Winlink 2000
e-mail anytime, anywhere

SeaPac – Jun 2013
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Agenda

- Welcome, Intro, Credits
- What is Winlink 2000? (What's in it for me?)
- What hardware do I need?
- What software do I need?
- Demo (?)
- Q&A Throughout!
- Resources

Winlink 2000 - Credits

Winlink Development Team (WDT)

- Victor D. Poor, W5SMM (sk)
- Rick Muething, KN6KB
- Steve Waterman, K4CJX
- Tom Lafleur, KA6IQ
- Lee Inman, K0QED
- Hans A. Kessler, N8PGR
- Don Moore, KM0R
- Lor Kutchins, W3QA
- Neil Hughes, VE1YZ
- Don Trotter, VE1DTR
- Phil Sutherland, VK6KPS
- Peter Woods, N6PRW
- Steve Hicks, N5AC
- Phil Sherrod, W4PHS

Help with this presentation

- Phil Sherrod, W4PHS
- Gary Takis, K7GJT
- Steve Aberle, WA7PTM
- Vern Smith, KA7DCQ

What is Winlink 2000?

- “Worldwide system of volunteer sysops, radio stations, and network assets that support e-mail by radio … “
- Includes non-commercial link to internet e-mail
- Users include
  - Many government agencies (contingency communication)
  - Amateur Radio operators
  - MARS operators
  - Private sailboats
  - Non Governmental organizations (NGOs)
    - Examples: Red Cross, AT&T, FedEx

WL2K: e-mail when you are away

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Mobile HF rig and antenna: $1,200…
PACTOR III Modem: $1,000…
All Looters Will be Shot on the Spot!
Ability to send email when commercial communications systems fail: Priceless
http://www.winlink.org

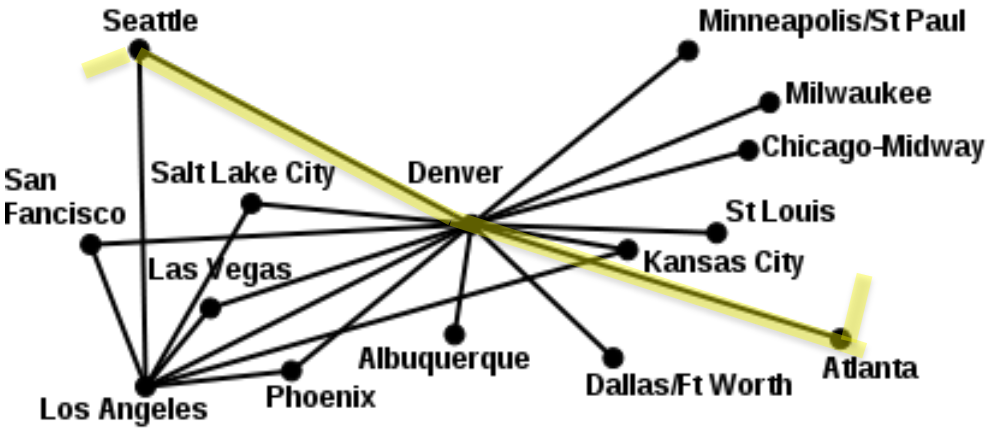
Disaster Assessment Picture Sent Via Winlink 2000

Public safety systems do fail.

Kentucky ice storm pix from TEMA recon vehicle.

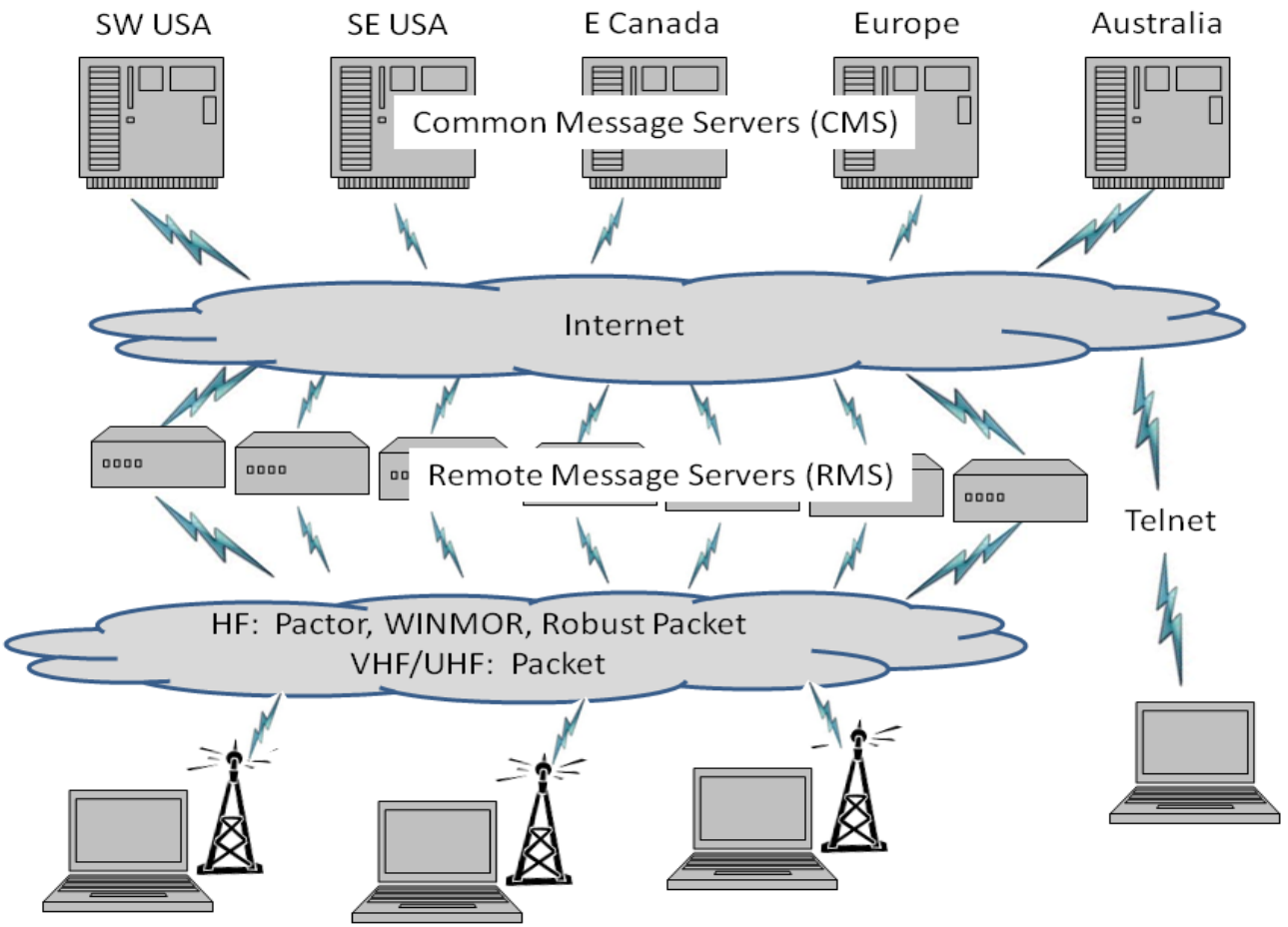
WL2K – like the hub and spoke airline system

- Drive to SeaTac
- Fly to Denver
- Change Planes
- Fly to Atlanta
- Rent a car
- Drive to your destination

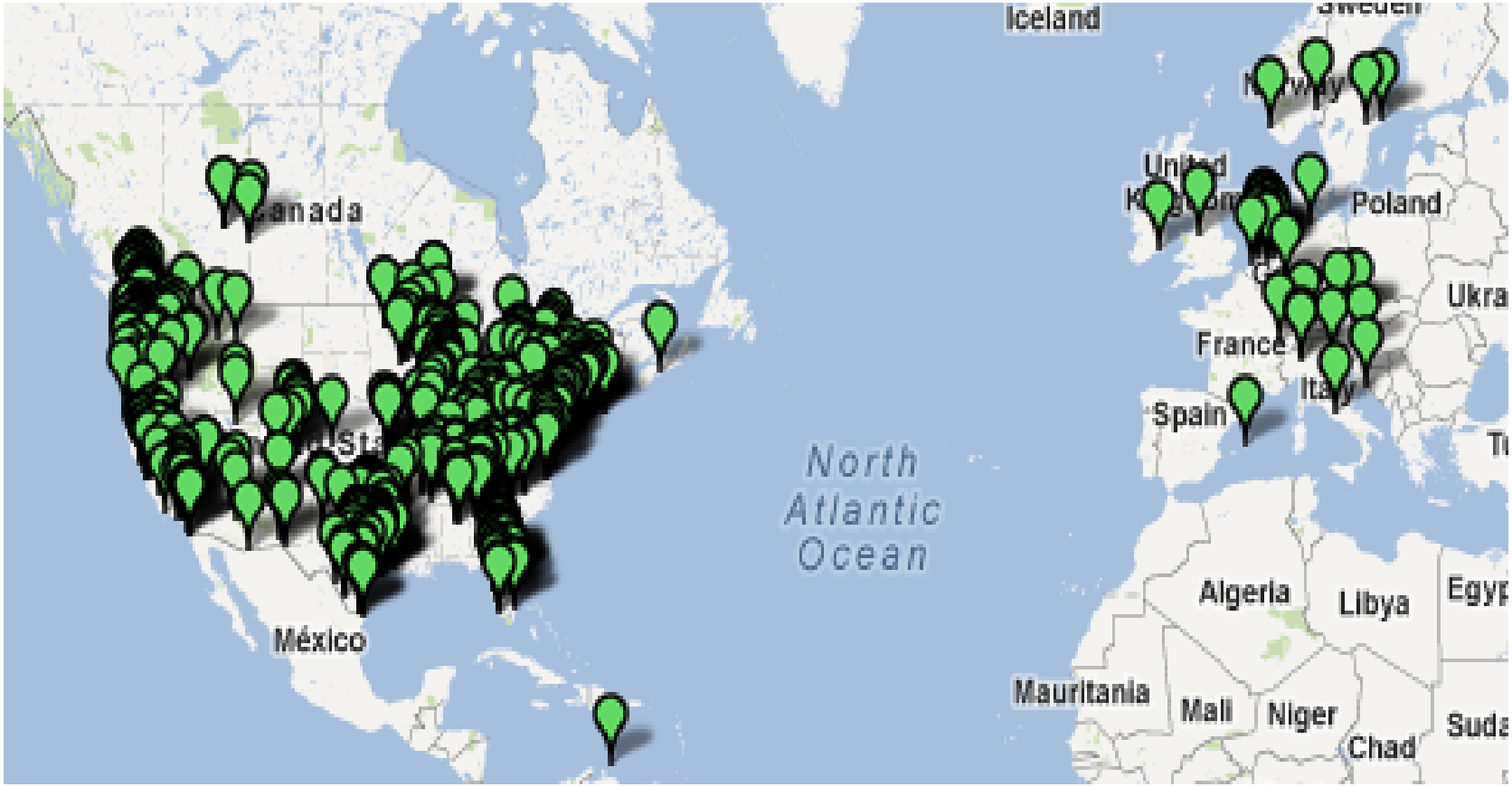


Winlink 2000 System Architecture

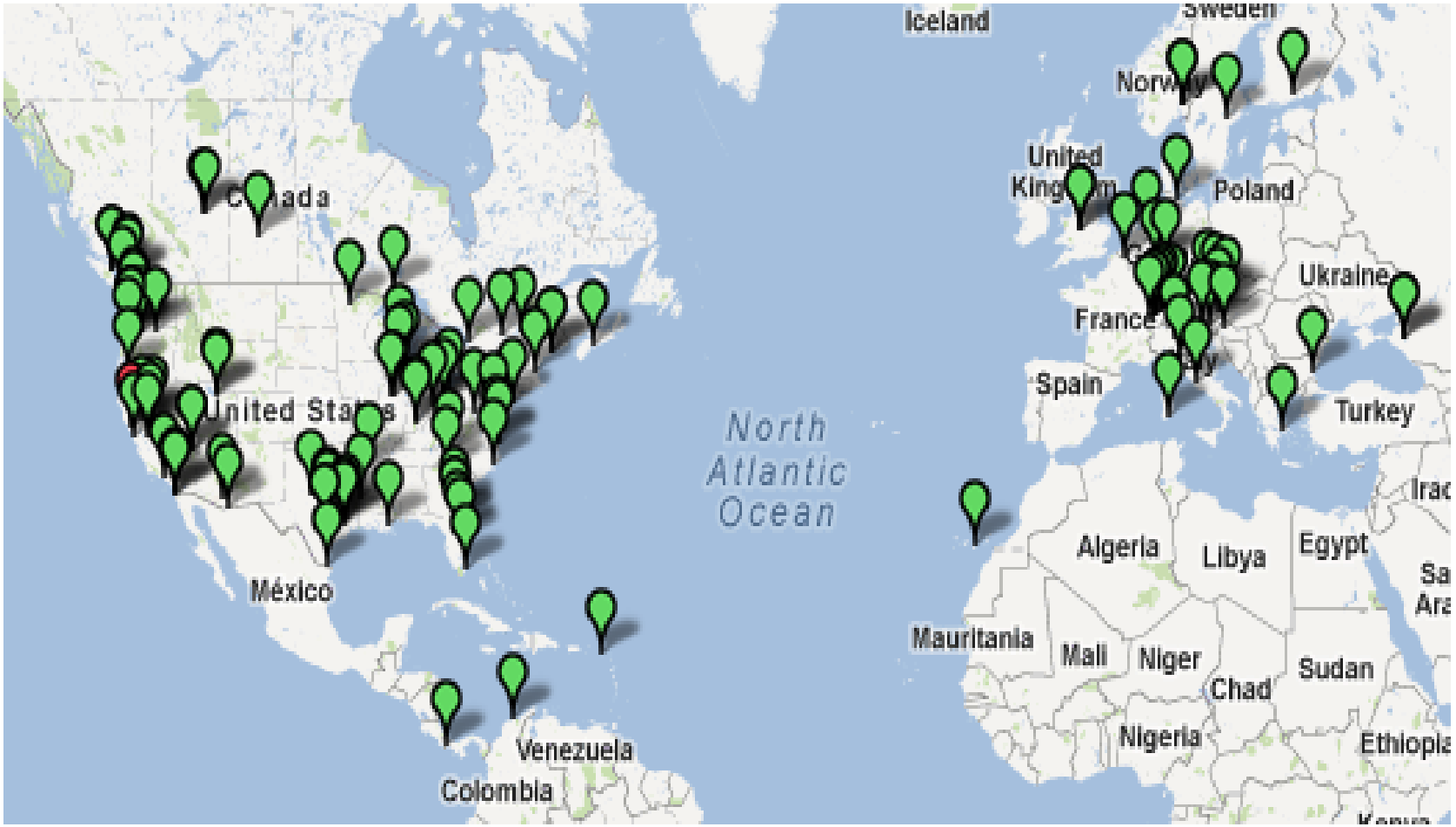
- CMS
- RMS (gateway)
- Client (you)



Winlink Ham VHF/UHF Gateways in America & Europe



Winlink Ham HF Gateways in America & Europe



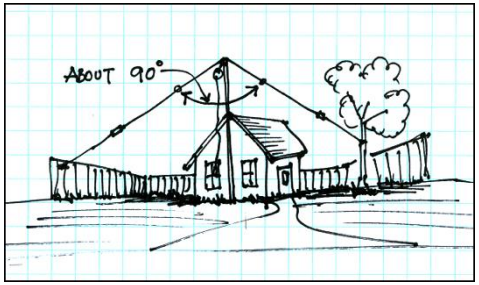
What hardware do I need for WL2K?

Computer, PII or higher
XP or better
(or VM on a Mac)
1+ GB RAM

Pactor

Soundcard

HF Radio



HF Antenna

TNC

V/UHF Radio

V/UHF Radio with
built-in TNC

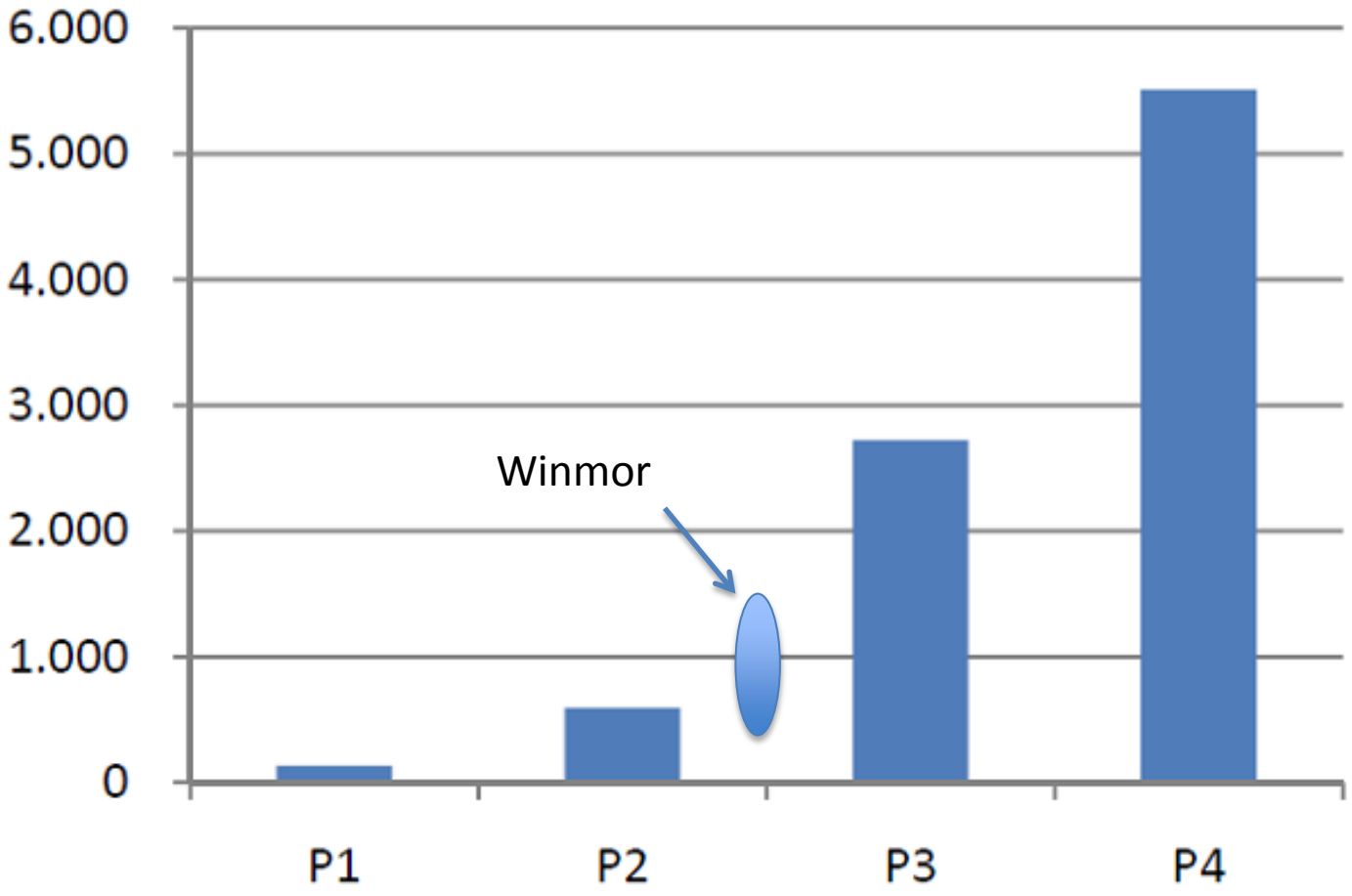
V/UHF Antenna

Winlink Connection Modes

- **HF Pactor 1, 2, 3, 4***
  - Fast and reliable
  - requires an expensive modem ($1500+).
- **HF WINMOR**
  - "Poor man's Pactor"
  - uses inexpensive sound card device ($100)
  - Slower than Pactor (speed between P2 and P3)
- **VHF/UHF Packet**
  - **1200 baud VHF** – Slower, can use ~$100 Byonics TinyTrak-4 modem.
  - **9600 baud UHF** – Fast. Requires $400 modem (e.g., Kantronics, or SCS Tracker), or radio with built in modem (e.g. Kenwood TM-D710).
- **Telnet**
  - Non-radio connection through the Internet.
  - Good for training and use if radio is down or network is busy.

*Pactor 4 not yet legal for US hams. OK for MARS

Pactor Speeds (HF)



Will my radio work?

- **HF Pactor 1, 2, 3 and 4**
  - Visit SCS site
  - see if they have a cable for your radio
- **HF WINMOR**
  - Visit Tigertronics (SignaLink USB) or US Navigator site
  - See if they have a cable for your radio
- **VHF/UHF Packet**
  - **Google "<my radio> packet"**
- **Telnet**
  - No radio needed. Computer and internet!

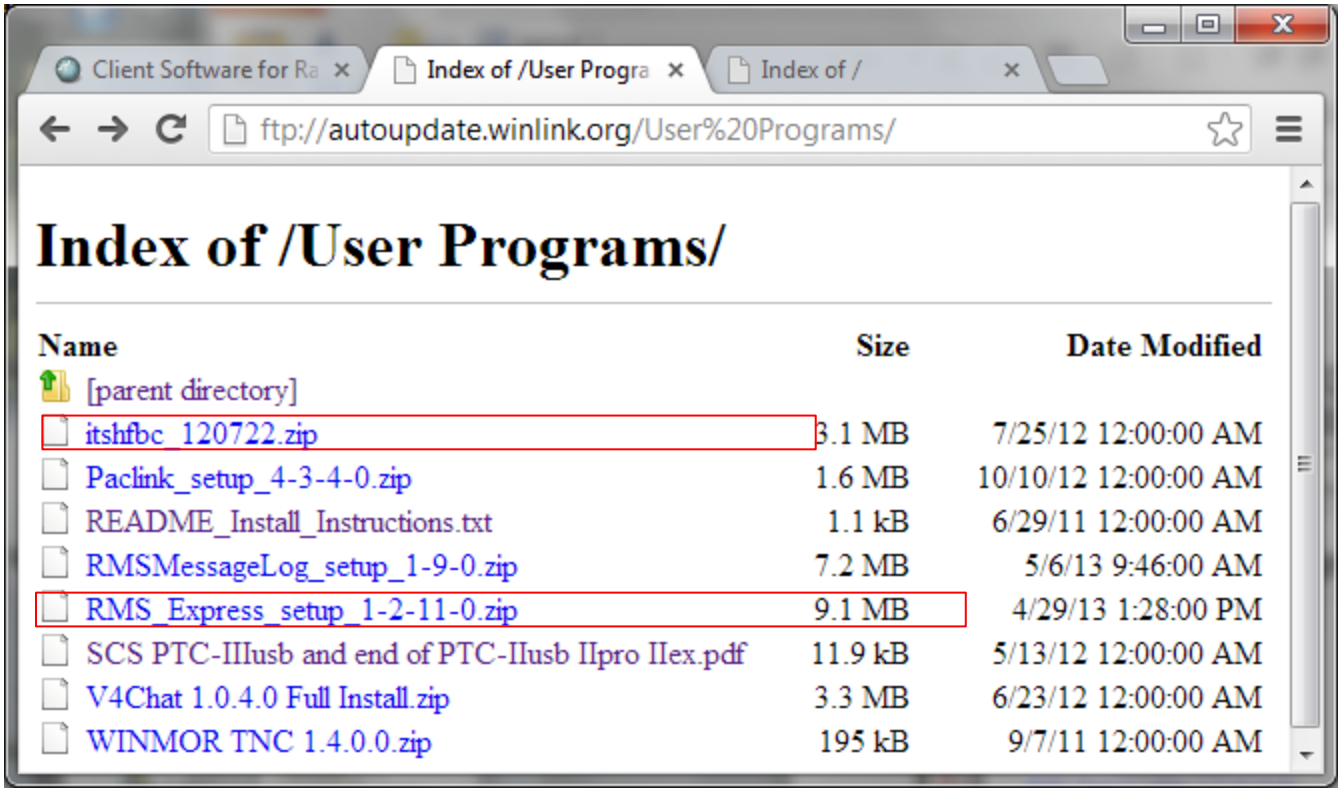
WKL2K: Software Choices

- RMS Express
  - Preferred e-mail client
  - Works with telnet, packet, WINMOR, PACTOR
  - Includes e-mail client

- Paclink
  - Streamlined radio e-mail client
  - Uses your e-mail application
    - Outlook, Thunderbird, etc.
  - No support for WINMOR

- Airmail
  - The oldest program for use with WL2K
  - No support for WINMOR

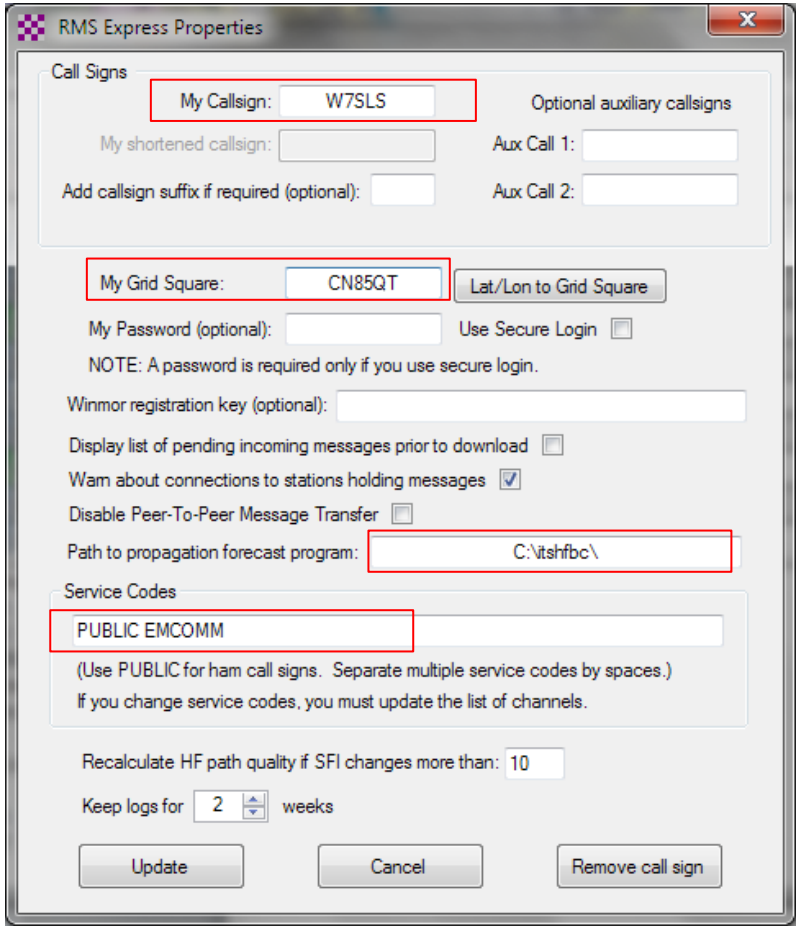
Download RMS Express & propagation sw



http://www.winlink.org/ > Software > User Software > RMS Express > Winlink ftp site > User Programs

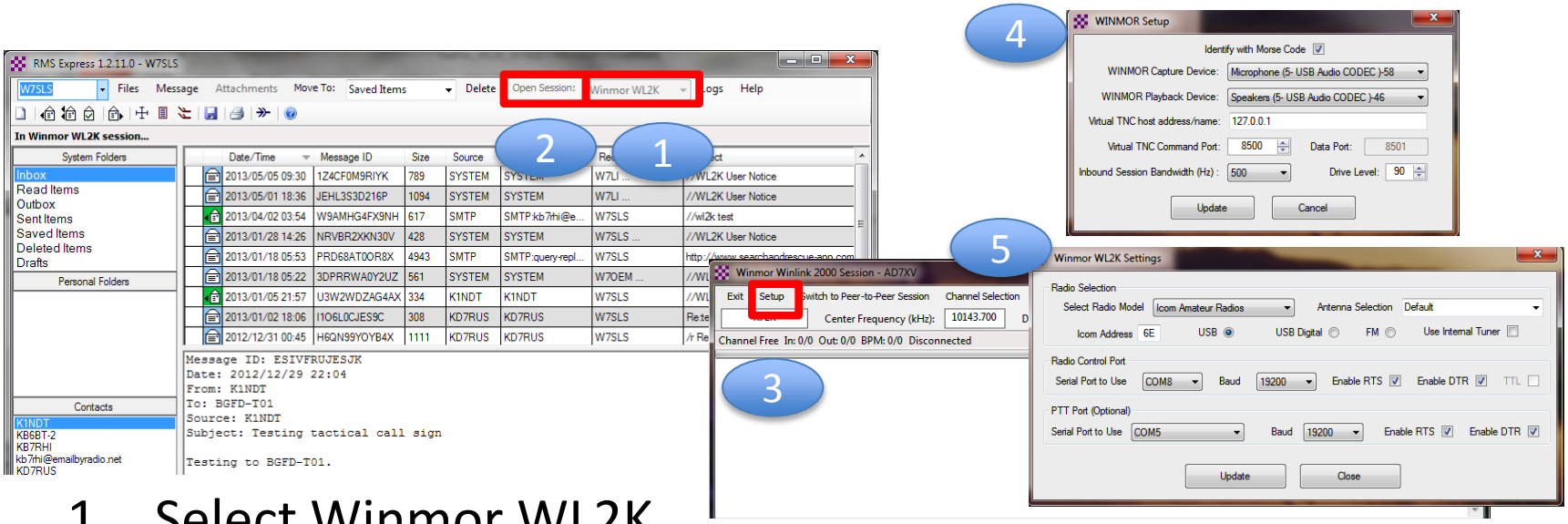
RMS Express _includes_ the WINMOR Software (don't need "WINMOR TNC")

Install software and setup RMS Express



Grid Square lookup: http://www.levinecentral.com/ham/grid_square.php

Onetime WINMOR Setup

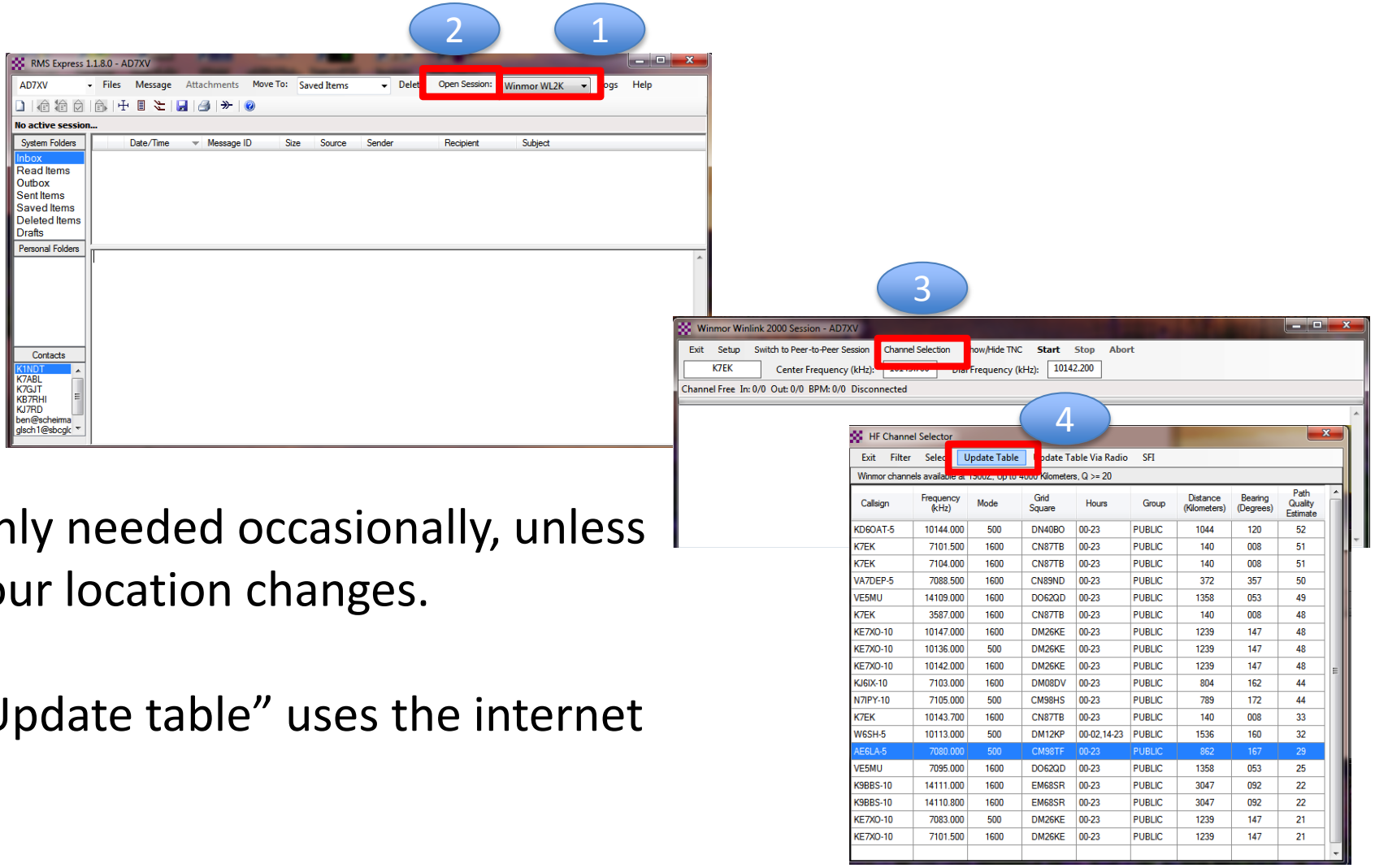


1. Select Winmor WL2K,
2. Open Session
3. Setup
4. Choose soundcard
5. Enter Radio control “CAT” info
6. Test your transmit level
7. Test your PC Digital Signal Processing power

6 Transmit Level Test

7 DSP Test

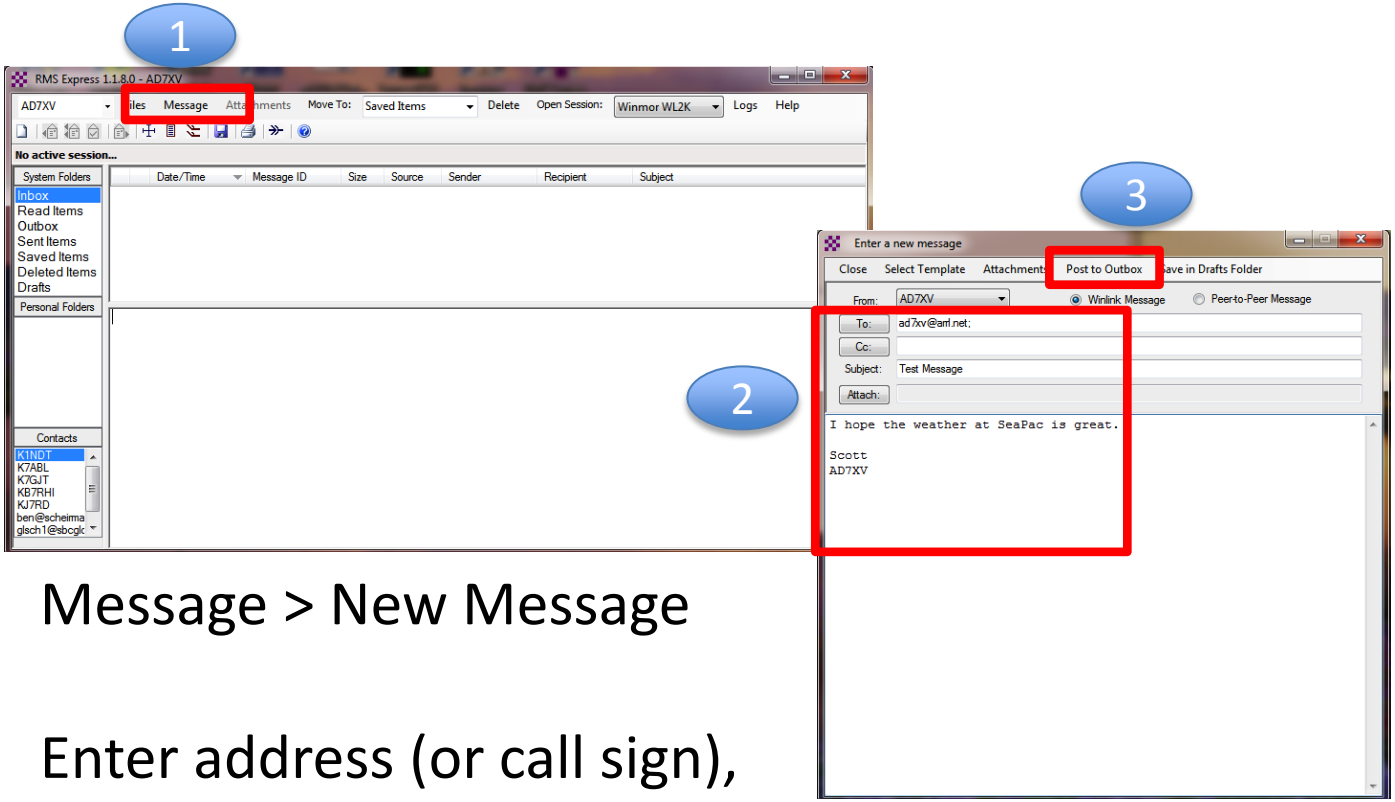
Get a list of HF RMS stations



Only needed occasionally, unless your location changes.

“Update table” uses the internet

Compose a message

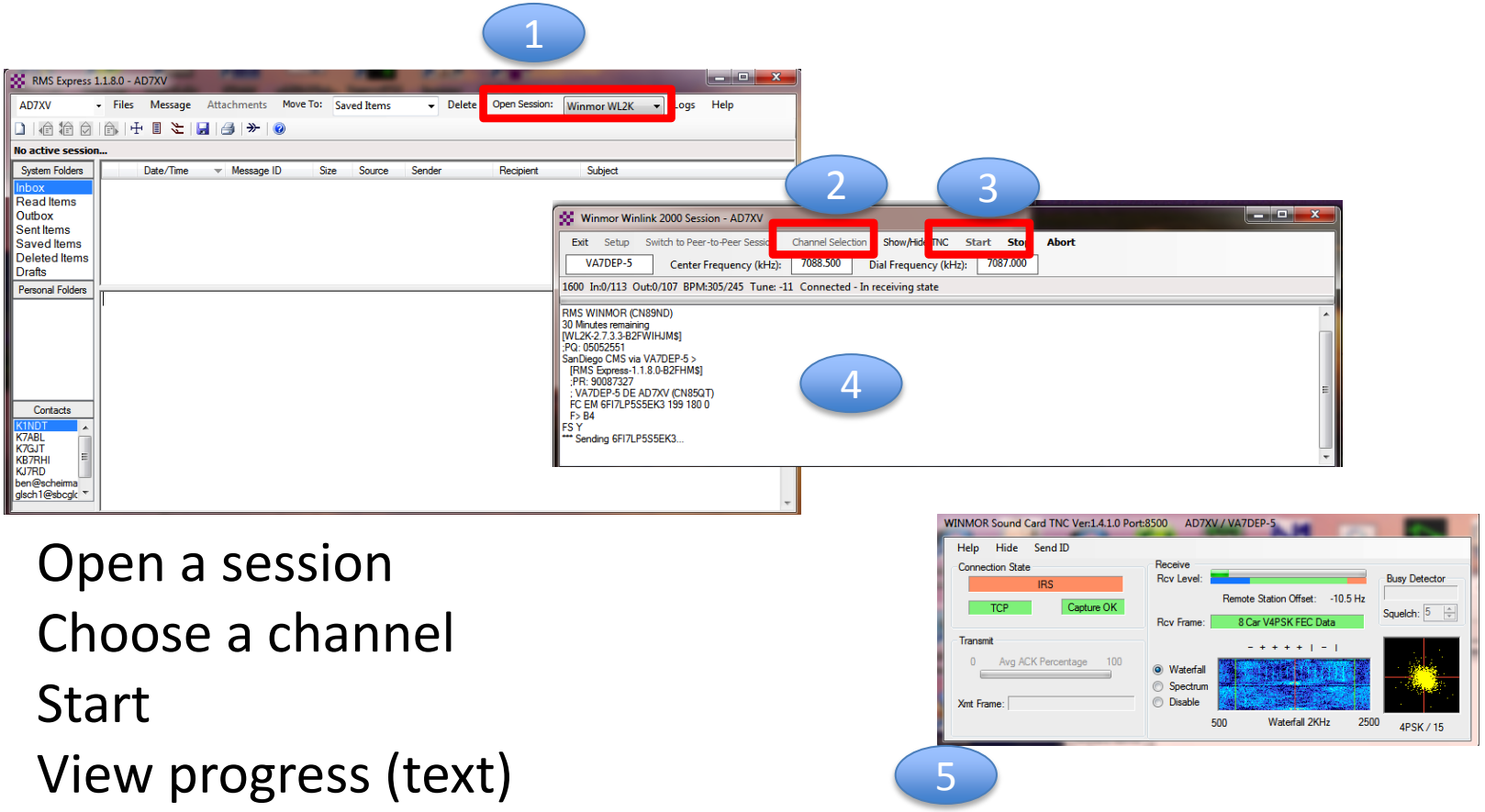


1. Message > New Message

2. Enter address (or call sign), subject, and contents

3. Post to Outbox

Send/Receive



1. Open a session
2. Choose a channel
3. Start
4. View progress (text)
5. View connection (graphical)

WL2K Resources

Your local ARES/RACES group

Getting Started with WL2K, Winmor, and RMS Express (emphasis on HF)

http://www.winlink.org/webfm_send/184

WL2K for the "Digitally Challenged" (emphasis on telnet and Packet)

http://groups.yahoo.com/group/LOADING_WL2K_USER_PROGRAMS/

WL2K Home Page http://www.winlink.org/

WL2K user (client) Software http://www.winlink.org/ClientSoftware

WL2K Yahoo groups

http://tech.groups.yahoo.com/group/Winlink_Programs_Group/

http://groups.yahoo.com/group/wl2kemcomm/

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WL2K Key Messages

- Winlink 2000 is a global system of volunteers, radios, and network infrastructure
- RMS Express is provides a familiar, scalable interface
- You can do this: winlink.org

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Questions?

Scott Scheirman w7sls@arrl.net
If you use WL2K, donate here:
http://www.arsfi.org/donate.aspx

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w7sls@arrl.net

OK, I want to get started

- Assemble / configure hardware
- Load user ("client") software
  http://www.winlink.org/ClientSoftware
  http://www.greg-hand.com/hfwin32.html
- Configure the software
- Send a message by radio to a WL2K RMS station, or by telnet to CMS
  - Suggest: send it to your main e-mail address
- You now have a new WL2K address:
  yourcall@winlink.org

V/UHF Packet (compared to HF)

Disadvantages

- Requires local V/UHF RMS site (not a repeater)
- Limited range, line of site
- Local “event” may take out V/UHF RMS (need HF as a backup anyway)

Advantages

- Smaller more convenient antenna
- Less expensive than Pactor
- High speed over UHF (9600 baud with SCS Tracker, Kantronics KPC-9612+, or Kenwood TM-D710)
- FM is usually noise/static free

WINMOR (compared to Pactor)

Disadvantages

- Soundcard settings can be tricky, subject to ‘change’ by Windows
- Not as robust as dedicated DSP hardware (i.e., Pactor)
- Speed between Pactor 2 and Pactor 3

Advantages

- Less expensive than Pactor ($100 vs. $1500)
- You may already have the equipment (e.g., if you do PSK-31)

What Winlink 2000 Offers for EmComm

- Flexibility:
  - Internet-only (Telnet) direct connections to Winlink.
  - Radio link bridge to Internet e-mail
  - Radio-only store and forward messaging
  - Peer-to-peer connections between radio end-users
  - Various levels of security including message encryption
- Interoperability: Connect different types of systems
    - Bridge different radio capabilities (VHF/UHF/HF)
    - Bridge protocols: Pactor, Winmor, Packet, Robust Packet
    - Seamless integration with Internet e-mail
- Geographical dispersion and redundancy for reliability

What Winlink Offers for EmComm (more)

- Standard e-mail format with many features
  - Binary file attachments (pictures, pdf, spreadsheets)
  - Automatic message compression/decompression
  - Encryption capabilities available to Agencies on non-ham channels
- Time independence
- Ability to collect messages while unattended
- Good operation at most power levels
- Not limited by station-to-station propagation
- Message logging, and ICS report generation
- Wide adoption by EmComm related agencies

Levels of Message Validation & Correction

- **No validation or correction** – RTTY, BPSK-31.
- **Forward Error Correction (FEC)** – Redundant information transmitted so minor errors can be corrected: MT63, Olivia, QPSK-31.
- **Automatic Repeat Request (ARQ)** – Positive or negative packet acknowledgements from receiving station: Pactor, Winmor, Packet, TCP/IP.
- Pactor and Winmor use both FEC and ARQ.
- Only ARQ provides 100% accurate message delivery.
- Accuracy is essential for EmComm.

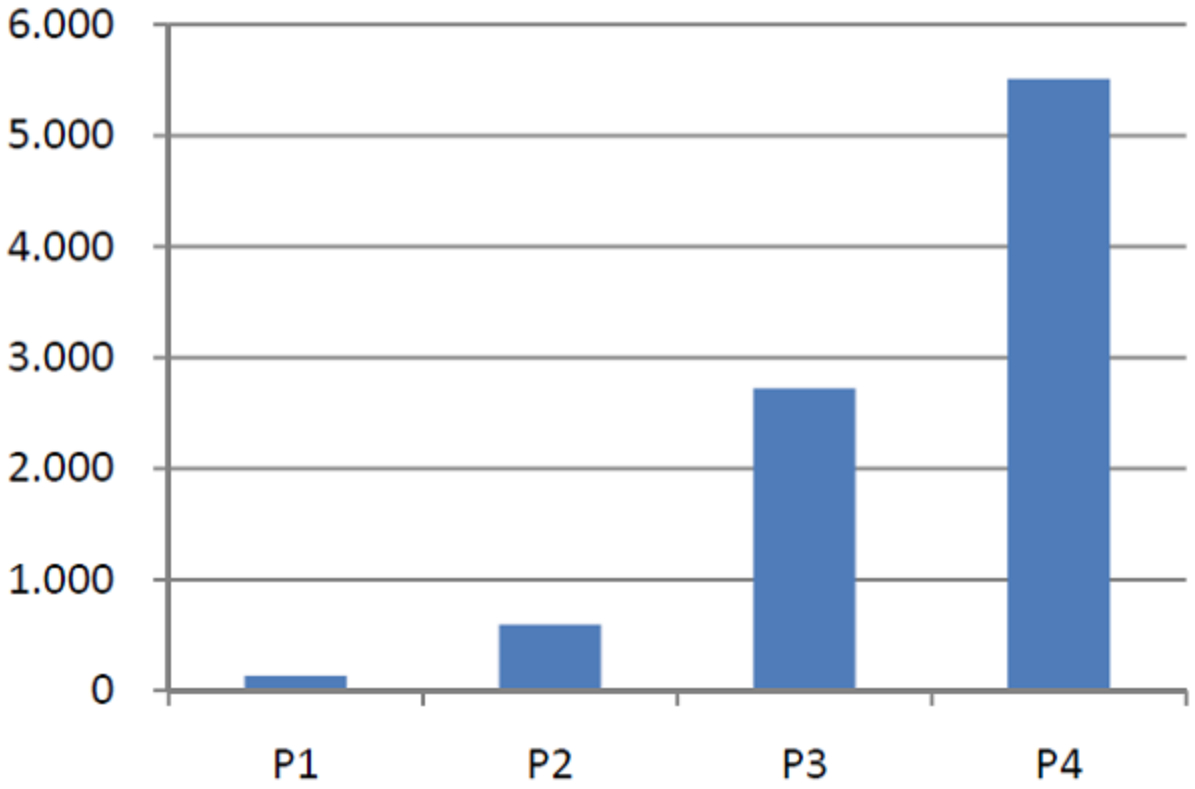
Good Operation at Most Power Levels

- QTH: Nashville, TN
- **0.5 watts Pactor 3**: South Carolina, New York, Michigan, Texas, Canada, Massachusetts, Pennsylvania, Florida, and Iowa.
- **0.5 watts Winmor**: Wisconsin, Maine, Ohio, Texas, Indiana, South Carolina, and North Carolina.
- **5 watts Winmor**: California and Canada
- Excellent for field operations on battery power.
- 100 watts is recommended for normal operations.

Recent Enhancements to Winlink for EmComm

- ***Service Codes*** to manage lists of channels
- ***RMS Express*** enhancements
- ***Radio-only*** store and forward message hubs
- ***Trimode*** RMS Server software

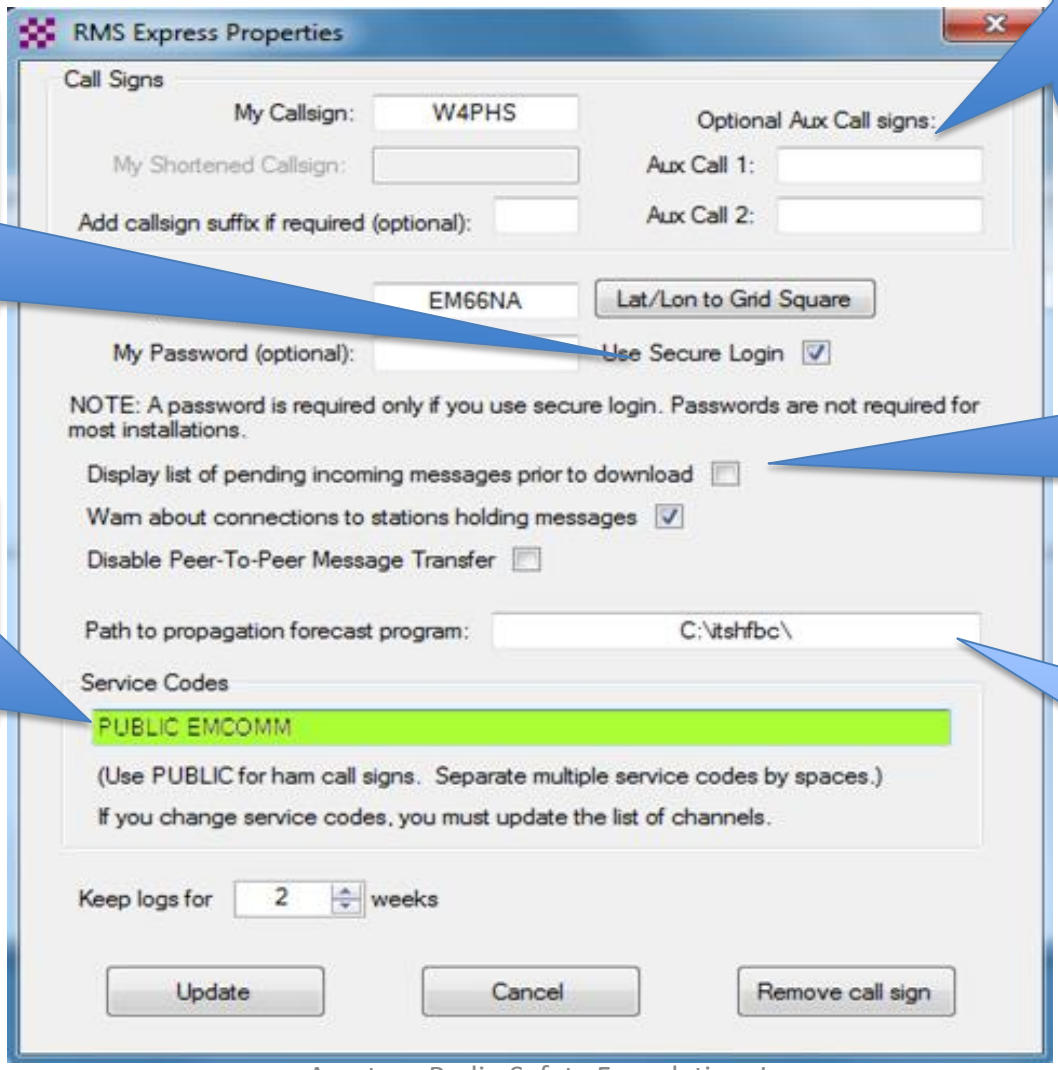
Pactor Speeds (HF)



Service Codes and Restricted Channel Lists

- Growing demand for separate channel lists
  - Public (ham)
  - EmComm (ham)
  - MARS
  - Other: International Red Cross, AT&T Disaster Recovery, etc.
- Each channel (frequency) has an associated *service code*
- Service codes are selected by the RMS node sysop
- Service codes are entered in client programs
- Service codes create channel lists with limited access

RMS Express Service Codes



Additional origination callsigns or tactical addresses for each "my callsign."

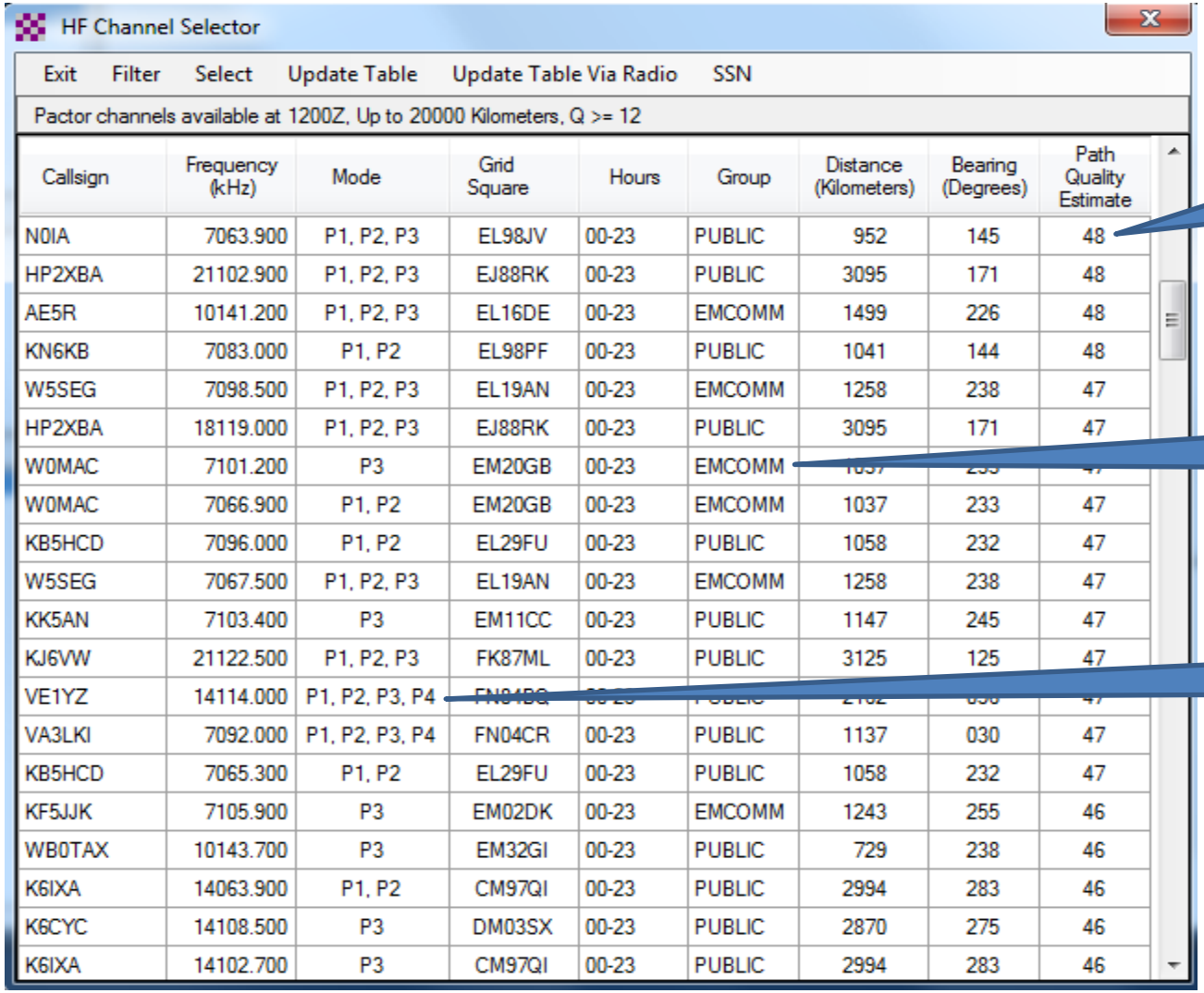
Additional security available.

Ability to review and select messages prior to download.

Combine multiple service code lists.

Propagation guidelines available.

RMS Express Channel List



HF Channel Selector

Exit Filter Select Update Table Update Table Via Radio SSN

Pactor channels available at 1200Z, Up to 20000 Kilometers, Q >= 12

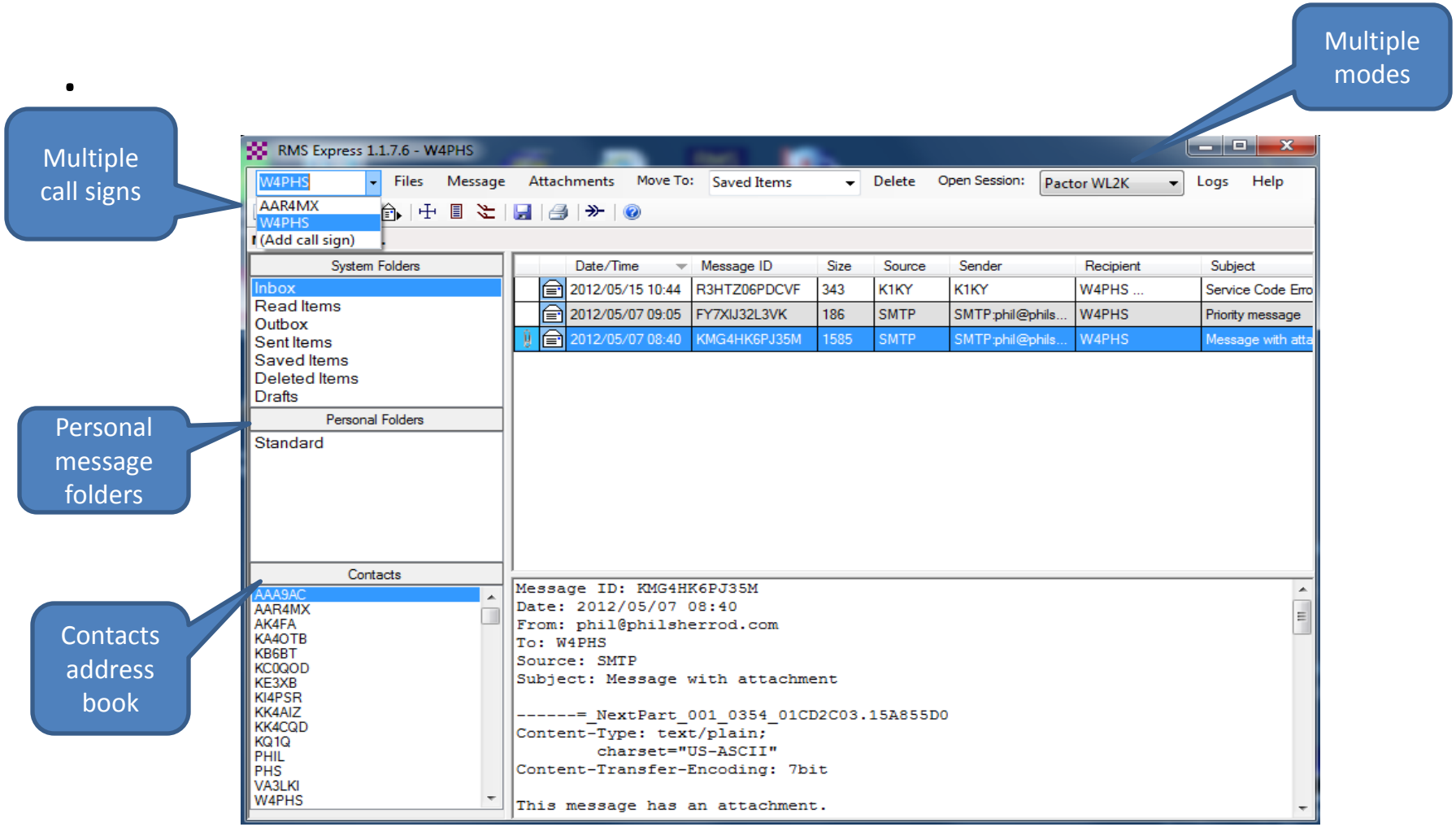
Callsign	Frequency (kHz)	Mode	Grid Square	Hours	Group	Distance (Kilometers)	Bearing (Degrees)	Path Quality Estimate
N0IA	7063.900	P1, P2, P3	EL98JV	00-23	PUBLIC	952	145	48
HP2XBA	21102.900	P1, P2, P3	EJ88RK	00-23	PUBLIC	3095	171	48
AE5R	10141.200	P1, P2, P3	EL16DE	00-23	EMCOMM	1499	226	48
KN6KB	7083.000	P1, P2	EL98PF	00-23	PUBLIC	1041	144	48
W5SEG	7098.500	P1, P2, P3	EL19AN	00-23	EMCOMM	1258	238	47
HP2XBA	18119.000	P1, P2, P3	EJ88RK	00-23	PUBLIC	3095	171	47
W0MAC	7101.200	P3	EM20GB	00-23	EMCOMM	1037	233	47
W0MAC	7066.900	P1, P2	EM20GB	00-23	EMCOMM	1037	233	47
KB5HCD	7096.000	P1, P2	EL29FU	00-23	PUBLIC	1058	232	47
W5SEG	7067.500	P1, P2, P3	EL19AN	00-23	EMCOMM	1258	238	47
KK5AN	7103.400	P3	EM11CC	00-23	PUBLIC	1147	245	47
KJ6VW	21122.500	P1, P2, P3	FK87ML	00-23	PUBLIC	3125	125	47
VE1YZ	14114.000	P1, P2, P3, P4	FN84BQ	00-23	PUBLIC	2102	030	47
VA3LKI	7092.000	P1, P2, P3, P4	FN04CR	00-23	PUBLIC	1137	030	47
KB5HCD	7065.300	P1, P2	EL29FU	00-23	PUBLIC	1058	232	47
KF5JJK	7105.900	P3	EM02DK	00-23	EMCOMM	1243	255	46
WB0TAX	10143.700	P3	EM32GI	00-23	PUBLIC	729	238	46
K6IXA	14063.900	P1, P2	CM97QI	00-23	PUBLIC	2994	283	46
K6CYC	14108.500	P3	DM03SX	00-23	PUBLIC	2870	275	46
K6IXA	14102.700	P3	CM97QI	00-23	PUBLIC	2994	283	46

Estimate of Signal Path Quality

Service Code Group

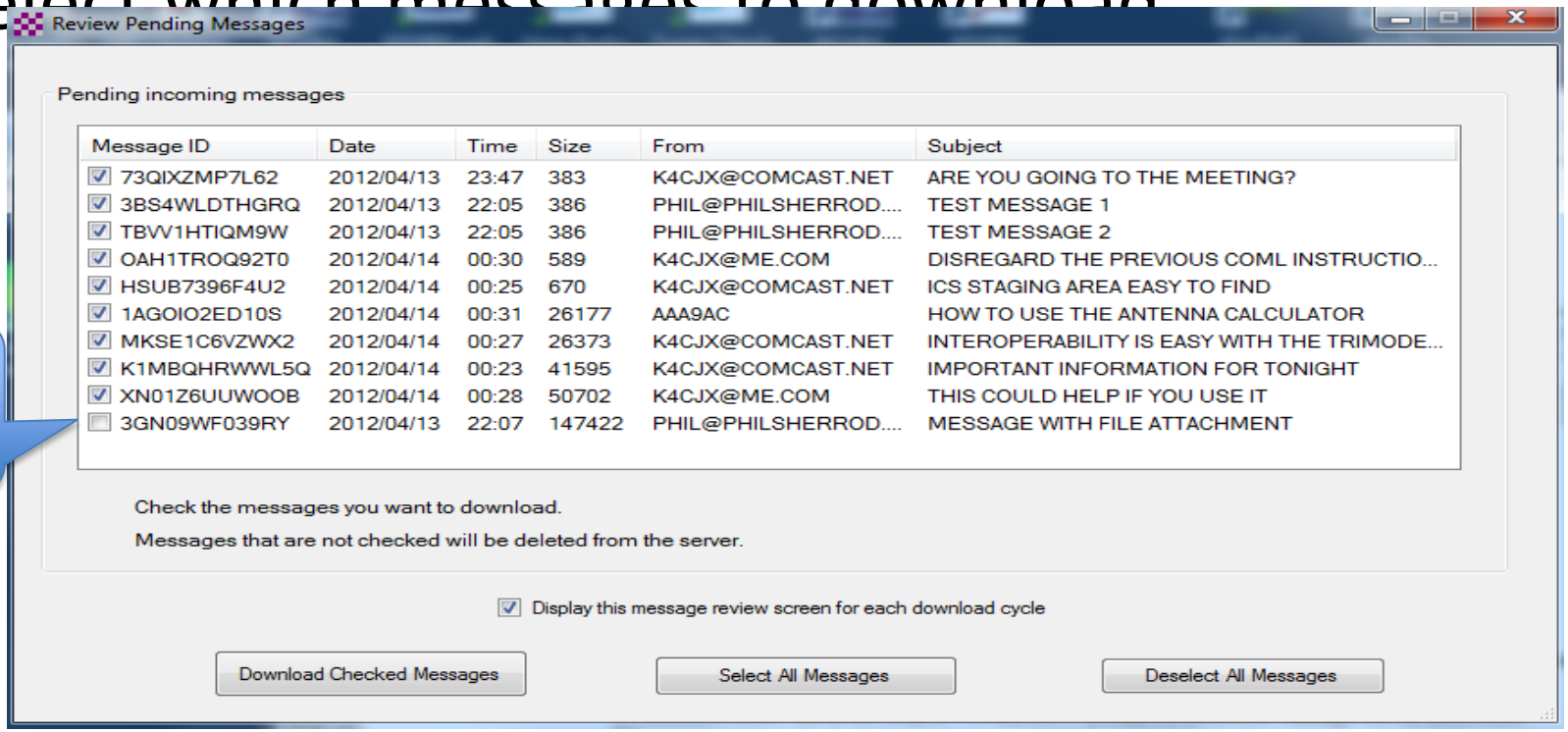
Pactor Modes

RMS Express Enhanced Support



RMS Express Message Review

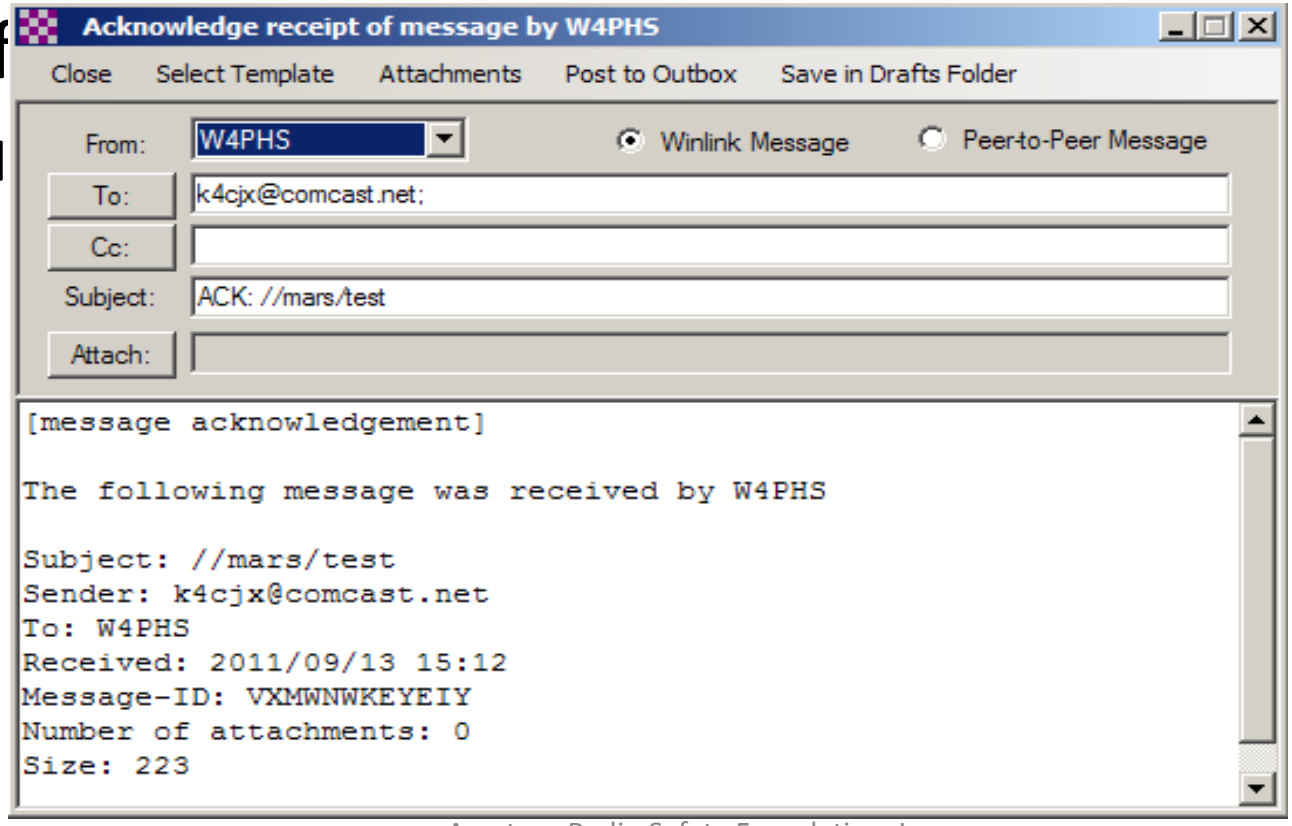
- Review pending messages before downloading.
- Select which messages to download



Message too large & not wanted

Message Receipt Acknowledgements

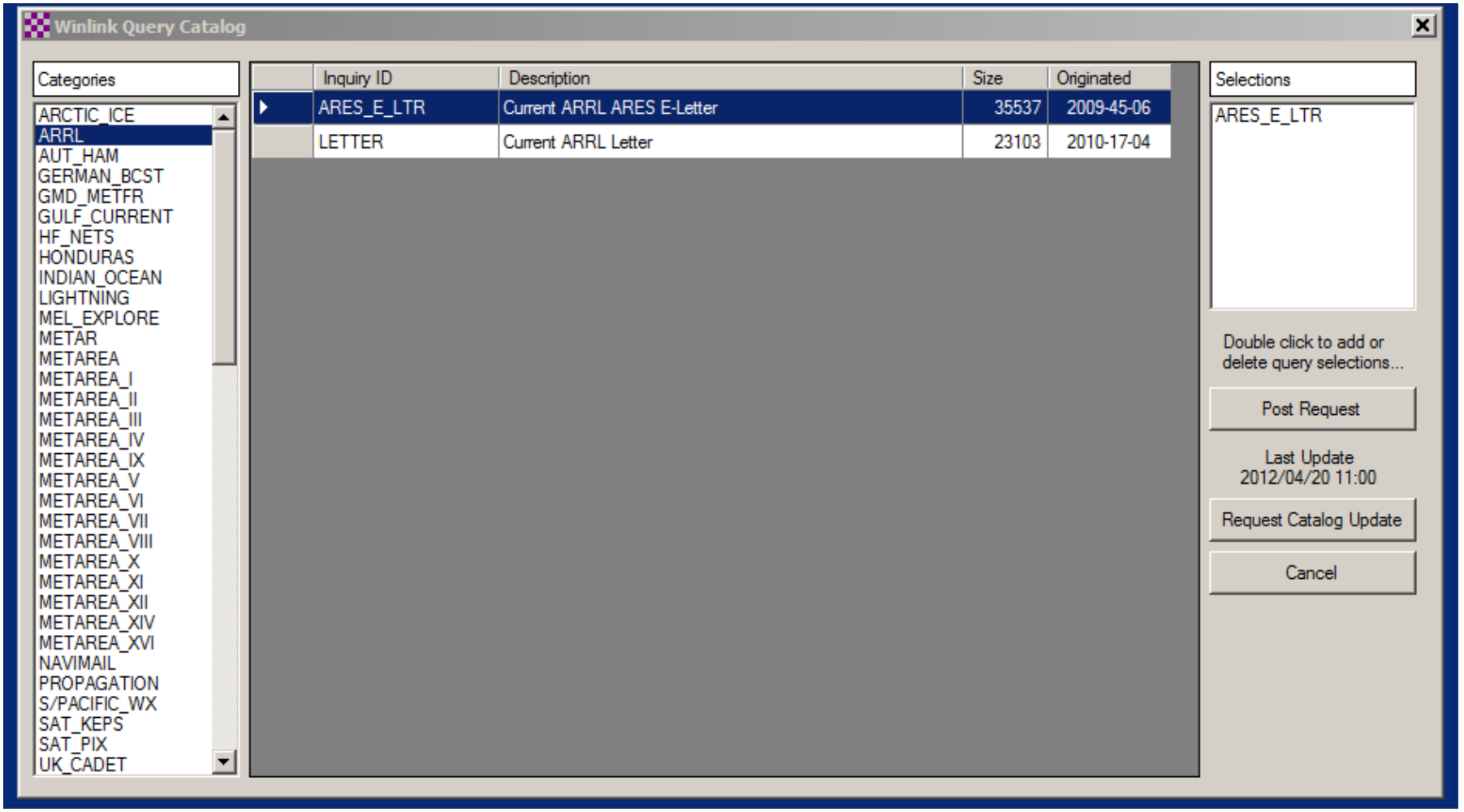
- Positive acknowledgment that message was received
- Inf
  au



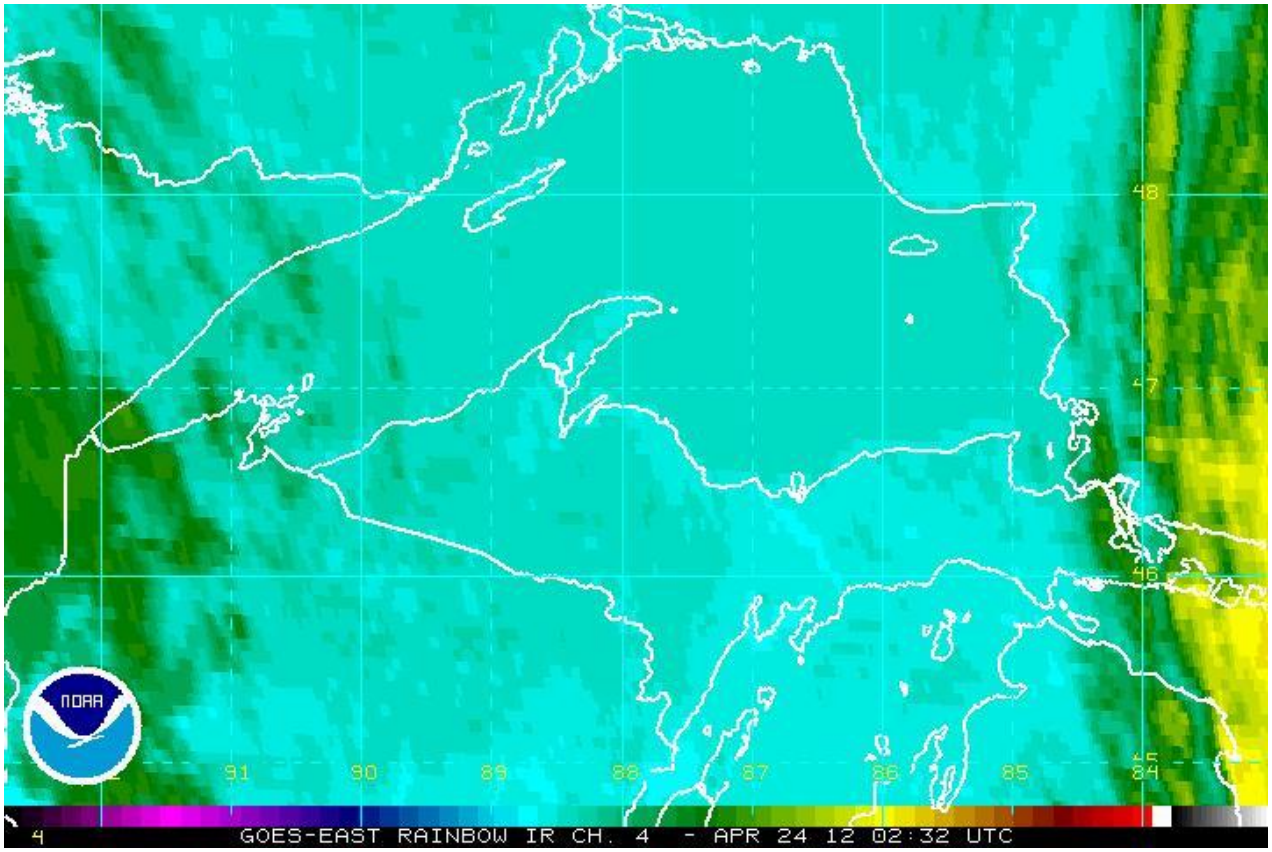
Information Requests

- 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 closest 30 stations
  - ARRL Newsletter, e-letter, etc.
  - Misc. bulletins

RMS Express Query Catalog



Weather Map Image Returned for Request



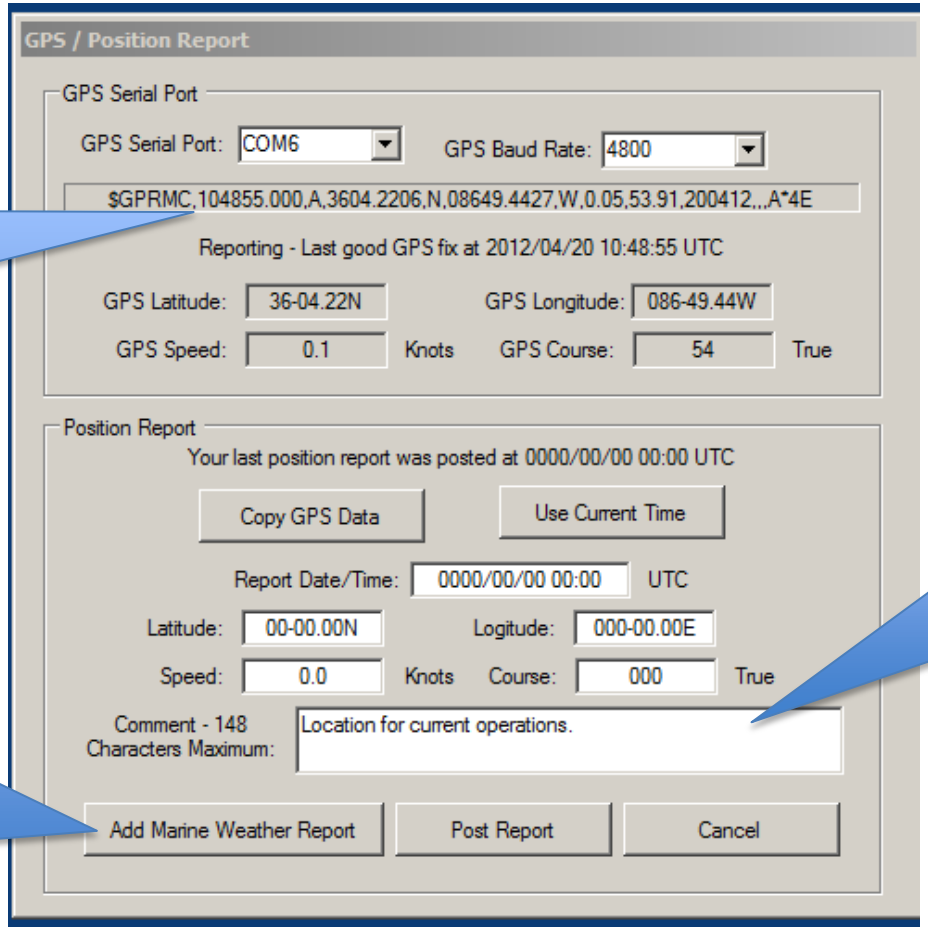
Winlink Position Reports

- You can send position reports to the Winlink system.
  - Coordinates sent via connected GPS.
  - Otherwise, your position may be entered manually.
- Position Reports are sent to:
  - Winlink system map
  - ShipTrak maps
  - APRS maps
  - YotReps maps
- Extremely valuable for pinpointing locations, especially for maritime operation.

Posting a Position Report

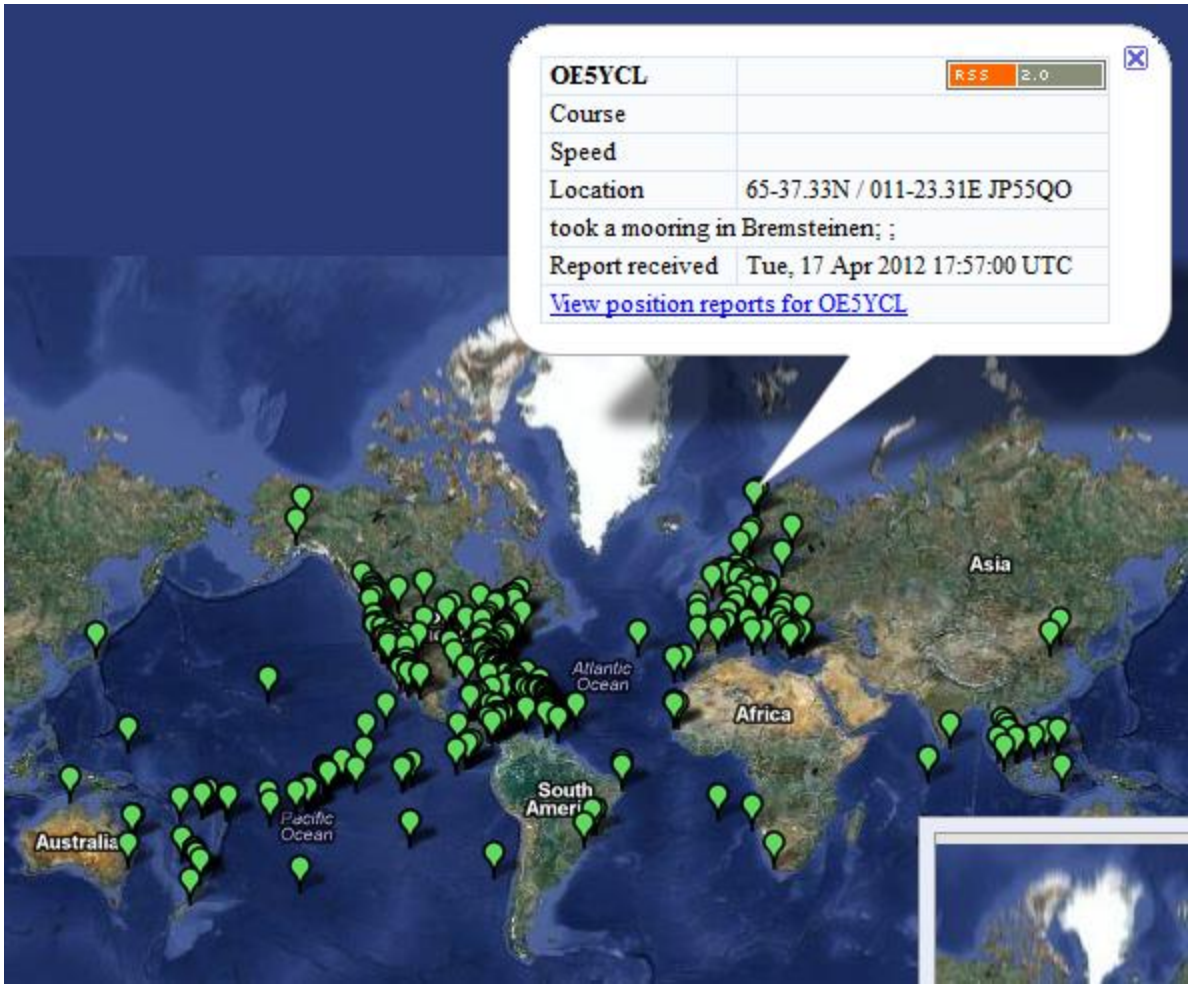
Data from a connected GPS unit.

WX assistance to the NWS Voluntary Marine Observation Program.

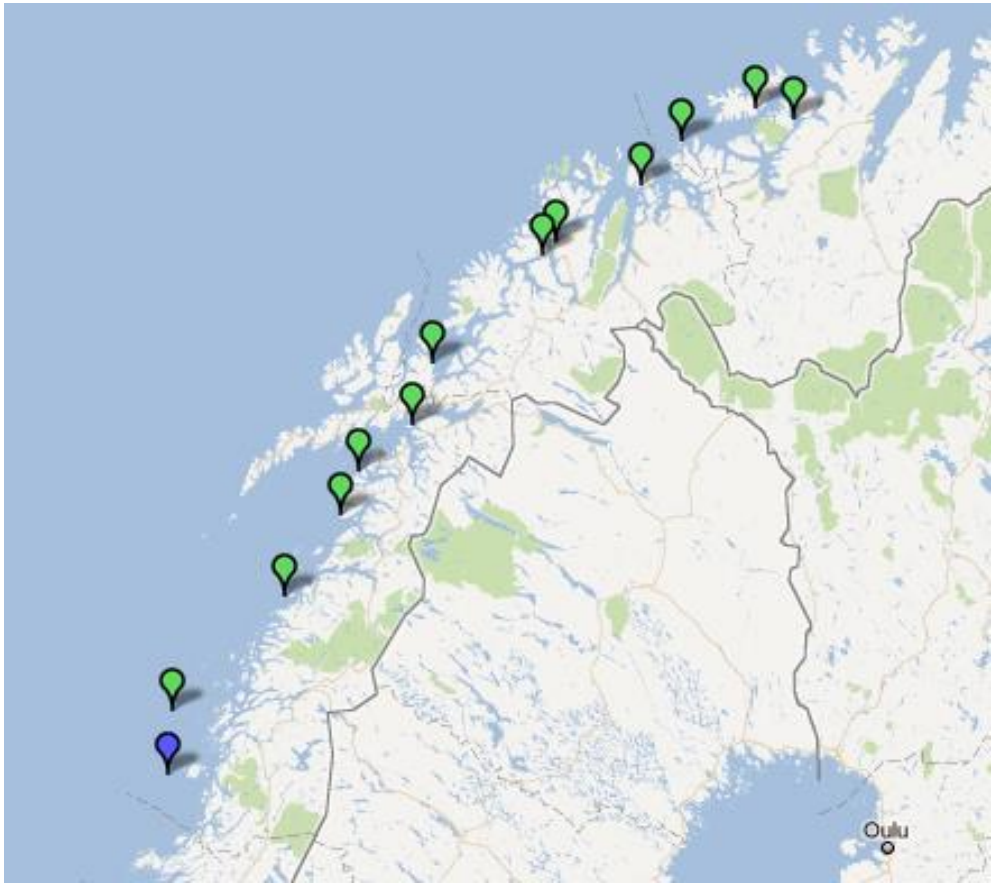


Useful in tracking with e-mailed disaster assessments.

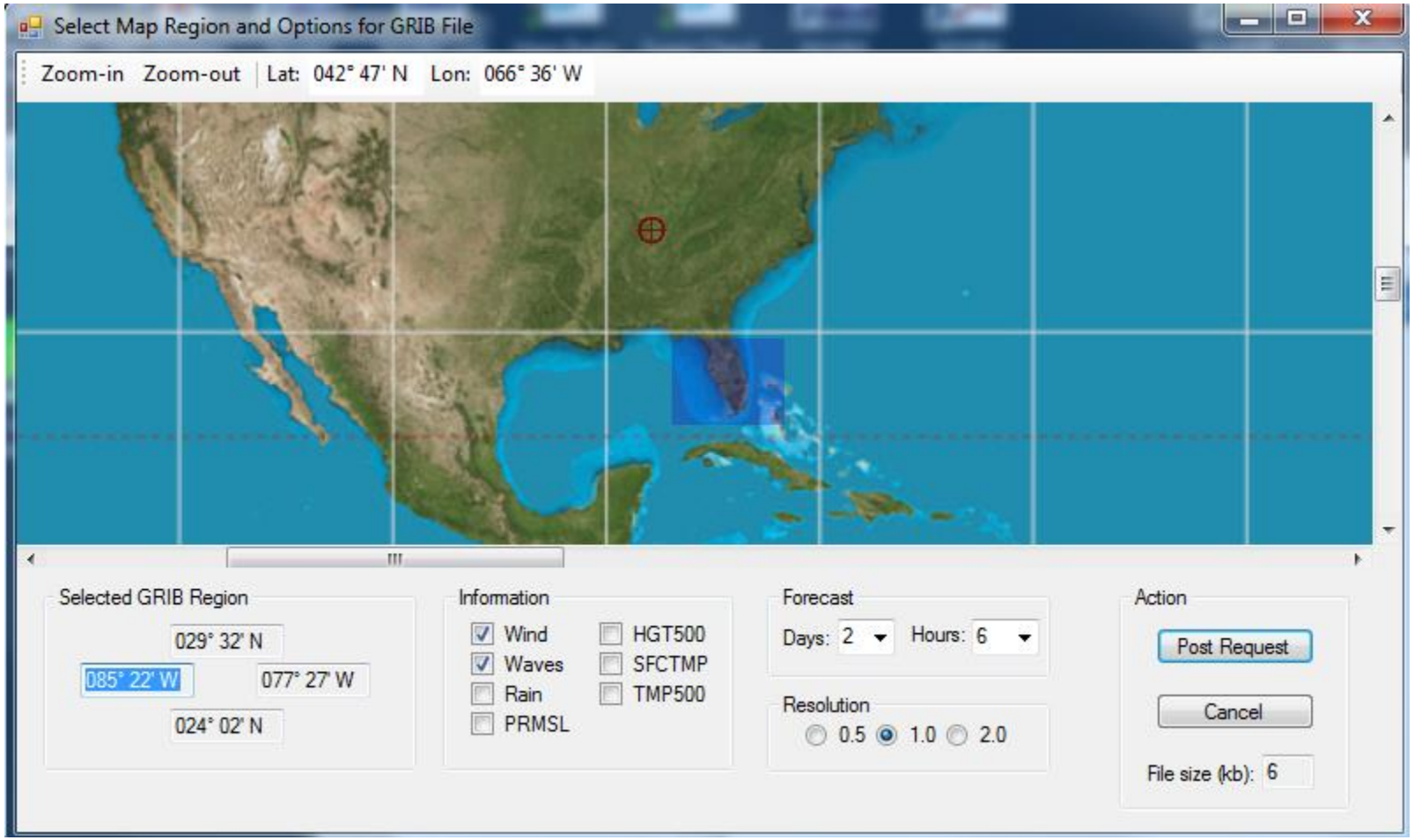
Winlink.org Real-time Position Report Page



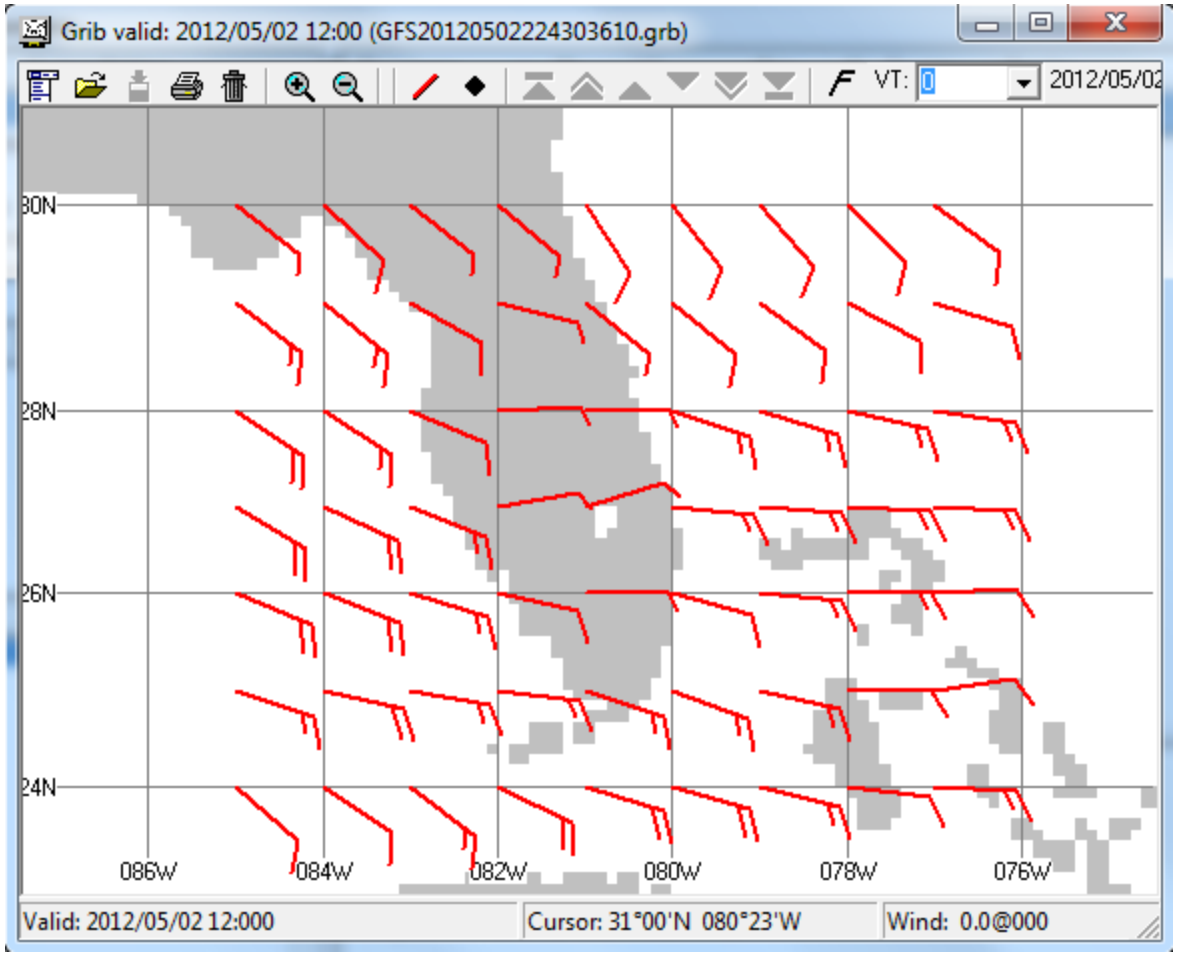
Position Tracking



GRIB File Requests



GRIB Map Returned by Winlink System



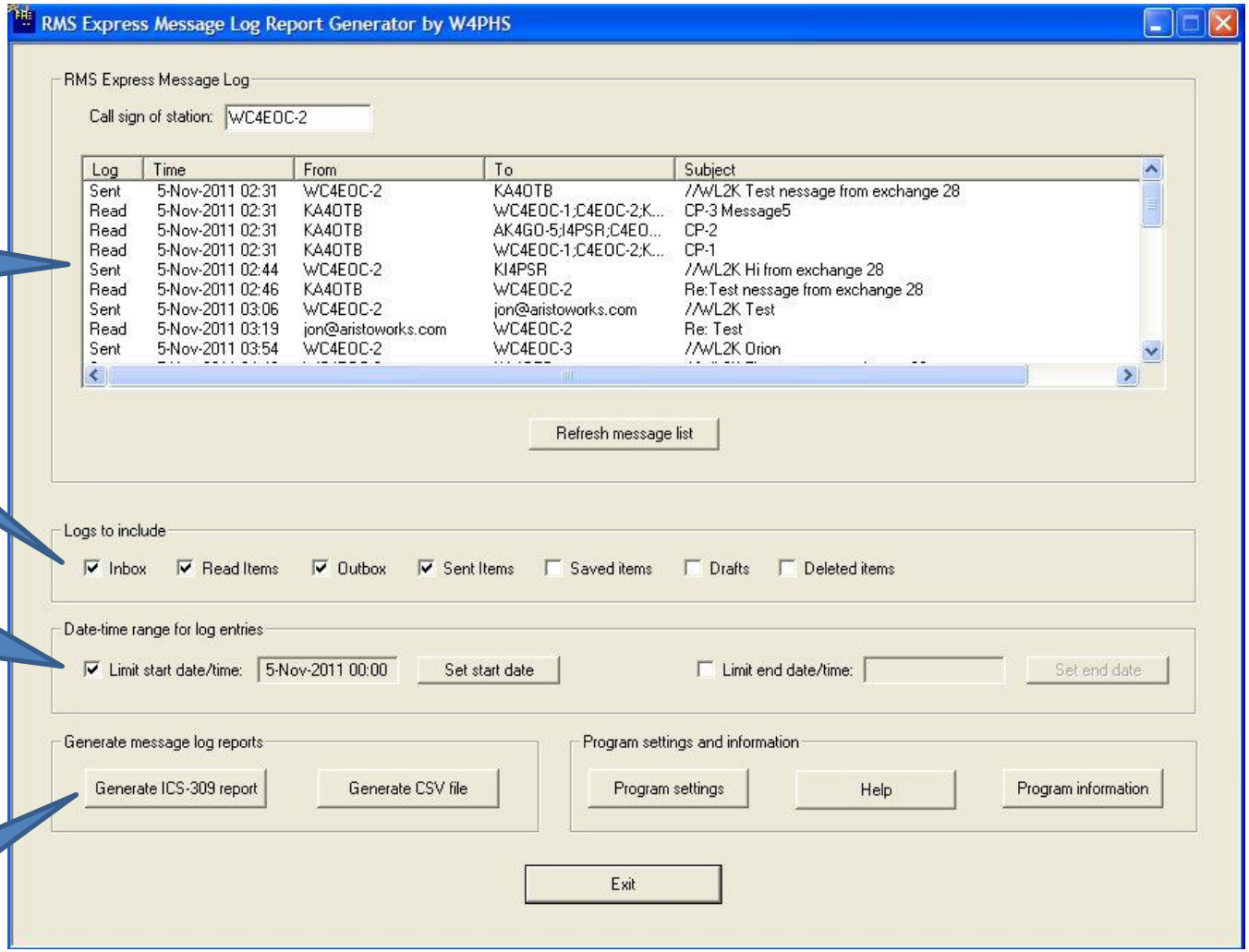
RMSMessageLog ICS-309 Generator

Messages during period

Select folders

Starting & ending report period

Generate ICS-309 pdf file



Generated ICS-309 PDF Message Log Report

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

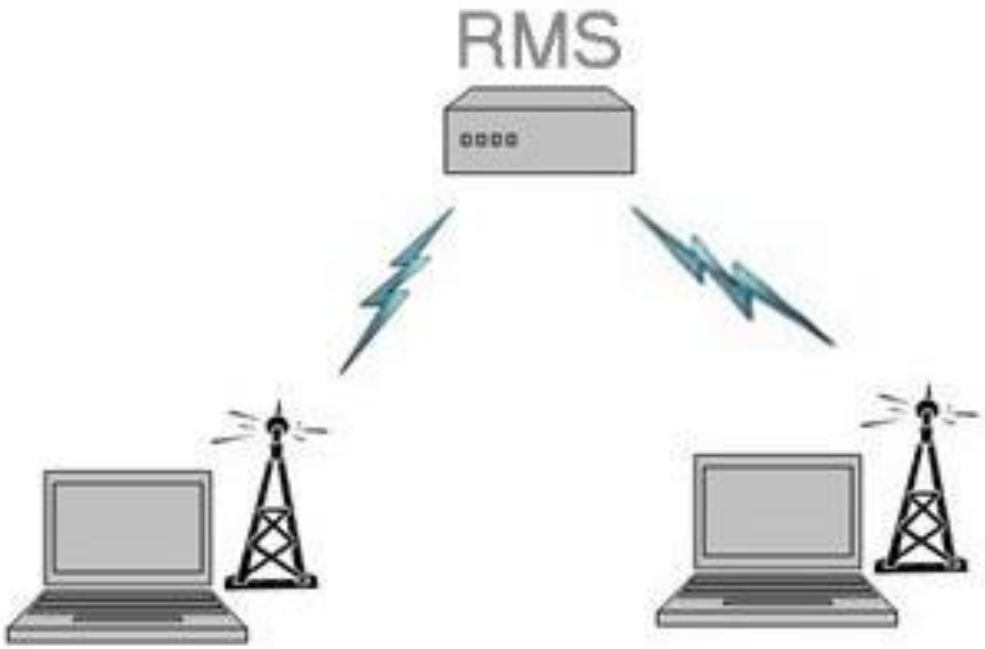
TIME	FROM	TO	SUBJECT
10-Sep-2011 08:21	KA4OTB	AK4GO KI4PSR WC4EOC-2 WC4EOC-1	HOW-100
10-Sep-2011 08:23	WC4EOC-2	KA4OTB	//wl2k Rest Stop # 3
10-Sep-2011 08:31	WC4EOC-2	KI4PSR WC4EOC-1	//wl2k Rest Stop 3
10-Sep-2011 09:11	WC4EOC-2	KA4OTB KI4PSR	//WL2K Test from Rest Stop 3
10-Sep-2011 09:12	KA4OTB	WC4EOC-2	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

Page 1 of 1	ICS 309
ICS-309 report generated by RMSMessageLog version 1.2.0 on 10-Sep-2011 15:31	

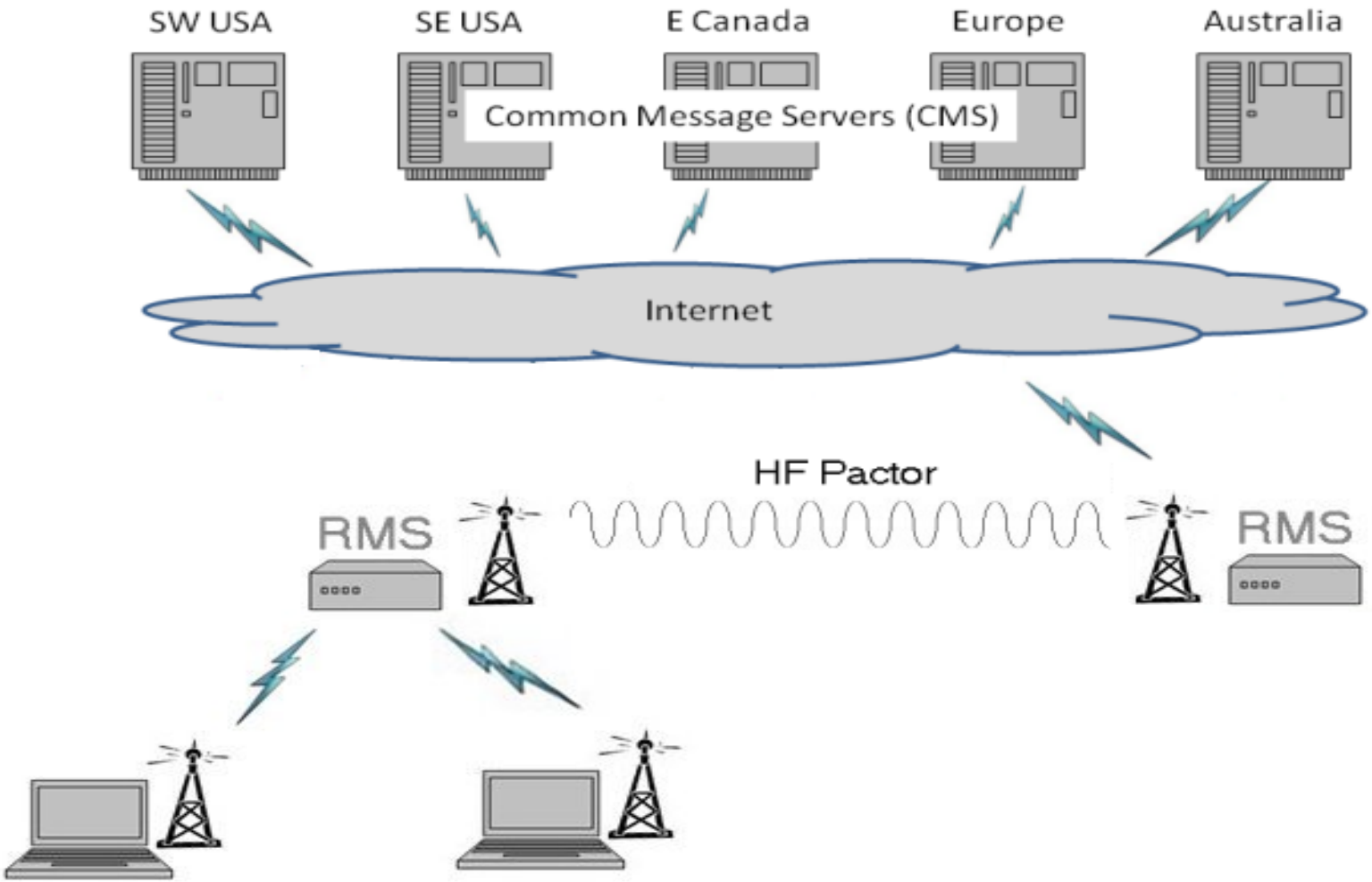
Winlink Radio-Only Message RMS Hub

- New capability for Winlink system.
- Radio-only: No Internet connection is required.
- RMS node running the *RMS Relay* program acts as a standalone message hub for multiple users.
- Messages are stored in a local database on the hub until picked up by the recipient.
- Any number of stations can communicate as long as they all connect to the same hub.
- Standard e-mail format is used and file attachments are supported.
- Option to hold messages until Internet available.
- HF forwarding to a RMS station via Pactor.

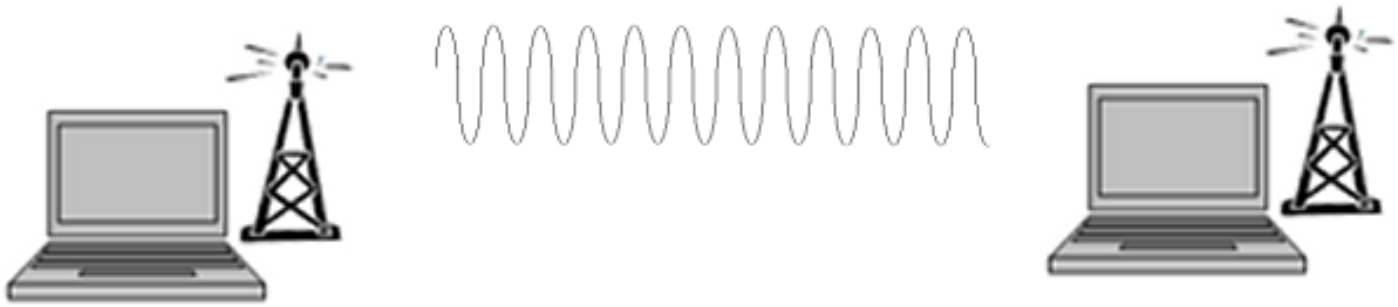
Radio-Only Message Hub Topology



HF Forwarding from Radio-Only Hub



Winlink Peer-To-Peer Radio-Only Operation

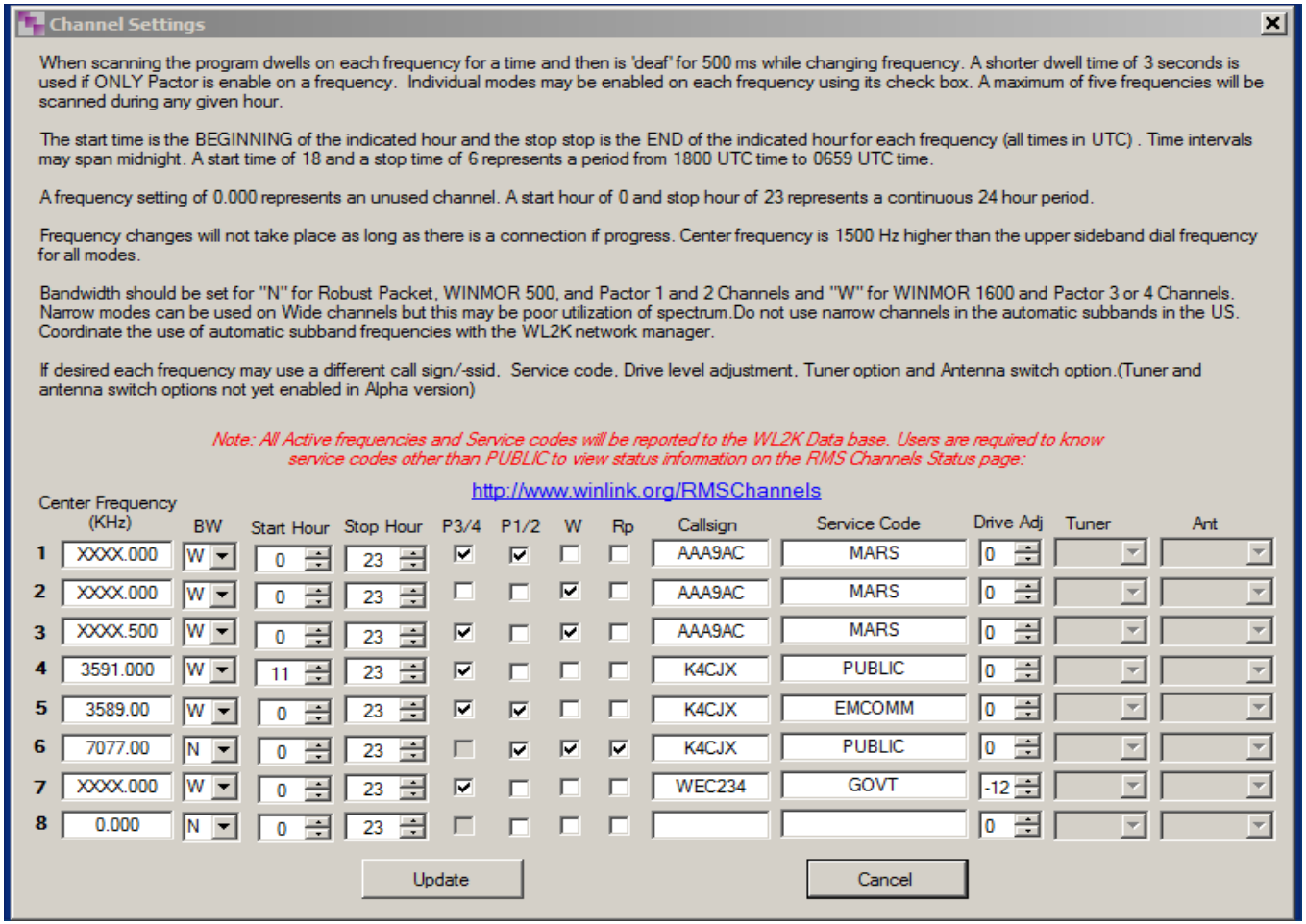
- Peer-to-peer: direct radio connection between end-users
- The Internet is not used, all communication by radio.
- Only the two client stations are involved.
- 

New “Trimode” RMS Node Software

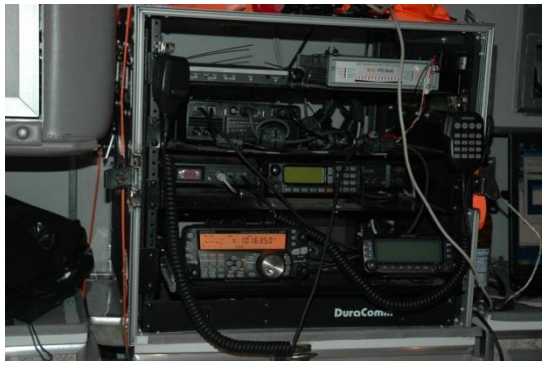
- Single program allows one radio/computer to control:
  - Pactor
  - Winmor
  - Robust Packet
- The RMS station simultaneously monitors and responds to connections from all three protocols.
- A single computer and radio can service up to 8 channels with any mix of protocols.
- Each channel has its own service code
- Replaces RMS Pactor and RMS Winmor
- Enhances interoperability between modes

Trimode RMS Channel Setup Screen

- Per channel: Frequency, Bandwidth, scan period, modes, callsign, & class of service.
- Flexibility allows conforming to regulatory environments.



Winlink Drop Kits for Field Operation



Conclusion

- Winlink use continues to grow, especially for EmComm.
- The Winlink Development Team continues to enhance capabilities to adapt to changing needs.
  - Service Codes provide a much-needed enhancement to channel management.
  - RMS Express has been enhanced to improve EmComm service. Paclink to follow.
  - Radio-only Winlink store and forward hubs.
  - Trimode RMS server consolidation

- Thank you!
- Questions?

- Information about Winlink can be found at www.winlink.org
- Information about presenter at www.qrz.com – W4PHS