

Technology Innovation for First Responders



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NAPSG Foundation

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napsgfoundation.org | [@napsgfoundation](https://twitter.com/napsgfoundation)

Today's Goal

Conduct a workshop that shares success (and challenges) of technology innovation for first responders, with actionable next steps for attendees.

This workshop will provide First Responders and GIS Staff with practical training on the latest available tools and resources to support local-level preparedness, readiness, and response operations. This session will also feature use cases and best practices from the Southeast, Yosemite All Hazards Region, and Colorado North Central Region.

Today's Objectives

By the end of the workshop all participants should be able to:

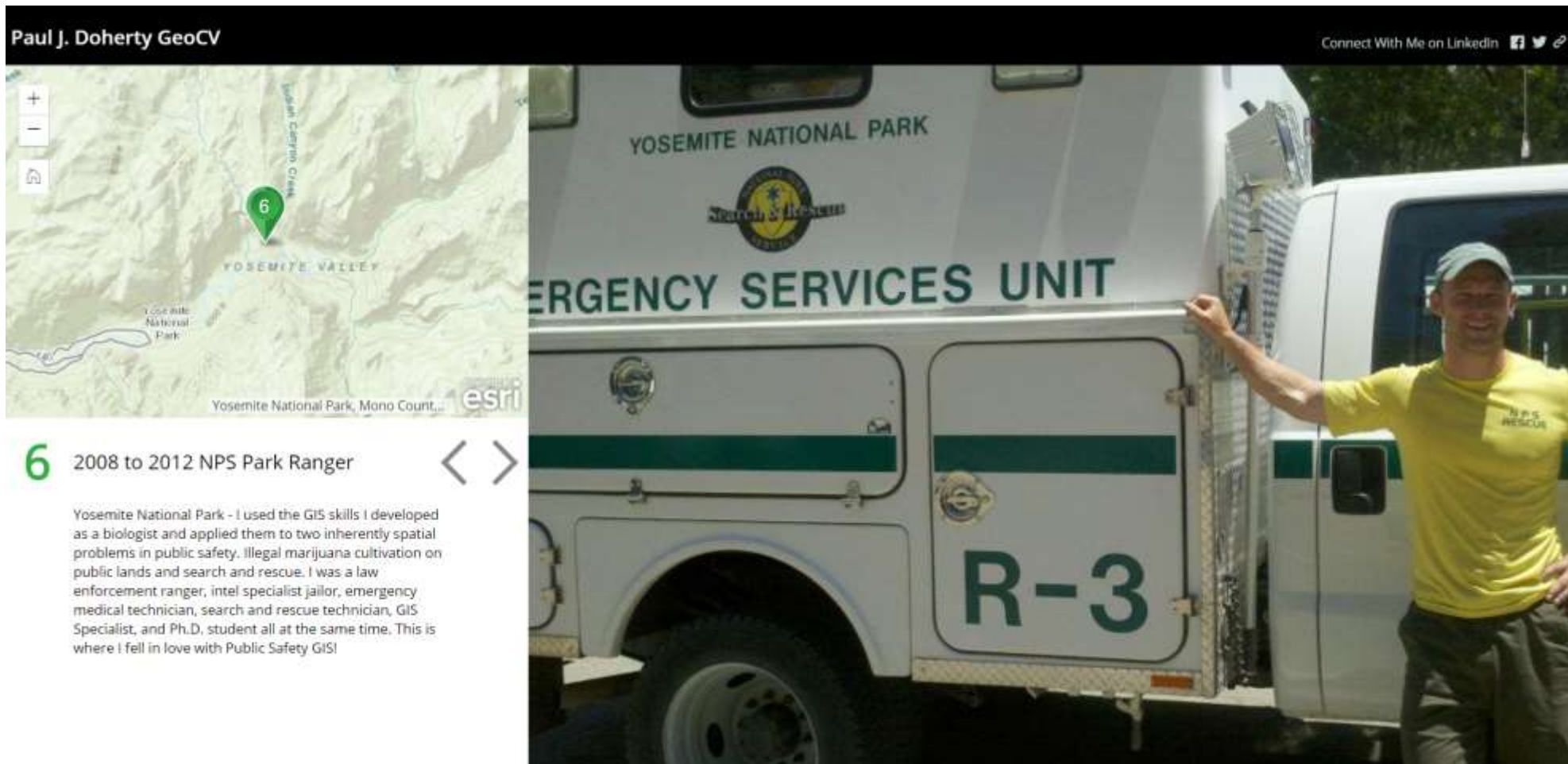
- Understand how to integrate a multi-step process for technology innovation for first responders.
- Get hands-on with a geospatial decision tool.
- Build a plan for technology innovation in their public safety agency.

Agenda

- Challenge
- Hands-On Exercise: Operations Response
- Vignettes From The Field
 - Colorado NCR
 - South Carolina Emergency Response Task Force
 - Yosemite All-Hazards Region
- Break
- Hands-On: Game Plan
- Closing

Tech Innovation for First Responders

Paul J. Doherty GeoCV Connect With Me on LinkedIn



6 2008 to 2012 NPS Park Ranger

Yosemite National Park - I used the GIS skills I developed as a biologist and applied them to two inherently spatial problems in public safety. Illegal marijuana cultivation on public lands and search and rescue. I was a law enforcement ranger, intel specialist jailor, emergency medical technician, search and rescue technician, GIS Specialist, and Ph.D. student all at the same time. This is where I fell in love with Public Safety GIS!

Recap: Core Information Needs

- Flood Preparedness Guideline ([Document](#))
- First Responder Core Operational Information Guideline ([Story Map](#))
- Two Pilot Regions
 - Charleston Region, SC AAR ([Report](#))
 - North Central All-Hazards Region (NCR), CO ([Report](#))
- Findings from pilots applied to activities at NGPS
 - Workshop with +30 Participating Agencies
 - Winter Wrath Exercise



First Responder Core Information Guideline

First Responder Core Information Guideline

National Guideline



Background - Core Operational Information

During a disaster, speed is life. When an incident occurs, first responders and decision makers must make life and death decisions under considerable time constraints. The ability of first responders and senior leaders to make informed and efficient decisions relies on access to actionable information across agencies and jurisdictions.

Building resilient communities, able to withstand and recover rapidly to and from disasters; requires actions that reduce risk, planning processes that incorporate lessons learned, and the coordination of information sharing among the private sector and all levels of government. This requires *deliberate* information

1 Overview of Core Operational Information Framework

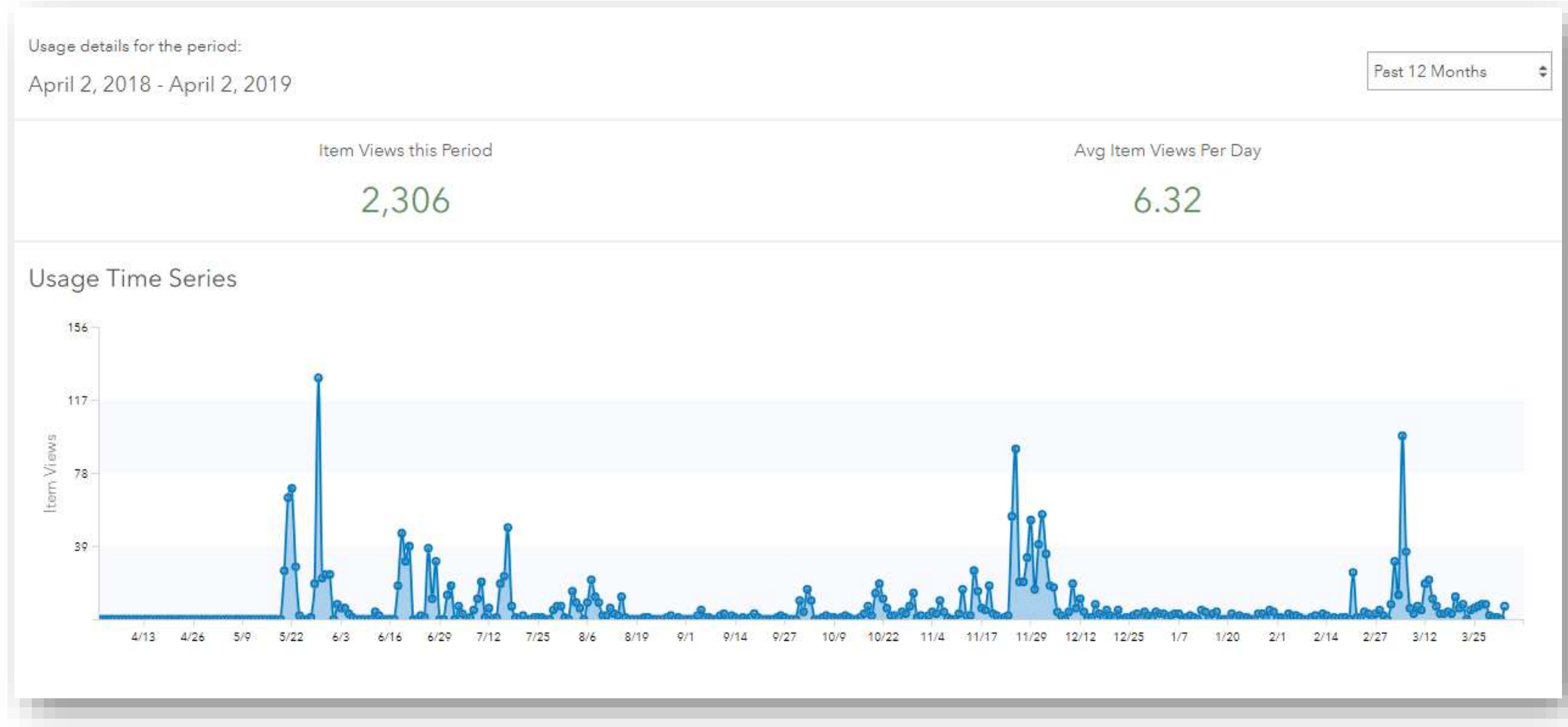
First Responder Core Information Guideline



Developed with support from the US Department of Homeland Security Science and Technology Directorate
Images courtesy of the Federal Emergency Management Agency

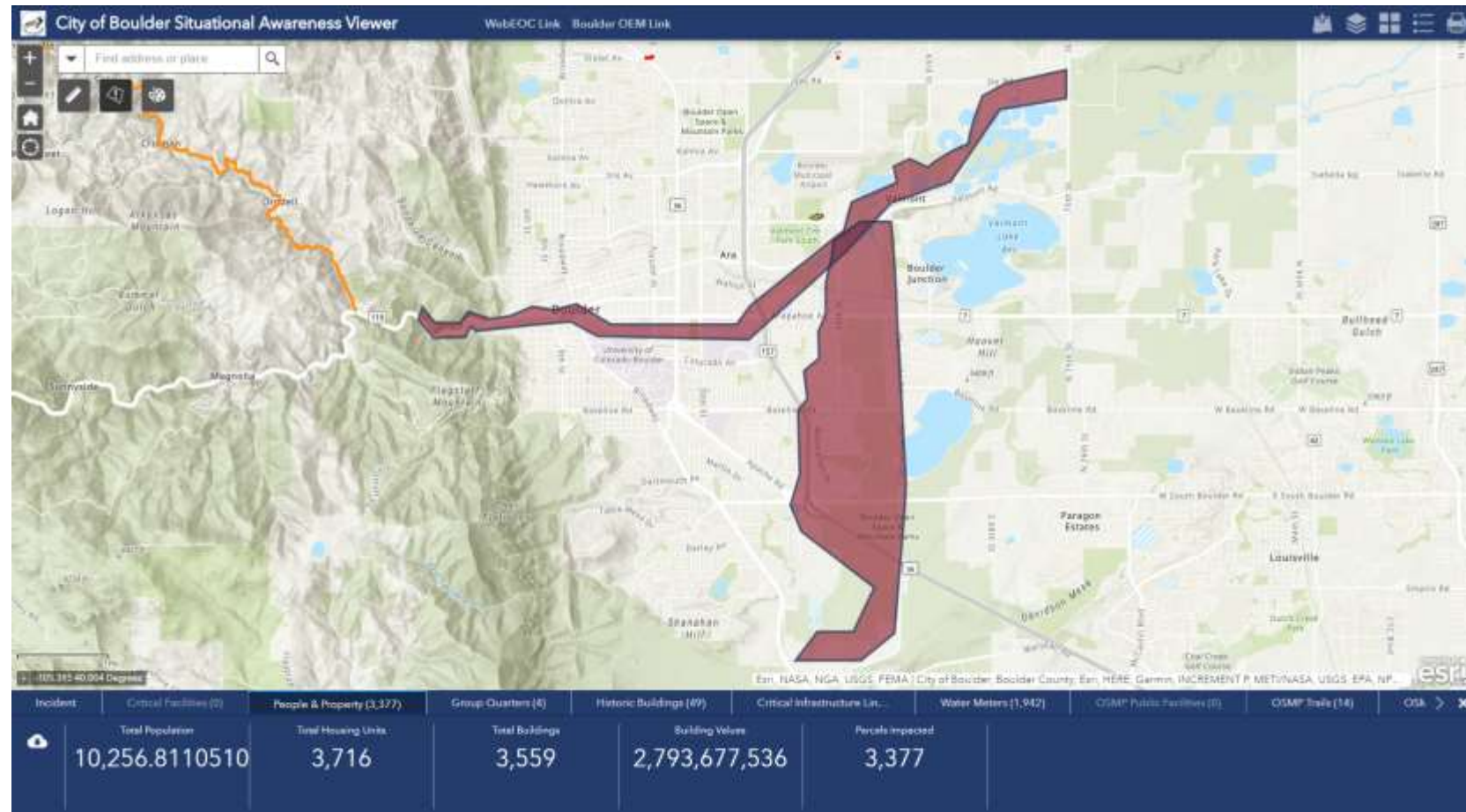
<https://arcg.is/amDj0>

Metrics on Use of Guideline



Core Information Needs → Situational Awareness

- Situational Awareness Section at Boulder EOC implementing as part of Standard Operating Procedure
- Understanding Potential Impacts
- Common approach across the Region?



Boulder City Situational Awareness Viewer for analyzing potential impacts to people and critical infrastructure.

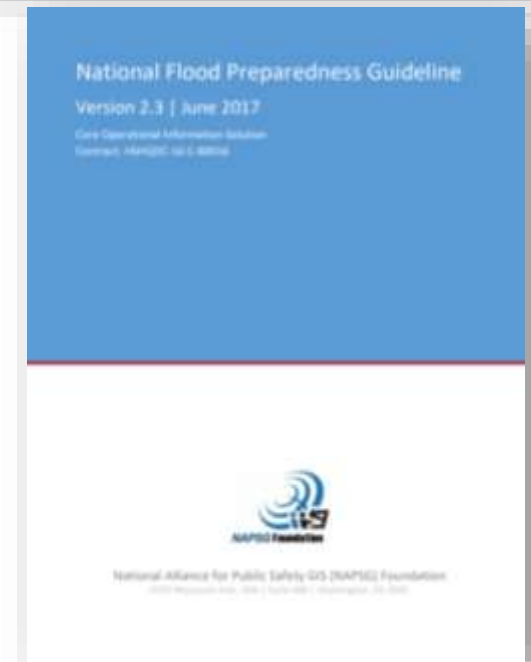
Overall Project Objectives

Goal

The goal of this new project is to develop, test, evaluate, and fully transition a national flood decision support framework and guidelines for operational use by local and state first responders and emergency managers nationwide.

Project Focus

- Provide access to current, relevant, and trusted critical operational information in a framework (or model) that drives efficient and effective decision-making in support of flood preparedness and operations.
- Develop proven and standardized guidelines for solution development and training for Public and private sector technology providers.

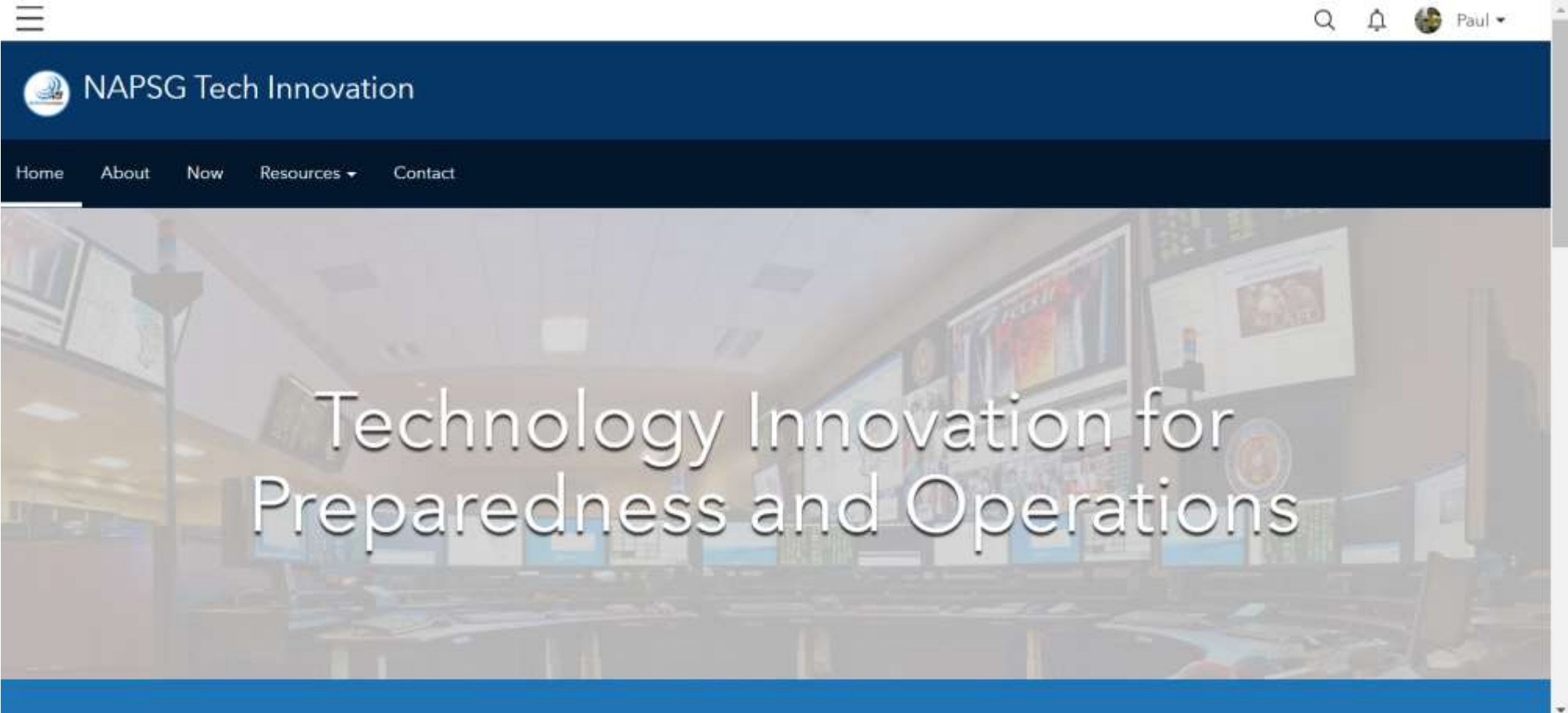


Tech Innovation Participants

- Colorado North Central All Hazards Region (NCR)
- South Carolina / Charleston
- Yosemite All Hazards Region (YAHR)



Situational Awareness Toolkit (Prototype)



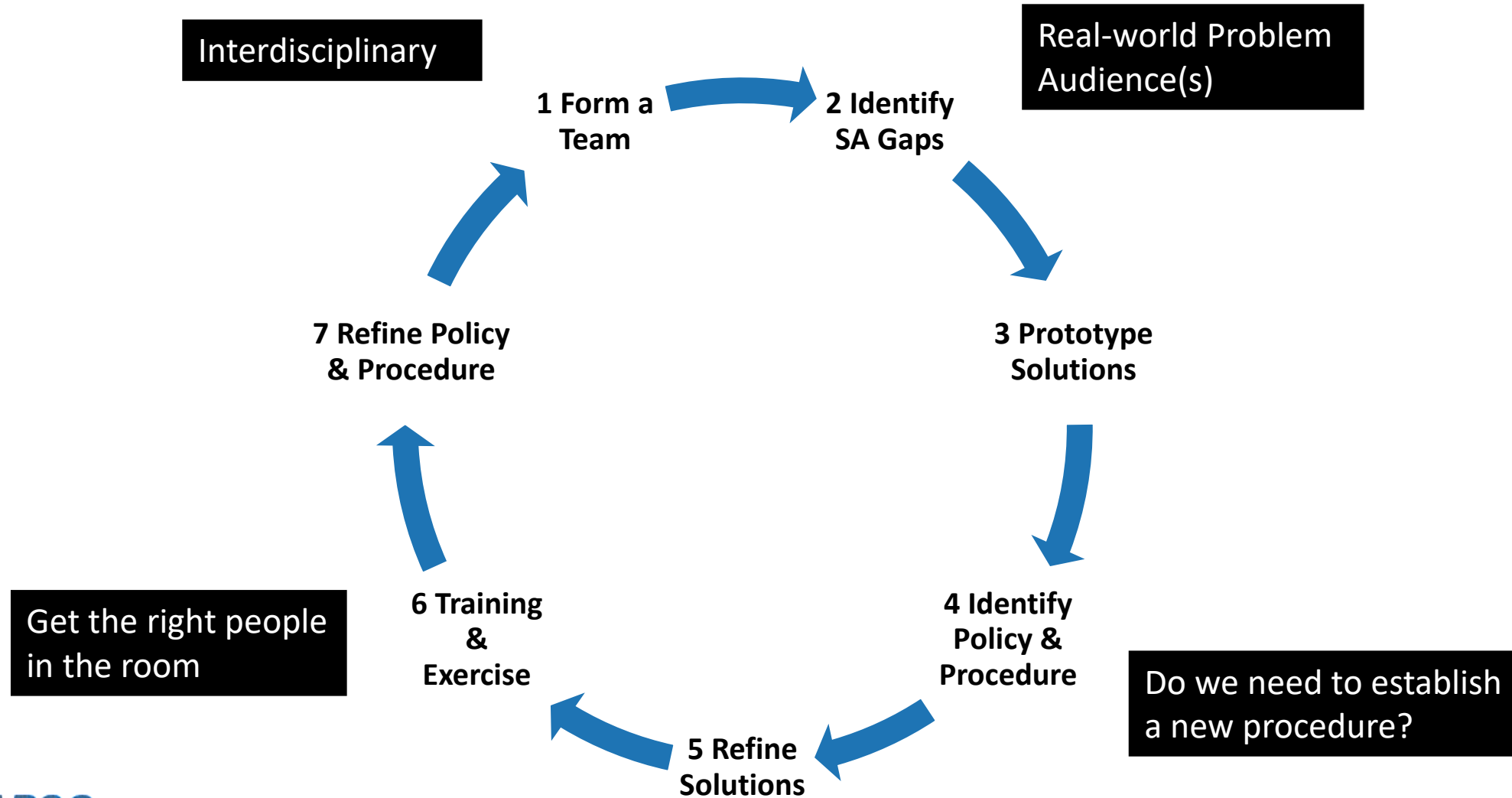
Challenge: Technology Innovation

Challenge

The ultimate challenge for innovation in Public Safety is...

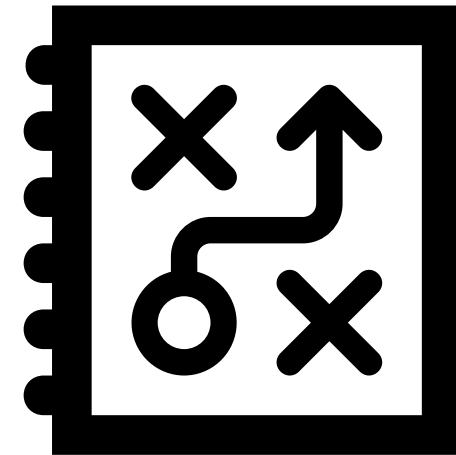
...that first responders and emergency managers will always rely on the best available and most familiar tools they already know how to use.

Technology Innovation Process



What is a geospatial game plan?

- Start with *identifying core information needs by audience. Consider the key questions by audience:
 - The Public
 - First Responders
 - Emergency Managers
- Develop a game plan for addressing those information needs. Test it. Refine it.
- Use a design-first approach – what should the map / app look like? How will it solve the real-world problem?
- Build – Test – Refine – Train - Repeat



The geospatial game plan can be a chart, document, whiteboard, website or any other medium that makes sense for your organization.

*Core information = geospatial by default.

Hands-on Exercise

Operations Response Viewer

Operations Response

- **Audience:** Emergency Management Planning and Operations Staff, County Sheriff
- **Problem:** Your County Emergency Management Agency is planning a training exercise and wants to make use of “Web GIS.” Typically, they have you print out a new wall map each operational period and the status of facilities (e.g. shelters) are maintained in spreadsheets.

This time they want to coordinate planning and operations across multiple locations, with everyone having the most up to date information on a live map. For example, they want to be able update the status of evacuation zones and shelters without requiring GIS expertise.

- **Solution:** Operations Response App

Operational Game Plan

Lifeline	Core Information Need	Public	First Responders	Emergency Managers	Operational Game Plan
	Evacuation Status	Am I safe here?	What areas need to be evacuated?	What areas have been evacuated? Where do people need assistance?	Sherriff's Office hand-draws evacuation zones and GIS Specialist updates the layer using pre-designated zones. Alerts are shared via WEA and social media with link to Public Information Map.
	Shelter Status	Where can I go to be safe?	Where do I take evacuees?	Where are the evacuees? What are their needs?	Mass Care lead changes the status of shelters and edits attribute information (e.g., number of people, capacity, etc.) as needed.
	Road Status	How can I get there?	How do I get to those in need?	What is the status of transportation systems?	Public Works provides internal feed of road status, GIS Specialist updates the layer.

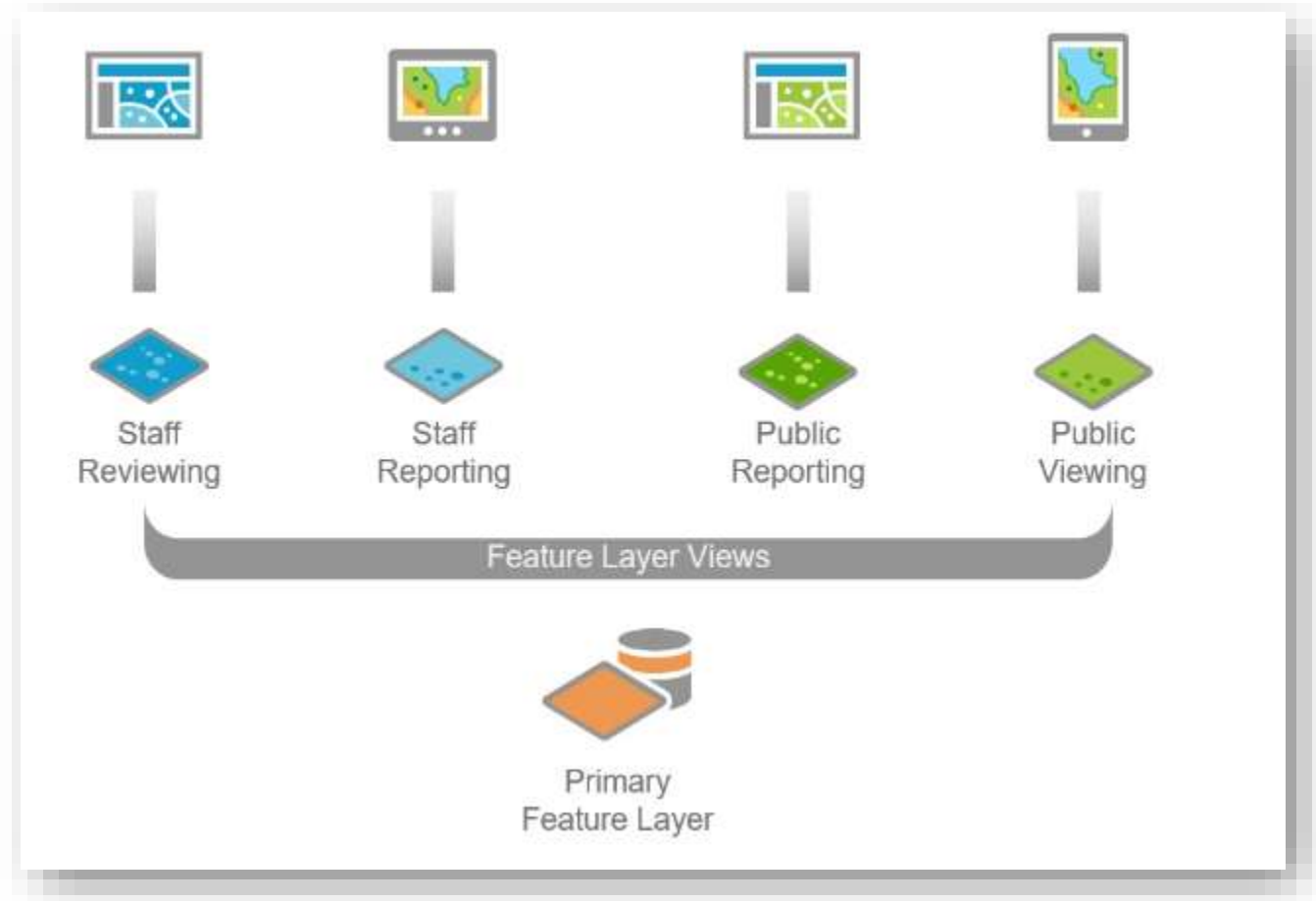
Public Information

- **Audience:** The Public
- **Problem:** The Public needs situational awareness as much as emergency managers and first responders. They want answers to questions like:
 - Do I need to evacuate?
 - Where can I go for more information or to be safe?
 - How do I get there / are there any road closures?
- **Solution:** Public Information Web Mapping Application

Technical Game Plan

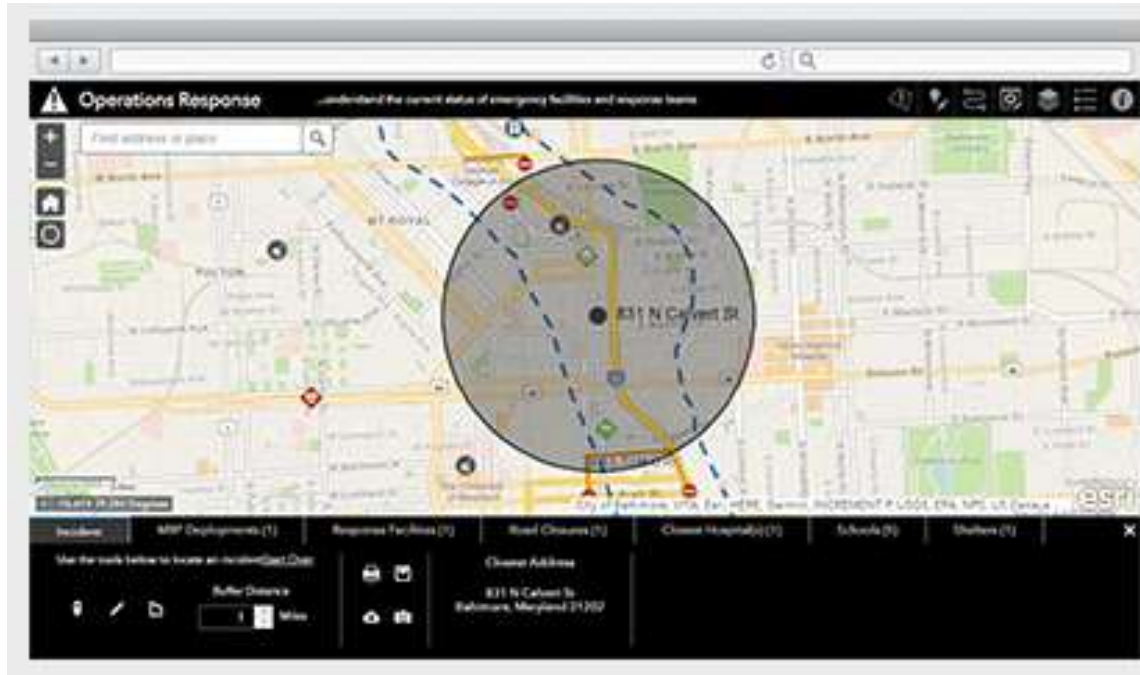
Hosted Feature Layer Views

- Internal Editing
- Public Viewing of LIVE Data

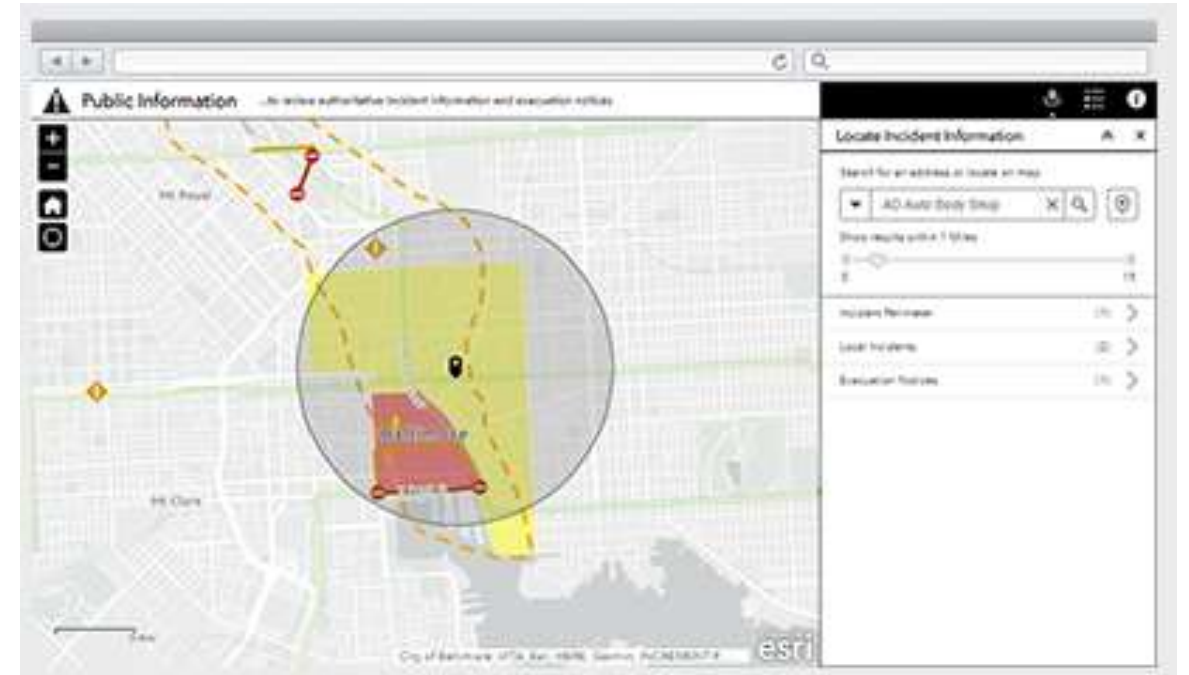


Blog: [Getting Started with Hosted Feature Layer Views](#)

Technical Game Plan



Internal Editing Feature Layers



Live & Filtered Public Feature Layer Views

Instructions for Wi-Fi



Wireless network: Jellyfish

1. Open a web-browser.
2. Browse to any non-Google site. A login screen will display.
3. Select “Guest Account” and complete the credentials form.
4. You will receive an email and text message with a username and password to connect to the wifi.

- You may need to step out into the lobby to get a cell connection
- Write down / save your password

Exercise

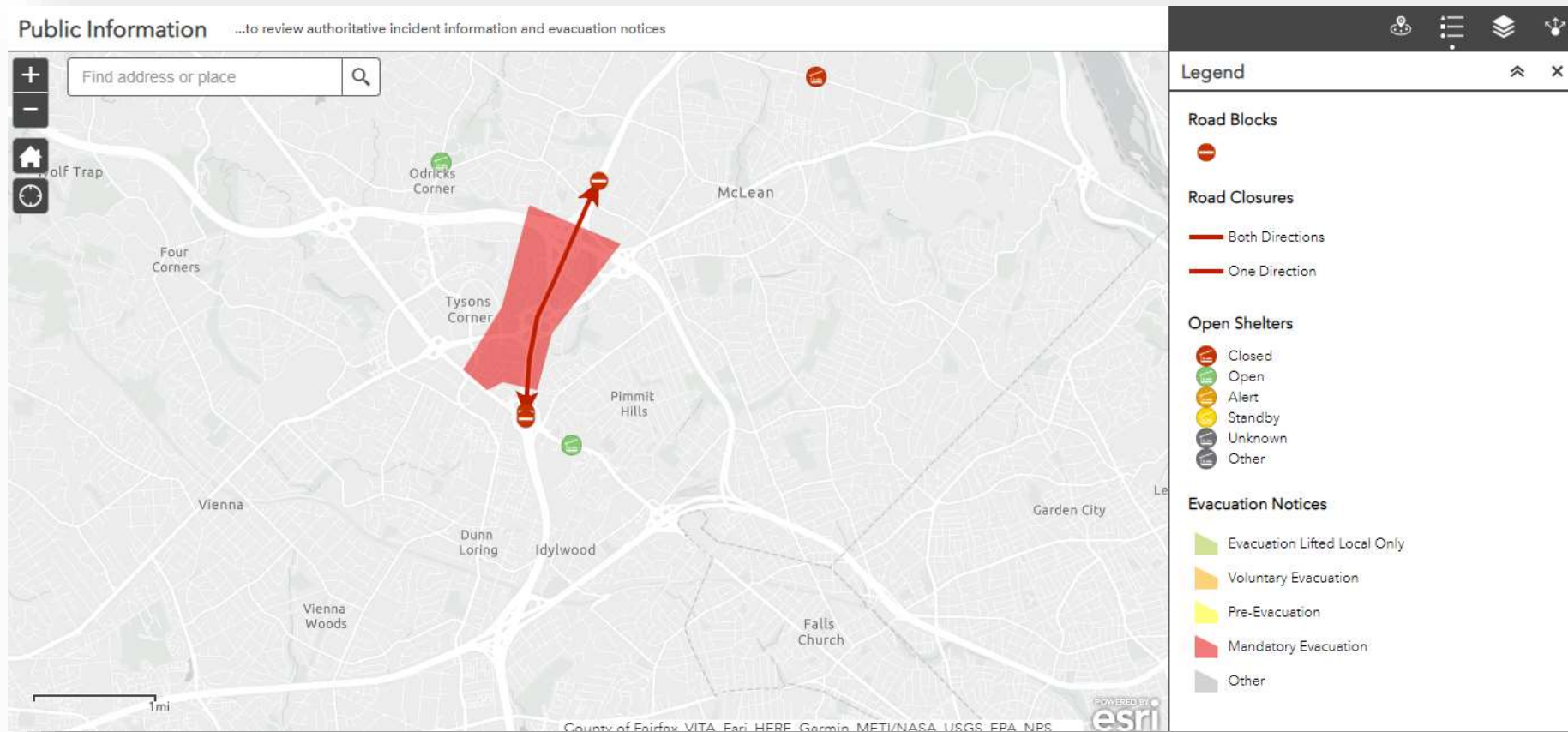
Can you provide your team with a web app that gives them some simple tools and just the layers they need to get started? Use a simulated flood or any other incident type to guide you through this process.

1. Access the App: <https://bit.ly/20191112OpsResponse>
2. Search for / Zoom To Your Jurisdiction
3. Plot an Incident Command Post
4. Open a Shelter
5. Design an Evacuation Zone
6. Close a Road

Scan the QR with
your camera and send it
to yourself



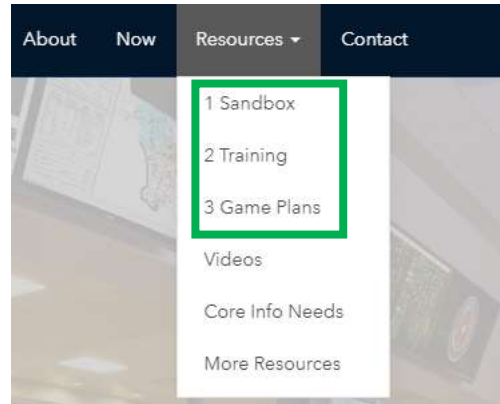
Demo: Public Information Map



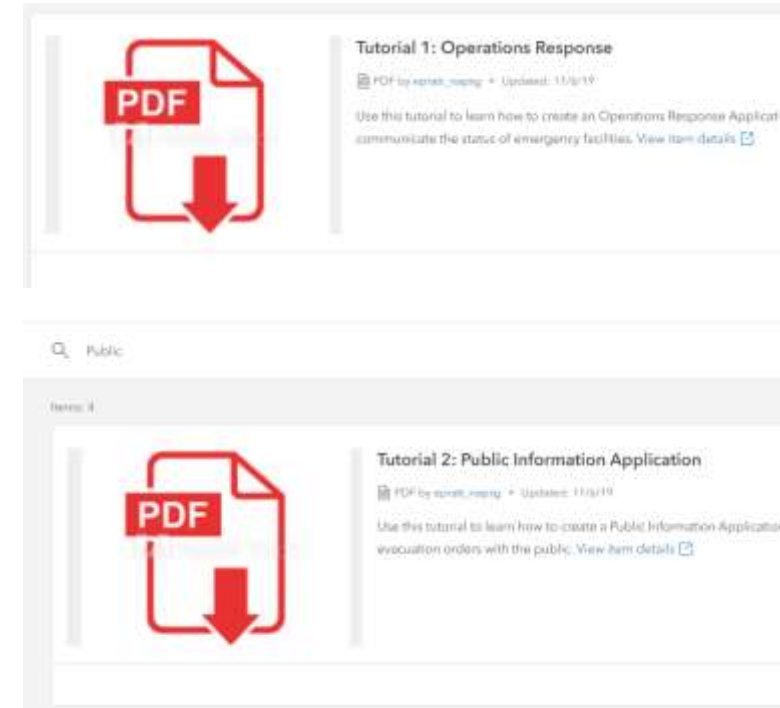
<https://arcg.is/1TvWye>

Coming Soon!

<https://techinnovation-napsg.hub.arcgis.com/>

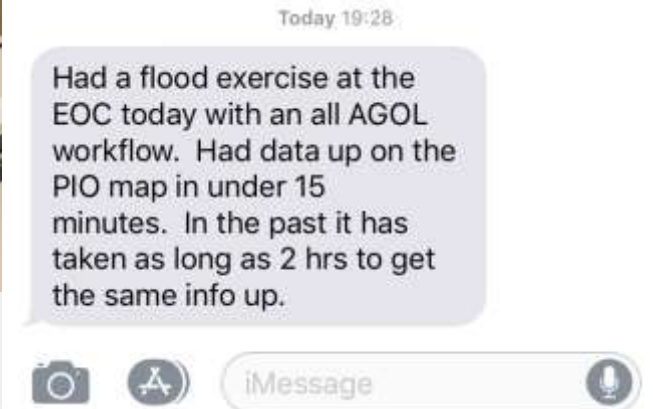


Sandbox, Training,
Game Plans and more!



Vignettes From The Field

- Colorado North Central All-Hazards Region (CO NCR)
 - Kevin Kay, Arapahoe County
- South Carolina Emergency Response Task Force (SCERTF)
 - Chad Beam (SC Fire Marshals) and Kevin Henson (Greenville)
- Yosemite All-Hazards Region (YAHR)
 - Ansley Singer, Yosemite National Park



Recent feedback from Colorado NCR stakeholders on implementing Core Information Needs framework.

Colorado NCR

Kevin Kay – Arapahoe County



North Central All-Hazards Region

- 10 county planning region
- Manage State Homeland Security and Urban Area Security Initiative funds
- Functional committees centered around core capabilities
- GIS Committee with representatives from all 10 counties with a central data repository
- Working with NAPSG on a flood pilot project (now on Phase 2)
- Separate regional situational awareness/portal to portal project



Arapahoe
County

Pre-planning: Critical incidents and special events

Incidents:

- 2013 Floods
- 2013 Arapahoe High School Shooting
- Aurora Theater Shooting
- 2015 Floods
- 2016 Blizzard
- Multiple wildland fires
- 2019 Bomb Cyclone
- 2019 STEM School Shooting

Planners:

- Fire pre-plans
- School resource officers
- SWAT Teams
- Emergency Management
- Public health
- EMS/Mass Casualty
- Private sector/large venues

Instructions (before tech innovation)

- Copy satellite image from Google Maps using “Snip Tool”
- Paste image into PowerPoint template.
- Right click on image and “send to back” so grid lines are visible.
- Drag icons and text boxes into desired positions.
- Rename and save the file.

MICRO VIEW: Name, Address City, State

		A1	2	3	4	5	6
1	A						
2	B						
3	C	B					
4	D						
5	E						
6	F	C					
7	G						
8	H						
9	J	D					
10	K						
11	L						
12	M	E					
13	P						



Shutoff



Helipad

MACRO VIEW: AC Fairgrounds Event Center, 25690 E. Quincy Ave. - unincorporated Arapahoe County, CO

1 A
2 B
3 C
4 D
5 E
6 F
7 G
8 H
9 J
10 K
11 L
12 M
13 P



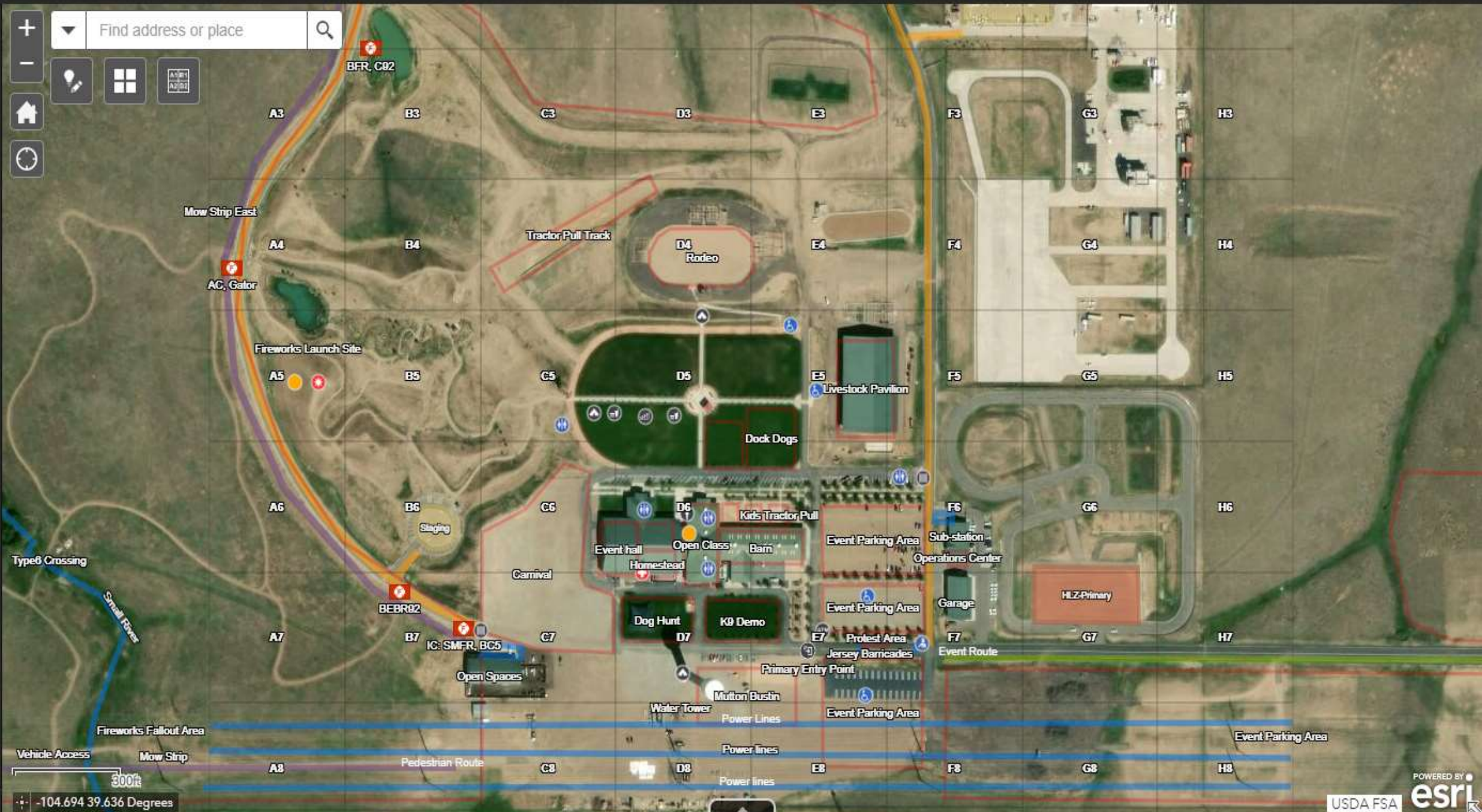
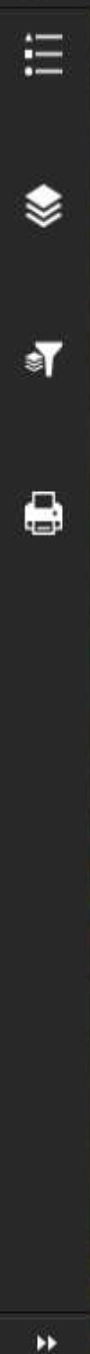
STOP
STOP
STOP

TOC

GAS
Shutoff

What Was Planned?

- Annual Arapahoe County Fair
- Fair participants, Sheriff's Office, Fire, private security, fair vendor, public (~10k)
- Took multiple pre-plans and condensed into one map available in the command post
- Used in conjunction with situational awareness tool (weather, resources, radio channels, etc.)





Demo: GRG Creation

What Actually Happened?

- Arapahoe County Fair
- Used during briefings in the command post but not out in the field
- Interest from the planning team on using it further

What Will We Improve?

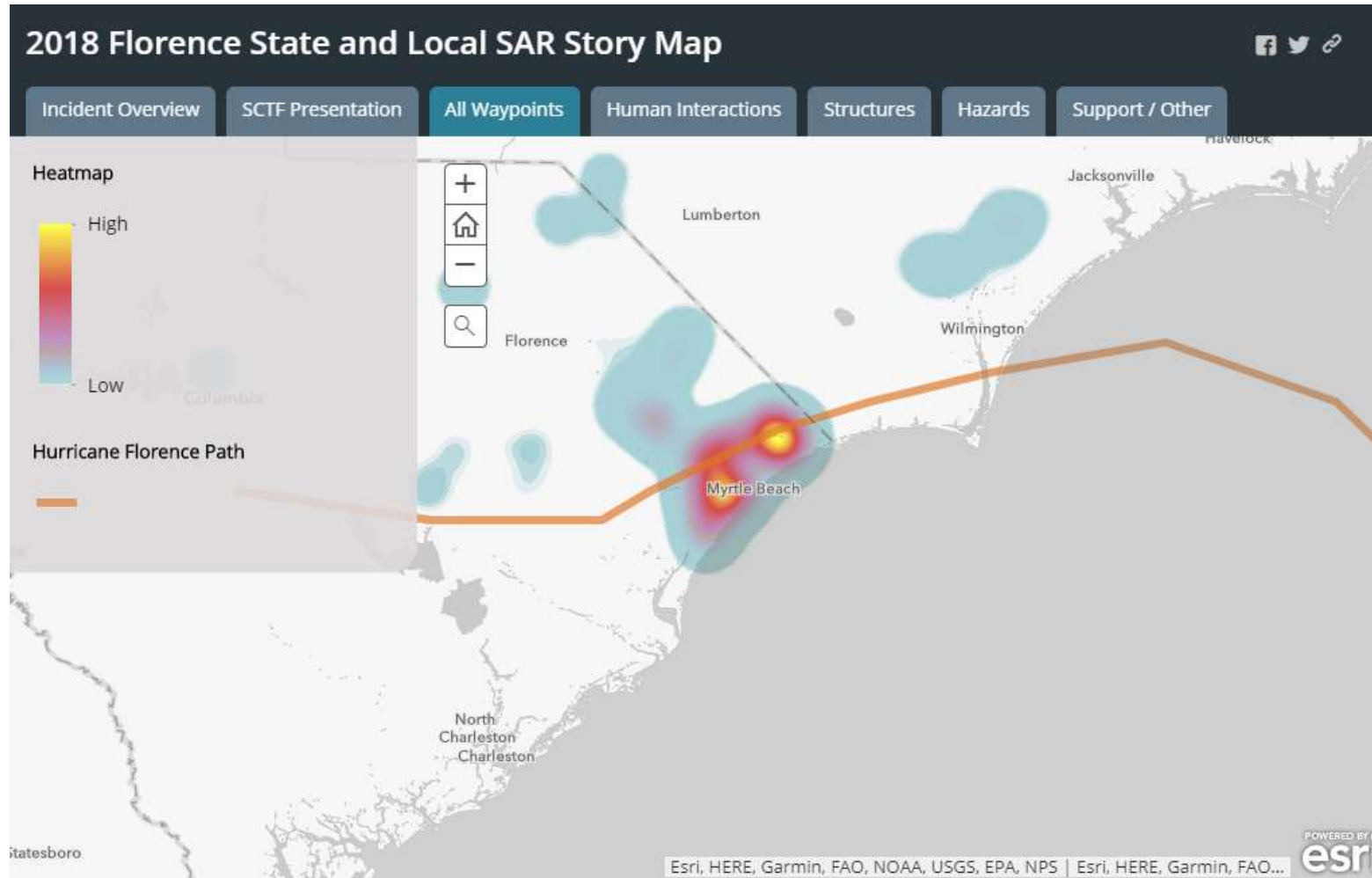
- Regionwide collaboration
- Special teams use cases – SWAT, EOD
- Mutual aid/information sharing

South Carolina

Chad Beam and Kevin Henson, SC Emergency Response Task Force



2018: Hurricane Florence



2019:What Was Planned?

- Interagency Workshop in August 2019
- Formation of Hurricane Game Plan



Background: SAR and First Responder Survey

SAR and First Responder Geospatial Toolkit

1 Introduction

What is the SAR and First Responders Geospatial Toolkit?

Use this Story Map template to adopt a *common geospatial framework* and train for disaster response search and rescue (SAR) missions. Interoperability between SAR teams is critical to response and recovery.

Next Steps

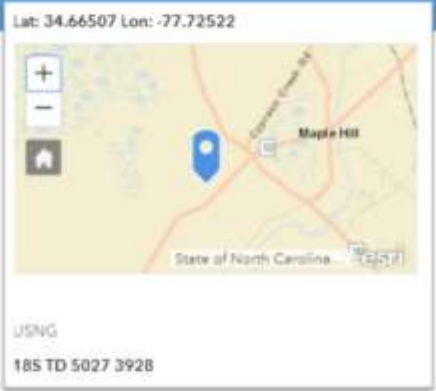
Each section below provides core geospatial capabilities that your team will need to prepare in advance. The left-hand side panel of each section will have a list of resources for the geospatial lead on your team, and the main stage on the right will have an opportunity to "try it live".

This Story Map is produced & maintained by the NAPSG Foundation based on work done by the USAR FIELD DATA WORKING GROUP. This is a group of search and rescue professionals that convened in 2018 with the purpose of preparing for hurricane season and developing a common data schema for field data collection.

USAR FIELD DATA WORKING GROUP

2 Common Location Language

3 Readiness



SAR & First Responder Geospatial Toolkit

NAPSG Foundation Search and Rescue Working Group

<https://arcg.is/00L58f>

Hurricane Game Plan – Geospatial Concept of Operations

Inspections/Assessments after a Disaster

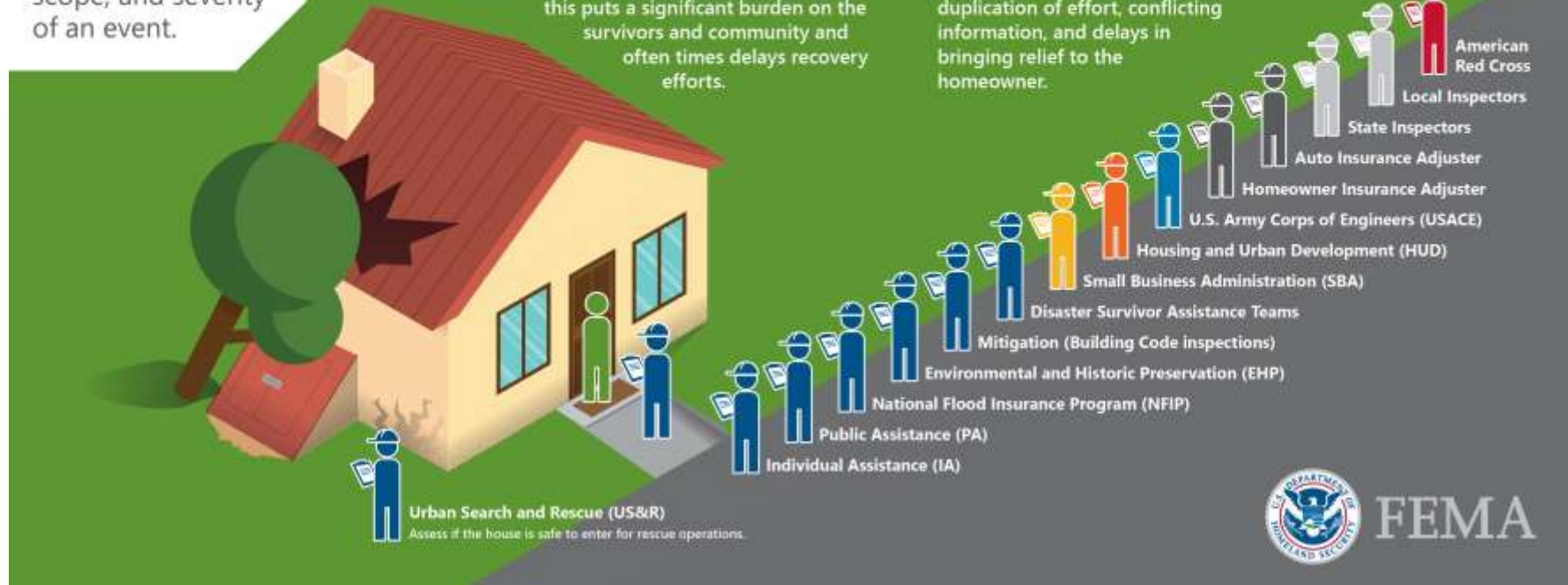
Assessments are an essential part of the response and recovery process and are critical for assessing the size, scope, and severity of an event.

THE CHALLENGE

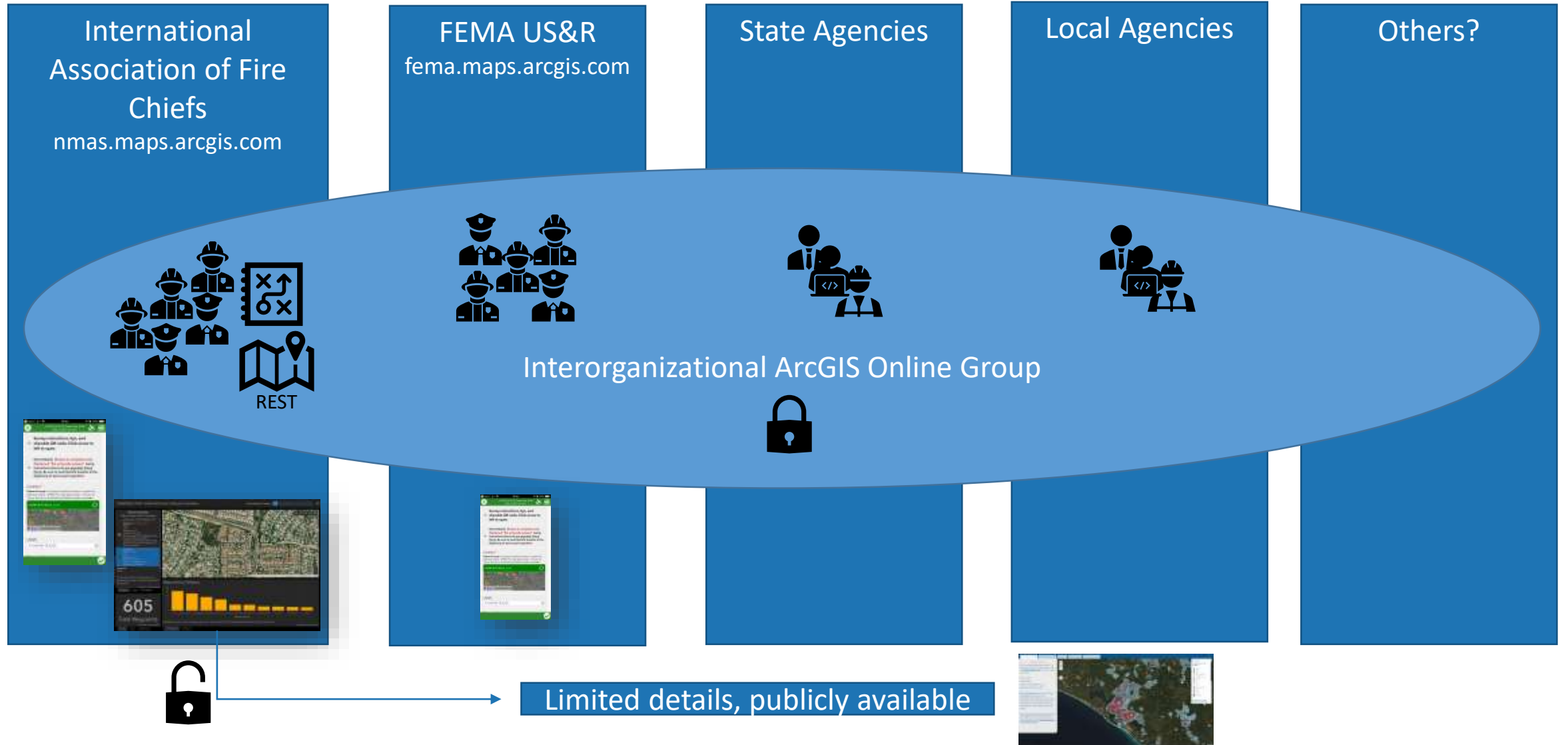
When a home is damaged as a result of a natural or man-made disaster, numerous damage assessments are performed to assess the safety of the structure, quantify the damage, and determine financial aid from the government and/or insurance company. While each assessment is conducted for a specific purpose, this puts a significant burden on the survivors and community and often times delays recovery efforts.

THE SOLUTION

Consistent standards and data sharing mechanisms are needed so various programs and agencies (e.g., state and local authorities, federal agencies, statutory authorities, non-profit organizations) can leverage the same data collected during the preliminary damage assessment. This will help avoid duplication of effort, conflicting information, and delays in bringing relief to the homeowner.



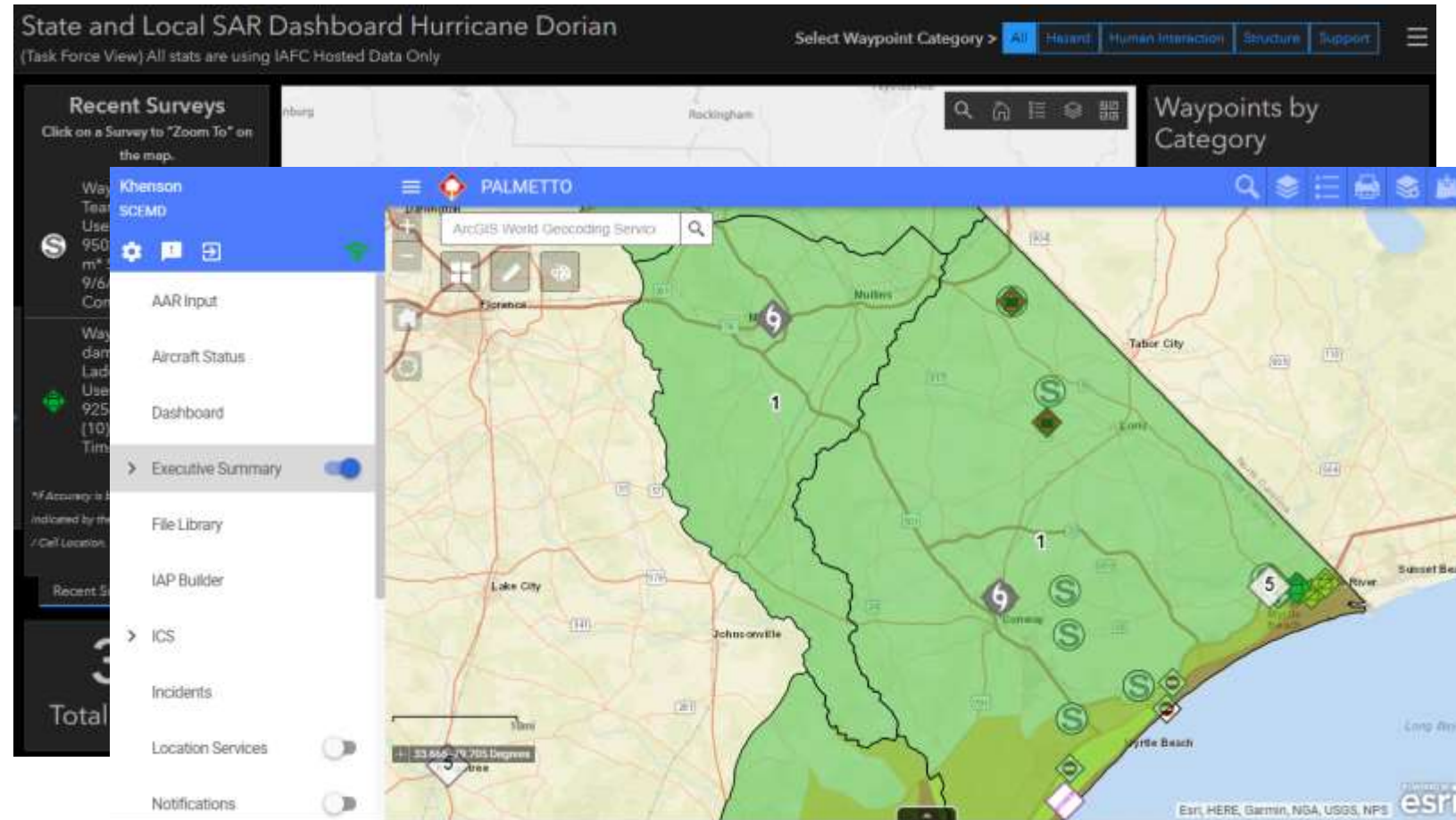
Hurricane Game Plan – Geospatial Concept of Operations



What Actually Happened?

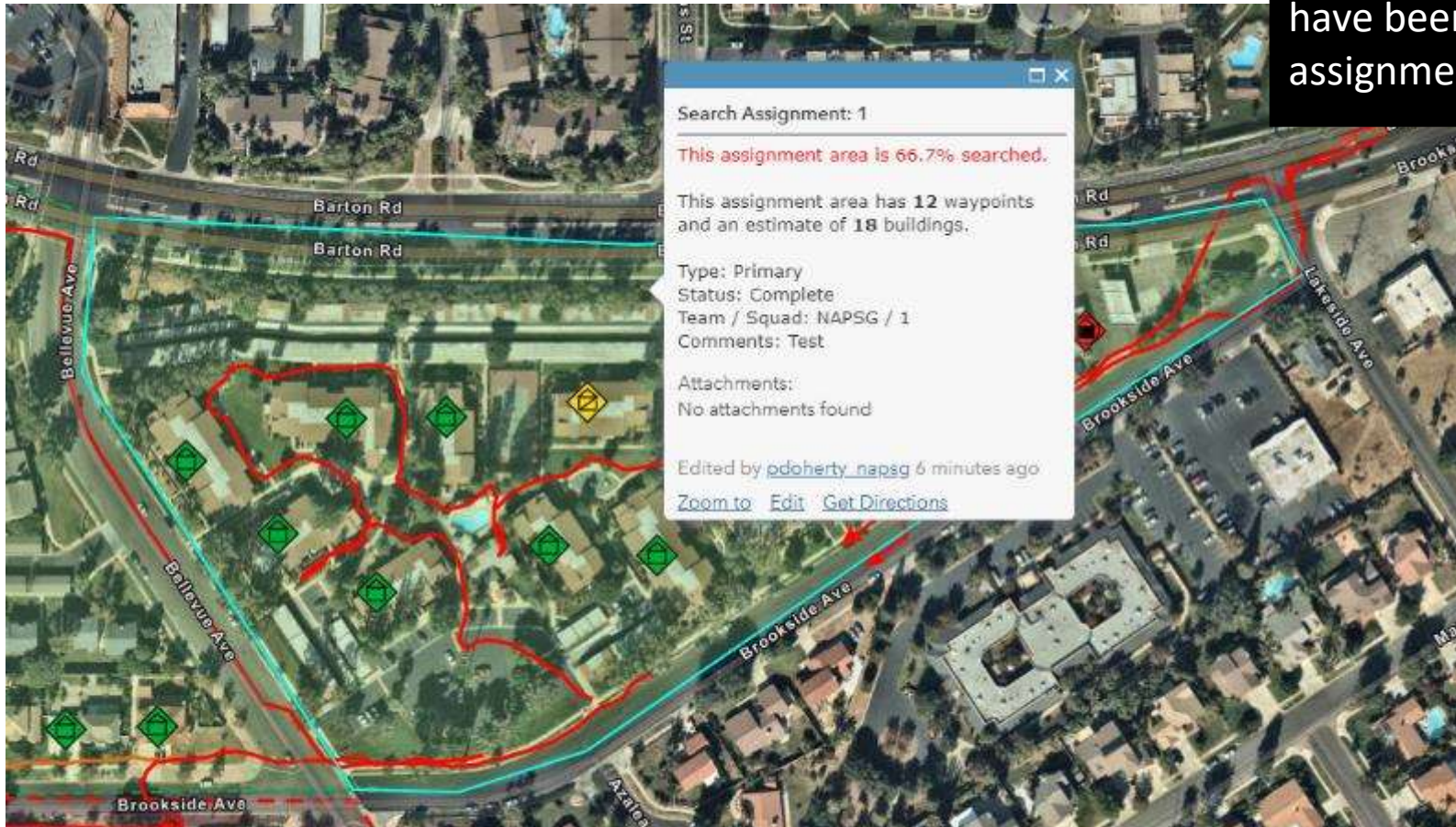
Hurricane Dorian 2019

- Deployed SAR Survey
- SAR Dashboard
- Integration of data into existing emergency management COP (Palmetto)



R&D: Analysis

Can we calculate the percentage of buildings that have been “searched” within an assignment area, on the fly?



Using “[Arcade](#)” scripting to estimate search coverage, thanks Ed Cook!

What Will We Improve?

- Formal data sharing agreement(s)
- Data-driven insights for decision making
- Training to first responders outside the Emergency Response Task Force

More details to follow this afternoon in:

“Collecting Data in the Field for Search & Rescue and Debris Management”

Interested in Geospatial Coordination for SAR?

Scan the QR code to open the survey on your device. [Click to download](https://arcg.is/1m88Tj)



<https://arcg.is/1m88Tj>



Yosemite All-Hazard Region

Detwiler Fire 2017

Ignited shortly before 4 p.m. on Sunday, July 16, 2017, the fire consumed up to 2,500 acres within its first day of burning.



Detwiler Fire 2017

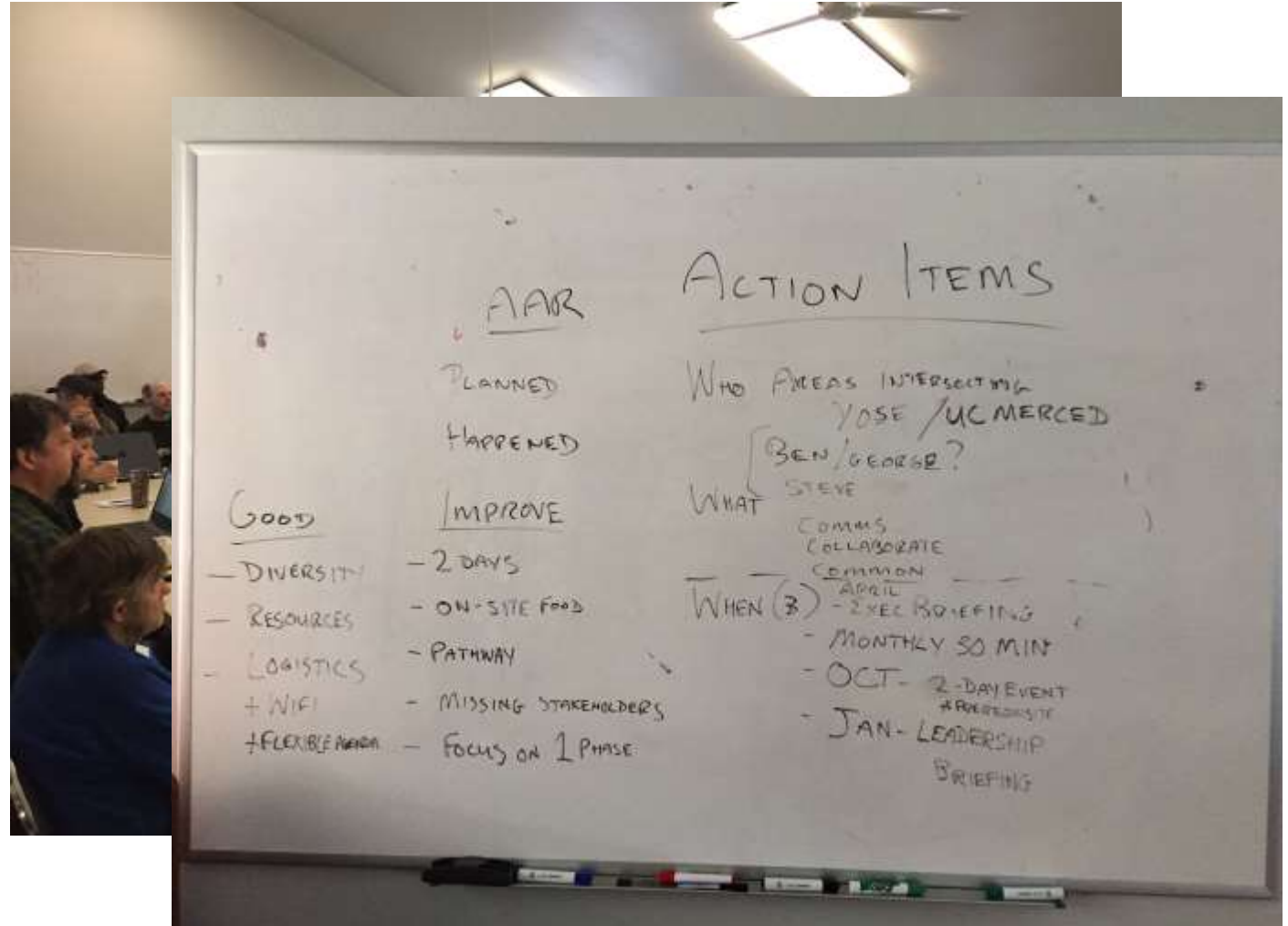
There were significant challenges sharing situational awareness information:

- Fire Incident Management Team
- Yosemite National Park
- Stanislaus National Forest
- Sierra National Forest
- Mariposa County
- Tuolumne County
- The Public



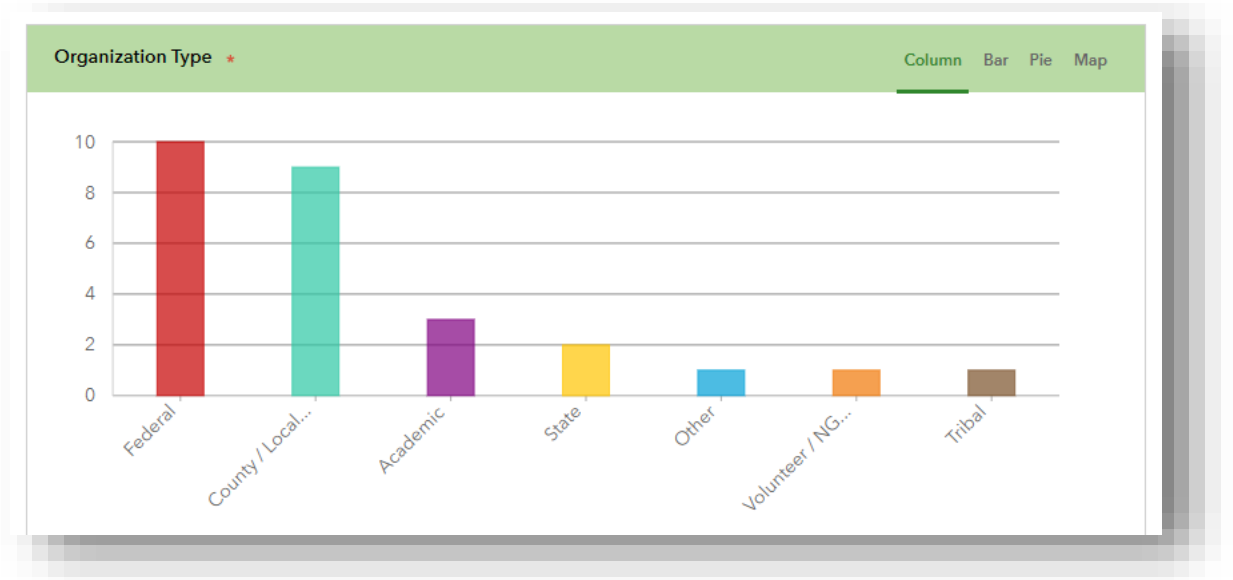
What Was Planned?

- Interagency Meeting
October 2018
- Interagency Workshop
March 2019



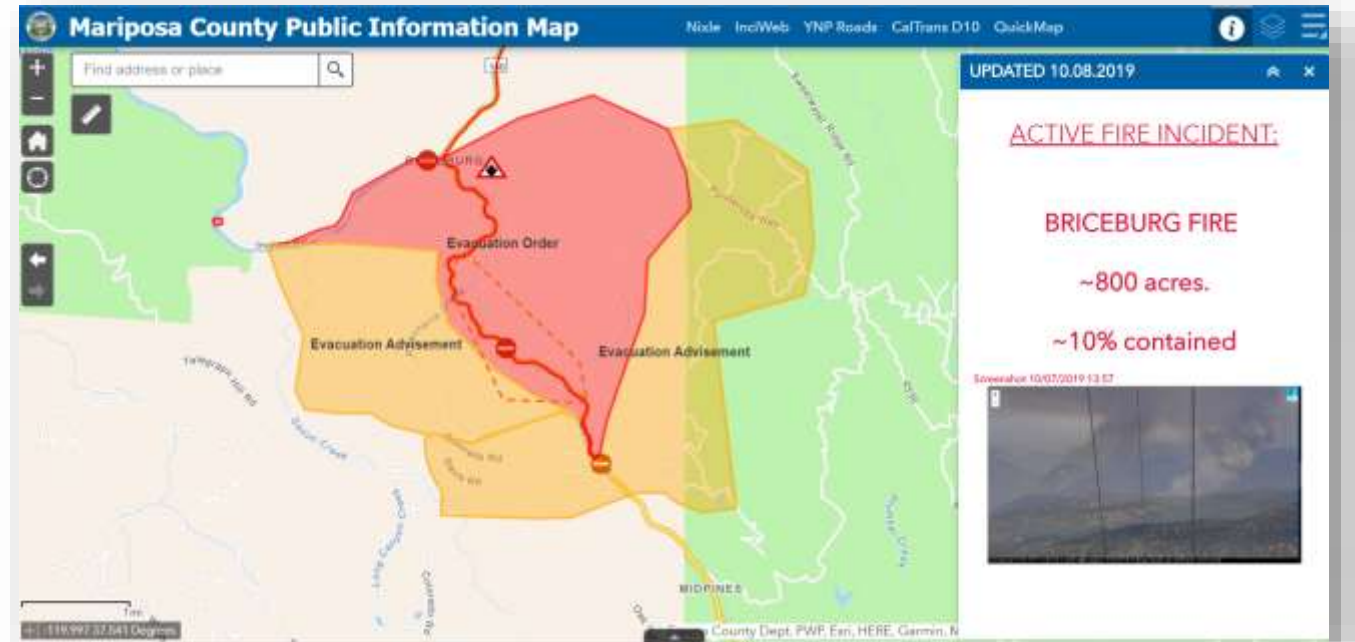
What Actually Happened?

- Formation of Regional Working Group: Yosemite All-Hazards Region (YAHR)
- Slack Team for instant communications
- Working Group Meetings
- Public Information Maps



What Actually Happened?

- Spring Flooding
- Ferguson Fire 2018 & Briceburg Fire 2019
- Improvements Made:
 - GIS Coordination between Counties and NPS
 - GIS use for internal situational awareness
 - Public Information Maps



What Will We Improve?

- Adopting common schemas and symbols
- Exchanging incident data across jurisdictions
- Regionwide GIS Training

Break

Prioritize Situational Awareness Gaps

Public

First Responder

Emergency Manager

Geospatial Game Plan



Am I safe here?

Who needs help/ where are they?

Did people evacuate or shelter in place?

Evacuation notice layer / IPAWS?



Where can I go to be safe?

Where do I take those who need a place to stay?

Where can displaced populations go to meet their needs?

Regionwide shelter status layer



How can I get there?

How do I get to those in need?

What is the status of transportation?

State DOT + Waze CCP Layer



What hospitals are open?



Where can I go to get a connection?



Is the gas station open? Electricity?



What's that smell?



Hands-on: – If you had \$100 to allocate...

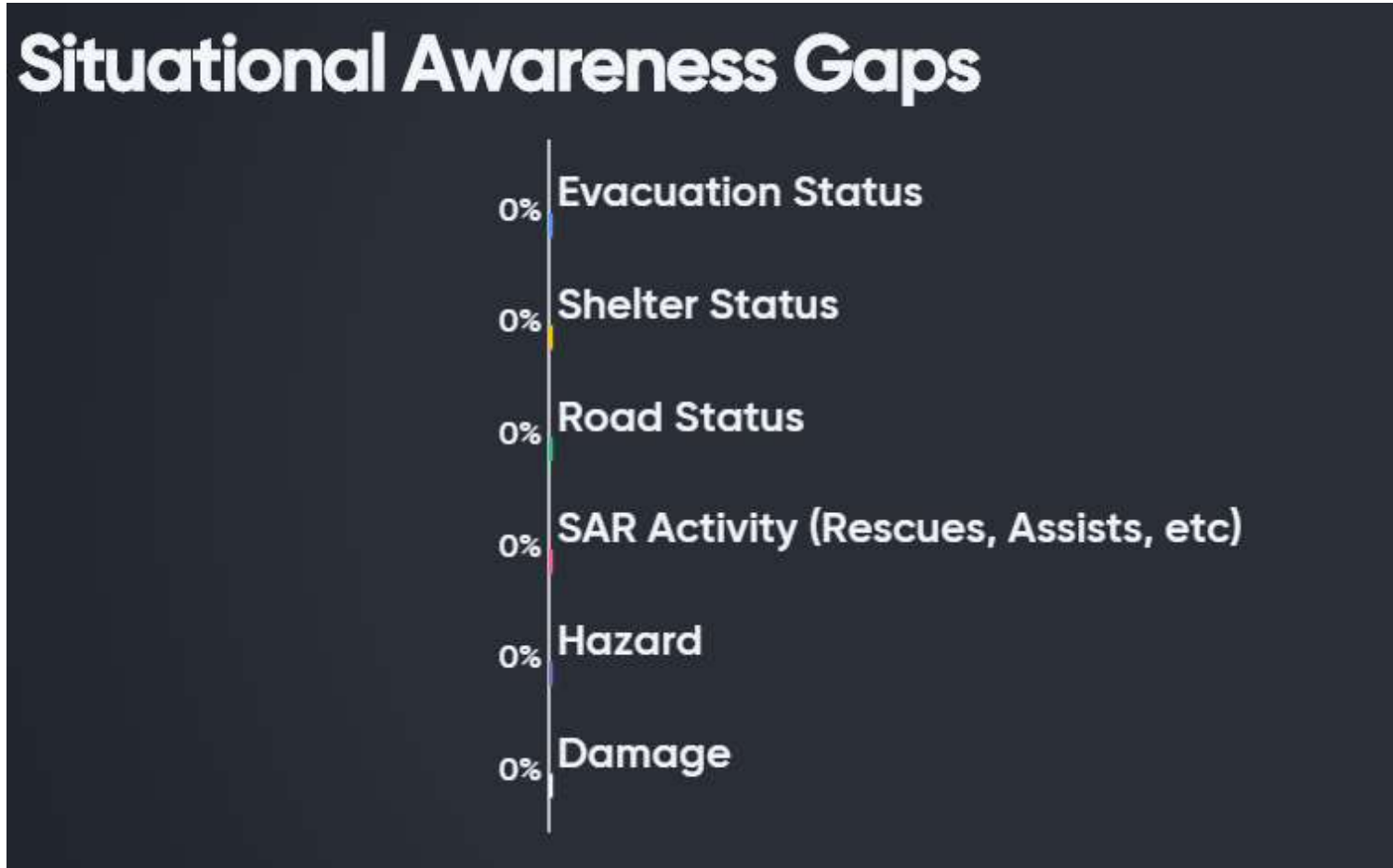
Go to **www.menti.com** and use the code



- 1**
Grab your phone
- 2**
Go to **www.menti.com**
- 3**
Enter the code **73 32 73** and vote!

<https://www.mentimeter.com/s/65d33eb311a46140a094376e1f87c52c/dc123b8e2f95>

Results



Begin Building Your Own Geospatial Game Plan

First Responder Geospatial Game Plan

Lifeline	Core Info Need	Public	First Responders	Emergency Managers	Operational Game Plan	Technical Game Plan
	Evacuation Status	Am I safe here?	What areas need to be evacuated?	What areas have been evacuated?		
	Human Interactions	N/A	Where are rescues needed vs already occurred?	Where are people sheltering in place?		
	Hazards	What areas are impacted?	What hazards are there in the field?	What hazards need to be addressed by other ESFs?		
	Support	N/A	Where are staging areas, landing zones, etc.?	Where are key logistics sites?		
	Damage	Is my home damaged?	Which houses are destroyed vs too dangerous to enter?	How many homes destroyed, major, minor affected?		

Emergency Manager / PIO Game Plan

Lifeline	Core Info Need	Public	First Responders	Emergency Managers	Operational Game Plan	Technical Game Plan
	Evacuation Status	Am I safe here?	What areas need to be evacuated?	What areas have been evacuated?		
	Shelter Status	Where can I go to be safe?	Where do I take evacuees?	Where are the evacuees?		
	Road Status	How can I get there?	How do I get to those in need?	What is the status of transportation?		

GIS Resources

Resource: All-Hazards Core Information Needs Group

Overview Content Members

Q Flood

Grid Date Modified Filter

Filters

1 - 7 of 7

Filters Type: Layers Category: Live Feeds Clear filters

Group Categories

- Incident Phase (19)
- Base Data (11)
- Incident Data (5)
- Live Feeds (7)
 - Current (2)
 - Forecast (5)

Item Type

- Maps
- Layers
 - Feature Layers
 - Tile Layers
 - Map Image Layers
 - Imagery Layers
 - Scene Layers
 - Tables
 - Layer Files
- Scenes
- Apps
- Tools
- Files

Live Stream Gauges (Flooding) by Esri

Created: Apr 8, 2016
Updated: Dec 12, 2018
View Count: 1,308,678

National Water by esri

Created: Aug 24, 2016
Updated: Jun 13, 2018
View Count: 125,000

Short-Duration Hazards - War... by NOAA.GeoPlatform

Created: Oct 1, 2015
Updated: Jul 5, 2017

Long-Duration Hazards - War... by NOAA.GeoPlatform

Created: Oct 1, 2015
Updated: Jul 5, 2017

Have you joined?

<https://arcg.is/iS8am>

Resource: All-Hazards Core Information Needs Group

Overview Content Members

Q Search group member

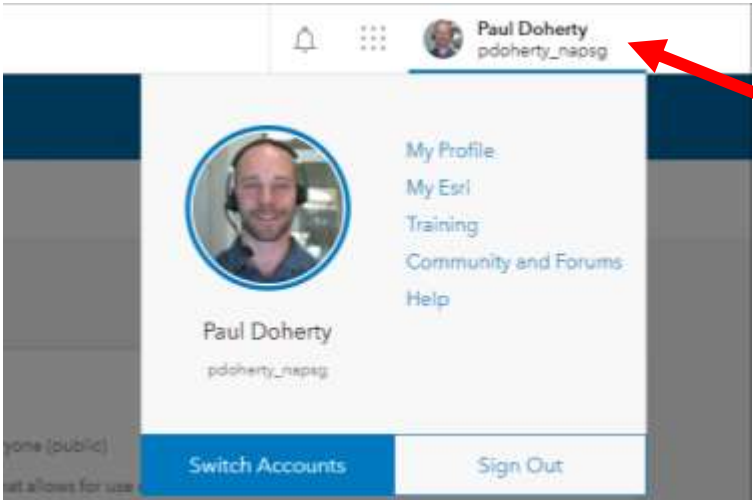
Date Joined Filter

Filters

1 - 20 of 62

Name	Group Role	Joined
 Madeline Amlin (madlineamlin)	Member	Mar 19, 2019
 Diana Beasley (DianaBeasley9)	Member	Mar 19, 2019
 Jackson Baynard (jmtbay)	Member	Mar 17, 2019
 George Durkee (gdurkee_gis_cc)	Member	Mar 13, 2019
 Cole Brown (HVFCMAP02)	Member	Mar 13, 2019
 Jean Behrend (jean.behrend_FEMA)	Member	Mar 4, 2019
 Daniel Stoelb (daniel.stoelb)	Member	Feb 1, 2019
 Lai, Stephen (Stephen.Lai@caloes.ca.gov_CalEMA)	Member	Jan 31, 2019
 Margaret Carew (margaret.carew_cityofthornton)	Member	Jan 31, 2019
 Monty Bell (MRA_Admin)	Member	Jan 16, 2019
 Stacy Belladin (stac8005@esri.com_modelpd)	Member	Jan 4, 2019
 John Caton (john.caton_FEMA)	Member	Dec 27, 2018

GIS Resources



My Profile

Edit my profile

Paul's Profile



First Name
Paul

Last Name
Doherty

Email
pdoherty@publicsafetygis.org

Paul Doherty
pdoherty_napsg

My Profile
My Esri
Training
Community and Forums
Help

Switch Accounts Sign Out

Password

Change Password

Security Question

What city were you born in?

Answer

Who can see your profile?

☒ Everyone (public)
☐ Organization
☐ Private

Game Plan

- Fill out your worksheet the best you can.
- If you don't have a clear answer for any one of these boxes, you have some homework to do!
- For Discussion: What boxes are missing from your worksheet?

Closing Discussion

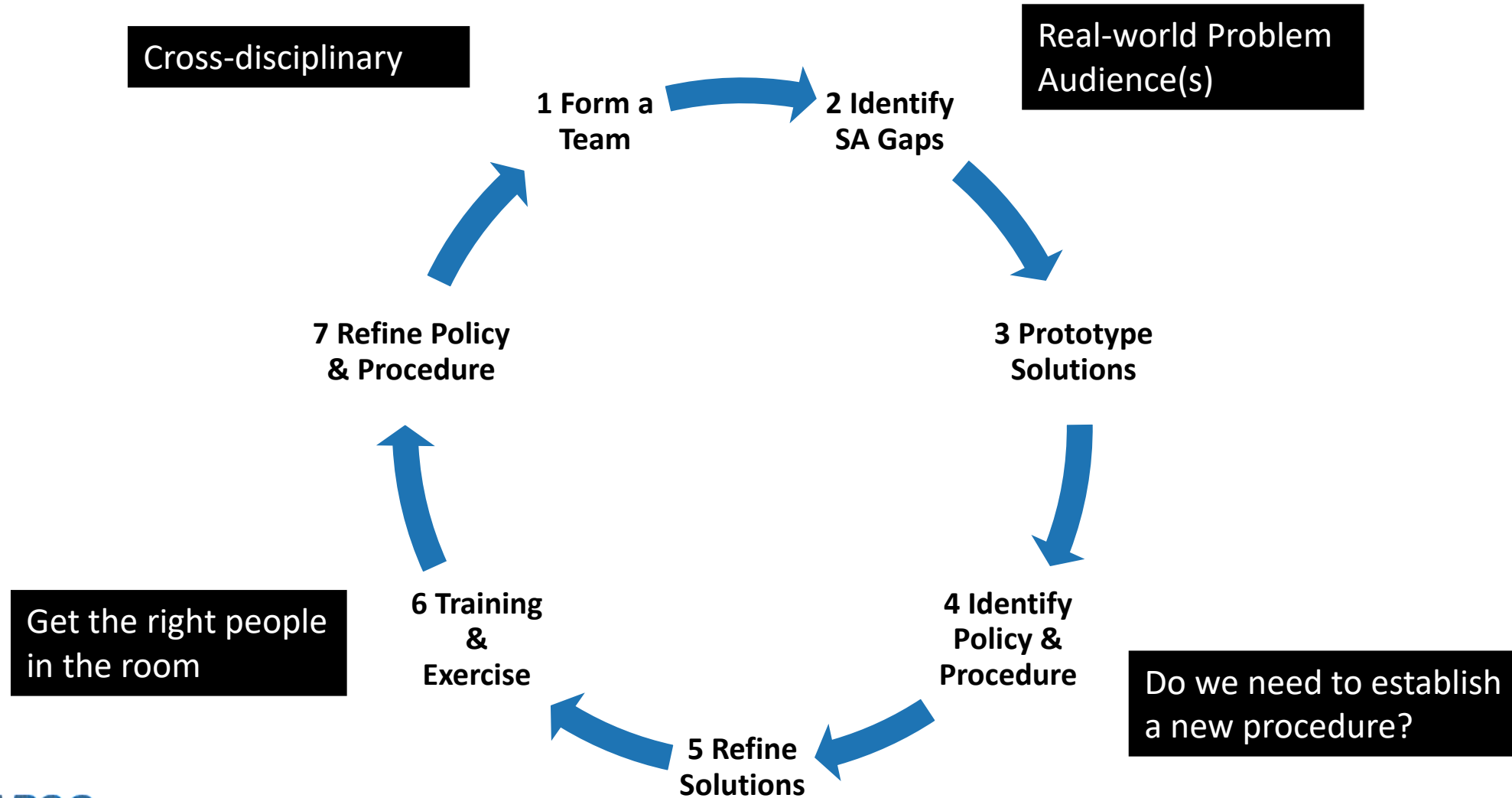
What should a geospatial game plan for first responders look like?

Challenge

The ultimate challenge for innovation in Public Safety is...

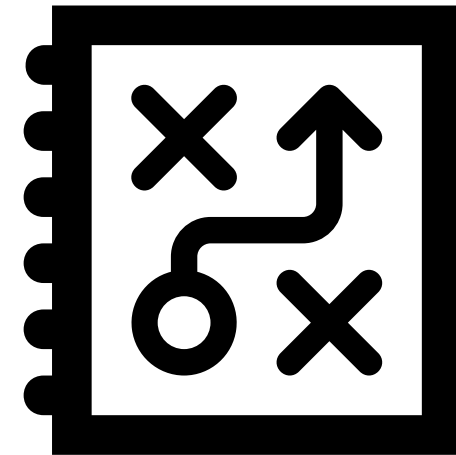
...that first responders will always rely on the best available and most familiar tools they already know how to use.

Technology Innovation Process



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- Build – Test – Refine – Train - Repeat



The geospatial game plan can be a chart, document, whiteboard, website or any other medium that makes sense for your organization.

*Core information = geospatial by default.

Challenge

How can NAPSG Foundation help you?

How can NAPSG Foundation help those who are not at InSPIRE?

How we do we make technology innovation to enhance outcomes for survivors.... *normal*?

Coming Soon!

Get Started

Select a resource below to begin implementing innovative technology for preparedness and operations.



Sandbox

Public Safety practitioners can get hands-on with innovative technology.



Training

Technologists can learn how to deploy innovative technology.



Game Plan

Together you can build a plan to operate technology.

<https://techinnovation-napsg.hub.arcgis.com/>

Thank You!



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