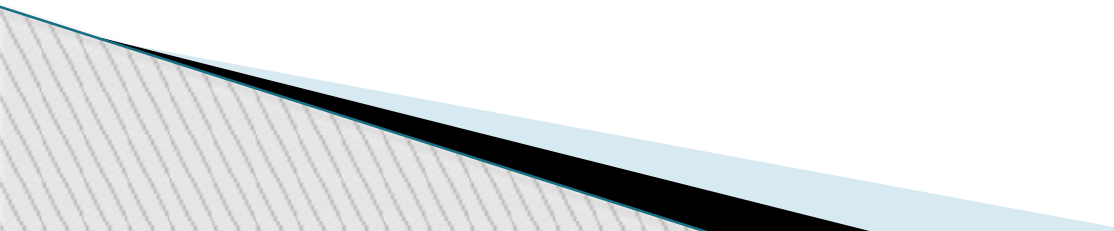


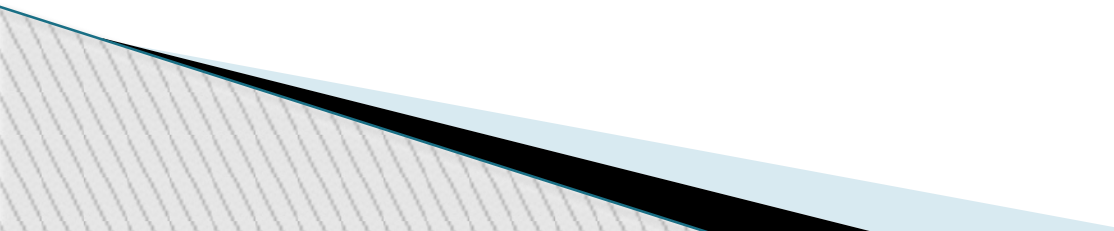
Sending and receiving emails over HF radio using Winlink and VARA



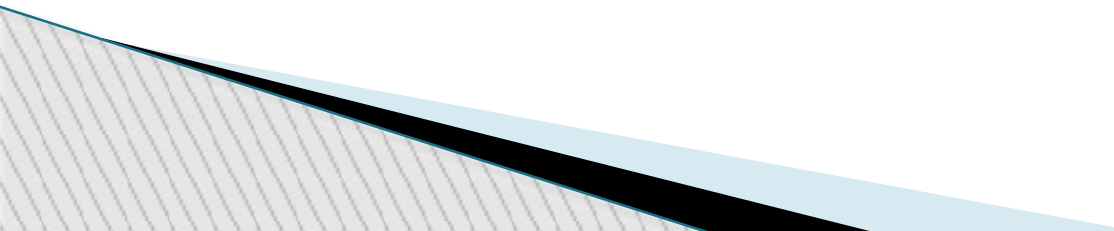
What is Winlink

- Winlink is a worldwide radio messaging system that allows users to send and receive email, even without an internet or satellite connection.
 - It uses a network of volunteer-operated amateur and government radio stations to relay messages and is frequently used by emergency responders, sailors, and other remote operators for communications when traditional infrastructure is unavailable.
 - The system can handle email with attachments, position reports, and weather bulletins, and it is supported by the non-profit Amateur Radio Safety Foundation.
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How it works

- **Radio frequency backbone:** Winlink doesn't have a single frequency. Instead, it uses a network of gateways, called Radio Message Servers (RMS), that operate on various amateur radio and government frequencies.
 - **Message relay:** Operators can connect to a nearby gateway via radio. This gateway, which is connected to the internet, acts as a portal to send and receive messages to and from the internet and other Winlink users.
 - **Automatic routing:** The system can also automatically route messages between radio stations when internet access is not available, using propagation forecasts to find the best path.
 - **Internet-to-internet and radio-to-internet:** Messages can be sent from an internet email account to a Winlink address, and from a Winlink address to any standard internet email account.
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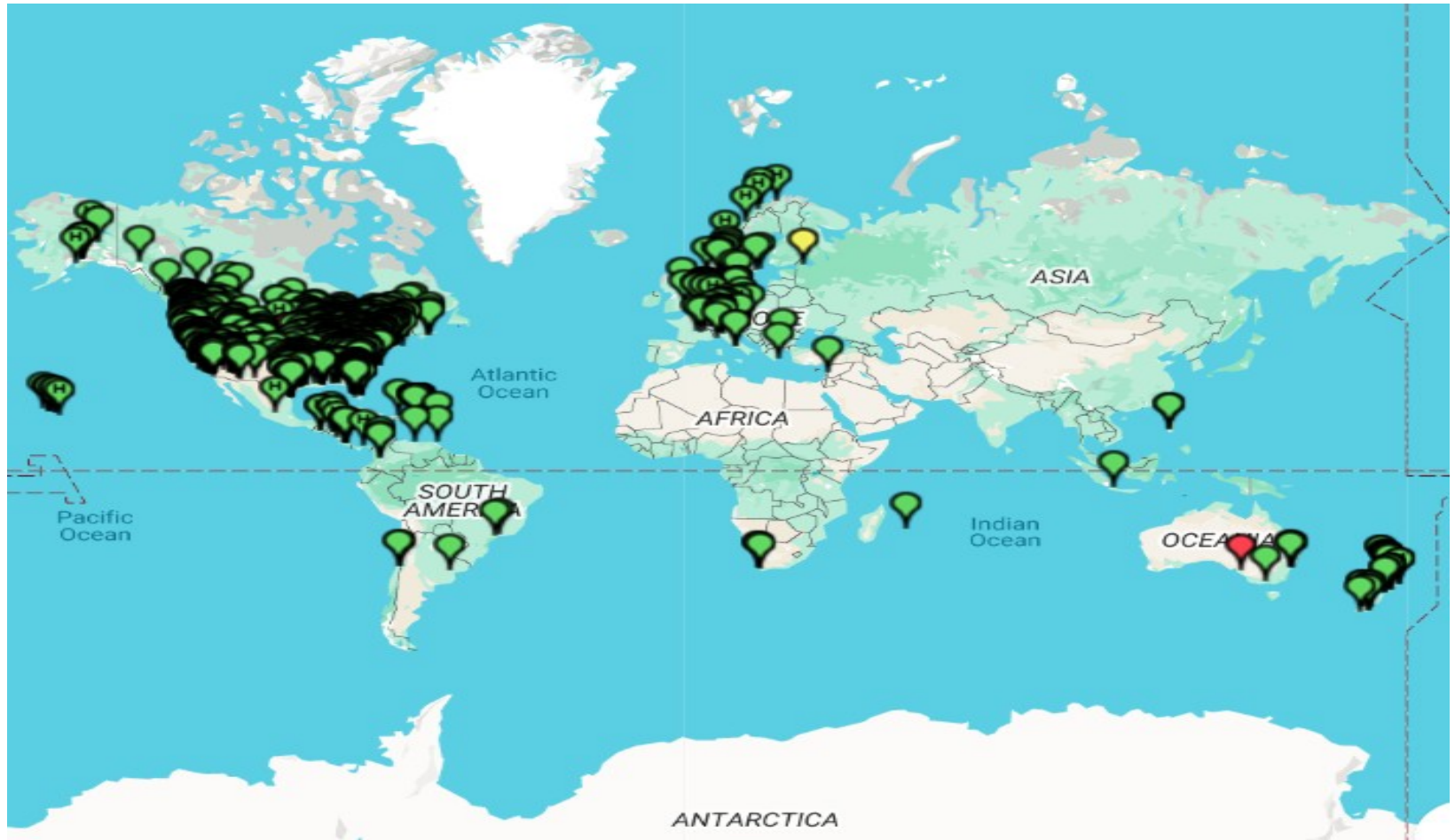
What it's used for

- **Emergency communications:** It is widely used by organisations like the Red Cross, ARES, and National Guard for emergency and disaster relief because it can function completely without the internet.
 - **Remote communication:** It provides email service for people in remote locations, such as sailors at sea or campers, who lack internet access.
 - **Information exchange:** It is used to distribute weather bulletins, position reports, and other information bulletins.
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European RMS coverage



Global RMS coverage



Which protocols are supported

Winlink can be used with a variety of radio and internet-based protocols, primarily depending on whether you are using a VHF/UHF or HF radio for your connection. For non-radio connections, Winlink uses standard internet protocols.

HF Radio protocols

- **ARDOP (Amateur Radio Digital Open Protocol):** A robust, soundcard-based open protocol designed to adapt to varying channel conditions.
- **VARA HF:** A proprietary, high-speed soundcard modem protocol. While the free version has some limitations, many users find it offers excellent performance.
- **PACTOR (I, II, III, IV):** A family of robust, high-speed protocols that require a hardware modem, often from Special Communications Systems (SCS). PACTOR-I is non-proprietary, but later versions are proprietary.
- **WINMOR (Deprecated):** An older soundcard-based protocol that has been phased out in favor of ARDOP and VARA.

VHF/UHF Radio protocols

- **VARA FM:** A high-speed soundcard modem protocol optimized for the FM-based VHF/UHF bands. It supports speeds up to 9600 bps.
- **AX.25 Packet:** A long-standing protocol for packet radio on VHF and UHF frequencies. It is a reliable option for local connections to an RMS (Radio Message Server) gateway.
- **D-Star:** A digital radio standard that can be used for high-speed data connections to the Winlink network, often for shorter-haul links.

Internet protocols

For situations where an internet connection is available, Winlink offers these alternatives to radio connections:

- **Telnet:** A basic network protocol that allows your Winlink client (e.g., Winlink Express) to connect to the Winlink Common Message Servers (CMS) over the internet. This is useful for managing your account, checking for new messages, or sending large files without using radio frequencies.
- **TCP/IP:** Winlink relies on standard TCP/IP networking for its internet-based operations, such as Telnet connections and synchronization with the CMS.

What is required

- **Winlink express email client:**

https://downloads.winlink.org/User%20Programs/Winlink_Express_install_1-7-27-0.zip

- **Modem:**

- ARDOP built-in to Winlink express (< 300 baud)
- VARA HF and FM modems (~180 baud free / ~8.5k baud paid licence)

<https://downloads.winlink.org/VARA%20Products/>

- Pactor hardware modem (100, 200, 5k, 10.5k baud)
£1500 new, £600 pre-owned

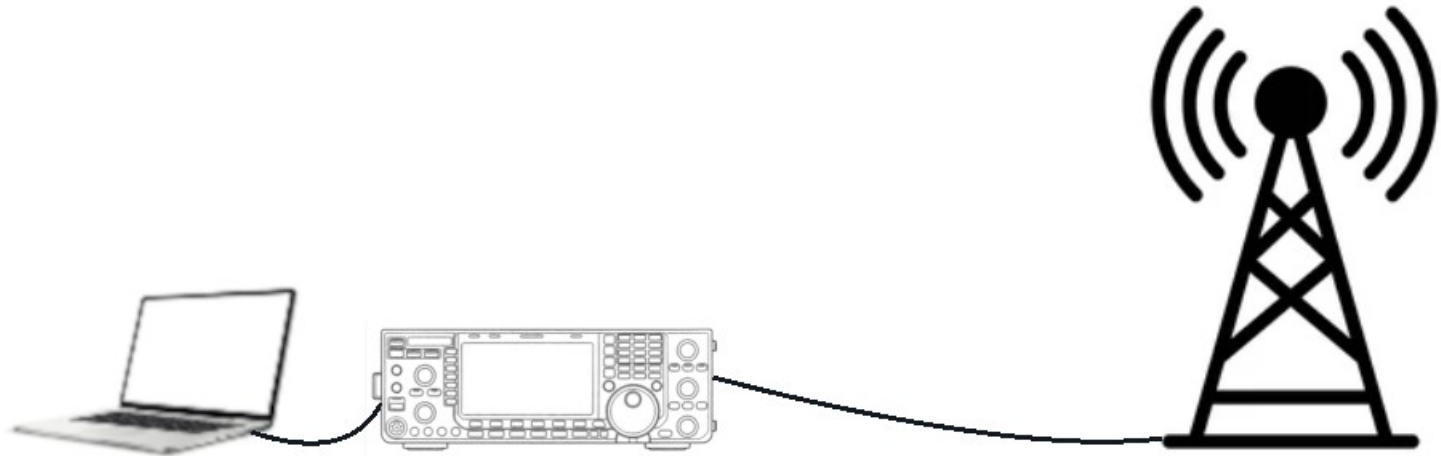
- **Computer:**

- Windows 10/11 laptop

- **Radio ideally with built in soundcard:**

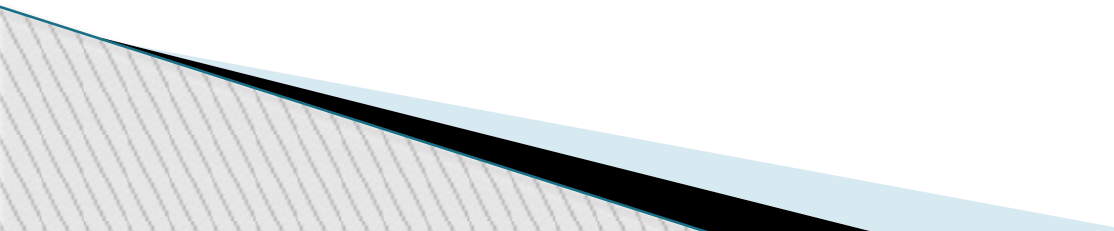
- Icom IC-7300

Physical setup



- Standard setup for using data modes:
 - Select “Vara HF Winlink” as the session.
 - Configure Winlink software to use appropriate radio and serial/USB settings.
 - Within the opened Vara HF modem configure appropriate input and output audio devices.
 - Set appropriate drive level for ALC.
 - Within the Winlink “Vara HF Winlink session” select channel based on available bands and propagation conditions and predicted path quality.
 - Set RF power level to establish connection.

Use Winlink Express email client

- Register for a Winlink email address <CALLSIGN>@winlink.org
 - Compose new emails to other Winlink users and/or Internet email users and “Post to Outbox”.
 - Open a “Vara HF Winlink session”, select an appropriate channel and click “Start” to send/receive emails.
 - If the session fails to connect or the connection is unreliable then either increase RF power or choose another channel and repeat. Close session to return to the main Winlink email client.
 - Any sent emails will now appear within “Sent Items” and received emails will appear within “Inbox”.
 - You can open emails by double-clicking on them.
 - Standard email functions are available to reply, forward, delete, copy and move emails to existing or created folders.
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Winlink Wednesdays

- Winlink Wednesday is a regular, weekly digital net for amateur radio operators to practice using the Winlink email system. The exercise is meant to keep operators proficient and ensure readiness for emergency communications, when internet access might be unavailable.
 - <https://winlinkwednesday.net/>
- Number of participants is growing exponentially year on year since introduction in 2016. Over 56000 messages sent by participants last year.
- Check-in #474 on the 8th October 2025 had 942 total unique participants with 32 new participants, including:
 - KN4GDX, Bruce, Broad Run, VA (VARA HF 12M)
 - o KE4ZDJ, Corey, Elkhorn City, Pike, KY (HF)
 - o M0WTN, John, Hednesford, Staffordshire, England (HF) [NEW]
 - o KE7FST, DAVID, VALLEY, ID, (HF)
 - WA7TAD, Tad, Lexington, Rockbridge, VA (VHF)

Thank you!

Questions?

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