



Winlink Email via Amateur Radio

Mark Bell – N7GRB

Agenda

- What is Winlink Email
- Winlink.org User Account
- Winlink Infrastructure System Components
- What is Required to Operate
- Express Operating Modes
- Winlink Clients
- Winlink Express Overview
- Odd's and End's
- Lets Play

What is Winlink Email?

- Formally known as Winlink Global Radio Email®
- As quoted from Winlink.org:
...is a network of amateur radio and authorized government stations that provide worldwide radio email using radio pathways where the internet is not present.
- Supported and maintained by the *Amateur Radio Safety Foundation, Inc.* (ARSF) primarily using volunteer help and donations
- Foundation days in the 1980's with a DOS based Aplink application (Amtor-Packet link)



What is Winlink Email?

- Mature, well tested system
 - 99.99% service reliability
 - 100% accurate message transmissions
 - Hosted by Amazon Web Services (AWS) since 2018 with two AWS servers providing system redundancy
- Standard e-mail format with features to include:
 - Message templates
 - Binary file attachments (pictures, pdf, spreadsheets)
 - Automatic message compression/decompression
- Several Winlink system compatible client applications

What is Winlink Email? - Users

- Off-grid amateur radio adventurers needing email or text message service
 - Messaging and position reports
 - Sailors at sea using amateur radio HF
 - Special Event support such as Georgia Jewel and Death Race
 - Isolated campers, RVer's, POTA operators ☺
- Governmental organizations
 - May operate on SHARES or amateur radio frequencies
 - SHARES (SHARed RESources) HF Radio network operates on Federal frequencies allowing encryption of data
 - DHS, National Guard, Emergency Management Agencies and more ...
- Non-Governmental Organizations (NGOs)
 - May operate on SHARES or amateur radio frequencies
 - American Red Cross, Southern Baptist Disaster Relief, FedEx and more ...

Caution on Winlink System Usage

- As US amateur radio operators our message traffic is public, no encryption (Part 97)
- RF based traffic is cached 21 days at Winlink.org for public view
- Messages can be sent between Winlink CMS and conventional email services
 - Your email address: [call sign]@winlink.org
 - //WL2K start of subject line convention (used to block spam, advertisements)
 - A user sending an email message to your Winlink address needs to be advised on open, public nature of the service; no sensitive info (e.g., HIPPA, financial data and/or inflammatory language ...)

Filter Type: **Sender** ▼Search for: **N7GRB**Limit to: **100**

records

Search

[5]

Winlink Global Radio Email®

	Timestamp	Callsign	Gateway	CMS	Source	Sender	Subject	Size	Attch	Frequency	Client
View	07/10/22 20:38	AB4NX	W6IDS	CMS-B	N7GRB	N7GRB	Re: message via portable	580	0	7.085 MHz	Express
View	07/07/22 13:35	N7GRB	N4BTA	CMS-B	N7GRB	N7GRB	Re: 213-WEEKLY GA PUBLIC HEA...	2165	0	28.132 MHz	Express
View	07/07/22 13:05	N7GRB	N4BTA	CMS-B	N7GRB	N7GRB	Winlink Check in Exercise - N7GRB -...	3905	2	28.132 MHz	Express
View	07/07/22 12:45	N7GRB	AB4NX	CMS-A	N7GRB	N7GRB	Saildocs query	152	0	28.134 MHz	Express
View	06/25/22 23:32	WB4QDX	WW4MSK	CMS-B	N7GRB	N7GRB	Re: Winlink Check In [Net]-WB4QD...	2224	0	3.593 MHz	Express

Selected Message: Re: message via portable ☐ Show Message Header

Roger that!

Mark

----- Message from AB4NX sent 2022/07/07 15:49 -----

Message ID: 19RX88LDLEUQ

Date: 2022/07/07 15:49

From: AB4NX

To: N7GRB

Source: AB4NX

Subject: message via portable

This message sent via my Windows based gateway.

Larry

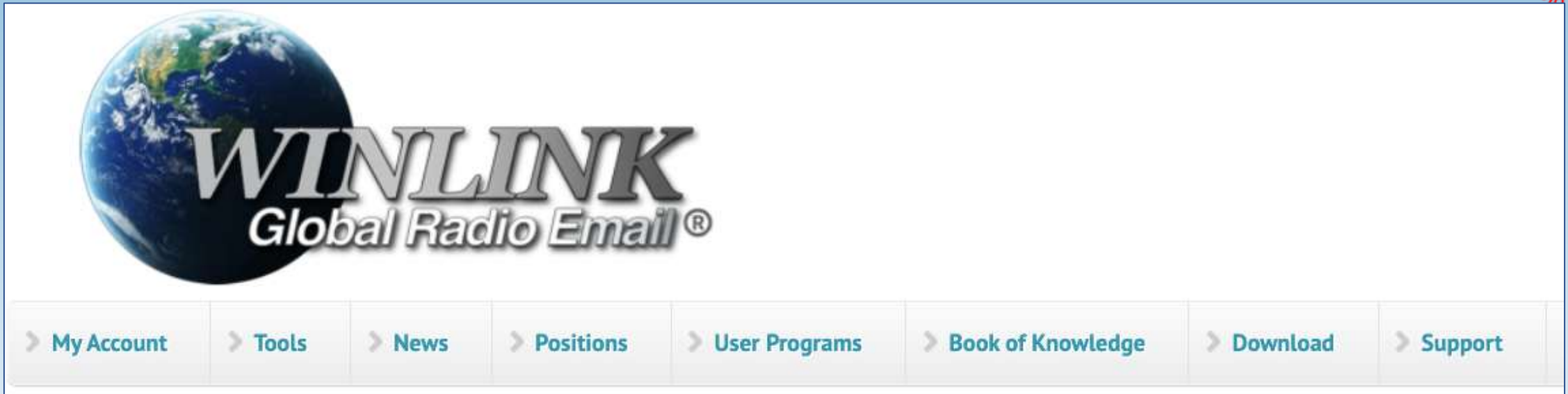
To be advised of the disposition of this complaint, please enter your email address below:

Email:

Reason for report:

[Report Possible Amateur Rule Violation](#)

Winlink.org User Account



- To use the Winlink system, you must have a Winlink account
- Requires a current radio license from a recognized authority
- Account is automatically created on first use of the system
- While a free service, ARSF requests a registration fee donation (\$24)
- Users are highly encouraged to access their account at Winlink.org

Winlink Account

- Provide / update password recovery email address
- Full contact information
- Manage account password
- Establish email whitelist
- Temporary forwarding email address (be careful on its use)
- SYSOP related functions
 - Used by RMS gateway owners

[Log out](#)
[Password change](#)
[My blog](#)
[CMS License Manager](#)
[US Amateur Radio Message Viewer](#)
[Sysop's Message Monitor](#)
[Station & System Activity Reporter](#)

[My Webmail](#)
[My Whitelist](#)
[Become an RMS sysop - GUIDELINES](#)
[Sysop Software](#)

N7GRB
[View](#) [Edit](#) [Track](#)
Full licensed name:
Mark T Bell
Street address 1:
2450 Peregrine Trail
Street address 2:
City:
Suwanee
State:
GA
Country:
USA
Postal code:
30024
E-mail address:

Grid square:
EM74XA
Phones:
Web site:
Comments:
ARES Gwinnett County, GA
Call prefix:
Call suffix:
PW Recovery e-mail:

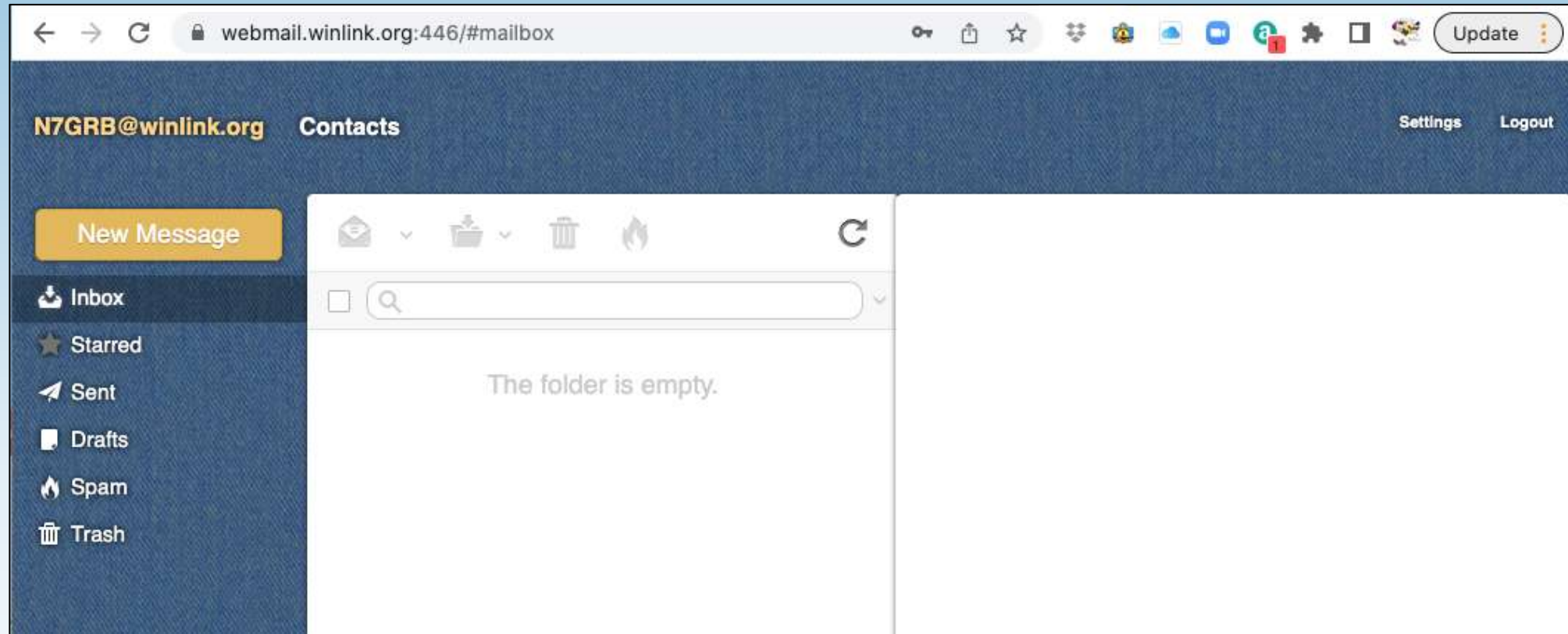
Alternate (temporary forwarding) e-mail:
Maximum message size:
120 000bytes

Registration keys

Express

9A4F51

Winlink Webmail Client Interface



- Simple Web HTML based interface
- Link to Web interface in your Winlink.org account

Winlink Clients

- Comparison table: <https://winlink.org/ClientSoftware>
- Winlink Express
 - Windows based (Win 7 or later), closed source
 - Well maintained by ARSF (Winlink.org development team)
 - Best choice for EMCOMM related communication
 - Download: <https://winlink.org/WinlinkExpress>
- Pat
 - Cross-platform to include Linux, Mac OS and Windows
 - Community based open-source project
 - Now supports Winlink.org standard message templates
 - Download: <https://getpat.io/>



Winlink Infrastructure – System Components

1. Client system

- Radio, computer with Winlink software, TNC (or sound card) and the operator

2. Radio Message Server (**RMS**)

- Radio gateway between the client (end-user) and the Winlink CMS system
- In “conventional” usage the RMS has Internet access to the CMS server
- Limited number of RMS gateways support a radio-only mode (Hybrid system)

3. Common Message Server (**CMS**)

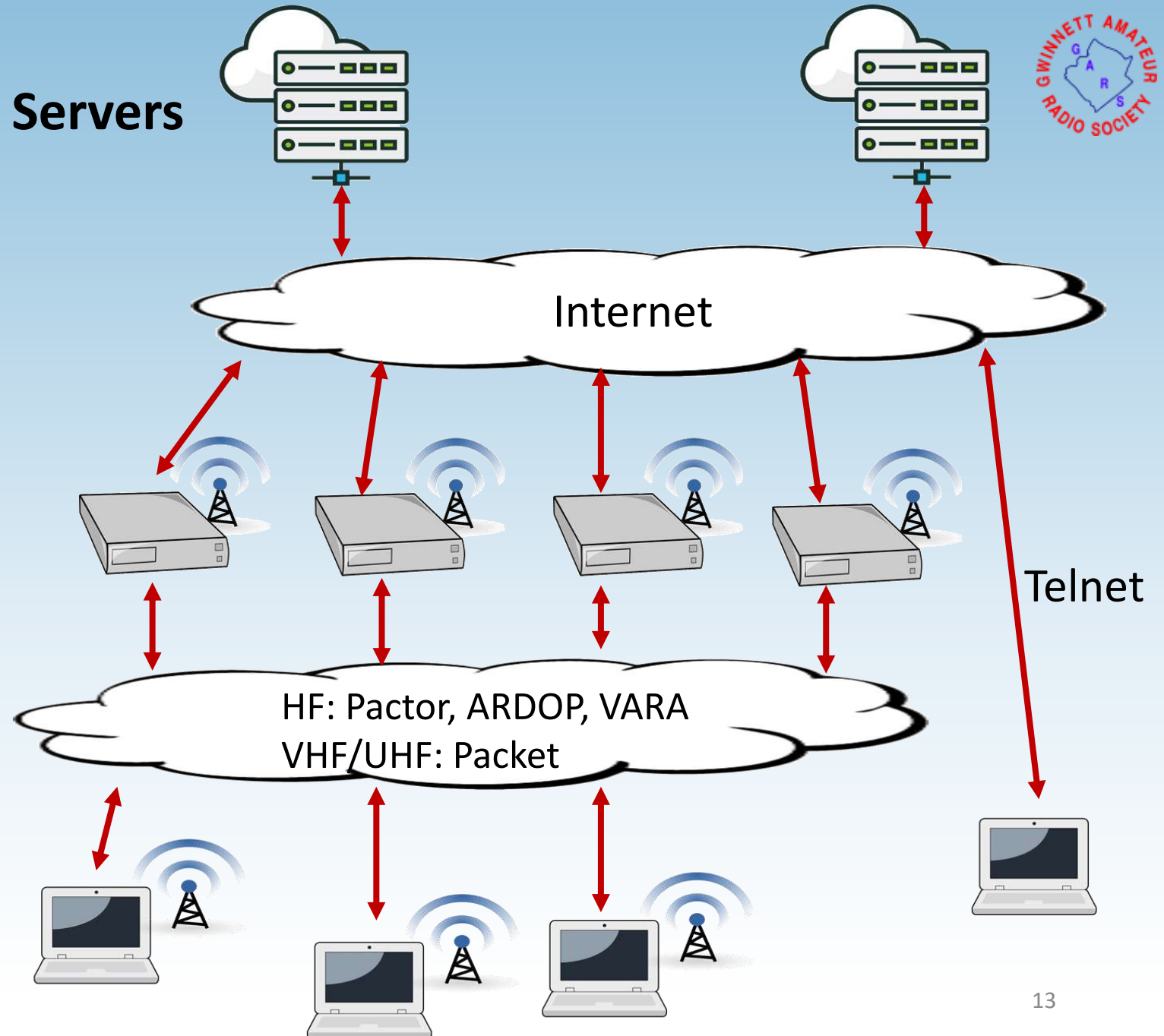
- The “conventional” AWS server system used for normal operations
- Store and forward service
- Accessed via Internet

Conventional Use Architecture

CMS Servers

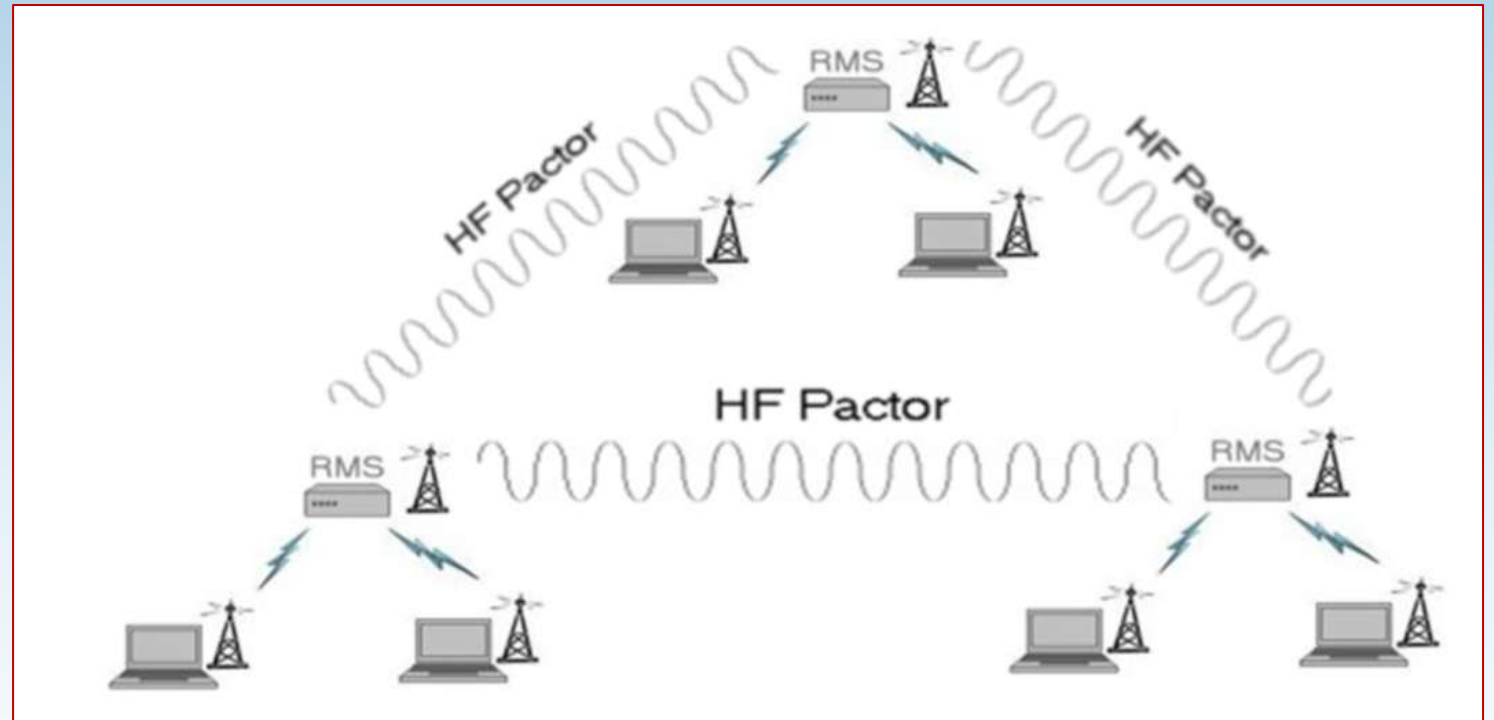
RMS Gateways

Winlink Client (You)



Hybrid Network Use Architecture

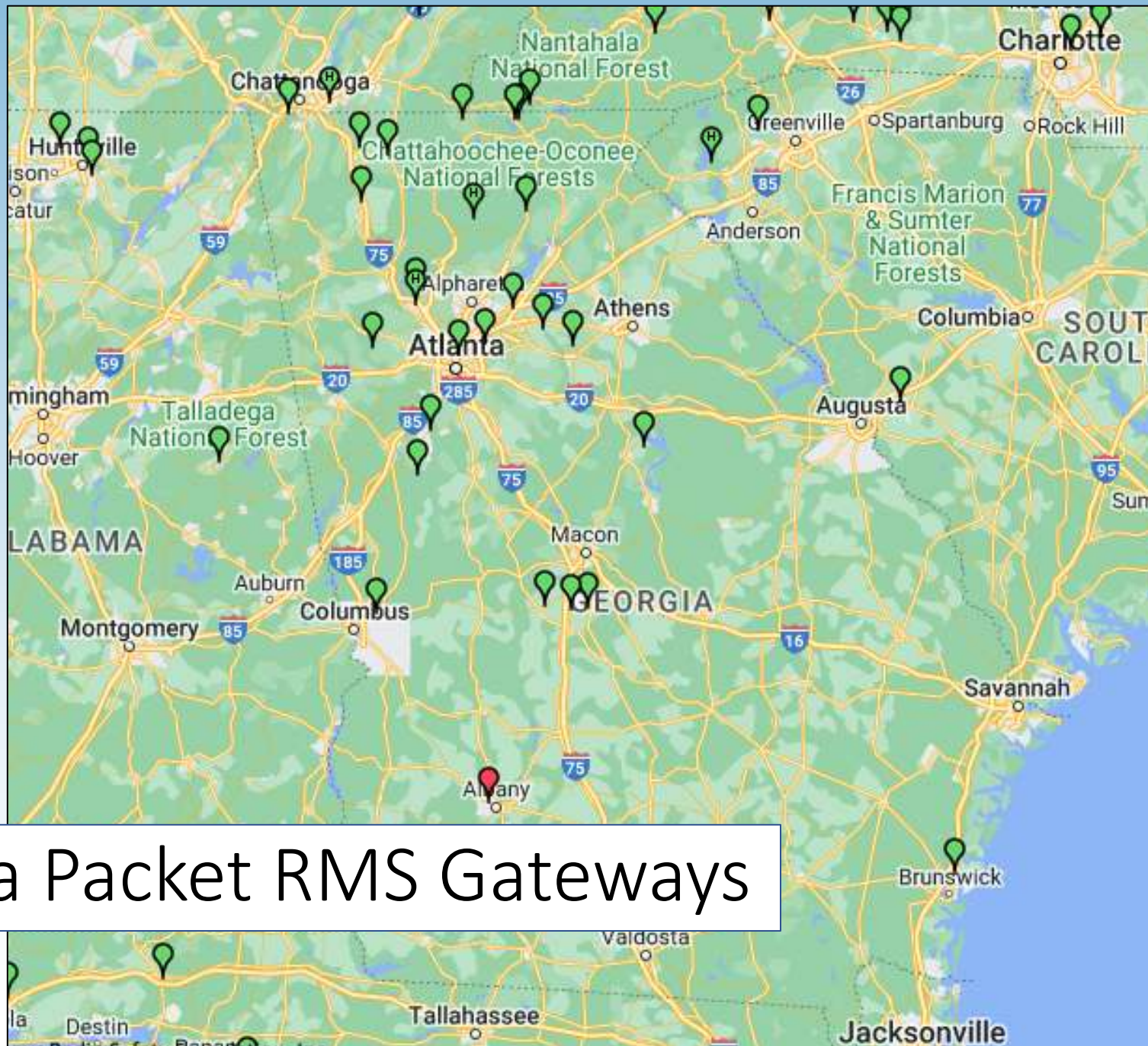
- No Interaction with CMS
- Not dependent on Internet
- Requires pre-registration with up to 3 hybrid RMS gateways
- Limited number of RMS systems support hybrid radio-only operation



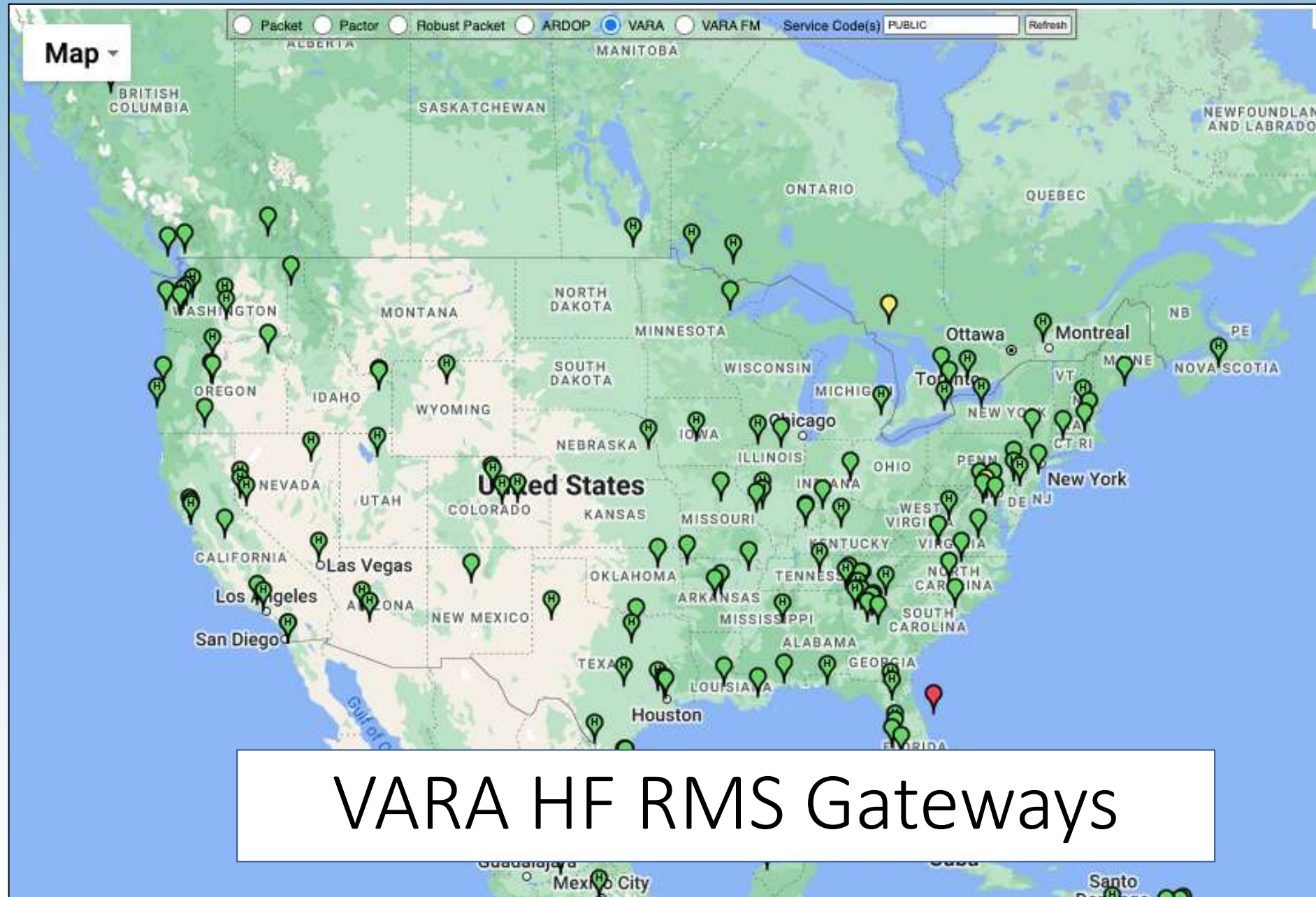
VHF RMS Gateway N7GRB-10

- Alinco DR135 MkIII 2m radio
- Copper tubing based Slim Jim antenna
- Raspberry Pi host
- TNC-Pi HAT (KISS TNC)
- LCD touch screen
- PiGate RMS Pi image
- AX.25 Packet based



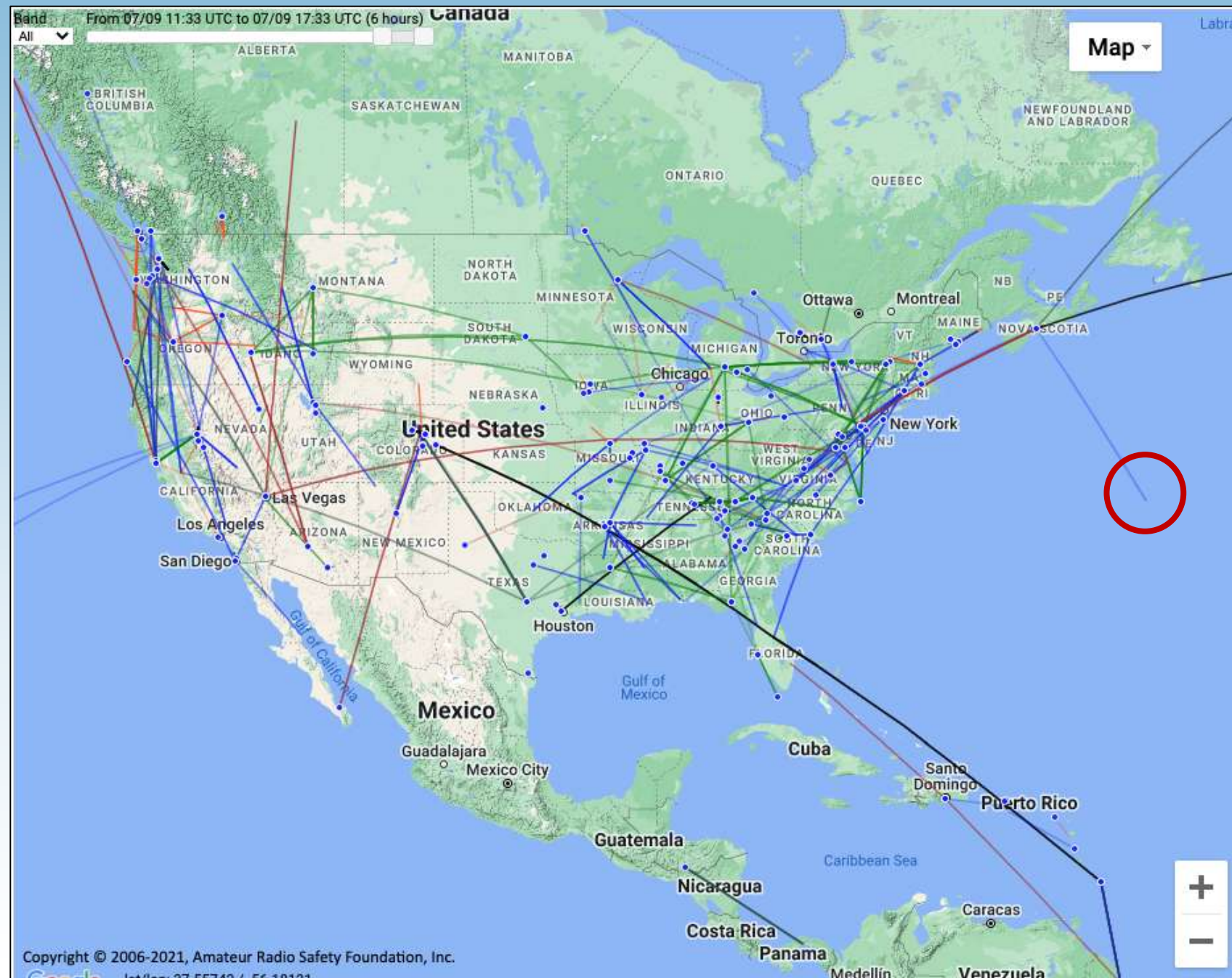


Georgia Packet RMS Gateways



Recent QSOs

(7/9/22)



Position Reports



What is Required to Operate?

- Windows 7 or newer PC / laptop
- Software drivers / cables for hardware interface
- Winlink client and account

For Packet based sessions:

- TNC, KISS TNC or sound card
- If sound card based, need UZ7HO soundmodem SW (virtual TNC)

For HF based sessions:

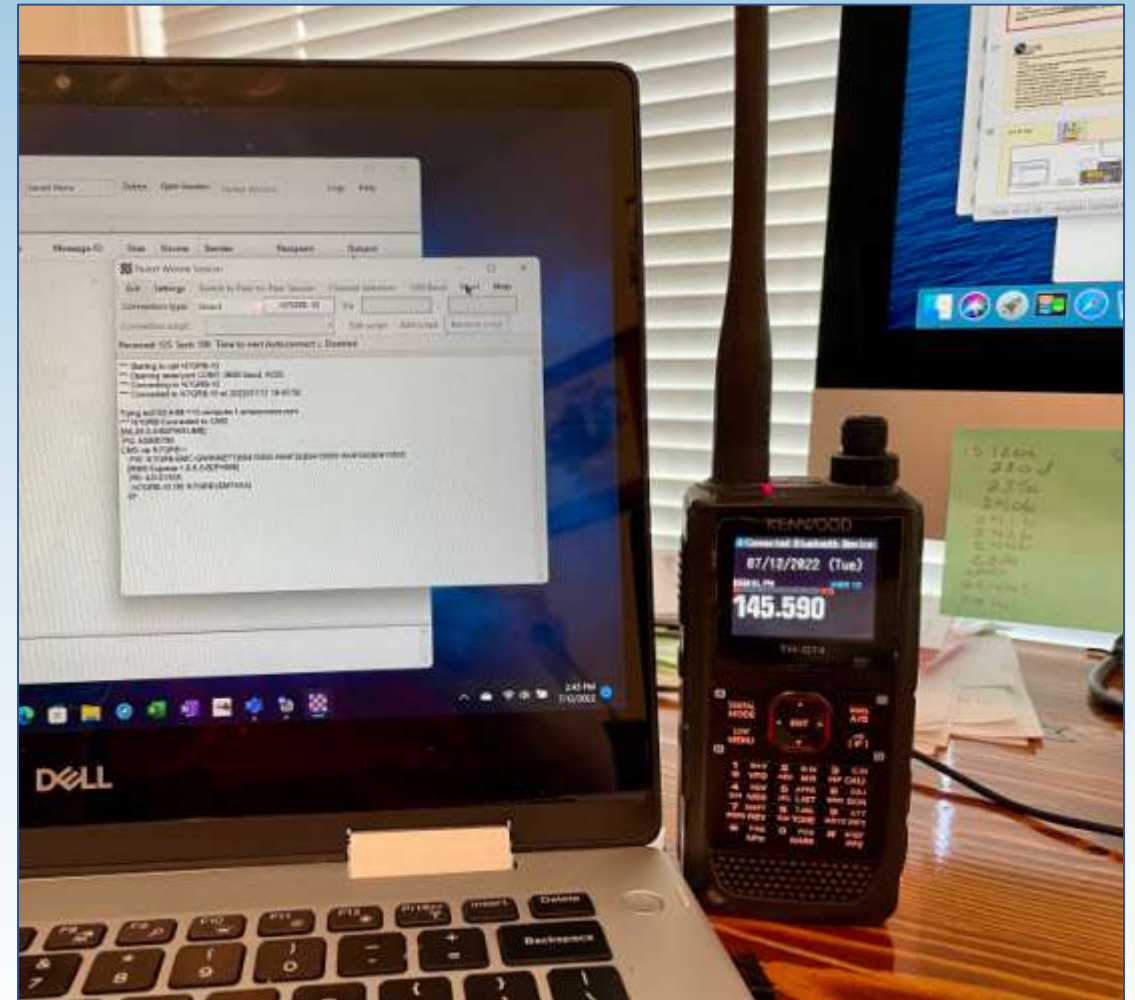
- Pactor modem and/or sound card
- Registered VARA HF or ARDOP (virtual HF modems)



Example Bluetooth connected KISS devices

Examples include:

- Kenwood TH-D74
- Mobilinkd TNC3
 - Requires cable interface to radio
 - TNC2 version insufficient buffer for reliable bi-directional traffic



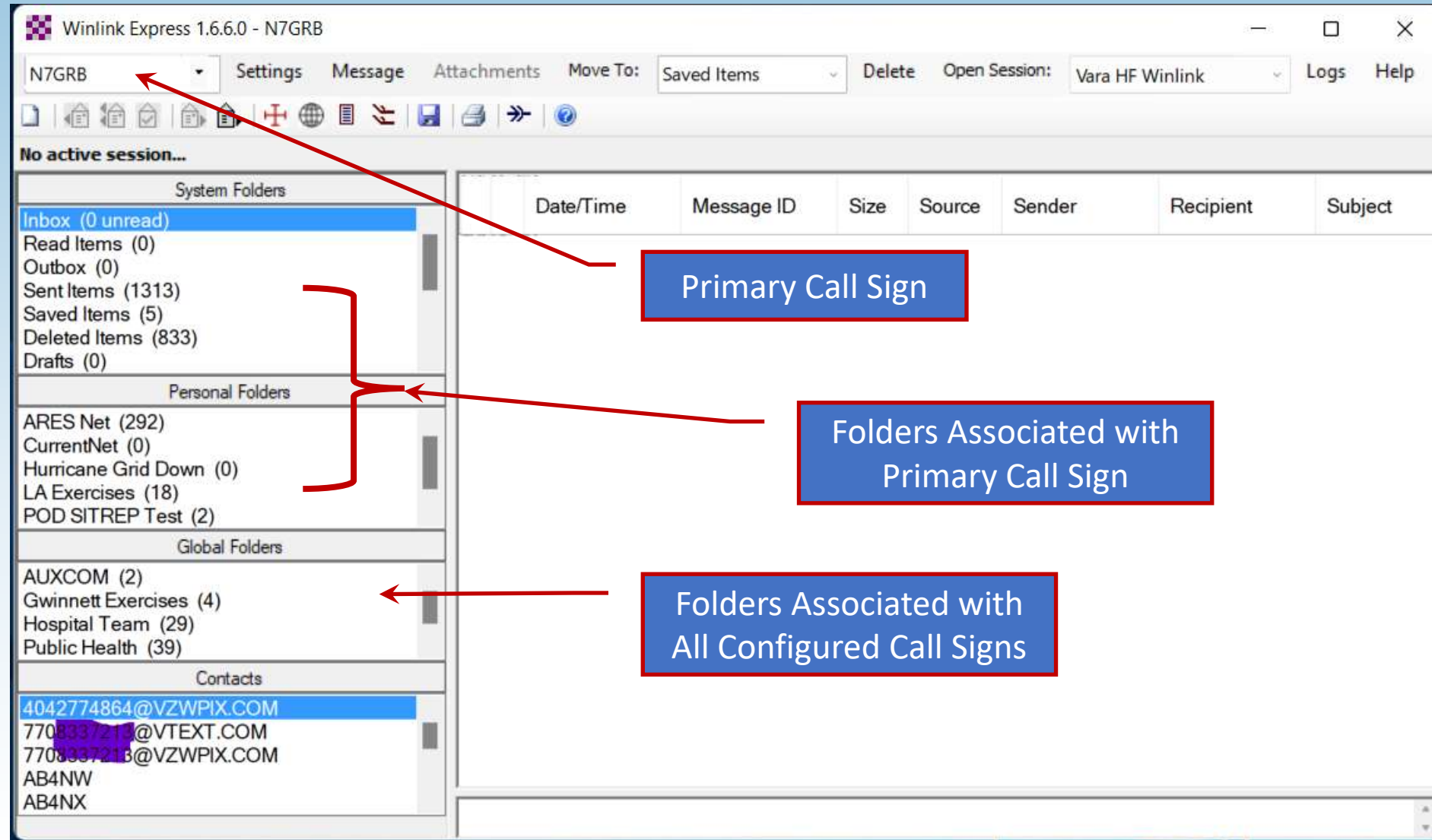
Winlink Express Client Overview



Coming up in an overview:

- Main Window
- Setting Window
- Message Menu
- Session Types
- Packet Session Example

Winlink Express Client Interface



Winlink Express Properties

Call Signs

My Callsign: N7GRB

My Password:

(Case sensitive)

Change password

Call sign suffix (optional):

(Used for country code)

Password recovery e-mail:

(Non-Winlink e-mail address where lost password will be sent when requested)

Remove Callsign

Request password be sent to recovery e-mail

Auxiliary Callsigns and Tactical Addresses

☒ EMC-GWINNETT

☐ GAARES-NET

☐ GAARES-WL2K

☐ GAANXC

Add Entry

Remove Entry

Edit Entry

My Grid Square: EM74XA

Lat/Lon to Grid Square

Winlink Express registration key:

Service Codes

PUBLIC

(Use PUBLIC for ham call signs. Separate multiple service codes by spaces.)

If you change service codes, you must update the list of channels.

Update

Cancel

Account Password

Contact Information (Optional)

Name:

Mark T Bell

Street address 1:

2450 Peregrine Trail

Street address 2:

City:

Suwanee

State/Province:

GA

Country:

USA

Postal code:

30024

Web Site URL (optional):

Phone number:

Non-Winlink e-mail:

Additional information (optional):

ARES Gwinnett County, GA

Recalculate HF path quality if SFI changes more than:

30

Keep logs for

2

weeks.

Keep deleted messages for

30

days.

☐ Display list of pending incoming messages prior to download

☒ Warn about connections to stations holding messages

☒ Allow diagnostic information to be sent to the Winlink Development Team

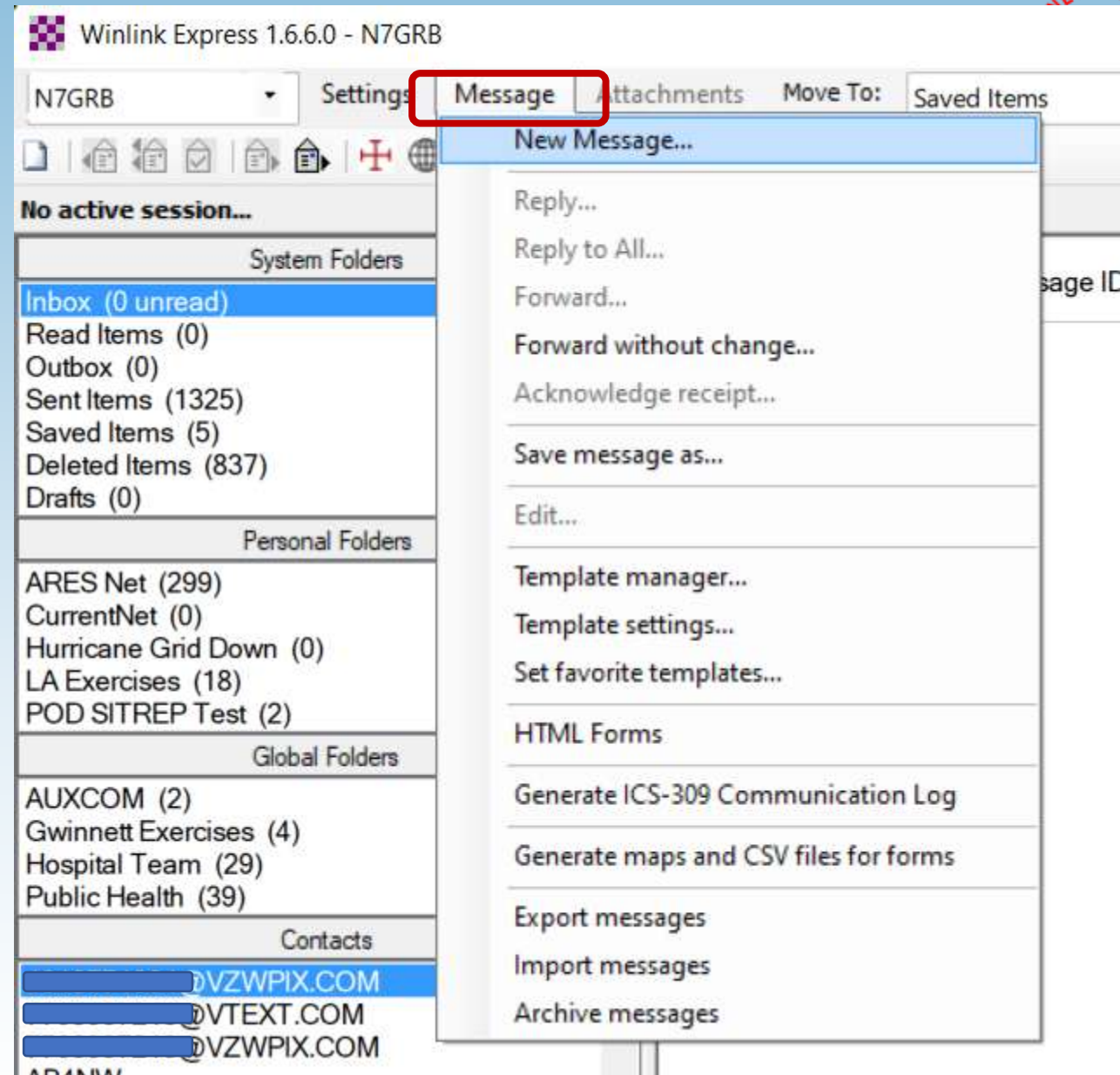
☐ Automatically install field-test (beta) versions of Winlink Express

Primary Call Sign

Your Current
Grid Square

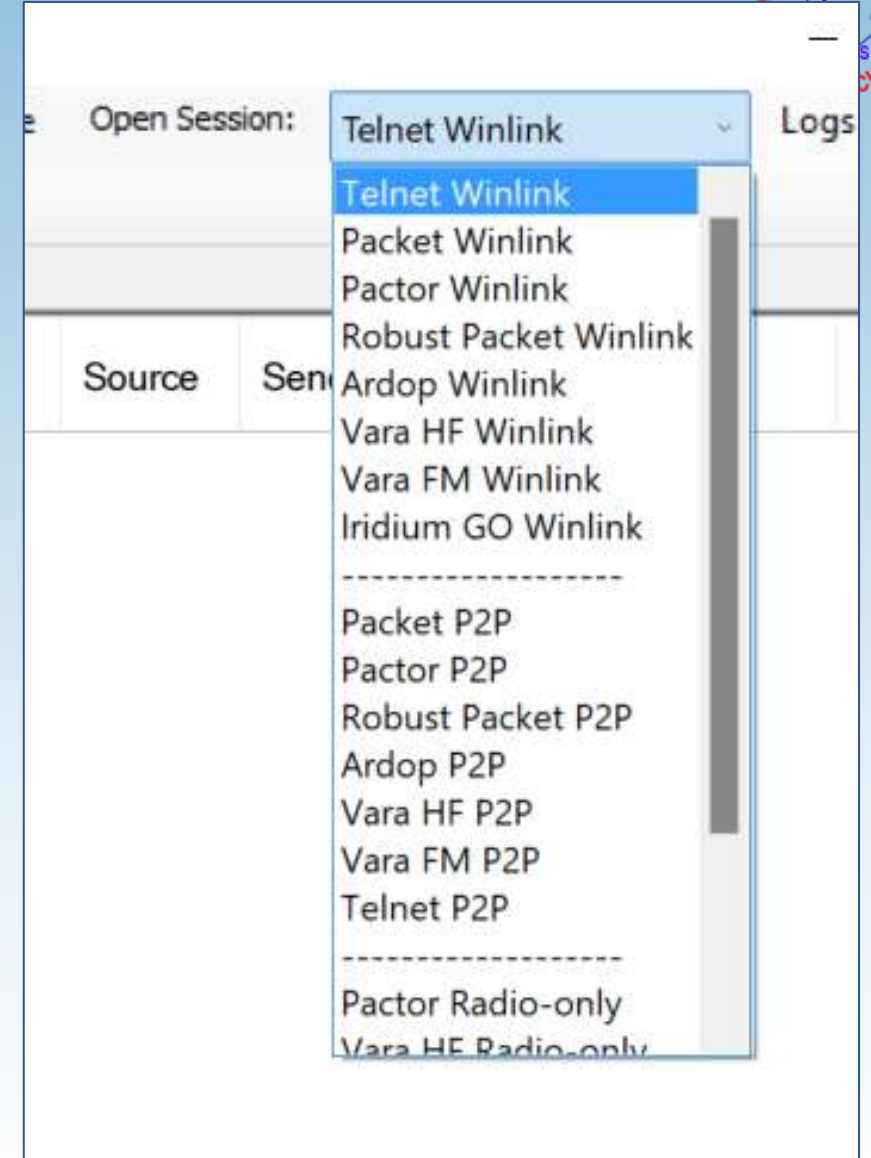
Message Menu offers several functions:

- Create New Message Window
- Reply, forward, acknowledge
- Template management
- Maps of GIS enabled messages
- Export/Import/Archive messages
- Create ICS-309 message log



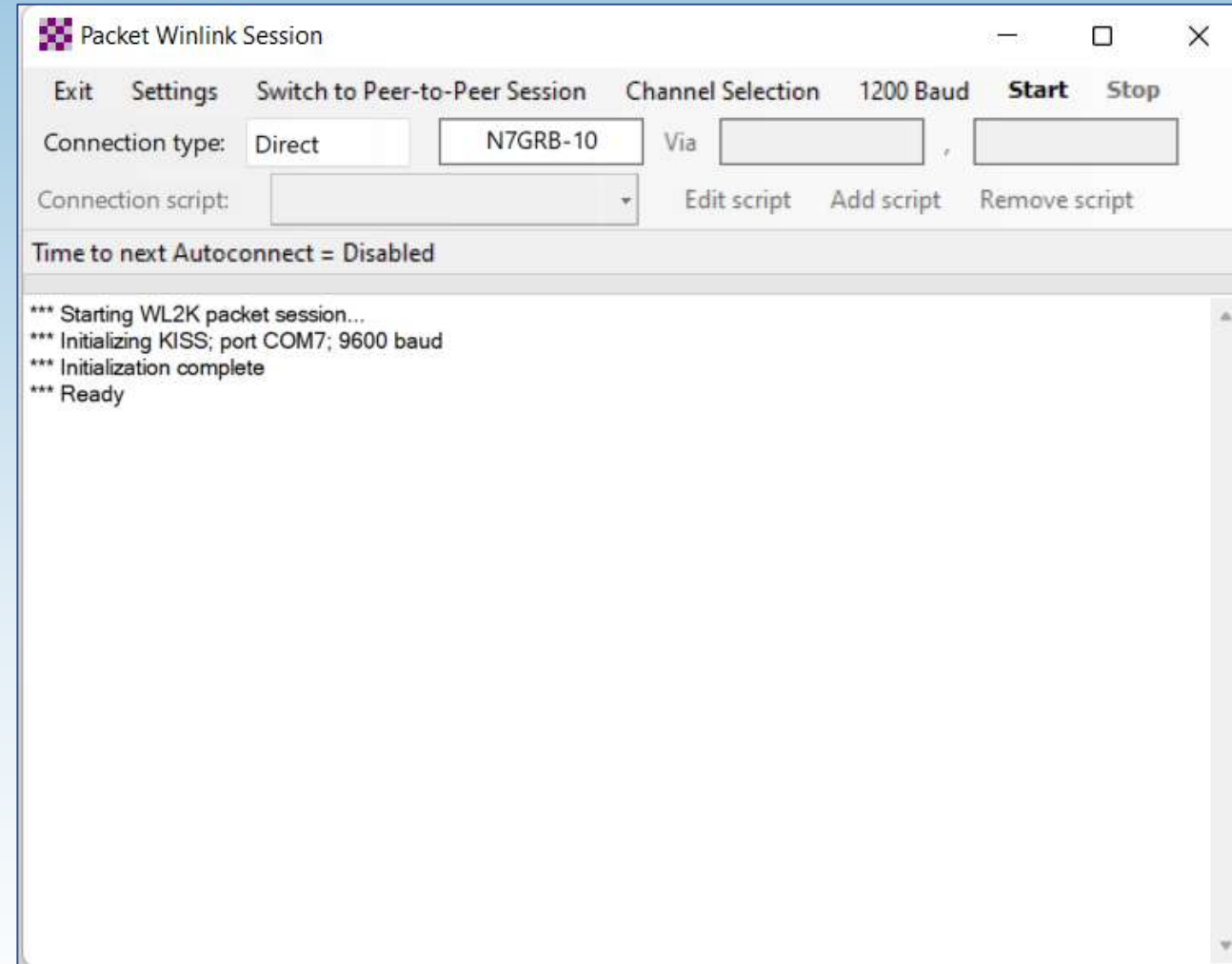
Four types of sessions:

1. Conventional Winlink system
 - Stores messages on CMS servers
 - Uses Internet between RMS and CMS
2. Peer-to-Peer (P2P)
 - Direct connection between two client systems
 - No use of Internet or Winlink infrastructure
3. Hybrid HF network
 - Radio-only network not dependent on Internet
4. MESH Network
 - Peer-to-peer through MESH between two Winlink Express clients
 - Post office server hosted by RMS Relay



Winlink Express Packet Session Example

- Session type “Packet Winlink”
- When session opened will connect to configured device
- Settings menu provides access to:
 - TNC connection setup
 - TNC parameters (packet length, timings and more ...)



Packet Session Channel Selector

- List of available RMS gateways
- RMS frequency
- Maidenhead Grid Square
- Distance/bearing based on the center of your own grid and RMS's grid
- When radio has rig control simply double-click RMS of interest

Packet Channel Selector

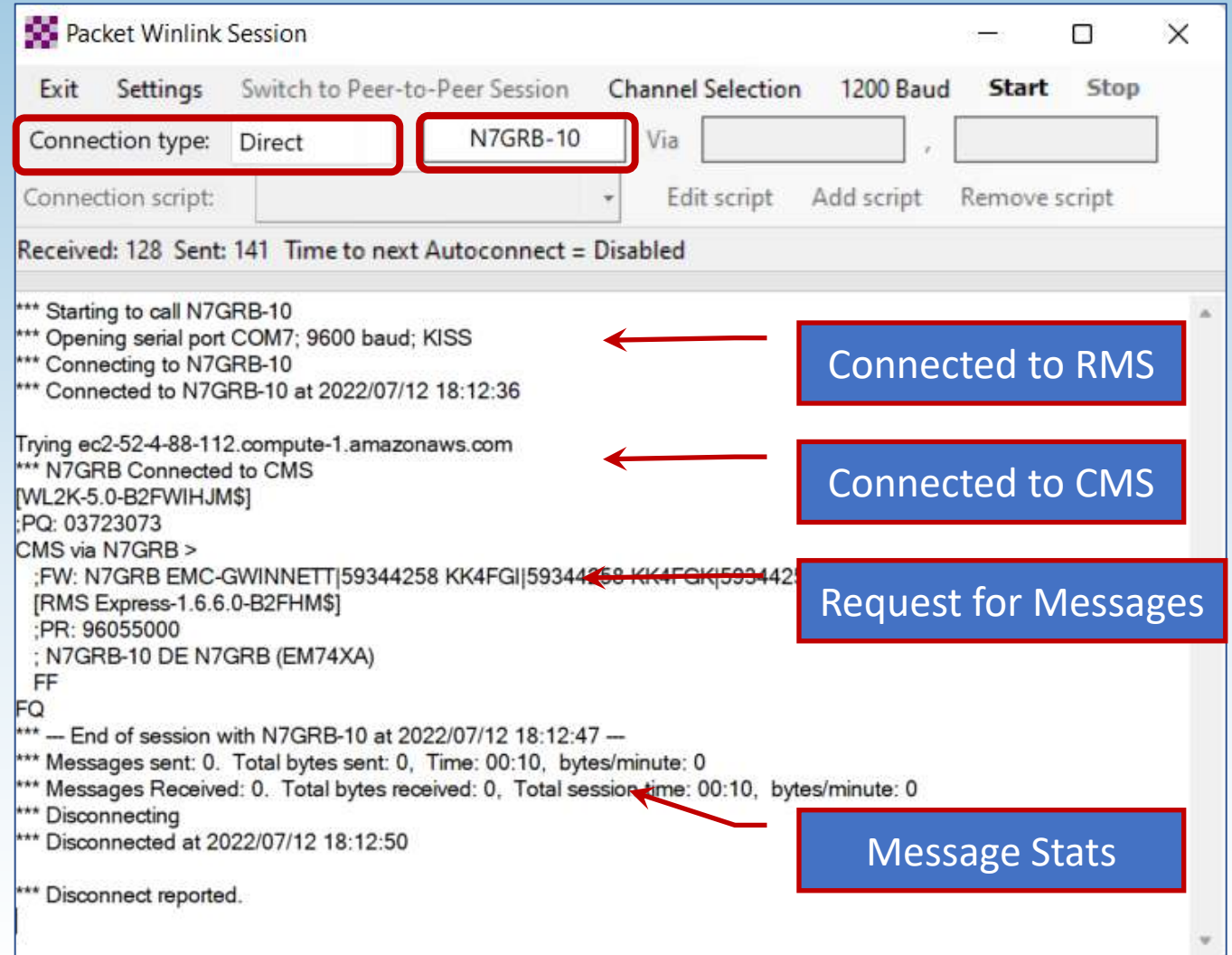
Exit **Select Channel** Update Table Via Internet Update Table Via Radio

Stations found within 185 miles of your grid square.

Callsign	Frequency (MHz)	Baud	Grid Square	Group	Distance (mi)	Bearing (Degrees)
N7GRB-10	145.590	1200	EM74XA	PUBLIC	000	000
KA4KKF-10	145.590	1200	EM84AC	PUBLIC	007	040
KE6IYD-10	145.590	1200	EM83BW	PUBLIC	011	121
KJ4QFY-10	145.590	1200	EM73VU	PUBLIC	016	220
WB4S-10	145.060	1200	EM84AG	PUBLIC	018	015
KG4ARC-10	145.710	1200	EM73TS	PUBLIC	026	229
KJ4UC-10	145.710	1200	EM74QC	PUBLIC	034	279
K9APD-10	145.750	9600	EM74QB	PUBLIC	034	275
AB4NX-10	145.710	1200	EM74UL	PUBLIC	035	336
AJ4GU-10	145.550	1200	EM83AL	PUBLIC	037	173
KX4MAT-10	145.750	1200	EM74SK	PUBLIC	038	321
KN4YZ-10	144.910	1200	EM73RK	PUBLIC	049	216
WX4PCA-10	14.105	1200	EM73NU	PUBLIC	050	257
WX4PCA-10	145.030	1200	EM73NU	PUBLIC	050	257
WX4PCA-10	10.145	1200	EM73NU	PUBLIC	050	257
WX4PCA-10	145.710	1200	EM73NU	PUBLIC	050	257
WX4PCA-10	145.090	1200	EM73NU	PUBLIC	050	257

Client Handshake through RMS to CMS

- Select connection type
- Enter target RMS station ID and if needed digipeater ID
- Start the session: “Start”
- Session will connect with the RMS which in turn connects to the CMS
- Messages in your outbox are uploaded and pending messages are received



The screenshot shows the Packet Winlink Session window with the following details:

- Connection type:** Direct
- Target RMS station ID:** N7GRB-10
- Status:** Received: 128 Sent: 141 Time to next Autoconnect = Disabled
- Log messages:**
 - *** Starting to call N7GRB-10
 - *** Opening serial port COM7; 9600 baud; KISS
 - *** Connecting to N7GRB-10
 - *** Connected to N7GRB-10 at 2022/07/12 18:12:36
 - Trying ec2-52-4-88-112.compute-1.amazonaws.com
 - *** N7GRB Connected to CMS
 - [WL2K-5.0-B2FWIHJM\$]
 - :PQ: 03723073
 - CMS via N7GRB >
 - :FW: N7GRB EMC-GWINNETT|59344258 KK4FGI|59344258 KK4FGI|59344258
 - [RMS Express-1.6.6.0-B2FHM\$]
 - :PR: 96055000
 - ; N7GRB-10 DE N7GRB (EM74XA)
 - FF
 - FQ
 - *** — End of session with N7GRB-10 at 2022/07/12 18:12:47 —
 - *** Messages sent: 0. Total bytes sent: 0, Time: 00:10, bytes/minute: 0
 - *** Messages Received: 0. Total bytes received: 0, Total session time: 00:10, bytes/minute: 0
 - *** Disconnecting
 - *** Disconnected at 2022/07/12 18:12:50
 - *** Disconnect reported.

Annotations on the right side of the window:

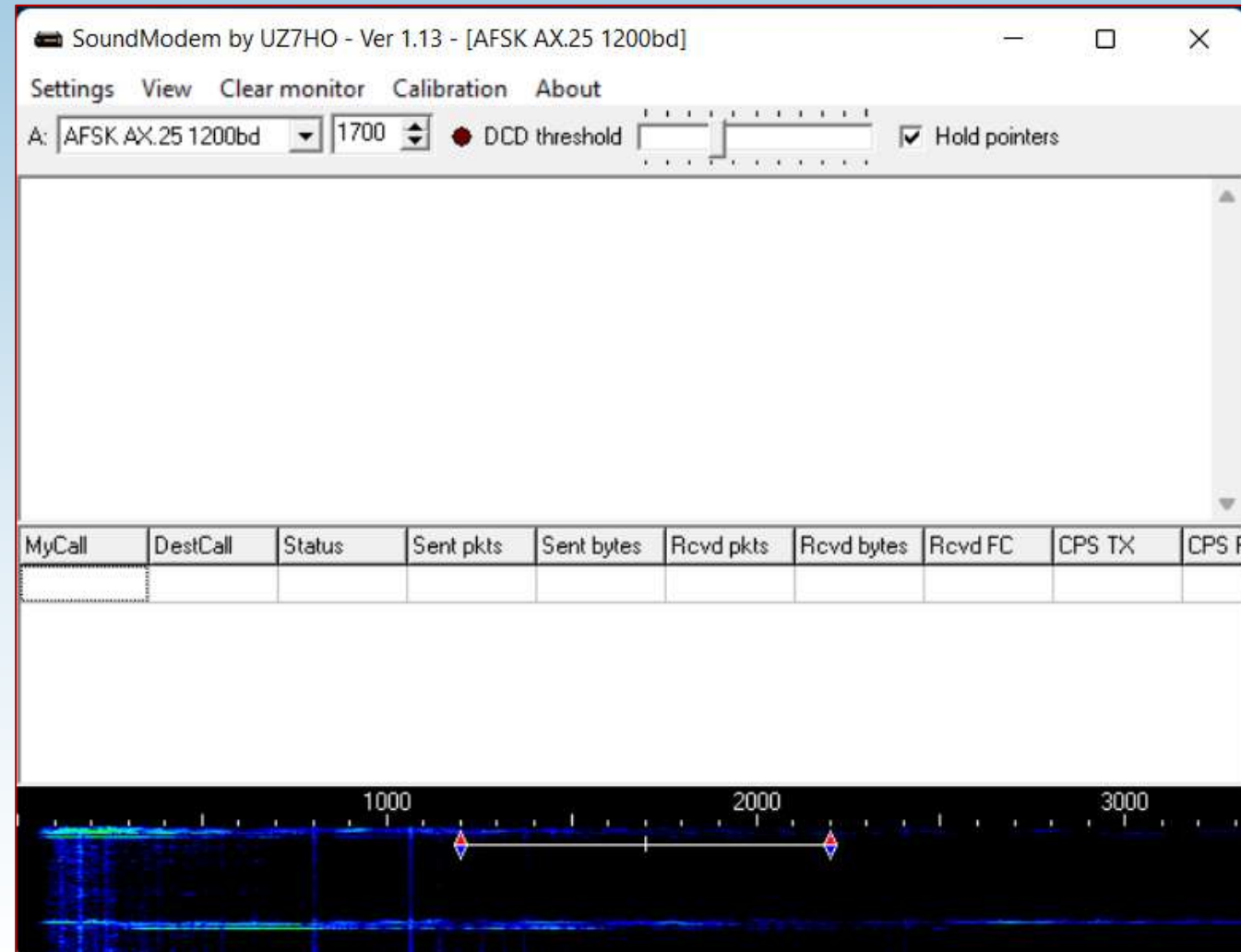
- Connected to RMS:** Points to the log message "Connected to N7GRB-10 at 2022/07/12 18:12:36".
- Connected to CMS:** Points to the log message "N7GRB Connected to CMS".
- Request for Messages:** Points to the log message "CMS via N7GRB >".
- Message Stats:** Points to the log message "Messages sent: 0. Total bytes sent: 0, Time: 00:10, bytes/minute: 0".

Odd's and End's

- UZ7HO Soundmodem (virtual packet modem)
- VARA and ARDOP HF Performance Example
- Want to Practice Using Winlink Express?

No TNC Hardware for Packet?

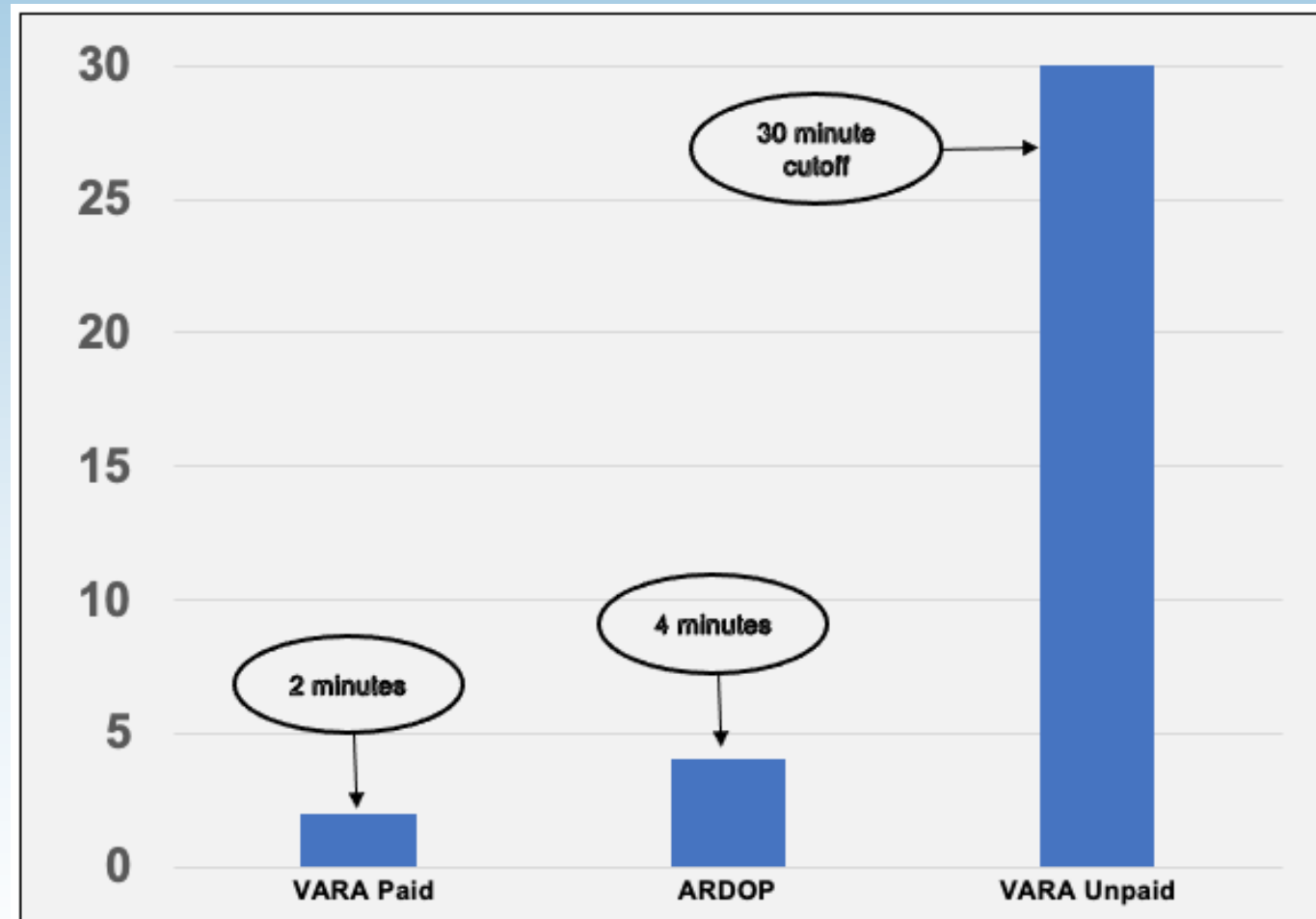
- Use UZ7HO Soundmodem virtual TNC
- Main window allows viewing all packet traffic on current frequency
- <http://uz7.ho.ua/packetradio.htm>



ARDOP vs VARA HF Performance

- HF RMS Gateway, 10 meters, 35 miles line-of-sight, 50 watts to eliminate propagation and power factors
- Simple Winlink message , empty message body with image attachment, total size 39,600 bytes

Modem	Average Speed	Time
VARA HF Registered	18,663 KB/min	2.09 mins
ARDOP	9,954 KB/min	4.31 mins
VARA trial	1,129 KB/min	35.1 mins



Want to Practice Using Winlink Express?

There are several opportunities to practice using Winlink Express, a few include:

- Georgia ARES Sunday Winlink Net, see the Net Schedules section at:
 - <https://gaares.org/frequencies-gaares.php>
 - Check in currently uses Winlink Check In standard template.
- Emcomm Training Organization Winlink Thursdays
 - Excellent training opportunity that in addition to message traffic through an RMS gateway periodically has peer-to-peer HF sessions.
 - <http://www.EmComm-Training.org>

It's Showtime!

- Let's go play with Winlink Express



Questions?