

# Ham Hum

May 2013



The official newsletter of  
The Hamilton Amateur Radio Club (Inc.)  
Branch 12 of NZART - ZL1UX  
Active in Hamilton since 1923



**Next Meeting :**

**Wed 15th May 7:30pm**

**Remits and ZL1UJG on handheld txvrs**

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**NZART Examiners:** ZL1IC, ZL1PK & ZL1TJA

## From the Editor

Apologies for the lateness of this issue of Ham Hum. As a newly married man, again, I haven't had much spare time for Amateur Radio activities.

The Annual Hamilton Market Day is on the horizon again. Mark August 17th in your calendar and plan to be at the Waikato Table Tennis clubrooms for this excellent annual event. See [http://z1lux.org.nz/market\\_day.html](http://z1lux.org.nz/market_day.html)

Next meeting on 15th May is Remit night with just the one remit that needs voting on. After that Kevin ZL1UJG will be giving a talk on handheld transceivers.

**Next Committee Meetings -  
1<sup>st</sup> May & 5<sup>th</sup> June**

## The K7RA Solar Update

05/03/2013

Solar activity made a healthy jump over the past week, with the average daily sunspot numbers up more than 30 points to 120.9, while the average daily solar flux increased more than 27 points to 136.5. The most active day for geomagnetic indices was May 1, when the planetary A index reached 21 and the high-latitude College A index (measured near Fairbanks, Alaska) was a whopping 57. That number has been higher, but only twice in the past six months, when it was 64 on March 1 and 79 on March 17.

Sunspot numbers for April 25-May 1 were 93, 104, 100, 97, 136, 165 and 151, with a mean of 120.9. The 10.7 centimeter flux was 119.2, 121.9, 127, 131.7, 142.4, 154.4 and 159.2, with a mean of 136.5. The estimated planetary A indices were 8, 17, 6, 5, 5, 7 and 21, with a mean of 9.9. The estimated mid-latitude A indices were 14, 18, 6, 4, 5, 6 and 16, with a mean of 9.9.

The latest forecast has the solar flux at 155 on May 3-4, 150 on May 5-6, 145 on May 7-9, then 140, 125 and 120 on May 10-12, 125 on May 13-15, 120 on May 16-17, then 125, 120, and 130 on May 18-20, 135 on May 21-22 and back down to 130 for May 23-24. The predicted planetary A index is 8 on May 3-4, 12 on May 5, 8 on May 6, 5 on May 7-20, then 15, 10 and 15 on May 21-23, and then back down to 5 through June 16.

On May 1, NASA released a new solar cycle prediction, but it wasn't really new. These predictions arrive at the start of every month, and they have remained the same since March 1 when NASA's prediction for the smoothed International Sunspot Number at the cycle peak shifted from 69 to 66 for fall 2013.

It's time to review our three-month moving average of sunspot numbers, which has increased. The average daily sunspot number for February, March and April was 85.2. The average daily sunspot numbers for the three-month periods centered on September 2012-March 2013 were 81.2 (August-October 2012), 82.3 (September-November 2012), 74.4 (October-December 2012), 82.8 (November 2012-January 2013), 73.6 (December 2012-February 2013), 80.7 (January-March 2013) and 85.2 (February-April 2013). The average sunspot number for the month of April was 112.8, for March it was 81.1, and it was 60.1 in February.

Eric Ferguson, VE3CR, of Burlington, Ontario, wondered why there are no solar flares at the Sun's poles. I passed this question on to Robert Steenburgh, KA8JBY, who is a Senior Space Weather Forecaster at the NOAA Space Weather Prediction Center. "Flares are thought to originate from the deformation of magnetic field lines which break and reconnect," he said. "There is a latitudinal band in which this

magnetic flux emergence (and hence sunspot formation) and deformation occurs. Sunspots typically form at mid-latitudes (equatorward of around 40 degrees) at the beginning of the solar cycle, and the breeding grounds drift toward the equator over the course of the cycle. This behavior is attributed to the solar dynamo. There were four flares identified poleward of 50 degrees latitude, out of a total of 20,186. The poles are usually dominated by coronal holes and 'open' magnetic field lines that extend out into the heliosphere. So the mechanisms for flare formation are generally absent."

Mike Snyder, KN8J, who lives a few miles south of Harrisville, West Virginia in grid square EM99lf, wrote on May 3: "My wife and I are early risers, usually up about 3 AM. Generally speaking, 3-5 AM produces some fair DX for me. Lately, it's been getting a bit better on the 20 and 30 meter bands. The South Pacific is usually open at these hours. I've managed a couple QRP contacts with Hawaii. I've noticed parts of Europe open as well. I had a solid contact with OK1HB from the Czech Republic on 14.062MHz. I was running 100 W barefoot for this one. This morning, I finally worked a new one: A35JP in Tonga on 14.003MHz."  
*All times listed are UTC, unless otherwise noted.*

*Amateur solar observer Tad Cook, K7RA, of Seattle, Washington, provides this weekly report on solar conditions and propagation. This report also is available via W1AW every Friday, and an abbreviated version appears each Thursday in [The ARRL Letter](#). You can find a guide to articles and programs concerning propagation [here](#). Check [here](#) and [here](#) for a detailed explanation of the numbers used in this bulletin. An archive of past propagation bulletins can be found [here](#). You can find monthly propagation charts between four USA regions and 12 overseas locations [here](#). Readers may contact the author via [e-mail](#).*

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## KiwiSAT summary to date:

Please refer to the KiwiSAT site at <http://www.kiwisat.org.nz/index.html>

For the past year, there has been some very good progress made, but also some steps backwards.

The socketed #3 IHU was replaced with the flight #1 IHU, but it failed after 3 months operation. #3 was placed back into the satellite until December 2012 when #2 IHU was swapped into the satellite. Unfortunately, it lasted only one month and was replaced with #3 again. This left us with the two flight IHU's inoperative.

Near the end of February 2013, a company "Detect-A-Leak" was hired to take thermographs of both of the boards to try and track where the faults were.

The photo right shows the result on IHU #2. The FPGA is the bright square yellow spot, with the CPU chip above in the + and the memory chips to the right with 2 sample temperatures.

As the FPGA chip seemed to be the obvious problem, it was replaced and the #2 IHU returned to normal operation. It was swapped into the satellite and is still working well.



The #1 IHU showed some abnormal heating of one of the 6 memory chips on the right side of the photo below. With the Infra red thermography, temperatures are relative and although the two large chips look

hot they are relatively cool. But, one of the memory chips showed some warming which is not expected so after purchasing a couple of spares, the IC was replaced. During the replacement it was noticed that the memory chip in the bottom right corner wasn't particularly well soldered and this was rectified too.



When powered up, we were delighted to find that this IHU is now working correctly. It remains powered on a test rig and has not missed a beat for the past 2 months.

We thank John Pope from Detect-a-Leak for his expertise and prompt service.

### Linear 2m Transmitter:

This is a cause of concern with failures occurring in December, February and April.

The fault has been the same on each occasion but the reason for it is not yet fully understood. This is the subject of very intense investigation by Dr Phil Wakeman of TMD Consultants, and also Hans ( ZL1HB ) who is looking in detail at the possibility of an 'overvoltage' event on the 5 Volt bus in his BCR design. If found, it could also explain the IHU problem since they both use the bus. Extensive and very detailed testing has so far failed to identify a problem, however work continues as a fix is essential prior to launch.

### **Flight Software:**

Further development is on hold awaiting a re-evaluation of system criterion. The current status is that we have a basic OS which works well to control the satellite for some simple operations, but does not have the capability to load an external program or to download files. Both of these are required to operate the camera and GPS and more especially to control the ADAC experiment.

In its present form the software is not 100% compatible with the ADAC system

however several options are under consideration to give us a quick but permanent fix.



### **Portable Clean-room**

By Fred Kennedy ZL1BYP

Last year Fred ZL1BYP completed a portable "Clean-room" so that KiwiSAT can be stored and operated in full flight configuration. This is 740 mm square and 1140 mm high with a large fan and full specification air filter on top. It's designed to just fit into a Toyota Hiace van for transportation. With a number of pre flight tests and trials (vibration, shock, thermal acoustic etc) to be carried out this will provide a safe and clean environment be-

tween the various test centres.

At Easter, the satellite was transported to Western Springs for the Technology Convention. All went well, and the showing was well received by all present.

#### Ground Station Software

Terry Osborne ZL2BAC has made progress on software to decode the telemetry sent from the satellite. Refer to the web page for the latest information.

#### ITU Registration

Formal registration of KiwiSAT continues apace. The application has been lodged with the ITU and notified to Administrations internationally.

Our Administration is assiduously working on several requests for coordination from as far afield as Canada and IRAN.

#### **ADAC**

After sterling preparatory work by Dr Jon Henderson, Massey University stepped up to the plate and after the successful work by four 4th year Engineering Students plus a Masters Student in 2011 another honours degree student has been nominated by the Massey Advanced Technology and Engineering School to work on KiwiSAT during 2013. (Additional sponsorship from the NZART Radioscience Educational Trust has been made available in his support and for this we are very grateful). With Jon's guidance International Student Larry Li will be developing a "de-tumble" control system using the ADAC facilities to take immediate and autonomous control of the satellites motion should it be released from the launch vehicle with excessive yaw, pitch and roll.

Despite assurances in the launch vehicle "Users Guide" we have been advised by other users this is not unusual

The work is fully supported by Dr Johan Potgieter, their Supervisor, who is himself now working with JPL on Student Robotics projects for NASA. (A small but, who knows, growing world for New Zealand!!). It should be emphasised that the launch preps are NOT tied to this effort. The ADAC experiment can be completed and run when KiwiSAT is already in orbit. The hardware and the Operating System will be in place!!

#### **Launch**

Launch opportunities are fewer than when the project commenced and the cost has escalated significantly in the last 12 months. While we originally worked on a figure of about \$0.5M, this can now be multiplied six or eight times to find the cur-

rent situation.

While remaining confident of achieving a launch in the not too distant future, there is still considerable work to do to bring that to fruition.

#### Web Site

President Terry Carrell ZL3QL has had the job of keeping the web site up to date during the past year.

Fred has made regular updates to the web page during the past year to keep members informed of progress.

Members are requested to view the site on a regular basis for the latest information on progress with KiwiSAT

And finally.

Many thanks for the support of the NZART Branches, but also to the many Radio Amateurs both from New Zealand and Overseas who have made significant donations. Without that support KiwiSAT would still be a pipe dream. Instead is very near completion and work on launch sponsorship is about to commence.

Ian Ashley

Secretary/Treasurer

AMSAT-ZL



## **MARKET DAY:**

Waikato Table Tennis Stadium

Edgecumbe Street

Hamilton

Saturday, 17th August, 2013

Selling commences at 10am

## Successful launch of ESTCube-1 CubeSat

The EstCube-1 CubeSat, amateur radio callsign ES5E, along with with Vietnam's VNREDSat-1A and ESA's Proba-V satellite has been successfully launched.

The Vega launch took place from Kourou in the Caribbean on May 7 at 0206 UT. This mission required five upper-stage boosts and lasted about twice as long as its first launch, in February 2012.

The three solid-propellant stages performed flawlessly and, after two burns of the liquid-propellant upper stage, Proba-V was released into a circular orbit at an altitude of 820 km, over the western coast of Australia, some 55 minutes into flight.

After releasing Proba-V, the upper stage performed a third burn and the top half of the egg-shaped Vega Secondary Payload Adapter was ejected. After a fourth burn to circularize the orbit at an altitude of 704 km, VNREDSat-1A was released 1 hour 57 minutes into flight. ESTCube-1 was ejected from its dispenser three minutes later.

Built by students at the University of Tartu ESTCube-1 the main mission of the satellite is to test electric solar wind sail technology, a novel space propulsion technology that could revolutionize transportation within the solar system. It will deploy a 10 meter conductive electrodynamic tether and the force interacting with the tether will be measured.

The technology is based on the electrostatic interaction between the electric field generated by the satellite and the high-speed particles being ejected from the Sun. A spacecraft utilizing this method would first deploy a set of electrically charged wires, which allow to generate an electric field over a large area. This area effectively forms a "sail" that can be pushed by the charged particles by being diverted by it and therefore transferring momentum to the craft.

The team also aim to capture images of Estonia for outreach purposes.

The IARU Amateur Satellite Frequency Coordination Panel have published these frequencies for ESTCube-1

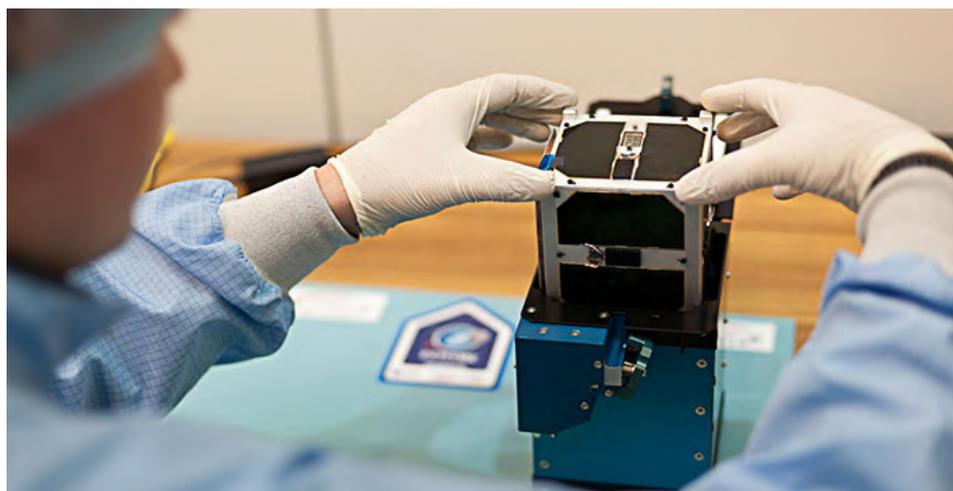
437.250 MHz – CW beacon, callsign ES5E/S

437.505 MHz – 9600 bps AX.25 telemetry, callsign ES5E-11

Electric solar wind sail <http://www.electric-sailing.fi/>

EstCube <http://www.estcube.eu/en/home>

Further information including TLE's at  
<http://amsat-uk.org/2013/05/06/estcube-1-estonias-first-cubesat-2/>



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**There is only one  
NEW ZEALAND ASSOCIATION  
of  
RADIO TRANSMITTERS.**

It serves you at  
local, national and international  
levels.

*It deserves our full support  
if we are to continue to have  
the frequencies and operating privileges  
we currently enjoy.*

**The Association  
is what you and I make it.**

## Upcoming Happenings & Events

<i>Date</i>	<i>Happenings &amp; Events</i>
<b>3rd May</b>	<b>NZART HQ Infoline</b>
<b>3rd May</b>	<b>NZART Sangster Shield</b>
<b>4th May</b>	<b>Wanganui Junk Sale</b>
6th May	HF Net, 3.575 MHz, 19:30
7th May	VHF Net, 146.525 MHz, 20:00
11th May	Reg Junk Sale
13th May	HF Net, 3.575 MHz, 19:30
14th May	VHF Net, 146.525 MHz, 20:00
<b>15th May</b>	<b>Club General Meeting</b>
<b>17th May</b>	<b>NZART HQ Infoline</b>
20th May	HF Net, 3.575 MHz, 19:30
21st May	VHF Net, 146.525 MHz, 20:00
<b>26th May</b>	<b>NZART Official Broadcast</b>
27th May	HF Net, 3.575 MHz, 19:30
28th May	VHF Net, 146.525 MHz, 20:00

**1-3 June—NZART Conference—Masterton**  
**2nd June—NZART Conference Official Broadcast**  
**7th June—NZART HQ Infoline**  
**8-9 June—NZART Hibernation Contest**  
**21st June—NZART HQ Infoline**  
**30th June—NZART Official Broadcast**  
**5th July—NZART HQ Infoline**  
**6-7 July—NZART Memorial Contest**  
**19th July—NZART HQ Infoline**  
**27th July—Waitakere Sprints SSB**  
**28 July—NZART Official Broadcast**  
**3rd August—Waitakere Sprints CW**  
**3-4 August—NZART Brass Monkey Contest**  
**17th August—Hamilton Market Day**  
**2nd September—NZART Doug Gorman Memorial Frequency Measurement Contest**  
**5-6 October—NZART Microwave Contest**  
**7th September—SPAM Nostalgia Night**  
**1st October—NZART/WIA Oceania Contest SSB**  
**2nd October—NZART/WIA Oceania Contest CW**  
**3rd November 2013—ZL1AIH Straight Key Night**  
**1st December 2013—KDMG Tw in Sprint PSK & RTTY 80m**  
**7-8 December 2013—NZART Field Day Contest**

For more information on any of the above please contact myself or any committee member.

## AREC Event Operators Page

<b>WRC Rally NZ/ Possum Bourne Rally</b>	<b>June 2013</b>	<b>Organiser : ZL1DK</b>
Please contact the <a href="#">Section Leader</a> with your team information and he will pass it on to Auckland.		

<b>Rollo's Marine Bridge to Bridge Water-Ski Race</b>	<b>October 2013</b>	<b>Organiser : ZL1UPJ</b>
<b><u>Position</u></b>	<b><u>Saturday Operator</u></b>	<b><u>Sunday Operator</u></b>
<b>Base</b>		
<b>Start Boat</b>		
<b>Rescue Boat</b>		
<b>X-Band</b>		
<b>A.</b>	Ngaruawahia/Taupiri	
	Start/Finish at Point	
<b>B.</b>	Ngaruawahia Ramp	
<b>C.</b>	Ngaruawahia W/S	
<b>D.</b>	Horotiu	
<b>E.</b>	Pukete Ramp	
<b>F.</b>	Days Park	
<b>G.</b>	Fairfield Bridge	
<b>H.</b>		
<b>I.</b>		
<b>J.</b>		
<b>K.</b>		
<b>L.</b>		

<b>Kairangi Hill Climb</b>	<b>September 2013</b>		<b>Organiser : ZL1IC</b>	
<u>Position</u>	<u>Operator</u>			
1.				
2.				
3.				
4.				
5.				
<b>School C ycling</b>	<b>July 2013</b>		<b>Organiser : ZL1IC</b>	
<u>Position</u>	<u>Operator</u>	<u>Position</u>	<u>Operator</u>	
1.		5.		
2.		6.		
3.		7.		
4.		8.		
<b>Colville Connection</b>	<b>March 2014</b>		<b>Organiser : ZL1PK</b>	
<u>Position</u>	<u>Primary Operator</u>	<u>Secondary Operator</u>	<u>Other Operator</u>	
<b>Base</b>				
<b>Stony Bay</b>				
<b>Fletcher Bay</b>				
<b>Hill 1</b>				
<b>Hill 2</b>				
<b>Fantail Bay</b>				
<b>Stand B y</b>				

For Details about and to help w ith these events, contact the person indicated as the organiser for the event. See Page 1 for their contact information.

## Club Information



### Contacts :-

**Business Meeting:** 1930 First Wednesday of each month  
88 Seddon Road, Hamilton

**General Meeting:** 1930 Third Wednesday of each month (except Jan)  
88 Seddon Road, Hamilton

**Homepage:** <http://z1ux.tripod.com>  
**eMail:** [branch.12@nzart.org.nz](mailto:branch.12@nzart.org.nz)

**HF Net:** 3.575MHz LSB 1930 Mondays  
**VHF Net:** 146.525MHz simplex 2000 Tuesdays

**2m Repeater:** 145.325MHz -600kHz split  
**STSP** 146.675MHz -600kHz split  
**Repeaters:** 438.725MHz -5 MHz split  
**ATV Repeater:** 615.250 Ch39 (off air)

*Cover Photo: Thermograph of AMSAT-ZL IHU board used to identify hotspots that possibly shouldn't exist. <http://www.kiwisat.org.nz/index.html>*

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