

# Winlink ARDOP

Winlink ARDOP is a method of sending “email” messages over HF radio via an RMS station. If you are new to Winlink, see the [Winlink How-To](#) first.

## Initial Setup

- Before connecting the radio to the computer for the first time, ensure to [install the driver](#).
- Ensure the radio is [setup for digital mode](#), turn it on, and connect it to the computer.
- Open Winlink and open an Ardop WinLink session



## Radio Check

### The Scenario

In the event of an emergency where the power, phone, and internet are all down, I want to be able to send my family back east a quick email to let them know that I'm ok, and offer the same service to others in my neighbourhood.


The first step is to select a list of stations I can connect to from my location. To do this, select:

- Channel Selection to see a list of all available stations.
- Update Via Internet to update the propagation information (last two columns).
- Sort by Path Reliability Estimate or Path Quality Estimate to see the most reachable stations first.



[These stations can also be visualized using the Map option](#) or from the [Winlink website](#).



Every week, I connect to RMS stations in different locations without actually sending or receiving messages just  to see how long the “handshake” takes to see if I can connect at all.

I save the successful connections to my Winlink favourites for quick retrieval, but I also log them in a spreadsheet for further analysis.

## The Spreadsheet

[The Winlink favourites list](#) is a good tool, but it's hard to “rank” the best stations. To that end, I use a

spreadsheet

to log the following information in addition to the stations' info:

- The length of the session (the shorter the better).
- The date I last connected (the most recent the better).
- The number of times I managed a connection (the more times the better), which auto calculates the percentage of time I've been able to connect to the station.

I also perform a crude approximation of the coastal distance of the RMS station. The rational here is that if an earthquake hits, there's a good chance that coastal RMS stations will be affected or overloaded so I want to be able to connect to a station further inland.

Based on all these different measures, I then create a semi-subjective ranking of the stations. Those are the stations I would try to connect to first.



- Some stations have a daily connection time limit. This is the *total* time I can be connected to that station (combining different frequencies or bands) during a given day.
- Some stations have the ability to hold and forward messages if the station's internet goes down. This only works if the sender and recipient connect to the same RMS. These are called **hybrid** stations.

The purpose of this spreadsheet is to do the “thinking” ahead of time so that in a real emergency, I can just look at the ranking to select the best frequency.

For more details on how I estimated the coastal distance, click on the link below:

I could manually look up the coastal distance of each station and note it, but that's a lot of tedious work. Instead, I used the distance and bearing between my station and the RMS station and performed some basic trigonometry to get an estimate.

To visualize the calculations, start with an [Azimuthal Map](#) centred at your location.



- I drew two lines to represent the coast. One going north west at a bearing of  $330^\circ$  and one going south at a bearing of  $170^\circ$ . These two lines are eye-ball approximations of where most of the coast is.
- Now imagine an RMS station  $S$  at a distance  $d$  with a bearing of  $\theta$  (1000 km away at a bearing of  $15^\circ$  for example).
- The distance from the coast would be:  $x = d \sin(30^\circ + \theta)$   
in our example:  $x = 1000\text{km} \cdot \sin(45^\circ) = 707\text{km}$
- Similarly, if the station is at a bearing south of  $70^\circ$ , the distance is calculated using  $x = d \sin(170^\circ - \theta)$

This is an approximation for two reasons:

1. Obviously, the coast isn't simply two straight lines.

2. But a more subtle point is that this simple geometry only works on a flat surface, not on the curved surface of the globe.

That being said, my purpose is not to know exactly how far the stations are from the coast, but to be able to roughly rank them so that I can identify those that are the furthest inland.

## Ardop vs Vara vs Pactor

There's essentially four different methods for sending Winlink messages on HF:



- **Pactor** is the fastest / most robust method but it requires a [\\$2100 external modem](#) to work.
- **Winmor** [has been deprecated](#) and will probably be removed from later versions of Winlink. It has a maximum speed of 750 bps.
- **Ardop** is the method I use. It is an open protocol in active development and has a maximum speed of 1336 bps. See here for [an overview](#).
- **Vara** is a closed protocol. The demo version has a maximum speed of 175 bps and the full version (\$70 USD) has a maximum speed of 7536 bps. See here for [more details](#).

So which is best to use? Well, it depends... For P2P, it's important that everyone uses the same method (and frequency), but for messages sent via an RMS, it doesn't matter at all.

It also depends on who's using it:

### What is best for a local EOC?

Our local EOC reports to the SW PREOC in Surrey and [their website](#) says:

The preferred method is data rather than voice. If you cannot get through peer to peer, send the message via Winlink.

It then goes on to list HF Data frequencies but doesn't say which mode to use (as if that was obvious). But our local EOC has a Pactor modem so I assume that's the industry standard. But that only matters for P2P. Winlink messages sent to an RMS will make it to their destination no matter the method.

So for EOCs, the answer seems to be the current standard: **Pactor**

### What is best for individuals?

Again, unless you want to use P2P, it doesn't matter if people are using different methods. Both Ardop and the free version of Vara seem to work, although the demo version of Vara also shows an annoying popup screen every few minutes asking you to register.<sup>1)</sup>

## Conclusion

I understand the desire for standardization within a region. It would be nice if there was only one mode (and it was free), but given all the different options, I guess it's a trade-off between cost, community buy-in, and speed.

Personally, I can't justify spending \$100 from my limited ham radio fund just to get a Winlink speed upgrade. If the option was between having HF Winlink for \$100, or no HF Winlink at all, I would spend the money, but \$100 for a mere speed upgrade is below my diminishing returns threshold. There's a lot of more I could do to improve my station with that money.

The other thing to consider is that if Vara figured out a way to increase the speed in a closed-proprietary way, it's just a matter of time before the Open Source Ardop team catches up. Personally, I tend to favour open source options to closed proprietary ones not only because it's cheaper for myself, but also because it lowers the entry bar for others in the community to join. If HF P2P is really important for our community, then we probably don't want to exclude people who can't afford the \$100 entrance fee.

1)

Vara shows an annoying popup screen every few minutes.

