The World Below 400 GHz

The Periodical Newsletter of the
WAIKATO VHF GROUP Inc.,
ZL1IS,
PO BOX 606,
Waikato Mail Centre
Hamilton 3240.

NZART
BRANCH 81

www.zl1is.info

August 2021 Issue

WAIKATO VHF GROUP EXECUTIVE

President	David King	ZL1DGK	07 884 9590
Vice President	Neill Ellis	ZL1TAJ	07 576 1999
Secretary	Gavin Petrie	ZL1GWP	07 843 0326
Treasurer	Ian Brown	ZL1TAT	07 847 3709
Projects	Tom Bevan	ZL1THG	07 864 5425
Committee	Morris Beale	ZL1ANF	07 884 8416
Committee	David McMillan	ZL1TLQ	07
Editor	David King	ZL1DGK	07 884 9590

General Meeting August 2021

The Special General Meeting of the Waikato VHF Group will be held on

Sunday, 29th August 2021, 1:30pm

at the Silver Fern Farms Event Centre, (aka Te Aroha Events Centre), 44 Stanley Ave, Te Aroha

Our guest will be Vaughan Henderson (ZL1VH). He will be talking about his company VH Marine and electronics install/repair in the marine environment.

Click HERE for a location map of the venue.

* * * * * * * * * *

ZL1PK SK

On 16 July our past president Phillip King (ZL1PK) passed away after a 12-13 battle with cancer aged 79. Life member Hamilton branch (Br 12), Life member Rotorua branch (Br 33), NZART Councillor 2009-2017, OTC 60 yr certificate recipient. Licensed at the age of 17 in 1959.

* * * * * * * * * *

Repeaters/Beacons

The Waikato VHF Group owns and maintains a number of repeaters and beacons in the greater Waikato and Bay of Plenty area. These are available for sponsorship for a period of 1 year. Please see http://zl1is.info/sites.html for a list of repeaters, beacons & links that are currently available for sponsorship. If you are interested in sponsoring one of them, please contact our Secretary (ZL1GWP) or Treasurer (ZL1TAT).

* * * * * * * * * *

Branch 12 Market Day

The Market Day will be held on

Sat 21st August 2021

at the Gordonton Hall
1024 Gordonton Road (S.H. 1b)
Gordonton

There is plenty of parking and a covered entrance to take equipment in & out.

Don't miss out!

More details http://www.zl1ux.org.nz/market_day.html.

* * * * * * * * * *

Battery Developed in Australia Promises Improved Energy

If you're a portable operator always on the lookout for changing battery technology, this new development from Australia might make you stop and think.

A manufacturer in Brisbane, Australia is claiming to have created an aluminium-ion battery with a charging speed as much as 60 times faster than that of top-quality lithium-ion cells. The company, Graphene Manufacturing Group, also says the newly developed aluminium-ion coin cell is capable of holding three times the energy of other aluminium-based cells. The batteries are said to last three times longer than the lithium-ion variety.

This development relies on nanotechnology developed at the University of Queensland, according to a recent article in Forbes magazine. The battery was created by inserting aluminium atoms into perforations made in graphene planes.

The company claims that because the batteries lack an upper Ampere limit that would otherwise cause spontaneous overheating, the batteries are also safer. The stable base materials also facilitate their recycling later.

The company hopes to bring these cells to market by the end of 2021 or early 2022.
(Source – Forbes)

* * * * * * * * * *

Te Uku Repeater

An issue on the link between our Te Uku repeater hub and Maungakawa '5575 repeater was resolved during a visit to Te Uku on 6 July. Traffic across the WaiPlenty network again has uniform levels.

* * * * * * * * * *

Constitution Review

A motion to introduce a Student Membership and to reduce numbers to achieve a quorum at our meetings was adopted at our 21 March 2021 AGM. The resulting review of our constitution (last updated in 2009), identified other clauses which were appropriate to update. A draft proposed new constitution was circulated with our May 2021 newsletter, and adopted at our 30 May Special General Meeting, prior to being approved by NZART Council on 1 June.

Our proposed 2021 constitution was then submitted to the Registrar of Incorporated Societies, who responded on 28 June requesting the first three words we'd added to clause 8.7.1 be removed. After being re-submitted, our constitution including that amendment was accepted for registration. Our new constitution can now be found on the VHF Group's web site at https://www.zl1is.info/CONS21V1-R01a.pdf or the submitted marked up version is on the Companies web site for Incorporated Society 212737 (NZBN: 9429042894599) as "Change of Rules" filed 29 June 2021 https://is-register.companiesoffice.govt.nz/

* * * * * * * * * *

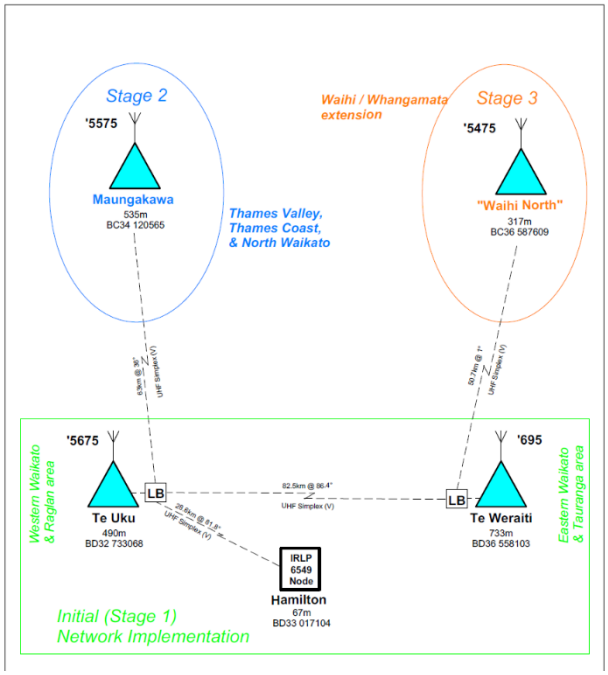
Waihi North Repeater

Waikato VHF Group's Waihi North '5475 repeater suffered antenna damage during a storm in the last week of May. A replacement antenna was imported prior to a working bee on 12 June attended by Roy ZL1BPB, Digby ZL2TUZ, Rod ZL1TFX and Ian ZL1TAT who lowered the mast to install the new antenna.

Rats found the LED panel meter display tasty!

During that site visit, extensive rat damage and soiling of the repeater equipment was discovered, especially to components within the power supply shelf. On 3rd July, the repeater radio transceiver (revealing signs of a failed transmitter PA) was sent away for repair. Repairs to the power supply shelf carried out in Hamilton included extensive cleaning (to remove rat droppings and urine), replacing the destroyed panel-mounted voltmeter (see photo) and chewed wires. One pair of chewed wires caused a short circuit which damaged the power supply /battery charger. A ventilated enclosure blocking rat access into the power supply shelf has been fabricated from perforated aluminium and will be installed when both shelves are returned to site and recommissioned prior to the end of August.

Being housed within a storage shed in a rural environment, keeping vermin out has been a challenge, as many farmers can attest. Rats follow scent trails when returning to sites frequented by them, so to disrupt those trails, peppermint oil has been laid across likely routes. An additional rat trap has also been installed.



Digby ZL2TUZ, Ian ZL1TAT and Roy ZL1BPB attach new antenna to the mast Photo credit: Rod ZL1TFX

* * * * * * *
* * *

Known Radio emissions from the ISS

FM VOICE for ITU Region 1: *Europe-Middle East-Africa-North Asia*
· Downlink 145.800
· Uplink 145.200

FM VOICE for ITU Region 2&3: *North and South America-Caribbean-Greenland-Australia-South Asia*
· Downlink 145.800
· Uplink 144.490

FM V/u with PL VOICE Repeater, *Worldwide*
· Downlink 437.800MHz FM; Doppler +-10KHz
· Uplink 145.990MHz FM with 67.0 Hz PL

FM SSTV downlink, *Worldwide* - Downlink 145.800, generally Pd 120 mode

UHF Simplex (rarely used) - Downlink 437.550 - Uplink 437.550

Other Frequencies (Not Amateur – Listen only)
121.125 FM RS EVA from Orlan suit [Credit N5VHO]
121.75 FM Downlink from Soyuz-TM (voice). RS EVA from Orlan suit. Soyuz VHF-2. Progress Telemetry. [Credit N5VHO]
130.167 AM VHF-2 Downlink from Zarya (Service Module). RS EVA to Orlan suits [Credit N5VHO]
143.625 FM VHF-1 downlink. Main Russian communications channel. Often active over Moskow. You can hear air to ground conversations in Russian. Sometimes English when US crews talk to their NASA representative in Star City. [Credit IZ6BYY]
166.000 AM Soyuz-TM and Progress M-1 telemetry
632.000 634.000 AM Zarya telemetry
628.000 630.000 AM Zvezda telemetry
922.76 CW Soyuz-TM and Progress M1 beacon
2265.0 Digital Telemetry Downlink
15003.4 Digital Data downlink

US On-Orbit Segment (USOS)
Space-to-Space Communications System (UHF 1.4 MHz bandwidth)
414.200 Extravehicular Mobility Unit-to Extravehicular Mobility Unit (EMU-EMU), EMU-to-Space Shuttle Orbiter (SSO), EMU-to-International Space Station (ISS), SSO-to-EMU, SSO-to-ISS, ISS-to-EMU, ISS-to-SSO.

SPACE X DRAGON FREQUENCIES
2216 MHz
2205.5 MHz
2231.5 MHz
400.5 MHz
Sorry No Boeing ones listed yet ☹

OR JUST WATCH LIVE ON NASA TV

****

Battery Charging

In this session I plan to have a look at charging, and how to determine how a big a battery you really need.

In simple terms there are two types of battery charger. Constant Current (CC) or Constant Voltage (CV).

One of the most common chargers in a Ham shack is the Ni-Cad charger, which uses a constant current at a rate of approximately 1/10thC or 1 tenth of the capacity of the battery. So, a 600mAh battery would have a charge current of 60mA. This type was known as a trickle charger, and would fully charge a battery in 14-16 Hours, for this reason they were also called overnight chargers. These are not suitable for NiMh (Nickel Metal Hydride) batteries as these batteries do not cope well with being overcharged. But irrespective of type, remove any battery once it is warm (this is a sign of overcharging)

Rapid chargers are the most common type for most consumer equipment and by increasing the current, they reduce the charge time to about 3 -6 hours. Unless there is a good temperature sensing in effect, there is high risk of overcharging, but with a temp sensor to shut off the charger, the battery can be disconnected once charged. The temperature sensor will also detect a faulty battery.

Fast chargers offer very fast charge times, with a current close to the battery capacity (1,000mAh – 1 amp) these will charge a battery in approx 1 hour. This demands tighter communication between the charger and battery. As the battery approaches full charge, some nickel-based chargers reduce the current to adjust to the lower charge acceptance. The fully charged battery switches the charger to trickle charge, also known as maintenance charge. Most of today's nickel-based chargers have a reduced trickle charge to also accommodate NiMH.

It should now be apparent that simply applying a voltage to a battery and letting it draw whatever current it wants is not ideal, and so lithium and Lead acid should employ a modified version called CCCV. Basically, a power supply with a fixed voltage, and current limiting, the CCCV system starts in a constant current mode, but as the battery approaches charge, the voltage is fixed and the current falls. Once the battery terminals reach full charge voltage, all charge stops. .. In theory. Practice is slightly different.

Li-ion has minimal losses during charge. At a current of 1C, the battery charges to 70 percent state-of-charge (SoC) in less than an hour; the extra time is devoted to the saturation charge. Li-ion does not require the saturation charge as lead acid does; in fact, it is better not to fully charge Li-ion — the batteries will last longer but the runtime will be a little less. Of all chargers, Li-ion is the simplest. No trickery applies that promises to improve battery performance as is often claimed by makers of chargers for lead- and nickelbased batteries. Only the rudimentary CCCV method works. The reason is that within the battery, each cell must be managed by an internal battery management system, without this the cells would not charge evenly.
So external chargers can be simple.

Lead acid batteries cannot be fast charged, and the term "fast-charge" is a misnomer. Most lead acid chargers charge the battery in 14–16 hours; anything slower is a compromise. Lead acid can be charged to 70 percent in about 8 hours; the all-important saturation charge takes up the remaining time. A partial charge is fine provided the lead

acid battery occasionally receives a fully saturated charge to prevent sulphation (a chemical process where the lead and sulphuric acid create a Lead Sulphate by product) which can cause an internal shorting of the plates if not returned to its original chemical state. High speed charging will shorten the life of your battery. Patience is a virtue.

With the CCCV method, lead acid batteries are charged in three stages, which are [1] constant-current charge, [2] topping charge and [3] float charge. The constant-current charge applies the bulk of the charge and takes up roughly half of the required charge time; the topping charge continues at a lower charge current and provides saturation, and the float charge compensates for the loss caused by self-discharge.

During the constant-current charge, the battery charges to about 70 percent in 5–8 hours; the remaining 30 percent is filled with the slower topping charge that lasts another 7–10 hours. The topping charge is essential for the well-being of the battery and can be compared to a little rest after a good meal. If continually deprived, the battery will eventually lose the ability to accept a full charge and the performance will decrease due to sulfation. The float charge in the third stage maintains the battery at full charge.

Mount Karioi from Te Uku '5675 repeater site after the installation of the wind turbines - March 2011