



Winlink 2000 Tutorial

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Winlink 2000 Overview

- Global system for sending/receiving e-mail via radio
- Extremely valuable when Internet is not available
- Becoming standard e-mail backup for emergencies
- Used by federal, state, and local agencies as well as DHS to bridge Internet e-mail when normal infrastructures are down.
- Separate servers for ham and MARS/agency use.

Winlink Emergency Communications

- **Reliability** – Error correcting protocols and redundant servers. Much lower error rate than voice messages.
- Much easier to send detailed information such as lists of numbers without transcription errors.
- **Interoperability:** Links together systems with different capabilities. Can communicate with external e-mail systems (Gmail, Hotmail, Comcast, etc.)

Emergency use (continued)

- Can send binary file attachment such as pictures and pdf files. Compression is done automatically.
- Communications between stations is not limited to radio range. If you can reach any RMS, you can send a message to any other RMS around the world.
- Time independence – Winlink is a store-and-forward system, so stations do not have to be on the air at the same time.
- Time-stamped copies of messages are stored to maintain an audit trail.

Emergency Use (continued)

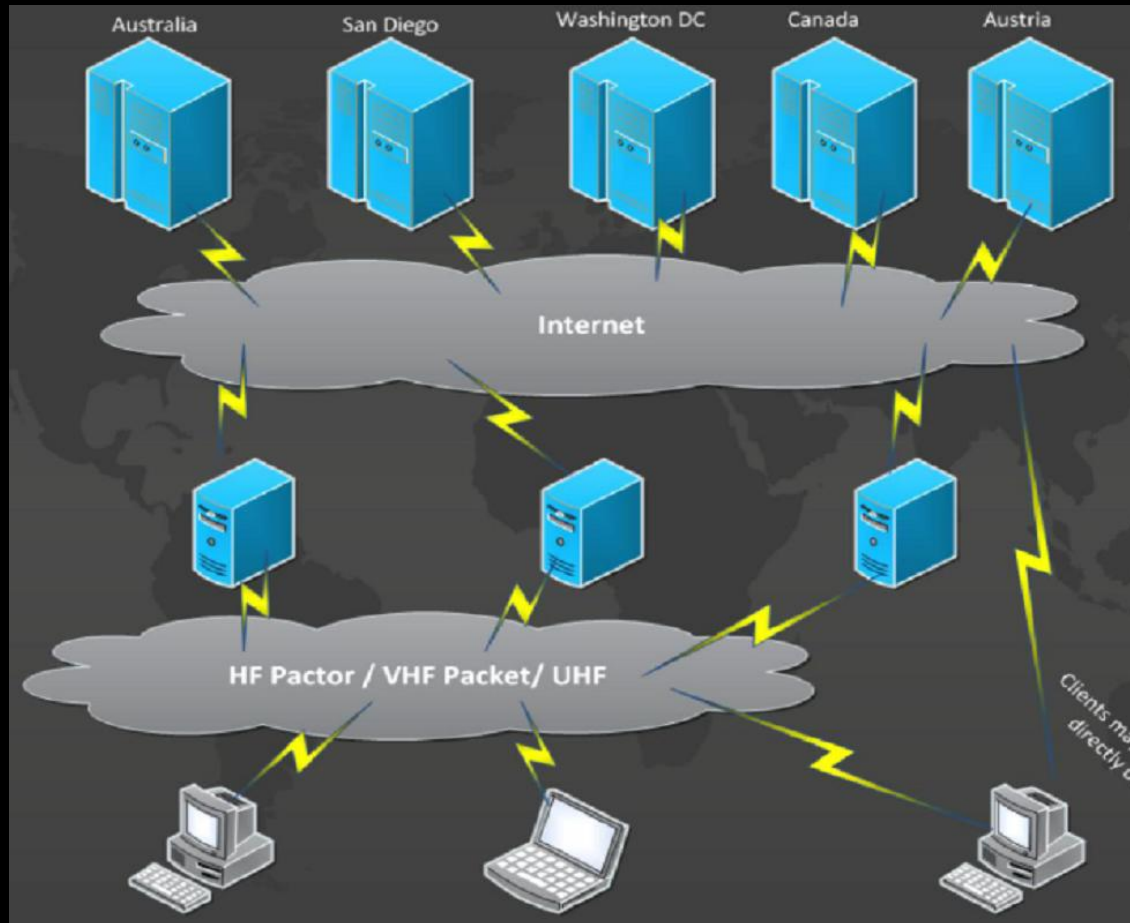
- Winlink is well suited for fixed, mobile, and field operations.
- Winlink is available to hams, MARS, and agencies. Agencies may use anyone as an operator.
- Agency stations *may* encrypt messages, but individual ham and MARS members may not encrypt messages.

Winlink System Organization

There are three levels to the Winlink system:

1. **Client system** – Your radio, computer, and modem.
2. **Radio Message Server (RMS)** – The radio gateway between the client station and the Winlink system.
3. **Common Message Servers (CMS)** – The central hub of the Winlink system. There are 5 CMS nodes that provide a redundant, fault-tolerant system. CMS nodes are mirrored and geographically separated.

Winlink System Organization



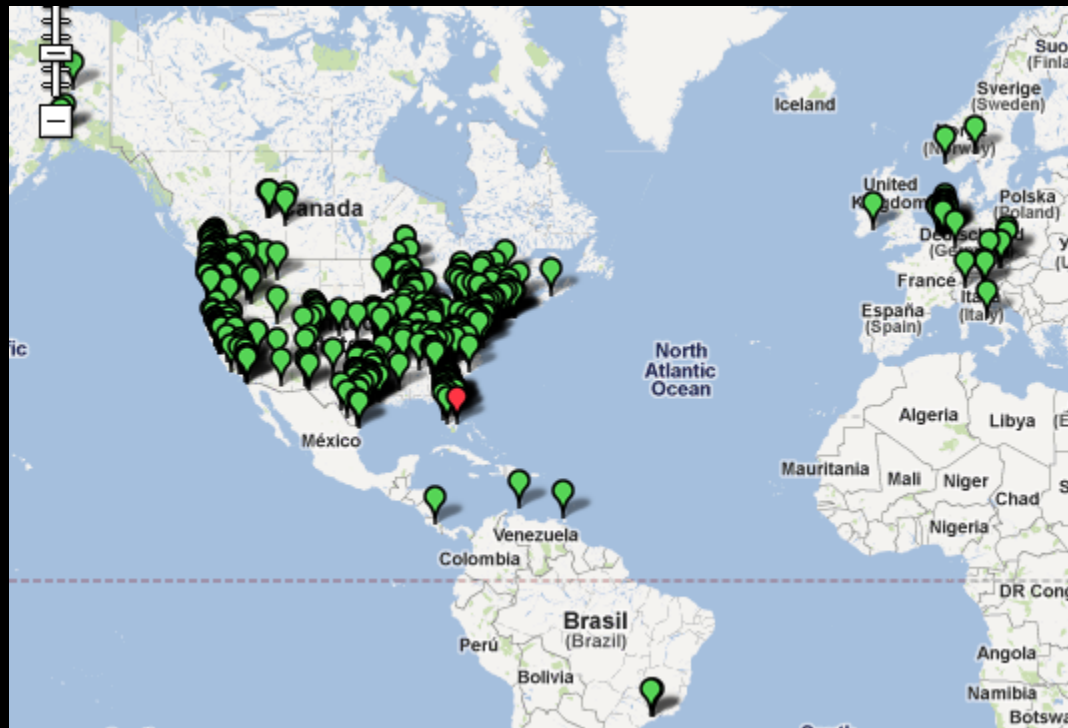
Winlink Ham HF RMS Stations



Winlink MARS HF RMS Stations



Winlink Ham Packet RMS Stations



Winlink MARS Packet RMS Stations



Peer-to-Peer Communications

- Direct communication from one client to another.
- In an emergency, message traffic may be very heavy, so peer-to-peer connections removes traffic from the net.
- Local RMS or Internet may be out of service, so two VHF/UHF stations may need to connect directly.
- If there were a massive cyber attack on the USA, the Winlink CMS or the Internet might be interrupted.
- Individual MARS members may use any voice frequency. Agencies may use Winlink frequencies.

Peer-to-Peer Disadvantages

- Connections are limited by RF propagation, whereas the Winlink system can connect to any RMS.
- Both stations must be on the air at the same time thus losing time independence.
- Stations must use some other form of communication to coordinate connections or have a pre-established plan for frequency and time.

Winlink Connection Modes

- **HF Pactor 1, 2, 3 and 4** – Fast and reliable but requires an expensive modem (\$1500+).
- **HF WINMOR** – “Poor man’s Pactor”. Not as good as Pactor, but operates with inexpensive sound card device (\$100).
- **VHF/UHF Packet** – Fast (9600 baud), reliable, range limited and requires \$400 modem.
- **Telnet** – Non-radio connection through the Internet. Good for training and use if radio is down or network is busy.

Winlink Connections (continued)

- There is a **web interface** for e-mail at Winlink.org. You can send and receive messages without file attachments. Useful for checking for messages or if you are traveling.

Interoperability Advantages

- Connections can be made by HF, VHF/UHF, using Pactor, WINMOR, and Packet. Thus Winlink serves as a bridge between systems with different capabilities.
- It is also a bridge with conventional e-mail systems.
- Time independence is provided by acting as a store-and-forward system.

Advantages of VHF/UHF Packet

- Much smaller and more convenient antenna for VHF/UHF. Excellent for drop-kits.
- Less expensive modem than Pactor.
- High speed – 9600 baud over UHF using SCS Tracker or Kantronics KPC-9612+ modem (about \$400).
- Lower speed (1200 baud) over VHF using Byonics TinyTrak4 modem (about \$100).
- FM connections are usually reliable and static-free.
- Can be used for peer-to-peer connections.

Disadvantages of VHF/UHF Packet

- Requires local VHF/UHF RMS site. Many locations don't have access to a VHF/UHF RMS.
- Usual limitations of VHF/UHF – line of site, limited range, possible blockage by hills or buildings.
- If the local infrastructure is down, the local RMS will probably be down too.
- HF is a better choice for backup communications in major emergencies.

Kantronics KPC9612+ Modem



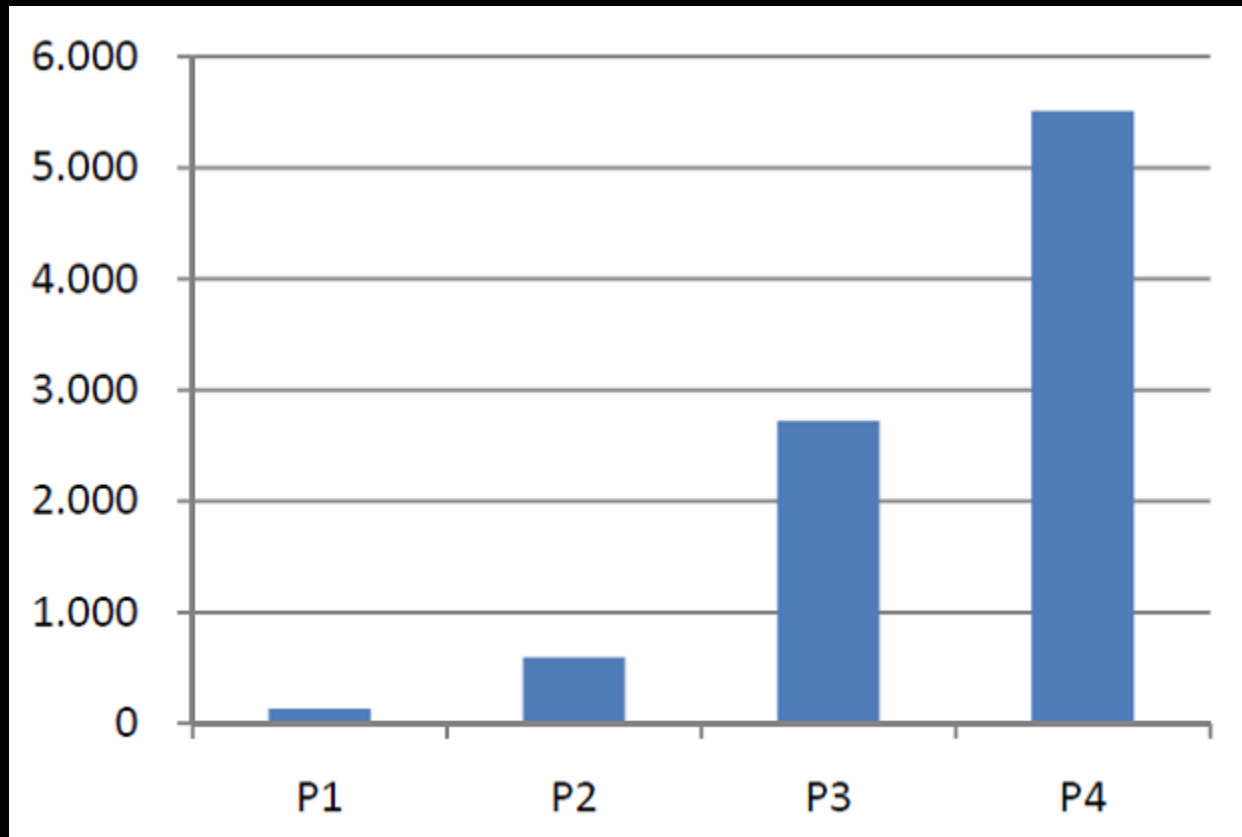
Equipment Needed for Winlink

- Radio: VHF/UHF for Packet, HF for Pactor/WINMOR
- Computer running Windows (XP or later) with RMS Express, Paclink, or Airmail software.
- HF modem:
 - SCS Pactor modem
 - Soundcard interface for WINMOR (Signalink)
- Packet modem:
 - Kantronics KPC9612+ or SCS Tracker (9600 baud)
 - Byonics TinyTrak4 (1200 baud)

DR-7800 Dragon Pactor 4 Modem



Factor Speeds



Client Software

- **RMS Express** – Preferred client program. Works with all modes: Pactor, WINMOR, Packet, Telnet. Also supports peer-to-peer connections. Ongoing development by Winlink Development Team.
- **Paclink** – Allows standard e-mail clients like Outlook to connect to Winlink. Primarily used for LAN access by agencies.
- **Airmail** – Original client e-mail program. Does not support WINMOR.

RMS Express Main Screen

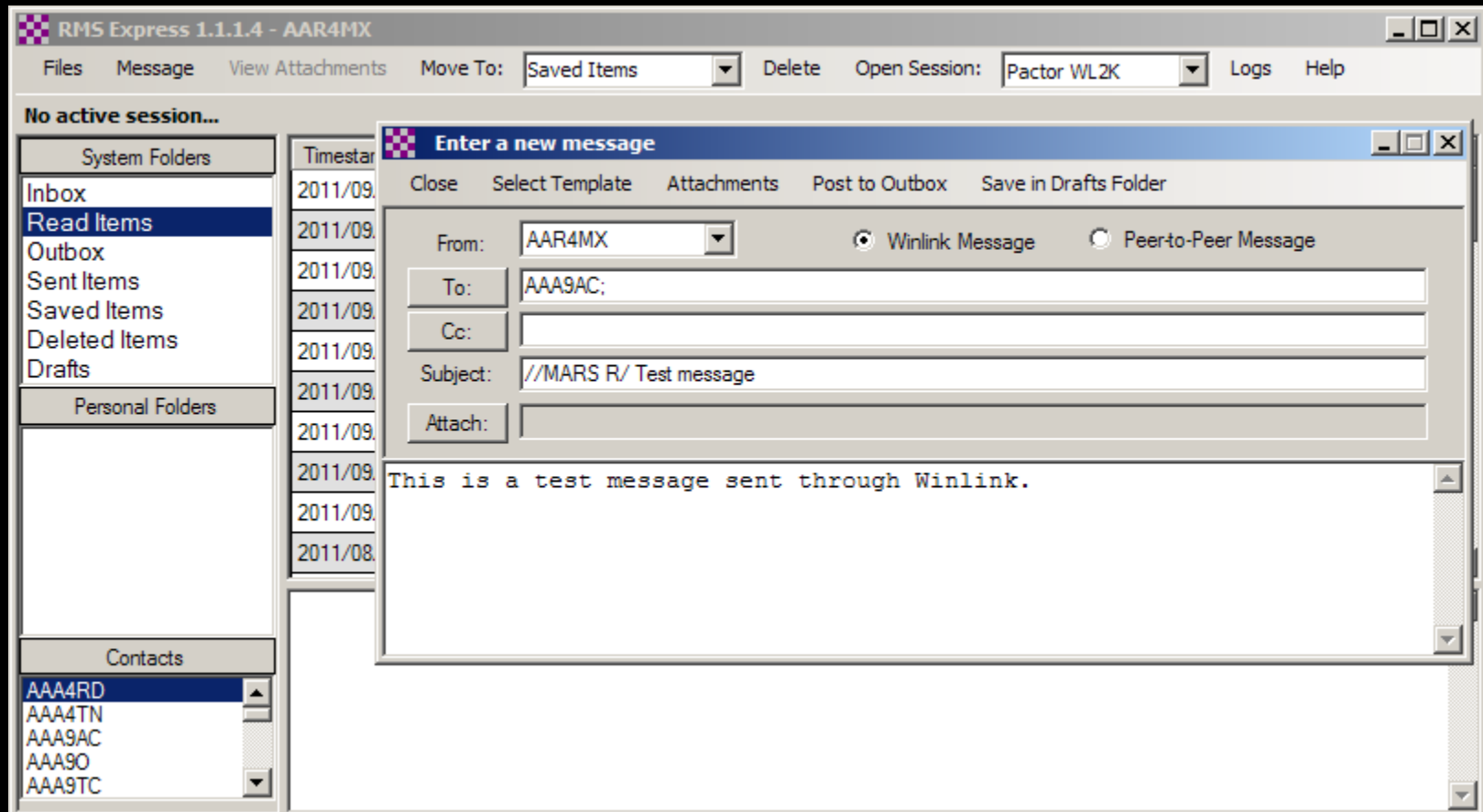
RMS Express 1.1.1.4 - AAR4MX

Files Message View Attachments Move To: Saved Items Delete Open Session: Pactor WL2K Logs Help

No active session...

System Folders	Timestamp	MessageId	Size	#	Source	Sender	To:	Subject
Inbox	2011/09/21 00:24	1DAAYX9T7TYI	1459		AAR4CY	AAR4CY	AAR4MX	//MARS R/A4J NET
Read Items	2011/09/17 22:35	AIAVLPQUEDLX	783		AAR4CY	AAR4CY	AAR4MX ...	//MARS R/A4J NET
Outbox	2011/09/14 11:10	1MXQ6ZTF2GJR	391		AAR4FS	AAR4FS	AAA4TN ...	//MARS R/NET REP
Sent Items	2011/09/13 10:20	U2L37Y1E67KX	275		W4PHS	W4PHS	AAR4MX	//MARS R/Test mess
Saved Items	2011/09/13 10:15	OKMBPSC36E5M	308		W4PHS	W4PHS	AAR4MX	//MARS R/Test mess
Deleted Items	2011/09/11 01:11	RBOCCF3CXDW3	286		AAR4SJ	AAR4SJ	AAR4MX	//MARS R/ICS 309 L
Drafts	2011/09/11 01:11	XA4FLVKEALJD	228		AAT4WR	AAT4WR	AAR4MX	//MARS R/NC TRAIT
Personal Folders	2011/09/08 02:39	G2ZSQHQTYYZC	533		AAR4FS	AAR4FS	AAA4TN ...	//MARS R/NET REP
Contacts	2011/09/07 03:19	1195_AAM6RD	402		AAM6RD	AAM6RD	AAR4MX	//MARS R/ICS 309 F
	2011/08/24 09:05	40BRAAYJCH9L	442		AAR4FS	AAR4FS	AAA4TN ...	//MARS R/NET REP

RMS Express New Message



Acknowledging Message Receipt

The screenshot shows the RMS Express 1.1.1.4 - W4PHS interface. The main window displays a list of messages with columns for timestamp, MessageId, Size, #, Source, Sender, To, and Subject. A context menu is open over the selected message, with 'Acknowledge receipt...' highlighted. The message details pane shows the following information:

Message ID: VXMWNWKEYEYIY
Date: 2011/09/13 00:00
From: k4cjsx@comcast.net
To: W4PHS
Source: SMTP
Subject: //mars/test

Steve Waterman

Timestamp	MessageId	Size	#	Source	Sender	To	Subject
1/09/22 23:49	1YZXRCSJR390	201		SMTP	SMTP:phil@phils...	W4PHS ...	Request delivery receipt
1/09/22 23:49	8EP929J5C8AS	193		SMTP	SMTP:phil@phils...	W4PHS ...	Request read receipt
1/09/13 20:02	K0EUH0R9E2GL	221		SMTP	SMTP:n6prw.eco...	W4PHS	Test message to validate ACK res
1/09/13 20:02	2UVOZZWALV4J	150		AAA9AC	AAA9AC	W4PHS	//MARS R/test
2011/09/13 17:33	QX13LZSYCF0N	508		SMTP	SMTP:k4cjsx@co...	W4PHS	Re: ACK: //mars/test
2011/09/13 15:12	VXMWNWKEYEYIY	223		SMTP	SMTP:k4cjsx@co...	W4PHS	//mars/test
2011/09/13 13:03	FVJDEQL1LRY0	394		SMTP	SMTP:phil@phils...	W4PHS	ACK: Test message with ACK at f
2011/09/13 13:03	OMLD4EPLW370	366		SMTP	SMTP:phil@phils...	W4PHS	ACK: Test message for ack
2011/09/13 12:50	HG51BOBSD177	229		AAR4MX	AAR4MX	W4PHS	//MARS R/ACK: Test with MARS
2011/09/13 12:43	LWOWQ4NM4R...	377		AAR4MX	AAR4MX	W4PHS	//MARS R/Test message from M
2011/09/13 10:14	KF1X0Y13JKPN	197		AAR4MX	AAR4MX	W4PHS	//MARS R/Test message from M
2011/09/13 03:12	AJITSK3XEQT2	188		SMTP	SMTP:Phil.Sherr...	W4PHS	Test ACK from S&H

Message Receipt

Acknowledge receipt of message by W4PHS [Close] [Select Template] [Attachments] [Post to Outbox] [Save in Drafts Folder]

From: Winlink Message Peer-to-Peer Message

To:

Cc:

Subject:

Attach:

[message acknowledgement]

The following message was received by W4PHS

Subject: //mars/test
Sender: k4cjsx@comcast.net
To: W4PHS
Received: 2011/09/13 15:12
Message-ID: VXMWNWKEYEIIY
Number of attachments: 0
Size: 223

Information Requests

- Use the “Winlink Catalog Request” feature in RMS Express to request:
 - Weather maps for most areas of the world
 - Weather forecasts
 - Maritime HF nets and frequencies
 - Satellite images
 - Location of three closest stations

RMS Express Catalog Request

Winlink Query Catalog

Categories	Inquiry ID	Description	Size	Originated	Selections
WX_CAR_GULF	FPUS62.KMFL	FL	47970	2000-45-31	
WX_CROATIA	FPUS62.KRAH	NC	10462	2000-15-31	
WX_DENMARK	FPUS63.KBIS	ND	5420	2000-16-31	
WX_EASTPAC	FPUS63.KDTX	MI	10189	2000-42-31	
WX_EUROPE	FPUS63.KFSD	SD	9262	2000-23-31	
WX_FAX	FPUS63.KLOT	IN, IA	6470	2007-17-08	
WX_FRANCE	FPUS63.KLSX	IL, MO	8822	2009-36-01	
WX_GERMANY	FPUS63.KMKX	WI	7768	2007-16-08	
WX_GREECE	FPUS63.KMPX	MN	8194	2000-07-31	
WX_GREENLAND	FPUS63.KOAX	NE	9706	2000-10-31	
WX_GT_LAKES	FPUS63.KTOP	KS	8452	2001-46-22	
WX_HIGH_SEAS	FPUS64.KEWX	TX	183672	2000-24-31	
WX_HOLLAND	FPUS64.KJAN	MS	6999	2000-07-31	
WX_INDIAN	FPUS64.KLIX	LA	8472	2000-43-31	
WX_ITALY	FPUS64.KLZK	AR	26309	2000-44-31	
WX_LABRADOR	FPUS64.KMBX	AL	19894	2000-44-31	
WX_MANITOBA	FPUS64.KOHX	TN	52568	2007-15-08	
WX_MARITIMES	FPUS64.KTSA	OK	37890	2000-17-31	
WX_MED	FPUS65.KABQ	NM	5770	2009-33-29	
WX_NAVTEX	FPUS65.KBOI	ID	49340	2000-44-31	
WX_NFLD					
WX_NOAA					
WX_NORWAY					
WX_OFFSHORE					
WX_PACIFIC					
WX_PANAMAR					
WX_RUSSIA					
WX_S_AFRICA					
WX_SPAIN					
WX_SWEDEN					
WX_SWISS					
WX_UK					
WX_US					

Double click to add or delete query selections...

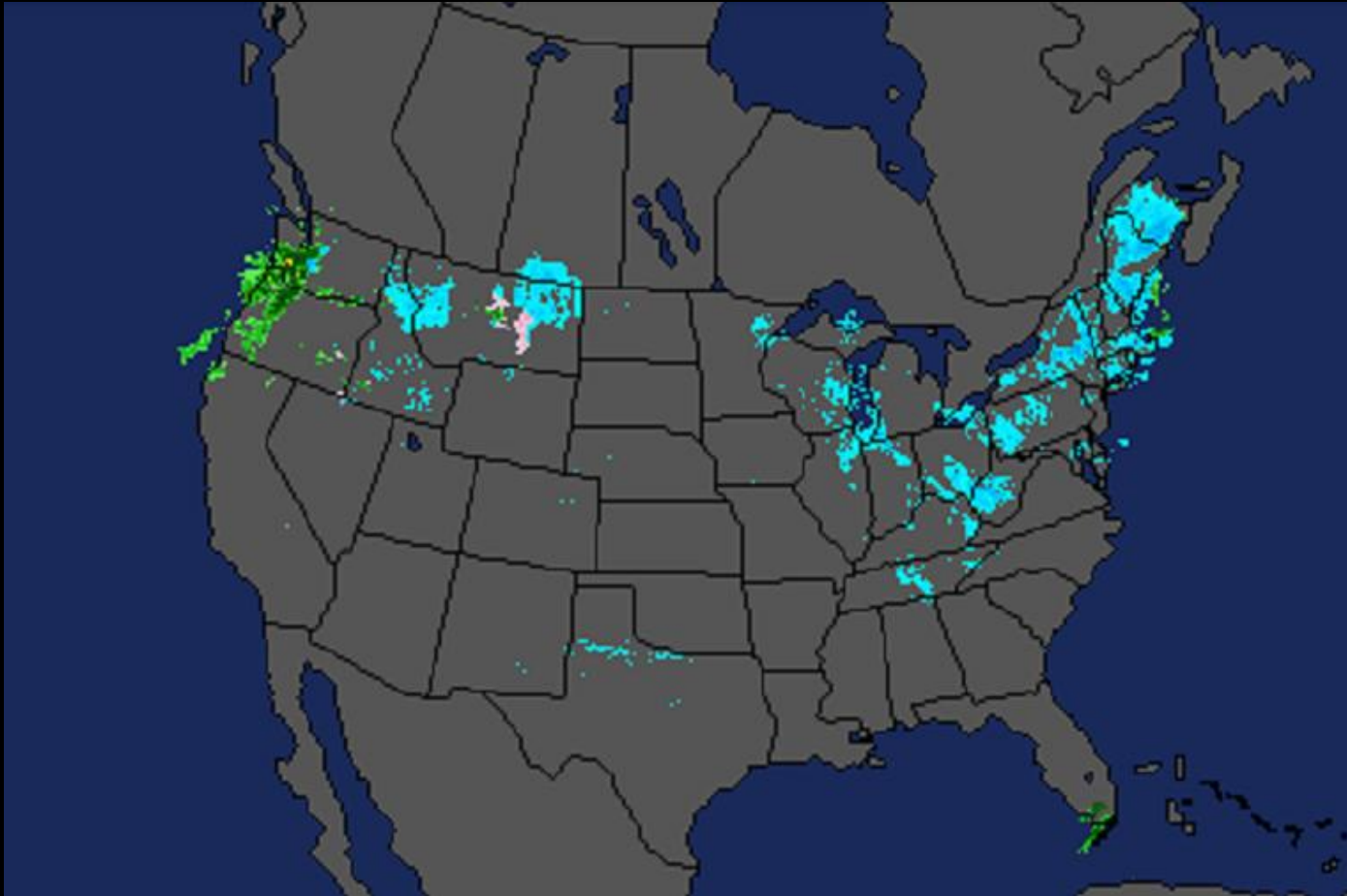
Post Request

Last Update
0000-00-00 00:00

Request Catalog Update

Cancel

Weather Map from Winlink



Position Reports

- You can send to the Winlink system a specially formatted message reporting your current position.
- If a GPS unit is attached, the position will be read from it. Otherwise, you can manually enter your position.
- A Winlink.org page shows reported positions.
- Extremely valuable for maritime operation.

Posting a Position Report

GPS / Position Report

GPS Serial Port

GPS Serial Port: GPS Baud Rate:

No connection to the GPS - Last good GPS fix at 0000/00/00 00:00 UTC

GPS Latitude: GPS Longitude:

GPS Speed: Knots GPS Course: True

Position Report

Your last position report was posted at 0000/00/00 00:00 UTC

Report Date/Time: UTC

Latitude: Longitude:

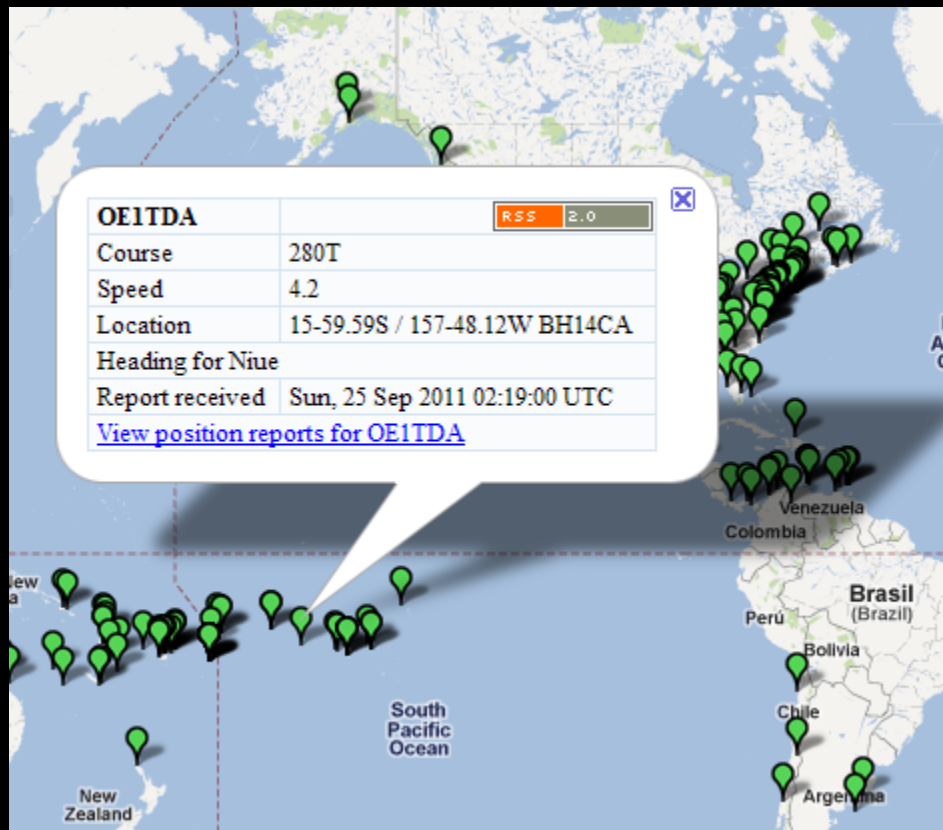
Speed: Knots Course: True

Comment - 148 Characters Maximum:

Position Report Web Page



Detailed Position Information



ICS-309 Message Log Generation

- **RMSMessageLog** program automatically generates ICS-309 message log forms from RMS Express message databases.
- Report is created as a pdf file that can be printed or e-mailed.
- Program is free
- Download from W₄PHS page at QRZ.com
- Eventually ICS-309 generation will be integrated into RMS Express.

Portable Drop-kit Board



Compact HF/VHF/UHF Drop-kit

