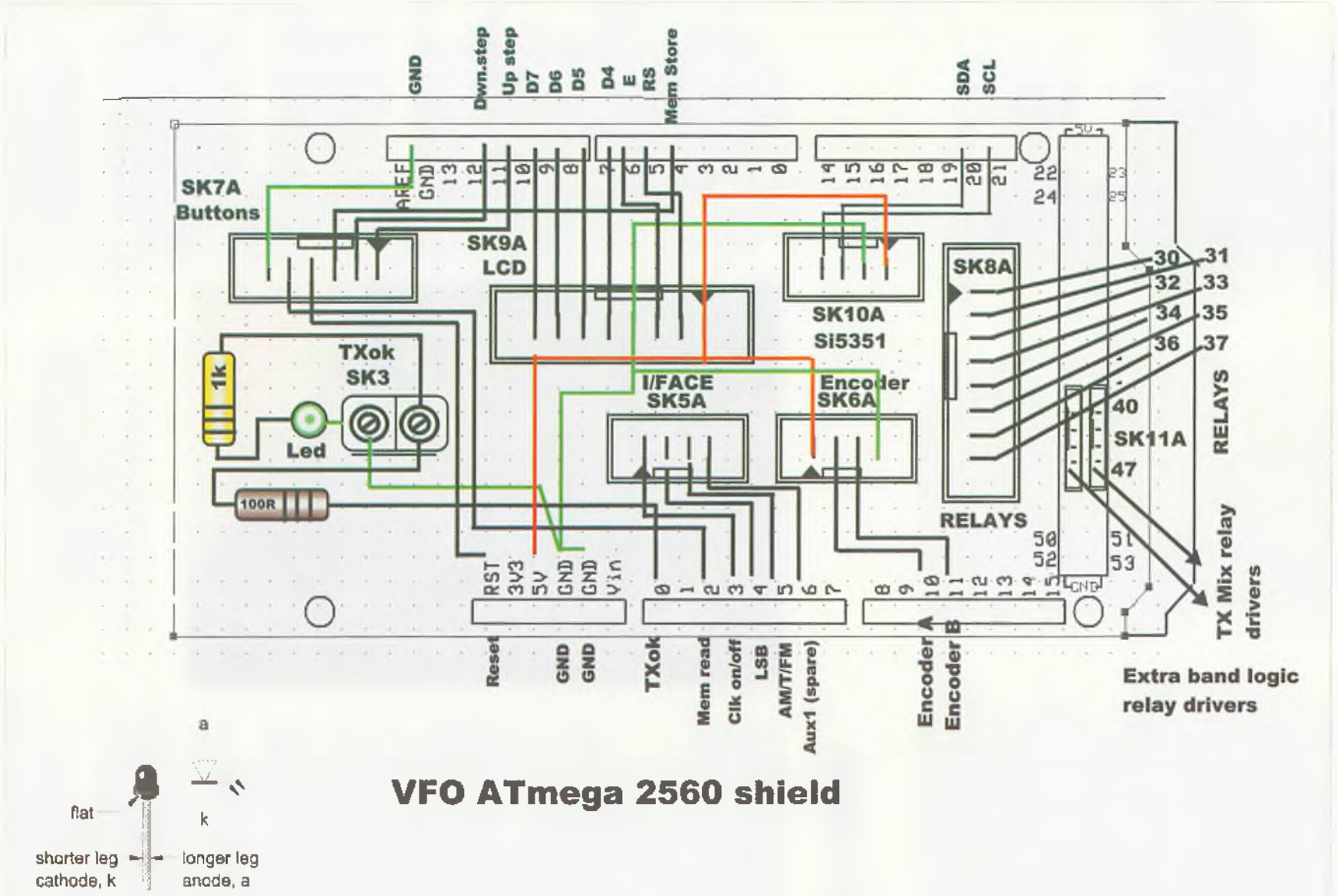


Figure 29B: The Arduino mega interface board, aka "shield", is a forest of connectors.

other buttons. For now it is good enough, however. Also, a lot more memories can be used as there is still plenty of EEPROM space, and that would necessitate a more direct access method to the memories. I do not store the mode or an analogue tune voltage, but that can also be added as a future upgrade.

In essence, there is plenty of scope to add more functions to the Arduino processor. The larger ATmega 2560 has plenty of scope for additions. A word of caution using EEPROM memories. Write cycles are limited to 100,000 or so. After that, the memory may become unstable. Accordingly, programs need to avoid writing to the EEPROM memory often. In fact, if it does write each time the program loops, the 100,000 writes can be exceeded in minutes!

So, if one wants to store the last used VFO frequency, you have to make sure it is not done on every loop of the program. In my case, the writes only occur when the store button is used. Some programs tend to do it at the end of a radio session by delaying the turn-off power to the Arduino and using a logic signal from the radio switch-off function to store the last VFO setting before the end of the delay. This means the last used VFO frequency comes up at switch-on.

In my case, I read the last memory accessed by the write command. I use the 10 memories by programming each memory with a frequency in the middle of each of the 10 amateur bands. So cycling through each memory moves me up through the amateur bands.

References

7. Simon Monk, Programming Arduino, Getting started with sketches, McGraw Hill Publication.

Continued next issue.

WIA news

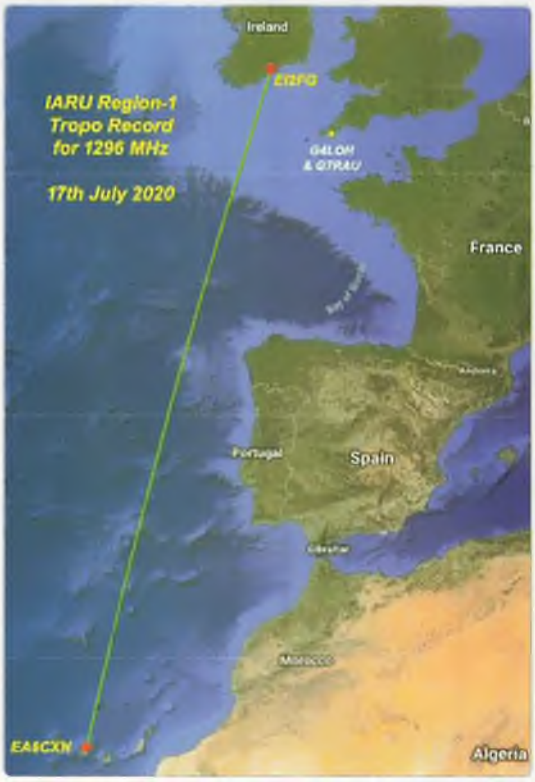
New 23cm DX record for Region 1 busts 2700 km

Distance records for VHF-UHF propagation have been tumbling over recent years all across the world. Growing activity on 23cm (1296 MHz) over wide geographic regions has contributed to this phenomena.

January this year saw the old VK National record of 30 years finally fall – not by much – when Hayden VK7HH worked Nick ZL1IU across the Tasman, extending the VK7 state record and creating a new national 1296 MHz record of 2458.7 km. The previous National record, held since March 1988 by Les Jenkins VK3ZBJ and Wally Green VK6WG (both SK), was 2455.1 km. See: *www.wia.org.au/members/records/data/*

In the northern hemisphere summer just gone, on 17 July an extraordinary contact on 23cm was made between Cesar EA8CXN in the Canary Islands, and John EI2FG in Ireland, over a distance of 2714 km.

Going 'against the grain' of digital DX contacts so prevalent in recent times, this time the contact was two-way SSB, exchanging reports of RS 51 and 54.



The previous 23cm DX record for Region 1 was 2661 km, set back in July 2017, between EA8AVI and M0VRL.

On his website, Cesar EA8CXN reports completing contacts on 70cm with G7RAU, G4LOH and EI20C. The action then moved to 23cm, with G7RAU first to complete a successful SSB contact on SSB using just 5 W into a 56-element Yagi. G4LOH followed, also completed a contact. EI2FG then succeeded in completing the record-busting contact.

The propagation mode was thought to be via a maritime duct over the ocean, which commonly appear at this time of the year.

The 23cm world DX record is 4151 km, established on 15 July 1989 between KH6EME in Hawai'i and N6XQ operating as XE2/N6XQ on Mexico's Baja Peninsula.

It is speculated that, should the D4VHF station on Cape Verde Islands off the coast of Africa ever became operational on 1296 MHz, the Region 1 record could well be extended to about 4000 km.

Visit: *https://ei7gl.blogspot.com/2020/08/new-2700km-iaru-region-1-tropo-record.html*

VHF/UHF - An Expanding World

David K Minchin VK5KK

In this edition of the column, for something different (again) we have a report on Digital ATV activity in VK1. We have the second of the "VHF and Above Construction series" looking at direct GPSDO locking of VHF/UHF transceivers, as well as another flash back from my column 20 years ago!

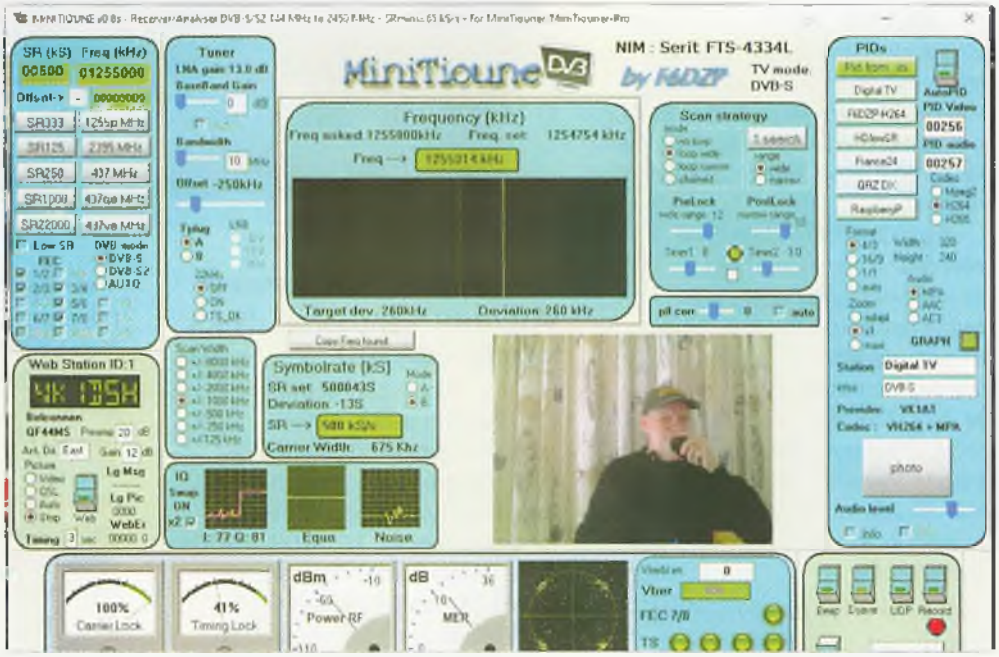


Photo 1: The Minitioune Digital ATV dashboard.

Recent VK1 Digital Amateur TV activities

Amateur TV activity in Australia was popular in most states from the late 1970s right through to the mid-2000s. The availability of "handy cams" made it possible to have a good quality live TV, and activity spread to the microwave frequencies using wideband FM in the late 1990s. Unfortunately, activity tapered off as analog TV was phased out, with no economic way of generating digital TV. That has all changed in the past few years, with new ways to generate digital TV and the use of lower symbol rate DVB-T.

Dale Hughes, VK1DSH reports: *"In August Jim VK1AT and Dale VK1DSH started doing some DATV tests on 1255 MHz using the DVB-S format. Several two-way video and audio QSOs have been completed to refine the equipment and become familiar with the technology and DATV mode. Jim VK1AT used an ADALM PLUTO SDR transceiver with DATV-Express software on transmit and SDRangel software on receive and Dale VK1DSH used a transceiver based on the British Amateur TV Club Portsdown transmitter and MiniTioune receiver designs.*

"Both systems offer the ability to use Reduced Bandwidth Digital TV, which allows high quality

Photo 2: Dale VK1DSH's Digital ATV suite.

television images to be transmitted at relatively low symbol rates, so the signal occupies a relatively narrow bandwidth. Experiments were undertaken at rates of 333 kSymbols/s, 1000 kS/s and 2000 kS/s, and all provided excellent quality signals. The 2000 kS/s signal is a standard rate for TV satellite set-top boxes, so VK1DSH was able receive the signal from VK1AT using a standard set-top box as well as the specialised MiniTioune receiver. Transmitter power used by both stations was approximately five watts into a short Yagi or Gridpak antenna.

"Experiments to-date have been over a distance of just a few kilometres, but now the equipment is working well there will opportunities to try some DATV DX from various elevated sites in the ACT. The equipment for DVB-S mode DATV is readily available, straightforward to use and is a relatively low-cost way of getting involved in an interesting aspect of amateur radio."

It would be good to connect with more groups experimenting with analogue or digital ATV so we can share what is being done. Just email me details of your group's activities and I will include in the column.

Photo 3: The IC-9700 GPSDO with LCD readout.

Construction Series Part 2: VHF/UHF Transceiver direct injection GPSDO

For the second part of the construction series, we will revisit reference locking of VHF/UHF transceivers to improve the frequency accuracy and stability for digital modes. 10 MHz GPSDOs (GPS Disciplined Oscillator) and OCXOs (Oven Controlled Crystal Oscillators) are readily available. However, as VHF-UHF transceivers use anything other than 10 MHz as a reference, a separate PLL stage is required to generate the final reference frequency. The most popular methods include the "XRef" from VK3XDK and VK3HZ (no longer available), or more recently, the Minikit and Leo Bodner injection locking PLLs for the IC-9700. The target stability is for ~ 1 Hz short term variation at the highest frequency the transceiver is to be used for digital modes, i.e. for 1296 MHz; that is, approximately 0.001 ppm. This is easily achieved with a GPSDO or even a good quality OCXO.

For shack use, one 10 MHz GPSDO can be connected via a splitter to multiple units that need to be reference locked. The number of discrete boxes and interconnecting cables/connectors is of less importance for reliability as they are set up and left untouched.

But for portable operation, the aim is to reduce the number of individual items, cables, and connectors so there is less to go wrong. A worn-out "noisy" BNC used to connect a GPSDO will easily ruin the stability of an oscillator in any microwave transverter, the ultimate $2 failure point!

Rule # 1 is to avoid poor quality BNCs for connecting a reference oscillator to a microwave transverter. A TNC threaded connector, or even an SMA connector (with a real gold plated

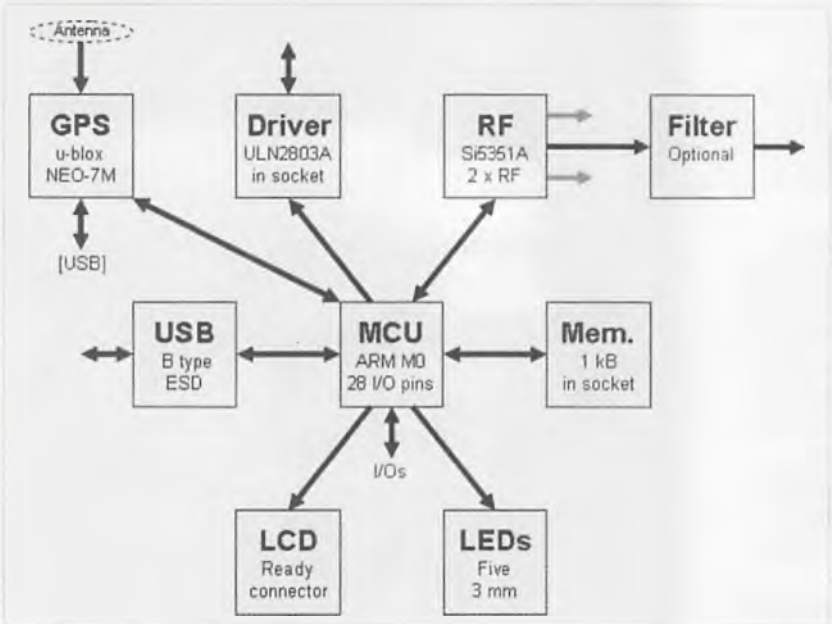


Photo 4: The RFzero GPSDO functional layout.

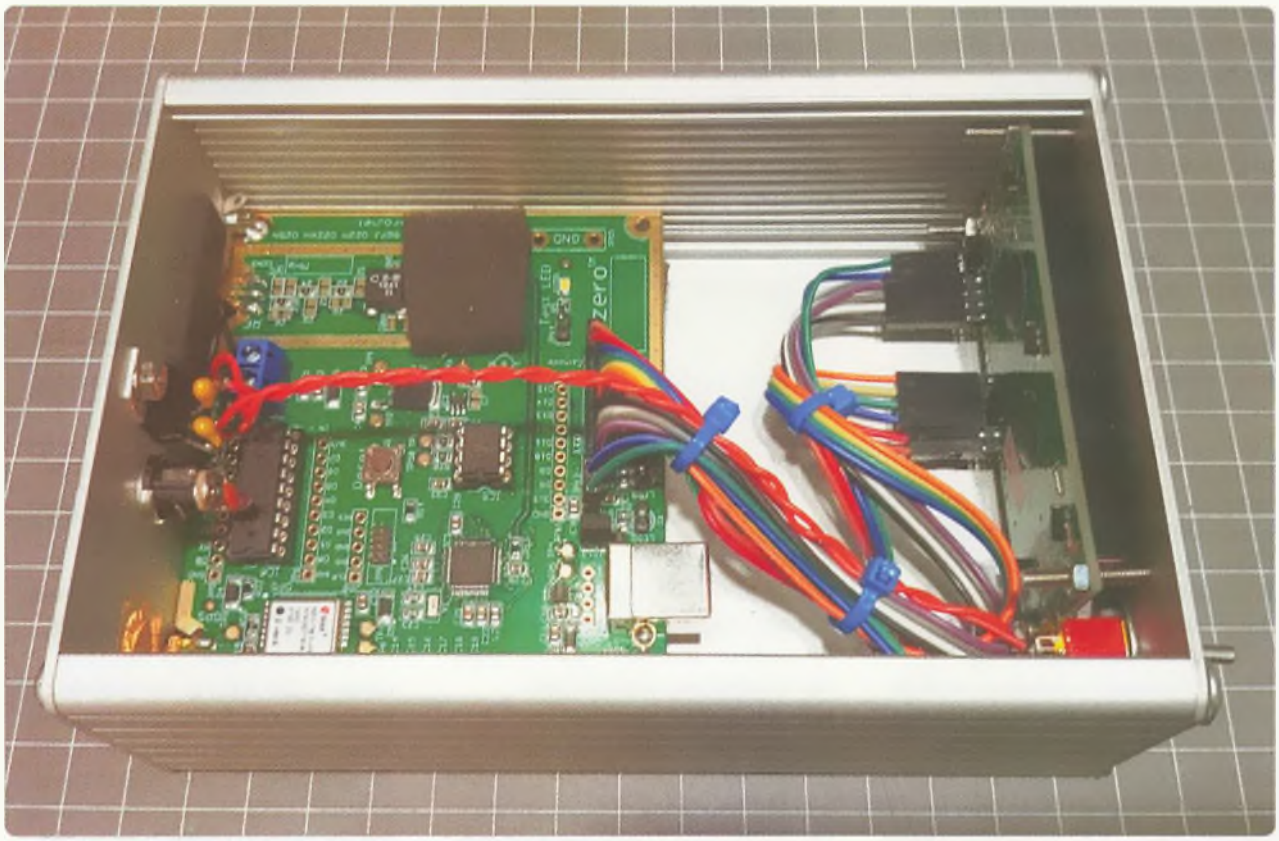


Photo 5: The RFzero PCB mounted inside a Eurocard enclosure.

centre pin), is a much better option. For VHF-UHF transceivers, I prefer a panel mounted SMA connector and then use a short length (300 mm) of RG316/U coax with an SMA connector one end and an inline BNC socket on the other end. There is much less mechanical loading on the panel mounted SMA and if the BNC becomes unreliable just swap the cable.

So, this leads me to this month's project. Rather having a separate GPSDO and PLL, why not just have a single GPSDO on the actual reference frequency of the transceiver? The last few years, quite a few GPS-based projects have appeared and in the search for a digital beacon RF generator for mmWave transverters, I came across the RFzero project created by Bo OZ2M. This Arduino-based, GPS locked RF generator PCB has a wide range of applications.

From the RFzero website: *"The RFzero™ is a multi-purpose GPS controlled RF unit. It can be used as a beacon (IBP, SPB, CW, FT4, FT8, JS8, JT9, PI4, WSPR, ...), signal generator, VFO, QO-100 dual LO, low cost GPSDO, e.g. for 10 MHz, or ... Furthermore, is the RFzero™ an Arduino compatible platform. So, it is possible for you to write or modify the software yourself. More than 20 programs, Arduino sketches, are integrated into the Arduino IDE for easy upload to the RFzero™"*

The RFzero can be programmed to operate on any frequency from 400 kHz to over 200 MHz with one millihertz resolution. The RF generator is a Si 5351A PLL with a 27.000 MHz TCXO clock. The controller is a 32-bit ARM M10+ CPU, programmed via the Arduino with parameters stored in a separate 24LC08B EEPROM so that basic data is retained when re programming the ARM CPU.

An on-board U-blox 7M GPS module provides all timing functions with the GPS NMEA strings accessible via the USB port. This is a useful feature to time-lock a PC for WSJTX when you are portable outside of a mobile phone area. The PLL has two 180 degrees out-of-phase outputs that are push pull transformer coupled to reduce even order harmonics. This transformer is then coupled via an 11-pole low-pass filter to an output SMA connector with approximately + 13 dbm output. The board can be connected to a 16X2 or 20X4 LCD display to provide UTC time, date and frequency information.

The Arduino sketch can be modified to display other NMEA data, like height ASL, etc. If you do not need a display, four LEDs can be connected to display GPS lock, enable, transmit and DC power. There is a ULN2803 available to perform external switching functions for beacons, etc. The PCB runs from a 5 V rail and draws about 100 mA with a 16 x 2 display. A lithium

battery pack consisting of two 18650 cells would run the RFzero for over 24 hours.

The RFzero was originally designed as a GPS-locked HF-VHF beacon source, with Arduino sketches already available for the modes listed. Several VHF-UHF beacons use the RFzero board in Europe, as well as the KH6HME/B 144 MHz beacon on Hilo Island that now uses WSPR + CW. Since then, other sketches have become available, including a frequency counter, signal generator and the GPSDO sketch we will use. A template sketch is also available to create other custom applications. More information can be found on the website *https://rfzero.net* or in the RFzero "groups io" digest.

I had already constructed the RFzero in a box to use as a "WSPR + CW" beacon on the 144 MHz and had previously tried the GPSDO sketch to see how it worked. More recently, I decided it was time to replace the IC-706MK2G transceiver I use on the 10 GHz EME system (that has a build in GPSDO) with the IC-9700 that I had always intended to use. The IC-9700 had already been upgraded to use the Minikits PLL reference with a coupling loop inserted into the reference oscillator enclosure so 49.152 MHz can be connected via the rear panel SMA.

In one of those "light bulb" moments while testing out the IC-9700, I loaded the GPSDO sketch into RFzero and connected it via a 3 dB attenuator to the IC-9700. It locked straight away and had less than 1 Hz delta on WSPR, so was worth investigating more!

The first step is to add an output filter to the RFzero PCB to clean up the RF output. SMD component locations are provided on the PCB to install a Pi low-pass filter with values for several 11-pole filters provided in documentation. When the RFzero is used to drive an amplifier, the third harmonic (~ -15 dBc) needs to be reduced substantially. However, for our injection locking application, this is less critical. Close-in spurs (+/- 1 MHz) are already less than – 60 dBc, so a simple 5-pole low-pass filter will suffice. The smaller filter creates three spare component locations that can then be used to install SMD resistors for an attenuator.

For the IC-9700, - 3 dB will reduce the output to the + 10 dbm needed to reliably lock the reference oscillator. As a bonus, the attenuator provides the transformer in the RFzero with a better 50 ohm load to stabilise the Si 5351A operating conditions. For 49.152 MHz, I chose a cutoff frequency of 55 MHz; the 0603/0805 SMD parts required are listed in the following table. Various online calculators are available to choose filter components for frequencies for other transceivers. *<insert Table 1>*

Rfzero Ref	Value	Type
Z1	300 ohm	0603 SMD Resistor
Z2	18 ohm	0603 SMD Resistor
Z3	300 ohm	0603 SMD Resistor
Z4	150 nH	0805 SMD Inductor
Z5	DNP	Not used
Z6	180 pF	0603 SMD Capacitor
Z7	120 pF	0603 SMD Capacitor
Z8	120 pF	0603 SMD Capacitor
Z9	DNP	Not Used
Z10	150 nH	0805 SMD Inductor

Table 1: Low-pass filter and attenuator values for the RFzero GPSDO.

The RFzero website has very comprehensive instructions for constructing and setting up a GPSDO so the following is just some of the more relevant points.

The RFzero uses the USB port to update parameters using command line instructions, so no changes are required to the actual Arduino sketch. Just plug the USB lead into your PC and use a terminal program (PuTTy, Teraterm, etc) set to 9600 baud, 8 bits, no parity and one stop bit. Type "config" to enter the configuration mode then type "rd cfg" to get the default parameters. To make changes type "?" first to get the list of instructions.

If you are using a display you will need to select which type you are using (16 X 2 or 20 X 4 only). I found the display options would work (bug?) unless you first overwrote everything with default parameters "wr default" and then updated it. Change the frequency from the default 10.0 MHz to 49.152 MHz or whatever your transceiver requires. Also, change the parameter so the RFzero waits for the GPS to have a "Valid" GPS lock before enabling the RF output. Lastly, turn on the GPS output to USB if you want to use this to set the time on your PC. The NMEA strings will then appear in the terminal, updated every second. Type "exit" to save and leave configuration mode.

The RFzero PCB has been dimensioned to fit one of those standard-sized tinplate boxes that are popular in Europe. Alan Melia G3NYK is the best source for these, just Google his callsign to find his webstore. I used a surplus box that had "Eurocard" (100 mm wide) slots so the PCB slid in perfectly. You will find these on eBay, get one that has enough room to add a battery pack to "clean power" the GPSDO and be one less battery lead to worry about in the field.

The 27 MHz TCXO and the Si 5351A PLL should always be covered with some low-density foam to improve the short-term temperature stability. As the loop reaction time is deliberately slow, it does take a few seconds to recover from a sudden change in temperature. Some foam under the

board also will also help.

How you couple the RFzero to the reference oscillator in the transceiver to "injection lock" it will depend on the construction and type of reference oscillator. For transceivers like the IC-706MK2G, IC-910H and IC-9700, adding a coupling inductor is relatively straight forward. The aim is to swamp the oscillator with 10 mW of RF so it has no choice but to injection lock to that signal! For other transceivers, it may not be possible to do this, so the alternative is to directly inject the oscillator into circuitry and disable the original oscillator. Injection levels then become critical to reduce unwanted signals. As the phase noise performance of the RFzero will not be the same as the original crystal oscillator, phase noise may increase in some cases.

If you would like more information in the column on how to couple the RFzero into various transceivers, please let me know and I will include more details in a future column. Next month we will look at a PLL project that reference locks 25 – 200 MHz TCXOs to improve the phase noise floor of microwave PLLs.

What happened 20 years ago

The headline from my October 2000 column, "NEW 10 GHz WORLD TROPO RECORD IN EUROPE". Australia's 5-½ year old 10 GHz World Record, held by Wally VK6KZ/P and Roger VK5NY/P, has finally been broken. The following was lifted from a report in the Israel Amateur Radio Club newsletter. *"On June 25 at 16:51 UTC two German Radio Amateurs broke the long-standing distance record for communication on 10GHZ. From the upper floor of a Hotel in Netanya, Israel, Dieter DJ4AM contacted his friend Adalbert DJ3KM on the Italian Island Lampedusa, in the Mediterranean Sea, a distance of 2079 kilometres. The QSO lasted about an hour. Netanya is about 30 kilometres north of Tel-Aviv. They broke the previous record of 30th December 1994 held by VK6KZ and VK5NY who beamed their signals over the Australian Bight for a distance of 1912 kilometres.*

"The equipment used by both German hams was identical and consisted of a transverter designed and built by DL1RQ fed into dish antennas with a diameter of 60 centimetres. The calculated gain was 33db using output power of 5 watts. They made lengthy calculations with the aid of maps and GPS's to get the angle right for pointing their dishes, because the dishes have an opening angle of only one-degree. Dieter spent 21 days in Israel but only managed to make the one contact."

The new record is well within VK's sights, in fact the record can be still broken between VK5 (from the South East) and Torbay in VK6, where VK6KZ operated for the 1994 world record. VK3 to VK6 could take that out to 2400 km before having to go further west from Torbay. All that is needed is some propagation this year!! The challenge has been laid down, let's get to it!

This record was surrounded by some controversy, however was to remain unchallenged for many years until a Swiss team lead by Paul-André Schmid F4WAG / HB9RXV conducted a DXpedition to Cape Verde in 2010. A new World record was set twice, first to Morocco over 2,200 km and then to Portugal over 2,696 km.

With no 10 GHz activity in VK6, the 1995 Australian 10 GHz record wasn't extended until 2013/2014 between VK5KK/VK5DK and then VK7MO/3 to VK6DZ. In 2015, Australia regained the 10 GHz world record crown thanks to Rex VK7MO and Des VK6DZ extending it to its current distance of 2732 km. More recently (2018) the French team planned another assault on the record but that did not proceed. There were several failed attempts between KH6 and California from 2015 to 2017, the highest frequency was 5.7 GHz for that world record.

More next month on what happened 20 years ago!

Online path loss calculator for 24 GHz and above

As previously covered, Iain VK5ZD's website that displays the calculated path loss for 24, 47, 76, 134 and 241 GHz has become a well-used resource to quantify mmWave band conditions. The website can be found here *http://weather.vk5microwave.net/Weather.aspx?State=H*

There is also a path loss calculator available on this link that allows live meteorological data to be entered for any site, anywhere in the world. *http://weather.vk5microwave.net/Calculate.aspx*

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 take much to put a few lines together and helps the diversity of this column. Just email me at *david@vk5kk.com*

73

David VK5KK

Meteor Scatter Report

Dr Kevin Johnston VK4UH

VHF Meteor Scatter: an introduction to operating practice in VK **Part 2**

The first part of this short series gave some background to Meteor Scatter Propagation (MS) and covered the basic physics and astronomy of meteors. This part will explore more details of the radio communication aspects of this type of propagation.

So, to recap. Meteors are very common. Meteor ablation typically occurs at an altitude of around 100 km – in the E-region of the ionosphere. Ablation involves the complete vaporisation of the meteor particle, where the kinetic energy released produces a visible flash of light. Free electrons displaced from air molecules in that process persist in the upper atmosphere as a trail of ionisation which is capable of reflecting or refracting VHF radio waves back to Earth. Free electrons are the basis of Meteor Scatter propagation.

Random meteor scatter propagation occurs at all times of the day and night and throughout all seasons of the year but peaks in the pre-dawn period and in the Spring season.

Meteor Showers occur on specific and predictable dates through the year and are associated with enormous enhancement of both visual Meteor sightings and Meteor Scatter propagation.

So, if Meteor Scatter only supports VHF propagation for a fraction of a second, how do you get a QSO out of that?

A fundamental question! Attempts to use Meteor Scatter for VHF contacts have been made since the 1960s. In that era, the only viable method of using Meteor Scatter Propagation by radio amateurs was by the use of high-speed CW.

Reflecting true dedication to this super-geek aspect of the hobby, this was achieved by using early electronic or mechanical keyers to transmit short, repetitive CW messages containing just callsigns and reports between two stations, over and over again at several hundred characters per minute, for long periods of time. Received signals were captured on multi-speed reel to reel tape recorders at high speed. These recordings were then replayed at slow speed to read any recovered CW signals by ear!

To make these techniques work required the adoption of three basic cornerstone principles still used today in MS.

Firstly, that a very short message or string, short enough to be received in the fraction of a second available, is repeated again and again at high speed until the occurrence of a random meteor propagates the message between the two stations.

Secondly that those two stations must be transmitting and receiving in pre-arranged, alternate time periods. In that era, transmit timing was typically achieved using the shack wall clock e.g. odd minutes and even minutes, or sometimes longer periods, by prior arrangement.

Thirdly was the adoption of an abbreviated and efficient reporting system to confirm receipt of signals, received signal reports and confirmation of a contact when complete.

Bear in mind that, back then, most VHF transmitters and receivers would have been home-brewed using valves. Computers were people with pads of paper and a slide rule. Both the internet and mobile phones were the stuff of science fiction. Confirmation of contacts often required the receipt of a QSL card sent by post.

In 2001, the whole amateur radio scene changed across many aspects of the hobby with the start of a digital revolution. In that year, a suite of software programs was freely released to the amateur community by its inventor Professor Joe Taylor K1JT.

The WSJT (Weak Signal Joe Taylor) software platform contained a number of new digital modes, intended to be run on the now commonplace home computers in amateur stations. The software was designed for Machine Generated Modes (MGM) where the computer itself produced and decoded digital audio tones to be transmitted and received through unmodified SSB transceivers via the normal microphone and speaker audio ports. Modes were created for use on a variety of different frequency bands and different modes of propagation. Everything from HF-QRP to microwave EME/moonbounce.

One digital mode, FSK441, was specifically created as an alternative to high speed CW for VHF Meteor Scatter work. This mode revolutionised MS communication, making VHF contacts over vast distances, often over 2000 km paths, easy and commonplace, on almost any day of the year, at times when no other modes of propagation were present.

The FSK441 mode held "pride of place" for VHF Meteor Scatter operating for over 17 years. Progressive development has seen the release of a series of even better Forward Error Correcting digital modes capable of achieving reliable contacts with even shorter or weaker meteor returns than before.

The current go-to mode, MSK144, will be discussed in detail later.

What sort of distances can be achieved with Meteor Scatter?

Prefacing the answer, remember that an old "rule of thumb" for propagation on 144 MHz (2m band), a basic station would expect reliable communications over a range of line-of-sight plus another third again. How far you can "see" – your horizon – depends of course on how high your location and antenna are and what sort of terrain is out there (your HAAT – height above average terrain). 2m SSB contacts over 100 km are not uncommon by normal tropospheric propagation, further if you are portable on a mountain top.

In addition, there are a number of atmospheric events leading to infrequent modes of VHF propagation occasionally capable of supporting contacts over longer distances. Examples include sporadic E (Es), tropospheric ducting, and auroral propagation. A 2m contact over 200 km s still a good achievement and something to be proud of.

Meteor Scatter on 2m, for comparison, is capable of supporting contacts out to over 2000 km on most days and, occasionally, even further if other modes or propagation occur at the same time. By way of example, from the author's QTH near Brisbane, regular contacts are possible on 2m MS to VK5, VK7, VK3, VK2 and VK1. From this far north, contacts to all but the most northerly tip of North Island ZL lie beyond the "normal" limit for Meteor Scatter, that being around 2300 km. Contacts from Southern Call areas (VK1,2,3) to ZL are, however, quite achievable.

That being said, the author has made a number of 2m MS contacts to ZL on occasions when there has been tropospheric ducting at one or both ends of the path to fill in the gaps.

SCIENTIFIC, POST MODERN DIGITAL AMATEUR RADIO (METEOR SCATTER)

What limits the range on Meteor Scatter to 2300 km?

This is really a matter of simple geometry. The ionised meteor trails responsible for MS propagation are formed at around 100 km in altitude, for the most part. That height and the curvature of the Earth itself determine the maximum range a VHF radio signal will propagate by MS. As the distance gets progressively longer, then the elevation of the signal at both ends of the path gets lower and closer to the ground. At the range limit then, signals that in general are traveling in a straight line, have to be "ground scraping" i.e. 0° elevation at both stations.

In a little more detail, the strongest returns occur where the meteor trail runs at right angles to the path between the two stations and is close to the mid-point of the path between them, as in Figure 3.

There is an "easy zone" for MS contacts between about 500 km and 1500 km range. In that zone, there are a many meteor trails at different angles and distances that will provide returns. Contacts at less than 500 km are less common and become progressively more difficult, primarily due to the high angle of elevation needed for signals over short paths.

Beyond 1500 km, again the returns become weaker and less frequent as fewer and fewer meteor trails have the required orientation and geometry. At the very maximum limit then, returns only occur when a meteor trail crosses exactly at the midpoint of the path and at exactly 90° orientation.

If the meteor reflections can come from different places in the sky, where do you point your antenna? Is antenna elevation required, like for satellite work? Do I need a massive antenna array, like for EME?

In general, elevation control is not required for Meteor Scatter work. Most stations of interest only require low angles of take-off.

Most meteor returns do not arrive exactly on the direct heading between the two stations. Rather, most returns arrive from two *hotspots*, each about 10° of azimuth on either side of that direct bearing. These are called hotspot A and B. Returns may occur across a narrow arc across the sky. However, statistically, at any particular time of the day, one or other of the two hotspots is likely to be more "active".

In general, it is best to point your antenna at the most active hotspot. Almost all of the software platforms

used for digital MS will advise the operator which is the preferred hotspot and the required azimuth heading, based on the gridsquares of the two stations involved and the time of day.

Unlike EME, where maximum antenna gain is king, most effective Meteor Scatter stations use relatively small, horizontally polarised antennas. Less antenna gain, but wider beamwidths to capture signals arriving from a wider arc of headings across the sky. An 8-to-10 element Yagi is a common choice for many operators. Larger antennas typically result in poorer performance since they miss returns arriving away from the direct heading.

Unlike weak-signal EME echoes, Meteor Scatter returns are frequently very strong – they are just of very short duration.

Are all meteor "returns" the same? What's the difference between a PING and a BURN?

The term "return" describes all types of signal reflected or refracted back from a meteor trail. As discussed above, they can be of different strengths, duration, heading and elevation. There are two main types which are quite distinct, both in characteristics and frequency.

The commonest and vast majority of returns are termed "under-dense" and called "pings". Pings typically have a short duration of between 100 ms and 500 ms (1/10 to ½ second). That's about the duration of a single syllable in SSB, or perhaps a single letter in CW. The primary aim of the digital MS modes is to be able to get a complete message string through on a single ping. Pings are generally the result of ablation of a small grain-of-sand sized meteor.

Under-dense pings are characterised by a rapid rise time to a peak, followed by an exponential decay back to threshold. Pings are due to true reflections from a single 'point' of ionisation in a meteor trail. Although the point may move, the reflection is brief and only from one point at any instant. As the cloud of free electrons rapidly disperses and recombines with their source molecules, reflection ceases.

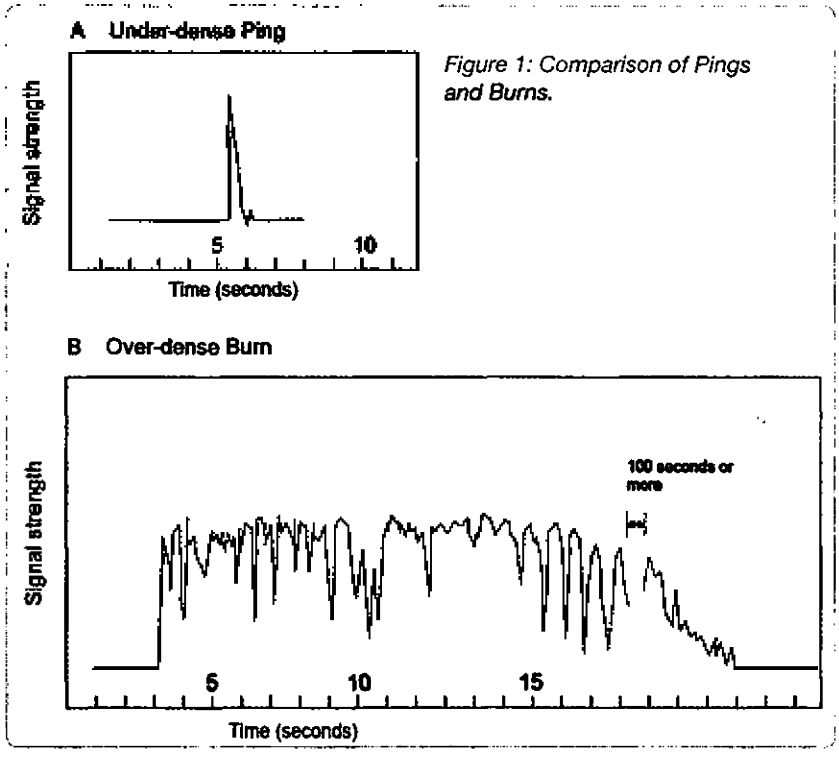


Figure 1: Comparison of Pings and Burns.

The less common type of return is termed "hyper" or "over-dense", called "burns". Burns may continue for anything up to a minute, and sometimes longer. The signal strength may be very high indeed while it lasts. Burns are due to ablation of larger meteors, but still small enough to be completely vaporised.

Burns are characterised by a rapid initial rise time in signal strength followed by a slower and sustained increase. This is followed by a prolonged plateau period of "fluttering" intensity, similar in many regards to aircraft-enhancement signals, eventually terminating in an exponential decline to threshold.

Burns are due to a combination of both reflection and refraction from multiple points along the same ionised meteor trail.

The initial ionised trail in a hyperdense burn is very intense and expands cylindrically around the trail. The free electron density is, however, still sufficiently intense to reflect and refract signals back to the ground. The second slow rise in signal intensity occurs since the reflecting surface has effectively become larger.

The flutter during the plateau phase is due to alternating periods of addition and cancellation of signals simultaneously arriving along different paths – interference.

Pings come from points of ionisation, burns come from tubes of ionisation.

I don't understand how lots of stations can all work on the same frequency at the same time. When the meteor reflections occur, why don't all the signals just pile up on top of each other?

This is the single most important question to answer.

It is true that virtually all VK-ZL VHF Meteor Scatter activity occurs on a single spot frequency, with many stations transmitting and receiving at exactly the same times. As with most other modern

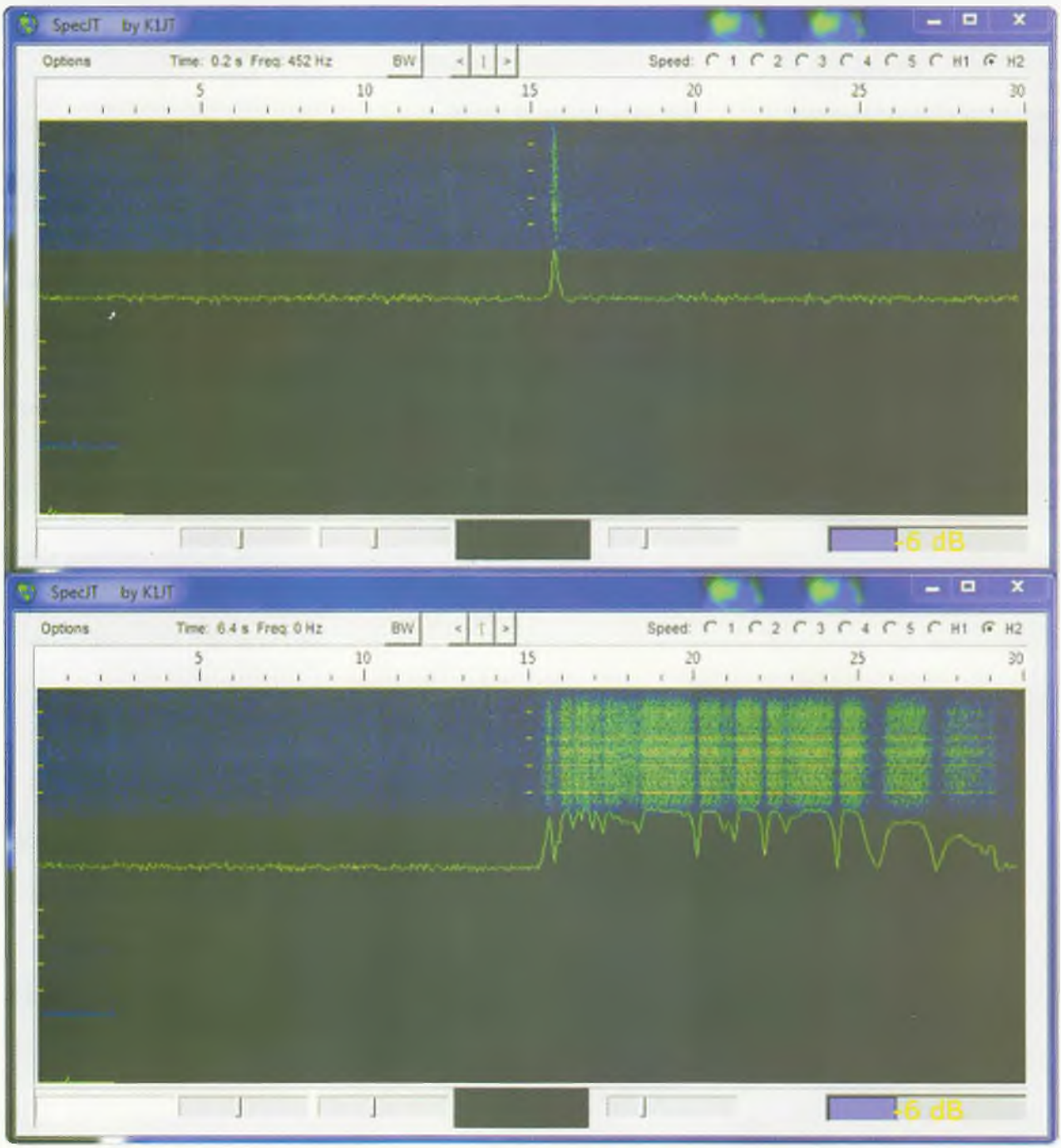
digital modes, digital meteor scatter operation involves transmission and reception in one of two specific time slots: *first* and *second* periods, currently of 15 seconds duration.

A full explanation of operating procedures and protocols, including who transmits in which period etc, will be found in a later part of these articles. Suffice to say here that all stations in a particular area will be running in the same period and their "targets" will be transmitting in the other.

Despite the fact that multiple stations in one area are transmitting at the same time and on exactly the same frequency, it is still possible to separate their reflected signals at a distant location because of an effect known as *geospecificity* – the real magic of Meteor Scatter.

When a meteor is ablated, the Meteor Scatter path produced does not "flash" like a mirror in the sky, visible to all on the ground. Rather, at any instant in time, propagation

Figure 2: Meteor Scatter returns received simultaneously on 2m (lower panel) and 70cms (upper panel) from the same station, off the same meteor.



is only enhanced between specific points back on the Earth's surface. Even stations geographically located in close proximity get separated. Two station even a few tens of kilometres apart may not both appear on the same ping.

Sometimes, both stations may appear but are separated by a small time-difference, sufficient to allow both to be decoded successfully. On longer burns, it is not uncommon to separate and decode multiple stations in the same period, either due to signals arriving at different times, or because the relative signal strengths of both stations are fluttering and peaking at different points in the period.

Does Meteor Scatter Propagation only work on 2m? Does it work on any other bands?

Meteor Scatter propagation is effective across a broad range of frequencies. There are at least four current VK amateur bands where it is possible to make long distance contacts using this mode of propagation. QSOs are possible from 10m right up to 70cms.

Transmit frequency does, however, have a large effect on both the duration and intensity of meteor scatter returns. Firstly, the higher the frequency in use, then, as a general principle, the higher the temperature and the higher the density of free electrons required for a reflection to be supported. Because of this, lower frequencies produce stronger and more persistent returns. Higher frequencies experience shorter and weaker returns.

Allowing just a little mathematics here, if we compare 6m and 2m, where the wavelength is roughly three time greater on the lower frequency.

Ping duration is proportional to λ (wavelength) **squared**.

So, for any given meteor return seen on 2m, the corresponding duration expected on 6m would be:

3 x 3 = 9 times longer.

A 100ms ping on 2m would correspond to almost a second on 6m.

Signal intensity is proportional to l (wavelength) **cubed** (i.e. to the third power)

So, for any given meteor return seen on 2m, the corresponding signal strength expected on 6m would be:

3 x 3 x 3 = 27 times, or around 15 dB stronger.

On 70cm, the wavelength is about 1/3 of that on 2m. So, for the same reasons, a 1 sec burn on 2m would only be expected to produce a 100 ms ping on 70cm and would likely be 15 dB weaker in strength.

Figure 2 shows an example of this made by the author during a meteor shower while running both a 2m and 70cms MS station side by side in Brisbane in contact with VK3ZL near Melbourne. The lower trace shows a strong 2m burn persisting for almost 15 seconds. The upper trace shows the corresponding 70cm ping, persisting for around 100 ms, received from the same station, at exactly the same time, over the same path and off the same meteor trail.

This relationship of frequency, duration, and intensity does not continue indefinitely. On the 10m band, Meteor Scatter contacts are possible, but the intensity of meteor returns is much lower. The peak frequency for Meteor Scatter is probably around 35-40 MHz.

Before the almost universal use of satellites for data collection, automated high-powered VHF meteor scatter transmissions were used by governments, science and defense for data collection from inaccessible and remote sites.

The closest amateur band to the sweet spot for MS is probably 50 MHz, where MS can produce spectacular results, even though there are many modes of propagation capable of supporting DX QSOs on the 6m band.

The next part of this series will cover transmission modes and operating protocols for Meteor Scatter operation, and also equipment requirements to establish a station of your own.

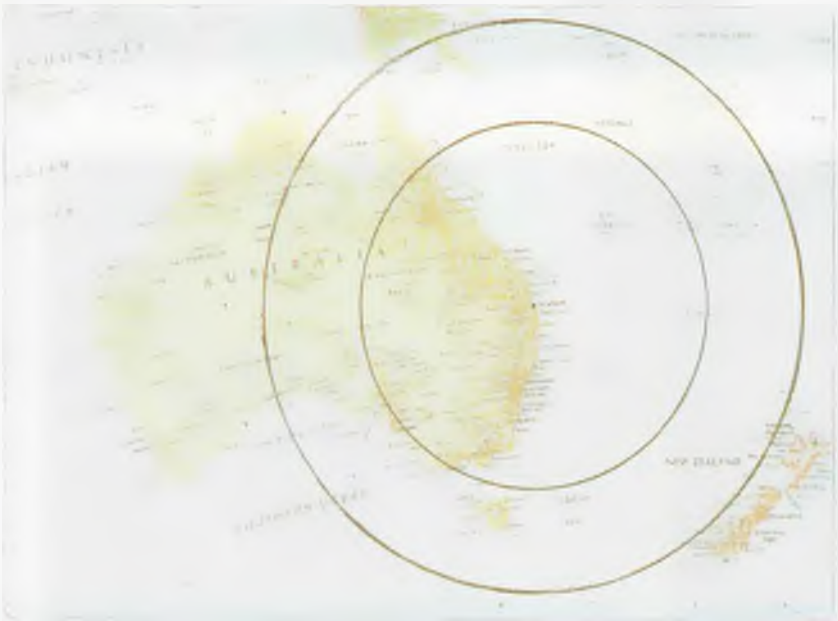


Figure 3: Meteor Scatter Range. Based on Brisbane.
- *Inner ring at 1500 km, representing the "easy zone".*
- *Outer ring at 2000 km, representing the normal limit.*

110 Years Anniversary 1910-2020

When governments ruled the aether

Peter Wolfenden VK3RV, WIA Historian

Amateur radio in Australia 100 years ago – Part 1

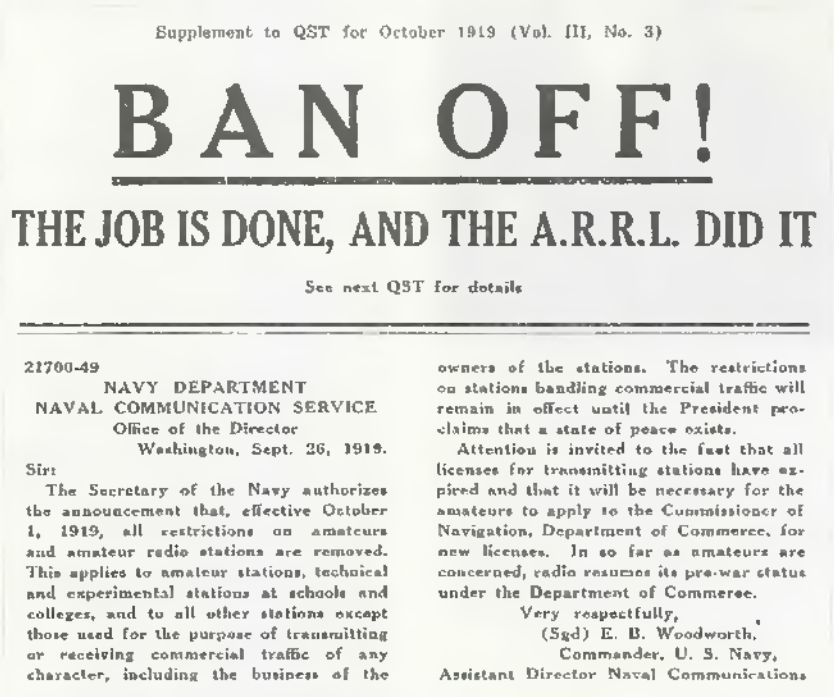
The Wireless Institute of Australia had its genesis 110 years ago at a meeting of like-minded people called together in Sydney by George Taylor. That meeting took place on 11 March 1910 at the Hotel Australia in Sydney's Martin Place, at which the ***Institute of Wireless Telegraphy of Australia*** was inaugurated, soon changing to the ***Wireless Institute of Australia***.

All Australian experimental wireless stations were closed down at the outbreak of World War One, as happened in many other countries. The Australian Call Book for 1914 listed 401 licensed Australian Experimental stations.

Post WW1 frustration among experimenters

Amateur experimenters in the new technology were keen to have their operating rights returned. Although the Armistice was signed on 11 November 1918, the formal end to WW1 was not proclaimed until 28 June 1919 at the signing of the Treaty of Versailles. However, the control of the radio spectrum in the UK, USA, Australia and other countries remained jealously retained by the respective Navies.

Amateur radio in America wasn't closed down for WW1 until April 1917. The USA managed to lead the way back to "normality" for experimental stations in their country during 1919, but the restrictions were only removed after Congress placed considerable pressure on the Director of the Naval Communication Service. This action helped to "break the ice" for amateurs in other areas of the Western World. [1]



Supplement to QST for October 1919 (Vol. III, No. 3)

BAN OFF!

THE JOB IS DONE, AND THE A.R.R.L. DID IT

See next QST for details

21700-49
NAVY DEPARTMENT
NAVAL COMMUNICATION SERVICE
Office of the Director
Washington, Sept. 26, 1919.

Sir:

The Secretary of the Navy authorizes the announcement that, effective October 1, 1919, all restrictions on amateurs and amateur radio stations are removed. This applies to amateur stations, technical and experimental stations at schools and colleges, and to all other stations except those used for the purpose of transmitting or receiving commercial traffic of any character, including the business of the owners of the stations. The restrictions on stations handling commercial traffic will remain in effect until the President proclaims that a state of peace exists.

Attention is invited to the fact that all licenses for transmitting stations have expired and that it will be necessary for the amateurs to apply to the Commissioner of Navigation, Department of Commerce, for new licenses. In so far as amateurs are concerned, radio resumes its pre-war status under the Department of Commerce.

Very respectfully,
(Sgd) E. H. Woodworth,
Commander, U. S. Navy,
Assistant Director Naval Communications

Photo 1: Extract of Insert to October 1919 QST.

The October 1919 QST Editorial included a statement which displayed the on-going frustration:

"..... Another month has rolled around and still we are unable to get any action from Washington or get any reason for inaction. Everybody tells us the same thing – that it is up to the Secretary of the Navy. And everybody, when you ask them why the Secretary of the Navy acts the way he does, makes a different guess....." [2]

In fact, a decision had been made on 26 September, which was quickly communicated to the American Radio Relay League (ARRL). The Editor for the October issue of QST, the ARRL journal, managed at the last minute to find room to publish the statement issued by the Commander of the US Navy, in which he said that the ban on amateur stations had been removed and that, as all transmitting licenses had been canceled, amateurs should now, from October 1, apply to the Commissioner for Navigation, Department of Commerce for new licences. [3]

The following month's QST Editorial made particular reference to "QRM" (or interference). It stated:

"Re-opening wasn't won easily..... if we interfere, we play right into the hands of the Navy Department and give them the strongest argument against us which could be devised.....Do not take a chance – know what your wavelength is, make sure it is not over 200m and comply with the law....."

The editorial concluded with:

Photo 3: Ernest Fisk, later to be knighted, became a key figure in releasing the government's grip on wireless spectrum in the years immediately following WW1. During 1919, while President of the WIA NSW Division, he became pro-active in having the spectrum re-opened to amateur experimenters. Ushering-in the use of spectrum for broadcasting was to follow.

"On your life, don't cause interference with commercial or government stations". [4]

The return to amateur radio in the UK, Australia and other countries gradually followed. However, many restrictions remained in force, some for many years.

The re-gathering of experimenters in Australia

The licensing hiatus here led to a re-forming of representative state groups. Experimenters licensed before the war and who served across the Services, maintained they should have their rights to operate returned immediately. After all, the war which caused the sudden closure of their stations was now officially over. And they had done their duty for "King and Country"! Many of those amateurs who returned from the bloody battlefields of Europe began to feel rejected by their own country, for which they had applied unselfishly their privately gained skills in wireless telegraphy.

On a positive side, the war experiences exposed pre-WW1 experimenters to the very latest radio technologies which had been gradually developing during the war. The many quiet thinking hours on the long and, in some cases, delayed journey home, flooded minds with ideas that could be applied to the development and improvement of their own stations.

It was the exposure to valve technology which intrigued and tantalised those experimenters' minds with potential applications for more sensitive receivers, audio amplification and perhaps the possibility of a more refined method of speech transmission – provided, of course, those valves could be sourced back home. It is understood that a number of amateurs did bring back a few "no longer needed" valves from "deserted" radios!

The Australian Navy remained most reluctant to relinquish the control of wireless. Amateur experimenters and commercial interests alike became annoyed and frustrated at the delay in the re-opening of the spectrum and it did not take long before the experimenters began to re-gather. State Divisions of the Wireless Institute, and clubs, most of which had become moribund during the war, gradually re-established and commenced lobbying the government for return of their privileges.

As President of the NSW Division during 1919, Ernest Fisk, became pro-active in having the spectrum re-opened to amateur experimenters. At this distance, it is somewhat unclear as to exactly what his motives really were, but there is little doubt that it was his drive, and his determination, which encouraged Australian amateurs to commence re-organising themselves to confront the authorities firmly with their requirements, but lingering in the background and in parallel with advancing the amateur's cause, Mr. Fisk was also able to address wireless matters relating to his business, AWA. (Or was it the other way around?).

It is appropriate at this juncture to re-call that the 'Spanish flu' was rampant in Australia during 1919, causing quarantining and restrictions to movement and the gathering of people.

Notwithstanding, New South Wales amateurs are reported as "re-establishing" their organisation in January 1919, Queensland in March, Victoria in April and Western Australia, in November. South Australia did not have a formal amateur organisation prior to WW1, and during September 1919, interested experimenters met to consider establishing a South Australian Division of the WIA, which was formally completed in November. Tasmania was the last to become part of the WIA during 1923. E.T. Fisk, or his delegate, was present at a number of the "re-establishment meetings" and it does appear that a cohesive, national, experimenters' organisation was his desire.[5]

Institute Federation, however, did not take place until May 1924, and then driven by notable amateurs such as Phil Renshaw, Ross Hull, Howard Kingsley Love and others.

So, although at that time Australian experimenters were not permitted to operate on the air, they were generally becoming more positive, with a deal of optimism, and by planning and lobbying, they were determined to return their stations to full activity.

Wednesday 13 August 1919 saw the lecture room of the Royal Society in Elizabeth St, Sydney, filled with the sounds of gramophone music magically appearing through the aether. The source of this was the premises of AWA in Clarence Street, a few blocks away, presumably under a permit from the Royal Australian Navy. Mr Fisk was lecturing on wireless and demonstrating wireless telephony before the Industrial

Section of the Royal Institution. This was the first of a number of similar demonstrations made in an attempt to encourage the government to allow broadcasting in Australia. [6]

The goal of transmitting speech was a great attraction and challenge for experimenters from the earliest days of wireless. Many tried with varying success, mostly failure. It was intriguing to find that the first documented report of a lecture on the subject before the Wireless Institute of Victoria, took place seven months after WW1 had been declared, and was mentioned in the Minutes of a WIV General Meeting held at the Oxford Chambers:

"Mr. HH Blackman [XOE a member, but unlicensed due to WWI closure] *in a very able manner addressed the subject 'Telephony' and was thoroughly appreciated by those present."*

This was the last-minuted, pre-WW1 meeting of the Wireless Institute of Victoria on record. [7]

The licensing debate drags on

Throughout 1919, the licensing debate with authorities continued with little success, and three days after AWA's telephony demonstration in Sydney, the situation appeared to remain quite hopeless. The *Sydney Morning Herald,* under the heading ***"Wireless – No Private Control",*** reported that:

"..... Consideration is being given by the Navy Board in conference with certain wireless institutes to the question of issuing licences for the private use of wireless plants. The Acting Minister for the Navy, Mr. Poynton, said today that he would take no steps to remove restrictions on the use of private wireless stations...." [8]

This statement upset many wireless people and generated an immediate response from Mr Fisk. In a letter to the Editor of the Melbourne *Argus* on August 20, he took on Acting Minister Poynton, by challenging the expressed view that the restrictions should remain and that the Federal Government should retain complete control.

Within his letter, Mr. Fisk stated that no-one suggested that the government should relinquish control of wireless, as presently it continued to have control of aviation and the licensing of motor cars. He also used the term "private user", which should not be presumed to be just the "amateur experimenter", but anyone other than the then-only legal user of wireless communications, the government.

Fisk concluded his letter with:

"The fact that the Government control of public telegraph and telephone lines which require large central exchange organisations, is not an argument for Government monopoly of wireless, in which a private user owns and operates his own unit. In the words of the United States commissioner of patents, "Government monopoly of wireless will be the end of wireless development."

He signed off as:

E.T. Fisk, Managing Director
Amalgamated Wireless (Australia) Limited
Sydney August 18.

The letter, not mentioning at all his involvement with experimenters, seems to portray a very frustrated and perhaps even a panicky stance on his part. E.T. Fisk was a centre stage player, usually firmly in control of things going on around him. He was very much a company man, in charge of a potentially highly profitable undertaking within an emerging market. He also appears to have been totally surprised by the appearance and timing of the Minister's statement in the press and perhaps even visualised the potential for 'his company', AWA, slipping through his fingers! [9]

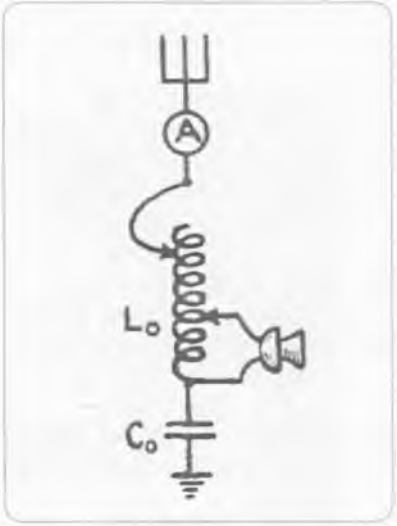


Photo 4: Additional circuitry for early AM (using the absorption method).


Photo 2: Marconi was an undoubted giant of the early years of wireless technology development and commercial success with the UK-based Marconi Co. His 'presence' was seemingly always felt in the background during commercial and defence developments of wireless technology and applications in Australia in the post-WW1 years.

In hindsight, Mr. Fisk must have felt under considerable pressure, as there was a great deal going on behind the scenes of the Australian "wireless world" during 1919. The Marconi Co (UK) had already proposed a commercial station for communication between here and the UK, to be built and operated by them, but handed over to the Australian Government if war should be declared. [10]

And the scandal which surrounded the sale to the Navy some years earlier of Shaw's Wireless Works (The Maritime Wireless Telegraph Company), together with

relevant patents, had re-surfaced. This was a messy business, which had financial and political implications for a number of people, including some of our politicians! [11]

Indeed, at that time, there were many ingredients within the melting pot of wireless development in Australia to occupy Mr Fisk's mind, as well as his desire to introduce a controlled form of broadcasting!

Thankfully, the continued pressure on the government was having effect because, towards the end of 1919, some good news emerged. The Navy Radio Service would finally issue temporary "Receive only" permits to individuals – at a fee of £2/-/- (about $160 today). Max Howden (later 3BQ) was one such lucky early recipient, with licence No.19, issued during late 1919. [12]

The availability of these expensive and temporary "Receive Only" licenses gained some momentum amongst experimenters, reaching well over two hundred by mid-1920. Arthur Cotton (XVS prior to WW1, later 5HY) was another who obtained a licence, No.210, in June 1920. His operating conditions were stipulated as: *"to receive only with a non-regenerative receiver"*.

Regenerative valve receivers, if incorrectly adjusted, could cause significant interference to other listeners – of great concern to authorities and amateurs alike. It is also understood that some individuals strayed into using purposely miss-adjusted regenerative receivers as short range code transmitters! [13]

To be continued next issue.

D TEMPORARY PERMIT TO USE W/T APPARATUS FOR PURPOSE OF RECEIVING WIRELESS TELEGRAPHY SIGNALS.

This Permit is issued pending legislation on the matter of the issue of licences to amateurs and others for experimental purposes, and is strictly limited to "receiving" stations. Permits for transmitting stations cannot be issued at present, except in special cases.

Unless specially endorsed, this permit does not extend to the use of "valves." Permission to use valves will be granted only to those who are certified W/T operators or furnish satisfactory evidence that they understand the principles of valve working and can receive W/T signals efficiently at a speed of not less than twelve words per minute.

This permit will lapse with the introduction of new Regulations governing the issue of licences for experimental and instructiona purposes, when the necessary forms of application for licence will be forwarded to the holders of permits.

Issued to .....

Address .....

Telephone No. (if any) .....

F. G. CRESSWELL,
Radio Commander,
Acting Director of Radio Service.

N.B.—This permit is not transferable, and applies only to the premises above specified.

Photo 5: From the 1920 Marconi Wireless Year Book.

References

(1) ***Back on the Air, 200 Metres and Down***, CB DeSoto, ARRL, USA, 1936, p58

(2) ***Daniels only Knows***, *Editorials, QST*, Journal of the ARRL, October 1919, p11

(3) ***Ban Off! - The Job is done and the ARRL did it***. Supplement to October 1919 QST

(4) ***At Last***, Editorials, QST, Journal of the American Radio Relay League, November, p13

(5) ***History of Amateur Radio in Australia***, Un-published, G Glover VK3AG, c1950

(6) ***Music by Wireless***, Argus, Melbourne, 15 August 1919, p6

(7) Minutes of General meeting of the Wireless Institute of Victoria, 9 March 1915

(8) ***Wireless – No Private Control***, Sydney Morning Herald, 16 Aug 1919, p17

(9) ***Restriction of Wireless***, Letter to Editor, Argus, Melbourne, 20 August 1919, p11

(10) ***Wireless Telegraph Scheme***, Western Argus Kalgoorlie, 18 March 1919, p29

(11) ***The Shaw Wireless Scandal***, Advertiser, Adelaide, 6 September 1919,

(12) ***History of Amateur Radio in Australia***, Un-published, G Glover VK3AG, c1950

(13 ***A5HY Station Log Book/Diary 1913-27***, A Cotton VK5HY, WIAA

Remembrance Day Contest 2020 – 75th Anniversary

Alan Shannon VK4SN

VK7 is the 2020 winning state for the Remembrance Day Contest. Who would have guessed?

Twenty per cent of the state's number of total individual licences, or 70 per cent of actual participants, submitted logs. That has to be a world record for log submission!

Runners up this year were VK6, with 52 per cent of participants submitting logs.

Overall, log submission increased from 19 per cent last year to 30 per cent for the number of participants submitting logs. An outstanding effort indeed.

Congratulations go to the following individuals:

SOPH VK7ZMS 1149 (new record!)
SOCW VK2GR 408
SOMX VK5SFA 1066 (new record)
QRPPH VK3TWO 442
QRPCW VK3QB 280
QPRMX VK2IO 499

The highest scoring Rookie was won by Tom VK5FAAH, with 79 points in the Single Op Phone section.

Top Foundation operator was Jeff VK6FJLM, with 362 points in the Single Op Phone section.

Top Team was "Cronies+1" (Richard VK7ZBX, Murray VK7ZMS, Hayden VK7HH), with a score of 2937, beating their own record from last year.

A total of 259 logs were submitted (184 last year) – including one Check-log, showing 32,183 QSOs, against 22,781 from last year. Did the extra logs come from operators who normally support a multi-operator station? No, there were only four operators submitting logs who were in a multi-op team last year. That means that there were 52 operators from previous MO stations who did not participate in this year's event.

Approximately 890 unique stations participated. No multi-operator stations were allowed this year due to a few Covid-19 lock-downs in the southern states.

Six paper logs were received and three of them were computer generated!

Most logs were uploaded to the VK log checker site, but emails were received with logs attached as operators had changed header options and were knocked back for incorrect options on upload.

Mistakes, there were a few

A total of 1400 log score adjustments were made over 176 logs. It is very apparent that a lot of operators do not use phonetics and most points lost were from incorrect call logging.

The greatest number of mistakes were logging of similar sounding letters like, Ts and Ps, Ns and Ms, Es and Cs, along with Ds and Bs.

Other common mistakes were

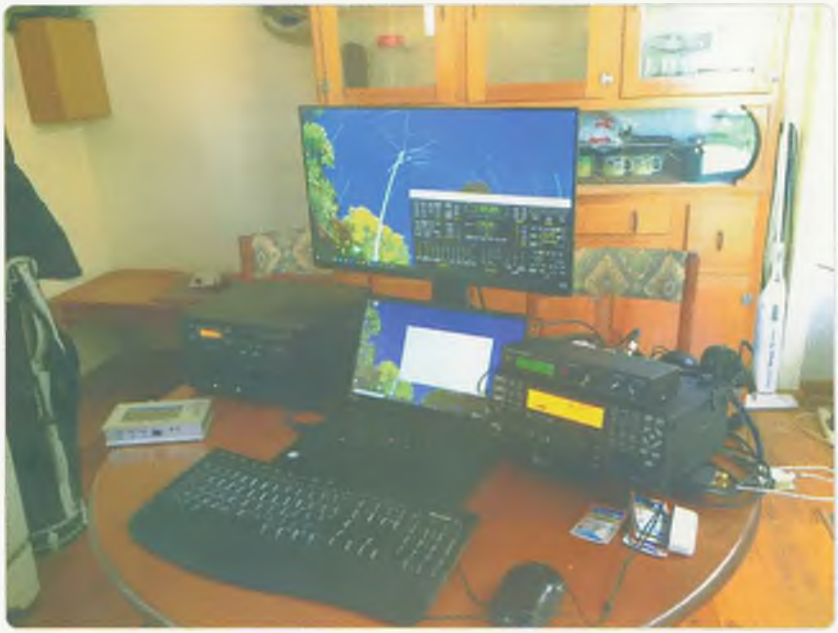


Photo 1: VK5GR portable in Tickera, on the eastern shores of Spencer Gulf.

TEAM NAME	CALLSIGN1	SCORE	CALLSIGN2	SCORE	CALLSIGN3	SCORE	TOTAL
Cronies+1	VK7ZBX	1056	VK7ZMS	1149	VK7HH	732	**2937**
AREG One	VK5GR	997	VK5IR	240	VK5SFA	1066	2303
EZARC	VK3YV	416	VK3LF	158	VK3LM	219	793

Table 1. Remembrance Day Contest 2020 Team Results

Full Results table:

SINGLE OP PHONE

Callsign	Points
VK7ZMS	1149
VK7TW	1058
VK7ZBX	1056
VK2EFM	1041
VK2MT	985
VK7OO	858
VK7HH	732
VK7GH	714
VK7JGD	685
VK4ZD	605
VK1MA	558
VK7QP	533
VK7FB	516
VK7KDV	497
VK7KAJ	492
VK7HW	422
VK3YV	416
VK5PAS	398
VK7ZTA	350
VK7VH	348
VK7MO	319
VK3AVV	307
VK5DT	304
VK6DDX	303
VK2FO	287
VK7DG	285
VK6YD	264
VK2VU	261
VK5ST	258
VK3GC	235
VK6BDO	232
VK3LM	219
VK6ATB	219
VK6CSW	212
VK6NAD	207
VK3YE	197
VK5BC	183
VK7RM	182
VK3JK	179
VK2DG	173
VK2ACD	169
VK6LTC	167
VK7KC	163
VK3LF	158
VK7HSE	150
VK2LDM	149
VK3BQ	147
VK4FY	146
VK7LG	142
VK6IR	133
VK7KK	133
VK6CF	128
VK5KBJ	124
VK7CL	122
VK7ALH	115
VK6MIL	113
VK2TTL	113

SINGLE OP CW

Callsign	Points
VK2DWP	111
VK7DM	111
VK6TKR	108
VK3AMW	107
VK3ASU	104
VK4KY	103
VK3JLS	103
VK7FPCL	100
VK2LX	100
VK6MM	100
VK6KW	100
VK3ADW	99
VK7JU	98
VK5MK	96
VK3MD	88
VK2KHA	86
VK6AJP	86
VK6JP	85
VK2VV	84
VK3MDH	84
VK4ALH	81
VK1HMS	80
VK5FBRO	80
VK7ZGK	80
VK5FAAH	79
VK7DW	79
VK3MZ	78
VK6ZO	77
VK6GD	77
VK2FRBG	77
VK3CO	75
VK3DRH	72
VK6LAP	71
VK3ER	71
VK3TZE	70
VK3JL	70
VK1DW	70
VK2BBQ	70
VK7ZRJ	64
VK6FRLR	63
VK7AW	63
VK2STG	61
VK3JWT	61
VK5NNN	59
VK6NCB	59
VK3HGB	58
VK5NYD	56
VK2UVP	53
VK2KDP	52
VK2XD	50
VK2BAM	49
VK6WE	48
VK3DY	48
VK3CT	47
VK7DIK	44
VK6JR	44
VK2DEK	43

Callsign	Points
VK7PD	42
VK3SG	41
VK8JG	41
VK3BTV	41
VK2XIC	39
VK5AYD	39
VK2PMG	38
VK7RE	38
VK3VLF	37
VK6AAO	37
VK3FI	36
VK7AN	36
VK7VKT	33
VK7GS	33
VK7DY	33
VK3LRE	32
VK4FLR	32
VK6WU	31
VK3NCC	31
VK4RJ	31
VK6FMTG	30
VK2ZG	29
VK5XB	29
VK2MK	29
VK6FRDM	27
VK4MST	26
VK7WH	25
VK3NRD	24
VK2ZDB	24
VK6AKR	24
VK3DAN	22
VK5DP	22
VK4PQ	22
VK5JGM	22
VK5PX	21
VK4ADC	20
VK6BBM	20
VK7KW	19
VK3FS	19
VK3JGP	16
VK5AV	16
VK6YA	15
VK7BYL	15
VK6GC	15
VK7MMT	15
VK4KC	14
VK5QI	14
VK3KZM	13
VK5LSB	13
VK2HRG	12
VK1JB	12
VK3OHM	11
VK1PE	11
VK5FBIC	11
VK4DA	11
VK2DAI	10
VK7FTAS	9

Callsign	Points
VK1CCJ	8
VK3FBAA	8
VK3EET	8
VK3PIA	7
VK4JSS	7
VK7KWB	6
VK6FEEE	4
VK3FUR	3
VK4JJW	3
VK2CIM	2

SINGLE OP MIXED

Callsign	Points
VK5SFA	1066
VK5GR	997
VK5LJ	996
VK4WIS	587
VK7GN	555
VK3ANL	461
VK6ZRW	442
VK4SN	402
VK2YW	294
VK4BZ	265
VK5CZ	251
VK6TDF	243
VK5IR	240
VK6ZMS	233
VK5PL	229
VK3IO	226
VK7BO	225
VK7ZCR	222
VK3MH	204
VK6DW	196
VK3KTT	193
VK4BXX	186
VK3MB	168
VK6MK	164
VK4DX	161
VK6WR	158
VK6POP	152
VK3VT	152
VK3CTM	147
VK4QH	131
VK6TU	128
VK3AE	104
VK7WR	102
VK6QS	91
VK1DA	72
VK4XU	67
VK3ZLT	61
VK5FD	58
VK3HY	52
VK2DLR	45
VK3ZAP	37
VK6AB	34
ZL3RIK	10
VK6ST	9

Callsign	Points
VK2GR	408
VK3HJ	162
VK2PN	136
VK3MV	130
VK2BJ	124
VK2KJJ	98
VK2BHO	92
VK2AYD	78
ZL1IF	42
VK2BJT	42
VK4QS	18
VK2EAH	14

QRP PHONE

Callsign	Points
VK3TWO	442
VK6FJLM	362
VK7BEN	303
VK6FMON	289
VK7FBOC	253
VK6FWCB	141
VK3OAK	136
VK3ZPF	89
VK6JN	57
VK3GK	51
VK2HJW	27
VK5FPAW	22
VK7WN	15
VK6FZEB	13

QRP CW

Callsign	Points
VK3QB	280
VK3VB	190
VK2IG	106
VK3HN	82
VK6FLAB	16

QRP MIXED

Callsign	Points
VK2IO	499
VK7KPC	40

MULTI-SINGLE

Callsign	Points
NO ENTRY	COVID19

MULTI-MULTI

Callsign	Points
NO ENTRY	COVID19

CHECKLOGS

VK5FSRJ

Photo 2: Antenna setup for VK5GR at Spencer Gulf.

STATE	LOGS	CNTCTS	PH	CW	RAW SCORE	WEIGH FACTOR	WEIGHTED SCORE
VK 1	7	669	636	33	811	408	1.99
VK 2	41	4935	4203	517	5876	3745	1.57
VK 3	60	5292	4823	469	6811	3965	1.72
VK 4	21	2191	1899	292	2918	2322	1.26
VK 5	27	4152	3771	381	5683	1574	3.61
VK 6	48	4989	4894	95	5827	1021	5.71
VK 7	51	9887	9770	117	13679	246	55.61
VK 8	1	42	42	0	41	133	0.31
ZL	2	26	5	21	52	5000	0.01
CK LOG	1						
TOTAL	**259**	**32183**	**30043**	**1925**	**41698**		**TOTAL**

Table 3: Logs and contacts submitted showing VK7's huge weighted winning score.

using the same prefix as your call when logging interstate calls and so many never logged the contact at all!

Eleven logs had severe time and date problems. I requested fixes, but in the end not much was fixed and many stations lost points because the call worked was not in the other log, and vice versa.

Thanks due

Thanks go to those whom I requested a rewrite of their logs, which was gladly done and re-submitted. Big thanks to those involved in getting a guest speaker for the Remembrance Day speech, especially Peter VK1PE. Peter has skills I don't.

As per usual, there is a full report and statistics on the WIA Website in the download area. 1st, 2nd and 3rd place getters will receive a printed certificate from the WIA office. State winner certificates are in PDF format and can be downloaded from the website and printed by the operator.

73 and see you next year. Alan VK4SN.

Covid, a Clansman, a Codan and QRP in a clamshell

Carmel Morris VK2CAR

Photo 1: Carmel VK2CAR with her portable home-built QRP rig in a clamshell container.

Putting the headline metaphors aside, many radio clubs have resorted to holding more nets during lockdown, along with video linkups using Zoom1, Jitsi2, Google Meet3, et al. On the air, DMR4 activity, and even the use of Peanut5, have seen a rise in operators as compensation for the lack of face-to-face meetings. However, I was still itching to do more with outdoor HF while keeping in mind social-distancing.

Recently, the NSW lockdowns were eased. Although our local Sydney amateur radio clubs have had little to no social get-togethers, a few of us were lucky to meet up recently for a morning net, surprising our net operator when we all called in as portable!

Park portable

It all started when I decided to take my gear to Wahroonga Park nearby and check in to the local Hornsby & Districts Amateur Radio Club (HADARC) net as portable. After the net, Colin VK2JCC had the idea to hold a net field day by having a few of us meet at Wahroonga Park for the following regular Friday 40m HADARC net. Amateur operators brought their own gear and everyone observed social distancing, placing antennas (and each other) beyond the required 1.5-meter distance.

The stars of the day were two Clansman PRC320 radios. These UK military radios are portable 'manpacks' that feature up to 30 watts transmit power. They appear on eBay from time to time, general for around $700 (AUD). They're data-capable and have a built-in auto tuner.

Military-grade speakers were also used on the day and can, so I'm told, withstand direct gun fire – I hope we don't get to experience that!

Preferring lightweight gear, I brought my home-built 40m QRP radio with Z-matcher, all housed in a clam shell case. I ran the feedline to a modified mobile antenna mounted on a junk camera tripod, using a bolt-on homebrew telescopic counterpoise array; all the parts were found at our local metal scrapyard for just a few dollars.

After another amateur turned up with a fancy Codan using a foldout military whip, it was all go on the airwaves with around ten amateurs taking part eventually. A hot breakfast was provided thanks to Steve VK2AAV and Grant VK2FGWP.

Despite the cold and damp weather it was a great net, drawing in some VK3s and VK7s as well. Lockdown rules permitting, we plan to hold a 40m 'field day net' more frequently, to help keep us all active on the air.

Photo 2: Colin VK2JCC and his Clansman setup, with end-fed antenna using a homebrew 9:1 unun and customised squid pole.

This may be a way for you and your club to engage safely in on-air social get-togethers but, as always, first confirm your current local/state Covid-19 lockdown rules.

References

1. Zoom is a cloud-based service which offers online video meetings and webinars, and offers video, audio and screen sharing across a wide range of devices (PCs, laptops, smartphones) and software platforms. See Wikipedia.
2. Jitsi is a collection of free and open-source multiplatform voice (VoIP – voice over internet protocol), videoconferencing, and instant messaging applications for the web platforms of Windows, Linux, macOS, iOS and Android. See Wikipedia.
3. Google Meet is a videoconferencing application developed by, yep, Google. See Wikipedia.
4. DMR – digital mobile radio, an international digital radio standard developed by the European Telecommunications Standards Institute (ETSI), providing improved voice quality over past systems, along with improved functionality (eg. location info), channel efficiency and security. See Wikipedia.
5. Peanut is an application that enables amateurs around the world to make contact via an Android device or network radio. You only need an Android device to use DSTAR or DMR and all the features they provide.

Photo 3: The Australian Codan transceivers are popular HF rigs, many models being obtained through second-hand sources.

Photo 4: The Clansman is a UK military radio operating over 2-30 MHz, providing SSB, AM, and CW modes and delivering 30 Wpep. Speech processing and automatic level control are employed to provide clear speech and a high mean output power.

Photo 5: Matt VK2BAI braving the bleak winter morning to surprise net controller Rod VK2DAY with yet another portable check-in.

Photo 6: Carmel's homebrew 7 MHz portable QRP transceiver and antenna matcher, housed in a clamshell case.

Don't forget to register for MEMNET.

SOTA and Parks

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COVID restrictions are still impacting activity

As travel restrictions have been eased in some states and territories, some operators have made good use of the relaxed restriction conditions. Activators have been out in NSW, ACT, SA and Qld. These activations have provided targets for chasers/hunters in all states, providing that propagation was cooperating.

While Greater Melbourne has quite a few weeks under lockdown, those in regional Victoria have some ability to travel for "exercise and outdoor recreation" under Stage 3 restrictions, but can only make day trips.

As the COVID situation improves, lowering of restriction levels, combined with improving weather, is likely to see some of the amateurs based in regional Victoria heading out to activate SOTA summits and/or Parks. One limitation will be that many National Parks are still closed.

All Activators need to be aware of the Rules for the various award schemes, which require that access to the operating site is permitted. Penalties may be applied if you activate from a closed site, either via the local Award manager or in the form of fines from the authorities if you are found in a closed Park.

Travel restrictions have also been eased in New Zealand, so VK amateurs have been able to attempt to contact NZ Activators.

ZL Activity Marathon

The Lee Jennings Memorial Activity Marathon 2020 commenced on 4 April 2020, as mentioned in the last column. Geoff ZL3GA published an update in *Break In* magazine, published in August. Up until the end of July, five amateurs had submitted logs meeting the Marathon conditions for 119 out of 119 possible days, including Gerard VK2IO and Peter VK3PF. Several other VK amateurs feature on the list.

Participation on week days from ZL amateurs has decreased as life returns to a state closer to normal. A regular group of amateurs in VK2 and VK3 can be found on CW at around 0000 UTC each morning. Look around 14.062, 3.532 and 7.032 MHz, plus or minus a few kilohertz. One should be aware that any SOTA or Parks Activation may impact the AM activity as the Chasers/Hunters seek out those out and about!

VKFF

Liz VK2XSE offers a summary of Parks activity as at early September:

VK operators have not been very active over the last months, with a new lockdown in Victoria and the closing of borders preventing many potential activations.

A highlight in August was the National Tree Day VKFF activation on 2 August, with 21 operators from VK1 through to VK5 activating local Parks. Those shut at home were able to enjoy some good conditions across HF bands for the day.

Several Hunters have reached new Honour Roll status this month, but a special mention goes to those receiving their early awards:
Danny ON4ON: Platinum VKFF Hunter

Matthew VK2FMJC: Silver VKFF Hunter

Marty VK4KC: Diamond VKFF Hunter

Leigh VK3SG: Diamond VKFF Hunter.

Activator awards are coming through more slowly:

Scott VK4CZ: Silver VKFF Activator

Marty VK4KC: Silver VKFF Activator

Chris VK1CT: Gold VKFF Activator.

Construction activity

Glenn VK3YY reports that he has been putting his spare time in lockdown to good use:

Just building small QRP radios here for when we can get out to the hills again! The QRP design is called "the uSDX", which has an active forum at the moment on Groups.IO.

This design is a simple stand-alone SDR based on a garden variety ATMEGA328 micro. Guidom PE1NNZ has squeezed everything out of that micro to run it as an SDR. The SSB transmitter is interesting, as the PA runs Class E, or thereabouts, and uses PWM to restore the amplitude component while maintaining high efficiency (EER).

I have built two of the radios; they are compact at about 65 x 70 x 30 mm external enclosure dimensions. The SSB does sound a bit harsh, but perfectly readable and the transmitted spectrum looks acceptable.

More details at: *https://vk3yy.wordpress.com/2020/07/12/usx-or-usdx-qrp-hf-transceiver/*

There's been further developments in that area with the development of a 'kit' for the portable version of the QCX, with an option for the uSDX. Check out: http://qrp-labs.com/qcxmini.html with the latest developments in *https://groups.io/g/ucx/topics*

Radios designed for portable operations

Several transceivers have appeared in various social media forums over recent months. Some are variations on existing designs, while others have presented some interesting new ideas. While the demonstration radios appear to be real, production models often take a long time to appear on the market.

One radio that has caused considerable interest has been the Icom IC-705, which was announced at the Tokyo Ham Fair in August 2019. There has been considerable speculation about the final features. As this column was being prepared, the radio had been on sale for several weeks in Japan. Despite delays due to shipping, the first units started being distributed in Australia in late August.

Perrin VK3PT has been making contacts "from the backyard" with his IC-705, together with an LC-192 backpack and a Comet HFJ-350m antenna. Justin VK7TW activated Mount Wellington VK7/SC-001 with his IC-705, including making two IC-705 to IC-705 contacts!

At this point, we've nothing in the calendar. The annual Keith Roget Memorial National Parks Award (KRMNPA) weekend has been cancelled as we await the post-COVID world.

73 & 44,
Allen VK3ARH

A SOTA activator's first impressions of the Icom IC-705

Ron Cook VK3AFW

The IC705 in its natural environment.

The IC-705 is the latest fully-featured portable transceiver on the market. It is also the most expensive. Although having a different body shape to the popular Yaesu FT-817 and FT-818, it is roughly the same weight and volume. It also covers the same bands and modes – 160m through 10m, plus 6m, 2m and 70cm.

So what does it offer for the extra cost? Firstly, it gives 10 W on all bands. This is useful under current conditions.

It uses digital signal processing (DSP) technology, which expands the functionality of the transceiver compared to the analog FT-817/818.

You can connect to the rig via USB or Bluetooth and use an android phone to control the transceiver. I've not tried that, as it's probably not important for my activations.

There is an SD (Secure Digital) card slot on which to record QSOs and to use for setting and menu backup. You have to supply the SD card, which are sold *everywhere* (including country servos!).

Size matters

It has a bigger screen than possible competitors; the same as in the popular IC-7300, which helps those with less than perfect vision. The screen is bright enough for outdoor use. It has a decent spectrum and water fall display. The frequency span of the display can be adjusted from a few kHz either side of the operating frequency up to 500 kHz either side on UHF. No aliasing or internal spurs were detected in a week's use.

If you're operating on 7032 and 7090 shows an SSB signal, it might mean a S2S (summit-to-summit) opportunity. It is so convenient to watch what is happening around you on the band while working another station.

For Dstar users, it has full capability.

It has a standard hand-held radio clip-on battery (BP-272), which can be charged whenever the transceiver is connected to a power source. Or, it can be unclipped and charged in a standard charger. This is adequate for several hours of operation, hence is suitable for most Park activations, or maybe three typical SOTA activations. When running on its own battery, the power level defaults to 5 W. The external supply voltage requirement is specified as 13.8 V +/- 15%, and the full power is maintained over this range.

An inbuilt battery management system charges the attached battery and switches off charging when the battery is fully charged. The set switches to the clip-on battery when the applied external voltage drops far enough.

The internal speaker is forward-facing, which makes for clearer audio. The tiny speaker does a surprisingly good job. Of course, you can use your favourite headphones.

The controls are a nice mix of buttons, knobs and menu items, similar to the IC7300, and is an advance on the IC7100.

I have used it on SSB and CW on HF, and FM on VHF; it is a delight to operate.

The audio with the small supplied microphone has been reported as 'very good, with a slight edge'. Not a bad thing for HF comms. The supplied Speaker Microphone handset has two user programmable buttons and an up and a down button.

I was intrigued by the self-setting of the internal clock against the inbuilt GPS. I was not sorry to avoid the button-pushing exercise to set the clock and it means my logged times will be more accurate.

Backyard activation

To date, I have only been able to use it in the back yard and the shack because of Virus restrictions. It has a big rig feel about it and 10 W is quite a useful power level. Build quality seems good, as might be expected from Icom.

The bigger screen allows a comprehensive metering display. I can see not only power out and SWR, but key-down current (just over 2 A at 10 W), as well as voltage and temperature.

If there is a problem with the battery or the rig getting hot, it shows up on the screen.

I found it necessary to tilt the rig back or to elevate it so that the tuning knob can be more easily turned.

It has a standard camera screw mount on the base so it can be tripod mounted, plus four tapped holes to fix it on a plate.

It's easy to set the mic gain and compression levels for SSB and to dial-up the keyer speed on CW. The CW memories are very similar to earlier Icom rigs and easy to program.

One thing is missing. An inbuilt ATU. I have two LDG tuners that I use for SOTA and one of these will become a companion to the IC-705. I have seen a video of this rig being disassembled and there is no room inside for an ATU!

I would have liked to have seen a CW decoder, as per the Elecraft K2 and K3, or the RS918/mcHF transceiver.

Touch and other issues

Questions have been raised about the use of a touch screen on cold mountain tops. It is a resistive sensing screen so it should not be affected by high humidity or cotton gloved fingers. Mittens would present a challenge. I haven't had problems with a similar screen on an IC-7100 on activations.

Frequency drift has also been raised as a possible issue for digital mode users. The internal GPS could have been connected to a stabilising chip for the reference oscillators. However, if the set is given some protection from direct sunlight and breezes it should be stable enough for JT65, even on 70cm if the power used is 5 W. Certainly, there should not be issues with FT8 on HF. The observed drift is well within the specified limits.

It has been suggested the 705 can be used as a handheld walky-talky, but 1 kg is a bit heavy for my arthritic wrists and a long QSO. The Elecraft KX2, however, could qualify on that role.

Other useful features, such as noise reduction and the selection of filters, are state of the art.

I have not experienced receiver overload on the amateur bands. The RF gain can quickly be reduced if the over-range message comes up, or an attenuator switched in. I have seen the over-range message when listening on the AM broadcast band.

The IC-705 has raised the bar for highly-featured small portable transceivers.

Given that the Covid-19 restrictions in Victoria put paid to our plans to travel interstate and to New Zealand, I admit that I spent the travel budget to acquire the rig.

Ron
VK3AFW

DX Talk

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Well folks, here we are again and things are still looking pretty grim on the DX front, but I shall remain ever hopeful.

With the October Sun soon to make its debut, we can typically expect the bands to grace us with a little more activity, and with this it is anticipated the higher bands will come to life.

The pickings have been slim at best, yet despite the lull, for those with a determined heart and unyielding persistence, DX can be found!

As ever, FT8 has been the mainstay, but personally I have used the time to catch up on QSLing and sort out the cards I need to chase down.

I managed to catch Warwick E51WL on 80m FT8 and have seen him on numerous bands operating from the North Cook Islands. Warwick is in fact a resident and only recently returned from New Zealand. Welcome home Warwick.

Alexey HC2AO is now active from Ecuador on 80m and up. I actually snagged him on 20m CW in late August. However, others have reported him mostly on 80m FT8.

There have been a few ops from Barbados – 8P2K, 8P6PE, 8P6EX and 8P6ET – on most of the active bands from 80m up, mainly FT8 or FT4.

Norbert, DJ7JC will be active from Iceland as TF/DJ7JC during 21 August to 18 October 2020. He will be QRV "holiday-style" on 160-10m, CW/FT8/RTTY. Vertical and 90 W. QSL is via DJ5BWD. Norbert has been worked by a few VKs.

Giorgio YI/IU5HWS is operating from Iraq until 30th November and has already been active, not that I or any one I know has worked him, as such. He is QRV on 40, 20 and 10m.

Contesting and CW

Don't forget the CQ WW SSB Competition is on 24th-25th October, and the CW equivalent is one month later, over 28th-29th November, see cqww.com for more info.

These large contests are a superb, perhaps even the best way, for newer DXers to get some new countries in the log as these stations quite often have big antennas; not only are the loud so smaller stations can hear them, their antennas are sufficient in size to still be able to pull weaker stations out of the noise floor.

So, if you are new to amateur radio or DXing, they are a great way to dip your toes in the water and get infected with the DX bug. Be warned... this bug usually equates to a station upgrade in antenna systems (and perhaps radios) in preparation for the next event.

The report for these contests is an easy one: 59 (regardless of signal) and your CQ ZONE, which is 30 for the Eastern States and 29 for WA and the NT.

If you read last issue's DX Talk in *Amateur Radio* magazine, this means you can program your radio's CW memories for your report and zone. If you need help decoding CW, I would recommend MRP40 and watch a few online videos of how to use it. It can also convert typed text to CW in real time if you want to try your hand at rag chewing with a CW Op (not during the competition of course).

Logging

Should you decide to enter these contests, I would suggest you use the N1MM+ logger. It is a very straight forward and very fast logging system, which you can then export to ADIF format for importing into your favourite logging program afterwards.

Chasing DX often starts through a lucky contact with a strong station outside of Australia, which often leaves an impression. Then you will find yourself logging your contacts Some use paper, but more common now is electronic logging programs like DX Keeper (by DX-Labs) and Log for OM (Log4OM). These are the two leading freebies. They make an interesting record where you can see repeat contacts and sort QSLs. They also make for easier tracking and claiming of awards.

The main award chased by DXers is, of course, the DXCC (DX Century Club). It simply means you have made and confirmed 100 contacts to 100 countries in the DXCC Entity world. The first of these was made and is still run by the US ARRL. There is also one on our doorstep, run by the WIA, which is free if you are a member and awards are pretty easy to apply for.

Go to the WIA home page and search for DX awards if you have an interest.

Well my fellow amateurs, I must apologise for the short column this month. Hopefully, there will be more action as our star wakes up over spring and summer and the Coronavirus loses its grip on planet Earth.

Until the next issue, you can keep updated with all the DX @ vkdxchasers on Facebook. Also check out *dx-world.net*

73

Steve VK3KTT

From the WIA QSL Bureau

John Seamons VK3JLS, National and Inwards WIA QSL Bureau Manager
vk3jls@wia.org.au

Is the QSL Bureau process slowly giving way to electronic QSLs?

Apparently not! (Well, not yet anyway!). In a report to the WIA Board, it was outlined that the WIA National Inwards Bureau had received and distributed to the State Bureaus almost 58,000 QSL cards for the first 9 months of 2019. This is already 2,500 cards more than were received and distributed for the full 12 months of 2018.

By cursory examination while sorting the cards, it is clear that FT8 contacts are dominating this growth in the number of cards being received, which would be the expectation during the recent periods of poor propagation.

I should also point out that the Bureau continues to place significant numbers of received cards (600 so far this year) for Special Events and DXpeditions directly into the WPB. In a future Article, I will explain why this is the case, and how we can all help to reduce this number, and assist the overall Bureau process.

Volunteers are the backbone of QSL Bureau operations. This was the 'first sort' of the VK5 Bureau back in 2016; L-to-R – Andrew VK5XFG, Sharon VK5FSAW, Gary VK5FGRY and Andy VK5AKH. Unseen are Grant VK5GR and Chris VK5CP, looking on.

Are you undertaking a Special Event or a VK9/VK0 DXpedition?

Special Events with a VI prefix, or DXpeditions to VK9 and VK0 destinations, are great opportunities for QSL collectors and DX chasers respectively. However, they can also be the cause of frustration for those people when they never receive their wanted QSL cards. In many cases, those undertaking the Special Event or DXpedition fail to recognise that they will have a lot of cards sent to those special callsigns via the VK Bureau, and simply expect that the Bureau will sort things out.

Under the new processes, applying for a special callsign for these events is now done through the Australian Maritime College, and not the WIA. As such, the WIA, and therefore the WIA Bureau, receives no advice of any such callsigns being issued, and thus can't plan for them in advance.

Discussions with the AMC have indicated that they have no interest in advising the Bureau of Special Event Callsigns that they issue, and expect the owners of any such callsign to advise the Bureau themselves.

Clearly, this is not happening, as the Bureau has not been receiving any advice from the owners of these callsigns; it is only by other means that we have found out about Special Events, such as VI3FLYNN, VI3MOON, VI50ML etc, and DXpeditions such as VK9NC, VK9NE, VK9NG, VK9CZ, VK9LQ, VK9NK, etc.

It would help the Bureau immensely if owners of Special Event and VK9/0 DXpedition Callsigns could let the Bureau know of their intentions for the callsign, and in particular what they intend to do regarding QSL cards. If a *QRZ.com* website is to be setup for these callsigns, please ensure that aspects related to the use (or non-use) of the VK QSL bureau are included.

Please also note that, if you do intend to use the Bureau for sending any Special Event or DXpedition outgoing cards, you will need to fill in the *"Application to use WIA Outward QSL Bureau"* form, which is available on the WIA website.

A hint for ARRL LoTW users

It is possible that not everyone is aware that for the last few years, the ARRL LoTW home page has provided information to enable LoTW users to check a specific callsign's most recent LoTW upload activity. This can be downloaded as a csv file, which can then be used

to check on QSOs made in the past when the distant user was not a LoTW user, but may have since uploaded his log (which could well contain your previously unconfirmed QSO).

By simply uploading any such QSOs into LoTW, you may get immediate confirmation for those previously unconfirmed elusive DXCCs!

The link to the download can be found under "News and Notes" dated July 29 2017, on the LoTW home page.

As a matter of interest, a recent download of that csv file shows there are 134,547 users of LoTW, with just over 1100 VKs (including VK0 and VK9).

Staffing Changes in the WIA Bureaus

There have been two recent changes in the management of the State QSL Bureaus. In VK5, Chris Platt VK5CP has stepped out of the role, which has been taken up by Grant Willis VK5GR while operating under the auspices of the Amateur Radio Experimenter's Group.

In VK8, Greg Winterflood VK8KMD has relinquished his role, noting a downturn in cards destined for Alice Springs Amateurs. Phil Brennan VK8VWA has taken over the VK8QSL Bureau management, which is now tied in with the Darwin Amateur Radio Club.

On behalf of the WIA, I would like to express my thanks and gratitude to both Chris and Greg for their assistance in ensuring that the QSL Bureau process has continued to operate effectively. The WIA QSL Bureaus could not continue to operate without the time given voluntarily by our members.

AMSAT-VK

AMSAT Co-ordinator
Paul Paradigm VK2TXT
email: *coordinator@amsat-vk.org*

Group Moderator
Judy Williams VK2TJU
email: *secretary@amsat-vk.org*

Website:
www.amsat-vk.org

Group site:
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' chat. Operators may join the net via EchoLink by connecting to either the "AMSAT" or "VK3JED" conferences. Past experience has shown that the VK3JED server offers clearer audio. The net is also available via IRLP reflector 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 Redcliffe 146.925 MHz -ve offset IRLP node 6404 EchoLink 44666

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

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

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

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

Become involved

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

To keep up to date with all of the major Australian contests, including rules and results, at the WIA Contest Website at:

www.wia.org.au/members/contests/about

ALARA

Jenny Wardrop VK3WQ

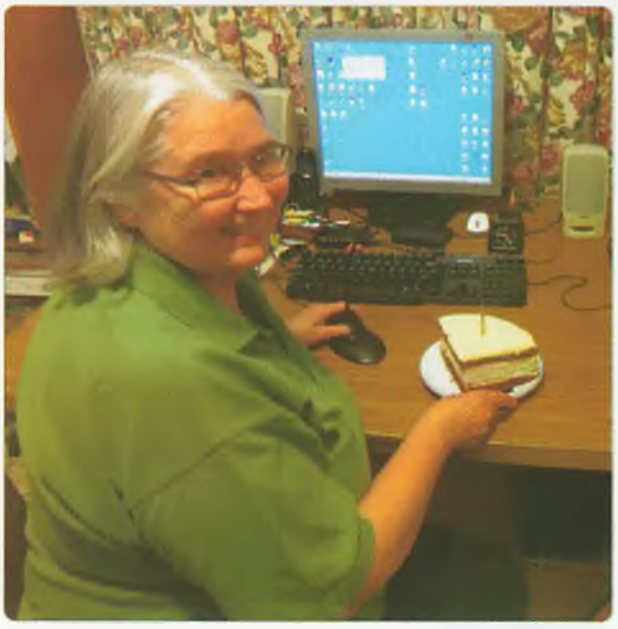


Photo 1: Norma VK2YL and the piece of birthday cake which daughter Michelle VK2FMYL brought to share with her and Dad, Frank VK2AKG, to celebrate ALARA's birthday.

Well, as I write this, we are still in Covid Lockdown in Victoria, but it hasn't been all "Gloom and Doom". On July 25th, some of the Victorian YLs Celebrated ALARA's birthday, not with our usual lunch but with a Zoom "chat". Unfortunately, owing to circumstances beyond our control, there were only five of us, but Jean VK3VIP, Heidi VK3FHID, Pat VK3OV, Margaret VK3FMAB and I, spent over an hour chatting happily. That evening, some of us joined YLs in other states for the Birthday Net on Echolink.

Earlier that same day, the WIA held it's AGM on Youtube and Zoom. Amongst the awards presented were two that we in ALARA are happy to acknowledge. Kaye Wright VK3FKDW (SK), our former ALARA Newsletter Editor, was posthumously awarded the Ron Wilkinson Achievement Award, which is given for "special achievement in any facet of amateur radio and is only available to amateurs from VK call areas"; in Kaye's case, it was for her services as Secretary to the Publications Committee.

The other recipient was author, David Dufty, who received a Presidents Commendation for "his literary contributions about Florence McKenzie's involvement in Amateur Radio in his book, 'Radio Girl', " which has been mentioned in this column previously. This book also contains some very interesting information about early amateur radio in Australia. As far as we are aware, this is the first time that the President's Commendation has been presented to an individual who is not an amateur.

ALARA's beginnings by Linda Luther VK7QP

ALARA has a net every Monday evening. It alternates between Echolink and 80 metres. While the 80m band can be problematic due to propagation and noise issues, our Echolink net has, presently, a gathering of up to 10 members during which we have a chance to exchange news and share information about our radio activities. You need a licence to join up to Echolink, and then all YLs are welcome to join us. Details of times and frequencies are on the ALARA website: *alara.org.au*

It has been a delight in the past few months to be joined on the net by Norma VK2YL who was the instigator of ALARA. This was back in the early 1970s and it was harder to arrange things then. No internet or messaging. We had no phone at home, so it was all done by letter, through Amateur Radio magazine and the weekly WIA broadcast.

Photo 2: Some of the Founder members of LARA (the forerunner of ALARA) at our 40th Birthday celebrations. L-to-r: Norma VK2YL, Linda VK7QP, RhondaVK3ZYL and Myrna VK5YW.

Martin GW3VBX and I, GW4ADB, had arrived from the UK in 1971. We soon got in touch with the WIA Queensland Division, as it was then, and set about establishing our radio equipment at home. The first Remembrance Day contest I entered was in 1972. I first worked Norma, then VK3AYL, in the 1973 Remembrance Day contest.

In 1975, Norma conceived the idea of creating an organisation to extend the interests of women in amateur radio. She publicised the idea through Amateur Radio magazine, supported by Rhonda de Stefano, Irene Robinson, and Jenny Roper. Nets were established on 80m and 2m. The first net I have a record of is on 21 July 1975 on 80m, with Norma VK3AYL, Mavis VK3KS, Myrna VK5YW, and Heather VK2HD. The following week, we were joined by Lorraine VK5LM, Anne VK4AAR, and Clarice VK3VB. The first official meeting was held in Melbourne, on 26 July 1975. Norma was elected President, with Rhonda de Stefano VK3ZYL, Vice President. LARA (Ladies Amateur Radio Association) was on its way.

After a year or so, I became busy with work, moving to a new house and studying for higher qualifications. My on-air activity became very limited, apart from participating in the Remembrance Day contest from time to time. I lost touch with LARA before it emerged as ALARA in 1978.

I was pleased to retain my licence as I could then help Martin out with test transmissions, and we could communicate on 2m between car and home. My main radio activity was antenna erection "hindermate" (a helpmate who isn't much help) and chief wincher for tower raising.

Fast forward to 2010 and my retirement. We bought a caravan and started traveling round Australia. It was during a stay in Melbourne that we visited a Hamfest and met Jean VK3VIP. This was just before ALARA's 40th birthday celebrations in 2015. It was nice to catch up with a number of other founder members at the birthday celebrations.

Photo 3: Linda operating VKFF portable.

Now I am retired, I have time to get on the air again. I am active with the VKFF program, hunting and activating parks. I have also become involved with ALARA. This is my second year as President, and I am also the VK7 rep.

(My thanks to Linda, whose arm I gently twisted, to give us some insights into her and ALARA's beginnings. VK3WQ).

The Complete Net Controller

Hints and Guidelines for Definitive Radio Net Management

1. As you convene the net, announce in a loud voice that you haven't the foggiest idea of who will show up, but that you intend to muddle through the mess somehow. This will stimulate the catcalls that warm the heart and start you off on the right foot. It also instils confidence in your prowess as a net controller . . . a real "Take Charge" type of person.
2. When taking State-Side check-ins, indicate that you will do so by Call Districts, then immediately acknowledge anyone calling out of order. This reassures the throng that you are a really super guy (or YL . . . not a brain in your head . . . but you make new friends this way.
3. Pay very close attention to, and acknowledge, anyone who calls you by name or yells "INFO" or "QUERY". These people obviously know you quite well (as well as your weaknesses) and, let's face it . . . what better way to get checked-in early?
4. Compliment the person who relays a signal report. He has a really good head for figures . . . he figures his turn will come more quickly this way.
5. Make a rule, out front, to limit contacts two to a person . . . then, be flexible (wishy-washy), i.e. if the first two people only make one call each, quite naturally the next in line is entitled to make four. That shows logic and courtesy on the part of the acting net control.
6. If you get bored with the whole thing, just go QRT without any explanation. This will be interpreted as your desire to leave the frequency clear for the use of the other people waiting. If the above suggestions are followed carefully your reputation as a net controller is guaranteed!

This is an abridged version of an article, author unknown, published in the ALARA Newsletter, issue no.12, March/June 1979. We wish to sincerely acknowledge the perpetrator of the original document, and any resemblance to current or past Net Controllers is purely coincidental!

VK2 news

Stuart Walker VK2BMX
vk2notes@arnsw.org.au

With the recent passing of Tim Mills VK2ZTM I have taken over the presentation of the VK2 News for inclusion in Amateur Radio magazine.

With the restrictions currently in place due to Covid-19, there are no events currently planned at VK2WI Dural. We continue to follow the updates to public health advice, and plan to resume in person activities once it is practical. But for now, the site remains closed to visitors. You can still make contact via email, to office@arnsw.org.au, or by phone message to (02) 9651 1490.

Owing to public health restrictions, many clubs and groups have increased their on-air activities. So, below is a summary of on-air activities from various groups in Sydney and across News South Wales.

We would like to hear about activities happening in your area. Please let us know, by emailing the details to *news@arnsw.org.au* – we don't need formatted news items, just the details of the activity and contacts. We also welcome any updates on the progress in these activities; which we can report on VK2WI News, and tell listeners how it went.

VK2WI Sunday morning broadcasts are continuing, commencing at ten am with the WIA National News followed by VK2WI Local News. The Sunday Evening News Bulletins are temporarily suspended due to restrictions placed on our operations by Covid-19.

For many years now, these VK2WI News bulletins have been relayed via many VHF and UHF repeaters. We would like to thank those clubs for their continued support of this news service.

Oxley Region Amateur Radio Club

The Club's AGM took place on Saturday the 5 September as an online video conference. Elected office bearers were; President Henry VK2ZHE, Vice President Paul VK2ICQ, Secretary Henry VK2ZHE, Treasurer Dennis VK2DAM and Committee Members Larry VK2CLL, Rob VK2CRF and Ian VK2IDL. A full list of office bearers and appointments will appear in September Oxtales, which will be published soon.

There was no September monthly general meeting but a Committee Meeting was held prior to the AGM. The minutes of the AGM and the Committee Meeting have been emailed to members.

In response to risks arising from the current public health situation, the Club's Committee has suspended in-person activities, including monthly general meetings and Friday night get-togethers. In the absence of meetings, members and visitors are encouraged to participate in the club on air nets as often as possible.

There are two nets each week; the mid-week net starts at 7:30pm on Thursday nights, and the weekend net starts at 9am on Sunday mornings.

Both nets are on the VK2RPM 2 metre repeater on 146.7 MHz, which requires a 91.5 Hz sub-audible tone for access. VK2RPM is also available via EchoLink, for those outside the coverage area of the repeater.

For more information about the Oxley Region Amateur Radio Club, visit the

website at orarc.org. The July 2020 issue of the club's bimonthly newsletter, Oxtales, is now available, and past issues are available on the website as well. The September issue of Oxtales is in preparation; it will include the list of office holders elected at yesterday's AGM. The club is also on Facebook; just search for Oxley Region Amateur Radio Club.

Central Coast Amateur Radio Club

At last week's general business meeting, the committee put forward the importance of a Secretary, to the club members. The Club would like to announce that Myles VK2ASS has accepted the position of Club Secretary and the rest of the executive team looks forward to working closely with him.

Brad VK2NMZ has fulfilled the role of Publicity, and Henrick VK2FTDR has taken up managing the publication of Club Newsletter, *Smoke Signals*; and if the previews are anything to go by, it is very impressive; so, club members – keep your eyes peeled, a new *Smoke Signals* is on its way!

The club is seeking expressions of interest for a HF operating night at the club rooms. This will primarily be focused towards foundation licence holders and those new to hobby, as well as those who may not have the capability to operate on HF frequencies at their QTH. If you are interested, please contact the club directly via telephone or email; details are available on the club's website. The club is planning another outdoor activity on the 17

October, although the location is yet to be decided.

A training and assessment day will be hosted at the club rooms on Saturday the 17 October, with assessments to be held on Sunday the 18th. With limited places available, bookings are essential; RSVP to the Club's education facilitator, Karen VK2AKB. Booking information is on the website, at; *ccarc.org.au/education*

A recent Thursday evening net was facilitated by Brad VK2NMZ, featuring the topic: "The FM cross-band repeater on the ISS and have you worked it?"

Many stations, both within VK and overseas, shared similar experiences of pile-ups and getting the occasional clear contact through. If you are interested in working this satellite, simply set your radio to 145.99 MHz with a 67 Hz subtone for transmit, and 437.8 MHz for receive, but note this does not take into account Doppler effect.

The Morning tea net continues daily on the Club's 2m repeater, running consecutively for five months. The Club thanks Bob VK2AOR for his continued efforts in hosting the net.

You can find out more about the CCARC on the web at *ccarc.org.au* or on Facebook, just search for Central Coast Amateur Radio Club.

Hunter Radio Group

The Group operates three repeaters at Mt Sugarloaf west of Newcastle. On 2m, the repeaters are on 146.9 MHz and 146.975 MHz, with EchoLink. On 70cm, the repeater on 438.025MHz serves Newcastle and the lower Hunter area. There is also a 6m beacon on 50.288 MHz.

The Hunter Radio Group has a news broadcast on Monday nights starting at 7:30pm on the 2m repeater 146.9 MHz, and the 70cm repeater, on 438.025 MHz. Callbacks are taken after the broadcast.

Blue Mountains Amateur Radio Club

On Friday 4 September the Club had the pleasure of listening to Darren Spoor on the topic of Power System Security. The event was well received, and BMARC would like to extend its appreciation to Darren for a job well done.

The Club will run a licence training and assessment weekend on the 10-11 October at the Clubhouse, 4 Moore Street, Glenbrook, face-to-face, under COVID-SAFE conditions.

Training for foundation licensees will take place on the Saturday, with Assessment for all licence grades planned for the Sunday; exams are available for Standard or Advanced theory, regulations and practical components of amateur radio proficiency.

Details of the syllabus, exam fees, and other information, can be found on the AMC website. For more information, or to book for the licence weekend; contact the Blue Mountains ARC Secretary, Irene VK2VAN – her email address is *secretary@bmarc.org*.

Remember that the club has two on air nets each week; the 80m net starts at 8pm on

Tuesday evenings, on 3543 kHz, and the 2m net starts at 8pm on Wednesday, on the club's 2m repeater on 147.050 MHz with a 123 Hz tone for access.

More information about the club can be found on the website, at: *www.bmarc.org*

Waverley Amateur Radio Society

With major refurbishment works about to commence at the Scout hall, the clubrooms will be unavailable until probably November or December at the earliest.

All other Society activities take place online, via Zoom. The next project day will be on Saturday 3 October, commencing at 1:30 pm through to 4 or 5 pm. Shack nights continue on the first Wednesday of the month. The digital special interest group usually meets on the second Tuesday of the month. The Morse code group meets on the first Sunday.

The next Foundation weekend, is scheduled for 14-15 November, subject to completion of the building works. Many candidates are studying on line and then doing remote assessments; contact the Society for more information.

Don't forget the weekly net on the VK2RBV repeater from 8pm every Monday evening, usually MCed by Richard VK2XRC. Some interesting discussions take place on these nets and all members and other visitors are always welcomed on the nets.

There is full information about the Waverley Amateur Radio Society on the website at *vk2bv.org*. You can book for courses or assessments, or use the contact form on the website to get in contact for more information.

Club Activities on the air

Oxley Region ARC nets 7:30pm Thursday, 9am Sunday. VK2RPM repeater, 146.7 MHz with 91.5 Hz tone.

Great Lakes Radio Club weekly net 7pm Monday on VK2RGL, 147.1 MHz.

Westlakes nets Monday, Wednesday and Friday; 9:30am on 3565 kHz.

Hunter Radio Group meeting net Wednesday 7:30pm on 146.9 MHz. VK2AWX News 7:30pm Monday, on 146.9 MHz and 438.025 MHz.

Central Coast ARC net Thursday night on VK2RAG 146.725 MHz, 91.5 Hz; also Echolink *CCARCNSW*.

Amateur Radio Central West Group afternoon tea net 4pm, Monday and Friday night at 8pm, on VK2RCW. HF net 8pm Wednesday on 3653 kHz.

Illawarra ARS Nets - Tuesday at 8:30pm on 80m, 3666 kHz. Saturday 9:30am on VK2RMP

146.850 and VK2RUW on 146.675.

Blue Mountains ARC nets 8pm Tuesday on 3543 kHz, 8pm Wednesday on VK2RBM, 147.050 MHz with 123 Hz tone.

WICEN nets now on Sunday evenings from 6pm.

Waverley ARS net 8pm Monday on VK2RBV, 438.1125 MHz. Activities online and in person, see website for details.

Fishers Ghost ARC net 7:30pm Thursday on VK2RFG, 438.65 MHz. Monthly meeting net has moved; next is on Thursday, 24th of September.

St George ARS net 8pm Thursday, on VK2RLE 146.8 MHz.

HADARC Monday night 8pm on VK2RNS, 147.25 MHz, on air net Tuesday at 8pm on VK2RNS – net control VK2WAH[we are home].

Manly-Warringah on-air meeting net, Wednesdays 8pm on 146.875 MHz.

At ARNSW, Morning News bulletins continue, and audio can be downloaded or streamed live from the website.

Silent Key

David 'Zoo' Stackpoole VK5ZOO / VK5MS

David, or 'Zoo' as he was colloquially known to all of his friends in the amateur radio fraternity, was born on the 22nd of February 1933 and lived in Westmere, Western Victoria, at a place he used to point out to us every time we went to the Ballarat Radio Convention. After residing in Westmere, he subsequently, moved to Hamilton in 1952 and married Shirley Ryan on the 22nd of December 1954.

David spent two years at the Hamilton Drive-in theatre to qualify for a projectionist's certificate when he was 28, and then studied at the Marconi School of Wireless in Melbourne to gain qualifications in radio and television servicing.

Once he had completed his course, he returned to Hamilton to work with Riley's Radio Repairs but, unfortunately, the company closed when the proprietor suddenly passed away (we think it was when David asked him for a pay increase).

With no job, he then took up the projectionist position at the Portland Drive-in Theatre and, during the day, he did television servicing and repairs, driving from Hamilton to Portland daily. In his spare time, he met an amateur by the name of Morton Riley VK3TN and was bitten by the amateur radio bug. The rest is history.

David obtained his first licence and call sign in 1964 as VK3ZZN, which he held up until he moved from Hamilton to Mount Gambier in 1968, when his call sign became VK5ZOO, which then became his name to all and sundry. He was not known

as David, but simply as 'Zoo'. During this time, he worked at the local television station SES 8 and, a year later, he was offered a job as a service technician at a company called EIL Service, a large domestic, commercial and technical services company, as a serviceman.

When EIL left Mount Gambier approximately 50 years ago, David took over the radio and television side of the business and Set Service, his business, was created. His business fixed thousands of televisions, VCRs and radios, and most are to be found today in the two shipping containers at David's home QTH.

While he did not have a lot of time on his hands due to the pressures of work, amateur radio was never far from his mind and he gave freely of his time and expertise to many young and upcoming amateurs, many of whom attended his funeral service. Although trying to get some bits and pieces from David was problematic, some managed to do so, although many lusted after the pile of 1680 FM rigs he had in his shop, he would never part with any.

Despite that, David was technically very competent and put together the first amateur radio repeater system in the Mount Gambier area. It consisted of two Vinten valve mobiles; the receiver was located on the northeast side of Mount Gambier and the transmitter was located at his home QTH, a distance of some 1.5 km. The antennas were two quarterwave whips. Despite the 10 watts output from the transmitter, it performed very well for the time.

Not being content with that installation, David then built the second repeater, consisting of two of the aforementioned 1680s in a finned aluminium case, which was located on the link tower of the Channel 8 television studios. It was OK, but was superseded in 1981 by a new solid-state system, which was built by SERG members and located on the Bluff, midway between Mount Gambier and Millicent.

In later years, David spent a lot of time repairing the system computers in forestry harvesters and processors, a time-consuming and very fiddly job, but he was very good at it and he often travelled vast distances to repair the units in the forests.

In 2011, David's good mate Stuart Millowick passed away and, in deference to their friendship, he assumed Stuart's call sign VK5MS, but to us he will always be known as Zoo.

Vale David from all of your mates at the South East Radio Group.

VK6news

Steve Kennedy VK6SJ

Peel Amateur Radio Group

Down Mandurah way, the very active Peel Amateur Radio Group has been out and about doing all sorts of things of interest to its growing list of members.

The PARG1 Emergency Communications trailer was deployed to Mount William in March for the John Moyle Field Day Contest, and great fun was had on HF, VHF, UHF and on the Group's 2.4 GHz mesh network. Work has started on a second smaller coms trailer, recently acquired, dubbed PARG2.

August saw the Group hold its fourth annual Birthday Bash Contest. This very friendly four-hour scramble saw a good number of members falling over themselves every 30 minutes on HF, VHF, UHF and the Group's 2.4 GHz mesh network, exchanging numbers and multipliers with both voice and packet contacts. Great fun was had by all, and the report they're eagerly awaiting the results of who gets to adopt the fabulous perpetual trophy for the next year.

Hot on the heels of the Birthday Bash Contest and the Bunnings Sausage Sizzle, the Group deployed the PARG1 Emergency Communications Unit to Cape Naturaliste for the International Lighthouse and Lightship Weekend. The Cape's Lighthouse Group and the Bunbury Amateur Radio Club operated at the lighthouse on Saturday, and PARG ran the activity as VK6ARG/I on the Sunday.

The Emergency Communications trailer worked very well – a tribute to the members who had worked so hard over the past years to set up the unit.

For the event, Martin VK6MJ had established a link between the Group's 2.4 GHz mesh network in Mandurah and the VK6RMW repeater at Mount William. The repeater was noise-free from PARG1 at Cape Naturaliste – 110 km line of sight, just skimming the curvature of the earth. HF conditions were pretty average on the Sunday, but VK6CLL/I at Cape Leeuwin and VK5CJL/I at Cape Jarvis were worked; Group spotters in Mandurah also heard VK2CLR/I at Ballina in northern NSW.

PARG has struck-up a good relationship with the operators of the lighthouse, which is keen to see the Group operate from there again in the near future.

Portable ops continued with Terry VK6TTF/p deploying to Nullagine, which saw a large group of members giving skeds 40m and 80m a try. The skeds were net-controlled by Mark VK6QI using the VK6XT remote HF station at Broomehill and were very successful. Geoff VK6GHD then operated portable at Prevelli Beach and a couple of weeks later, at Augusta; net control for the latter 3600 kHz skeds was conducted by Maurice VK6HLY and Terry VK6TTF.

A flow-on from the 80m operations was a renewed interest in getting 80m going by many of the members. Tony VK6DQ has started refurbishing his pre-selector and leant his MFJ-1026 noise canceller to Martin VK6MJ for trials with PARG1 and home, to deal with the usual S9 noise levels on 80m.

There's now a high risk that Tony will never see his noise canceller again – Martin has successfully knocked the noise level from S9 to S3 – suddenly making 80m from home a practical proposition.

Martin has also been experimenting with different 80m squid pole antennas, and Tony has been out and about helping John VK6FAAZ and Don VK6DON sort out their 80m offset-fed dipoles.

Meanwhile Baz VK6MU has had lots of fun with different antennas, and his wife has even suggested that he put up a new tower, rather than tangling up the clothes line – what a great club!

The Group's focus is now on on-air activities, monthly tech talks and workshops. On-air nights are held on the VK6RMH repeater, 146.850 at 7pm local time on the first Tuesday of each month; the option of continuing to use 3600 kHz is being considered. For the tech talks, a long list of topics has been established. The Group should have interesting topics to appeal to all members for the next several years.

The tech talks and workshop nights are held at the Mandurah SES Headquarters, and video conferenced via Zoom for those who can't get there. Recent talks were on the sensational new bit of test equipment – the Nano Vector Network Analyser, how do repeaters work, and most recently, a great talk by President Geoff VK6GHD to inspire portable operations. Links to YouTube videos of the tech talks are in the Workshop/Technical area on the Group's website: *parg.org.au*

The Group is keen to encourage new members and has had several new folks join this year. People new to Amateur Radio who would like to find out more about the hobby, or perhaps get a helping hand toward getting an amateur license are most welcome. More experienced amateurs will find that the Group is a terrific way to share both technical and social aspects of amateur radio. Contact the Secretary, David VK6FAAZ, at *parg_secretary@iinet.net.au*, or check the website for more information: *www.parg.org.au*

Cheers,

Mark Bosma VK6QI/VK2KI

Northern Corridor Radio Group

NCRG has had a fruitful last few months. As reported in the last edition of this column, the club approved funding of an EME building to house the EME station away from the main building. This building has now been purchased and delivered and is now just waiting on an extension to the club lease to provide more real estate to house both the EME building and the 80m dipole used for the Sunday morning broadcasts. It needed a building that was well away form the main building to provide as much access to the horizon as practical.

The Moonbounce system is in construction right now, using a Kuhne 10 GHz transverter, driven by an Icom IC9700 on 70cm. This is fed into a TYT 150 W amplifier then into a WR75 waveguide switch to a Kuhne 10 GHz LNA and waveguide feed to a Seatel 2.7m diameter dish with a Larry-built stepper motor system controlled by a VK5DJ Digital Logic drive.

NCRG held its AGM in August, resulting in a new executive committee comprising Steve VK6SJ as president, Tim VK6EI as Vice President, Brian VK6MIT as Secretary, and Anthony VK6AL as the honourable minister for money. Matt VK6ML and Stu VK6BG are committee members. The Committee expressed heartfelt thanks to the outgoing executive members for their service over the past few years. They have left huge shoes to fill.

One of the Group's members, Wayne VK6EH, returned to Cocos Keeling Islands (VK9C) for work just recently, as he does a couple of times a year. This time, he managed to take some HF and many of the club members managed to get VK9C confirmed on 40m and 80m. A number of other members are looking to activate VK9XX (in cooperation with Christmas Island Amateur Radio Club), on Christmas Island over the next six months. Watch this space.

The club held its annual car boot sale in August in place of HamFest that it normally holds at this time of the year. The event was well attended by members and non-members alike.

NCRG has reluctantly decided not to run HamFest this year due to uncertainty over COVID restrictions. It will be running the annual raffle regardless though, and this year it will be online and open for anyone in VK to participate. More on this in the next edition.

The Group has had increased interest in using the club station for contests of late, with Brian VK6MIT participating in the recent FT8 contest, and John VK6NU in a CW contest. In addition, the club has been activated regularly on HF by many of the members. It's great to see the club station being used more often.

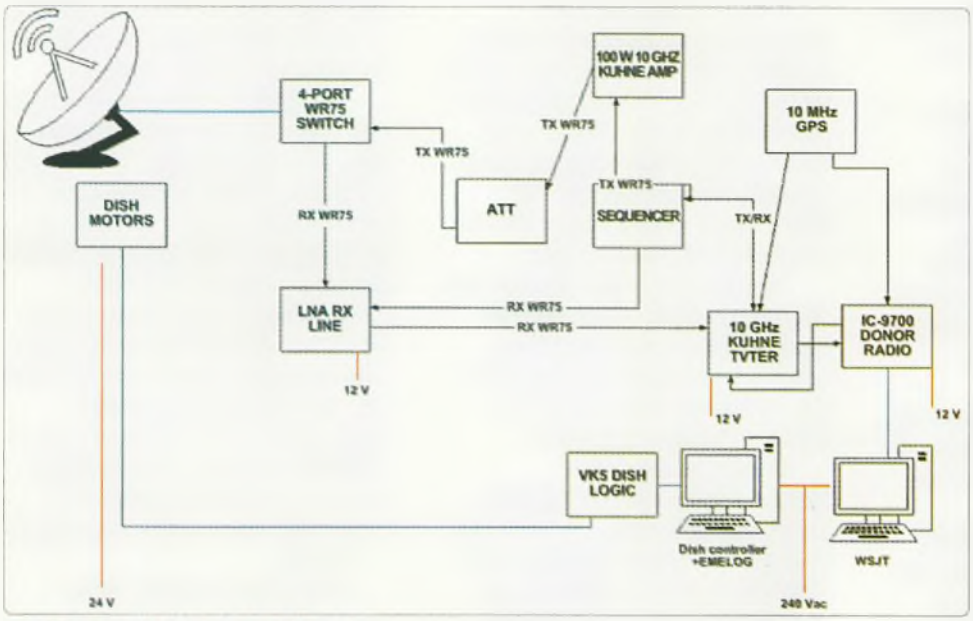
The other activity now in serious progress is an upgrade to the 2m repeater using a new RFT Eclipse2 100 W repeater system. This should be up and running before the next edition of *AR*. These repeaters are Australian made and more functional than any other on the market, so a lot of fun to integrate within the Group's current repeater network, we're told. NCRG's variant also works as a P25 repeater, so members are looking forward to trying this digital mode as well.

Ham College

Having resumed classes this year, Ham College is now about halfway through the Standard curriculum, with five students attending. The College is also offering Foundation License exams on a bi-monthly basis as it has always done. Ham College recently held its AGM, with the current committee remaining as it was last year.

Marc and Adam spent a weekend in September getting the HF station back up and running and managed quite a few contacts around Australia on 20m.

The college has a real buzz about it now, with a healthy spread of members contributing to the running of the organisation. It is also finally looking to get the College's 2m voice beacon back on air with a new RFT Eclipse 2 destined for the task, along with a renewed process for updating news. The beacon has been down for a couple of years and has in the past broadcast the news on a 2-hourly basis (WIA and News West), as well as articles and advertisements from WA-based clubs.



The Northern Corridoor's EME system.

VK7news

Justin Giles-Clark VK7TW
e *vk7tw@wia.org.au*
w *https://groups.io/g/vk7arnews*

630M distances extended

I continuously monitor WSPR signals on the 630m band from Hobart, Tasmania. As the sun sets, signals appear out of the spectrum display and they start decoding. The regulars appear – VK4YB, VK3HP, VK5FQ, VK2COW, and VK3WRE. Recently, they have been joined regularly by VK3CYD, VK6HP, VK6AKT and VK3QD.

About seven months ago, the distance was suddenly extended by the reception of Merv K9FD at 9107 km! Merv is on Molokai Island in the Hawaiian group and signal levels get down to -24 dB.

Recently, I have been decoding W6GJB at a distance of 12,739 km. The signal levels are low, at -30 and -31 dB on the WSPR scale. W6GJB is reporting to be transmitting at 5 W ERP.

There are plenty of longer distances being reported on the WSPR database, with the current maximum distance for the 630m band being 18,814 km, between HZ3MDY in Saudi Arabia and VA3ROM in Canada. Getting close to antipodean distances!

23 at 23cm QSO Party

In the last VK7 column, we reported increasing numbers participating in the QSO parties on 23cm (1296.15 MHz) that happen each Sunday at 10am, after the WIA and VK7 Amateur Radio broadcasts in the Hobart and Launceston areas.

Way back on the 3rd May, we had 21 stations (19 Hobart, 2 Launceston); then, on 10th and 17th of May, we had 23 stations (21 in Hobart and 2 in Launceston). Our new objective is 23 in Hobart! We'll keep you posted.

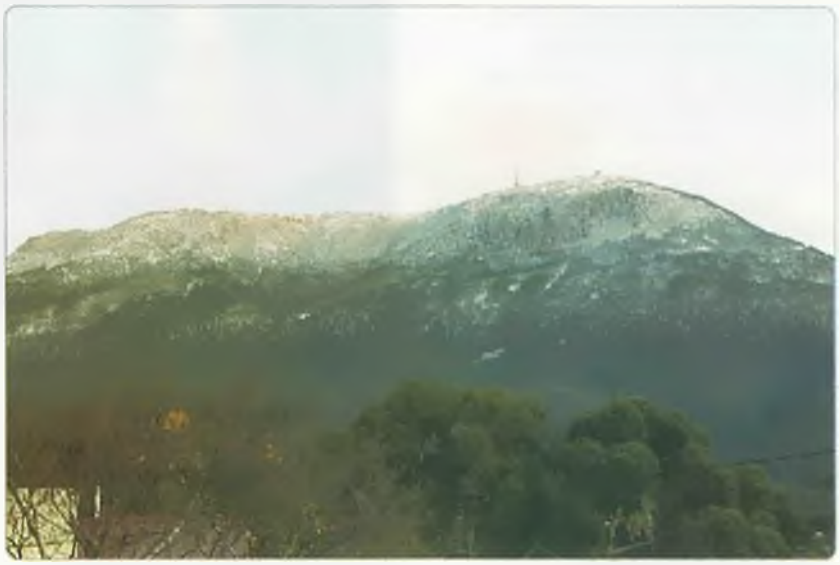


Photo 1: 23cm passive reflector, otherwise known as Mt Wellington (courtesy of Justin VK7TW).

From 10:00am, the Hobart stations all beam toward Mt Wellington, using it as a passive reflector for FM voice contacts and then, from 10:30am, a number of Hobart stations beam North to Launceston on 1296.2 MHz, using the digital mode QRA64-D. Hobart stations transmit first period.

With many people working from home, the 23cm frequency of 1296.15 MHz is being monitored throughout the day by many stations around Hobart and they are happy to have a chat.

Northern News

Northern Tasmanian Amateur Radio Club (NTARC)

www.ntarc.net/

During the COVID-19 lock-down, NTARC has been running two nets on a Wednesday night. The first, around 7:00pm, is a QRP Net on 3.58 MHz for low power stations, and then at 7:30pm AEST on 3.567 MHz, they run a Technical Net. Running along side the Technical Net is an internet-based chat group using the application Discord. The Tech Net Controller is Nic VK7BEE, using the NTARC club callsign VK7TAZ; Paul VK7KPA runs the Discord sessions.

Regular participants include Kevin VK7HKN, Ross VK7RC, Peter VK7KPC, Andrew VK7DW, Paul VK7KPA, James VK7JAM, Graham VK7KT, Phil VK7ZPD, Peter VK7PD, Idris VK7ZIR, Andre VK7ZAB, Ross VK7ALH, Kerry VK7FKEK, Kerry VK7PAK, and Alan VK7AT. They have had up to 17 stations on the net. There are regular VK3s, VK4s and ZLs also on the net.

Discord attracts those that can and cannot hear the net to join in and share chat and pictures. Net SDRs are used to great effect for

reception. Nic has also started a series of lessons on learning Morse code during lock-down.

Southern News

Radio and Electronics Association of Southern Tasmania Inc.

www.reast.asn.au/
www.facebook.com/reasttas/

REAST has been holding virtual club gatherings for both the Wednesday afternoon group and the Wednesday evening groups. The normal presentation nights are a whole-of-club zoom session.

Two sessions have been held about digital voice modes; the first was on DMR and the second was on DSTAR. Both were presented by Clayton VK7ZCR and Scott VK7HSE. Both presentations can be found on the REAST Hobart YouTube Channel.

The DMR session focused on the Radioddity GD77 handheld and explored Roger Clarke's OpenGD77 firmware and the features of this firmware enhancements.

The DSTAR presentation covered a short history, registration that enables users to talk through repeaters and gateways. VK7 repeaters including VK7RCR, VK7RAD, VK7RRR and VK7RJG. DPRS, which is the DSTAR equivalent of APRS or Automatic Position Reporting Service, was also covered. Equipment that is available that supports DSTAR was covered and the presentation finished off with some traps for young and not so young players.

The other Wednesday night session saw our 'Working from the Shack' series that has included online interviews with Rex Moncur VK7MO, Warren VK7WN, Paul VK7FPCL, Peter VK7PD, Peter Dodd VK7KPC and Tony VK7AX.

Photo 2: The 'Working from the Shack' interview with Tony VK7AX (courtesy of Justin VK7TW).

The interviews take the form of a history and entry into amateur radio, inspirations for getting into amateur radio, special interests and projects, shack tours and questions from the audience via repeaters, DMR TG 3807, and the YouTube Chat Channel. The program goes out on RF on 445.5 MHz DVB-T 7MHz Standard Definition from the Queens Domain studio around the Hobart area. Look out for VK7OTC, which also streams the nights on the REAST YouTube channel: *www.reast.asn.au/news-events/live-stream/*

We get underway with the DATV Experimenter's Night from 7:30pm AEST on Wednesday nights.

Silent Key – Peter Nicolle VK7RN

We are saddened to announce the sudden passing of Peter Nicolle VK7RN, on the 9 April 2020. Peter was a recent entry into amateur radio, gaining his Foundation Licence in 2016 and upgrading in 2017.

Peter would travel weekly with Mark VK7ME from Sheffield to Burnie for their regular Monday night training sessions, a two-hour round trip. Peter was very active on the Sewing Circle Net and certainly liked a chat on air. Reportedly, he was a prolific CBer for many years until he obtained his amateur licence.

He had a good collection of HF radio equipment and was always keen to experiment with various antennas. Peter had recently moved to a quiet bush location on Claude Road, near Sheffield.

I am sure the amateur community is the poorer for his passing and he will be sadly missed by all who knew him.

(73, from Dave VK7DC and Eric, VK7EV).

WIA Awards

Marc Hillman VK3OHM/VK3IP

Changes afoot

This issue's listings includes all new awards issued from 2020-04-15 to 2020-08-14.

To use the online award system, go to: *www.wia.org.au/members/wiadxawards/about/*

New awards

Antarctic

#	Call	Name	Mode
118	UA9YF	Mikhail Melnikov	Phone
119	VK3MH	Brendan Bryant	Open

DXCC 5-band Elite

#	Call	Name	Count	Mode
1	VK3EW	David McAulay	313	Open
2	VK3EW	David McAulay	293	Phone
3	VK3HJ	Luke Steele	201	Open
4	VK3QI	Peter Forbes	266	Open
5	VK6IR	Stephen Chamberlain	220	Open
6	IK0XBX	Francesco Fucelli	219	Open
7	LB2TB	Lars Roksund	213	Open
8	LB2TB	Lars Roksund	203	CW

DXCC Multi-band (3)

#	Call	Name	Mode	Band	Count
165	VK3MB	Philip White	Open	40-20-17m	347
166	VK3KJ	Scott Williams	Open	80-40-20m	534
167	VK3KJ	Scott Williams	Digital	80-40-20m	522
168	IU0LFQ	Alessio Bravi	Open	40-30-20m	523
169	IU0LFQ	Alessio Bravi	Digital	40-30-20m	503
170	IK0XBX	Francesco Fucelli	Open	40-20-15m	817
171	IK0XBX	Francesco Fucelli	Phone	20-15-10m	596
172	IK0XBX	Francesco Fucelli	CW	40-20-15m	716
173	IK0XBX	Francesco Fucelli	Digital	40-20-15m	464
174	YO8CRU	Iulian Manolescu	Open	30-20-15m	442
175	YO8CRU	Iulian Manolescu	CW	30-20-15m	353
176	VK6IR	Stephen Chamberlain	Triple Play	40-20-15m	397
177	VK3EW	David McAulay	Triple Play	40-20-17m	566
178	VK6WX	Wesley Beck	CW	40-30-20m	412
179	LB2TB	Lars Roksund	Open	30-20-17m	875
180	LB2TB	Lars Roksund	CW	30-20-17m	870
181	VK6WX	Wesley Beck	Phone	40-20-15m	391
182	VK3MB	Philip White	Digital	40-20-17m	374

DXCC Multi-band (5)

#	Call	Name	Mode	Band	Count
118	VK2BY	Bradley Devon	Open	40-30-20-17-15m	716
119	VK3KJ	Scott Williams	Open	80-40-30-20-15m	817
120	VK3KJ	Scott Williams	Digital	80-40-30-20-15m	804
121	IU0LFQ	Alessio Bravi	Open	40-30-20-17-15m	824
122	IU0LFQ	Alessio Bravi	Digital	40-30-20-17-15m	803
123	IK0XBX	Francesco Fucelli	Open	40-30-20-17-15m	1312
124	IK0XBX	Francesco Fucelli	Phone	40-20-17-15-10m	903
125	IK0XBX	Francesco Fucelli	CW	80-40-30-20-15m	1140
126	IK0XBX	Francesco Fucelli	Digital	80-40-20-17-15m	725
127	LB2TB	Lars Roksund	Open	40-30-20-17-15m	1431
128	LB2TB	Lars Roksund	CW	40-30-20-17-15m	1421
129	VK2BY	Bradley Devon	Digital	40-30-20-17-15m	652
130	VK2PW	Adam McCarthy	Open	40-30-20-17-15m	644

DXCC Multi-band (7)

#	Call	Name	Mode	Band	Count
52	VK3KTT	Steven Barr	Open	80-40-30-20-17-15-10m	1158
53	IK0XBX	Francesco Fucelli	Open	80-40-30-20-17-15-10m	1762
54	IK0XBX	Francesco Fucelli	CW	160-80-40-30-20-17-15m	1518
55	IU0LFQ	Alessio Bravi	Open	80-40-30-20-17-15-10m	1054
56	IU0LFQ	Alessio Bravi	Digital	80-40-30-20-17-15-10m	1027
57	LB2TB	Lars Roksund	Open	80-40-30-20-17-15-12m	1920
58	LB2TB	Lars Roksund	CW	80-40-30-20-17-15-12m	1899

DXCC Multi-band (8)

#	Call	Name	Mode	Band	Count
18	VK3HJ	Luke Steele	CW	80-40-30-20-17-15-12-10m	1824
19	VK3HJ	Luke Steele	Open	80-40-30-20-17-15-12-10m	2047
20	VK6DU	Lance Martin	CW	80-40-30-20-17-15-12-10m	1714
21	IK0XBX	Francesco Fucelli	Open	80-40-30-20-17-15-12-10m	1942
22	IK0XBX	Francesco Fucelli	CW	160-80-40-30-20-17-15-10m	1676
23	IU0LFQ	Alessio Bravi	Open	80-40-30-20-17-15-12-10m	1173
24	IU0LFQ	Alessio Bravi	Digital	80-40-30-20-17-15-12-10m	1131
25	VK6RZ	Peter Drew	Open	80-40-30-20-17-15-12-10m	1464
26	LB2TB	Lars Roksund	Open	80-40-30-20-17-15-12-10m	2133
27	LB2TB	Lars Roksund	CW	80-40-30-20-17-15-12-10m	2102
28	VK3SIM	Simon Keane	Open	80-40-30-20-17-15-12-10m	1476

DXCC Multi-band (9)

#	Call	Name	Mode	Band	Count
24	IK0XBX	Francesco Fucelli	Open	160-80-40-30-20-17-15-12-10m	2120
25	IK0XBX	Francesco Fucelli	CW	160-80-40-30-20-17-15-12-10m	1817
26	VK6IR	Stephen Chamberlain	Digital	160-80-40-30-20-17-15-12-10m	1307
27	LB2TB	Lars Roksund	Open	160-80-40-30-20-17-15-12-10m	2289
28	LB2TB	Lars Roksund	CW	160-80-40-30-20-17-15-12-10m	2258

DXCC Multi-mode (CW)

#	Call	Name	Count
270	IU0LFQ	Alessio Bravi	102
271	YO8CRU	Iulian Manolescu	223
272	LB2TB	Lars Roksund	318

DXCC Multi-mode (Digital)

#	Call	Name	Count
110	VK3ANL	Nicholas Lock	102
111	VK3KJ	Scott Williams	227
112	IU0LFQ	Alessio Bravi	211
113	VK1MES	Malcolm Stephens	100
114	YO8CRU	Iulian Manolescu	126
115	VK2QN	John Watt	107
116	VK5XY	Colin Luke	131
117	VK2VAR	Colin Greenwood	106
118	VK2IO	Gerard Hill	140

DXCC Multi-mode (Open)

#	Call	Name	Count
494	VK3KJ	Scott Williams	236
495	IU0LFQ	Alessio Bravi	216
496	VK2UCT	Michael du Plessis	100
497	VK1MES	Malcolm Stephens	100
498	YO8CRU	Iulian Manolescu	246
499	VK5XY	Colin Luke	131
500	LB2TB	Lars Roksund	320
501	VK2VAR	Colin Greenwood	106

DXCC Multi-mode (Phone)

#	Call	Name	Count
638	YO8CRU	Iulian Manolescu	140
639	IU0LFQ	Alessio Bravi	100
640	LB2TB	Lars Roksund	201

DXCC Multi-mode (Triple Play)

#	Call	Name	Count
1	VK3GA	Graham Alston	242
2	VK3KTT	Steven Barr	142
3	VK6IR	Stephen Chamberlain	253
4	VK5GR	Grant Willis	106
5	VK6APK	Aleksandar Petkovic	157
6	VK6WX	Wesley Beck	127
7	VK3EW	David McAulay	309
8	VK3HJ	Luke Steele	219
9	VK7CW	Steven Salvia	137
10	VK3FZ	Roger Stafford	132
11	VK3VT	Greg Williams	163
12	VK4CAG	Graeme Dowse	155
13	VK3BDX	David Burden	102

DXCC Single-band

#	Call	Name	Mode	Band	Count
526	VK2ZQ	Michael Ramsay	Phone	40m	143
527	VK2ZQ	Michael Ramsay	Phone	15m	140
528	VK2ZQ	Michael Ramsay	Phone	10m	142
529	VK2ZQ	Michael Ramsay	Digital	20m	109
530	VK3KTT	Steven Barr	Open	17m	115
531	VK2PW	Adam McCarthy	Open	40m	140
532	VK2PW	Adam McCarthy	Digital	40m	124
533	VK2PW	Adam McCarthy	Digital	20m	134
534	VK3OHM	Marc Hillman	Digital	17m	105
535	VK4CAG	Graeme Dowse	Open	40m	211
536	VK4CAG	Graeme Dowse	Open	30m	198
537	VK4CAG	Graeme Dowse	Open	17m	253
538	VK4CAG	Graeme Dowse	Open	15m	247
539	VK4CAG	Graeme Dowse	Open	12m	181
540	VK4CAG	Graeme Dowse	Open	10m	178
541	VK4CAG	Graeme Dowse	Phone	17m	162
542	VK4CAG	Graeme Dowse	Phone	15m	197
543	VK4CAG	Graeme Dowse	Phone	12m	138
544	VK4CAG	Graeme Dowse	Phone	10m	158
545	VK4CAG	Graeme Dowse	Digital	80m	125
546	VK4CAG	Graeme Dowse	Digital	40m	170
547	VK4CAG	Graeme Dowse	Digital	30m	155
548	VK4CAG	Graeme Dowse	Digital	17m	153
549	VK4CAG	Graeme Dowse	Digital	15m	134
551	VK2QV	Rasika Liyanage	Digital	30m	100
552	VK3BDX	David Burden	Phone	40m	103
553	VK2PW	Adam McCarthy	Open	30m	136
554	VK2PW	Adam McCarthy	Digital	30m	130
555	VK4SN	Alan Shannon	Open	40m	115
556	VK4SN	Alan Shannon	Open	20m	113
557	VK4SN	Alan Shannon	CW	40m	103
558	VK4SN	Alan Shannon	CW	20m	102
559	VK2BY	Bradley Devon	Phone	20m	121
560	VK2BY	Bradley Devon	Open	40m	156
561	VK2BY	Bradley Devon	Open	30m	133
562	VK2BY	Bradley Devon	Open	17m	137
563	VK2BY	Bradley Devon	Digital	40m	138
564	VK2BY	Bradley Devon	Digital	30m	132
565	VK2BY	Bradley Devon	Digital	20m	152
566	VK2BY	Bradley Devon	Digital	17m	129
567	VK3KTT	Steven Barr	Digital	17m	105
568	VK3MH	Brendan Bryant	Open	40m	152
569	VK3MH	Brendan Bryant	Open	30m	135
570	VK3MH	Brendan Bryant	Open	17m	130
571	VK3MH	Brendan Bryant	Digital	40m	152
572	VK3MH	Brendan Bryant	Digital	30m	128
573	VK3MH	Brendan Bryant	Digital	17m	126
574	VK6DU	Lance Martin	Digital	17m	116
575	VK6DU	Lance Martin	Digital	15m	148
576	VK6DU	Lance Martin	CW	20m	267
577	VK6DU	Lance Martin	Open	40m	286

DXCC Single-band

#	Call	Name	Mode	Band	Count
578	VK6DU	Lance Martin	Open	80m	121
579	VK6DU	Lance Martin	Open	30m	230
580	VK6DU	Lance Martin	Open	17m	271
581	VK6DU	Lance Martin	Open	15m	280
582	VK6DU	Lance Martin	Open	12m	216
583	VK6DU	Lance Martin	Open	10m	232
584	VK6DU	Lance Martin	CW	80m	101
585	VK3MH	Brendan Bryant	Open	15m	102
586	VK3QI	Peter Forbes	Open	160m	131
587	VK3QI	Peter Forbes	Open	80m	265
588	VK3QI	Peter Forbes	Open	40m	318
589	VK3QI	Peter Forbes	Open	30m	329
590	VK3QI	Peter Forbes	Open	17m	324
591	VK3QI	Peter Forbes	Open	15m	319
592	VK3QI	Peter Forbes	Open	12m	304
593	VK3QI	Peter Forbes	Open	10m	305
594	VK3QI	Peter Forbes	Phone	80m	107
595	VK3QI	Peter Forbes	Phone	40m	102
596	VK3QI	Peter Forbes	Phone	20m	283
597	VK3QI	Peter Forbes	Phone	17m	145
598	VK3QI	Peter Forbes	Phone	15m	226
599	VK3QI	Peter Forbes	Phone	12m	102
600	VK3QI	Peter Forbes	Phone	10m	222
601	VK3QI	Peter Forbes	CW	160m	121
602	VK3QI	Peter Forbes	CW	80m	184
603	VK3QI	Peter Forbes	CW	40m	251
604	VK3QI	Peter Forbes	CW	20m	212
605	VK3QI	Peter Forbes	CW	17m	206
606	VK3QI	Peter Forbes	CW	15m	141
607	VK3QI	Peter Forbes	CW	12m	222
608	VK3QI	Peter Forbes	CW	10m	119
609	VK6APK	Aleksandar Petkovic	Digital	20m	125
610	VK3FZ	Roger Stafford	Digital	30m	102
611	VK4CAG	Graeme Dowse	Digital	12m	100
612	VK2ND	Ian Hawkins	Open	20m	102
613	VK3HJ	Luke Steele	Open	160m	139
614	VK3HJ	Luke Steele	Open	80m	201
615	VK5DG	David Giles	Open	30m	118
616	VK5DG	David Giles	Open	17m	106
617	VK5DG	David Giles	Open	15m	131
618	VK5DG	David Giles	Open	10m	105
619	VK5DG	David Giles	Digital	20m	114
620	VK5DG	David Giles	Digital	17m	102
621	VK5DG	David Giles	Digital	15m	102
622	VK3MB	Philip White	Open	17m	100
623	VK3KTT	Steven Barr	Open	80m	107
624	VK3FN	Peter Dernikos	Digital	20m	109
625	VK2BY	Bradley Devon	Open	15m	109
626	VK3KJ	Scott Williams	Open	80m	156
627	VK3KJ	Scott Williams	Open	40m	204
628	VK3KJ	Scott Williams	Open	30m	135

DXCC Single-band

#	Call	Name	Mode	Band	Count
629	VK3KJ	Scott Williams	Open	20m	174
630	VK3KJ	Scott Williams	Open	17m	132
631	VK3KJ	Scott Williams	Open	15m	148
632	VK3KJ	Scott Williams	Digital	80m	156
633	VK3KJ	Scott Williams	Digital	40m	195
634	VK3KJ	Scott Williams	Digital	30m	135
635	VK3KJ	Scott Williams	Digital	20m	171
636	VK3KJ	Scott Williams	Digital	17m	130
637	VK3KJ	Scott Williams	Digital	15m	147
638	VK6DU	Lance Martin	Phone	40m	103
639	VK6DU	Lance Martin	Phone	17m	139
640	VK6DU	Lance Martin	Phone	15m	184
641	VK6DU	Lance Martin	Phone	12m	101
642	VK6DU	Lance Martin	Phone	10m	174
643	VK6DU	Lance Martin	CW	30m	218
644	VK6DU	Lance Martin	CW	17m	238
645	VK6DU	Lance Martin	CW	15m	247
646	VK6DU	Lance Martin	CW	10m	179
647	VK6DU	Lance Martin	CW	12m	194
648	IU0LFQ	Alessio Bravi	Open	80m	130
649	IU0LFQ	Alessio Bravi	Open	40m	181
650	IU0LFQ	Alessio Bravi	Open	30m	164
651	IU0LFQ	Alessio Bravi	Open	20m	178
652	IU0LFQ	Alessio Bravi	Open	17m	163
653	IU0LFQ	Alessio Bravi	Open	15m	138
654	IU0LFQ	Alessio Bravi	Digital	80m	123
655	IU0LFQ	Alessio Bravi	Digital	40m	175
656	IU0LFQ	Alessio Bravi	Digital	30m	161
657	IU0LFQ	Alessio Bravi	Digital	20m	175
658	IU0LFQ	Alessio Bravi	Digital	17m	156
659	IU0LFQ	Alessio Bravi	Digital	15m	131
660	IK0XBX	Francesco Fucelli	Open	160m	178
661	IK0XBX	Francesco Fucelli	Open	80m	231
662	IK0XBX	Francesco Fucelli	Open	40m	268
663	IK0XBX	Francesco Fucelli	Open	30m	248
664	IK0XBX	Francesco Fucelli	Open	20m	285
665	IK0XBX	Francesco Fucelli	Open	17m	247
666	IK0XBX	Francesco Fucelli	Open	15m	264
667	IK0XBX	Francesco Fucelli	Open	12m	180
668	IK0XBX	Francesco Fucelli	Open	10m	219
669	IK0XBX	Francesco Fucelli	Phone	80m	125
670	IK0XBX	Francesco Fucelli	Phone	40m	177
671	IK0XBX	Francesco Fucelli	Phone	20m	217
672	IK0XBX	Francesco Fucelli	Phone	17m	130
673	IK0XBX	Francesco Fucelli	Phone	15m	201
674	IK0XBX	Francesco Fucelli	Phone	10m	178
675	IK0XBX	Francesco Fucelli	CW	10m	158
676	IK0XBX	Francesco Fucelli	CW	160m	174
677	IK0XBX	Francesco Fucelli	CW	80m	204
678	IK0XBX	Francesco Fucelli	CW	40m	240
679	IK0XBX	Francesco Fucelli	CW	30m	220

DXCC Single-band

#	Call	Name	Mode	Band	Count
680	IK0XBX	Francesco Fucelli	CW	20m	251
681	IK0XBX	Francesco Fucelli	CW	17m	204
682	IK0XBX	Francesco Fucelli	CW	15m	225
683	IK0XBX	Francesco Fucelli	CW	12m	141
684	IK0XBX	Francesco Fucelli	Digital	80m	123
685	IK0XBX	Francesco Fucelli	Digital	40m	141
686	IK0XBX	Francesco Fucelli	Digital	30m	123
687	IK0XBX	Francesco Fucelli	Digital	20m	183
688	IK0XBX	Francesco Fucelli	Digital	17m	138
689	IK0XBX	Francesco Fucelli	Digital	15m	140
690	IU0LFQ	Alessio Bravi	Open	10m	100
691	OM2GM	Tibor Fuzik	CW	17m	100
692	VK2PW	Adam McCarthy	Open	17m	111
693	VK2PW	Adam McCarthy	Digital	17m	104
694	YO8CRU	Iulian Manolescu	Open	30m	141
695	YO8CRU	Iulian Manolescu	Open	20m	171
696	YO8CRU	Iulian Manolescu	Open	17m	120
697	YO8CRU	Iulian Manolescu	Open	15m	130
698	YO8CRU	Iulian Manolescu	CW	30m	107
699	YO8CRU	Iulian Manolescu	CW	20m	124
700	YO8CRU	Iulian Manolescu	CW	15m	122
701	YO8CRU	Iulian Manolescu	Digital	20m	102
702	IU0LFQ	Alessio Bravi	Open	12m	100
703	IU0LFQ	Alessio Bravi	Digital	10m	100
704	IU0LFQ	Alessio Bravi	Digital	12m	100
705	VK3KTT	Steven Barr	CW	40m	100
706	VK6IR	Stephen Chamberlain	Digital	160m	100
707	VK3GA	Graham Alston	3x Play	20m	136
708	VK6IR	Stephen Chamberlain	3x Play	40m	146
709	VK6IR	Stephen Chamberlain	3x Play	20m	125
710	VK6IR	Stephen Chamberlain	3x Play	15m	126
711	VK6IR	Stephen Chamberlain	3x Play	10m	108
712	VK3EW	David McAulay	3x Play	15m	141
713	VK3EW	David McAulay	3x Play	17m	172
714	VK3EW	David McAulay	3x Play	20m	217
715	VK3EW	David McAulay	3x Play	40m	177
716	VK5GR	Grant Willis	Open	80m	105
717	VK3WE	Rhett Donnan	Open	30m	100
718	VK6RZ	Peter Drew	Open	80m	102
719	VK6APK	Aleksandar Petkovic	Digital	17m	102
720	VK3VT	Greg Williams	3x Play	20m	104
721	VK6WX	Wesley Beck	CW	30m	104
722	LB2TB	Lars Roksund	Open	160m	156
723	LB2TB	Lars Roksund	Open	80m	241
724	LB2TB	Lars Roksund	Open	40m	276
725	LB2TB	Lars Roksund	Open	30m	301
726	LB2TB	Lars Roksund	Open	20m	289
727	LB2TB	Lars Roksund	Open	15m	280
728	LB2TB	Lars Roksund	Open	17m	265
729	LB2TB	Lars Roksund	Open	12m	248
730	LB2TB	Lars Roksund	Open	10m	213

DXCC Single-band

#	Call	Name	Mode	Band	Count
731	LB2TB	Lars Roksund	Phone	20m	108
732	LB2TB	Lars Roksund	CW	160m	156
733	LB2TB	Lars Roksund	CW	80m	241
734	LB2TB	Lars Roksund	CW	40m	276
735	LB2TB	Lars Roksund	CW	30m	301
736	LB2TB	Lars Roksund	CW	20m	286
737	LB2TB	Lars Roksund	CW	17m	283
738	LB2TB	Lars Roksund	CW	15m	275
739	LB2TB	Lars Roksund	CW	12m	237
740	LB2TB	Lars Roksund	CW	10m	203
741	VK3SIM	Simon Keane	Open	80m	103
742	VK3SIM	Simon Keane	3x Play	20m	112
743	VK2BY	Bradley Devon	Digital	15m	101
744	VK6WX	Wesley Beck	Digital	20m	102
745	VK6WX	Wesley Beck	Phone	40m	101
746	VK2PW	Adam McCarthy	Open	15m	100
747	VK2QV	Rasika Liyanage	Open	30m	120
748	VK2QV	Rasika Liyanage	Digital	15m	117
749	VK2IO	Gerard Hill	Open	40m	117
750	VK2IO	Gerard Hill	Open	20m	112
751	VK3MB	Philip White	Digital	17m	108

DXer of the Year

#	Call	Name	Category	Place	Grade	Year
91	VK3BDX	David Burden	Grid	3	All Grades	2019
92	VK3BDX	David Burden	Open	1	All Grades	2019
93	VK3BDX	David Burden	Phone	1	All Grades	2019
94	VK3BDX	David Burden	Digital	1	All Grades	2019
95	VK3BDX	David Burden	DXCC	1	All Grades	2019
96	VK3KJ	Scott Williams	Open	2	All Grades	2019
97	VK3KJ	Scott Williams	Phone	3	All Grades	2019
98	VK3KJ	Scott Williams	Digital	2	All Grades	2019
99	VK3KJ	Scott Williams	DXCC	2	All Grades	2019
100	VK3MH	Brendan Bryant	Grid	2	All Grades	2019
101	VK3MH	Brendan Bryant	Open	3	All Grades	2019
102	VK3MH	Brendan Bryant	Digital	3	All Grades	2019
103	VK3MH	Brendan Bryant	DXCC	3	All Grades	2019
104	VK5GR	Grant Willis	CW	2	All Grades	2019
105	VK3KTT	Steven Barr	Phone	2	All Grades	2019
106	VK2DX	Nikola Hacko	Grid	1	All Grades	2019
107	VK6WX	Wesley Beck	CW	3	All Grades	2019
108	VK7CW	Steven Salvia	CW	1	All Grades	2019
109	VK2FBAG	Anthony Garton	Grid	1	Foundation	2019
110	VK2FBAG	Anthony Garton	Open	1	Foundation	2019
111	VK2FBAG	Anthony Garton	Digital	1	Foundation	2019
112	VK2FBAG	Anthony Garton	DXCC	1	Foundation	2019
113	VK3FGNT	Benjamin Carthew	Grid	2	Foundation	2019
114	VK3FGNT	Benjamin Carthew	Open	2	Foundation	2019
115	VK3FGNT	Benjamin Carthew	Digital	2	Foundation	2019
116	VK3FGNT	Benjamin Carthew	DXCC	2	Foundation	2019
117	VK1FREB	Rebecca Cuthbert	Open	3	Foundation	2019
118	VK1FREB	Rebecca Cuthbert	Digital	3	Foundation	2019

Grid Square

#	Call	Name	Mode	Band	Count
482	VK3MH	Brendan Bryant	CW	HF	113
483	VK3OM	Michael Andrews	Open	HF	427
484	VK3OM	Michael Andrews	Digital	HF	427
485	VK3FGNT	Benjamin Carthew	Digital	HF	327
486	IU0LFQ	Alessio Bravi	Open	HF	983
487	IU0LFQ	Alessio Bravi	Open	6m	58
488	IU0LFQ	Alessio Bravi	Phone	HF	216
489	IU0LFQ	Alessio Bravi	CW	HF	210
490	IU0LFQ	Alessio Bravi	Digital	HF	940
491	IU0LFQ	Alessio Bravi	Digital	6m	53
492	OM2GM	Tibor Fuzik	Digital	6m	59
493	YO8CRU	Iulian Manolescu	Open	HF	748
494	YO8CRU	Iulian Manolescu	Open	6m	64
495	YO8CRU	Iulian Manolescu	Phone	6m	50
496	YO8CRU	Iulian Manolescu	CW	HF	109
497	YO8CRU	Iulian Manolescu	Digital	HF	675
498	VK3KTT	Steven Barr	Open	6m	52
499	VK2HV	Paul Hanna	Phone	HF	139
500	VK2HV	Paul Hanna	CW	HF	124
501	LB2TB	Lars Roksund	Open	HF	1515
502	LB2TB	Lars Roksund	Open	6m	168
503	LB2TB	Lars Roksund	Phone	HF	331
504	LB2TB	Lars Roksund	CW	HF	1479
505	LB2TB	Lars Roksund	CW	6m	158
506	VK2VAR	Colin Greenwood	Open	HF	688
507	VK2VAR	Colin Greenwood	Digital	HF	688
508	VK3WE	Rhett Donnan	Digital	6m	53

IARU Worked All Continents (Basic)

#	Call	Name	Mode	Band
88	VK3MH	Brendan Bryant	Open	

Islands of Australia

#	Call	Name	Count
14	UA9YF	Mikhail Melnikov	50
15	VK2IO	Gerard Hill	27

Worked All States VHF

#	Call	Name	Mode	Band
229	VK3HJ	Luke Steele	Open	6m
230	VK2IO	Gerard Hill	Open	6m

Worked All VK Call Areas HF

#	Call	Name	Mode
2406	UA9YF	Mikhail Melnikov	Phone
2407	VK3WE	Rhett Donnan	Open
2408	VK5BC	Brian Cleland	Digital
2409	VK3HJ	Luke Steele	Open
2410	VK3BDX	David Burden	Digital

Pages from the Past

From the Argus newspaper (Melbourne) 29 September 1910

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London September 27th

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He has continued the experiments during the voyage of the steamer to the Argentine, and has found that the kite takes the end of the wire from the ship above the influence which had interfered with the electric waves hitherto.

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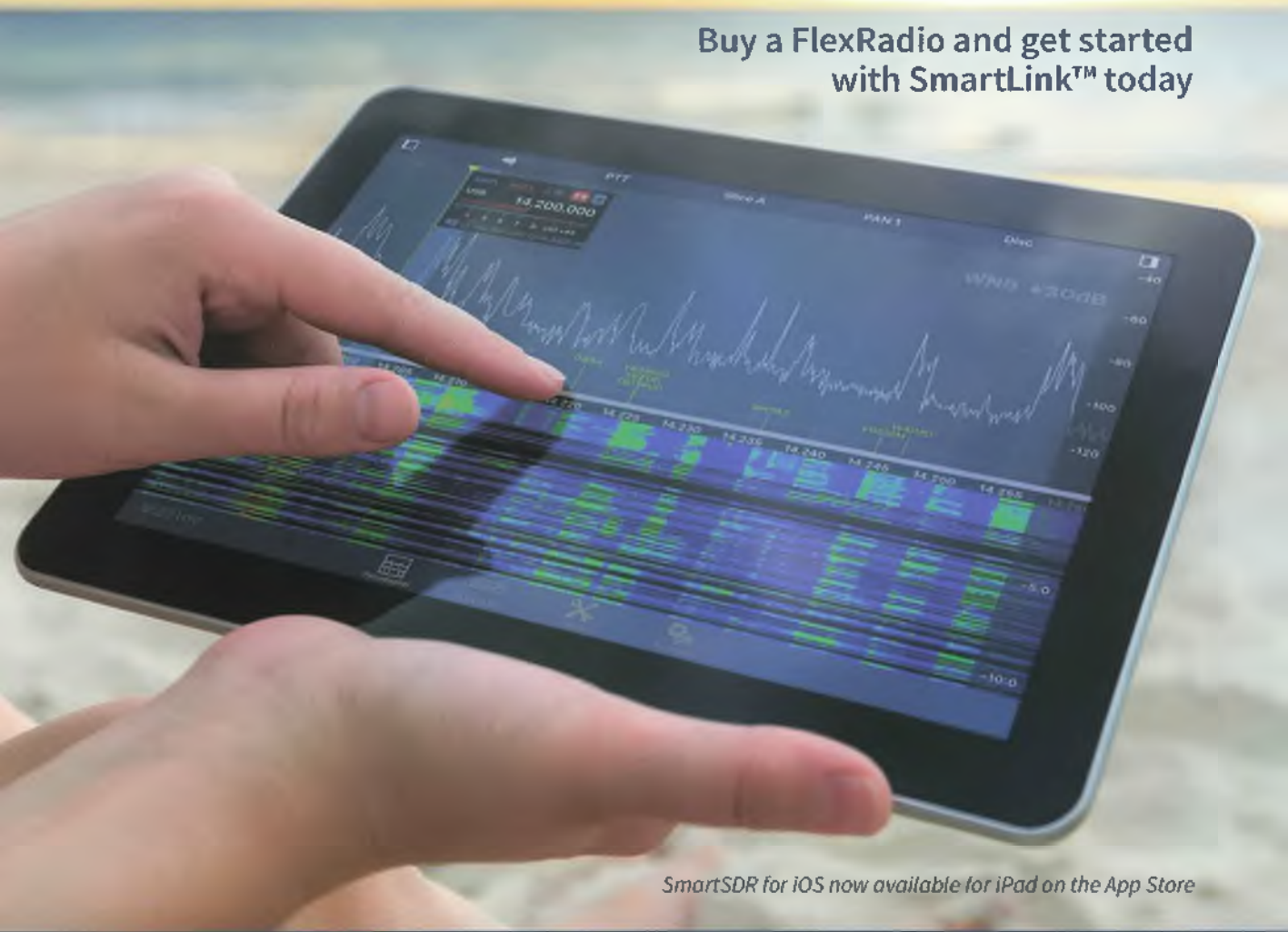

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