

Situation Awareness Without Infrastructure

Winlink for Emergency Communication EMAT

Phil Sherrod – W4PHS / NCS398

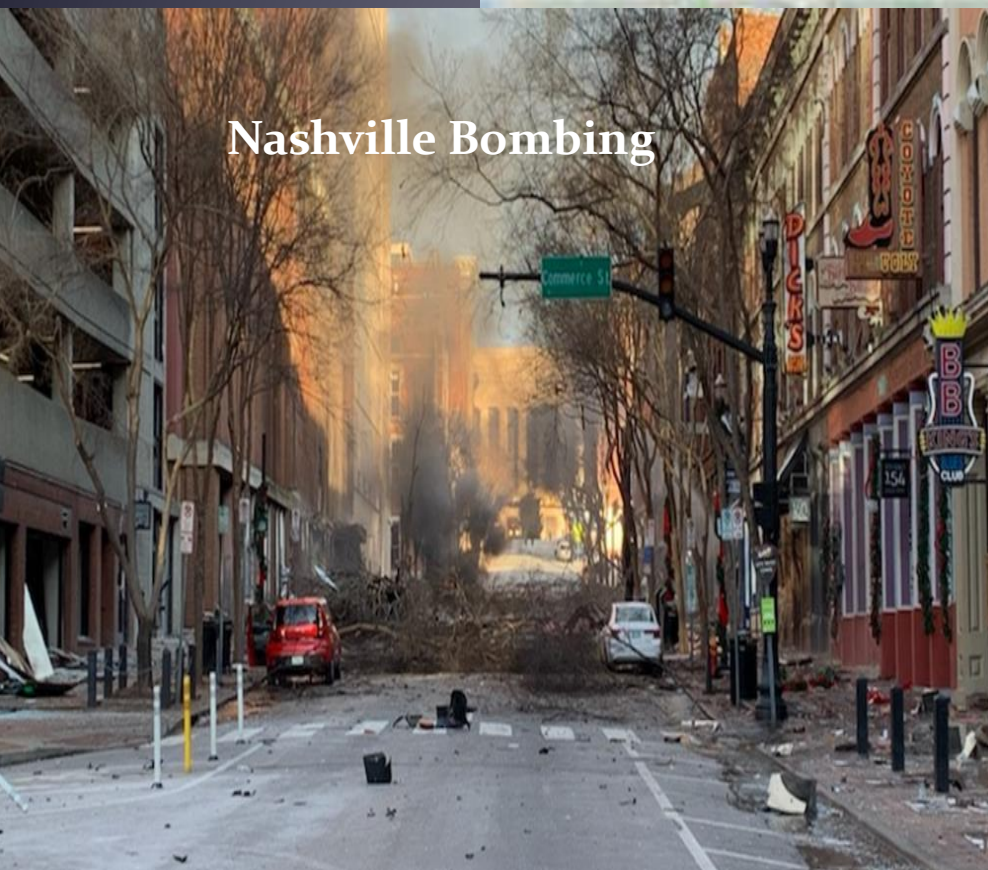


Why We Can't Count on Normal Communications

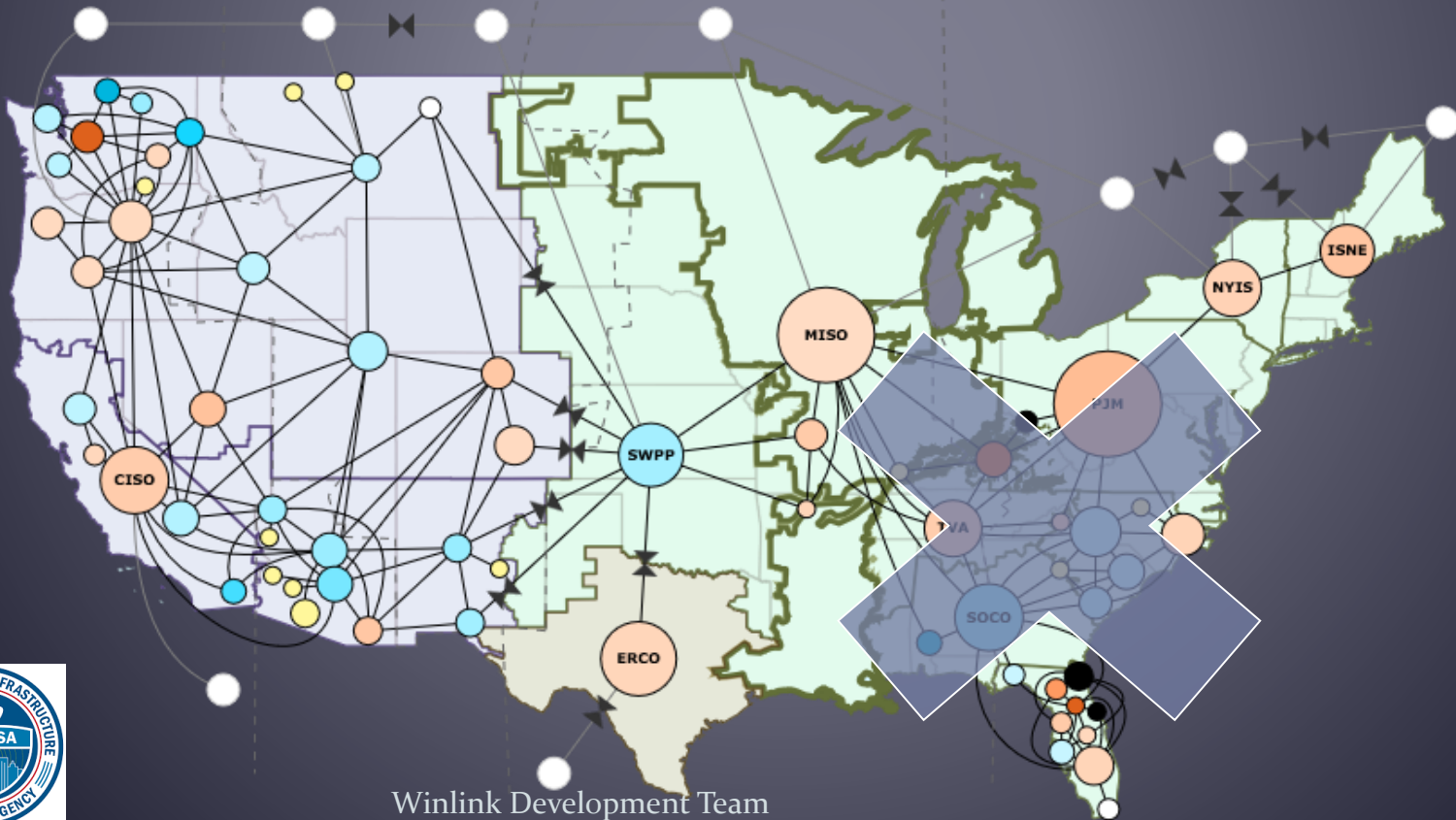


Outages do not require a “mass” casualty event

Nashville bombing took out 911 and other vital services across the South East



Landlines, cell phones, satellite phones, LMR networks & the Internet all depend on *vulnerable infrastructure*, which depend on *cables, power, water, fuel & people*.



Does your PACE Plan* have no-infrastructure resiliency?

Normal Primary Everyday method of communications

- Preferred solution for emergency use
(Public Safety LMR, FirstNet)

Alternate Conventional Option

- Backup methods and work arounds:
(SOW/COW, portable LMR, Satellite)

Contingency options*

- Fallback Methods and alternate solutions;
(planned assistance from elsewhere)

No Infrastructure Resiliency*

- *Minimal Costs*, rarely used, and often forgotten, (until it is needed)

*Winlink Radio Email (HF/VHF/UHF)



Things are
really bad

*Not a frequency or channel plan, but rather *a prearranged plans to switch to other systems or methods of communication*

Continuity: Lessons Learned

- Sustaining essential functions is dependent on the availability of resilient communications systems.
- Alternative communications methods are essential.
- Immediate availability to resilient communication at primary and alternate locations must be ensured.
- Infrastructure-related outages usually endure for significant periods.
- Volunteers can provide important information about the extent of outages via radio.

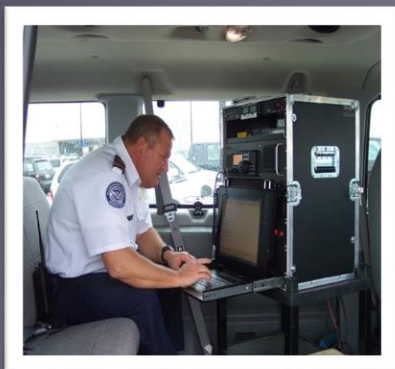
The Winlink Radio E-mail Network

- No infrastructure is needed. Extremely resilient.
- Winlink provides e-mail from any point on the earth – including the middle of the ocean (or your county).
- Messages are sent via HF, VHF/UHF radio, and telnet.
- Winlink software and use of the system are free of charge.
- Hardware costs \$2,500 to \$4,000. Less than one P25 radio.
- Winlink guarantees 100% accurate transmission.
- Pactor AES-256 encryption is available on CISA SHARES.
- Winlink is an interoperable store-and-forward system providing time and frequency *independence*.
- Winlink is interoperable between CISA SHARES, amateur radio, Internet e-mail, and other services.

Why Winlink High Frequency (HF) Radio?



National Guard



DHS TSA



Idaho Nat'l Labs



Red Cross HQ

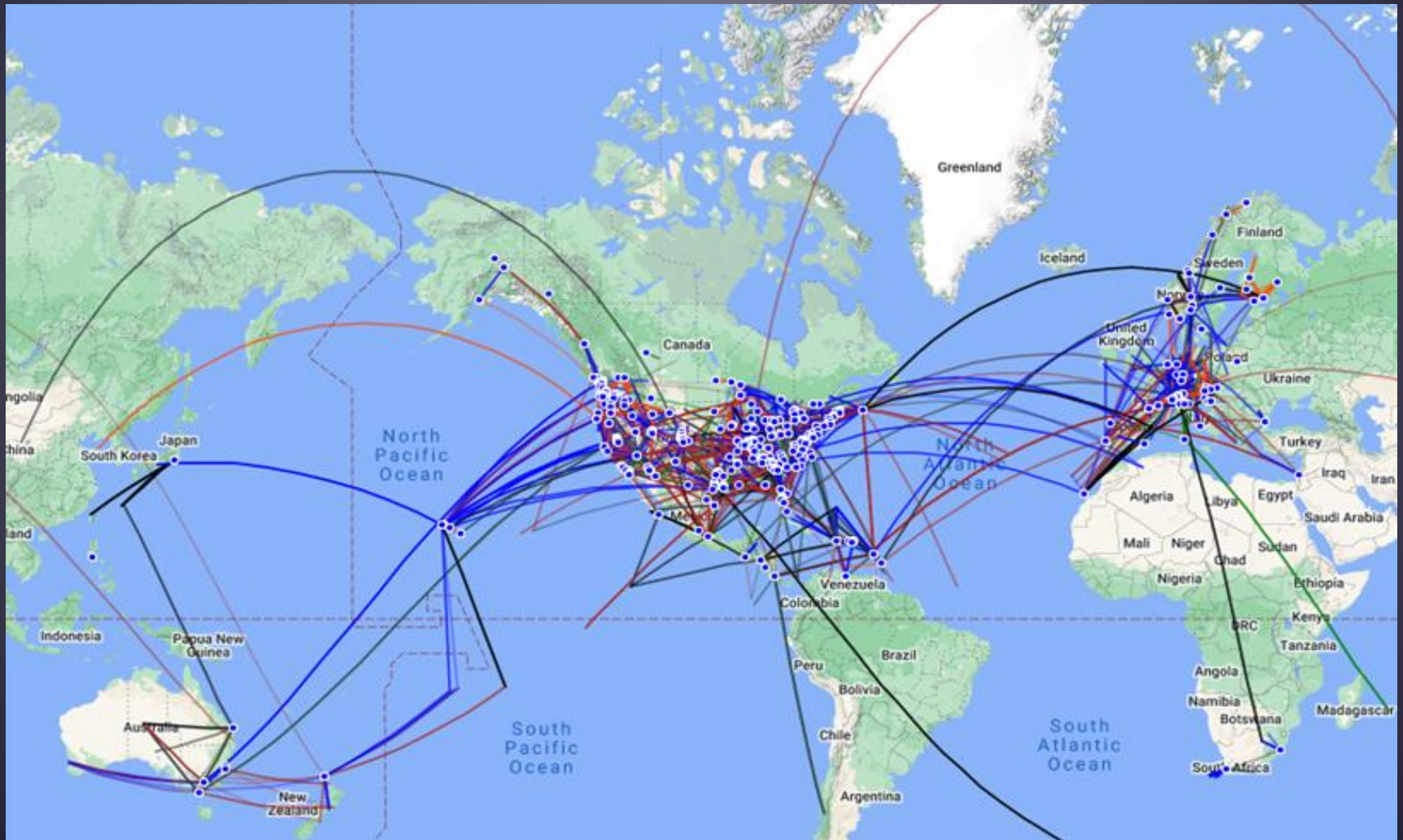
- The most interoperable radio system in existence.
- Most state EMA have Winlink stations as do many counties
- Used by National Guard, American Red Cross, and many other NGOs as well as thousands of volunteers.
- Tremendous growth over last few years.
- Can send e-mail to anyone.

SHARES Winlink Radio Servers

- With HF radio, you can connect to any Winlink server within hundreds of miles. You can get outside large incident areas. No infrastructure needed.



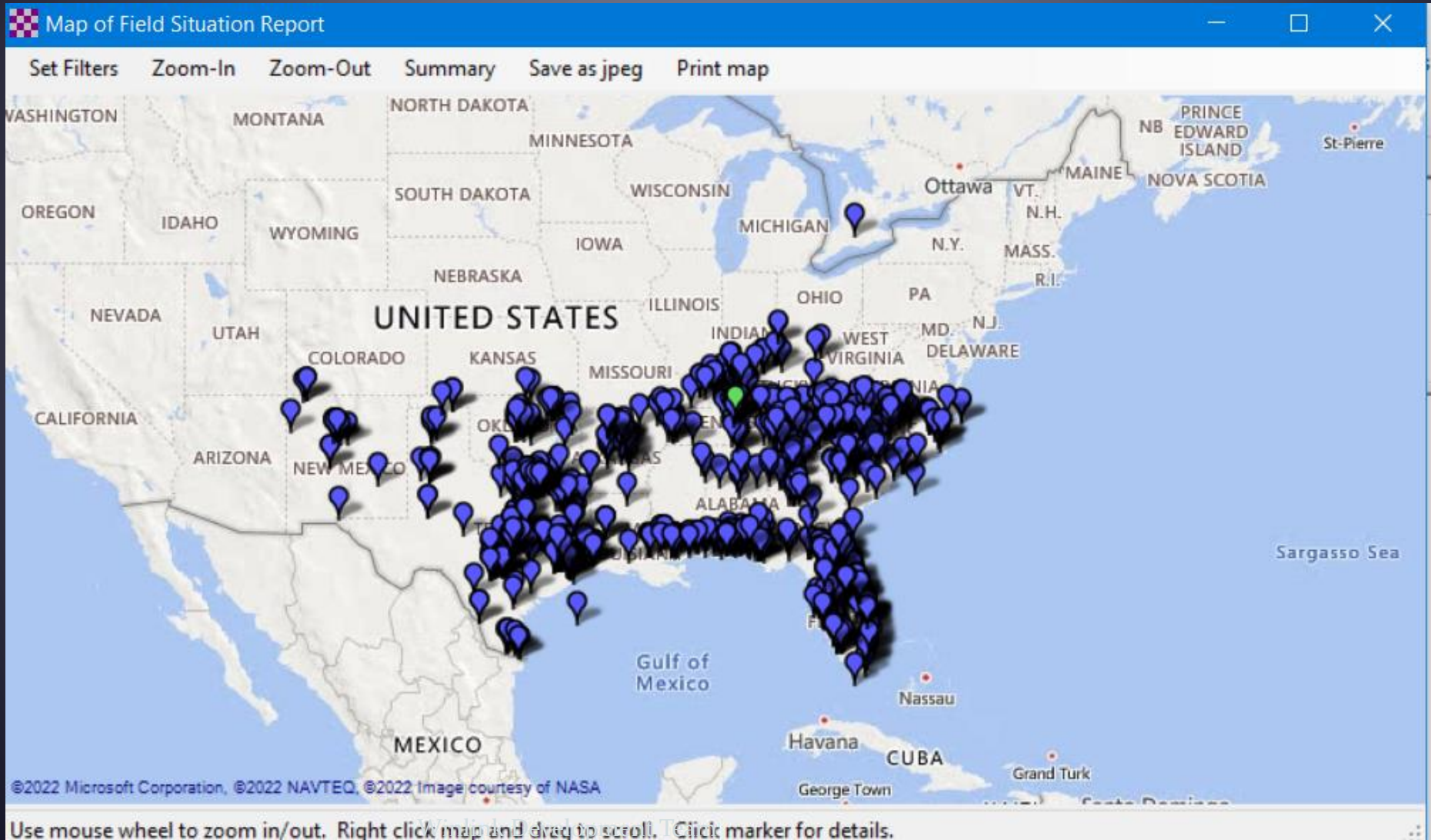
Connections During 24 Hour Period



Getting the Big Picture of Incidents

- Military people talk about the “fog of war,” well there’s a “fog of information” during major incidents.
- How can you plan an effective response and recovery if you don’t know the extent of outages and which resources are out in each area?
- How do you get the information you need if the infrastructure is down?
- Would you like a map showing where resources are out and the infrastructure is down?
- This is how you can get the information and map...

Winlink Provides Mappable Situation Reports



What's Needed to Submit and Display Reports

- Winlink Express is the free Winlink client radio e-mail program that runs on Windows.
- Winlink Express has over 100 built-in HTML forms including many ICS forms and forms requested by state and local agencies, American Red Cross, Hospital reports (HICS), and many other service groups.
- About a dozen forms send data with positions so they can be mapped.
- Winlink Express includes built-in mapping and filtering. No other software is needed.
- Mapping is easy to learn and use.

Basic Message Composition

- Enter message using built-in composition/editing screen.

Click "Select Template" to open a report form.

Winlink Express 1.7.0.0 - NCS398

NCS398 Settings Message Attachments Move To: Saved Items Delete Open Session: Te

No active session...

	Date/Time	Message ID	Size	Source	Sender
	2022/08/21 12:45	#V91RLQGDHW3	528	NNA4KY	NNA4KY
	2022/08/16 23:12	#HFY81H108Q5	1189	NNA4KY	NNA4KY

System Folders

- Inbox (16 unread)
- Read Items (0)
- Sent Items (0)
- Saved Items (0)
- Deleted Items (34)
- Drafts (0)
- Personal Folders
- Global Folders
- Global 1 (4)
- Global 2 (2)
- Contact
- TEMA EOC

Enter a new message

Close Select Template Sitrep Attachments Post to Outbox Spell Check

From: NCS398 Send as: Winlink Message Request message r

To: phil@philsherrod.com;

Cc:

Subject: Status report from Shelter 7

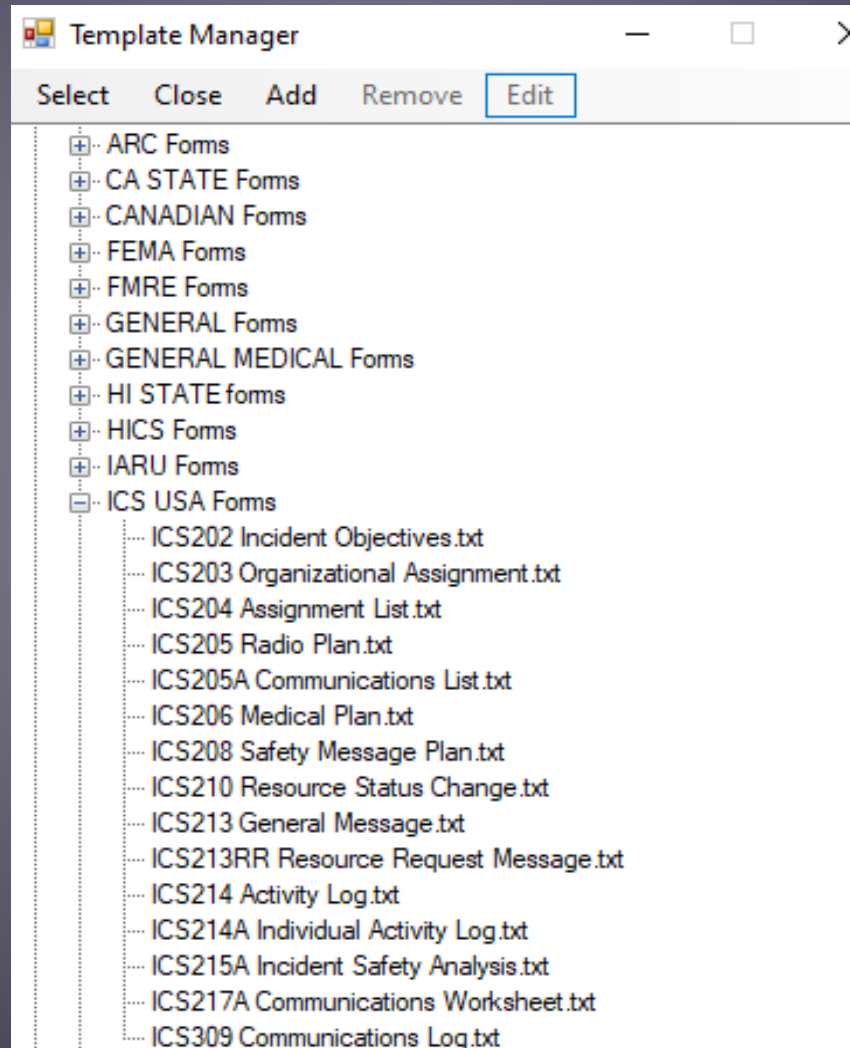
Attach:

Arrived at shelter at 1145.
45 people currently being housed
Power provided by local generator. Available fuel unknown.
Request for 200 bottles of water to be delivered to shelter.
Further information will be forthcoming.

Phil, NCS398

<no message body>

Forms are Organized by Category



ICS-213 General Message Form

General Message (ICS 213)		
Load ICS213 INITIAL Data		Form Instructions
1. Incident Name: Incident name is optional		
2. To (Name/Position):		
3. From (Name/Position):		
4. Subject:	5. Date:	6. Time:
7. Message: Be Brief and Concise		
8. Approved by:		Position / Title:
Save ICS213 INITIAL Data	Submit	Reset Form
		Ver 41.12

ICS-214 Activity Log

ACTIVITY LOG (ICS 214)		
<input type="button" value="Load ICS 214 Data"/> Form Information		
1. Incident Name: <input type="text"/>		Page # <input type="text"/>
2. Operational Period (Date/Time) From: <input type="text"/> To: <input type="text"/>		
3. Name: <input type="text"/>		4. ICS Position: <input type="text"/>
5. Home Agency and Unit: <input type="text"/>		
6. Resources Assigned:		
Name	ICS Position	Home Agency and Unit
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>
7. Activity Log: <input type="button" value="Clear Activity Log"/> Paste Data from a Spreadsheet		
Date & Time (local 24 hr)	Notable Activities <small>Activities may include notable occurrences/events such as task assignments, task completions, injuries, or difficulties encountered.</small>	
<input type="button" value="Click for Date/Time"/>	<input type="text"/>	
<input type="button" value="Click for Date/Time"/>	<input type="text"/>	
<input type="button" value="Click for Date/Time"/>	<input type="text"/>	

USGS Did You Feel It -- DYFI

Earthquake: Did You Feel it?

Did You Feel It? (DYFI) collects information from people who felt an earthquake and helps create maps that show what people experienced and the extent of damage.

The USGS email is automatically filled when clicking SUBMIT below and the information is sent directly to the USGS via Winlink.

[Click here to go to the USGS Web Site if you have Internet.](#)

[What is DYFI & More](#)

>>> This Earthquake report is an Exercise REAL EVENT

Optional Exercise ID:

Did you feel it? (REQUIRED)

Yes No

Time of earthquake: (REQUIRED) Local Date and Time Format: 1/31/2020 09:15

Date: Time: [Click Date or Time Field to Modify](#)

(Opening this form inserts your current Date & Time, you may manually change by click in the field)

Your location - street address, city, and state when the earthquake occurred: (REQUIRED)

Optional GPS coordinates in the following format: 32.504892 -116.982466 LAT LON

If you have a Winlink Express connected GPS device, the LAT/LON in decimal degrees will be entered for you.

The remainder of this form is optional. If you indicated NO, then do not answer the questions below. If you indicated YES, then the answers below will help to create intensity info for the USGS.

What was your situation during the earthquake?

Not specified Inside a building Outside a building
 In a stopped vehicle In a moving vehicle
 Other Describe:

Were you asleep?

Not specified No Slept through it Woke up

Did others nearby feel it?

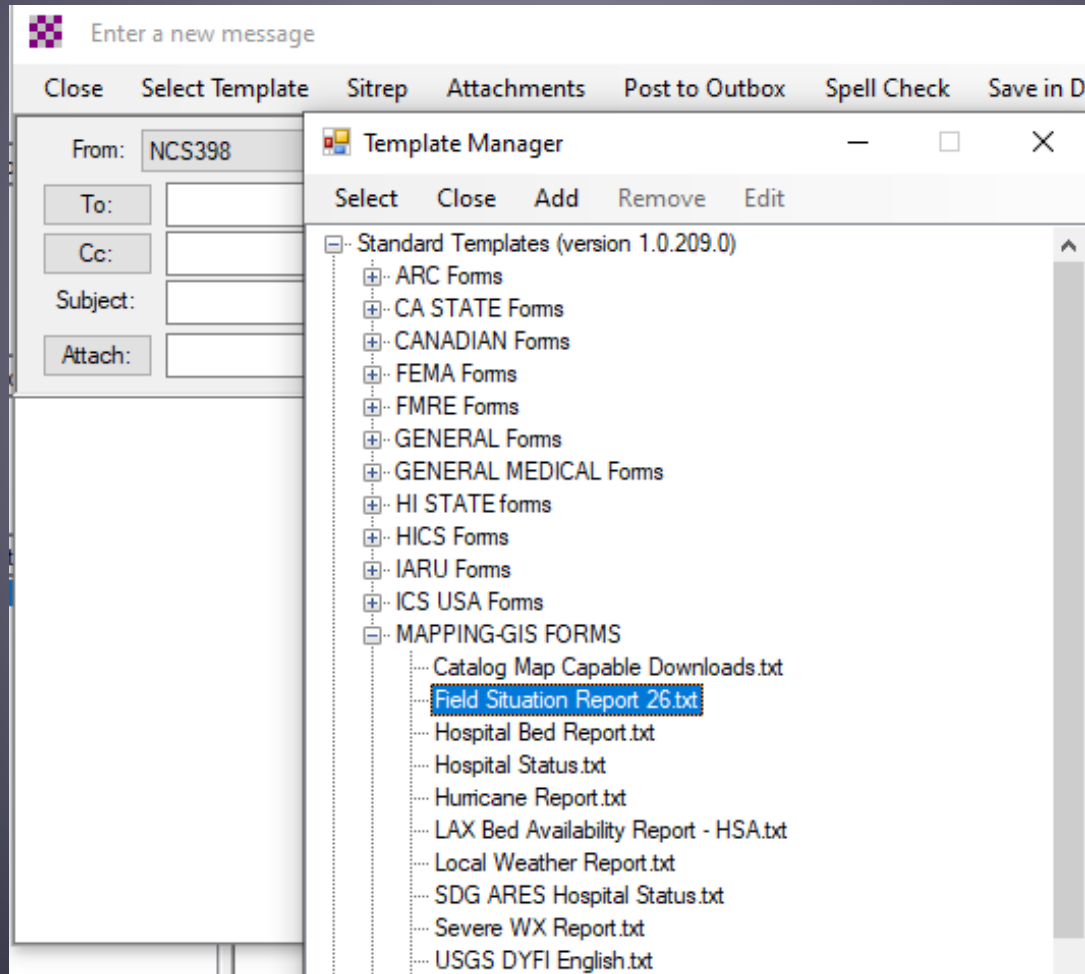
Not specified No others felt it Some felt it, most did not Most felt it Everyone/almost everyone felt it

Situation Reports and Other Mapping Enabled Forms

- Timely situation reports, weather reports, and other status reports are essential for incident management.
- Reports may be needed from no-Internet locations.
- Winlink Express offers forms that provide position reports for mapping CSV/KML files for spreadsheets.
- When received at incident command centers, Winlink Express can display a map showing status markers of reports. It also can generate CSV and KML data files with information from reports for use by spreadsheet and commercial GIS programs.

Sending a GIS Mappable Report

- Compose message using Field Situation Report template



Field Situation Report

FIELD SITUATION REPORT			
Setup	Click to add an agency or group name	Load Field Situation data	Form info
<small>For Non-Express recipients, the form is sent as plain text in the message body. Once this page is submitted, no changes or editing of the message are allowed.</small>			
PRECEDENCE:	<input type="text" value="RD Routine"/>	DATE/TIME:	<input type="text" value="2022-08-18 23:45:56Z"/>
FROM:	<input type="text" value="NCS308"/>		
TO:	<input type="text"/>		
INFO (CC):	<input type="text"/>		
<small>Cell signs or Emails entered into the TO or INFO fields above, can be multiples separated by a semicolon.</small>			
1. Is there an EMERGENCY/LIFE SAFETY Need? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			
<small>If your local situation is LIFE CRITICAL, report via 911. If 911 services are not available, a reporter may use this form and mark the block for LIFE CRITICAL, the reporter should describe the situation and provide the residential address.</small>			
2. City:	<input type="text"/>	County:	<input type="text"/>
State:	<input type="text"/>	Territory:	<input type="text"/>
3. Latitude and longitude:	LAT <input type="text" value="36.0825"/>	LON <input type="text" value="-86.7917"/>	MGRS <input type="text" value="18SUC187980000"/>
<small>LAT and LON are required to map this SpotRep. If entering manually use Decimal Degree format or from an attached GPS device. By default, LAT, LON and MGRS is the center of the grid square listed in Express Settings.</small>			
4. POTS landlines functioning?	<input type="checkbox"/> YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> Unknown - N/A		
<small>If no, state provider</small>			
5. VOIP landlines functioning?	<input type="checkbox"/> YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> Unknown - N/A		
<small>If no, state provider</small>			
6. Cell phone voice calls functioning?	<input type="checkbox"/> YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> Unknown - N/A		
<small>If no, state provider</small>			
7. Cell phone texts functioning?	<input type="checkbox"/> YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> Unknown - N/A		
<small>If no, state provider</small>			
8. AM/FM Broadcast Stations functioning?	<input type="checkbox"/> YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> Unknown - N/A		
<small>If no, provide broadcast station callsign/frequency that is off-the-air.</small>			
9. TV Stations functioning?	<input type="checkbox"/> YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> Unknown - N/A		
<small>If no, indicate over-the-air or cable, state provider.</small>			
10. Public Water Works functioning?	<input type="checkbox"/> YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> Unknown - N/A		
<small>Comments</small>			
11. Commercial Power functioning?	<input type="checkbox"/> YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> Unknown - N/A		
<small>If no, state provider.</small>			
12. Commercial Power Stable?	<input type="checkbox"/> YES <input type="checkbox"/> NO- Brown outs/blinking lights. <input checked="" type="checkbox"/> Unknown - N/A		
<small>If no, state provider</small>			
13. Internet functioning?	<input type="checkbox"/> YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> Unknown - N/A		
<small>If no, indicate Fiber/Cable/Wireless/Satellite, state provider.</small>			
14. NOAA/NWS weather radio loud and clear?	<input type="checkbox"/> YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> Unknown - N/A		
<small>If No, describe audio degradation.</small>			
15. Additional Comments <small>brief summary of current situation - expected outage times, mg or observations, etc.</small>			
<input type="text"/>			
16. POC <small>Point of Contact</small>			
<input type="text"/>			
Save Field Situation data	Submit	Reset Form	Ver 0.2.5

Message with Report Ready to Send

Enter a new message

Close Select Template Sitrep SitRep Attachments Post to Outbox Spell Check Save in Drafts

From: NCS398 Send as: Winlink Message Request message receipt Set Defaults

To: NNA4TN

Cc:

Subject: //WL2K R/ SPOTREP 2021-11-12 17:40:53Z

Attach: RMS_Express_Form_Shares_Spotrep-2_Viewer.xml;

PRECEDENCE: R
DATE/TIME Group: 2021-11-12 17:40:53Z
TASK# 1
FROM: NCS398
TO: NNA4TN
INFO (CC):
BT
UNCLASS

SUBJ SPOTREP 2021-11-12 17:40:53Z

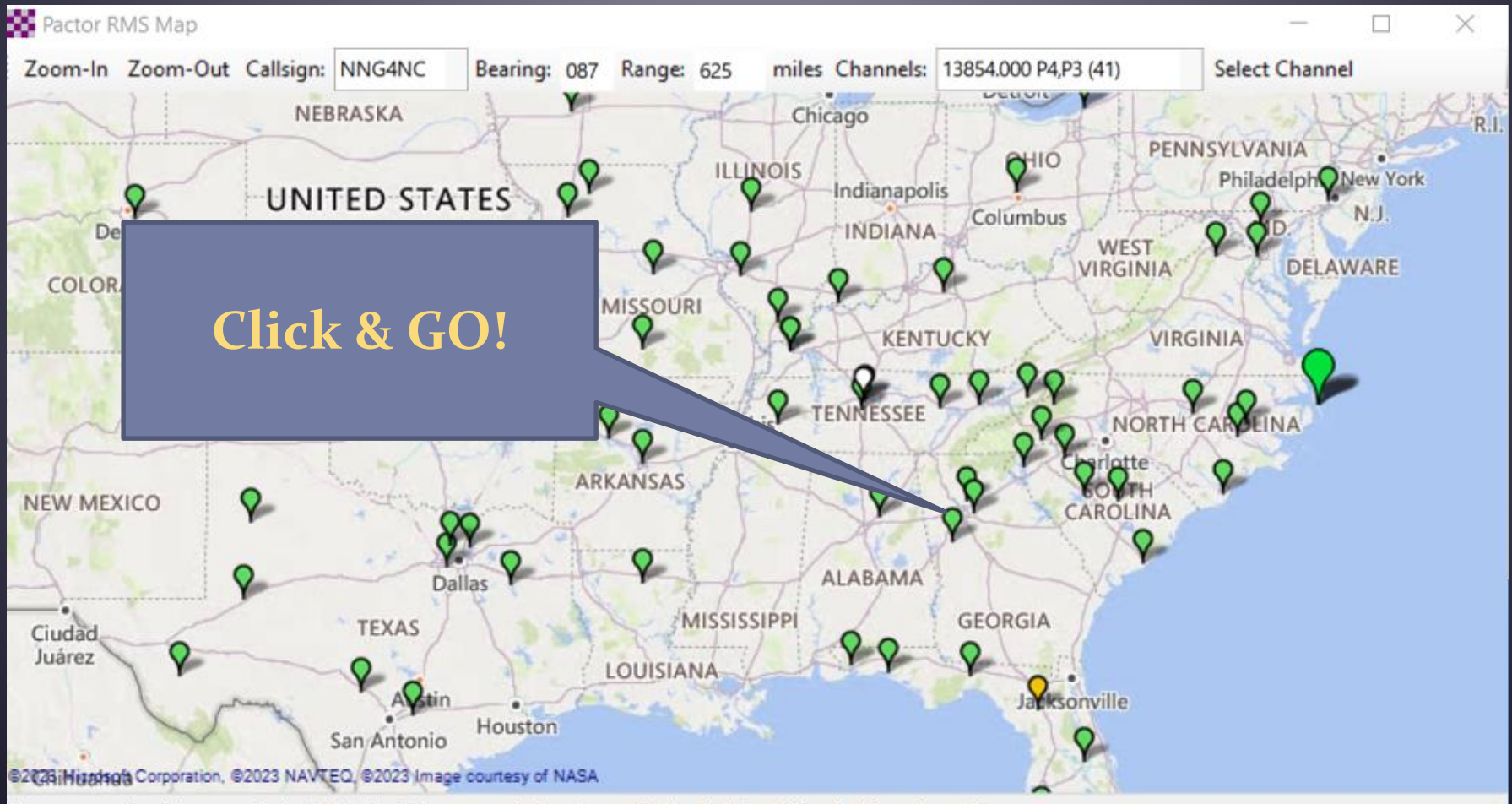
1. City/State/Territory: Brentwood, TN
2. Latitude :36.0077 Longitude:-86.7667 MGRS:
3. LandLines functioning? [NO]
4. Cell Phones functioning? [YES]
5. AM/FM Broadcast Stations functioning? [--]
6. TV Stations functioning? [--]
7. Public Water Works functioning? [YES]
8. Commercial Power functioning? [NO]
9. Internet functioning? [NO]

Winlink Express HF Channel Selector LIST (With propagation path quality estimates)

Callsign	Frequency (kHz)	Mode	Grid Square	Hours	Group	Distance (mi)	Bearing (Degrees)	Path Reliability Estimate	Path Quality Estimate
NNB4TN	4575.000	P4, P3	EM65NV	00-23	SHARES12...	12	205	98	98
NNA4TN	4015.000	P4, P3	EM66OC	00-23	SHARES12...	2	000	98	98
NNB4TN	5866.000	P4, P3	EM65NV	00-23	SHARES12...	12	205	97	97
NNA4TN	295.000	P4, P3	EM66OC	00-23	SHARES12...	2	000	97	97
NNA4TN	301.500	P4, P3	EM66OC	00-23	SHARES12...	2	000	96	96
NNB4TN	21.500	P4, P3	EM65NV	00-23	SHARES12...	12	205	96	96
NNA4TN	92.500	P4, P3	EM66OC	00-23	SHARES12...	2	000	96	96
NNB4TN	51.000	P4, P3	EM65NV	00-23	SHARES12...	12	205	95	95
NNA4TN	15.000	P4, P3	EM66OC	00-23	SHARES12...	2	000	94	94
NNB4TN	27.500	P4, P3	EM65NV	00-23	SHARES12...	12	205	92	92
			167GX	00-23	SHARES12...	137	345	88	52
			178NE	00-23	SHARES12...	181	035	88	51
			157MO	00-23	SHARES12...	160	312	87	51
			157QB	00-23	SHARES12...	123	305	87	50
			174UB	00-23	SHARES12...	198	134	84	50
			155MO	00-23	SHARES12...	126	256	88	50
NNA4AL	7387.500	P4, P3	EM63SR	00-23	SHARES12...	162	173	85	50

Click & GO!

Winlink Express HF Channel Selector MAP



“Auto-Connect” Makes It Easy

Click “Auto-connect” and stations will be called automatically until a good connection is made.

The screenshot shows the Pactor Winlink software interface. At the top, it displays 'Pactor Winlink Session NCS398'. Below this is a menu bar with options: Exit, Settings, Pactor Winlink (with a dropdown arrow), Channel, Map, Forecast, AES On (with a dropdown arrow), **Auto-connect** (highlighted in blue), Next chan., and Start. Below the menu bar are several input fields: a call sign field containing 'NNA4KY', a 'Center Freq. (kHz):' field with '9051.000', a 'Dial Freq. (kHz):' field with '9049.500', a 'Bearing:' field with '306', and a 'Quality:' field with '47'. Below these fields is a 'Favorites:' section showing 'NCS387 @ 7358.500' with options to 'Select', 'Add to favorites', and 'Remove from favorites'. A status bar below the favorites section reads 'Channel Busy In: 0 Out: 0 Disconnected'. At the bottom, a log window shows the following text: '*** Starting Winlink Pactor session.', '*** Initializing the PTC-DR7800 TNC, Pactor 4, IP address 192.168.1.165:3000, AES encryption enabled.', '*** Using Icom 7610, COM8, 115200 baud', and '*** Ready'.

Reception of Reports With GIS Data

- When a message with an attached GIS data report is received by someone running Winlink Express, the information from the report is extracted from the message automatically and stored in a database.
- Messages do not need to be selected or viewed for the data to be added to the database; it's done when the message is downloaded.
- To generate maps and CSV files, click the “world” toolbar icon to get to the mapping control screen.



Click this for maps

Showing Maps and Creating csv Files

The screenshot shows a software window titled "Maps and CSV/KML Files for Forms". The window contains several sections and controls:

- Select form:** A dropdown menu currently set to "Field Situation Report".
- Number of stored reports:** A text label showing "998".
- Map provider:** A dropdown menu currently set to "Bing".
- Form Report Management:** A section containing:
 - A text input field for "Delete reports older than this many days:" with the value "30".
 - A button labeled "Delete old reports for this form".
 - A button labeled "Delete all reports for this form".
- Export and Import Form Data:** A section containing:
 - A button labeled "Export form data".
 - A button labeled "Import form data".
- Bottom Buttons:** A row of four buttons: "Display Map", "Generate CSV File", "Generate KML File", and "Close".

Callouts on the left side of the window point to these features:

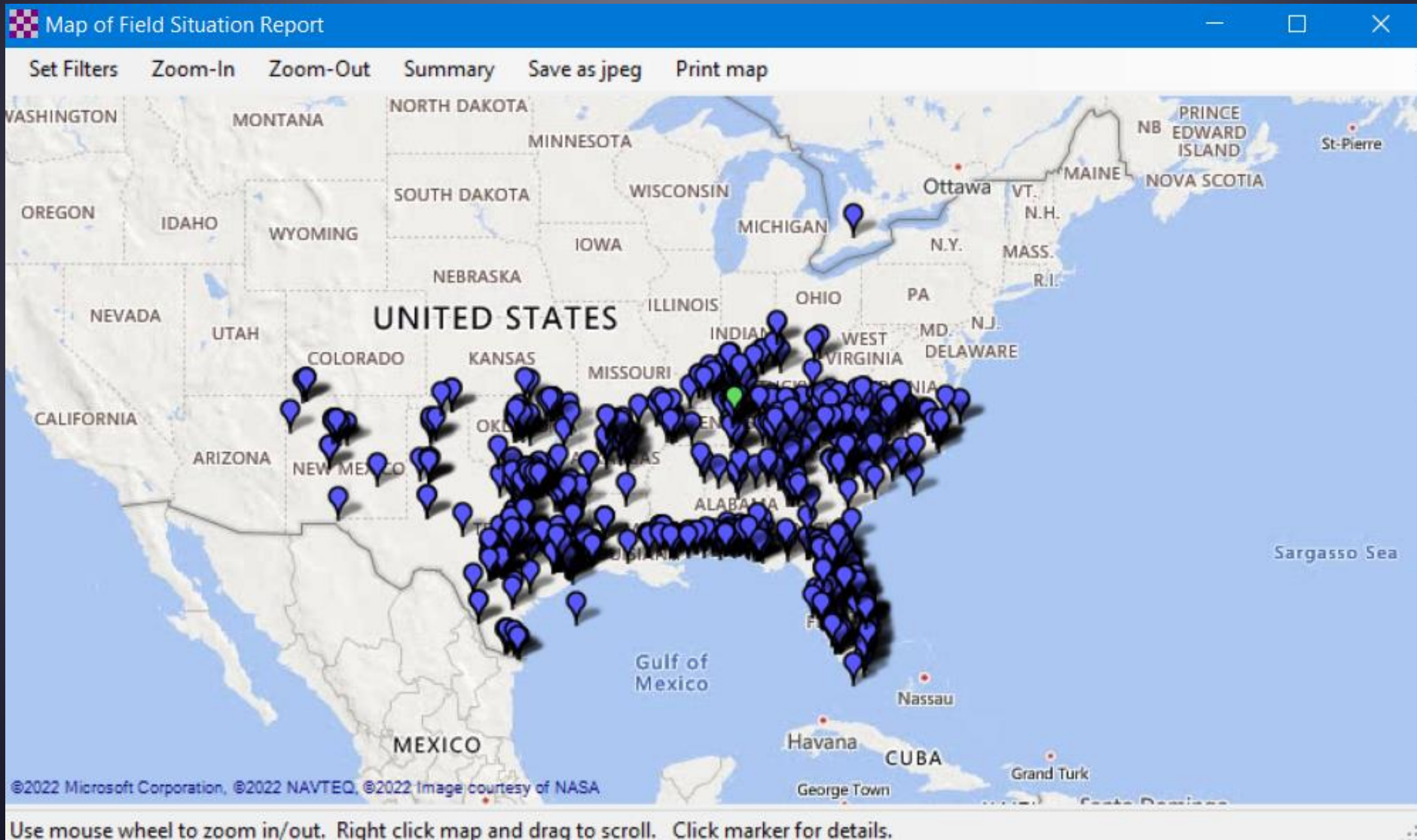
- "Select form" points to the "Select form:" dropdown.
- "Type of map" points to the "Map provider:" dropdown.
- "Expiration days" points to the "Delete reports older than this many days:" input field.
- "Expire old reports" points to the "Delete old reports for this form" button.
- "Delete all reports" points to the "Delete all reports for this form" button.
- "Display map of reports" points to the "Display Map" button.

Callouts on the right side of the window point to these features:

- "Export and import reports" points to the "Export form data" and "Import form data" buttons.
- "Make csv file" points to the "Generate CSV File" button.

2022 FEMA Regions 4&6 Cyber Attack Exercise

- Situation Report Map -



Click a Marker Pin for Details about a Report

Field Situation Report from KI5RTM

Sender: KI5RTM
Date/time: 2022-05-31 17:27 (local)
Age: 85.7 days
Message ID: 47X8ST8ECK18
Subject: //WL2K (R) - Routine/ Field Situation Report 2022-05-31 22:27:06Z
Latitude Longitude: 33.5282 N 101.9131 W
MGRS: 14SKC2945813650
Range and bearing: 875.0 mi @ 263
Precedence: (R) - Routine
Agency:
Task Number:
Is there is an EMERGENT/LIFE SAFETY Need?: NO
Need:
City: Lubbock
County: Lubbock
State: TX
Territory: Territory
LandLines functioning: YES
LandLines Comment:
Cell Phones functioning: YES
Cell phone Comment:
AM/FM Broadcast Stations functioning: YES
Broadcast Station Comment:
TV Stations functioning: YES
TV station Comment:
Internet functioning: YES
Internet Comment:
Commercial Power functioning: YES
Commercial Power Comment:
Public Water Works functioning: YES
Public Water Works note:
NOAA/NWS Comment:
Additional Comments: EXERCISE, EXERCISE, EXERCISE
POC: John H Sanders KI5RTM

Filtering Reports for Map

Age and Date Limits on Reports

Do not limit reports by age or date
 Only display reports more recent than this many hours:
 Limit to this date range:
 Limit start date/time: (Local time)
 Limit end date/time: (Local time)

Filter Map by Field Values

Stored Filter Sets
 Filter set:

Enable map filtering Include text fields such as comments as filter items (filter with one or more words or phrases separated by commas)
 Select reports that match ANY enabled filter item Select reports matching ALL enabled filter items

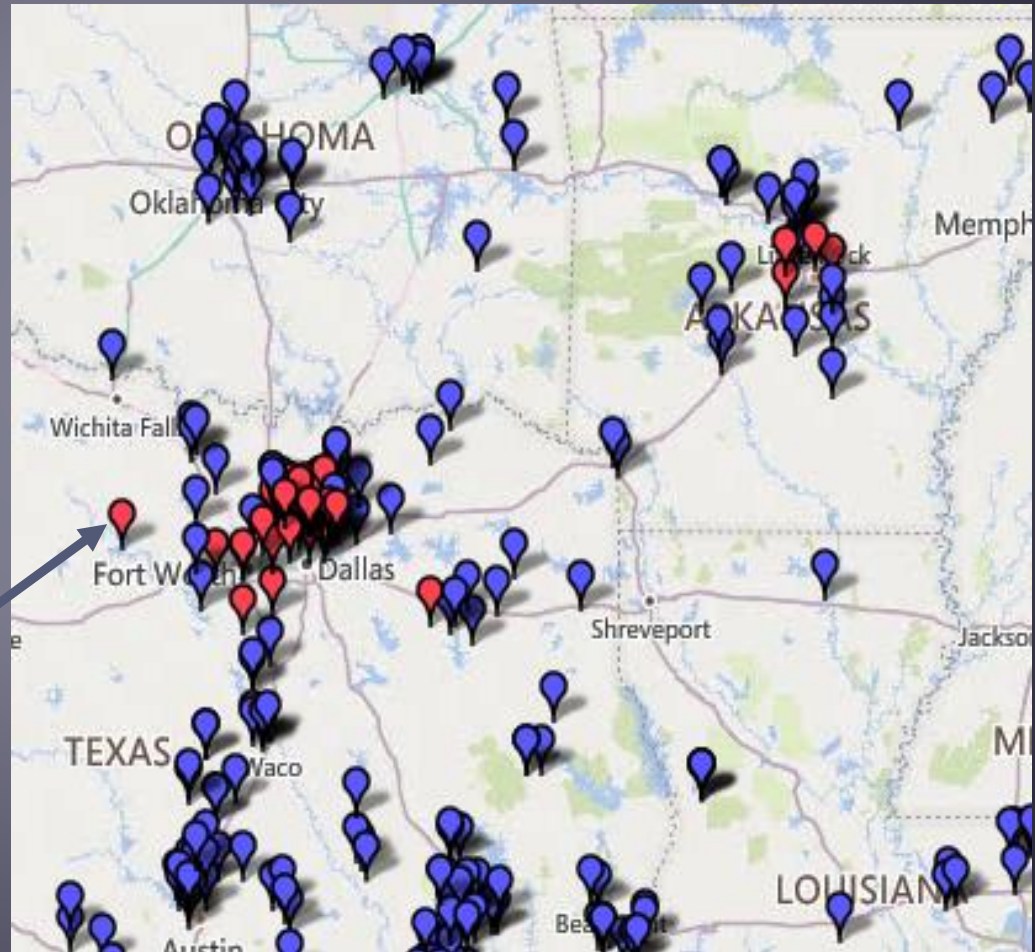
Form field	*	Selection Value	Marker Color	^
AM/FM Broadcast Stations functioning	=	(Ignore)	(default)	▼
Cell Phones functioning	=	NO	(default)	▼
Commercial Power functioning	=	(Ignore)	(default)	▼
Internet functioning	=	NO	(default)	▼
Is there is an EMERGENT/LIFE SAFETY N...	=	(Ignore)	(default)	▼
LandLines functioning	=	(Ignore)	(default)	▼
Precedence	=	(Ignore)	(default)	▼
Public Water Works functioning	=	(Ignore)	(default)	▼
Range (mi)	=		(default)	▼

Which markers to show on map
 Display all markers using colors to indicate selected ones
 Display only markers selected by filters

Default color for unselected markers
 Color if multiple colors are selected
 Color of your location marker (QTH)

Mark No-Internet Reports in Red

Sender: K15NXU
Date/time: 2022-06-01 11:40 (local)
Age: 89.1 days
Message ID: GPND3OL57HPP
Subject: //WL2K (P) - Priority/ Field Situation Report
Latitude Longitude: 32.8958 N 98.4583 W
MGRS: 14SNB5066339865
Range and bearing: 699.0 mi @ 255
Precedence: (P) - Priority
Agency:
Task Number: 1.0
Is there is an EMERGENT/LIFE SAFETY Need?: NO
Need:
City: Graford
County: Palo Pinto
State: TX
Territory: Territory
LandLines functioning: NO POTS or VOIP
LandLines Comment:
Cell Phones functioning: NO
Cell phone Comment:
AM/FM Broadcast Stations functioning: YES
Broadcast Station Comment:
TV Stations functioning: YES
TV station Comment:
---> Internet functioning: NO
Internet Comment:
Commercial Power functioning: YES



Generating CSV and KML Files

- In addition to the mapping and filtering built into Winlink Express, it can generate CSV and KML files automatically when new reports are received.
- You can set up automatic Telnet polling for reports.

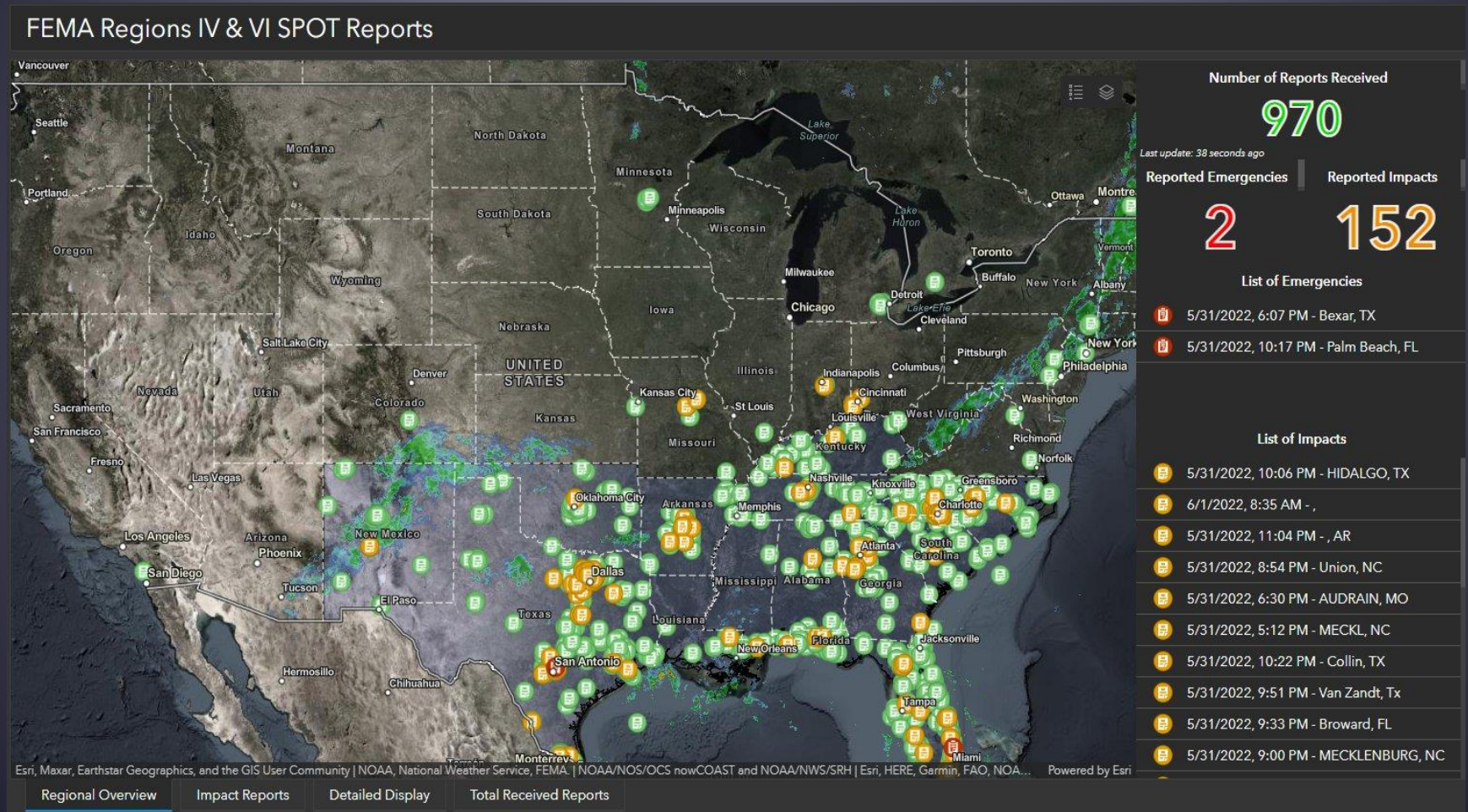
The screenshot shows a configuration window with the following sections:

- Column Delimiter:** Radio buttons for Comma and Tab.
- Format of Dates:** A dropdown menu set to `mm/dd/yy` and a checkbox for UTC time.
- Selection Date Range:** Two rows of controls. The first row has Limit start date/time: `2022-06-07` (calendar icon) and `17:21` (spinner icon) (Local time). The second row has Limit end date/time: `2022-06-07` (calendar icon) and `17:21` (spinner icon) (Local time).
- Automatically Generate CSV File When New Reports Are Received:** A checkbox Generate new csv file when reports are received (CSV file is written to file specified below as "CSV Output File").
- CSV Output File:** A text box containing `C:\Test\FSR.csv` and a **Browse** button. Below the text box is the note: (Should be .csv file type).
- Buttons:** **Generate CSV File** and **Exit**.

Using CSV & KML Files with Commercial GIS

- Many states and agencies have licenses for commercial GIS programs such as ArcGIS.
- These commercial GIS programs offer additional features such as map layers and the ability to generate bar and pie charts.
- The power of these programs come with a price – both \$\$ and time to learn. If you have a trained GIS person available, that's great. But many agencies don't have GIS experts, or the experts may not be available during an incident.
- Winlink Express GIS is easy for ordinary people to use.

SCEMD Displays using CSV File with ArcGIS



Recommended GPS Dongle



GlobalSat BU-353-S4 USB GPS Receiver (Black) (Improved-New)

Brand: GlobalSat

★★★★☆ 32 ratings | 9 answered questions

Amazon's Choice for "bu-353-s4"

\$59⁹⁹

Get a **\$8 bonus** when you reload **\$100 or more** to your gift card balance (Restrictions apply).

Color: **IMPROVED-NEW**

Product details

Brand	GlobalSat
Connectivity Technology	USB
Map Type	Satellite
Color	IMPROVED-NEW
Are Batteries Included	No

- Built-In GPS Patch Antenna





- Tennessee Winlink team:
 - Phil Sherrod, W4PHS (Developer and BoD)
 - Steve Waterman, K4CJX (Administrator and BoD)
- Winlink web site: www.winlink.org
- White papers about Winlink: www.qrz.com/db/W4PHS
- Support group:
<https://groups.google.com/forum/#!forum/winlink-programs-group>

**SPECIAL THANK YOU TO
STEVE WATERMAN FOR
SUPPLYING THESE SLIDES**