Webinar Prep

- Due to the large attendance, all participants are muted for the duration of the session to prevent background noise.
  - Please use the Q&A functionality within Zoom for questions that are relevant to the whole group.
  - We will address these Q&A at the end of the webinar!

While you wait...

Answer a quick question on our Mentimeter Using the QR Code or link.

Menti.com

Code: 49 90 27

Poll Closed

Applying Drones & Imagery for Disaster Management

PrepTech Talks

Powered by NAPSG Foundation

July 28, 2020

National Alliance for Public Safety GIS (NAPSG) Foundation

napsgfoundation.org | @napsgfoundation

Today's Objectives

- Learn how drones are transforming the landscape of disaster response missions nationwide.
- Learn from industry leaders on the keys to developing a successful public safety drone/UAS program in your agency.
- Gain an understanding of how your agency can leverage Civil Air Patrol and their drone capacity during a disaster.
- Hear the latest innovations in imagery collection, exploitation and artificial intelligence for imagery-derived disaster intelligence.

Hosts and Panelists

Tari Martin - Director, National and Federal, NAPSG Foundation

Charles Werner - Director, DRONERESPONDERS Public Safety Alliance

Austin Worcester - Senior Program Manager for sUAS, Civil Air Patrol

Christopher Todd – Executive Director, Airborne International Response Team

Agenda

2:00-2:05 PM **Welcome –** Tari Martin, NAPSG Foundation

2:05-2:20 PM **State of Drones for Public Safety** – Charles Werner, DRONERESPONDERS Public Safety Alliance

2:20-2:35 PM **Leveraging Civil Air Patrol** - Austin Worcester, Civil Air Patrol

2:35-2:45 PM **DRONES FOR GOOD™ Disaster Response Operations –** Christopher Todd, Airborne International Response Team

2:45-2:50 PM **Next Steps**

2:50-3:00 PM **Closing and Q/A**

About NAPSG Foundation

Our Vision

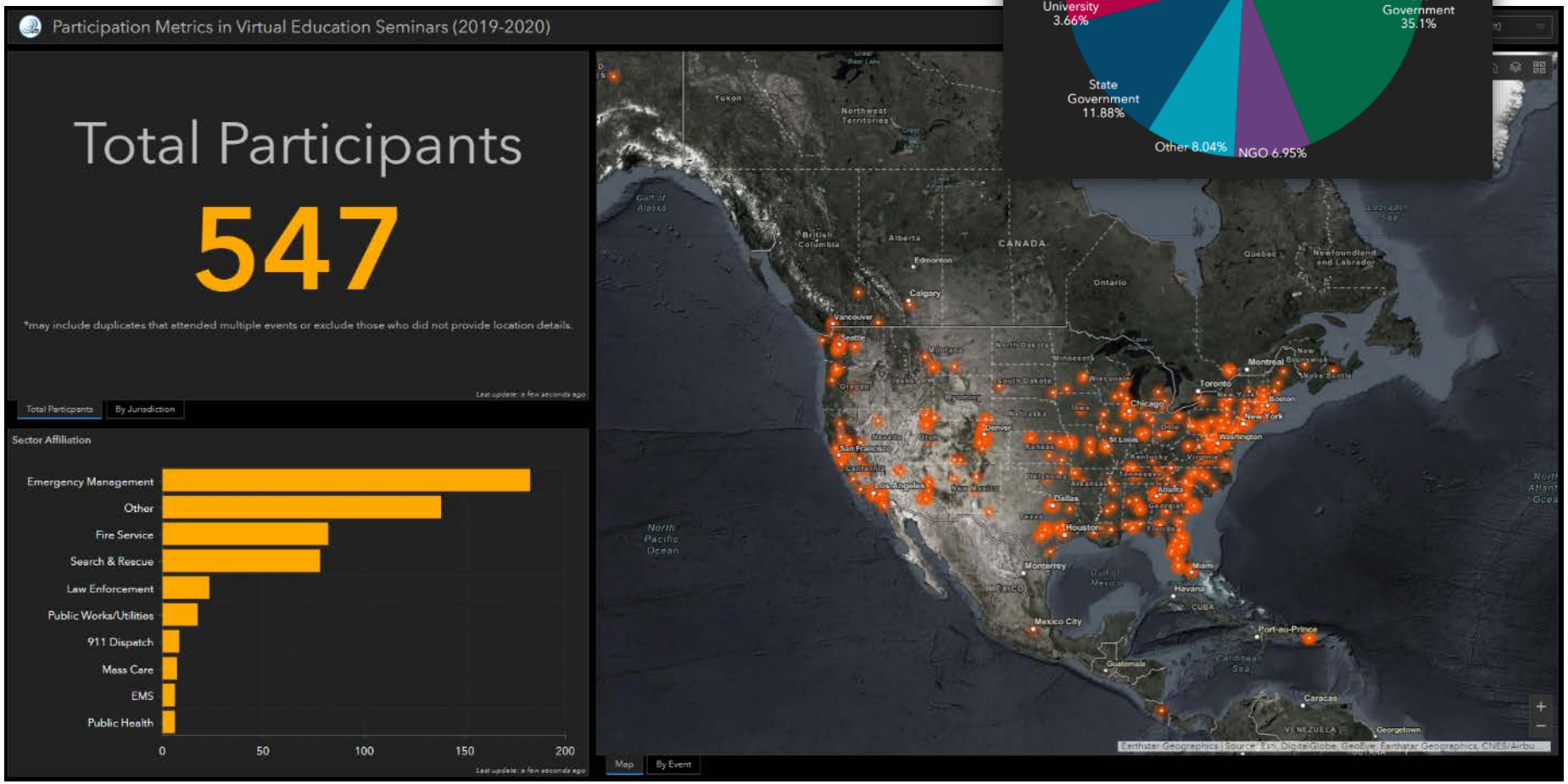
A Nation of emergency responders and leaders equipped with the knowledge and skills in applying technology and data to change the outcome for survivors.

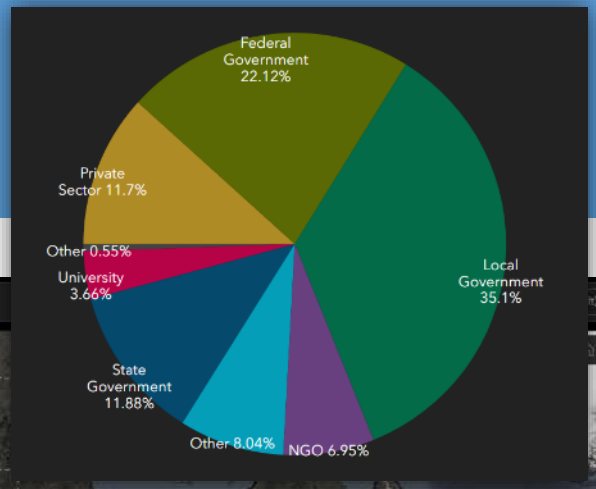
- 501(c)(3) Non-profit organization established in 2005
- +20,000 member network: Public Safety leaders, first responders, and GIS practitioners
- Board of Directors comprised of public safety & emergency management industry leaders

NAPSG Foundation

Local Focus – National Reach

- 20,000+ member network
- 12 primary national & international associations
- All disciplines
- All levels of government
- Private sector





Virtual Training participants with contact details redacted.

From Preparedness through Response and into Recovery

First Responders, Operators, and Decision Makers have access to and know how to use the **right <u>actionable information</u> at the right time**

NAPSG Foundation

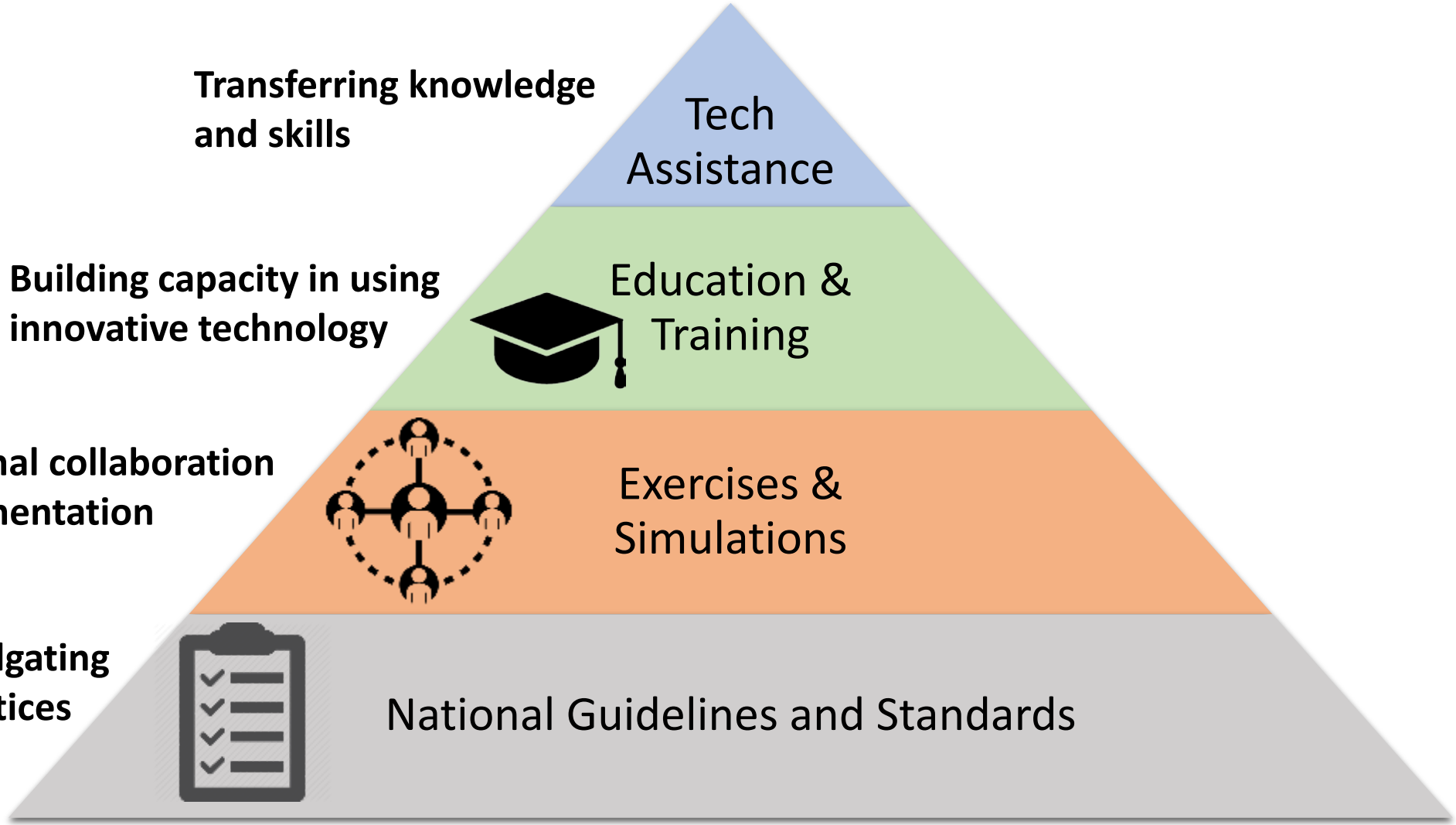
How Do We Do It

Transferring knowledge and skills

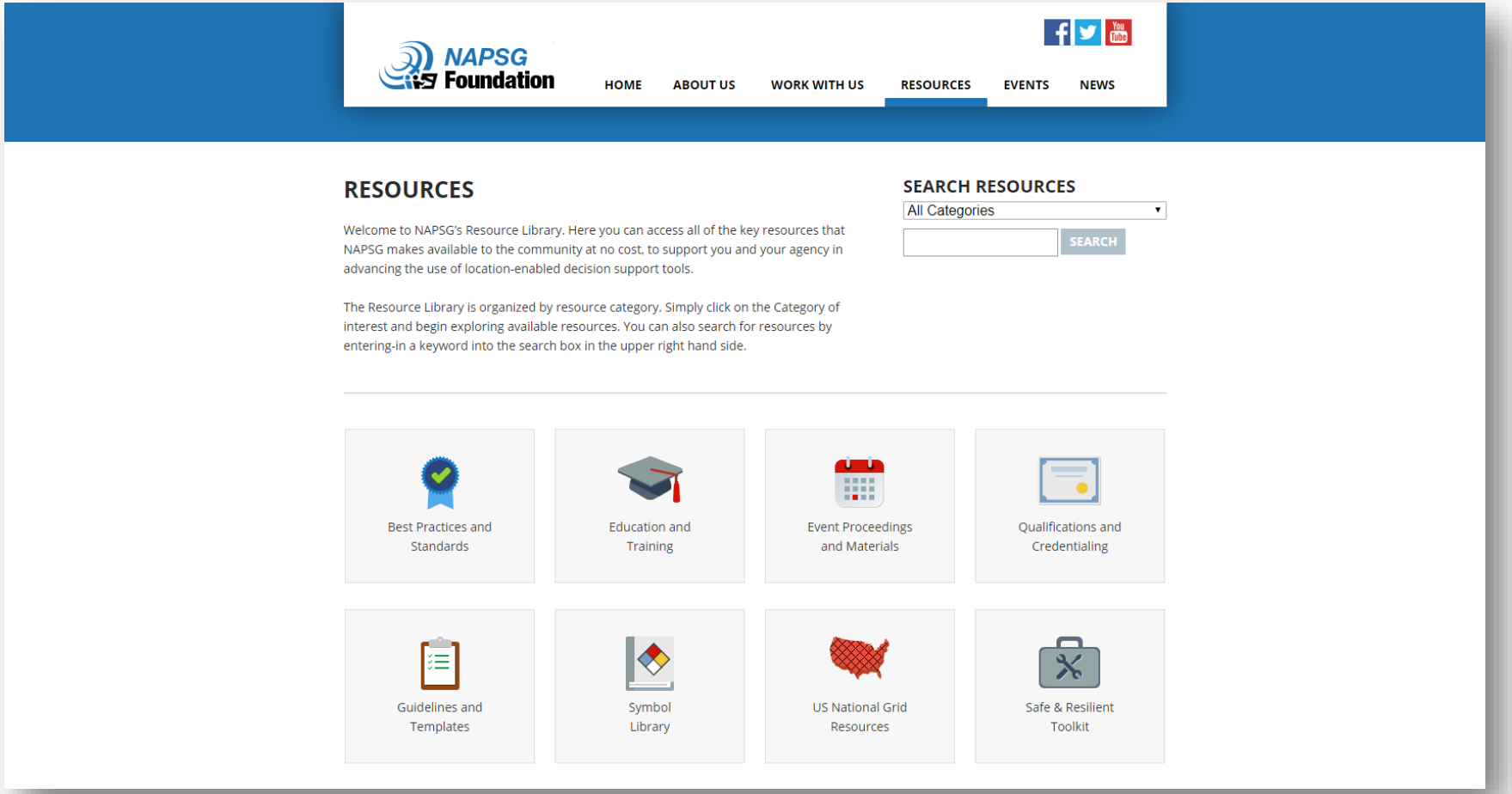
Building capacity in using innovative technology

Fostering regional collaboration through implementation

Defining and promulgating consistent best practices



Resource Library

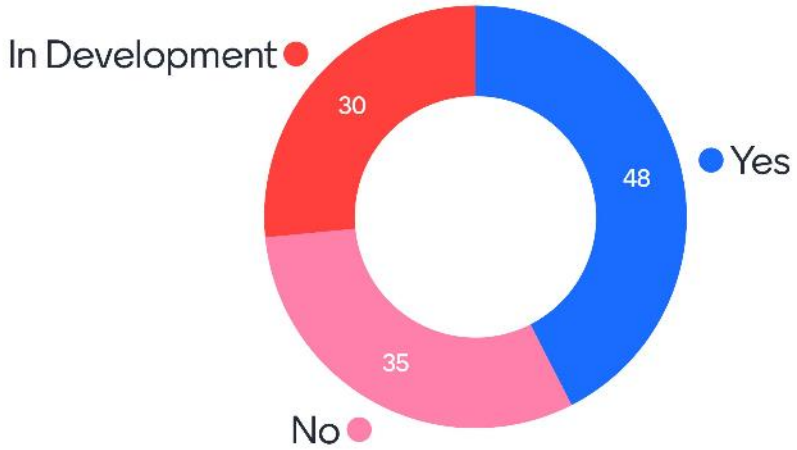


https://www.napsgfoundation.org/all-resources/

Menti Results

Mentimeter

Does your agency currently have a drone program?



113

DRONERESPONDERS

The State of Drones for Public Safety

Chief Charles L. Werner (Emeritus-Ret.)

Director, **DRONERESPONDERS Public Safety Alliance**

DRONERESPONDERS.org

“Would you ever put your personnel or citizens in harms way unnecessarily?”

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Structure FireFighting

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Thermal Imaging Operations

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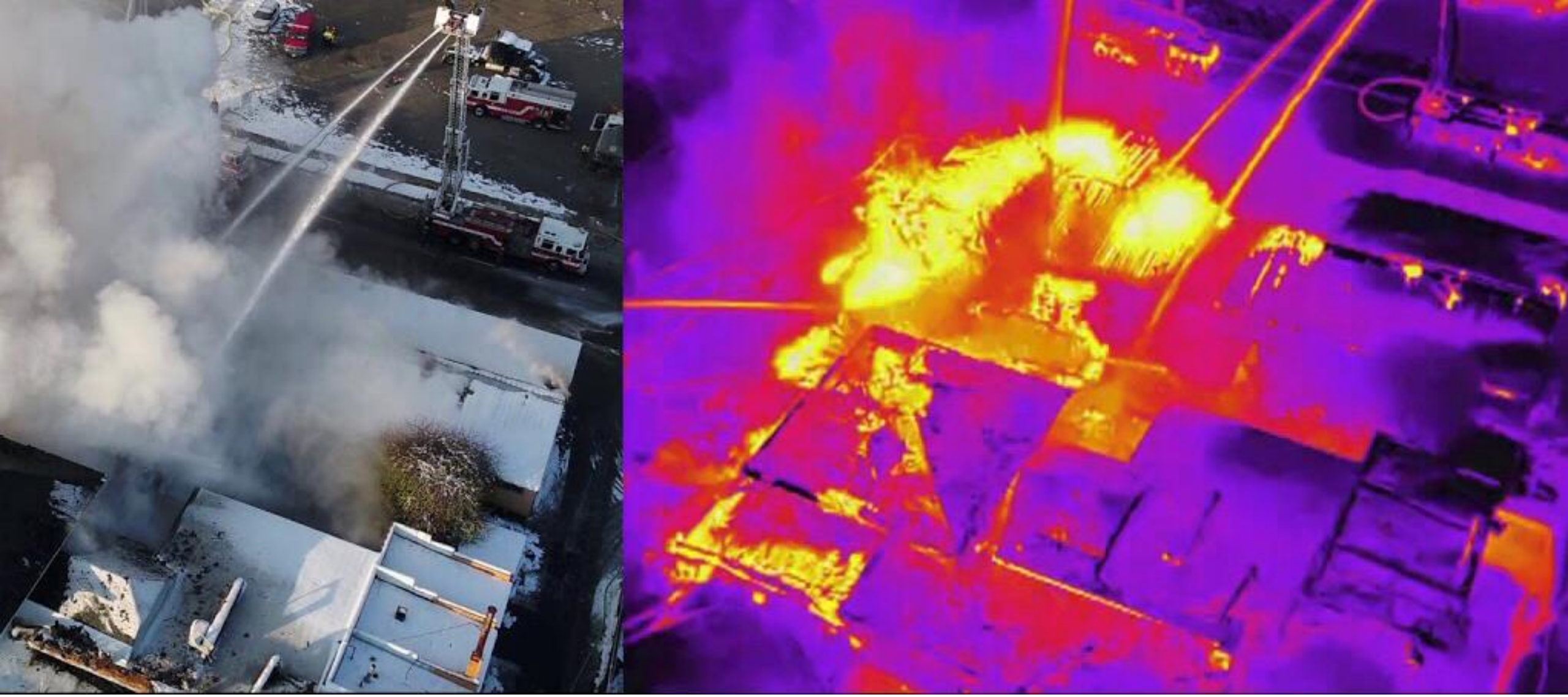
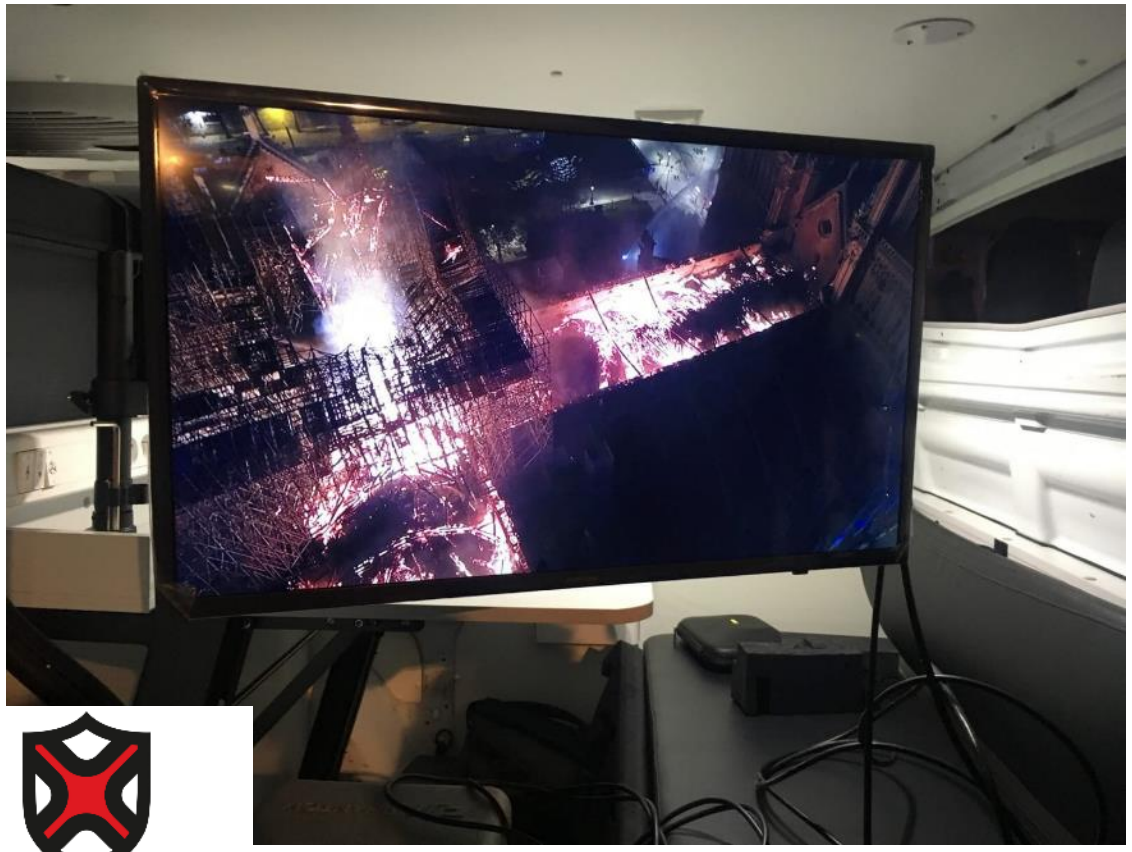


Camera View vs. Thermal Image View – Heat Signature DJI FLIR Zenmuse XT

Notre Dame Fire in France

Drone was instrumental in saving the remainder of this historic building



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Major Traffic Accidents

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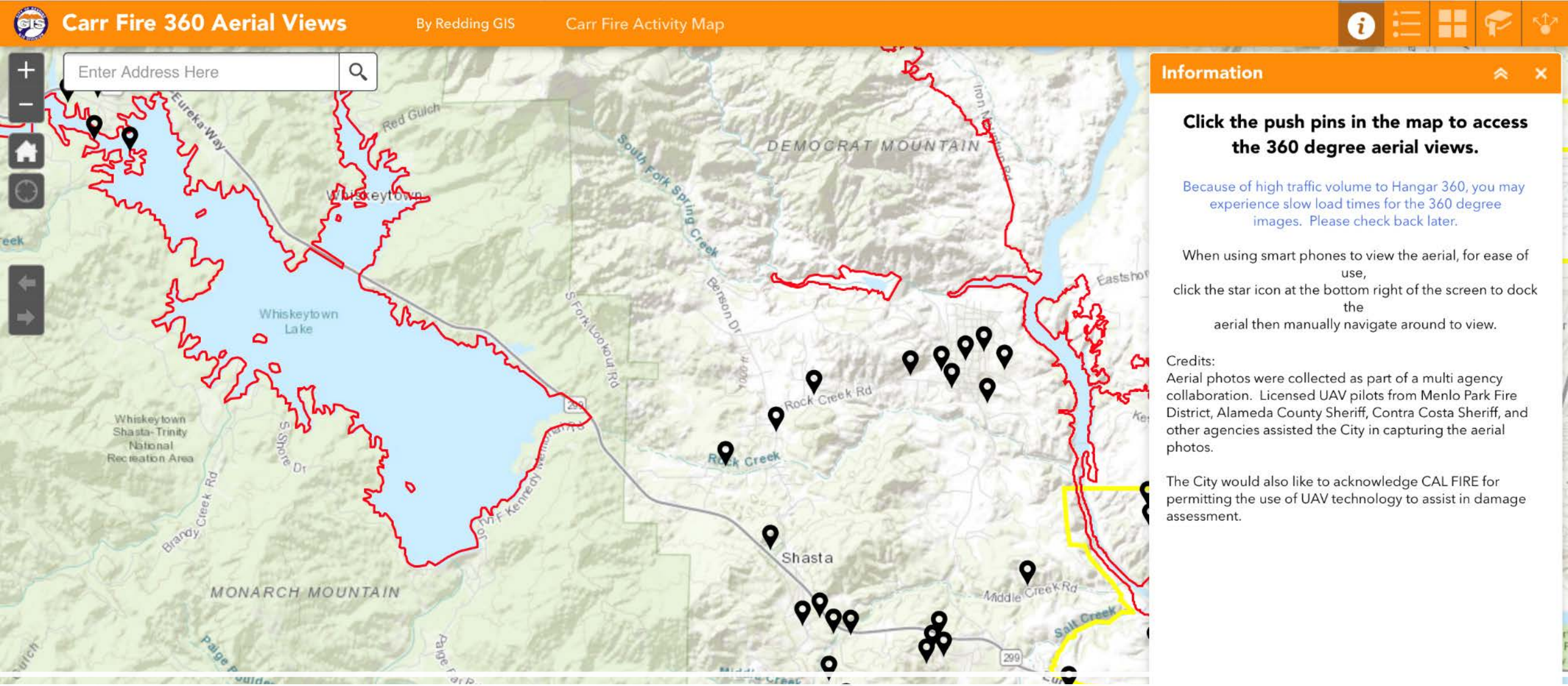


Combining GIS & Digital Imagery

DRONERESPONDERS

DRONERESPONDERS

CHULA VISTA POLICE DEPARTMENT - DRONE AS A FIRST RESPONDER (DFR)

CHULA VISTA POLICE DEPARTMENT

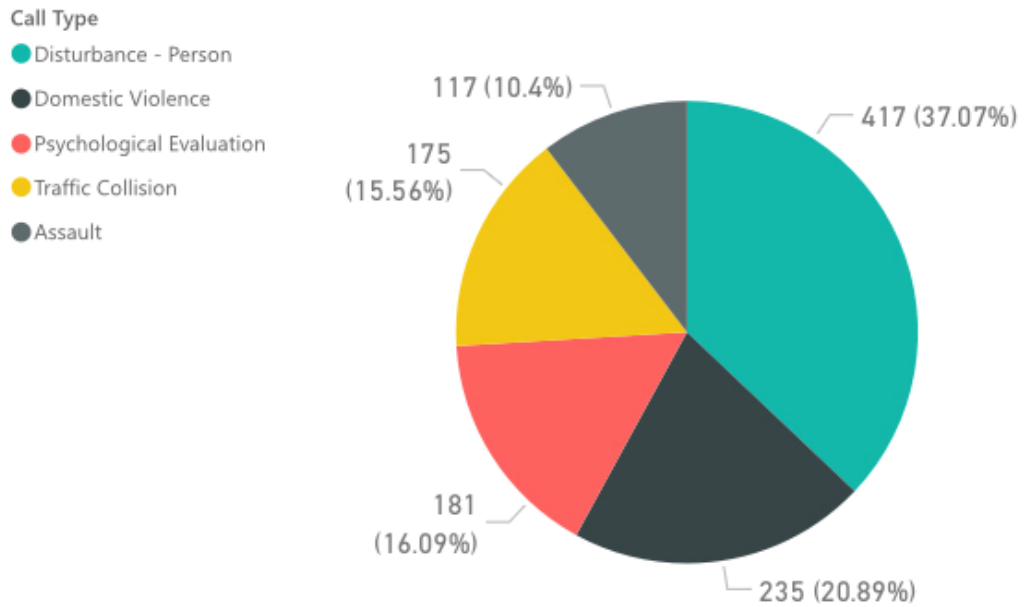
* Selected as part of the IPP on October 2018

* First program in the nation using Drones as a First Responder (DFR). See FAA site

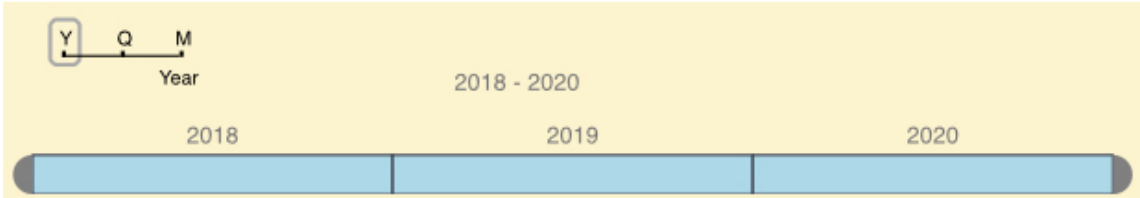
* Current status: DFR Pilot Program currently based from CVPD HQ with limited flight range of about 1 mile radius

* Common use of drones in Chula Vista: Drones as first responders, documenting crime and accident scenes, searching for missing or wanted persons, fires, and evaluating damage after a major incident or

TOP 5 CALLS RESPONDED WITH DFR ASSISTANCE



PLEASE SELECT A TIME FRAME



DFR ACTIVITY BY THE NUMBERS

TOTAL CALLS RESPONDED TO	2881
DFR ASSISTED ARRESTS	373
DFR DEPLOYMENT AVOIDED DISPATCHING A PATROL UNIT	687
DFR FIRST ON SCENE COUNT	1207
AVG RESPONSE TIMES - FIRST ON SCENE (IN SECONDS) *	108.66
AVG RESPONSE TIMES - ALL CALLS (IN SECONDS) *	141.99

EARLIEST RESPONSE 10/22/2018 7:23:18 AM LATEST RESPONSE DATE/TIME 7/15/2020 3:06:14 PM

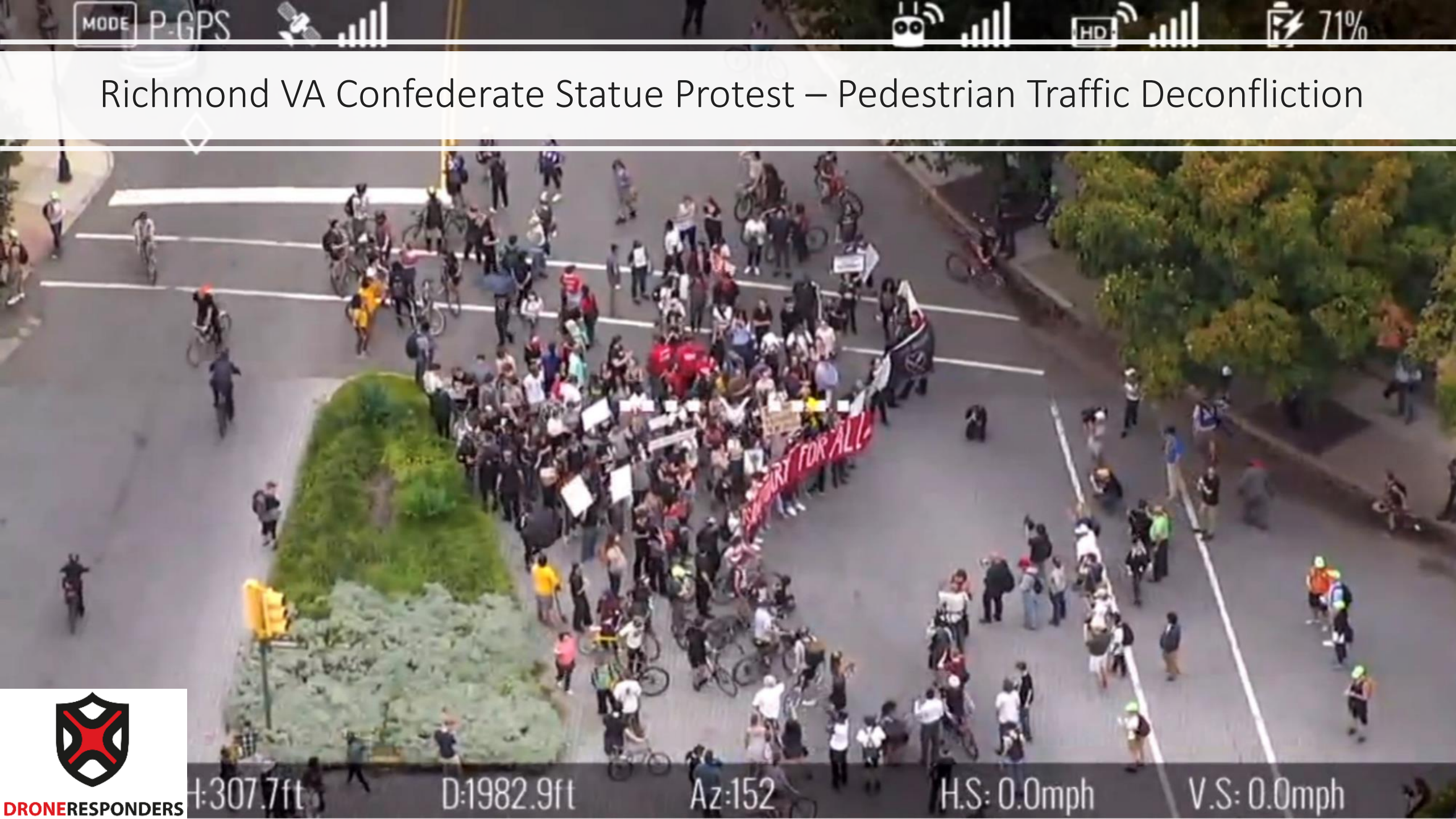
om

DRONERESPONDERS

Search and Rescue – Lost Persons

DRONERESPONDERS

Richmond VA Confederate Statue Protest – Pedestrian Traffic Deconfliction



Courtesy: Marco Luzuriaga
HURRICANE HARVEY FLOODS BRAYS BAYOU, SURROUNDING AREAS
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Alabama Tornado – Search & Rescue, Damage Assessment

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Hawaii Volcano Monitor Lava Spread, SO2 Sensing & Evacuation

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Law Enforcement Tactical Ops

Traffic Crash Reconstruction – 1/3 Time, Reduces Secondary Accidents

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Train Derailment, Fire & Spill

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Critical Infrastructure

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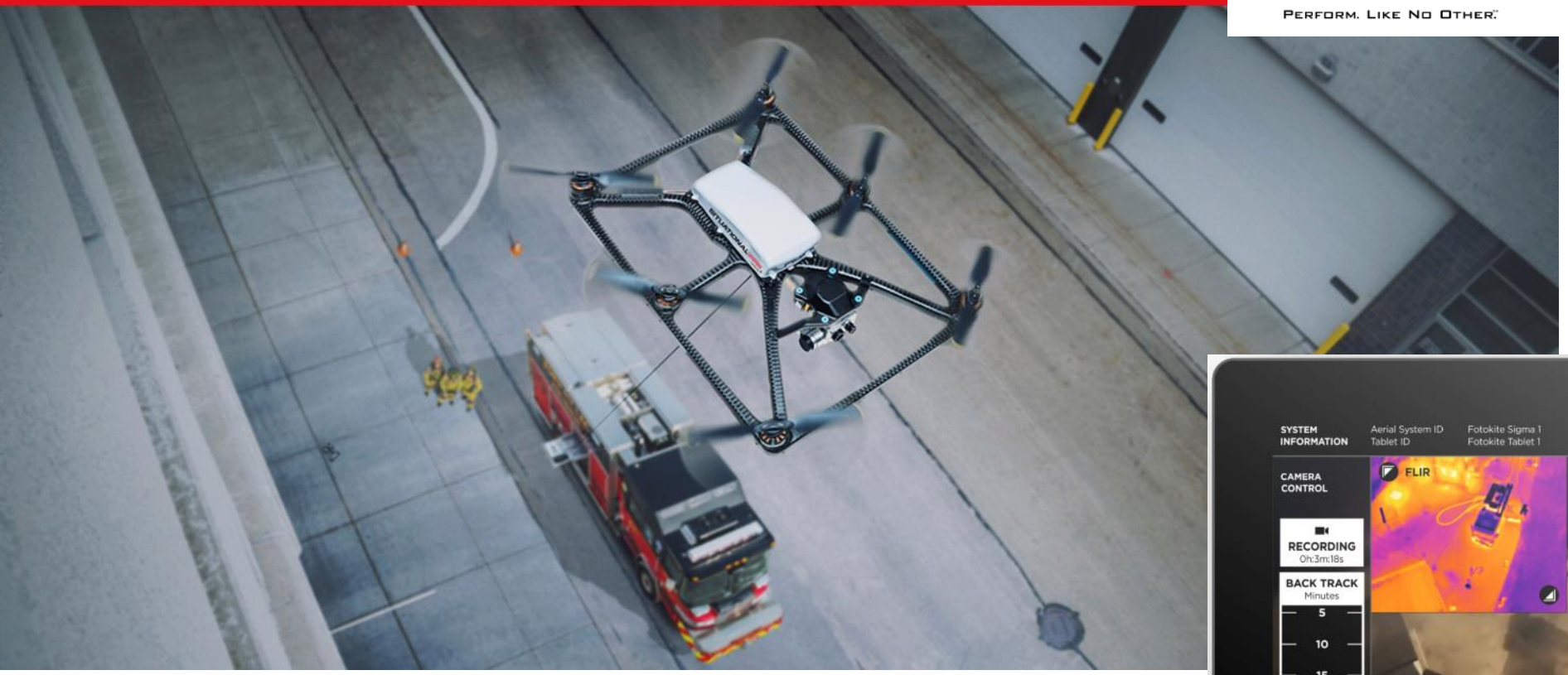
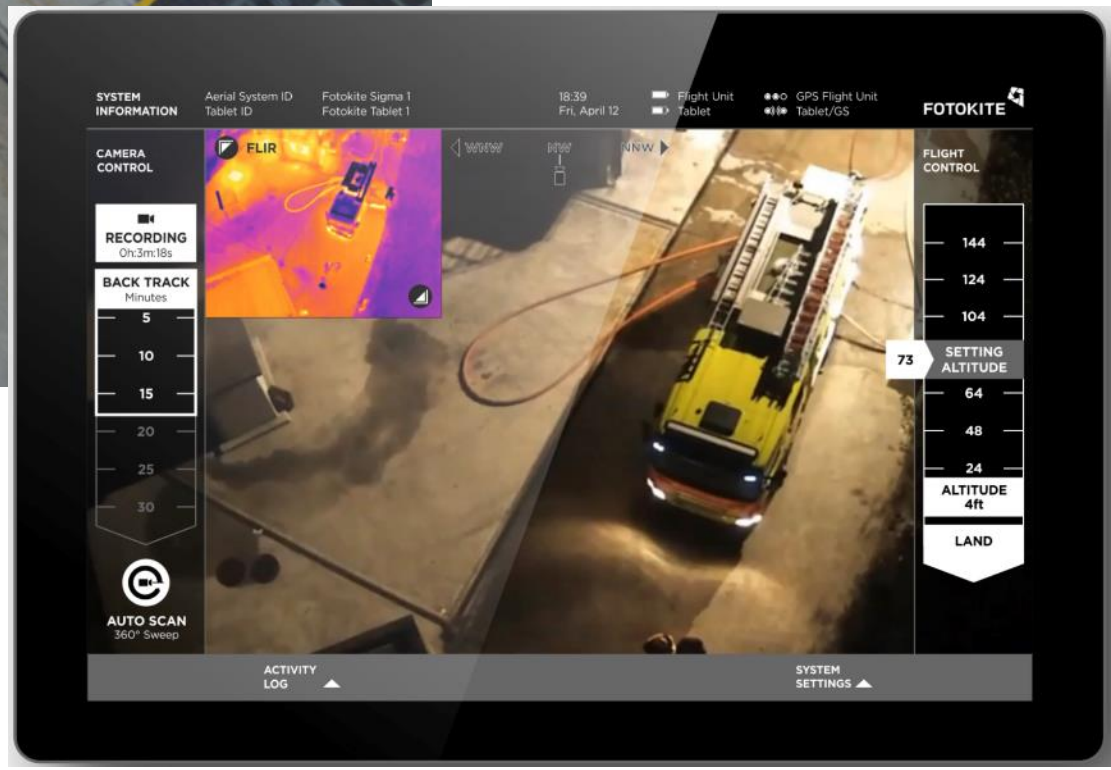
SITUATIONAL AWARENESS SYSTEM

Pierce
PERFORM. LIKE NO OTHER.





FAA Compliant

No piloting necessary; fully autonomous launching, flight, & landing

Flight Time

24 hours continuous (as long as truck is running or plugged into shore power)

Camera

Thermal stream resolution of 320x256/30fps with 5x EO digital zoom at 720p/30fps

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Public Safety Vehicle/Portable Tethered Drones – Continuous Power

FAA does NOT Require Remote Pilot

AT&T/FirstNet Flying Cell on Wings (COW) for LTE

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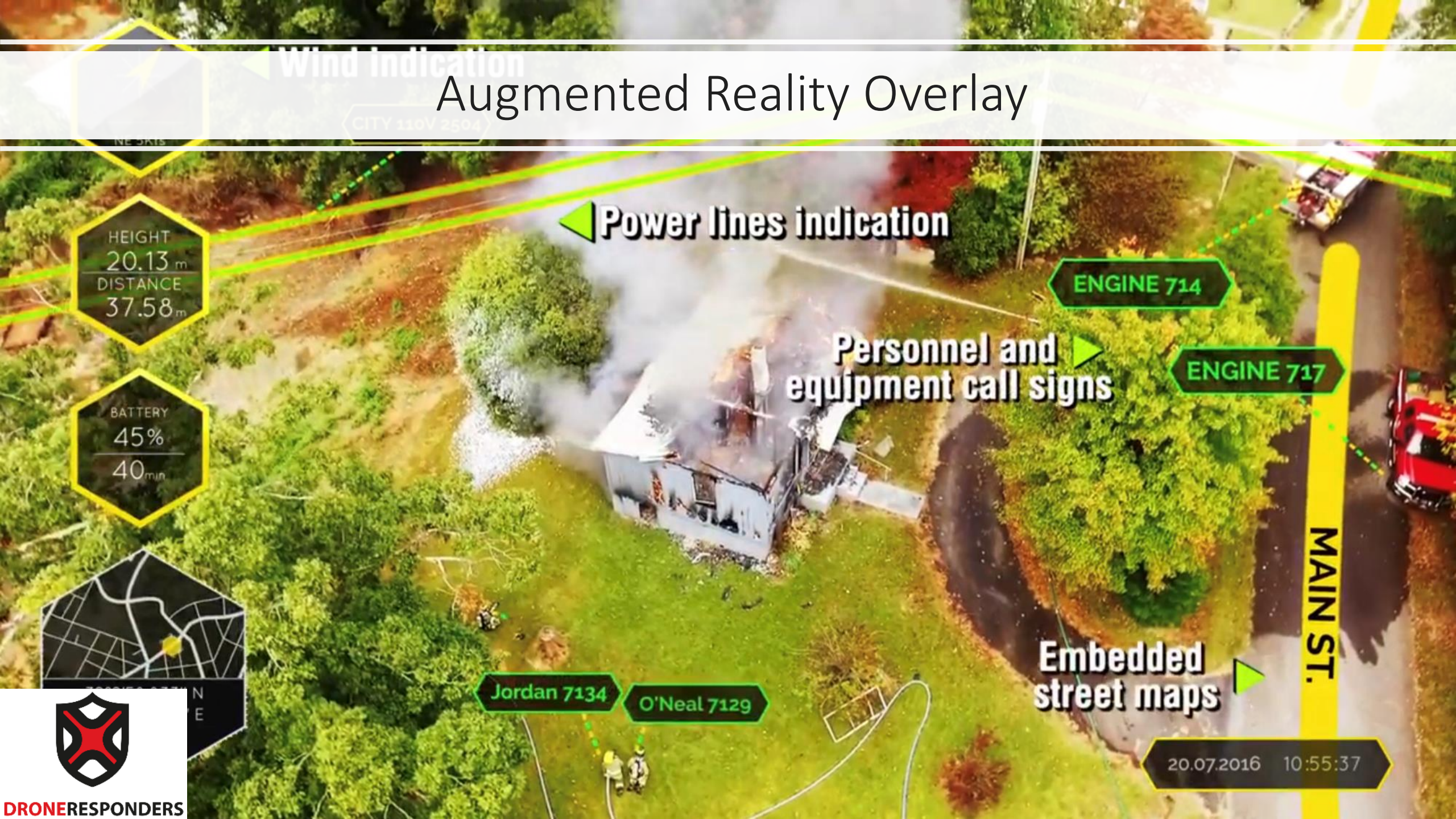
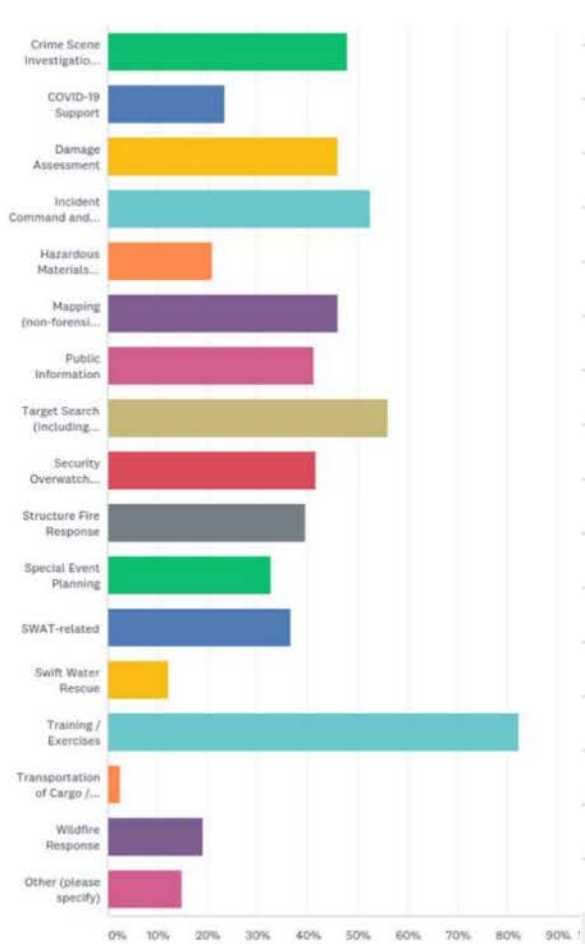
Augmented Reality Overlay



DRONERESPONDERS

Q18: Which of the following types of public safety UAS missions has your organization flown to date in 2020?

Answered: 248 Skipped: 41



Crime Scene Investigation / Forensic Analysis	47.98%	119
COVID-19 Support	23.39%	58
Damage Assessment	45.97%	114
Incident Command and Control (Live Streaming)	52.42%	130
Hazardous Materials (HAZMAT) Response	20.97%	52
Mapping (non-forensic related)	45.97%	114
Public Information	41.13%	102
Target Search (including Search and Rescue)	56.05%	139
Security Overwatch (Surveillance)	41.53%	103
Structure Fire Response	39.52%	98
Special Event Planning	32.66%	81
SWAT-related	36.69%	91
Swift Water Rescue	12.10%	30
Training / Exercises	82.26%	204
Transportation of Cargo / Equipment	2.42%	6
Wildfire Response	18.95%	47
Other (please specify)	14.92%	37
Total Respondents: 248		

AIRT DRONERESPONDERS

AIRT-DRONERESPONDERS Spring 2020 Research Study Report
https://www.droneresponders.org/research

DRONERESPONDERS

State of Public Safety UAS Programs 2020

- UAS Programs are more mature
- Flying more missions and more types of missions
- Increase in number of remote pilots

AIRT-DRONERESPONDERS Spring 2020 Research Study Report
https://www.droneresponders.org/research

DRONERESPONDERS

How Drones Make a Difference in Public Safety

- Safety – Civilians & Responders
- Operational Effectiveness
- Situational Awareness
- Disaster Recovery

AIRT-DRONERESPONDERS Spring 2020 Research Study Report
https://www.droneresponders.org/research

DRONERESPONDERS

Question:

Operate under a COA or Part 107?

Answer:

BOTH - Provides Most Versatility

Examples:

Tactical BVLOS Waiver

Operations Over People

Night Operations

DRONERESPONDERS

What's Involved in Implementing a Drone Program?

It's more than buying and flying!

Mission Types, Aircraft, Payloads, Flight Logs, Training, Maintenance, Batteries, Spare Equipment, Logistics, Insurance, Data Storage, Documentation, Privacy, Civil Rights, Policies & Procedures

DRONERESPONDERS

STANDARDS

- NFPA 2400 – http://NFPA.org/2400
- APSA – http://PublicSafetyAviation.org
- ASTM F38 - https://www.astm.org/COMMITTEE/F38.htm
- ASTM 3379-20 – Public Safety Remote Pilot Trainin Requirement - https://www.astm.org/Standards/F3379.htm
- NIST UAS Obstacle Course - https://www.nist.gov/el/intelligent-systems-division-73500/response-robots/aerial-systems
- ANSI UASCC STANDARD ROADMAP - https://www.surveymonkey.com/r/WG2RPBR

DRONERESPONDERS

droneresponders.org

Please register on the website (it's FREE)

JOIN and access the largest online collection of Public Safety UAS documents (SOPs, Best Practices, Lessons Learned, Training Info and more)

DRONERESPONDERS.ORG

Contact Information

Chief Charles L. Werner (Emeritus - Ret.)

Director, DRONERESPONDERS

Charles@DRONERESPONDERS.org

Mobile: 434.825.5402

DRONERESPONDERS

Participant Poll

How is your agency currently using imagery in preparedness, response, recovery and/or resilience efforts?

Answer a quick question on our Mentimeter Using the QR Code or link.

Menti.com
Code: 49 90 27

Poll Closed

Civil Air Patrol
United States Air Force Auxiliary

CAP sUAS / Remote Sensing Use in Emergencies

Austin “Sauce” Worcester
Senior Program Manager, sUAS
National Headquarters
28 July 2020

About CAP

- **Founded December 1, 1941**
- **Became the U.S. Air Force Auxiliary in 1947 with the birth of the U.S. Air Force**
- **In all 50 States, D.C., as well as Puerto Rico and the U.S. Virgin Islands.**
- **66,000+ volunteer members supported by less than 200 full time employees**
- **Largest owner of single engine Cessna aircraft in the world – 570 aircraft**
- **Largest single owner of sUAS in the Nation – more than 1800 sUAS aircraft**

CAP Fixed Wing sUAS in Use for AFAM

Event 38 – E 384

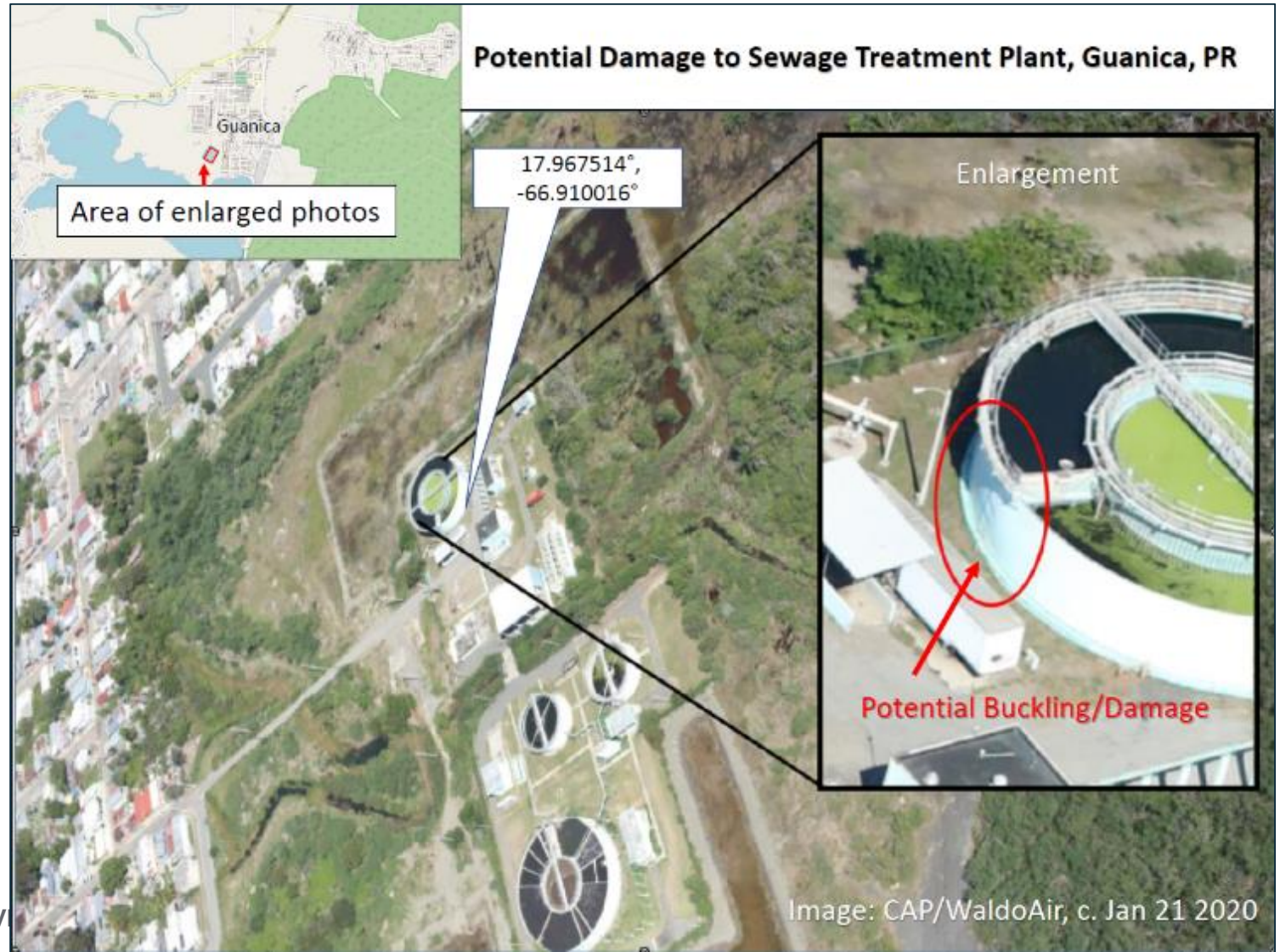
CAP Rotary Wing Aircraft in Use for AFAMs

INSTANTEYE MK 3 GEN 4

T960 WITH LIDAR

Puerto Rico Earthquake Ops

Imagery Collection from WaldoAir and sUAS

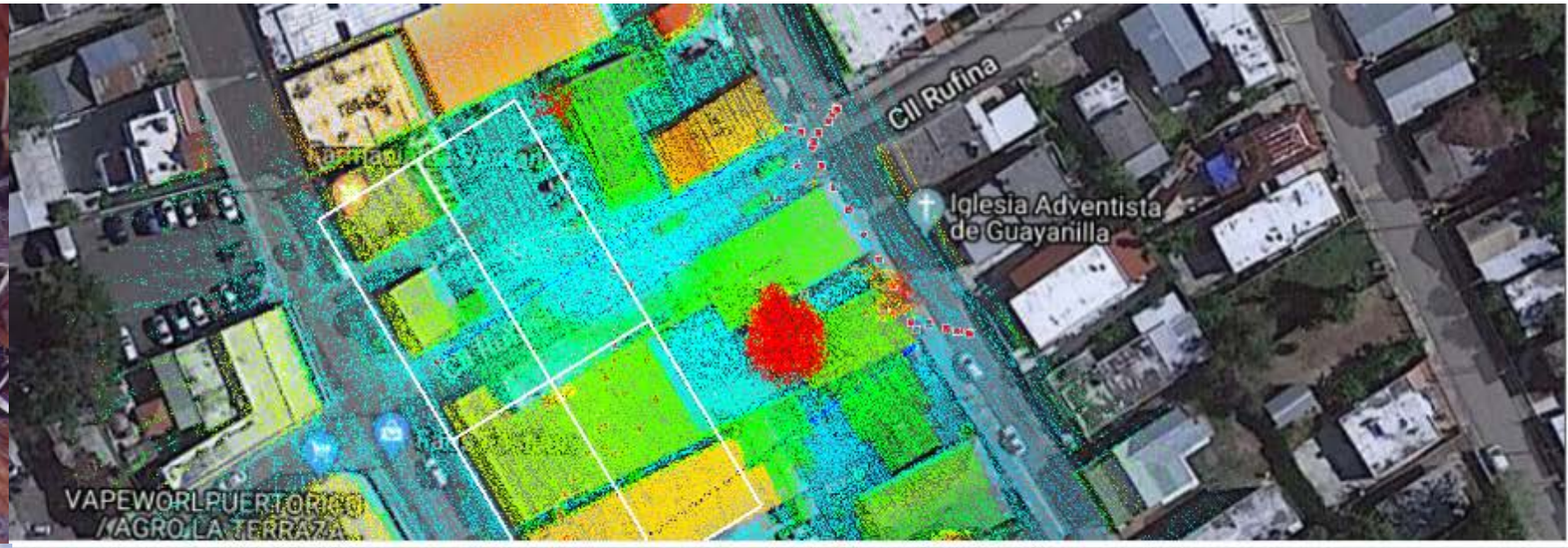


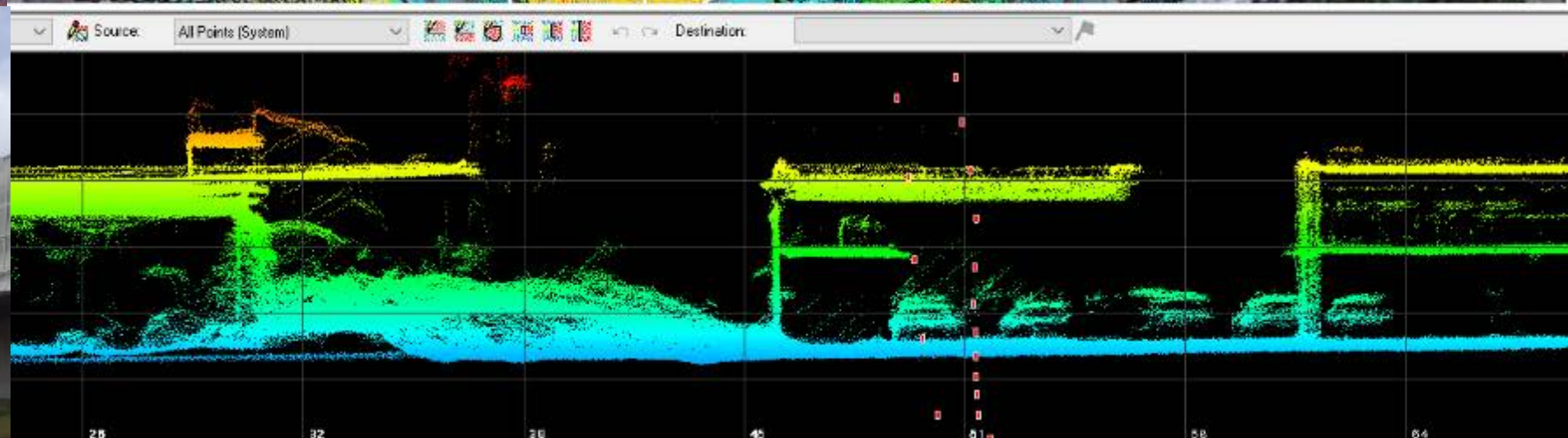
Hurricane Maria Recovery Linear Feature Imaging for Powerline Surveys of Puerto Rico

Waldo Air XCAM - R Sensors

Puerto Rico Earthquake Ops

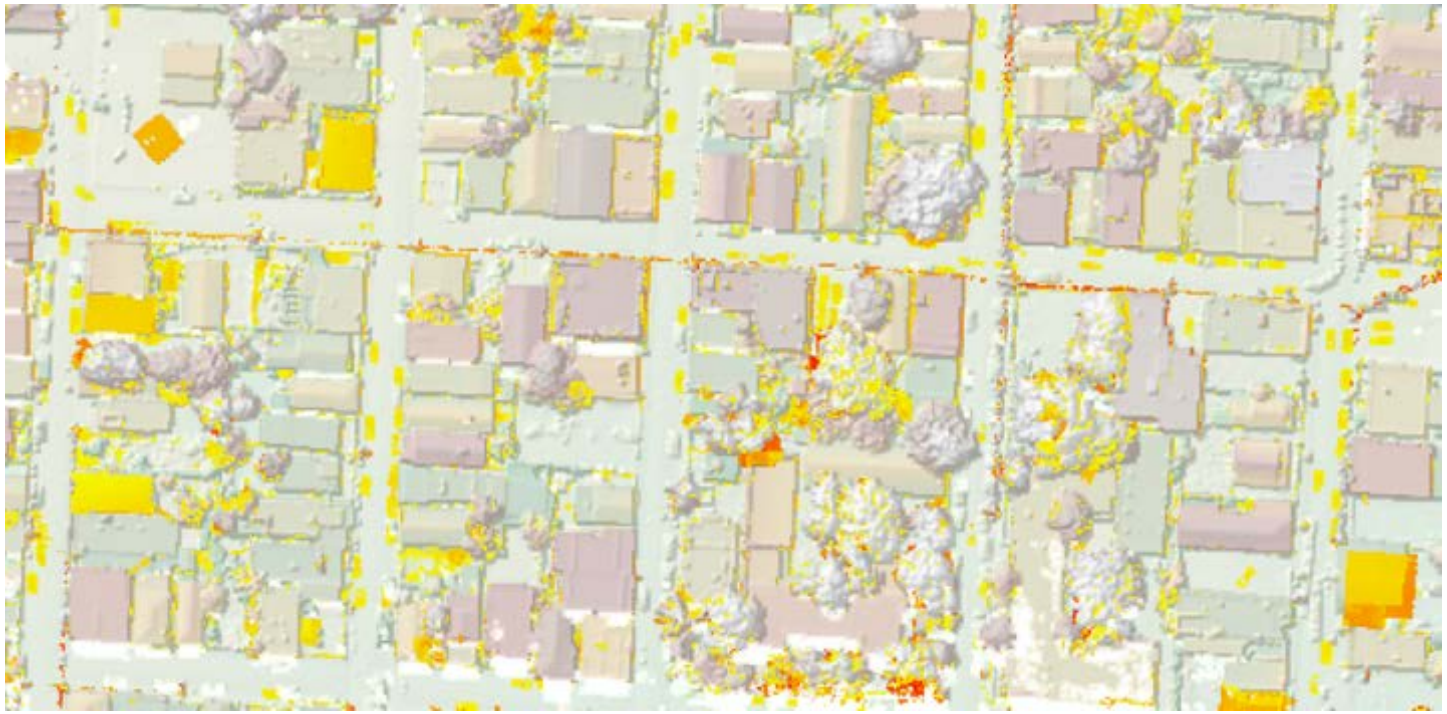
Guayanilla Warehouse Collapse Lidar Image

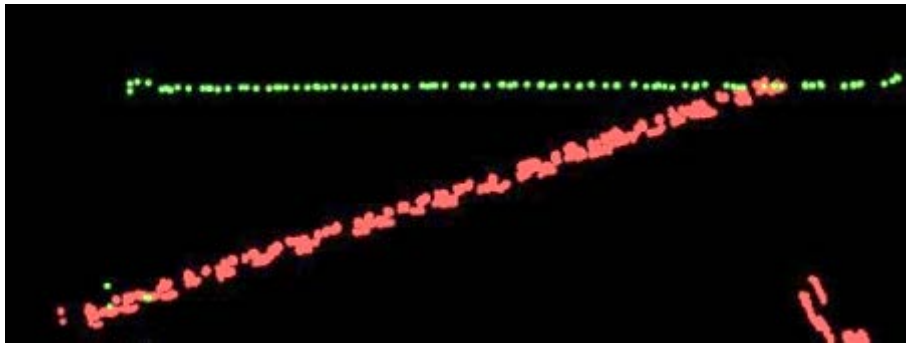




Puerto Rico Earthquake Ops

FEMA Lidar Analysis





Vertical difference highlighted above in orange identifying the difference between lidar data collected after Hurricane Maria 2018 and the 2020 Puerto Rico earthquake.

Green line is 2018 data and red line is from 2020

Tennessee Tornado Waldo Collection

Arkansas Tornado Remote Damage Assessment Using AI

Arkansas Tornado Remote Damage Assessment Using AI

Arkansas Tornado Remote Damage Assessment Using AI

Questions & Contact Info

Austin “Sauce” Worcester
Senior Program Manager, sUAS
Civil Air Patrol National Headquarters
aworcester@capnhq.gov
334-953-3180

Emergencies – Contact our National Operations Center
24/7/365: 888-211-1812
opscenter@capnhq.gov

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DRONES FOR GOOD™
DISASTER RESPONSE OPERATIONS

Presented by Christopher Todd CEM, FPEM

SurveyMonkey

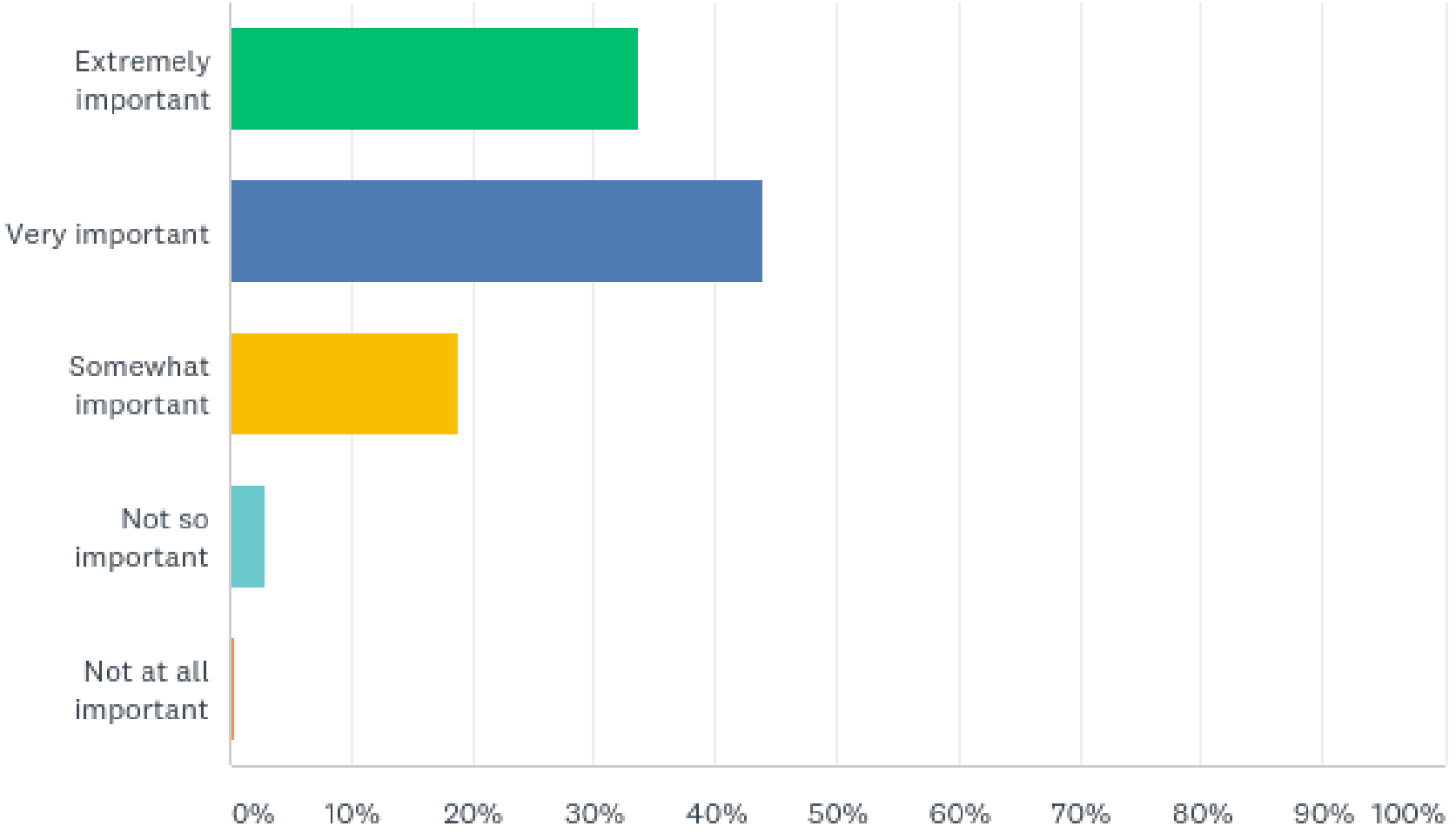
Hurricane Michael Response
Panama City, FL
2018

ABOUT

1. 501(c)3 non-profit organization.
2. Founded 2017 in Miami, Florida – the heart of hurricane alley.
3. Offer aerial intelligence capabilities for disaster management and special projects focused on sUAS and GIS.
4. Producer of world-class content and events focused on Drones For Good and Public Safety UAS.
5. Official home of the DRONERESPONDERS program.

Q28: How important is the ability to track and understand how different public safety organizations around the world are using Drones For Good?

Answered: 243 Skipped: 46



© AIRT Inc. 2020

KEY FINDING #20

97% of survey respondents believe the ability to track and understand how public safety organizations around the world are using Drones For Good is important.

© AIRT Inc. 2020

Hurricane Michael Response
Lynn Haven, FL
2018

HURRICANE RESPONSE | TYPICAL MISSIONS

1. Situational Awareness and Public Information (How bad is Bad?)
2. Target Search (and rescue)
3. Damage Assessment
4. Damage Mapping and Documentation
5. Power Restoration
6. Telecommunications Inspection
7. Insurance Claims (and FEMA Reimbursement)
8. Delivering Aid and Relief Supplies (emerging use cases)

Damage Assessment: Flyover
Hurricane Michael | Youngstown, FL

HURRICANE RESPONSE | LESSONS LEARNED

2017: IRMA (South Florida)

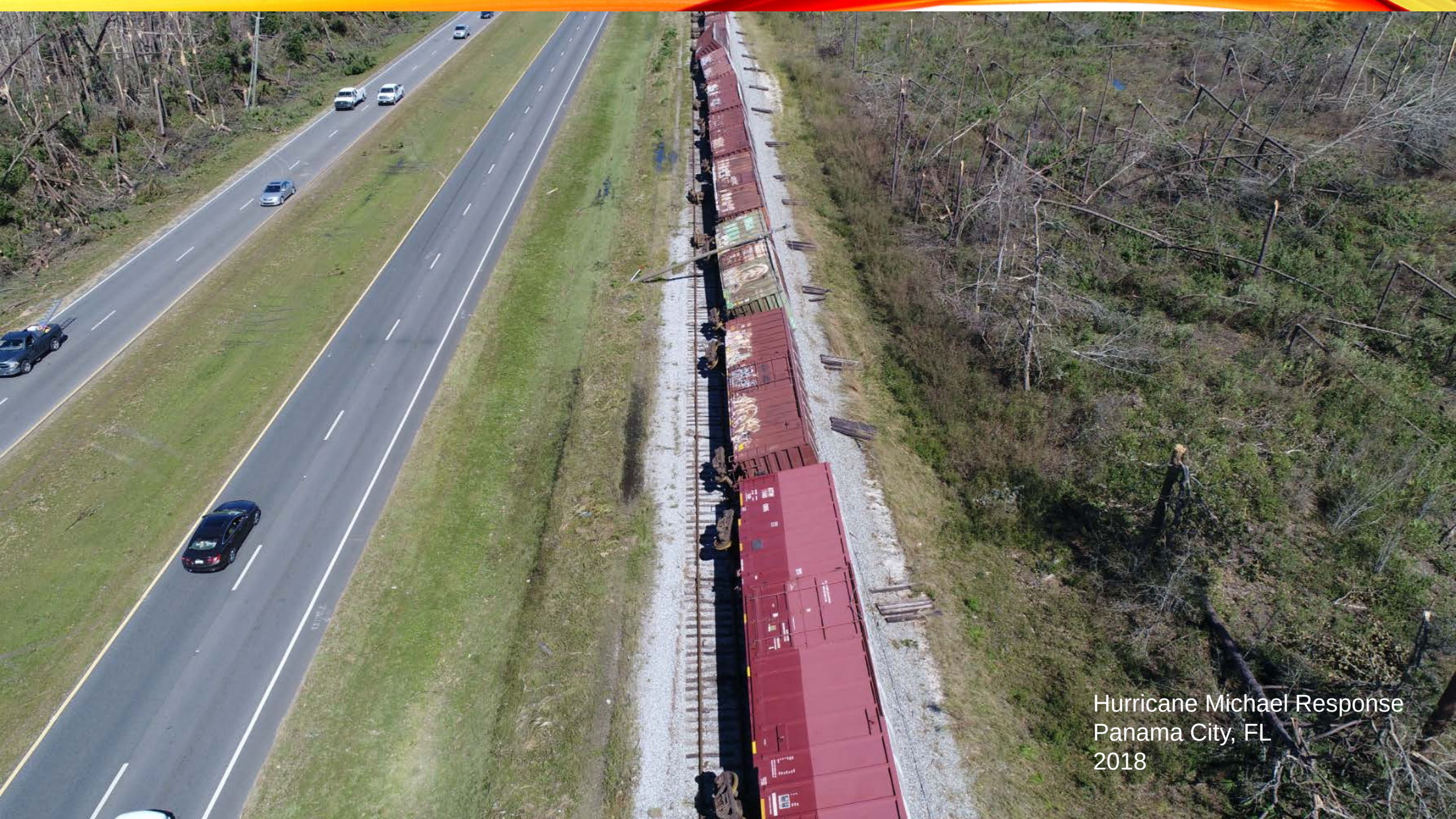
- Logistics are essential for success.

2018: MICHAEL (Florida Panhandle)

- Maintain a CONOP for disconnected environments.

2019: DORIAN (Northern Bahamas)

- Relationships and flexibility are paramount.



Hurricane Michael Response
Panama City, FL
2018

HURRICANE DORIAN | NORTHERN BAHAMAS

Freeport and Eastern Grand Bahama Island

- Partnered with FL Region 7 AHIMT
- University of the Bahamas
- Residential Areas
- Building goodwill on the fly is essential for success

Marsh Harbor, Great Abaco Island

- The Mud (Shantytown)
- Empathy and respect. Not a photo op. Act as if.

AIRT

hurricane DORIAN | PIX4Dreact

1. Field test of Pix4Dreact beta version.
2. Rapid processing under austere conditions.
3. Establishing workflow sequencing is essential.
   A. What is the desired output for end user?
   B. Remote sensing capabilities?
   C. Aircraft range?
   D. Number of flights/batteries?
   E. Recharging capacity?
   F. Airspace authorization and deconfliction?

Layers

Add Annotation Layer

Filter by name or tag...

- [x] Annotations
- [ ] DSM
- [x] Orthomosaic
- [x] 3D Textured Mesh 3D
- [ ] Point Cloud 3D

Because you are not the owner of this project, any changes you make will not be saved.

FIU Disaster Field Exercise
North Miami, FL
2018

TIPS FOR SUCCESS

1. Aerial imagery without GIS intelligence is nothing more than disaster art.
2. Your end-product becomes a math equation. Work backwards to determine key variables.
3. You can’t be an expert in everything. Know your strengths and weaknesses. Fill the gaps.
4. Train and exercise your workflow or you will waste time and resources.

AIRT DRONERESPONDERS

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PROJECT
HOME
TOOLS
Contents
esri

AIRT

CONTACT

Christopher Todd
Executive Director
ctodd@airt.ngo

Call to Action

*How can you **prepare now** to use drones and imagery for a future incident?*

Where do you start?

- Join nationwide grassroots public safety UAS Initiative - www.DRONERESPONDERS.org
- Gain experience and hone your skills volunteering as a GIS analyst or field manager with the Airborne International Response Team (AIRT). More info at http://airt.ngo
- Locate your local Civil Air Patrol Unit - https://www.gocivilairpatrol.com/
- Consult the research community to advance your capabilities - https://uas-test.umd.edu/

Menti Results

How is your agency currently using imagery in preparedness, response, recovery and/or resilience efforts?

Call to Action

Technical Resources

- Incident Imagery and Use-Cases
- **FEMA's Remote Sensing Resources Hub** https://gis-fema.hub.arcgis.com/pages/remote-sensing-resources
- Esri Platform
- **Esri Imagery and Remote Sensing Data Collection** Living Atlas & Premium Content
- **ArcGIS Drone2Map** https://arcg.is/mfaKu
- **Site Scan For ArcGIS** https://www.esri.com/videos/watch?videoid=bqLchJCW8jE

Where can you get help from the community?

- Imagery and Remote Sensing GeoNet Community https://community.esri.com/community/gis/imagery-and-remote-sensing
- US Disasters Community https://community.esri.com/groups/us-disaster-community

What's Next?

- Next PrepTech Talk:
  - August 13, 2020 - The Indoor Frontier: Exploring Emerging Technologies for First Responders in the Indoor Environment
  - September 10, 2020 - Verdict is Out: Decrypting Risk, Resilience, Social Vulnerability Data & Indices
  - October 2020 – Applying Drones & Imagery (Part 2)

PrepTech Talks
Powered by NAPSG Foundation

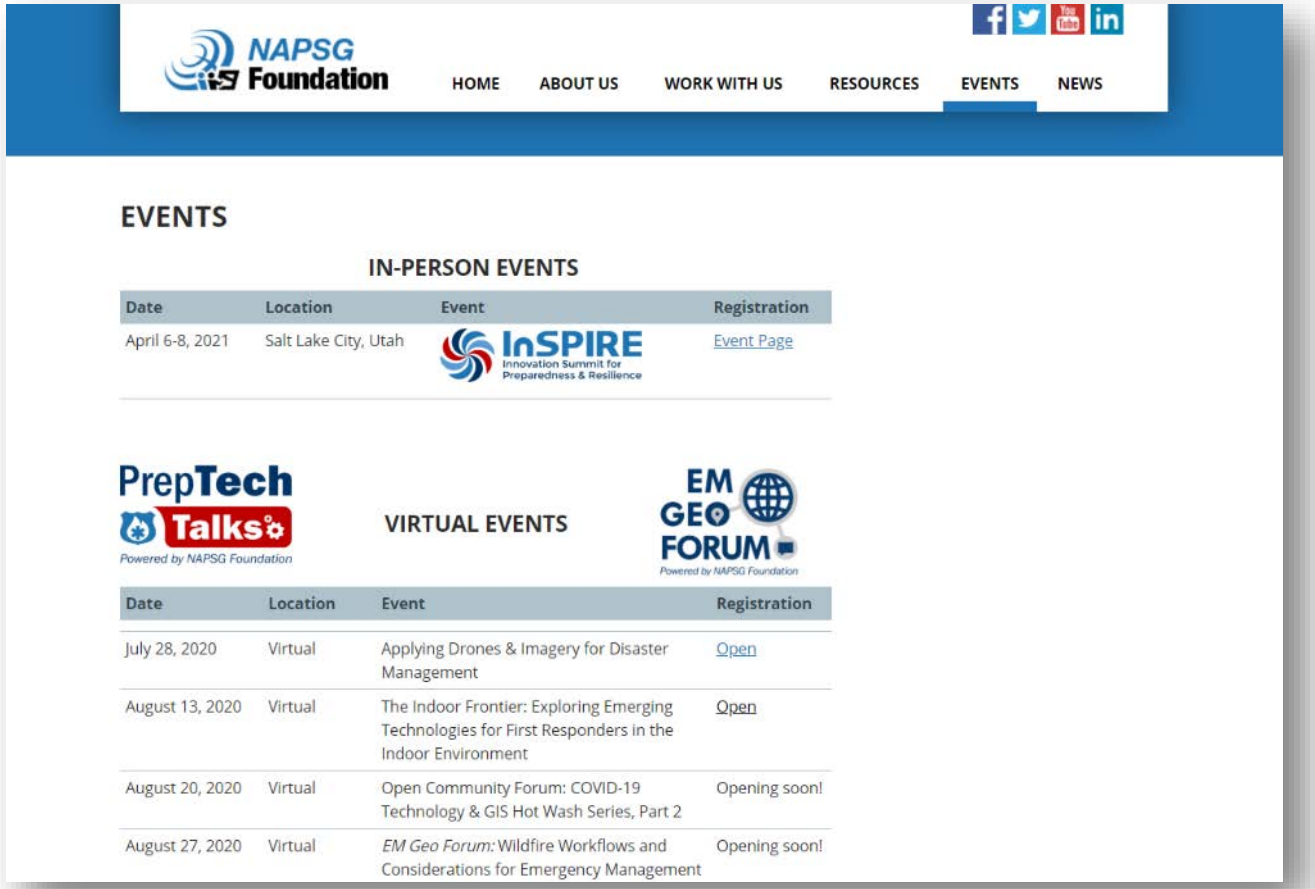
- Events:
  - August 20, 2020 - Open Community Forum: COVID-19 Technology & GIS Hot Wash Series, Part 2
  - *August 27, 2020 - EM Geo Forum:* Wildfire Workflows and Considerations for Emergency Management

InSPIRE
Innovation Summit for Preparedness & Resilience

- InSPIRE
  - April 6-8, 2021 - Salt Lake City, Utah

https://www.napsgfoundation.org/events/

What's Next?



NAPSG Foundation

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EVENTS

IN-PERSON EVENTS

Date	Location	Event	Registration
April 6-8, 2021	Salt Lake City, Utah	InSPIRE Innovation Summit for Preparedness & Resilience	Event Page

VIRTUAL EVENTS

PrepTech Talks — Powered by NAPSG Foundation

EM GEO FORUM — Powered by NAPSG Foundation

Date	Location	Event	Registration
July 28, 2020	Virtual	Applying Drones & Imagery for Disaster Management	Open
August 13, 2020	Virtual	The Indoor Frontier: Exploring Emerging Technologies for First Responders in the Indoor Environment	Open
August 20, 2020	Virtual	Open Community Forum: COVID-19 Technology & GIS Hot Wash Series, Part 2	Opening soon!
August 27, 2020	Virtual	*EM Geo Forum:* Wildfire Workflows and Considerations for Emergency Management	Opening soon!

https://www.napsgfoundation.org/events/

Thank you!

Questions?

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