The World Below 400 GHz

The Periodical Newsletter of the
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WAIKATO VHF GROUP EXECUTIVE

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General Meeting September 2011

A General Meeting of the Waikato VHF Group will be held on
Sunday, 4th September, 2011 at 1:30pm.

The venue will be the Tauranga Volunteer Coastguard Headquarters,
72 Keith Allen Drive, Sulphur Point, Tauranga.
See website - www.zl1is.info/meetings.html - for location map.

The guest speaker will be Maurice French, ZL2MF/G3ZXD,
who will be talking about (commercial) satellite communications
past present and future and demo satellite broadband services.
Maurice is currently Business Development Manager,
Tuaropaki Communications Limited

Non members and visitors welcome.

News Items from August 2011 Committee meeting

Site Reconstruction: Approval has been given to site equipment at Maungakawa. Te Weraiti and Te Uku have been linked and are working satisfactorily

Linked Network: A possible name of "WaiBop Network" is being proposed for the eventual 4 repeater linked system. We welcome your feed-back?

Raglan/Te Uku Site: The site at Te Uku is to be known as Te Uku and not Raglan

Funding: An application is to be made for funding for equipment for the Maungakawa site

Review of Inc. Societies: A note about this will be in the Newsletter - see below

Meetings Ideas: The committee is still looking for meeting topics and possible guest speakers - any ideas to committee

Linked 2 Metre Network

At the recent committee meeting discussion was held on what the new 2m network, along with future extensions, should be called. The name being proposed by the committee is "WaiBop Network". We are keen to have further input, so if you have any ideas, please let us know, by contacting any committee member or email - branch.81@nzart.org.nz

Legislative review of the Incorporated Societies Act 1908

The Law Commission is seeking feedback on a range of issues and options for reform raised in the recently-released paper: "Reforming the Incorporated Societies Act 1908".

There are over 23,000 incorporated societies registered in New Zealand, and tens of thousands of New Zealanders are involved in an incorporated society one way or another.

The Law Commission argues that some of the requirements of the century-old Incorporated Societies Act 1908 are in need of major reform.

The paper can be read on the Law Commission's website. **Submissions can be made online and close on 30 September 2011**.

Go to the Law Commission website now at www.lawcom.govt.nz

WAIKATO/BOP (WaiBOP) 2m REPEATER NETWORK

On 22 June 2011, the Raglan '5675 repeater at Te Uku and '695 now located at Te Weraiti were linked, completing stage 1 of our Te Aroha coverage replacement project. IRLP (node 6549) access is now available via both repeaters.

These 2m repeaters, plus their associated links, employ latest model Icom commercial radio equipment. Both repeaters share antennas with commercial services at those sites, benefiting the VHF Group by alleviating some antenna system maintenance costs. Our links have dedicated Yagi antennas (owned by the VHF Group).

Following '695's transfer off Te Aroha on 24 May, some users, particularly around Tauranga, are enjoying better access into '695 (the radio path from that area is obstructed by high ground south-east of Mt Te Aroha). Areas north of Te Aroha are getting less intense coverage for the time being, a situation which will improve once the planned installation (by December this year) of a third repeater in this network, '5575 at Maungakawa, which will also be linked to the two already established. Maungakawa (the highest point on the ridge west of Patetonga) will extensively cover the Hauraki plains, plus extend coverage well up the Coromandel peninsular's west coast, further north of Thames than Te Aroha reached. It will also improve existing coverage from Huntly north through to the Bombays.

Longer term plans (subject to funding) exist for a fourth repeater in this network to cover Waihi through to north of Whangamata. While there is no doubt Mt Te Aroha offered the best available single-site coverage of the Waikato and western Bay of Plenty, this new 'WaiBOP' 2m repeater network will end up providing substantially better overall coverage.

After enjoying repeater coverage off Mt Te Aroha for 37 years, that site became untenable for the Waikato VHF Group to remain there. '695 had operated on a temporary antenna kindly loaned by Kordia for 18 months following failure of our original 4-dipole array. The likely cost of replacing that antenna ran to many thousands of dollars, plus required a partial shut down of some broadcast transmitters while riggers carried out that task. A very intense field around our 2m antenna from multiple high-powered FM transmitters operating on adjacent antenna arrays delivered 2.3 volts of RF at our 2m feeder termination! When the prospect of site rentals arose (commencing at just under $5000 pa), your committee made a strategic decision in December 2009 to vacate Te Aroha, and establish the network now being put in place. Earlier this year, NZART reached an agreement extending access to Kordia sites hosting existing amateur installations for a further five years, but that is only a temporary reprieve. Improvements in overall repeater coverage beginning to be realised from this expanded network would not have been possible had we remained at Te Aroha, yet that would have ended up costing us significantly more money over the longer term.

NOTE: Some mobiles around Hamilton have been observed operating on '695, possibly not realising they'd have better access into '5675 at Te Uku which is linked to '695. If you haven't checked yet, how about comparing the signal on 145.675 MHz (minus 600kHz split) to possibly gain better access?

NATIONAL SYSTEM EXTENDED INTO EASTERN COROMANDEL

A new extension to the National System is now operating from a site overlooking Opito Bay on the eastern Coromandel peninsular.

This project gathered momentum in April 2011, spurring re-formation of Mercury Bay Branch 85, who provided trustees and organised site access for this new installation. Waikato VHF Group members assisted with initial planning and prepared the Form 10's to FMTAG. Equipment secured from various sources was configured and set up by Colin ZL1ACM, before its 2 August installation on site. Also contributing to this project have been ZL1AAF and ZL1BCJ (repeater trustees), ZL1DOM, ZL1TAT, ZL1TDV, ZL1UET, and ZL2TAR (FMTAG). Thanks also go to Gary & Judy Inglis of "Smittys Bar and Grill" Whitianga for funding assistance through "Pub Charity", and Whitianga Volunteer Coastguard for use of their site. We expect to publish some pictures of this installation on our web site shortly.

Mercury Bay '480 transmits on 434.800 MHz, and to access it, you need to transmit to the repeater on 439.800 MHz. With no viable radio path from this eastern Coromandel site to an existing National System ULS (Kaimai, or Brynderwyn), it operates as an extension off Edgecumbe '9975 174km away, hence the inverted frequencies.

Hamilton Amateur Radio Market Day

Hamilton Amateur Radio Market Day has come and gone, and some well needed funds were raised on the Table. The scribe, who manned the table, saw a few Waikato VHF Group members. The sales off the table, were steady throughout the day, even to the point of packing up the table, and when packing the "junk' into the carboot, was surprised with another large sale of a large HF antenna tuning unit that had been on the table for a number of sales.

The scribe even bought an item off the table as well... I wasn't able to get round to see what other people were selling and saved my money for a quick sandwich as I left the building. Thanks to the Hamilton Amateur Radio Club for organising the Day.

Crystals

The scribe has just made a crystal order from Krystaly Hadrec Karalove. A.S in the Czech Republic. www.krystaly.cz They have been very consistent in their quality and have shown no signs of problems associated with lesser quality crystals.

If one buys standard crystals, they are often NOT Preaged and would typically have severe drift, which slows down over time (read years !). Preaging is normally done by heating them at an elevated temperature, typically from 85 to somewhere over 100C for a period of time. This typically ages the crystals past a first years use, so the aging slope is reduced. Crystal aging always occurs but the rate slows down over time. www.conwin.com/pdfs/aging_perf_crystals.pdf

The scribe personally knows of a quite a number of instances of badly aging crystals, which made them unusable for the original applications

Another factor with crystals is the Q or Quality factor. There appears to be a trend now that the crystal Q is low to the point of being a fraction of what is expected in a crystal, perhaps around 10,000. Typical Q of a good 5th Overtone crystal might be 60,000 to 100,000. At lower frequencies the Q can rise even further and the scribe has seen crystal Q close to 1 Million for a 6 MHz crystal from a German manufacturer, and a lesser quality one still showed around 300,000. It is very easy to throw the performance of a crystal away by using a bad design in the oscillator.

A simple equivalent circuit of a 100 MHz crystal might show across the pins, ~ 4 mH, 0.5 fF (0.0005pF) and 30 ohm, all in series, with 6 or 7 pF across that.

Use a good quality crystal manufacturer and specify the crystal adequately and you should be ok.

New VK Records on 78 and 122 GHz

Michael VK3KH and Alan VK3XPD have succeeded in having QSO's on the above bands in suburban Melbourne. The 122 GHz record was over 1.51 km and the 78 GHz record is over 11.88 km. I am sure that these records will be broken further by the time this newsletter arrives. They were using 300mm dishes which would be extremely sharp at these frequencies. (Probably far less than 1 degree beamwidth).

Typically Kuhne (DB6NT) equipment is used for activity on these bands, but it is understood that they haven't used this equipment, but no info is available. They mentioned that drift was a major problem at these frequencies.

The scribe was /p with Stephen ZL1TPH a few years back during a 24 GHz record attempt near Raglan, and remembers continual tuning of a Icom IC402 IF transceiver, while the LO (local oscillator) of the transverter drifted. Normal sounding speech drifted into "Donald Duck" rather quickly. The advantage of improving the stability or possibly phaselocking the oscillators, is that digital modes could be used, which can process signals below the noise. This could be used to help increase the distances worked.

Stephen ZL1TPH now uses phaselocking on his transverters on a number of bands (2.4, 3.4, 5.7, and 10 GHz). This could be a phaselocked VCO (voltage controlled oscillator), or VCXO (voltage controlled crystal oscillator). The VCXO's are far less noiser, because their "Q" is higher. Under a single signal condition one might not hear the difference, but with multiple signals then the wanted signal (using a VCO LO) could be noised up by an adjacent signal. (Reciprocal mixing from a TX or a RX source)