



## ZL2VH Newsletter – June 2016

### President's Report

Another month has passed and the winter is starting to set in. It looks like the work carried out on the South Hut on Mt Climie has produced some good results in weatherproofing the hut. We will be carrying out regular visits to keep an eye on it.

#### QRM.

If you notice any QRM on any of the repeaters please let one of the repeater trustees know. Time, date, weather conditions, type of interference and which repeater was affected would help us pinpoint the cause. There has been a noticeable crackle on the 730 repeater lately especially in bad weather.

As an interim measure we are looking at swapping over the feed from 730 to the 5425 stack on the South pole until the North pole antenna is serviced. (North pole is the normal 730 antenna)

5425 D-Star will use the previously crackly antenna on the North pole until a repair or replacement is implemented. Digital radio D-Star masks the crackle and noise heard on FM.

Digital stops working once the antenna has completely failed. This gives trustees time to work on the noisy antenna when weather permits.

Upcoming events include the NZART AGM / convention in Christchurch over Queens Birthday weekend, Lighthouse weekend (20-21 August 2016 - Duration 48 hours from 0001 UTC 20.8.2016), JOTA and a Saturday session (date to be decided....) at the clubrooms to assist Seymour and Eric to compile a list of club equipment so that we can keep track of club assets and update and ensure that our equipment is kept in a usable state.

For more info on the Lighthouse Weekend check out

<http://illw.net/>

73's and good DX

Mike ZL2NSA

## **Branch 63 Repeater Update – May 2016**

At the end of April a working bee gave the Clubs south hut at Climie was given a decent coat of paint in an attempt to improve the weatherproofing. Thanks to Mike ZL2NSA, Mark ZL2UFI , Justin ZL2UGL and Simon ZL2BRG for the work.

The weather station at Climie suffered a partial failure with the humidity sensor getting blown off its mount during a recent storm. It is due to be replaced during an upcoming trip.

Weather Station link <http://www.harvestalarms.com/w.cgi?hsn=11398&tabs=1>

### **Status Updates**

#### **Climie Mesh Test**

A proposal is to be put to the club by Wellington Mesh group. The proposal document is included in the newsletter for reference.

#### **WebSDR**

No progress this month

#### **3cm Beacon**

On Air

#### **1292 23cm**

On Air with ID disabled. Waiting on proposals for future use

#### **860 DStar**

On Air.

#### **5425 DStar**

On Air

#### **730 2m FM Repeater**

As reported elsewhere there is an intermittent noise issue on 730. As a temporary measure 5425 antennas will be put on 730 and 730's on 5425.

#### **53.950 6m FM Repeater**

On Air

**We are always looking for articles to fill the pages of newsletter. Please forward anything no matter how large or small to the editor - Eric ZL2SET – [ericwilby@gmail.com](mailto:ericwilby@gmail.com).**

**For Sale.**  
**Cheapest D-Star transceiver on the market.**

A Branch 63 members special offer for a NEW DV3000 ThumbDV vocoder USB stick. Package is supplied with an additional CD containing the WinDV (Dutch D-Star) Windows software and a headset microphone with 3.5mm plugs to suit any PC sound card. Everything to get you on the air immediately.

NOTE: If you are not registered on the D-Star gateway database I can do that for you. D-Star Registration is also handled by Branch 63 administration trustee Mark ZL2UFI.

DV3000 ThumbDV plugs into any desktop or laptop PC running the Windows 7 or later OS. Note: Possibly runs on older OS but not tested. Software includes ZL host files that can be added once the WinDV is installed. DV3000 works stations via DPlus, DExtra, DCS, XRF, XLX reflectors and gateway repeater protocols.

Everything that is currently available on D-Star.

This is the cheapest way into any of the digital radio systems currently available to amateurs. I am trialing this sale to see if it is viable to import more units and get more members and non-members interested in D-Star.

The DV3000 vocoder is the unit used on the Flex6000 series of SDR radio.

Total price including DV3000 ThumbDV, headset microphone and software is \$240. If you already have a suitable headset and microphone and do not need the one supplied the total price is \$205. If you only want the DV3000 and have alternative software and OS the total is \$200.

This sale requires local pick-up or additional postage cost can be applied.

Contact John ZL2TWS for more information.  
[zl2tws@clear.net.nz](mailto:zl2tws@clear.net.nz)

## **ZL Winter Sprint Series**

With the Lee Jennings marathon in mind, I am running a Winter Sprint contest series each Tuesday night for five weeks commencing 7 June 2016 and ending 5 July 2016. It will run for an hour from 7.30pm (NZST) with the first half hour being CW and the second half hour SSB.

The object is to work as many other stations as you can on 40m during that period swapping signal report and the outside temperature at your location. You can do either or both half hour periods as there are separate entry categories for CW and SSB and for those who do both as well as QRP and non-QRP. The scoring is simply 1 point per QSO with no multipliers and you can only work each station once in CW and once on SSB.

The overall winners will be the people who post the best four scores over the five week period in each category. There are no prizes, just bragging rights.

I have written a module for the N1MM+ contest logger which can be obtained by simply emailing me together with instructions as to how to set it up.

If you have never tried contesting this is an opportune time to give it a go in a low key casual way while also looking to improve your operating skills. The full rules can be found at <http://www.zl3x.com/zl-winter-sprint>. If you have any questions feel free to email me. I look forward to hearing you on the air!

73

Mark ZL3AB

### **Possible museum visit?**

Malcolm ZL2UDF has sent the following photos and wondered if anyone would be interested in a Branch visit to the Kapiti Coast Museum, Waikanae. If so, please let me know and I'll pass on the information. – Also for any other suggestions for Branch visits. (Ed.).

The museum details are:

*The Kapiti Coast Museum is housed in the old Waikanae Post Office. When the museum was established the New Zealand Post & Telegraph Department donated a significant amount of out-dated telephone and telegraph equipment including the original Waikanae Telephone Exchange (in use from 1897 to 1917) and the exchange that replaced it. These remain as valued exhibits.*

*Along with radio and communications equipment, including a fully operational Ham Radio "Shack", the museum is now home to extensive displays of everyday life from the pioneering era.*

*The building, which opened as a post office in 1908, is now a Category 2 New Zealand Historic Places Trust Building.*

*The museum is open weekends and most public holidays 2pm - 4pm. Other times by prior arrangement.*



Branch 13 visit to the Waikanae museum in March 2013.



Museum Amateur Radio station ZL6KCM with David ZL2DW on the mike.

## **PROPOSAL TO UPPER HUTT BRANCH 63 NZART: MESH NETWORK EQUIPMENT ON MT CLIMIE**

### **Wellington Mesh Coordination Group**

The *Wellington Mesh Coordination Group* comprises a loose group of mesh enthusiasts who coordinate the mesh network within the Wellington region.

A representative from each of the Wellington Region branches of NZART is included on the Coordination Group. The group meets approximately quarterly to help coordinate mesh design, promote expansion and uptake of the mesh, and to develop guidelines to ensure the safety, integrity and speed of the mesh.

The group is not incorporated, as it does not own assets or hold a bank account. It is simply a group of branch representatives. Mesh equipment at repeater sites is placed under the guardianship of the associated branch who may determine access rights and set specific site requirements. Active mesh users and/or local clubs donate equipment at these sites.

### **Amateur Radio Mesh Networks**

The application of amateur radio mesh networks is in its infancy in New Zealand, with activity commencing in New Zealand towards the end of 2014. Today, the Wellington Region has possibly the largest contiguous amateur radio mesh network in the world (excluding mesh extensions using tunnelling protocol). The focus of the Mesh Coordination Group has been to expand local coverage rather than seek to link nationally or internationally via the internet.

Amateur Radio Mesh technology is based on commercially available WiFi radio equipment, including Linksys and Ubiquiti radios. The equipment provides high speed data access in the 900MHz, 2.4GHz, 3.3GHz, and 5.8GHz and 24GHz bands. Equipment in the 2.4Ghz and 5.8GHz bands can operate under the amateur radio GURL (as some WiFi channels fall within the amateur radio spectrum) or the equipment can be operated under the Short Range Devices GURL.

To provide increased versatility in mesh use, the Wellington Mesh Coordination Group recommends that normal mesh nodes operate under the Short Range Devices GURL. This permits connection of the mesh to an internet gateway. Regardless of which GURL the mesh operates under at any point in time, only amateur radio operators have access to the mesh network. No breaches have been observed to date.

Two software systems (that are currently compatible with each other) being used for amateur mesh communications are Broadband-Hamnet™ and AREDN™. In both cases the software is specifically designed for amateur radio use. Any amateur operator may use this software for free. The software replaces proprietary software installed on Linksys and Ubiquiti radios.

The mesh software essentially provides connections to a LAN network, access to a DHCP server and a LAN port, and a webserver showing all mesh nodes and their status. Additional features can be unlocked for particular purposes. Nodes are all in the 10.X.X.X address space (i.e. a private network).

The Mesh Coordination Group was aware by the end of 2015 that the network configuration initially adopted in the region had resulted in traffic bottlenecks. Segmentation of the mesh network is planned to improve throughput. It was also agreed that a wireless data backbone should be developed for the region. In effect, this means that mesh nodes on high points would move “off-mesh”.

Over the next few months some equipment on high sites around the region (Mt Field, Colonial Knob and Ngaio) will be changed over to non-mesh software to provide the high-speed backbone to connect communities across the region. Additional radios will be needed to complete this work, and this relies on donors.

When this work is complete it will provide for:

- Segmentation of the network to reduce congestion
- Higher speed network connections between segments
- An off-mesh backbone (suitable for a wider range of potential purposes)

Mt Climie is a key high point in the region, with line of sight access to a range of other high points including Colonial Knob, Ngaio Reservoir, Mt Victoria and various points in the Wairarapa.

### **Nature of the Mt Climie Trial**

James Smith ZL2ET sought approval from Branch 63 NZART in late September 2015 to trial mesh network equipment at the Mt Climie repeater site.

The purposes of the trial were to establish whether the site would allow for connections to mesh equipment located on Colonial Knob and provide a means for extending the mesh to the Wairarapa (Stonehenge). The trial was also intended to provide some mesh access to Branch 63 members (although the narrow beamwidth equipment is not ideal for this purpose).

Branch 63 NZART, in giving permission for the trial, asked that upon the conclusion of the trial, should the group seek longer term access to the site, that a proposal be submitted to the Branch for consideration.

### **Results of Mt Climie trial**

Initially a 2.4Ghz Ubiquiti Airgrid M2 (20dBi) WiFi radio was installed temporarily on site at the commencement of the trial period aimed at Colonial Knob (to the West).

The Airgrid was connecting, somewhat unreliably at first, to a home station in Johnsonville. The addition of an Airgrid at the Colonial Knob site, aimed at Mt Climie has since provided for a reliable connection to the mesh network

Shortly thereafter, a 2.4Ghz Ubiquiti Airgrid M2 (16dBi) directed towards the East in the Wairarapa was installed at Mt Climie. This connected to an Airgrid at Stonehenge.

Key outcomes from the trial suggest that Mt Climie:

- provides single-path connections to Wellington (Ngaio Reservoir), Porirua (Colonial Knob) and Wairarapa (Stonehenge) that are reliable and provide adequate signal-to-noise ratios (18dB or more);
- provides a critically important site for high-speed data connections in the region;
- has nodes that have performed reliably over the course of the trial (with only one outage due to installation issues)
- Has had one Branch 63 member access the system from their home QTH (Mike ZL2NSA)

Issues with Colonial Knob South congestion have prevented full testing of a remote receiver at Stonehenge. However, QHUG is confident that with mesh segmentation and the establishment of an “off mesh” backbone, remote operations at Mt Climie should be accessible within the region with a remote station operating via the mesh.



While a connection to the Kapiti Coast (Mt Field) has not been tested, computer path modelling suggests that this path is also feasible. The ability of Mt Climie to connect directly with other mesh backbone points is an important feature of this site.

## Proposal

It is proposed that Upper Hutt Branch 63 NZART approve:

- Permanent colocation of WiFi networking equipment on the Branch 63 Mt Climie site for exclusive amateur use, operating under normal circumstances within the terms of the Public GURL, and under the amateur GURL as determined by the Mesh Coordination Group;
- Existing equipment retained on site and to fall under Branch 63 callsign and licence (as required), but ownership of equipment remaining with the Mesh Coordination Group as donors;
- Equipment be located in the South (main) hut and the antennas be mounted on the 6 meter pole adjacent to the hut, and connected to the 12v DC direct from the Branch 63 battery bank;
- Changeover of software in the near future of both nodes to stock Ubiquiti software so as to provide point-to-point link operation to Colonial Knob and Stonehenge or another site in the Wairarapa. This will effectively segment the mesh and improve throughput and stability;
- Upgrade equipment installation for permanence with the Mesh Coordination Group and Branch 63 working collaboratively to achieve this within 2-3 months as time and weather allow;

In order to changeover the software on the two existing mesh nodes to stock Ubiquiti software to provide point-to-point communications as a backbone, it is likely that nodes may need to be removed temporarily.

Current equipment located on Mt Climie provides limited local access directly to the South-West, but this is not ideal for providing local access to the mesh for all local amateurs in Upper Hutt.

It is further recommended by the Mesh Coordination Group that:

- An additional node be installed at Mt Climie to provide local access on 2.4GHz (NSM2 or similar); and
- Provision of an internet gateway at Mt Climie, using the existing internet connection be provided to enable mesh operations for Stonehenge and to support local mesh internet access in Upper Hutt;

Note that existing mesh members may be willing to contribute towards the costs of an Upper Hutt local node and internet access equipment. The cost will be in the order of \$200 for a local node and around \$85 to provide a managed switch for the internet gateway. The full benefits of the mesh will only arise if the mesh is actively populated and used. The managed switch would also provide for support for a telephone exchange (cost around \$100 for a Raspberry Pi 2) in future for Upper Hutt local access with trunk lines to other meshes.

## Rationale and Benefits

The rationale for wireless broadband data access (typically 20Mbps on inexpensive equipment and up to 1Gbps or more with commercial equipment) is that it provides an exclusive data network amateur operators within the Wellington Region.

Any application that operates on a LAN or over the internet (i.e. requires a TCP/IP connection) will operate on the mesh network. Servers can be connected to the mesh to provide a very broad range of services including websites, VOIP telephony, FTP servers, etc. A broad range of services including a telephone exchange, VOIP services, websites and data storage are already available over the Wellington mesh network.

Significant amateur radio applications are likely to include:

- Digital traffic to support other amateur services (such as D-STAR, and DMR); and
- HF remote station access;
- Emergency communications applications.

The Wellington mesh users current have access to the following free services:

- Several websites and a Mesh News website
- Webmail service and delivery to home email address (ZL1AXG)
- File storage service with up to 2Tb available storage (ZL1AXG)
- Real-time DX Cluster feed (ZL2ARN)
- SIP Telephone exchange and around 10+ existing lines (ZL1AXG)
- Video monitor at Branch 42 clubrooms (ZL2AFV)

The Quartz Hill User Group (QHUG established by Wellington Amateur Radio Club Inc, Branch 50 NZART) is in the process of installing a remote HF station at Stonehenge in the Wairarapa. Details of the remote station concept and progress reports can be found on the Quartz Hill User Group website at <http://remote.zl6gh.com>.

QHUG is hopeful that broadband access through Mt Climie could provide a means for returning signals back to Wellington for amateur operator use and also provide an internet gateway. Remote site operations will be available to all mesh amateur operators in the region on a bookings basis. The resource will be booked for contest station use during a limited number of international contests. There are plans to add additional remote RX sites, which are becoming essential in light of the rise in home QTH QRN/QRM levels.

## Support

The Mesh Coordination Group will work with Branch 63 to ensure that:

- Mesh operations function well and provide a valuable service;
- Branch 63 members have access to mesh expertise and updates
- Members have low cost access to mesh products (e.g. SIP telephones, WiFi access points and end of line Ubiquiti nodes)
- Branch 63 members have access to remote station operating via the mesh under a bookings system. Donations will be requested to maintain the remote station and mesh transport system.

## Contact Details

The Mesh Coordinating Group currently comprises the following representatives of local branches:

Name	Callsign	Br	Email
Ted Linney	ZL2TB	18	<a href="mailto:tlinney@paradise.net.nz">tlinney@paradise.net.nz</a>
John Andrews	ZL2HD	74	<a href="mailto:jandrews@clear.net.nz">jandrews@clear.net.nz</a>
Mike Woods	ZL1AXG	50	<a href="mailto:mhwoods@gmail.com">mhwoods@gmail.com</a>
Richard Harkett	ZL2FY	69	<a href="mailto:zl2fy@paradise.net.nz">zl2fy@paradise.net.nz</a>
TBC		42	
Simon Eatough	ZL2BRG	63	<a href="mailto:Simon.eatough@gmail.com">Simon.eatough@gmail.com</a>

The Mesh Coordinating Group would welcome opportunities to provide presentations about the mesh and mesh applications at Branch meetings, workshops or conferences.

Ted Linney ZL2TB  
ZL2HDBranch 18 NZART  
Convenor

John Andrews  
Branch 74 NZART Representative

Mike Woods ZL1AXG  
Branch 50 NZART Representative

Richard Harkett ZL2FY  
Branch 69 Representative

Branch 42 Representative

Simon Eatough ZL2BRG  
Branch 63 Representative