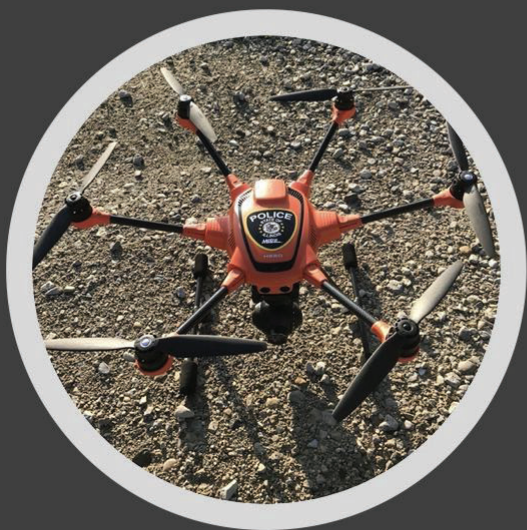


# Unmanned Aerial System Operations

**Kevin Stuehler**  
Drone Program | Metra Police





# Metra Police Department

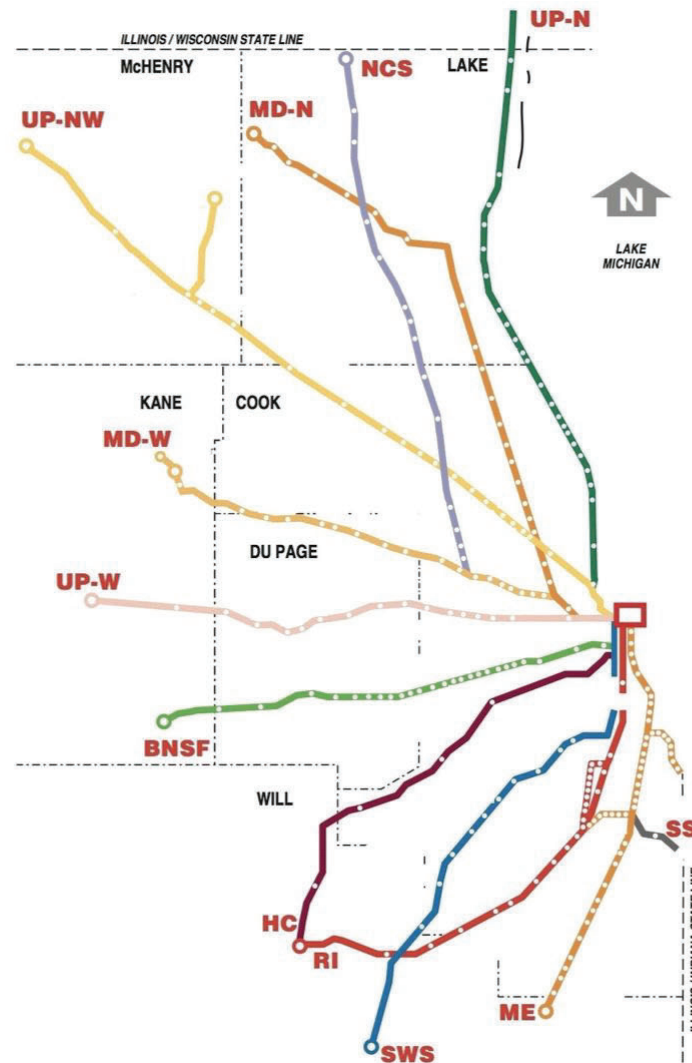
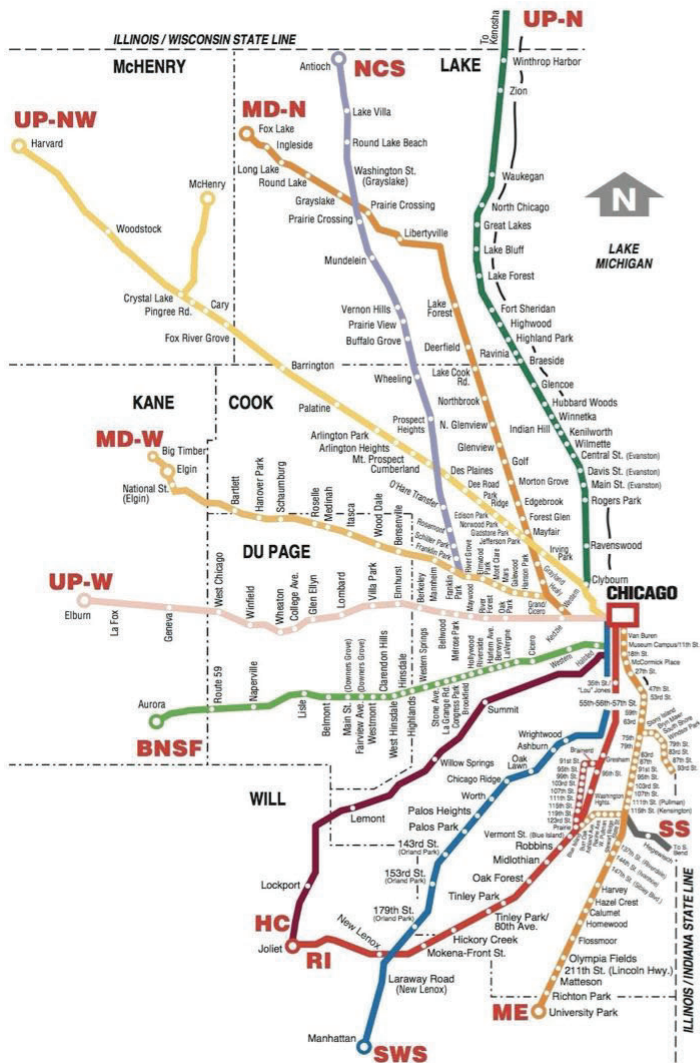
## Unmanned Aerial System (UAS) Operations



# Metra Police Department

- (Metra) State of Illinois railroad commuter transit division under the Regional Transportation Authority.
- Complete jurisdiction within our six counties.





- 11 Lines.
- 242 Stations.
- 566 Grade crossings.
- 1,155 Miles of track






# UAS Operations Overview

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- 170 UAS Mission Deployments since January 2019.
  - Including Train Strikes, Assisting Other Agencies, Search and Rescue, Crime Scene Documentation
- 207 Training Deployments since January 2019
- Currently 2 FAA Part 107 licensed UAS Operators.
- 24 hours of instructor led training on PIX4D photogrammetry software.

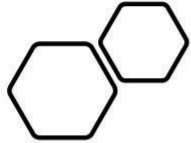




## Current Unmanned Aerial System Units

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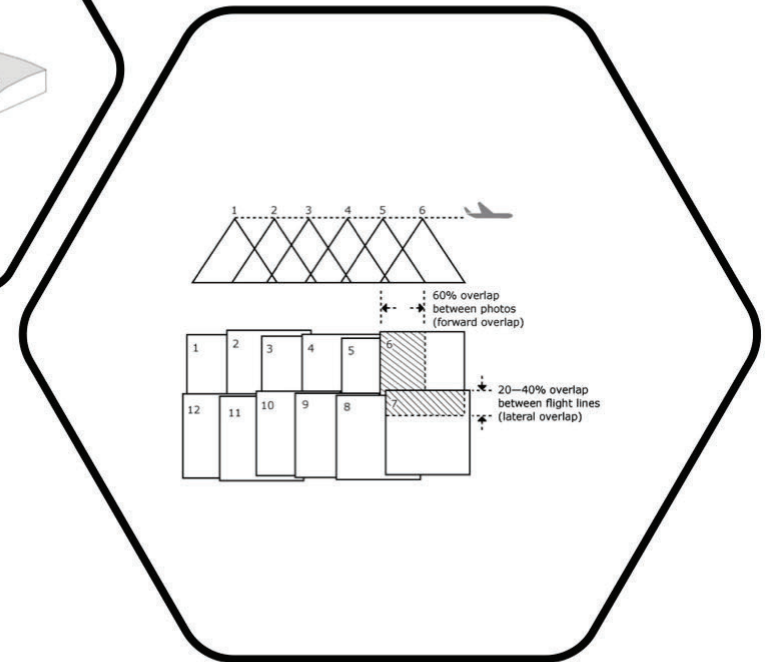
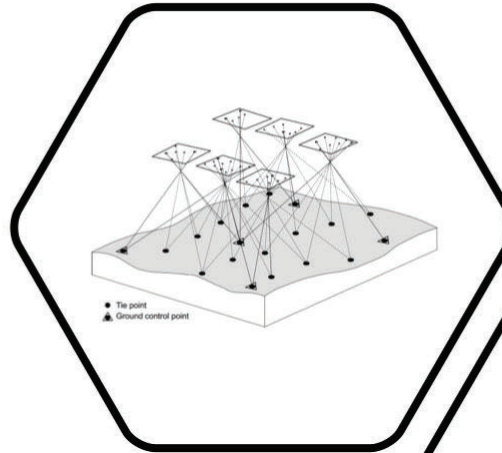
- Yuneec H520
- DJI Mavic 2 Enterprise Advance
- DJI Mavic 3 Cine



# Photogrammetry

Is the art of obtaining reliable information about physical objects through recording, measuring, and interpreting images.

Used in surveying and mapping in order to measure distances between any objects.





## Photogrammetry with PIX4D Software

- PIX4D software will take the overlapping images captured by a drone and stitch them together; thus, creating a 3D image or birds eye view scene.
- Evidence marking.
- Point of Impact.
- Final places of rest.
- 3D imaging of damage.
- Distances from any object to object.







Mission Deployments



## 2020 - Arlington Heights Train vs Vehicle

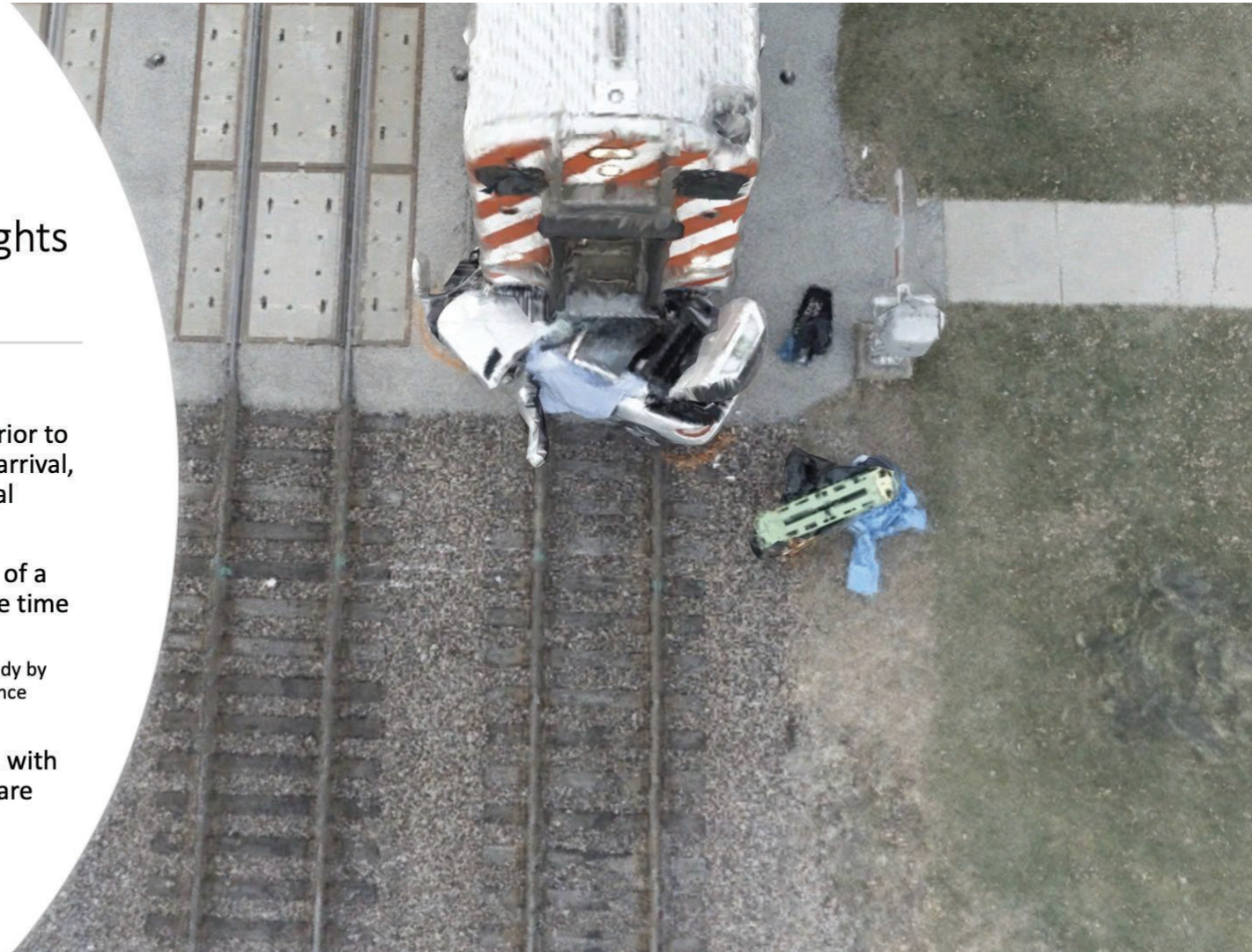
- Incident scene spanned approximately 1550 feet
- 271 images captured by MPD UAS at this scene
- Video of the scene was captured as well
  - Videos usually document the trains path and direction of travel as well as a 360° view of the scene from the sky
- Approximate UAS flight time of 25 minutes at this scene



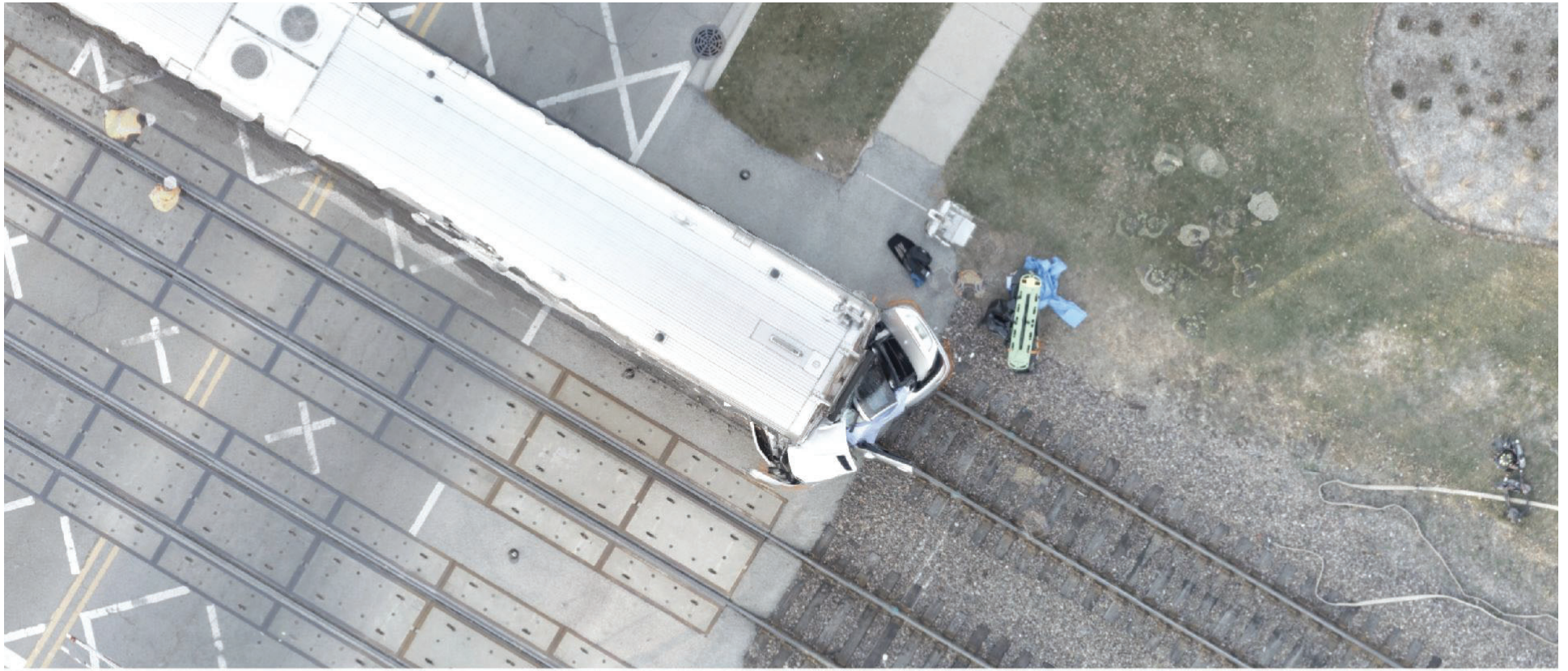


## 2020 - Arlington Heights Train vs Vehicle

- UAS mission was completed prior to the Medical Examiners Office arrival, as well as the tow trucks arrival
- The alternative to a UAS deployment would be the use of a “Total Station” with an average time frame of 2 hours
  - Time frame was taken from a study by Lake County Major Crash Assistance Team
- This scene was later recreated with PIX4D photogrammetry software







Completed PIX4D – Map Tools Software Projects





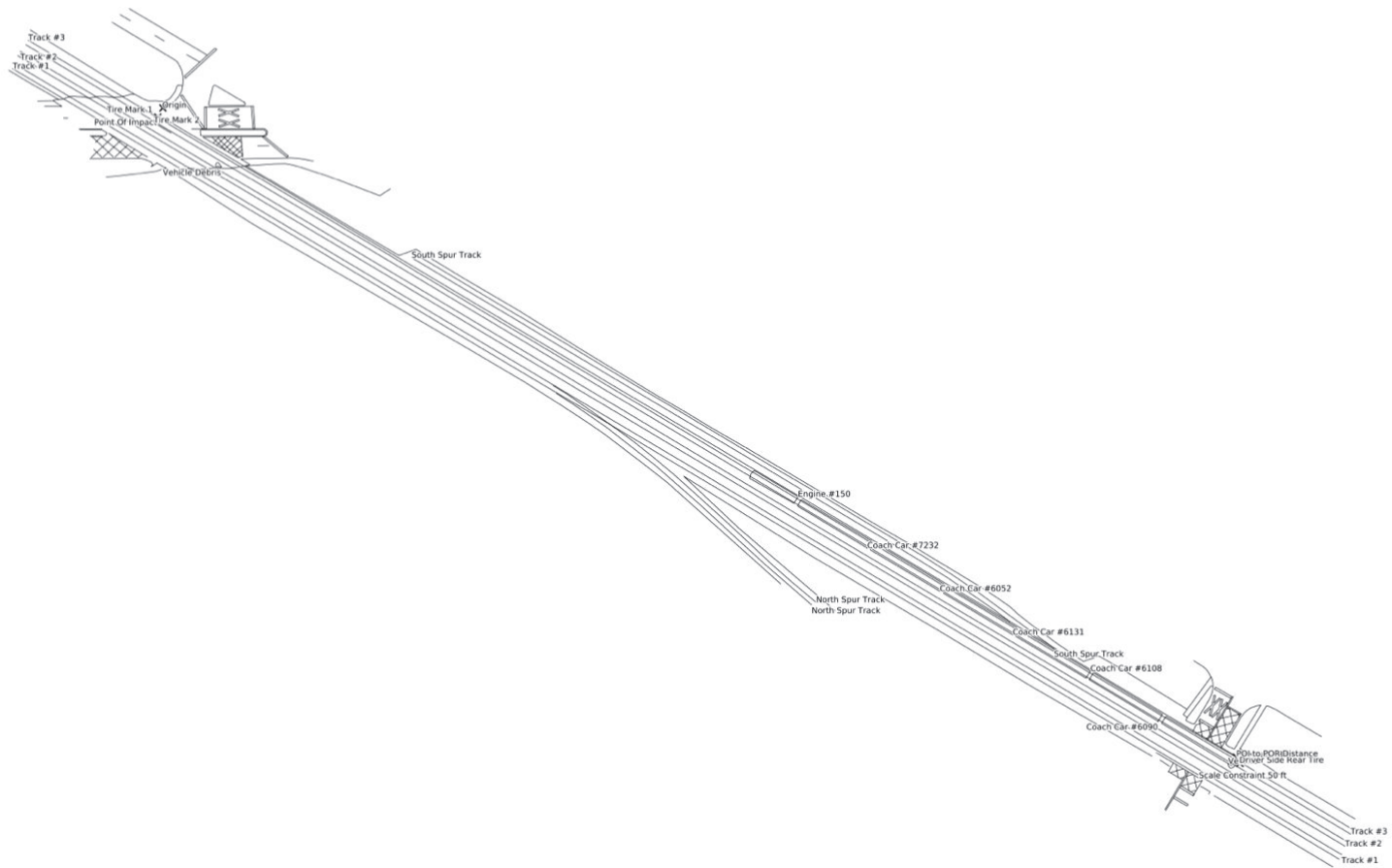






















# PIX4D Digital Animation





## Suicide By Train

- The Metra Police Department receives a number of calls throughout the year of individuals that state that they wish to take their own life, or we will receive calls from family/friends stating that a loved one has made the comment of committing suicide by way of train.
  - When this occurs, officers will respond to the area where this attempt might be made, as well as our dispatch center (Cook County Sheriff) will make an attempt to ping the caller or person wishing to take their own life's cell phone.
- With the use of drones, we have had the ability to search our property in the hopes of locating these individuals and getting them the help they need.
- Drones are a great tool to utilize in hard-to-reach areas where a vehicle cannot gain access, or an officer may struggle to search.

### Freedom from Drone Surveillance Act

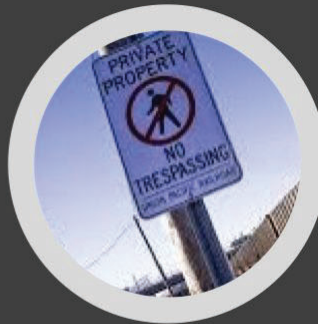
- (725 ILCS 167/15)(3) "If a law enforcement agency possesses reasonable suspicion that, under particular circumstances, swift action is needed to prevent imminent harm to life".
- (725 ILCS 167/15)(4) "If a law enforcement agency is attempting to locate a missing person, and is not also undertaking a criminal investigation".

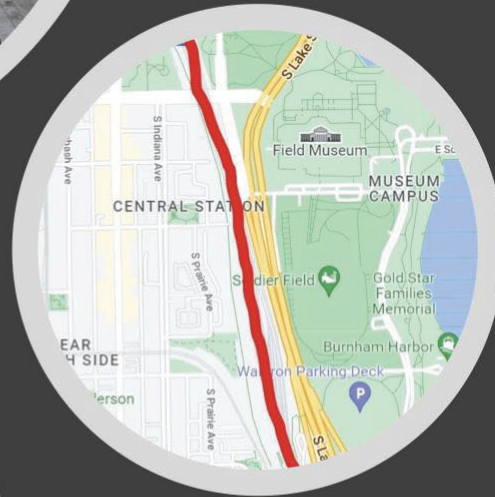


# Trespassing on Railroad Property

## Freedom from Drone Surveillance Act.

- (725 ILCS 167/10) "Prohibited use of drones" .... "a law enforcement agency may not use a drone to gather information".
  - Meaning, if we are having issues with trespassers in an area I can not pre deploy our drone and conduct surveillance even if on our property. – A warrant is required by state law.
- (725 ILCS 167/15) Exception = (Section3) "If a law enforcement agency possesses reasonable suspicion that, under particular circumstances, swift action is needed to **prevent imminent harm to life, or to forestall the imminent escape of a suspect** or the destruction of evidence".
  - A drone may be deployed once the crime of trespassing to railroad property or state supported land has occurred. Trespassing in rail yards or across a non designated crossings is dangerous and from time and time again has proven to be deadly. If someone is trespassing, they are not free to leave, a citation or arrest may be warranted by state law.
- (625 ILCS 5/18c-7503) Trespassing on railroad property.
- (720 ILCS 5/21-5) Criminal trespass to State supported land. = Metra falls under the umbrella of the Reginal Transportation Authority (State of Illinois property).





- One way the Metra Police Department has been able to prevent trespassing and help reduce the risk of a train vs pedestrian strike is by the use of our Fotokite. Fotokite is a tethered kite that is used for situational awareness and can go up 150 FT and stay there as long as it has a power source. This unit has thermal as well as standard camera capabilities. While the Federal Aviation Administration has created laws for tethered devices it does not meet the standards to be a drone.
- One location where we predominantly utilize our Fotokite is on our Metra Electric line/McCormick Place Busway. This is an area that is between Michigan Ave and Grant Park in the city of Chicago. Throughout the year the city of Chicago hosts events such as lollapalooza and coming next year Nascar. The city utilizes the bridges that cross our tracks as access points for people attending these events; however, people that try to sneak into these events will jump down from ground level and cross our tracks. This area is constantly busy with train traffic coming and going from Millennium and Van Buren station. These tracks are also utilized by NICTD (South Shore) trains from Indiana.
- Once people commit trespassing upon railroad property the officer controlling the Fotokite is able to radio a patrol unit to stop the trespasser.





Presented by,

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Special Operations Unit – UAS Division  
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