Drone Products

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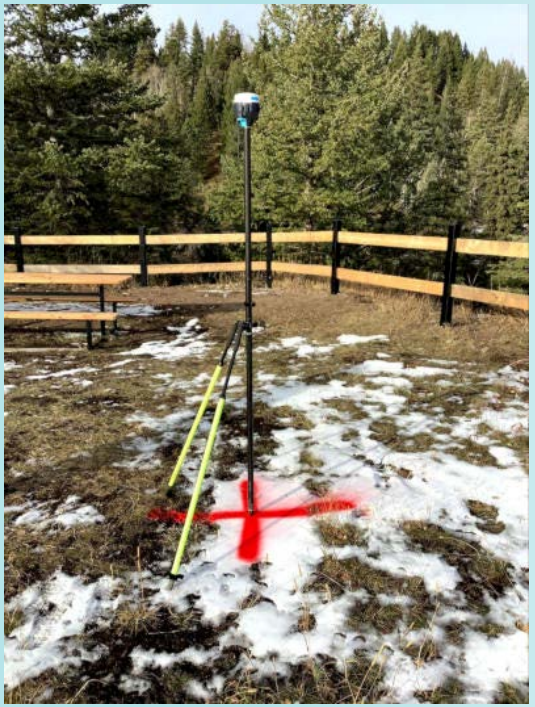
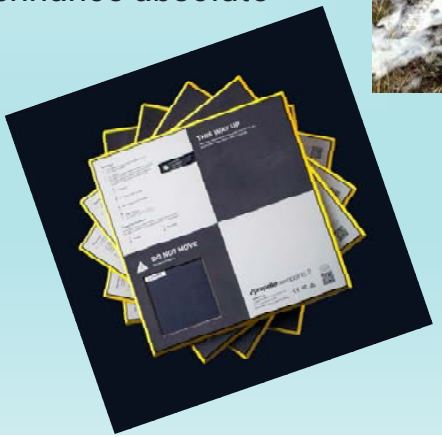
FREESE AND NICHOLS

Quick Drone Refresher

Data Gathering

- Photogrametry
  - Photogrammetry is the science of creating accurate 3D models, maps, and measurements from overlapping 2D photographs
  - Software analyzes images taken and triangulates points in space to reconstruct the shape, size, and position of objects or landscapes.
- Ground Control Points
  - Series of targets which are surveyed to get an exact x, y, and z
  - Used while processing photogrammetry
    - Points picked up in overlapping photos
    - Used to anchor images to real-world locations
    - “geographical thumbtacks” to correct distortion and enhance absolute accuracy.





Quick Checks

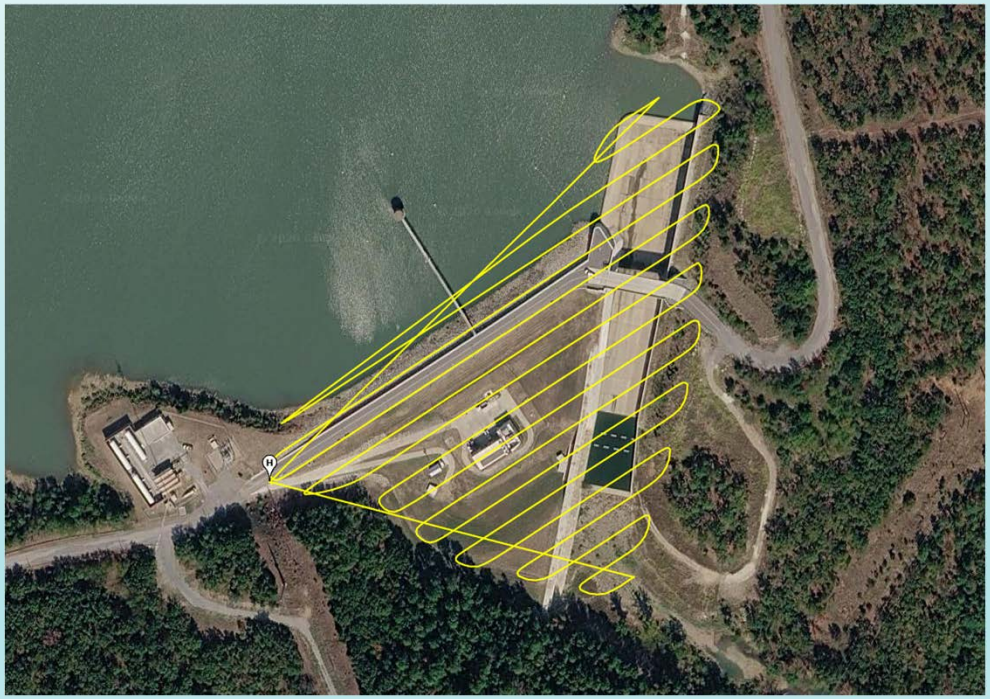
Input Summary

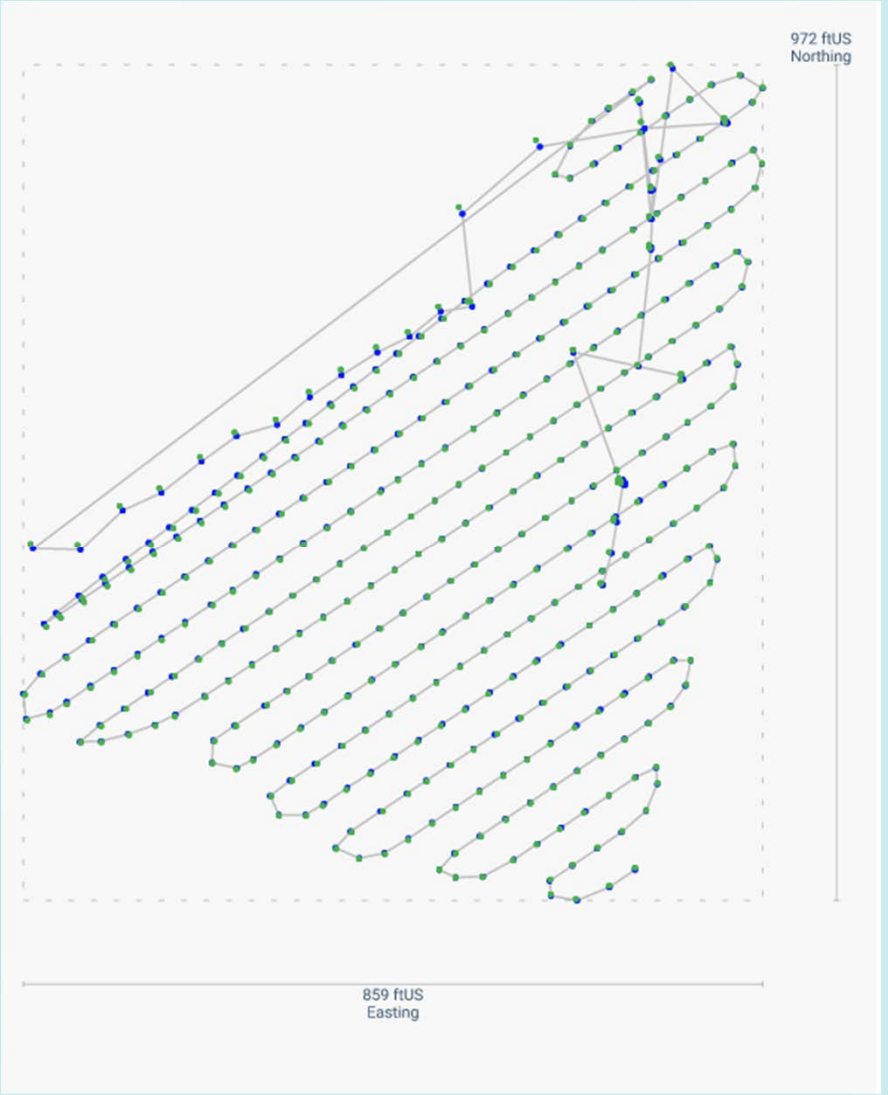
Project	384728-Project-2025-09-19T20_35_01.629Z
Camera Model Name	DJI_M3E_12.3_5280x3956
Image Input	415 input images (as 415 camera captures)
Image Coordinate System	Horizontal EPSG:4326, Vertical ellipsoidal
Project Coordinate System Name	NAD83(2011) / Oklahoma South (ftUS) + NAVD88 height (ftUS)
Project Coordinate System Type	COMPOUNDCRS
Project Coordinate System Axes	Easting[ftUS], Northing[ftUS], Gravity-related height[ftUS]
Geoid Model	GEOID18
Platform Versions	2.15.0 / QR v2.9.5

Quality Checks

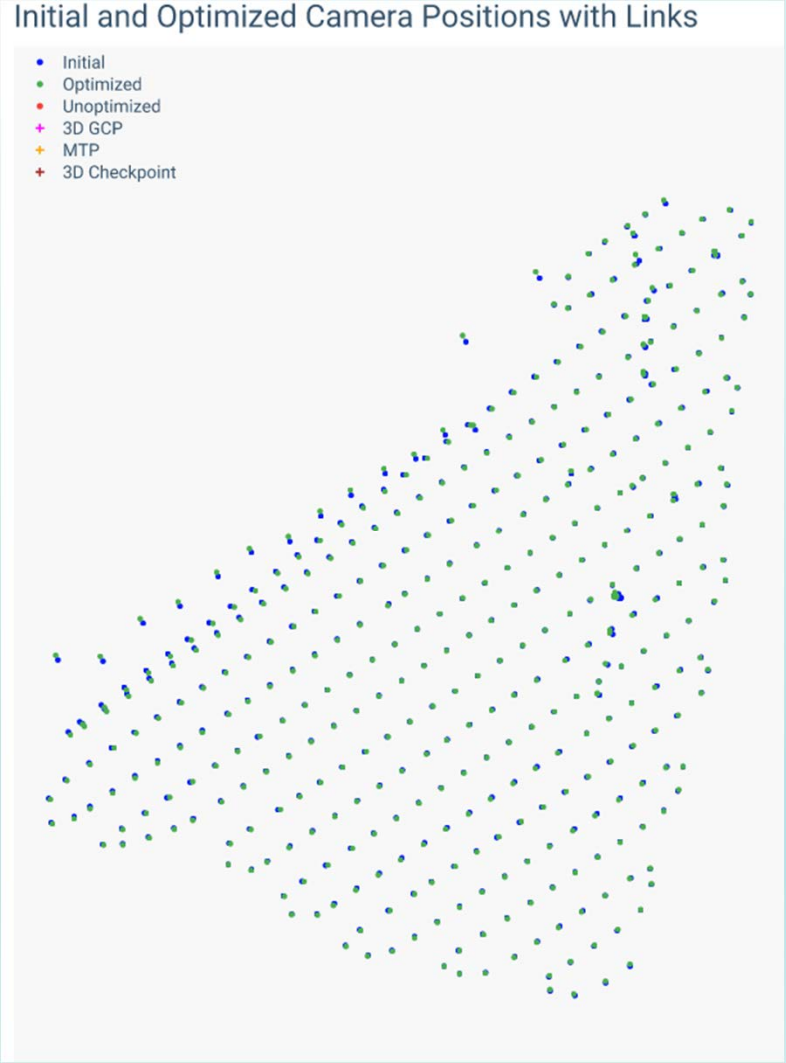
Dataset	415 out of 415 images were calibrated (100.0%)
Camera Optimization	0.01% relative difference between initial and optimized parameters
Median Number of Matches per Camera	16211
Median Number of Keypoints per Camera	59289
Average Ground Sampling Distance (GSD)	0.047073 [ftUS]
Cameras Calibrated	415
Cameras Geolocated	415
Number of Ray Cloud Points	1761840

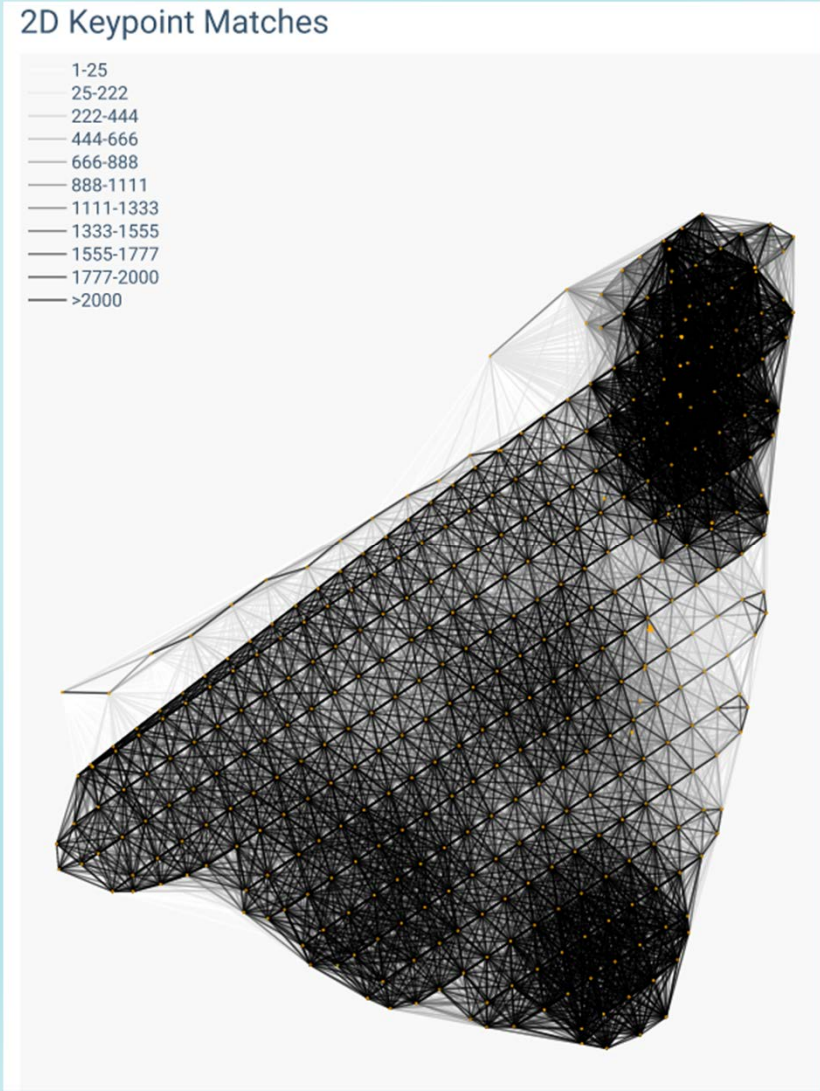
Drone Flights





Drone Flights





Error Report

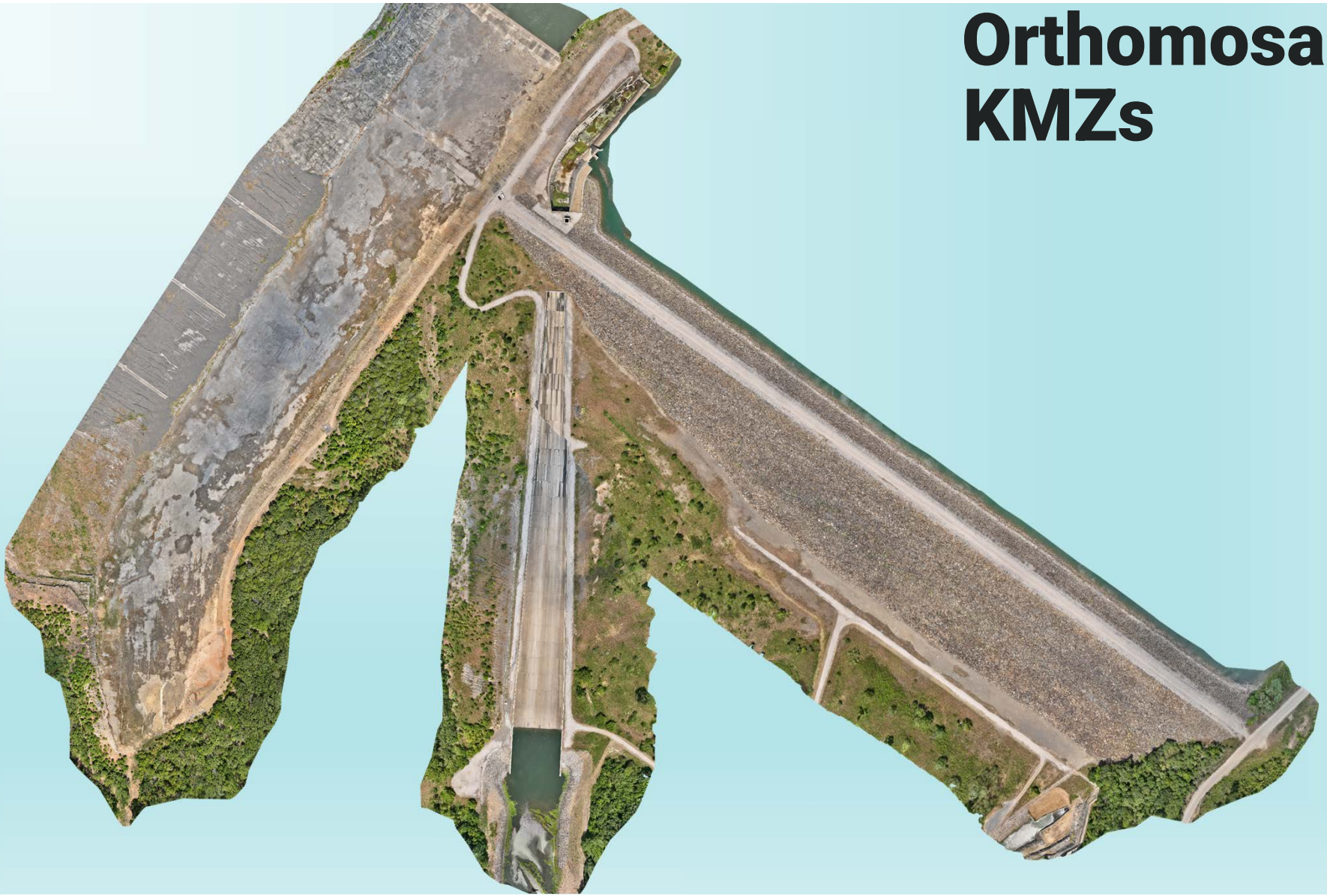
Absolute Geolocation Variances

Min. - Max. Error [ftUS]	Error X [%]	Error Y [%]	Error Z [%]
[-1000, -10]	0.0	0.0	0.0
[-10, -6]	0.0	1.7	0.0
[-6, -3]	3.4	5.1	8.4
[-3, -1]	24.8	12.5	32.5
[-1, -0.5]	11.6	8.2	7.0
[-0.5, -0.2]	6.7	8.0	4.8
[-0.2, -0.1]	3.9	2.7	1.0
[-0.1, -0.05]	1.4	1.2	1.2
[-0.05, -0.025]	1.9	0.0	0.0
[-0.025, -0.01]	0.0	0.5	0.0
[-0.01, 0]	0.2	0.2	0.5
[0, 0.01]	0.0	0.0	0.0
[0.01, 0.025]	0.2	0.5	0.5
[0.025, 0.05]	0.2	0.5	0.5
[0.05, 0.1]	0.5	1.2	0.5
[0.1, 0.2]	3.1	2.9	1.0
[0.2, 0.5]	6.7	7.0	4.8
[0.5, 1]	8.2	18.1	8.7
[1, 3]	20.7	28.0	16.1
[3, 6]	6.3	1.9	9.6
[6, 10]	0.0	0.0	2.9
[10, 1000]	0.0	0.0	0.0
Mean [ftUS]	0.003413	-0.005419	0.03175
Sigma [ftUS]	1.91643	1.887492	2.599938
RMS Error [ftUS]	1.916434	1.8875	2.600132

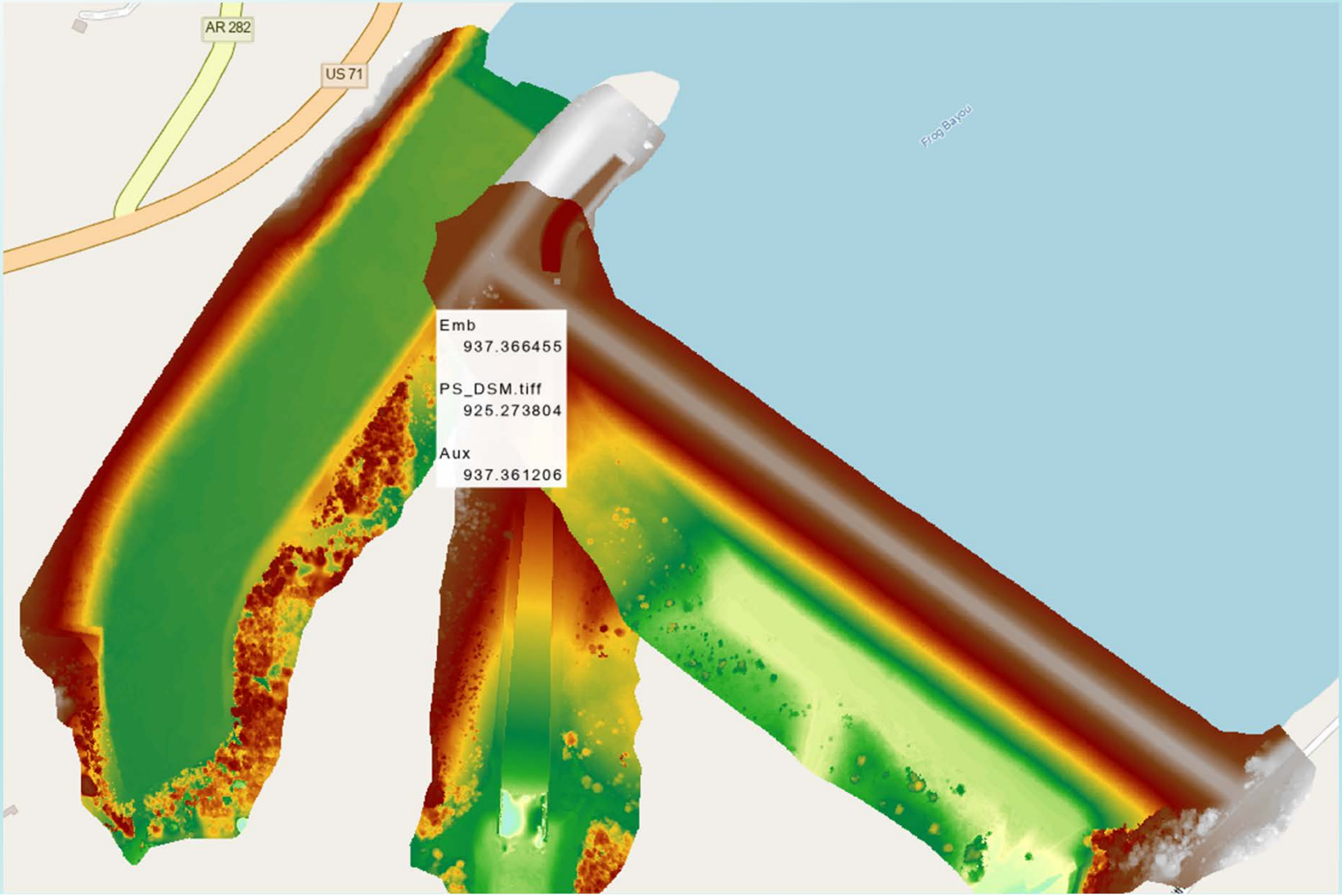
Products

- Orthomosaic
  - PNG, TIFF, KMZ
- DSM
  - Without ground control ~1-2 ft accuracy
  - With ground control – centimeter accuracy
- Point Cloud
  - Similar to LiDAR point cloud
- 3D Model

Orthomosaics KMZs



DSM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US 71
Frog Bayou
Emb
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PS_DSM.tiff
925.273804
Aux
937.361206

3D Model

Questions?