SARCOP and Geospatial Planning for Search & Rescue

National Hurricane Conference 2024

FEMA

Workshop Activity Link

March 28th, 2024

Paul Doherty, PhD, FEMA US&R Branch

Emily Zeilberger, FEMA Region 4

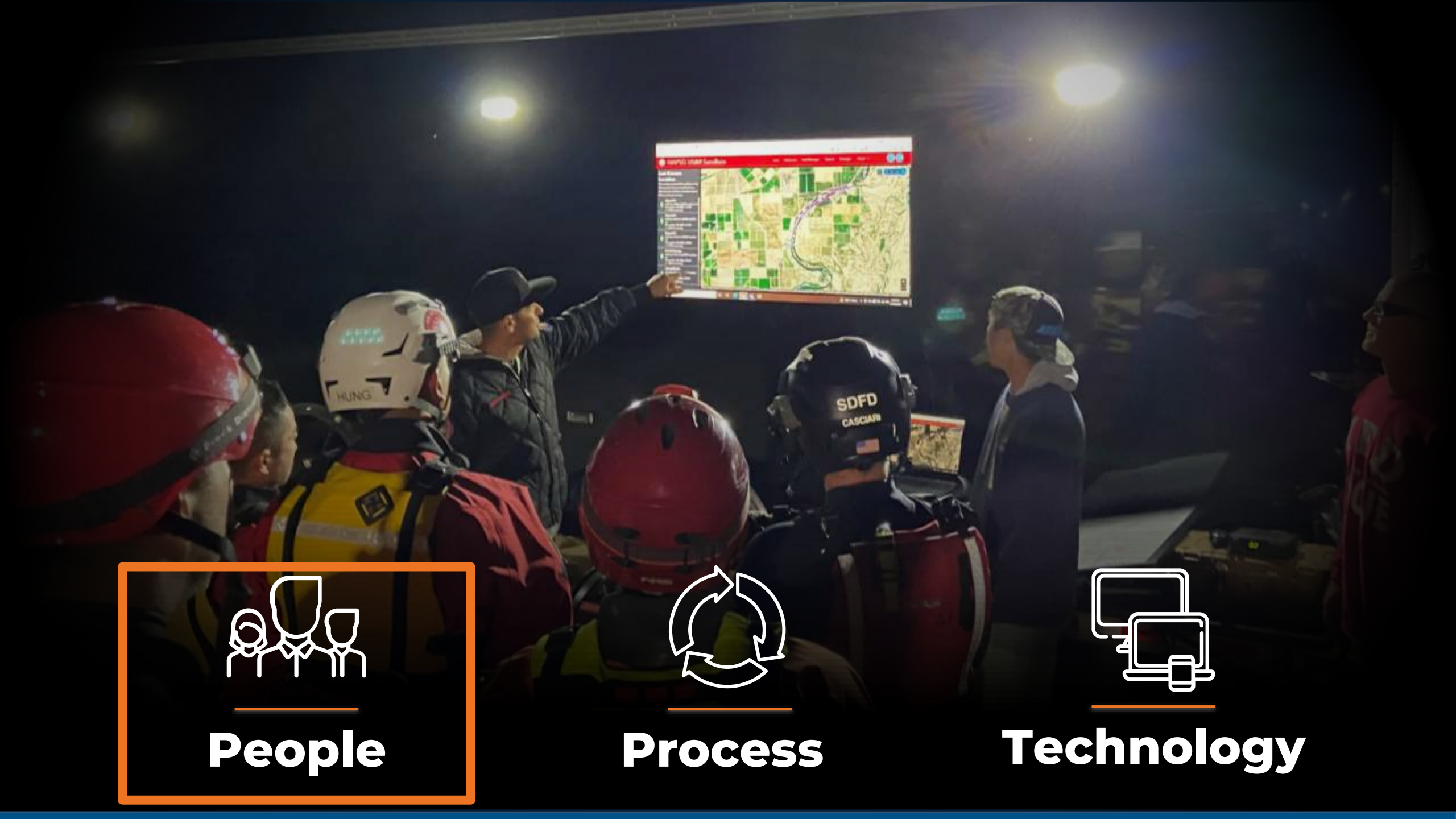
Bottom Line Up Front

- SARCOP is….
  - a life-saving resource for search and rescue mapping
  - a life-sustaining resource for emergency managers
  - successfully adopted across the US (beyond FEMA US&R)
  - more than just technology

Agenda

- Intro to SAR Common Operating Platform
  - People
    - Case Study 1 - Task Force (Tripp Hansen)
  - Process
    - Case Study 2 – US&R IST (Paul Doherty)
  - Technology
    - Case Study 3 – FEMA Region (Emily Zeilberger)
  - Conclusion & Discussion

Workshop Activity Link



People

Process

Technology

National Urban Search and Rescue Response System Established in 1989

Michael Rieger/ FEMA News Photo

Mission expanded to include
Wide Area Search and Water Operations

“The foundation of our concept of operations for effective search and rescue actions at large-scale catastrophic events is effective reconnaissance.”

Chief Fred Endrikat 2010 following the Haiti Earthquake

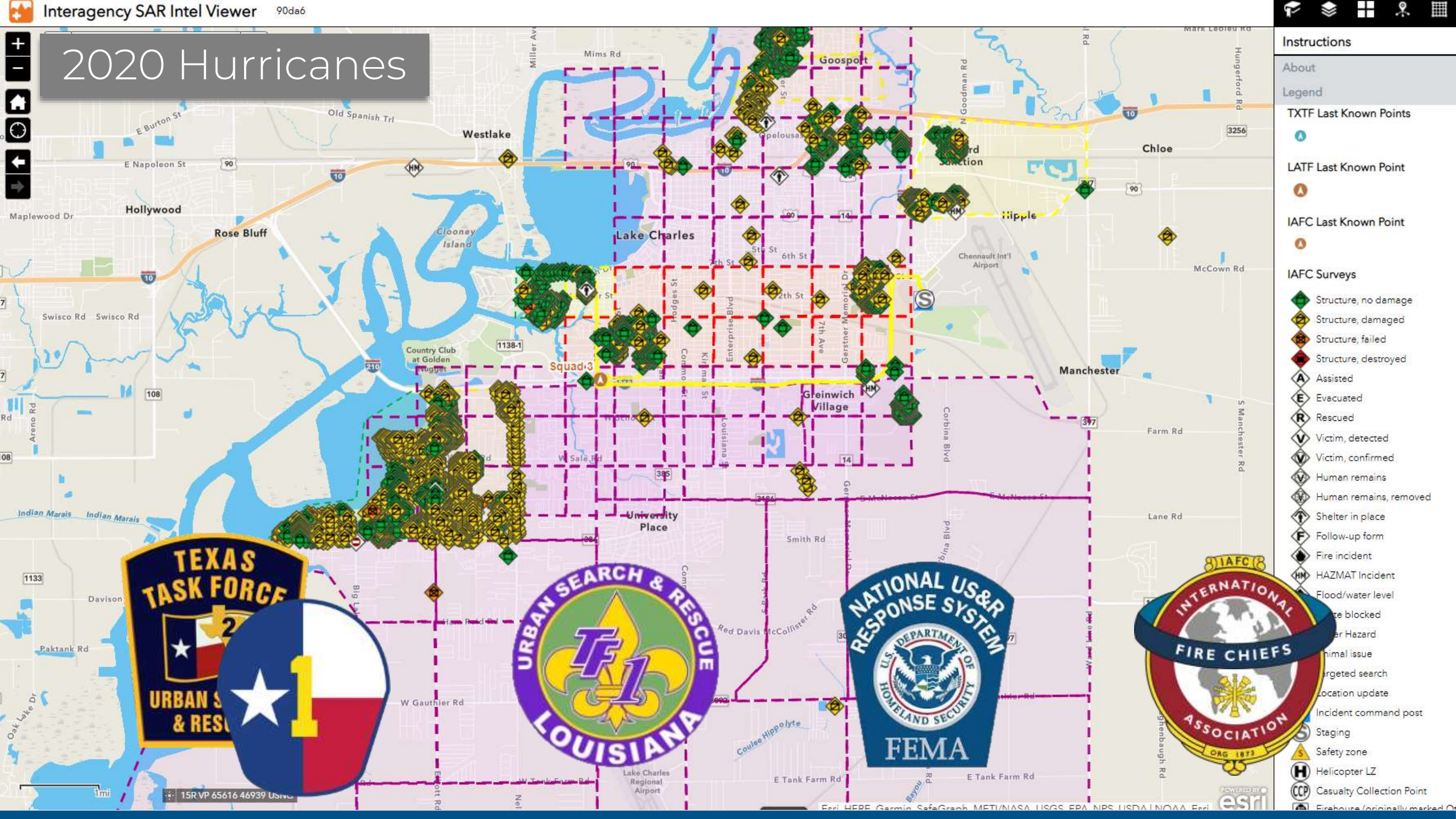
Credit - Reuters

Search and Rescue is
an inherently spatial problem

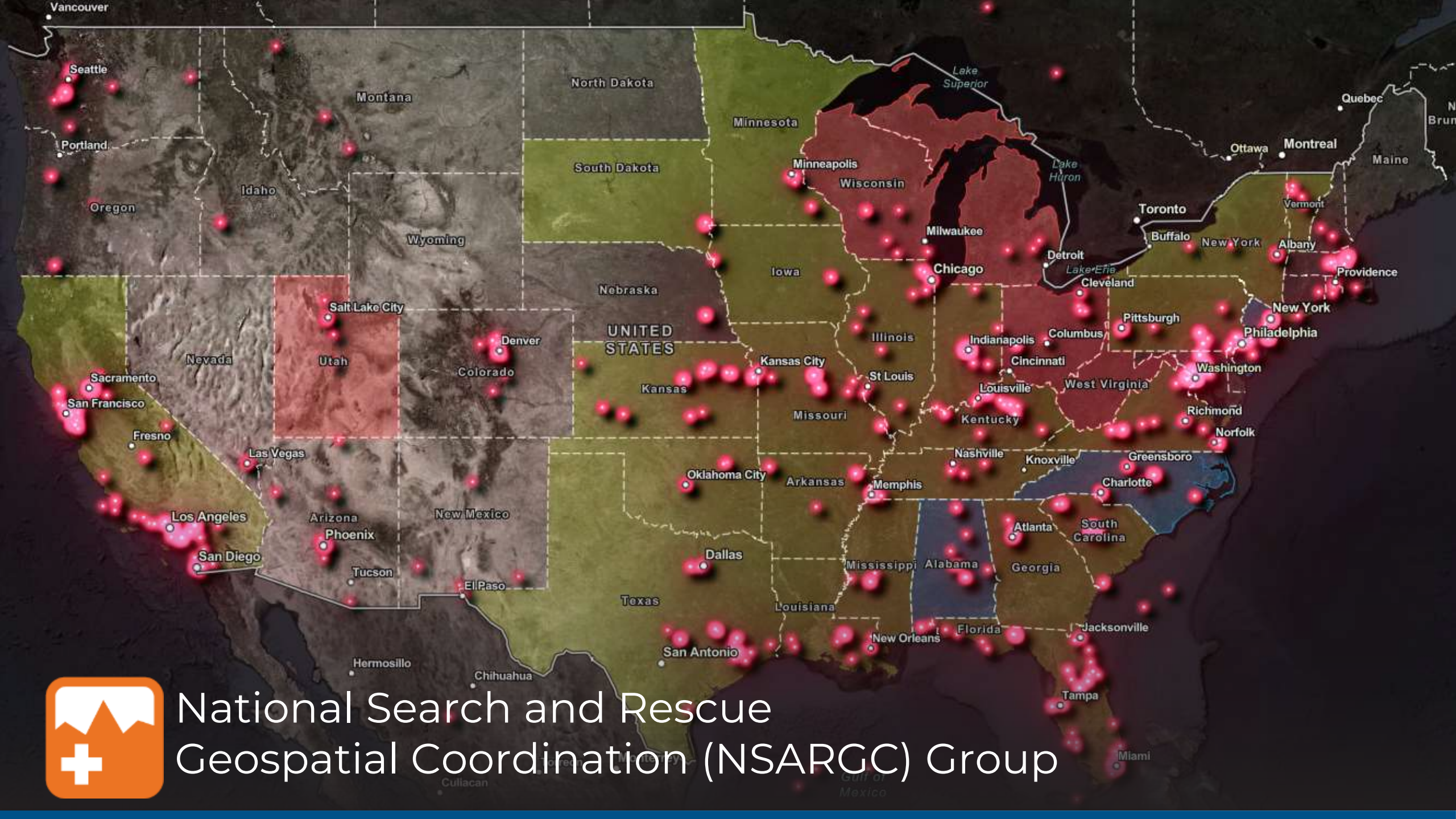
2013 GPS Use and File Conversion Protocol (Iron Sights)

2017 Hurricane Harvey, first use of Survey123 during a major US&R incident

2020 Hurricanes



Supported by DHS Science and Technology



National Search and Rescue Geospatial Coordination (NSARGC) Group

Task Force List

This list will show individual survey entries based on your filter selection, with most recents edits appearing at the top. Viewing or editing more details requires credentials.

Search...

CO-TF1
West Metro Fire Rescue
Last Edit: 11/14/2023, 3:53 PM
View Form | Update Form

CA-TF5
Orange County
Last Edit: 7/13/2023, 11:54 AM
View Form | Update Form

AZ-TF1
Phoenix Fire Department
Last Edit: 4/28/2023, 1:31 PM
View Form | Update Form

CA-TF1
City of Los Angeles
Last Edit: 4/28/2023, 1:31 PM
View Form | Update Form

CA-TF2
Los Angeles County
Last Edit: 4/28/2023, 1:31 PM
View Form | Update Form

CA-TF3
City of Menlo Park
Last Edit: 4/28/2023, 1:31 PM
View Form | Update Form

Last update: 14 seconds ago

Selected

28

Last update: 14 seconds ago

All FEMA US&R Task Forces

US&R Catalog
Link

Task Force List

This list will show individual survey entries based on your filter selection, with most recents edits appearing at the top. Viewing or editing more details requires credentials.

Search...

KY-TF1
Ky Emergency Management
Last Edit: 1/20/2024, 2:19 PM
View Form | Update Form

CO-TF1
West Metro Fire Rescue
Last Edit: 11/14/2023, 3:53 PM
View Form | Update Form

MS-TF2
Philadelphia Fire Department
Last Edit: 11/6/2023, 12:32 PM
View Form | Update Form

Ky-LexingtonFD
Lexington Fire Department
Last Edit: 8/14/2023, 2:20 PM
View Form | Update Form

CA-RTF11
Bakersfield Fire Department
Last Edit: 7/25/2023, 8:04 AM
View Form | Update Form

CA-RTF4
Pasadena FD/Multi-Agency
Last Edit: 7/25/2023, 8:03 AM
View Form | Update Form

Last update: 5 seconds ago

Selected

116

Last update: 5 seconds ago

All US&R Task Forces (Type 1-4)

Legend

Urban Search and Rescue Catalog (View)

- Local
- State
- FEMA
- USCG
- Title 32
- Other

Esri, Maxar, Earthstar Geographics, and the GIS User Community | NSARGC, NAPSG Foundation, FEMA, SUSAR, DHS S&T | Esri, TomTom, Garmin, FAO, NOAA, USGS, E... Powered

Task Force List

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Search...

KY-TF1
Ky Emergency Management
Last Edit: 1/20/2024, 2:19 PM
View Form | Update Form

CO-TF1
West Metro Fire Rescue
Last Edit: 11/14/2023, 3:53 PM
View Form | Update Form

MS-TF2
Philadelphia Fire Department
Last Edit: 11/6/2023, 12:32 PM
View Form | Update Form

USCG-MSST Cape Cod-FR
USCG
Last Edit: 9/14/2023, 10:58 AM
View Form | Update Form

CT-TF1
Connecticut Division of Emergency Management and Homeland Security
Last Edit: 9/12/2023, 12:14 PM
View Form | Update Form

USCG-ATL Strike Team-FR
USCG
Last Edit: 8/30/2023, 10:05 AM
View Form | Update Form

Last update: 8 seconds ago

Selected

385

Last update: 8 seconds ago

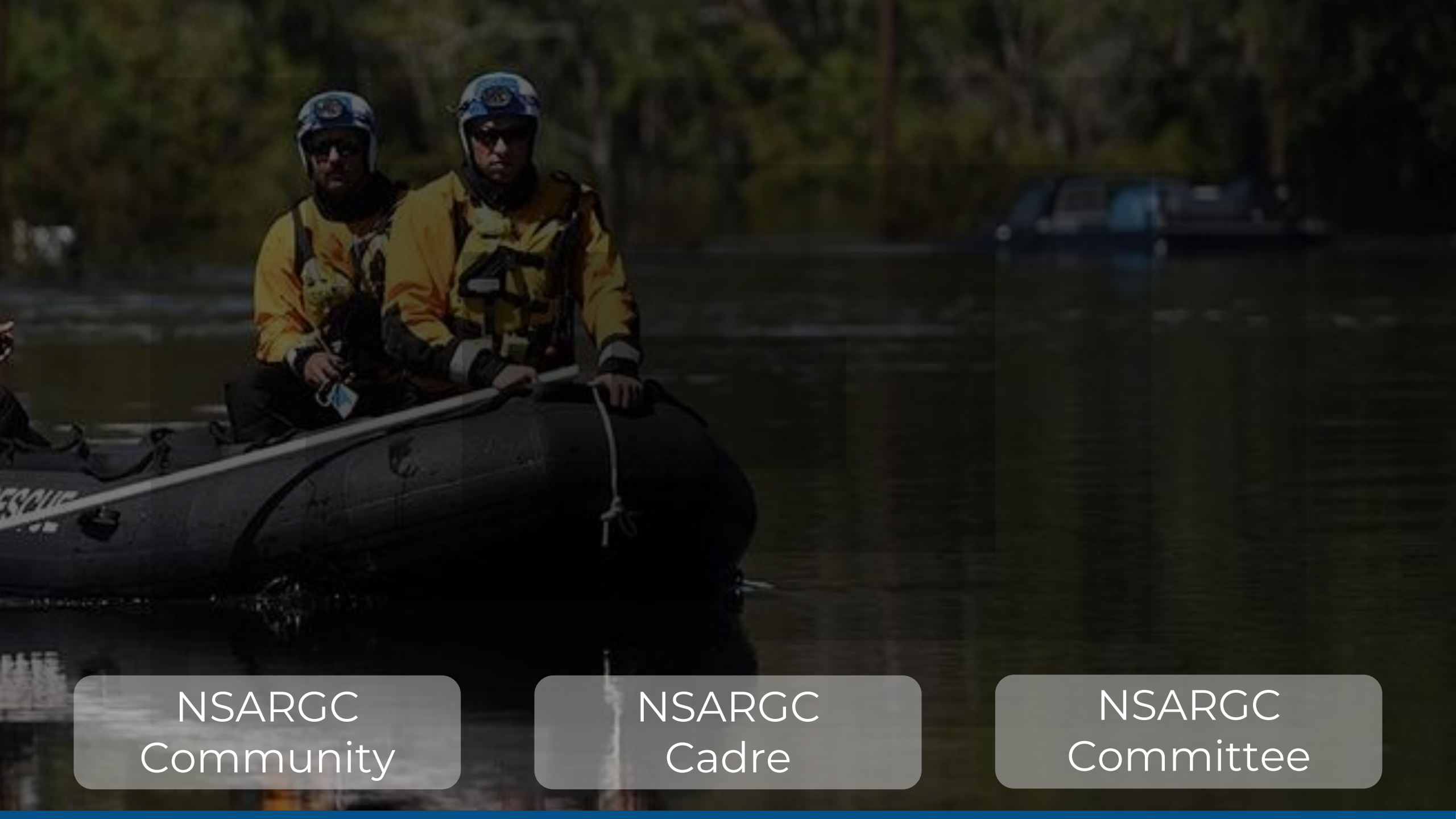
All US&R Task Forces, Collapse Rescue, Collapse Search, Swiftwater / Flood

Legend

Urban Search and Rescue Catalog (View)

- Local
- State
- FEMA
- USCG
- Title 32
- Other

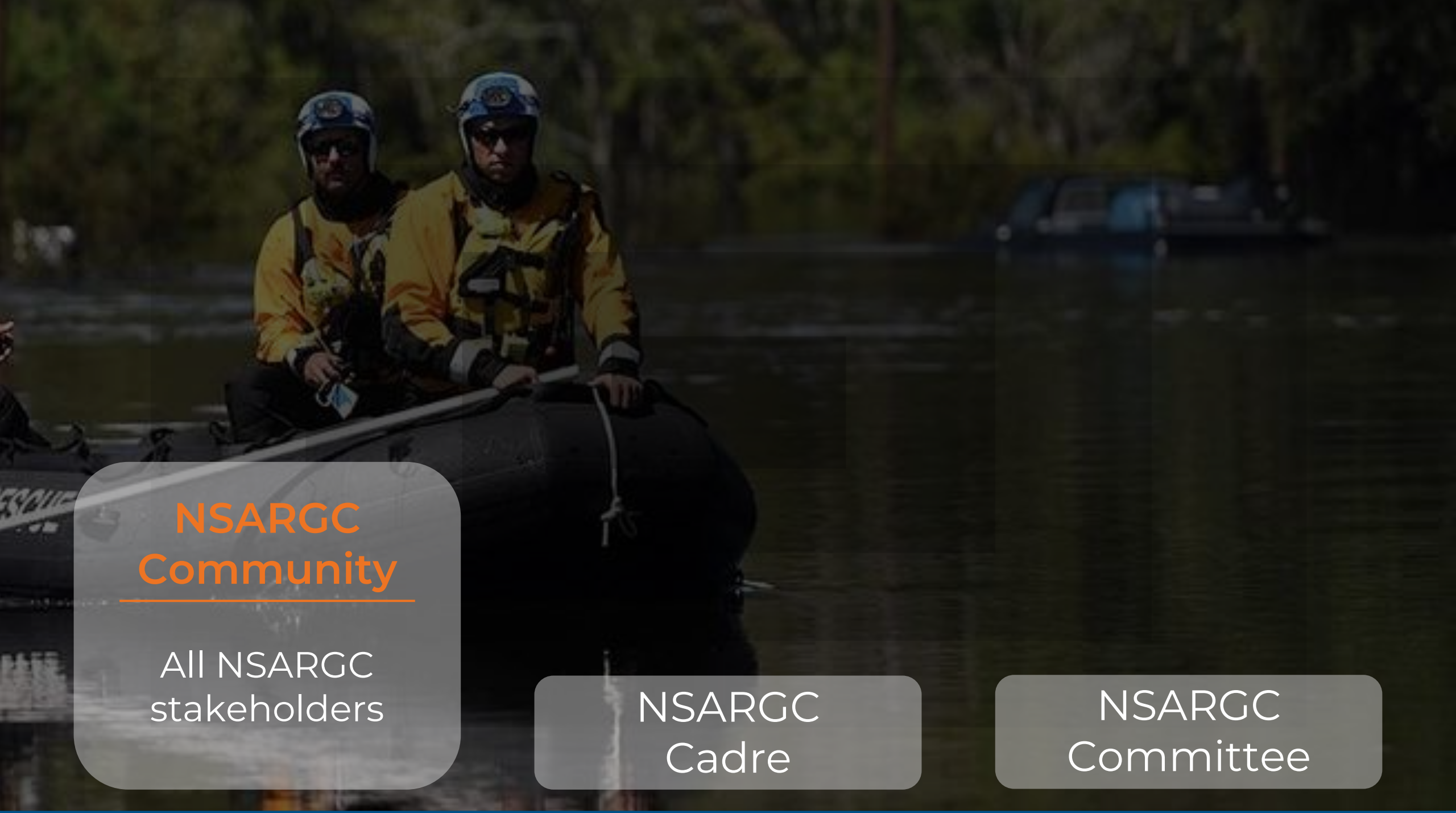
Esri, Maxar, Earthstar Geographics, and the GIS User Community | NSARGC, NAPSG Foundation, FEMA, SUSAR, DHS S&T | Esri, TomTom, Garmin, FAO, NOAA, USGS, E... Powered



NSARGC Community

NSARGC Cadre

NSARGC Committee

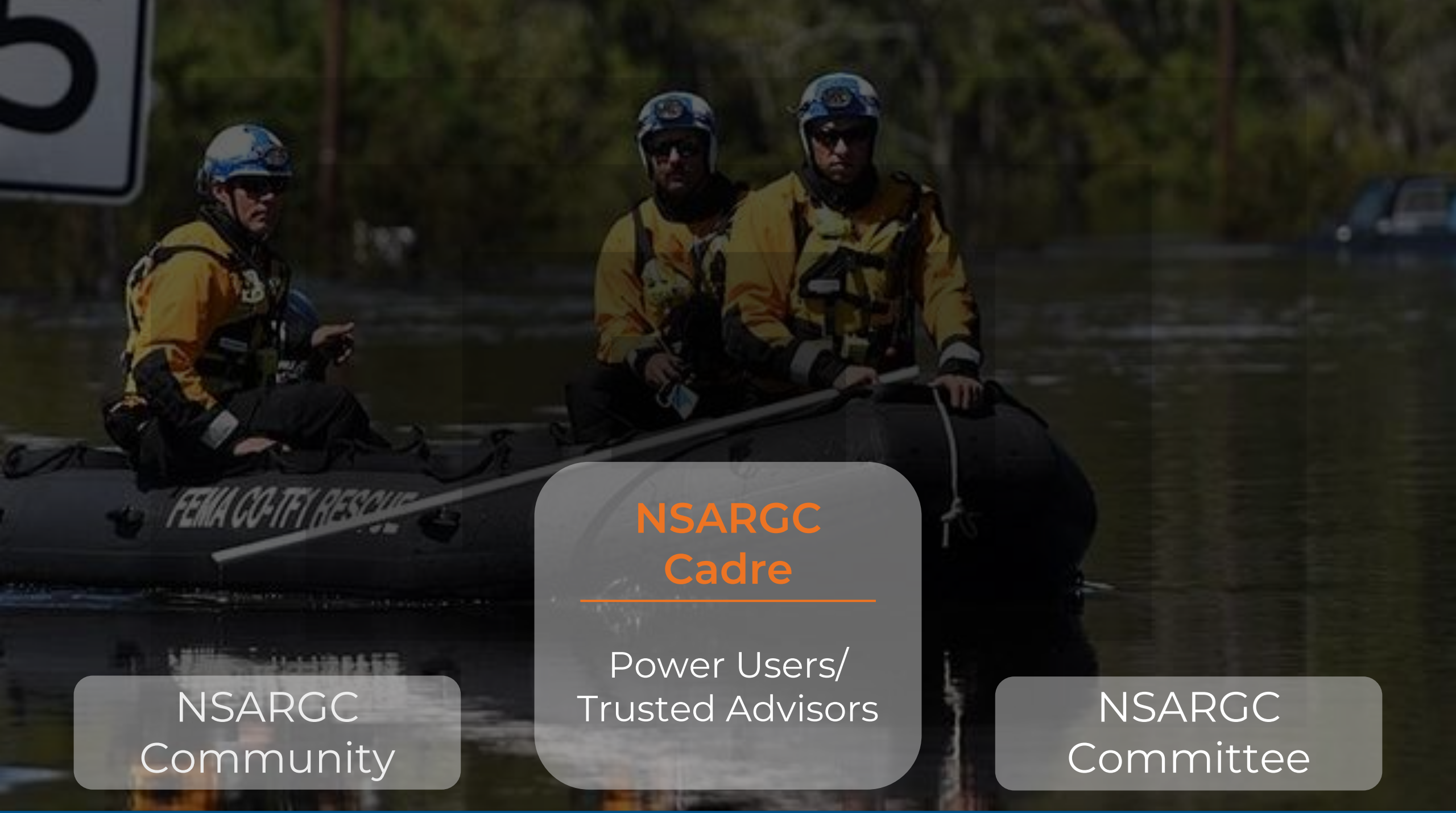


NSARGC Community

All NSARGC stakeholders

NSARGC Cadre

NSARGC Committee

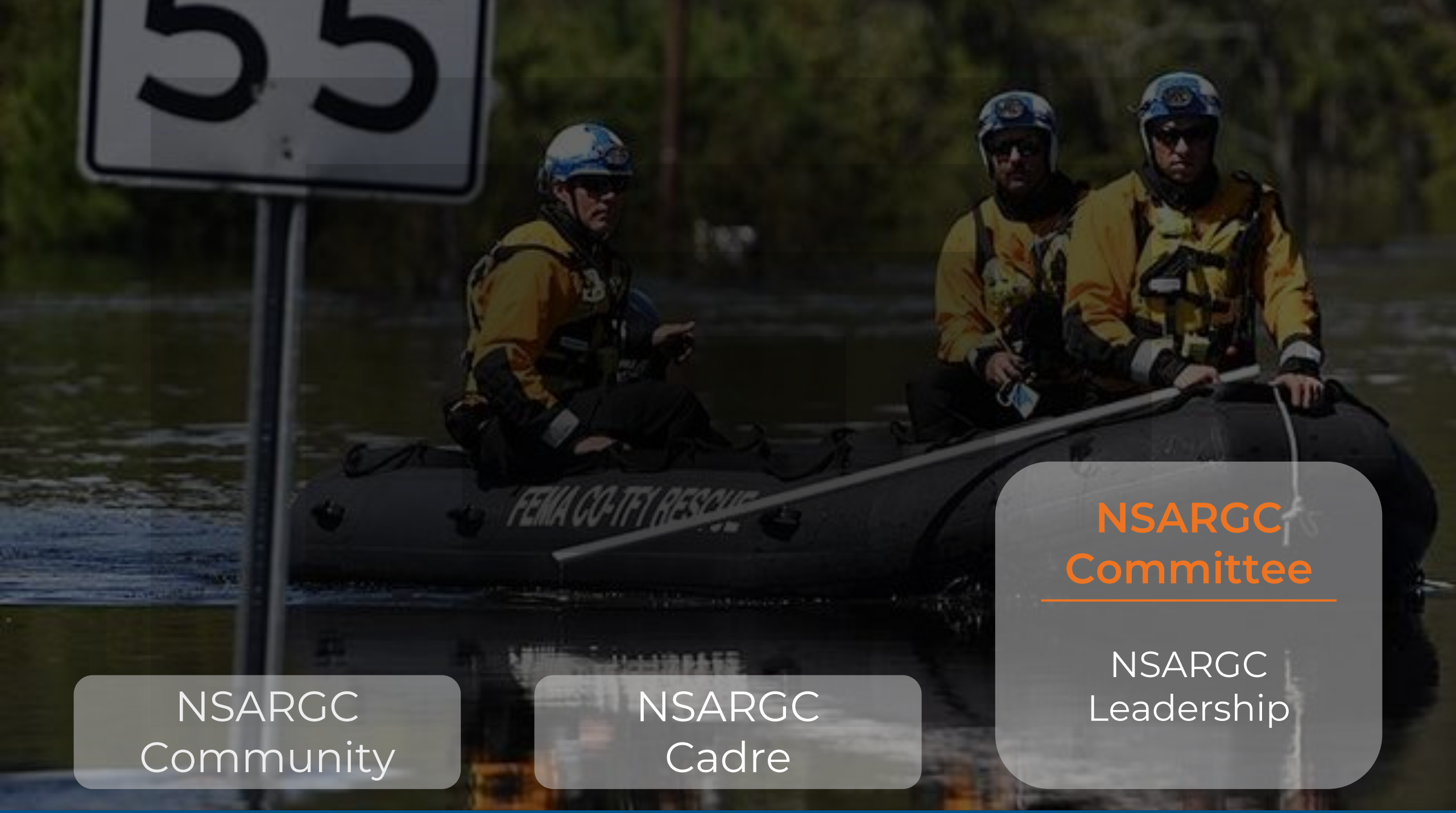


NSARGC Community

NSARGC Cadre

Power Users/ Trusted Advisors

NSARGC Committee



NSARGC Community

NSARGC Cadre

NSARGC Committee

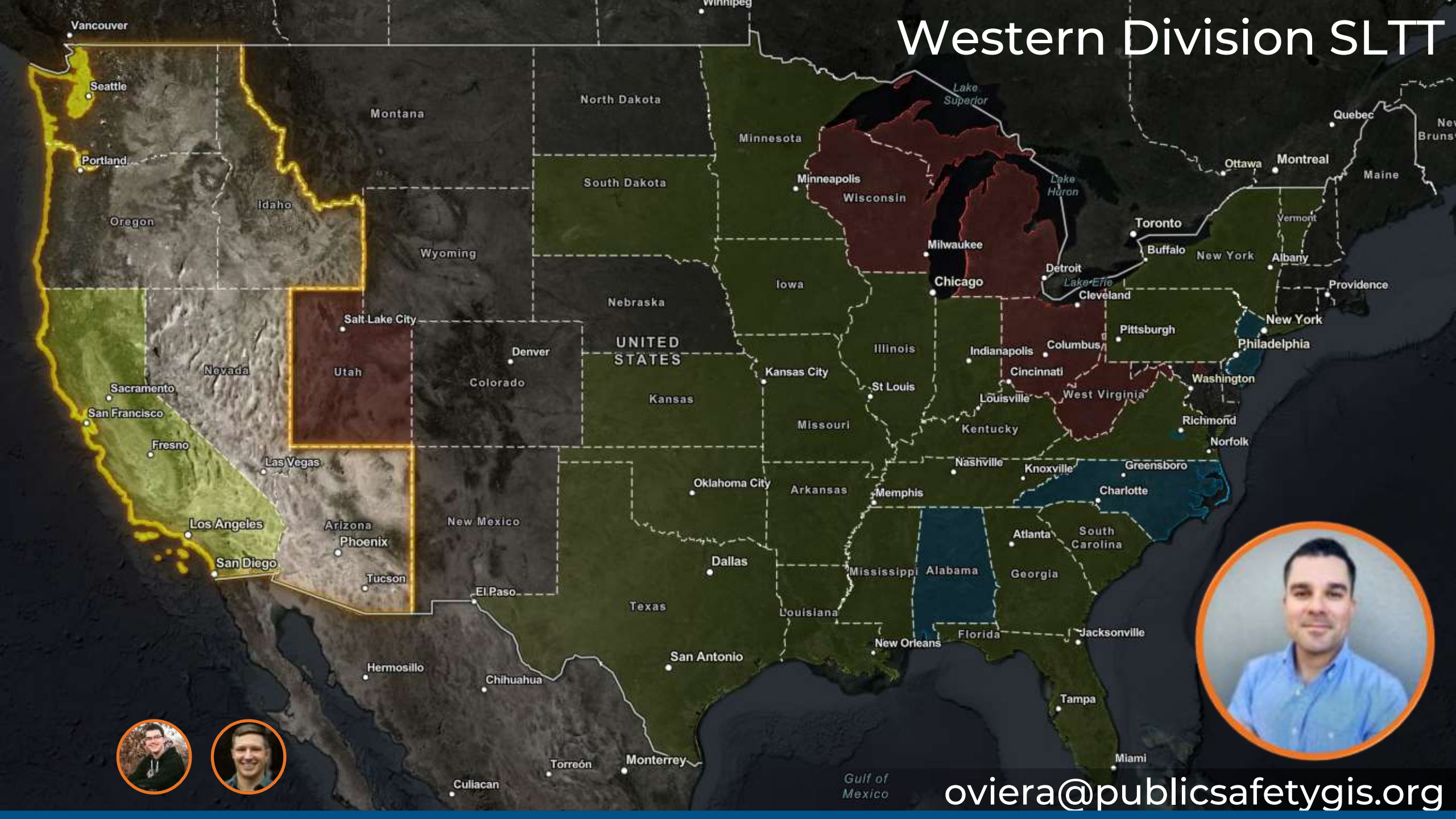
NSARGC Leadership

NSARGC Committee Participating Agencies

FEMA US&R Support

paul.doherty@fema.dhs.gov

Western Division SLTT

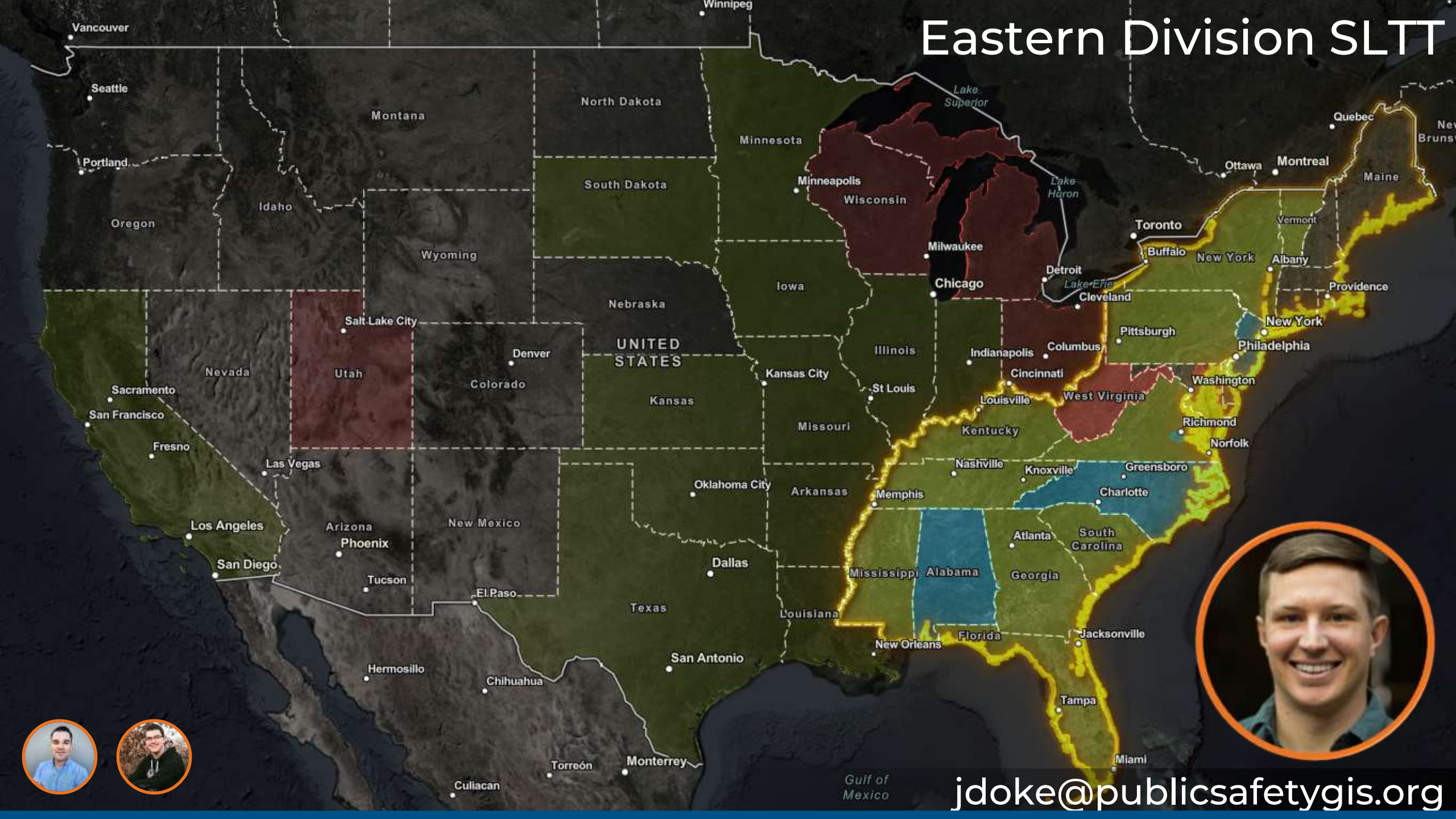


oviera@publicsafetygis.org

Central Division SLTT

afackler@publicsafetygis.org

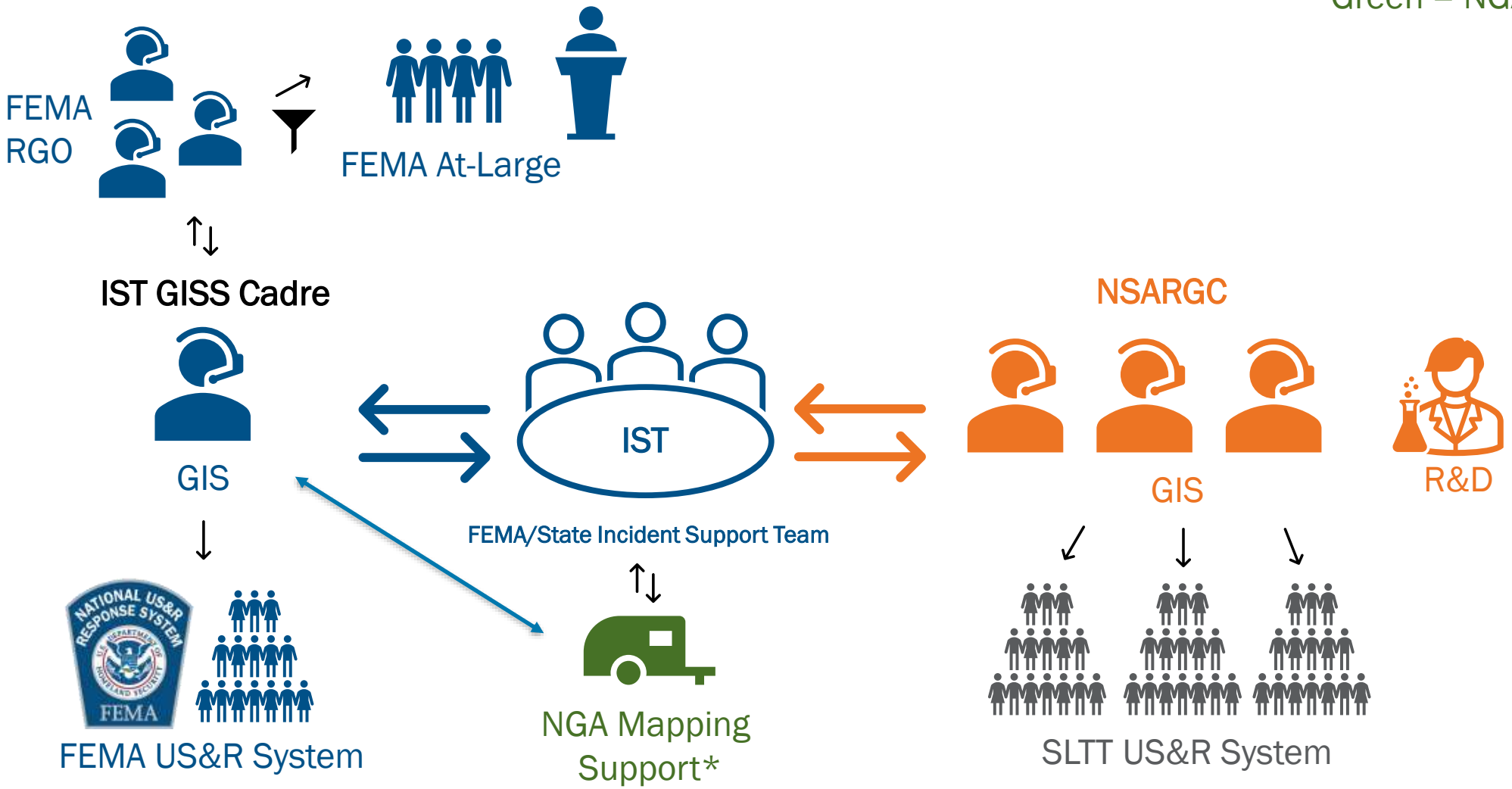
Eastern Division SLTT



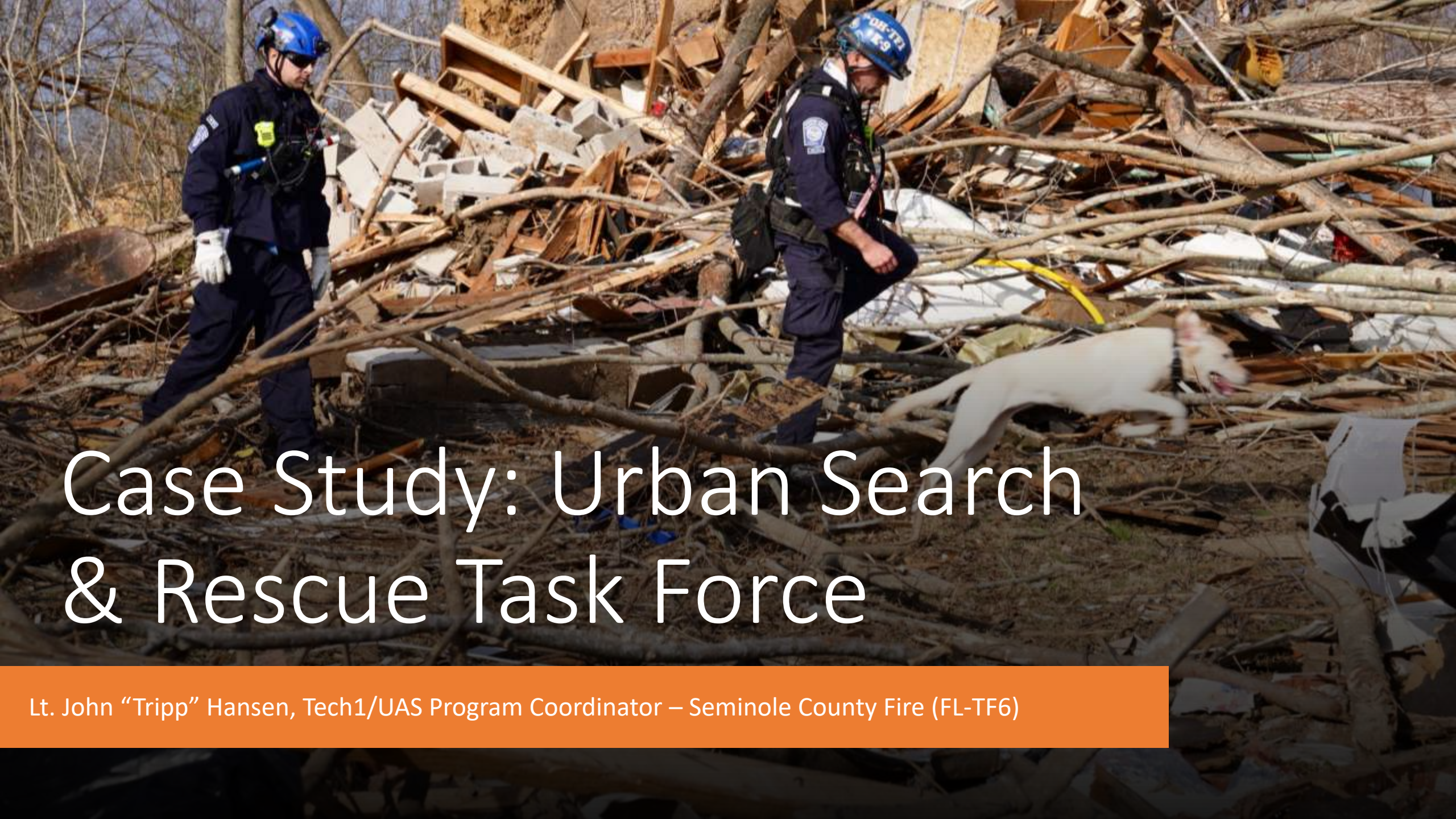
jdoke@publicsafetygis.org

SARCOP – People (Response)

FEMA = Blue
Orange = NSARGC
Grey = SLTT
Green = NGA



*Via ESF9 Mission Assignment when incident scope and complexity requires.



Case Study: Urban Search & Rescue Task Force

Lt. John “Tripp” Hansen, Tech1/UAS Program Coordinator – Seminole County Fire (FL-TF6)

People

Process

Technology

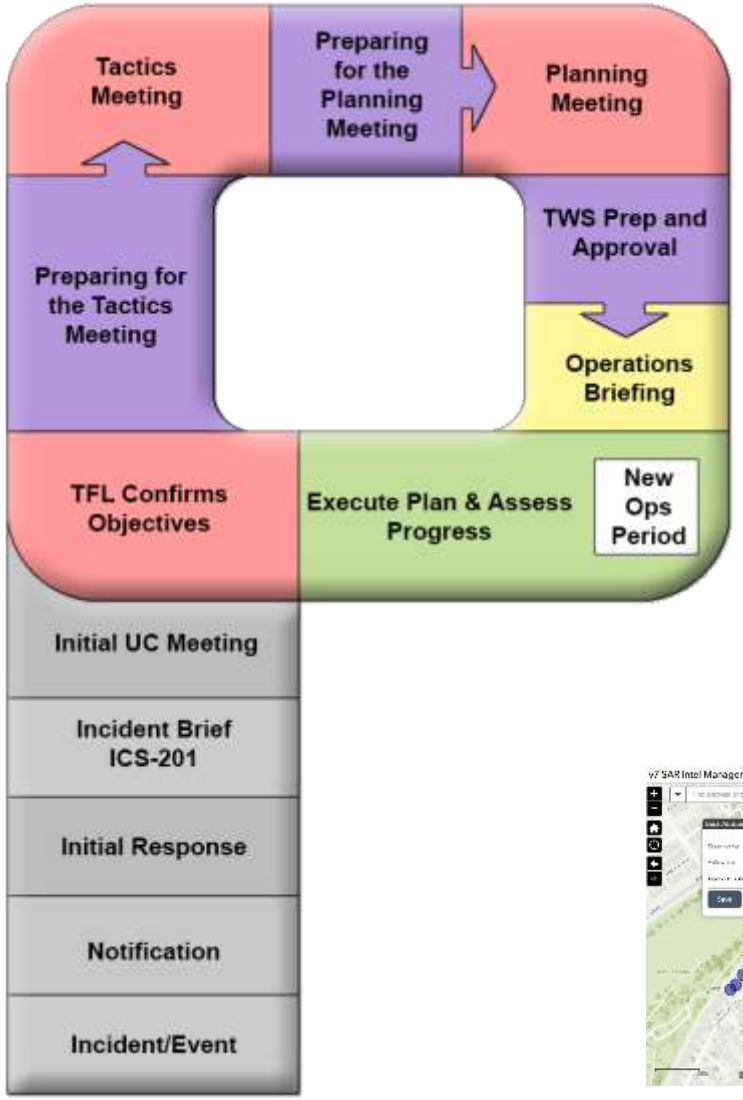
Integrate into existing processes
while developing new ones to support the mission

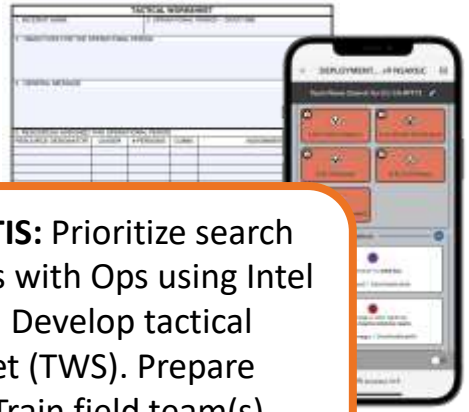
“Geospatial” Planning P

2 Plans/TIS: Create search segments using Intel Manager.

1 Plans/TIS: Refine common operating map with forecasts/early impacts. Determine objectives. Review Search Data Documentation Requirements (SDDR).

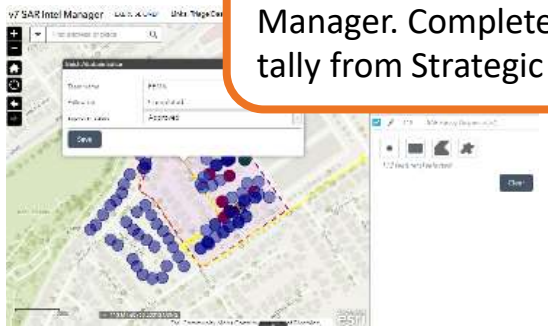
0 Plans/TIS: Prep the common operating map, forecast, and early impacts. **Field:** Use QuickCapture to document initial searches (recon, hasty, if applicable).





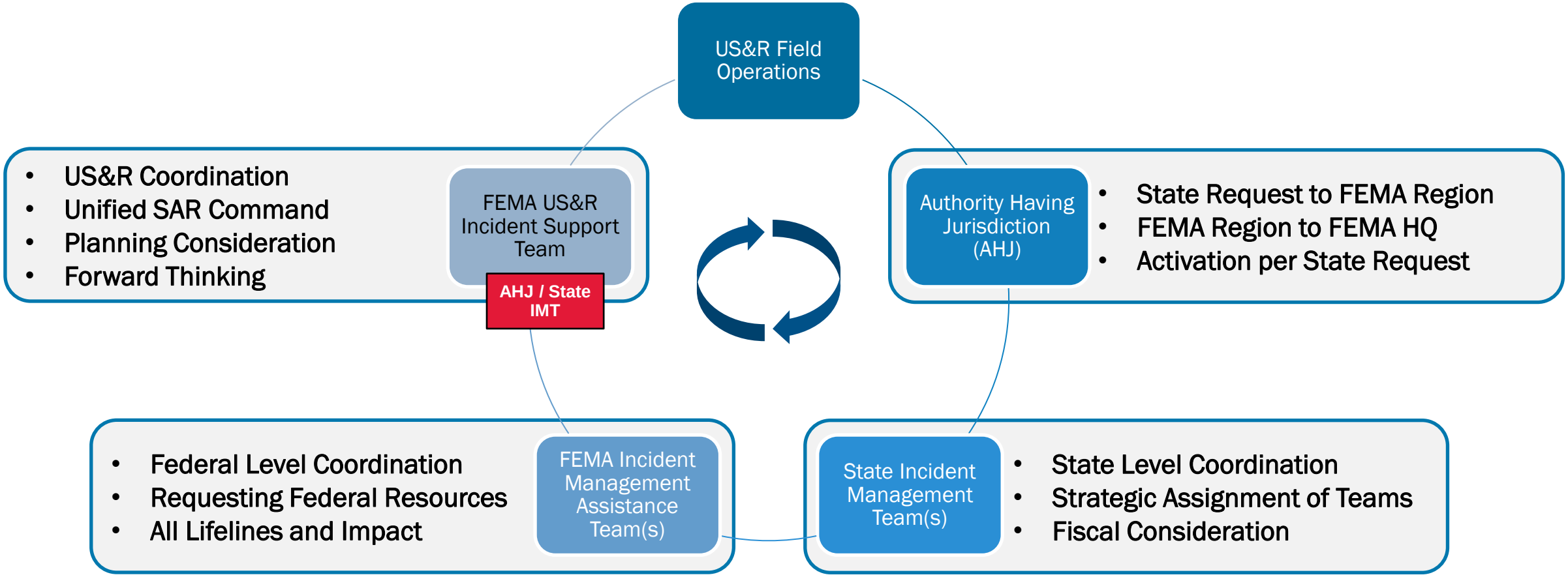
3 Plans/TIS: Prioritize search segments with Ops using Intel Manager. Develop tactical worksheet (TWS). Prepare devices. Train field team(s).

4 Plans/TIS: Monitor Tactical Dashboard. **Field:** Use QuickCapture for tracklogs and waypoints and Field Maps for SA.



5 Plans/TIS: Review, assign follow-ups, approve data using Intel Manager. Complete an ICS 209 with tally from Strategic Dashboard.

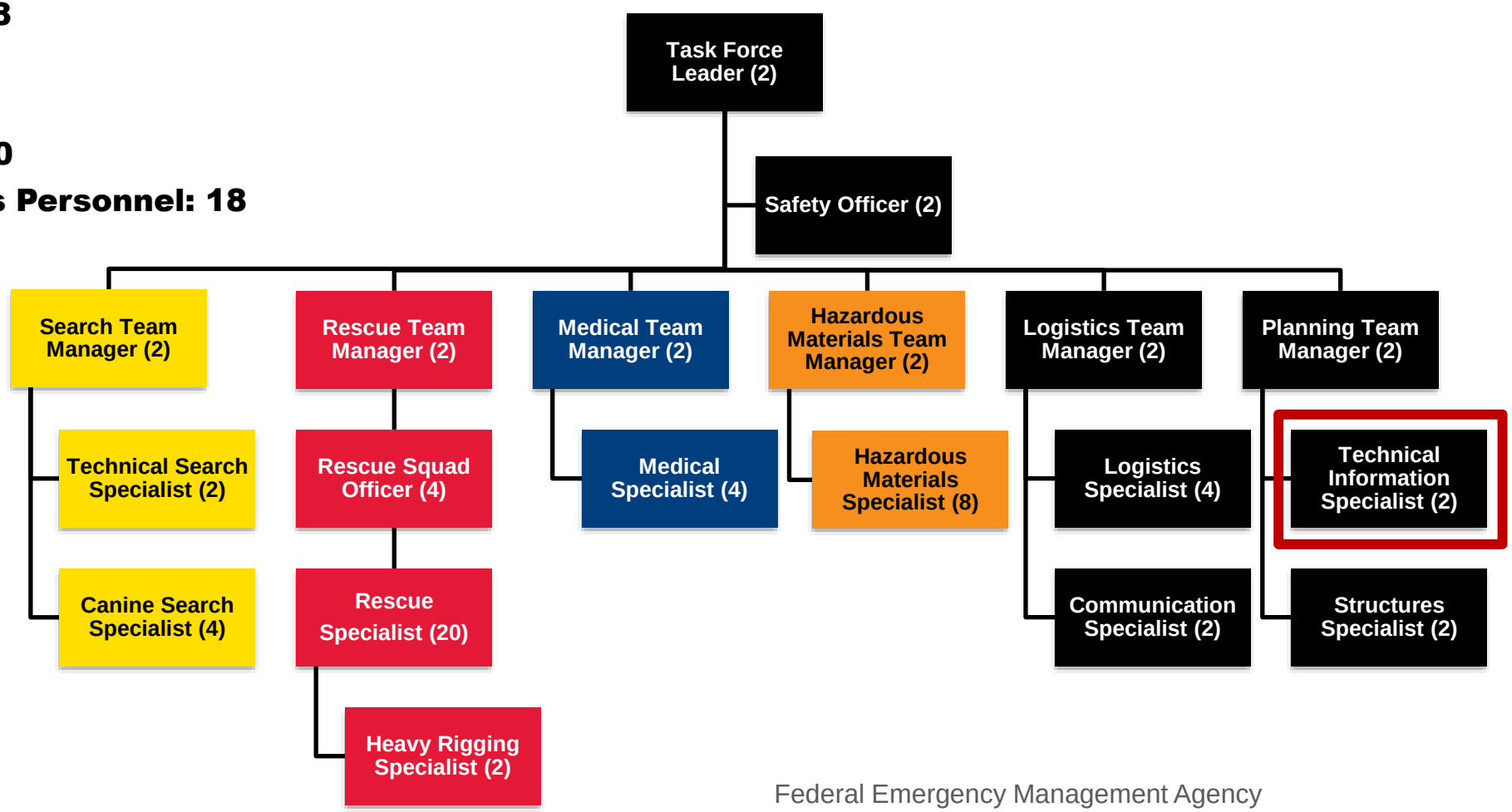
US&R Field Operations



FEMA US&R – Type 1 Task Force

Type I Task Force: 70 personnel

- **Rescue Personnel: 28**
- **Search Personnel: 8**
- **Medical Personnel: 6**
- **HazMat Personnel: 10**
- **Command/Logs/Plans Personnel: 18**



FEMA

Canine Search

- Live Find (LF)
- Human Remains Detection (HRD)
- Handlers work 30+ hours a week training their canine
- 4 deploy with a Type 1
- Lives with the handler
- Certification Evaluation

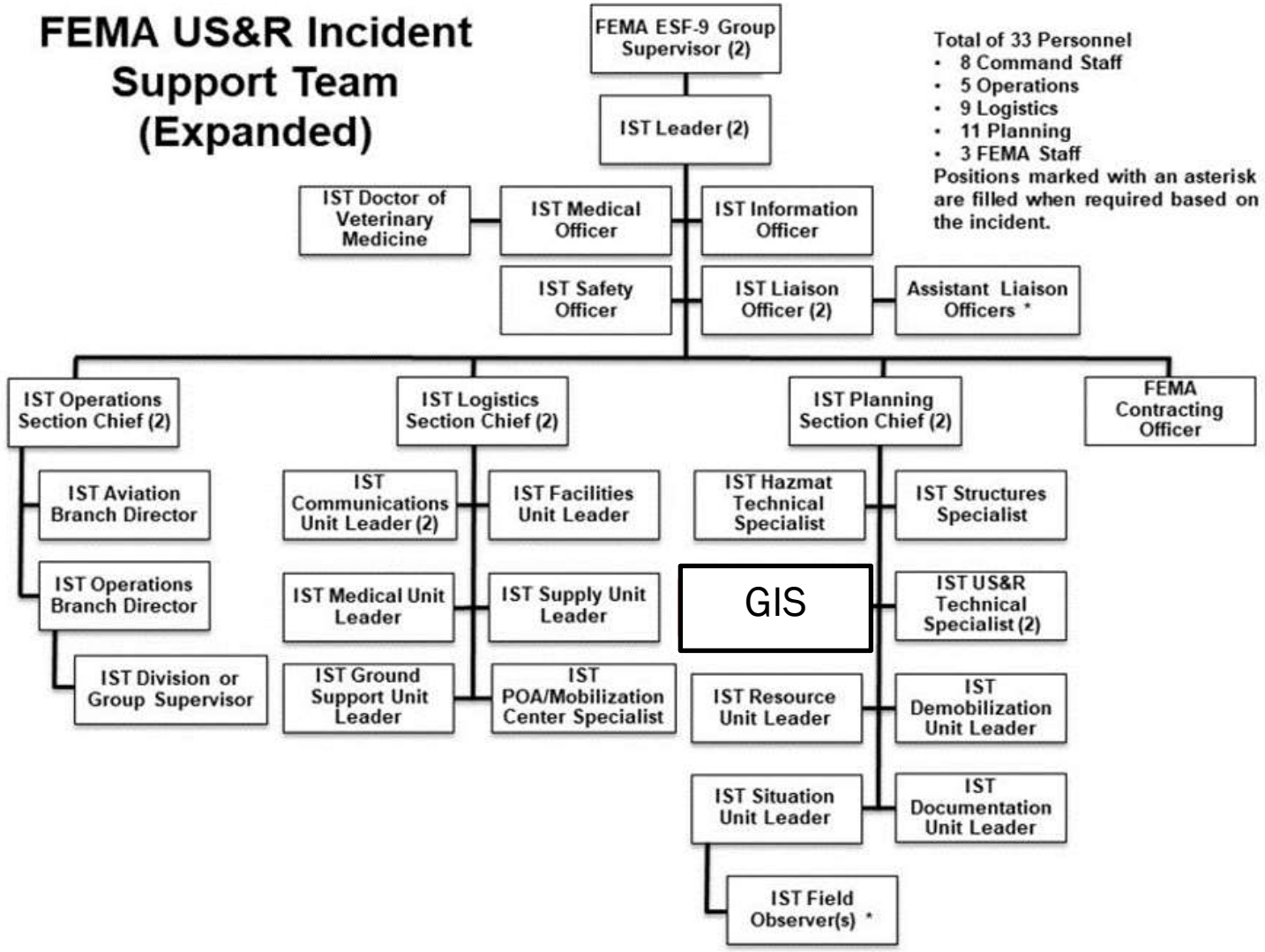
Technical Search

- Search Cameras
- Delsar Listening Devices
- Other Equipment

Rescue

- Breaching
- Lift and Moving
- Shoring
- Rope Rescue
- Confined Space

FEMA US&R – Incident Support Team



FEMA

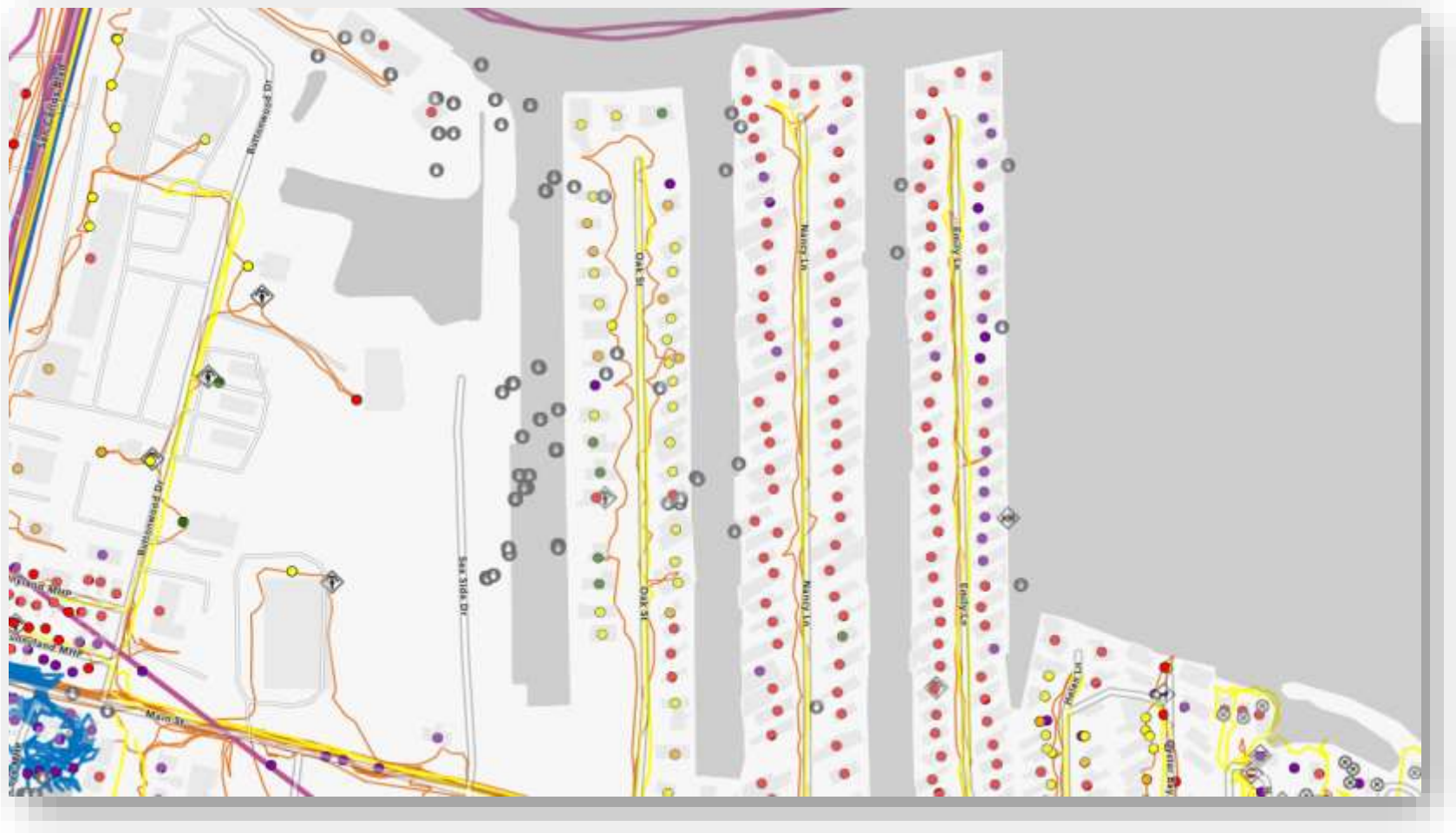
Incident Support Team - One Team, One Fight

FEMA US&R White IST +Louisiana and South Carolina IST

FEMA

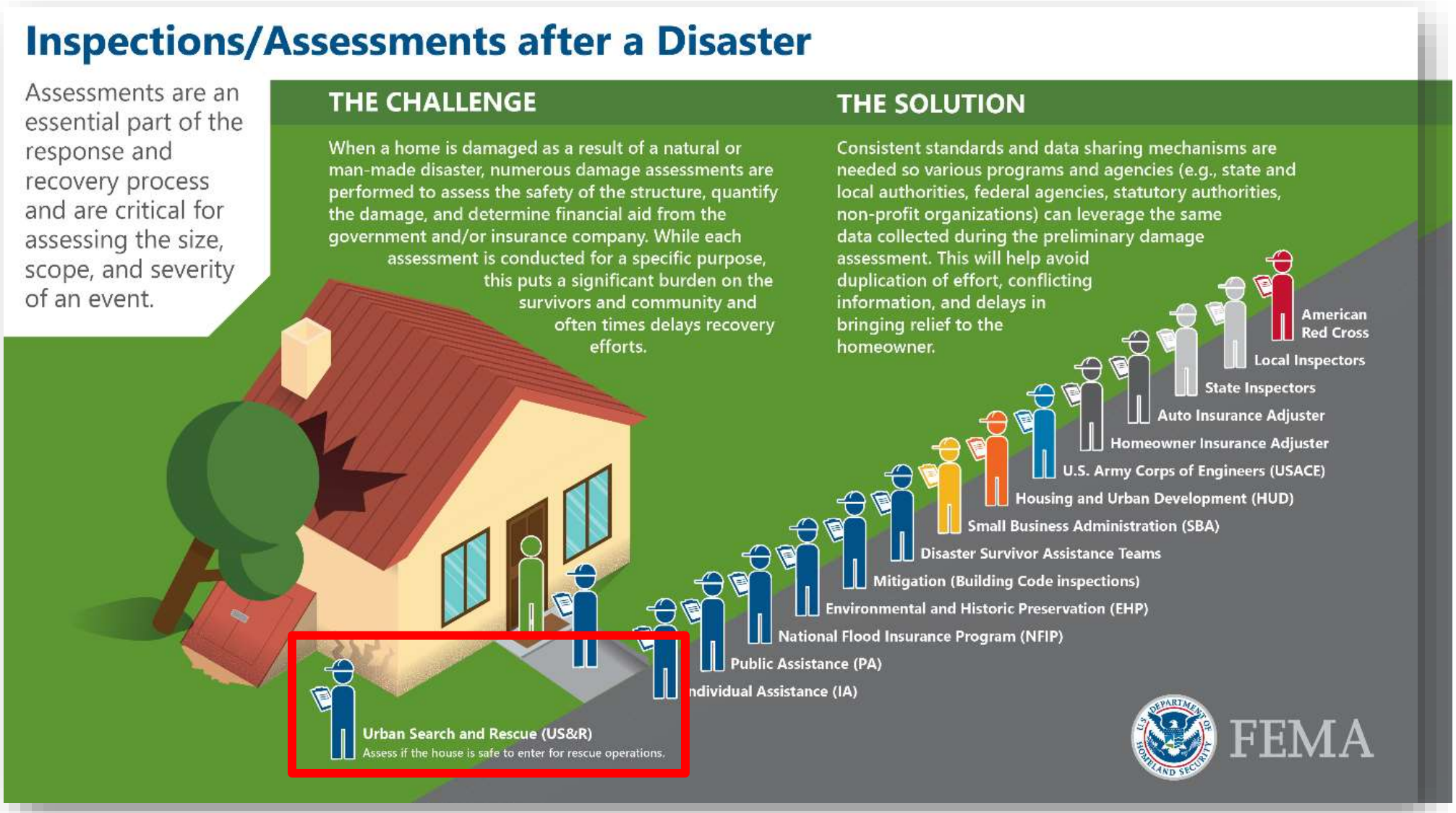
Wide Area Search Process

Where are areas that have/have not already been covered?



Tracklogs and waypoints created by Task Forces (FEMA, State, Local) in the field.

Life Sustaining Mission



Feed The Information Up

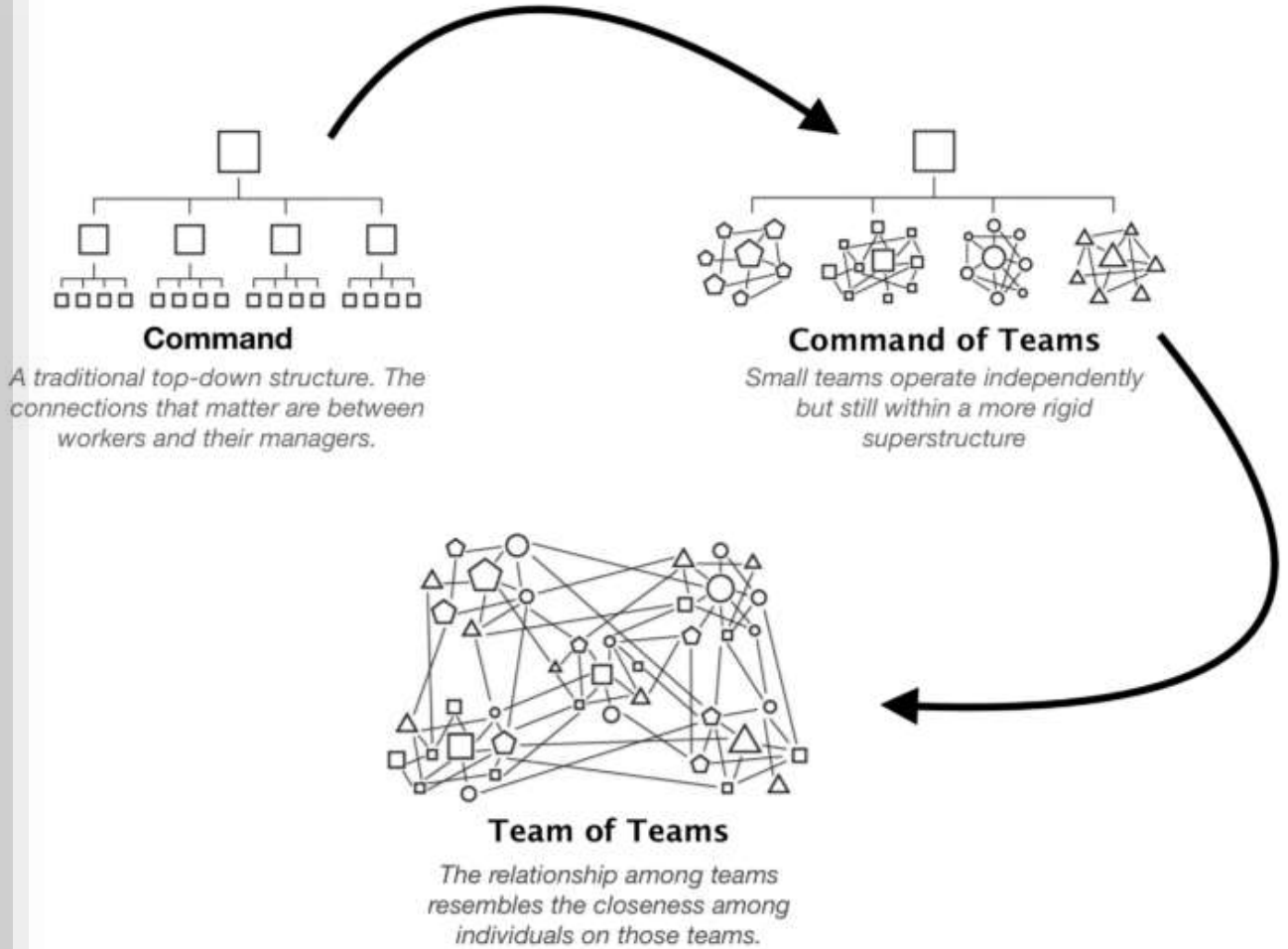
- How many Task Forces?
- How many personnel?
- Staged in what cities?
- Where are teams now?
- What are the conditions there?
- How many rescues as of right now?
- How many rescues last night?
- How many combined rescues over the 4 states, by federal, state and volunteer teams, broken down by day and by hour?
- I can see on CNN that….

FEMA

Wide Area Search Process

Case Study: US&R Incident Support Team

Paul Doherty – US&R Incident Support Team GIS Specialist



Team of Teams: New Rules of Engagement for a Complex World – General Stanley McChrystal

People

Process

Technology

What is SARCOP?

Intel Manager provides team managers search operation and review field with the ability to plan the data.

Intel Manager

Dashboards

Dashboards provide command with real-time tracking and situation reports.

These can be filtered based on the audience.

QuickCapture

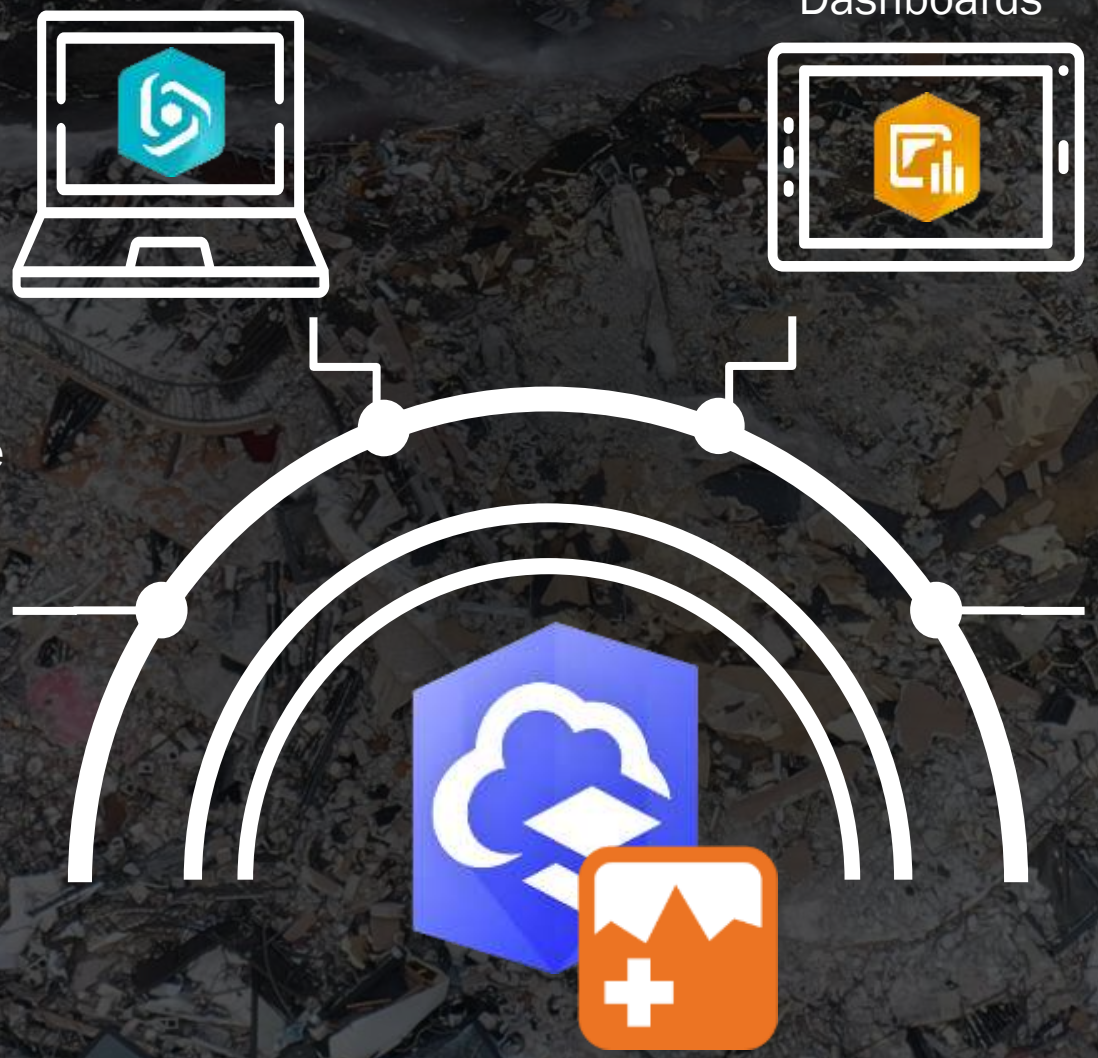
Mobile apps provide field data collection, navigation, and shared situational awareness in the field.

QuickCapture, Field Maps, and Survey123.

We also use Microsoft Teams for sharing situation updates and remote tasking.

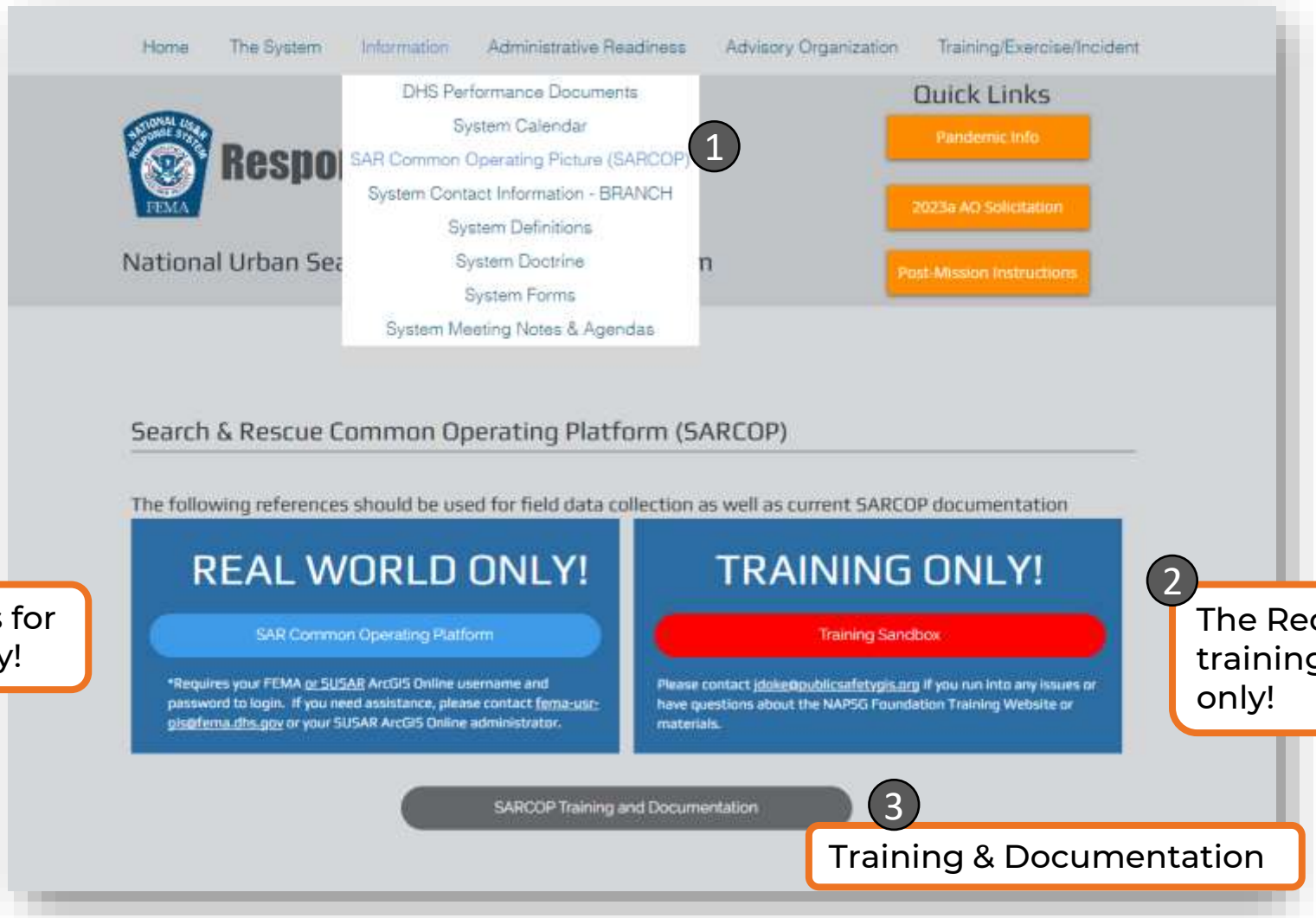
ArcGIS Pro

ArcGIS Pro provides GIS Specialist with map production, spatial analysis, and the integration of AI.



Search and Rescue Common Operating Platform

Access the SARCOP Sandbox for Training



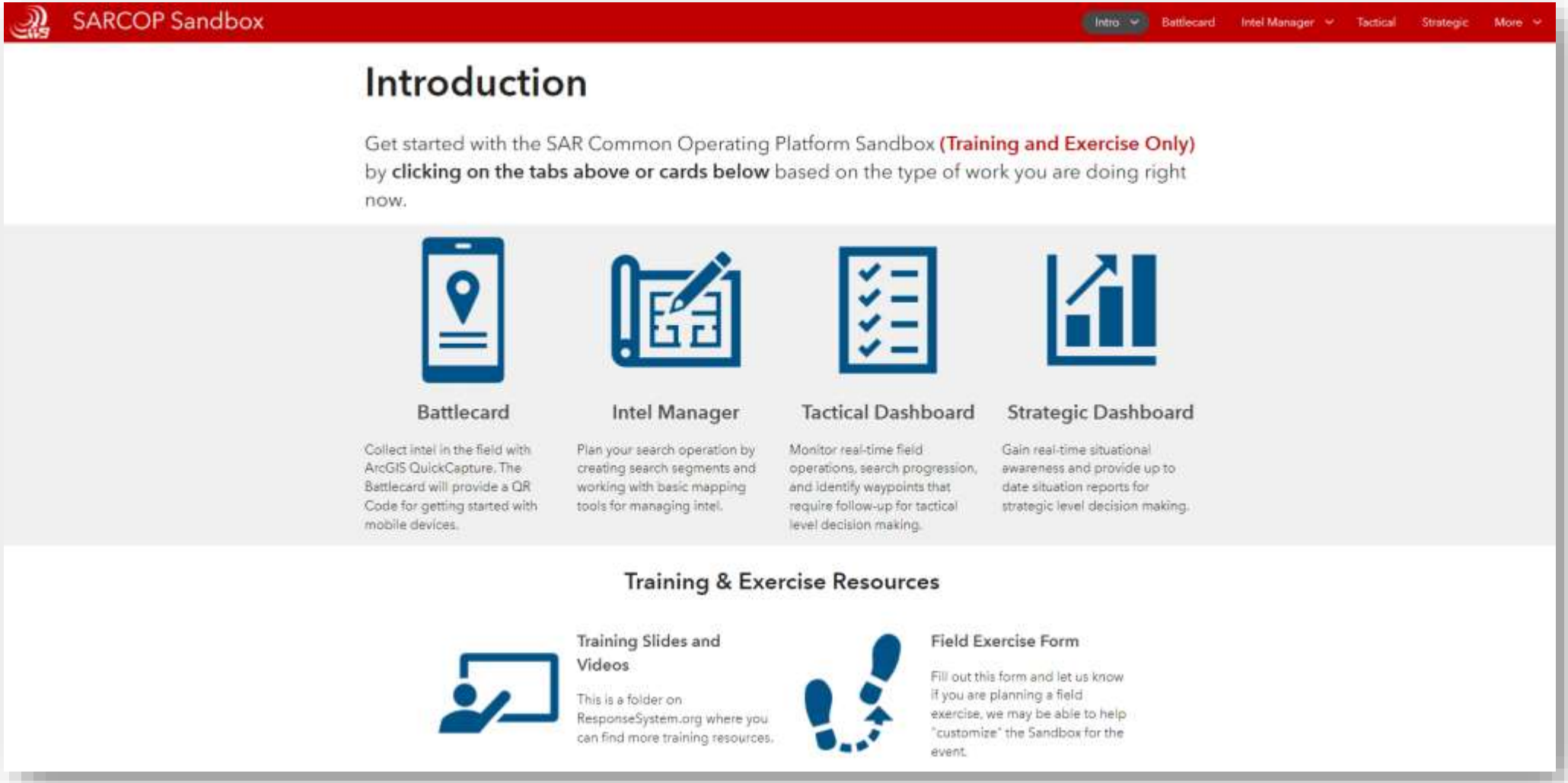
The Blue Button is for real-world use only!

The Red Button is for training and exercises only!

Training & Documentation

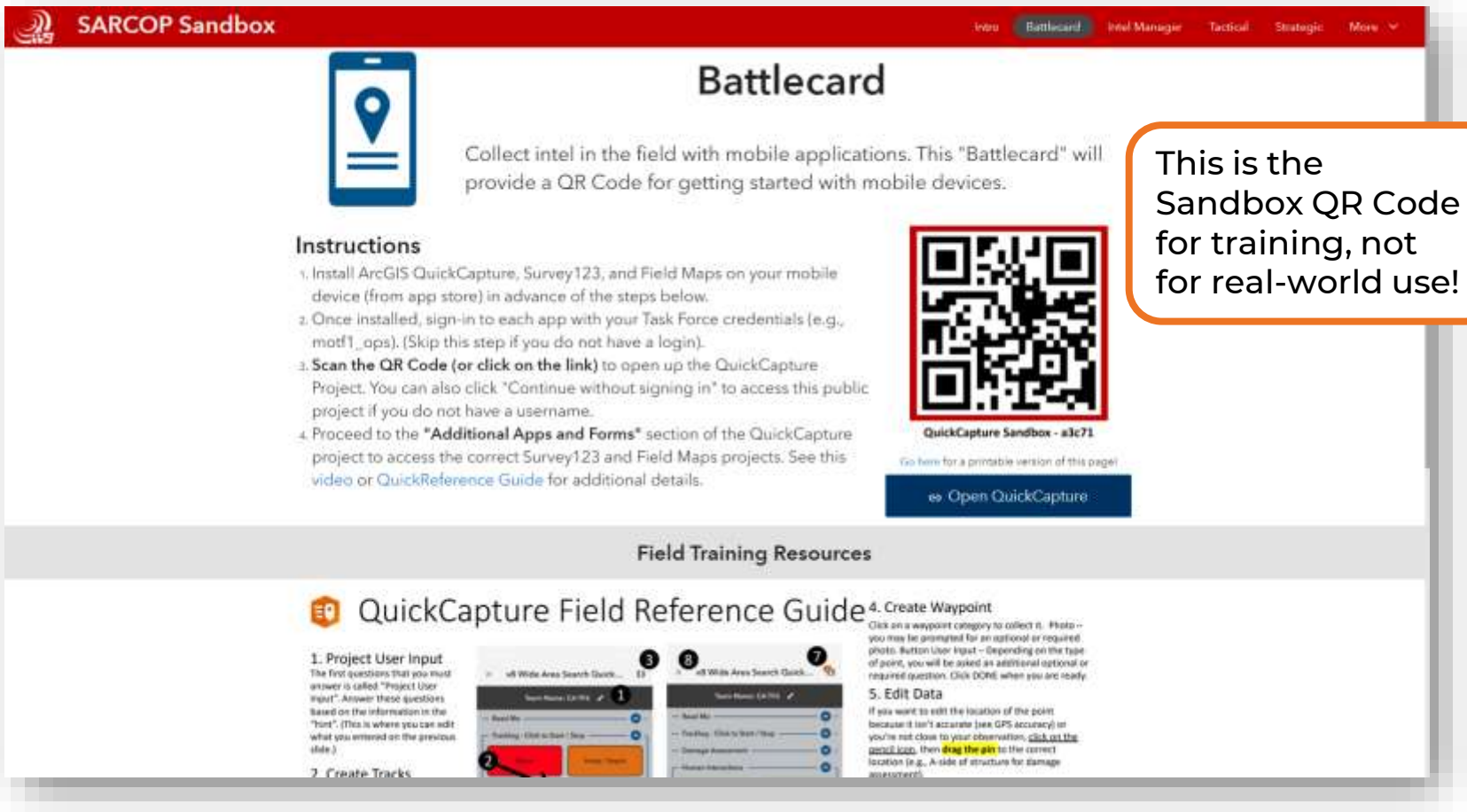
https://www.responsesystem.org/sarcop

SARCOP Sandbox (Red = Training Only!)



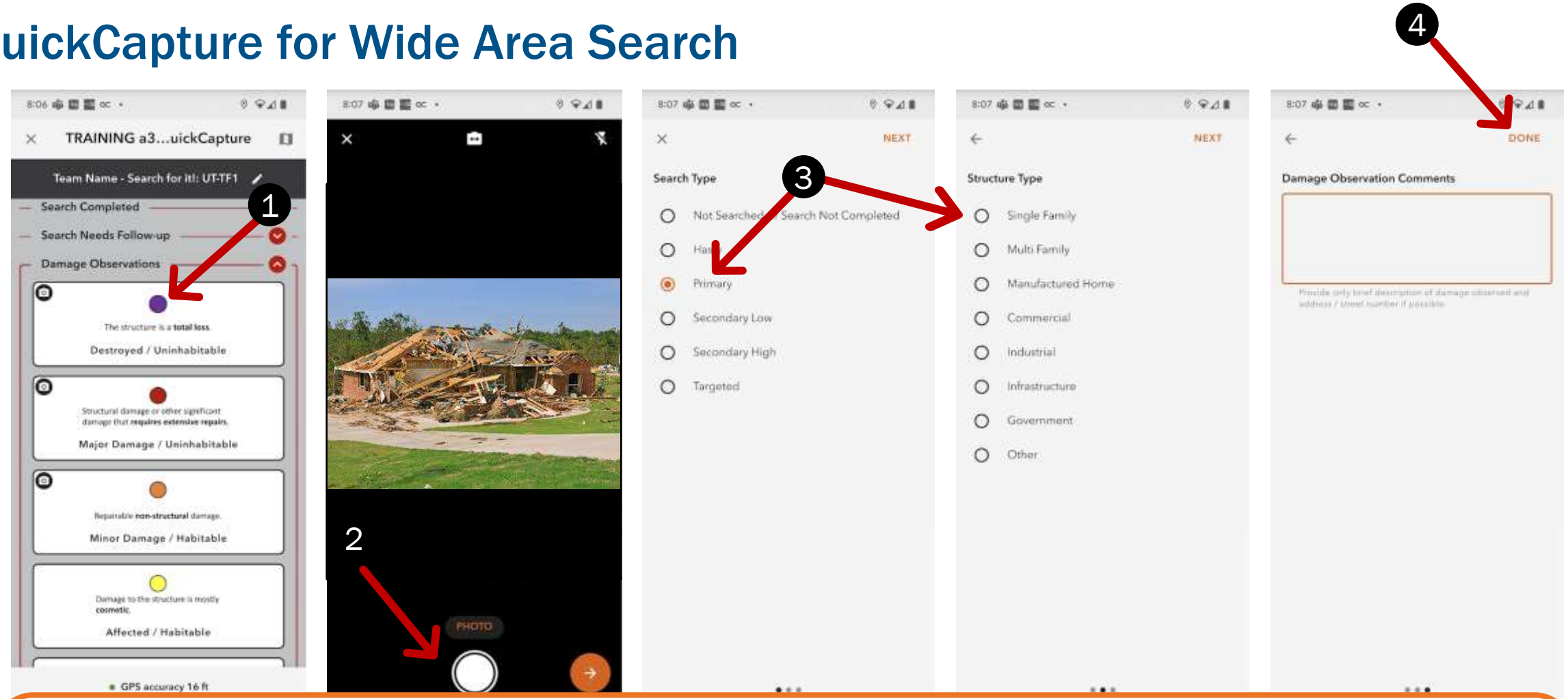
Battlecard

- A battlecard is a simple way to deploy field apps via a QR Code.
- It is set up to start with QuickCapture, then to install additional forms and apps from there.
- **Note:** For real-world, the Deployment (blue) QR code is used for all incidents (is not incident-specific).



This is the Sandbox QR Code for training, not for real-world use!

QuickCapture for Wide Area Search



1. Click on a waypoint category.
2. Photo – you may be prompted for an optional or required photo. Landscape preferred!
3. Button User Input – Depending on the type of point, you will be asked an additional optional or required question.
4. Click DONE when you are ready.

*This sends the information to database and maps (when connected, stores on device when offline).

Purpose of SARCOP

What needs to be searched?
What have we searched?
What needs follow-up?
Where do we search next?

SARCOP is not....

01

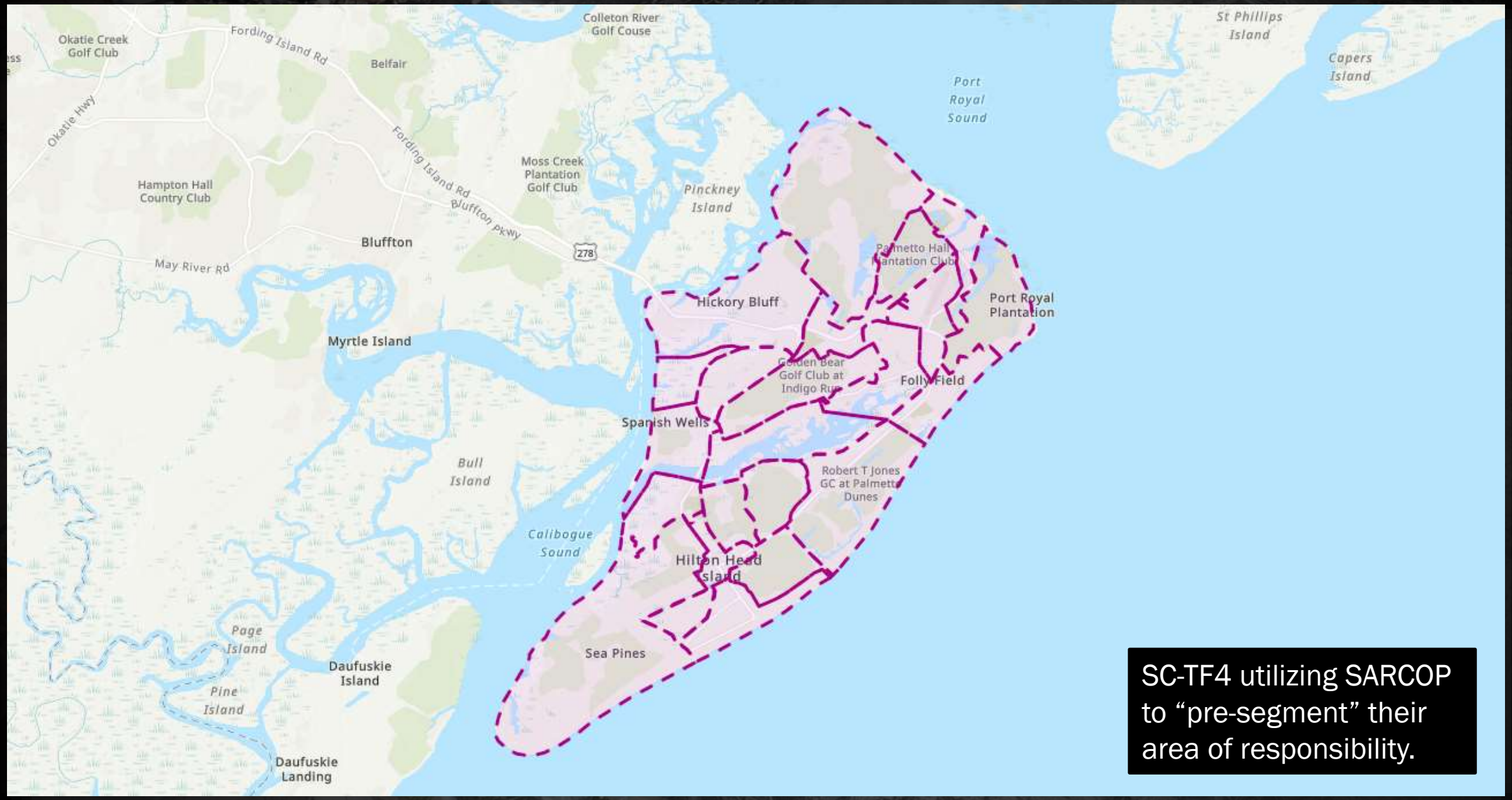
A Preliminary Damage Assessment (PDA) tool

A system to store Personally Identifiable Information (PII)

02

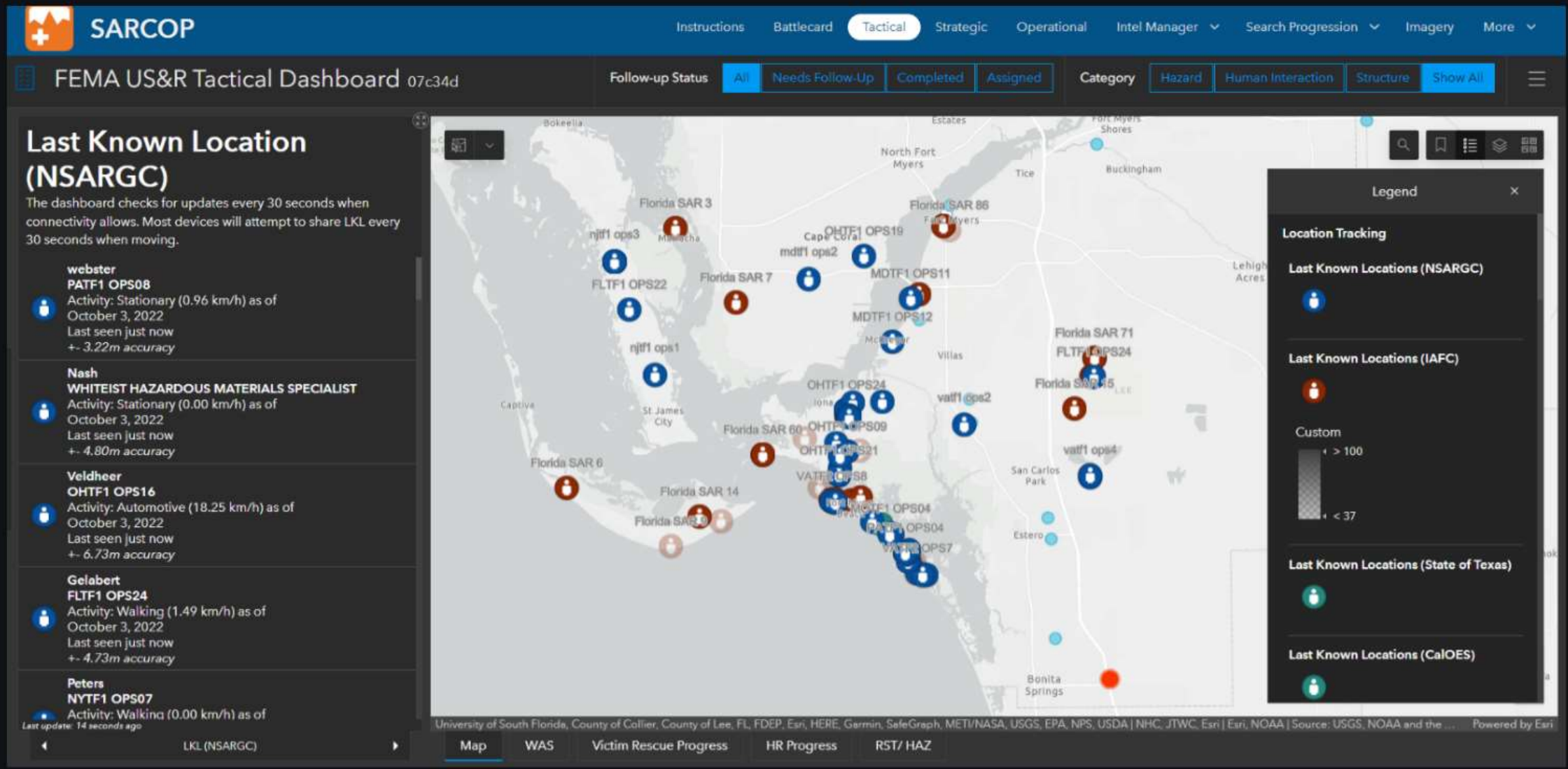
Why Use SARCOP?

Pre-Incident Planning



SC-TF4 utilizing SARCOP to “pre-segment” their area of responsibility.

Real-Time Tracking (Interagency)



We were able to see where both Federal and State Task Forces were working, in real-time, on one map thanks to Location Sharing in QuickCapture.

Search Coverage Analysis

Search Coverage Analysis

Select an Event	Select a State	Select a Model Run	Select a Branch	Select a Division
20230810 HI Wildfires DR-472...	No State selected	2023-08-18, 20:31:51	No branch selected	No division selected

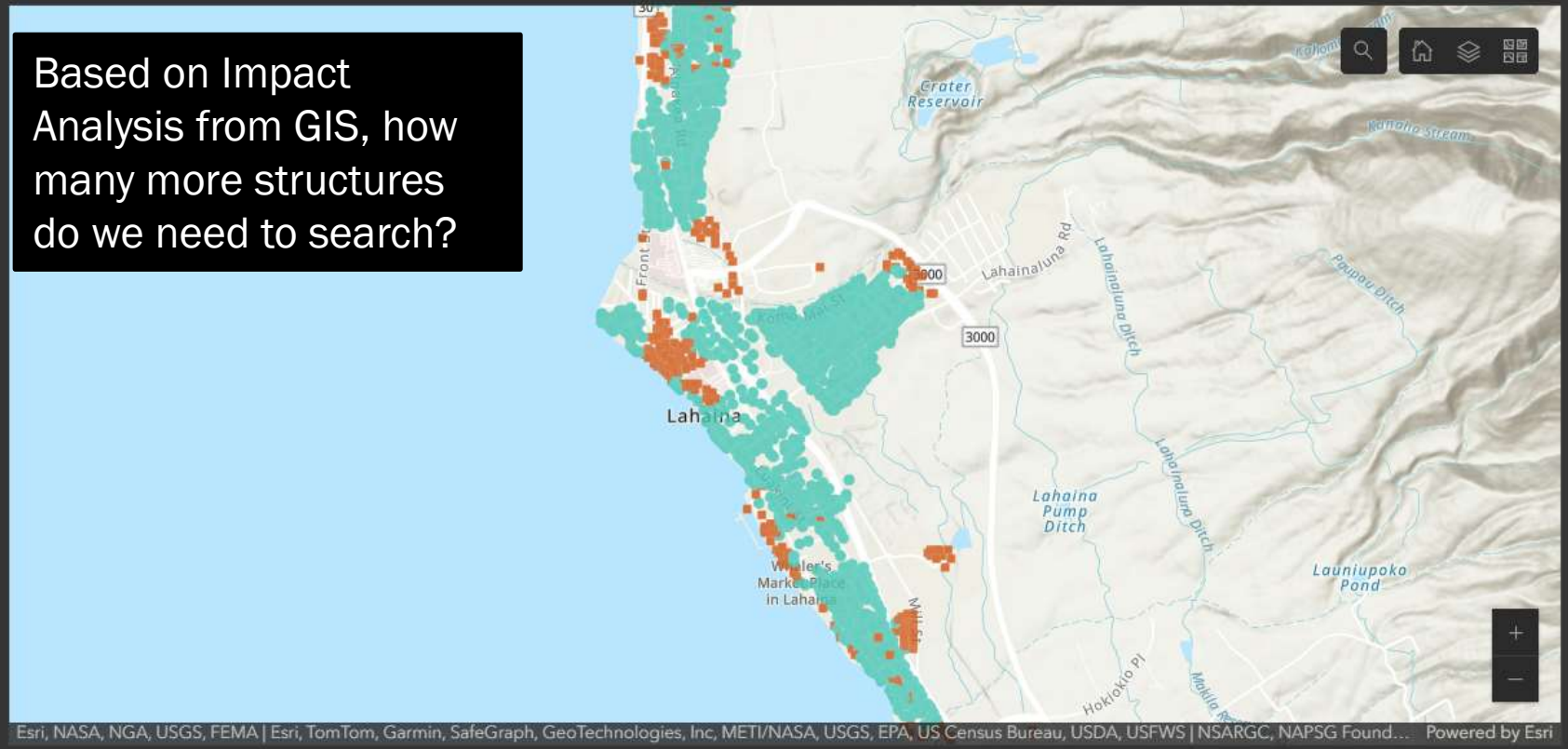
Search Coverage Analysis

Select latest run using the filters in the header.

Summary: This analysis uses the building footprints that are believed to be destroyed or affected and their distance from tracklogs and waypoints to estimate search progress. This analysis *does not factor* in delayering and search effort required at complex worksites.

PRE-DECISIONAL

Based on Impact Analysis from GIS, how many more structures do we need to search?



Search Coverage Analyzed Structures

Meters from Search Point/Track

- More than 15
- Less than 15

SARCOP v9 SIFS Internal View

SARCOP Divisions

Search Progress:

84.92%

of affected structures

Total Structures

2,063

Structures within 15m

1,752

of a Tracklog or Waypoint

of a search track/point

Structures beyond 15m

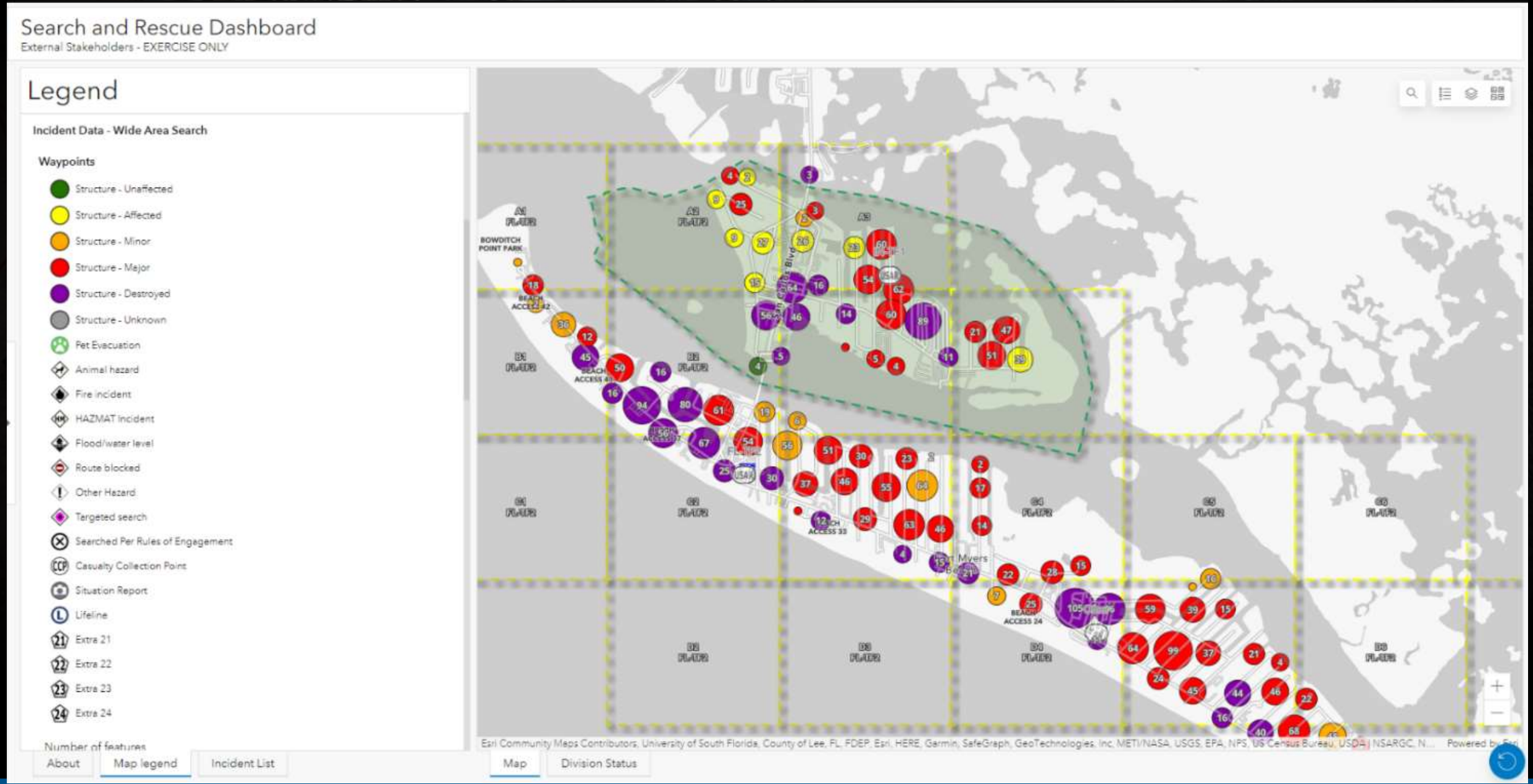
311

of a Tracklog or Waypoint

from a search track/point

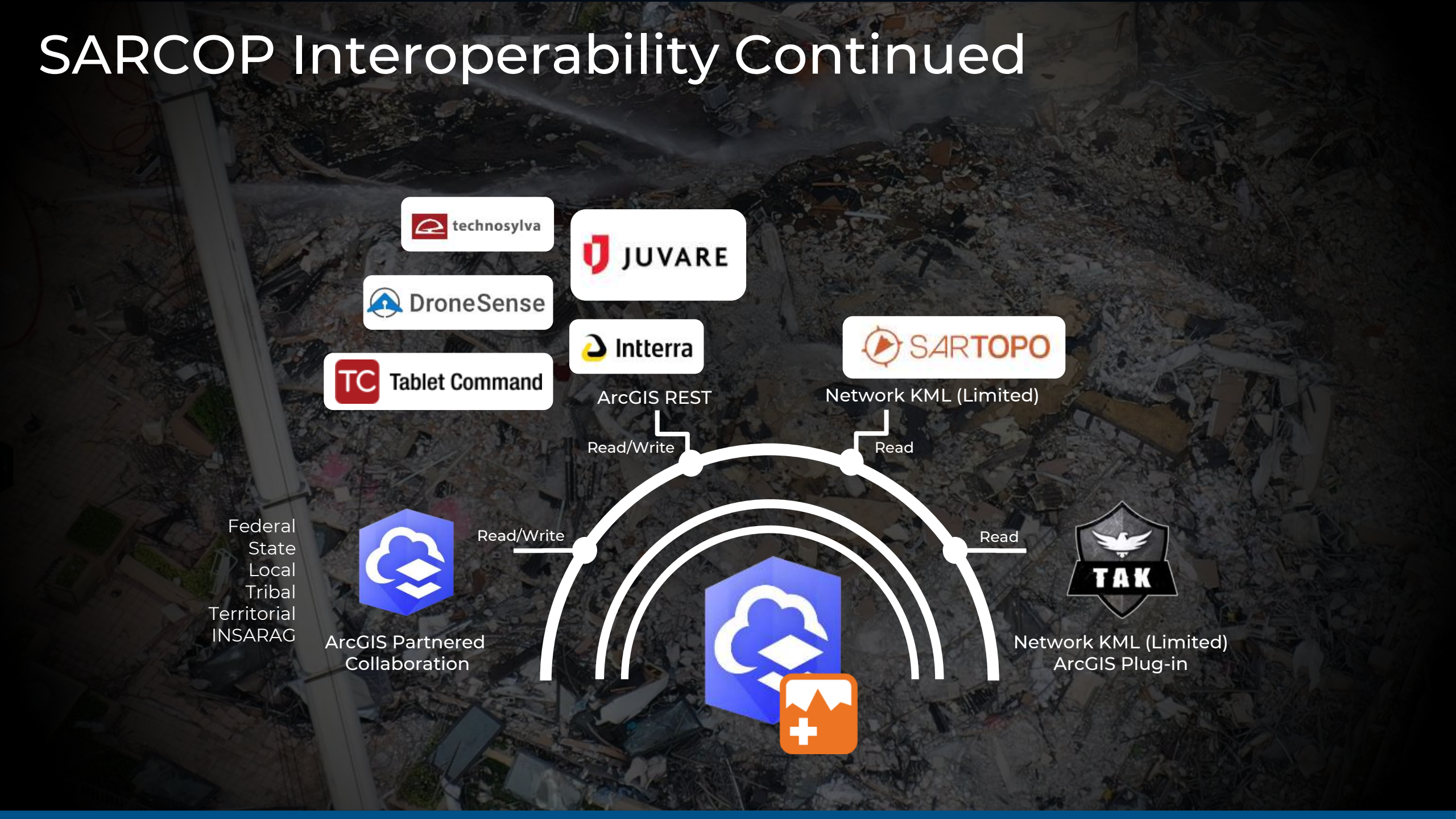
Search Coverage Analysis

External Dashboard (Damage Only)

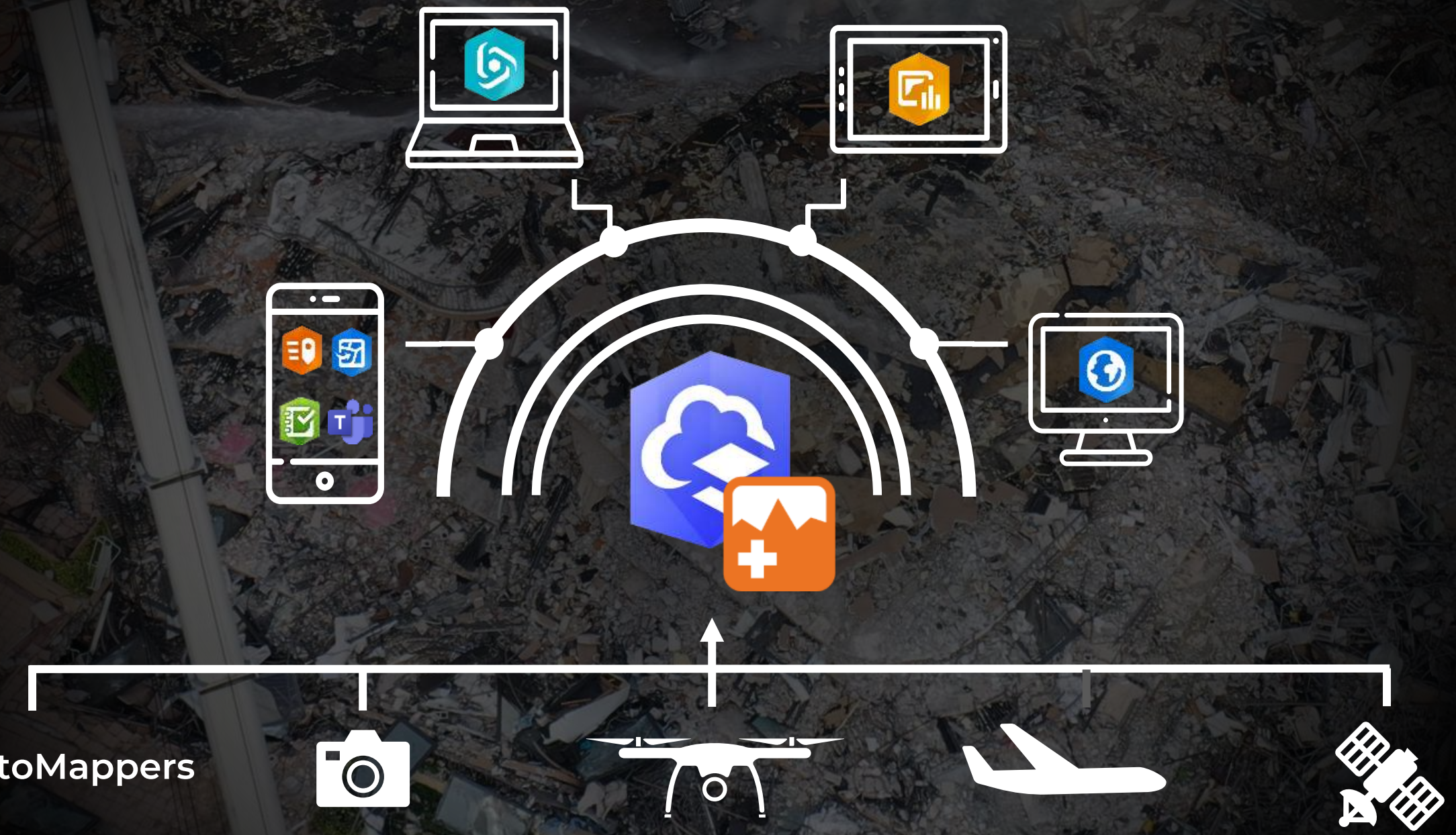


SARCOP Interoperability

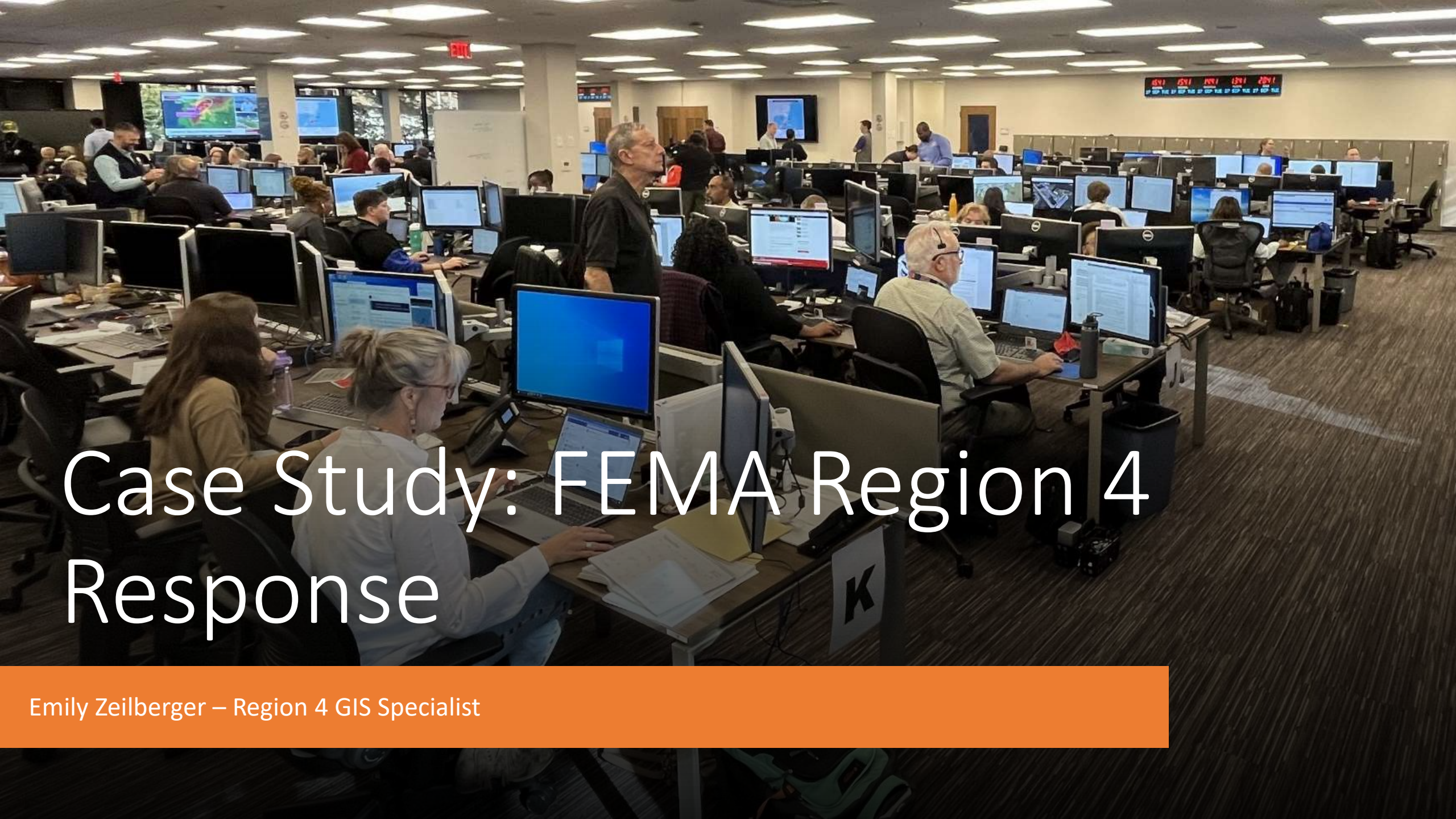
SARCOP Interoperability Continued



Imagery in SARCOP



#PhotoMappers



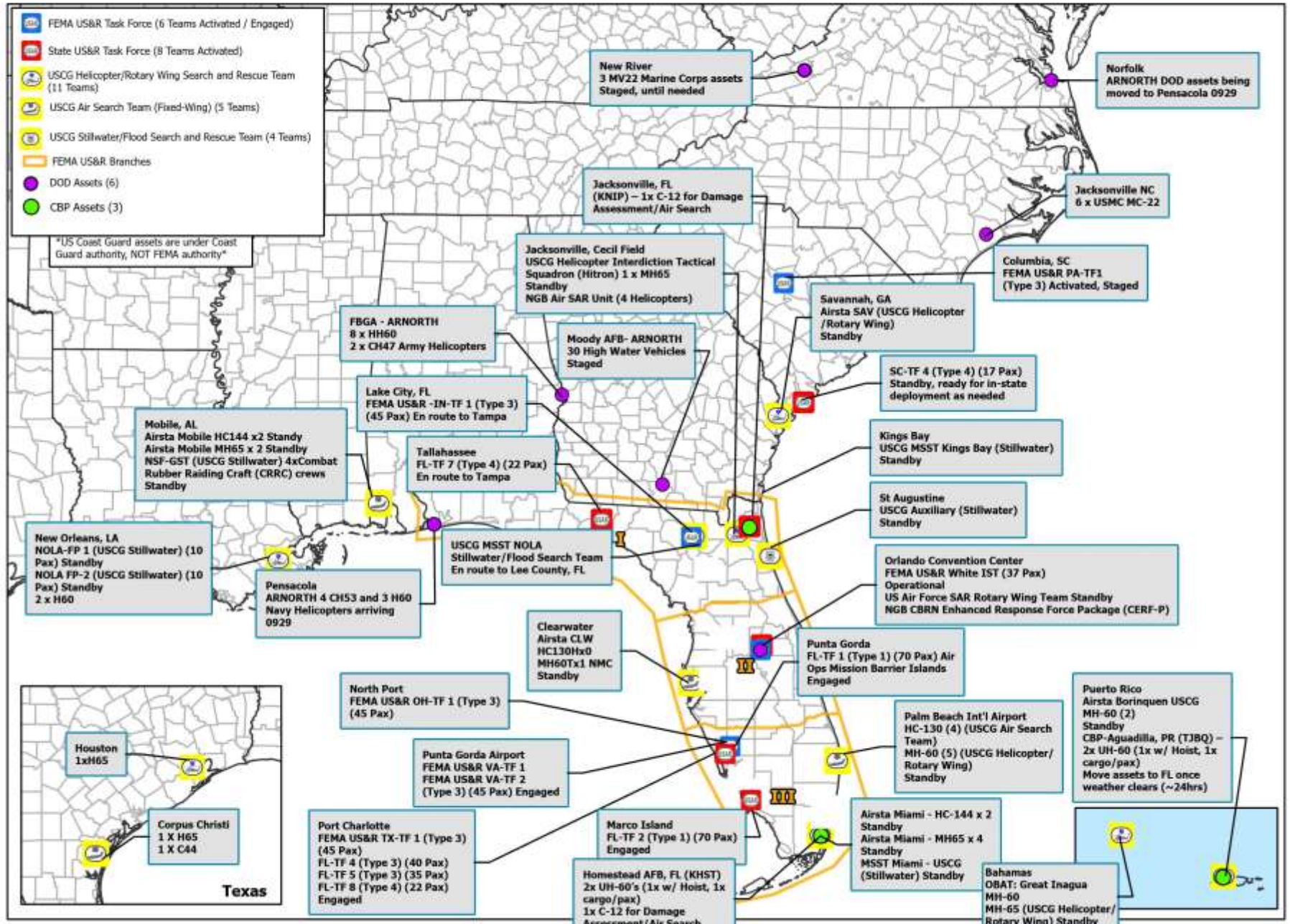
Case Study: FEMA Region 4 Response

Emily Zeilberger – Region 4 GIS Specialist

Search and Rescue (ESF-9) Force Laydown as of 9/29/22 1600 EST

Hurricane Ian

FEMA



1 of 4

Structure - Destroyed 17R MK 04743 26284

Zoom to Pan

Point ID:	QC
Team Name	
Team Name Filter (REPEAT Name Above)	FL-TF2
Squad ID	1
Operator Name	Ramos
Search Type	
usng	17R MK 04743 26284
mgrs	17RMK0474326284
Degree Decimal Minutes	26°27.2224'N 81°57.3299'W
Waypoint	Structure - Destroyed
Original Waypoint	Structure - Destroyed
waypoint_cat_cal	Structure
Street Address	200 Old San Carlos Blvd
Structure Type	
Start Time	9/29/2022, 3:35 AM
End Time	9/29/2022, 3:35 AM

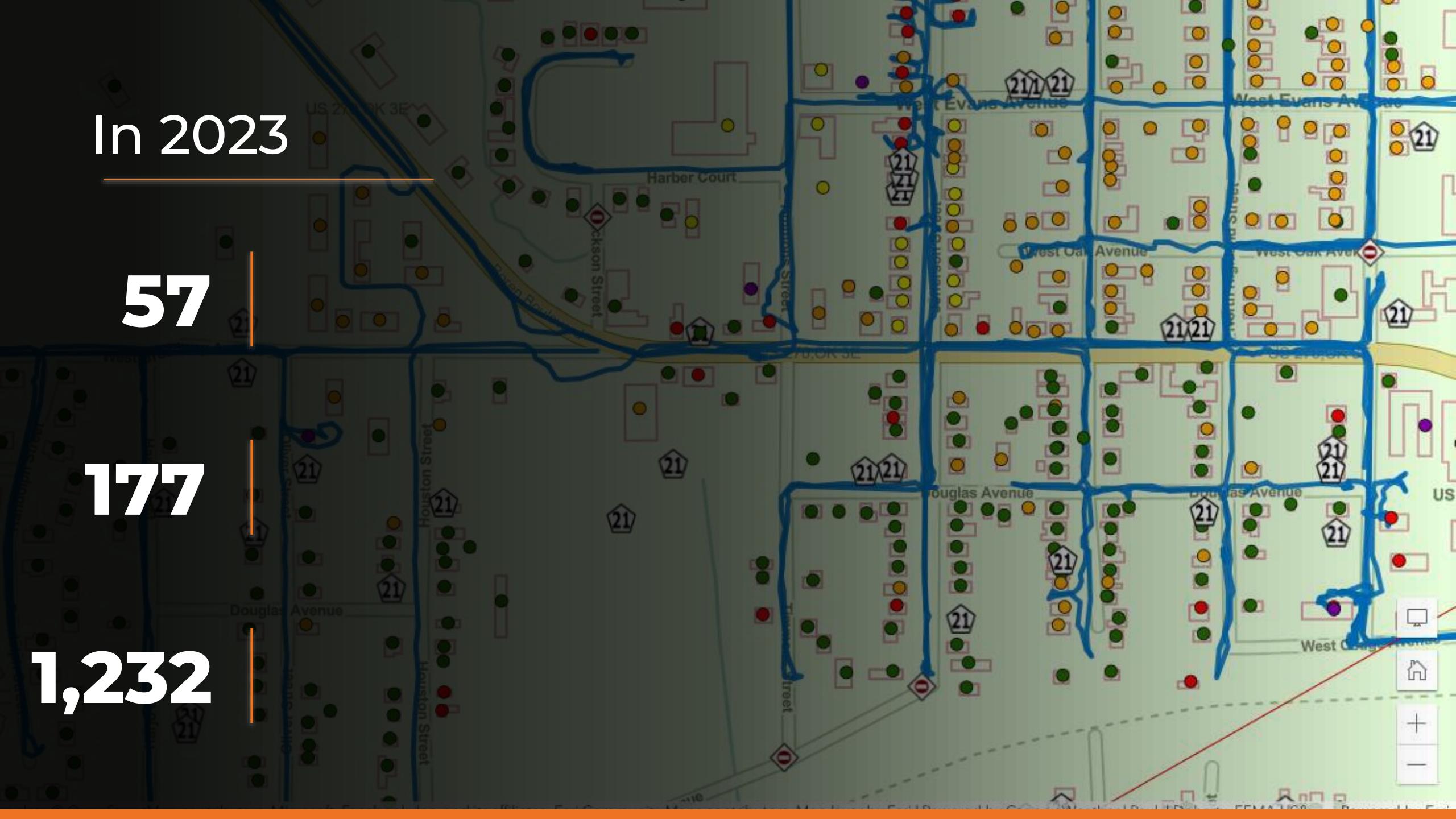
SARCOP Success

In 2023

57

177

1,232



In 2023

57 | Deployments Supported

177

1,232

In 2023

57 | Deployments Supported

177 | Registered Exercises

1,232 |

In 2023

57 | Deployments Supported

177 | Registered Exercises

1,232 | NSARGC Community Members

Updated January 4th, 2024

Key Points

- SARCOP is....
  - a life-saving resource for search and rescue mapping
  - a life-sustaining resource for emergency managers
  - successfully adopted across the US (beyond FEMA US&R)
  - more than just technology

THANKS!

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SARGeo Interest List

Sandbox: https://www.responsesystem.org/sarcop

General Information https://nsargc.napsgfoundation.org/

Preparedness Discussion