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)

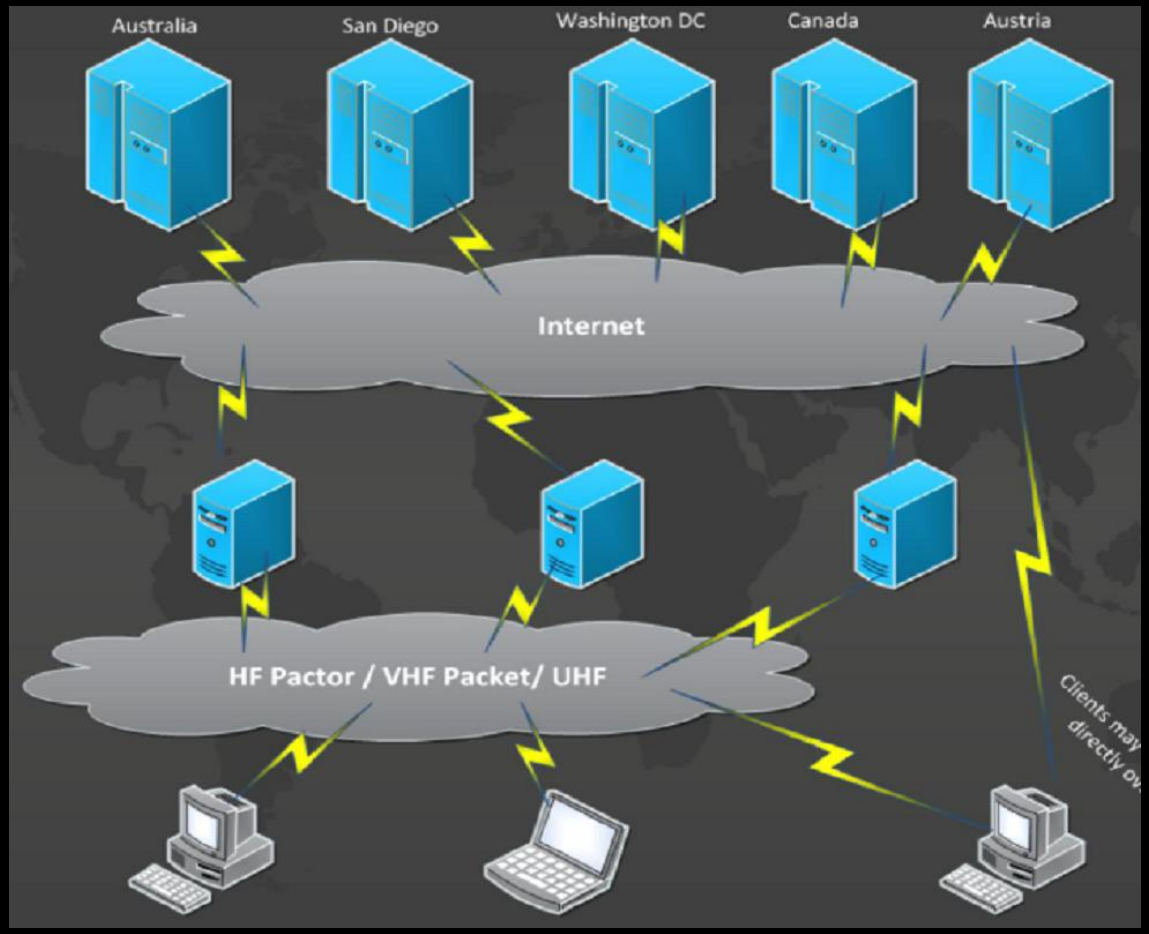
- Winlink is well suited for fixed, mobile, and field operations.
- Winlink is available to hams, MARS, and agencies. Agencies may use anyone as an operator.
- Agency stations *may* encrypt messages, but individual ham and MARS members may not encrypt messages.

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. May 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.

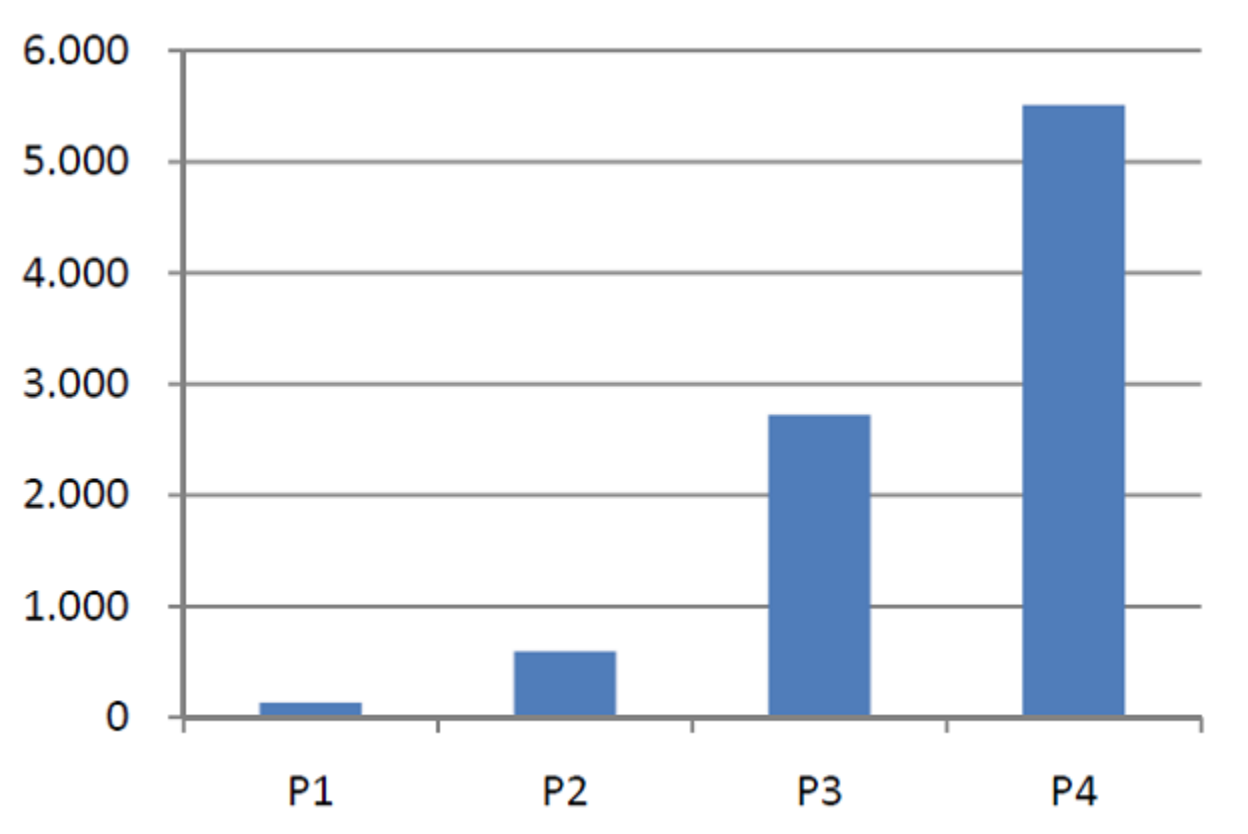
Kantronics KPC9612+ Modem

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

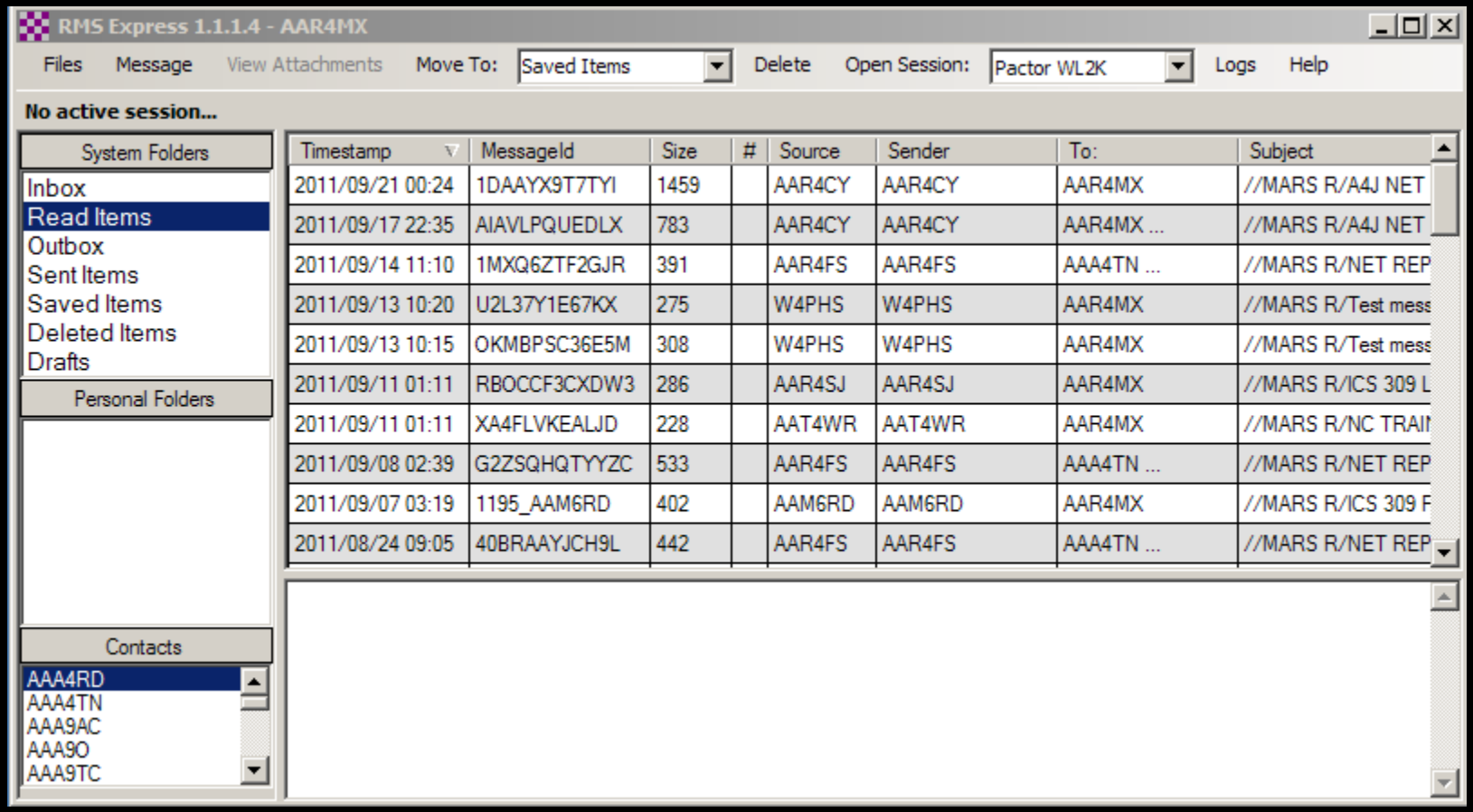
Pactor Speeds



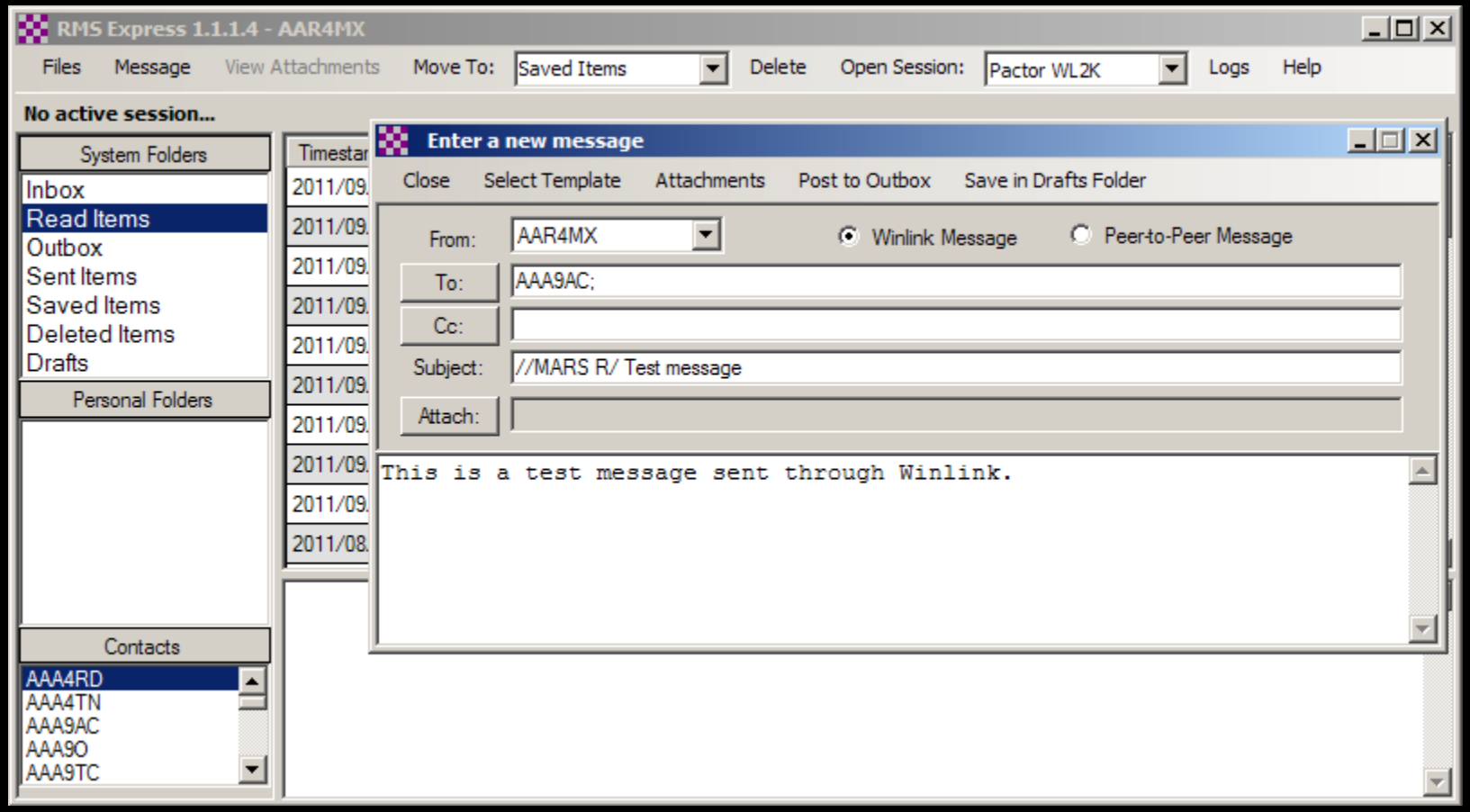
Client Software

- **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.

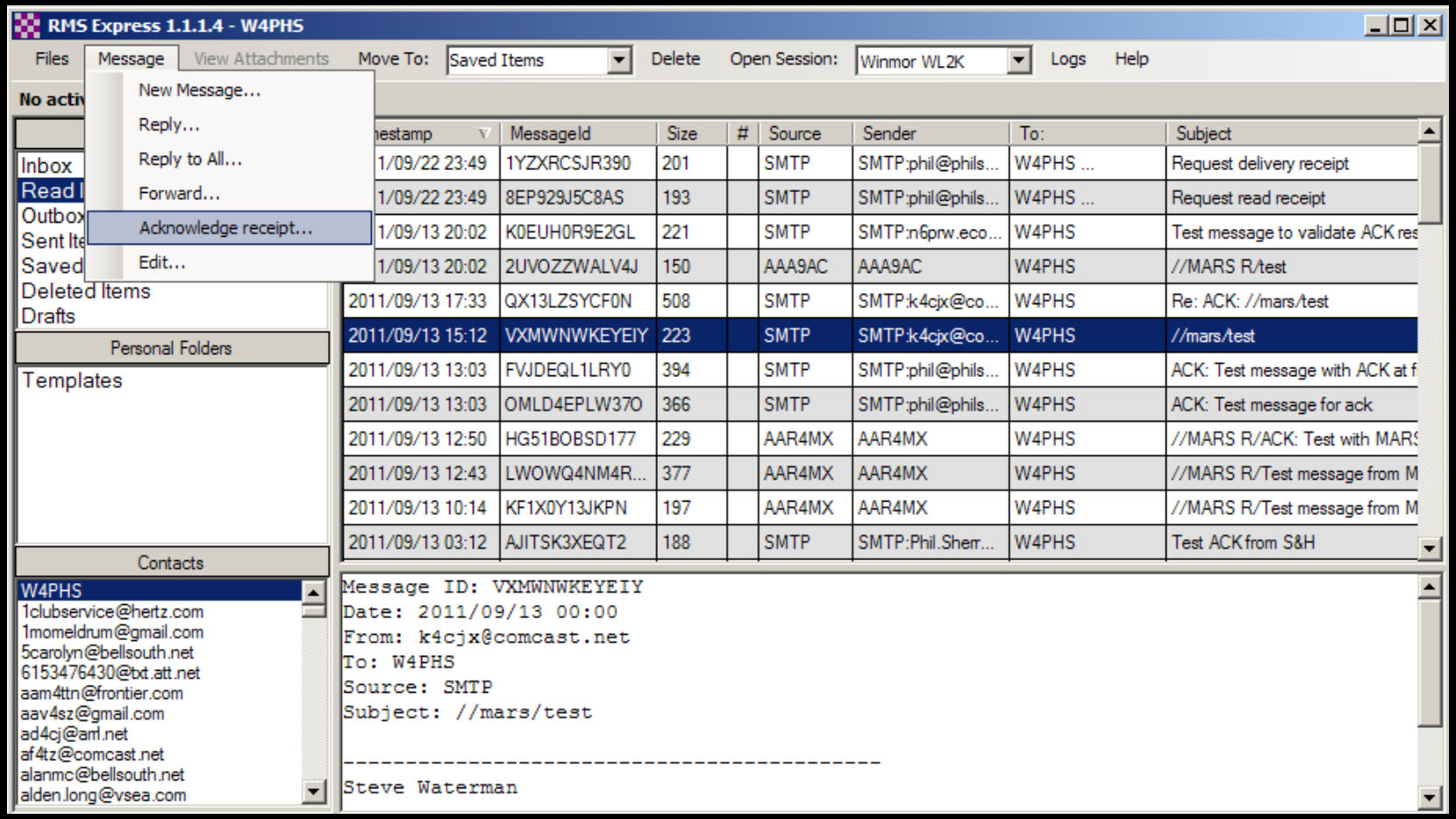
RMS Express Main Screen



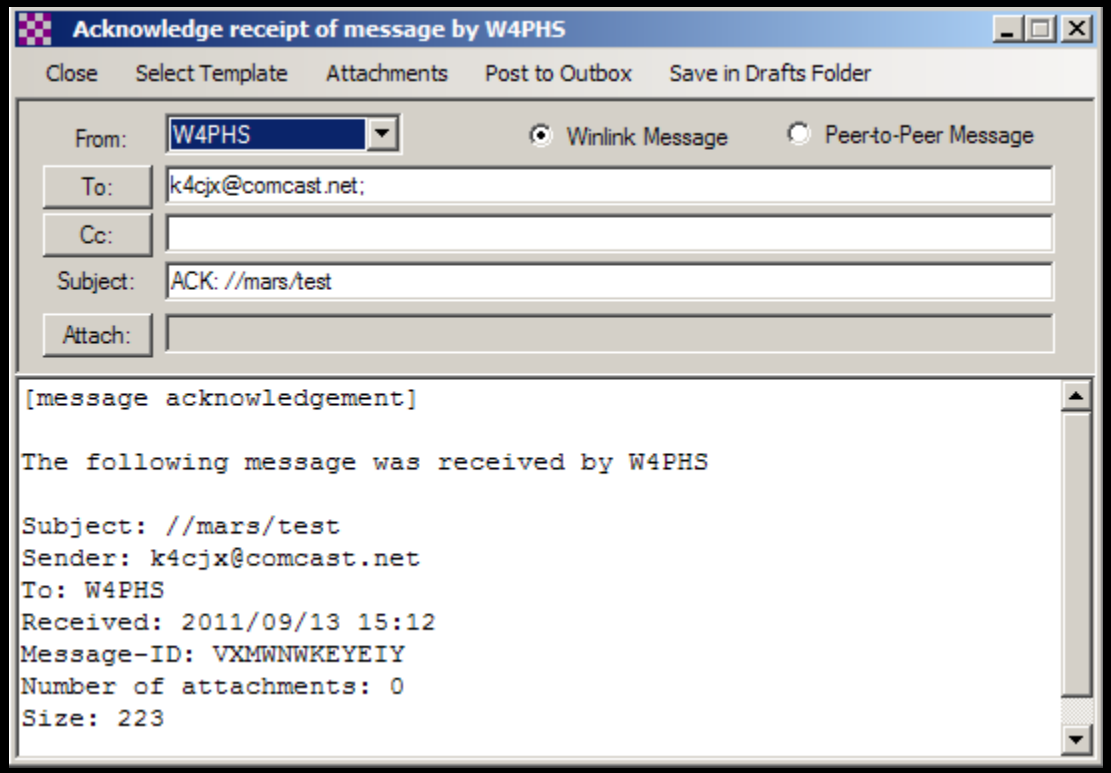
RMS Express New Message



Acknowledging Message Receipt



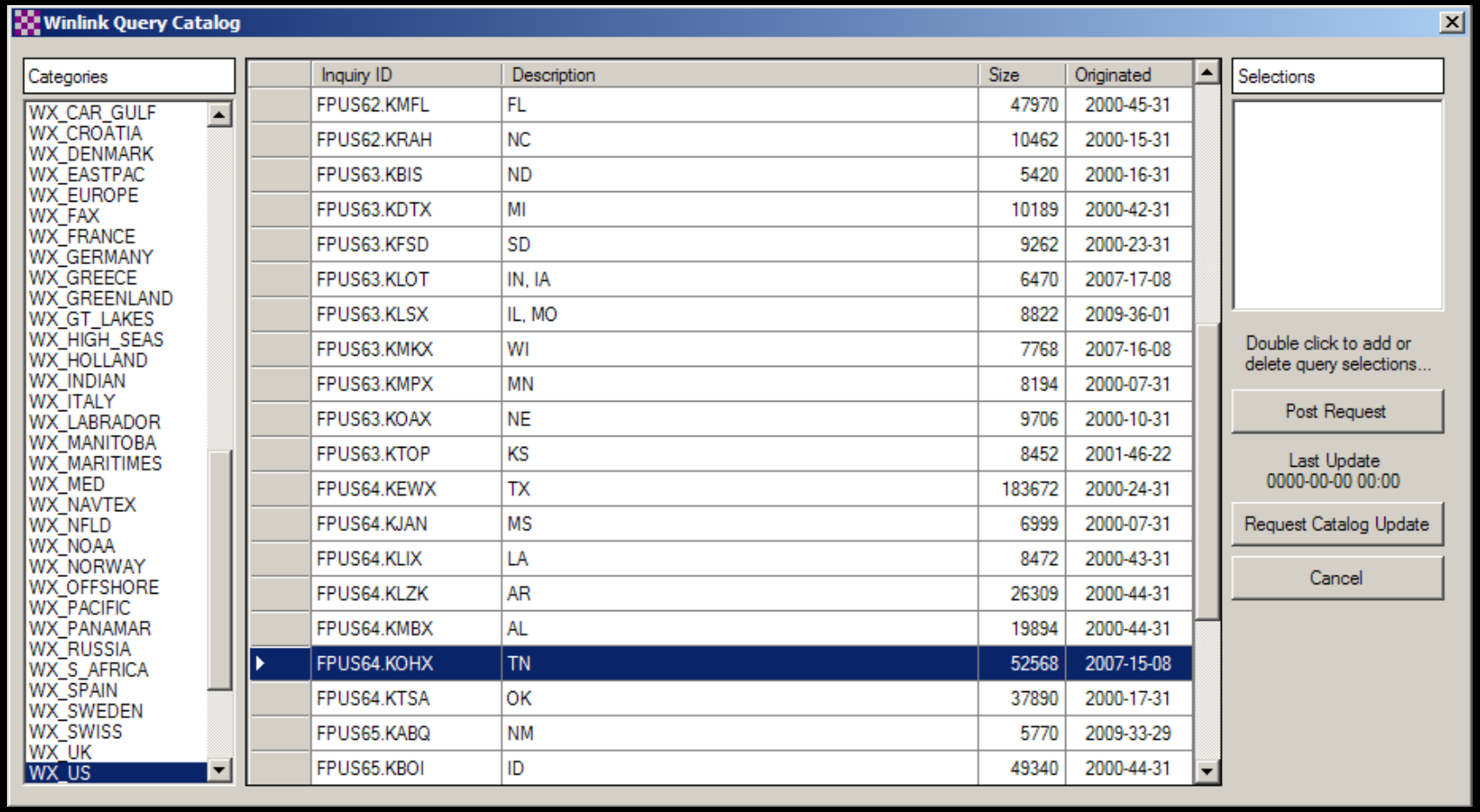
Message Receipt



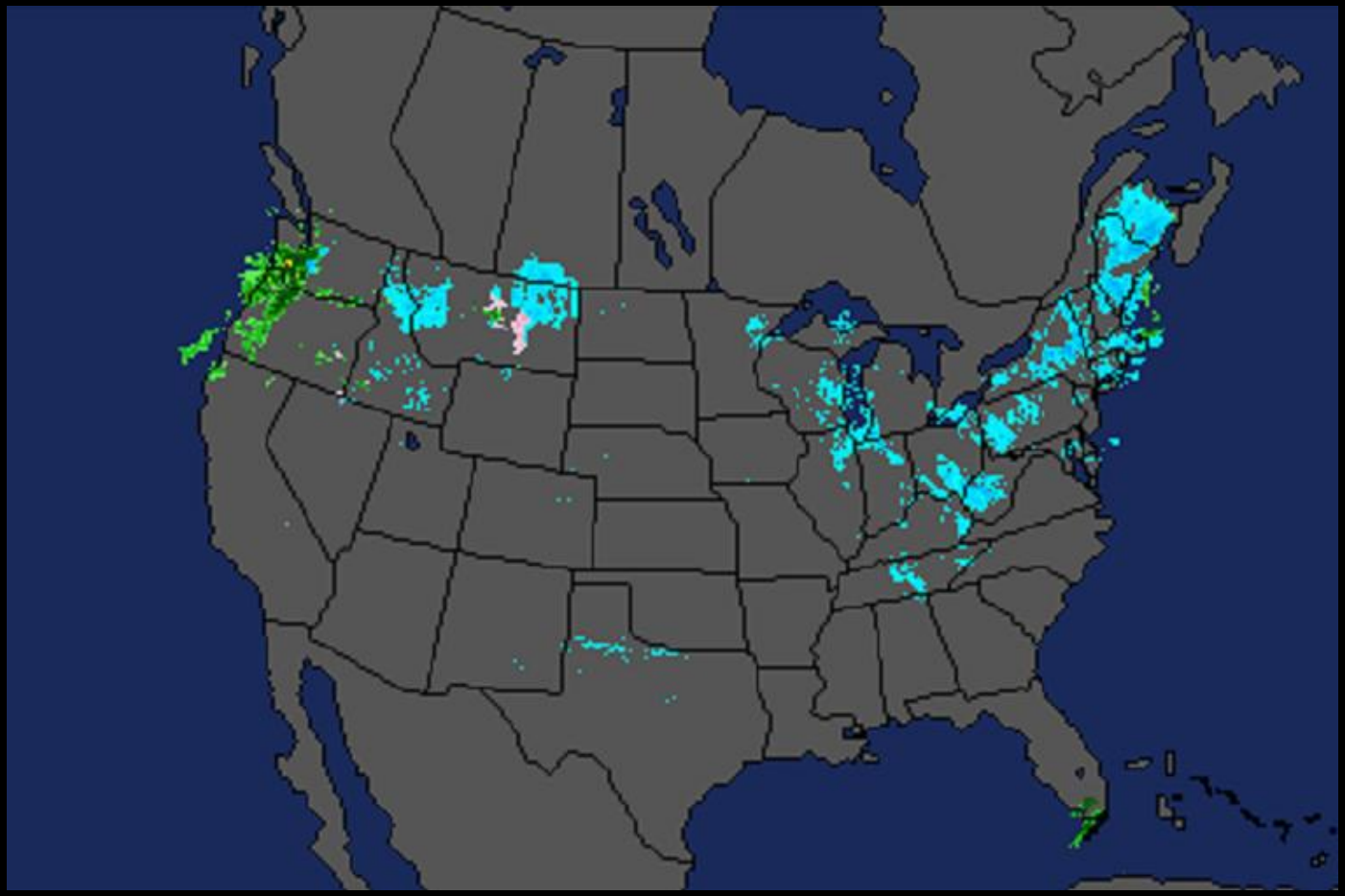
Information Requests

- 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



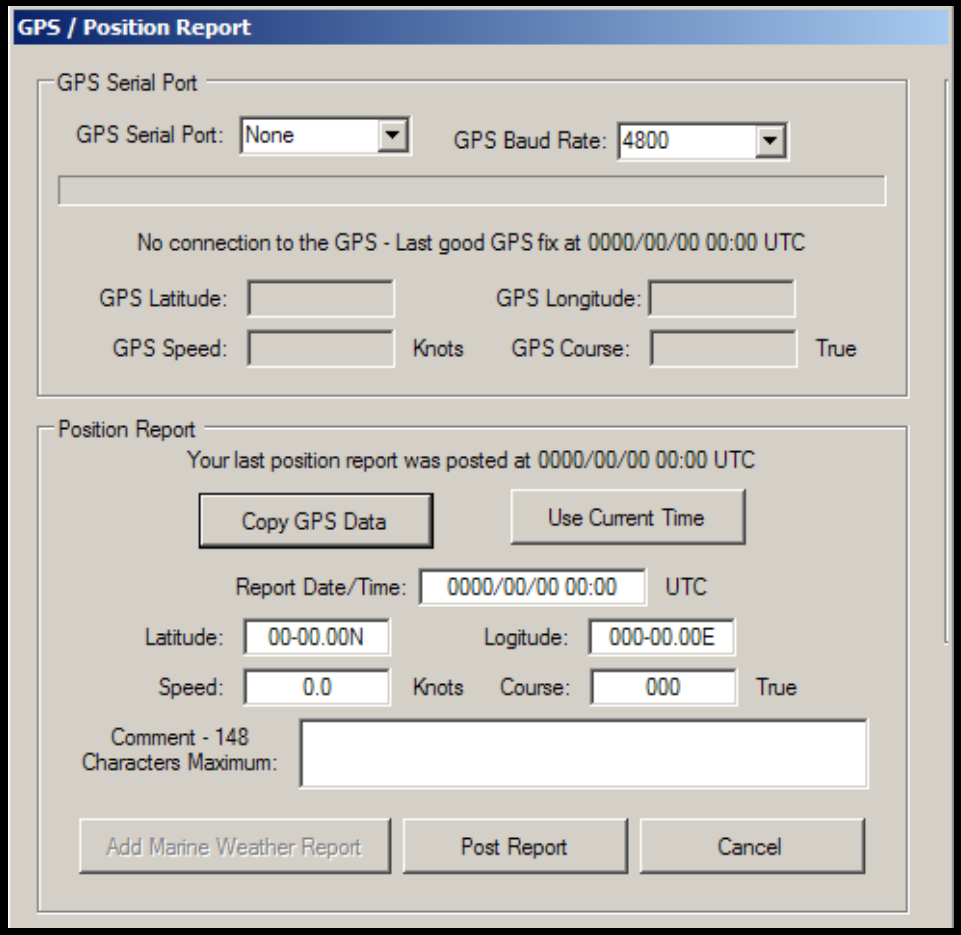
Weather Map from Winlink



Position Reports

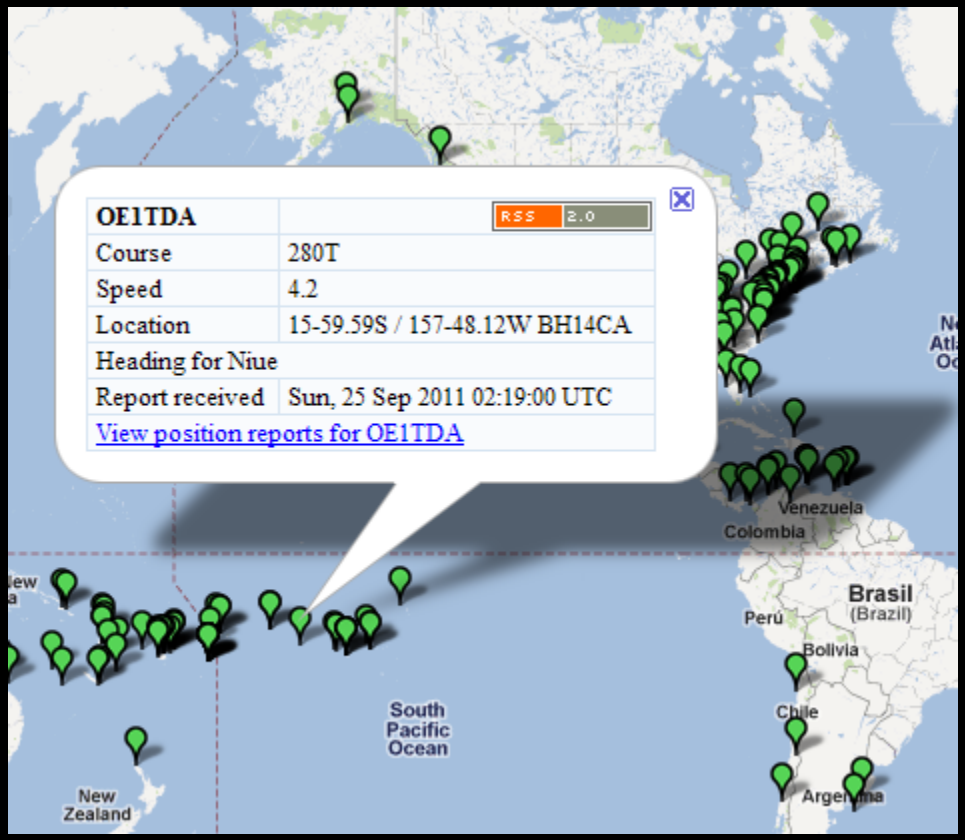
- You can send to the Winlink system a specially formatted message reporting your current position.
- If a GPS unit is attached, the position will be read from it. Otherwise, you can manually enter your position.
- A Winlink.org page shows reported positions.
- Extremely valuable for maritime operation.

Posting a Position Report



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.

Example ICS-309 Message Log

COMMUNICATIONS LOG	TASK #	DATE PREPARED: 10-Sep-2011 TIME PREPARED: 15:31
OPERATIONAL PERIOD # 0800 - 1100 Sep. 10, 2011	TASK NAME: HOW-100 bike ride	
RADIO OPERATOR NAME: W4PHS	STATION I.D. Rest Stop # 3	

LOG

TIME	FROM	TO	SUBJECT
10-Sep-2011 08:21	KA4OTB	AK4GO KI4PSR WC4EOC-2 WC4EOC-1	HOW-100
10-Sep-2011 08:23	WC4EOC-2	KA4OTB	//wl2k Rest Stop # 3
10-Sep-2011 08:31	WC4EOC-2	KI4PSR WC4EOC-1	//wl2k Rest Stop 3
10-Sep-2011 09:11	WC4EOC-2	KA4OTB KI4PSR	//WL2K Test from Rest Stop 3
10-Sep-2011 09:12	KA4OTB	WC4EOC-2	Re:Rest Stop # 3
10-Sep-2011 09:12	KA4OTB	WC4EOC-2	Re:Rest Stop # 3
10-Sep-2011 09:12	KI4PSR	WC4EOC-2 KI4PSR WC4EOC-1	Re:Rest Stop 3
10-Sep-2011 09:14	WC4EOC-2	KI4PSR	//WL2K Re:Rest Stop 3
10-Sep-2011 09:14	KA4OTB	WC4EOC-2	Test Message
10-Sep-2011 09:16	WC4EOC-2	KA4OTB	//WL2K Re:Test Message
10-Sep-2011 09:34	KI4PSR	KA4OTB AK4GO KI4PSR WC4EOC-2 WC4EOC-1	Re:HOW-100
10-Sep-2011 09:50	WC4EOC-2	KA4OTB	//WL2K Water received at Rest Stop 3
10-Sep-2011 10:00	WC4EOC-2	KA4OTB	//WL2K Rest Stop 3 has riders
10-Sep-2011 10:12	KA4OTB	WC4EOC-2	Re:Rest Stop 3 has riders
10-Sep-2011 10:23	WC4EOC-2	KI4PSR	//WL2K Winlink--vhf or hf
10-Sep-2011 10:51	KI4PSR	WC4EOC-2	Re:Winlink--vhf or hf
10-Sep-2011 10:53	WC4EOC-2	KI4PSR	//WL2K Re:Winlink--vhf or hf
10-Sep-2011 11:02	WC4EOC-2	KA4OTB KI4PSR	//WL2K Rest stop 3 shutting down

ICS-309 report generated by RMSMessageLog version 1.2.0 on 10-Sep-2011 15:31

Portable Drop-kit Board

Compact HF/VHF/UHF Drop-kit