Learning the Winlink System & Winlink Express

Module 1: the Basics

Outline

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- Terms and Definitions
- The Winlink System & Linkages
- Message Routing Examples
- Hardware Configurations & Modes
- The Winlink Web Site – Maps & Information
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What is Winlink?

Winlink is a worldwide radio email service that uses radio pathways where the internet is not present. It is also capable of operating completely without the internet--automatically--using smart-network radio relays.

Winlink had its origins with the sailing community with email, position reporting and weather information. It now has a substantially broader role supporting emergency and disaster relief communications.

Winlink also supports non-ham governmental communications, one notable example being the SHARES (SHAred RESources High Frequency Radio Program) that is administered by DHS.

The system is built, operated and administered entirely by licensed volunteers. Support for the system is provided by the Amateur Radio Safety Foundation, Inc., a US 501(c)(3) non-profit, public-benefit entity.

Terms & Definitions (1/2)

- RMS: Radio Mail Server. An RMS Gateway is a RMS that is connected via the internet to the Common Message Server. Client stations connect by RF to an RMS.

- CMS: Common Message Server. The CMS is the Winlink server that is situated in the Amazon Web Service (AWS) cloud.

- Radio-Only Operation: This consists of RMS stations that can auto-forward by RF, independent of internet availability.

- MID: Message ID. This is a unique alpha-numeric code (e.g. YFYJDP7P2GFJ) that is assigned to each message.

Terms & Definitions (2/2)

- ARQ: **A**utomatic **R**epeat on re**Q**uest. An interactive error correction mode used for all Winlink RF message transfers. This assures perfect accuracy.

- Open B2F Compression: The body of each Winlink message is compressed to reduce the amount of data that has to be transferred.

- Winlink Express: The Windows client software as developed by the Winlink Team. Other clients are available from 3rd parties, e.g. Airmail, Pat, BPQ, etc.

The Winlink System & Linkages
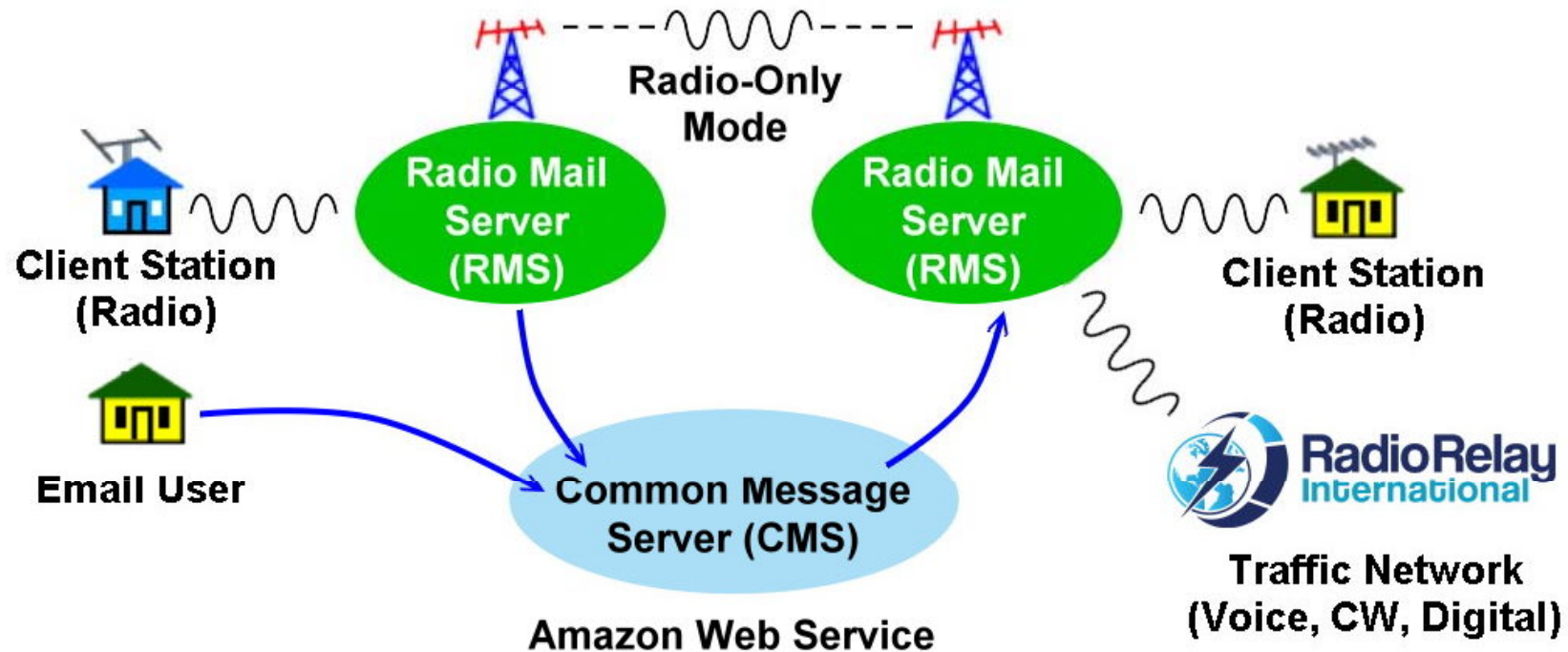
This is the overall scheme with a number of connection alternatives. The next pages will provide detail for each element in the chain.
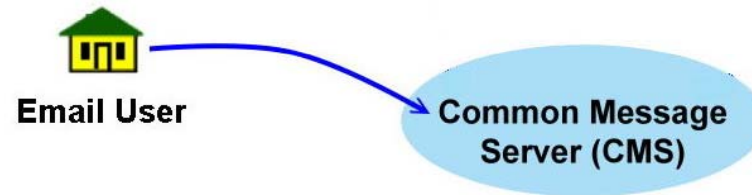
Outbound Message
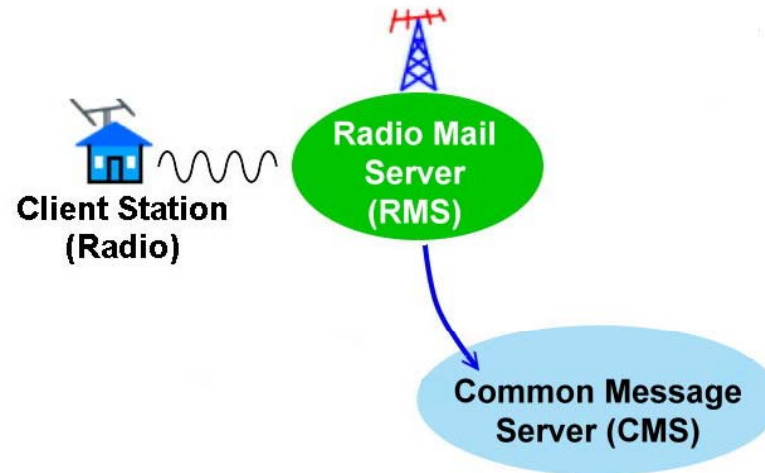
- Upon composing and saving a new message, the message is assigned unique ID (MID).

- The operator selects and then connects to a RMS gateway by radio. If for some reason the CMS cannot be reached due to an internet outage, the connection will be refused OR (depending upon the RMS configuration) a pop up message will indicate that the message will be delivered when the internet connection is restored. The operator can accept the option to leave the traffic or try another RMS.

- After the initial handshaking, the message is transferred to the CMS via the RMS.

- Telnet from a client ham station works in the same manner but the connection is direct to the CMS.
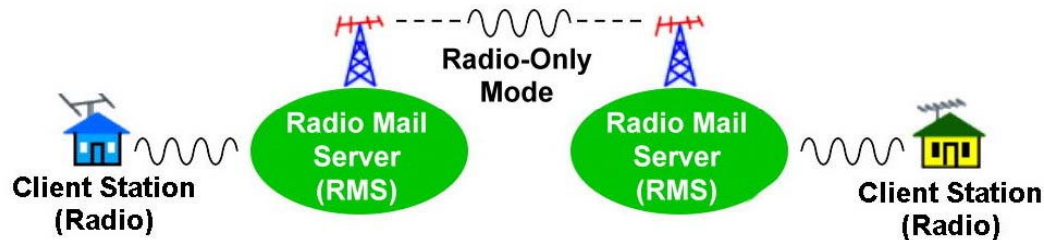
Inbound Message
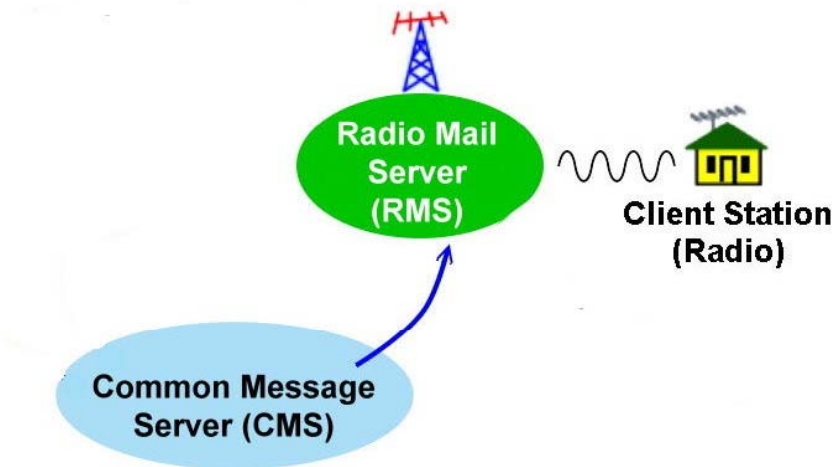
- The client station connects to any available RMS gateway.

- The CMS is searched for any messages that are destined for the client station's address.

- Matching messages are transferred to the RMS and then to the client station.

- The message is saved in the CMS for 21 days but has been tagged as retrieved. Subsequent connects will not result in a duplicate transfer of the message.

- Telnet to a client ham station works in the same manner but the connection is direct to the CMS.

Using Commercial Email

- Anyone can send a message to or receive a message from a Winlink address using regular email. The message is addressed to <callsign>@winlink.org
- To avoid spam, the outbound message must contain "//WL2K" at the start of the message subject line. Otherwise the system will reject the message as spam.
- By default, "//WL2K" is inserted in the subject line of all outgoing Winlink messages.
- Once a Winlink user sends a message to commercial email address, that address is placed on the sending station's "white list" and the spam filter is bypassed. The //WL2K is not needed.

The Radio-Only Network

Provides:

- Operation completely independent of the Internet.

- Fully automatic routing and forwarding.

- Automatic routing around any unavailable RMS

On the other hand:

- Messages must be picked up from designated Message Pickup Stations (MPS). This requires pre-event planning.

- There is a delay in message delivery due to relaying.

- Reduced message traffic capacity due to HF relaying.

- Cannot send messages to internet e-mail addresses.

Relays to the Traffic Networks

Radio Mail Server (RMS)

Traffic Network (Voice, CW, Digital)

RadioRelay International
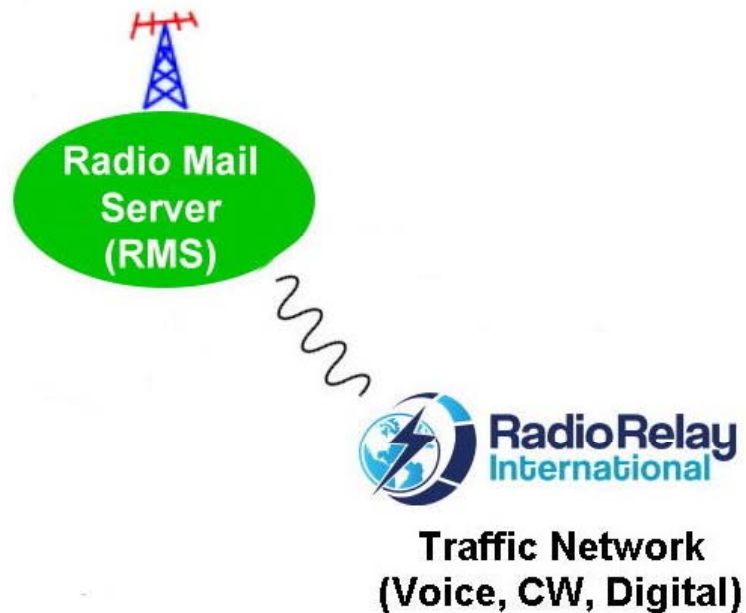
- The Traffic Networks (National Traffic System and Radio Relay International) transfer messages by voice, cw and digital. These are fully interoperable.

- System established in 1949.

- Messages use the universally recognized Radiogram format.

- Routing is based on state and postal code.

- Networks run 24/7.

- In mid-2018 a formal linkage was formed between Winlink and RRI where messages originated in the Winlink system are routed to regional RRI Liaisons who then inject the messages into the Traffic System.

Message Routing: Example 1
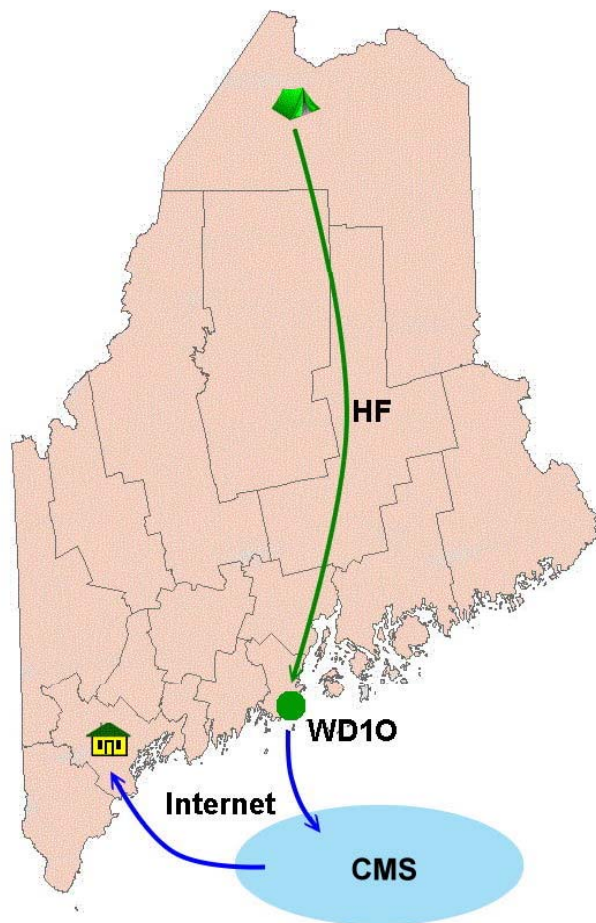
- A station is located in northern Maine and has no access to conventional communications. Fortunately he's a ham and is equipped with a portable Winlink station.
- The station connects by a HF mode to the WD1O RMS in Tenants Harbor.
- WD1O relays the message to the CMS via internet.
- The receiving station has no radio but can connect to the internet through their regular email.
- The system works in the other direction.

Message Routing: Example 2
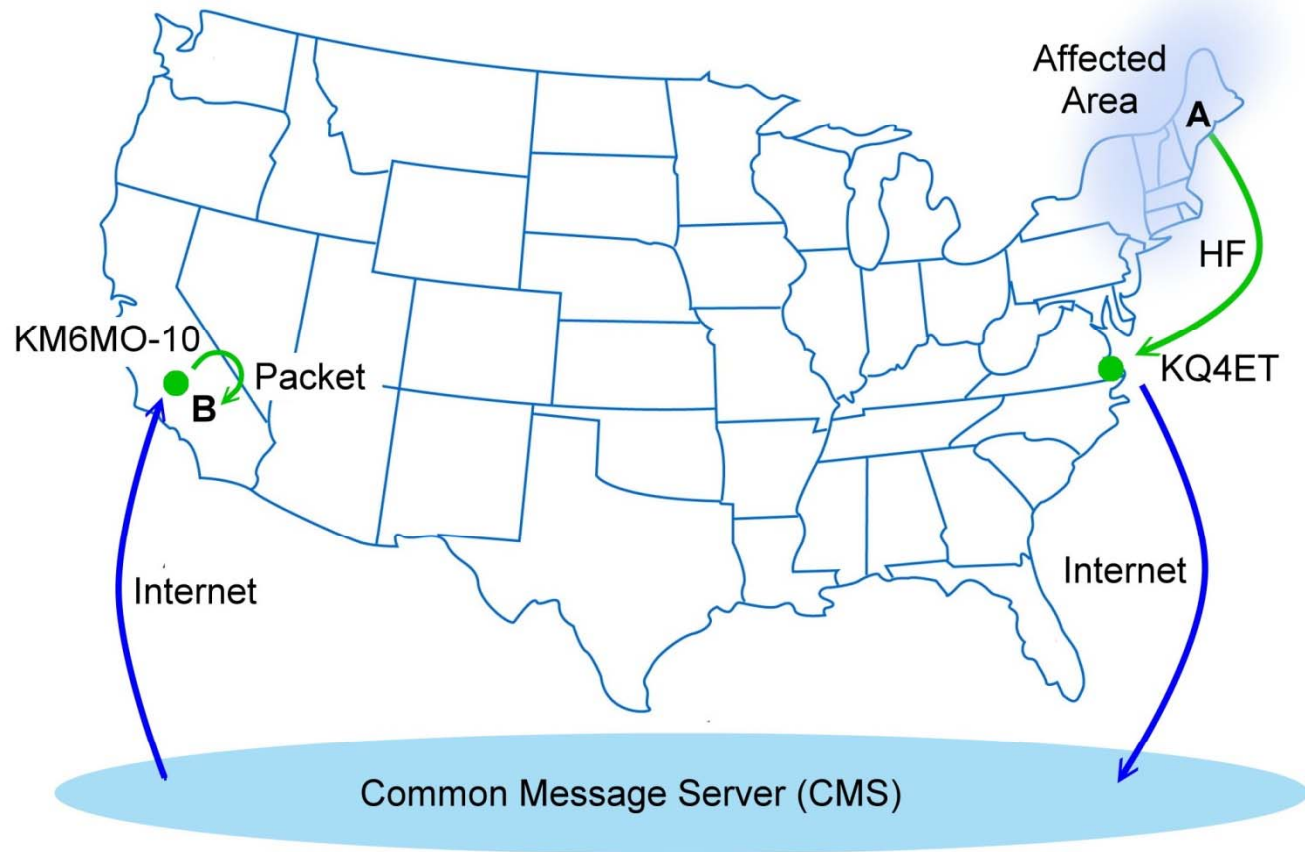
The process is the same as that shown in Example 1. Station A is in an area without standard communications services. It connects by HF to a RMS outside the affected area. Station B connects to a local RMS via packet and the message is retrieved.

Hardware Configurations
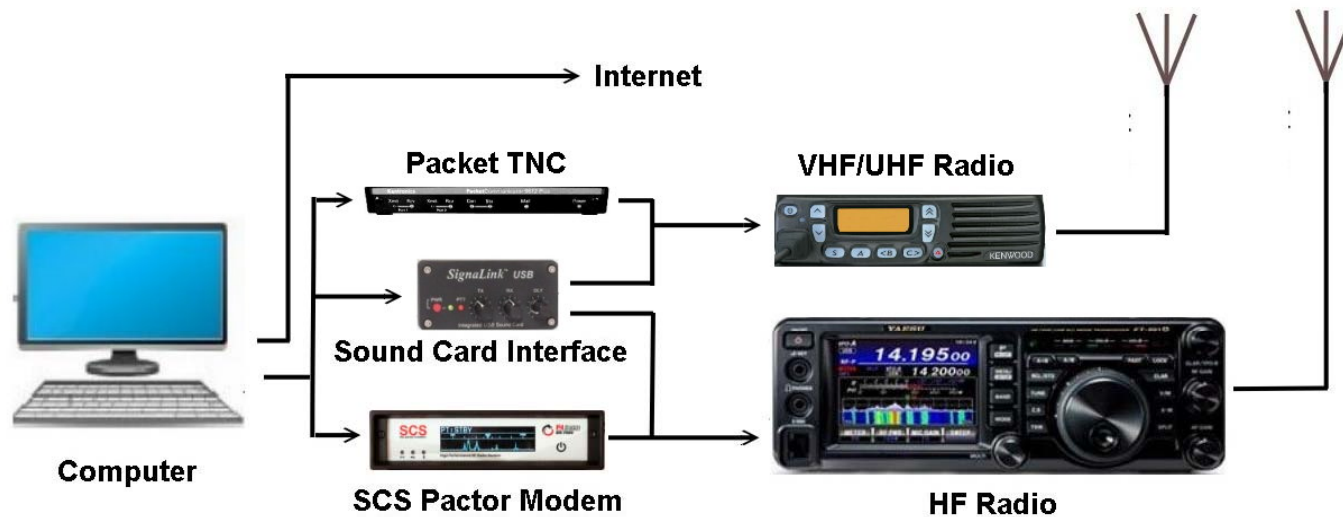
- Internet (Telnet): if the internet is available locally
- Packet (VHF/UHF): can use a dedicated hardware TNC or software TNC with sound card modem
- Sound card modes (HF): Winmor, ARDOP, VARA
- Pactor (HF): Proprietary but highest HF performance. Required for governmental SHARES operation (e.g. SHARES)

Winlink Modes & Transfer Times

Mode	Transfer Time
Packet 1200 (Direct)	2 minutes
Packet 1200 (1 node)	2.5 minutes
Packet 9600 (Direct)	1 minute
Pactor 1	15 minutes
Pactor 2	4 minutes
Pactor 3	30 seconds
Pactor 4	15 seconds
Winmor 500	10 minutes
Winmor 1600	3 minutes
Telnet	<< 1 second

- The times are based on a 4k message after compression. (Source: Winlink FAQ)
- ARDOP can approach Pactor 2 speeds under good conditions at both ends.
- VARA (3rd party) can approach Pactor 3 speeds under good conditions at both ends.
- Pactor 4 is not yet legal in the USA as it violates the Part 97 300 baud symbol rate restriction.

Guidelines for Sending Messages

- In an emergency and/or there is a significant amount of traffic and the internet is available, use telnet to avoid congestion at the RMS stations.
- Each RMS can only handle one HF connection at a time. If you don't hear any activity on a given RMS, it may be busy on another frequency.
- Packet gateways can generally handle more than one simultaneous connect.
- Establishing and closing each connect session takes time. If possible, batch your messages rather than sending messages one at a time.
- If there are multiple stations in an affected area that need to use the system, each station should try to use a different RMS.
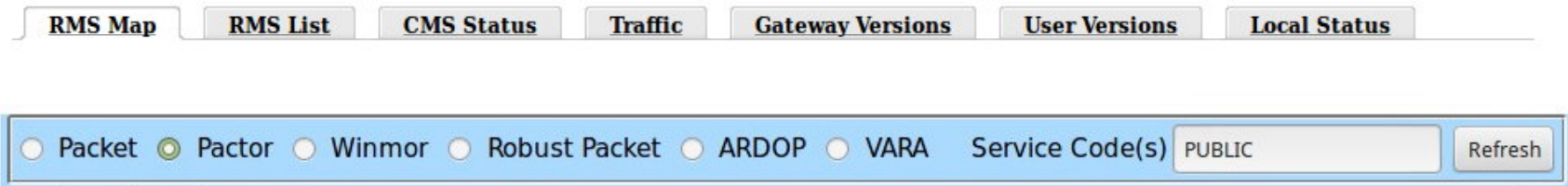- Keep the messages as brief as possible.

The Winlink Web Site

| My Account | Tools | News | Positions | User Programs | Book of Knowledge | Download | Support |

- Navigate to winlink.org. It will open on the "News" page.
- In this module we will look at some of the features in the "Tools" and "Positions" menus.
- In the next module (installing Winlink Express and setting up an account) we will use the "Download" and "My Account" menus.
- Spend some time exploring other features of the Winlink site:
  - "User Programs" compares the various client programs that can be used with Winlink.
  - "Positions" shows the locations of mobile Winlink stations.
  - "Book of Knowledge" provides a wealth of information and supplements the Help included within Winlink Express.

Tools - RMS Map

Live System Information

| RMS Map | RMS List | CMS Status | Traffic | Gateway Versions | User Versions | Local Status |

○ Packet ◉ Pactor ○ Winmor ○ Robust Packet ○ ARDOP ○ VARA Service Code(s) PUBLIC [Refresh]

- Under the "Tools" tab you will find a number of tabs that provide information from the CMS regarding RMS and CMS information.
- The "RMS Map" tab will be discussed in this section.
- The various maps show the worldwide RMS stations by mode.
- The "Service Code" only shows maps that are related to the indicated code. The default amateur radio code is "PUBLIC." "EMCOMM" indicates amateur radio RMS stations that have more restricted use or are only available in declared emergencies. Other services such as SHARES do not have publicly published Service Codes.
- Winlink is in the process of transitioning away from Winmor to the newer ARDOP and VARA modes.

ARDOP Map

- This is the ARDOP RMS map as of November 2018.
- The color of the symbol indicates when the last report via the internet has been received. (Green, within 2 hrs; Yellow, 2-4 hrs, Red, 4-6 hrs) Stations not updating within 6 hrs disappear from the map.
- An "H" within the symbol indicates that the station participates in the Hybrid, Radio-Only network.

Pactor Map

This is the Pactor RMS map as of November 2018.

Packet Map

This is the Packet RMS map as of November 2018. These are for local use.

RMS Detail – KQ4ET
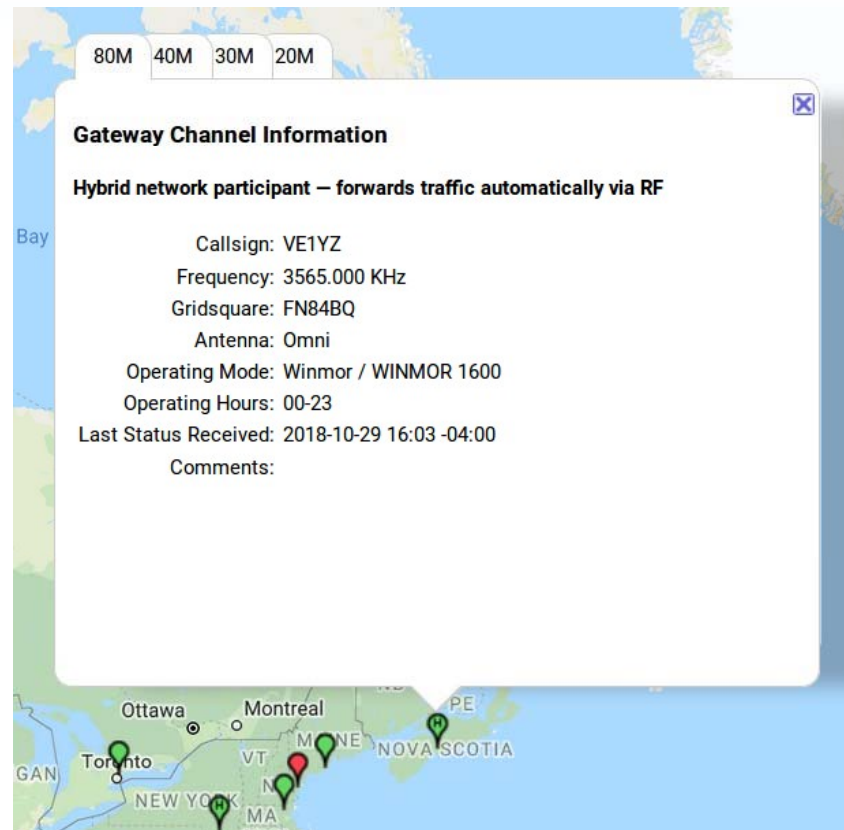
- Clicking on a station symbol brings up specific information related to that station.
- KQ4ET (Virginia Beach, VA) sequentially scans 7 frequencies/bands for Pactor connects. All indicated HF frequencies are USB center frequencies (dial + 1500 Hz).
- The station is in operation 24/7.
- KQ4ET also supports 2m packet and 80 and 40 meter ARDOP.

RMS Detail – VE1YZ

- VE1YZ (Halifax, NS) supports Winmor (shown), Pactor and packet.
- The station participates in the Radio-Only Hybrid network.

RMS Detail – WD1O

- WD1O (Tenants Harbor, ME) supports Winmor (shown), Pactor and packet.
- WD1O also supports a BBS on the same frequencies (not shown in the Winlink System as it's independent of Winlink).

Position Reports

- Mobile Winlink stations often provide position reports. The map of all reporting stations can be found by clicking the "Positions" tab on the Winlink home page.

- Mousing over any object will bring up a brief summary.

- Find an interesting object (e.g. a sailboat at sea) and enter the call sign in the box at the upper left of the map. Click "Find."

- This will open a new map window with the history of the station's position reports. Often there will be comments about conditions at the time of the report.

Discussion Forums

Subscribe to the following for information, hints and solutions to common problems.

- **Winlink Programs Group**: Primary support forum.
  https://groups.google.com/forum/#!forum/winlink-programs-group
- **Winlink for EmComm**: Focus on emergency preparedness and disaster recovery.
  https://groups.google.com/forum/#!forum/winlink_for_emcomm

Summary

Hopefully this module has provided some useful information and has made the Winlink System a little bit less mysterious.

Module 2 will cover the installation of Winlink Express on your computer and will provide instructions on setting up your Winlink account.