



# Challenges Using Drones in Remote vs. Urban Environments

By

Adam Majzoub  
Todd Allen  
Radarview / Universal Construction  
Testing



1. FAA compliance
  - Drone registration
  - Remote Pilot In Command - FAA Certified
  - Visual Observers
  - Safety
2. Airspace
  - FAA authorizations for controlled airspace
  - FAA Waiver of part 107 rules
3. Drone usage on structures
  - Infrared roof and facade surveys
  - Facade examinations - High Resolution photos/video
  - 3D Model from Photogrammetry
  - Topography
  - Case Studies

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Drone registration

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## Drone Registration



- Required under part 107 FAA Rules and Guidelines of sUAS operations
- Renewed every 3 years
- FAA Part 107 registration vs Model Aircraft section 336

## Remote Pilot in Command



- **FAA certified drone pilot**
- **Requirement under part 107 of rules and guidelines from FAA**
- **Required to take aeronautical knowledge test every 2 years**
- **Must be vetted by TSA**

## Visual Observers



- “Second pair” of eyes to watch for surrounding aircraft or other collision hazards
- Requirement under Part 107
- Must constantly maintain visual line of sight on the drone during flight

## Safety



- Safe drone operations is the goal of FAA rules and guidelines
- Standard Rules:
  - Never fly above 400 feet (exceptions)
  - Never fly in restricted airspace
  - Never fly above public
  - FAA waivers and authorizations can be obtained

## Authorization in Controlled Airspace

- Prior authorization **MUST** be received before any flight in controlled airspace
- Four classes of controlled airspace:
  - **Class B:** Generally, that airspace from the surface to 10,000 feet MSL surrounding the nation's busiest airports. **ATC clearance is required**
  - **Class C:** Generally that airspace from the surface to 4,000 feet above the airport elevation. **ATC clearance is required**
  - **Class D:** Extends from the surface to 2,500 feet (760 m) above the ground
  - **Class E:** In most areas of the United States, class E airspace extends from 1,200 feet AGL up to but not including 18,000 feet MSL. Class E airspace most common in US.
- **Class G: Uncontrolled Airspace.** ATC has no authority or responsibility to control air traffic. No prior authorization required. Part 107 rules still apply.





## FAA Waivers for Part 107 Rules

\*Partial list

- Flying at night (§ 107.29)
- Flying directly over a person or people (§ 107.39)
- Flying from a moving vehicle or aircraft, not in a sparsely populated area (§ 107.25)
- Flying multiple aircraft with only one pilot (§ 107.35)
- Flying beyond the pilot's visual line-of-sight (§ 107.31)
- Flying above 400 feet (§ 107.51B)

# FAA Authorizations for Part 107 Rules

FAA FORM 7711-1 UAS PART 107 AUTHORIZATION  
2017-P107-CSA-20689

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DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION	
<b>CERTIFICATE OF WAIVER OR AUTHORIZATION</b>	
ISSUED TO <b>Radarview LLC</b>	POC PHONE NUMBER <b>832-473-8664</b>
ATTN: Todd Allen	
This certificate is issued for the operations specifically described hereinafter. No person shall conduct any operation pursuant to the authority of this certificate except in accordance with the standard and special provisions contained in this certificate, and such other requirements of the Federal Aviation Regulations not specifically waived by this certificate.	
OPERATIONS AUTHORIZED Operations under this certificate of authorization are limited to the maximum altitude listed below. This altitude is an absolute value and it shall not be added to the height of any structures. Class of Airspace: B At or Below: Altitudes in accordance with published UAS facility map ( <u>wide area</u> ) Under the Jurisdiction of: Houston Hobby Airport Traffic Control Tower (HOU) Airport Identifier: HOU	
LIST OF WAIVED REGULATIONS BY SECTION AND TITLE N/A	
STANDARD PROVISIONS	
1. A copy of the application made for this certificate shall be attached and become a part hereof. 2. This certificate shall be presented for inspection upon the request of any authorized representative of the Federal Aviation Administration, or of any State or municipal official charged with the duty of enforcing local laws or regulations. 3. The holder of this certificate shall be responsible for the strict observance of the terms and provisions contained herein. 4. This certificate is nontransferable.	
Note-This certificate constitutes a waiver of those Federal rules or regulations specifically referred to above. It does not constitute a waiver of any State law or local ordinance.	
SPECIAL PROVISIONS	
Special Provisions 1 thru 3, inclusive, are set forth in this authorization.	
This certificate 2017-P107-CSA-20689 is effective from January 10, 2018 to September 30, 2018 and is subject to cancellation at any time upon notice by the Administrator or his/her authorized representative.	
BY DIRECTION OF THE ADMINISTRATOR	
<u>FAA Headquarters, AJV-115</u> <small>(Region)</small>	Digitally signed by <b>Scott J. Gardner</b> <small>Date: 2018.01.08 11:25:42 -05'00'</small> <u>Scott J. Gardner</u> <small>(Signature)</small>
<u>January 8, 2018</u> <small>(Date)</small>	<u>Acting Manager, UAS Tactical Operations Section</u> <small>(Title)</small>

FAA Form 7711-1 (7-74)

CIVIL PART 107 AUTHORIZATION, NOVEMBER 7, 2017

FAA FORM 7711-1 UAS PART 107 AUTHORIZATION  
2017-P107-CSA-20689

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**SPECIAL PROVISIONS**

**1. CONTACT INFORMATION:**

- a. Todd Allen is the person designated as responsible for the overall safety of UAS operations under this Certificate of Waiver or Authorization. During UAS operations for on-site communication/recall, the Responsible Person shall be continuously available for direct contact at 832-473-8664 by the Houston Hobby ATCT or designated representative.
- b. The Responsible Person listed on this Authorization must maintain a current list of pilots by name and the remote pilot certificate number(s) associated with the Authorization holder's operation. This list must be presented for inspection upon request from the Administrator or an authorized representative.

**2. SCHEDULE OF FLIGHT OPERATIONS:**

- a. This Certificate of Waiver or Authorization and the Special Provisions shall be in effect between civil sunrise and civil sunset local time.
- b. This airspace authorization does not relieve the remote pilots from the responsibility to check the airspace they are operating in and comply with all restrictions that may be present in accordance with see 14 CFR 107.45 and 107.49 (a)(2), such as restricted and Prohibited Airspace, Temporary Flight Restrictions, etc.
- c. The facility may disapprove, terminate, restrict, or delay UAS flight operations covered by this authorization at any time.
- d. The operator is responsible for reviewing the published UASFM at <http://uas-faa.opendata.arcgis.com/> prior to each flight to ensure that no changes have been made to the map, i.e., altitude changes, airspace modifications, etc. **Operations at an altitude not in accordance with the published UASFM must apply for a new authorization requesting that altitude.**

**3. EMERGENCY/CONTINGENCY PROCEDURES - Lost Link/Lost Communications Procedures:**

- a. If the UAS loses communications or loses its GPS signal, the UA must return to a pre-determined location within the operating area and land.
- b. The PIC must abort the flight in the event of unpredicted obstacles or emergencies.

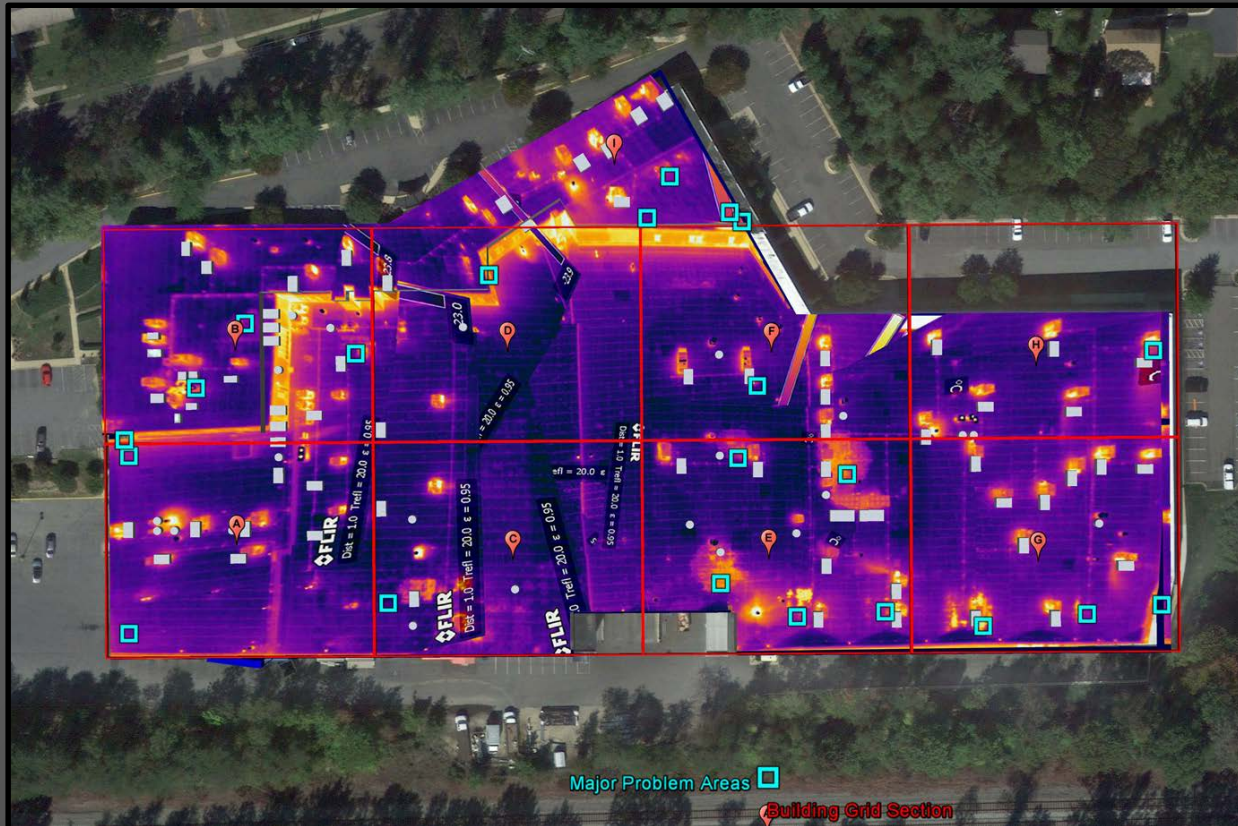
CIVIL PART 107 AUTHORIZATION, NOVEMBER 7, 2017

# UAV Applications

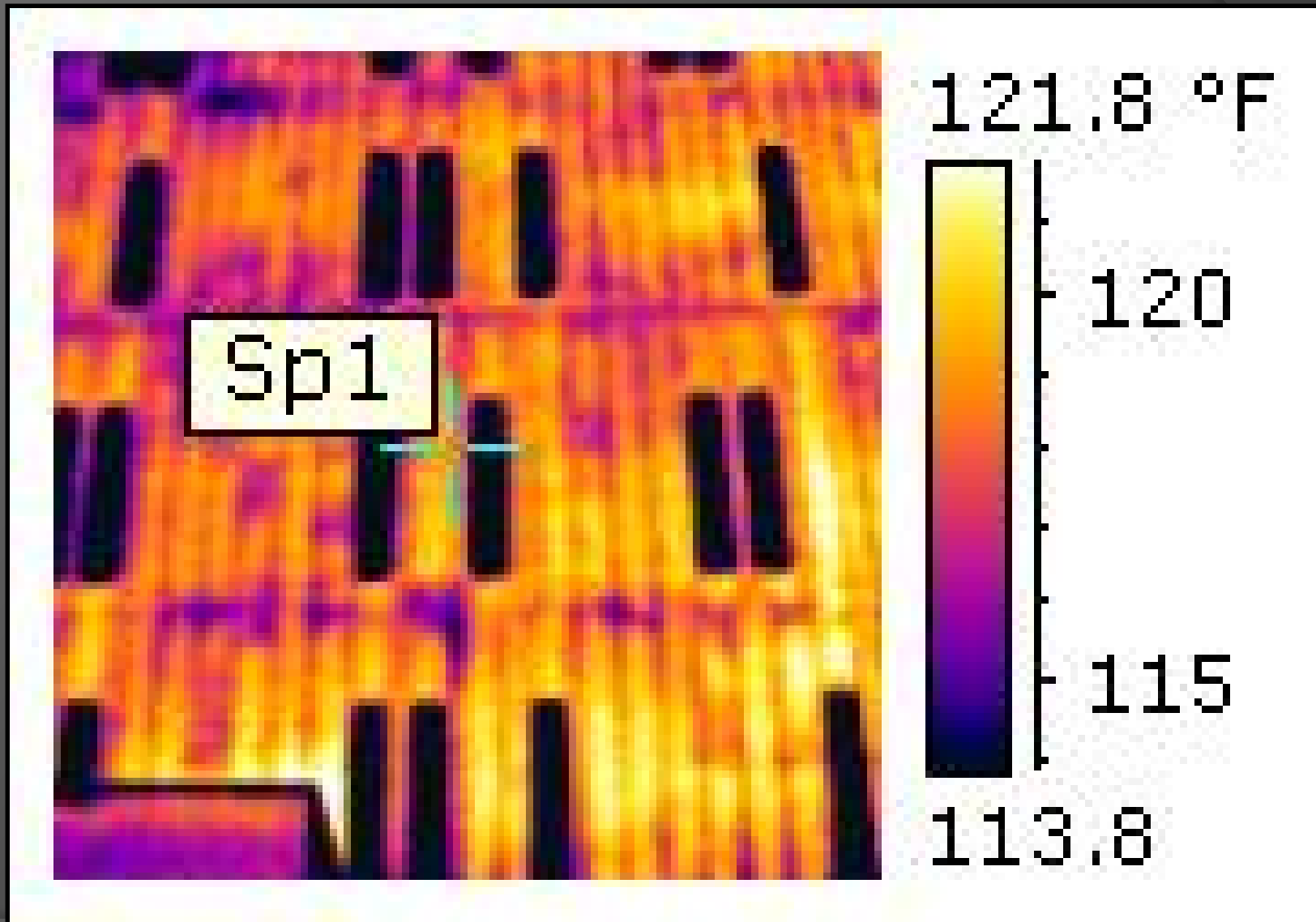
- IR roof and facade surveys
- 3D modeling
- Aerial inspection
- Façade inspections
- Geophysical Surveying
- And more!



## Infrared Roof Surveys

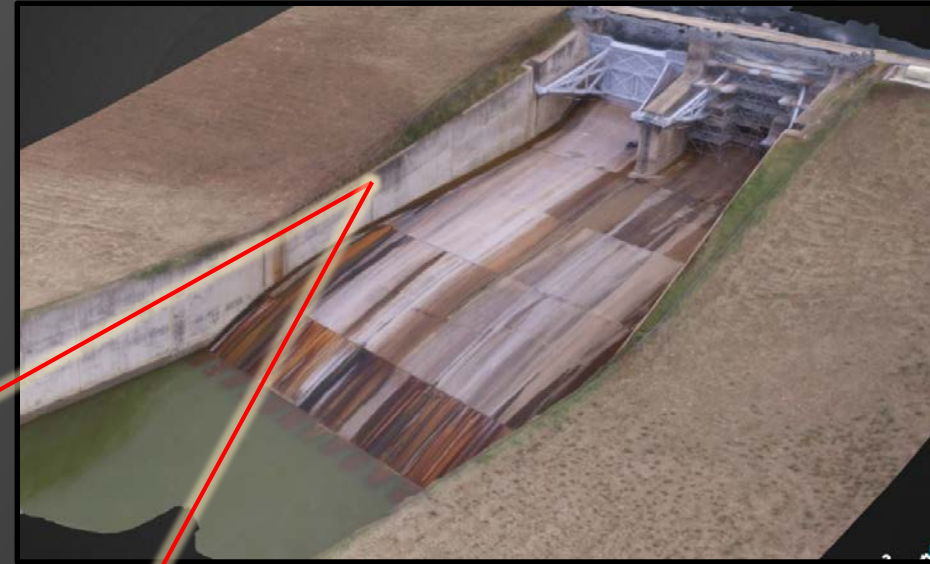


- High quality imagery and rapid assessments
- Increased coverage
- Detect leaks and other problem areas that could be missed from typical handheld IR cameras



## Visual Examinations

- Photogrammetry
- Rapid data collection
- Remotely locate defects





- Visual examinations and 3D modeling of a dam in Bastrop, Texas







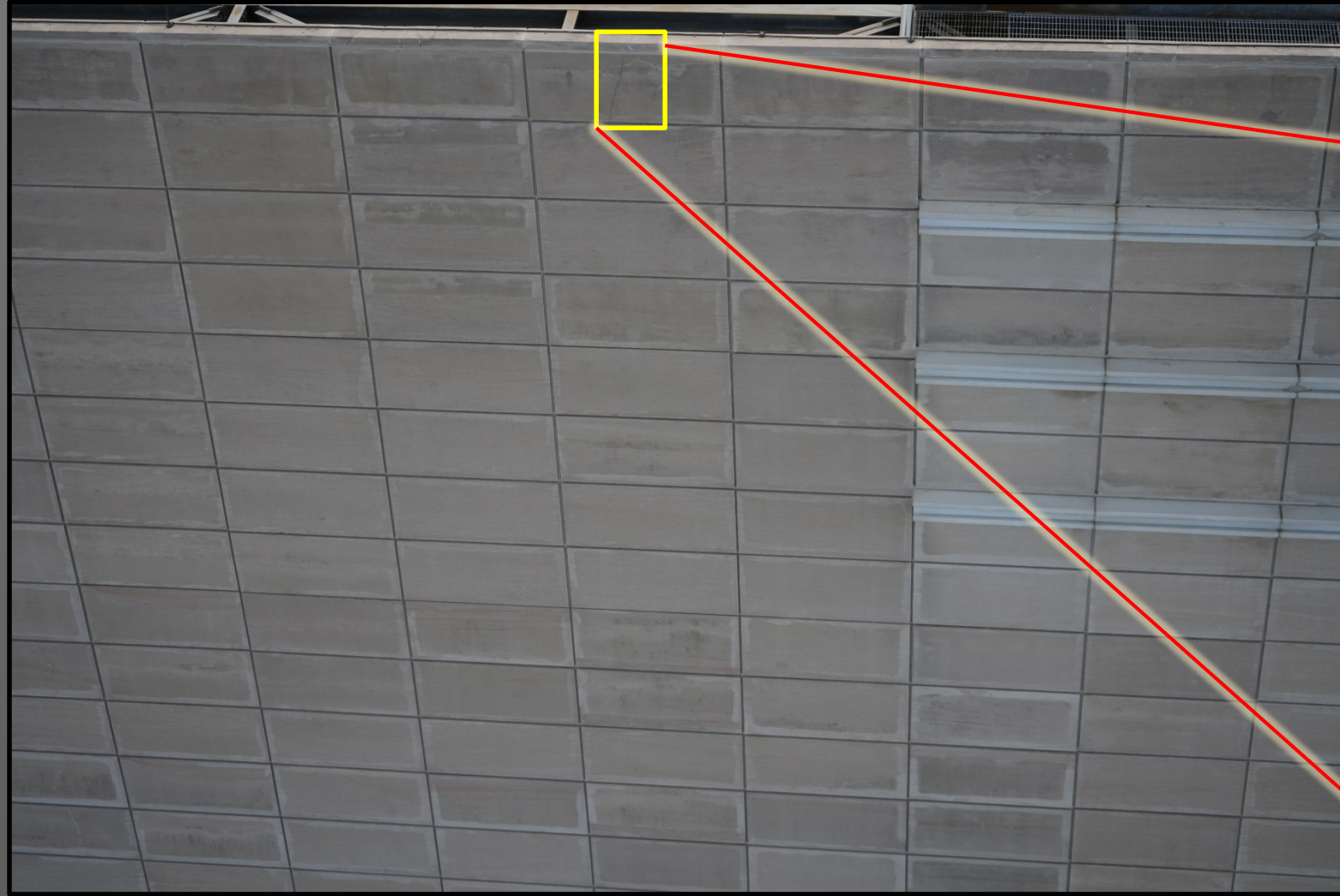


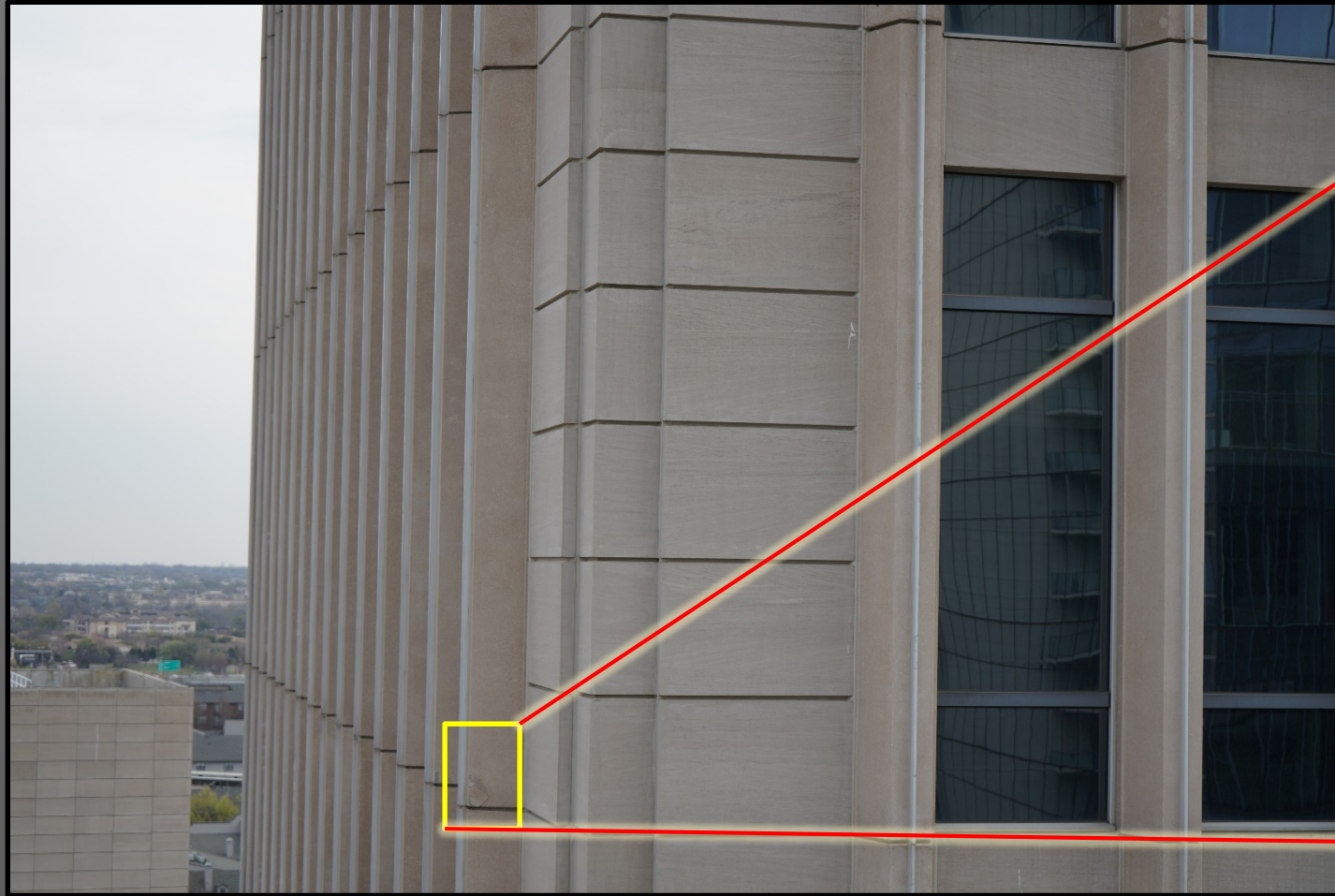




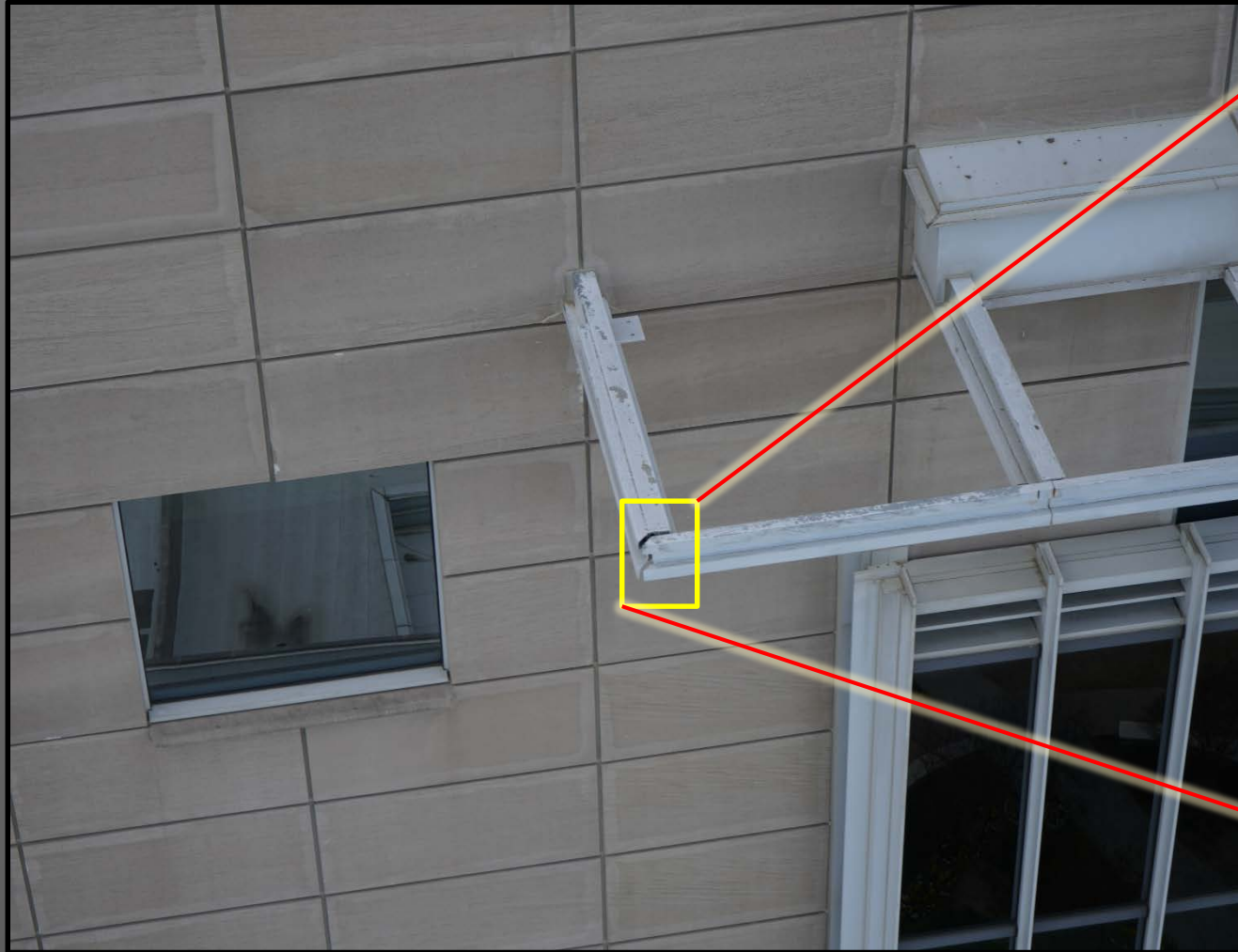


# Façade Inspections





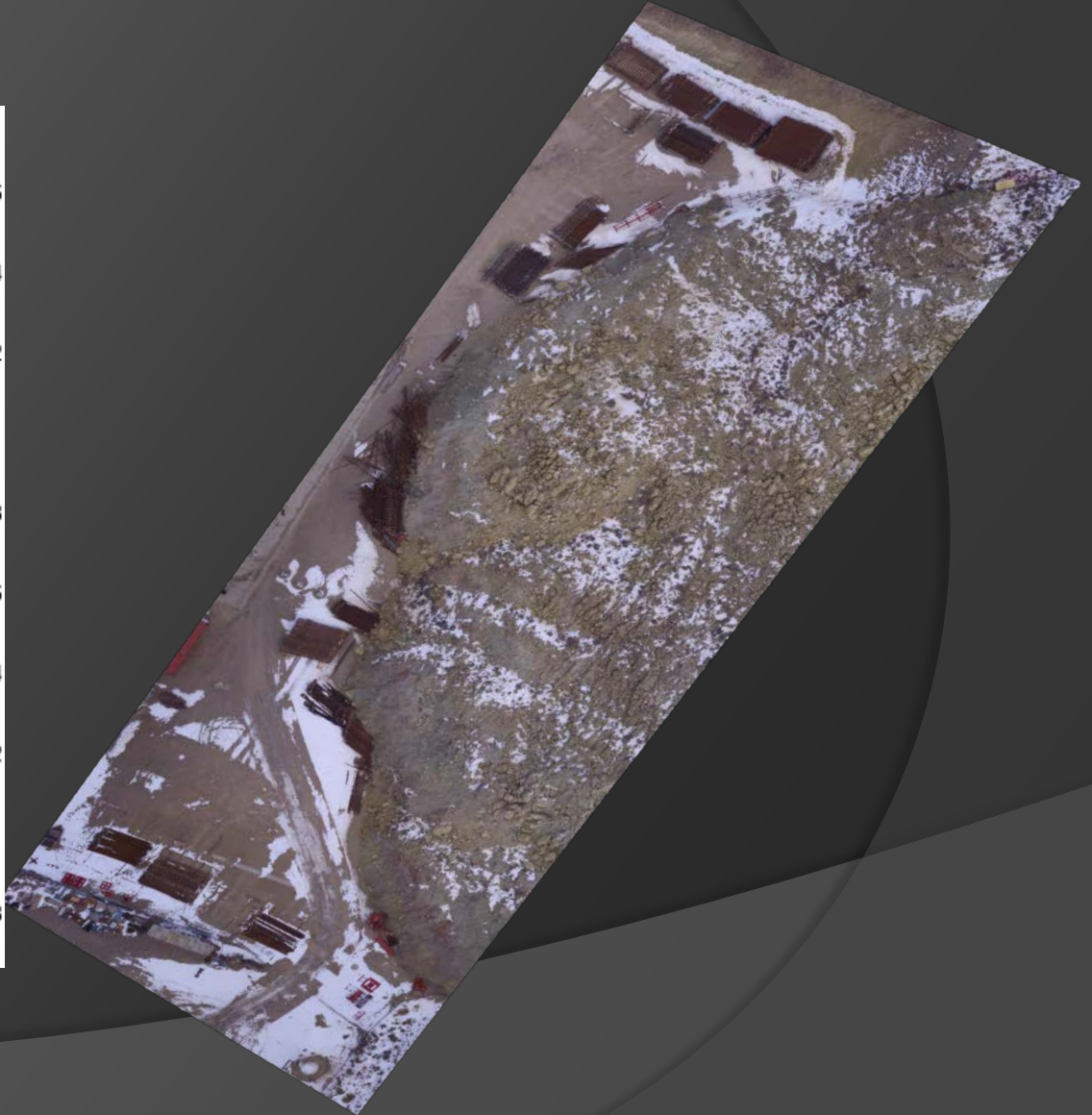
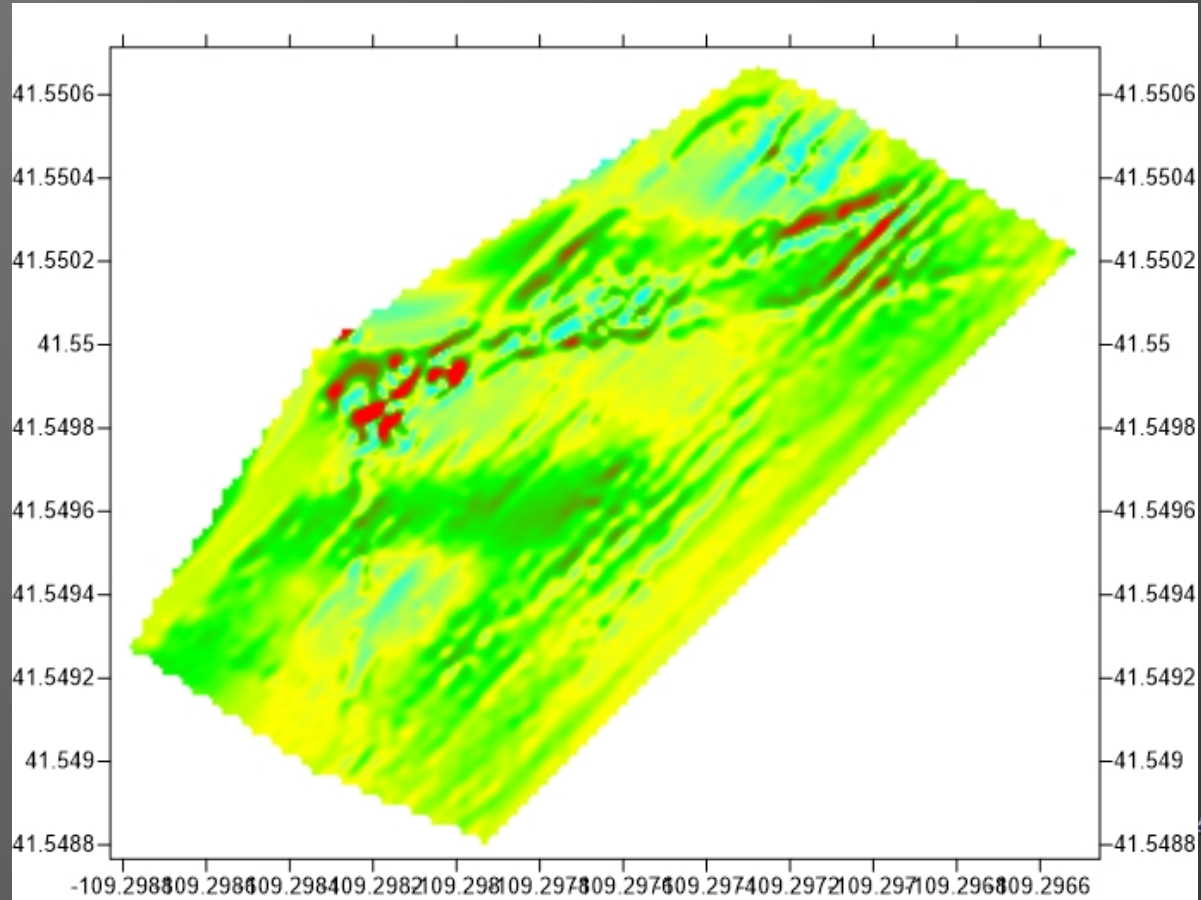




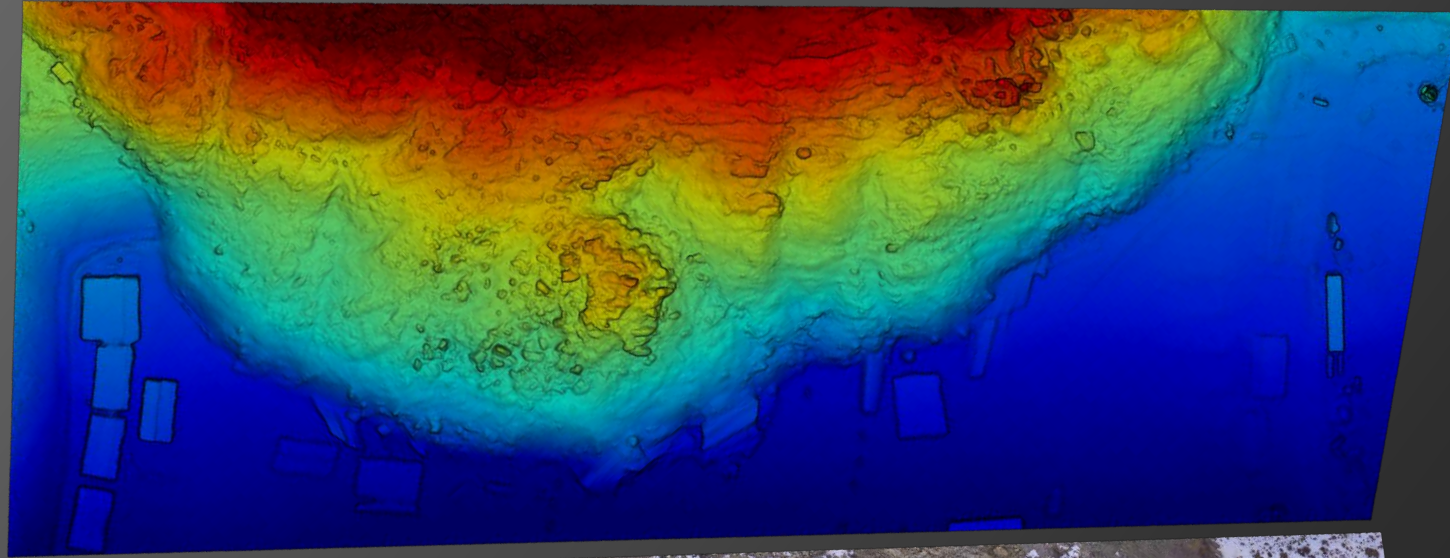


# Geophysical Surveying

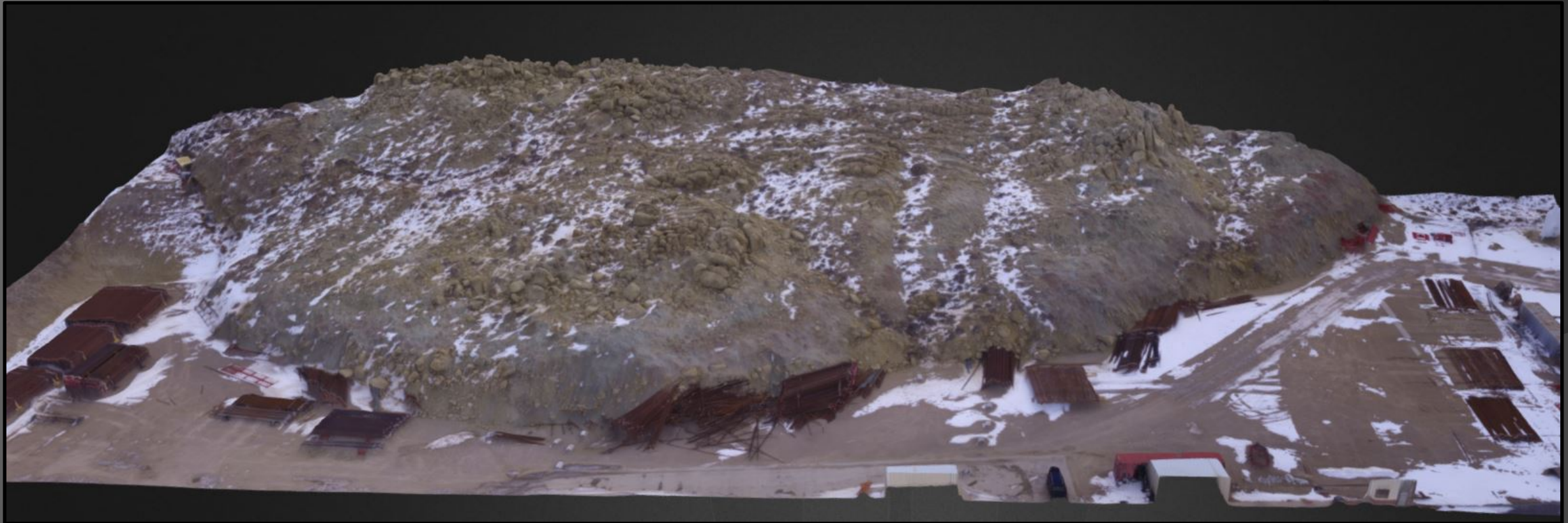








- 3D Model of recent landslide in Rock Springs, Wyoming



# Questions?