Ohio | UAS Initiative

flyOhio

DriveOhio
The Future of Smart Mobility

UAS
OHIO UNMANNED AIRCRAFT SYSTEMS
CENTER

Ohio UAS Center

UAS Brief
WV Workshop
April 7th, 2022

Ohio UAS Center

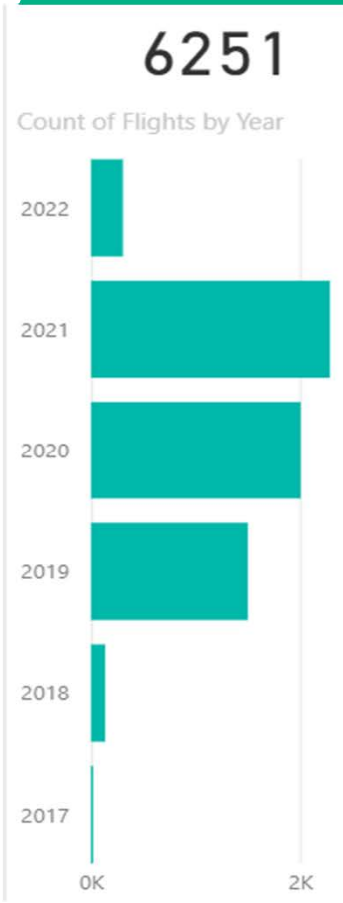
David Gallagher, Flight Operations Manager

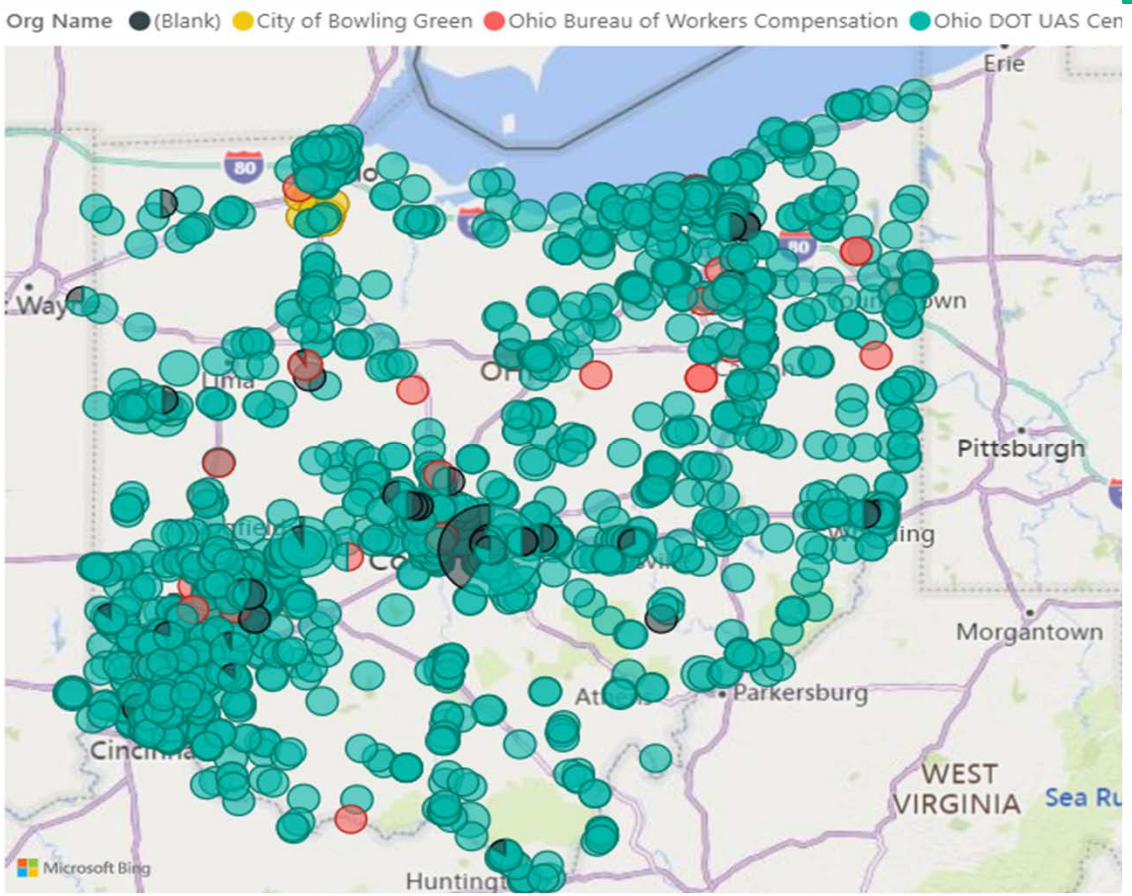
About the UASC

- Formed in 2013
- ODOT
  - Support and conduct UAS operations within ODOT
  - Develop UAS policy and procedures
  - Review proposed UAS operations for ODOT contracts
- External (Shared Resource)
  - Support state and federal agencies as well as state universities
  - Promote the safe and proper use of UAS throughout the state
  - Reduce redundant UAS functions within the state
  - Allow for more efficient use of resources

Increase Efficiency Save Time & Money

Flight Operations Summary





1783.7 HOURS Skyward

2019 Total Logged Flights 1471, 344 Operations

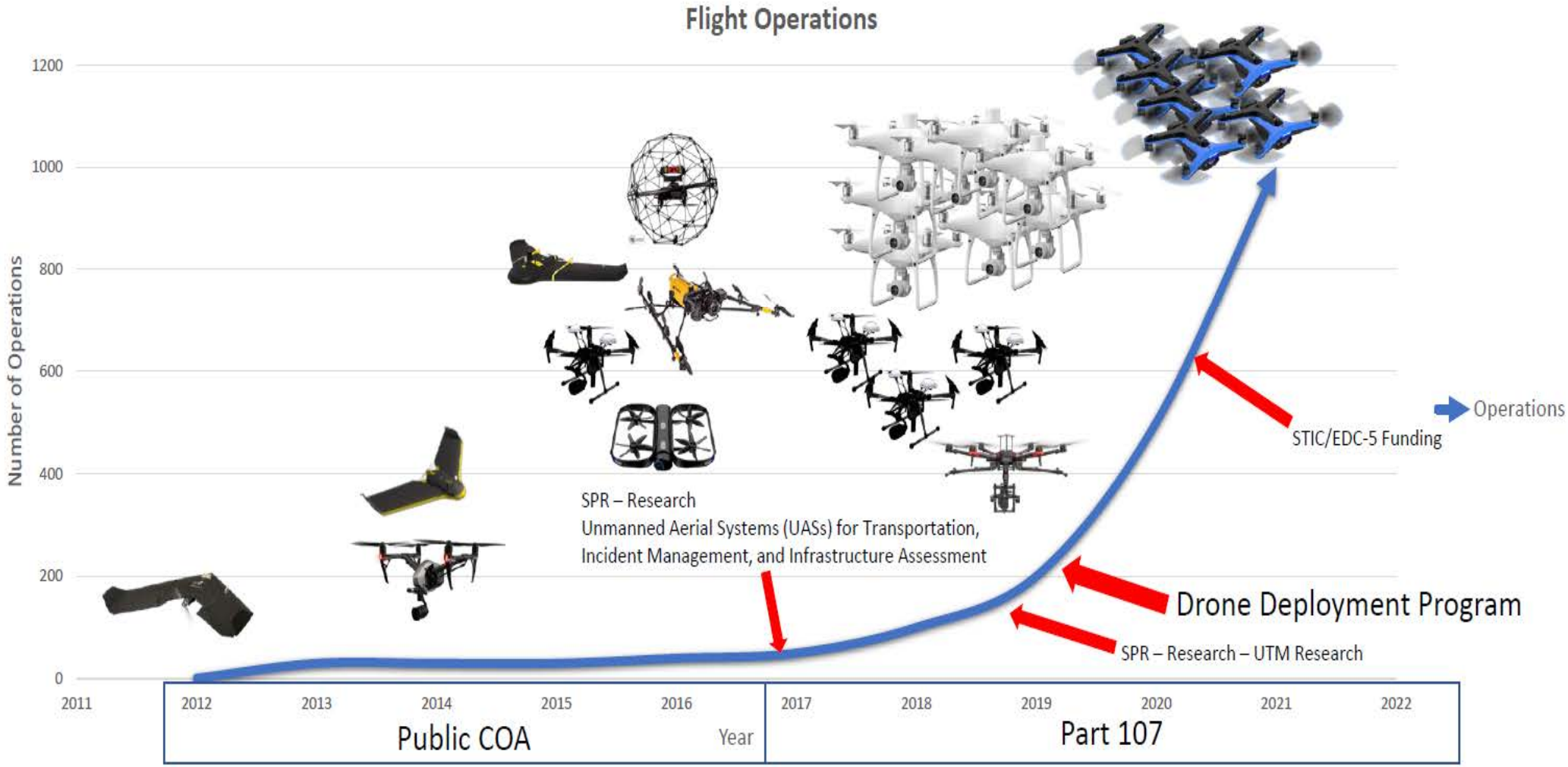
2020 Total Logged Flights 2,009, 552 Operations

2021 Total Logged Flights 2,289, 751 Operations

Total Logged Flights 6251, 1,781 Operations

UAS Operations

Data Collection Operations



Aircraft Fleet

- Aerial Photography/GIS
- Exterior/interior Inspections
- Construction Monitoring
- Traffic Monitoring
- Natural Disasters/ Emergency Management
- Communications/Promotional Videos
- Work Zone

District Deployment

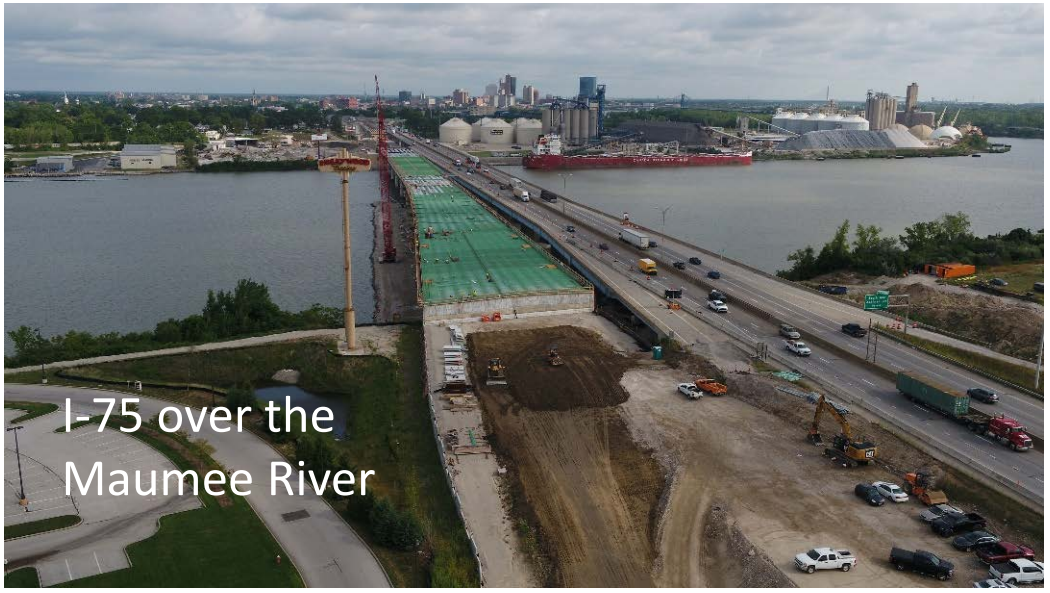
- Remote Pilot Certificate 107
- 2 Days of training at UASC
- 3 Hour Minimum of training on UAS Platform (Phantom 4 Pro)
- 10 Hours of Solo time – SMS, Risk Assessment, Flight Planning
- Check out with UASC Staff

5 Bridge Inspectors, 5 Surveyors, 1 Engineer, 2 Communications, 2 Construction, 1 CADD & Mapping. 15 District, 4 UASC.

Construction Progress Monitoring

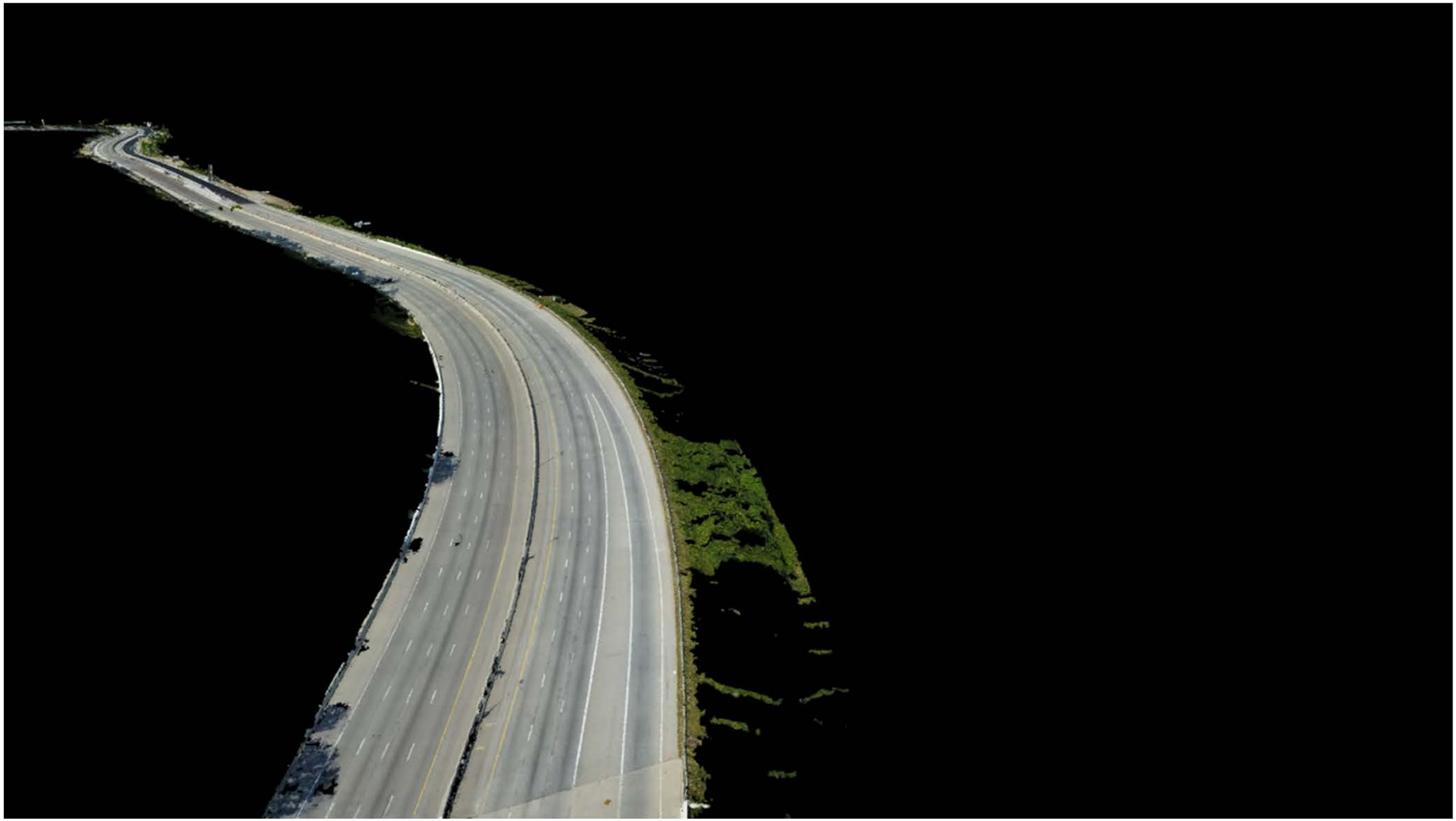
Construction Work Zone

Bridge Construction Projects

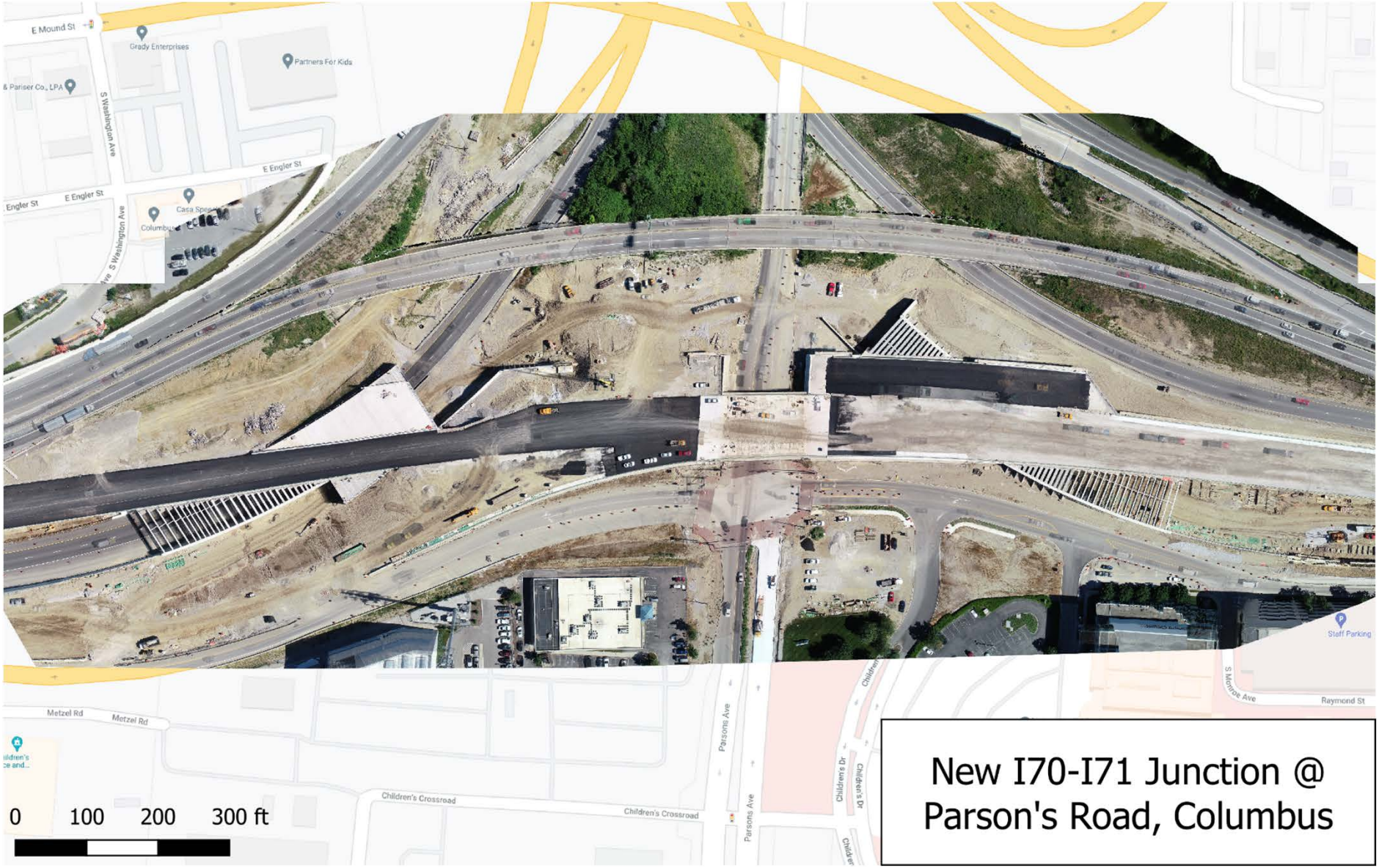


Attorney General Property I-75

D8 Pavement



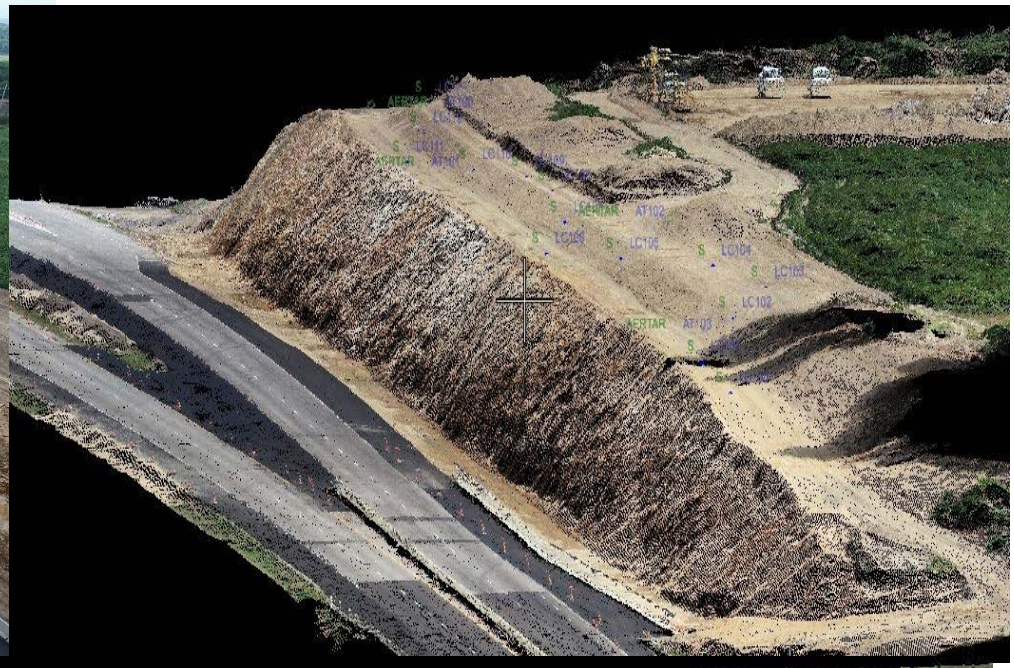
Construction Volume



New I70-I71 Junction @ Parson's Road, Columbus

UAS Operations

Construction for Design



Road Widening

Rubbleizing Concrete Pavement

Smart Lane

RED X: SmartLane is closed

GREEN ARROW: SmartLane is open

RCUT Traffic

Lane Closure & Lane Shift

Traffic Monitoring

ODOT drone survey brings signal timing changes to area around Pearl Road, I-480

By: Jordan Vandenberge

Posted at 2:24 PM, Nov 28, 2019 and last updated 6:18 PM, Nov 28, 2019

BROOKLYN, Ohio — A recent drone survey by the Ohio Department of Transportation's Unmanned Aircraft Systems Center (UAS) led to traffic signal changes done by the City of Brooklyn in an effort to mitigate frequent traffic logjams in the area, especially around peak times.

Traffic Monitoring

"A drone can get that bird's eye view, an aerial view, of what's really going on in that intersection and what's going on with the traffic signals

Traffic Hotspots

Traffic & Schools

Springboro Layout, April 24

- Vehicle UC Matrice 210 w/UC Z30 & UC X5S

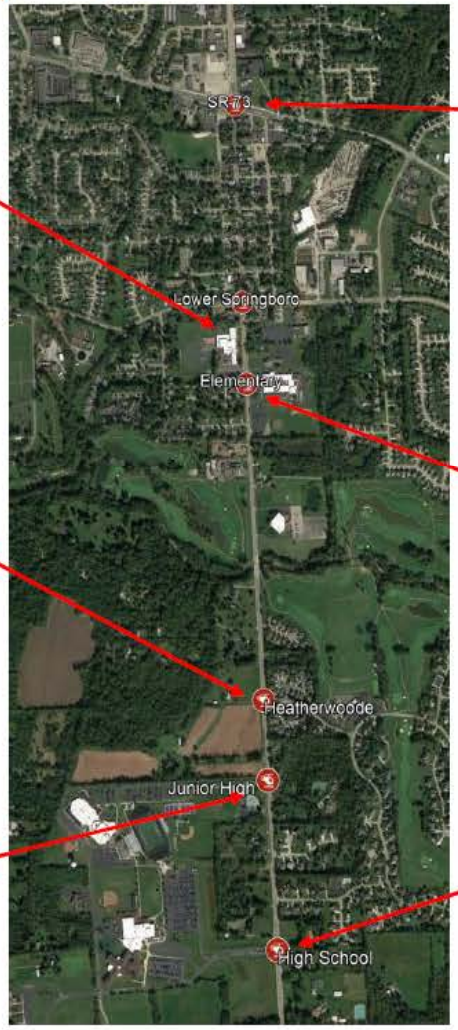
Springboro Intermediate

- UASC Inspire 2 w/UASC X5S or UASC X4S

Heatherwood Blvd

- UASC Matrice 210 w/UASC Z30

Springboro Junior High



- UC Matrice 100 w/UC Z3

Corner of SR73 and SR741

- UASC Matrice 210 w/UASC Z30 & UASC X5S

Clear Creek Elementary

- UC Matrice 100 Tether System w/UC Z30

Springboro High School

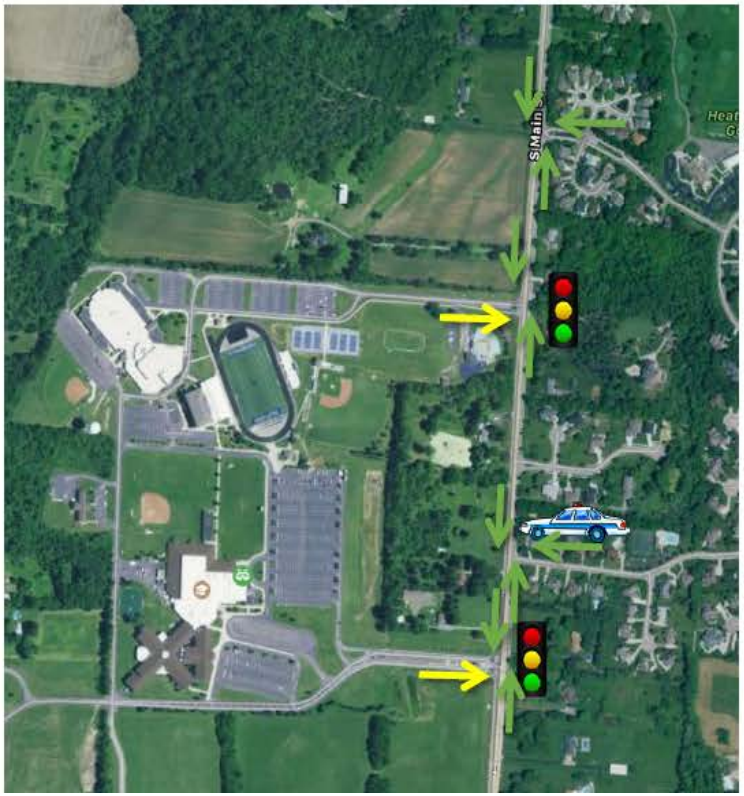
Traffic Monitoring

Overall Observations and Results

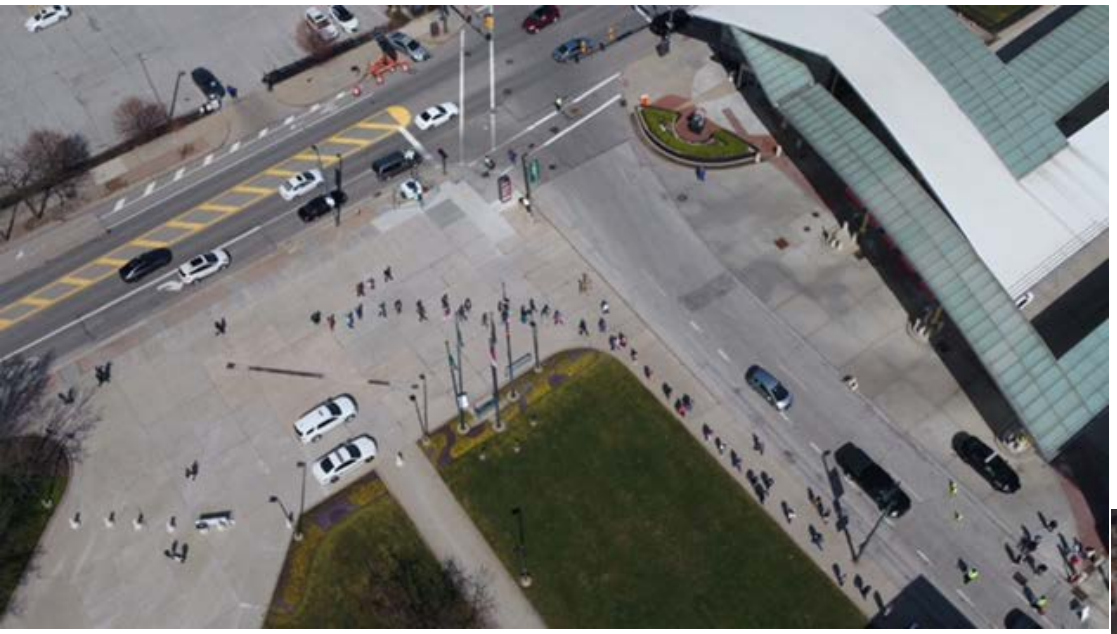
Largely free moving traffic with minimal queues

Traffic view not easily observed, likely minimal queues

Significant traffic/queues observed, but did not last more than 2 light cycles



Mass Vaccination Site



Special Events Traffic

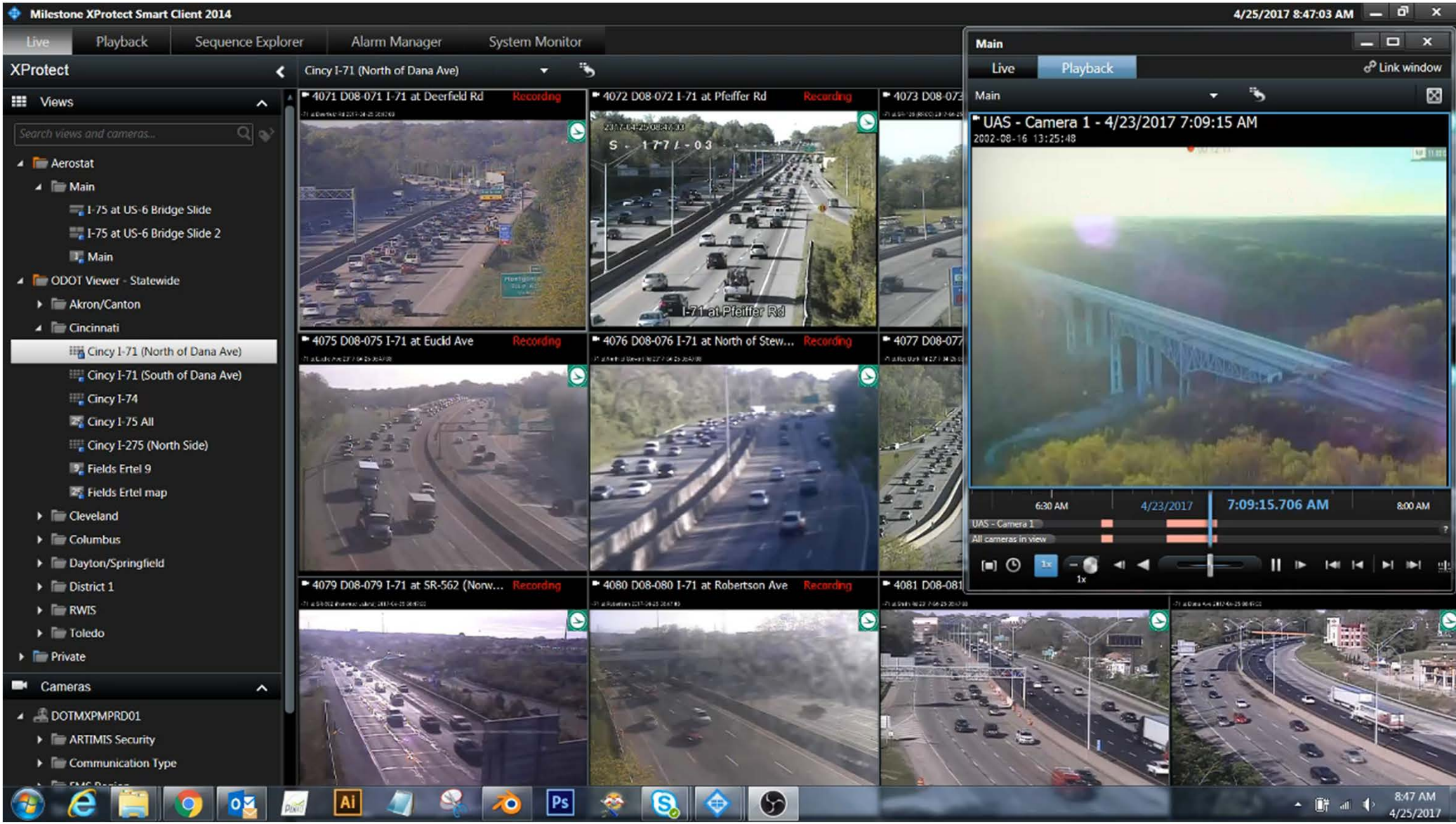
Special Events

Traffic Monitoring

Milestone Box

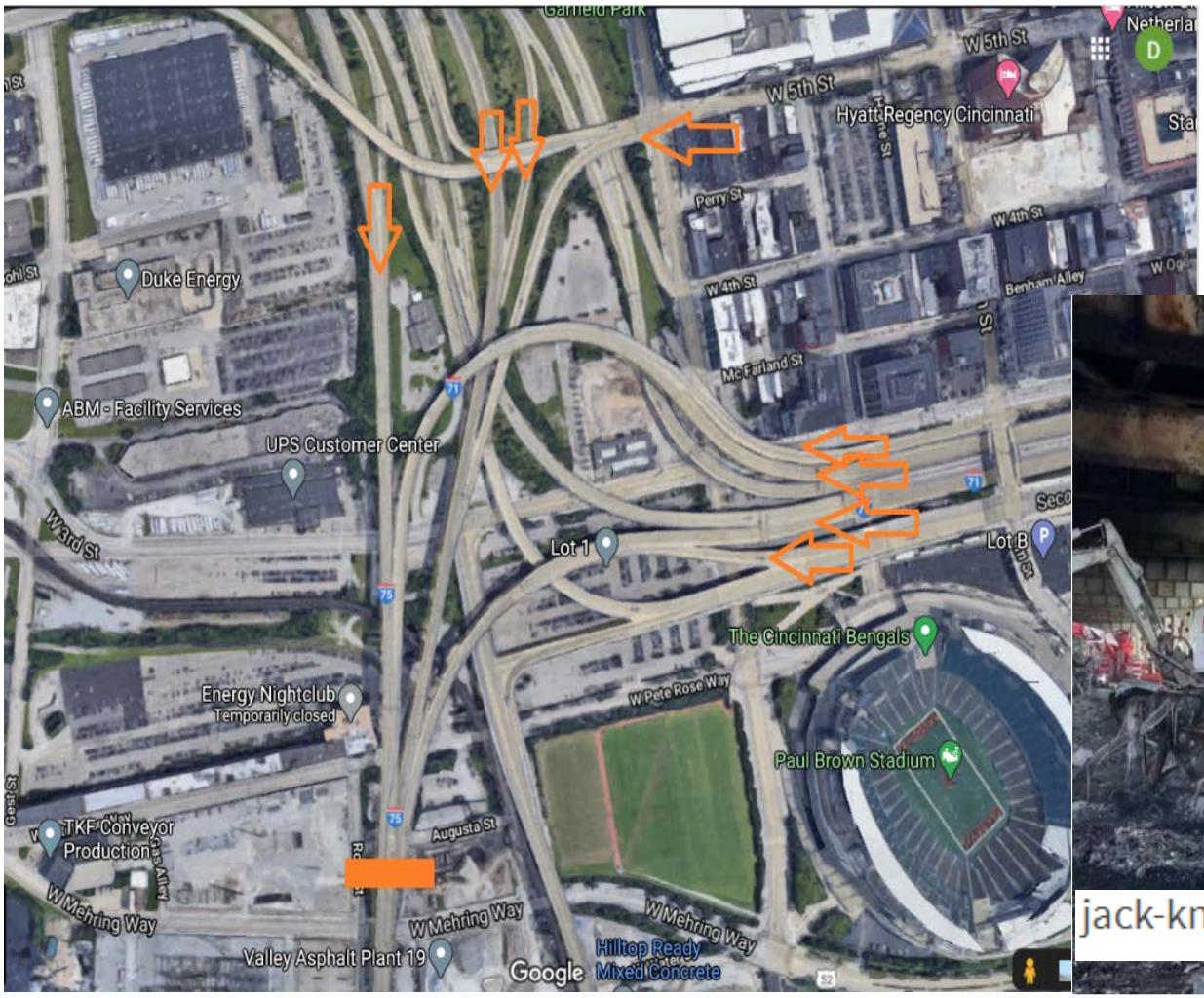
- Share data with local and remote users in real-time
- Stream Video to the ODOT Video Servers (Milestone)
- Watch Drone Video on your phone/Laptop
- Watch Video Drone feed on Goggles

Traffic Monitoring



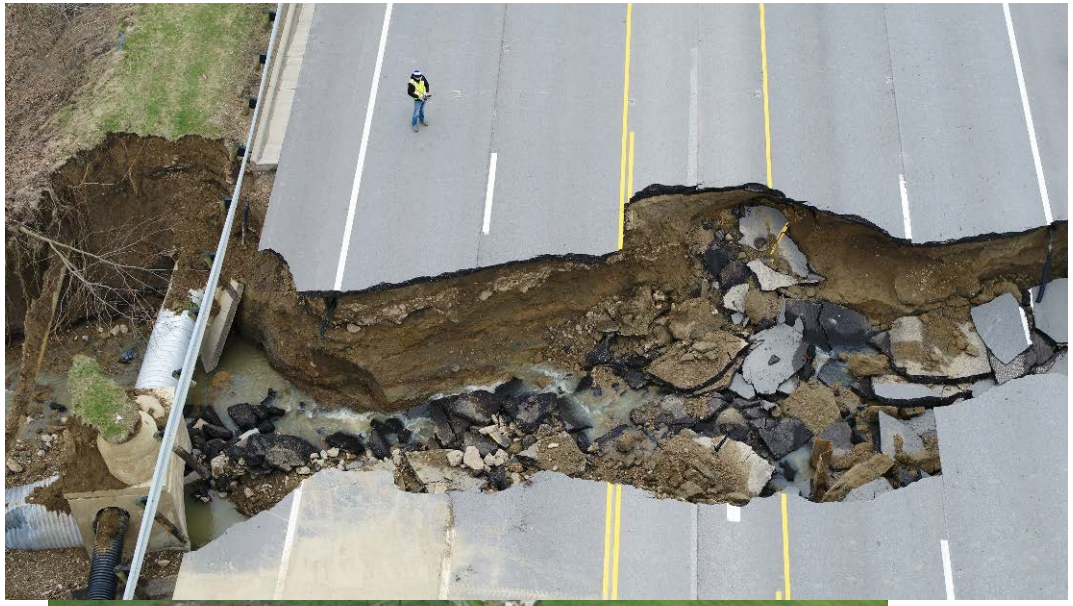
Emergency Shutdown

Brent Spence Bridge crash reveals little-known Kentucky ban on hazmat shipments



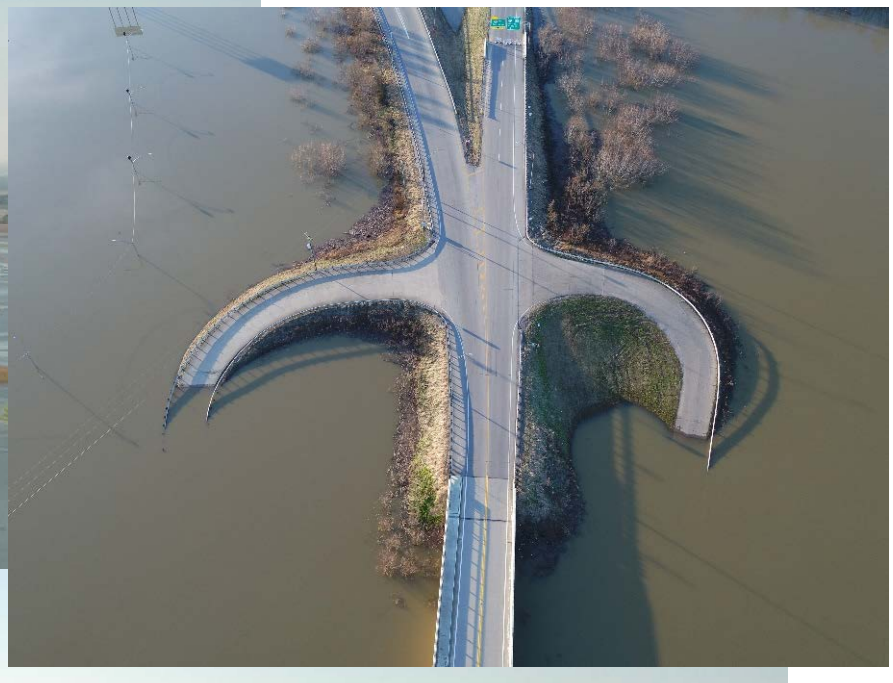
jack-knifed semi was carrying potassium hydroxide.

Natural Disasters

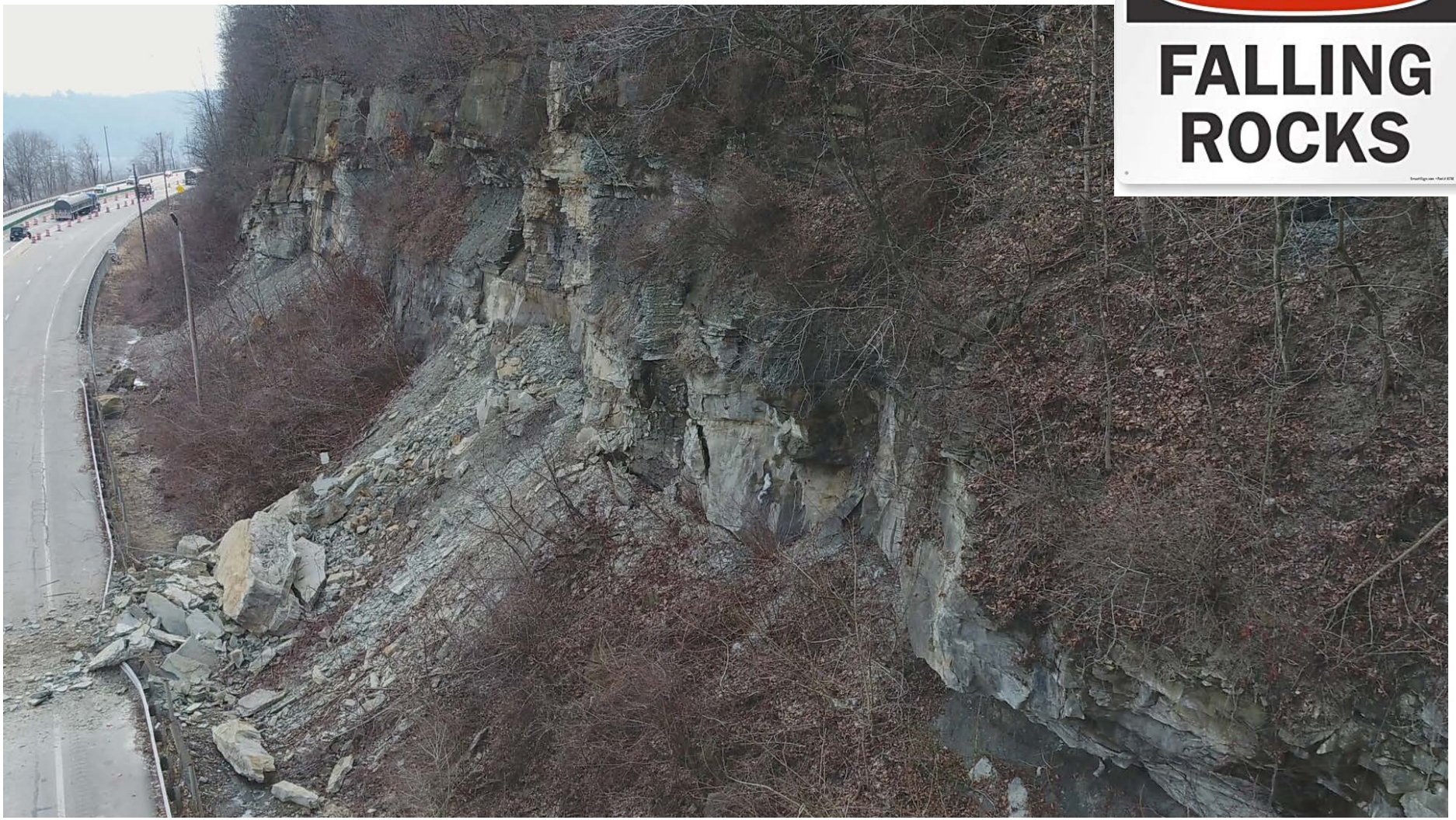


Tornado Response

Flooding



Landslides



Landslides

Bridge Inspection

Using Available Technology

Traditional Snooper Inspection

Source:
www.co.goodhue.mn.us/CivicAlerts.aspx?AID=248&ARC=553

VS

UAV Inspection

DJI Matrice 210

Inspector Remote

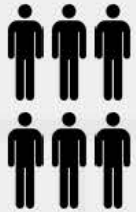
Pilot Remote

ROI

Bridge Inspections - ROI Calculations

Snooper Inspections

LABOR


6 Employees


48 Total Labor Hours


$2,018 Total Payroll

EQUIPMENT


$625 for Snooper


$500 for Other


$1,125 for Total Cost

$3,143

($4,182 nights/weekends)

Drone Inspections

LABOR


2 Employees


8 Total Labor Hours


$427 Total Payroll

EQUIPMENT


$45 for Drone


$50 for Pickup


$95 for Total Cost

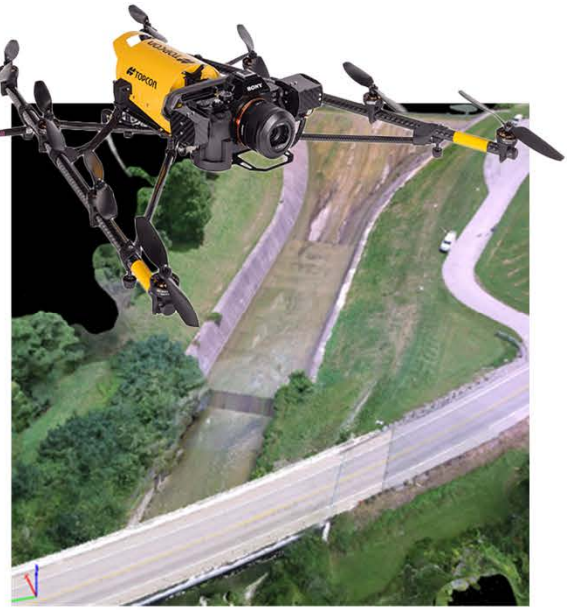
$522

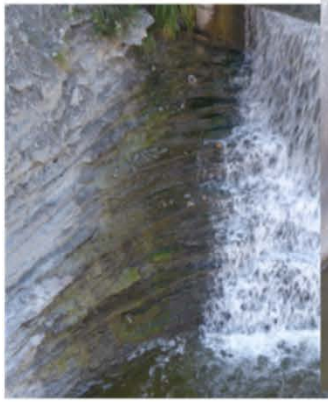
($735 nights/weekends)

$2,621 in Savings

($3,417 nights/weekends)

Bridge Inspection

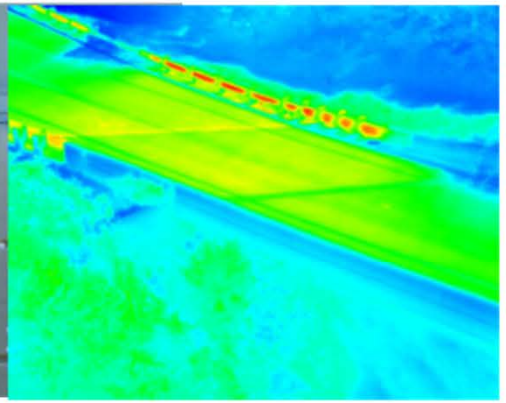




Scour Assessment

Footing Detail

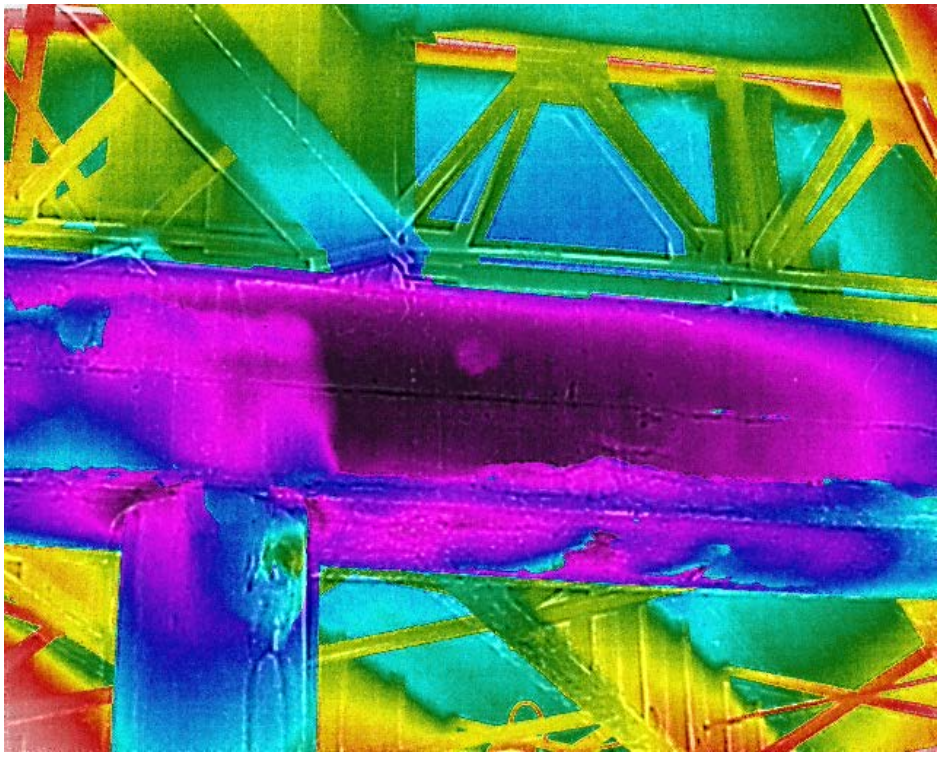
Cracking

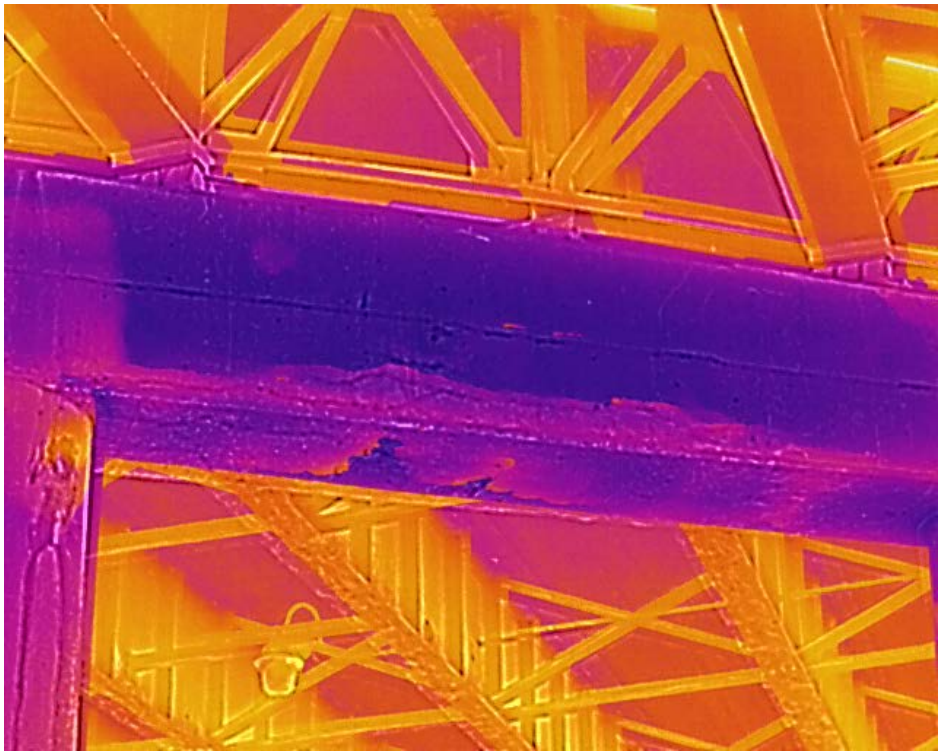


Delamination Assessment

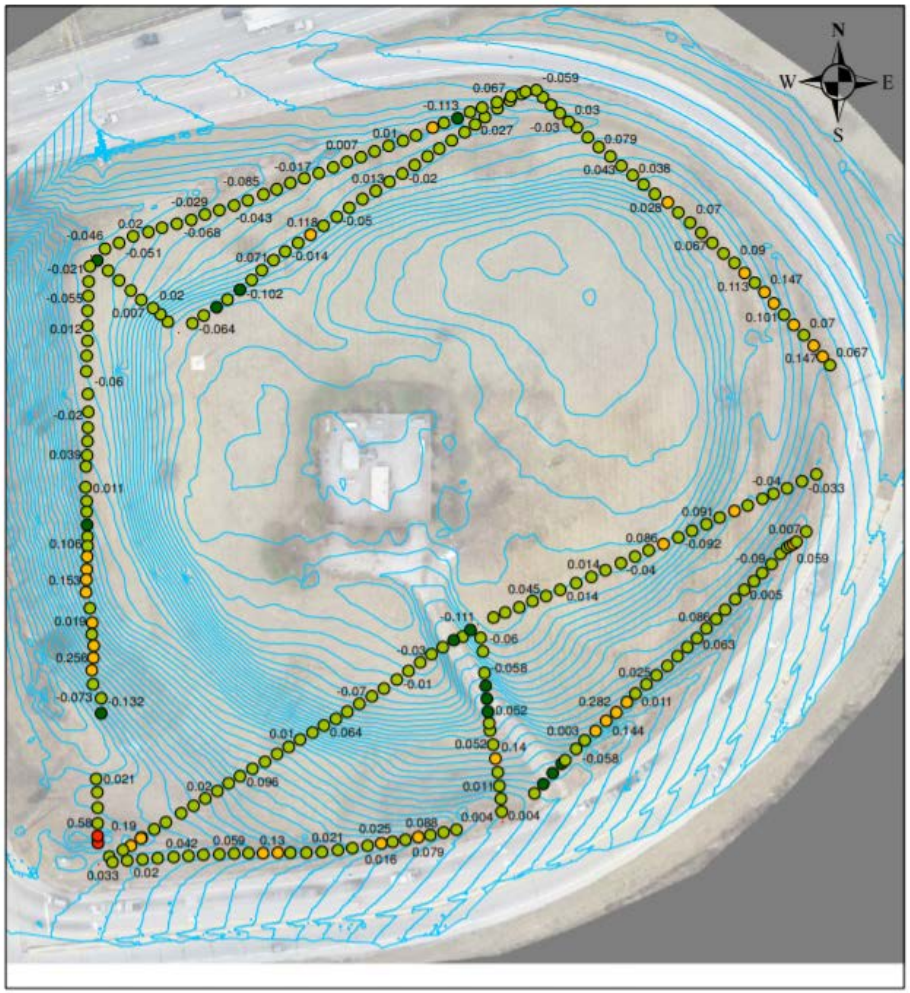
Bridge Inspection

Bridge Delamination





Survey Project



FAI-I70 AT SR256 EB OFF RAMP

Equipment: DJI Phantom 4 RTK, Trimble R6-2 TSC3, Trimble S6 Robotic total station, Topcon Digital Level
Proceedure: ODOT S&M spec, compliant Control Point observation Topographic observation with S6 total station
Point cloud and orthomosaic processing by Pix4dMapper - GCPs incorporated.
Point cloud manual processing and datum adjustment (similar to all District scans)
Terrascan, Dz report similar to S&M spec control report.

Result: Class B maintained vegitated surfaces within compliance inside study area.

1:1,000

0 62.5 125 250 Feet

25436_values_US_FT

Dz

- under -0.1
- -0.1-0.1
- 0.1- 0.3
- over 0.3

Survey Project

ROI

Photogrammetry Survey - ROI Calculations

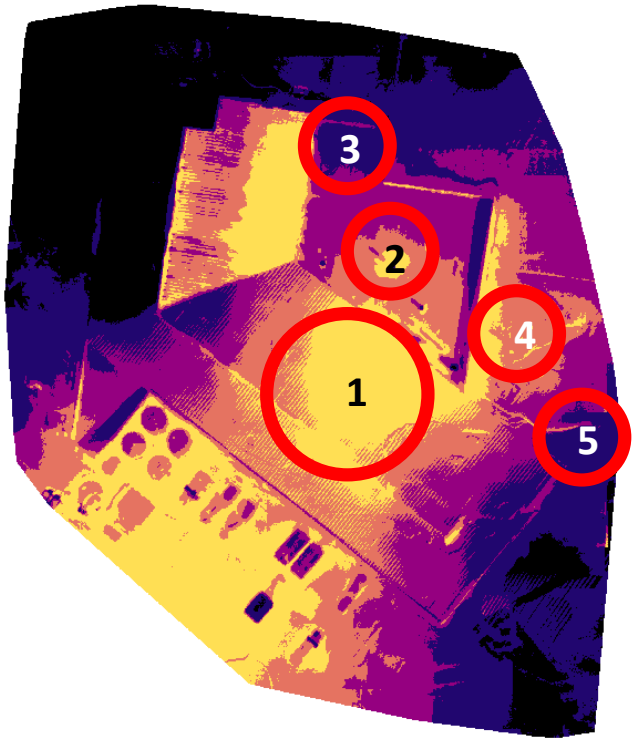
Current Cost for Terrestrial Laser Scan
1.5 Miles of Road **$19,000**

Cost to Scan 1.5 Miles of Road with Drones **$2,264.65**

Cost to Scan 8 Miles of Road with Drones **$3,881.70**

Save $15,118.30
Scan 6.5 More Miles

Data Collection – Facility Inspection



Thermal Map of the Northwood Garage

Optical Orthomosaic of the Northwood Garage

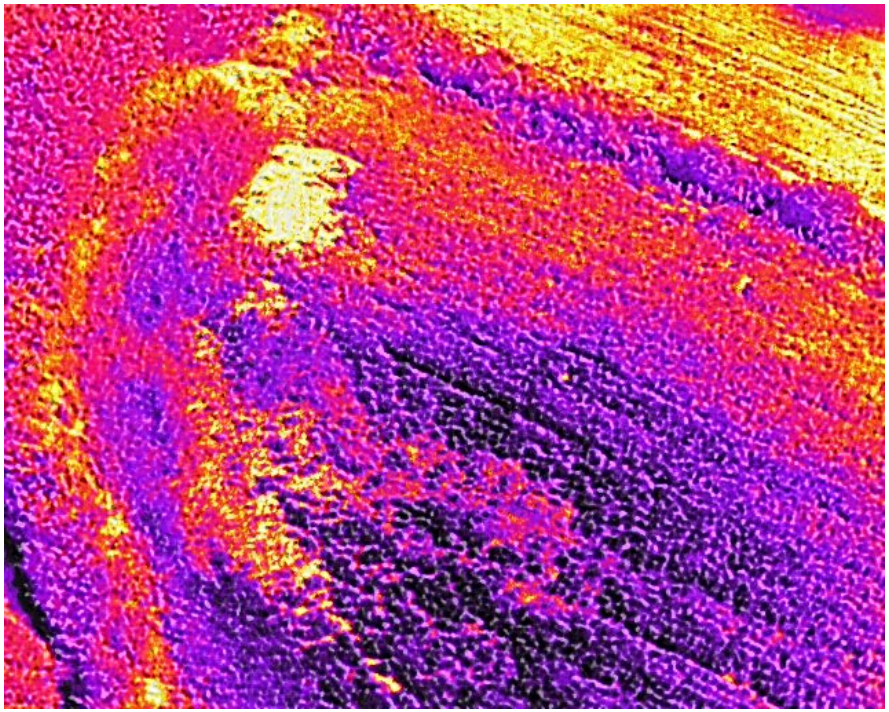
Weather Information:
The thermal images were captured on December 28, 2017, at 12:45PM. Weather was sunny with a high of 12°F.

Thermal Map:
Dark blue spots are the relative cold temperature spots.
Lighter yellow are the relative high temperature spots.

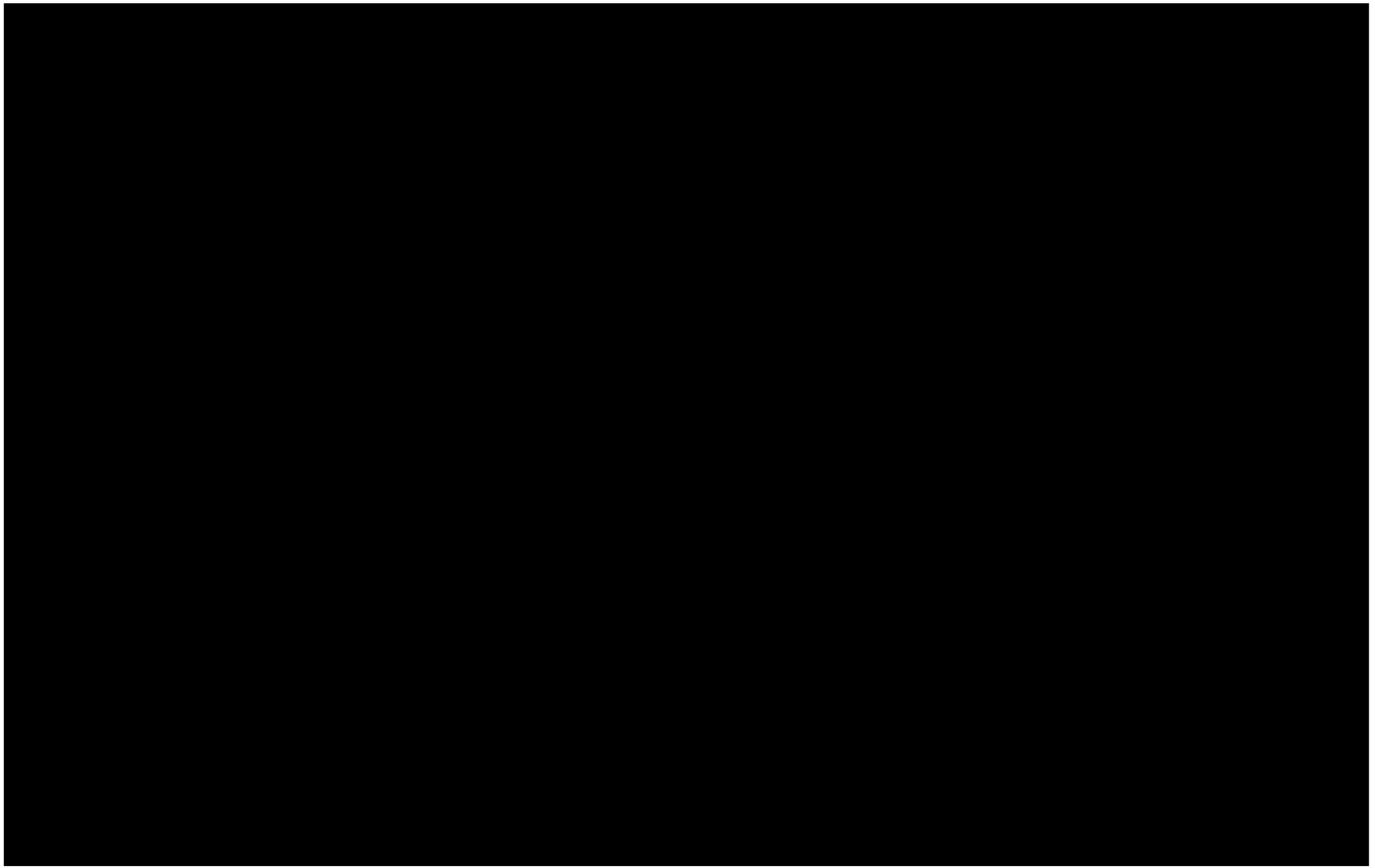
Observations:
1. Moisture present/Highly emissive surface.
2. Moisture present in the concrete structure
3. No presence of moisture
4. Grass with moisture
5. Grass without moisture

Light pole

Light pole

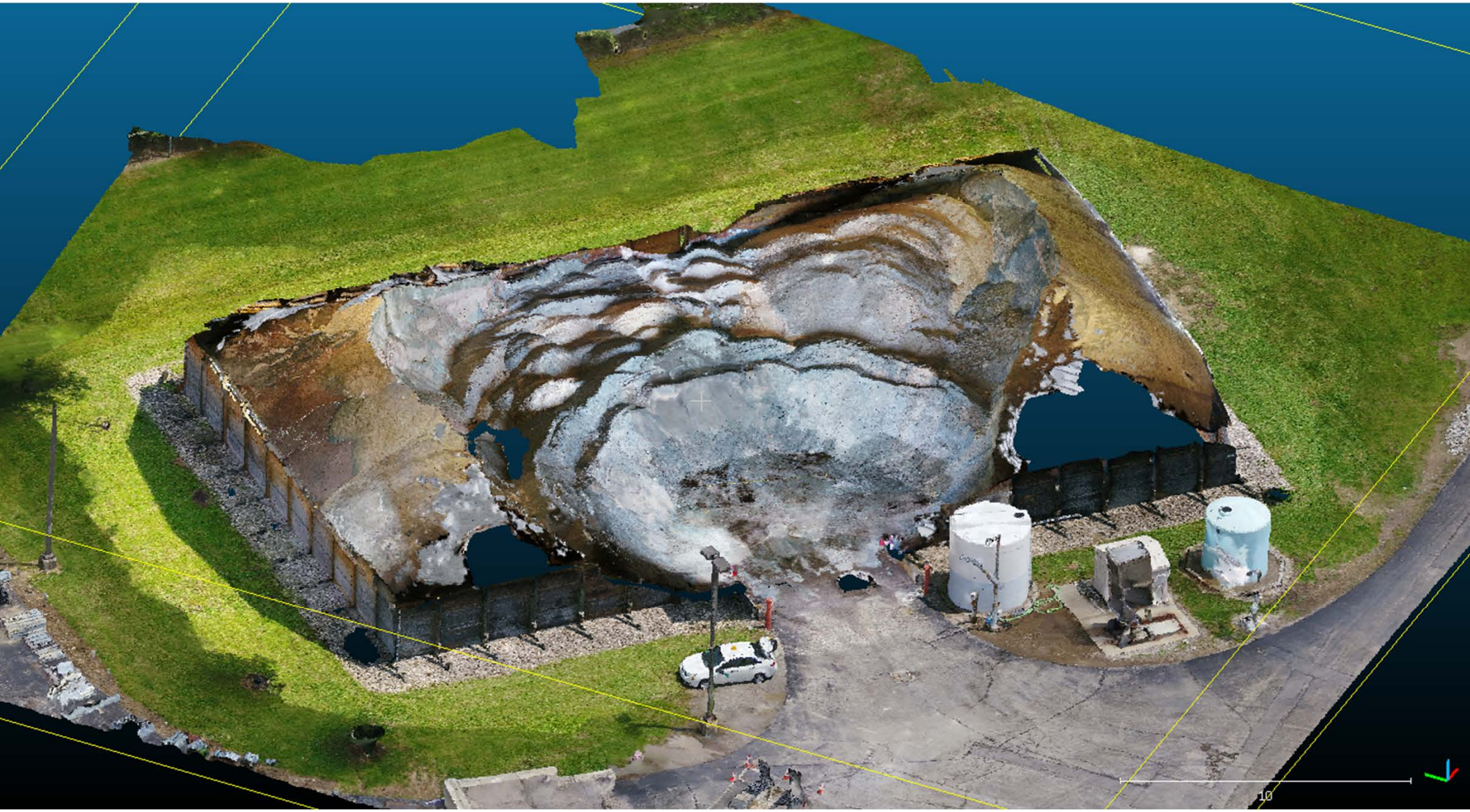


Roundabouts

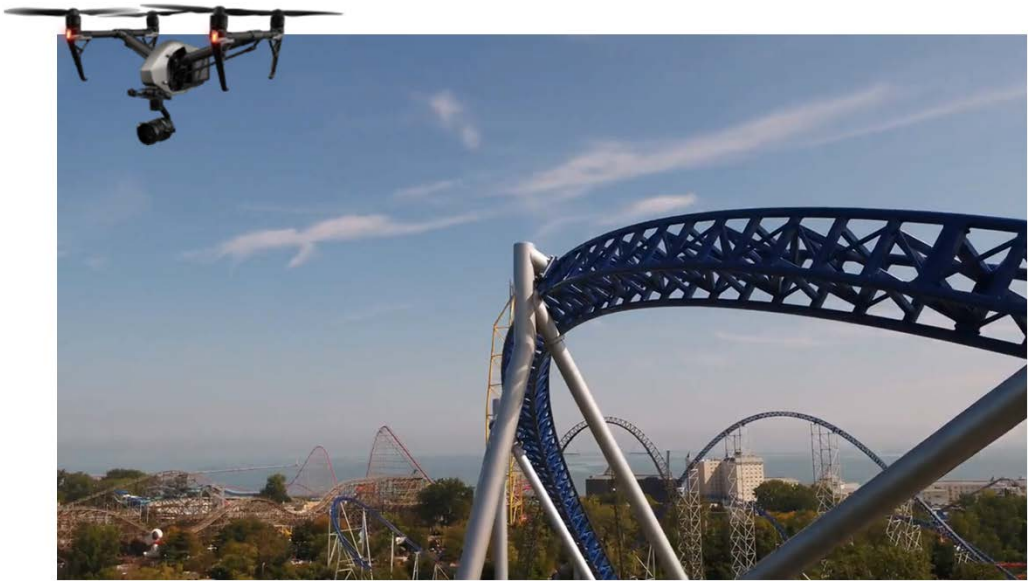


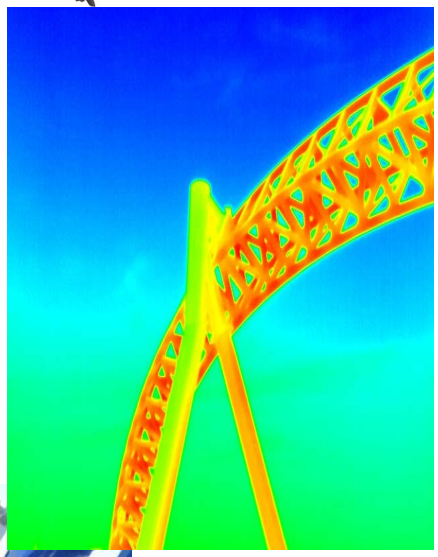
UAS Data Examples

UAS Data Examples

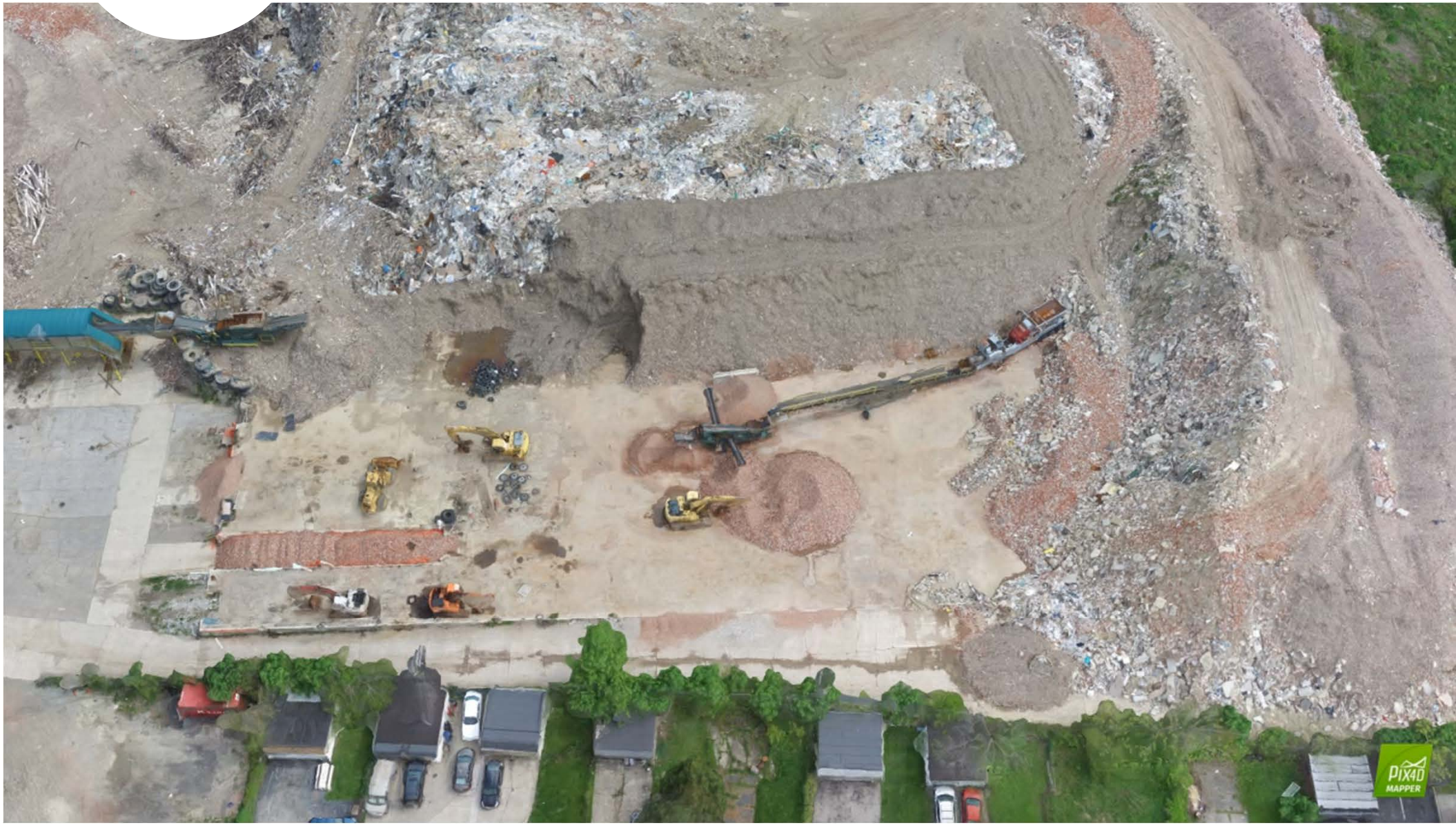


Department of Agriculture





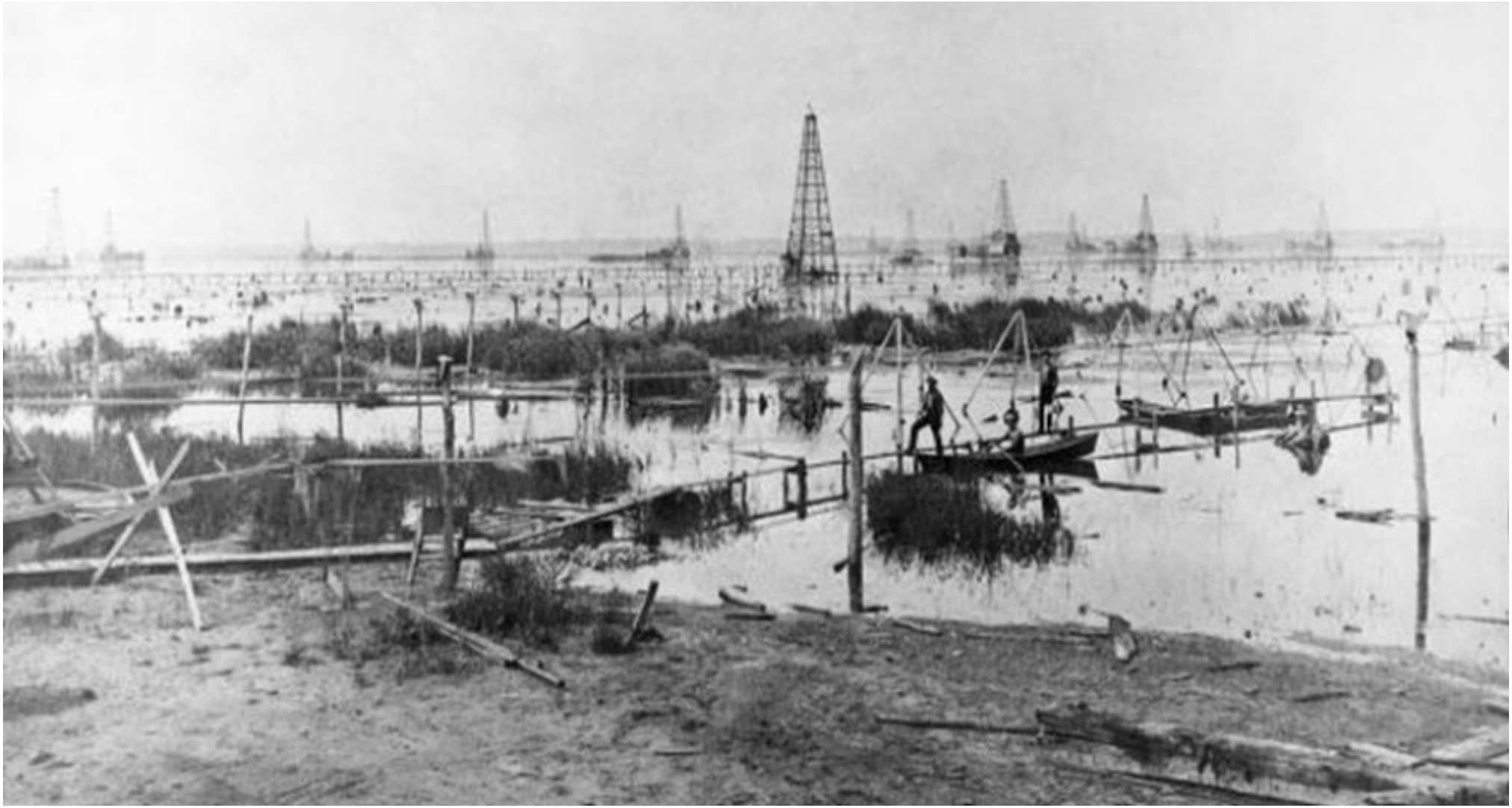
Data Collection – EPA



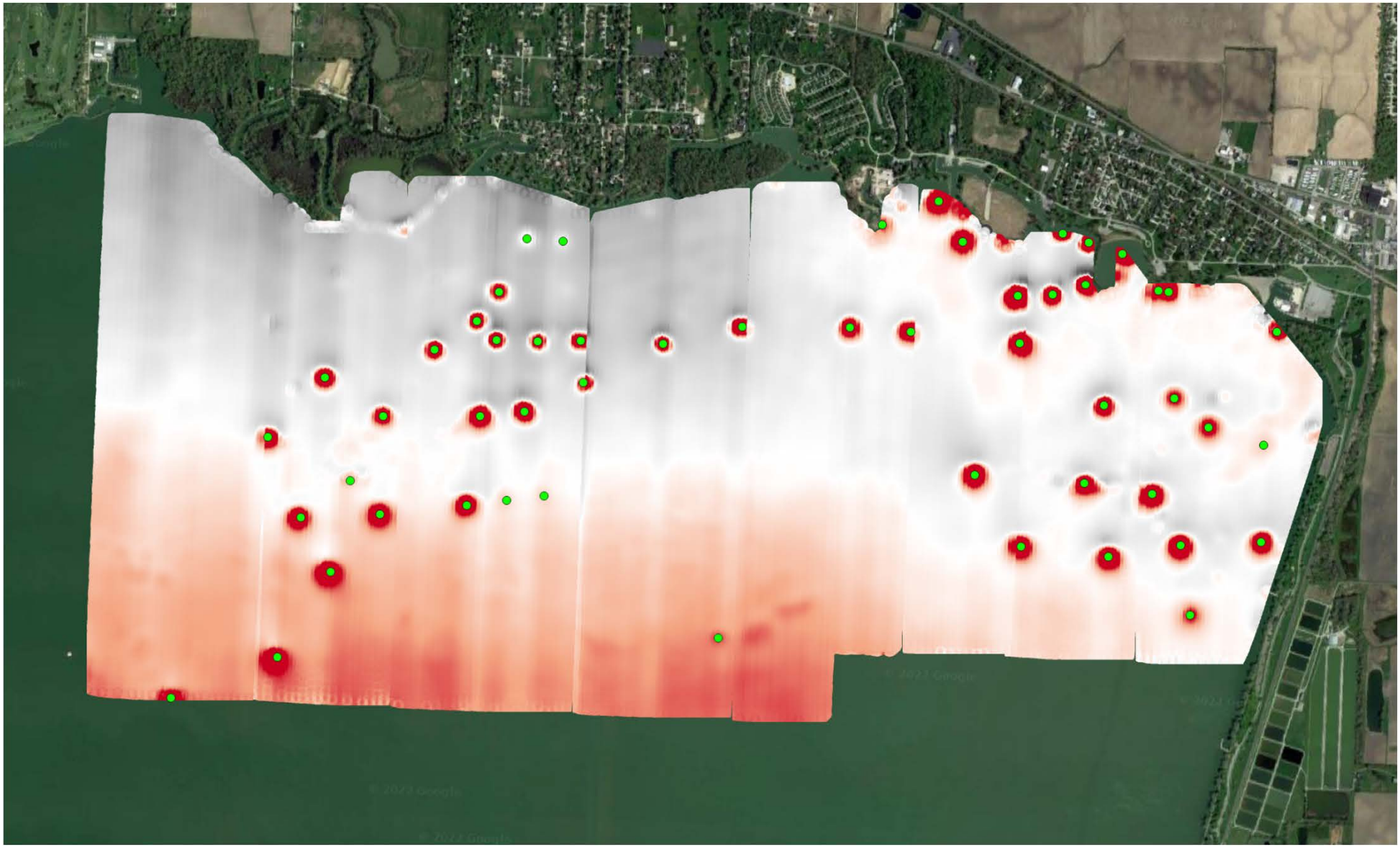
BLOS - Chemical Spill

Magnetometer ODNR

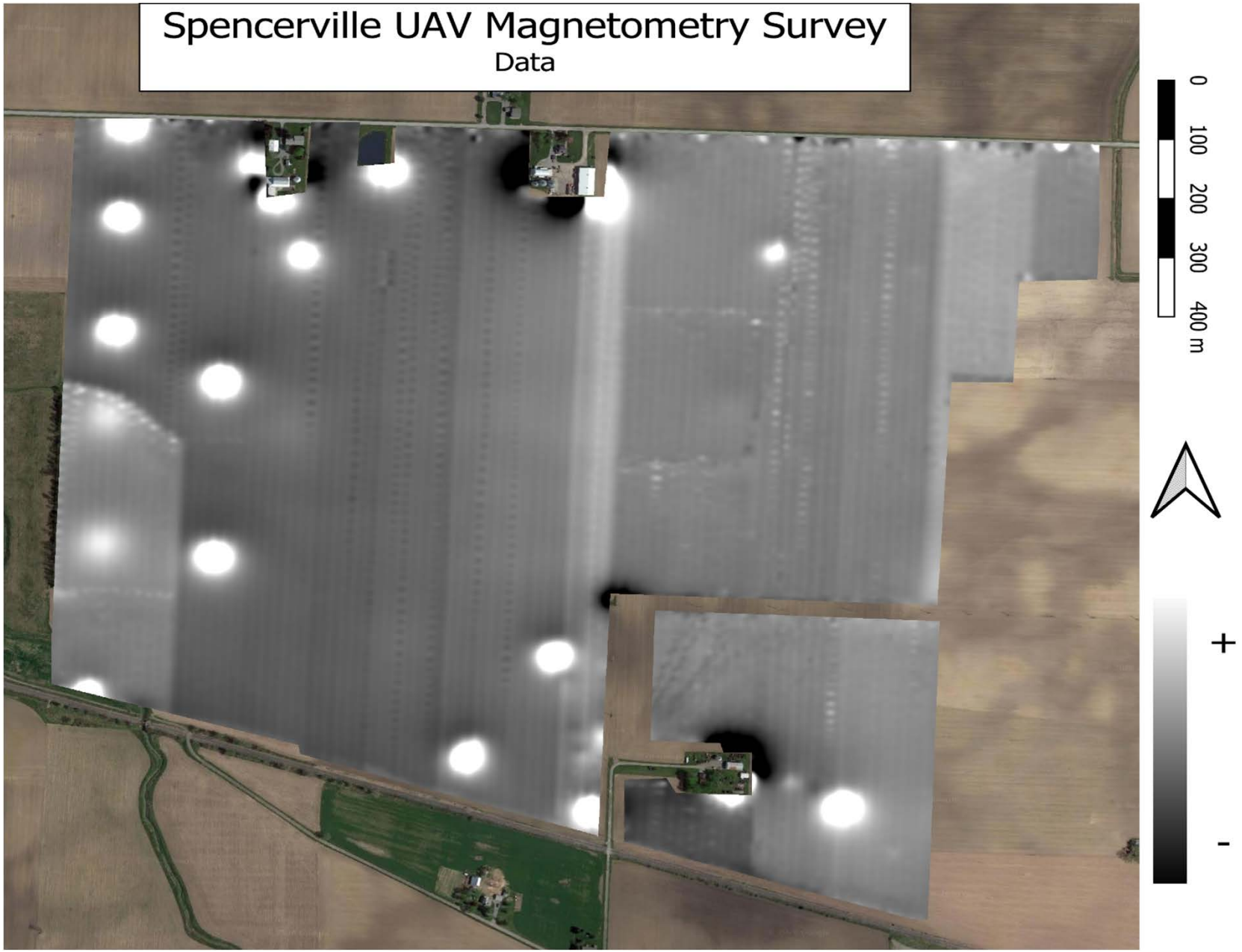
Magnetometer ODNR



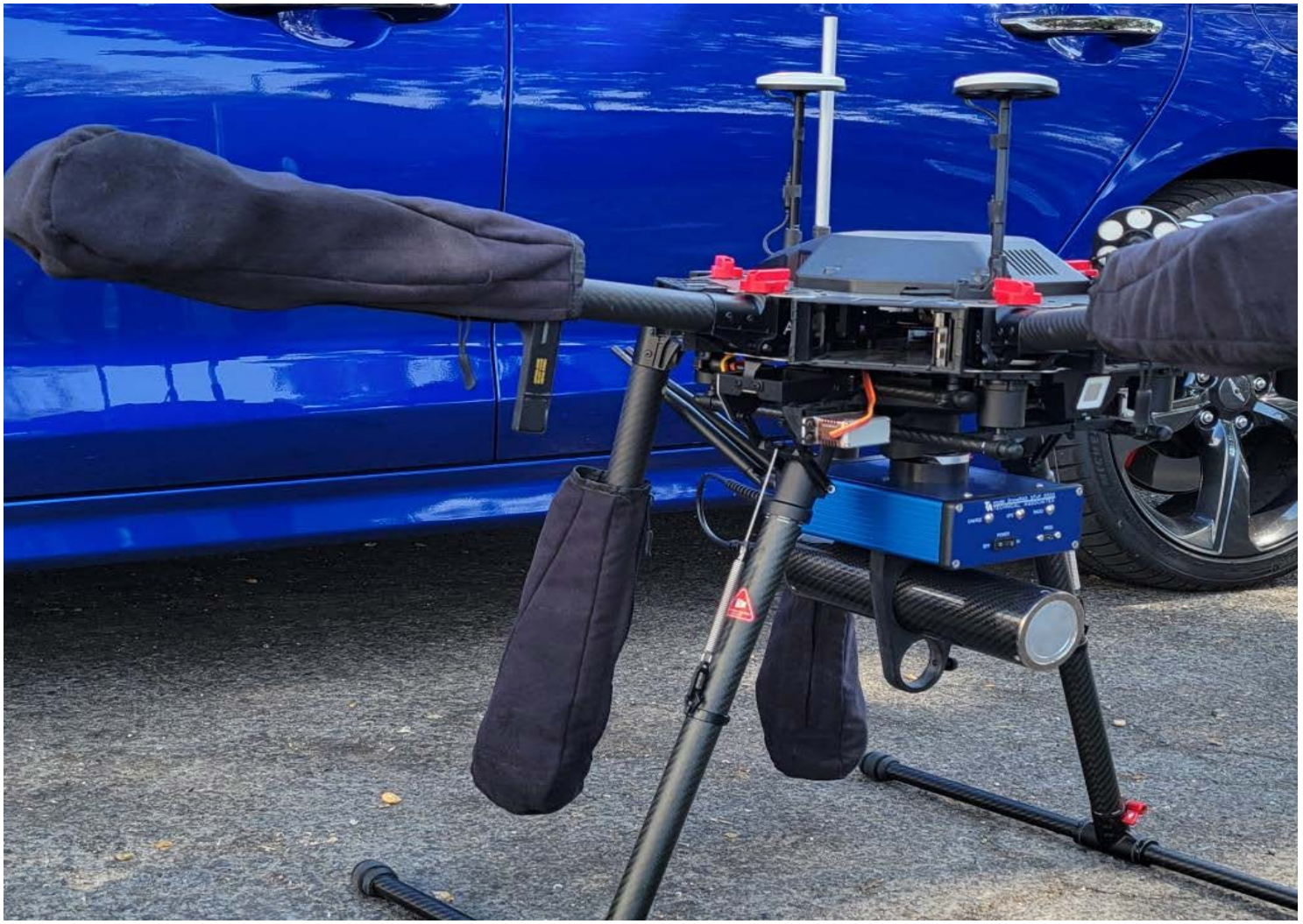
Magnetometer ODNR



Magnetometer ODNR



Radiation Detection



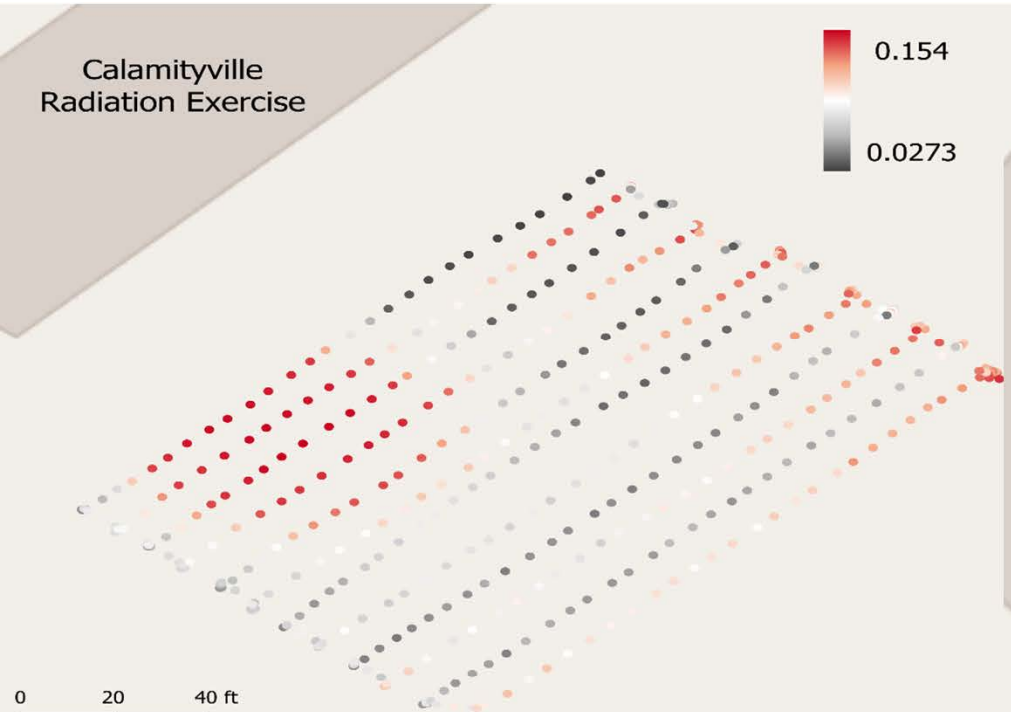
Delivery expected July 2021
Electronics payload re-designed to accommodate measurements from three detectors.
The Search Tube (ST), NaI 2x2 detector, is the tube pictured.
The small vacant mount is for the low and high range GM tubes
Testing for compatibility with RadResponder will done in Ohio.

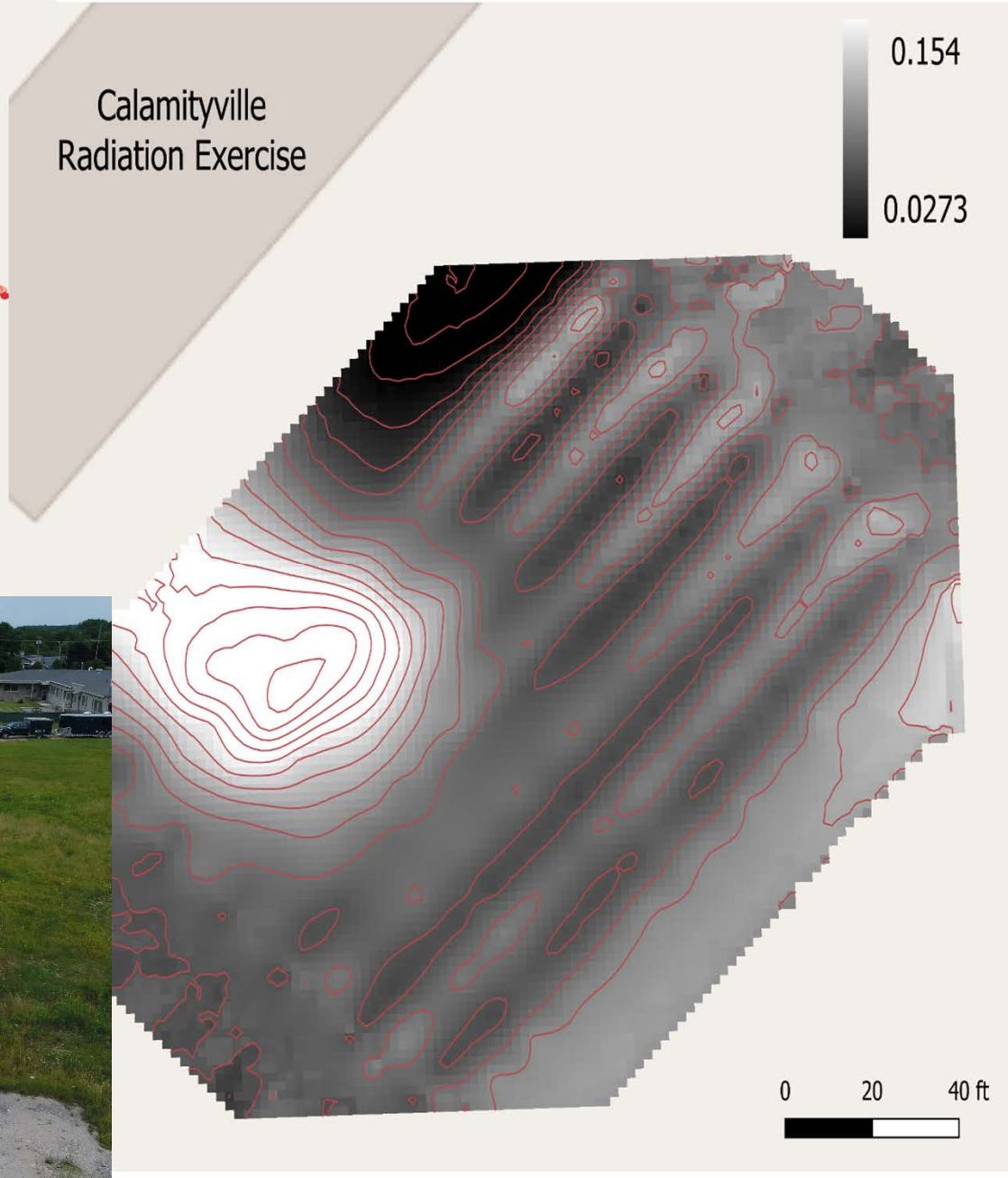
Radiation Detection

Radiation Detection

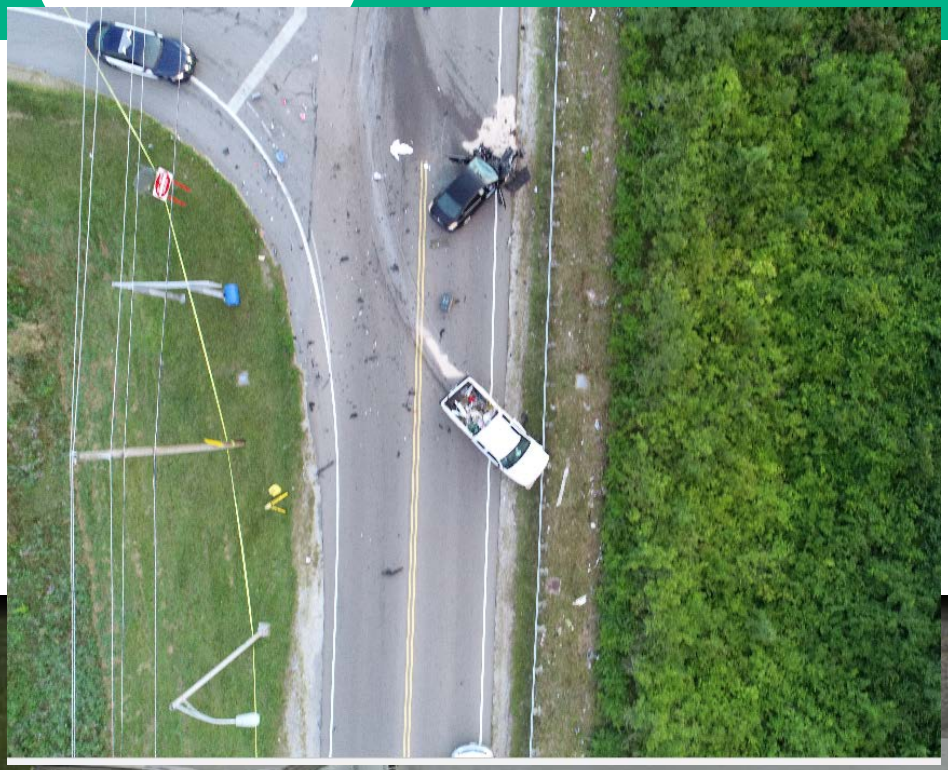
Radiation Detection

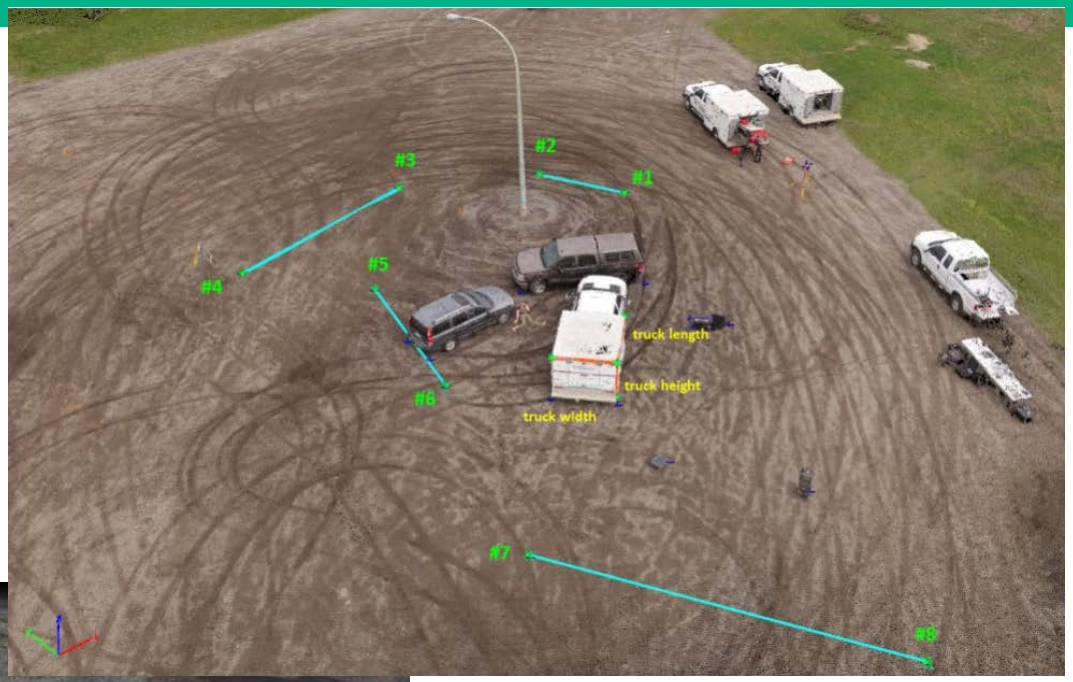
Radiation Detection

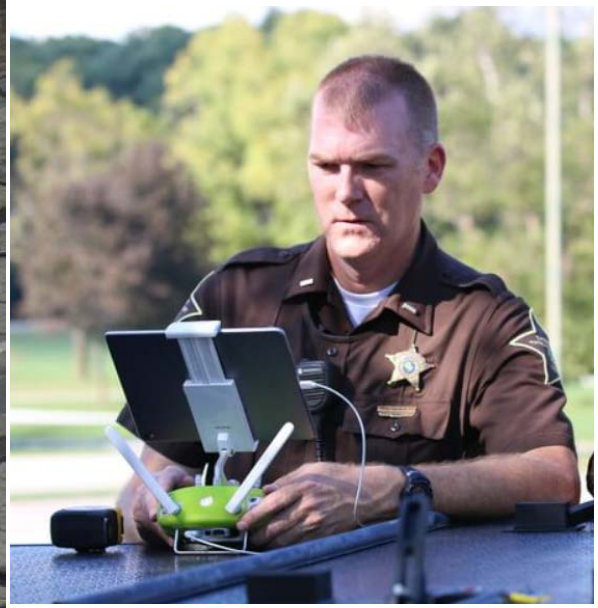




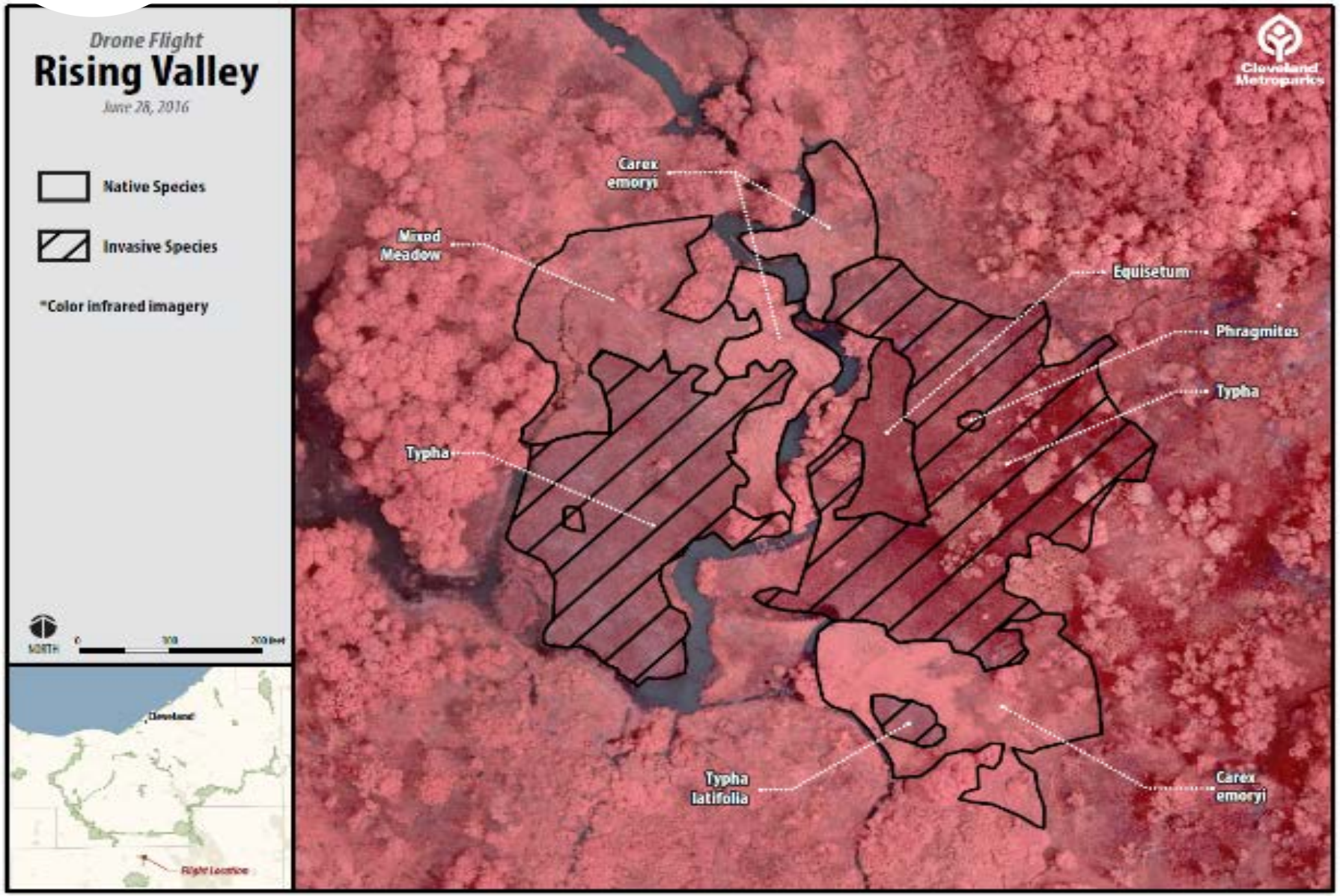
Accident Reconstruction



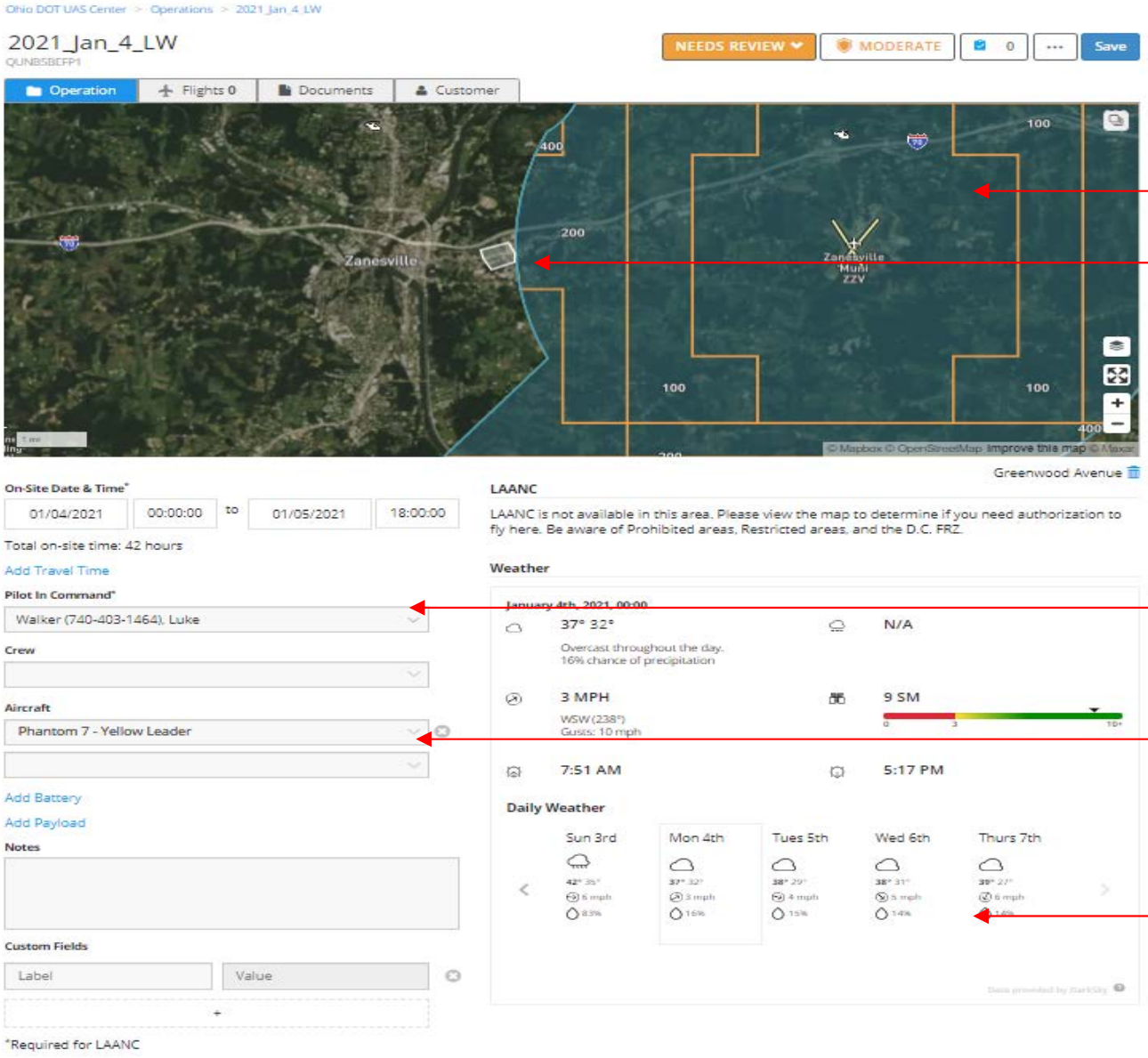




Cleveland Metroparks



Flight Planning



Airspace

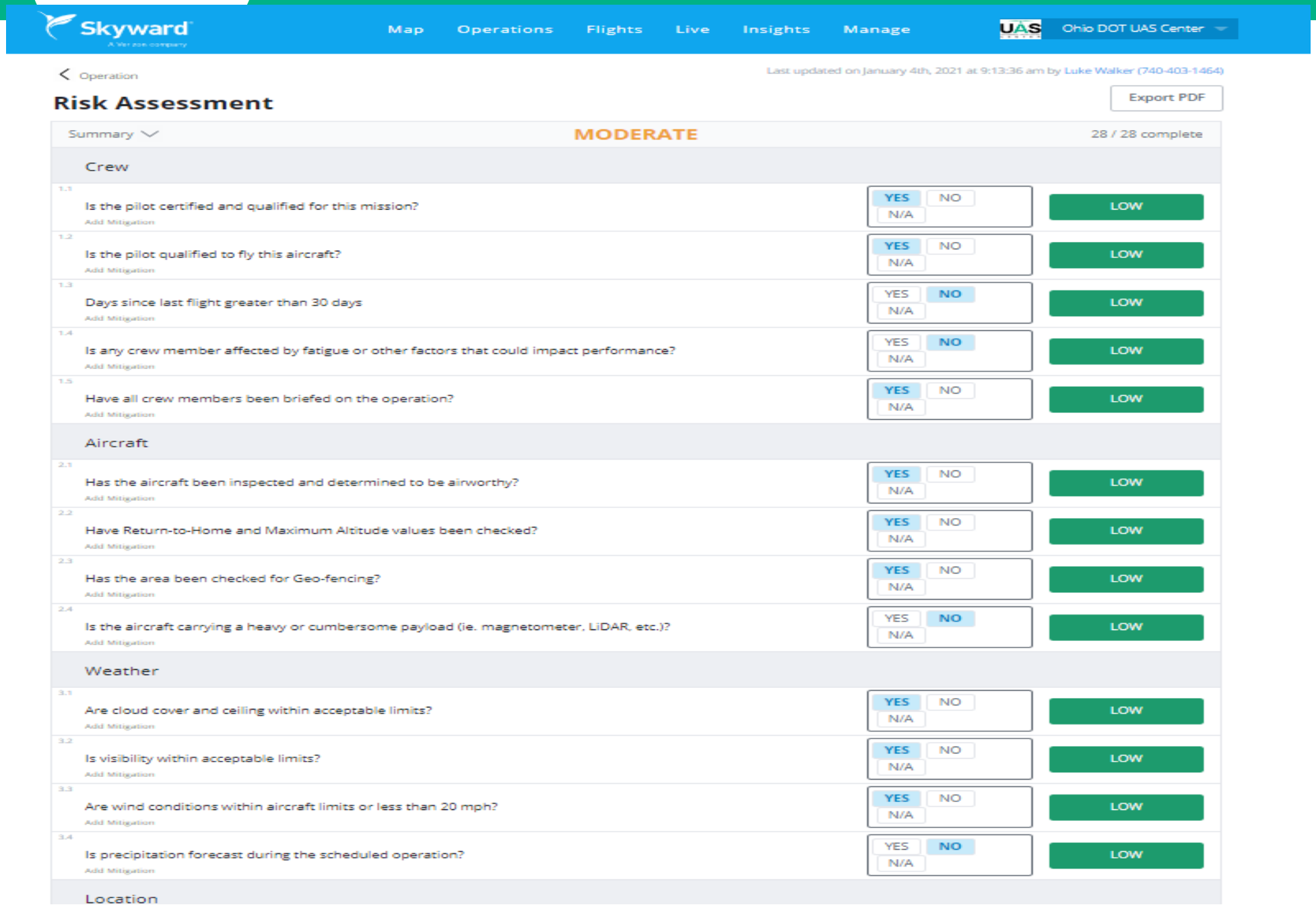
Flight Area

PIC

Aircraft

Weather

Risk Assessment



Ohio UAS Center

David Gallagher
937-497-6767
david.Gallagher@dot.ohio.gov