

RAMBLER

JANUARY 2023



VOL. 65 ISSUE 5

NEWSLETTER OF THE OTTAWA VALLEY MOBILE RADIO CLUB INCORPORATED (OVMRC.CA)

WHAT'S INSIDE:

OVMRC EXECUTIVE	2
NETS/EVENTS	3
PRESIDENT'S RAMBLINGS	4
X-MAS GATHERING	5
CONGRATS PAT!	6
MOBILE ANTENNA	7
SLOT ANTENNA	9
OSCAR-118	14
SDR & SOFTWARE	16
OVMRC NET ACTIVITY	26
LINKS	22
EDITOR'S NOTE	28

MEETING: WEDNESDAY JAN 18 7:15 P.M. VIA ZOOM

AGENDA

- OPENING 7:15 BARRY (VE3NA)
- GREETINGS-GUESTS/MEMBERS
- PRESIDENT'S REMARKS
- X-MAS GATHERING SUMMARY
- CHAIRPERSON REPORTS
- PRESENTATION: NICK VE3OWV "AMATEUR RADIO OPERATIONS AT THE DIEFENBUNKER, PAST AND PRESENT".
- MEETING ADJOURNMENT
- RAG CHEW

CHECK-IN TIME 6:45 TO 7:15 P.M. MEMBERS AND INVITED GUESTS WILL BE SENT AN EMAIL INVITATION SEVERAL DAYS BEFORE MEETING DATE WITH LOGIN AND PASSWORD. OTHERS NOT ON OUR MAILING LIST PLEASE CONTACT NORM AT: VE3LC@RAC.CA FOR INVITATION.

OVMRC AFFILIATIONS





OVMRC Executive and Officers 2022-2023

DIRECTORS

President:

Barry Allison, VE3NA
ve3na@rac.ca

Vice-President:

Norm Rashleigh, VE3LC
ve3lc@rac.ca

Treasurer & Membership Records:

Nicole Boivin, VE3GIQ
ve3giq@rac.ca

Corporate Secretary:

Alan Fricker, VE3KAE
alanfricker@yahoo.ca

STANDING COMMITTEES

Club Projects & Bulk

Orders: Barry Alison,
VE3NA ve3na@rac.ca

Radio Course & Accredited Examiner:

Norm Rashleigh, VE3LC
ve3lc@rac.ca

Meeting Reception:

John McGowan, VA3JYK
john.mcgowan1314@gmail.com

Nets & Radio

Operations: Hugo
Kneve, VE3KTN
ve3ktn@rac.ca

Rambler Newsletter

Editor and Production:

Alan Hotte, VA3IAH
editor@ovmrc.ca

OVMRC.CA & Social

Media: Adam Bird,
VA3IRD web@ovmrc.ca

OVMRC Repeater

Keeper: Norm Rashleigh,
VE3LC ve3lc@rac.ca

Special Events: Roger

Egan, VA3EGY
va3egy@gmail.com,
John McGowan, VA3JYK
john.mcgowan1314@gmail.com

**OVMRC Groups.io
Ongoing discussion
Group at:**

<https://ovmrc.groups.io/g/main>; All radio
amateurs members and
non-members are
welcome

**Ottawa Valley Mobile
Radio Club,
Incorporated PO Box
41145 Ottawa, ON
K1G 5K9**

OVMRC Life Members:

Ernie Jury, VE3EJJ
Maurice-André Vigneault,
VE3VIG
Ralph Cameron, VE3BBM
Doug Carswell, VE3ATY
Doreen Morgan, VE3CGO

OVMRC Repeaters:

- **VE3RAM** Limited coverage to Orleans and East Ottawa
443.700 MHz (+) DMR
CC1 & D-Star Network
connected to
Brandmeister
- **VE3TWO** Limited coverage to East and South Ottawa 147.300 MHz. +, PL 100.0 Hz.
Analogue FM and
C4FM

**Special Event & Field
Day Call Sign **VE3JW****



LOCAL WEEKLY NETS (ALL CHECK-INS WELCOME)

- **Rubber Boot Net**, VE3OCE 146.880 MHz (-)136.5 Hz tone weekday mornings at 7:30 AM conducted by Roger, VE3NPO
- **Pot Hole SSB Net**, 3760 kHz, every Sunday morning at 10:00 AM conducted by Ernie, VE3EJJ, or Glenn, VE3XRA.
- **Pot Lid Slow Speed CW Net**, Sunday night, 7:30 PM, 50.090 MHz., horizontal polarization. Join controllers Hugo (VE3KTN), Norm (VE3LC) and Ante VA2BBW for accomplished and budding CW operators alike.
- **QCWA Chapter 70 Net**, VE3OCE 146.880 MHz (-) 136.5 Hz tone, Monday evenings at 7:30 PM conducted by John, VE3ZOV
- **Capital City FM Net**, VE2CRA 146.940 MHz -, (100 Hz tone), Monday evenings at 8:00 PM.
- **Champlain Mini Net**, VE3STP 147.060 MHz -, (114.8 Hz tone), held Monday through Saturday at 7:00 PM.
- **Upper Frequency Net**, Simplex 144.250 MHz using USB, Tuesday evenings at 9:00 PM conducted by Glenn, VE3XRA. Following check in on 2 m you can check your radios on 6 m at 50.150 MHz and 70 cm on 432.150 MHz as well using USB. All check ins are welcome.
- **Phoenix Net**, VE3OCE 146.880 MHz (-) 136.5 Hz tone, Tuesday evenings at 7:30 PM conducted by Pete, VE3XEM
- **Almonte ARC's D-Star Net** Tuesday evenings at 8:40 p.m. carried on XLX197 and everything connected to it. Dale VE3XZT presides.
- **OVMRC 2-Metre Net**, Thursday Evenings, 8:00 PM, Club Net on FM will be held through VE3OCE 146.880 MHz (-)136.5 Hz tone conducted by Hugo, VE3KTN.

VOLUNTEER OPPORTUNITIES:

- **Canadian Ski Marathon 2023** The event dates are Feb 11-12, 2023. The radio ops volunteer site is at <https://hambone.ca/CSM>

INFORMAL AMATEUR RADIO RESTAURANT GATHERINGS

- | | | | |
|--|--|---|--|
| • QCWA Chapter 70
Breakfast gathering every Tuesday morning at 7:30 to 10:00 AM, Summerhays Grill, 1972 Baseline Rd., Nepean - Restarted | • Orleans Coffee gathering (on hold)
every Friday morning at 9:00 AM, McDonalds, 2643 St. Joseph Blvd, Orleans | • QRP Group
Dinner meeting , Second Wednesday every month, 5:00 PM, Newport Restaurant, 322 Churchill Ave N., Ottawa | • Phoenix Net
monthly Breakfast gathering (on hold) , usually the second Saturday every month at 9:00 AM, Check with Pete
ve3xem@rac.ca |
|--|--|---|--|



President's Ramblings for January 2023

On behalf of the executive of the OVMRC, Happy New Year and best wishes to all club members, your families and friends!

Looking forward, we hope to restart meetings "in person" soon, for the first time after a long hiatus. More on this to follow.

My family and I were looking forward to a vacation away over Christmas and New Years but all that was dashed with the storm of a generation. Oh well, we did get together at home and made the best of it.

I haven't had much time for any radio activities over the recent few weeks, and consequently have nothing to report in this newsletter since we have been "power visiting" with family.

Regarding year end door prizes, I have only received one suggestion so far (thanks Rob, ve3rxh). Cost limit is \$450.00 per prize, tax in. Dream on! Suggestions welcome. There will be at least three prizes, maybe more if costs are lower per prize.

Notes to OVMRC club members:

- contact Alan (Rambler editor) va3iah@rac.ca for some guidance in submitting an article for the Rambler.

That's it for my brief January ramblings. Everyone is invited to join the OVMRC January Zoom meeting Wednesday January 18. Check in will start at the usual ~ 6:45 PM with a start time as close to 7:15 as possible. The meeting will be a restart of club activities for 2023. Anyone not receiving the check in credentials can do so by sending an email to Norm (Zoom custodian) ve3lc@rac.ca.

The OVMRC meetings are open for all to attend. Club membership is not required (but of course we would like to have you as a member). Guests wishing to attend can submit a request to the Zoom custodian (see above) and joining credentials will be sent to you.

I look forward to seeing many club members and guests at the January Zoom meeting.

73,
Barry, ve3na



OVMRC Christmas Gathering Summary

Date / Time:

Wednesday, December 16, 2022 at
19:16

Location: Via ZOOM on-line meeting

Call to order:

The special annual Christmas meeting was chaired by Vice President, Norm Rashleigh, VE3LC. Norm VE3LC called the meeting to order at 1916 hrs. Norm introduced the club executive members and informed that President Barry, VE3NA is away on a vacation. There were 37 check-ins including new hams and new OVMRC members VA3WBR Bill Redmond and VE3NPP Norm Siemens, and Associate Member John Falbo who may be testing next week.

Approval of minutes from November 16, 2022:

MOTION: Moved by Bill VA3HWA and seconded by Tim VE3TXB that the minutes of the meeting held Wednesday November 16, 2022, be approved.

VOTE: All in favour.

CARRIED.

Vice President's Remarks and**Announcements:**

Norm, VE3LC extended greetings to all attending.

Norm introduced new members Dave VE3LHO, Norm VE3NPP, Jim VA3BJO, Mike VE3TEC, AureleC VE3RDI, and John Falbo, who is an associate member. Norm VE3NPP talked about his recent activities to get set up after 20 years of ham radio inactivity. Jim is a new ham since

June 2022. Jim talked about his love of making contacts and is now a volunteer at the Diefenbunker. Bill VA3WBR talked about his recent activities as a new ham. Bill got his radio certificate on a recent Tuesday and checked into the new hams net on Wednesday night. He has been checking into 2 meter nets when he can. Bill mentioned he has a 10 meter radio coming and is working on antennas. John Falbo is still studying and has been listening on the radio. John expects to take the test next week. Welcome to all.

Meeting Close:

Norm VE3LC called the meeting to a close at 21:40 and wished Merry Christmas to all.

Announcements:

Of special note – Nicole VE3GIQ is seeking more amateur radio volunteers for the MS Bike event in the coming year. More to follow from her on this.

Norm VE3LC mentioned we may have a special in-person group meeting in March 2023.

Hugo mentioned the RAC Call Sign Policy Survey results are now available on the web.

<https://www.rac.ca/rac-survey-on-current-canadian-call-sign-policy/>



Upcoming contests:

For more detailed information on upcoming contests, see the WA7BNM contest calendar:
<https://www.contestcalendar.com/>

RAC Members can login and go here:
<https://wp.rac.ca/amateur-radio-contest-calendars/>

ARRL Members can log in and go here:
<http://contests.arrl.org/>

Next meeting:

The special Christmas meeting concluded at 21:40 PM. The next virtual monthly meeting of the OVMRC will be held Wednesday, January 18, 2023 at 7:15 pm via ZOOM. Please watch for your email meeting invitation and link to Zoom.

*** Congratulations Pat VE3KJQ! ***

Pat VE3KJQ finally received his long awaited award as top QRP station in Canada from the November 2021 ARRL November Sweepstakes. Pat VE3KJQ would also like to note that this award was earned without the benefit of SDR software tools such as CW skimmers (more on those in this edition of the Rambler). A hearty "well done" OM from the OVMRC!





USING AN OPEK HVT-600 VERTICAL AS A MOBILE ANTENNA

The Opek HVT-600 is a 200 Watt 10-band ($1/4 \lambda$) ham radio antenna (80m - 2m). Manufacturer Opek of Taiwan also offers marine, CB, cellular, LAN, and commercial radio antennas (<https://www.opekantenna.com>). I purchased mine through Walcott Radio of Iowa in the USA (<https://www.walcottradio.com>).

The antenna consists of a matching coil with nine taps (and jumper cord), a bottom fixed section, and a telescoping top section. The bottom has PL-259 connector. The telescoping top is held in its various positions by a hexagonal socket-head screw (key is provided). It's a tall antenna, 52- $1/2$ " at shortest and 71" at maximum extension of the telescopic section.

I paired the Opek antenna with a Comet CM-5M Magnetic Mount (4- $1/2$ " diameter magnet) with the required SO-239 base and 13 feet of built-in RG-58A/U coax (<https://cometantenna.com>). I purchased the magmount through Radioworld in Toronto (<https://www.radioworld.ca>). Coax from the magmount runs into the car through a window left open a crack (downwind side works better!).

The antenna manual consists of one side of a single sheet of paper listing the antenna's general particulars and giving a frequency chart for correct jumper position

and overall length to use for each of the bands. Unfortunately, OPEK provide only one length per band.

Knowing that some bands are wider than others, and knowing that VSWR would be very dependent on exact configuration of installation, I took those dimensions only as a rough starting guide and checked them with an antenna analyzer, placing the magmount in proper position on my specific car.

The lengths for the higher frequencies worked fairly well. For example, the recommended length for the 2m band provides a VSWR of 1.5 or less from 144 to 148 MHz.

In addition, and despite not being advertised as being a 70cm antenna, the telescoping section can be extended to achieve a VSWR of a little less than 2.0 in that band, making it usable there, with a tolerant radio or bit of help from a tuner.

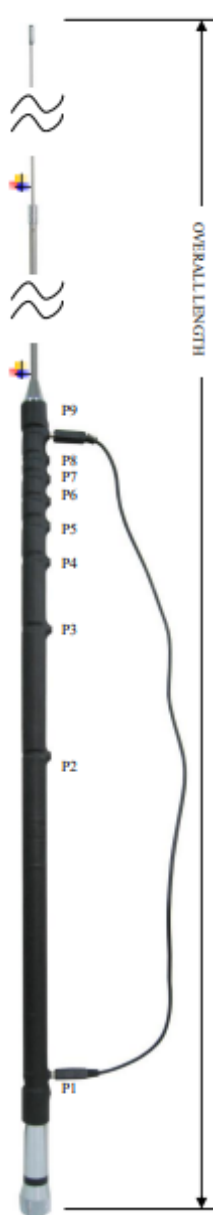


Figure 1: OPEK HVT-600 from the product literature



On 10m again a single antenna length suffices for the whole band. VSWR is below 1.5 from about 29.1 on down, meaning one can work AM and USB without a tuner. Highest VSWR is a bit under 3 at the top end of the band (FM zone).

The antenna was not envisioned for use on the 11m band, but as I want to work CB as well, I found a workable combination of jumper and length to get a VSWR below 2.0.

Below that, though, things get complicated. On the 20m band, OPEK suggested overall length of 1610mm for that band, i.e., 63.385 inches, but I found that 65.5 inches worked better, though the best VSWR was a little under 3.5.

It got even more complicated for 40m, where it initially seemed that no length would bring the VSWR under 5.0. However, the product page for this antenna at <https://www.americanradiosupply.com/opek-hvt-600-multi-band-mobile-antenna-40-meters-mod-hack-david-vk4ice/> recommended placing a hose clamp on the outside of the matching coil section just above the 2nd to last tap on the bottom. This enabled the antenna to achieve a VSWR to about 2.5 for a portion of the 40m band, though the bandwidth is rather narrow and one would have to change lengths at least once to be able to work the whole 40m band, even with a tuner. It gets even worse for the 80m band, where the bandwidth is so narrow that one effectively needs a different length of telescopic section for each frequency worked!

In practice, it is a somewhat fussy process to change bands. The antenna has to be taken off the roof and the hex key used to loosen the telescopic section. One needs to carry a tape measure to get the telescopic length exactly right (this is quite critical at the lower frequencies). Plugging in the jumper is easy; no tools required. Keeping the bottom of the magmount clean is important, lest one damage the paint on the roof of the car. Also, if one happens to be a bit on the short side, it is helpful to also have to carry a step-stool for easier access to the roof.

The antenna is provided with only one key for the hexagonal socket head screws. The exact size of the Allen key is not given anywhere in the "manual" and by measurement seems to be neither a standard metric nor SAE size. My vendor, Walcott, does not carry spares and the manufacturer did not even answer my email! It turns out a 5/64 SAE size will work, but is a little tight. Replacement jumper wires are available at <https://www.americanradiosupply.com/replacement-jumper-for-opek-hvt-600-antenna/>

My plan for the future is to explore better grounding than the magmount alone can offer, with hope of making the lower bands more accessible. Working when parked means that one or more counterpoise wires, either hanging or even grounded via a metal tent peg are potentially practical options.



Other suggestions from reviewers at <https://www.eham.net/reviews/view-product?id=10937> included replacing the hex head socket screw with a thumb screw, making whip length adjustments faster and eliminating the whole issue of the Allen key, and another substituted a longer whip from a Wilson 1000 to achieve made for better and broader tuning on the lower bands. Finally, another suggestion was to add a capacitance hat to improve bandwidth on lower bands.

73, Kathleen, VA3WEX

2M/70cm Slot Antenna: Repurposing a satellite dish for amateur radio

With a surplus satellite dish on my hands as a result of an internet upgrade, I began to look around for a potential amateur radio use. I was inspired to by Marcel Stieber's (AI6MS) presentation "Dual-Band Satellite Dish Slot Antenna" who was in turn inspired by John Portune (W6NBC), guru of all-things-slot-antenna.

The lessons learned identified by Marcel Stieber (AI6MS) in his presentation included: 1) Place the slots as close to the centre of the satellite dish as possible for an even vertical radiation pattern; 2) Remove the satellite dish feedhorn to reduce potential interference; 3) Multi-band slots on the same satellite dish don't appear to interfere with performance, and

4) The use of a single feed-point for both slots or the use of Y-coax harness to feed with different phased lengths of coax are possible adaptations to avoid the use of a duplexer in the design of the dual band antenna.

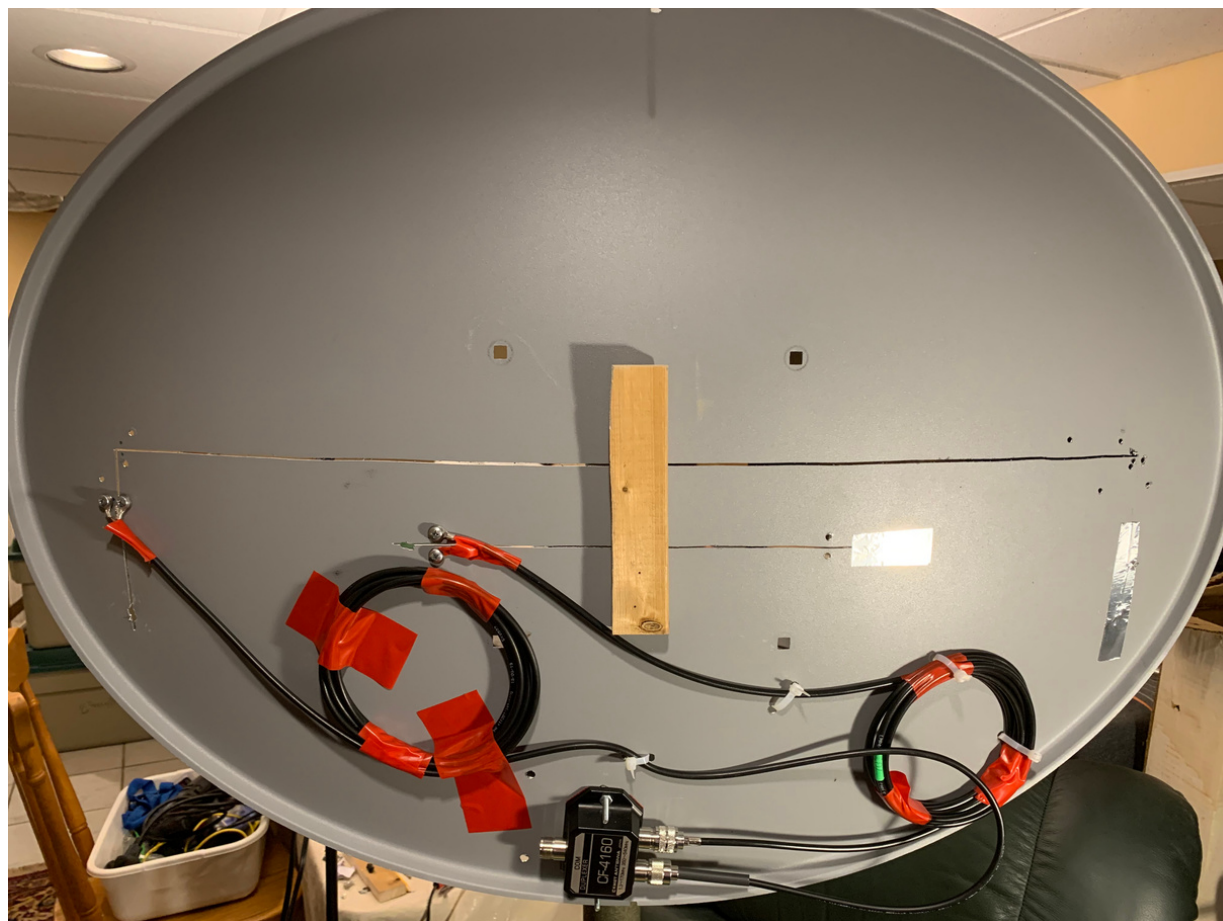
An additional reason for undertaking this project was to explore first-hand how slot antennas function ("How a hole can be an antenna") and explore possible applications. At a technical level the idea that a horizontal dipole shaped hole in a piece of metal could be fed to radiate an RF signal with a vertical polarization was kind of intriguing! The Antenna-Theory.com section of the reference below provided a good overview of why a slot antenna radiates RF in the way it does.

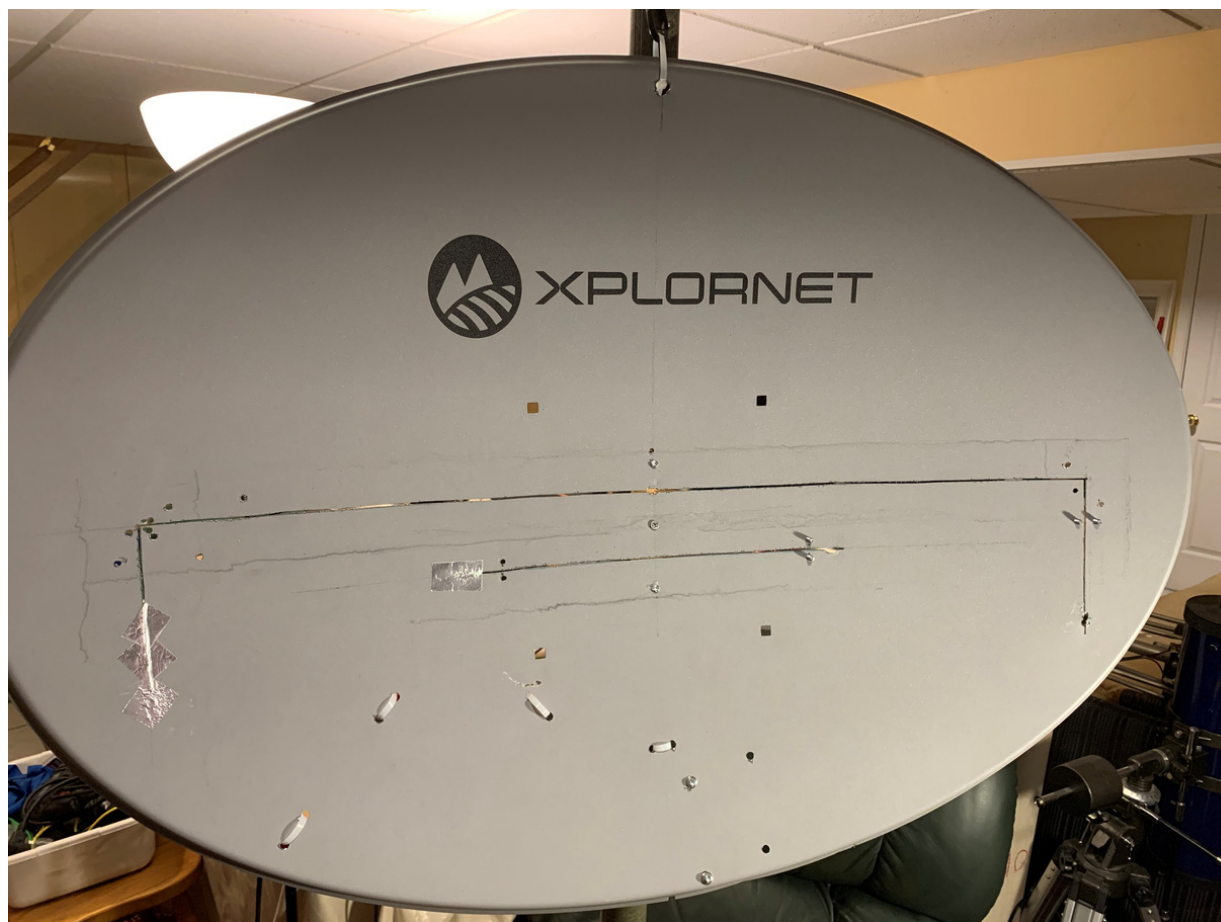
The 2M Build: Based on the calculations for a half-wave dipole, a slot of 103 cm. ($\lambda/2 = 150/146 = 1.027\text{m}$ or 102.7cm. or 103cm.) was cut with 76 cm horizontally and two downward vertical cuts at each end of 13.5 cm. A feed point was calculated ($936/146 \times 0.6 = 3.8466$ or 9.77cm. which I rounded to 10cm.) and two holes were drilled for a feed-point within .5cm. on each side of the right vertical slot 10cm. up from the bottom. The slot was made by determining the centre of the dish vertically and horizontally and drawing out in pencil the centre line for the 2m slot, as this would be the main intended use with the 70 cm. slot being centred horizontally falling 5.5 cm. below the vertical median line of the 2m slot. Given that the surface I was drawing on



was concave my metal carpenter's tape measure wasn't very effective and I had to resort to borrowing my wife's fabric measuring tape which could more effectively measure out the slot lines. A standard fine tooth metal jigsaw blade was used to cut the slot one blade width wide between starter holes drilled at each end of the horizontal slot facilitating cutting both the larger horizontal section and the two small downward "legs" to make up the entire distance. A small wooden brace was used in the centre to help keep the upper and lower sections a relatively uniform distance apart.

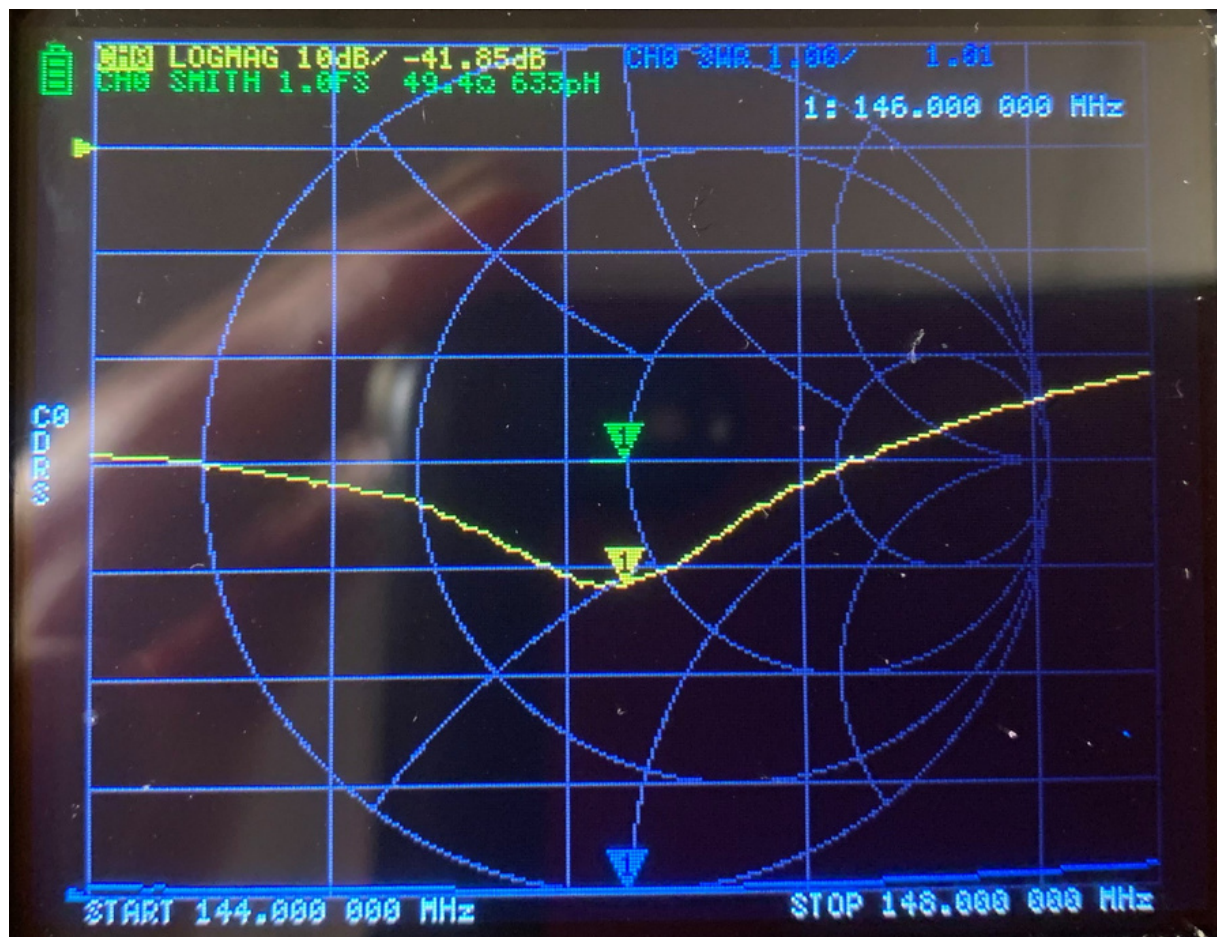
A short length of LMR 195 was used to connect the braid and centre conductor to each side of the slot, with some plastic tape to avoid shorting the braid across the slot. Six turns of LMR 195 in a 16 cm. loop was used as a current balun. For testing the satellite dish it was suspended about 1m from the floor in my basement. An initial check on my NanoVNA indicated a VSWR of 2.0:1 at 146MHz.





With the NanaoVNA inline, pieces of aluminum adhesive tape were added to cover the vertical leg of the slot opposite to the feed-point, until the Smith Chart indicated a tight arc around the system impedance point with a VSWR of less than 1.5:1 across 144-148 MHz. The result was a 2m slot length of 94.7cm., while maintaining the 10 cm feed-point at the opposite end. Aluminum tape was applied to both sides of the dish to strengthen and provide better electrical connections across the slot.

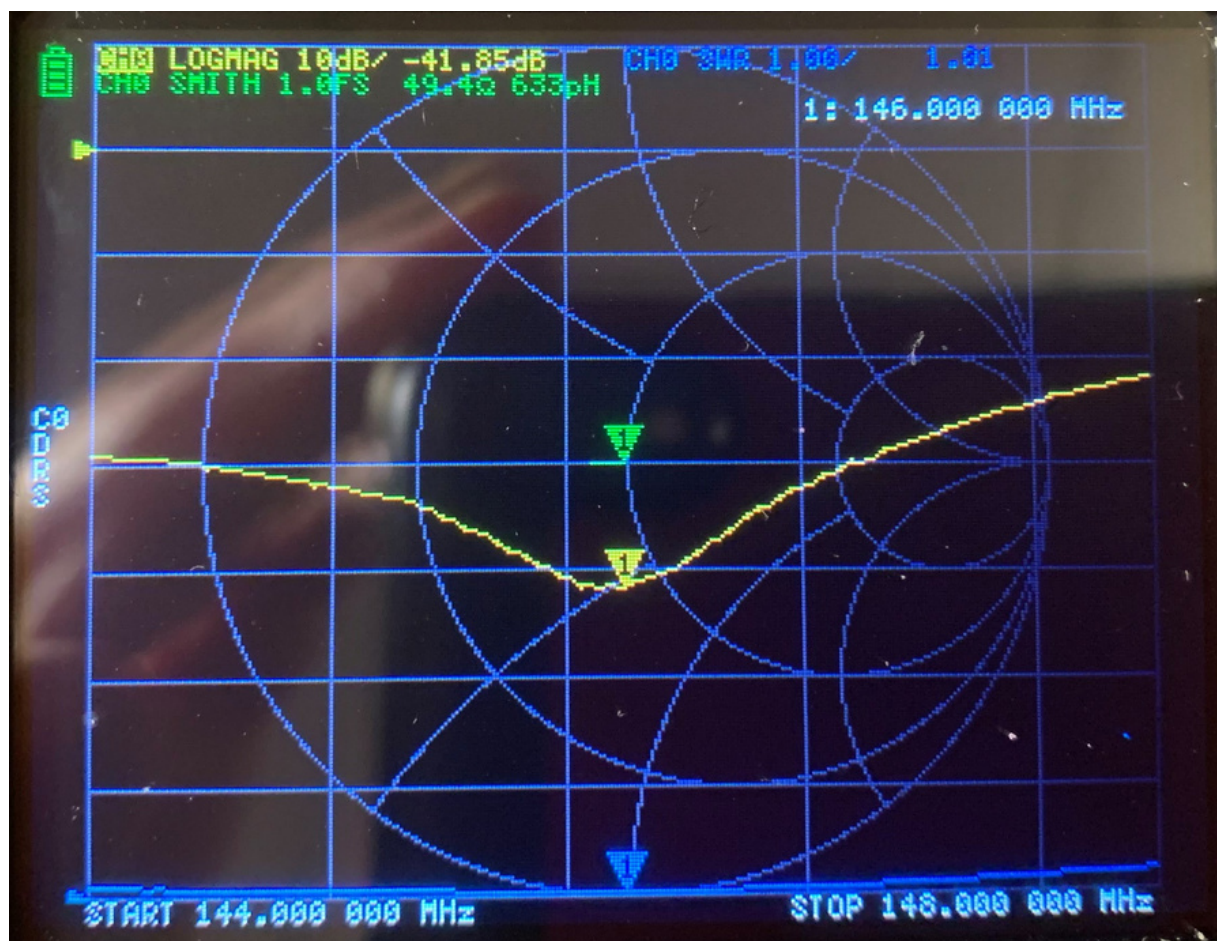
As a transmission test with an HT connected inline with a VSWR meter it was possible to reach several local repeaters with 3 watts and a VSWR of 1.02:1 from my basement. Given that one intended application for this antenna was to be used in an attic for local repeaters, these signs of effective performance were encouraging. The slot antenna may be well suited to this purpose, particularly for smaller attics given its horizontal orientation with vertical polarization appropriate for local 2m FM repeaters.



The 70 cm. Build: For a half-wavelength 70cm band slot of 33.7cm. ($\lambda/2 = 150/445 = 0.3370\text{m}$ or 33.7cm.) was cut just below the 2m slot with two holes drilled for a feedpoint at 3.20 cm. ($936/445 \times 0.6 = 1.26$ inches or 3.20cm). Initial testing with a NanoVNA indicated a VSWR less than 2:1, but there was room for improvement, so pieces of aluminum tape were added to slot end opposite the feed-point until a maximum performance on the Nano VNA could be determined (see next page). The 70 cm. slot was reduced by 2 cm. to 31.7 cm. with the aluminum tape covering the slot to produce a VSWR rating of less than 1.6 across 430-450 MHz.

When I next have a surplus satellite dish, I plan to try out an alignment of the 2m/ 70cm. slots that may permit the use of a single feed-point or possibly maintain the current design and figure out, with the help of club members, how I might use my NanoVNA to determine a phased length of coax for a Y-Coax harness for both 2m and 70cm. feed-lines.

73, Alan VA3IAH



REFERENCE LINKS:

Other non-radio re-purposing ideas for a satellite dish:

- KipKay: <https://www.youtube.com/watch?v=LaAf6Ltgal8&t=14s>

Marcel Stieber (AI6MS)

- “Dual-Band Satellite Dish Slot Antenna”, March 2021, Virtual Ham Expo, <https://vimeo.com/523480920>

John Portune (W6NBC)

- Slot Antennas for Ham radio: The Forgotten Antenna (Kindle book) <https://www.amazon.ca/Slot-Antennas-Ham-Radio-Forgotten-ebook/dp/B08D8LC9HP>
- Slot Antennas: How can a hole be an Antenna, <https://www.youtube.com/watch?v=MNqqvYlifyw>
- An Efficient 2 Meter Antenna Disguise as a TV Satellite Dish <http://www.w6nbc.com/articles/2016-3QSTdishslot.pdf> and <https://w6nbc.com/articles/20xx-dishslot.pdf>
- A Durable, Low Profile 2-Meter Mobile Antenna <http://www.w6nbc.com/articles/2018-03QSTdesigncompetition.pdf>

Slot Antenna Theory:

- <https://www.antenna-theory.com/antennas/aperture/slot.php>
- <https://youtu.be/dI6e4ZR9Oi8>
- <https://www.youtube.com/watch?v=iefZnZnh8Wc>

Smith Chart:

Basics of Smith Chart and Antenna Measurement, Alan Wolke, W2AEW: <https://www.youtube.com/watch?v=kOEw6A8CovE>



CAMSAT's Transponder Satellite CAS-5A (Fengtai OSCAR-118)

This article summarizes my thoughts of working for QSOs through Fengtai OSCAR-118 that is listed in the AMSAT Two Line Elements as FO-118 (Ref 1 provided below). It was launched on Friday, December 9, 2022, joining 36 other OSCAR satellites being tracked by AMSAT, to provide current operational states of satellites (Ref 2). The spark in this article's creation was Rambler's Editor, Alan Hotte, VA3IAH request to sharing my experience. Alan, thank you.

To begin, my equipment for QSOs through FO-118 (Ref 3,4) and other satellites consists of: Windows 10 laptop; SatPC32 software (Ref 5); GoSatWatch for iPhone (Ref 6); Icom IC-9700 (Ref 7); 16.7 M (55') of RG-213 coaxial; Digiwav antenna Rotator (Ref 8); and handcrafted \$4.00 Ham Radio Satellite Antenna (Ref 9) at 2.5 M (8') angled up at 20 degrees.

The station's largest limitation is the residential antenna restrictions. This effectively removed nearly 180 degrees of receivable azimuth. What I do have allows a receivable satellite pass from 328 Degrees, clockwise, to 140 Degrees. The stations largest advantage, other than being in the house, is the IC-9700 dual VFOs which allows me to meet FO-118's VHF/UHF mode FM transponder settings without a second radio. These settings required VFO 1 on the FM transmission uplink of 145.925 MHz and VFO 2 on the FM reception downlink of 435.600 MHz. For most and for me, the initial reward in having this setup work is hearing your own voice being transmitted back to Earth from the 3200 KM (2000 Mile) Low Earth Orbit trek up and back down.





In deciding to work satellites, that now includes FO-118, there were 2 main challenges. The first was having to improve my programming capabilities for the IC-9700 and the Doppler adjusting software of SatPC32. For the IC-9700, reprogramming provided a reduction from 3 to just 1 Terminal setting. This resulted in a welcomed simplification. It was also successful in establishing presets to operate 5 different software programs which included SatPC32.

For the SatPC32 software, the programming of the DOPPLER.SQF file included a learning curve. This was key in my immediately hearing of the FM signal with the right audio pitch for the entire pass that eliminated my need of dialing around to find the signal. The second challenge in wanting to work FO-118 was being able to add it to my existing goal of completing QSOs through 19 different satellites. This goal was kicked-off with my first QSO through the International Space Station's FM transponder in 2022.

In preparing the radio, antenna control, and software for the FO-118's QSO attempt, I was curious as to how good the new satellite's transponder audio would be. To help determine this, I employed the IC-9700 audio recorder during 2 different satellite QSOs. These QSOs were through FM transponders aboard the FO-118, launched in 2022 with WA4VOC on December 24th and the AO-91, launched in 2017 with N2FYA on December 31st. Both were received with an RST of 59 during part of each QSO. The distinguishable difference was that FO-118 provided a higher received audio clarity (less white noise). I state "during part of each QSO" as my Yagi antenna's fixed vertical position does not adjust with the satellite's changing of vertical and horizontal emissions as it travels over. The 2 recorded audios of the AO-91 QSO are provided for your experience of satellite contact. Both were recorded by Icom IC-9700's of mine and N2FYA (Ref 10 and recordings of QSO can found on the OVMRC website - see Ref 11).

Beyond my QSO through FO-118's FM transponder I find the satellite still holds many aspects I may explore. For the current state of FO-118's transponders that you may wish to consider, see the FO-118's satellite user manual (Ref 4 below), which identified:

- **CW telemetry beacon**, 435.57 MHz, RF power 20 dBm, CW rate 22 WPM (active)
- **GMSK telemetry**, 435.650 MHz, RF power 25 dBm, Data rate 4800/9600 bps (active)
- **VHF/UHF Linear transponder**, uplink 145.820 MHz, downlink 435.540 MHz, RF power 23 dBm, bandwidth 16 KHz, spectrum inverted (active)
- **VHF/UHF FM transponder**, uplink 145.925 MHz, downlink 435.600 MHz, RF power 23 dBm, bandwidth 16 KHz (active)
- **HF/UHF Linear transponder**, uplink 21.435 MHz, downlink 435.505 MHz, RF power 23 dBm, bandwidth 15 KHz, spectrum normal (active)
- **3 X visible light band space cameras** (not yet active)



Overall, it was a welcomed learning challenge with the joy of accomplishing a QSO through FO-118 that raised my fist in the air with a throaty YYYEEESSSS!!!

Keep sparking it up,
73, Shaun Lumley CD, VE3VHU

Reference (Ref):

1. <https://www.amsat.org/keplerian-elements-resources/>
2. <https://www.amsat.org/status/>
3. <https://amsat-uk.org/tag/cas-5a/>
4. <https://ukamsat.files.wordpress.com/2022/12/cas-5a-amateur-radio-satellite-users-manual-v1.0.pdf>
5. <https://www.amsat.org/product/satpc32-by-electronic-download/>
6. <https://apps.apple.com/us/app/gosatwatch-satellite-tracking/id300546718>
7. <http://www.icomamerica.com/en/products/amateur/hf/9700/default.aspx>
8. <https://www.grainger.ca/en/product/HDTV-ANTENNA-ROTATOR/p/HOMAR500>
9. http://www.amateurradio.bz/4_dollar_satellite_antenna.html
10. N2FYA - Callsign Lookup by QRZ Ham Radio
11. <https://ovmrc.ca/2023/01/camsats-transponder-satellite-cas-5a-fengtai-oscar-118/>

Technological advancement in Amateur Radio: Software Defined Radio and innovative software with potential application for POTA and SOTA.

According to Innovation, Science and Economic Development (ISED) Canada

“... The "amateur radio service"..is a radio communication service in which radio apparatus are used for the purpose of self-training, intercommunication or technical investigation by individuals who are interested in radio technique solely with a personal aim and without pecuniary interest...”.

This emphasis on technological advancement and experimentation in the amateur radio community has rapidly developed with the advent of Software Defined Radio (SDR). QST's working definition of SDR was that:

“... A Software (Defined) Radio is one in which one or more transceiver functions are performed by digital circuitry under software control on a digital representation of the signal. Software radios use digital signal processing (DSP) for filtering, modulation and demodulation of signals within the radio. DSP can do everything an analog radio can do, it can also do functions that are difficult or impossible for analog radios... ” (QST, Oct 2002, pages 33-35).



The availability of powerful microprocessors in combination with software developments in the last 20 years, is the driving force behind the resurgence in building sophisticated QRP (low power) HF transceivers. Traditional amateur radio analogue transceivers often had an instantaneous bandpass of just 3 kHz. Typical amateur radio SDRs can cover all frequencies from 1 kHz through VLF, LF, MW, HF, VHF, UHF and L-band to 2 GHz, with no gap. With digital communications and new digital modes, SDR receiver software can evolve for the use of new digital modes. As such software improvements and innovations increase the possible range of amateur radio uses of your SDR.

One such innovation is that of CW skimmer, which I will describe in the context of the Reverse Beacon Network (RBN) and Software Defined Radio.

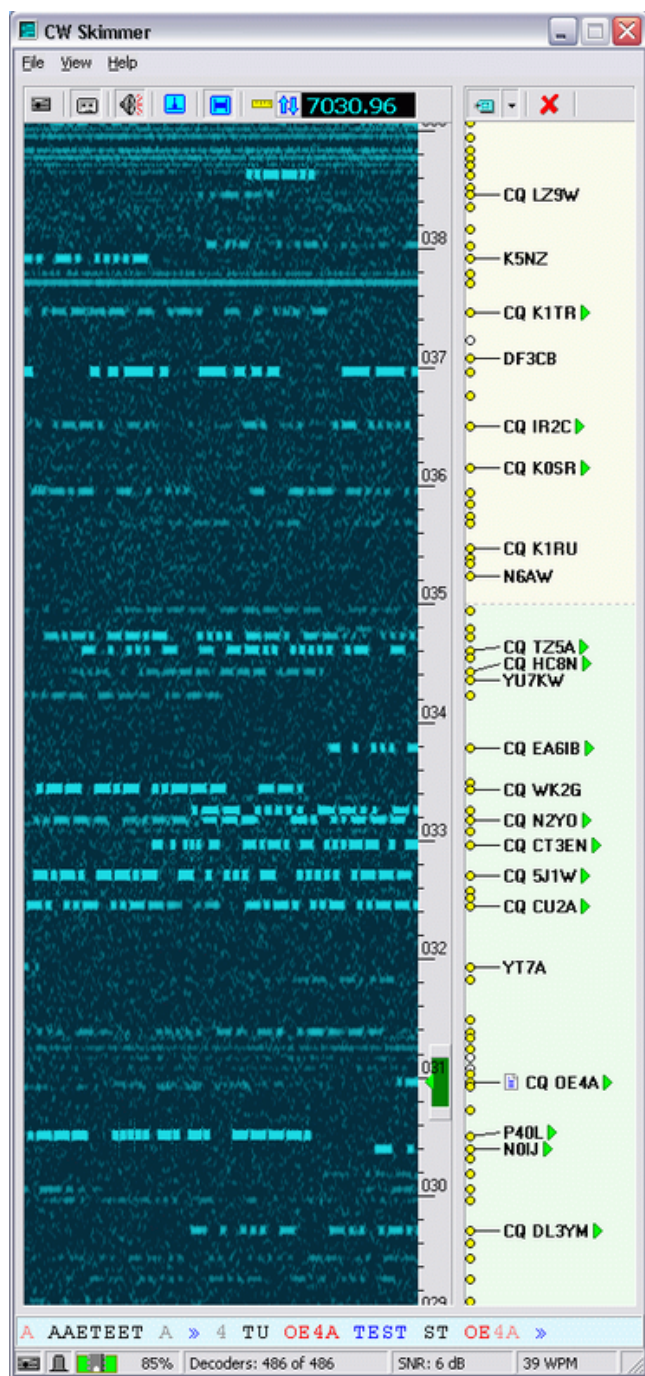
CW Skimmer: There have been many attempts to develop computer programs to decode individual CW signals on the air. CW decoders, such as those included on Elecraft KX3, only copy one signal, which YOU tuned to. In 2008 CW Skimmer (Alex Shovkoplyas, VE3NEA) became available and can best be described as “... a high sensitivity CW decoding algorithm based on the methods of Bayesian statistics; simultaneous decoding of ALL CW signals in the receiver passband - up to 700 signals can be decoded in parallel on a 3-GHz P4 (Pentium processor) if a wideband receiver is used; a fast waterfall display, with a resolution sufficient for reading Morse Code dots and dashes visually; the callsigns are extracted from the decoded messages, and the traces on the waterfall are labelled with stations' callsigns; the extracted callsigns are exported as DX cluster spots via the built-in Telnet cluster server; a DSP processor with a noise blanker, AGC, and a sharp, variable-bandwidth CW filter; an I/Q Recorder and player.”

With the advent of CW Skimmer, amateur radio stations were now able to automatically update the SDR data to various amateur radio servers and combine their data with other contributors. The CW Skimmer program was modified for use by server grade computers and from several SDRs simultaneously to provide a comprehensive picture across the CW sections of amateur radio bands.

Some CW skimmer stations monitor up to 192 KHz of individual amateur radio bands to detect various signals. Wideband display and decoding shown in Figure 1 require a wideband SDR receiver. By way of comparison please note that only 3 kHz of spectrum can be decoded and viewed on the waterfall display if a typical 3 kHz bandwidth radio is used, as shown on the Figure 2 screenshot. In both cases the call signs detected are validated with a database of known amateur radio calls before being sent to the Reverse Beacon Network.



Figure 1: CW Skimmer wideband display (Alex Shovkopyas, VE3NEA)



Reverse Beacon Network: Now let's look into how the system of CW skimmers, Software Defined Radio and the Reverse Beacon Network have evolved over the years. This system of world wide networked receivers are able to provide live real-time data that is supplied by telnet to the Reverse Beacon Network.

The original networked CW skimmer stations were very expensive to create and operate. The original K3LR contest station hardware (see Figure 3,4) illustrates a multi-band first generation CW skimmer station that consisted of rack mounted six (6) server grade computers of multi-core high performance computers hand built by W9PA. The computers required a custom monitored power supply. The first generation system used six (6) Perseus SDR HF receivers to simultaneously supply up to six band data to the RBN (see Figure 5).

The second generation of the K3LR CW skimmer hardware replaced the six servers with six (6) Intel NUC mini computers which are small form factor PCs. Intel NUC (Next Unit of Computing) are multi-core high performance 13.8 VDC computers.

The second generation system continues to use the six (6) Perseus SDR HF receivers to simultaneously supply up to six band data to the RBN. The second generation system uses three additional Intel NUC mini computers to continuously back up all the data that is being sent to the Reverse Beacon Network (see Figures 5,6,7,8,9).



Figure 2: CW Skimmer (Alex Shovkoplyas, VE3NEA)

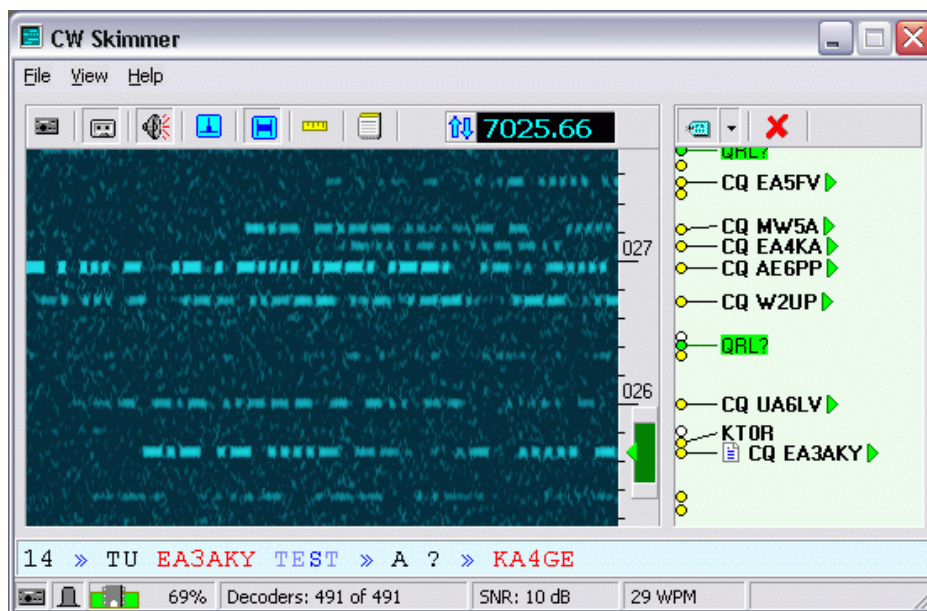


Figure 3: First generation K3LR CW skimmer hardware with six rack mounted servers, six Perseus SDR HF receivers and custom server power supply. Image credit K3LR)





Figure 4: First generation K3LR CW skimmer hardware highlighted to show the custom Power Supply, Perseus SDR Receivers and the multicore servers. Image credit K3LR



Figure 5: Second generation K3LR CW skimmer hardware consisting of six (6) Intel NUC mini computers which have replaced six multicore servers. The Intel NUV minicomputers all operate on 13.8 VDC. Image credit K3LR





Figure 6: Second generation K3LR CW skimmer hardware continues to use six (6) Perseus SDR HF receivers to simultaneously supply up to six band data to the RBN. Image credit K3LR

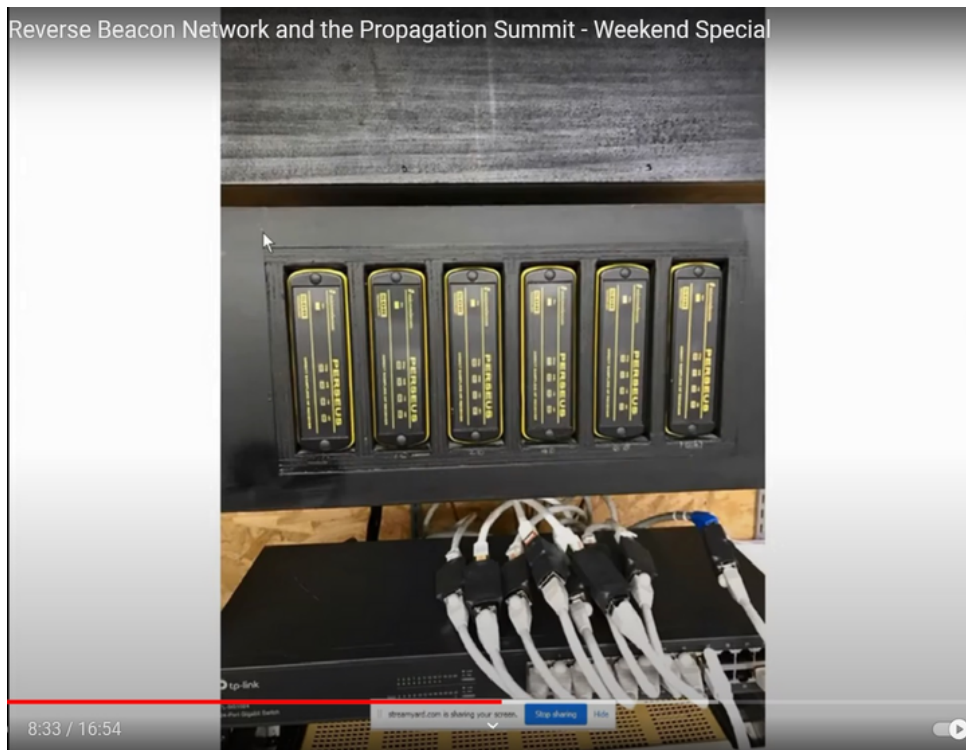
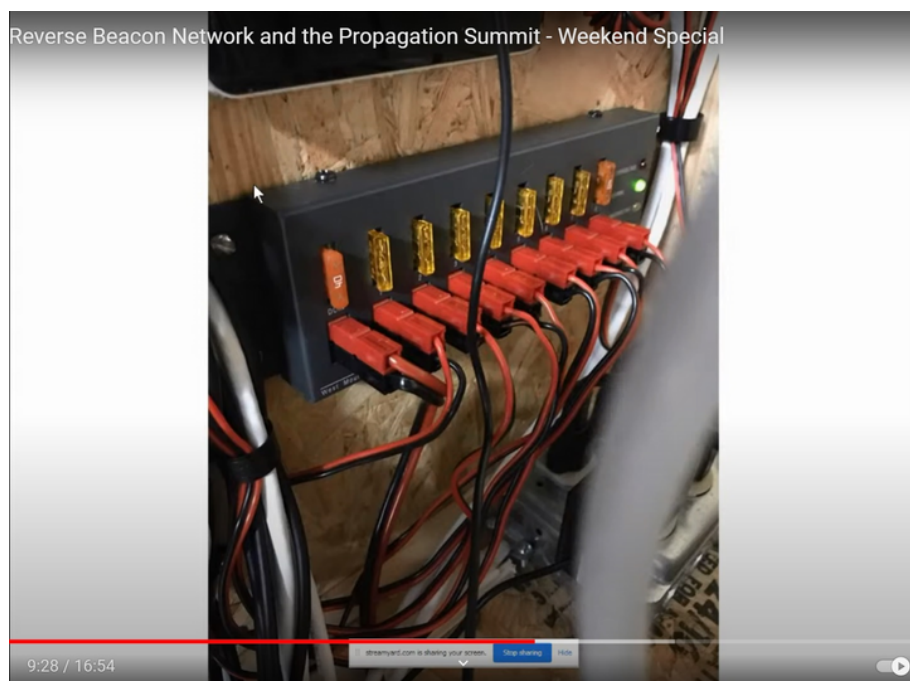


Figure 7: The Second generation K3LR CW skimmer hardware evolved to use 13.8 VDC to power the six (6) Intel NUC mini computers which have replaced six multicore servers. Image credit K3LR



A West Mountain individually fused DC power supply system using Anderson Power Pole connectors is used to power the NUC computers

Note: This image demonstrates good amateur radio practice in using appropriately rated fuses for each circuit to provide the best protection for each individual NUC.



Figure 8: The Second generation K3LR CW skimmer hardware now uses two dedicated commercial power supplies to provide 5 VDC for the six (6) Perseus SDR HF receivers and 13.8 VDC for the (6) Intel NUC mini computers and (3) extra NUC mini computers used for data backup.



I hope that this detailed look at a typical Reverse Beacon Network node station equipped with CW skimmer software and hardware, SDR receivers and dedicated HF antenna will provide a hint of the cost and dedication required to provide the continuous source information to feed into the RBN. One of the challenges of operating the RBN is the large number of volunteers needed to provide the data. There are many areas of the world where there are no RBN stations to provide the data. Recently there have been projects to fund various amateur radio clubs in under serviced areas to provide equipment and technical support in order to increase the number of reporting stations.



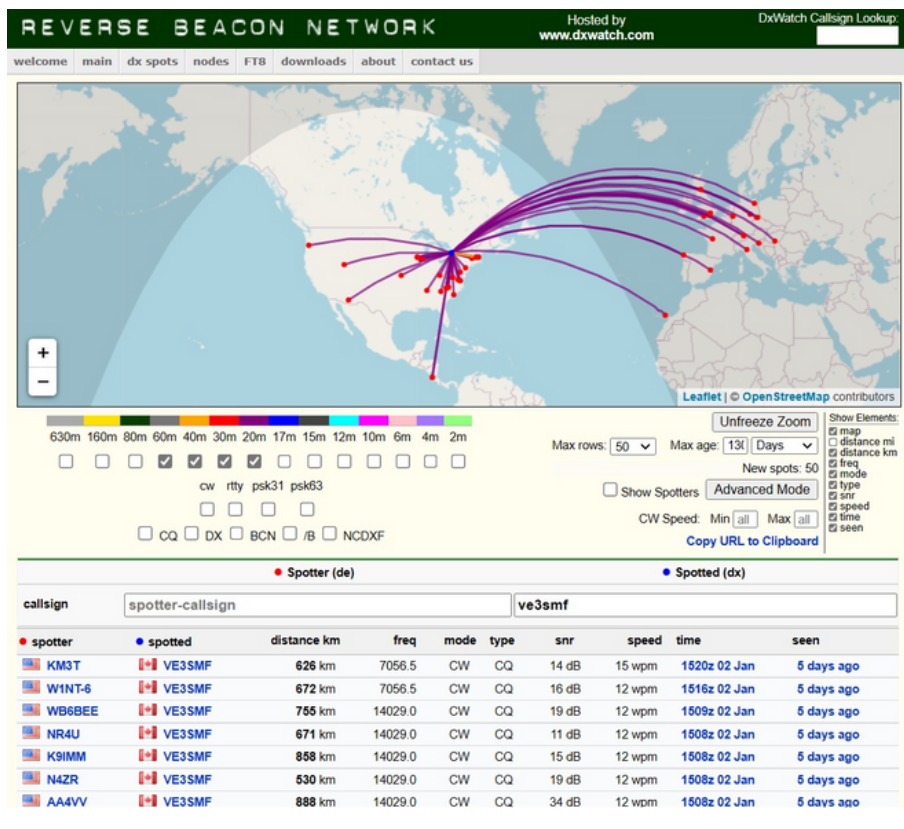
CW Skimmer Tips and Tricks

To make sure that CW Skimmer has the best chance of decoding your CW signal make sure your CW is as near to perfect as you can make it. The use of a memory keyer or a stored CW message in your transceiver will improve performance.

The RBN can be used for antenna comparisons and this is very useful to gain understanding of which antenna works the best to various locations and on different bands. Normally if a station spots you on one frequency, it will not spot you again on the same frequency until at least 10 minutes have passed. The trick around this is to change your frequency (QSY) at least 300 Hz and then call again with the different antenna. Then the RBN will show the results at the new frequency. You can then compare the reports from the same CW skimmer station. This is also useful to not only compare various antenna but it can be used to compare various power levels from your transceiver. One can start at a higher power level and then sequentially reduce power by 50% and also change frequency. This will demonstrate the which paths on that day are best for that QRP contact.

In summary when you use the Reverse Beacon Network, try out the many ways to use the data to learn more about the current propagation conditions; and to test how far that your own CW, RTTY, PSK31 and PSK63 signal is being heard. You can use the various data filters to look at your own data by bands to see where you have been heard.

Figure 10: Sample Reverse Beacon Network propagation map for VE3SMF on 60m, 40m, 30m 20m bands for RBN in USA, Europe, Africa, and South America.





But wait, there is more! We have covered the basics of CW skimmers, Software Defined Radio and Reverse Beacon Network. What are some of the other cool uses of the RBN system?

There is interest locally in the Ottawa region in the use of **Summits On The Air (SOTA) and Parks On The Air (POTA)** activations. The RBN is an independent resource and not directly affiliated with SOTA and POTA. Having said that, the SOTA and POTA systems are capable of using RBN data in real time to create active spots. You must **schedule** or “add” your activation with POTA or “create” an alert with SOTA. If you have not scheduled your activation on-line **BEFORE** you activate, the RBN will still post your CW call on the RBN system, but it will not be picked up by the SOTA/POTA spotting systems. The SOTA/POTA systems need to know the date, times (+/-) and which park or summit that you plan to activate.

Why is this important? This process permits you to activate on SOTA/POTA when you are at your pre-planned activation location without the use of the internet/cell phone. For remote locations this can be one of the few methods to quickly activate. You can still call CQ POTA, make a contact, and hopefully find someone who can correctly make a post on the SOTA/POTA systems on your behalf. It does require some pre-planning and hopefully finding someone who already knows how to correctly post the required data on-line. See Figure 11 and 12, for what POTA and SOTA activation look like on line. Complete details on How to use the reverse Beacon Network (RBN) for automatic POTA and SOTA spotting are available at: <https://qrper.com/2022/04/how-to-use-the-reverse-beacon-network-rbn-for-automatic-pota-and-sota-spotting/>

73, Stuart VE3SMF

Figure 11: Sample Parks On The Air activation post by VE3PTA using the POTA App for activation Port Hope Conservation Area in Ontario on 40/80m bands for 2023-01-06 22:29 to 2023-01-07 01:00 UTC.

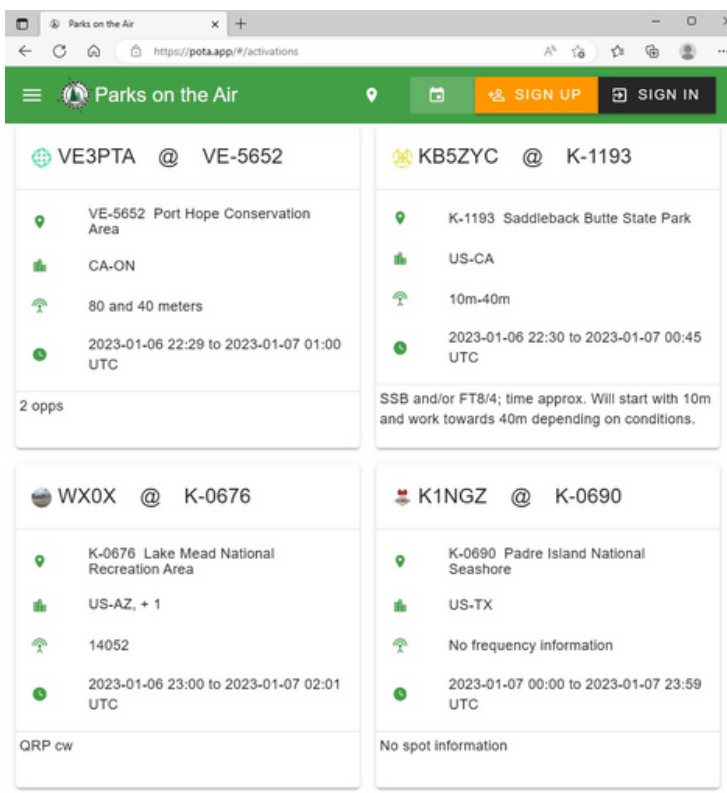




Figure 12: Sample Summits On The Air post by VE2EO who was active on 21 MHz CW, 14 MHz CW, 7 MHz CW and 7 MHz SSB on Mont Bear in Quebec.

	please very QRS (Posted by OE3KME)	14.038-cw, 10.111-cw
14:30	WB2FUV on W2/EH-021 S+4, looking for s2s and DX, please check 21-28 MHz (Posted by WB2FUV)	cw 7.061 14.063 21.060 28.060
14:30	EA5NU on EA5/AT-009 (Posted by EA5NU)	7-cw, 14-cw
14:30	EA5INS/P on EA5/CS-025 Time approx +/- Also VGCS-138 [SOTA Spotter] (Posted by EA5INS)	14-ssb,7-ssb
14:30	S57AJJ/P on S5/CP-011 (Posted by S57AJJ)	145.550-fm
14:30	2E0ICJ/P on G/SB-007 (Posted by 2E0ICJ)	145.450 fm 5w qrp
14:45	WC1N on W1/MV-006 (Operator: Eric Summit: Mont Bear, 666m, 4 pts)	14.062-cw, 7.062-cw, 146.52-fm
15:00	VA2EO on VE2/ES-022 Short 40m-ssb for local chasers at the end but only 10w. (Posted by VA2EO)	21-cw, 14-cw, 7-cw, 7-ssb
15:15	EI4JY/P on EI/IE-007 (Posted by EI4JY)	145-fm
15:15	EA2GM/P on EA1/AT-208 S2S are welcome ;-) (Posted by EA2GM)	14,21,28
16:00	KD5ZZK on W5A/OH-001 +/- 1hr On APRS KD5ZZK-9 (Posted by KD5ZZK)	7.190-ssb, 14.3425-ssb



OVMRC Net Activity, Check-ins for December, 2023.

Prepared by: Hugo Kneve, VE3KTN

OVMRC 2 Metre Net: VE3OCE 146.880-, 136.5 Hz. tone, Thursdays 8 p.m. local.

December 1	December 8	December 15	December 22	December 29
VE3KTN ~ NCS	VE3KTN ~ NCS	VE3KTN ~ NCS	VE3KTN ~ NCS	VE3KTN ~ NCS
New & Visitors	New & Visitors	New & Visitors	New & Visitors	New & Visitors
Nick ~ VA2WEC Jim – VA3BJO Vince – VA3VGH	Norm ~ VE3NPP	Bill ~ VA3WBR		Jon ~ VE3DNU
General Check-ins	General Check-ins	General Check-ins	General Check-ins	General Check-ins
VE3RUU VE3VIG VE3NA VE3LC VE3KAE VA3IAH VA3EO VA2OJD VE3LBU VE3LAF VE3OTW/p VE3KJQ VA2BBW VE3NPO VE3OKD VA3CSG VA3GLB VE3YY	VE3RUU VE3ZZU VA3EO VE3NPO VE3NA VE3LC VE3KAE VA3IAH VE3KAE VA3IAH VA3CSG VA3CSG VA2BBW VE3KJQ VE3RXH VE3VIG VE3LAF VE3YY VE3OKD	VE3RUU VE3ZZU VE3NA VE3LC VE3KAE VA3IAH VE3CWM ¹ VA3CSG VE3NPP VA2EV VA2BBW VA3WEX VE3LBU VE3NPO VA3GLB VE3KJQ VA3EO VE3VHU VA3HBL VE3VIG VA2OJD VE3LAF	VE3RUU VE3LC VE3ZZU VA3EO VE3NPO VA3PSI VE3LBU VA3CSG VA2OJD VE3VHU VA3GLB VA3IAH VA3WBR VE3KAE VE3YY VA3WEX VA3HBL VE3NA VE3LAF VE3VIG VE3RXH VE3OTW	VE3RUU VE3ZZU VA2OJD VE3NPO VE3LC VE3LAF VE3YY VA3WEX VE3RXH VA3EO VE3KJQ VA3IAH VE3OTW VE3VIG

1 – Thane, VA3TTM at the mic.



OVMRC Pothole Net: 3760 kHz. LSB Sunday mornings at 10 a.m. local.

December 4 SFI:134 A:10	December 11 SFI:142 A:8	December 18 SFI:155 A:2	December 25 SFI:133 A:23
VE3EJJ - NCS	VE3EJJ - NCS	VE3XRA - NCS	VE3EJJ - NCS
New & Visitors	New & Visitors	New & Visitors	New & Visitors
	John - VA3DU		
General Check-ins	General Check-ins	General Check-ins	General Check-ins
VA3BGO VA3PSI VE3XRA VE3SYZ VA3IAH VE3KTN VA3IEN VE3CWM ¹	VA3EO VE3KAE VA3BGO VE3YY VA3PSI VE3KTN VA3IAH VE3CWM ² VA3IEN	VE3EJJ VE3SYZ VE3KTN VA3EO VE3OWV VA3IAH VE3CWM ¹	VE3KTN VA3EO

1 – Fred, VE3LAF at the mic

2 - Eric, VA3DXP at the mic.

The “SFI” and “A” values are the Solar Flux Index and Geomagnetic A-Index respectively as reported on the NONBH Space Weather web site: <https://www.hamqsl.com/solar.html>. Values are taken within 30 minutes prior to net start time.



General Links of Interest:

1) Check out the YOTA Camp on the RAC web site:

--> <https://www.rac.ca/youth-on-the-air/>

2) See if you can hear Bernard Bastien's experimental 8M
CYA373 station on-the-air - for more see VA2CY on QRZ

<https://www.qrz.com/db/VA2CY>

3) The University of Montana journalism students put together
this video about "HAM Radio" for the Montana PBS station that
may be of interest to a lot of club members. Thanks Barry
VE3NA and Ralph, VE3BBM.

<https://www.montanapbs.org/programs/ham/>

Editor's Note:

The Rambler is the official newsletter of the Ottawa Valley
Mobile Radio Club Incorporated and is published 10 times a
year (monthly, except for July and August). Opinions
expressed in the Rambler are those of the authors and not
necessarily those of the OVMRC, its officers or its members.
Permission is granted to republish the contents in whole or in
part, providing the source is acknowledged. Commercial use
of the contents is expressly prohibited. Submit articles and
notices to: Alan at editor@ovmrc.ca

73, Alan VA3IAH

FOR DMR RADIOS, HOTSPOTS, ANTENNAS, QRP HF RADIOS AND MORE



Your Canadian Hamshack!

\$15 DISCOUNT TO OVMRC MEMBERS ON \$300 OR MORE