



# Environmental Crime Investigations using Drones

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Pearland Police Department  
Pearland, TX



# Introduction

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- Chief Pilot for Pearland Police Department
  - Former CFI Single, Multi-engine, Instrument Ratings
  - Chair for Gulf Coast Public Safety UAS Response Team
  - Lead Public Safety UAS Instructor for Texas A&M TEEK
  - Globally Recognized Subject Matter Expert for UAS operations for Public Safety Response
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A photograph showing police officers and a drone in front of a patrol car. The car is white with "POLICE" and "U194" visible. The scene is set at sunset, with the sun low on the horizon, creating a warm, golden glow. Two officers in the foreground are holding remote controls for a drone. Another officer is visible in the background. The drone is in the foreground, partially obscuring the car. The overall atmosphere is professional and focused on law enforcement technology.

# Topics of Discussion

1. Background
2. Environmental Crimes Investigations
3. Case Law

# Pearland Police Department UAS Team

- Established 2017
- Currently Have 5 Certified Pilots
- Have FAA Authorization to fly day or night anywhere in the greater Houston Area
  - Have the ability to gain further authorizations for statewide responses
  - Also have the authorization to fly Beyond Visual Line of Sight
- Flown over 1000 missions for public safety
- Have one of the most developed UAS programs in the nation.
- First agency in the US to obtain a Tactical Beyond Visual Line of Sight Waiver



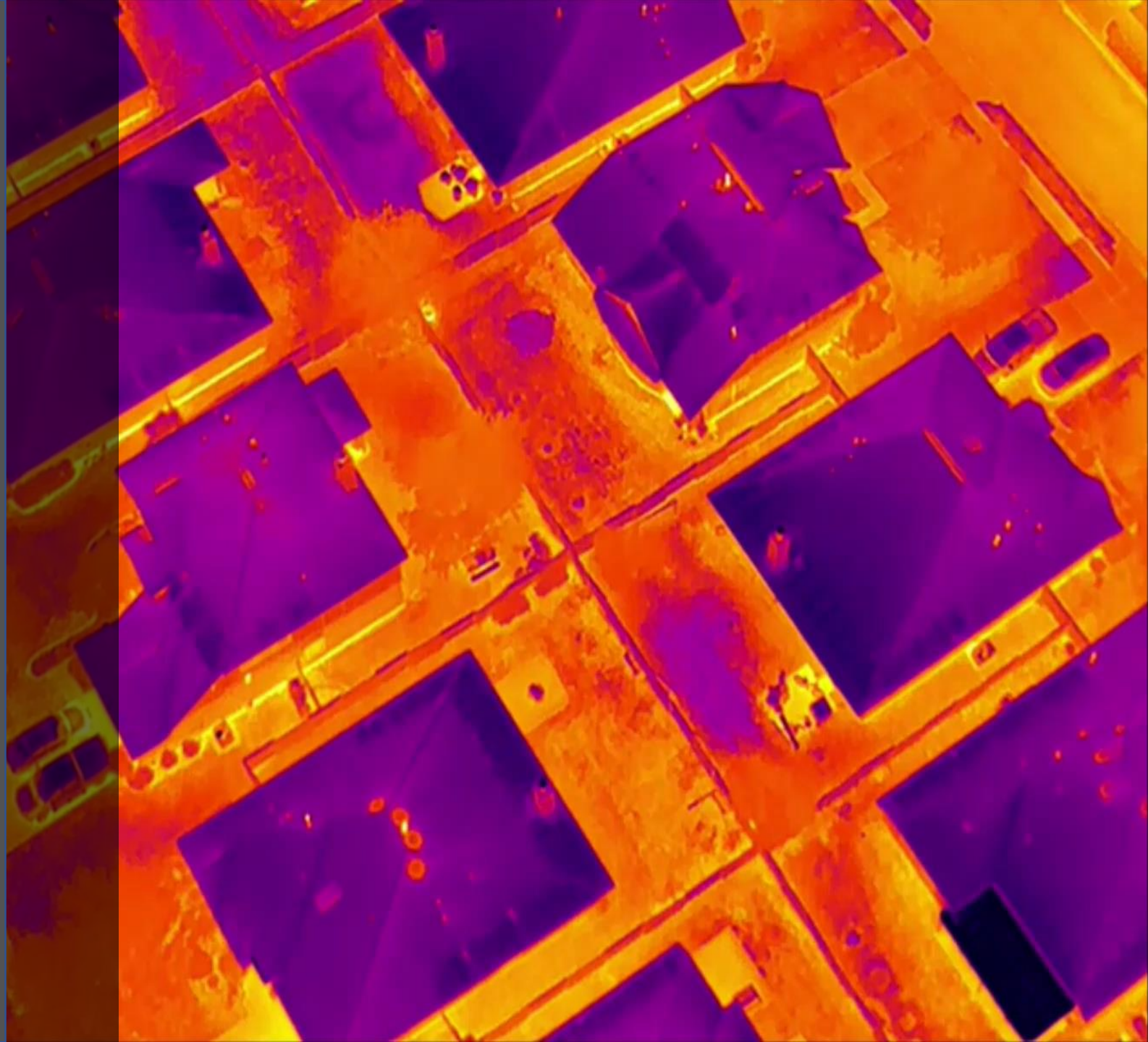




# sUAS Applications

Search for person/ Overwatch Ops:

- High risk tactical operations
- K9 deployments
- Missing persons
- SAR events
- Search for suspects



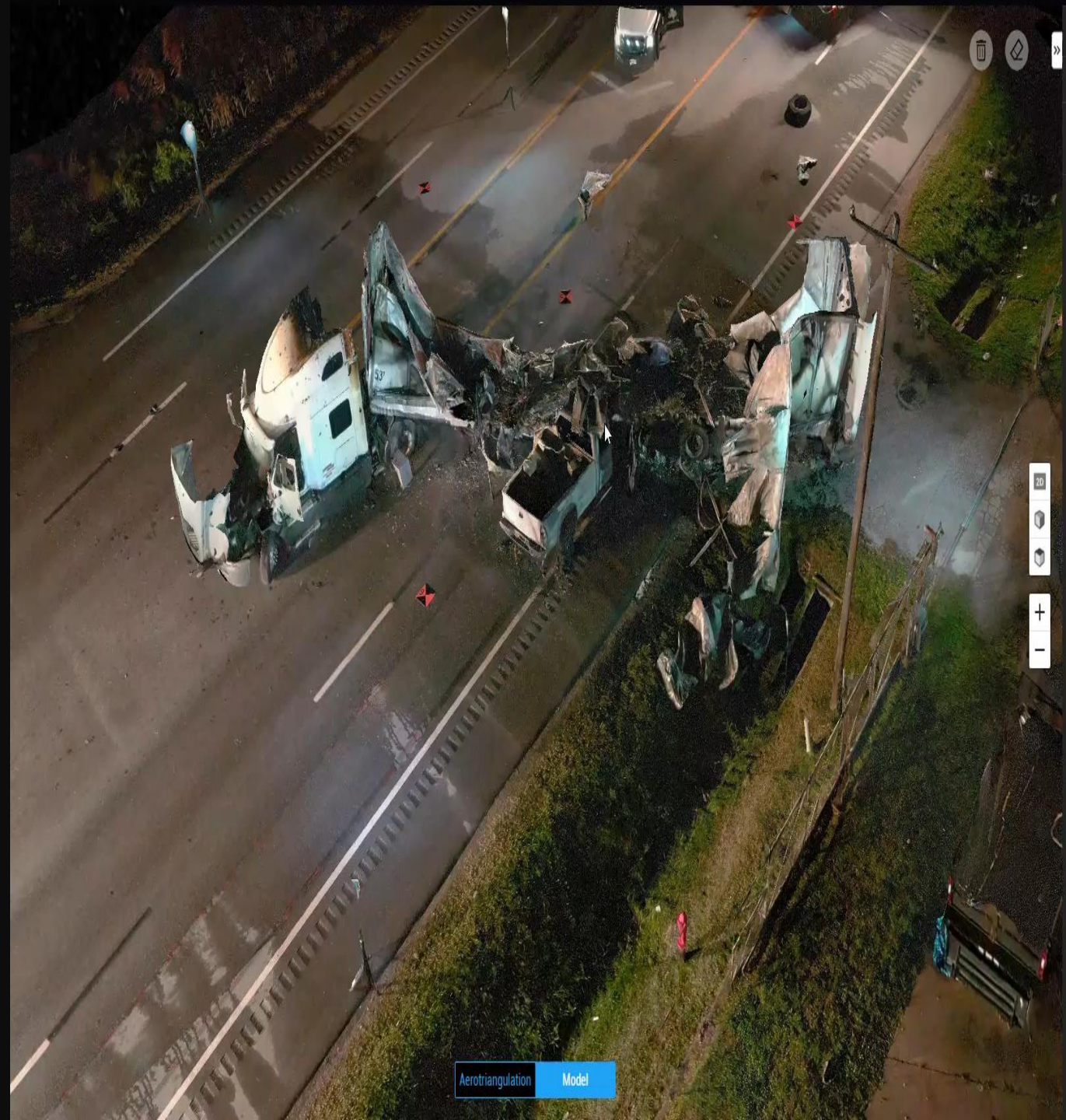


# sUAS Applications

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Evidentiary purposes:

- Aerial perspective
- Search warrants
- 3D reconstructions of the scene
- Orthomosaics of large areas





# sUAS Applications Cont.

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## Special Events:

- Crowd monitoring
  - Traffic congestion
  - Quick Reaction Force
  - Secure Live Feeds utilizing DroneSense
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A photograph showing two men in uniform operating a drone. They are wearing light-colored shirts with "SOUTHERN RESCUE FLORIDA" and "NATEE" printed on the back, and dark pants. One man is holding a remote control. A drone is flying in the air above them. In the background, there is a large white tank with a hazard diamond symbol and the word "DANGEROUS" visible. The scene is outdoors with trees and a clear sky.

# Environmental Crime Investigations





Thermal Imaging Camera  
w/ Thermometer display.  
Allows for nighttime  
operations

## Drone Mounted Sensor Array

Daytime Camera  
With Zoom and  
Gimbal. Can read a  
License Plate from  
Approx. 1000 ft away

Combustible Gas Meter  
With Oxygen, H<sub>2</sub>S, & CO

Test Papers- Airborne Acids, Bases,  
Flourine & Chemical Weapons M-8

Radiation Meter



Easy remote readings using the camera payload



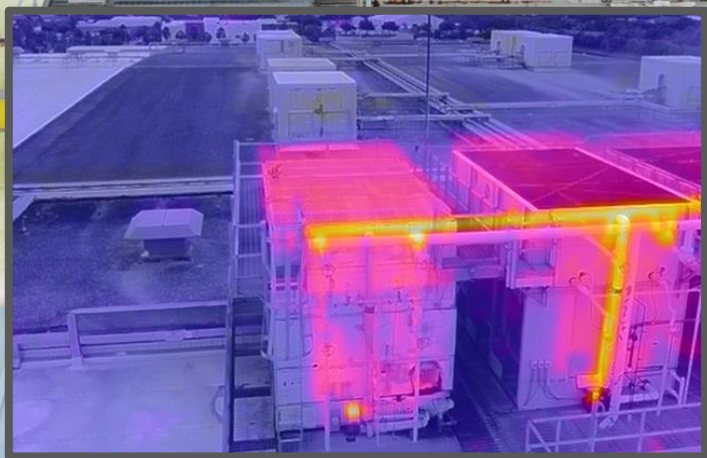






## Case Study: Anhydrous Ammonia Leak

- DJI Mavic 2 Enterprise Dual
- Used as ISR platform as well as searching for leak using the thermal camera.
- MSX feature allows pilots/command staff to see entry team and locate the leak.







Notice the cloud of Ammonia coming from the refrigeration system.







**Using long range zoom the investigator can locate leaks or areas of interest without being in the Hot Zone**



# Smoke/Plume Tracking

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- Drones can improve downwind monitoring as well, by more accurately tracking where these products are traveling to, thus decreasing time for evacuation/shelter in place decisions to be made.





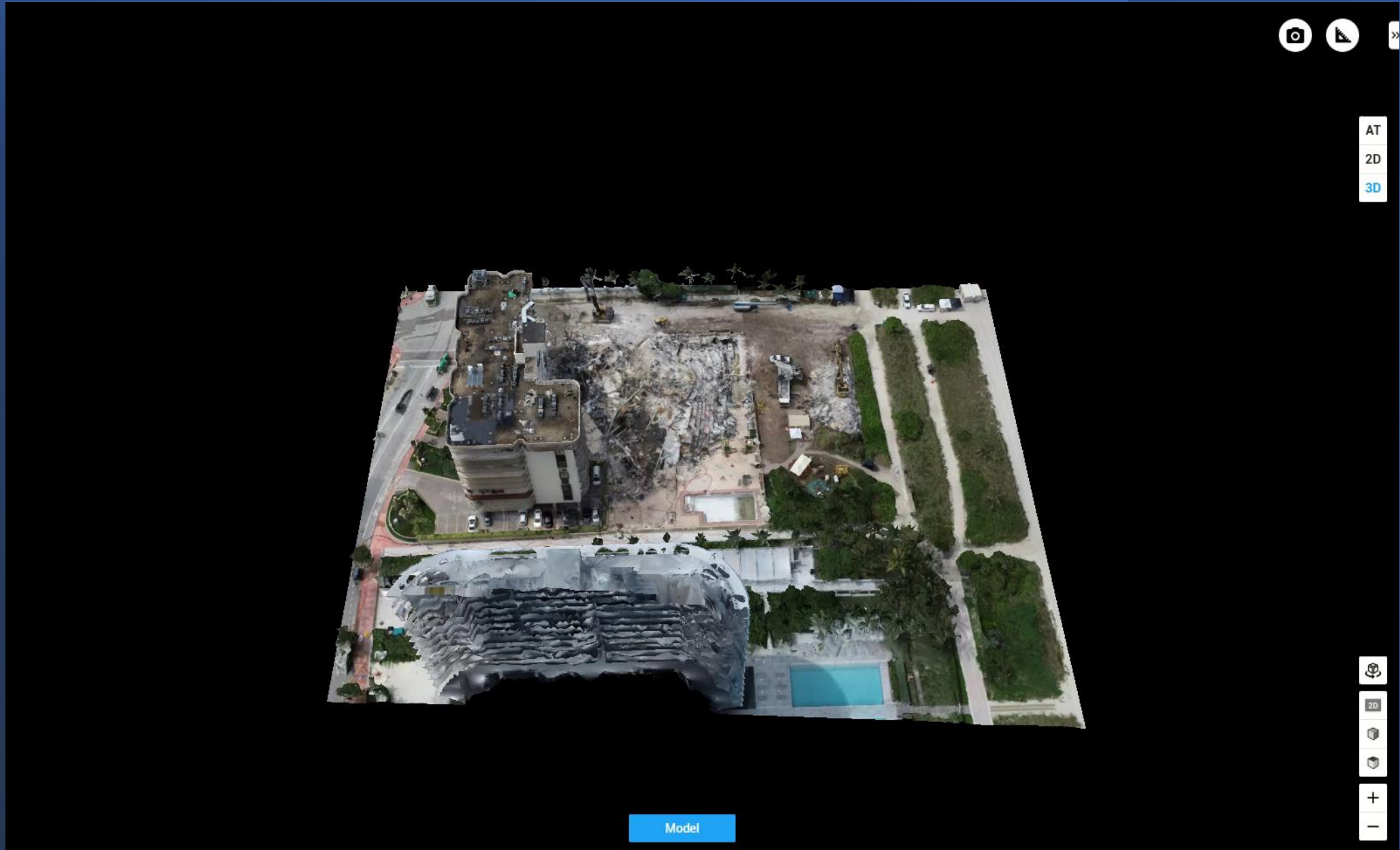


## Control and Containment

- UAS views provide intel on the best placement for control and containment.
- Thermal , Optical, LIDAR and Spectral sensors can be used to ID contamination on water and land.



# Stock Pile/ Debris Mapping





# Case Law Applicable to UAS

Piker v. FAA Administrator Huerta (2014)

Smith v. New England Aircraft Co. (1930)

Katz v. United States (1967)

California v. Ciraolo (1986)

Florida v. Riley (1989)

United States v. Causby (1946)

Dow Chemical Co v. United States (1986)

Kyllo v. United States (2001)

# FAA Administrator Huerta v. Raphael Pirker (2014)

## Background:

- October 17, 2011 Raphael Pirker remotely piloted a sUA around the University of Virginia campus in Charlottesville, VA.
- Pirker was accused of operating the sUA in a careless and reckless manner.
  - 10 feet above ground level (AGL)—up to 1,500 feet AGL.
  - Directly at people and vehicles
  - within approximately 100 feet of an active heliport.
- Fined \$10,000





# Pirker v. FAA Administrator Huerta (2014)

## **Defense Argument:**

- Pirker moved to dismiss the complaint
- the Federal Aviation Regulations (FARs), which govern the operation of “aircraft,” did not apply to respondent’s sUA.
- NTSB Dismissed the Case March 2014
- FAA Appealed

# Pirker v. FAA Administrator Huerta (2014)

## **Decision:**

- The full Board found that the statutory (49 U.S.C. § 40102(a)(6)) and regulatory definition (14 C.F.R. § 1.1) of “aircraft” are broad and clear on their face to include UAS.
  - Includes model aircraft
- “any airborne contrivance ‘now known or hereafter invented, used, or designed for navigation or for flight in the air.’”

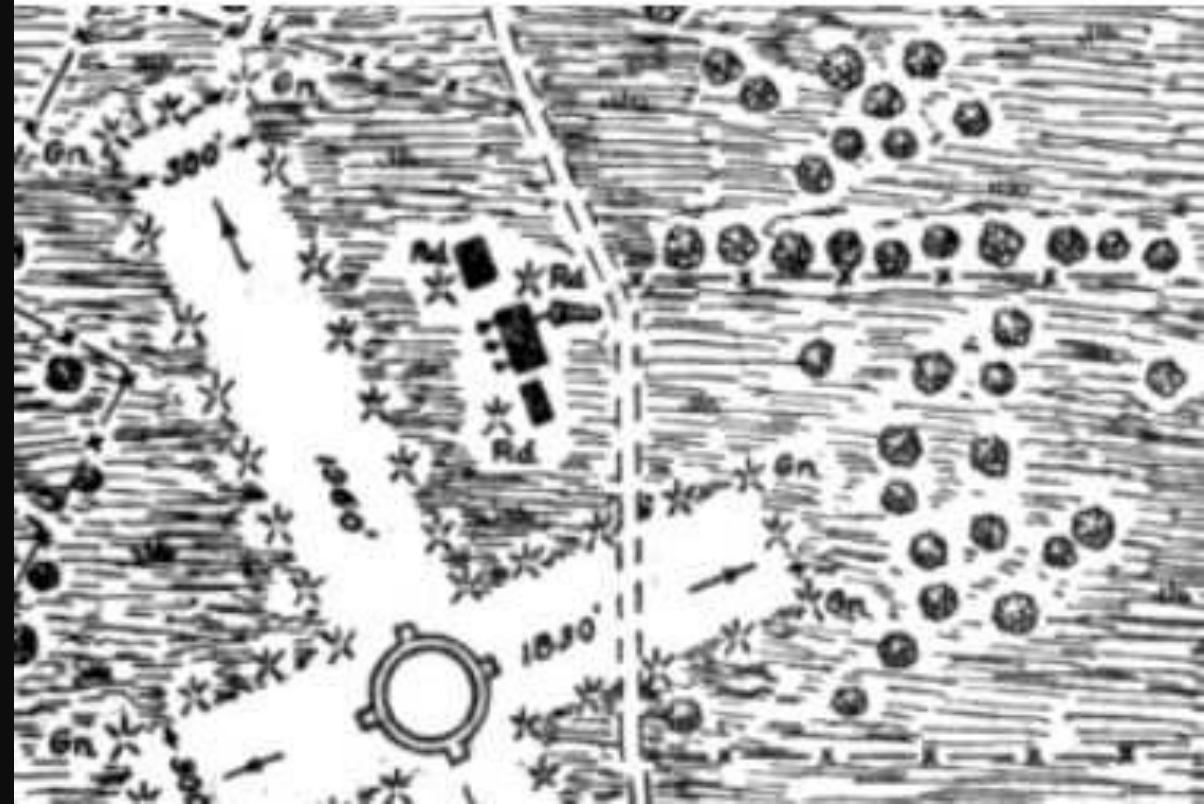


# Smith v. New England Aircraft Co. (1930)

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## Background:

- Whittall Field/ Grafton Airport, MA was built next to the estate of the Smiths.
  - Suit was filed seeking injunctive relief and damages.
  - The trial court granted judgment to the airplane owners and the airport and assessed costs against the property owners.
  - The property owners appealed.
- 



An orange horizontal bar is located in the top left corner of the slide. The background features a wooden gavel resting on a wooden block with the words "AVIATION LAW" engraved on it. The gavel is positioned vertically, with the head of the gavel at the top and the handle extending downwards. The wooden block is positioned horizontally, with the words "AVIATION LAW" engraved on its top surface. The background is a dark, blurred image of the gavel and block.

# Smith v. New England Aircraft Co. (1930)

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**Opinion:**

"For the purposes of this decision we assume that private ownership of airspace extends to all reasonable heights above the underlying land. It would be vain to treat property in airspace upon the same footing as property which can be seized, touched, occupied, handled, cultivated, built upon and utilized in -its every feature."





# United States v. Causby (1946)

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## Background:

- An airport was built 1/3 mile from the Causby's farm.
- But several years later, the military began using the airport.
- The roar and glare of the planes disturbed the Causbys' sleep and scared their Chickens to death.
- Filed a 5<sup>th</sup> Amendment Claim- "Nor shall private property be taken for public use, without just compensation."

# United States v. Causby (1946)

## **Decision:**

- The Court concluded that if found true, "every transcontinental flight would subject the operator to countless trespass suits. Common sense revolts at the idea."
- However, "if the landowner is to have full enjoyment of the land, he must have exclusive control of the immediate reaches of the enveloping atmosphere."
- Court stated that flights over the land could be considered a violation of the Takings Clause if they led to "a direct and immediate interference with the enjoyment and use of the land."



# Katz v. United States (1967)

## Background:

- used a public telephone booth to transmit wagering information from Los Angeles to Boston and Miami in violation of federal law.
- FBI placed a listening device to the top of the telephone booth and recorded Katz's end of the telephone conversations
- Katz moved to have the evidence suppressed under the Fourth Amendment
- The motion was denied.





# Katz v. United States (1967)

The background of the slide is a blurred image. On the left, a person wearing a white cap and a dark jacket is visible. On the right, a drone with a camera attached is shown in flight. The overall scene is out of focus, emphasizing the text in the foreground.

## **Opinion:**

The Government's activities in electronically listening to and recording the petitioner's words violated the privacy on which he justifiably relied while using the telephone booth and thus constituted a "search and seizure" within the meaning of the Fourth Amendment.

The courts developed a two-prong test from the Katz decision.

- 1) Whether the individual, by his [or her] conduct, has 'exhibited an actual (subjective) expectation of privacy.'
- 2) Whether the individual's subjective expectation of privacy is 'one that society is prepared to recognize as reasonable.'



# California v. Ciraolo (1986)

## Background:

- Anonymous tip that marijuana was growing in the backyard of Dante Ciraolo
- A six-foot outer fence and a ten-foot inner fence prevented ground-level observation.
- After twelve additional tips they rented a private plane which flew at an altitude of 1,000 feet over the Ciraolo home.
- Using only the naked eye, the officers identified marijuana plants and **photographed** the plants with a 35mm camera before pursuing additional aerial investigations.
- A warrant was issued, and seventy-three marijuana plants were seized.



# California v. Ciraolo (1986)

## **Defense Argument:**

- Reasonably guarded public views of his yard without going as far as to cover it
- he asserts he has not "knowingly" exposed himself to aerial views.
- Respondent argues that, because his yard was in the curtilage of his home, no governmental aerial observation is permissible under the Fourth Amendment without a warrant



# California v. Ciraolo (1986)

## Decision:

- The Supreme Court of the United States held that the Fourth Amendment was not violated by the naked-eye aerial observation of Ciraolo's backyard.
- The Court stated that Fourth Amendment protection of the home had never been extended to require law enforcement officers to shield their eyes when passing by a home on **public thoroughfares**.
- Officers observed the violation from a place they had a legal right to be and rendered activities clearly visible.

# California v. Ciraolo (1986)

## Application:

“The Court stated that Fourth Amendment protection of the home had never been extended to require law enforcement officers to shield their eyes when passing by a home on public thoroughfares. Nor did the mere fact Ciraolo had erected a 10-foot fence around his yard preclude an officer's observations from a public vantage point where he had a right to be and which rendered activities clearly visible.”



# Florida v. Riley (1989)

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## Background:

- Anonymous tip that marijuana was being grown on the respondent's property
- Investigators went to the property and determined that he could not see the contents of the greenhouse from the road.
- Rented a helicopter and flew at 400 feet and was able to see what he **thought** was marijuana with his naked eye through some missing panels in the greenhouse's ceiling.
- A warrant was issued based on these observations and Riley was charged with marijuana possession.



# Florida v. Riley (1989)

## **Defense Argument:**

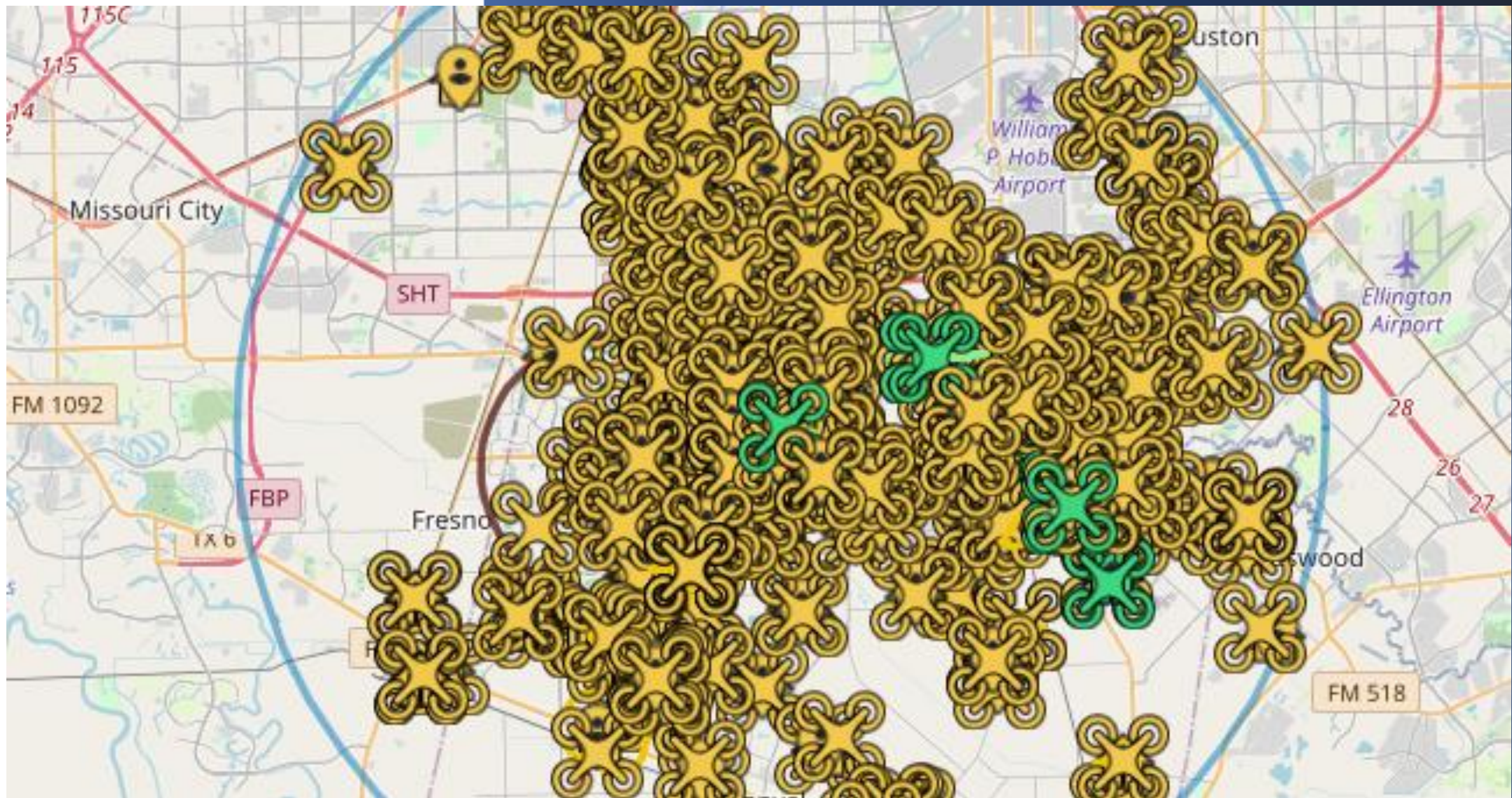
- Riley moved to suppress due to 4<sup>th</sup> Amendment claim.
- The trial court granted Riley's motion to suppress
- Florida Court of Appeals reversed. The Florida Supreme Court, however, reversed the appeals court's decision and reinstated the order suppressing the evidence. The state of Florida appealed to the U.S. Supreme Court, which reversed the Florida Supreme Court's decision.



# Florida v. Riley (1989)

## Decision:

- The Court decided that Riley's expectation of privacy was unreasonable because we live "[i]n an age where private and commercial flight in the public airways is routine."
- Because Riley had left the roof of his greenhouse partially open, it was open to viewing from the air, "if flying at that altitude had been contrary to law or regulation."
- Because it is not illegal for a helicopter to fly at an altitude of 400 feet, such flights are not rare, and so Riley's anticipation that his property would not be observed from such a height was unreasonable.





# Dow Chemical Co v. United States (1986)

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## Background:

- Dow Chemical Co. operates a 2,000-acre chemical plant. Dow maintains elaborate security around the perimeter of the complex, barring ground-level public views of the area.
- When Dow denied a request by the (EPA) for an on-site inspection of the plant
- EPA did not seek an administrative search warrant, but instead employed a commercial aerial photographer



# Dow Chemical Co v. United States (1986)

## Defense Argument:

Upon becoming aware of the aerial photography, Dow brought suit in Federal District Court, alleging that EPA's action violated the Fourth Amendment and was beyond its statutory investigative authority. The District Court granted summary judgment for Dow, but the Court of Appeals reversed, holding that EPA's aerial observation did not exceed its investigatory authority and that the aerial photography of Dow's plant complex without a warrant was not a search prohibited by the Fourth Amendment.



# Dow Chemical Co v. United States (1986)

## **Defense's Argument:**

Upon becoming aware of the aerial photography, Dow brought suit in Federal District Court, alleging that EPA's action violated the Fourth Amendment and was beyond its statutory investigative authority.

## **Opinion:**

- EPA's taking, without a warrant, of aerial photographs of petitioner's plant complex from an aircraft lawfully in public navigable airspace was not a search prohibited by the Fourth Amendment.
- The open areas of a business is not the same as the "curtilage" of a dwelling. For purposes of aerial surveillance, the open areas of an industrial complex are more comparable to an "open field" in which an individual may not legitimately demand privacy.
- EPA was not employing some unique sensory device not available to the public, but rather was employing a conventional, albeit precise, commercial camera commonly used in mapmaking.

## Kyllo v. United States (2001)

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### Background:

- United States Department of the Interior used a thermal imaging device to scan the building to determine whether the amount of heat emanating from the home was consistent with use of the high-intensity lamps typically required for growing marijuana indoors.
- The scan took place from the public roadway and only lasted a couple minutes.
- After continued investigation techniques, a warrant was issued and agents found an indoor growing operation involving more than 100 plants.





# Kyllo v. United States (2001)

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## Defense:

- At trial in federal district court, the court denied Kyllo's motion to suppress the seized evidence, and Kyllo entered a conditional guilty plea.

## Opinion:

- The Supreme Court concluded that obtaining information regarding the interior of a home, which could not otherwise have been obtained without physical intrusion into a constitutionally protected area, such as Kyllo's private residence, constituted a search, at least where the technology was not in general public use.