

# Do You Know Where Your Assets Are?

March 14, 2019

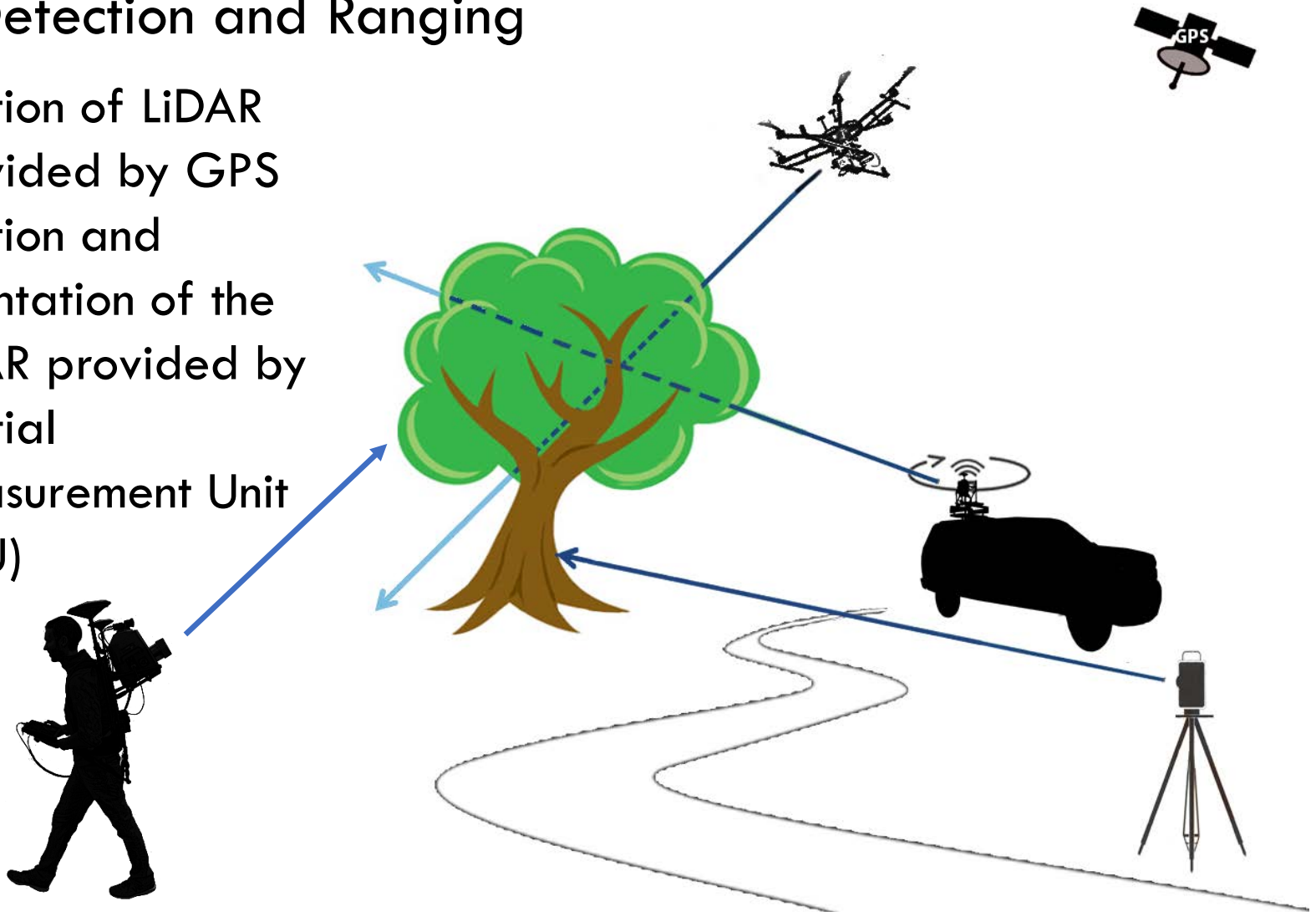
**Michael R. Frecks, PLS**  
LiDAR/Survey Manager

**Allison Bruner, PE**  
Transportation Engineer

# Basic Principle of LiDAR Scanning

## Light Detection and Ranging

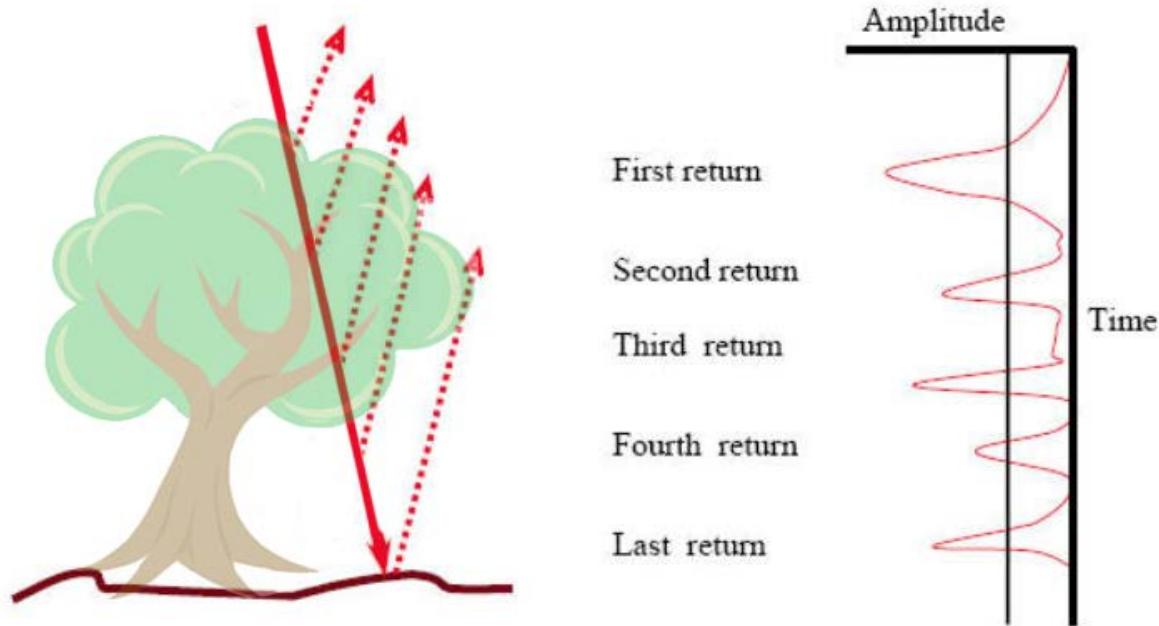
- Position of LiDAR provided by GPS
- Position and orientation of the LiDAR provided by Inertial Measurement Unit (IMU)



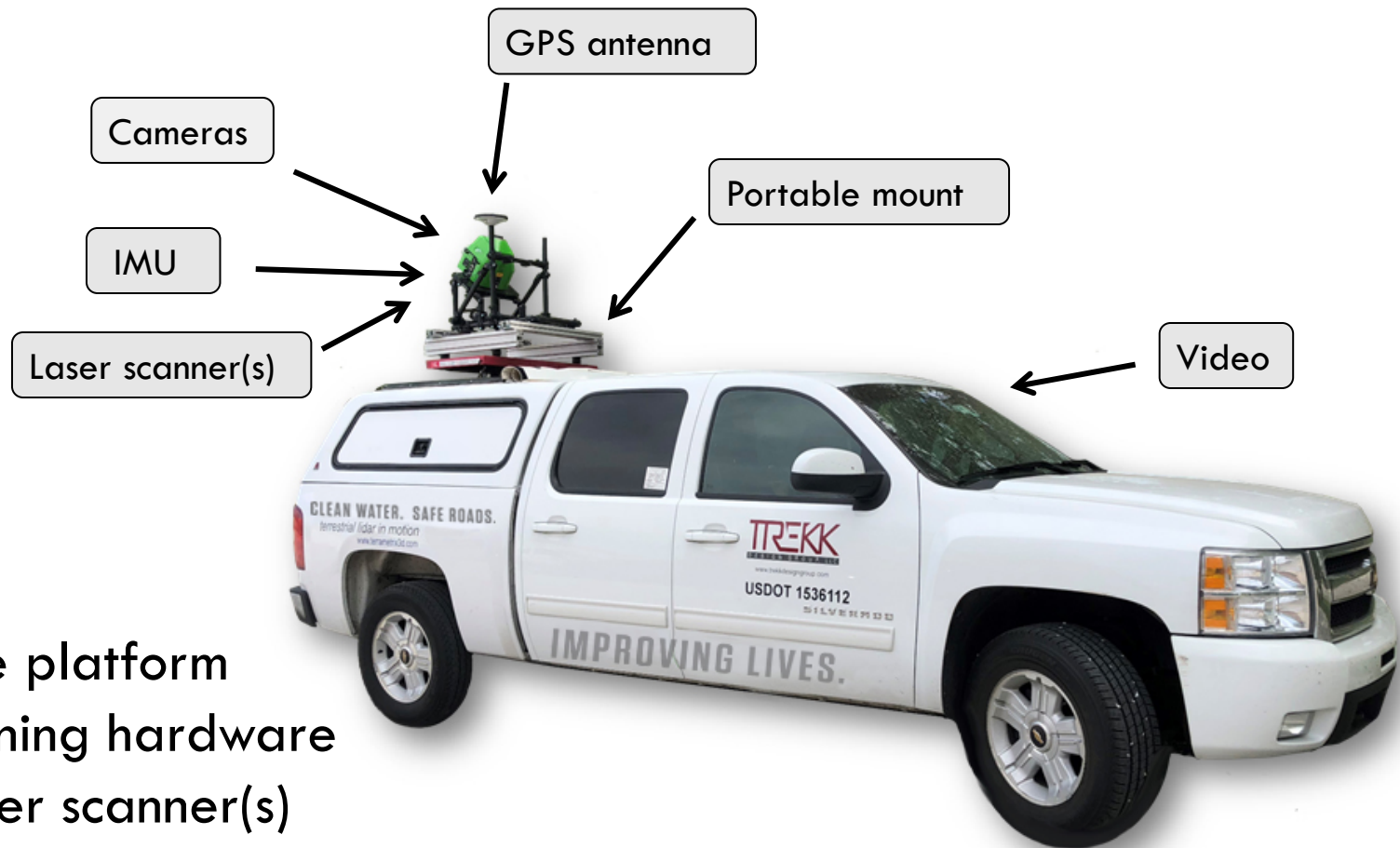
# Basic Principle of LiDAR Scanning

## Multiple Returns

- Laser pulse finite diameter  $>10$  cm
- One light pulse can have many returns
- Provides better feature analysis
- Returns with corresponding  $x, y, z$  coordinates create the 'point cloud' dataset

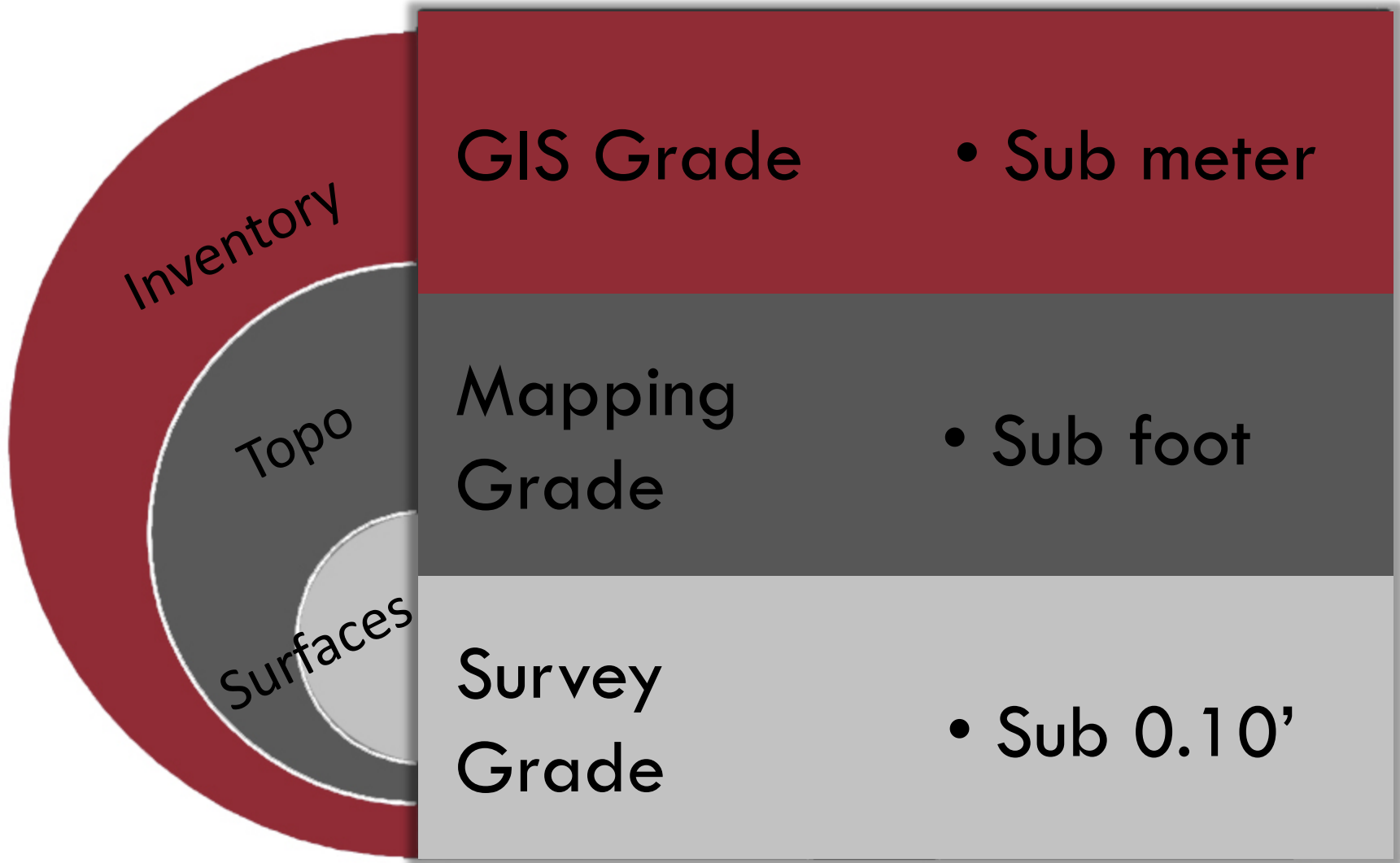


# Components of LiDAR Scanning



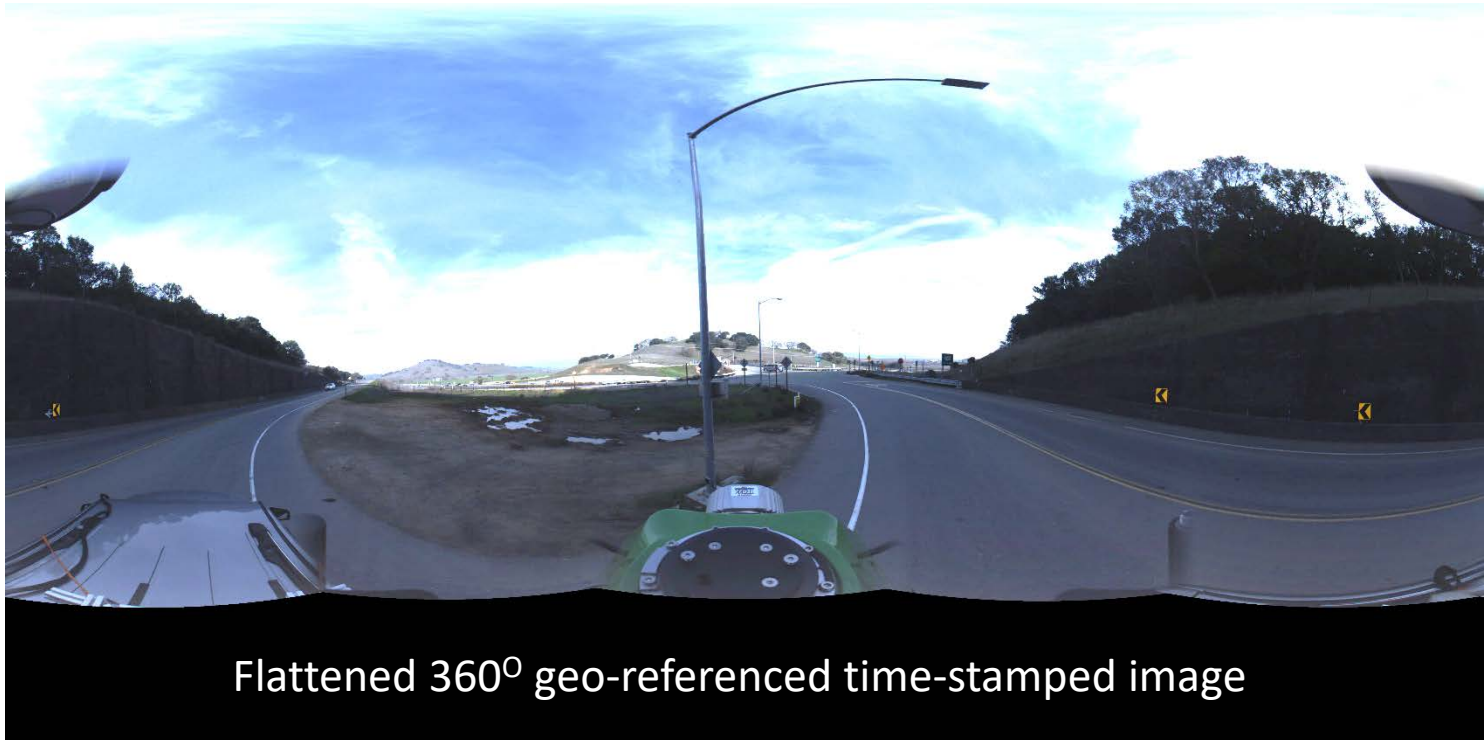
- Mobile platform
- Positioning hardware
- 3D laser scanner(s)
- Photographic/video recording
- Computer and data storage

# Mobile LiDAR Benefits - Accuracy



# Mobile LiDAR Benefits - Efficiency

- Additional data mining
- Digital Terrain Models
- RGB components



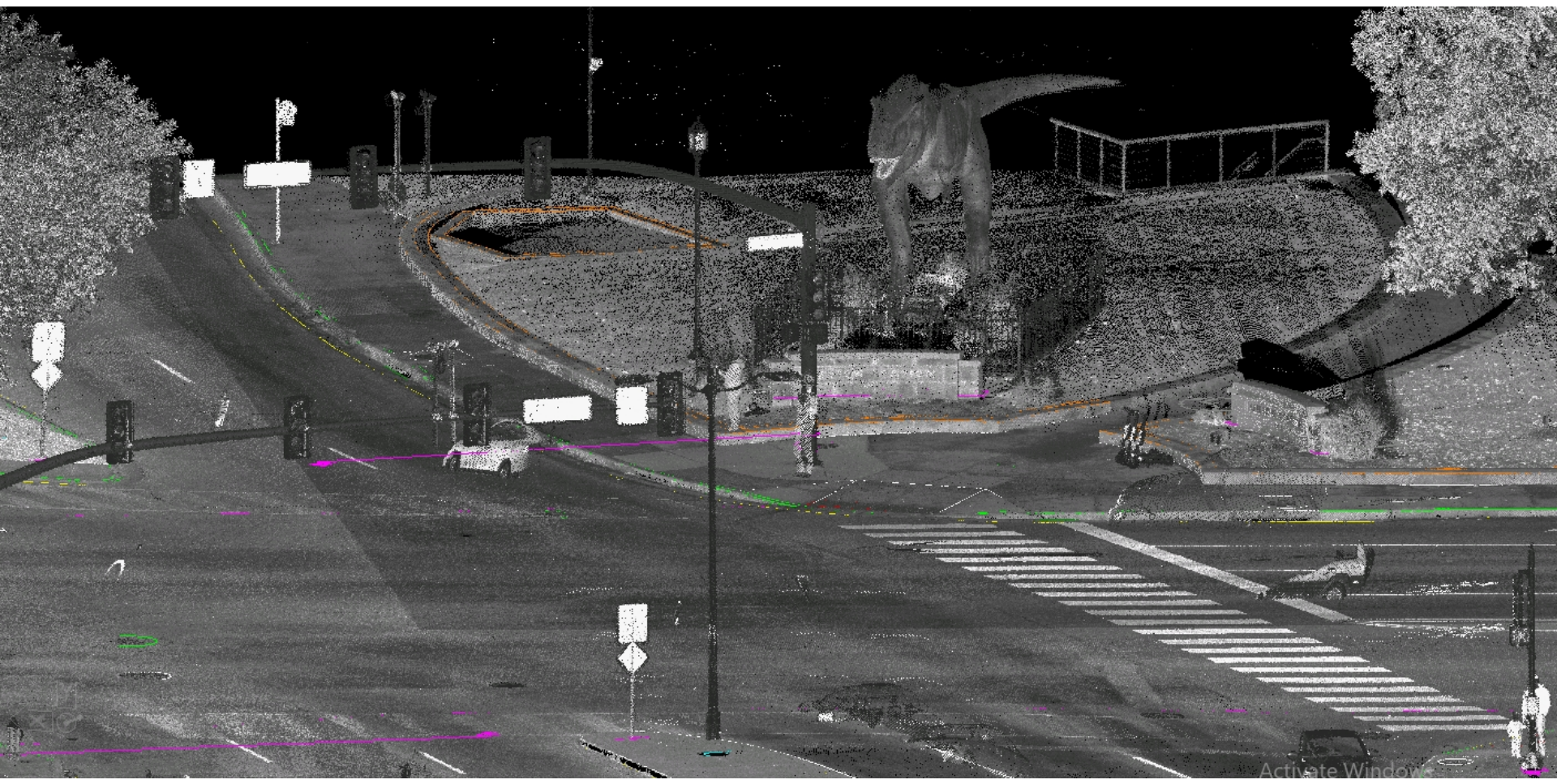
Flattened 360° geo-referenced time-stamped image

# Mobile LiDAR Benefits - Safety

- Non intrusive data collection
- Data collected at traffic speed
- No traffic control or lane closures
- Day or night operations
- Safer for the traveling public and crews
- Out of the RED ZONE



# Mobile LiDAR Point Cloud Data





# Sign Inventory Experience



163 miles  
2,000 signs



95 miles  
5,589 signs

# Sign Inventory Experience

Front
Drag to place anchor point for Lat/Lng

Field	Value
OBJECTID	63
S_TREKK_ID	03_050
SignCode	R2-1
SignCodeDescription	Speed Limit
SignCondition	Bent
SignDescription	SPEED LIMIT 55
SignDesignation	R
SignDirection	Southwest
SignHClearance	8.107681
SignHeading	211.314357
SignHeight	2.5
SignID	00004366_001157_1
SignPosition	Top
SignType	Flat
SignVClearance	7.540729
SignWidth	2
StructureName	00004366_001157

# Sign Inventory Experience

Sign Structure Properties

Report Delete

Title  
00004366\_001157

Structure Type: Post  
Construction: 4x4 Wood

Structure Position: Right  
Post Mounting: Non-Breakaway

Post Count: 1  
Post Condition: Good

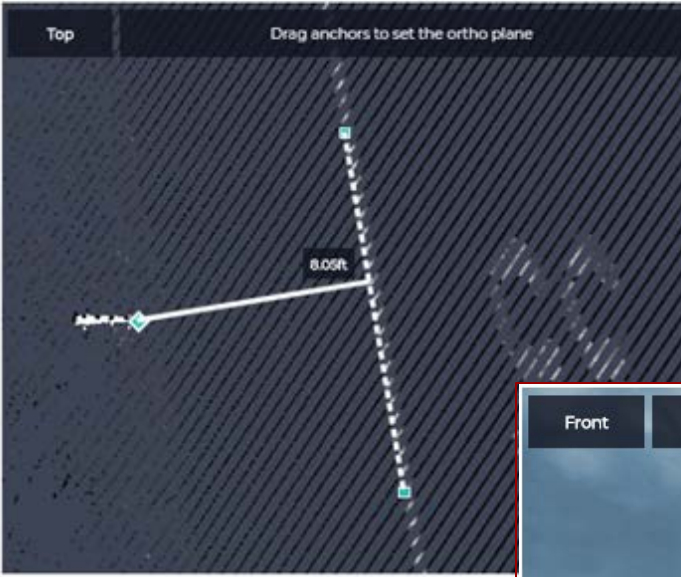
Signs  
search sign type...

R2-1 Speed Limit  
SPEED LIMIT 55

Cancel


Features

Top Drag anchors to set the ortho plane



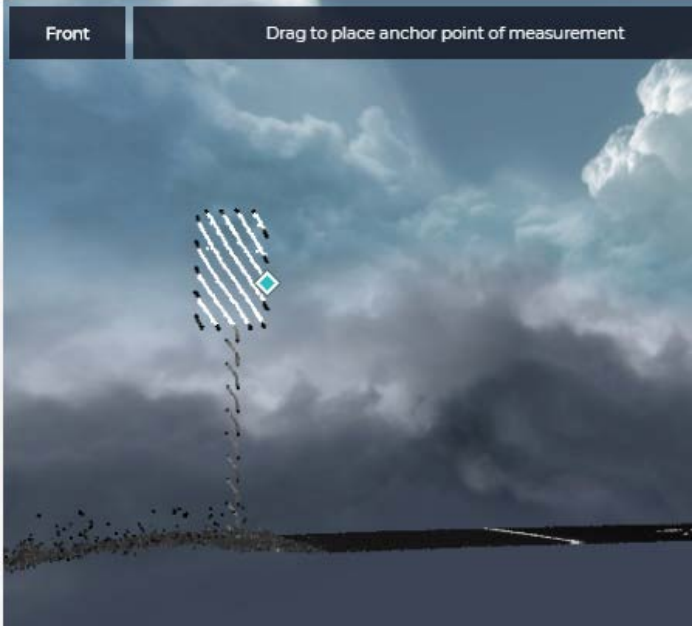
8.05ft

Panorama Street View



Lat/Lng Position  
Distance to Roadway  
Height Under Sign

Front Drag to place anchor point of measurement



# Sign Inventory Experience



**Height above  
travelway to  
bottom of sign**

**Distance from travelway to nearest  
side of post**

# Sign Inventory Experience

Sign Structure Properties

Report Delete

Title  
00004366\_001157

Structure Type: Post  
Construction: 4x4 Wood  
Structure Position: Right  
Post Mounting: Non-Breakaway  
Post Count: 1  
Post Condition: Good

Features

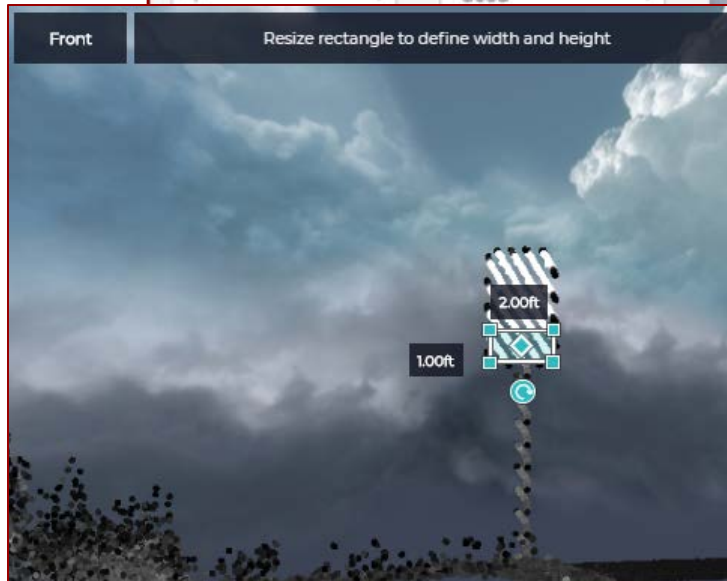
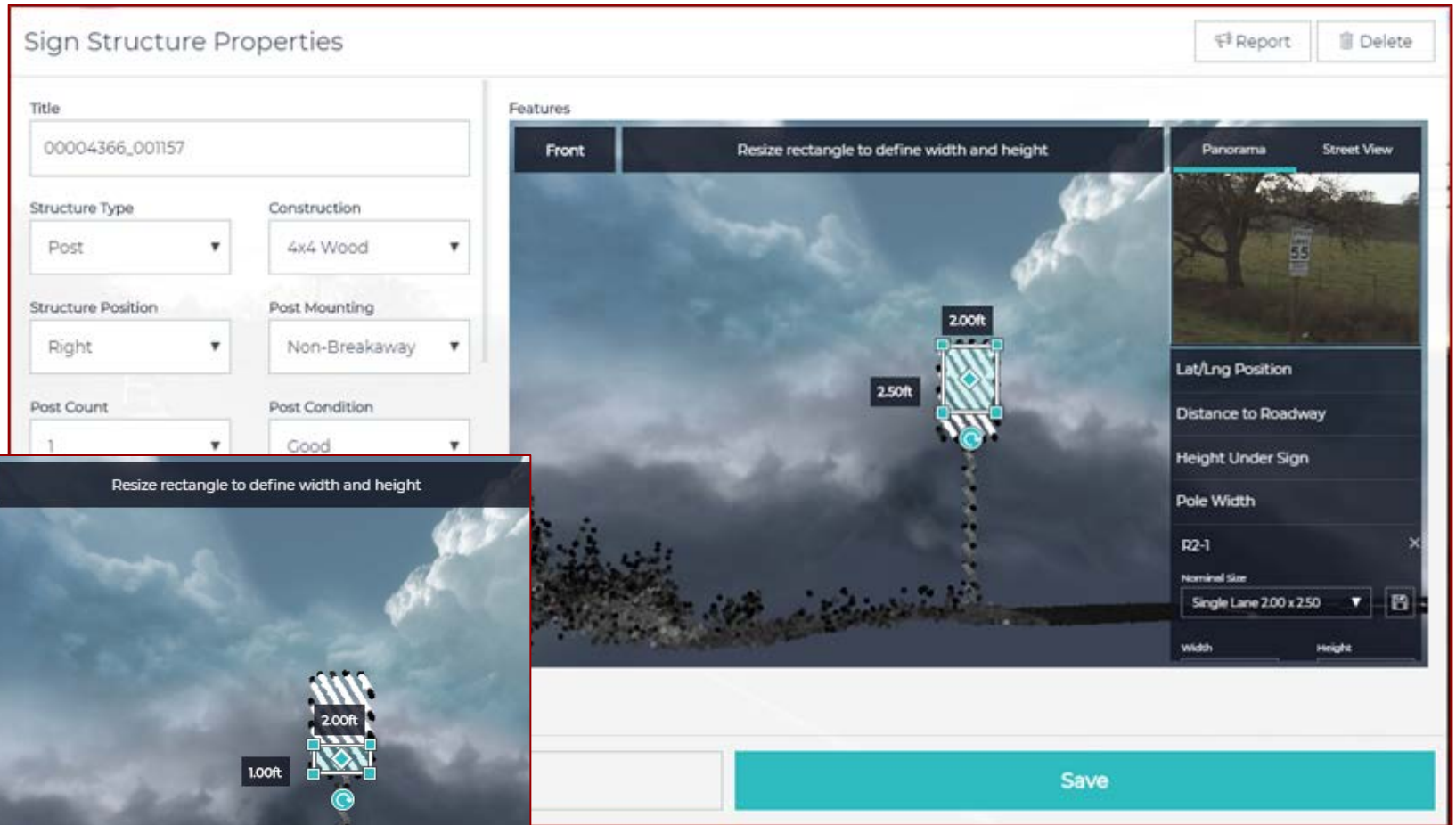
Front: Resize rectangle to define width and height

2.50ft 2.00ft

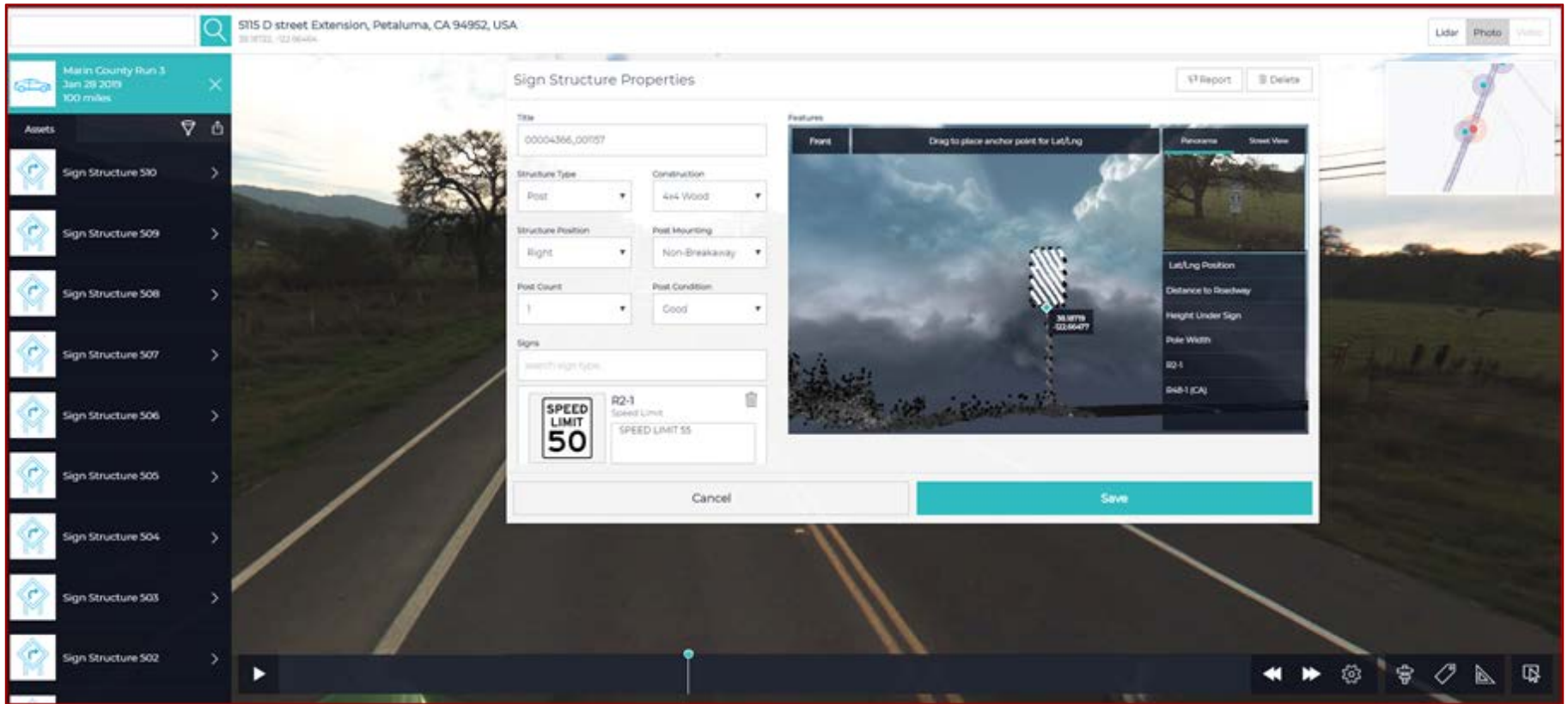
Panorama Street View

Lat/Lng Position  
Distance to Roadway  
Height Under Sign  
Pole Width  
R2-1  
Nominal Size: Single Lane 2.00 x 2.50  
Width Height

Save

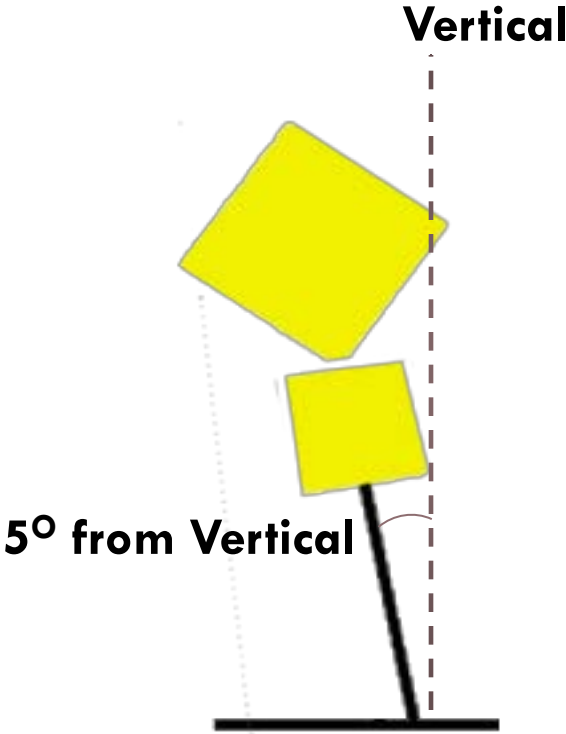


# Sign Inventory Experience

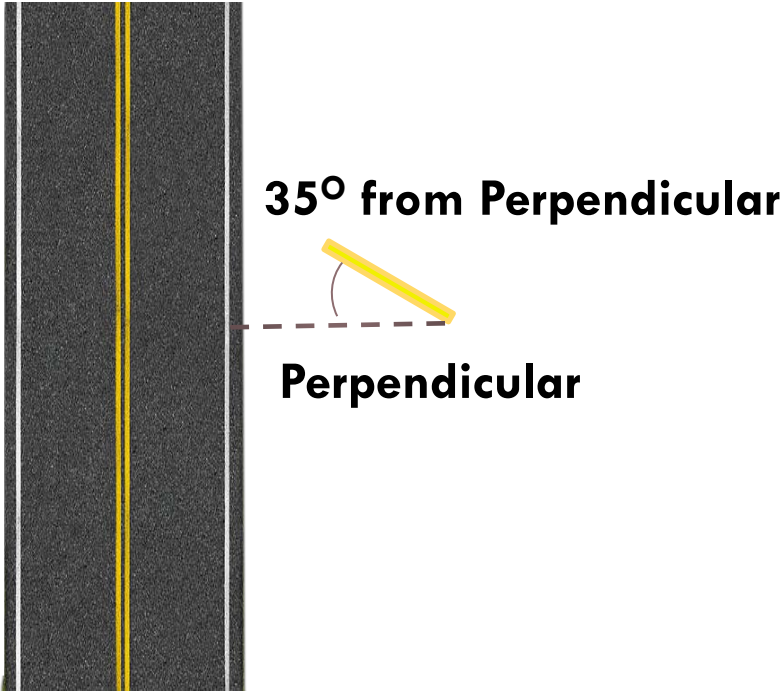


# Sign Inventory Experience

## Additional Data Fields



Cross Section View



Plan View



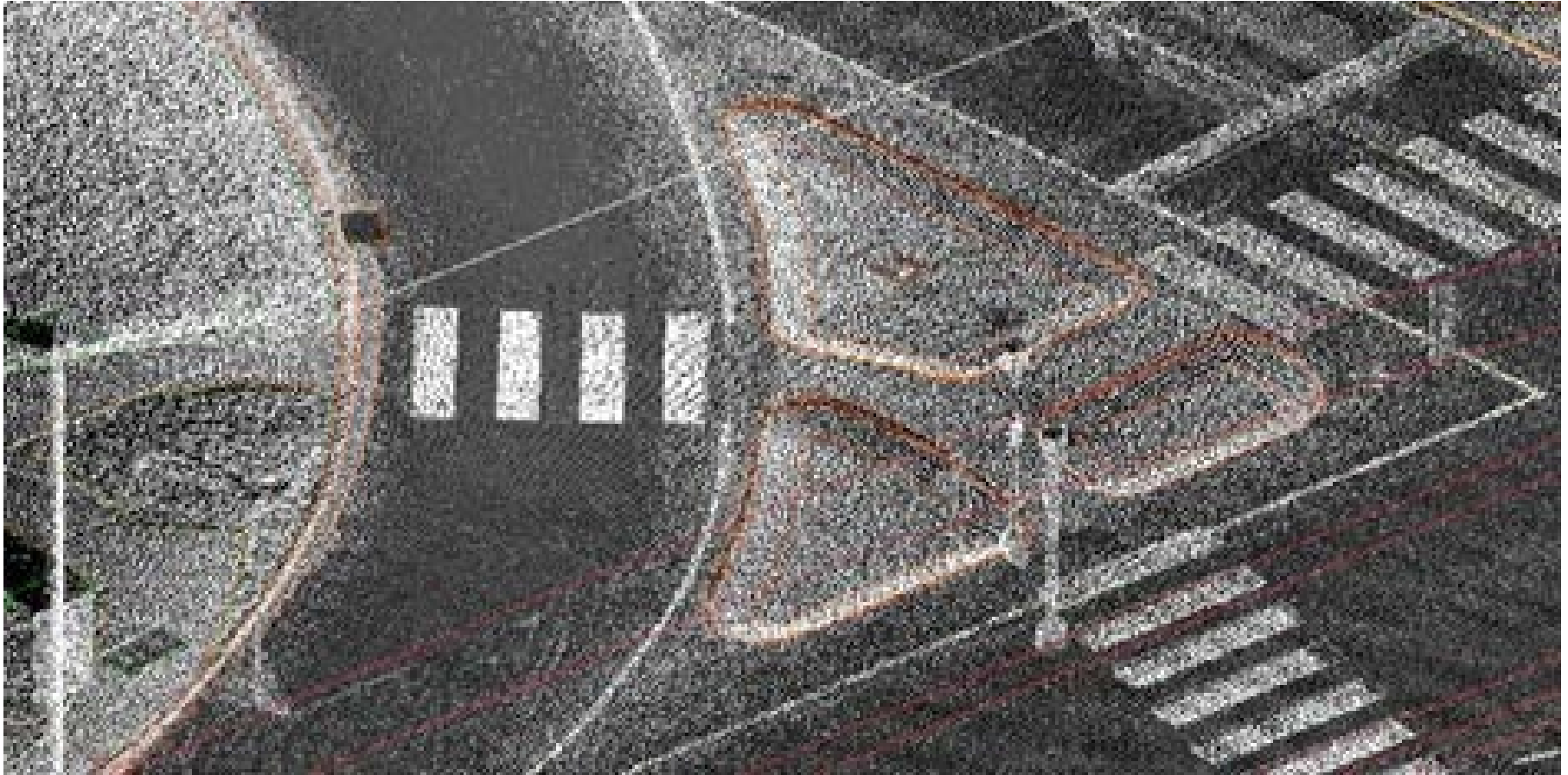


# Sign Inventory Experience

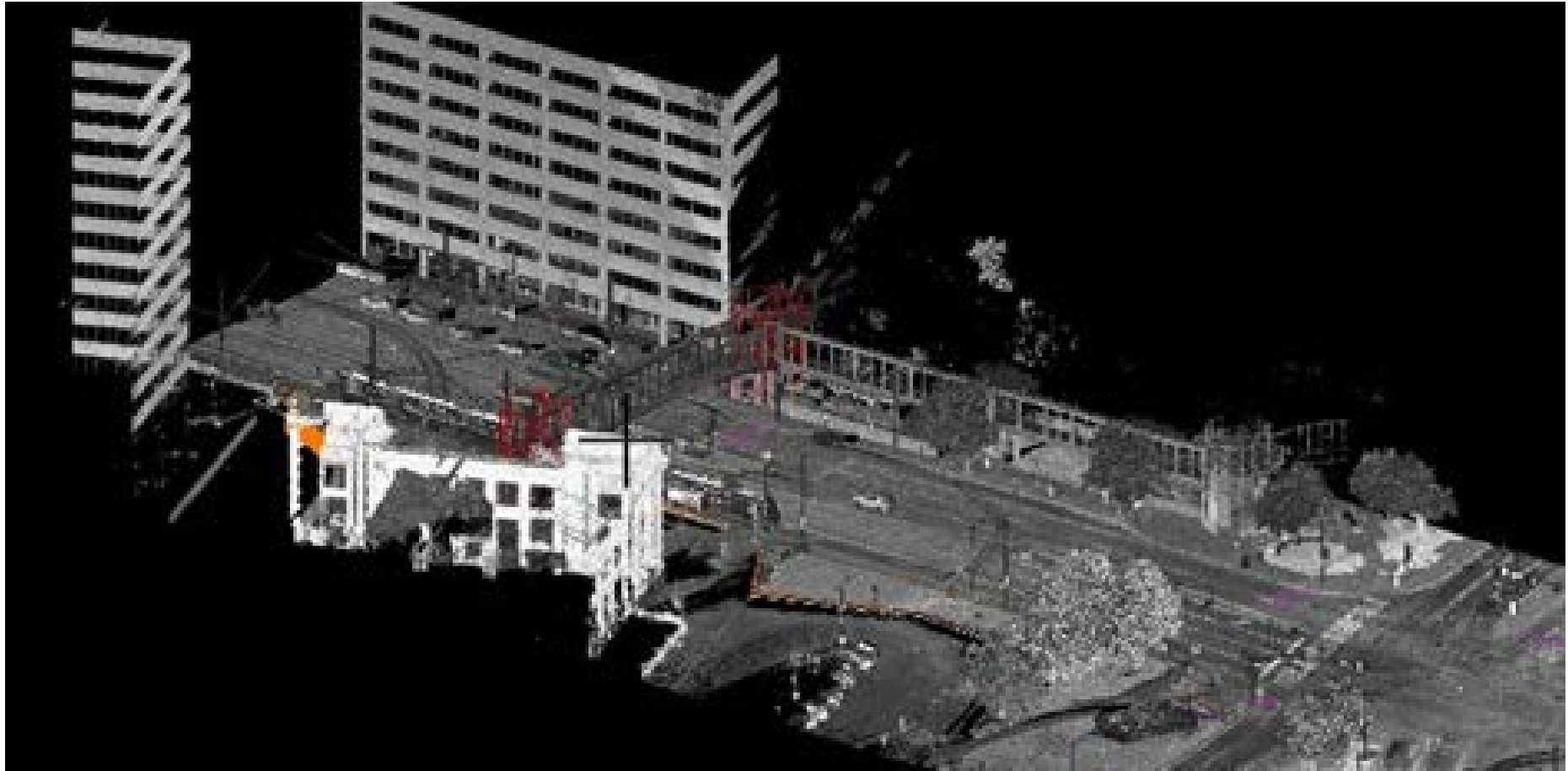
- 360° georeferenced image
- Reference point
- Date
- MUTCD sign designation/sign type
- Sign description/current sign size
- Condition of sign
- Post type
- Post spacing
- Sign height above travel way
- Sign distance from travel way
- Sign modifications
- Shoulder width



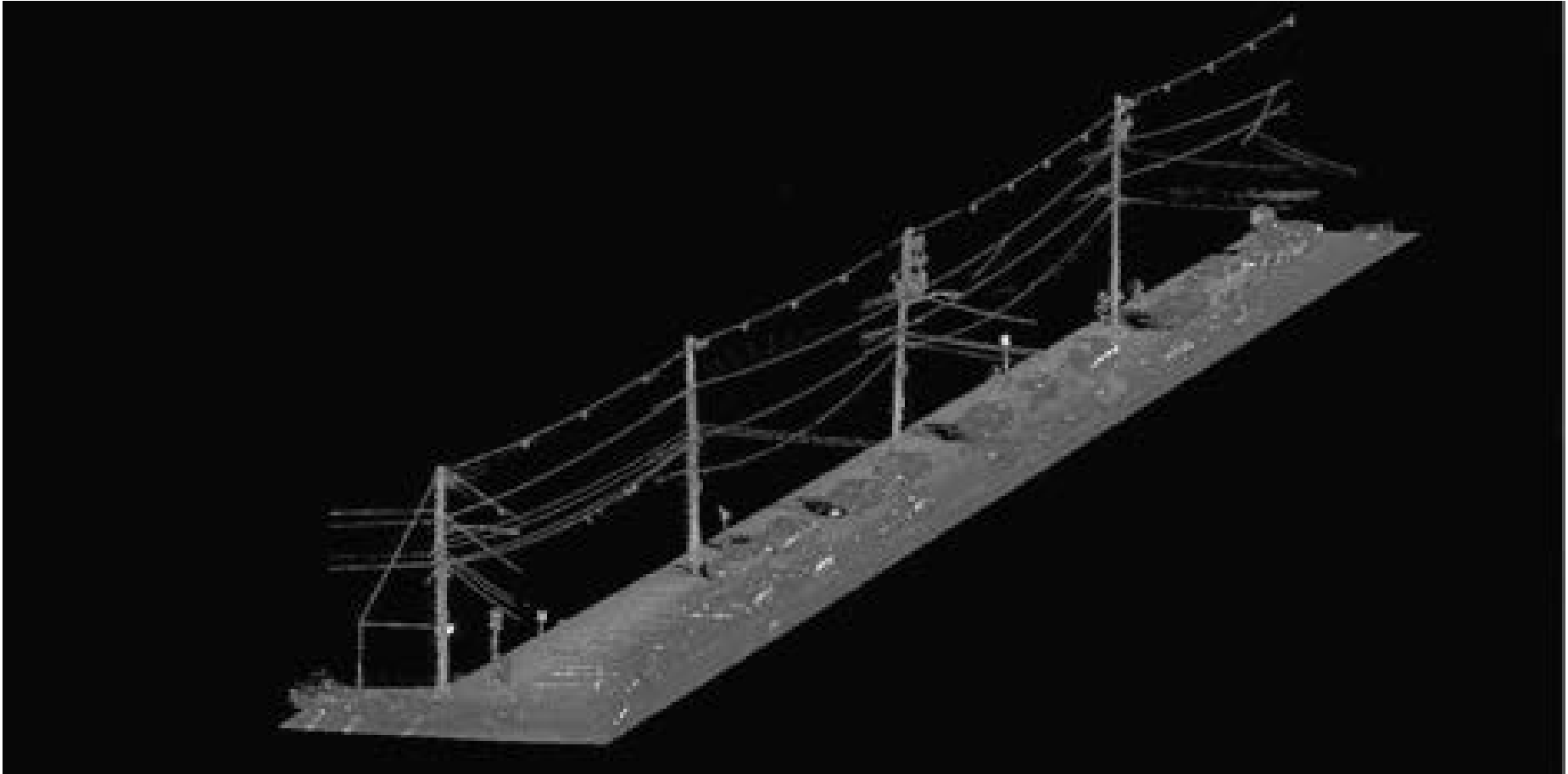
# Other Assets – ADA Compliance



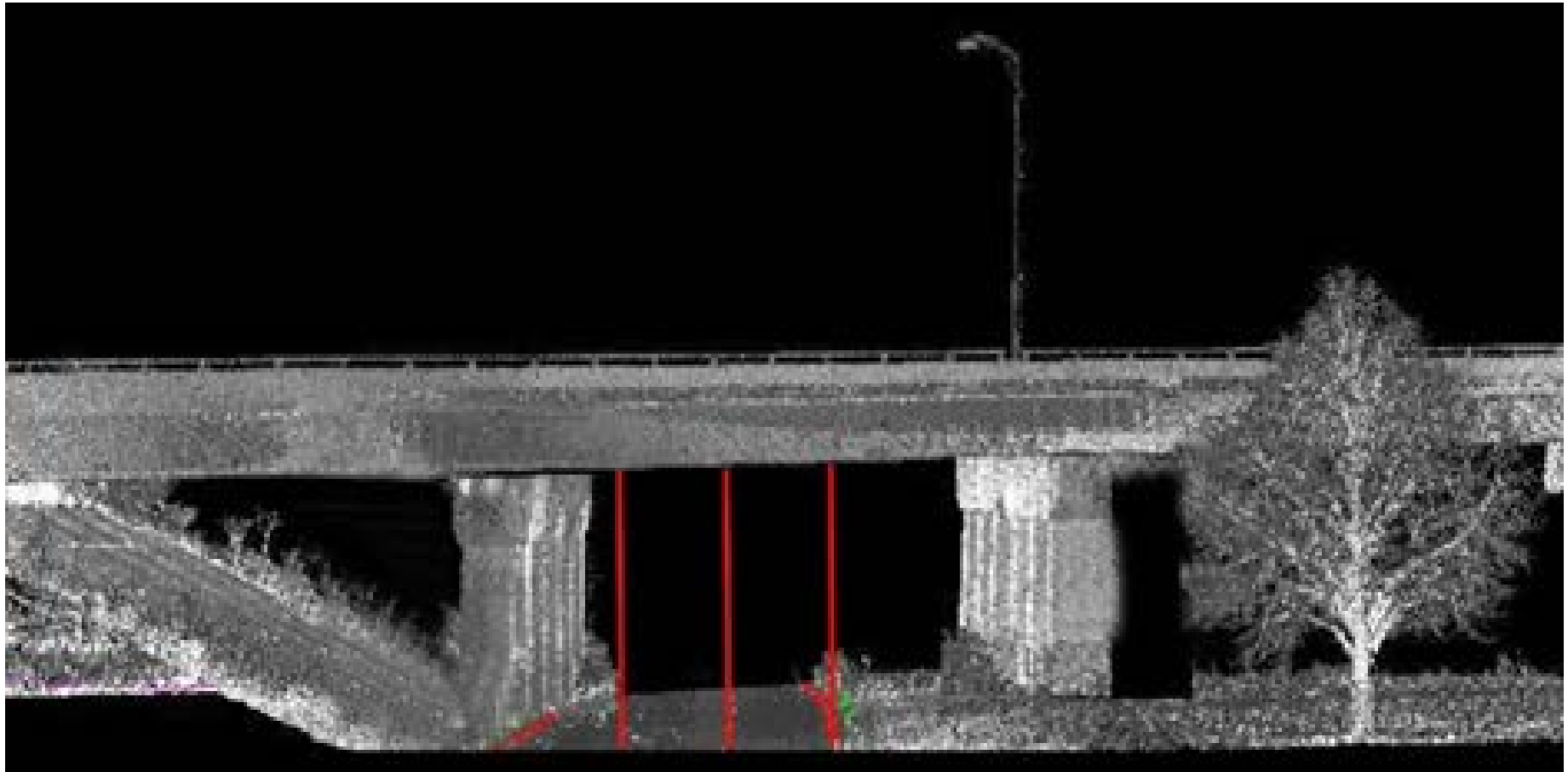
# Other Assets – Building Footprints and Streetscapes



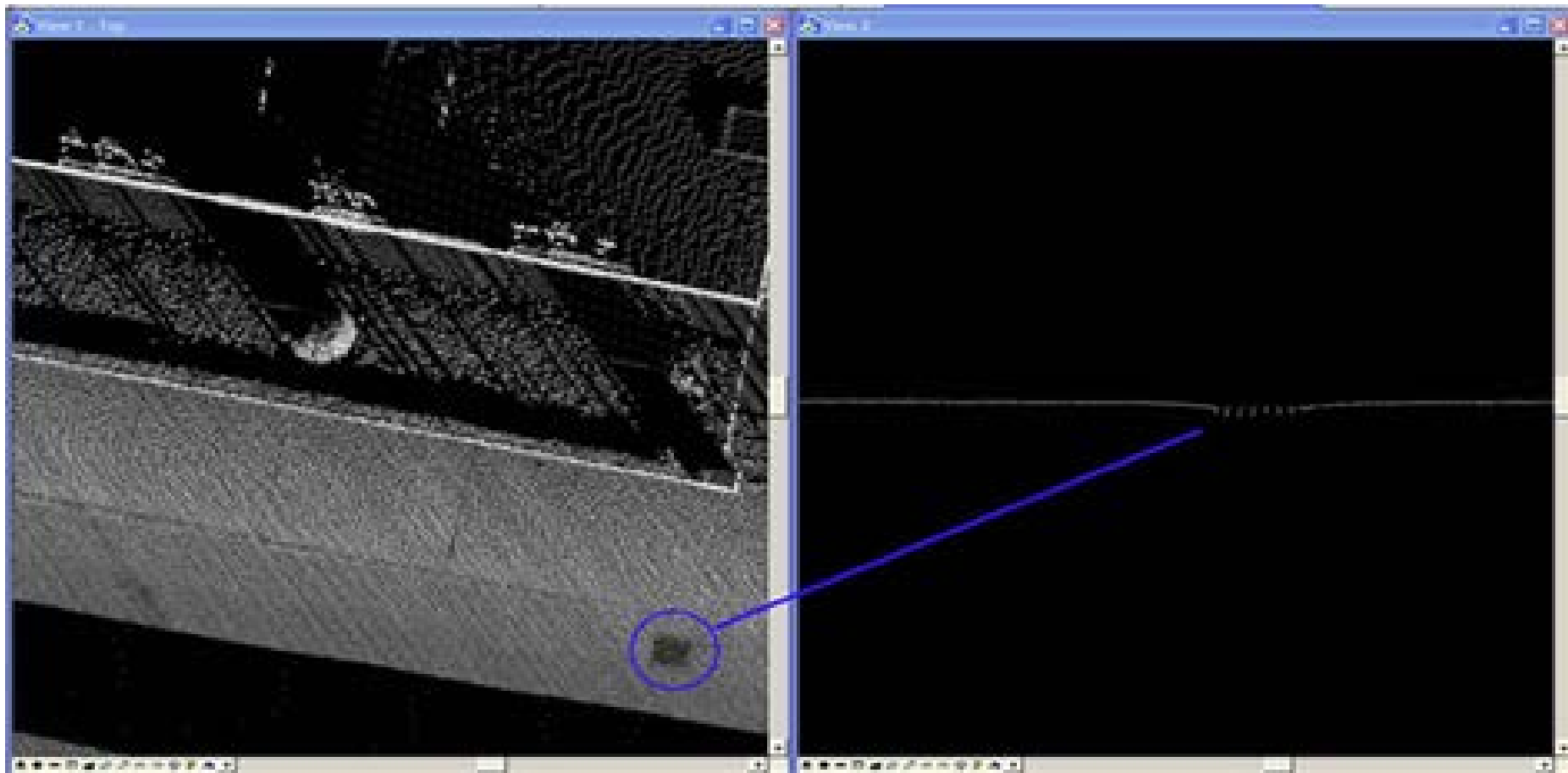
# Other Assets – Overhead Utilities



# Other Assets – Bridge Clearances



# Other Assets – Manholes, Inlets and Drainage



# Other Assets – Airports



# Potential Types of Assets

- Signs
- Light and power poles
- Bridges/clearances
- Inlets/curb/shoulder
- Fire hydrants
- Cross section
- Cross slope/pavement drainage
- Rail
- Pavement marking
- Utility locates
- Guardrail
- Median
- ADA facilities





# Do You Want Your Problems to be Extinct?

- Identify Problems
- Collect Data
- Organize/Analyze Data
- Understand Your Assets
- Design Your Solutions





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