



An Introduction to the  
*WINLINK*  
Global Radio Email System

Modified by VE3SMF with permission from Joel Weder VE6EI  
& Dann St-Pierre VE6TD

## INTRODUCTION (HIGH LEVEL) TO THE *WINLINK* SYSTEM

- A volunteer project of the Amateur Radio Safety Foundation, Inc. (ARSFI)
- Email “client” software has some similarities to traditional email programs you already know such as Microsoft Outlook, Thunder Bird
- Files may be sent as attachments, though remember channel speed is limited
- Typically connects to the email server system over a radio link. Alternately can be via an internet-based Telnet connection

## INTRODUCTION (HIGH LEVEL) TO THE *WINLINK* SYSTEM

- Allows sending/receiving **email** from almost anywhere on Earth
- Connections are initially to **Radio Message Server (RMS) Gateways**, typically operated by hams at their homes
- RMS gateways connect via Internet (telnet) or RF to one of several **Common Message Servers (CMS)** around the world, hosted by Amazon.
- Messages are redundantly sent to all of the CMS locations. You can retrieve your messages by connecting to **any RMS Gateway**, which links to closest CMS.

## INTRODUCTION TO THE *WINLINK* SYSTEM

- **Winlink Express** is a very popular program to access the *WINLINK* system, but others include AirMail, Outpost, WoAD, PAT, Paclink.
- Developed for **Windows computers**.
- Send emails to other *WINLINK* system users with their callsign as address.
- To email a non-*WINLINK* address from a *WINLINK* client, use the full regular email address.

## INTRODUCTION TO THE *WINLINK* SYSTEM

- To email a *WINLINK* address from a public email system, use the format [callsign@winlink.org](mailto:callsign@winlink.org)
- Registering on the system is easy. After installing the software, just fill out the form that appears when you start Winlink Express.
- Best source for information & software is <https://winlink.org>

## WHY USE A *WINLINK* EMAIL CLIENT?

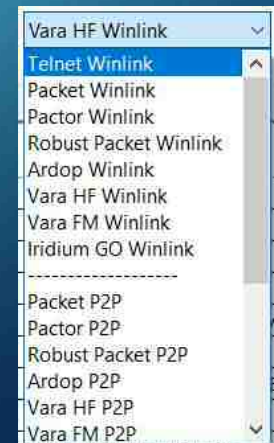
- Rapidly becoming the standard for emergency and disaster relief communications.
- Helpful with **interoperability** between agencies, as email is very common.
- Capable of operating completely without internet, using **Hybrid RMS Gateways**.
- Connect from almost anywhere, even far out at sea or deep in the bush.

## WHY USE A *WINLINK* EMAIL CLIENT?

- Templates can be shared among users to create common email contents for emergency operations. Example **ICS-213 Incident general message** and **ARRL Radiogram templates**
- Winlink is used by ARES, Auxiliary Communication Service (ACS), and other agencies.
- Winlink also used by the **Canadian Forces Affiliate Radio System (CFARS)**
- Can be used for private non-emergency Public Service use as well.

## *WINLINK* Express Session Options

- Several communication channel options available in the software
- **Telnet** is a connection directly to a **CMS** over the internet
- **Packet** will use a connected AX.25 packet modem (eg Kantronics) for VHF/UHF FM radios.
- **Pactor** can use a Pactor modem for HF long range. Fast & good ability to handle noisy conditions, but this hardware is expensive.
- **VARA HF** will use the VARA HF software modem, just about as good as Pactor and far less expensive. (Free for lower data rates).
- **VARA FM** is a software modem used by some VHF or UHF systems, instead of packet.
- **Peer to Peer (P2P)** sessions allow two stations running Winlink to communicate directly, instead of through a Gateway.





## *WINLINK* HF Connection Aids

- If selecting an HF modem option, user can download information to help choose the best RMS gateway – many exist, but which will be reliable?
- Based on current ionospheric conditions and location of the gateways
- Provides Path Reliability and Path Quality estimates, but NOT always perfect!
- Sometimes must try connecting to several Gateways before a good connection is established
- Software will perform repeated attempts (typically 10x) as most Gateways are scanning multiple frequencies on different bands



The screenshot shows the 'HF Channel Selector' window with a menu bar containing 'Exit', 'Select', 'Update Via Internet', 'Update Via Radio', 'Map', 'Forecast', 'SFI', and 'All RMS'. Below the menu is a table with the following columns: Callsign, Frequency (kHz), Mode, Grid Square, Hours, Group, Distance (km), Bearing Degrees, Path Reliability Estimate, and Path Quality Estimate. The table contains eight rows of data.

Callsign	Frequency (kHz)	Mode	Grid Square	Hours	Group	Distance (km)	Bearing Degrees	Path Reliability Estimate	Path Quality Estimate
N7TRY-2	7102.500	V2300	CN85NI	00-23	PUBLIC	903	230	64	47
VE6JTM	5405.000	V2750	DO33FN	00-23	PUBLIC	297	005	61	46
KD7ZDO	10148.700	V2300	CN85QH	00-23	PUBLIC	893	229	59	45
N7TRY-2	10148.500	V2300	CN85NI	00-23	PUBLIC	903	230	59	45
KF7RSF	10146.500	V2750	CN73SC	00-23	PUBLIC	1174	227	58	44
KG7AV	7103.500	V2300	CN94IB	00-23	PUBLIC	937	219	58	44
KF7RFI	10146.700	V2300	CN95IC	00-23	PUBLIC	843	223	57	44

# HARDWARE FOR AN HF *WINLINK* STATION

Antenna



Radio with built-in sound card

USB Cable



Computer running Winlink Express

OR

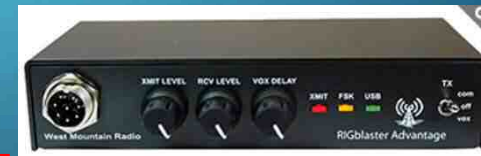
...

Antenna



Rig Control – PTT, freq

Receive & Transmit Audio



USB Audio & Control Interface

# HARDWARE FOR A VHF/UHF *WINLINK* STATION

Antenna



VHF or UHF FM radio



Packet Modem eg KPC3



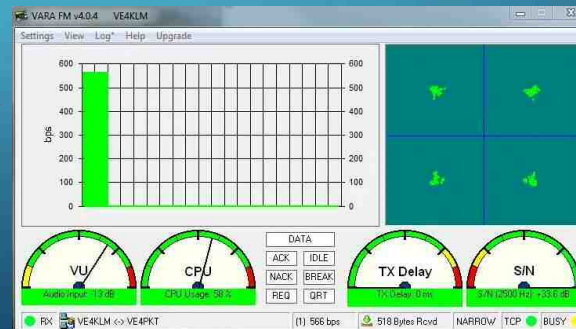
Winlink Express

Control &  
Tx/Rx  
Audio

Serial  
Cable

OR...

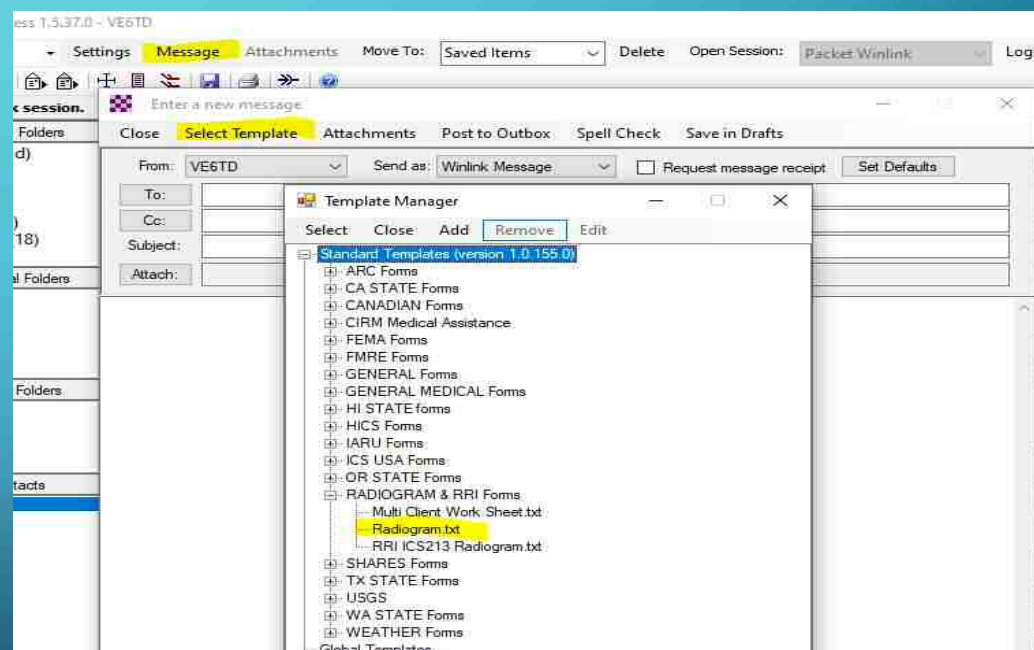
Rig Control – PTT,  
Receive & Transmit Audio



VARA FM Software Modem

# WINLINK How-To and Walkthrough

- Sending a new email message:
  - Click 'Message' -> 'New Message'
  - Compose your email similar to your usual email client
    - Optionally, you may 'Select Template' and choose from the available templates
    - In this example, select 'Radiogram'



# WINLINK How-To

Amateur Radio RADIOGRAM Text Creator [Read Help and Instructions!](#)

Number 12	Precedence R EMERGENCY P W <small>Emergency not in use at this time.</small>	Handling Instructions NONE HXA HXB <a href="#">HX Help</a> ADD MORE HX INFO	Station Of Origin VE6TD <small>Change if not you.</small>	Check 10	Place of Origin OKOTOKS AB	Time 2143L	Date MAY 26
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SVC (Handler use)

TO:

Name:  Call Sign:

Address:

City / Town:  State or Province:  [2 Letter Codes](#) Zip:

Country:

Phone:  Extension:  E-mail:

Op Note about this Radiogram:

MESSAGE TEXT Check:  [ARRL Message Numbering Help](#)

SYSTEM UPDATE DASH THE VE6OKT  
NODES HAVE BEEN RENAMED VE6FAR

[Click here to preview for accuracy BEFORE you SUBMIT](#)

Signature (name) of person for whom message originated:

Operator Note:

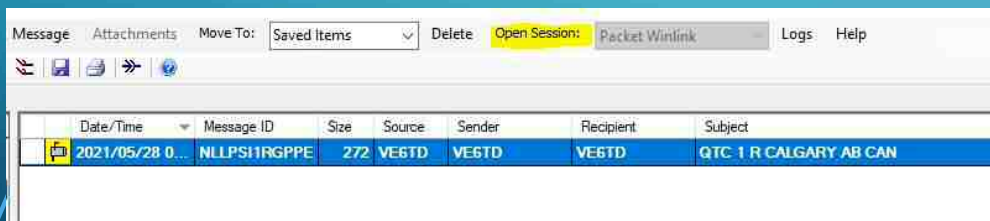
>>> NOW CLICK HERE and select a Liaison Station <<<

Contact KB1TCE about this form. Ver 10.5

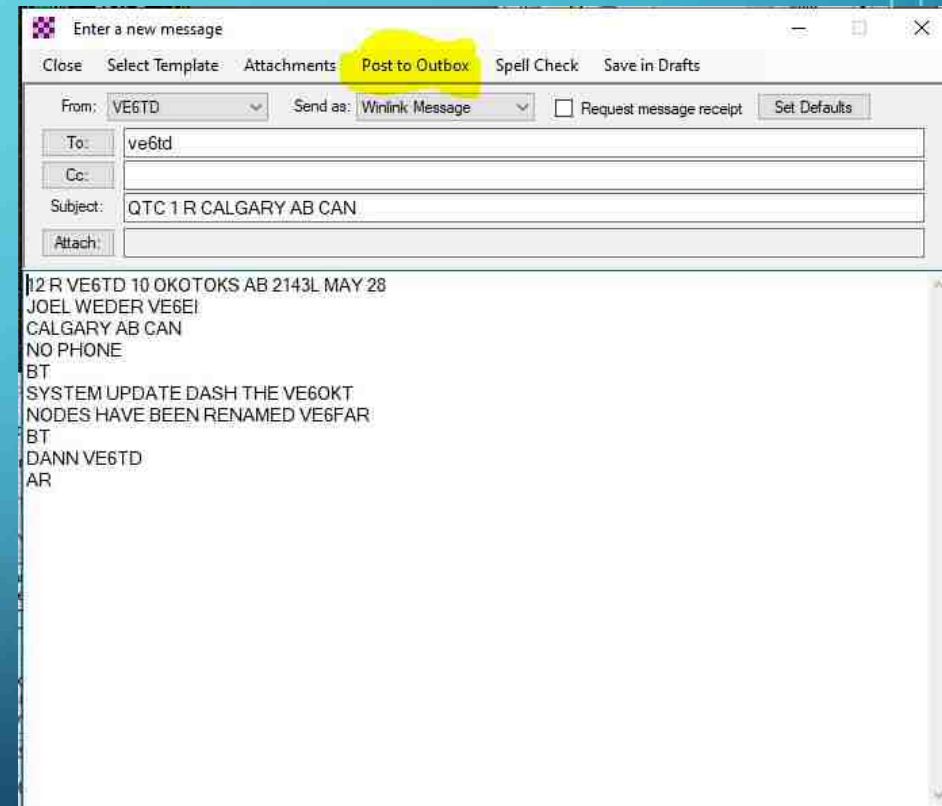
- Your web browser will open and display the radiogram creator form
- Enter data in the required fields
- When done, click 'Submit'

# WINLINK How-To

- Your message text will appear in the message window
  - If not using a template, type your message text here
- Post to Outbox
- When you are ready to send, select a session type, in this case **Packet Winlink**



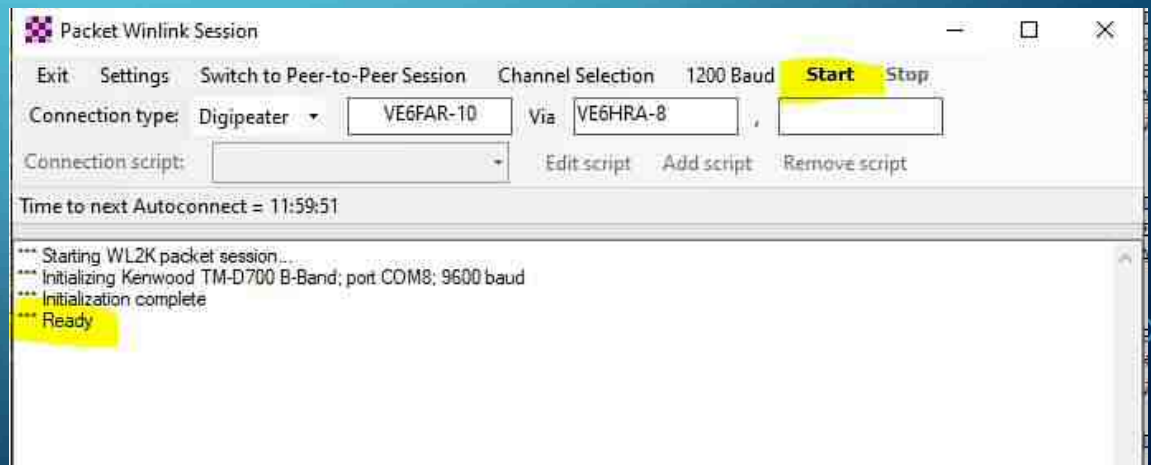
- Open Session to start





# WINLINK How-To

- Wait for your radio and TNC to initialize
- Select your Connection type - can be Direct or Digipeater  
Enter the Winlink node name to use  
Use a Digipeater (or two) if you can not reach the Winlink node directly  
Enter the Digipeater name
- Click Start to initiate the RF connection to upload and download your messages



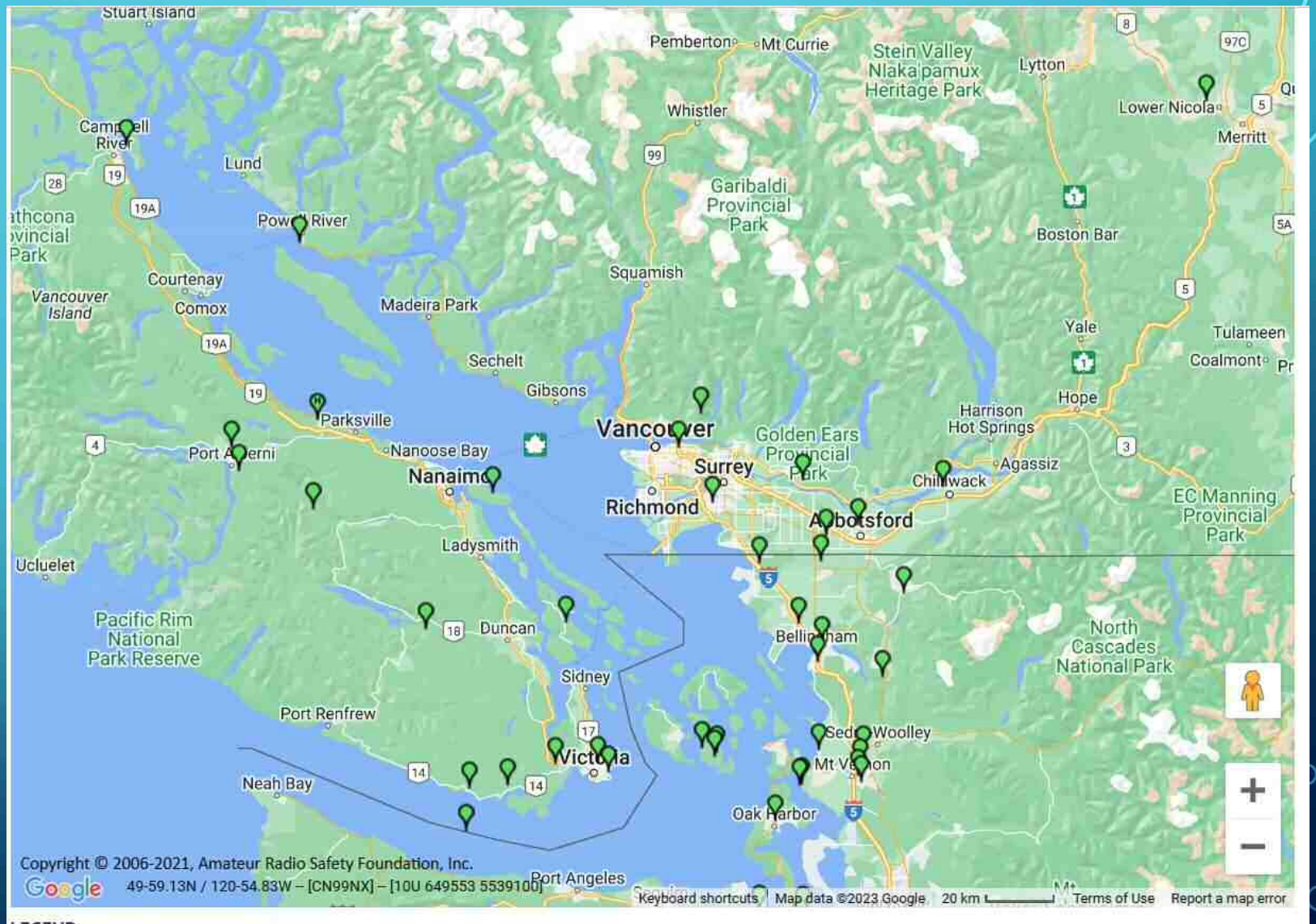


# SETTING UP A BASIC WINLINK PACKET/VARA FM RMS GATEWAY

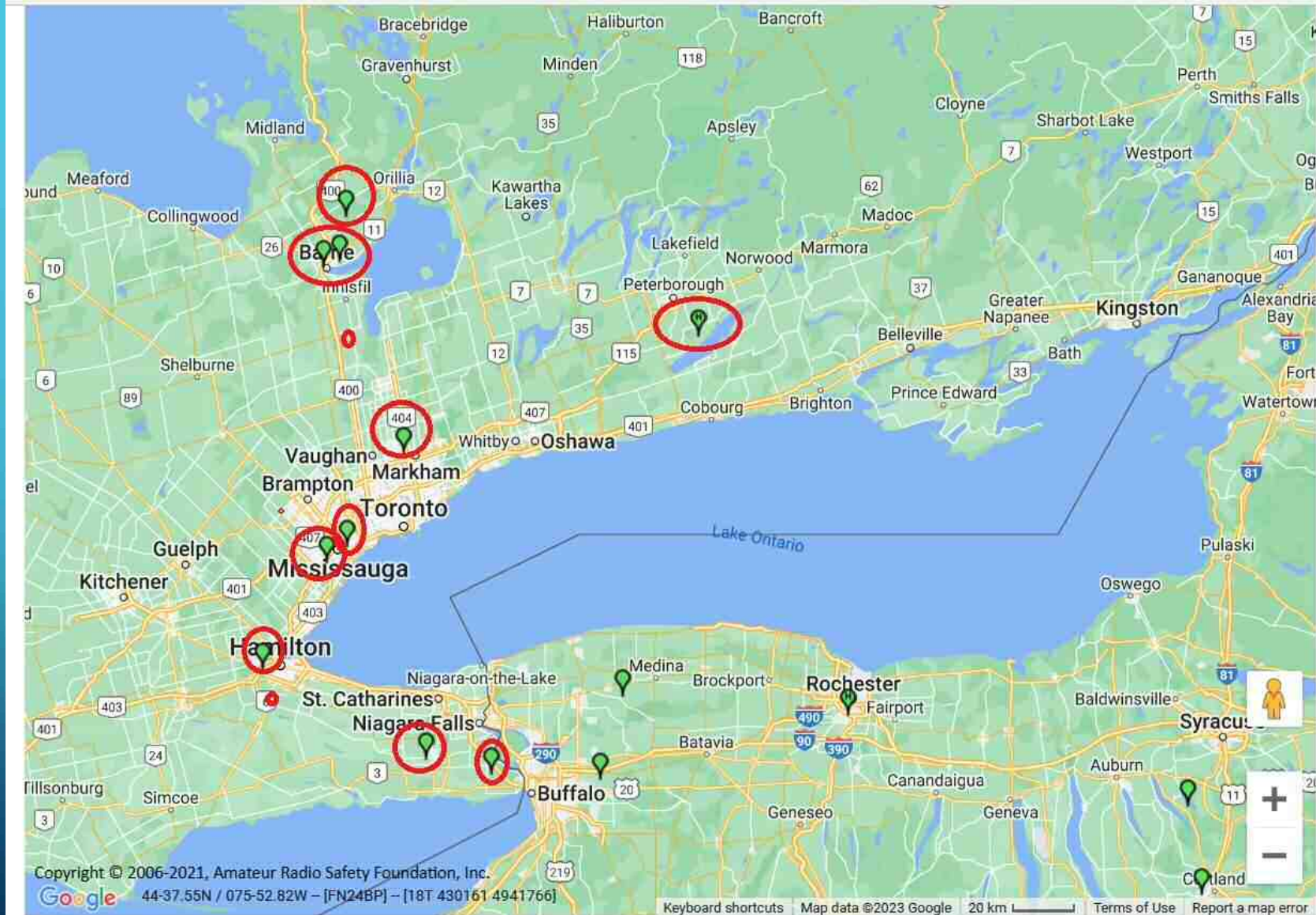
Ottawa Valley Amateur Radio Club Wednesday  
February 15<sup>th</sup>, 2023. Stuart VE3SMF



# PACKET RMS VANCOUVER

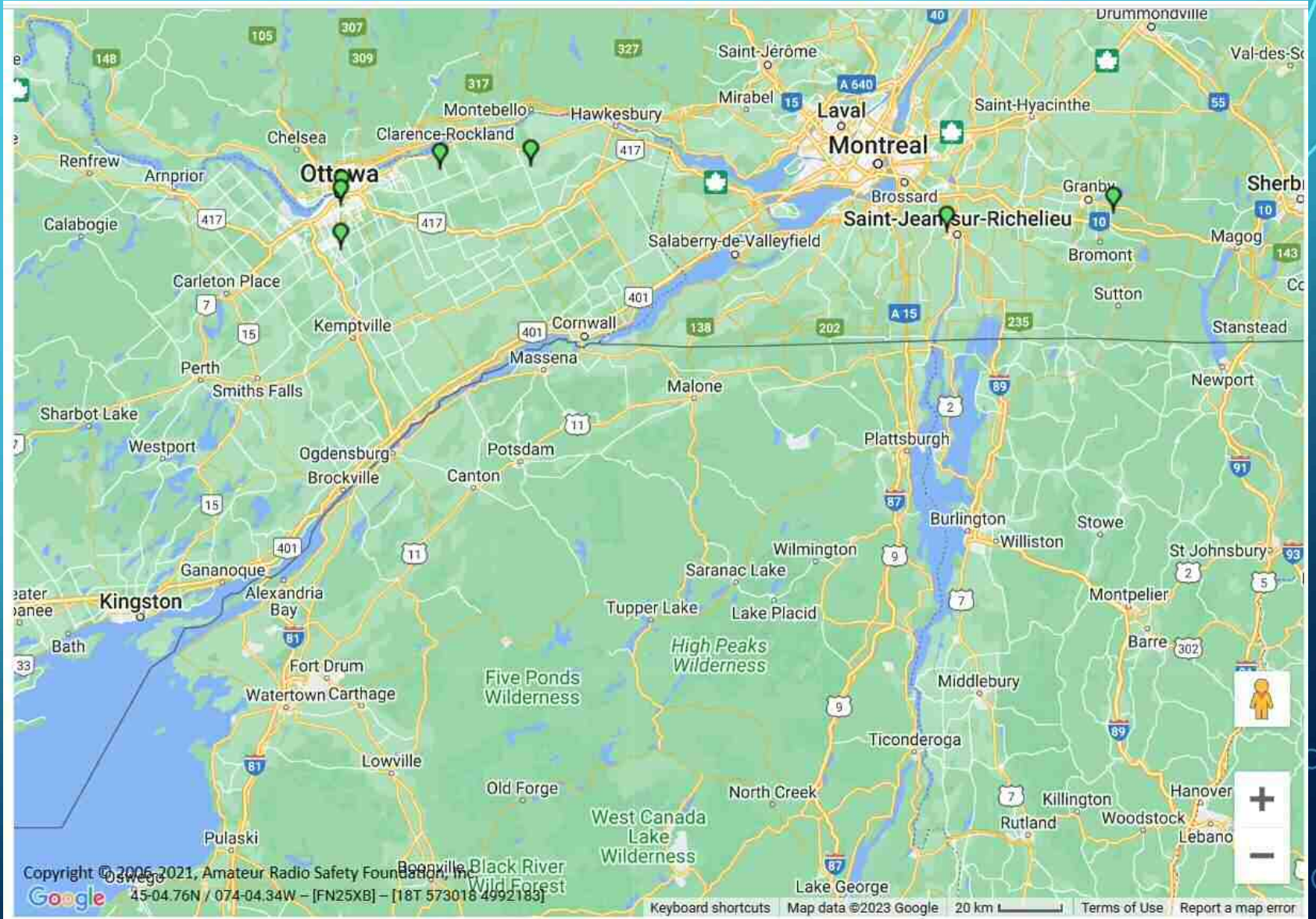


PACKET  
RMS  
GTA



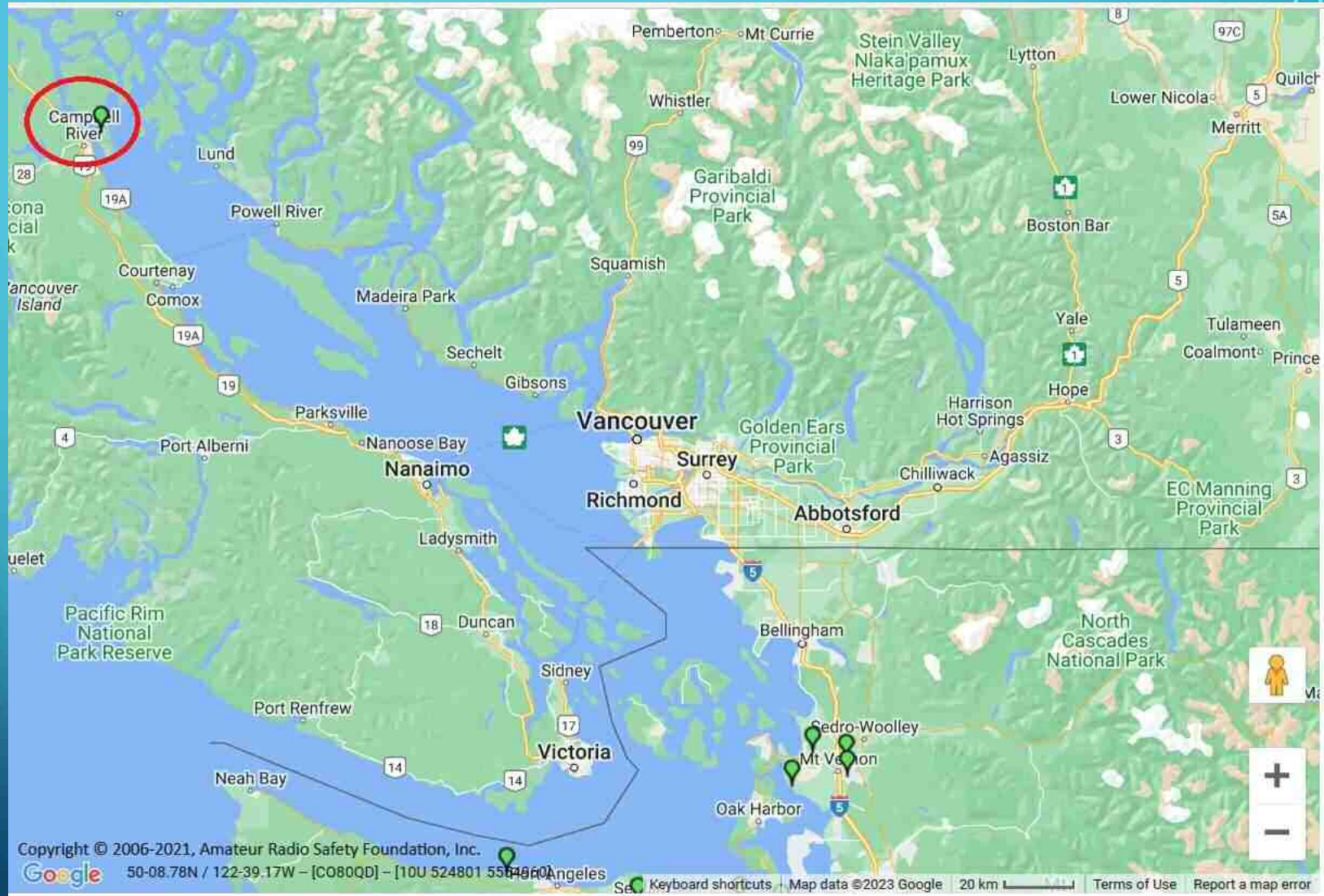


# PACKET RMS OTTAWA

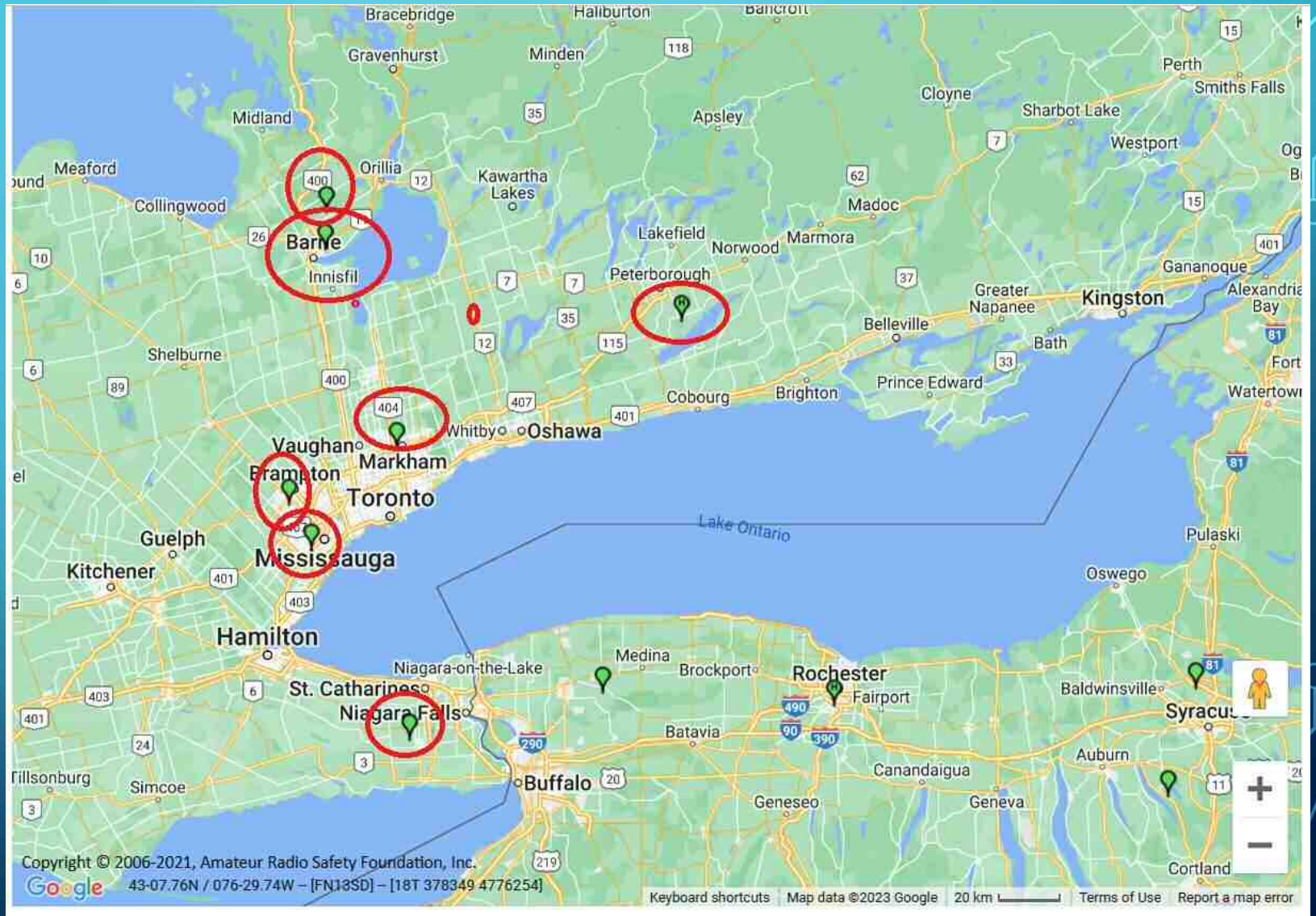




VARA FM  
RMS  
VANCOUVER

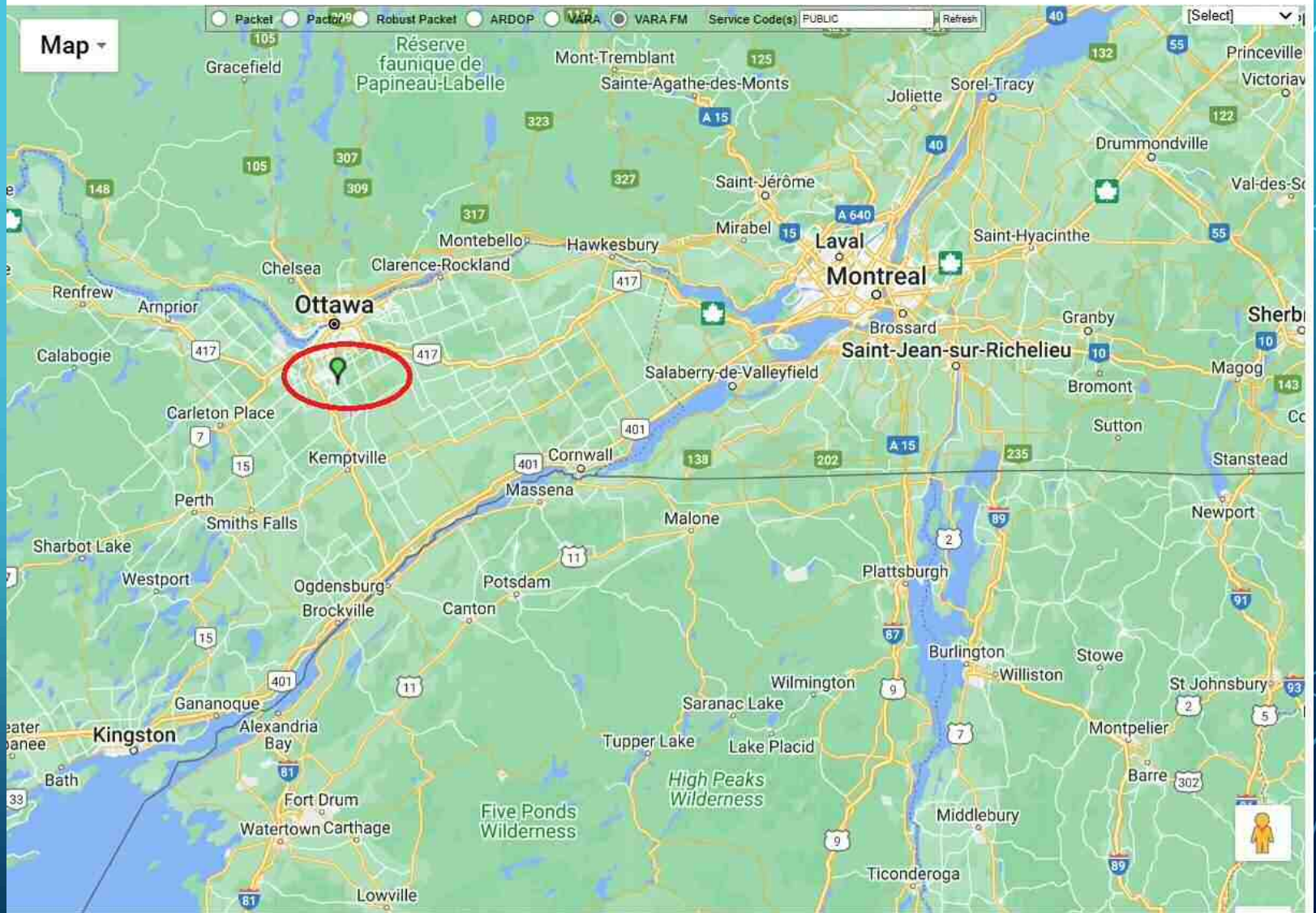


VARA FM  
RMS  
GTA





VARA FM  
RMS  
OTTAWA



## SETTING UP A PACKET/VARA FM VHF RMS GATEWAY

- Relatively fast data connection
- Local/Regional Resources.
- Stored in Favorites (of Winlink Express)
- Less dependent on propagation

# SETTING UP A PACKET/VARA FM VHF RMS GATEWAY

- Internet connection
- Interoperability with other systems
- Often EOC/Partner endpoint
- MESH network
- Digipeater
- HF radio via Hybrid Gateway



## SYSOP FOUNDATION SKILLS AND GEAR

- Proven Winlink station operating skills in station set-up of radio, antenna, software, sound card and sending/receiving Winlink traffic. Requires regular participation in nets.
- Duplicate (similar) station hardware & software will become the RMS gateway. Instant backup of system components.
- Backup plan (power) for resiliency of system.

# JOIN THE GATEWAY SYSOP TEAM (SYSOP GUIDELINES)

## [JOIN THE GATEWAY SYSOP TEAM \(SYSOP GUIDELINES\)](https://winlink.org/content/join_gateway_sysop_team_sysop_guidelines) | [WINLINK GLOBAL RADIO EMAIL](#)



The screenshot shows a web browser window with the URL [https://winlink.org/content/join\\_gateway\\_sysop\\_team\\_sysop\\_guidelines](https://winlink.org/content/join_gateway_sysop_team_sysop_guidelines). The page features the Winlink Global Radio Email logo, which includes a globe and the text "WINLINK Global Radio Email®". Below the logo is a navigation menu with the following items: My Account, Tools, News, Positions, User Programs, Book of Knowledge, Download, and Support. The main heading of the page is "Join the Gateway Sysop Team (Sysop Guidelines)". The text below the heading describes the rewards and responsibilities of being a Winlink sysop, including saving lives, assisting with medical missions, and participating in emergency communications.

### Join the Gateway Sysop Team (Sysop Guidelines)

Running a Radio Mail Server (RMS) gateway station is rewarding. Actually saving a life or a boat in distress, helping medical missions in far off jungles, and participating on local public service and emergency communications teams are some of the ways sysops use their radio assets for the public good. Almost weekly one of the Winlink sysops will receive direct, heartfelt thanks from an incident victim or their loved ones. Sysops often assist with the evacuation of a sick yachtsman for emergency treatment, locate an overdue yacht for a worried family, or help arrange medical supplies for a remote medical clinic. Many sysops support their communities as part of a local emergency network. EmComm organizations train and drill member sysops and radio email operators for emergency field deployments. Off the amateur bands, Winlink is a mainstay in DHS SHARES, and is a last-resort communication tool for national, regional and local governments, NGOs and agencies. Our sysops often remark that their work as a Winlink RMS gateway station is the most deeply rewarding thing they do in amateur radio.

# OPERATING POLICY

- Operating Policy
- *Before you inquire to run an RMS gateway station, you must first be an active user of radio email. This is a firm pre-requisite to be sure you have the required knowledge and familiarity with the Winlink system.* All gateway software requires a Winlink account password. To get one you must maintain an active radio email account for each callsign/license you use as a gateway. You must also request authorization for your station to connect with CMS servers as a network gateway.

# AUTHORIZATION REQUESTS

1. Your name and call sign.
2. The base call sign of the gateway station. This callsign must be under your direct control as licensee or trustee.
3. State your agreement and commitment to operate within these guidelines.
4. A reference to confirm your affiliation with an established EmComm organization, if you intend to operate the station as a temporary or portable asset.

# RMS GATEWAY CONTINGENCY PLAN

- Relay for Winlink Traffic using internet to CMS via Internet or by RF to other RMS gateways.
- Reliable always available.
- Role in testing operator stations. Assisting others to troubleshoot.
- Most important is emergency power plan.

## RMS GATEWAY CONTINGENCY PLAN (DIFFERENCE BETWEEN OPERATOR STATION AND RMS GATEWAY)

- Most important is emergency power plan.
- Commercial power supplies 120 VAC power:
  - 12 VDC power supply for computer, radio, Internet Router, Internet modem, WiFi Access Points (AP)
  - Installation of a UPS. Often a UPS will not be able to keep the station equipment operating for a long period of time.
  - Need to scale back power demands of station.
  - The UPS provides time for you to implement your personal alternative power generator. (gasoline/propane/solar/wind/other)

# VE3SMF-10 RMS GATEWAY EMERGENCY POWER CONTINGENCY PLAN

- Alinco DM-330MV switching power supply 120 VAC input nominal 13.8 VDC output. Variable output voltage with Anderson Powerpole (AP) cable.
- West Mountain Radio PWRgate PG40S with AP connectors for Power Supply (PS) in, Output (OUT) to RMS Gateway power distribution and battery (BAT) for backup battery. For portable operations using a 100 Ah LiFePO4 battery, a West Mountain Radio Epic PWRgate that will use multiple battery chemistries and support a solar panel input.

# ALINCO DM-330MV SWITCHING POWER SUPPLY





# VE3SMF-10 RMS GATEWAY EMERGENCY POWER CONTINGENCY PLAN

- West Mountain Radio PWRgate PG40S with AP connectors for Power Supply (PS) in, Output (OUT) to RMS Gateway power distribution and battery (BAT) for backup battery.
- For portable operations using a 100 Ah LiFePO4 battery, a West Mountain Radio Epic PWRgate that will use multiple battery chemistries and support a solar panel input.

# WEST MOUNTAIN RADIO PWRGATE PG40S



# EPIC PWRGATE



# VE3SMF-10 RMS GATEWAY EMERGENCY POWER CONTINGENCY PLAN

- DC Power Cube 30 amp maximum power output with fused four (4) position AP connectors.
- For home and portable operations a Honda EU-1000i gasoline generator and extension cords are available.

# POWER SUPPLY, PWRGATE, DISTRIBUTION SYSTEM AND BACKUP BATTERY

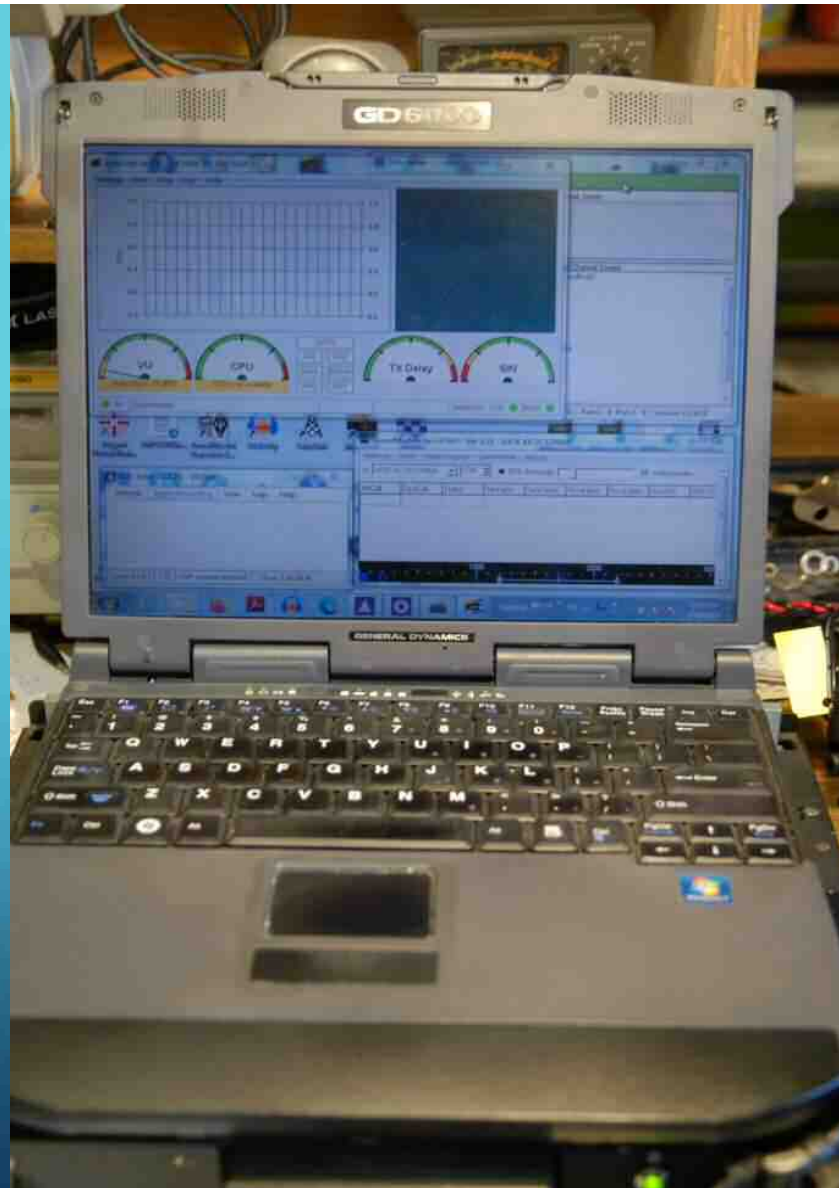


## VE3SMF-10 RMS GATEWAY COMPUTER

- General Dynamics GD6000 portable computer running Windows 7 mounted in a GD6000 vehicle rugged docking station. The docking station provides WiFi access, USB 2.0 ports, serial ports, ethernet port. Computer is used 100% for Winlink VHF RMS Gateway.
- Computer and Docking station powered by 13.8 VDC (12 VDC) Anderson Powerpole (AP) connectors to 12 VDC power distribution system. Internal battery of GD6000 will power computer for short periods of AC power supply interruption.



# GD-6000 COMPUTER



## VE3SMF-10 RMS GATEWAY COMPUTER

- Computer uses internal WiFi to connect to home WiFi router.
- To prevent disconnection problems with CMS the Windows Device settings were configured to prevent the computer, Wifi, USB and other items from entering sleep mode.
- This is a major cause of the Winlink CMS reporting the RMS Gateway is no longer working.



## VE3SMF-10 RMS GATEWAY COMPUTER

- This computer will be replaced with a mini-computer that runs directly on 12 VDC that uses Windows 10.
- This mini-computer will be dedicated to Winlink VHF/HF RMS Gateway use.

VE3SMF-10  
COMPUTER  
UPGRADE



## VE3SMF-10 RMS GATEWAY COMPUTER TO EXTERNAL SOUND MODEM AND TRANSCEIVER

- A Signalink USB device is used from the GD6000 computer to the transceiver. I have standardized on using Signalink USB devices, for audio circuits. There are many other hardware/software options available.
- I use a Yaesu FT-897 HF/VHF transceiver for my VE3SMF-10 RMS gateway. It was part of my HF deployment kit and works well. For a dedicated dual mode Packet Winlink/VARA FM VHF RMS Gateway most any VHF transceiver of 25-50 watts output would be satisfactory.
- Use what you already have.

SIGNALINK  
USB & YAESU  
FT-897



## VE3SMF-10 RMS GATEWAY ANTENNA SYSTEM

- Cushcraft Dual Band Ringo (AR-270B) 70 cm/2 meter antenna.
- Gain 5.5 dB on 2 m, 7.5 dB on 70 cm (430-470 MHz). Antenna is on 50 ft tower, with 10 ft mast. Tip of antenna is about 57 ft Above Ground Level (AGL).
- The antenna is fed with about 125 ft of LMR-400 coax.
- Calculate your Effective Radiated Power (ERP). Do the math!





# BUT WAIT, THERE IS MORE! WHAT SOFTWARE DO YOU NEED?

- Winlink Express C:\RMS Express
- VARA FM C:\VARA FM
- Sound Modem C:\SoundModem
- RMS Packet C:\RMS\RMS Packet
- RMS Relay C:\RMS\RMS Relay
- Startup Delayer C:\Program Files\R2 Studios

# RMS GATEWAY CONFIGURATION

- RMS Gateway configuration is an advanced topic that will be supported on a one-to-one basis.

## DUAL MODE PACKET WINLINK/VARA FM RMS VHF GATEWAY VE3SMF-10

- Dual Mode Packet Winlink/VARA FM RMS VHF Gateway VE3SMF-10 operates on 145.030 MHz and supports both Winlink Packet and VARA FM.

## DUAL MODE PACKET WINLINK/VARA FM RMS VHF GATEWAY VE3SMF-10

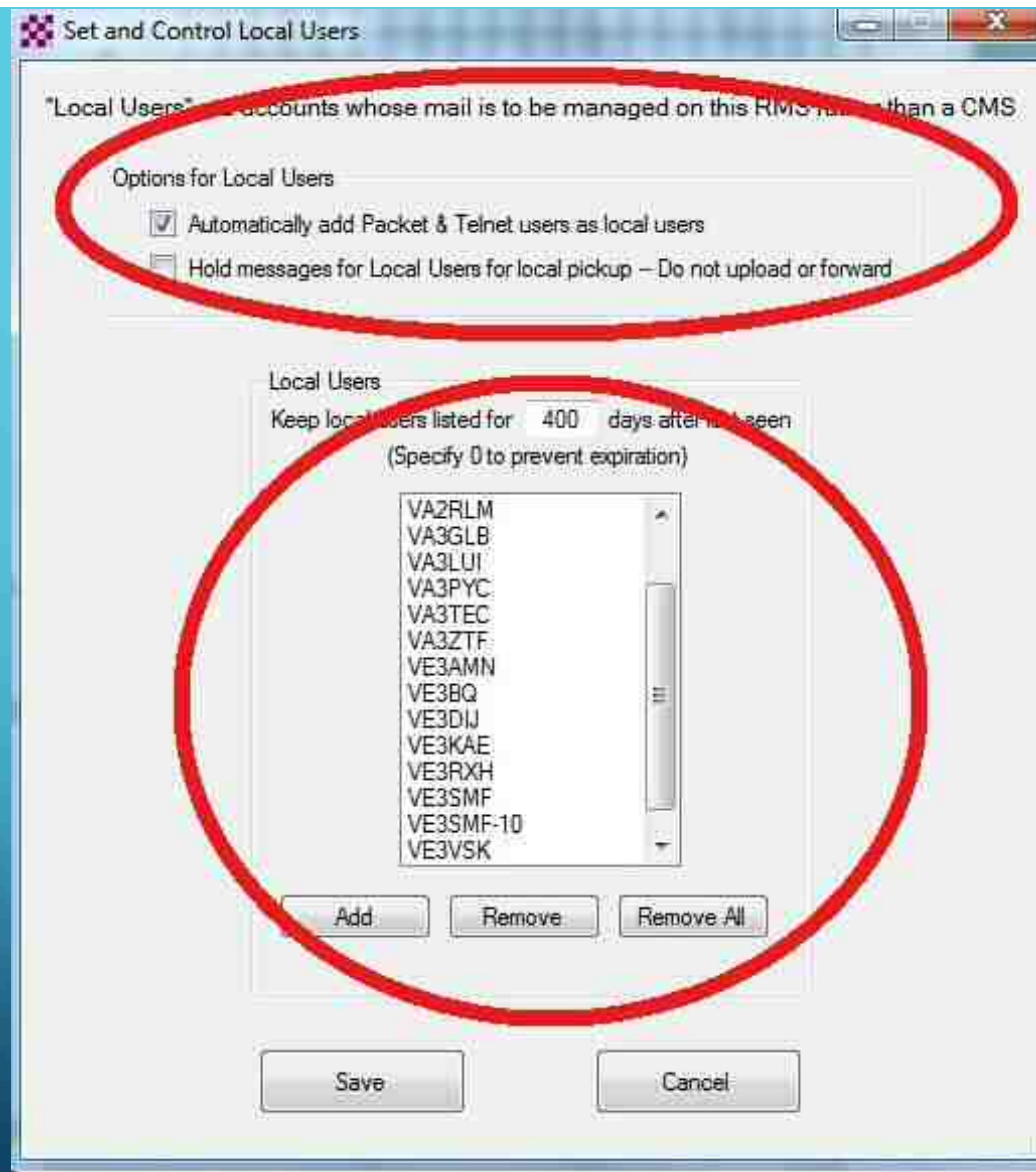
- The RMS VHF gateway will respond to Packet Winlink connecting stations with Packet Winlink and will respond to VARA FM connecting stations with VARA FM on the same frequency.



## DUAL MODE PACKET WINLINK/VARA FM RMS VHF GATEWAY VE3SMF-10

- The time required to pass traffic using Packet Winlink is longer than the same message sent by VARA FM. VARA FM just works faster and will work at a lower signal to noise ratio.

# VE3SMF-10 LOCAL USERS



# VE3SMF-10 LOCAL USER VA3ZTF

VARA FM v4.2.3 VE3SMF-10

Settings: View Ping Log\* Help

bps

VU CPU TX Delay S/N

ACK IDLE NACK BREAK REQ QRT

TX VA3ZTF <-> VE3SMF-10 (2) 1188 bps 5 Bytes Rcvd NARROW TCP BUSY

RMS Relay - 3.2.1.0 - VE3SMF

Settings Begin-forwarding View Logs He

VA3ZTF:

Users: 1 / 0 / 6 / 179 CMS upload enabled Run: 5

Incoming connection active

SoundModem by UZ7HO - Ver 1.13 - [AFSK AX.25 1200bd]

Settings View Clear monitor Calibration About

MyCall	DestCall	Status	Sent pkts	Sent bytes	Rcvd pkts	Rcvd bytes	Rcvd FC	CPS TX	CPS RX	Dir:

6:43 PM 10/25/2022

## RADIO IN THE PARK 2022-09-17

- Radio In The Park at Walter Baker Park.
- I operated Winlink Express portable from my 1986 VW Vanagon Westfalia pop top bus.
- Antenna was Arrow J-Pole antenna on a 12 ft mast on the back of the vehicle.

## RADIO IN THE PARK 2022-09-17

- Portable power supply system using a Honda 1000 generator.
- Sent and received Winlink traffic to VE3SMF-10 RMS Gateway located south of the Ottawa Airport.
- From VE3SMF-10 RMS Gateway, traffic went to the Winlink Central Message System (CMS).
- Winlink Express can generate a post event ICS-309 Communication Log (next image).



<b>COMMUNICATIONS LOG</b>		<b>TASK # Portable-In-The-Park-2022</b>		DATE PREPARED: 2023-02-14	
OPERATIONAL PERIOD #		TASK NAME: Portable-In-The-Park-2022			
RADIO OPERATOR NAME: Stuart VE3SMF				STATION I.D. VE3SMF	
<b>LOG</b>					
<b>TIME</b>	<b>FROM</b>	<b>TO</b>	<b>SUBJECT</b>		
2022-09-16 15:42	VE3SMF	VA3LP	Test Winlink portable station		
2022-09-16 16:13	VE3SMF	VA3LUI VA3LP	OARC : Radio In The Park		
2022-09-16 16:45	VA3LUI	VE3SMF	Re: OARC : Radio In The Park		
2022-09-16 17:54	VE3SMF	VA3LUI	Re: OARC : Radio In The Park		
2022-09-17 10:06	VE3SMF	QTH VA3LP VE3JJA	Position Report		
2022-09-17 10:11	SERVICE	VE3SMF	Position Report Acknowledgement		
2022-09-17 10:20	VE3SMF	VA3LUI	Portable In The Park OARC on site operating Winlink		
2022-09-17 11:02	VE3SMF	B9HJU K2EU KD4QNA KE4IP KG5FLJ	Radio In The Park 2022 demonstration		
2022-09-17 11:05	SERVICE	VE3SMF	Undelivered Message		

No active session...

- System Folders
  - Inbox (35 unread)
  - Read Items (0)
  - Outbox (0)
  - Sent Items (373)
  - Saved Items (4)
  - Deleted Items (17)
  - Drafts (0)
- Personal Folders
  - ACSFALLEX-21 (3)
  - Field-Day-2021 (0)
  - PortableInThePark2022 (23)
  - Spring-SET-2021 (44)
- Global Folders

Date/Time	Message ID	Size	Source	Sender	Recipient	Subject
2022/09/16 19:42	4KTINYXHCSCA1	292	VE3SMF	VE3SMF	VA3LP	Test Winlink portable station
2022/09/16 20:13	3MBDYV2H4F9I	594	VE3SMF	VE3SMF	VA3LUI...	OARC : Radio In The Park
2022/09/16 20:45	7HD5JSCEX21T	924	VA3LUI	VA3LUI	VE3SMF	Re: OARC : Radio In The Park
2022/09/16 21:54	1Y0720X7GLUU	1042	VE3SMF	VE3SMF	VA3LUI	Re: OARC : Radio In The Park
2022/09/17 14:06	W6UUJED05909G	313	VE3SMF	VE3SMF	QTH	Position Report
2022/09/17 14:11	O9U6LS0Z4F17	374	SYSTEM	SERVICE	VE3SMF	Position Report Acknowledgement
2022/09/17 14:20	JQW1OERCPJYL	260	VE3SMF	VE3SMF	VA3LUI	Portable In The Park: OARC on site o
2022/09/17 15:02	AA321Q1YHRHP	742	VE3SMF	VE3SMF	B9HJU...	Radio In The Park 2022 demonstrati
2022/09/17 15:32	ODQQUT8B8QM2	727	VE3SMF	VE3SMF	VE3OXUJ	Test message. 2022-09-17 Operator
2022/09/17 15:36	VI5EHIWNJUCY	734	VE3SMF	VE3SMF	KG7KIQ...	2022-09-17 Operation Radio in the P
2022/09/17 15:41	1SVBFSOR5M0F	733	VE3SMF	VE3SMF	N0UYH...	2022-09-17 Operation Radio in the P

Message ID: 4KTINYXHCSCA1  
 Date: 2022/09/16 19:42  
 From: VE3SMF  
 To: VA3LP  
 Source: VE3SMF  
 Subject: Test Winlink portable station

Hello Lance. Just testing Winlink portable in my 1986 Vanagon camper. I hope to operate portable with the Ottawa Amateur Radio Club on Saturday.

- Contacts
  - ACSFALLEX-21
  - ALOY
  - ALHOWARD@SUPERAJE.COM
  - B9HJU
  - CSO@RAC.CA
  - EMRC@UTS.CA

# QUESTIONS

I thank you for your interest in this topic.

## TEASER FOR ARDEN MESH AND WINLINK EXPRESS

- Connection between Client computer and ACS Operator computer using **MikroTik hAP ac lite Dual-concurrent Access Point (RB952Ui-5ac2nD)** and **ARDEN Mesh RF transceivers** on 2.4 GHz amateur radio band.

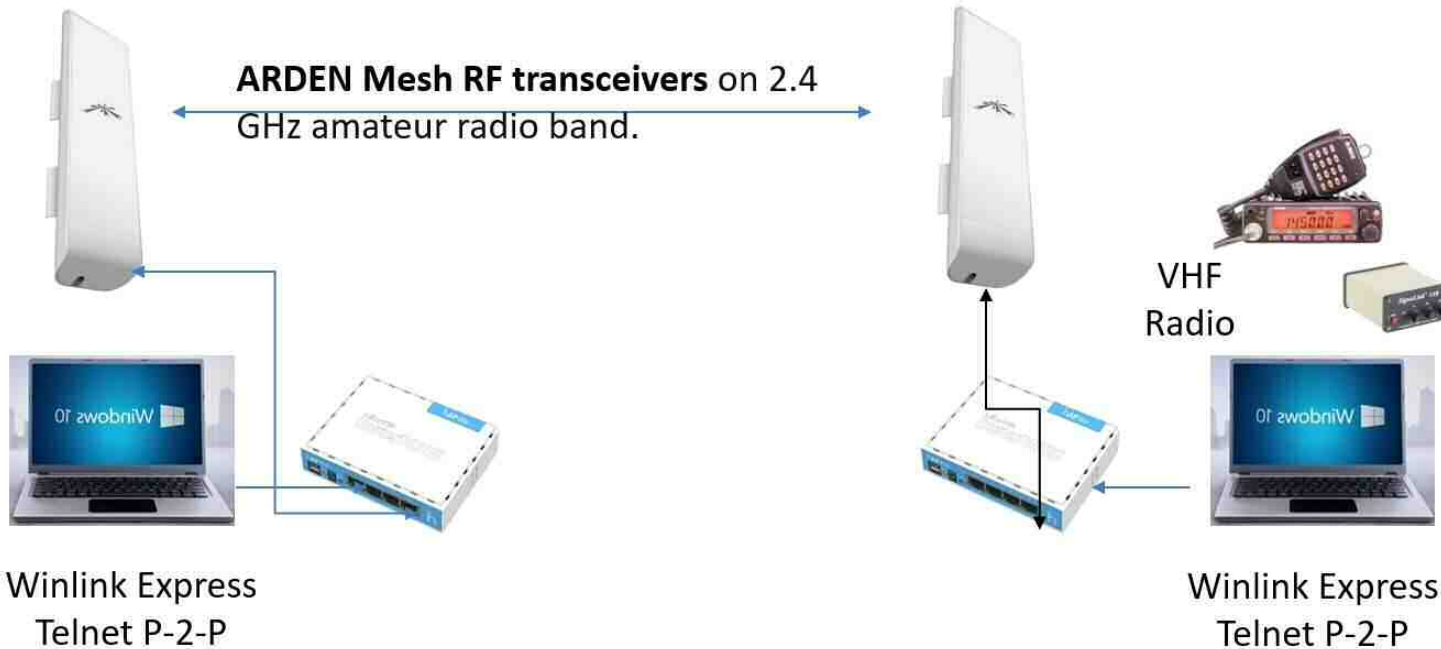


Client PC with Winlink Express operating in Telnet P-2-P

Connection between Client computer and ACS Operator computer using **MikroTik hAP ac lite Dual-concurrent Access Point (RB952Ui-5ac2nD)** and **ARDEN Mesh RF transceivers** on 2.4 GHz amateur radio band.



ACS Radio Operator (RadOp) PC with Winlink Express operating in Telnet P-2-P



Winlink Express  
Telnet P-2-P

Winlink Express  
Telnet P-2-P



Images from Jack VE3ZPW modified by Stuart **VE3SMF**



Attachments

Finished Add Edit/Resize-Image Open/View Delete Save-As Save-as-pdf

File Name	Size (kb)
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