

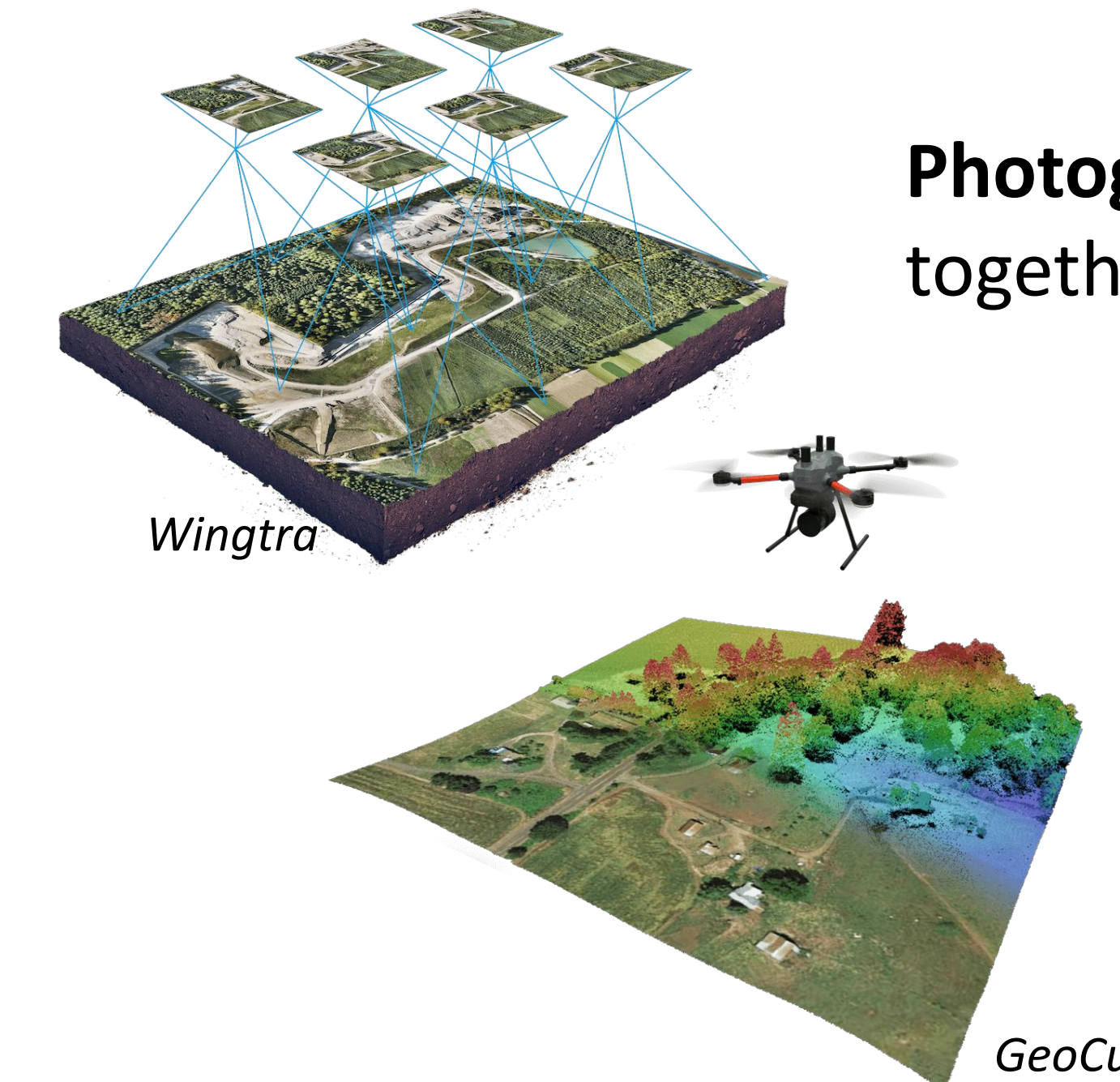
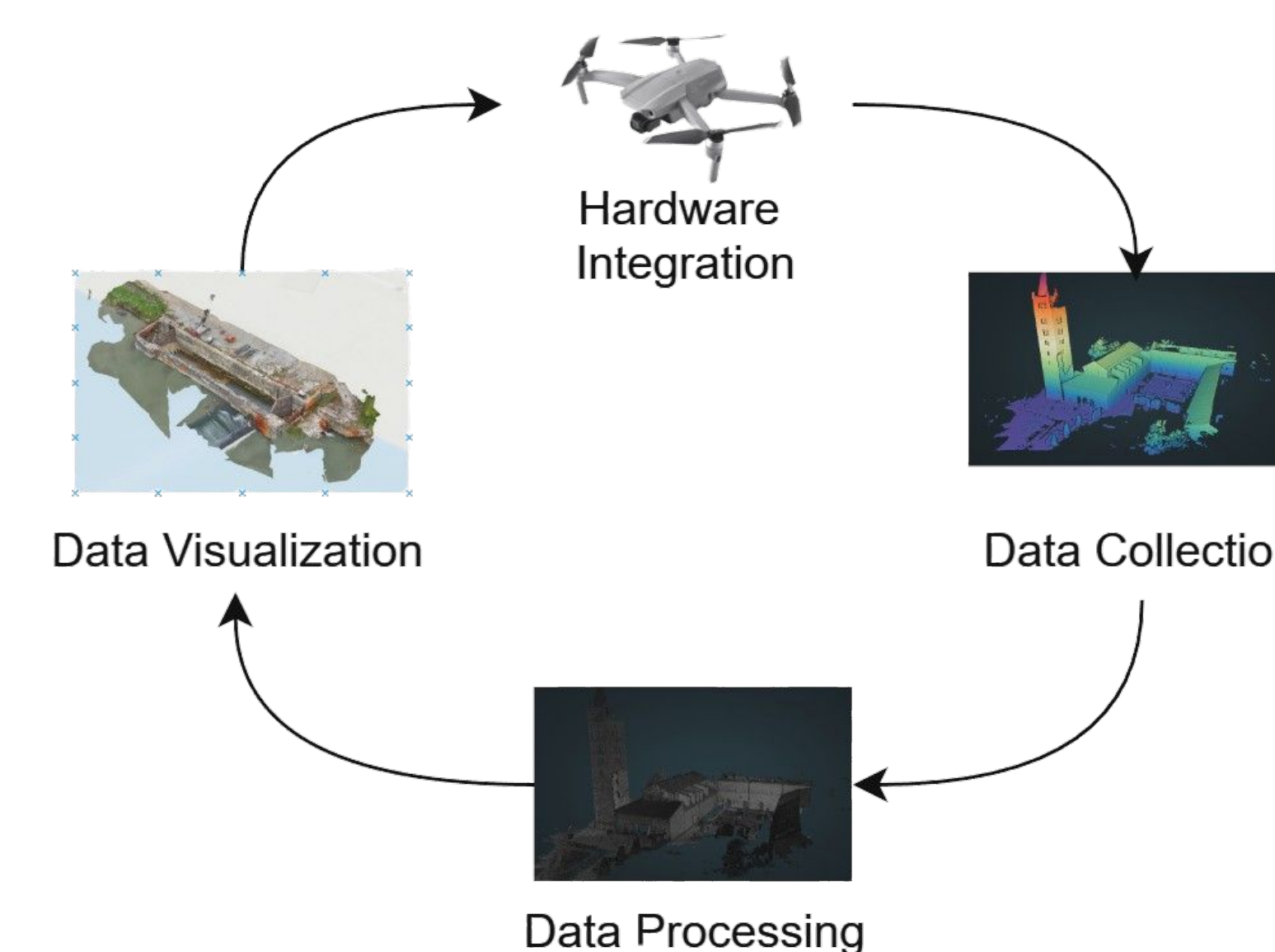
Aerial Precision: 3D Reality Capture and GIS Integration with Drone Technology



GEODECISIONS
A Division of Gannett Fleming

Team members: Adil Adil, Nathan Germain, Grady Beck, Colin Drake | **Faculty adviser:** Yuichi Motai PhD, Tamer Nadeem PhD | **Sponsor:** GeoDecisions

Problem Statement: This project aims to develop an efficient, replicable process for using drone technology to create 3D models of infrastructure worksites. By integrating photogrammetric and LiDAR-based imagery analysis with ESRI's ArcGIS software suite, we aim to streamline data collection, processing, and visualization. Ultimately, this project will provide an in-house process to leverage in the ever-competitive geospatial sensing industry.



Photogrammetry is a method where 2D images are stitched together to approximate a 3D model (NOAA).

LiDAR (Light Detection And Ranging) is a sensing process that uses a pulsed laser to measure range to a given object (NOAA).

Components Used



DJI Mavic Air 2

The DJI Mavic Air 2 combines high-resolution imaging with position data, capturing aerial photos ideal for precise mapping and surveying applications.



Livox Mid-360

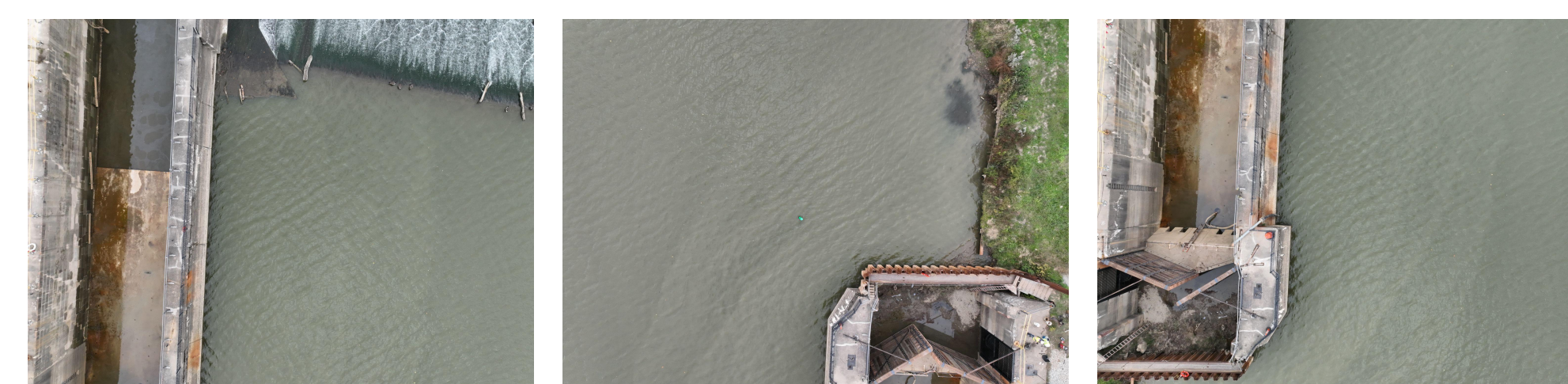
Mounted on a drone, the Livox Mid-360 LiDAR captures a high-resolution point cloud, giving accurate position data in order to form a depth map.



xPhase Pro X2

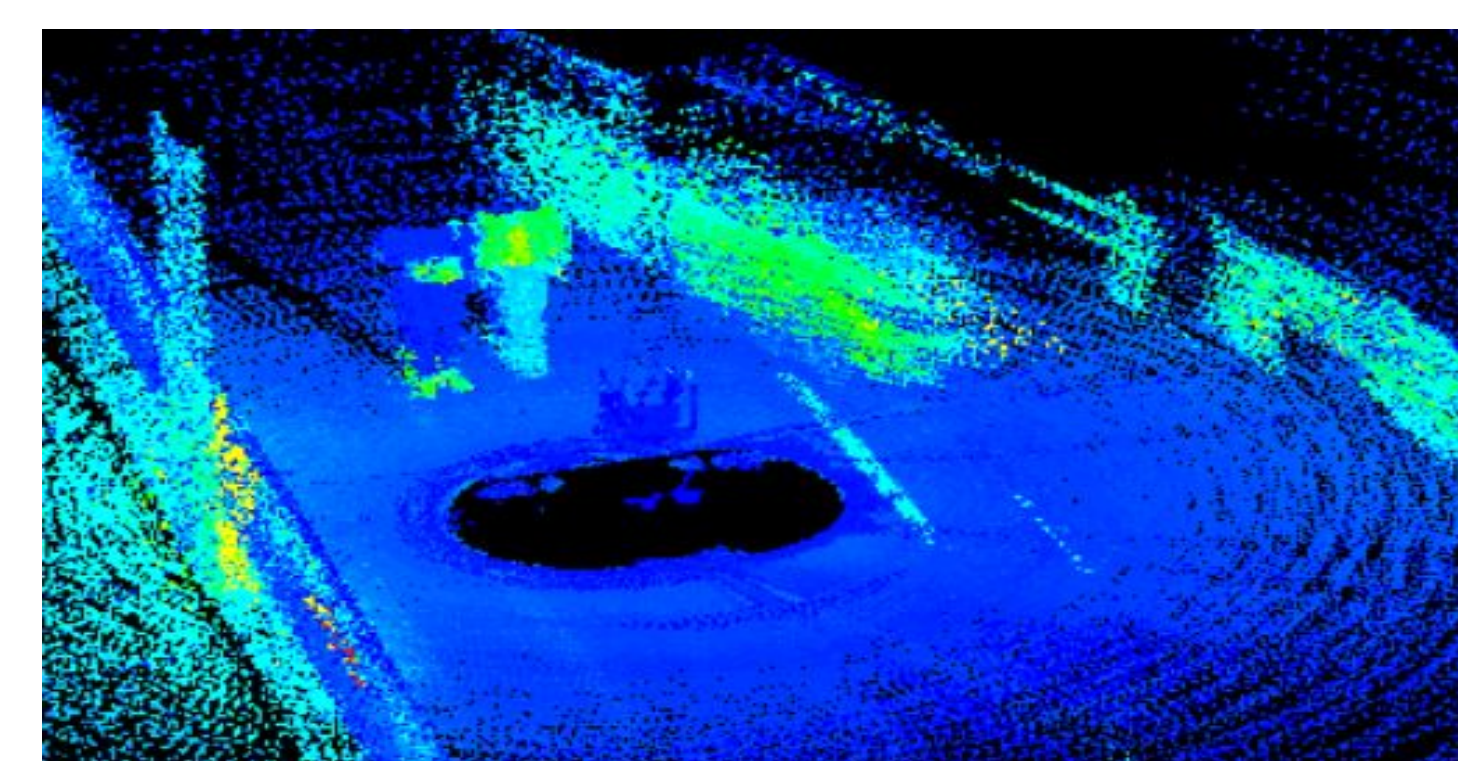
The 360° xPhase Pro camera enables precise capture of both static and dynamic models of objects, creating high-quality datasets ideal for detailed analysis and visualization.

Datasets Produced



Latitude: 59.79959
Longitude: 30.73570
Altitude: 201.119

Georeferenced photographs



LiDAR data (displayed in Livox Viewer)



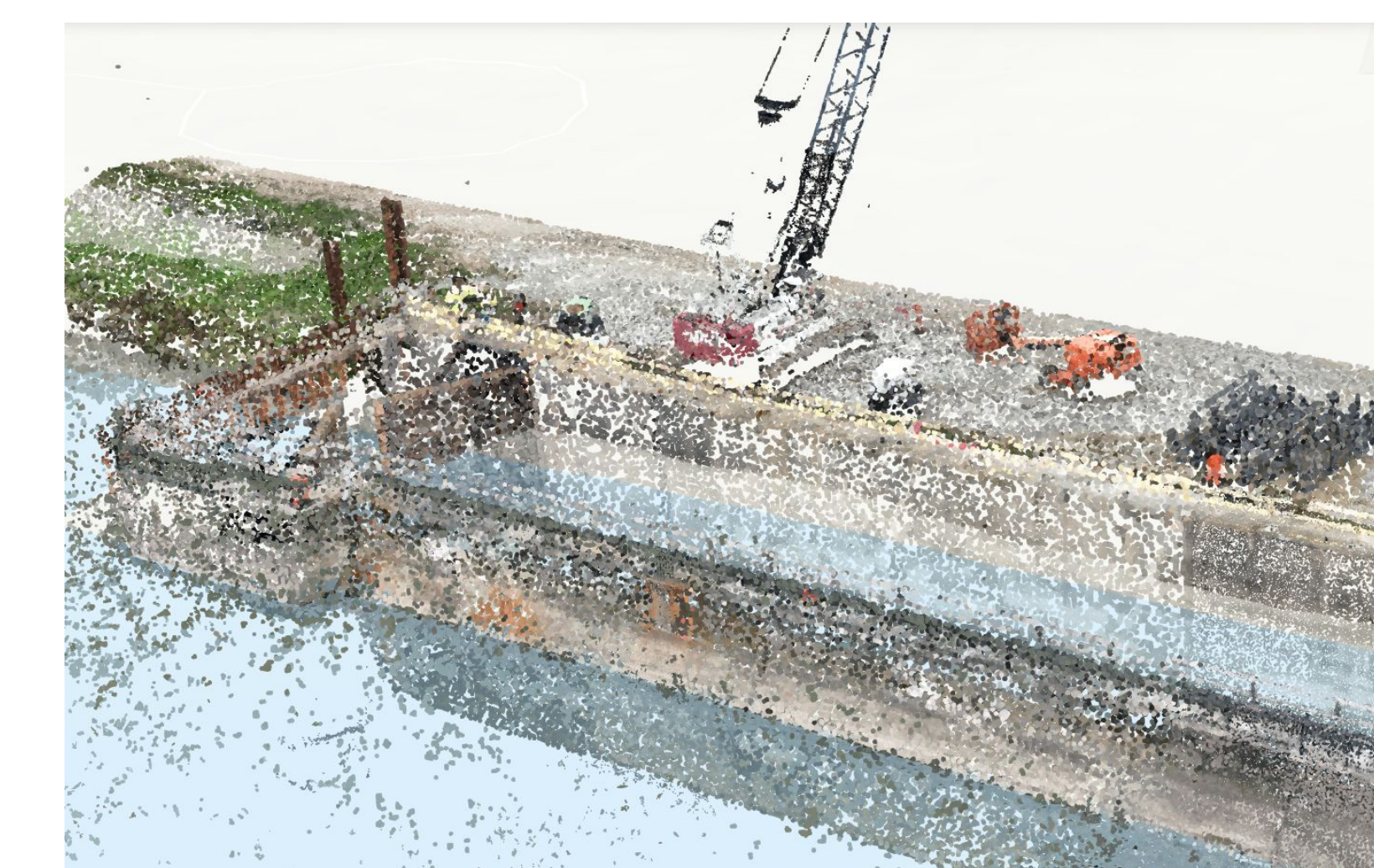
360 panoramic image

Data Processed

Datasets are then processed within the ArcGIS Reality suite, which allows for collating photogrammetry and LiDAR data into a single model



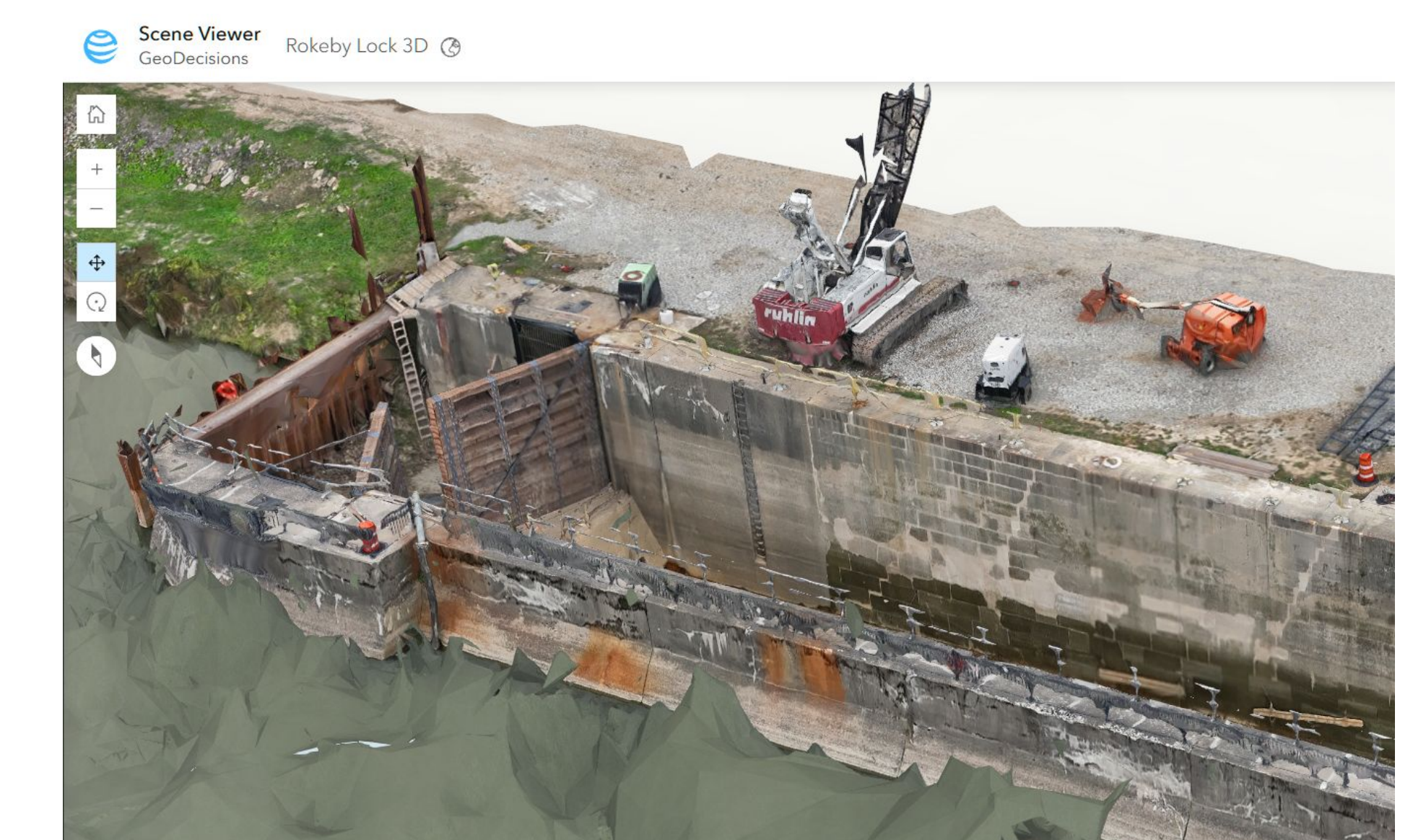
Rendered orthomosaic view from drone photos



LiDAR point cloud with color data

Model Visualized

The completed model is placed into a virtual environment, ArcGIS Online, which provides stakeholders the means to view and manipulate models from anywhere in the world.



Completed model within ArcGIS Online

As work on the site continues, repeated site surveys can be completed and the new data passed through the workflow to provide a time axis for reviewing progress.

