

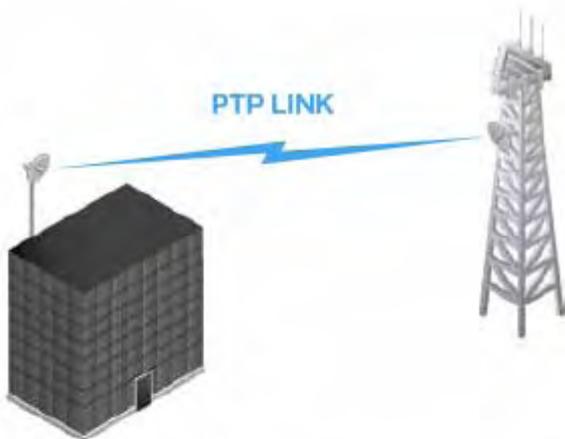
Mt. Climie Wi-Fi Link: D-Star Gateway Link

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In 2011, Upper Hutt Branch 63 NZART members decided to accept the offer of a UHF D-Star Repeater and controller for placement on the Mt Climie repeater site above Upper Hutt, Wellington, New Zealand. This equipment originally gifted to the Wairarapa Branch 46 had been under utilised and it was thought that passing the equipment to Upper Hutt would prove a better idea. The equipment along with two ICOM IC-2820H D-Star transceivers was originally donated by ICOM New Zealand.

After installation of the D-Star UHF Repeater (438.600 MHz) on site on 21 June 2011, and following excellent reports from mobile stations using the new DV mode, the club decided to invest in a D-Star VHF Repeater (145.425 MHz) as well. This was purchased from ICOM New Zealand and we thank them for the discounted price. The VHF repeater was installed on 6 August 2011. After various interference issues with this repeater were resolved the issue of how to get the Internet from the valley floor to Mt Climie began in earnest.

In previous readings, the inventor of IRLP Dave Cameron VE7LTD had some two years earlier discussed this very issue, as the best place to interface IRLP is at the repeater site, rather than by a link radio. In his email out to the various node owners he had pointed out that Wi-Fi linking could be achieved through the use of point-to-point linking using inexpensive equipment. He explained that it was easily achievable to get 10-15 km distance, and gave links to the Ubiquiti M5 Bullet series of Wi-Fi equipment.



Using two NanoBridge M to create a powerful, long range, PTP (point to point) link.

Figure 1: Mt Climie point-to-point link.

I recalled this message and after re-reading it then proceeded to seek out such equipment here in New Zealand that would suit our task.

After many hours of searching Google and various YouTube video's I had settled on what was required. I then had predication charts completed of various paths from the valley floor to the Mt Climie site – this path predication is all done via software and saves having to

place equipment at a site, only to find it wasn't viable. We wanted the club to have control of the link from the clubrooms but the clubrooms are not line of sight to Mt Climie and it would require two hops to get there. This proved to be unacceptable as we were concerned over the possible latency from the two hops. After checking three possible sites, one club members QTH appeared to be the best, as it was 6.1 km's line of sight and had unobstructed views of the Mt Climie repeater site. This site selection was proven by the path prediction charts/graphs.

Further research located within New Zealand, a company called Go Wireless New Zealand (<http://www.gowifi.co.nz>), suppliers of long range wireless network equipment and accessories. After searching their site and speaking to Dale Roberts (Go Wi-Fi contact man) about our particular needs the club purchased the following equipment based upon his suggestions:

Uplink Site (club members QTH) - Ubiquiti NanoBridge M5 802.11n/a 200mW 25dBi Outdoor AP/Bridge Model: NB-5G25

Mt Climie site - Ubiquiti NanoStation M5 802.11n/a 500mW Outdoor AP/Bridge (16dBi dual-polarity gain at 5GHz) Model: NSM5

Plus 100 metres of Tough Outdoor Cat 5e Networking Cable and ten RJ-45 Connectors.

Total cost was under NZD\$550.00



Figure 2: Mt Climie panel antenna.



Figure 3: Uplink antenna.

The Uplink site antenna is a parabolic antenna with a high degree of gain and is directional towards the repeater site.

The Mt Climie site utilises a panel antenna that has a wide arc so if required we can re-locate the Uplink site without having to visit the repeater site, but still retain the internet link.

Both antennas use POE (Power over Ethernet) to inject power to the antennas, thereby no cable lost for long runs to your hut from the antenna location. (The antenna contains the Wi-Fi transceiver)

The equipment is a 'turnkey' investment as all hardware and software was supplied to our order, and no additional equipment was required to be purchased.

We are using the 5 GHz band and GURL (General User Radio Licence) licence free band, this is a saving of about \$200 in the first year and about \$100 each year thereafter if we had used amateur band based equipment – these costs are the yearly licensing fee charged by the MED RSM division. So within five years we have recovered the cost of the equipment in savings from not having to pay the licence fees.



Figure 4: Mt Climie panel antenna.

All equipment was delivered to Gordon ZL2ARN for testing, as Gordon had built the D-Star Gateway PC's. After soak testing the equipment was deemed fit for purpose and was delivered to the repeater trustee Simon ZL2BRG ready for installation.

Simon installed the Uplink antenna and Gateway PC, and then we had to wait for the weather to give us a break so we could get on site to install the repeater end. Simon and I installed the Mt Climie link on Sunday 27 November 2011. We were able to test connectivity from Mt Clime to the Uplink site, and vice versa from the supplied software (that came with the antennas).

On average we were seeing 58 Mbps link connection, peaking to 72 Mbps on the link path at times. This software showed the path length as 6.3 km's, which was close to our predications. Simon installed the panel antenna inside a PVC downpipe with a top on it to protect as much as possible from the extreme weather experienced at this site. The actual antenna is located next to the south hut on a nearby antenna pole recently surplus to requirements after a co-tenant moved out leaving this antenna behind. It has a good view of

the upper valley and is close to the trig station. The actual run of Cat 5e cable is approximately 20 metres. The Cat 5e cable runs directly from the antenna to the ICOM D-Star repeater controller with the Gateway PC located at the Uplink Site, not at the repeater site. Apparently not many have been able to achieve the Gateway PC at the uplink site due to latency issues between the PC and the ICOM Controller so have had to have the Gateway next to the controller on site. We appear to be OK at this point, and from early reports the link is working well.

Once the link was in place various false starts were had with the Gateway software. These were finally resolved by Gordon and Simon, and the gateway is now working in for both inbound and outbound contacts (in other words audio in both directions).

Record of the first contact via the Gateway, from John ZL2TWS – “I am pleased to be the first to work the gateway to ZL1ZLD 23cm repeater in Auckland. I connected this morning (29 December 2011) and worked Rick ZL1WOT and Laurie ZL1ICU.”

Thanks must go to Gordon ZL2ARN for the many hours setting up and navigating through the Gateway software installation process, as well as Simon ZL2BRG who has taken on the role of Gateway Administrator. I am sure that the many club members as well as others from around the country and the world will appreciate all the hard work put in.

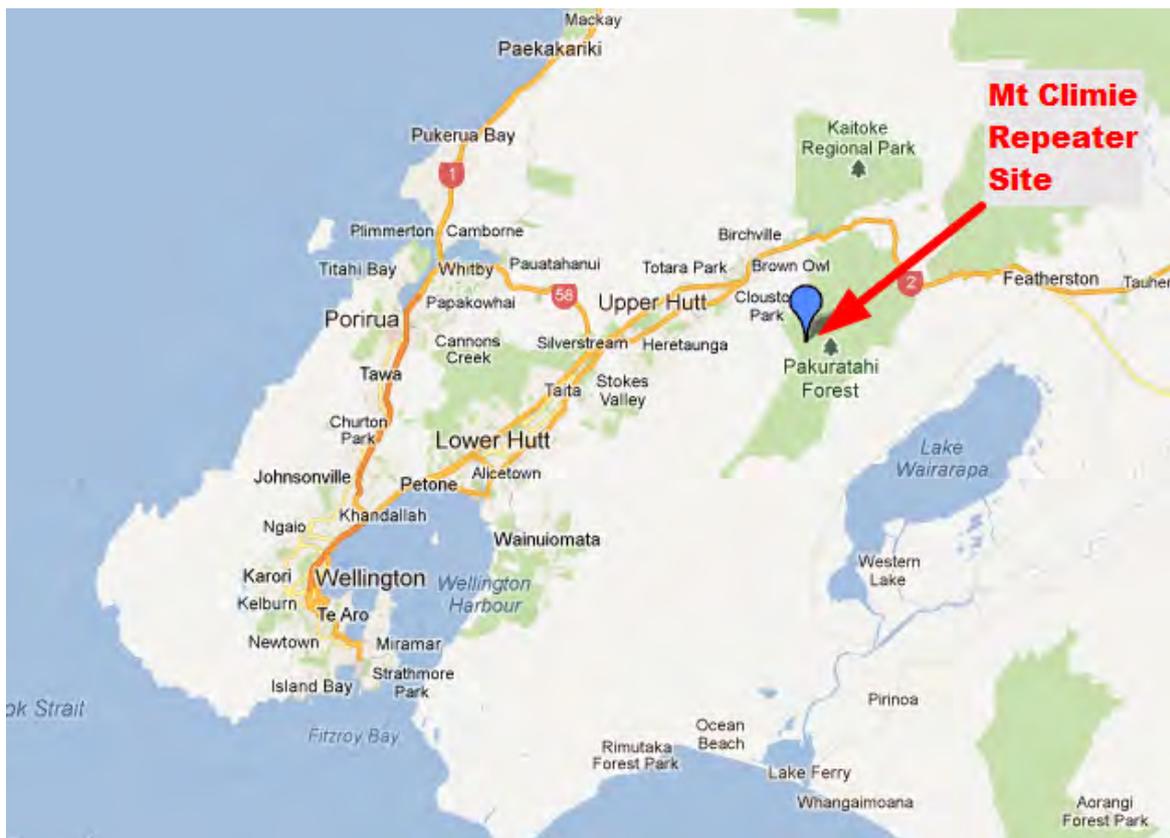


Figure 5: Mt Climie location.

The capital city of New Zealand is not only D-Star enabled, but now D-Star Gateway enabled as well! A fine result for a project first started in April 2011.