

2022 Briefing to RRT5

Drones in EGLE

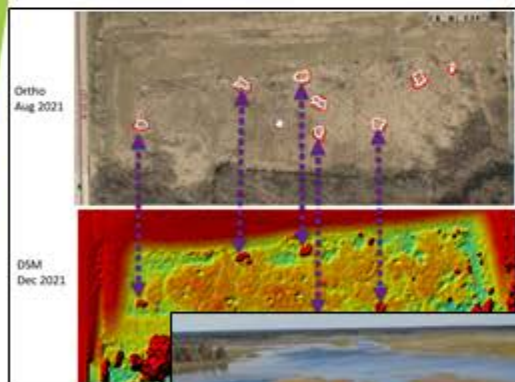
By

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2022 Drones in EGLE

1. What is “Drone Technology” in the EGLE Drone Program
2. EGLE Drone Policy, Privacy, Security
3. EGLE Drone Considerations-Models, Apps, Postprocessing, Deliverables
4. Lessons Learned - Crashes-Incidents, Curveballs, Blue or Not to Blue
5. The EGLE Drone Program - 5 years of Metrics: 2017 thru 2021
6. Questions

The Use of Drones to Improve Planning and Assessment

What is “Drone Technology”



What is “Drone Technology”

1. The Drone

The vehicle that gets in the air



The Use of Drones to Improve Planning and Assessment

What is “Drone Technology”

1. The Drone

The vehicle that gets in the air, in the water, or on the ground



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A drone does not “**Take**” your sample

You don’t “**Sample**” with a Drone

The Use of Drones to Improve Planning and Assessment

What is “Drone Technology”

1. The Drone

The vehicle that gets in the air, in the water, or on the ground



2. The Sensor/Attachment

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2. The Sensor/Attachment

Photo/Video, Thermal Imagery, Lidar
Sampling/Monitoring

\$\$\$ Can Cost More than Drone



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3. Post Processing

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3. Post Processing

Software that takes the Sensor output

Making meaningful Deliverables

Requires High-End Hardware (Processor/RAM/Graphics)

\$\$\$ Can Cost More than the Drone+Sensor

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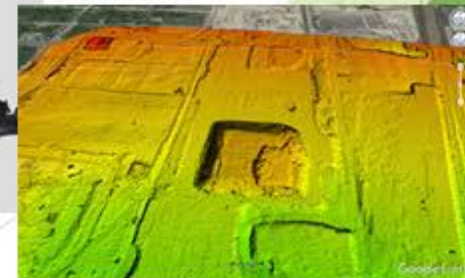
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\$\$\$ Can Cost More than the Drone+Sensor / Reoccurring subscription costs



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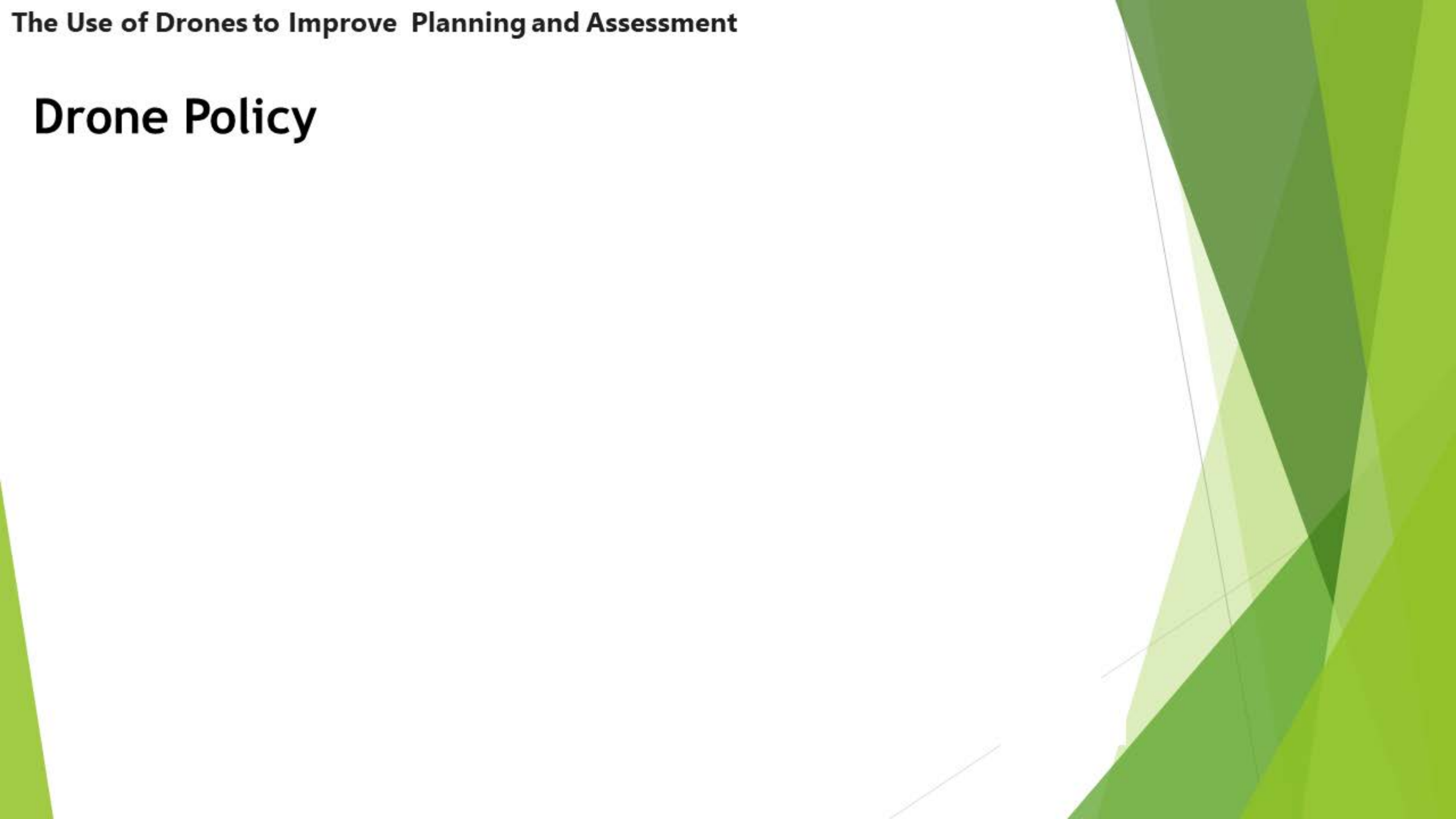
NEW 4. UAS Enterprise Management
Subscription based-cloud
management of the entire
fleet/postprocessing/environment



NEVER GIVE UP

NEVER STOP TRYING TO EXCEED YOUR LIMITS. WE NEED THE ENTERTAINMENT.

Drone Policy



Drone Policy - *needed whether you fly or not*

Drone Policy - *needed whether you fly or not*



Drone Policy - *needed whether you fly or not*

Addressing Drone Use in your organization, educating staff

Preventing potential bad press, ill public perception, liability (physical and legal).



Drone Policy - EGLE



DEPARTMENT POLICY AND PROCEDURE

02-006 - Use of Small Unmanned Aircraft Systems

Original Effective Date: 8/20/2018
Last Reviewed Date: MM/DD/YYYY
Distribution: All EGLE Employees

ISSUE

The Department of Environment, Great Lakes, and Energy (EGLE) owns and operates a number of unmanned aircraft systems (UAS), commonly referred to as drones. This policy and procedure is to establish requirements for the safe operation and legal use of UAS in the EGLE.

AUTHORITY

Title 14 of the Code of Federal Regulations (CFR), Part 107, Small Unmanned Aircraft Systems
Unmanned Aircraft Systems, 2016 PA 436, as amended, Michigan Compiled Laws (MCL) 259.301 – 259.331

DEFINITIONS

Aerial reconnaissance technology drone technical and program support team (ART Drone TAPS Team) - The ART Drone TAPS Team is a group of representatives from each EGLE division that advise and coordinate the use of UAS technology within EGLE.

Air traffic control (ATC) - The ground-based personnel and equipment concerned with monitoring and controlling air traffic within a particular area.

Division UAS representative - Responsible for division UAS operations, division pilots, and coordination with the EGLE UAS coordinator. This person is appointed by the division director.

Drone - Generic term for unmanned aerial vehicle or system.

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EGLE UAS coordinator - Works with division UAS representatives to coordinate UAS use, training, and reporting at the department level. The EGLE UAS coordinator tracks UAS inventory, coordinates

Drone Policy - EGLE

Procedures - Mission Planning, Mgmt Approval



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Training / Demonstration of Proficiency

Privacy - Incidental Imagery



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Training / Demonstration of Proficiency

Privacy - Incidental Imagery

Security - Best Practices



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NEW United States Presidential Memorandum



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Incident Reporting- Minor, Major, Catastrophic



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PERSEVERANCE

THE COURAGE TO IGNORE THE OBVIOUS WISDOM OF TURNING BACK.

Drone Training in EGLE



Become a Drone Pilot

FAADroneZone

FAADroneZone is the only FAA-approved online training platform for Part 107 pilots. It provides a comprehensive, self-paced course that covers all the knowledge and skills you need to become a Part 107 pilot. The course is designed to be completed in approximately 10 hours, but you can take it at your own pace. Upon completion, you will receive a Part 107 Certificate of Completion, which is required to take the Part 107 knowledge test.

Top Tasks

- Register your sUAS
- Download the Part 107 knowledge test
- Take the Part 107 knowledge test
- Receive your Part 107 Certificate of Completion

First-Time Pilots

Eligibility

To become a pilot you must:

- Be at least 16 years old
- Be able to read, speak, write, and understand English
- Be in a physical condition to safely operate a drone
- Have the most recent knowledge test score

Requirements for Remote Pilot Certificate

- Must be able to identify the relevant pilot during all sUAS operations
- Valid for 2 years. Certificate holders must pass a recurrent knowledge test every two years.



Drone Training in EGLE

WannaBees - No FAA Cert, No Experience



ChickenHawks - Part 107 Certification



Trainer drone (\$35) Proficiency - Evaluation

Entry level field drone - DJI Spark, Mavic (\$500)

Mission Planning Development - Airspace, LAANC, Weather, Checklists

Evaluation/Demonstration with Entry Level Drone

EGLE Remote Pilot in Command -

Entry Level Drone >> Camera Drone >> Specialized Drone

Spark, Air

P4P-Anafi

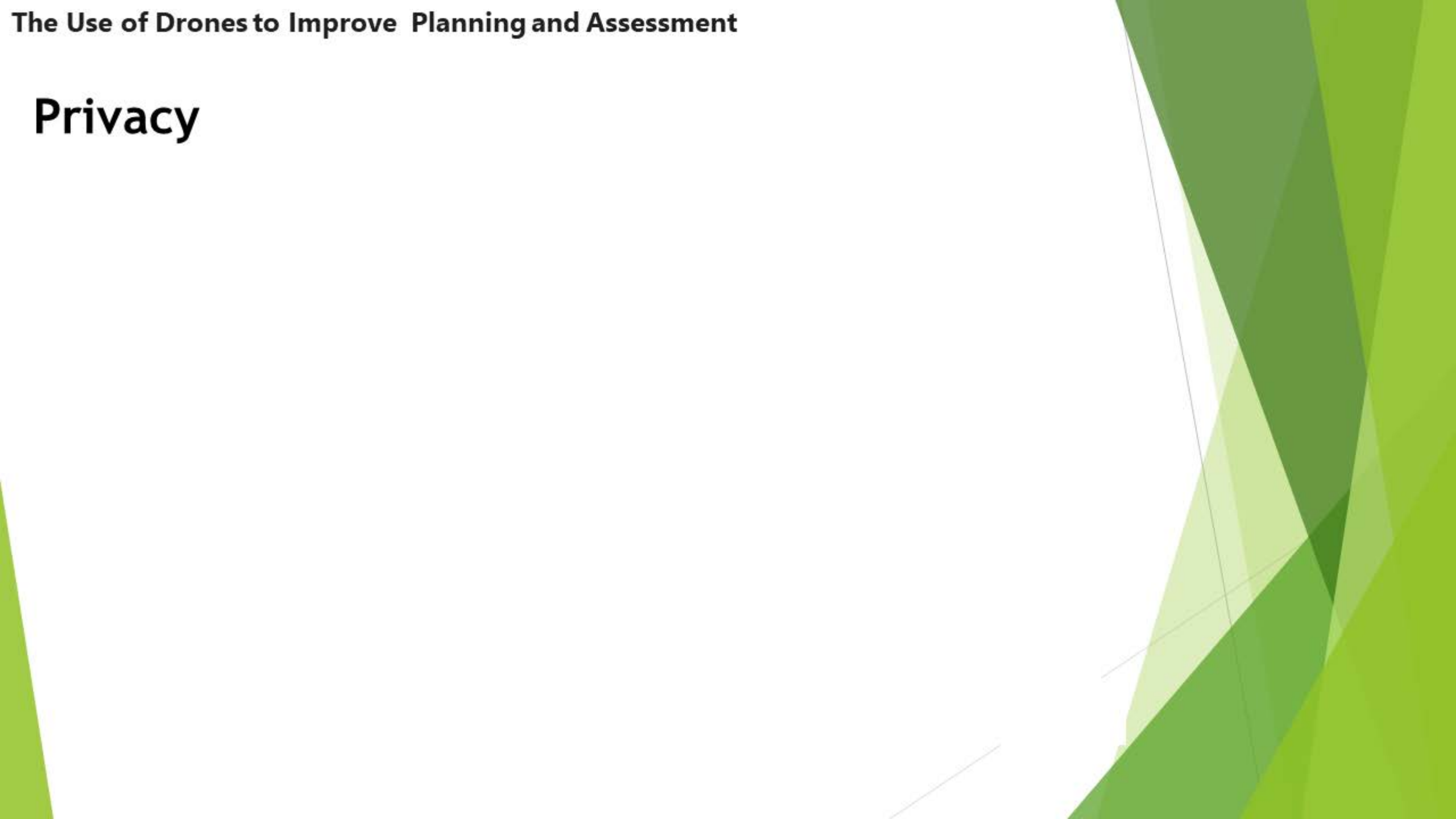
M210-M300-M600



Sponsored
Potensic Upgraded A20 Mini Drone
Easy to Fly Even to Kids and
Beginners, RC Helicopter Quadcopt...
★★★★☆ ~ 8,245



Privacy



Privacy

Google Maps satellite images cover 98 percent of the world's population

It has photographed 10 million miles of Street View imagery.



Mariella Moon, @mariella_moon
12.14.19 in [Internet](#)

14
Comments

430
Shares



Privacy

In Drone use, there has emerged a statutory difference between

Privacy

In Drone use, there has emerged a statutory difference between Flying,



Privacy

In Drone use, there has emerged a statutory difference between Flying, Flying and “taking a picture”



Privacy

In Drone use, there has emerged a statutory difference between Flying, Flying and “taking a picture”, and “the intent of the drone picture”.



Privacy

***** Act 436 of 2016 THIS NEW ACT IS EFFECTIVE APRIL 4, 2017 *****

UNMANNED AIRCRAFT SYSTEMS ACT

Act 436 of 2016

AN ACT to provide for the operation and regulation of unmanned aircraft systems in this state; to create the unmanned aircraft systems task force; to provide for the powers and duties of state and local governmental officers and entities; and to prohibit conduct related to the operation of unmanned aircraft systems and prescribe penalties.

History: 2016, Act 436, Eff. Apr. 4, 2017.

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History: 2016, Act 436, Eff. Apr. 4, 2017.

ANYBODY
Using a
Drone
In Michigan



***** 259.322.new THIS NEW SECTION IS EFFECTIVE APRIL 4, 2017 *****

259.322.new Operation of unmanned aircraft system; harassment, violation of order, or invasion of privacy prohibited; definition; individual registered as sex offender.

Sec. 22. (1) A person shall not knowingly and intentionally operate an unmanned aircraft system to subject an individual to harassment. As used in this subsection, "harassment" means that term as defined in section 411h or 411i of the Michigan penal code, 1931 PA 328, MCL 750.411h and 750.411i.

(2) A person shall not knowingly and intentionally operate an unmanned aircraft system within a distance that, if the person were to do so personally rather than through remote operation of an unmanned aircraft, would be a violation of a restraining order or other judicial order.

(3) A person shall not knowingly and intentionally operate an unmanned aircraft system to violate section 539j of the Michigan penal code, 1931 PA 328, MCL 750.539j, or to otherwise capture photographs, video, or audio recordings of an individual in a manner that would invade the individual's reasonable expectation of privacy.

(4) An individual who is required to register as a sex offender under the sex offenders registration act, 1994 PA 295, MCL 28.721 to 28.736, shall not operate an unmanned aircraft system to knowingly and intentionally follow, contact, or capture images of another individual, if the individual's sentence in a criminal case would prohibit the individual from following, contacting, or capturing the image of the other individual.

History: 2016, Act 436, Eff. Apr. 4, 2017.

Privacy

General Public use of Drone: 259.322

“individuals' reasonable expectation of privacy” from drone photo, video, audio recording.....

Privacy

General Public use of Drone: 259.322

“individuals' reasonable expectation of privacy” from drone photo, video, audio recording.....

State of Michigan use of Drone: 259.307 - Facility consent, Warrant, Imminent Endangerment

259.307 Prohibited use of an unmanned aircraft system; exceptions; permit, license, order, or other decree; notice of state-owned or operated; consent; information exempt from freedom of information act; applicability.

Sec. 7. (1) Except as otherwise provided in subsection (6), a department, agency, board, or commission of this state or a person under a contract with or acting at the direction or on behalf of a department, agency, board, or commission of this state shall not use an unmanned aircraft system to surveil, inspect, or gather evidence or collect information about a facility that is subject to a permit, license, or order issued by or a decree or other requirement governed by that department, agency, board, or commission unless any of the following apply:

(a) The owner or operator of the facility has given express consent for the use of an unmanned aircraft system for the purposes described in this subsection in a particular instance.

(b) The department, agency, board, commission, or person is acting under a valid search warrant and the use of the unmanned aircraft system is strictly limited to the subject matter and scope of that warrant.

(c) The department, agency, board, or commission has reason to believe that there may be an imminent threat to public health, safety, property, or the natural resources of the state from the facility and the use of the unmanned aircraft system is strictly limited to the investigation of that imminent threat.

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“individuals' reasonable expectation of privacy” from drone photo, video, audio recording.....

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(c) The department, agency, board, or commission has reason to believe that there may be an imminent threat to public health, safety, property, or the natural resources of the state from the facility and the use of the unmanned aircraft system is strictly limited to the investigation of that imminent threat.

(5) Any data, including videos, photographic images, or geospatial data, collected by the operation of an unmanned aircraft system concerning a facility described in subsection (1) shall be furnished promptly to the facility's owner or operator upon request and shall be rebuttably presumed to be not subject to disclosure under the freedom of information act, 1976 PA 442, MCL 15.231 to 15.246.

The Use of Drones to Improve Planning and Assessment

Privacy

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DEPARTMENT POLICY AND PROCEDURE

01-033 - EGLE Drone FOIA Procedure

Original Effective Date: March 3, 2022
Distribution: All EGLE Employees

ISSUE

Michigan's [Freedom of Information Act, 1976 PA 442, as amended](#) (FOIA) states, "It is the public policy of this state that all persons . . . are entitled to full and complete information regarding the affairs of government and the official acts of those who represent them as public officials and public employees . . . The people shall be informed so that they may fully participate in the democratic process."

The Michigan Department of Environment, Great Lakes, and Energy (EGLE) has a legal obligation to disclose all nonexempt public records in its possession pursuant to a FOIA request. EGLE acknowledges that sometimes it is necessary to invoke the exemptions identified under FOIA in order to ensure effective operation of government and to protect the privacy of individuals.

The [Unmanned Aircraft Systems Act, 2016 PA 436](#), MCL 259.307(5) states, "Any data, including videos, photographic images, or geospatial data, collected by the operation of an unmanned aircraft system concerning a facility described in subsection (1) shall be furnished promptly to the facility's owner or operator upon request and shall be rebuttably presumed to be not subject to disclosure under the freedom of information act, 1976 PA 442, MCL 15.231 to 15.246."

EGLE wishes to promote transparency, create consistency in asserting exemptions and applying redactions in the production of records in response to FOIA requests, and reduce its risks.

PROCEDURE

Step	Who	Does What
1.	EGLE FOIA Team	Receives or is informed of a FOIA request related to drone data.
2.	EGLE FOIA Team	Contacts the EGLE drone program coordinator to determine if the FOIA request involves public or facility-related drone data.
3.	EGLE Drone Program Coordinator	Contacts the EGLE drone pilot or project manager to determine the type of data collected.
4.	EGLE Drone Program Coordinator	If the drone data is determined to be of a public nature (public lands, surface waters of the state, etc.), the EGLE drone program coordinator will respond to EGLE-FOIA@Michigan.gov with access information for the drone data.
5.	EGLE Drone Pilot or Project Manager	Determines if a site access agreement exists for the facility-related drone data. If the public release of drone data is covered in the site access agreement and the drone data is determined: <ul style="list-style-type: none">• public, proceed to step 9.• not public, proceed to step 6. If there is no site access agreement, proceed to step 6.
6.	EGLE Drone Pilot or Project Manager	Sends an email to EGLE-FOIA@Michigan.gov indicating that facility outreach is needed and provides the facility address or the FOIA request tracking number.
7.	EGLE FOIA Team	Grants a 10 business day extension.

Step	Who	Does What
8.	EGLE Drone Pilot or Project Manager	Contacts the facility owner or operator to determine drone data accessibility. Provide in the email/contact request that if the facility owner or operator does not respond to EGLE within three days of the notification, the drone data will be assumed to be public. If the facility owner or operator indicates: <ul style="list-style-type: none">• the drone data is not public, proceed to step 10.• or it is assumed that the drone data is public, proceed to step 9.
9.	EGLE Drone Pilot or Project Manager	If the drone data is determined public, within five days of the initial outreach by the EGLE drone program coordinator, notifies EGLE-FOIA@Michigan.gov and provides access to the drone data.
10.	EGLE Drone Pilot or Project Manager	If the facility owner or operator claims the drone data is not public, documents the facility owner's or operator's factual basis and analysis for which FOIA exemption applies. Within five days of the initial outreach by the drone program coordinator, notifies EGLE-FOIA@Michigan.gov of all the following: <ul style="list-style-type: none">• The facility address or FOIA request tracking number.• All or those portions of the drone data identified as not public by the facility owner or operator.• The factual basis and analysis for the exemption(s).• Coordinates access to the drone data for review.
11.	EGLE FOIA Team	Reviews the drone data. a) If the drone data has been determined to be public; reviews and releases the drone data per policy. b) If all or a portion of the drone data has been determined to be not public; provides all relevant information to the EGLE FOIA coordinator for review and action.

Privacy

MICHIGAN

Township violated Michigan couple's privacy by using drone, court says

Beth LeBlanc The Detroit News

Published 12:06 p.m. ET Mar. 19, 2021 | Updated 3:04 p.m. ET Mar. 19, 2021

[View Comments](#)



A Michigan Court of Appeals panel ruled this week a northern Michigan township could not use drone photos it obtained without a search warrant to prove a resident wasn't complying with zoning rules.

Privacy

Michigan Court of Appeals “Expectation” of Privacy -

No one “expects” a drone to be looking in their backyard, even if flying legally in accordance with FAA and State Regs.

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Privacy

Pg 8..

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-8-

Pg 10.

We also observe that plaintiff's warrantless surveillance was totally unnecessary. The parties could easily have—and likely should have—included a monitoring or inspection provision in their settlement agreement. Aside from that, as the United States Supreme Court observed, the quantum of evidence necessary to establish probable cause to conduct an administrative inspection is more than “none,” but is less than what might be required to execute a criminal search warrant.

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“..parties.. should have-included a monitoring or inspection provision in their agreement”

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Privacy



Privacy

Agencies have “inspection authority” in their statutes.

It is your Mission to protect the Environment, enforce laws, monitor habitat and agreements.



Privacy

Agencies have “inspection authority” in their statutes.

It is your Mission to protect the Environment, enforce laws, monitor habitat and agreements.

You likely already use these type of Sensors (visual, cameras)

Drones bring your Sensor to the site so you can do your job better, safer.



Privacy



Privacy

If you have inspection authority in your permits/legal agreements, make sure its clear and includes “aerial” in your inspection “tool box”, do not leave it implied.



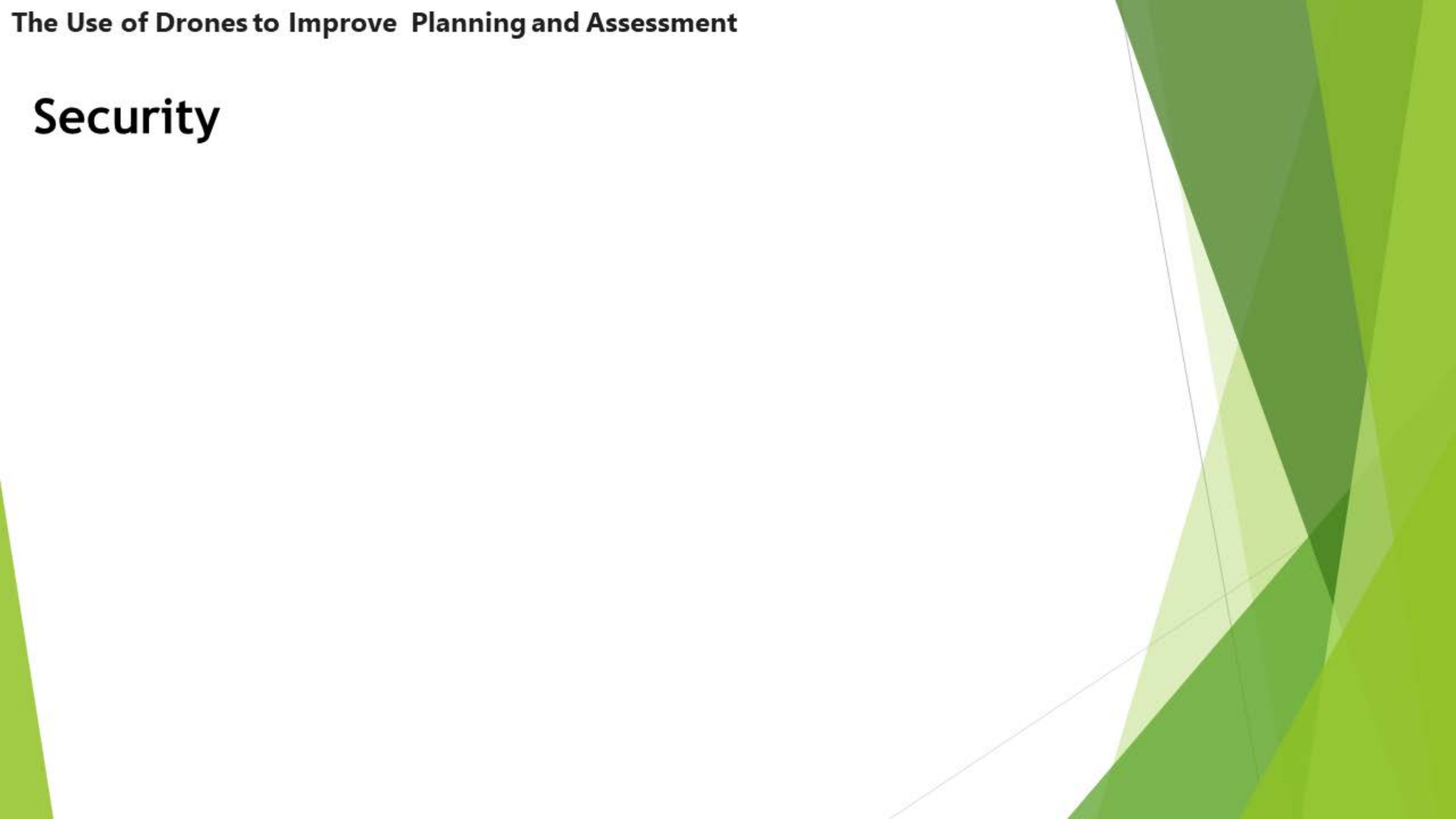
Privacy

If you have inspection authority in your permits/legal agreements, make sure its clear and includes “aerial” in your inspection “tool box”, do not leave it implied.

Always ASK and OBTAIN consent before surveilling private property, similar to walking on.



Security

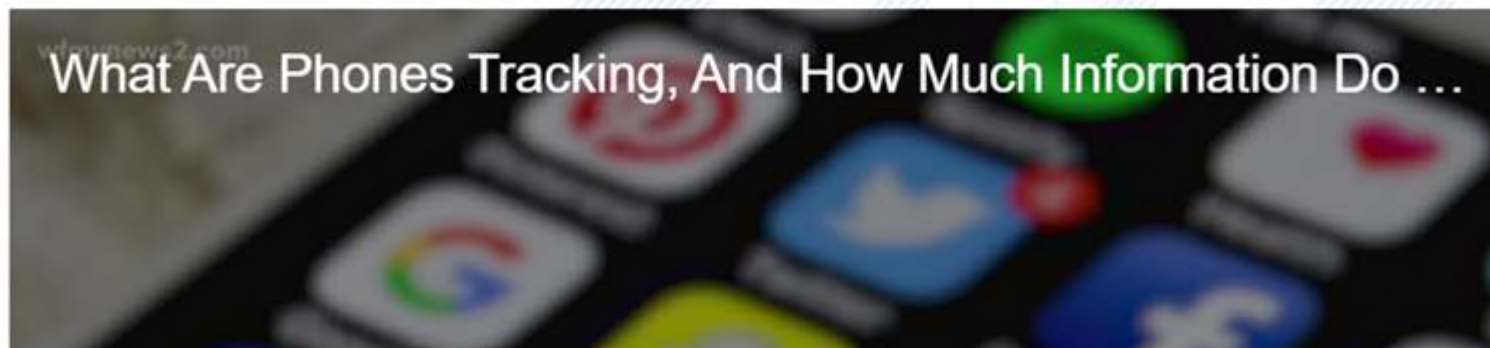


Security



Your Cell Phone Is Talking About You Behind Your Back

It's revealing personal details about your life to third party companies. But there are ways to protect your information!



Security with Drones can be fully addressed

During Flight Transmission -

Post Flight imagery security-



[_https://uavcoach.com](https://uavcoach.com)

Want to Make Sure Your DJI Drone Isn't Sharing Your Data? Here's What to Do

BY ZACC DUKOWITZ

5 June 2019

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Do not connection to Internet

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Post Flight imagery security-

Be prepared to adopt your Agency’s digital Business Confidential procedures (e.g., Enforcement Cases, Sensitive Security Sites)



<https://uavcoach.com/>

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5 June 2019

The Use of Drones to Improve Planning and Assessment



What is the ROI (\$500-\$2000 Drone) ?

An extra 15-30 minutes of field time can provide a wealth of additional information
It can extend your field season into the winter months



DISCOURAGEMENT

YOU ARE THE WIND BENEATH MY WINGS, OTHERWISE KNOWN AS TURBULENCE.

UAS Uses, Examples, & Considerations in Environmental Emergency Response

Kentucky: Belle Thomas, UAS Coordinator
Department of Environmental Protection,
Division of Waste Management

What kind of Emergency Responses would a UAS be beneficial at?

- Large spills or releases
 - Fires
 - Hazardous/dangerous incidents
 - Inaccessible scenarios , i.e. hazardous terrain
 - Any incident that would benefit from real time assessment
-
- ❖ Safety is to human health & the environment of utmost importance. Including those who are responding to an emergency.

Large Releases:



Large Releases:



Fires (chemical):



Inaccessible Hazardous Environments



Inaccessible Hazardous Environments



Inaccessible Hazardous Environments



What to consider during an Environmental Emergency Response?

- Safety as the drone operator. What hazards will you encounter?
 - i.e. other drone operators, proximity to the incident, emergency vehicle traffic
- Would a BVLOS Waiver be beneficial?
- Do you have the capability to live stream?
 - Incident Command Drone Trailer, Update the main office
 - WiFi Hotspot, Microsoft Teams screen sharing within the organization,



UAS Drone use in Environmental Assessment

What can be done with drones that takes only pictures?

See places you cant access (Looking Glass River – high water)



What can be done with drones that takes only pictures?

Get perspective/scale of what your dealing with



Search

vic: Tokyo, Japan

[Get Directions](#) [History](#)

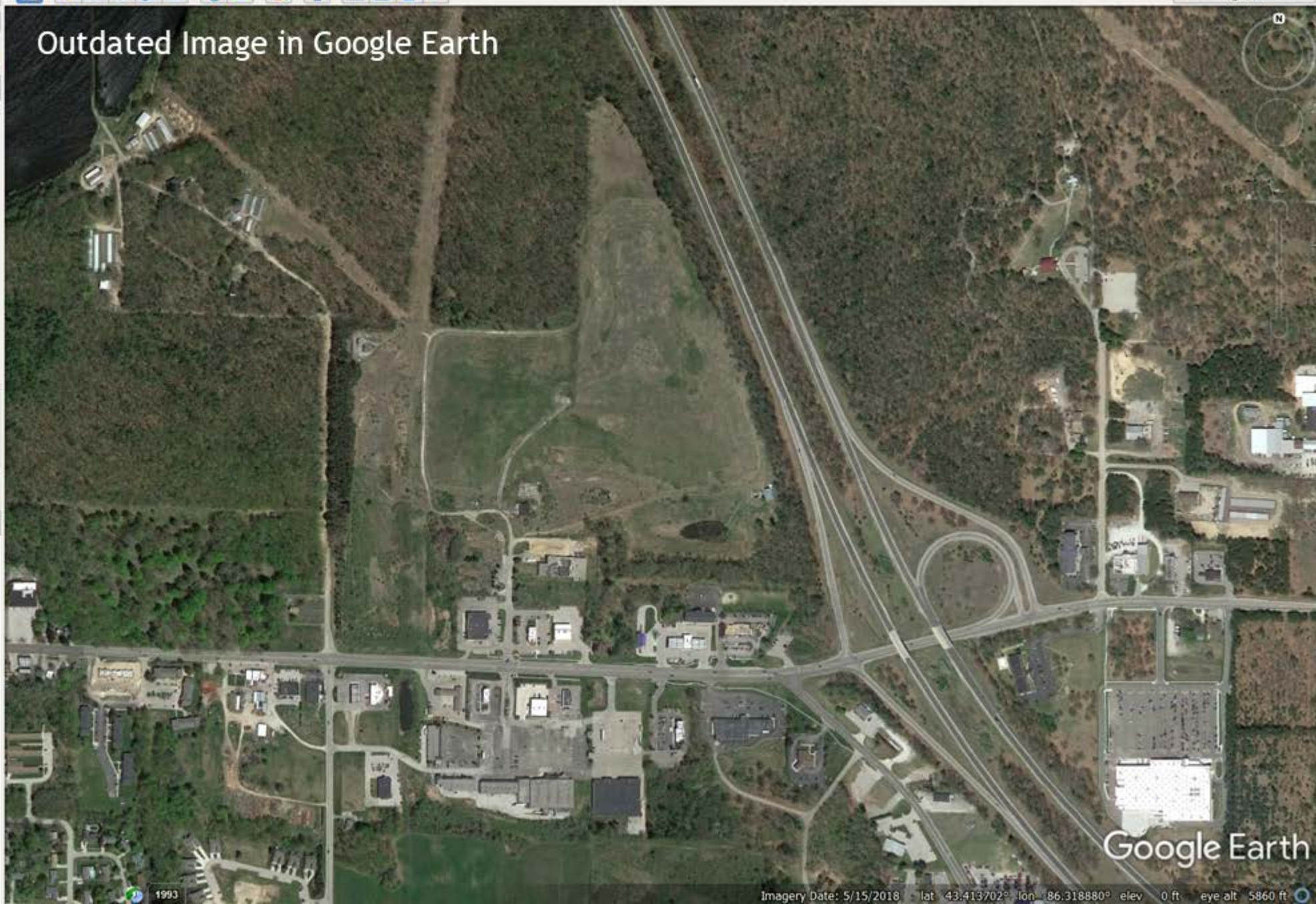
▼ Places

- My Places
 - Untitled Placemark
 - KAMN Pix4D
 - 2019_05_14_Huron Monofil
 - Ontogan_Halfway Ck_2019_06_11
 - 2019_06_17_WLLF
 - Ortho
 - 2019_06_17_WLLF Whitehall transpar**
Source: Google Earth, Orthomosaic overlay
Metadata: 2019_06_17_10:24:00
 - DSM
 - NDVI
 - Contours
 - pix4D other
 - 2019_10_04_Park Lake
 - 2019_10_11 Buick City v1
 - 2019_10_18 Occ LF Cap
 - 2019_10_18 Occ LF Cap
 - Orthomosaic overlay
 - Orthomosaic overlay

▼ Layers

- Primary Database
- Announcements
- Borders and Labels
- Places
- Photos
- Roads
- 3D Buildings
- Ocean
- Weather
- Gallery
- Global Awareness
- More
- Terrain

Outdated Image in Google Earth



Google Earth

Imagery Date: 5/15/2018 lat 43.413702° lon -86.318880° elev 0 ft eye alt 5860 ft

Google Earth Pro

File Edit View Tools Add Help

Search

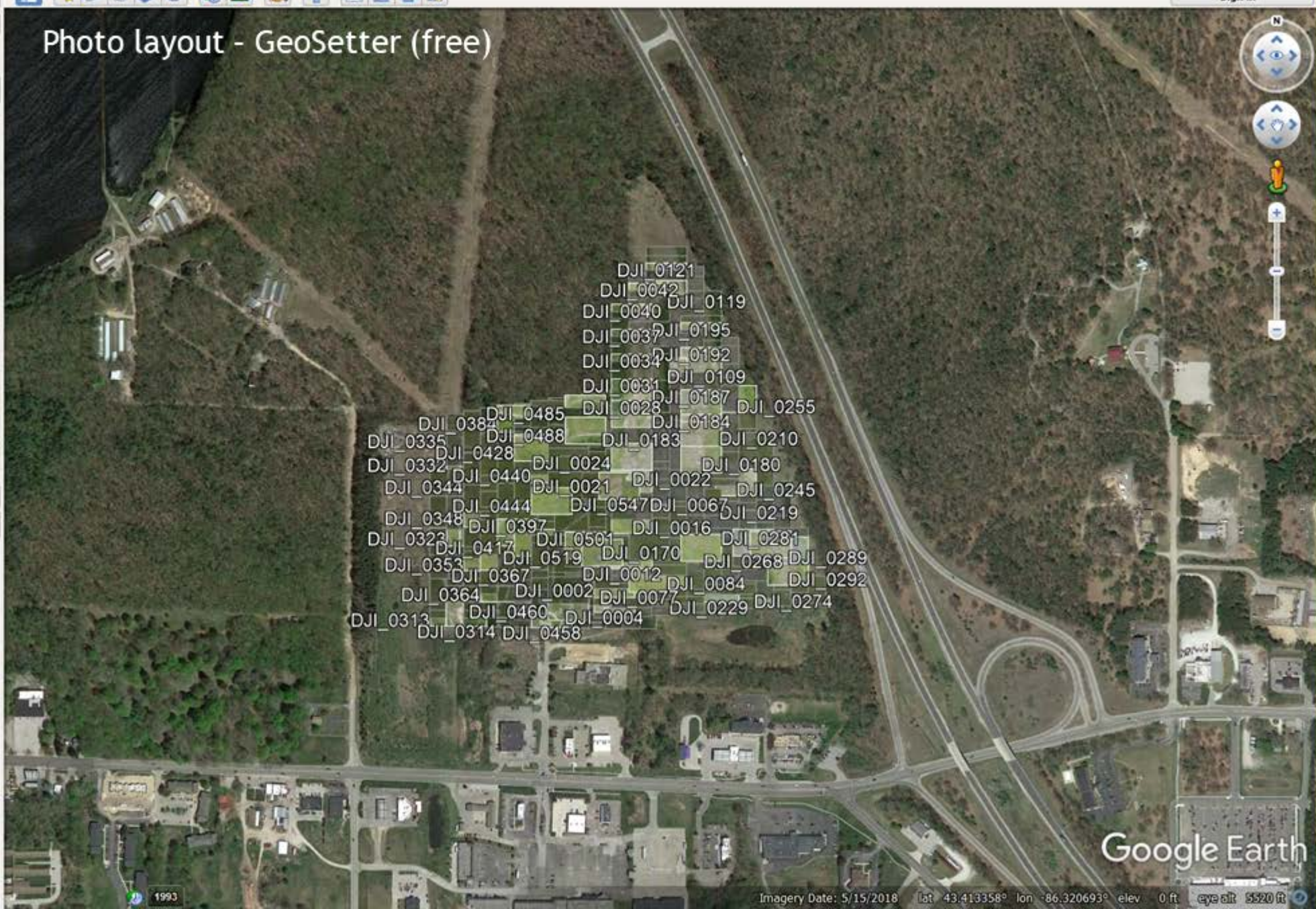
Search

Get Directions History

Places

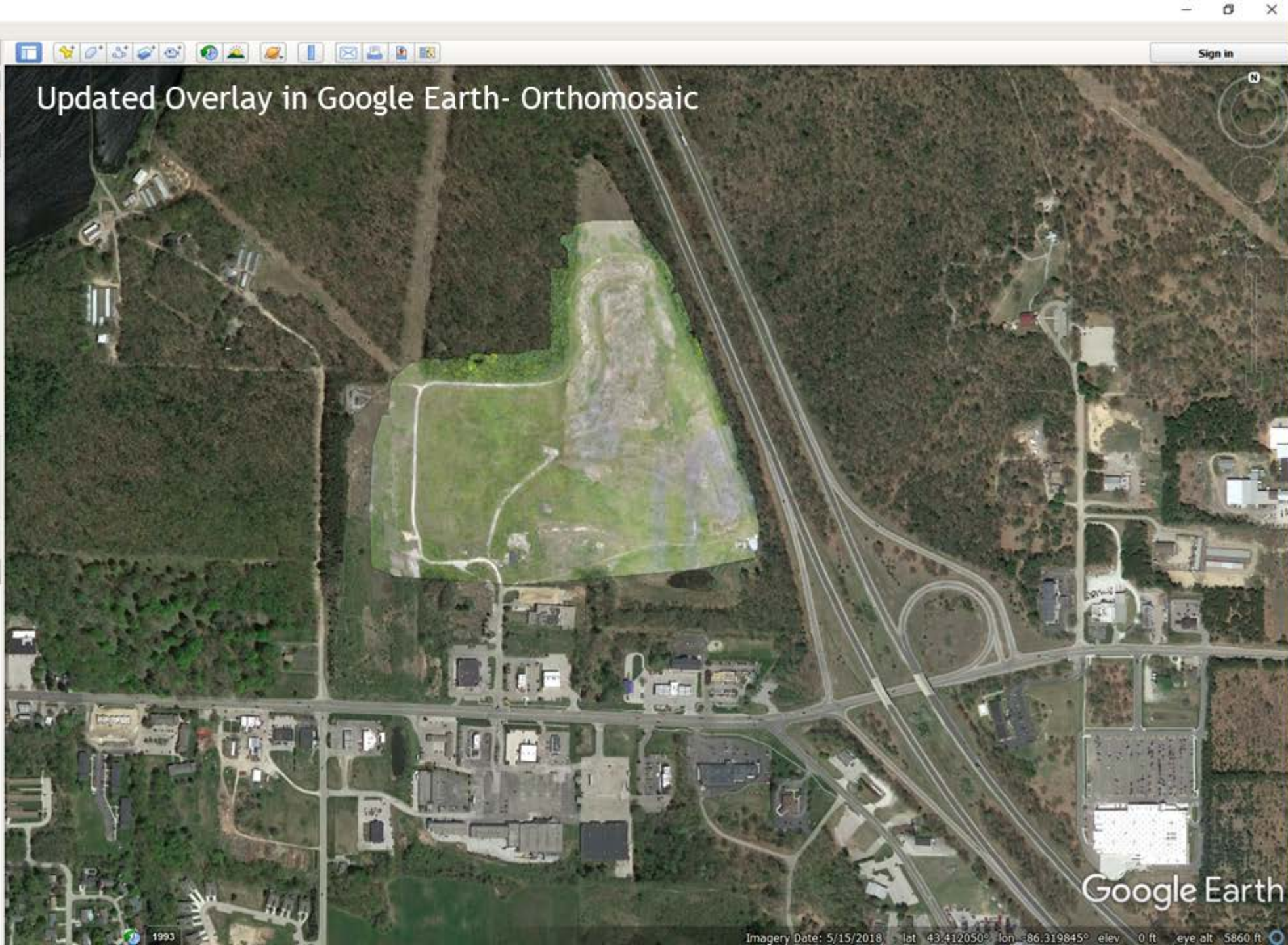
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 - Orto
 - 2019_06_17_WLLF Whitehall transpar
 - Source Image: C:/artfiles/Drone Missions/2019_06_17_WLLF/Post/
 - DSM
 - NDVI
 - Contours
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 - 2019_06_17_WLLF Whitehall transpar
 - Source Image: C:/artfiles/Pix4D Projects/2019_06_17_WLLF_Whitehall
 - 2019_06_17_WLLF Whitehall
 - Overlap overlay
 - 2019_06_17_WLLF Whitehall
 - Matches overlay

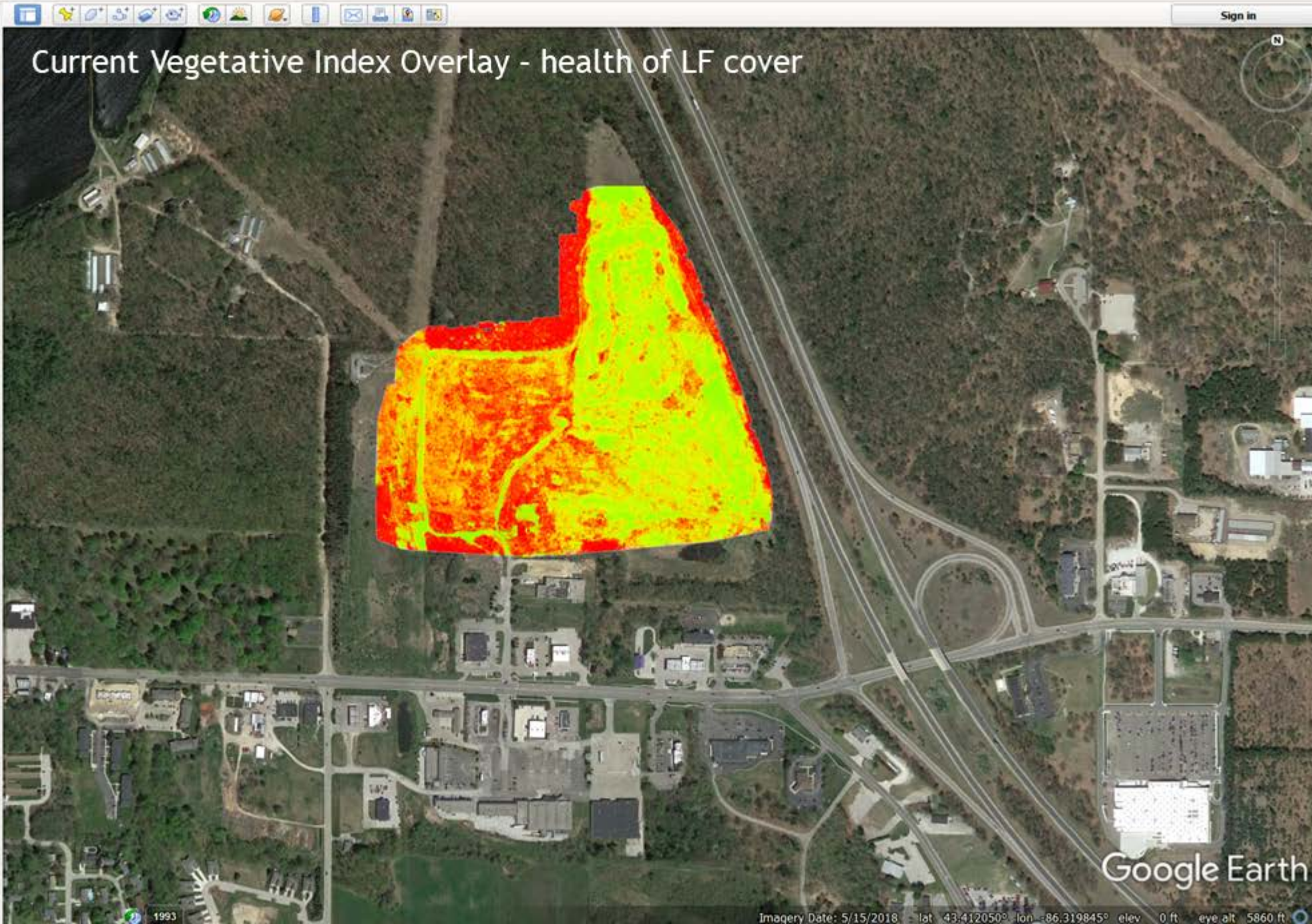
Photo layout - GeoSetter (free)



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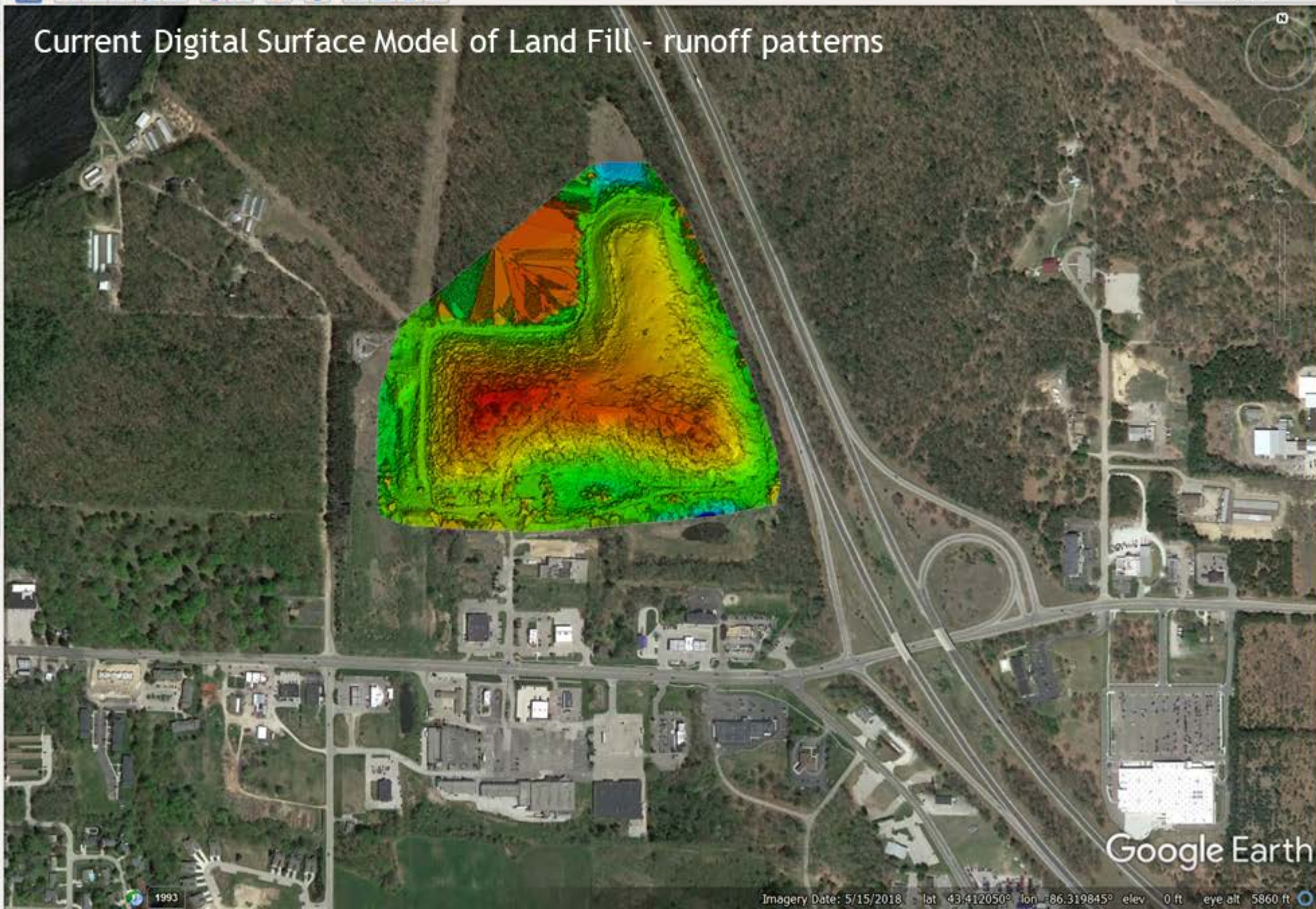




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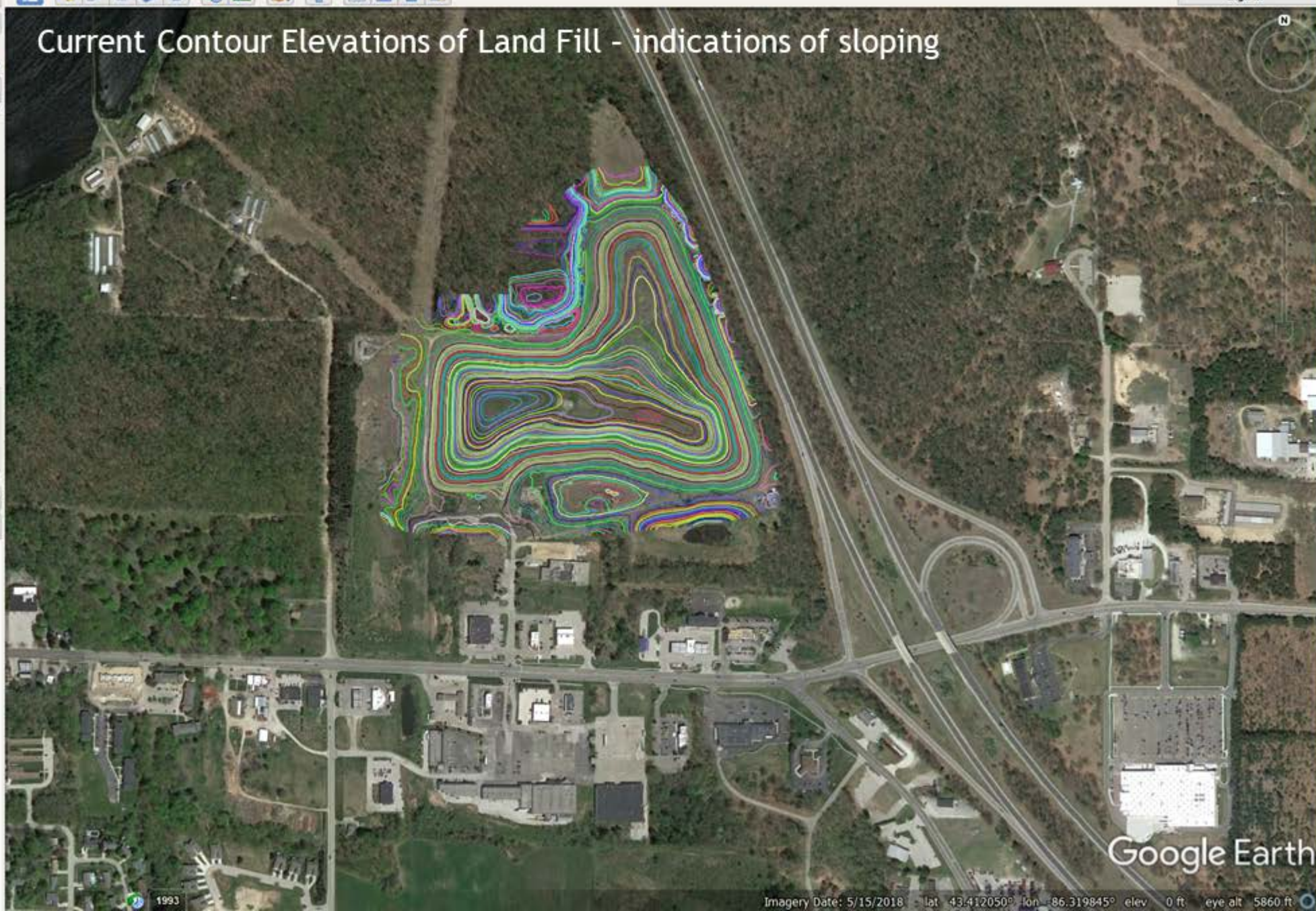
Current Digital Surface Model of Land Fill - runoff patterns



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Current Contour Elevations of Land Fill - indications of sloping



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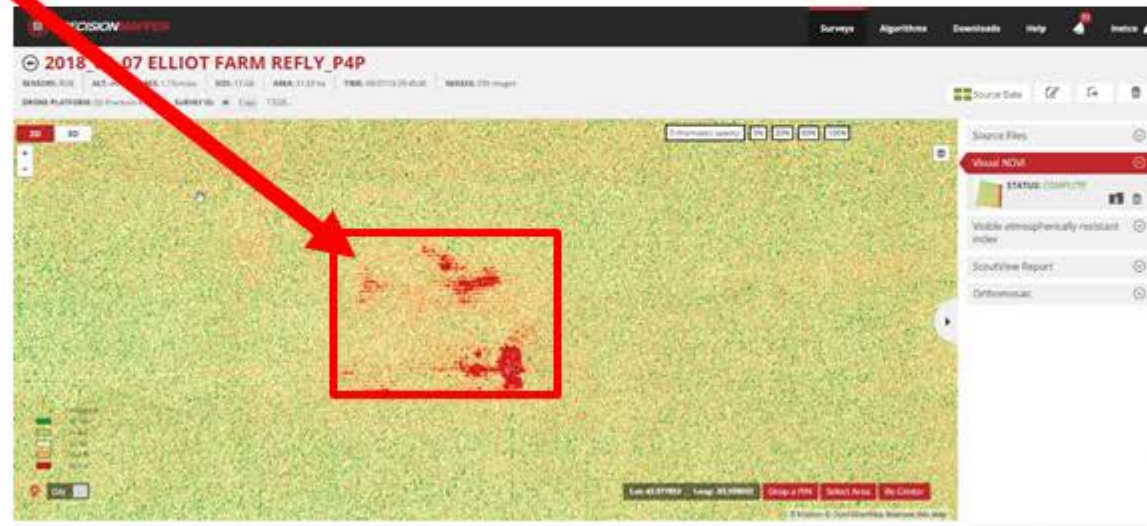
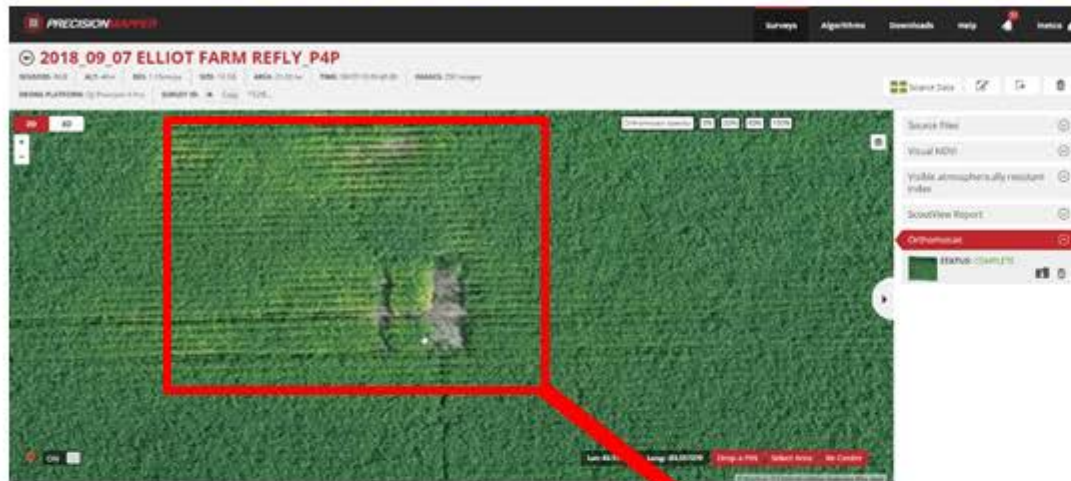
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3D representation of Drone Imagery Products



What can be done with drones that takes only pictures, enhanced by post-processing?

Remediation Verification



What can be done with drones that takes only pictures, enhanced by post-processing?

3D MODELS





LIMITATIONS

UNTIL YOU SPREAD YOUR WINGS,
YOU'LL HAVE NO IDEA HOW FAR YOU CAN WALK.

Lessons Learned in EGLE UAS Drone Program



Lessons Learned in EGLE UAS Drone Program



Incidents and Crashes

Interesting Curveballs

To Blue or Not to Blue

XII. FAA Field Documentation - EGLE UAS Incident Response Plan

DEQ Pilot in Command Incident Planning v3 12/20/2018

Levels: Green-Minor, Yellow-Major, Red-Catastrophic

Definitions:

MPT = Mission Planning Template TTC= TAPS TEAM Coordinator (AO)

TTDR = TAPS TEAM Division Representative (varies) EM = Emergency Manager (IE)

Level: Green - Minor

Minor –

- I. Reported in >> Pilot Log Notes, brought to TTC and TTDR attn.
- II. Corrective Actions taken >> update preflight checklist

Minor Incident Examples:

Prop damage on takeoff or landing
Minor equipment damage - scuffing
Undetermined flying errors that results in Safe Recovery and Landing
Public or Law Enforcement Inquiry on Mission site with DEQ-PIC

Level: Yellow-Major

Major

I. Reported in >> Pilot Log Notes and brought to attention of TTC, TTDR, and MPT supervisor (signed off) attention within 24 hours, (e.g. email description). EM and Executive Office will be notified of the incident through the TTC of any costs to repair equipment. EM will be notified if the TTC feels the situation warrants.

II. Corrective Actions Taken >> DEQ Drone specific Flights Halted until Investigation and Diagnosis resolves issue to DEQ-PIC, TTC, MPT supervisor (signed off). Checklist update and Retesting must be done before any new DEQ drone specific flights are made (email and note to TTC, TTDR, MPT Supervisor (signed off))

Major Incident Examples Are:

Equipment damage needing servicing (motors, IMU)
Undetermined flying errors that results in Crash and Recovery
Public/Law Enforcement Drone inquiry to DEQ Front Office (Notify EM of this issue)
Any type of Injury to personnel below FAA/NTSB Thresholds to PIC (Notify division safety liaison)

Level: Red-Catastrophic

Catastrophic – EXE/FAA/NTSB Needs Notification

I. Reported ASAP >> TTC, TTDR, MPT Supervisor, DEQ I.C.
Reported in Pilots Log and meeting held with DEQ I.C.
DEQ I.C. submits FAA and NTSB reports within timeframe (10d)

II. Corrective Actions Taken:

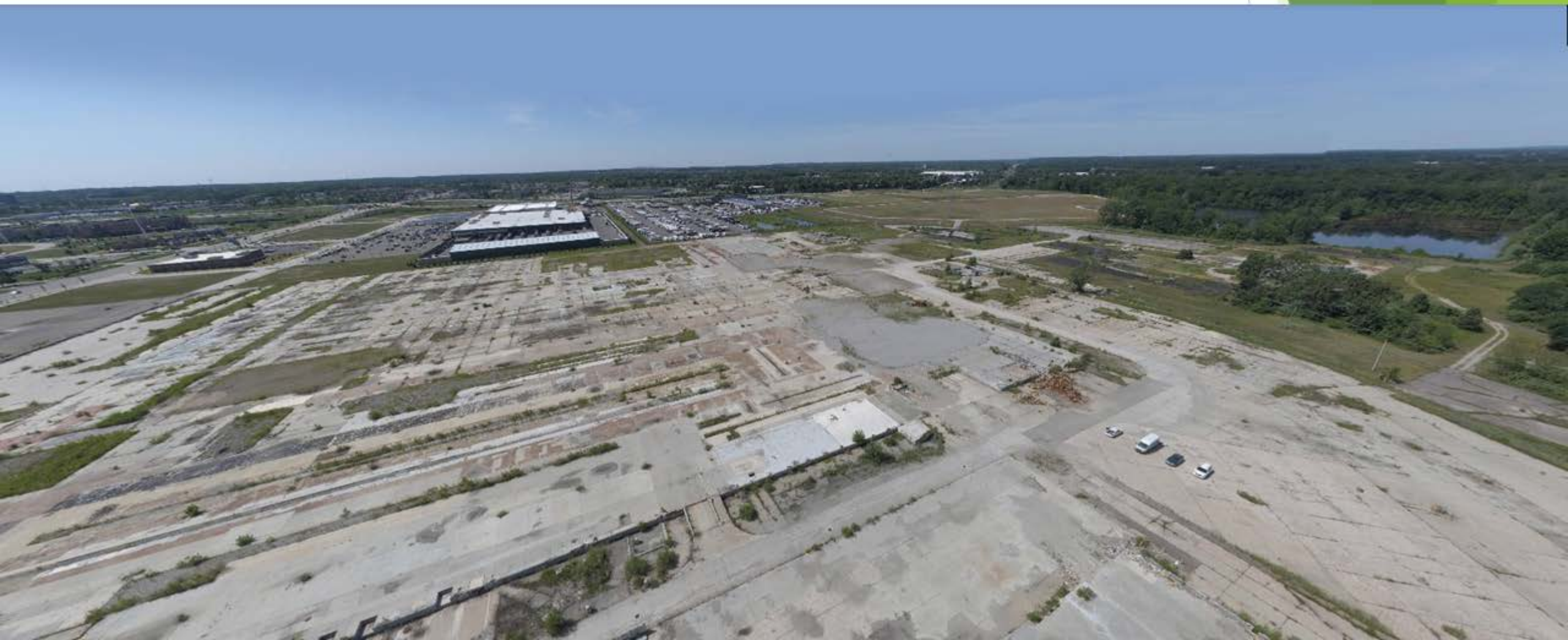
ALL DEQ Pilots grounded until Investigation and Diagnosis resolves issues to FAA, NTSB, and DEQ I.C. satisfaction.

Catastrophic Incident Examples:

Drone is Lost – unrecovered (need to sticker/label all DEQ Drones)
Drone is crashed – extensive damage to equipment/ total loss.
Drone causes Injury to PIC or property above FAA/NTSB thresholds, or any injury to any bystander.
Public /Law Enforcement makes legal inquiry against DEQ Mission

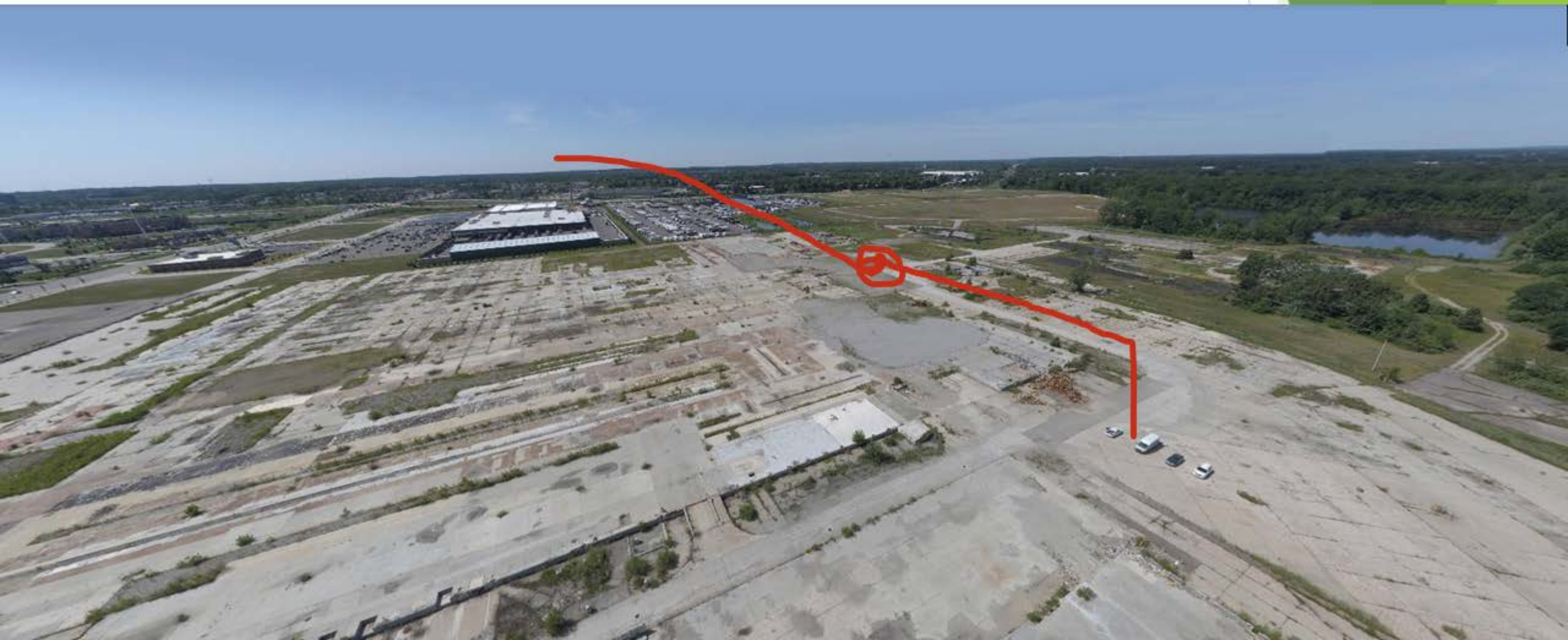
Incidences and After Actions Taken

First Fly-Away (returned safely) - August 2017 Phantom 4 Pro



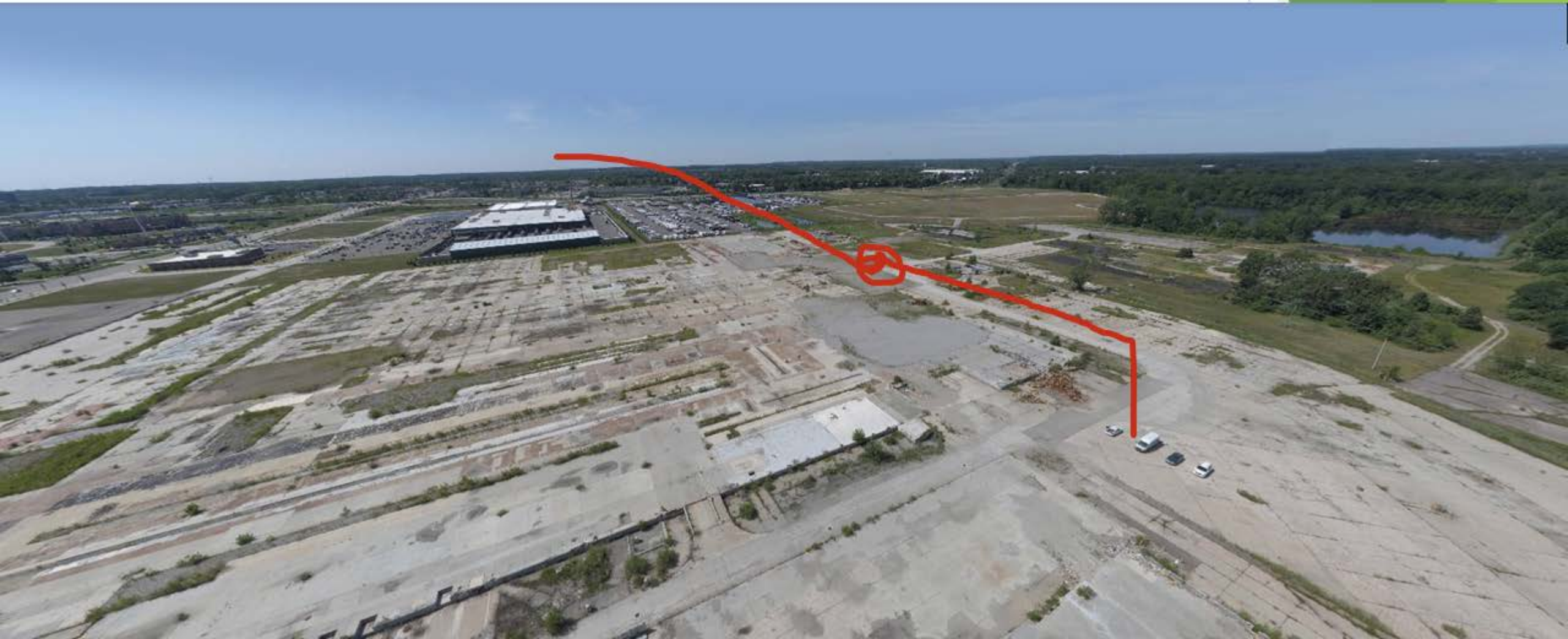
Incidences and After Actions Taken

First Fly-Away (returned safely) - August 2017 Phantom 4 Pro



Incidences and After Actions Taken

First Fly-Away (returned safely) - August 2017 Phantom 4 Pro
*After Action: Proper procedure for stopping automated flight,
and proper Return to Home put in Mission Planning Template*



Incidences and After Actions Taken

First Crash Dec 2018 - M210 was loitering to bring down battery level to “storage capacity”, due to firmware issue, the Drone invoked self RTH and hit a tree on the way up. DJI replaced drone and camera.



DJI Matrice 210 RTK V2 -
Quadcopter - Wi-Fi

\$11,125.80



DJI Zenmuse XT2 Radiometric,
640, 19mm, 9HZ

\$11,638.65 (€10,769.50)

Incidences and After Actions Taken

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<https://coptrz.com> > The Coptrz Blog

NEWS FLASH: DJI Matrice 200 Series Firmware Update - Coptrz

Fixed an **issue** where the **battery** level was not correct, the **battery** update will also calibrate the **battery** level. Be sure to update all of your **batteries** to ...



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Incidences and After Actions Taken

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DJI replaced drone and camera.

After Action: no loitering needed as batteries are self discharging...no loitering under trees

<https://coptrz.com> > The Coptrz Blog

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Incidences and After Actions Taken

Second Crash July 2020 - M2Pro Sanford Dam picture flight



Incidences and After Actions Taken

Second Crash July 2020 - M2Pro Sanford Dam picture flight...



Incidences and After Actions Taken

Second Crash July 2020 - M2Pro Sanford Dam picture flight... Drone Struck a limb on a reverse camera shot. Instead of landing on the sand, pilot tried to bring it back pressing RTH. In flight, arm collapsed in and Drone landed hard from 30 ft.



Incidences and After Actions Taken

Second Crash July 2020 - M2Pro Sanford Dam picture flight... Drone Struck a limb on a reverse camera shot. Instead of landing on the sand, pilot tried to bring it back pressing RTH. In flight, arm collapsed in and Drone landed hard from 30 ft. **DJI repair serviced - \$400**

*After Action: If a drone hits something, land as soon as possible, do not fly it home
Don't count on collision avoidance, fly safe at all times.*



Incidences and After Actions Taken

Most Famous Incident August 2020

EAGLE takes down EGLE Drone conducting a shoreline assessment over Lake Michigan

Incidences and After Actions Taken

Most Famous Incident August 2020

EAGLE takes done EGLE Drone conducting a shoreline assessment over Lake Michigan



Incidences and After Actions Taken

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The New York Times

Bald Eagle Sends Government Drone Into Lake Michigan

A Michigan state environmental agency, which is abbreviated E.G.L.E., lost a \$950 drone in the aerial battle.



Incidences and After Actions Taken

Most Famous Incident August 2020

EAGLE takes down EGLE Drone conducting a shoreline assessment over Lake Michigan

After Action: Painted “eyes” on all Phantom 4 Adv Drones, Look around for birds of prey, instituted evasive maneuvers (up/over) if approached on attack line

Review “find my drone” procedures - “last ping” location



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My “15 minutes of fame” was not all I thought it would be...

The New York Times

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Monthly Fit4Service and Pilot Active Status invoked in 2020 Policy Update



Monthly Fit4Service and Pilot Active Status invoked in 2020 Policy Update

Additional incidents during Fit4Service:

2021 Parrot Anafi - Broken Prop during F4S flight

After Action: Inspect Parrot props for strength at motor...rubber band props when in case (don't flop around)

2020 Spark hit indoor warehouse wall - During Monthly Practice - Atti mode (no gps) drifted

After Action: Pay attention! Collision Avoidance did not save Drone - Pilot replaced Drone (\$250)

2020 Phantom 3 Advanced hit indoor trailer -During Monthly Practice- Atti mode (no gps) drifted

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Monthly Fit4Service and Pilot Active Status invoked in 2020 Policy Update

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“The master has failed more times than the beginner has even tried.”

— Stephen McCranie



Interesting Curve Balls in the EGLE Drone Program

EGLE Drone Program - Policy is changing faster than we can update it

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ANYBODY
Using a
Drone
In Michigan

***** 259.322.new THIS NEW SECTION IS EFFECTIVE APRIL 4, 2017 *****

259.322.new Operation of unmanned aircraft system; harassment, violation of order, or invasion of privacy prohibited; definition; individual registered as sex offender.

Sec. 22. (1) A person shall not knowingly and intentionally operate an unmanned aircraft system to subject an individual to harassment. As used in this subsection, "harassment" means that term as defined in section 411h or 411i of the Michigan penal code, 1931 PA 328, MCL 750.411h and 750.411i.

(2) A person shall not knowingly and intentionally operate an unmanned aircraft system within a distance that, if the person were to do so personally rather than through remote operation of an unmanned aircraft, would be a violation of a restraining order or other judicial order.

(3) A person shall not knowingly and intentionally operate an unmanned aircraft system to violate section 539j of the Michigan penal code, 1931 PA 328, MCL 750.539j, or to otherwise capture photographs, video, or audio recordings of an individual in a manner that would invade the individual's reasonable expectation of privacy.

(4) An individual who is required to register as a sex offender under the sex offenders registration act, 1994 PA 295, MCL 28.721 to 28.736, shall not operate an unmanned aircraft system to knowingly and intentionally follow, contact, or capture images of another individual, if the individual's sentence in a criminal case would prohibit the individual from following, contacting, or capturing the image of the other individual.

History: 2016, Act 436, Eff. Apr. 4, 2017.

Interesting Curve Balls in the EGLE Drone Program

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Is it “surveillance”?

Did it cross the line as “invasion of privacy”? Was there an expectation of privacy?

Is citizen drone imagery of other private property legal ?

Can EGLE be FOIA'd for other peoples submitted drone pictures of private property violations?

Was there potential for imminent risk?

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AMBITION

THE JOURNEY OF A THOUSAND MILES SOMETIMES ENDS VERY, VERY BADLY.

To Blue or Not to Blue



To Blue or Not to Blue

1. In EGLE - All imagery is subject to FOIA release...its all public
If your agency UAS imagery is public - China could just FOIA you for it
2. In EGLE - Security Risk is mitigated...
All Agencies can fly drones WITHOUT AN INTERNET CONNECTION
3. What is available freely on the Internet (ESRI World Imagery, Google Earth) in terms of resolution is vast
Is the imagery you are collecting a threat to national security, or is it already publicly available on the web?
(cognizant of PPI, faces, situations)....see 2 above.
4. Any Bad Actor (terrorist, communist sympathizer) can go to Best Buy, or Amazon, purchase a non-blue Drone, fly it legally, and take imagery to send back to China, Russia, via email, if they so chose.
Why would they need to intercept your agencies imagery when they could collect it themselves?

The State of Michigan pays Contractors to Image the entire State of Michigan



MiSAIL Program Services

2021-2024

Click the links for more information:

Vendor Name	Ortho Imagery	Lidar	Oblique Imagery	Third Party	Contract #	Description
Atlantic	x	x			210000000218	Aerial ortho imagery and lidar acquisition through MiSAIL annual spring flights
Eutro				x	210000001076	Third Party aerial ortho imagery service through Hexagon
Kucera			x		210000000656	Oblique imagery acquisition and viewing service through Geospan
Nearmap			x		210000001311	Oblique imagery acquisition and viewing service through Nearmap
				x	210000001310	Third Party aerial ortho imagery acquisition and viewing service through Nearmap
Sanborn			x		210000001075	Oblique imagery acquisition and viewing service through Sanborn
Woolpert			x		210000000657	Oblique imagery acquisition and viewing service through Earthview
				x	210000001139	Third Party Satellite ortho imagery acquisition and viewing service through Planet

[MiDEAL](#) https://www.michigan.gov/dtmb/0,5552,7-358-82550_85753---,00.html

DTMB Procurement <https://www.michigan.gov/dtmb/0,5552,7-358-82550---,00.html>

*Each vendor may have additional services available that can be purchased through these contracts.

The State of Michigan pays Contractors to Image the entire State of Michigan



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[Contact Us](#) [Login](#)

[GET A QUOTE](#)

Click the links for more information:

Vendor Name	Ortho Imagery	Lidar
Atlantic	x	x
Eutro		
Kucera		
Nearmap		
Sanborn		
Woolpert		

[MiDEAL](#) <https://www.michigan.gov>

[DTMB Procurement](#) <https://www.dtmb.com>

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ABOUT OUR COVERAGE

We regularly capture and publish imagery covering 90% of the Australian population — 118 urban areas encompassing more than 130,100 unique square kilometres annually, and growing. Our coverage map shows both existing and planned coverage. Keep up to date with our coverage updates by subscribing to our newsletter.

How often do we fly?

We add new content for major Australian metros frequently, subject to weather and other conditions. The resolution is 5.5cm-7.5cm, although we may capture areas at higher resolution in some circumstances. Take a look at our coverage map for update frequency and other information.



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China does not need your Agency's UAS Imagery - it can freely buy coverage from a vendor

5. Private Satellite imagery is far superior to any UAS imagery your agency will take, and for sale to those willing to pay.



Ukraine crisis: Satellite imagery ...
asia.nikkei.com



Verifying Images of the War in Ukraine ...
nytimes.com



Russia launches full-scale invasion of ...
usatoday.com



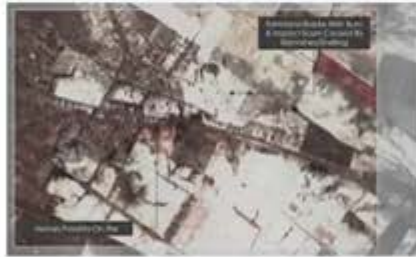
Ukraine war; in pictures | The Independent
independent.co.uk



Satellite imagery shows Russian attack ...
cnbc.com



Verifying Images of the War in Ukraine ...
nytimes.com



Russia-Ukraine war: Satellite imagery ...
hindustantimes.com



Ukraine crisis: Satellite data firm ...
bbc.com

Latest Satellite Images Show Massive Russian Build-Up Near Ukraine

New satellite images collected by Maxar over the past 48 hours show a massive build-up of Russian troops in Belarus, Crimea, and western Russia.

World | Reported by Vishnu Som, Edited by Abhimanyu Kulkarni | Updated: February 15, 2022 11:50 am IST

TRENDING



France's Emmanuel Macron Wins Second Term, Defeats Far-Right Leader



Amid Break-up Rumours, Sidharth And Kiara Share Cryptic Posts



University Sacks Professor For Alleged Offensive Remark Against Lord Ram



Satellite image ©2022 Maxar Technologies

NY Times, USA Today, CNBC, BBC, etc.....

6. If you think Private Satellite imagery is good, imagine how good
(Chinese and Russian) Military Satellite Imagery is. *Your UAS imagery is not needed.*

Top Secret

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The Security Risks from using DJI (foreign) drones can be (and are) mitigated in EGLE.

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State of Michigan, Emergency Response, First Responder UAS operations should use the best, safest, aircraft available. Our Missions depend on it.

To Blue or Not to Blue -

Use the best, safest, most reliable aircraft available. Period.



DJI Inspire 2

BLUEHALO bluehalo.com | sales@bluehalo.com

BLUEHALO

Intense Eye Version 2 (IE-V2)

Intense Eye Version 2 is a 750 mm class 4 rotor Vertical Take Off and Landing (VTOL) Unmanned Aerial Vehicle (UAV) designed for commercial operations.

Features

- 750 mm Frame
- Stowable Landing Gear
- Top and Bottom Payload Mounts
- 2X Configurable Payload Power
- Built in FPV
- Option for Tethered Flight
- Existing Army Air Worthiness Certification

Applications

- Payload Development and Deployment
- Fire and Rescue Operations
- Wild Fire Monitoring
- Storm Chasing
- Education and Research
- Atmospheric Profiling
- Test Target
- Reconnaissance

Packable Design



IE-V2

Component	Feature	Specs	Unit
Air Frame	Frame	750 mm	g

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The use subpar aircraft (GPS, transmission range, motors, escs, IMU, and apps) may introduce a much greater risk to personnel, operations, and people on the ground than Foreign manufactured aircraft, at no benefit to any adversary, and to the detriment of Agency Operations



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BLUEHALO bluehalo.com | sales@bluehalo.com

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AO IMHO-Stay away from Pixhawk-Cube based Flight Controllers....flight safety is compromised !

<https://www.aerosystemswest.com/product-page/blue-c...>

Cubepilot The Blue Cube H7 - Pixhawk 2.1 - Aero Systems ...

Blue Cube H7 Specifications ; Frequency, 400MHz ; I/O PWM Voltage, 3.3V/5V ; RAM, 1M ; Flash, 2M ; Weight, 31.8g.

RAM: 1M

Processor: STM32H753

\$600.00 · In stock

Flash: 2M

Weight: 31.8g

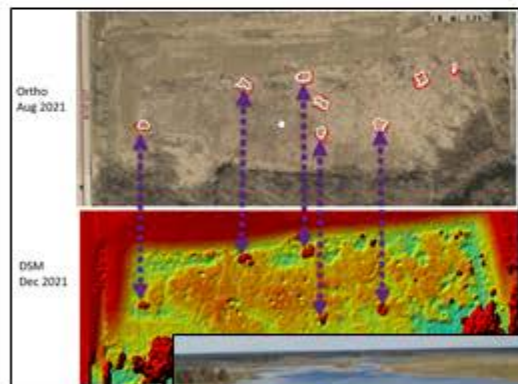




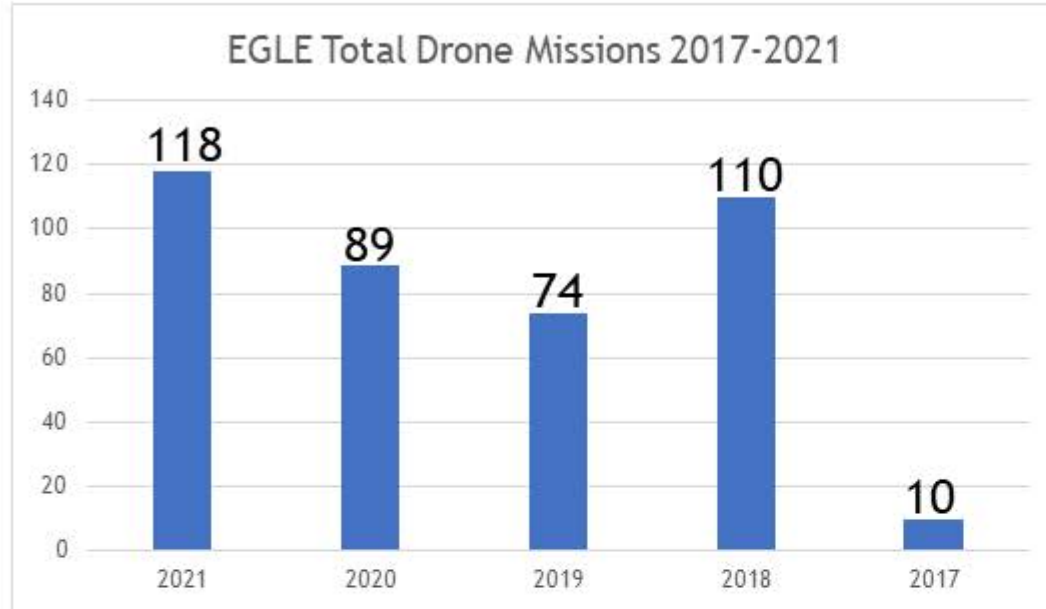
FORESIGHT

THOSE WHO SAY IT CANNOT BE DONE
SHOULD NOT INTERRUPT THOSE BUSY PROVING THEM RIGHT.

EGLE Drone Program Metrics

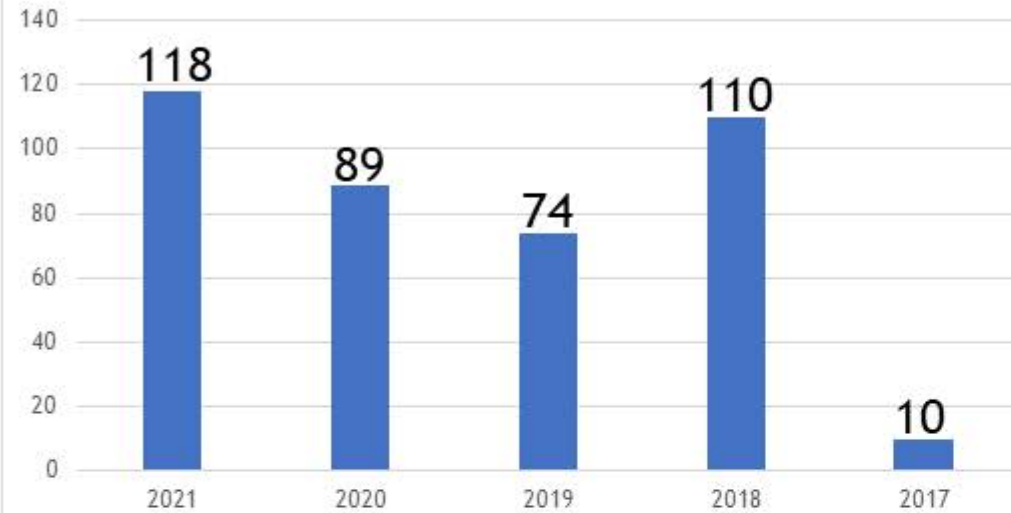


Aerial Drone Use in EGLE is growing steady as opportunities/adoption increases

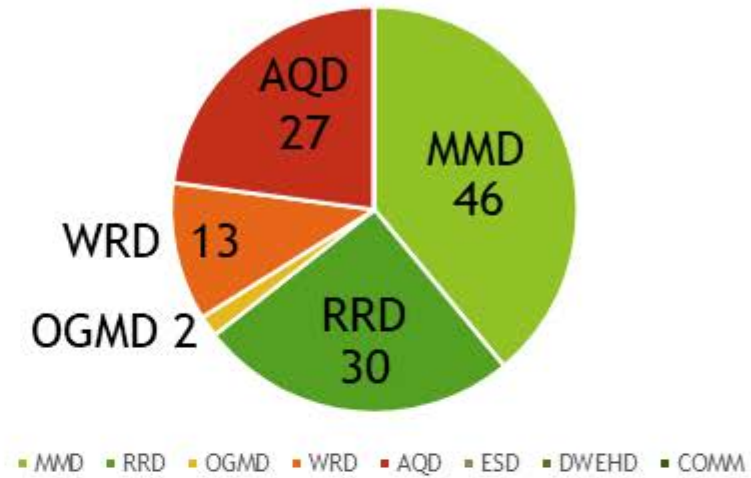


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EGLE Total Drone Missions 2017-2021



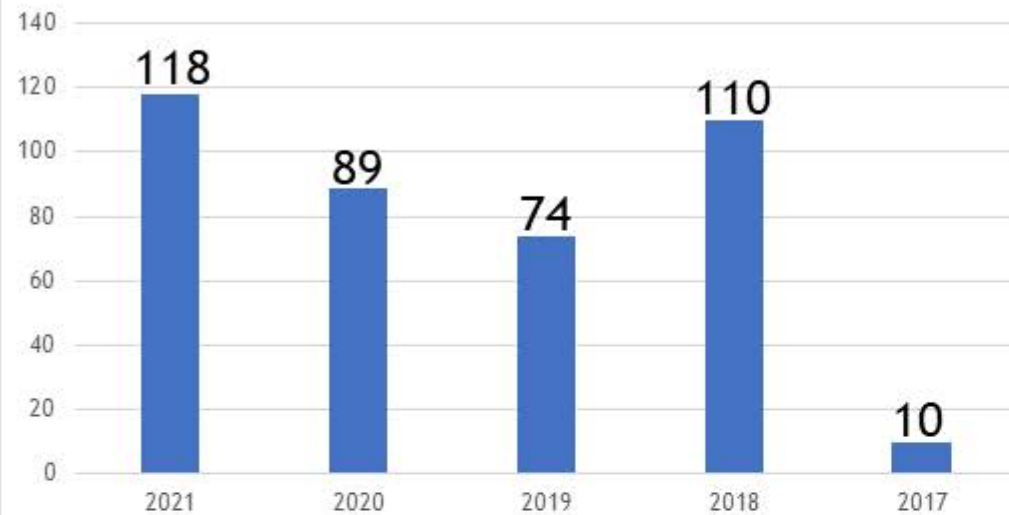
EGLE 2021 Drone Missions by Division



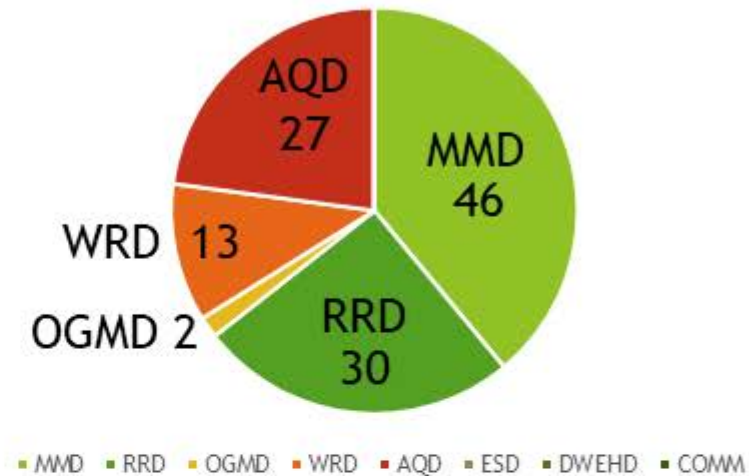
118 Missions in 2021

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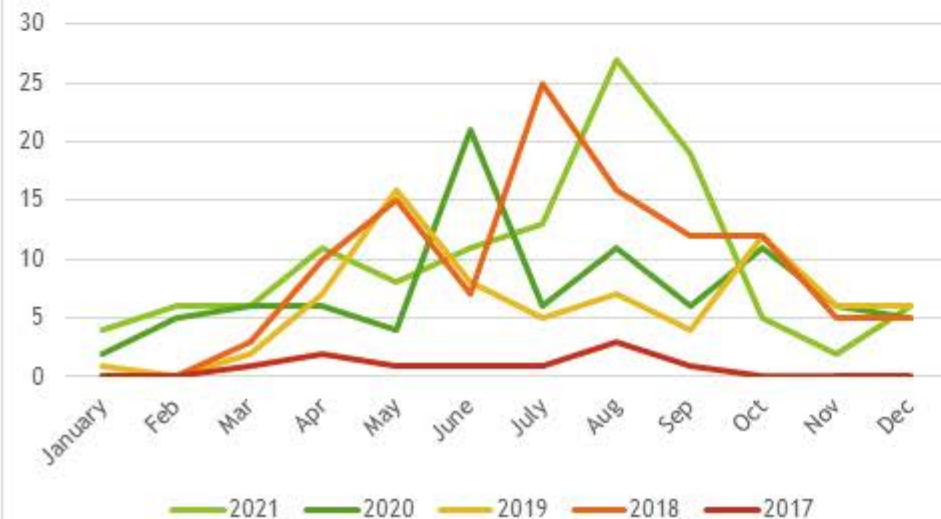


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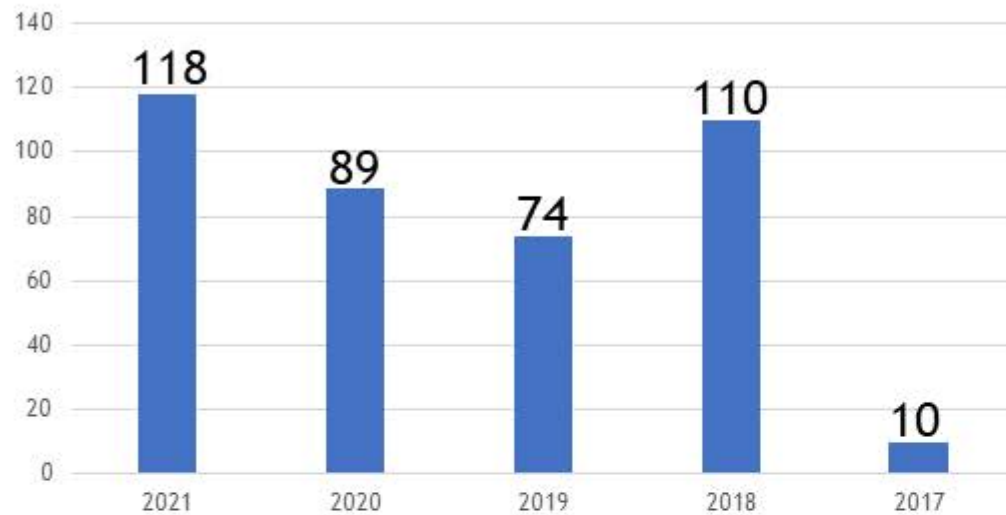
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Monthly EGLE Drone Use 2017-2021

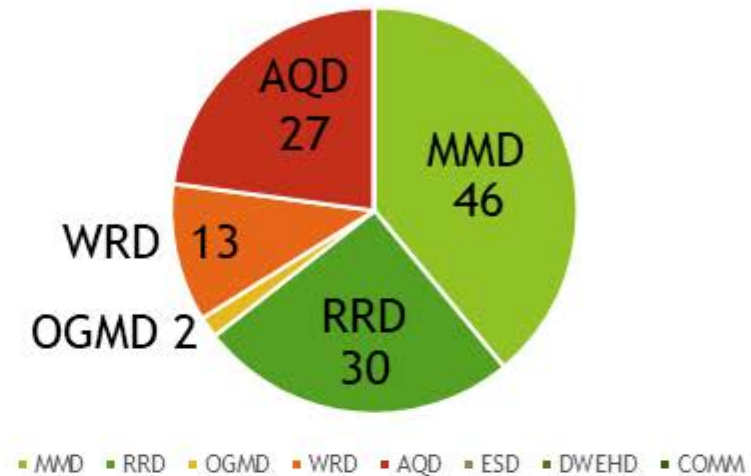


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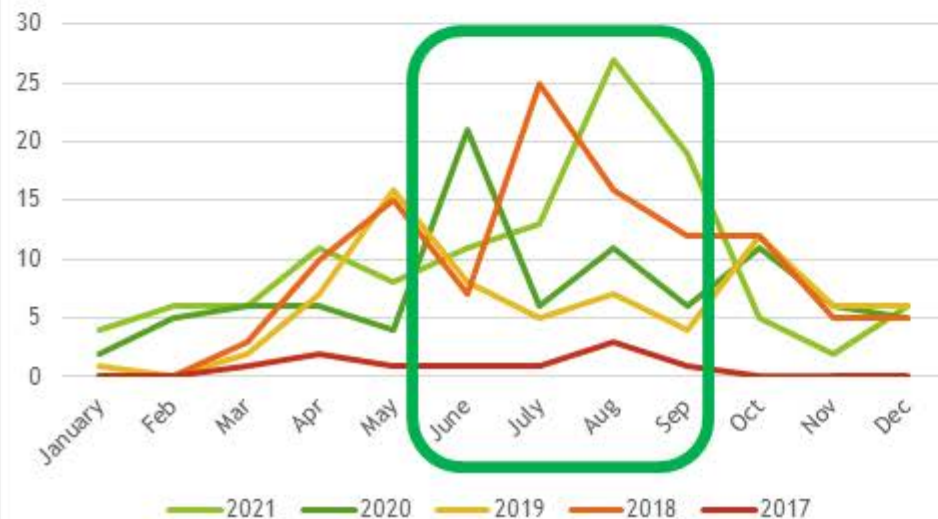


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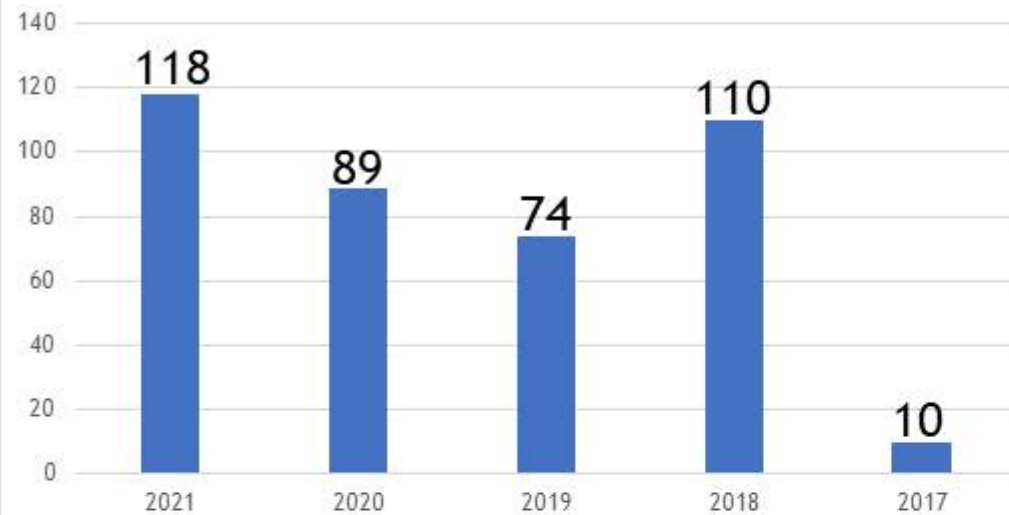
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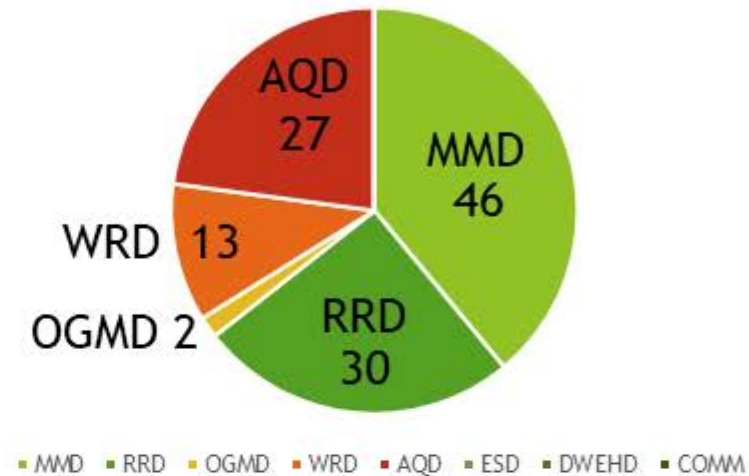


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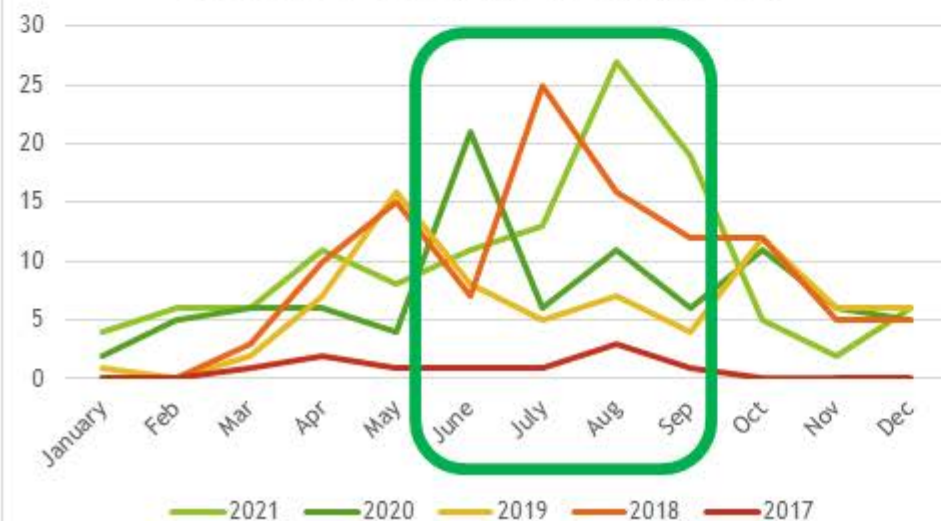


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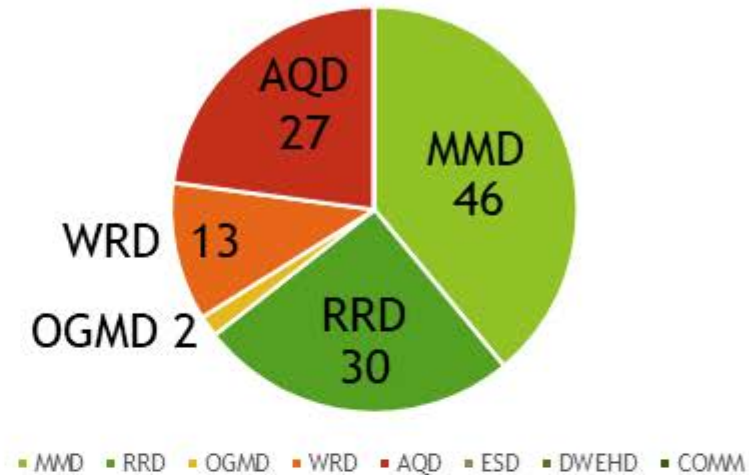


2022: 24 Remote Pilots in Command
9 Staff in Training *(Supervisor/Division approved)*
33 Staff in Drone Program Total
40 Aircraft

Aerial Drone Use in EGLE is growing steady as opportunities/adoption increases

	Model	# EGLE	Max Wind
Entry Level Field Drone (4)	Spark	4	18 mph
2nd Level Field Drone (16)	Mavic Air	10	24 mph
	Parrot Anafi	6	31 mph
High End Photometry (10)	P4P	6	22 mph
	Mavic 2 Pro	1	24 mph
	Mavic 2 Enterprise	2	24 mph
	Autel Evo2 Pro	1	38 mph
Sensor / Load Carrying (7)	Inspire 2	1	22 mph
	Matrice 210	2	22 mph
	Matrice 300	3	27 mph
	Matrice 600	1	18 mph
Will Not Buy Again (3)	Yuneec Typhoon H+	1	35 mph
	Blue Halo	1	20 mph
	Splash Drone	1	18 mph

EGLE 2021 Drone Missions by Division



118 Missions in 2021

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EGLE Drone Program – the past

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Renewed: \$75,000 for FY22, FY23, FY24

This funding over the next 3 years is anticipated going towards:

Base support and supplies: Batteries, propellers, sensors (\$25,000)

New Drones for entry level and high-end applications (\$25,000)

Imagery Post-Processing in a Remote Work Environment (\$25,000)

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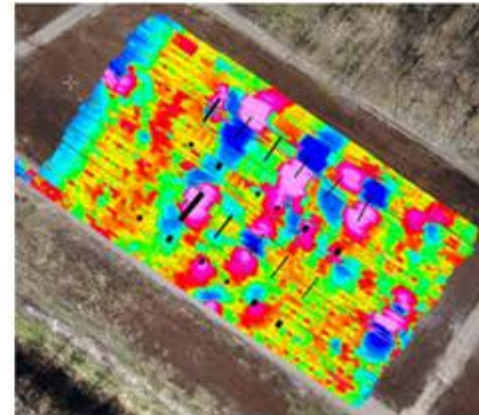
Divisions have sought out Supplemental Grants to fund Specific Projects:

WRD- EPA GLNPO, Wetland Dedicated Funds AQD-EPA MOOSE MMD-Homeland Security



[SENSYS MagDrone R3](#) magnetometer

Dataset: <https://files.ugcs.com/s/YrrTi8spE77rzBi>





Moved all Drone reporting from .xls to EGLE-TEAMS

Pilot Flight Status: Active vs Inactive

Mission Reporting

Incident Reporting

Conducted Monthly TEAMS Mtgs: Coordinator + Division Reps + Pilots

Conducted Monthly IMD Oversight Program Calls (Brad + Art)

EGLE UAS Drone Program - 2021 v2										
Consolidated Mission Reporting Table										
<div> <div>Required</div> <div>Mission is a single site (Dam/Landfill) Locations can include numerous Missions (River System, multiple sites)</div> </div>										
Option A or B or C is required										
(Lat)	EGLE Division	Mission Name- Location (City)	CPRL - Flight Date	RPIC	Option A Temp-Initials	Option B Airdata Flight Log Link	Option C Latitude	Longitude	Aircraft Model(s)	Flight log is required if a Major or Catastrophic incident occurs
										Notes
1	AOD	Rose Lake - East Lansing, MI	1/21/2021	Tom Gauthier	TG		42.790453	-84.398815	Parrot Aah Thermal	
2	WRD	Edenville Dam Tobacco Spillway	1/6/2021	Ryan Schwarb	RS		43.81650286	-84.38859708	Matrice M300	documenting contraction on dam spillway
3	WRD	Edenville Dam Tobacco Spillway	1/20/2021	Ryan Schwarb	RS		43.81650286	-84.38859708	Matrice M300	documenting contraction on dam spillway
4	WRD	Rouge River AOC project 2-4	1/27/2021	Ryan Schwarb	RS		42.294586	-83.145669	Matrice M300	Thermal plums and sheens on water identifiable from H20t camera
5	WRD	Edenville Dam Tobacco Spillway	2/3/2021	Ryan Schwarb	RS		43.81650286	-84.38859708	Matrice M300	documenting contraction on dam spillway
6	MMD	Dalton Rd Landfill, Jackson MI	2/4/2021	Art Ostaszewski		https://app.airdata.com/share/pGmJAdI	42.29625	-84.355624	M2P, Air	Issues with Mavic 2 Mapping with Smart Controller- no go, Issues with Pix40 and Mavic Air - no connect, Drone Deploy worked with the Air today.
7	MMD	Bailer Sampling via Yuneec Typhoon H+, Jackson MI	2/20/2021	Art Ostaszewski	AO		42.260184°	-84.307563°	Yuneec TyphoonH+	Successful lift and carrying. Seating stopper ball needs technique
8	MMD	Tittabawassee / Saginaw River Feb Ice Conditions pre flood, Saginaw MI	2/25/2021	Art Ostaszewski	AO	https://app.airdata.com/share/latmste	43.430799°	-84.042296°	M2P (one bad IMU) AOAir	iPhone for M2P died during 3rd flight..(Potential Remedy: Updated OS),otherwise success documenting ice conditions before the spring floods of Bank Management
9	WRD	Edenville Dam Tobacco Spillway	2/24/2021	Ryan Schwarb	RS		43.81650286	-84.38859708	Matrice M300	Areas of the TR in Segment 5,6,7 Used M2P (one bad IMU) and AO Air documenting opening of new spillway.
10	MMD	Grass Lake, Jackson County, Grass Lake, MI	3/5/2021	Art Ostaszewski	AO	https://app.airdata.com/share/kCPow5	42.257510°	-84.218218°	M2P	Shoreline seep scan, Panos... iPhone lasted ok with updated IOS
11	RRD	Comm Tower	2/4/2021	Nic Dawson	ND		43.073048°N	84.424837°W	M2PED	Flight for DTMB of communication tower in Maple Rapids.
12	MMD	Test of Hydra Sleeve - Yuneec Typhoon H Gillets Lake Jackson, MI	3/9/2021	Art Ostaszewski	AO	NA - Yuneec	42.260877°	-84.305477°	Yuneec TyphoonH+	Flight and sampling went fine...crashed on ground from 2 ft, trying to force drone tether. Pilot error- should have used 2 people. Drone fine, 3 props broken. AO covering replacement props, \$25
13	WRD	Edenville Dam	3/12/2021	Ryan Schwarb	RS		43.81650286	-84.38859708	Matrice M300	Documentation of lowered lake level and documentation of Tittabawassee spillway
14	MMD	Test of Mapping macrophytes thru water	3/17/2021	Art Ostaszewski	AO	https://app.airdata.com/share/gHjWYts	42.259858°	-84.308913°	P4v2, M2pro, AOAir	Series of Flights with P4v2, M2Pro, AOAir...Taking video and using ICE worked as well if not better and faster than trying to stitch in D2M. Flying at 320ft was better than 160, as shoreline added key points. Mapping over open water only worked with ICE (photo/video).

[illegible]

	Due Every Month											
	PILOT RESPONSIBLE INITIALIZES for Month											
Model	2020 Oct	2020 Nov	2020 Dec	2021 Jan	2021 Feb	2021 Mar	2021 Apr	2021 May	2021 June	2021 July	2021 Aug	
DJI P4P	DRB	DRB	DRB	NA	NA	DRB	DRB	DRB	AO	NA	AO	
DJI Spark Red	AO	NA	AO	AO	AO	AO	AO	AO	AO	AO	AO	
DJI Spark Blue	BPS	BPS	BPS	BPS	BPS	BPS	BPS	BPS	BPS	BPS	BPS	
DJI Phantom 3	AO	AO	AO		GG	GG	GG	GG	GG	GG		
DJI M Air RRD	MP	MP	MP	MP	MP	MP	MP	MP	MP	MP	MP	
DJI M Air OGMD	CW	CW	CW	CW	CW	CW	CW	CW	CW	CW	CW	BH
DJI P4A #2	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	
Yuneec T Hpro	AO	AO	AO	AO	AO	AO	AO	AO	AO	AO	AO	
DJI Matrice 210 A RRD	MP	MP	MP	MP	MP	MP	MP	MP	MP	MP	MP	
Splashdrone 3-RRD	PJ	PJ	PJ	PJ	PJ	PJ	PJ			PJ	MP	MP
DJI M2PED #1	BH	BH	BH	BH	BH	BH	BH	BH	BH	BH	BH	CW
DJI M600P	AO	NA	AO	AO	AO	AO	AO	MQ	MQ	MQ	AO	AO
DJI Matrice 210 B RRD	MP	MP	MP	MP	MP	MP	MP	MP	MP	MP	MP	
DJI M Air 1	AO	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	
DJI M Air #2	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	
DJI M Air #3		JC	JC		JC		JC	JC	JC			AO

2021 Highlights - Projects - Accomplishments

Moved all Drone reporting from .xls to EGLE-TEAMS

EGLE Drone Imagery Disclosure Policy

AQD >> MOOSE initiative - DR2000 Mobile Air Lab



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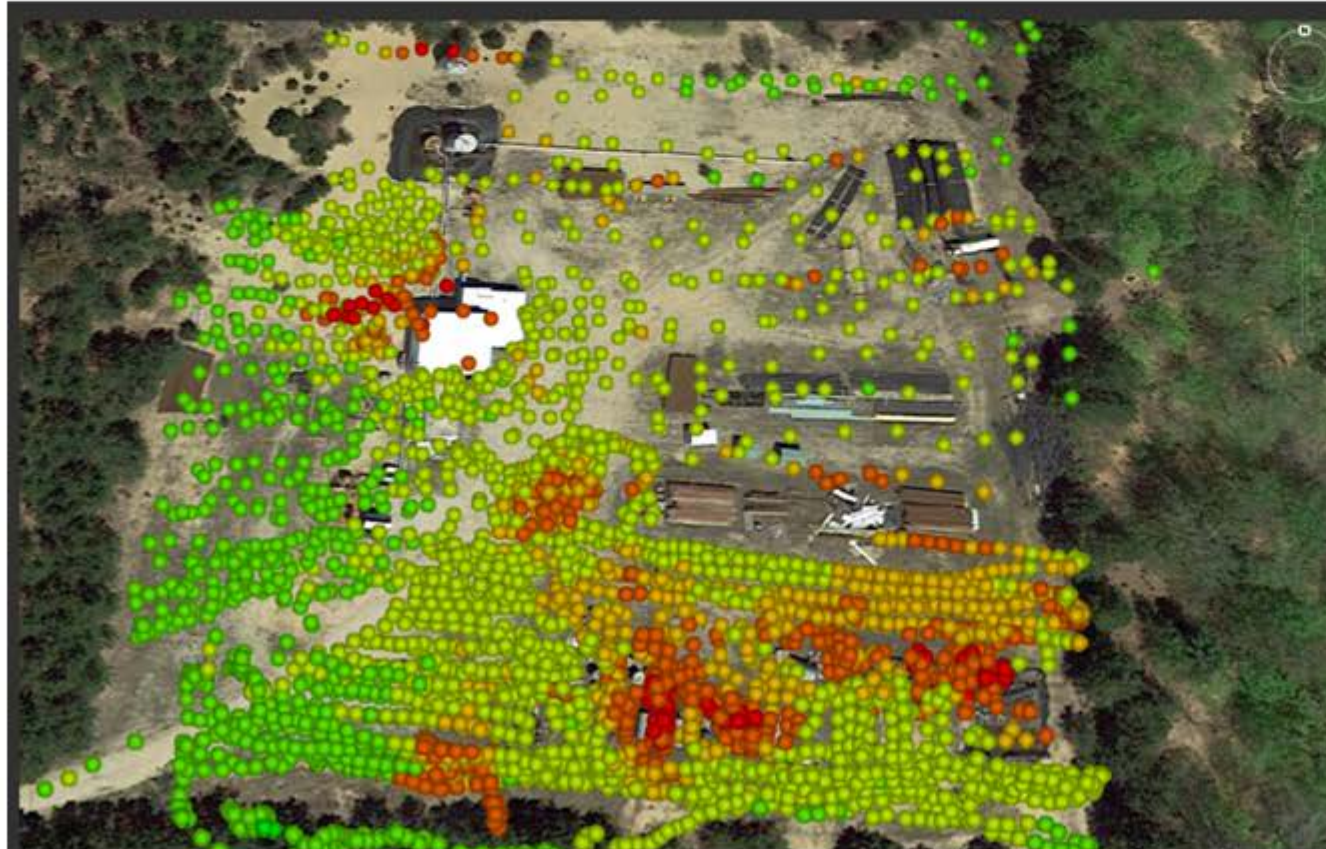
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MMD + OGMD >> Radiological Assessment-Blue Bay Project

Contamination Map.PNG Download Full screen Print Save to OneDrive



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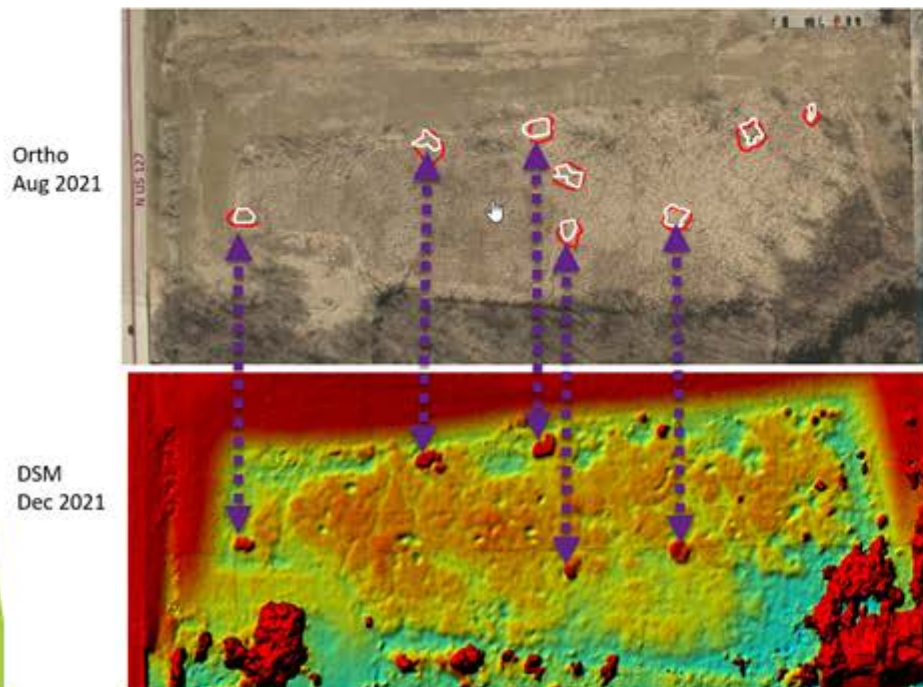
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EGLE Drone Program Outreach >> MDOT Wetland Mapping (Phragmites)

EGLE Drone Program Outreach >> Saginaw Chippewa Tribe (Wild Rice Assessment)



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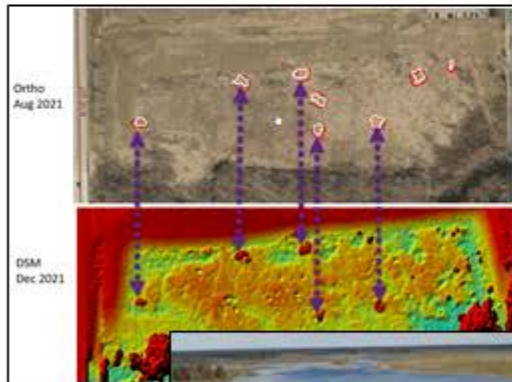
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EGLE Drone Program Outreach >> MDOT / Saginaw Chippewa Tribe



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Policy Scope, Training Protocol, Flight and Safety Procedures, Variety of Mission Applications, Number of FAA Certified Pilots, Number and Variety of Aircraft, and Field Implementation



The EGLE Drone Program is outstanding in the Field

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The EGLE Drone Program is out standing in the Field

2022 Briefing to RRT5

Drones in EGLE

Collaboration - Questions ?

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