THE WORLD OF WINLINK

EMAIL COMMUNICATION VIA INTERNET, VHF/UHF, HF

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LEVEL SET

- Winlink is a large topic

- This is for an overview and hopefully demo – Comprehensive would take a few hours or more…

- I do not consider myself an expert

- I'm here to share my experiences and some basics.

AGENDA

- Preliminary Thoughts

- Who, What, When, How & Why

- Modes – VHF/UHF & HF & Internet

- Equipment

- Costs?

- Demo

PRELIMINARY THOUGHTS

- Get some basics here

- Watch some YouTube videos

- Play with it and experiment

- Share your experiences

WHO, WHAT, WHEN, HOW & WHY

- Who: Ham operators – Recreational, Emergency (ARES/RACES, Red Cross), Experimenters

- What: Email - with or without attachments – Like Packet or Outpost

- When: Whenver, but it gets busy so patience may be necessary

- How: VHF/UHF, HF, or home internet

- Why: To communicate…. Routine or emergency

WHAT IT IS AND WHAT IT IS NOT

- This is still ham radio – Part 97

- This is not a full substitution for email

- Encryption is not legal

- Large attachments is not practical (or polite)

- Privacy is non existant – open airwaves

RED CROSS – NOVEMBER 14, 2020 DRILL W/ ARES

- Originally expected a few hundred, expanded to several hundred…

- Final count was over 1000 Winlink messages received in 12 hours.

MODES

- Telnet – Internet – Existing Internet Connection

- Packet – Using typical VHF/UHF packet nodes

- PACTOR/VARA/ADROP – Using HF nodes

MODES - INTERCHANGEABLE

- Common Winlink Program

- Different sub program to go to Telnet, Packet, Winmor/Vera/Adrop

MODES – TELNET (INTERNET)

- Computer w/ Winlink software

- Internet Connection

- Select "Telnet Winlink" and then "Open Session"

- On the "Telnet Winlink Session" window, select "Start"

TELNET EMAIL (2:52)
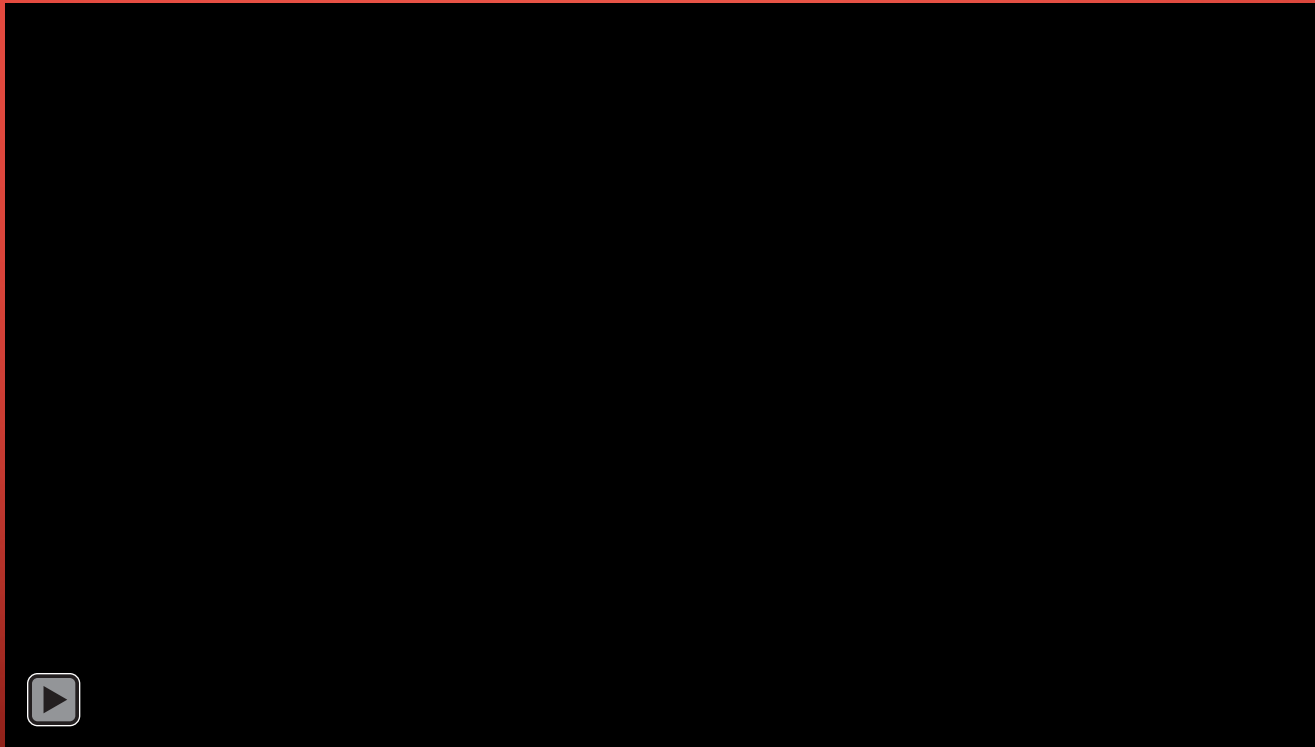
MODES – VHF/UHF PACKET

- Computer w/ Winlink software

- VHF/UHF Radio

- Interface – Specific to your radio & computer.
    - TNC (Terminal Node Controller) i.e. Kantronics KPC3, TNC-X – RS232 Serial to Audio
    - Special Sounds Card (i.e. Signalink) and Software to translate data to audio (i.e. Direwolf previously AGWPE)
    - Radio that has built in TNC/Sound Card – i.e. Kenwood TM D710 GA

- Select "Packet Winlink" and then "Open Session"

- First time – define settings to match your equipment configuration

- On the "Telnet Winlink Session" window, select "Start"

PACKET EMAIL (4:51)
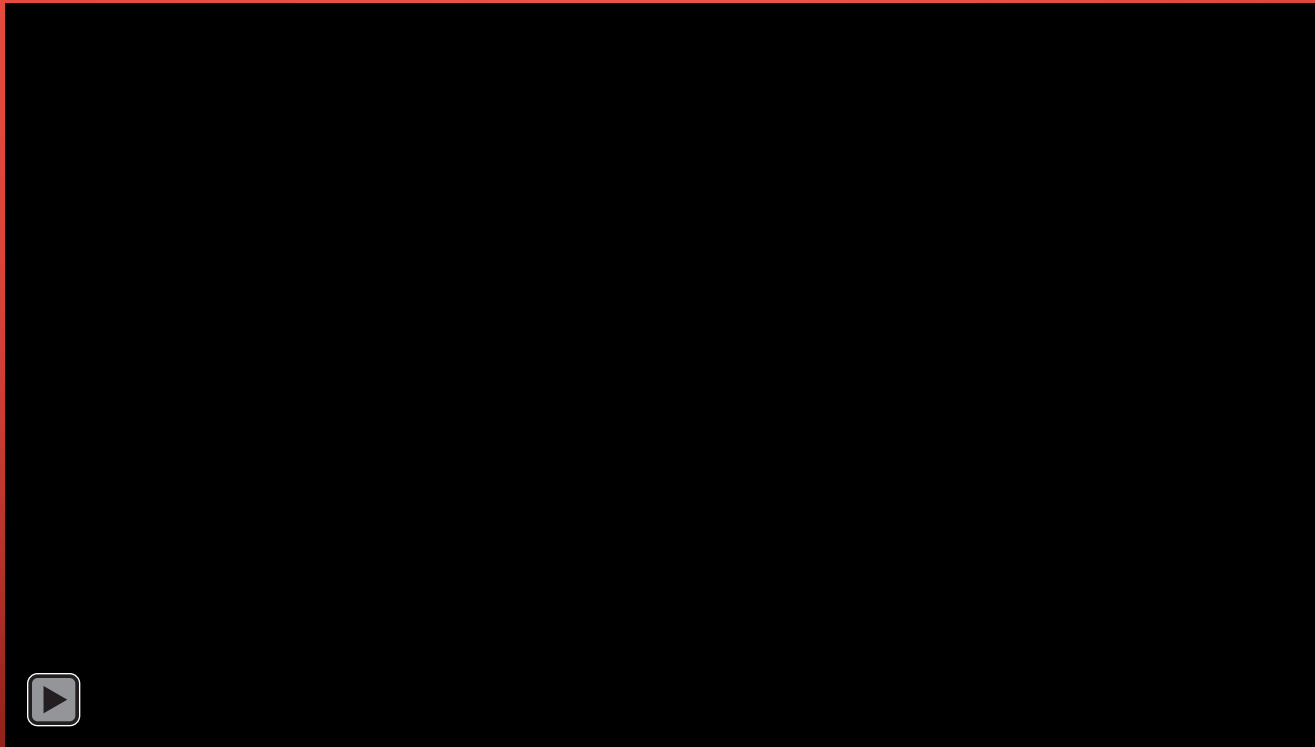
MODES – HF PACTOR / ADROP / VARA

- Computer w/ Winlink software

- HF Radio

- Interface – Specific to your radio & computer.
  - Radio that has built in TNC/Sound Card – i.e. Icom IC7300 or Yaesu FT-991a
  - Special Sounds Card (i.e. Signalink) and Software to translate data to audio (i.e. Direwolf previously AGWPE)
  - TNC (Terminal Node Controller) i.e. Kantronics KAM XL – RS232 Serial to Audio (unknown)

- Select "Winmor Winlink", "Adrop Winlink" or "Vara Winlink" and then "Open Session"

- First time – define settings to match your equipment configuration

- On the "Pactor Winlink Session" window, wait for the frequency not to be busy and select "Start"

HF NODE

VERA HF FORM EMAIL (6:54)

TELNET EMAIL – READ & PRINT (1:20)

VERA HF EMAIL – READ & REPLY (12:34)
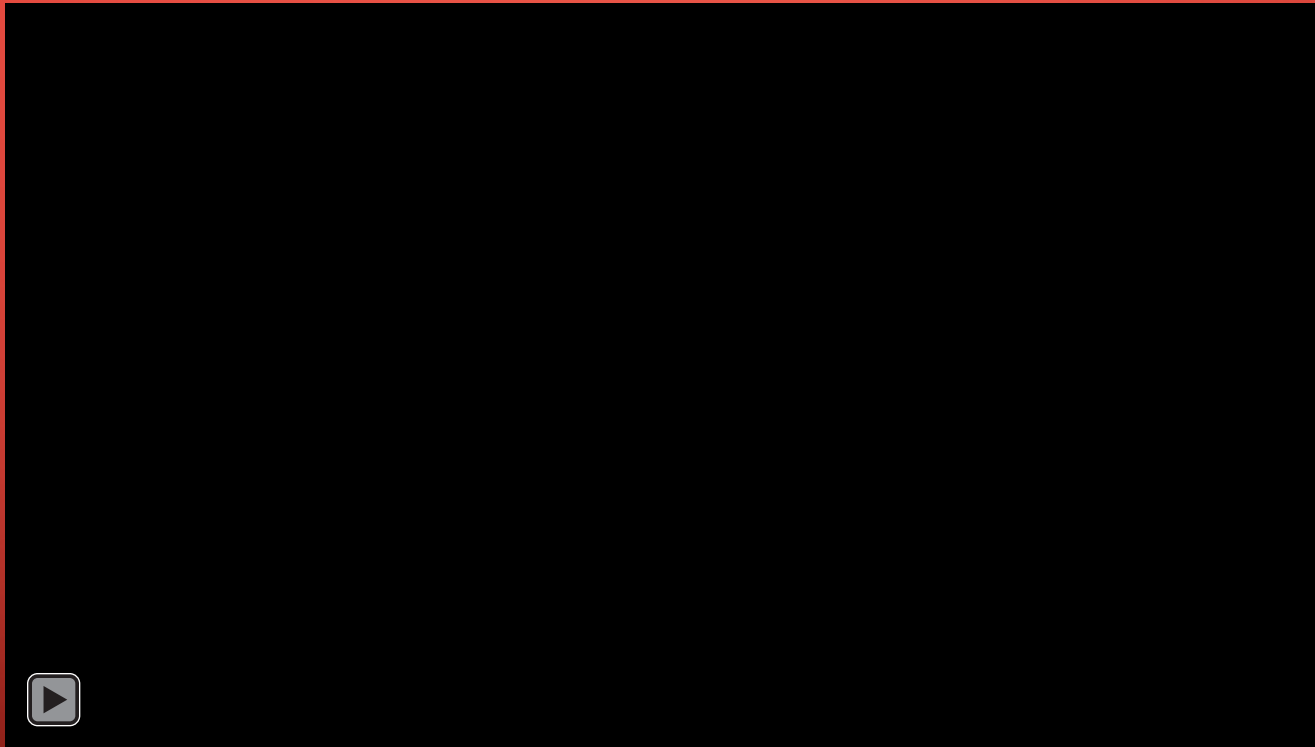
FORMS

- ICS Forms

- California OES Forms

- Red Cross Forms

MESSAGE – ICS-213

REPORT – ICS-309

COMMUNICATIONS LOG			TASK # Winlink Demo	DATE PREPARED: 07/16/20
				TIME PREPARED: 17:36

OPERATIONAL PERIOD # 07/16/2020			TASK NAME: Test	
RADIO OPERATOR NAME: T. Takeuchi			STATION I.D. N6SBC	

LOG			
TIME	**FROM**	**TO**	**SUBJECT**
07/15/20 00:18	SERVICE	N6SBC	Password Recovery Address Change Notification
07/15/20 00:21	N6SBC	W6TST	213-Test Demo-Demo - 7/15/2020 00:20
07/15/20 00:24	W6TST	N6SBC	Re: 213-Test Demo-Demo - 7/15/2020 00:20
07/15/20 10:34	N6SBC	CALIFORNIA	CESN Winlink Check In-San Benito County
07/16/20 12:32	N6SBC	W6TST	Testing 1-2-3
07/16/20 14:17	W6TST	N6SBC	Test from the Internet
07/16/20 14:22	N6SBC	W6TST	Re: Test from the Internet
07/16/20 14:28	N6SBC	W6TST	213-Winlink Demo-Winlink for Emcom Communications - 2020-07-16 14:26
07/16/20 14:45	W6TST	N6SBC	Re: 213-Winlink Demo-Winlink for Emcom Communications - 2020-07-16 14:26

Page 1 of 1	ICS 309
	ICS-309 report generated by Winlink Express 1.5.30.0

MODES – WINLINK SERVER VS P2P

- Over the air – You can use Winlink through a server much like traditional email or P2P (Point to Point)

- I haven't done much with P2P

WHAT DO I HAVE?

- Computer w/ Winlink software

- Icom IC-7300 (HF)
  - USB Connection (w/ Antenna & Tuner)

- Kenwood TM-D710GA
  - Serial to USB Connection (w/ Antenna)

SOFTWARE OPTIONS

- Winlink - $24

- VARA HF - $69 (full speed)
  - Reduced demo speed

WHY?

- Email is reliable under normal cirumstances…

- During an earthquake, internet cable cut, power outage?

- You can use Winlink to send an email via HF and bypass all local failing infrastructure.

The Winlink
Radio e-Mail Network

E-mail with or without the Internet
Phil Sherrod, W4PHS

Developed by
The Winlink DevelopmentTeam

Defense Secretary Leon Panetta warns of "Cyber Pearl Harbor".

What is Winlink

- Worldwide system for sending/receiving e-mail via radio

- Provides e-mail from almost anywhere in the world.

- Mature, well-tested and full featured system.

- Adopted for contingency communication by many federal, state and county government agencies

- Used by the National Guard (14 units in Tennessee)

- Used by infrastructure-critical NGOs such as International & American Red Cross, Southern Baptist Disaster Relief, DHS Tiered AT&T Disaster Response & Recovery, FedEx, Bridgestone Emergency Response Team, etc.

Winlink Has Been Used in Many Incidents

TSA Activation

Demo for Congress

AT&T Disaster Recovery

Disaster Assessment Picture – Kentucky Ice Storm

Kentucky Ice Storm 2009

Cell, Land-line or Fax?   NO!

- Air Card? NO!

-Public Safety, Mutual Aid?   NO!

- Satellite/Microwave? NO!

-Winlink Radio E-Mail?
Yes! Mobile from a TEMA vehicle.

This picture was one of several sent by TEMA mobile through the Winlink radio email system.

Winlink System Components

Hierarchal levels of the Winlink system:

1. ***Client system*** – Radio, computer with Winlink software, TNC (or sound card) and you, the end-user!

2. ***Radio Message Server (RMS)*** – Radio gateway between the client (end-user) and the Winlinksystem backbone.

3. ***Common Message Servers (CMS)*** – Winlink backbone.
   - 5 CMS locations.
   - Redundant, fault-tolerant.
   - Located on 3 continents.
   - One CMS is sufficient for normal system operation.

Winlink Architecture (Conventional Mode)

- CMS

- RMS (gateway)

- Client (you)
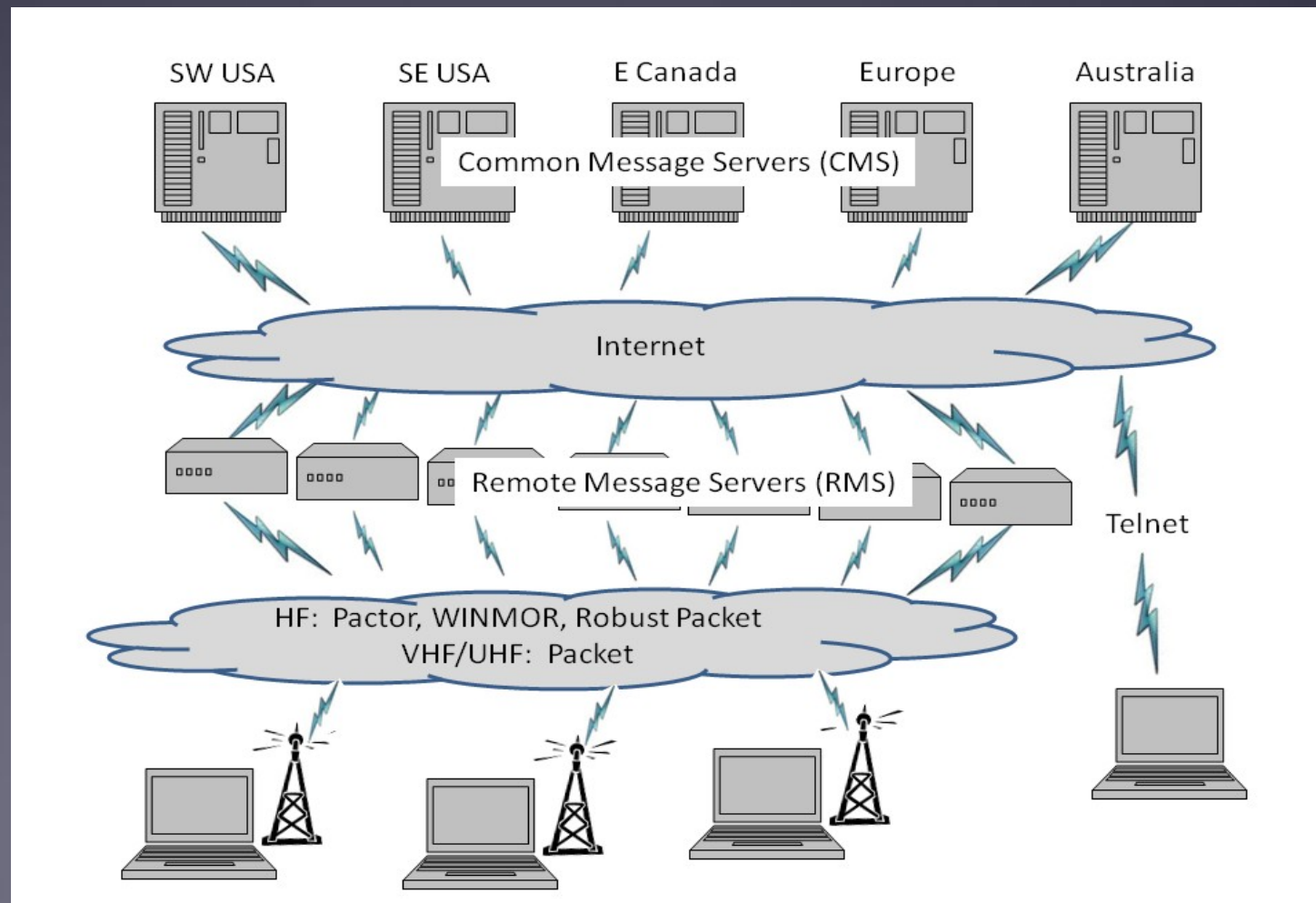
Winlink Connection Modes

- **HF Pactor** – Fast but expensive - $1,500.
- **HF WINMOR** – "Poor man's Pactor". $100 or $0.
- **VHF/UHF Packet – 9600 baud, $400. 1200, $100.**
- **Telnet** – Non-radio connection through the Internet. Good for training or if no radio.
- **Iridium GO!** – Satellite phone connection.
- **MESH network** to Winlink "Post Office" (RMS Relay).
- **Telnet peer-to-peer** between to Express users.

Winlink Express E-mail Client Program

-

Multiple modes

Multiple call signs

In-box, Out-box, etc.

Personal message folders

Contacts address book
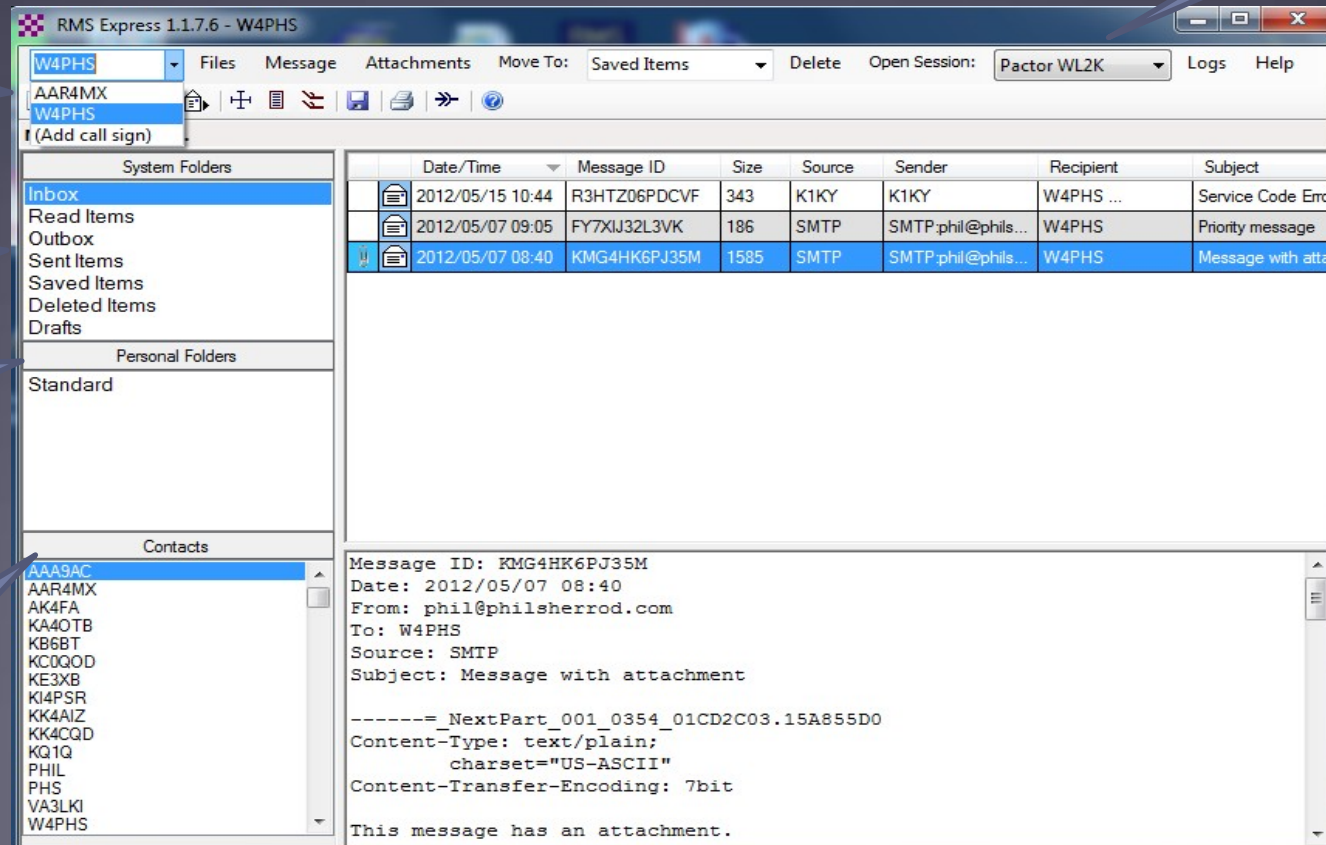
Composing a Message in Winlink Express

Message Receipt Acknowledgements

- Positive acknowledgment that message was received
- Information about message filled in automatically

Built-in ICS-309 pdf Message Log Generator

Built-in Picture Cropping/Resizing

Winlink Express RMS Channel List

Current Amateur (Ham) HF Pactor RMS Stations

Concern About "Cyber-Pearl Harbor" Attack

- "The most destructive possibilities, Mr. Panetta said, involve 'cyber-actors launching several attacks on our critical infrastructure at one time, in combination with a physical attack.' He described the collective result as a 'cyber-Pearl Harbor that would cause physical destruction and the loss of life, an attack that would paralyze and shock the nation and create a profound new sense of vulnerability.'"
The New York Times, October 11, 2012

Growing Threat to USA Infrastructure

- "WASHINGTON — The Obama administration has warned the nation's power companies, water suppliers and transportation networks that sophisticated cyberattack techniques used to bring down part of Ukraine's power grid two months ago could easily be turned on them."   New York Times, Feb. 29, 2016

- Power grid threats and vulnerabilities extensively researched in Ted Koppel's book *Lights Out*.

- Cyber-attacks can be devastating, and they are *much* easier to launch than physical attacks.

Radio-Only Winlink Network (No Internet)
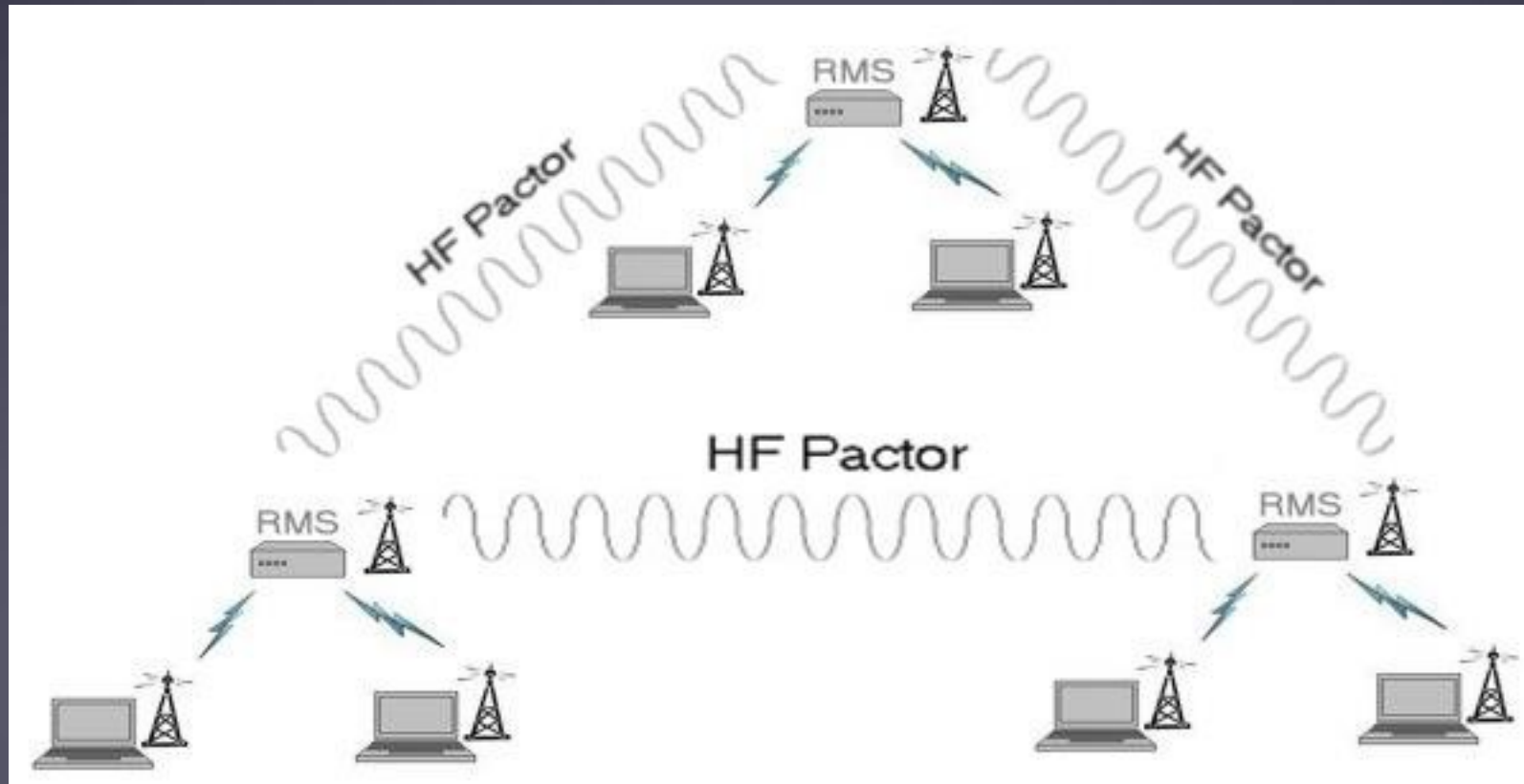
Winlink Peer-To-Peer Radio-Only Operation

- 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.

- 100% error-free transmission and file attachments.

GETTING STARTED

- http://winlink.org
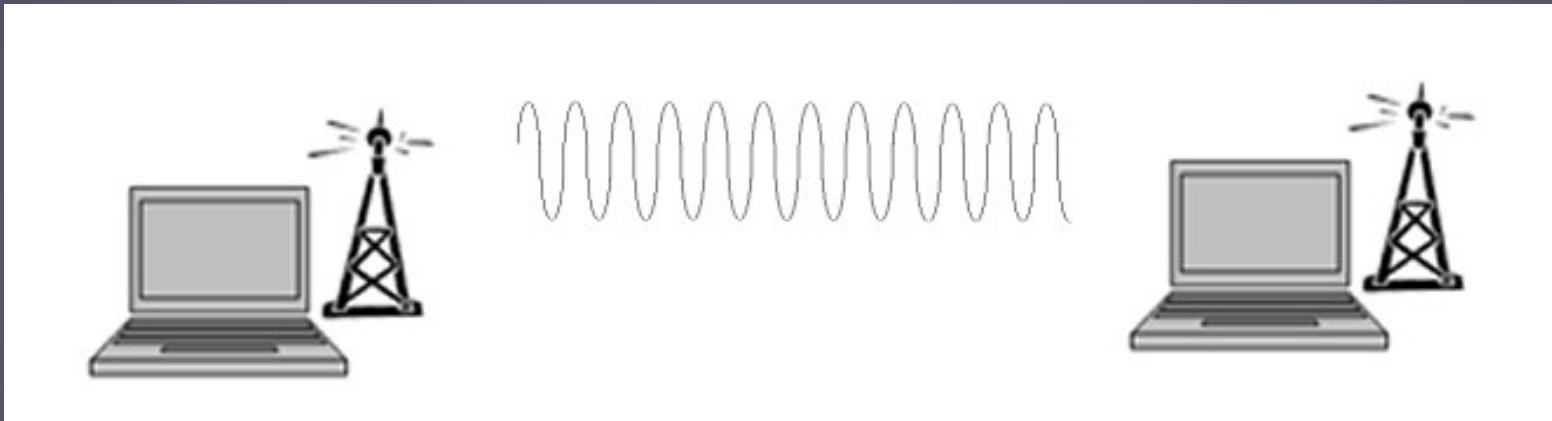
- Download the software, register your call sign and emails under settings

- Confirm your email

- Start with TELNET

- Move to VHF/UHF or HF as you desire and your license allows

WINLINK IS NOT STATIC

- Things are always changing!

- Watch when doing research – PACTOR is currently out of favor of Vara – that could easily change.

- Don't read standards, programs, utilities or techniques as static and check the dates of the material you read.

LINKS FOR FUTURE STUDY

- Discussions: https://sbcara.groups.io/g/Tech/

- Site: https://www.winlink.org/

- How 2 Series: https://www.winlink.org/content/k4ref_how_to_video_series_winlink_winlink_express

- Radio e-Mail Network: http://www.philsherrod.com/Winlink/Winlink_PowerPoint.pdf

- Winlink Express – Installation and Configuration: http://wiki.oevsv.at/images/c/c2/14-Winlink_Express_Install_and_Configure-Currie.pdf

- Using Forms with RMS Express in Winlink 2000: https://clallamares.org/library/Using%20Forms%20with%20RMS%20Express%20in%20Winlink%202000.pdf

- Winlink for Emcom: https://www.youtube.com/watch?v=3gdwsV9_ca0

- Winlink for Hospital Communication: https://www.youtube.com/watch?v=tGbHMgRL5ZM

- How To Send/Receive Emails Over Ham Radio Using IC-7300 And Winlink: https://www.youtube.com/watch?v=ijxkjvqkOyw

- VARA HF, Email Over Ham Radio, Winlink Express Tutorial, Military Grade!! https://www.youtube.com/watch?v=SegKxnJSmiM

CONCLUSION

- Learn

- Study

- Follow Up

- Share

- http://sbcara.org/winlink001/