Winlink for ARES

AN OVERVIEW OF WINLINK, ITS FEATURES AND ITS USES

BY PATRICK N4LKZ

Traditional role of ARES Support

- Report health and welfare of affected public
- Voice communications among served agencies (EOCs, hospitals, shelters, IC)
- Site tactical support – Incident command, SAR, damage and storm reporting (SKYwarn)
- Formal, structured written emergency traffic handling (ICS-213 et al)

Problems with voice communications

- Our traditional methods of communications fail for complex message handling in today's agency environment.
- Since the advent of e-mail:
  - Need for delivering written procedures, lists, graphics, images and predefined, formatted documents to multiple recipients.
  - Multiple recipient e-mail with file attachments is the de facto standard to carry written information.
  - Hand-written message forms are seldom used.
- For complex messages, voice, CW, radiograms and traditional packet radio won't do…
  - Slow, inflexible, prone to error, no permanent record, not self-originating
  - Doesn't go end-to-end from user-to-user on their own computers in their own offices
  - No attachments and no automatic distribution

Fortunately, there is a solution…

What is Winlink?

- Winlink is a worldwide system to enable e-mail by HAM radio.
- Winlink system operates on HF, VHF and UHF frequencies and over the internet.
- It provides several services:
  - Email (with attachments) with or without internet
  - Position reporting (like APRS)
  - Weather bulletins
  - Emergency and relief communications
  - Message Relay

Why Winlink over traditional Email?

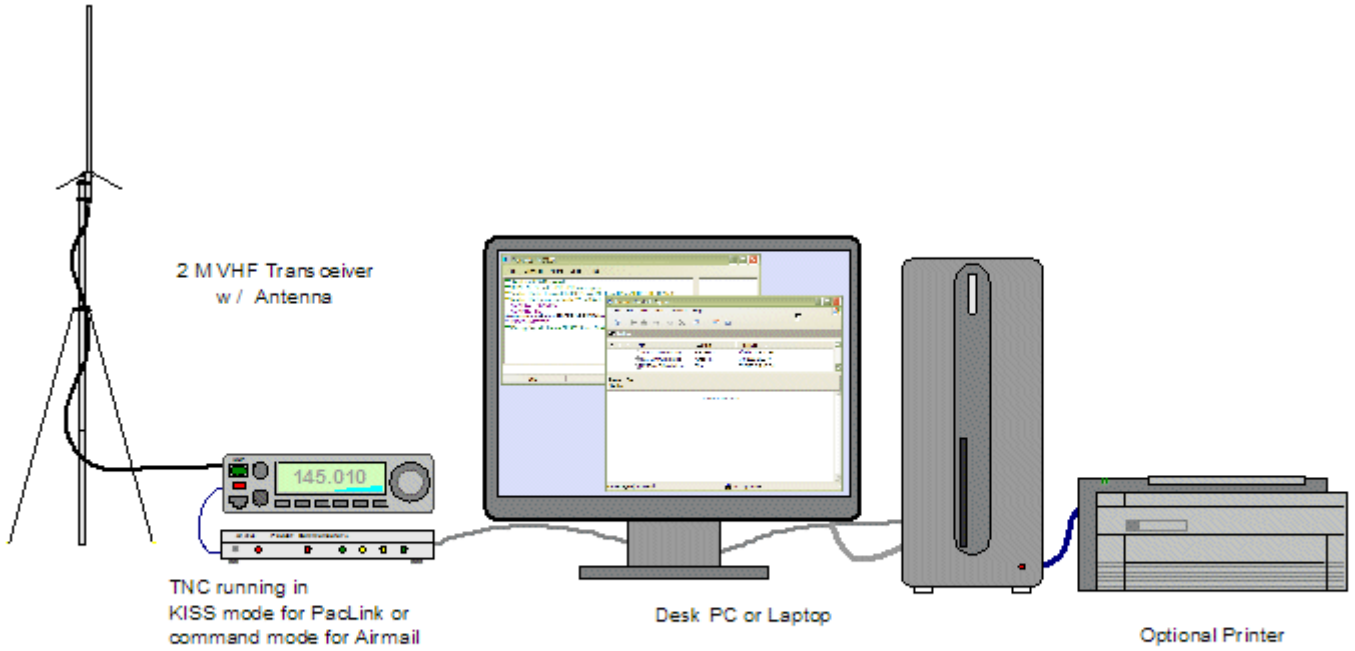
- Normal E-mail requires an internet connection.
  - Between agencies
  - Between an agency and the field
  - Between an agency and, well, *anywhere!*
- If a “last mile” internet link is broken, or the agency e-mail server is down, *e-mail cannot flow*.
  - The “last mile” is the path across an area where conventional communications have been disrupted or overloaded by an incident.
- Unfortunately, in today’s world, we cannot predict the frequency, size, nature or location of our disaster areas.

How does it work?

- Winlink consists of two cloud-based and four redundant Common Message Servers (or CMSs).
- The CMSs organize, synchronize and manage all WinLink e-mail traffic.
- All CMSs have the same (e.g. redundant) information.

How does it work?

- A typical HAM radio e-mail station is composed of simple components.
  - A VHF transceiver + antenna
  - A TNC or Soundcard interface (e.g. Signalink)
  - A computer running Windows with RMS Express



Winlink "Home" Station Equipment

How does it work?

- A radio “gateway” to the internet is called a Radio Message Server (RMS).
- To send or receive e-mail, a station makes a connection with an RMS which is always connected to the internet.
  - Packet networks or digipeaters can be used if the nearest RMS gateway has lost its internet connection.
- Up to 30 miles between stations, VHF Packet Radio is utilized.
- You can send and receive radio e-mail directly to internet e-mail users and even cell phone users via text message.

RMS Gateway Stations in the area

- W6BA* 145.050 MHz Yucca Valley / Landers
- N4LKZ-10** 145.030 MHz Yucca Valley
- KJ6BOI-1 431.070 MHz Twentynine Palms
- KJ6BOI-10 144.970 MHz Twentynine Palms
- KJ6BOI-4 145.050 MHz Twentynine Palms

* This is a digipeater. Contact KJ6BOI-10 via W6BA.

** This station is unavailable except in emergencies.

Winlink uses HF too!

- For long distances and difficult terrain, HF radios may be used.
- Instead of packet radio, HF Winlink uses Pactor 1-3 and WINMOR.
- If local VHF RMS gateways have lost their internet connection, HF Pactor or WinMOR may be the best option.

RMS HF Gateway Stations

Winlink Pactor Stations

Winlink WINMOR Stations

Find ideal HF stations at https://winlink.org/RMSChannels

Getting started with Winlink

How do I get started?

Download and install RMS Express from
http://www.winlink.org/ClientSoftware

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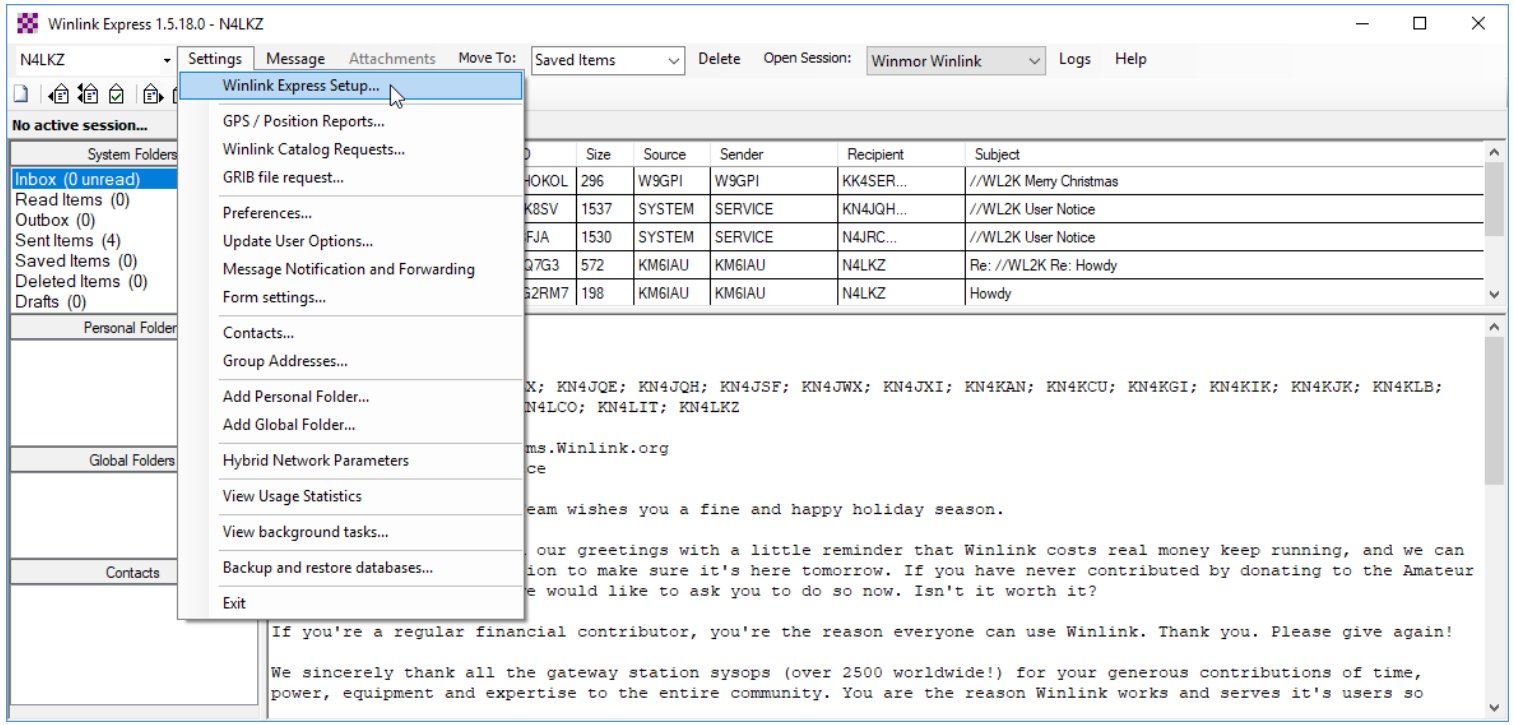

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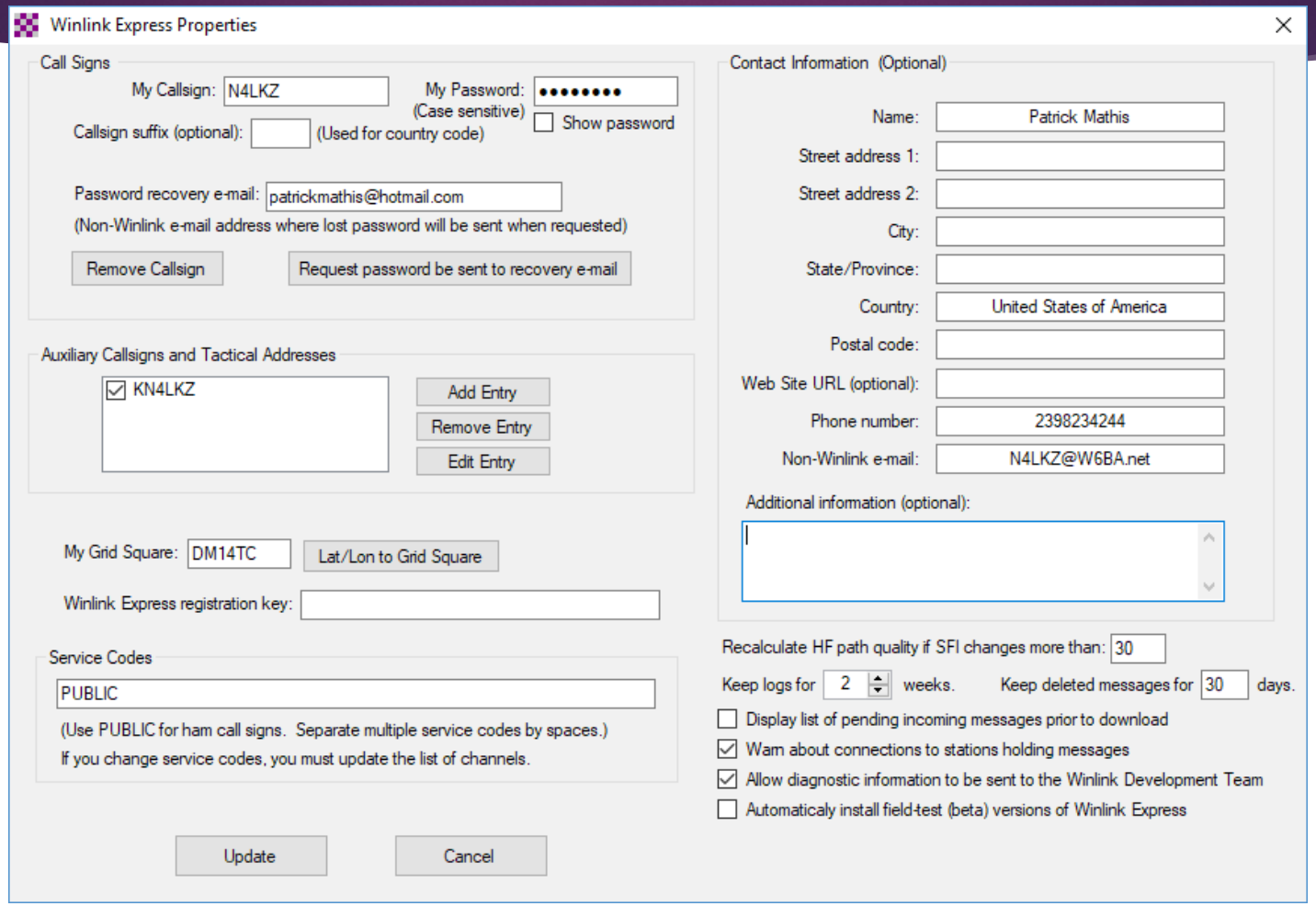

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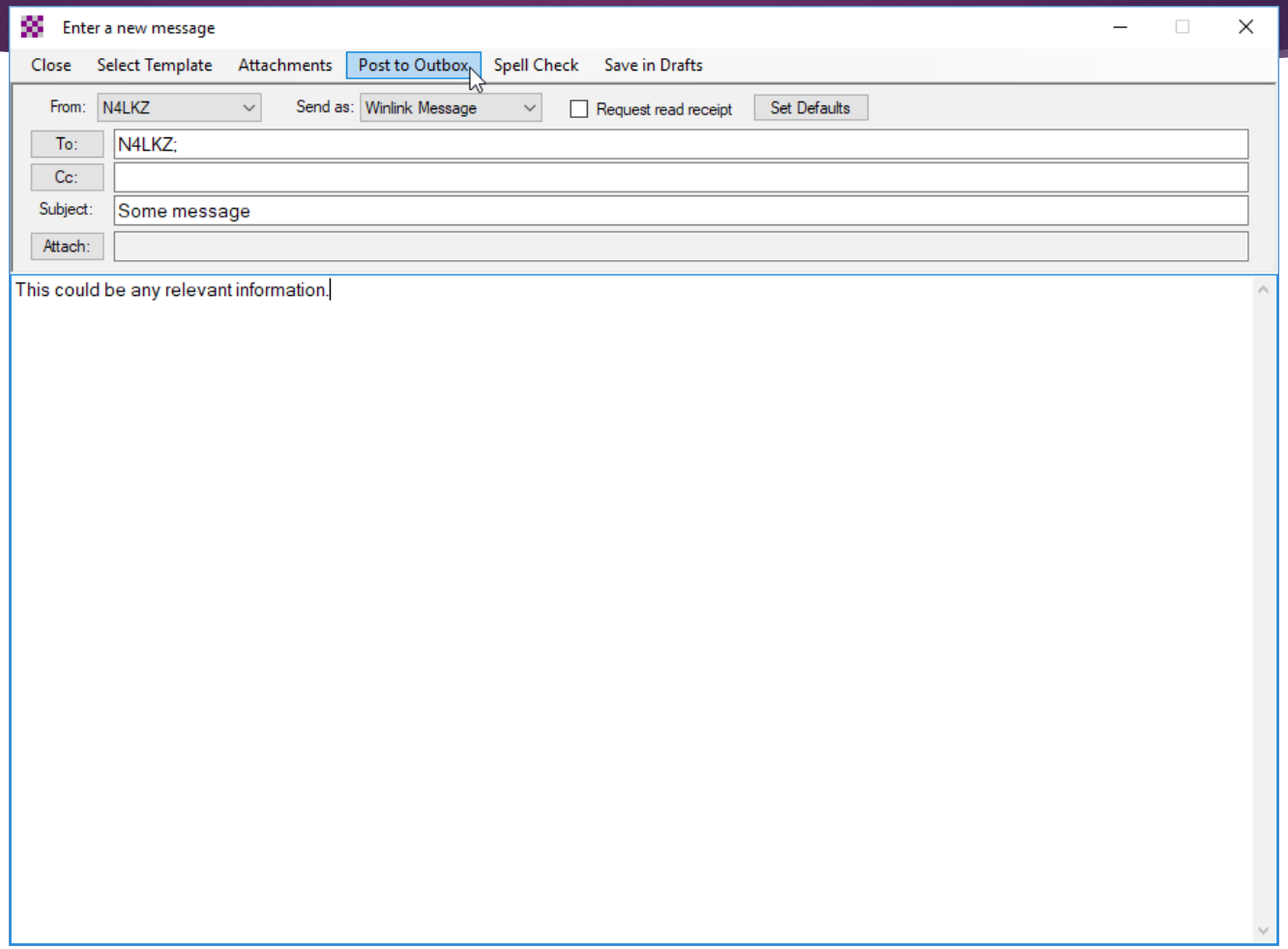

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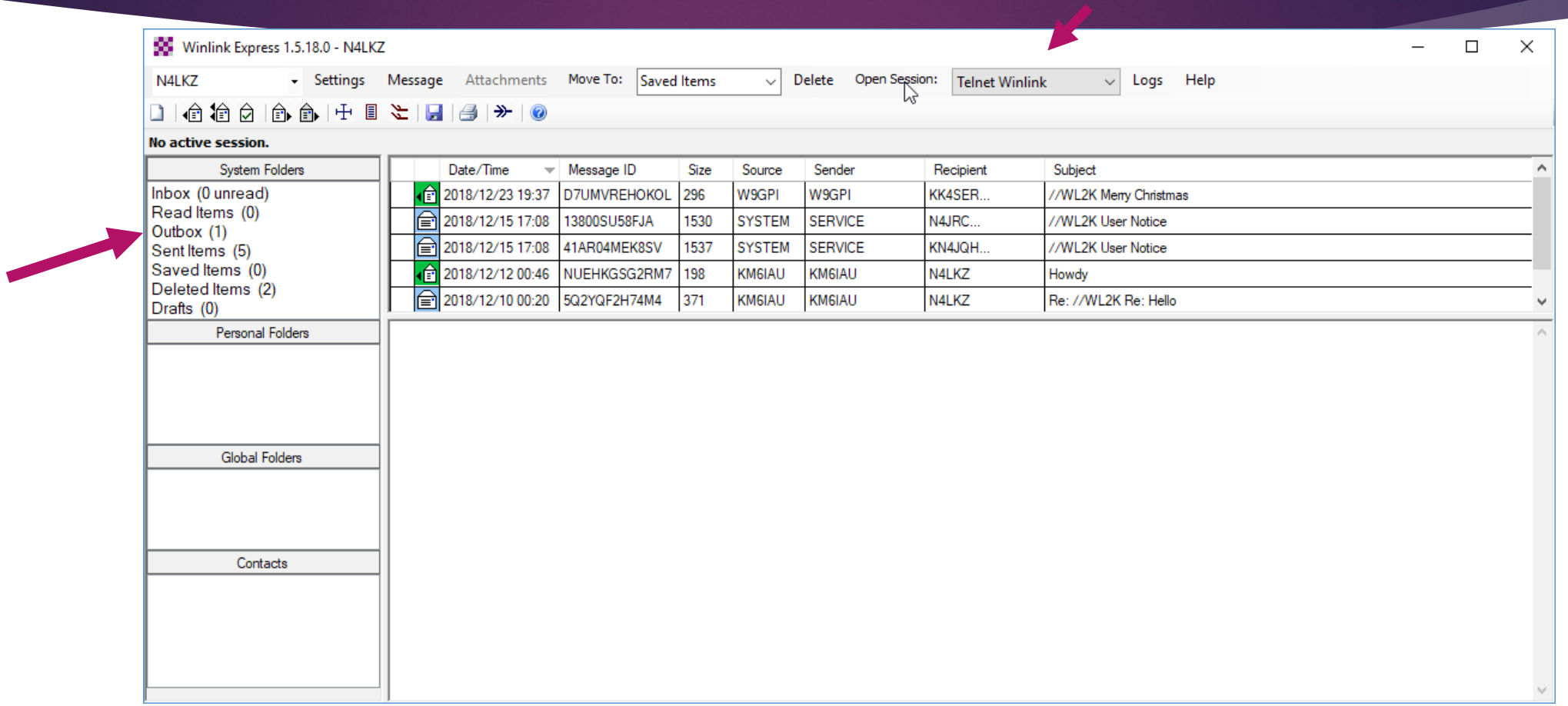

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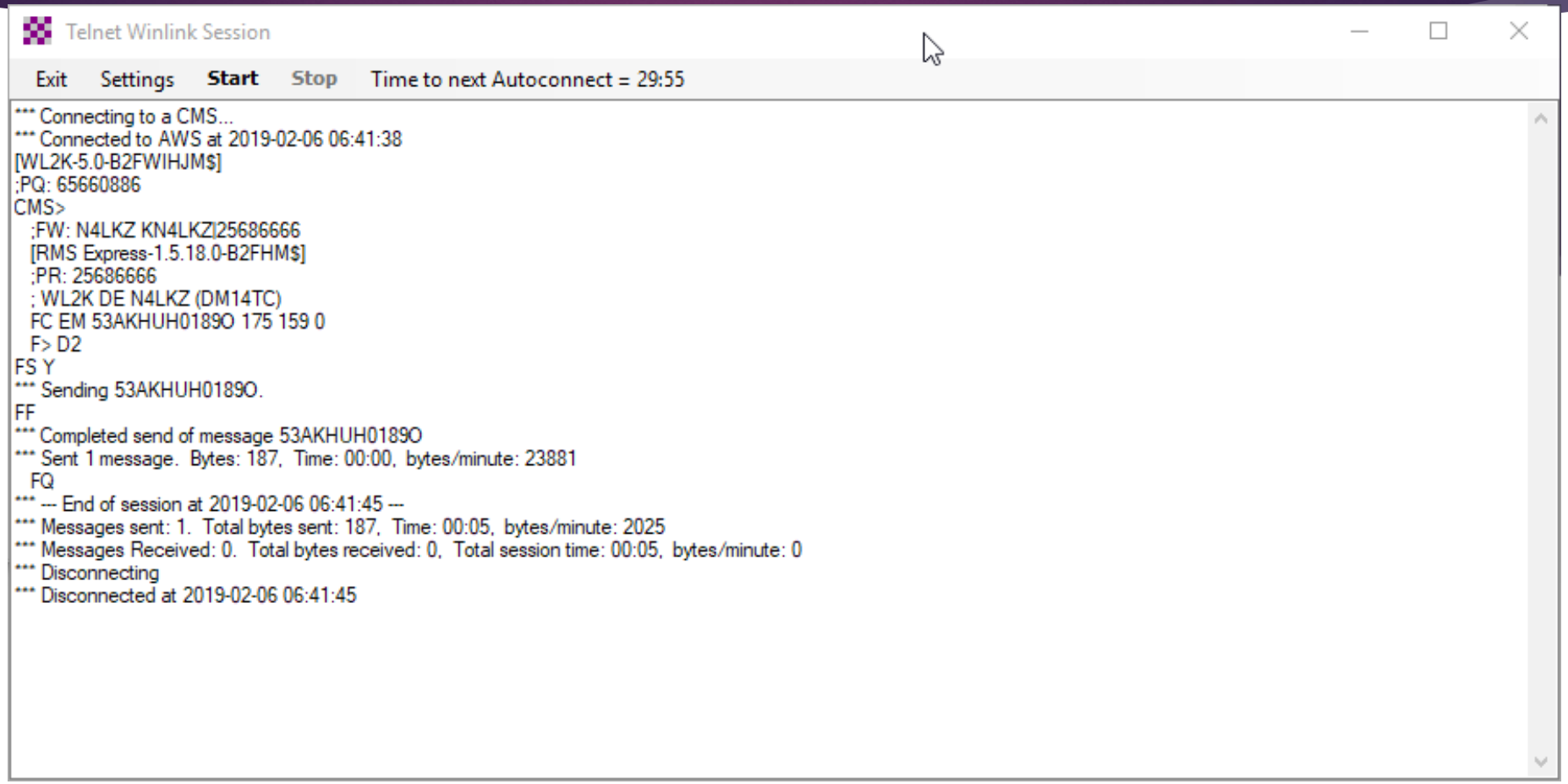

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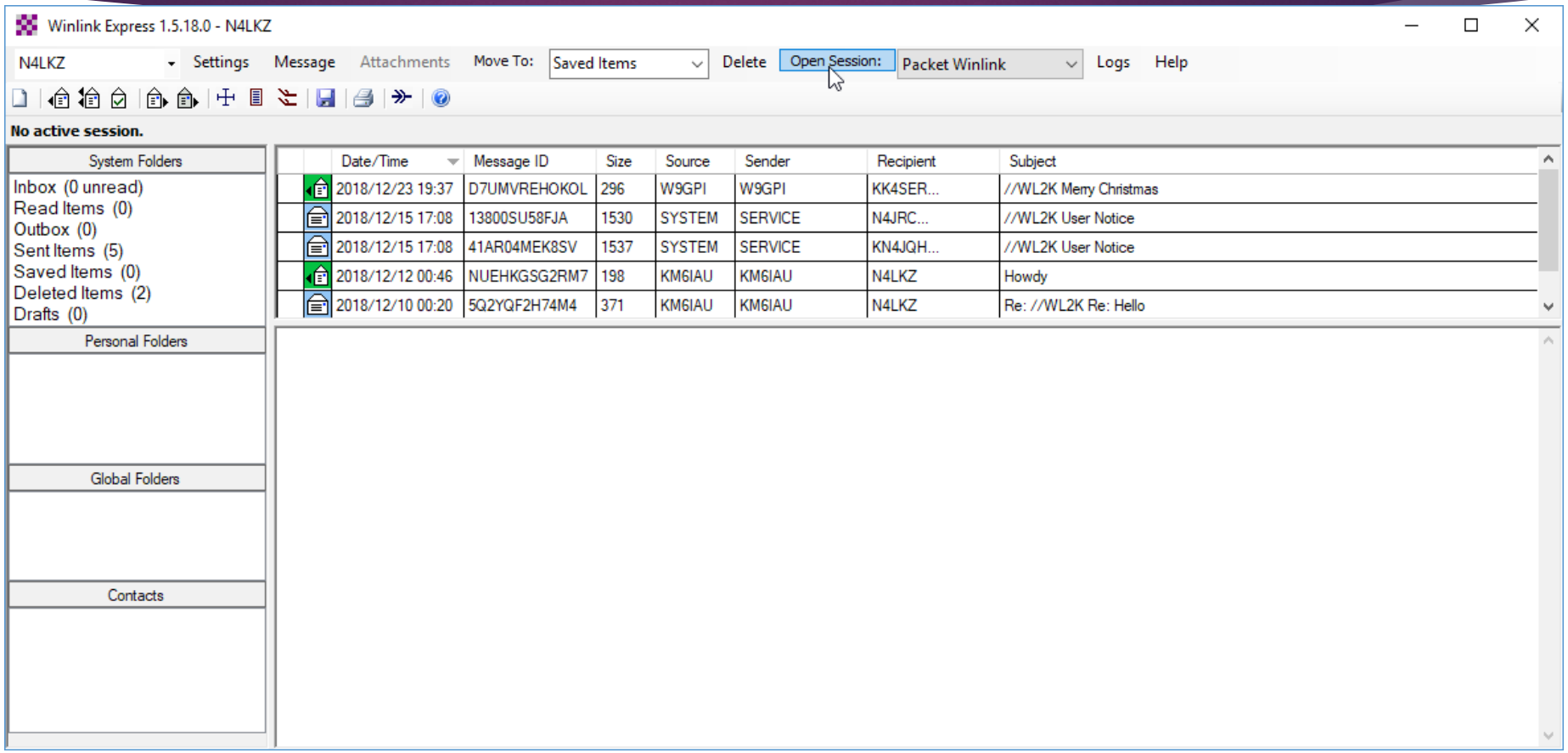

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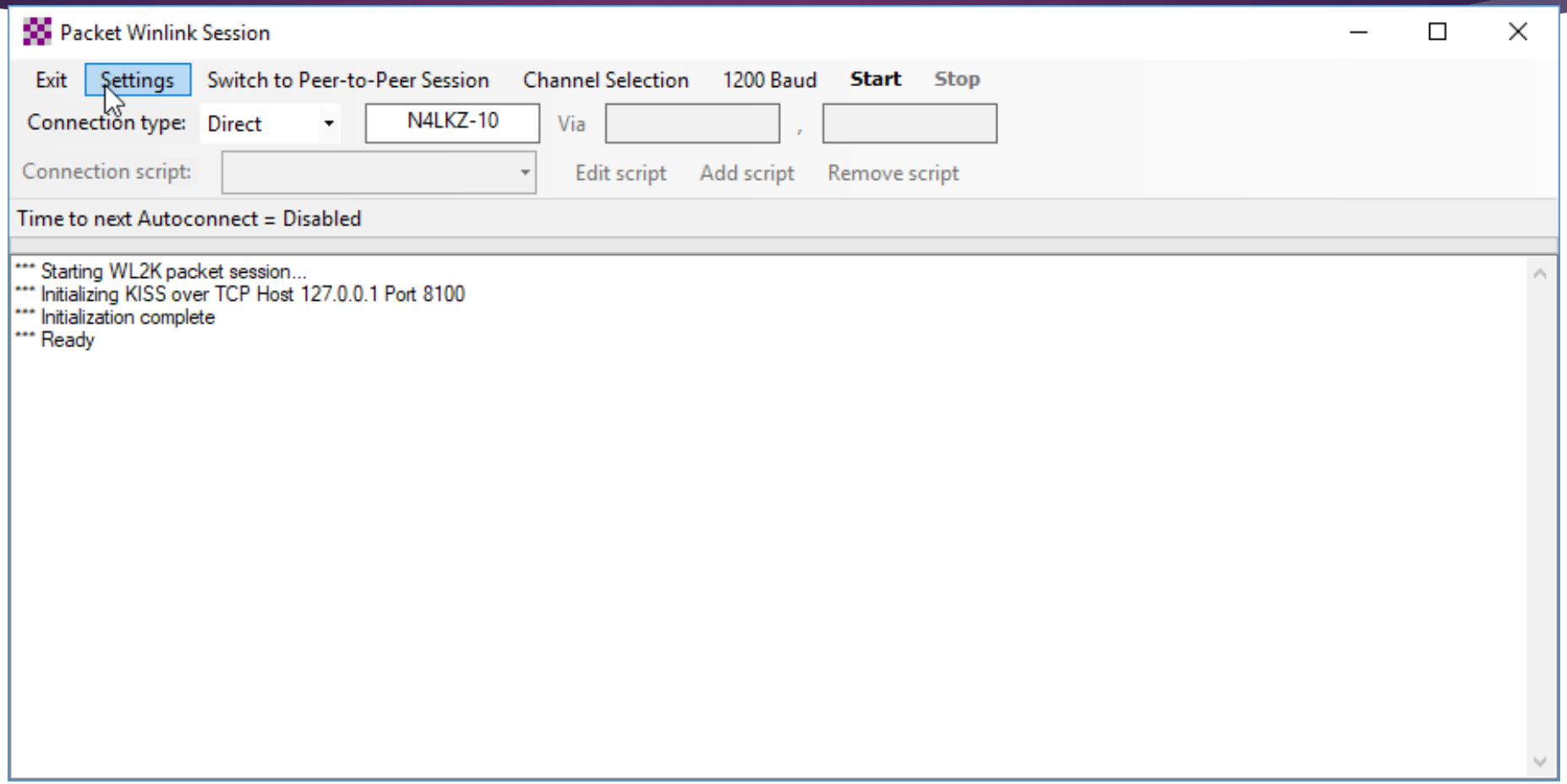

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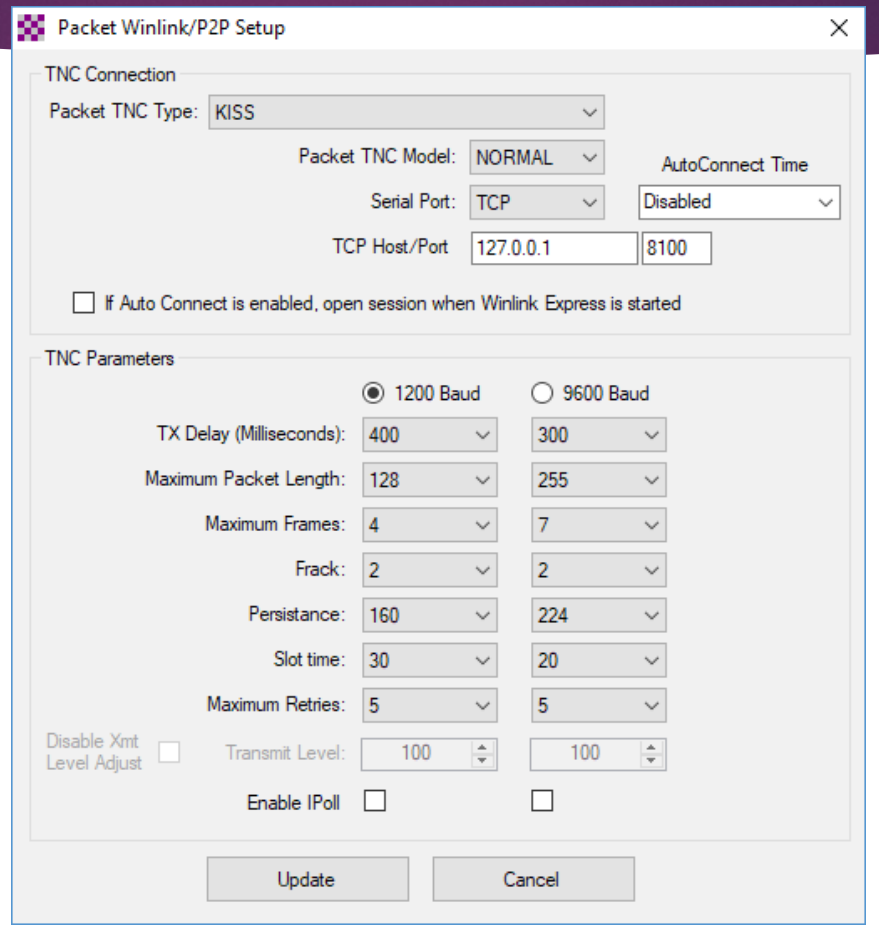

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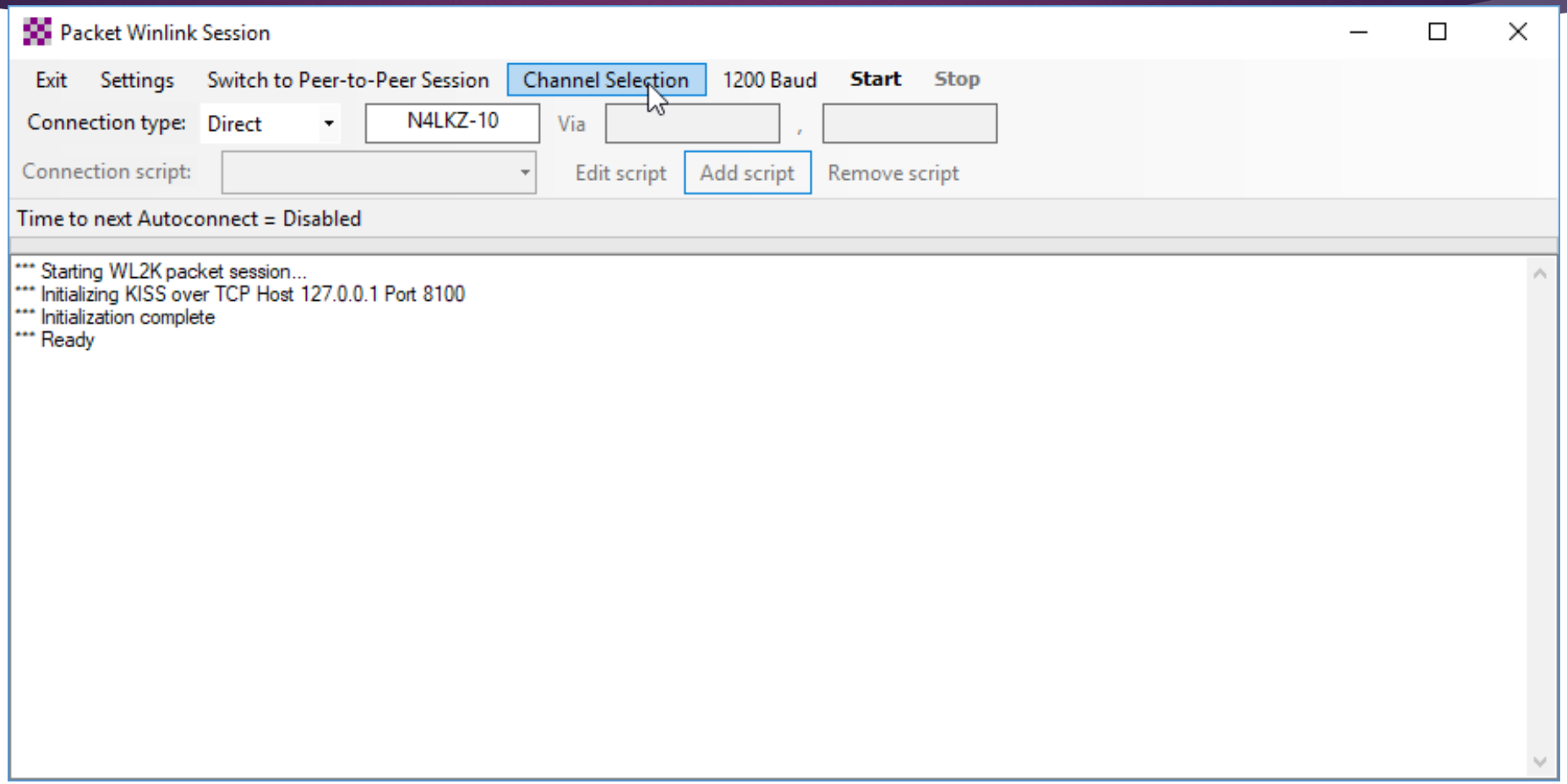

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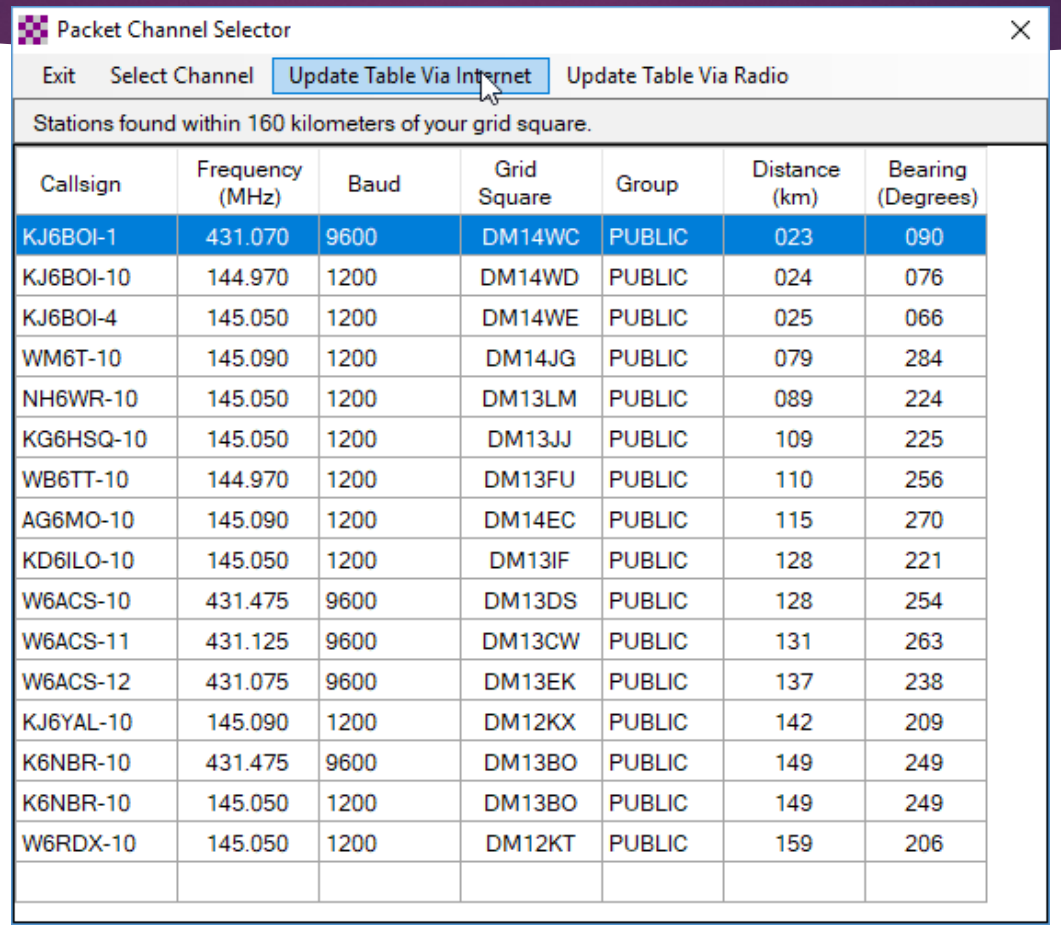

Callsign	Frequency (MHz)	Baud	Grid Square	Group	Distance (km)	Bearing (Degrees)
KJ6BOI-1	431.070	9600	DM14WC	PUBLIC	023	090
KJ6BOI-10	144.970	1200	DM14WD	PUBLIC	024	076
KJ6BOI-4	145.050	1200	DM14WE	PUBLIC	025	066
WM6T-10	145.090	1200	DM14JG	PUBLIC	079	284
NH6WR-10	145.050	1200	DM13LM	PUBLIC	089	224
KG6HSQ-10	145.050	1200	DM13JJ	PUBLIC	109	225
WB6TT-10	144.970	1200	DM13FU	PUBLIC	110	256
AG6MO-10	145.090	1200	DM14EC	PUBLIC	115	270
KD6ILO-10	145.050	1200	DM13IF	PUBLIC	128	221
W6ACS-10	431.475	9600	DM13DS	PUBLIC	128	254
W6ACS-11	431.125	9600	DM13CW	PUBLIC	131	263
W6ACS-12	431.075	9600	DM13EK	PUBLIC	137	238
KJ6YAL-10	145.090	1200	DM12KX	PUBLIC	142	209
K6NBR-10	431.475	9600	DM13BO	PUBLIC	149	249
K6NBR-10	145.050	1200	DM13BO	PUBLIC	149	249
W6RDX-10	145.050	1200	DM12KT	PUBLIC	159	206

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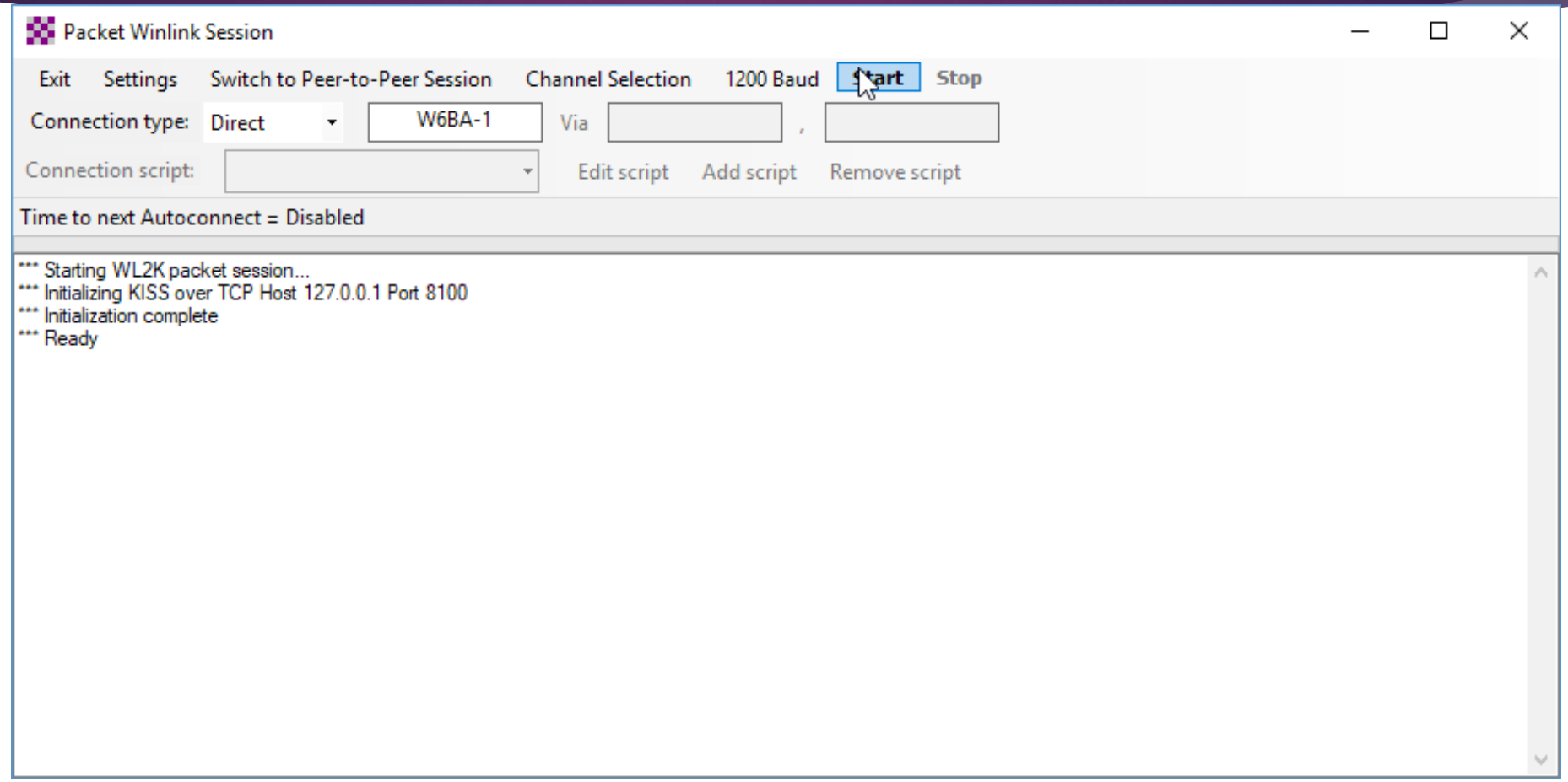

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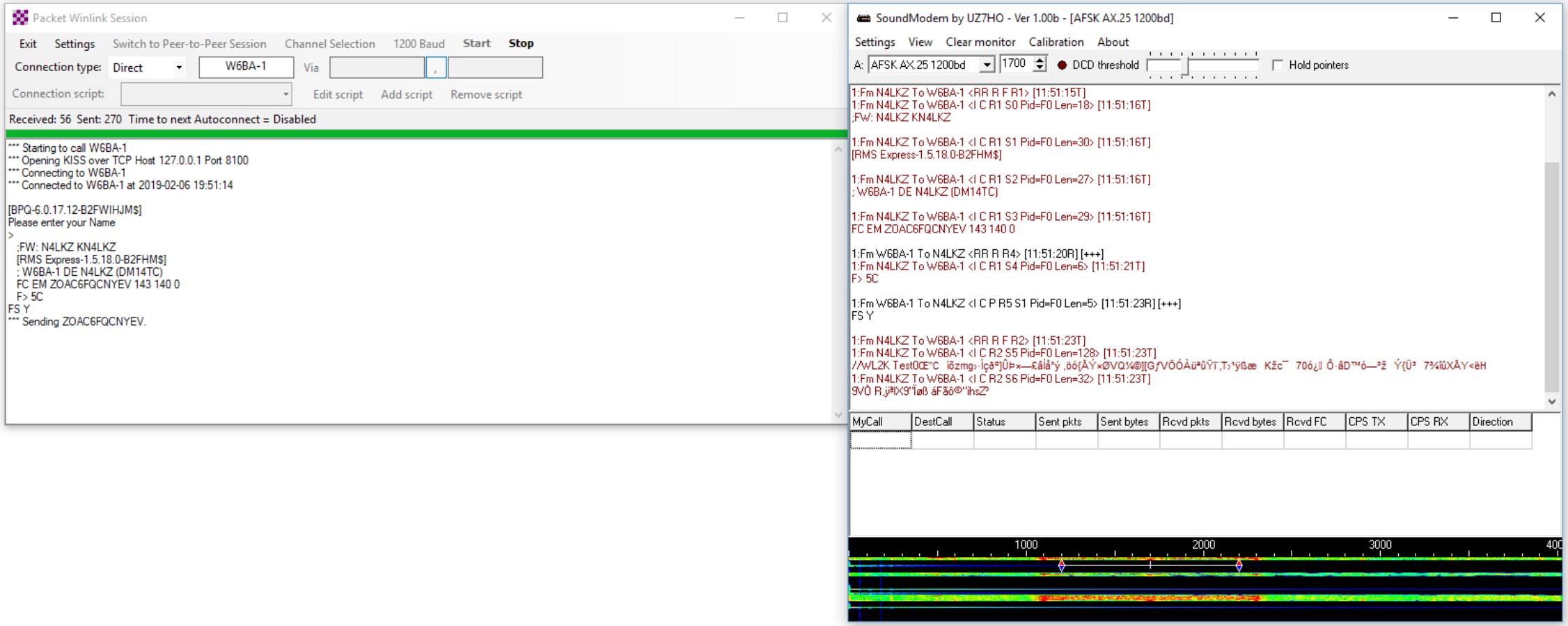

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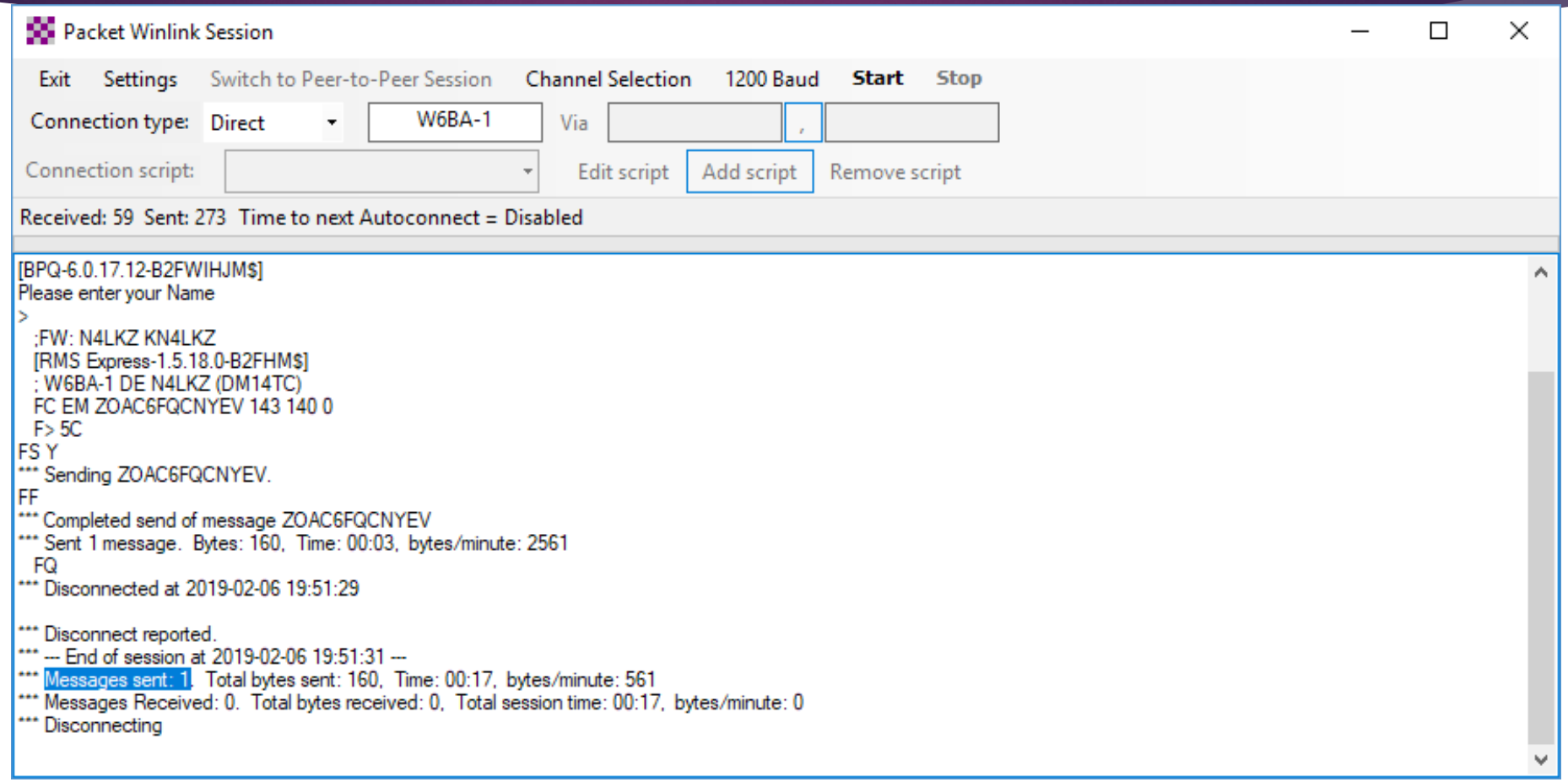
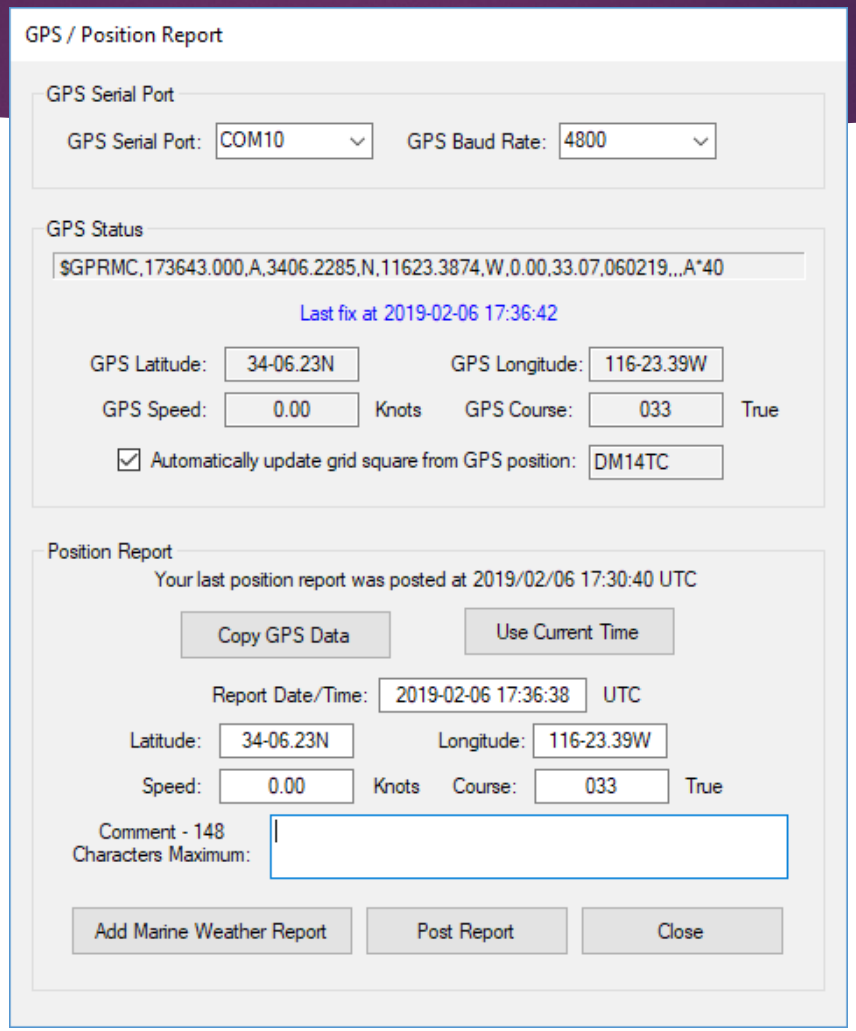


Other features of Winlink

Position Reports

- Position reports may be sent in RMS Express using the  on.
- Location may be entered manually or received from a serial GPS device.
- Reports are sent to Winlink's QTH system and APRS.
  - Position reports will appear on APRS maps with this symbol: 
- Position reports enhance situational awareness for all parties involved in an incident.

Position Reports



Catalog Request

- Winlink provides a catalog of real time data for end users.
- The catalog query may be accessed using the ico 

- Available queries include:
  - Weather conditions
  - World news
  - Propagation
  - Winlink Status
  - And much, much more!

Catalog Request

- The catalog may be refreshed using the “Update Via Internet” option.

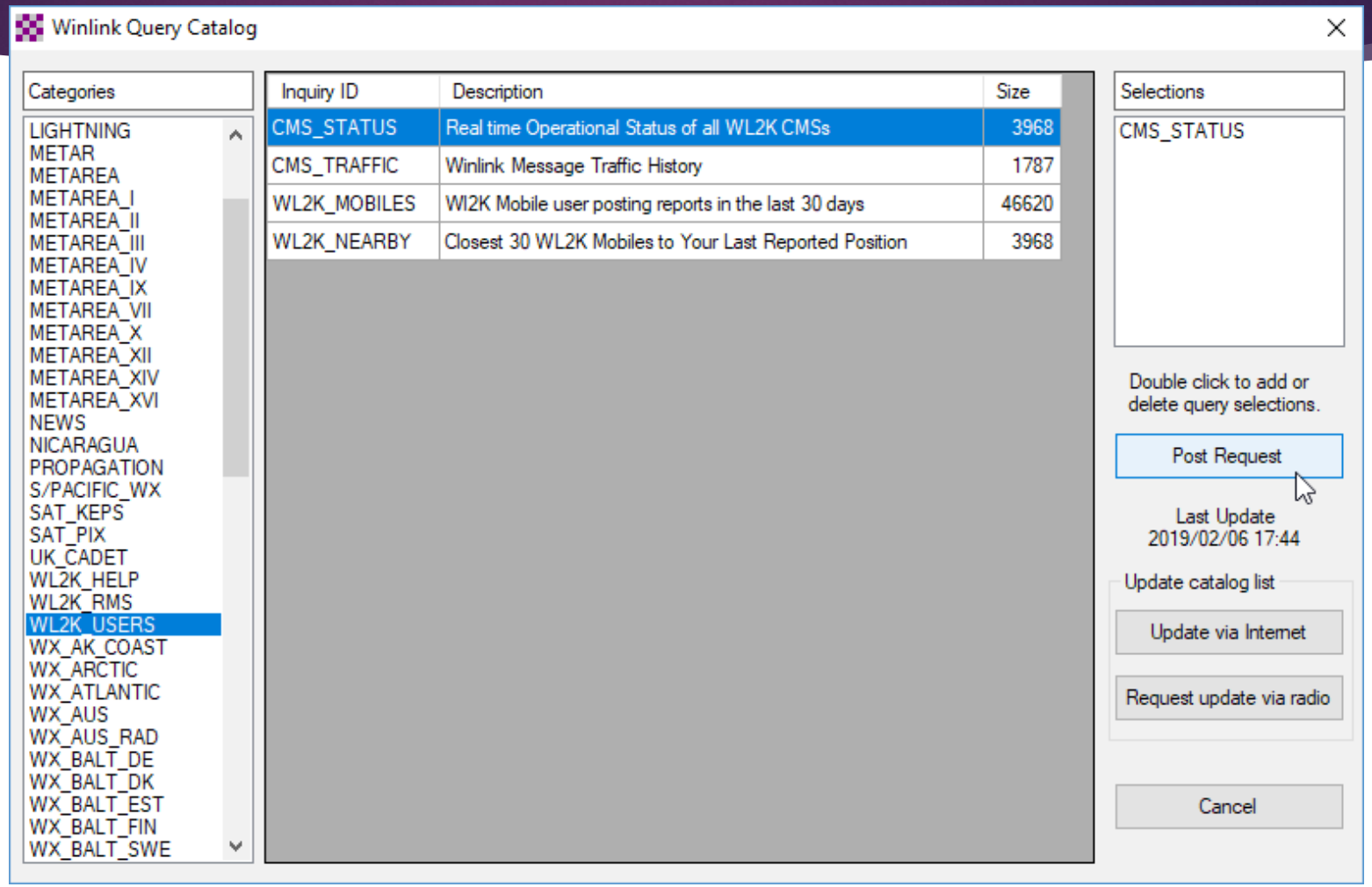
DO NOT USE THE “REQUEST UPDATE VIA RADIO” OPTION!

Winlink is a low baud rate system, and updating the catalog may take a significant amount of time to complete.

BE MINDFUL OF THE SIZE OF QUERIES!

Like above, larger queries may clog up the frequency for an unacceptable amount of time.

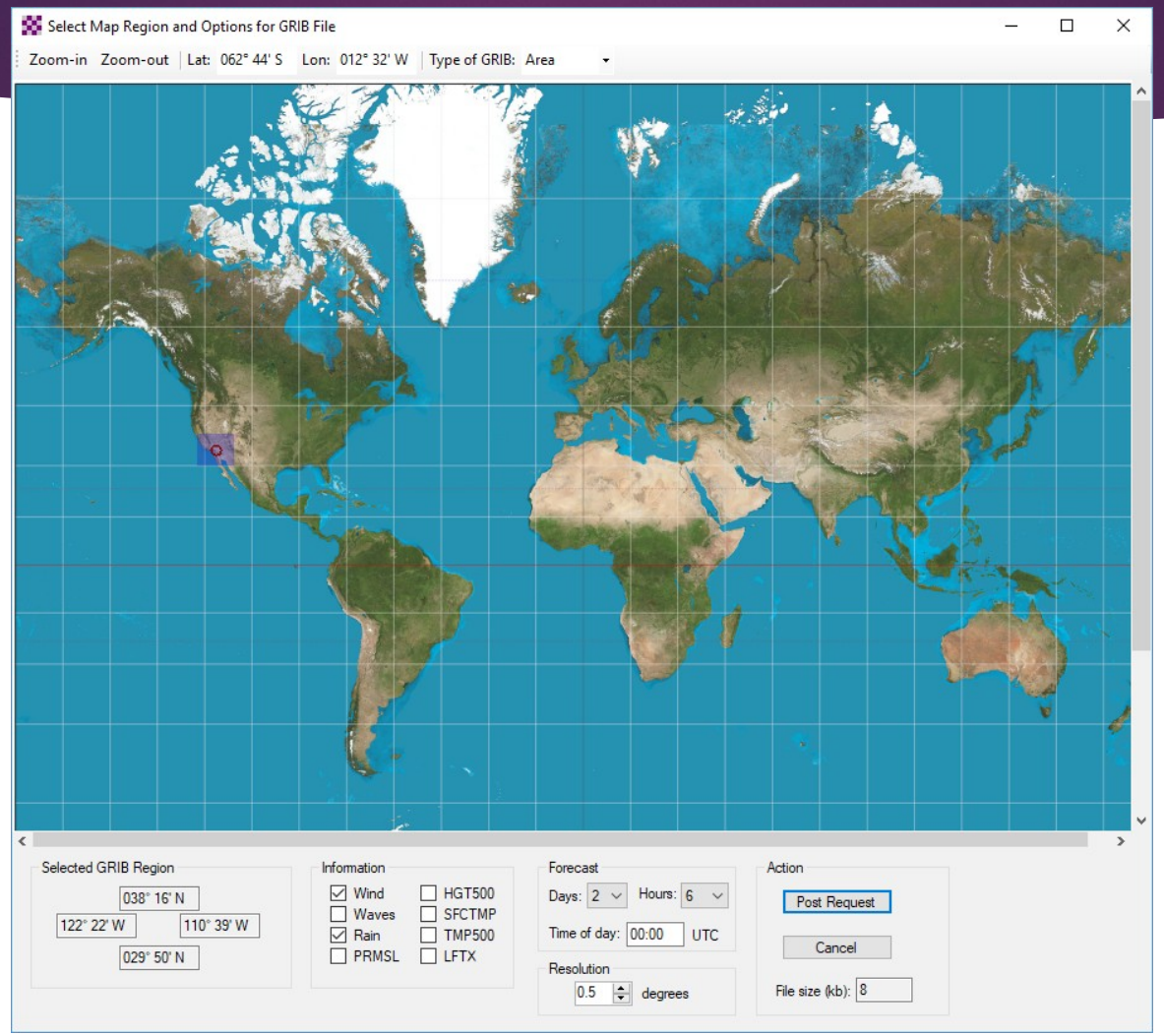
Catalog Request



GRIB Request

- GRIB (GRIdded Binary) is a data format used in meteorology to store historical and forecast data.
- Available meteorological data consists of Wind, Rain, Pressure, Surface Temperatures, and other technical data.
- The GRIB request may be accessed using the  n.
- A request may be made for an area or a spot on the map.
- Once the request is posted, you will receive a message with the GRIB file as an attachment.
- To view the resultant GRIB data, download an application such as XyGrib.

GRIB Request



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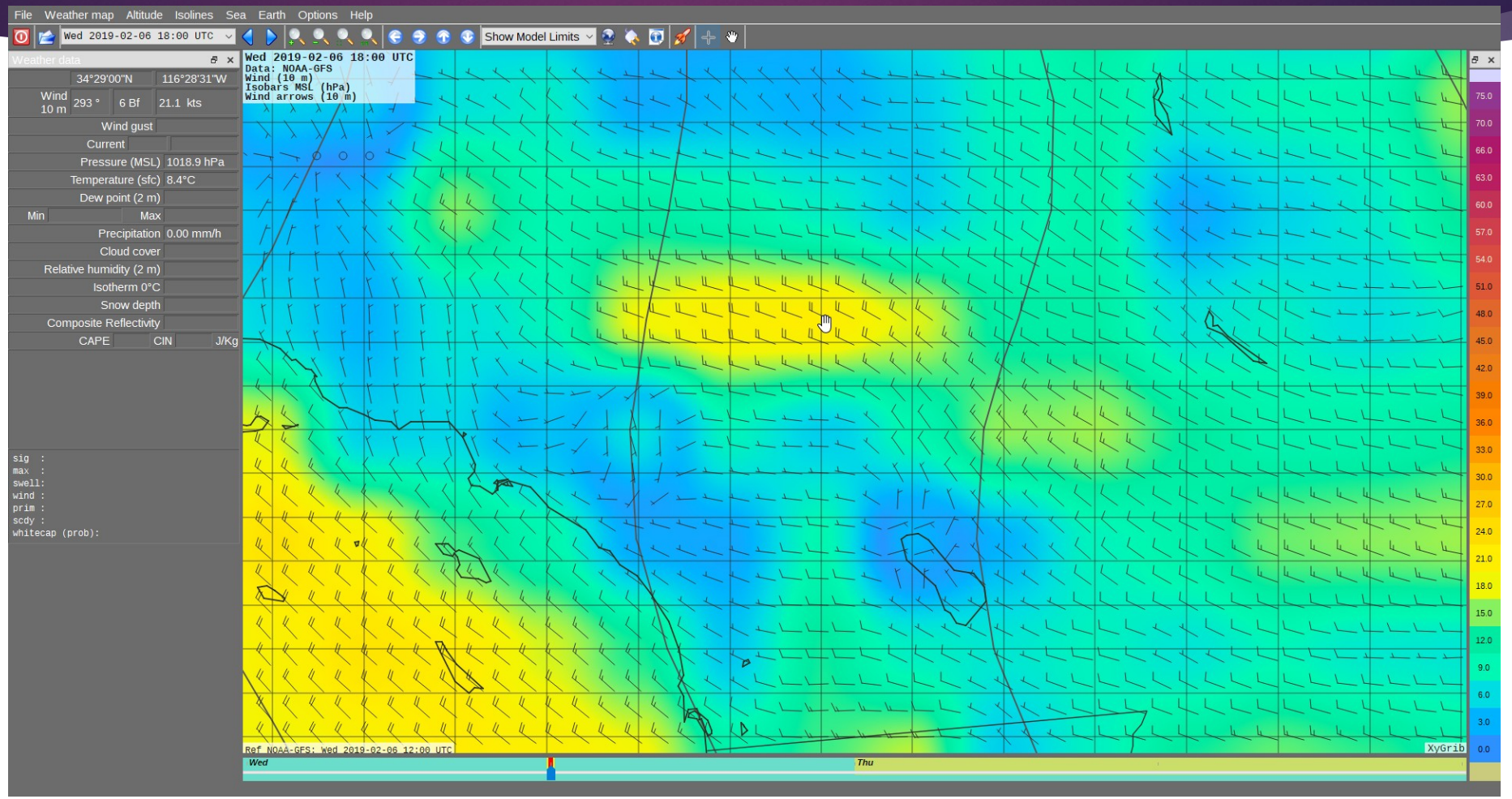
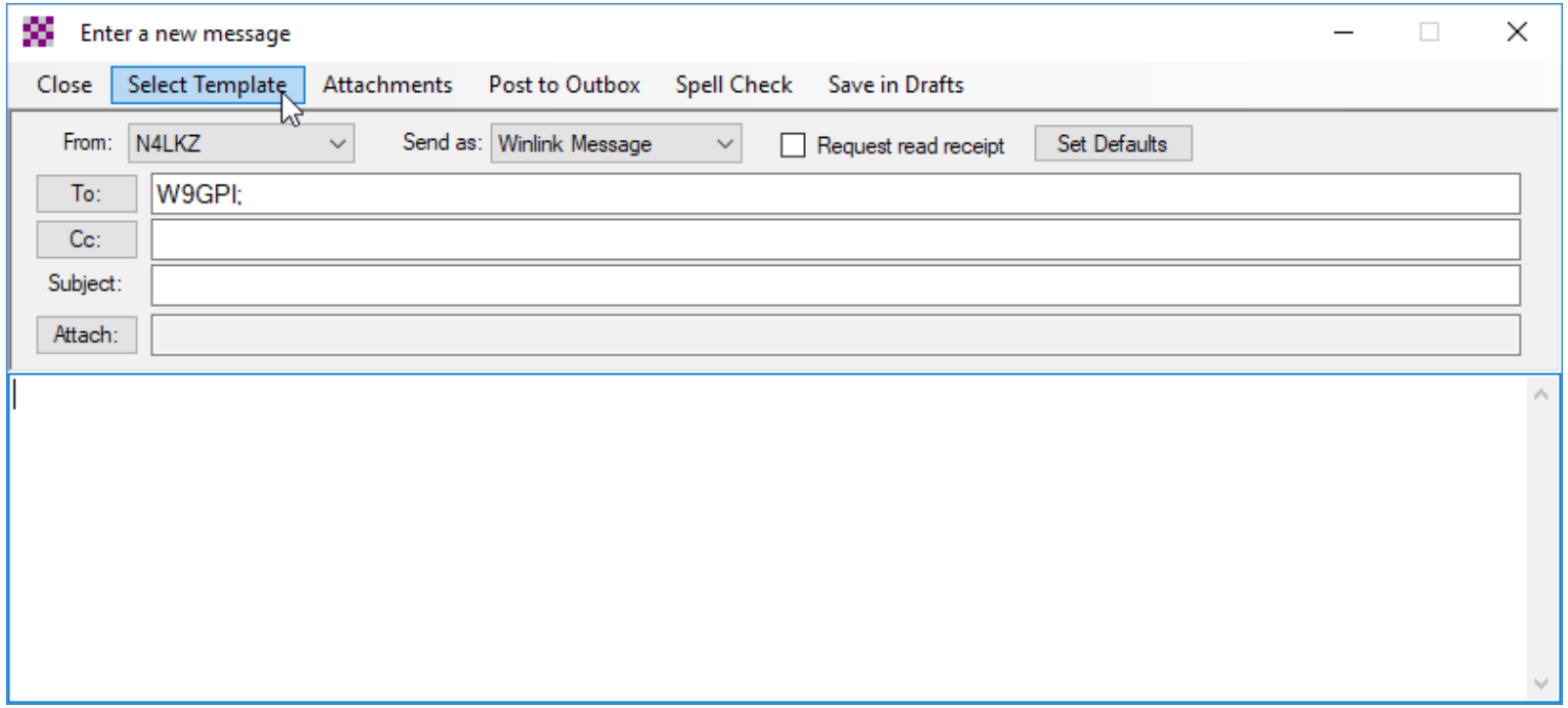


Message Templates

- When operating under ICS, we will typically be requested to transmit information in standardized forms (such as ICS-213).
- Winlink provides a simple way to handle these requests.

Message Templates



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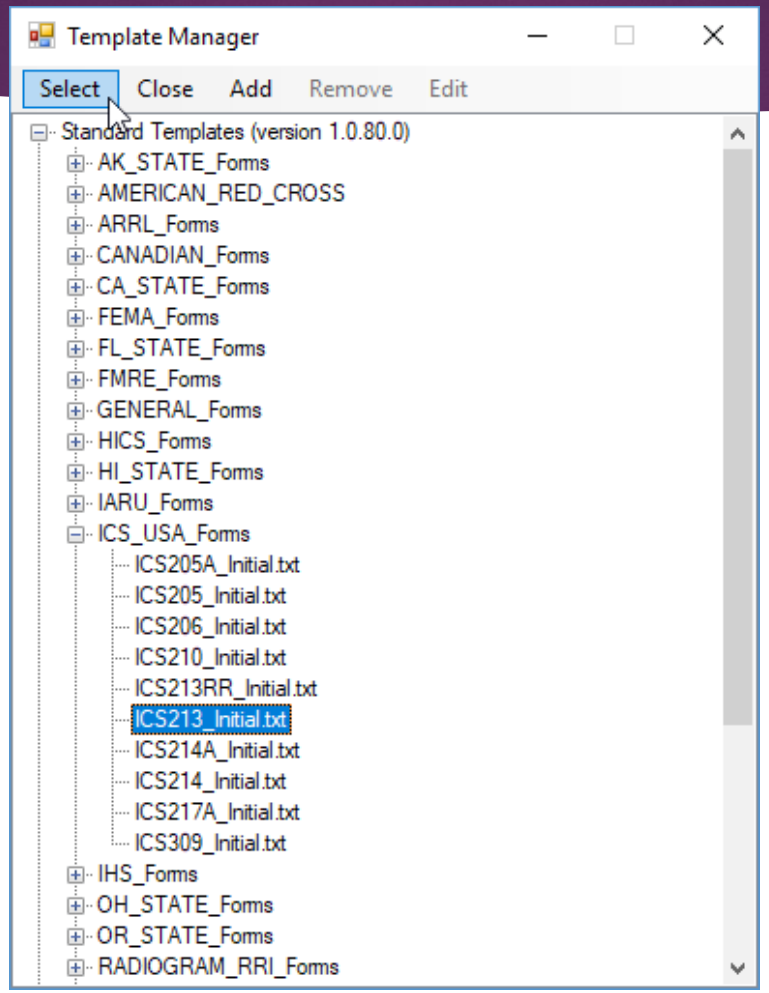


Message Templates

General Message (ICS 213)

Load ICS213 INITIAL Data Form Instructions

1. Incident Name: Simulated Emergency Test #193

2. To (Name/Position): W9GPI Steve Smith / Lee County Emergency Coordinator

3. From (Name/Position): N4LKZ Patrick Mathis / NWS Liason

4. Subject: Update from NWS Tampa Bay 5. Date: 2019-2-6 6. Time: 10:02

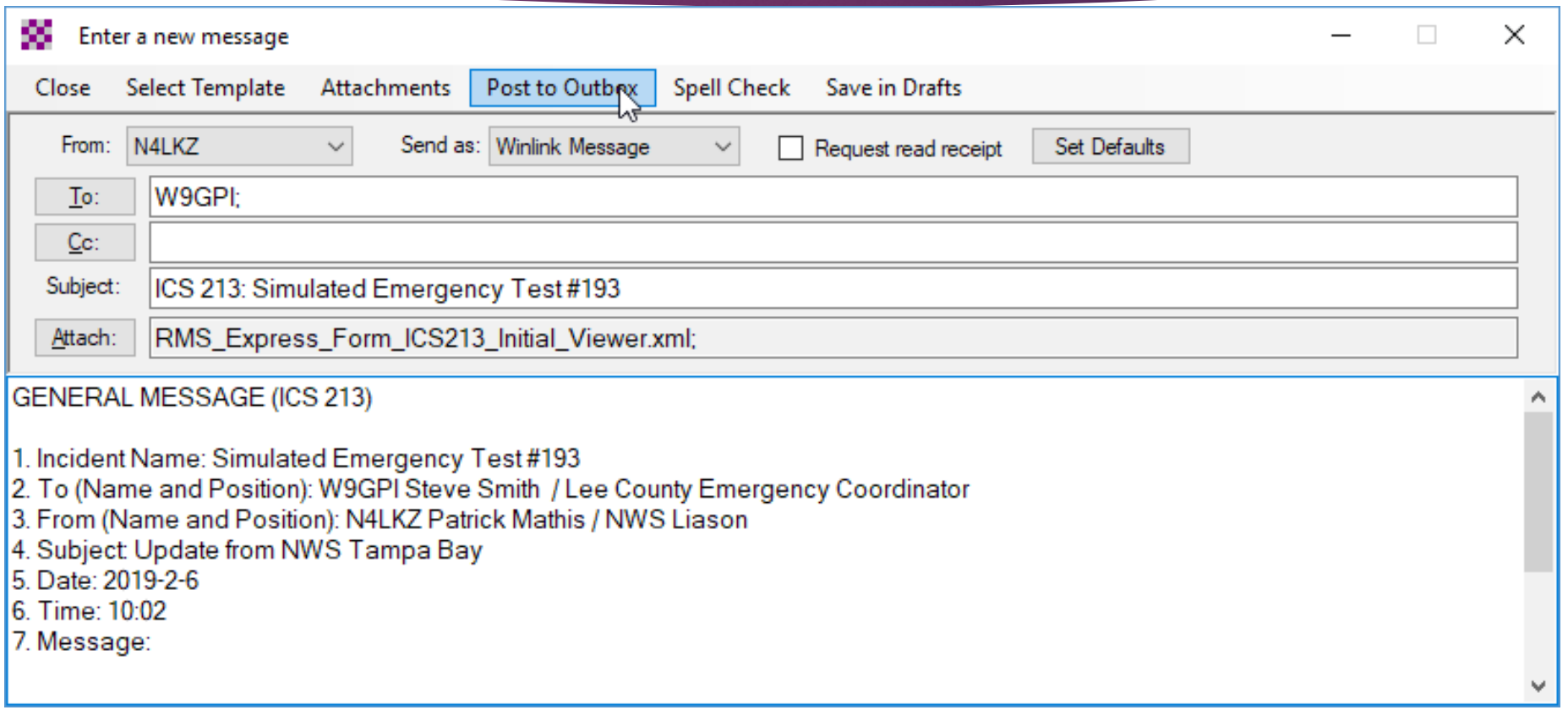
7. Message:

The chief meteorologist at NWS Tampa Bay has acknowledged our contact with SKYwarn Net Control at Ruskin.

8. Approved by: N4LKZ Patrick Mathis Position / Title: NWS Liason

Save ICS213 INITIAL Data Submit Reset Form Senders Base Call: N4LKZ Ver 36.2

Message Templates



Message Templates

General Message (ICS 213)		
1. Incident Name: Simulated Emergency Test #193		
2. To (Name/Position): W9GPI Steve Smith / Lee County Emergency Coordinator		
3. From (Name/Position): N4LKZ Patrick Mathis / NWS Liason		
4. Subject: Update from NWS Tampa Bay	5. Date: 2019-2-6	6. Time: 10:02
7. Message The chief meteorologist at NWS Tampa Bay has acknowledged our contact with SKYwarn Net Control at Ruskin.		
8. Approved by: N4LKZ Patrick Mathis	Position / Title: NWS Liason	
9. Reply: Print form to obtain a written response if needed. You cannot create a reply from here. Close this form. When ready to respond double click on the message. Click *Reply* at the top and enter the response into the new form. Click SUBMIT when ready to post.		
10. Replied By (Name):	Position / Title:	
Date / Time:	Senders Base Call: N4LKZ	Ver 36.2

Message Templates

- Other templates include:
  - ICS 205A Communications List
  - ICS 205 Incident Radio Communications Plan
  - ICS 206 Medical Plan
  - ICS 210 Resource Status Change
  - ICS 214A Individual Activity Log
  - ICS 214 Activity Log
  - ICS 217A Communications Resource Availability Worksheet
  - ICS 309 General Purpose Communications Log
  - Many, many, MANY more!

Final Notes

- Keep messages and attachments as small as possible when using Winlink over RF.
  - A 10kb message will take ~5-10 minutes on average to send after the gateway handshake. A 1MB picture will take **several hours** to send over VHF, and over **a day** to complete over HF.
  - For an example, an 30kb attachment took 50 minutes to download on VHF using the W6BA digipeater.
- Keep polling intervals short.
  - A RF RMS gateway handshake takes approximately 45 seconds.
- You can use software such as Paclink to link existing e-mail clients to the Winlink network.

Any questions?