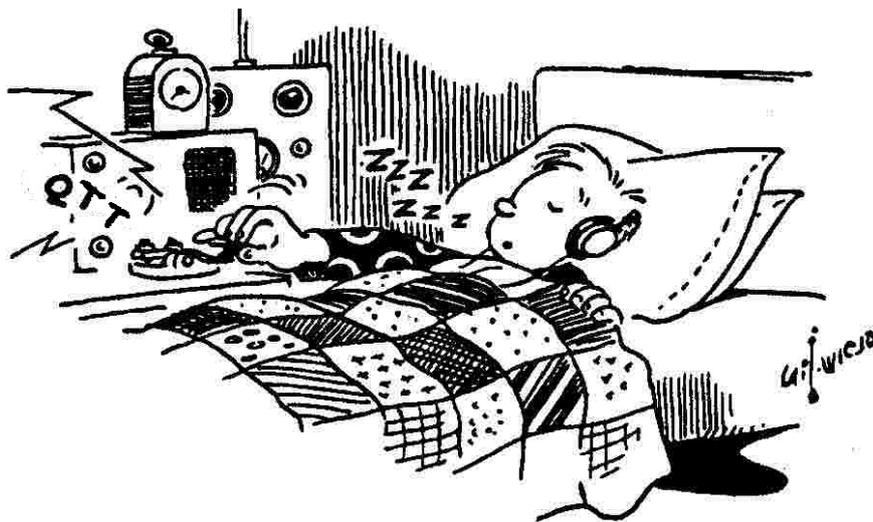


Ham Hum

August 2017



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



Next Meeting

16th August : 7:30pm

Market Day : 26th August

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From the Editor

This month we have our monthly meeting on 16th August, and that will be a time for any last minute organisation activities for the Market Day (26th August) and any prep needed for the club sales table.

A bit of history in this issue, involving an Austin A30.

Then, we move to modern very small sprite satellites.

All good reading.....

SB PROP ARL ARLP030 ARLP030 Propagation de K7RA

All of the indicators we track at the bottom of this bulletin fell last week.

Because there were no sunspots in six of the seven days (July 20 to 26) last week, average daily sunspot number dropped from 26.6 to 1.7. Average daily solar flux declined from 85.9 to 69.7.

Average daily planetary A index declined from 13 to 11.9, while the mid-latitude A index went the opposite direction, from 10.9 to 12.9.

The latest predicted solar flux (as of July 27) shows 68 on July 28 and 29, 72 and 76 on July 30 and 31, 80 on August 1 to 3, 82 on August 4 to 11, 80 and 75 on August 12 and 13, 70 on August 14 to 25, 80 on August 26, 82 on August 27 through September 1, 80 on September 2 to 4, 82 on September 5 to 7, and 80, 75 and 70 on September 8 to 10.

Predicted planetary A index is 7, 5, 6, 12, 10 and 8 on July 29 through August 2, 5 on August 3 to 5, 25 and 10 on August 6 and 7, 5 on August 8 to 15, 15 on August 17 and 18, then 12 and 8 on August 19 and 20, 5 on August 21 to 31, then 25, 10 and 8 on September 1 to 3, and 5 on September 4 to 10.

F. K. Janda, OK1HH of the Czech Propagation Interest Group sent this geomagnetic activity forecast for the period July 28 to August 22, 2017.

Geomagnetic field will be:

Quiet on August 4, 9

Mostly quiet on July 30, August 2, 8, 10, 14 and 15

Quiet to unsettled July 28 and 29, August 1, 3, 16

Quiet to active on July 31, August 5, 7, 11, 13, 17 to 22

Active to disturbed on August 6, 12

Amplifications of the solar wind from coronal holes are expected on July 13 to 16 (-17), 20 and 21, (23 and 24, 28 and 29,) August 6 to 8.

Remark:

- Parenthesis means lower probability of activity enhancement and/or lower reliability of prediction due to irregular changes in position and area of coronal holes.

American Geophysical Union reports on 200 year old sunspot drawings discovered in Maine:

<http://bit.ly/2tPjuil>

Don't miss the Solar Eclipse QSO Party on Monday, August 21 from 1400-2100 UTC. This is a wide-ranging propagation experiment intended to observe what happens when the moon blocks ionizing solar radiation from the ionosphere. The event is sponsored by ARRL and HamSCI, and the details are in the August 2017 QST, or you can read the same QST article at <http://bit.ly/2tJ6EON>.

Martin McCormick, WB5AGZ of Stillwater, Oklahoma reported on July 23:

"This has been one of the less spectacular sporadic E seasons so far with several openings but very few that are the type one will remember much after they occurred.

After learning that WWV had installed a turnstile antenna on its 25 MHz transmitter, I began parking a receiver on that frequency to see if I could hear it in North-Central OK.

The first couple of weeks were nothing but then WWV began coming in around 0000 UTC starting July 20.

Whatever is ionizing the E layer to create this propagation is sticking around for a few days because once it started fading in, it has made numerous appearances

this last week. It has mostly been in the mid to late evenings Central time but on Sunday July 23, it has been in with a fair signal since around 1200 UTC and is still somewhat audible at 1700 UTC as I write.

It is good that WWV is transmitting on 25 MHZ as there are almost no steady identifiable signals in high HF and low VHF anymore to indicate when the bands are open.

There is an announcement at 17 minutes past the hour stating that the turnstile antenna's configuration will not change until after the eclipse on 21 August.

The theory that one of the possible triggers for a Sporadic E event has to do with clouds of iron and magnesium atoms from meteorites is interesting because we seem to have nothing for days at a time even though Geo magnetic activity is not unusually low or high and then we have several active days of Sporadic E and the numbers are not any different than they were when there was no E sub S at all."

Today Martin wrote:

<http://adsabs.harvard.edu/abs/2010JGRA..11512318K>

"The idea that a cloud of something such as magnesium or iron ions is one of the factors makes a lot of sense since we don't have Sporadic E every day, all Summer or all Winter even though the angle of Solar radiation is totally predictable and the Geo magnetic activity indices are always present if variable so something else which is hard to see and slow-moving must also contribute to causing sporadic E.

Those of us who have been listening to both sporadic E and normal ionospheric propagation for years notice that the fading rate of signals always speeds up when there is lots of variation in the Sun's magnetic field and slows way down when things are quiet.

The 25 MHZ WWV signal was audible here last week almost every evening and most of last Sunday but this week, there have been only a few seconds in which it pops in briefly and then everything goes dead again."

For more information concerning radio propagation, see the ARRL Technical Information Service at <http://arrl.org/propagation-of-rf-signals>. For an explanation of numbers used in this bulletin, see <http://arrl.org/the-sun-the-earth-the-ionosphere>.

An archive of past propagation bulletins is at <http://arrl.org/w1aw-bulletins-archive-propagation>. More good information and tutorials on propagation are at <http://k9la.us/>.

Monthly propagation charts between four USA regions and twelve overseas locations are at <http://arrl.org/propagation>.

Instructions for starting or ending email distribution of ARRL bulletins are at <http://arrl.org/bulletins>.

Sunspot numbers for July 20 through 26, 2017 were 0, 0, 0, 0, 0, 12, and 0, with a mean of 1.7. 10.7 cm flux was 70.2, 69.4, 69.5, 70.6, 70.1, 69.8, and 68.6, with a mean of 69.7. Estimated planetary A indices were 7, 14, 16, 14, 12, 9, and 11, with a mean of 11.9. Estimated mid-latitude A indices were 6, 13, 18, 16, 13, 9, and 15, with a mean of 12.9.



Why the Navy Sees Morse Code as the Future of Communication

For centuries, mariners around the globe have used lamps and shutters to beam messages via Morse code from ship to ship. But today, Morse code isn't being learned by every sailor, even though lamp light communication is still being used.

So, how we reconcile these two facts? Well, if you're the U.S. Navy you update your lamp light communication systems to encode the modern form of Morse code: texting.

In a test recent carried out aboard the USS Stout, the U.S. Navy used a new mechanism it calls the Flashing Light to Text Converter (FLTC) system. During the test, sailors aboard the Stout fired off text messages and the FLTC converted them to their Morse code lamp light signals which were interpreted by the USS Mon-

tery, moored at a dock in Norfolk, Virginia.

"The best part of this flashing light converter is how easy it is for sailors to use," said Scott Lowery, a [Naval Surface Warfare Center](#) engineer. "It's very intuitive because it mirrors the messaging systems used on iPhones. You just type your message and send it with the push of a button."

In fact, the system seems so intuitive to use that the sailors decided to play one the most literalist jokes in the book when asked to send Lowery a message. "I asked them to text me something random, so they signaled the word 'random,'" said Lowery. Taking the rather lame attempt at humor in stride, Lowery added. "Simple, but it shows the system is working."

Though the FLTC is still in its prototype phase, the [Office of Naval Research](#) seems to be developing a foolproof system for delivering messages even if radio communications are down. Essentially, the FLTC uses nothing more than a lamps that are either LED-based (they can flicker on and off digitally) or have shutters that are controlled by fast acting stepper motors which open and close mechanically, and a GoPro camera for receiving incoming messages.

The neat bit of technology that ties these elements together is an algorithm that can interpret text message sent from a computer, of handheld device, convert them to Morse code, clap out the message via light, and vice versa.

With this successful test, the U.S. Navy asserts that it's developed a system that it can quickly deploy to its fleet. With a few more tests under its belt, the U.S. aquatic fleet could have FLTC system out to its ships sometime in 2018.

For more naval news, learn about [Manufacturing China's Navy](#).



Austin A30 put me on the road to freedom and airwaves

An Austin A30 not only put radio enthusiast Allan Papworth on the road to freedom but on the air as well.

I was 19 and working at Pye in Cambridge when I achieved freedom – my first car, the Austin A30, registration PCE 190.

I was a student apprentice, working in Cambridge and studying at Cambridge Tech – now Anglia Ruskin University. Before getting the car I relied on the Pye bus to pick me up from home every day. Now I was my own boss, I could come and go whenever I wanted!

For the princely sum of £50 I purchased a 1956 A30 from the local garage – quite a lot of money considering I was paid £6 per week.



It was a very basic car by today's standards... 803cc engine, semaphore-type indicators, no seat belts and no radio.

I soon solved the problem of a radio. Being a radio amateur, I fitted it out with two sets of equipment – they drained so much power that I burned out the dynamo. I had a VHF antenna on the front and an HF antenna on the back.

Within two weeks of getting my licence, and the car, I drove all the way to South Wales to operate radio equipment from remote locations. Trips to London, to the radio shops, were now possible. Even today, when driving down the A1 near Welwyn Garden City in Hertfordshire, I think of the first time I made that major trip in my little car.

I was a mad keen radio amateur in those days. For me it wasn't girls – it was love of radios. I am still a radio amateur but not as mad about it as I was in the 1960 and 70s. I did eventually get married – my wife is a radio amateur as well.

That car hated the cold weather. I didn't have a garage so it was parked on the verge in front of my parents' house. The carburettor frequently froze in the winter, I used to tie a woollen scarf around it to try and stop the freezing.

One Friday I was driving back from work and it was snowing and freezing so much that the car kept stopping. So I ended up pulling in to a farm in Horningsea, near Cambridge, and asking if I could spend the night in the car in their barn. They kindly offered me a bed on the sofa for the night.

But she was a faithful chariot and we made several more long-distance trip for radio activity. This photo shows the A30 loaded up for a trip to the Malvern Hills for yet another radio contest.

When the time came to put it up for sale I even made a profit, unusual for second hand cars. That £75 went towards buying an Austin Cambridge. The start of my life with large saloon cars.

When my mates were buying sports cars I had a Ford Zephyr, then a Humber and later Rovers. But that's another story!

When I first rented a car in America, the company asked me what type of car I wanted. My reply was a saloon. Their answer was "Sorry, we don't have cars with bars in them". A saloon car is called a sedan in America.



Minimum qualifications of radio amateurs

ITU Recommendation **M.1544** defines minimum levels of operational and technical knowledge for a person wishing to operate a station in the amateur services

The recommendation is set at a level that would seem to encompass all existing Entry Level licences. It appears that even a sub-set of the existing UK Foundation syllabus could still meet the minimum requirements.

You can download ITU Rec M.1544 from <https://www.itu.int/rec/R-REC-M.1544-1-201509-I/en>

New Zealand's amateur radio licence, the General User Radio Licence, quotes Recommendation M.1544 as a requirement for visitors wishing to operate under the terms of the GURL for up to 90 days.

Operation in New Zealand by overseas amateurs is covered in Clause 7 of the GURL which can be downloaded from

<https://www.rsm.govt.nz/about-rsm/spectrum-policy/gazette/gurl/amateur-radio-operators>
<https://gazette.govt.nz/assets/pdf-cache/2017/2017-go2423.pdf>



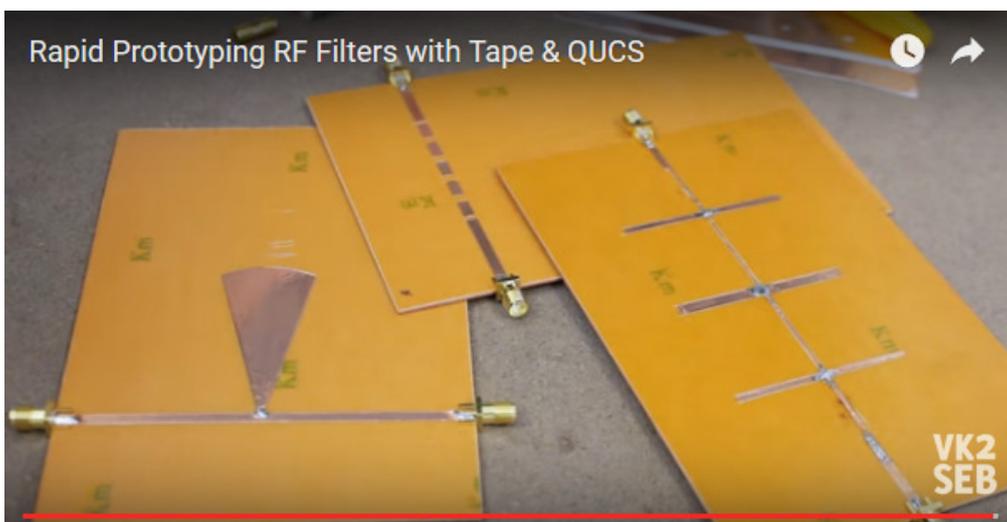
Rapidly prototyping RF filters

Sebastian Holzapfel VK2SEB has released a guide to simulating microstrip filters in QUCS and prototyping them with copper tape on blank FR4 sheets

These super-cheap materials are good up to a couple gigahertz, as you'll see in the video.

Following a quick real-time demonstration, I simulate and build 2 microstrip filters, a 1GHz stepped-impedance LPF, and a 10GHz end-coupled BPF.

- 2:05 - 1/4 wavelength stub build & tests
- 3:46 - Radial stub build & tests
- 4:18 - Stepped impedance microstrip LPF design
- 6:42 - Stepped impedance microstrip LPF build & tests
- 9:10 - Trimming the stepped impedance LPF
- 10:26 - Brief tutorial on synthesizing filters in QUCS
- 14:51 - Synthesizing a 10GHz end-coupled microstrip BPF



18:33 - 10GHz end-coupled BPF build & tests

Watch Rapid Prototyping RF Filters with Tape & QUCS

<https://youtu.be/drwGvATLNaw>

VK2SEB <http://sebholzapfel.com/rapid-prototyping-rf-filters-with-tape-qucs/>

Hackaday <http://hackaday.com/2017/07/25/rapidly-prototyping-rf-filters/>

437 MHz Sprite satellites deployed

Scientific American magazine interviews radio amateur **Zac Manchester KD2BHC** in the article *Breakthrough Sends Smallest-Ever Satellites into Orbit*

On June 23, 2017 six tiny satellites were sent into low-Earth orbit as secondary payloads on the Venta and Max Valier satellites that were launched on the Indian PSLV-C38 rocket. These six satellites are comparatively dainty, but punch far above their weight. Called "Sprites," each is a 4-gram flake of circuit-board just 3.5 centimeters on a side, packing solar panels, computers, sensors and communications equipment into an area equal to a U.S. postage stamp.

One Sprite apiece is attached to the outside of each mothership — the Latvian Venta satellite and the Italian Max Valier satellite, the latter of which also holds four additional Sprites awaiting deployment into space as wholly independent spacecraft. Radio telemetry from minuscule magnetometers and gyroscopes on the deployed Sprites would then be used to track the spacecraft as they shift, spin and tumble, to better understand their orbital dynamics.

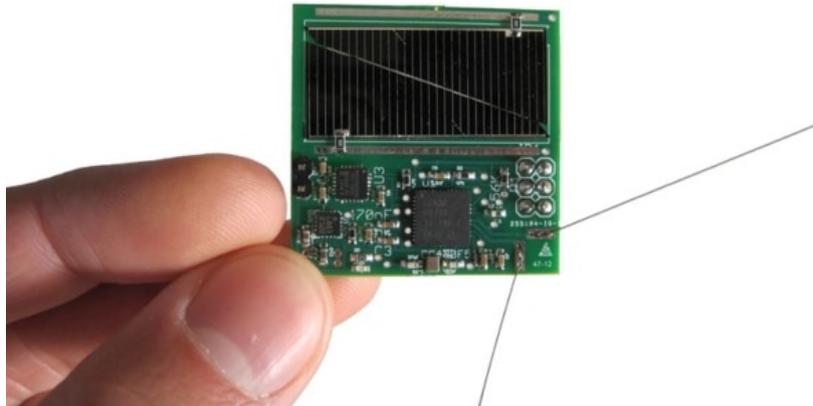
Signals on **437.325 MHz** from at least one of the exterior-mounted Sprites have been received in California and New York.

Read the Scientific American article at

<https://www.scientificamerican.com/article/reaching-for-the-stars-breakthrough-sends-smallest-ever-satellites-into-orbit/>

Zac Manchester KD2BHC had 104 Sprite satellites launched into orbit on board KickSat-1 on April 18, 2014 but the Sprites failed to deploy

<https://amsat-uk.org/2014/04/18/successful-launch-of-kicksat-carrying-104-sprite-satellites/>



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we currently enjoy.*

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is what you and I make it.**

Upcoming Happenings & Events

<i>Date</i>	<i>Happenings & Events</i>
1st August	VHF Net, 146.525 MHz, 20:00
4th August	NZART HQ Infoline
5-6 August	NZART Brass Monkey Contest
7th August	HF Net, 3.575 MHz, 19:30
8th August	VHF Net, 146.525 MHz, 20:00
12th August	WIA Remembrance Day Contest
14th August	HF Net, 3.575 MHz, 19:30
15th August	VHF Net, 146.525 MHz, 20:00
16th August	General Meeting
18th August	NZART HQ Infoline
21st August	HF Net, 3.575 MHz, 19:30
22nd August	VHF Net, 146.525 MHz, 20:00
26th August	Hamilton Market Day
27th August	NZART Official Broadcast
28th August	HF Net, 3.575 MHz, 19:30
29th August	VHF Net, 146.525 MHz, 20:00

1st September—NZART HQ Infoline
15th September—NZART HQ Infoline
24th September—NZART Official Broadcast
6th October—NZART HQ Infoline
7-8 October—NZART Microwave Contest
29th October—NZART HQ Infoline
29th October—NZART Official Broadcast
5th November—NZART Straight Key Night
2-3 December—NZART Field Day Contest

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

Club Information



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88 Seddon Road, Hamilton

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

Homepage: <http://www.zl1ux.org.nz>
eMail: 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: Off air pending channel changes

Cover Photo: QTT = Qualified True Telegraphist

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