Situation Awareness Without Infrastructure
Winlink for Emergency Communication EMAT
Phil Sherrod – W4PHS / NCS398

WINLINK

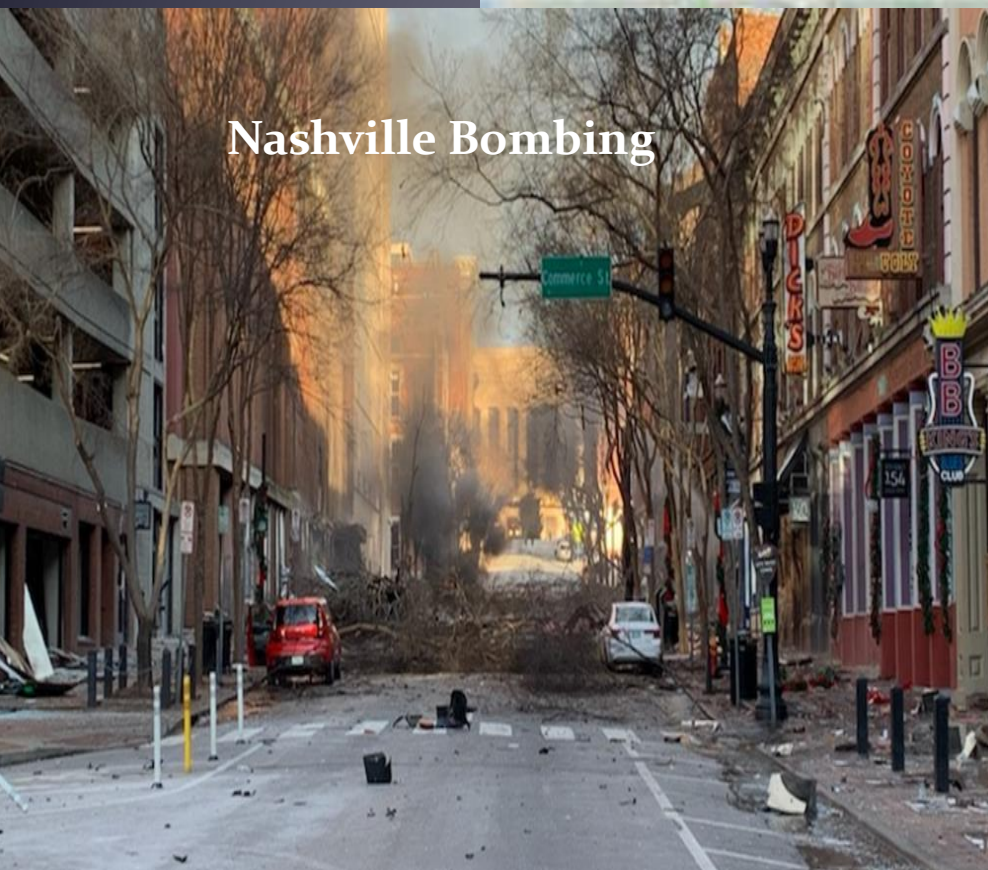GRID DOWN EMERGENCY COMMUNICATIONS?

Winlink Development Team

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

Nashville Bombing

NC Farmer Cuts Fiber with Tractor

Landlines, cell phones, satellite phones, LMR networks & the Internet all depend on *vulnerable infrastructure, which depend on cables, power, water, fuel & people.*
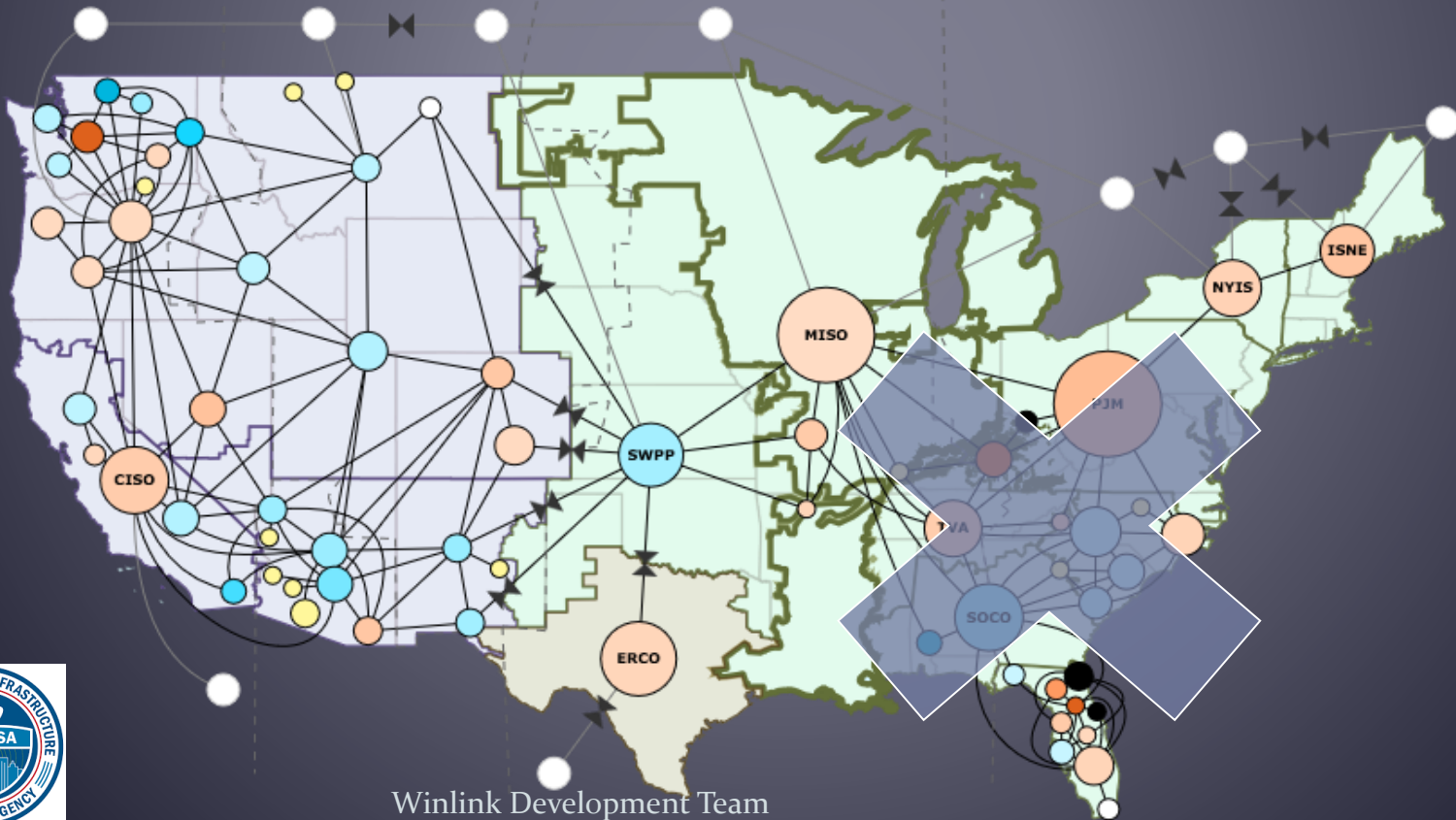
Does your PACE Plan* have no-infrastructure resiliency?

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
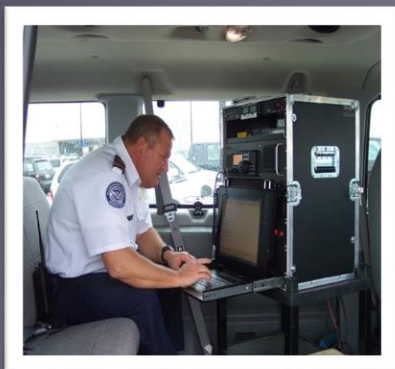
DHS TSA

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

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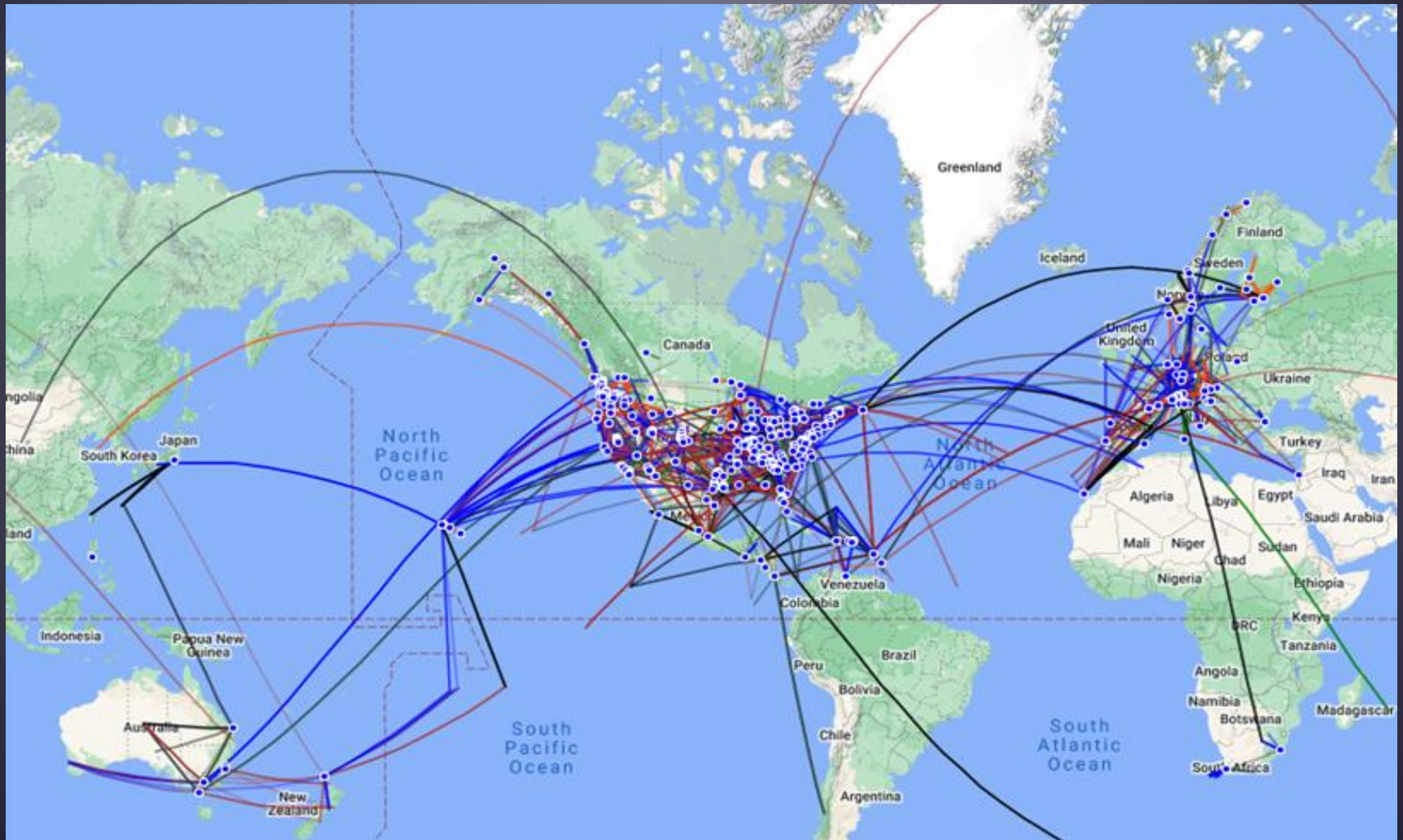
Getting the Big Picture of Incidents

- 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
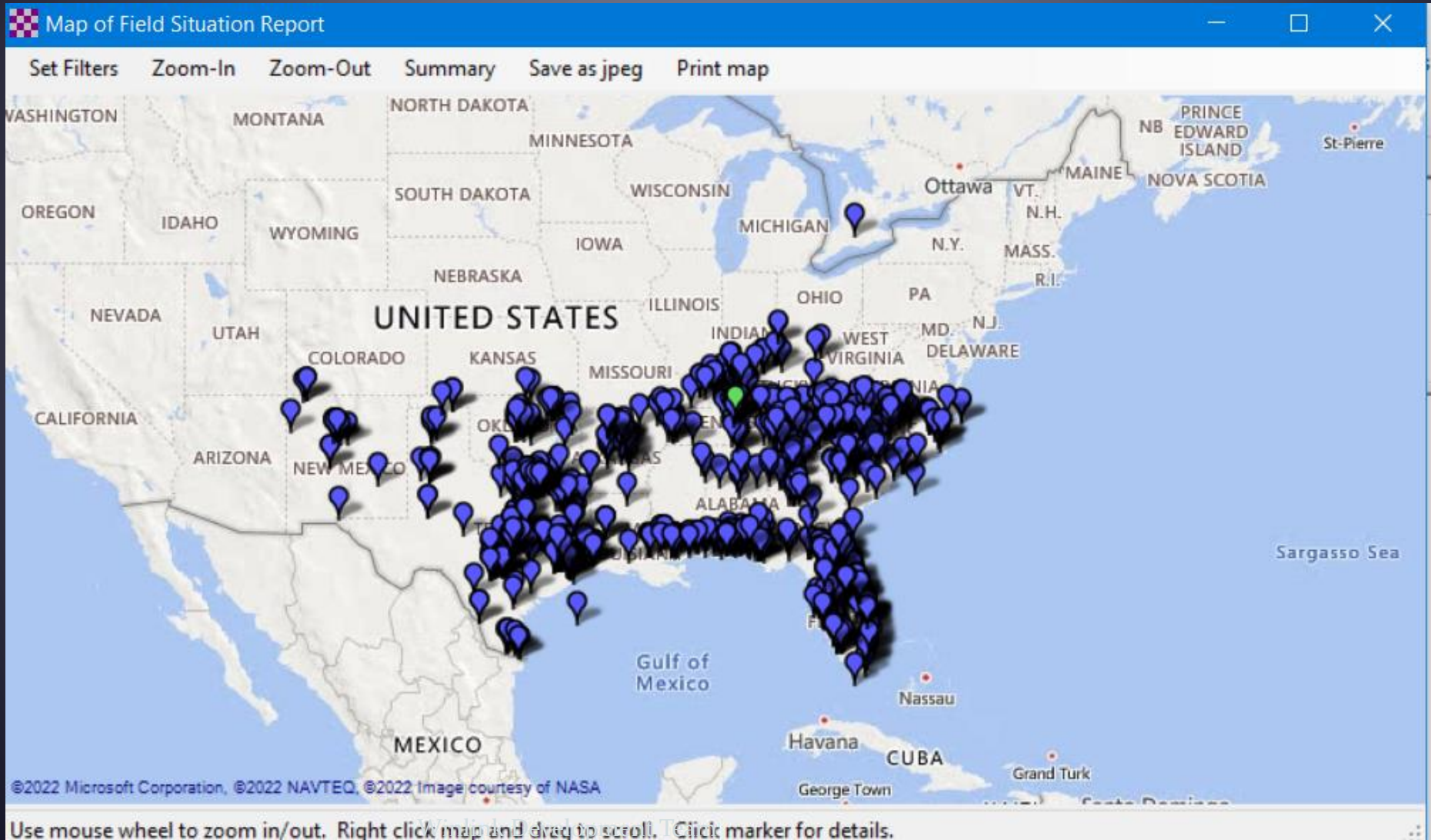
What's Needed to Submit and Display Reports

- 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.

Forms are Organized by Category
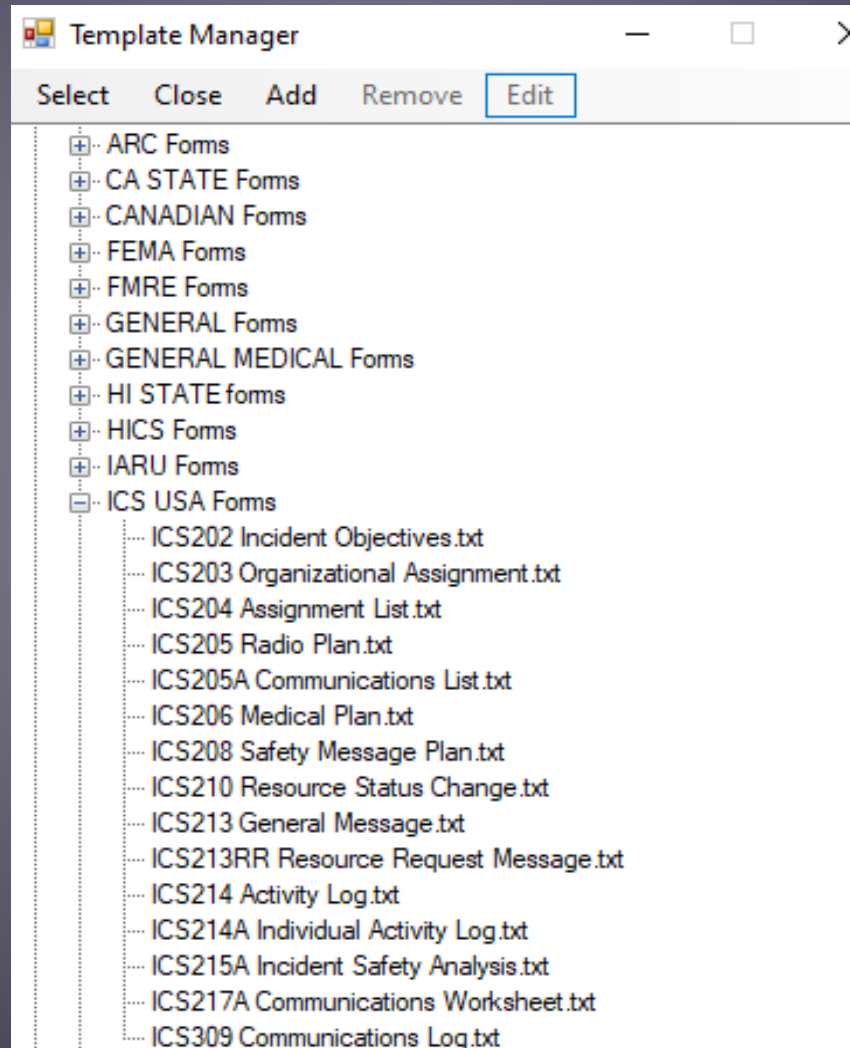
ICS-213 General Message Form

ICS-214 Activity Log

ACTIVITY LOG   (ICS 214)

Load ICS 214 Data   Form Information

1. Incident Name: Page #

2. Operational Period (Date/Time) From: To:

3. Name: 4. ICS Position:

5. Home Agency and Unit:

6. Resources Assigned:

Name	ICS Position	Home Agency and Unit

7. Activity Log: Clear Activity Log

Paste Data from a Spreadsheet

| Date & Time (local 24 hr) | Notable Activities
Activities may include notable occurrences/events such as task assignments, task completions, injuries, or difficulties encountered. |
| --- | --- |
| | |
| Click for Date/Time | |
| Click for Date/Time | |
| Click for Date/Time | |

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USGS Did You Feel It -- DYFI

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

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Message with Report Ready to Send

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

HF Channel Selector

Exit   Select   Update Via Internet   Update Via Radio   Map   Forecast   SFI   All RMS

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
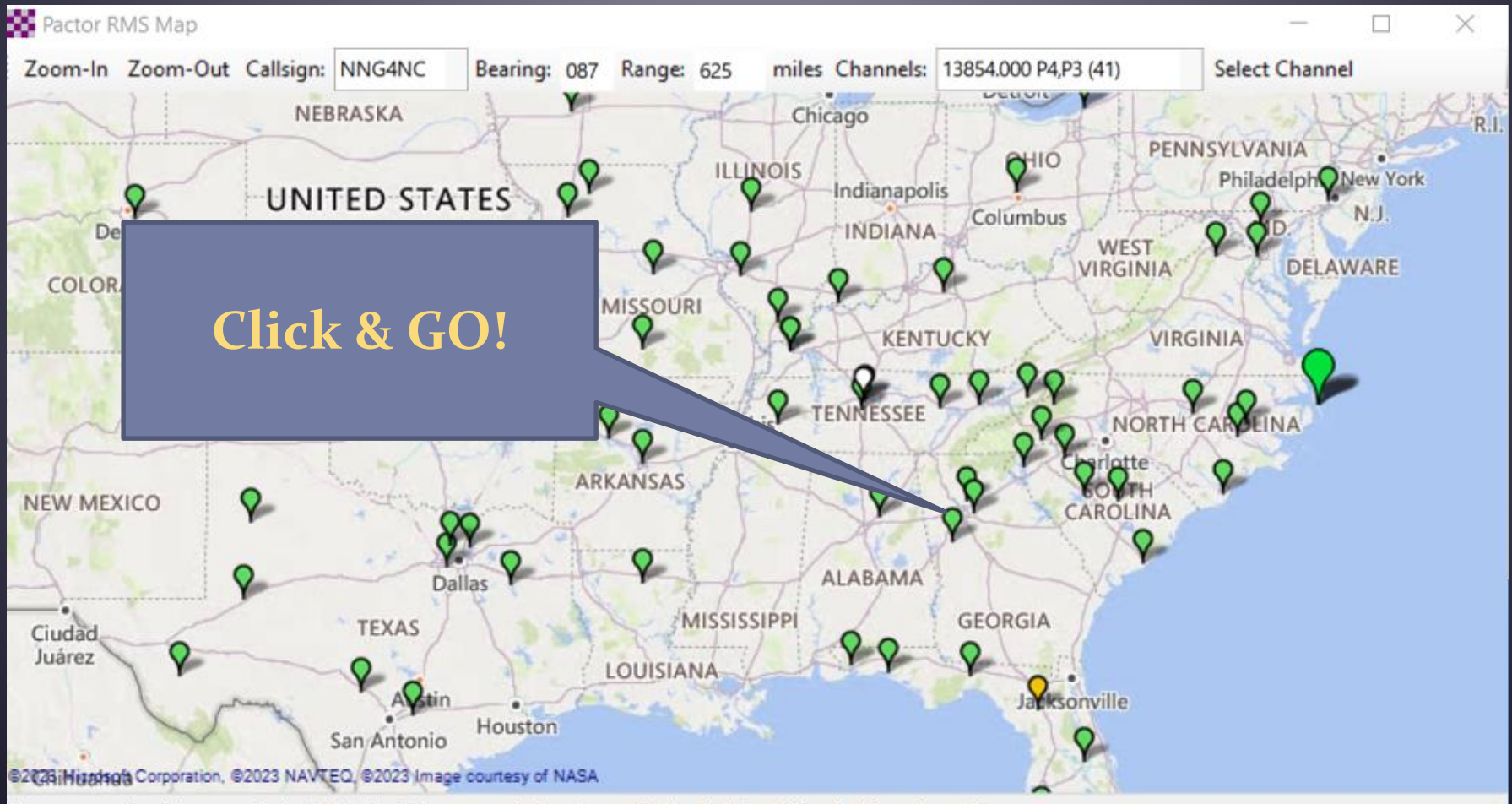
"Auto-Connect" Makes It Easy

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

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

Select form

Type of map

Expiration days

Expire old reports

Delete all reports

Display map of reports

Export and import reports

Make csv file

Maps and CSV/KML Files for Forms

Select form: Field Situation Report

Number of stored reports: 998

Map provider: Bing

Form Report Management

Delete reports older than this many days: 30

Delete old reports for this form

Delete all reports for this form

Export and Import Form Data

Export form data

Import form data

Display Map   Generate CSV File   Generate KML File   Close

2022 FEMA Regions 4&6 Cyber Attack Exercise
- Situation Report Map -
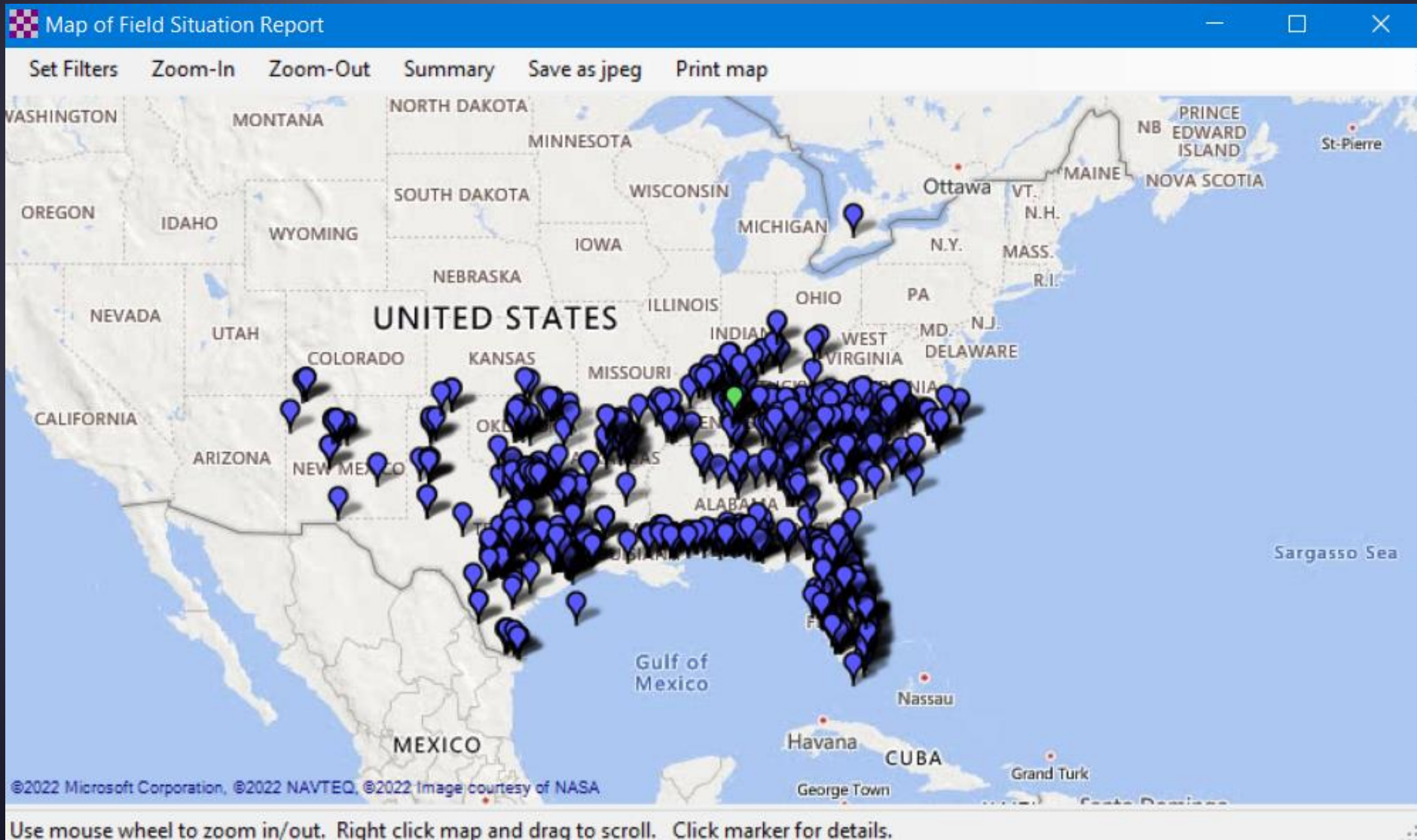
Click a Marker Pin for Details about a Report

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

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Filtering Reports for Map

Mark No-Internet Reports in Red

Sender: KI5NXU
Date/time: 2022-06-01 11:40 (local)
Age: 89.1 days
Message ID: GPND3OL57HPP
Subject: //WL2K (P) - Priority/ Field Situation Repo
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
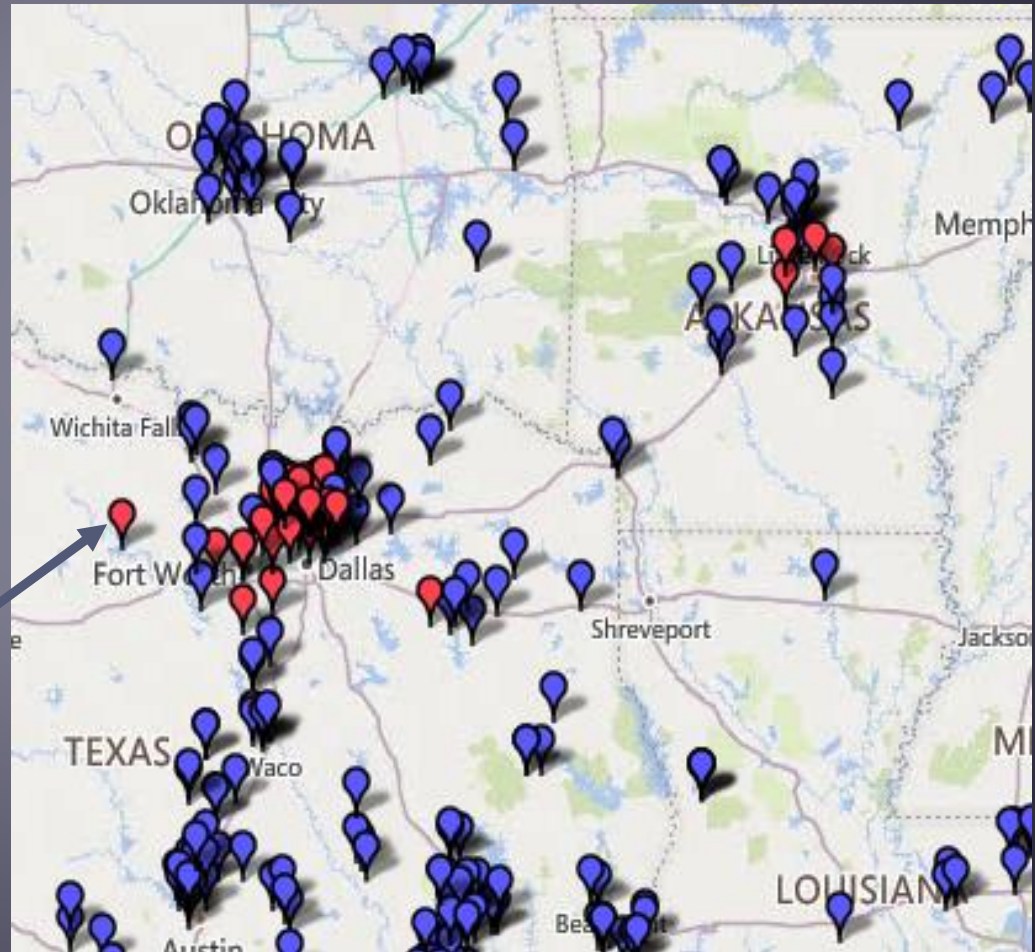
Generating CSV and KML Files

- 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.

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
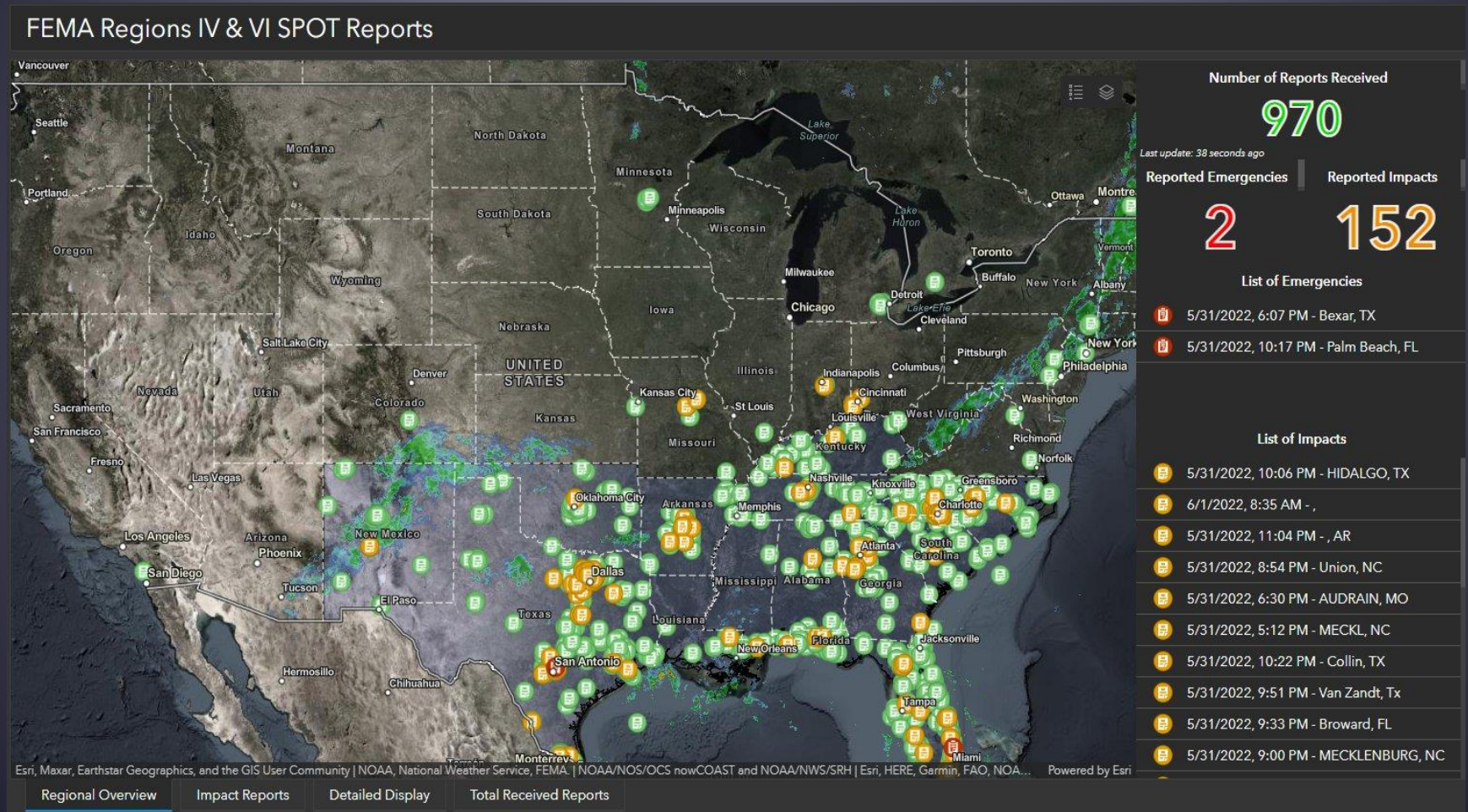
Recommended GPS Dongle

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