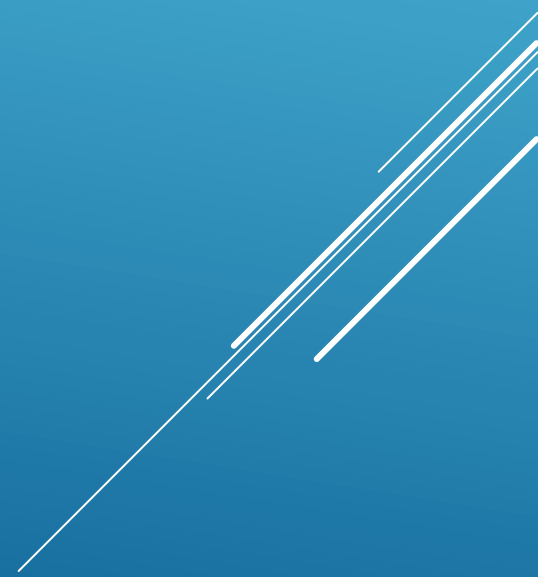




Winlink Express Overview and Installation

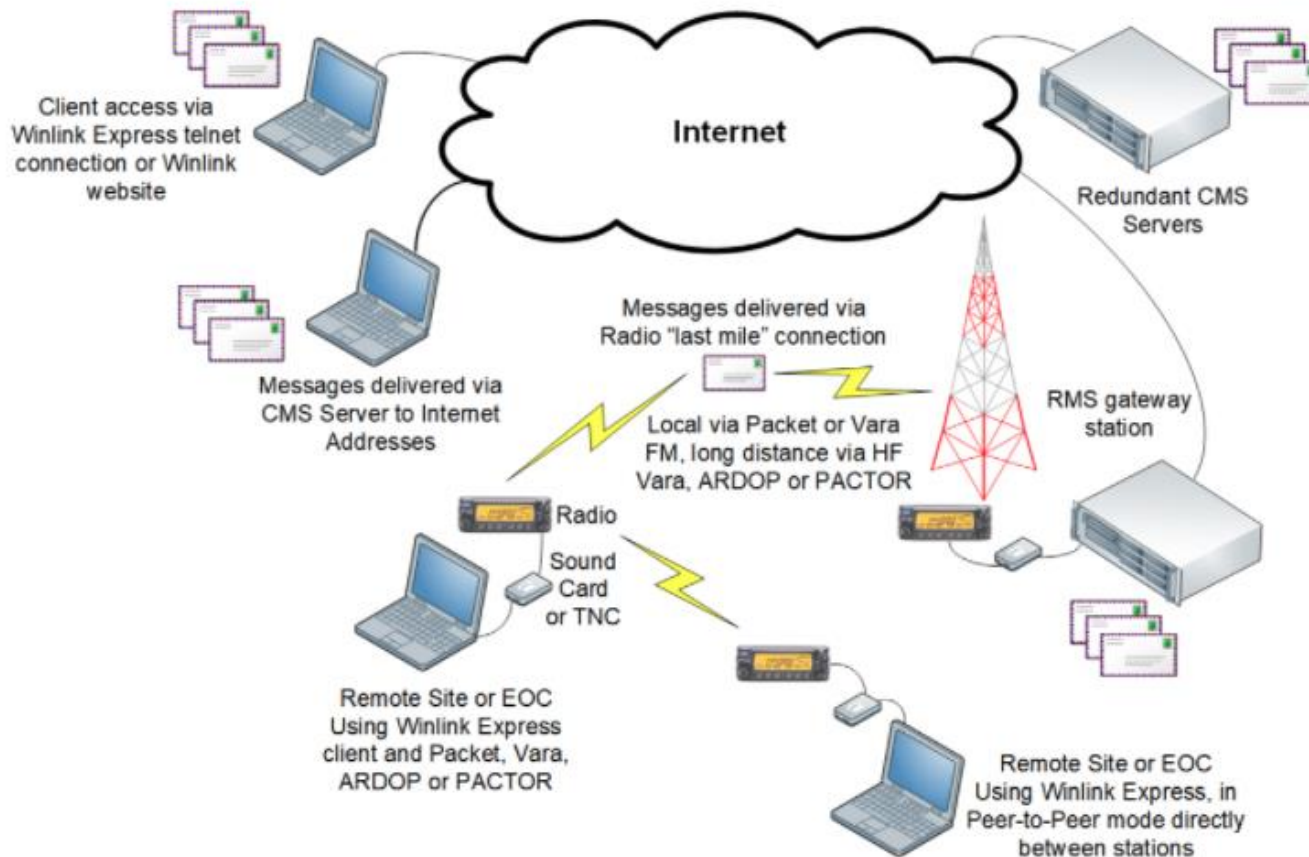


WHAT IS WINLINK

- Worldwide system for sending e-mail via radio.
- Provides e-mail from almost anywhere in the world.
- Entirely supported and operated by amateur radio volunteers (Amateur Radio Safety Foundation, Inc.).
- Winlink Express software is the preferred client application.
- Adopted for contingency communication by many government agencies (DHS SHARES Program).
- 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.

WHAT IS WINLINK

The diagram below gives an overview of the Winlink system



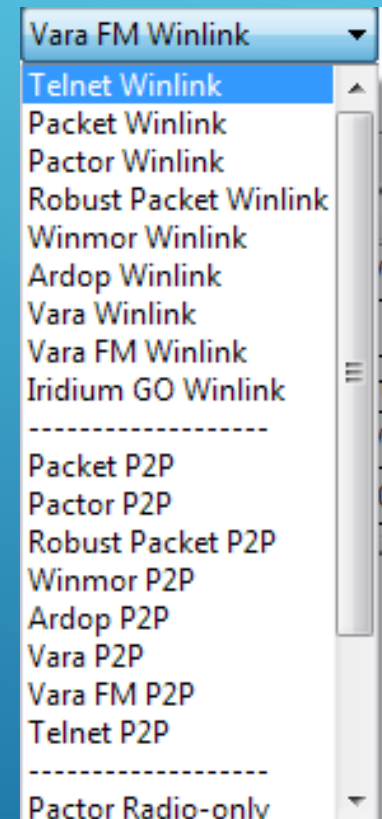
Winlink System Diagram

WINLINK CONNECTION MODES (SESSION TYPES)

- **Telnet** – Non-radio connection through the Internet. Good for training (no radio equipment required) and use if radio is down or network is busy.
- **VHF/UHF Packet** (local LOS propagation) –
 - **9600 baud** – Fast, reliable, range may be limited and requires \$400+ modem (Kantronics or SCS Tracker) or a good sound card interface (non-Signalink) modem. Radio must be 9600 capable.
 - **1200 baud** – Slow, but can use inexpensive TNC like Byonics TinyTrak-4, TNC-X, or sound card interface with software TNC application. Will work with virtually any FM radio.
 - **Experimental Speeds** – Between 1200 and 9600 using PSK and sound card interfaces
 - **Vara FM** – Multi-carrier OFDM “high speed” connections

WINLINK CONNECTION MODES

- **HF ARDOP** – “Poor man’s Pactor”. Not as good as Pactor, but operates with an inexpensive sound card interface, speeds between Pactor 2 and 3.
- **HF Pactor 1, 2, 3 and 4** – Fast and reliable but requires an expensive TNC (\$1500+). Pactor 4 not permitted in US.
- **Vara HF** – Multi-carrier OFDM with 2.4kHz or 2.7kHz bandwidth. HF speeds equal or better than PACTOR 3/4.
- All RF modes can operate in Peer-to-Peer mode (P2P).



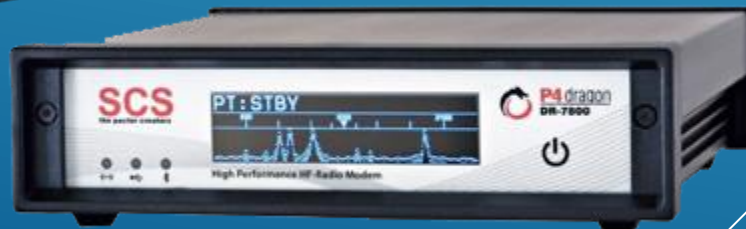
RESOURCES NEEDED FOR WINLINK EXPRESS

VHF/UHF Packet Radio

- Computer running Windows 10 or 11.
- Microsoft .NET 4.6 framework.
- V/UHF radio with data port (1200/9600) or speaker/mic connection (1200 only).
- Packet hardware TNC (Kantronics, TNC-X, MFJ, etc.), or USB sound card interface (DRA, Signalink or similar). TNC might require a USB to RS232 Serial dongle.
- Note: Some new radios have built-in sound cards/TNC's.
- Software downloads: winlink.org
- All software is free, but donation is suggested (\$69 Vara registration is required to unlock full speed features).

PACKET TNC

- Can be simple KISS mode, or full function.
- Cost from about \$200 to \$1500.
- Radio needs to have a data port (1200/9600) or use microphone and speaker connections (1200 only).
- Some radios include a built-in TNC or sound card.
- Might require a USB to serial adapter
 - Use FTDI chipset devices for best results





- ▶ Simple device powered by USB connection.
- ▶ Cost is about \$70-200.
- ▶ Radio needs to have a data (sound) port or use microphone and speaker connections.
- ▶ Need to run “Software TNC” application such as Direwolf, or UZ7HO soundmodem (for packet), or use Vara FM.

SOUND CARD INTERFACE

HARDWARE TNC OR SOUND CARD?

THERE ARE ADVANTAGES TO BOTH

Hardware TNC

- Many available, maybe an old one in the closet?
- Simple COM port connection.
- No additional software needed.

Sound Card Interface

- Can be used for other digital modes besides Winlink.
- Software TNC has superior decode over older hardware TNC.
- Can be used for Packet, ARDOP and Vara HF/FM on Winlink.

HARDWARE TNC OR SOUND CARD?

THERE ARE DISADVANTAGES TO BOTH

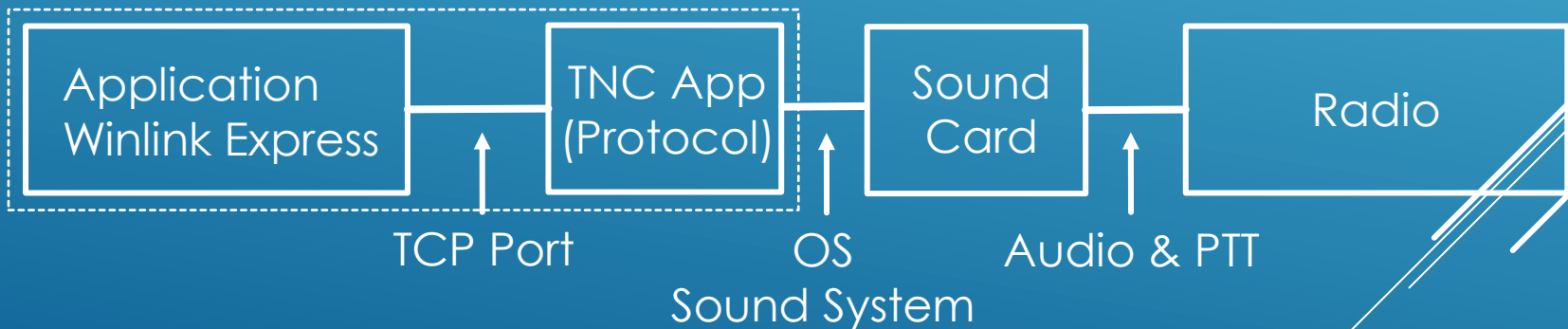
Hardware TNC

- Only does packet (or maybe Pactor too).
- Older units do not perform as well, no new development.
- Will require USB to serial adapter.

Sound Card Interface

- Sound levels and other settings may be changed unintentionally by OS updates or other applications.
- Requires additional software, and a slightly more complex operation (training issue?).

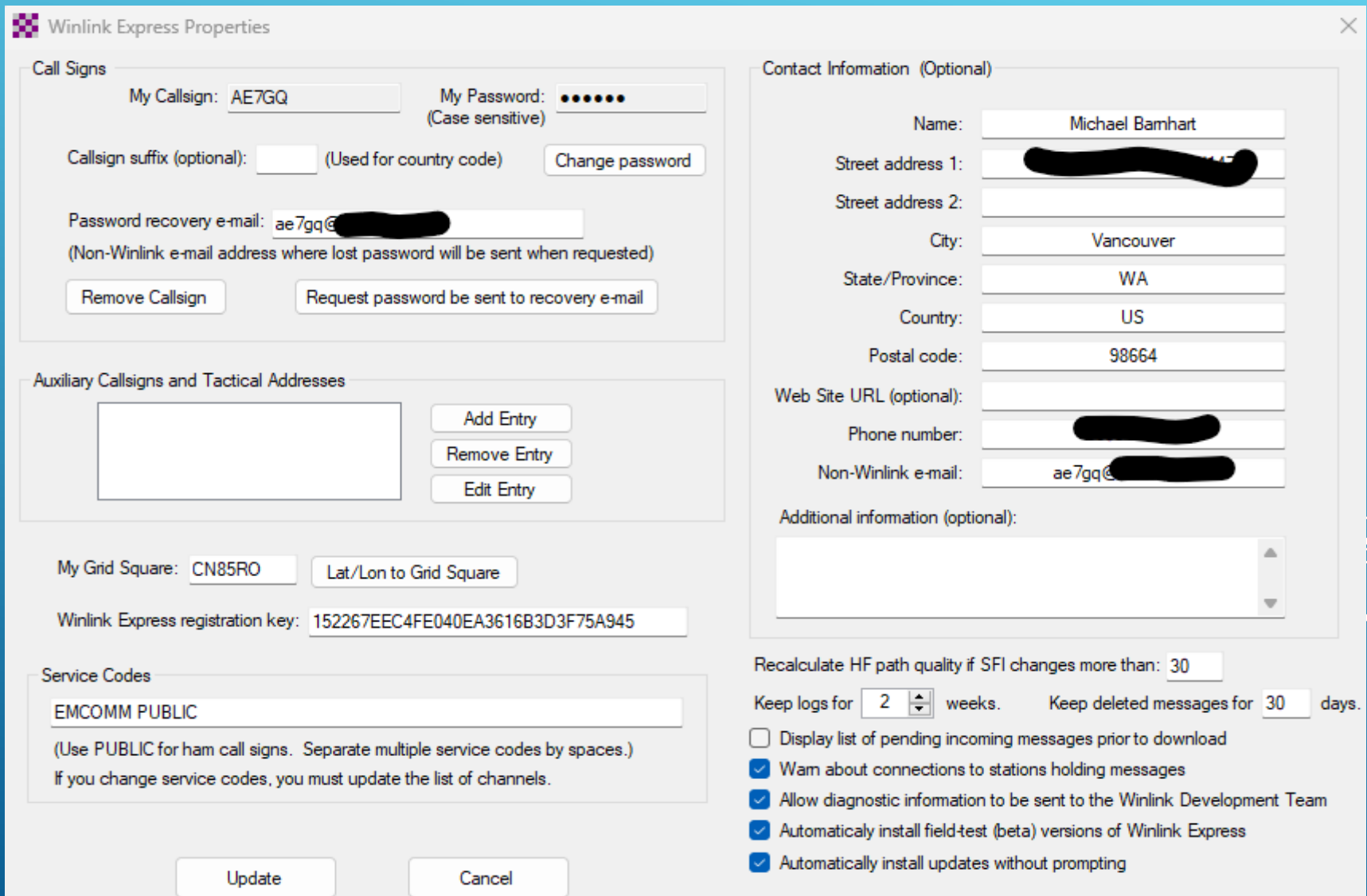
HARDWARE TNC OR SOUND CARD?



INSTALLING WINLINK EXPRESS CLIENT

- Download zip file: winlink.org
 - Search engines may send you to fakes
- Extract the .msi installer from the zip file and run it.
- Complete the setup screens (call sign, password, location, preferences, etc.).
- Create and send a new message to register call sign with the Winlink System (creates a call@winlink.org address)

WINLINK EXPRESS INITIAL SETUP

The image shows a screenshot of the 'Winlink Express Properties' window. The window is titled 'Winlink Express Properties' and has a close button in the top right corner. It is divided into several sections: 'Call Signs', 'Auxiliary Callsigns and Tactical Addresses', 'Service Codes', 'Contact Information (Optional)', and a bottom section with 'Update' and 'Cancel' buttons. The 'Call Signs' section contains fields for 'My Callsign' (AE7GQ), 'My Password' (masked with dots), 'Callsign suffix (optional)', 'Password recovery e-mail' (ae7gq@...), and buttons for 'Remove Callsign' and 'Request password be sent to recovery e-mail'. The 'Auxiliary Callsigns and Tactical Addresses' section has a list box and buttons for 'Add Entry', 'Remove Entry', and 'Edit Entry'. The 'Service Codes' section has a text box containing 'EMCOMM PUBLIC' and instructions. The 'Contact Information (Optional)' section has fields for 'Name' (Michael Bamhart), 'Street address 1', 'Street address 2', 'City' (Vancouver), 'State/Province' (WA), 'Country' (US), 'Postal code' (98664), 'Web Site URL (optional)', 'Phone number', and 'Non-Winlink e-mail' (ae7gq@...). There are also checkboxes for 'Recalculate HF path quality if SFI changes more than: 30', 'Keep logs for 2 weeks', 'Keep deleted messages for 30 days', and several other options.

Call Signs

My Callsign: My Password:
(Case sensitive)

Callsign suffix (optional): (Used for country code)

Password recovery e-mail:
(Non-Winlink e-mail address where lost password will be sent when requested)

Auxiliary Callsigns and Tactical Addresses

My Grid Square:

Winlink Express registration key:

Service Codes

(Use PUBLIC for ham call signs. Separate multiple service codes by spaces.)
If you change service codes, you must update the list of channels.

Contact Information (Optional)

Name:

Street address 1:

Street address 2:

City:

State/Province:

Country:

Postal code:

Web Site URL (optional):

Phone number:

Non-Winlink e-mail:

Additional information (optional):

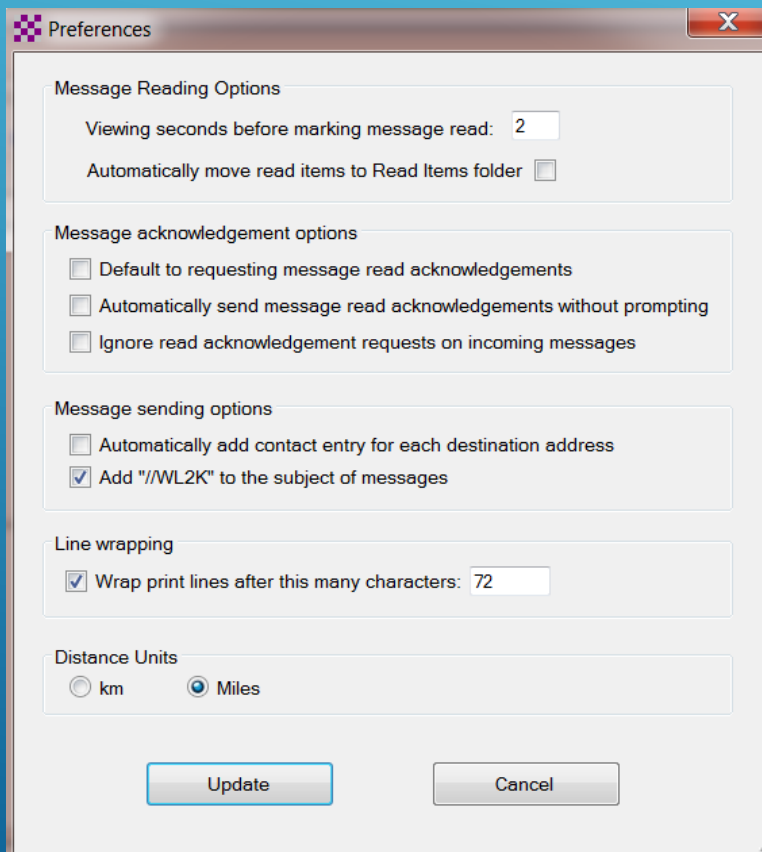
Recalculate HF path quality if SFI changes more than:

Keep logs for weeks. Keep deleted messages for days.

Display list of pending incoming messages prior to download
 Warn about connections to stations holding messages
 Allow diagnostic information to be sent to the Winlink Development Team
 Automatically install field-test (beta) versions of Winlink Express
 Automatically install updates without prompting

USER PREFERENCES

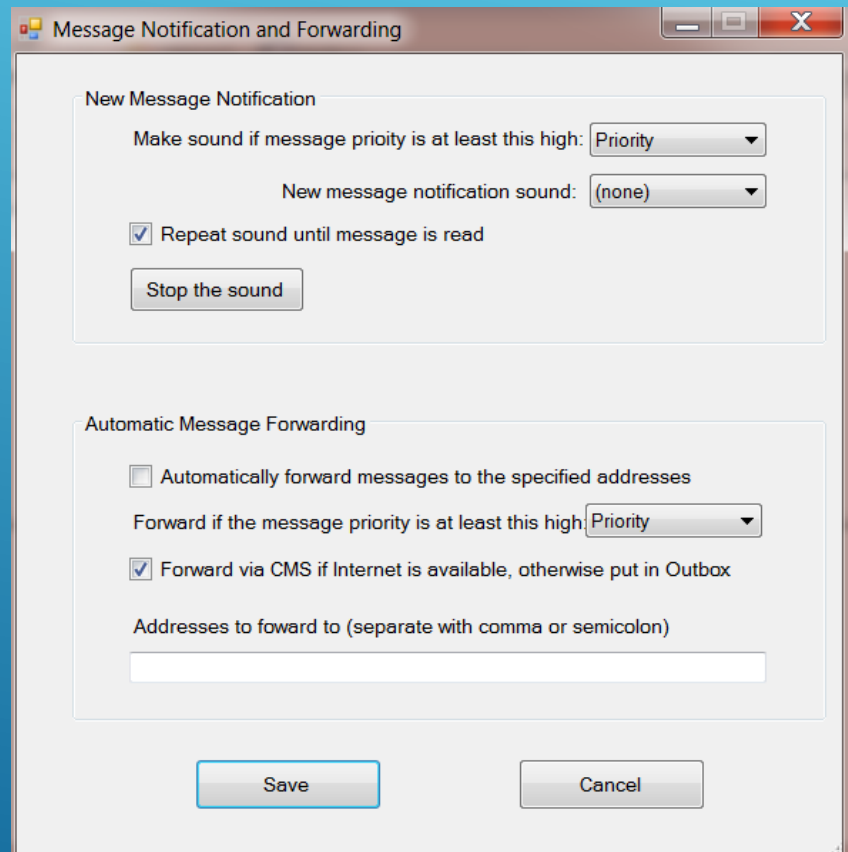
- Click “Files” followed by “Preferences/Message Notification”



The 'Preferences' dialog box is shown with the following settings:

- Message Reading Options**
 - Viewing seconds before marking message read: 2
 - Automatically move read items to Read Items folder:
- Message acknowledgement options**
 - Default to requesting message read acknowledgements:
 - Automatically send message read acknowledgements without prompting:
 - Ignore read acknowledgement requests on incoming messages:
- Message sending options**
 - Automatically add contact entry for each destination address:
 - Add "//WL2K" to the subject of messages:
- Line wrapping**
 - Wrap print lines after this many characters: 72
- Distance Units**
 - km:
 - Miles:

Buttons: Update, Cancel

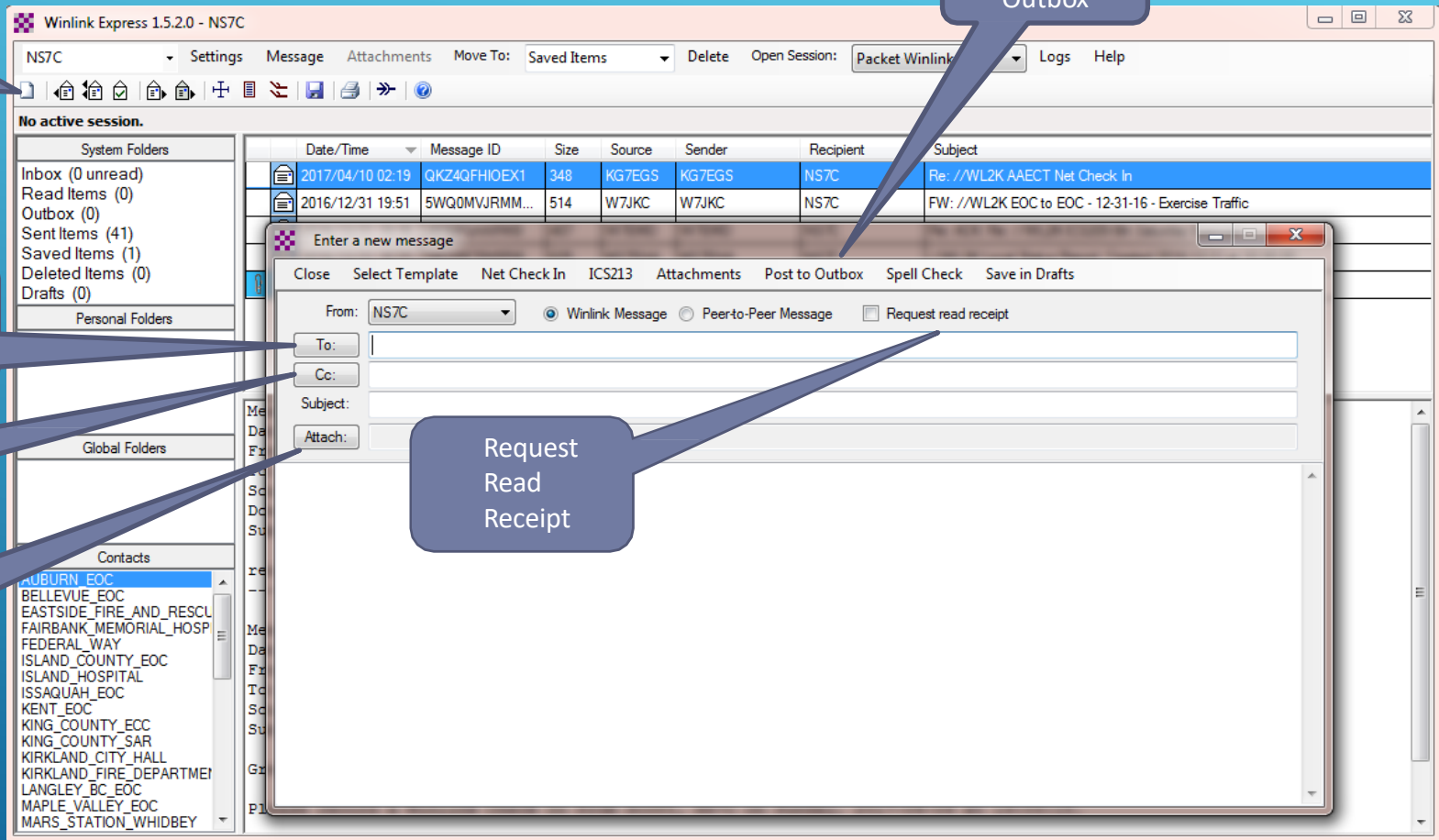


The 'Message Notification and Forwarding' dialog box is shown with the following settings:

- New Message Notification**
 - Make sound if message priority is at least this high: Priority
 - New message notification sound: (none)
 - Repeat sound until message is read:
 - Stop the sound: [Button]
- Automatic Message Forwarding**
 - Automatically forward messages to the specified addresses:
 - Forward if the message priority is at least this high: Priority
 - Forward via CMS if Internet is available, otherwise put in Outbox:
 - Addresses to forward to (separate with comma or semicolon): [Text Field]

Buttons: Save, Cancel

COMPOSING A MESSAGE



New Message Button

Click "To" or "CC" for contacts

Multiple recipients and CC

File attachments



Post to Outbox

Request Read Receipt

PENDING MESSAGE

Open Session

The screenshot shows the Winlink Express 1.5.2.0 - NS7C interface. The window title is "Winlink Express 1.5.2.0 - NS7C". The menu bar includes "Settings", "Message", "Attachments", "Move To:", "Saved Items", "Delete", "Open Session:", "Packet Winlink", "Logs", and "Help". The toolbar contains various icons for navigation and actions. The main window is divided into three panes. The left pane shows a folder tree with "System Folders" (Inbox (0 unread), Read Items (0), Outbox (1), Sent Items (41), Saved Items (1), Deleted Items (1), Drafts (0)), "Personal Folders", "Global Folders", and "Contacts" (listing various EOC locations like ALBURN_EOC, BELLEVUE_EOC, etc.). The middle pane displays a table of messages. The top row is highlighted in blue and contains the following data:

	Date/Time	Message ID	Size	Source	Sender	Recipient	Subject
 	2017/04/10 22:44	IDAOHYIHSV9G	2064	NS7C	NS7C	WA7AUB	FW: //WL2K WA R4 EOC Sitrep-12/31/16 Quarterly Activation-

The right pane shows the details of the selected message:


Message ID: IDAOHYIHSV9G
Date: 2017/04/10 22:44
From: NS7C
To: WA7AUB
Source: NS7C
Subject: FW: //WL2K WA R4 EOC Sitrep-12/31/16 Quarterly Activation-

----- Message from KF7UXB sent 2016/12/31 18:31 -----
Message ID: P20BG2KK0913
Date: 2016/12/31 18:31
From: KF7UXB
To: NS7C
Source: KF7UXB
Subject: //WL2K WA R4 EOC Sitrep-12/31/16 Quarterly Activation-

Originating EOC: [Region 4]
To: NS7C

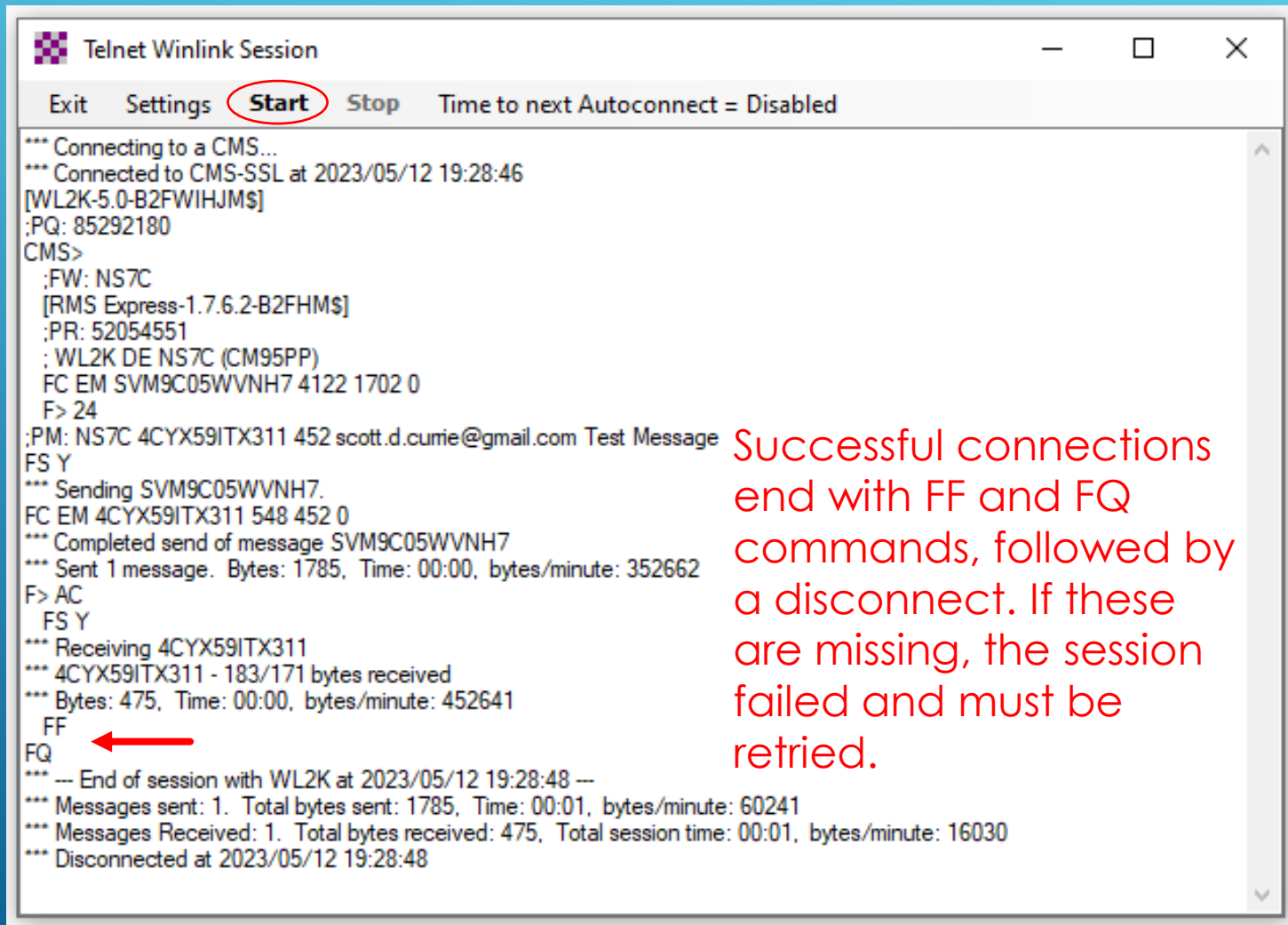
PENDING MESSAGE

The transfer process is always the same, regardless of the transfer method (Session Type) selected:

- Connect to the Gateway or P2P partner
 - Handshake capabilities, exchange calls/password
 - Exchange messages (both send and receive)
 - If there are no further messages to transfer, disconnect
- 

TELNET SESSION

CONNECT, LOGIN, SEND MESSAGES, DISCONNECT



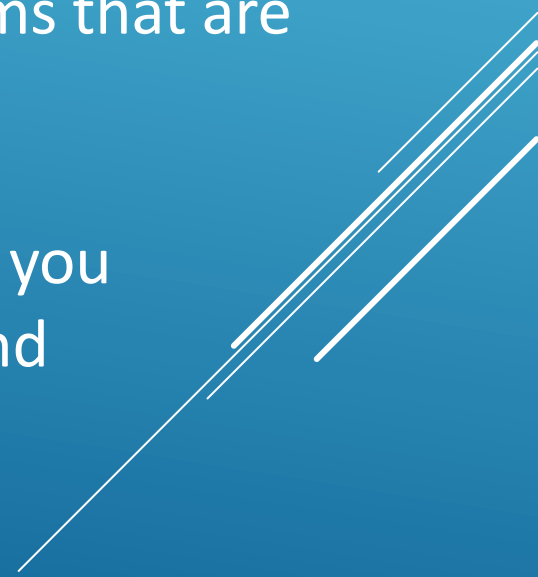
The screenshot shows a Telnet Winlink Session window with a menu bar containing 'Exit', 'Settings', 'Start' (circled in red), and 'Stop'. The main text area displays the following log:

```
*** Connecting to a CMS...
*** Connected to CMS-SSL at 2023/05/12 19:28:46
[WL2K-5.0-B2FWIHJM$]
:PQ: 85292180
CMS>
:FW: NS7C
[RMS Express-1.7.6.2-B2FHM$]
:PR: 52054551
:WL2K DE NS7C (CM95PP)
FC EM SVM9C05WVNH7 4122 1702 0
F> 24
:PM: NS7C 4CYX59ITX311 452 scott.d.cumie@gmail.com Test Message
FS Y
*** Sending SVM9C05WVNH7.
FC EM 4CYX59ITX311 548 452 0
*** Completed send of message SVM9C05WVNH7
*** Sent 1 message. Bytes: 1785, Time: 00:00, bytes/minute: 352662
F> AC
FS Y
*** Receiving 4CYX59ITX311
*** 4CYX59ITX311 - 183/171 bytes received
*** Bytes: 475, Time: 00:00, bytes/minute: 452641
FF
FQ
*** -- End of session with WL2K at 2023/05/12 19:28:48 --
*** Messages sent: 1. Total bytes sent: 1785, Time: 00:01, bytes/minute: 60241
*** Messages Received: 1. Total bytes received: 475, Total session time: 00:01, bytes/minute: 16030
*** Disconnected at 2023/05/12 19:28:48
```


A red arrow points to the 'FF' command in the log. To the right of the window, red text explains: 'Successful connections end with FF and FQ commands, followed by a disconnect. If these are missing, the session failed and must be retried.'

WINLINK EXPRESS

HTML FORMS

- HTML forms are efficient and professional looking.
 - Forms can be simple or very complex.
 - Forms can look as good as any web site.
 - Forms are easy to use and prompt user for required information.
 - The Winlink team maintains a library of forms that are included with the Winlink Express Client.
 - Custom forms can be created by the user.
 - Complex forms are difficult to create unless you understand HTML, cascading style sheets and JavaScript.
- 

HTML FORM AND TEMPLATE SET

- A full form set has three components:
 - A template that displays the form and generates the text message to be sent.
 - An input form that solicits input from the user.
 - A display form that formats and displays the information on the recipient's computer.
 - The form itself is not transmitted, only the data entered on the form.
 - Forms may be very complex and feature rich, but the actual data transmitted is very compact.
 - Receiving station must have the display form installed for proper display, but they will still receive a text-only version of the message.
- 

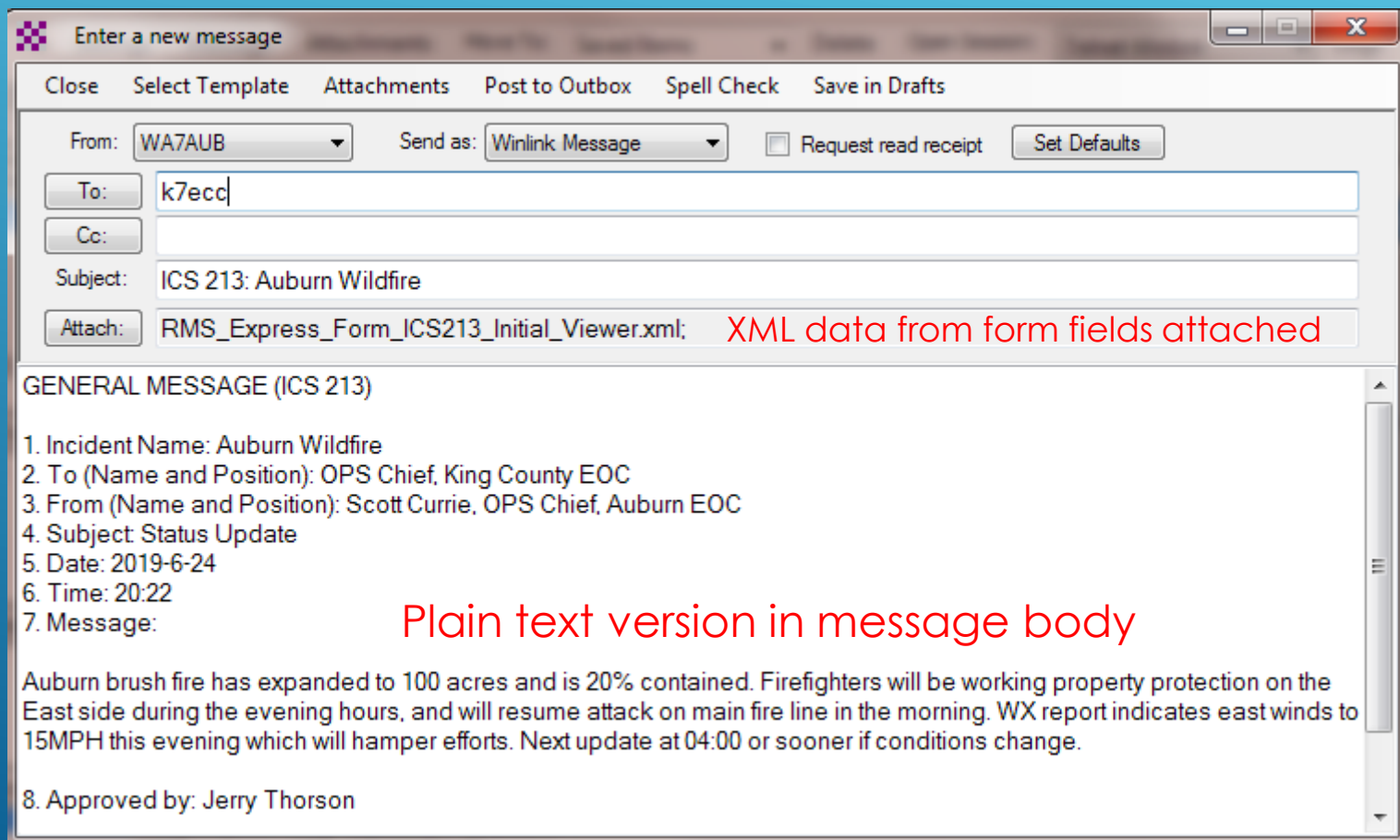
WINLINK EXPRESS FORMS

ICS FORM FOR DATA ENTRY IN BROWSER

General Message (ICS 213)		
<input type="button" value="Load ICS213 INITIAL Data"/> Form Instructions		
1. Incident Name: <input type="text" value="Auburn Wildfire"/>		
2. To (Name/Position): <input type="text" value="OPS Chief, King County EOC"/>		
3. From (Name/Position): <input type="text" value="Scott Currie, OPS Chief, Auburn EOC"/>		
4. Subject: <input type="text" value="Status Update"/>	5. Date: <input type="text" value="2019-6-24"/>	6. Time: <input type="text" value="20:22"/>
7. Message: <div style="border: 1px solid black; padding: 5px; min-height: 100px;"><p>Auburn brush fire has expanded to 100 acres and is 20% contained. Firefighters will be working property protection on the East side during the evening hours, and will resume attack on main fire line in the morning. WX report indicates east winds to 15MPH this evening which will hamper efforts. Next update at 04:00 or sooner if conditions change.</p></div>		
8. Approved by: <input type="text" value="Jerry Thorson"/>	Position / Title: <input type="text" value="EOC Manager"/>	
<input type="button" value="Save ICS213 INITIAL Data"/>	<input type="button" value="Submit"/>	<input type="button" value="Reset Form"/> Senders Base Call: <input type="text" value="WA7AUB"/>
		Ver 36.2

WINLINK EXPRESS FORMS

COMPLETED FORM READY TO SEND



The screenshot shows a 'Winlink Express' window titled 'Enter a new message'. The window has a menu bar with 'Close', 'Select Template', 'Attachments', 'Post to Outbox', 'Spell Check', and 'Save in Drafts'. Below the menu bar, there are fields for 'From: WA7AUB', 'Send as: Winlink Message', and a 'Request read receipt' checkbox. The 'To:' field contains 'k7ecc', and the 'Subject:' field contains 'ICS 213: Auburn Wildfire'. The 'Attach:' field shows 'RMS_Express_Form_ICs213_Initial_Viewer.xml' with a red annotation 'XML data from form fields attached'. The main message body is titled 'GENERAL MESSAGE (ICS 213)' and contains a numbered list of 7 items. Item 7, 'Message:', is followed by a red annotation 'Plain text version in message body'. The message body text describes an Auburn brush fire that has expanded to 100 acres and is 20% contained. It mentions firefighters working on property protection, a WX report of east winds at 15MPH, and a next update at 04:00. Item 8, 'Approved by: Jerry Thorson', is at the bottom of the message body.

From: WA7AUB Send as: Winlink Message Request read receipt Set Defaults

To: k7ecc

Cc:

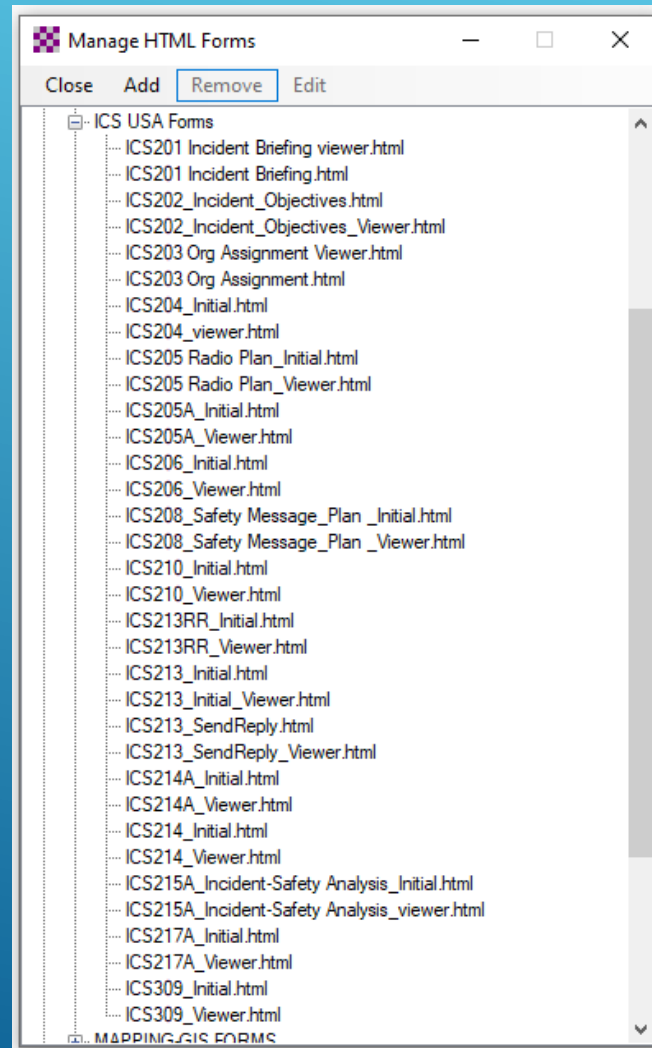
Subject: ICS 213: Auburn Wildfire

Attach: RMS_Express_Form_ICs213_Initial_Viewer.xml; XML data from form fields attached

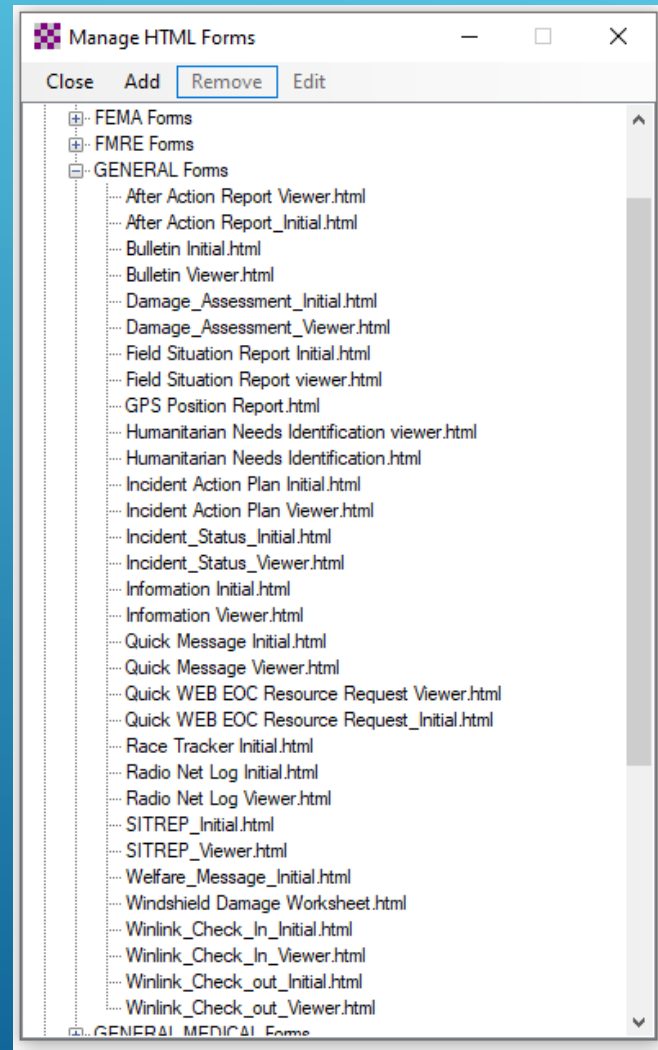
GENERAL MESSAGE (ICS 213)

1. Incident Name: Auburn Wildfire
2. To (Name and Position): OPS Chief, King County EOC
3. From (Name and Position): Scott Currie, OPS Chief, Auburn EOC
4. Subject: Status Update
5. Date: 2019-6-24
6. Time: 20:22
7. Message: Plain text version in message body
Auburn brush fire has expanded to 100 acres and is 20% contained. Firefighters will be working property protection on the East side during the evening hours, and will resume attack on main fire line in the morning. WX report indicates east winds to 15MPH this evening which will hamper efforts. Next update at 04:00 or sooner if conditions change.
8. Approved by: Jerry Thorson

AVAILABLE WINLINK EXPRESS FORMS (ICS)



AVAILABLE WINLINK EXPRESS FORMS (GENERAL)



AVAILABLE WINLINK EXPRESS FORMS

- A full set of standard forms are included
 - Installed with the application
 - Maintained by WDT
 - Updates are downloaded whenever Winlink Express is started (via Internet)
 - Forms can be requested via radio
 - Form data can be saved and reloaded to save time when similar messages are sent
- Locally developed forms must be maintained by users
 - If there are enough users, local forms can be added to the distribution

GPS AND MAP SUPPORT

The screenshot displays the Winlink Express 1.5.44.0 interface. The main window shows a message list on the left and a message details pane on the right. A 'Maps and CSV Files for Forms' dialog is open, showing a map of California with a location pin at San Luis Obispo. A 'Map of SPOTREP-2' window is also open, displaying a map of California with a location pin at San Luis Obispo. A 'Form Report Management' dialog is open, showing details for a SPOTREP-2 report from K7WVI.

Winlink Express 1.5.44.0 - NS7C

NS7C Settings Message Attachments Move To: Saved Items Delete Open Session: Packet Winlink Logs Help

No active session.

System Folders

- Inbox (0 unread)
- Read Items (0)
- Outbox (0)
- Sent Items (218)
- Saved Items (0)
- Deleted Items (116)
- Drafts (0)

Personal Folders

Global Folders

Contacts

- SCOTT CURRIE
- SLOECC_NORTH_COUNTY

Message Details:

Date: [blank]
From: K7WVI
Source: [blank]
Subject: [blank]

GENERAL

- Inbox
- To: K7WVI
- From: K7WVI
- Subject: [blank]
- Date: [blank]
- Title: [blank]
- Message: [blank]

I am operating [blank]
Callsign: NS7C
Class: 1D

Maps and CSV Files for Forms

Select form: SPOTREP-2

Number of stored reports: 3

Map provider: Bing

Form Report Management

Delete reports older than [blank] days

Delete [blank]

Delete [blank]

Display [blank]

Map of SPOTREP-2

Set Filters Zoom-In Zoom-Out Save as jpeg

San Jose Merced Sierra National Forest Kings Canyon N.P. Sequoia National Forest Inyo National Forest Death Valley National Park

Salinas Fresno Hanford Visalia

Los Padres National Forest

CALIFORNIA

Sequoia National Forest

San Luis Obispo Bakersfield

Los Padres National Forest

Santa Barbara Ventura Los Angeles San Bernardino

Oxnard Long Beach Riverside

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and drag to scroll. See Settings/Map Settings for options.

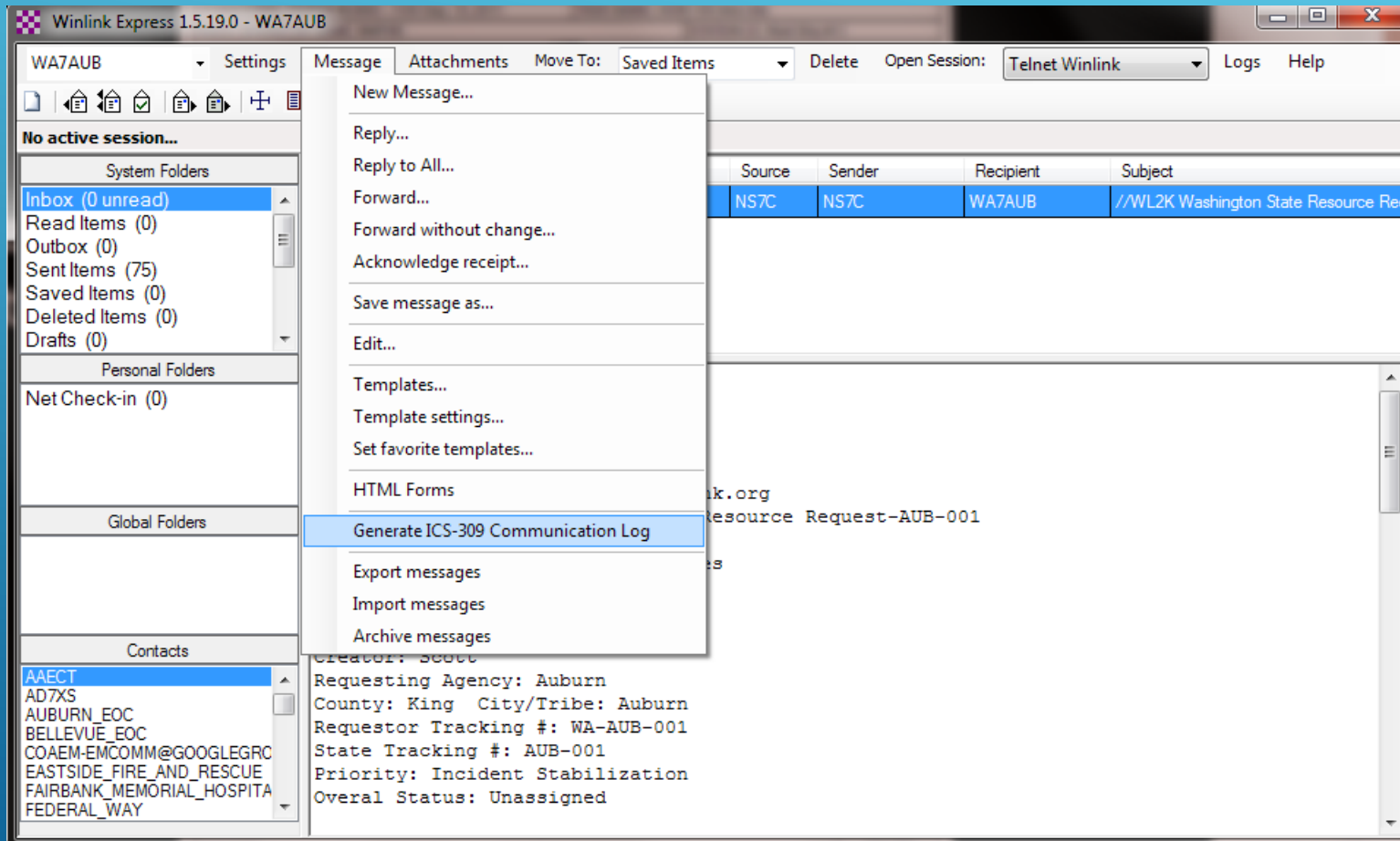
Form Report Management

SPOTREP-2 from K7WVI

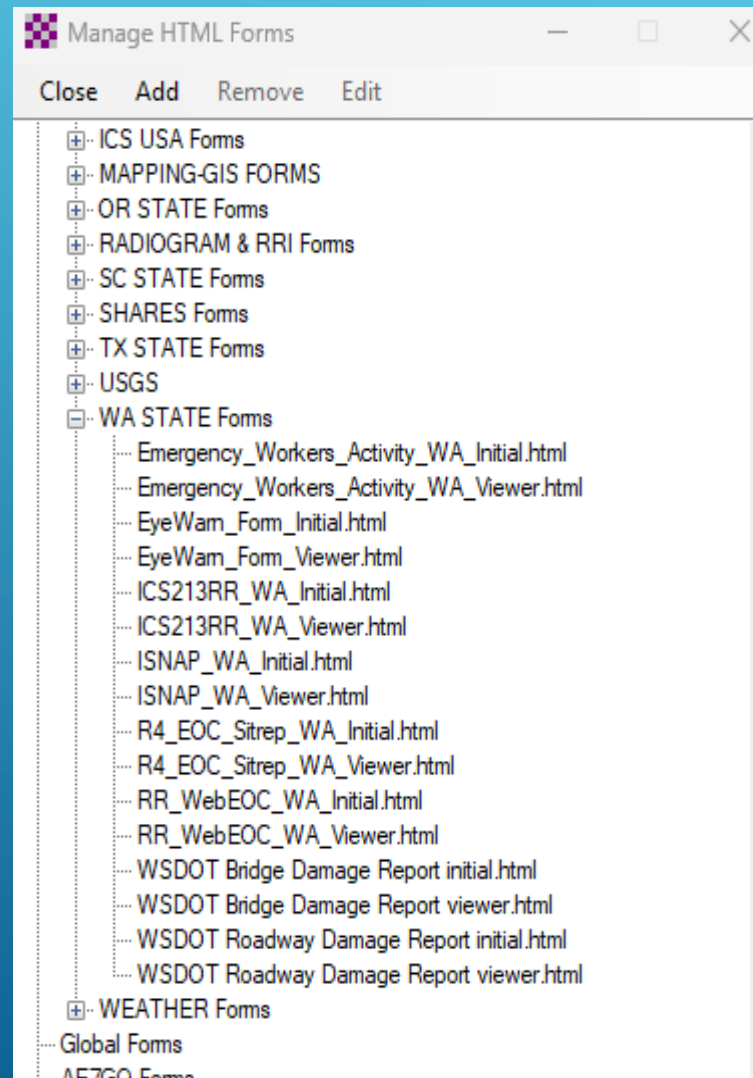
Sender: K7WVI
Date/time: 2021-12-16 11:00 (local)
Age: 15.3 days
Message ID: 5XFKY02QDW4
Subject: //WL2K (R) - Routine/ SPOTREP 2021-12-16 19:00:46Z
Latitude Longitude: 35° 38.38' N 120° 40.70' W
MGRS: 10SGE1020646458
Range and bearing: 2.0 mi @ 104
Precedence: (R) - Routine
Task Number:
City/State/Territory:
LandLines functioning?: YES
LandLines note:
Cell Phones functioning?: YES
Cell phone note:
AM/FM Broadcast Stations functioning?: YES
Broadcast Station note:
TV Stations functioning?: YES
TV station note:
Internet functioning?: YES
Internet note:
Commercial Power functioning?: YES
Commercial Power note:
Public Water Works functioning?: YES
Public Water Works note:
Additional Comments:
POC: Kathy

OK

GENERATED ICS-309 PDF MESSAGE LOG REPORT



WSDOT BRIDGE AND ROAD REPORT FORMS



WOAD AND RADIOMAIL APPS


WOAD is an WinlinkClient application for Android Devices, available in the Google Play Store.

RadioMail is a Winlink Client for iOS Devices, available in the Apple App Store.

Both are capable of doing a telnet Winlink session via a WiFi Connection or over the smart phone's cellular data connection.

They will also work with the Mobinlind TNC3 and TNC4 TNCs.

CONCLUSION

- Winlink Express use continues to grow, especially for EmComm applications.
 - The Winlink Development Team continues to enhance capabilities and adapt to changing needs.
 - Installation and set up is relatively easy.
 - Familiar “e-mail” like interface.
 - Supports multiple radio-based transfer modes.
 - Support for both hardware TNC and sound card radio interfaces.
- 

Thanks to Scott Currie
NS7C
For the original Power Point
Presentation

