



Unmanned Aerial Systems Applications

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Presented by

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BIOGRAPHY

Bradley S. Holleman, PLS, EI

- BS in Civil Engineering from LSU
- Minor in Land Surveying from LSU
- Engineer Intern 29386
- Professional Land Surveyor 5082
- LSPS President 2019–2020
- LSPS Executive Board Member 2016–2021
- Senior Vice President – Survey / Advanced Measurements and Modeling at Forte and Tablada, Inc.



Types of sensors for UAS in Land Surveying...

- Light Detection and Ranging (LiDAR)
 - Topographic surveys
 - DEMs for Construction Quantities and Monitoring
 - Volumetric Surveys
- Aerial Photography
 - Topographic Surveys
 - Facility Planning
 - Asset Inventory
 - Structural Inspections



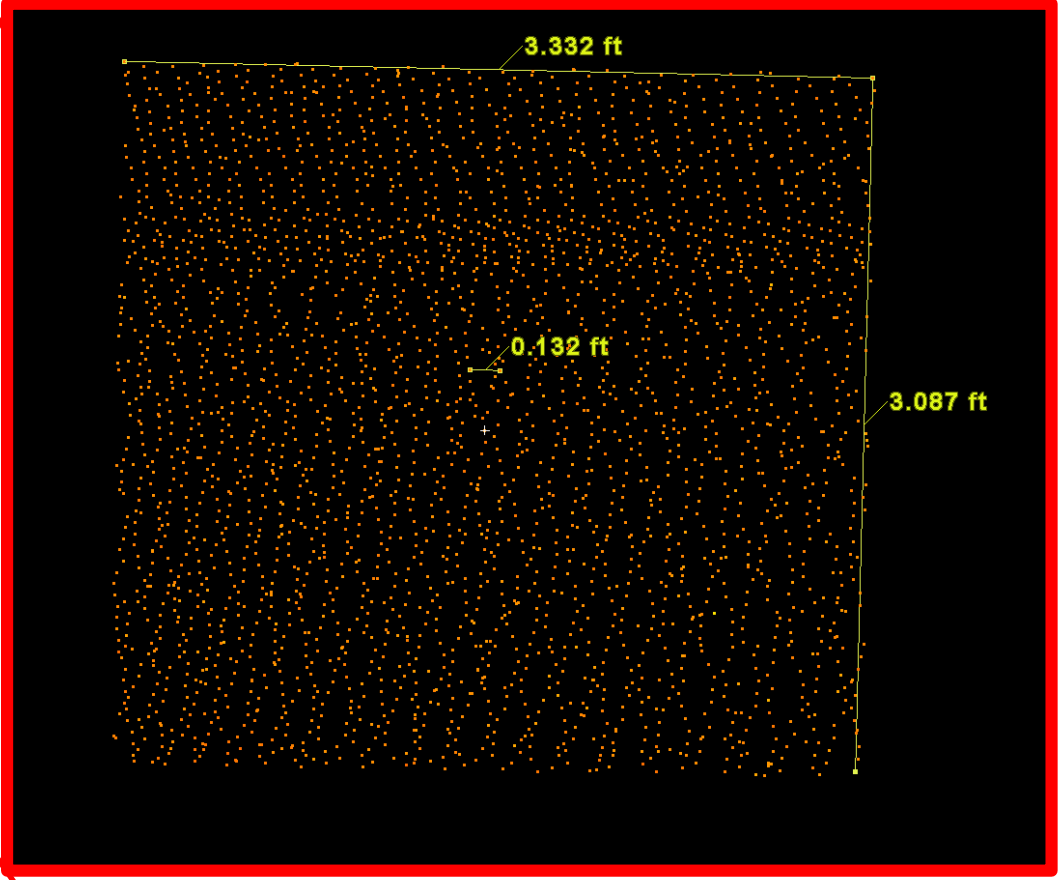
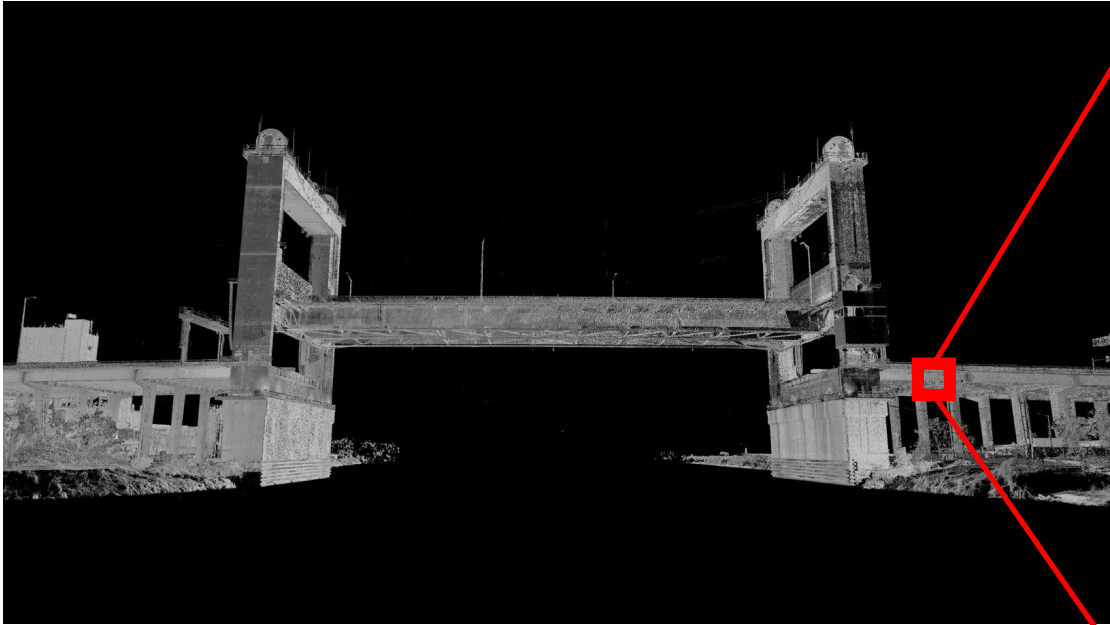
What is LiDAR...



LiDAR stands for Light Detection and Ranging

A LiDAR scanner uses lasers to measure the distance of objects from the scanner based on the amount of time it takes for the laser light to reflect back to the scanner. This happens at light speed and is able to be collected while the scanner is in motion.

What is LiDAR...



Types of LiDAR Collection



Terrestrial Stationary

- Most precise
- Vertical 0.001' – 0.02'



Terrestrial Mobile

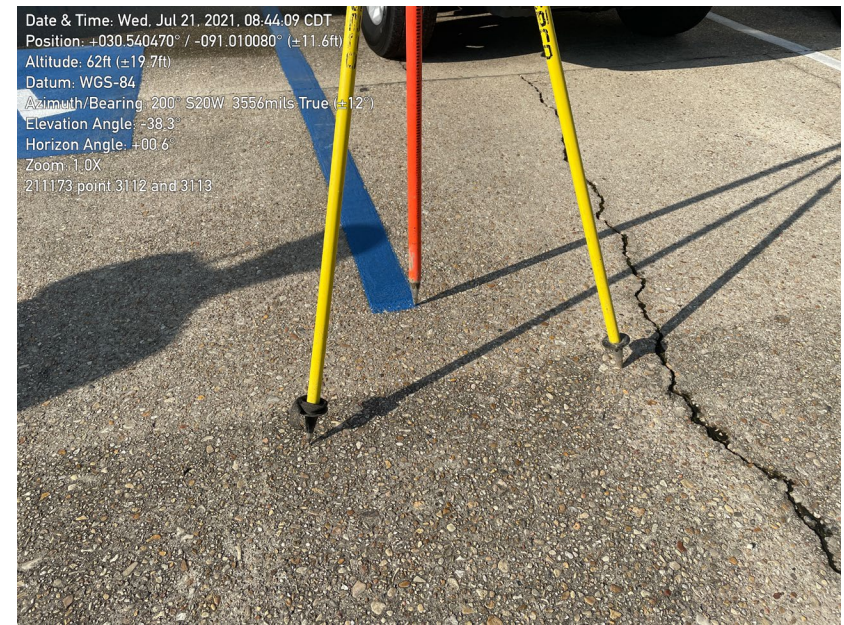
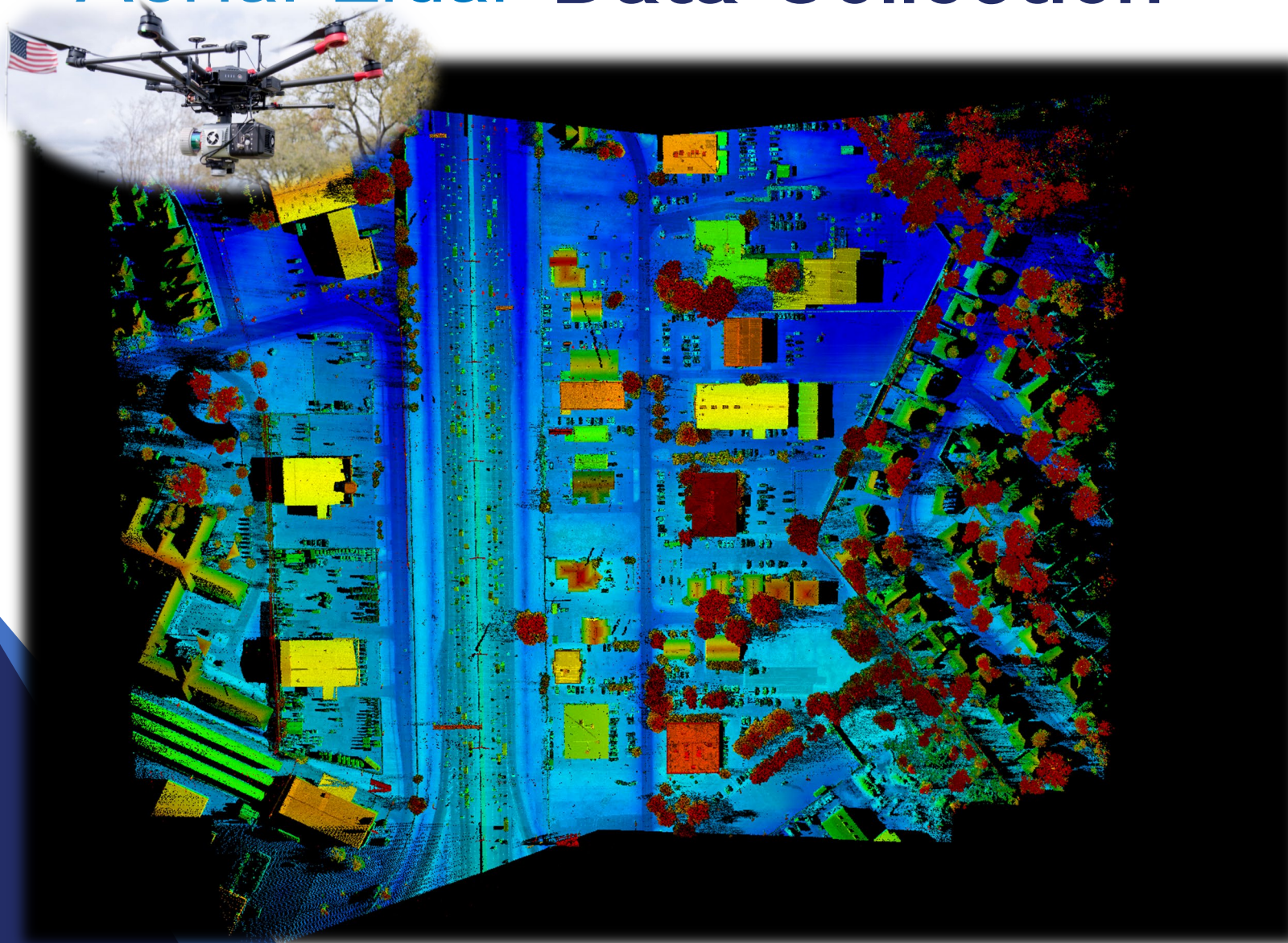
- Mobile platform introduces more variables
- Type A < 0.06'
- Type B < 0.10'
- Type C > 0.15' (varies)



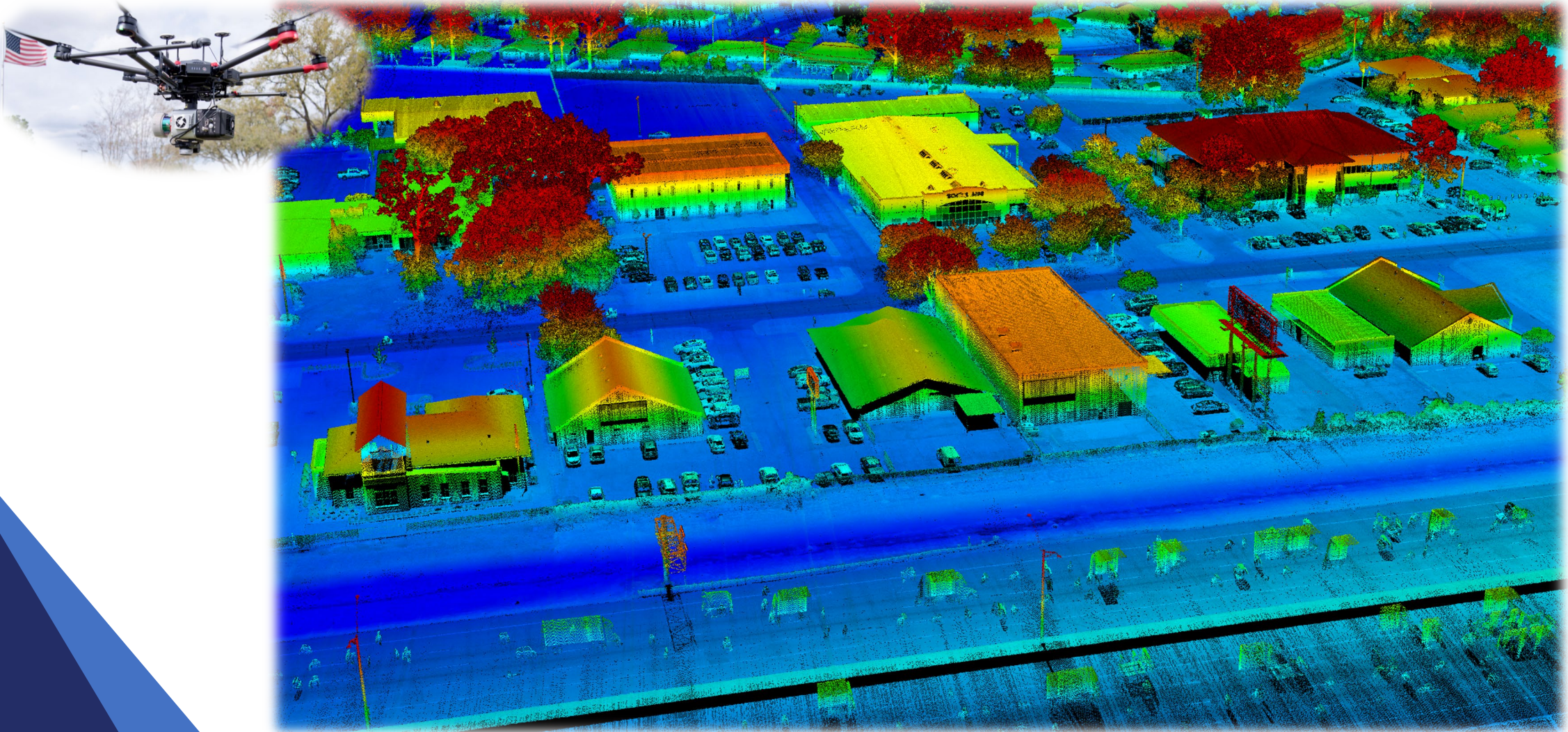
Aerial Mobile

- Aerial platform introduces more variables
- Ground Control < 0.15'
- GNSS Only > 0.30'
- Sample vs. Population DEM

Aerial Lidar Data Collection



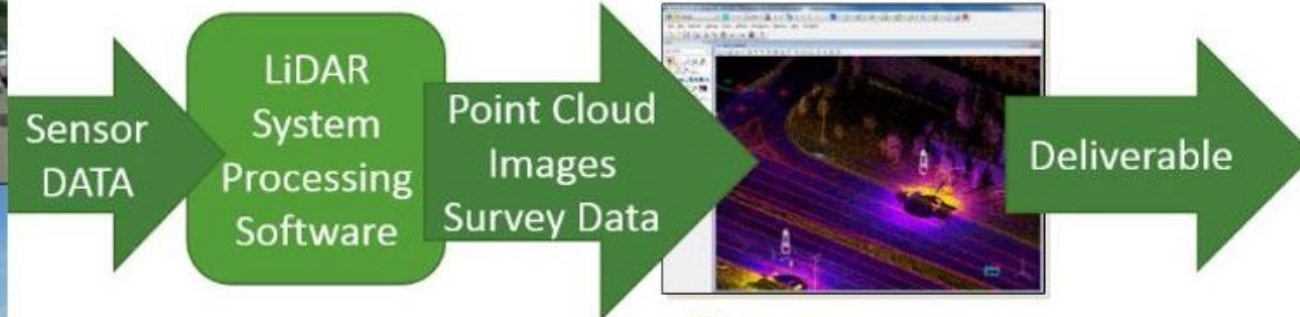
Aerial Lidar Data Collection



Aerial LiDAR Data Extraction



LiDAR System



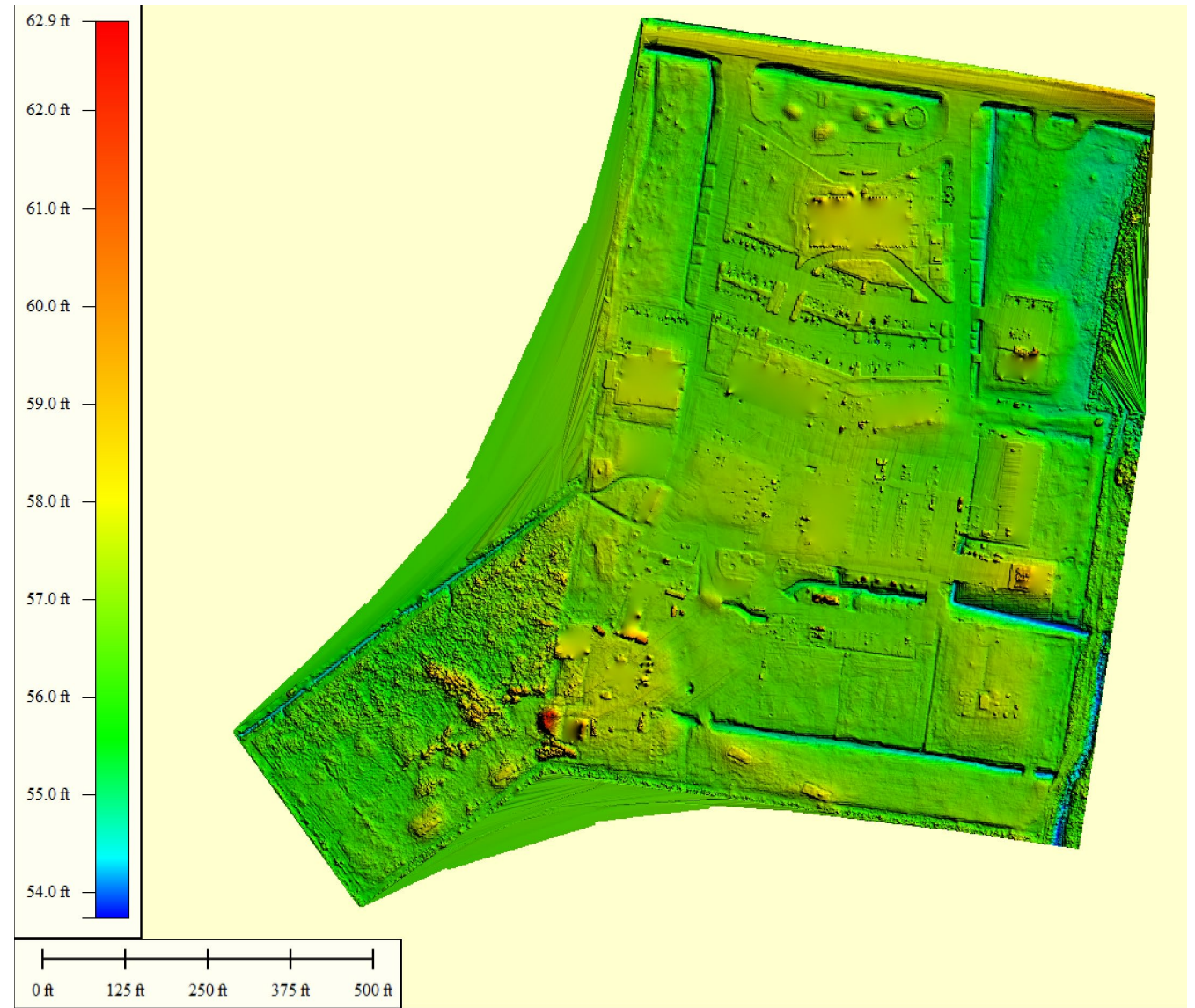
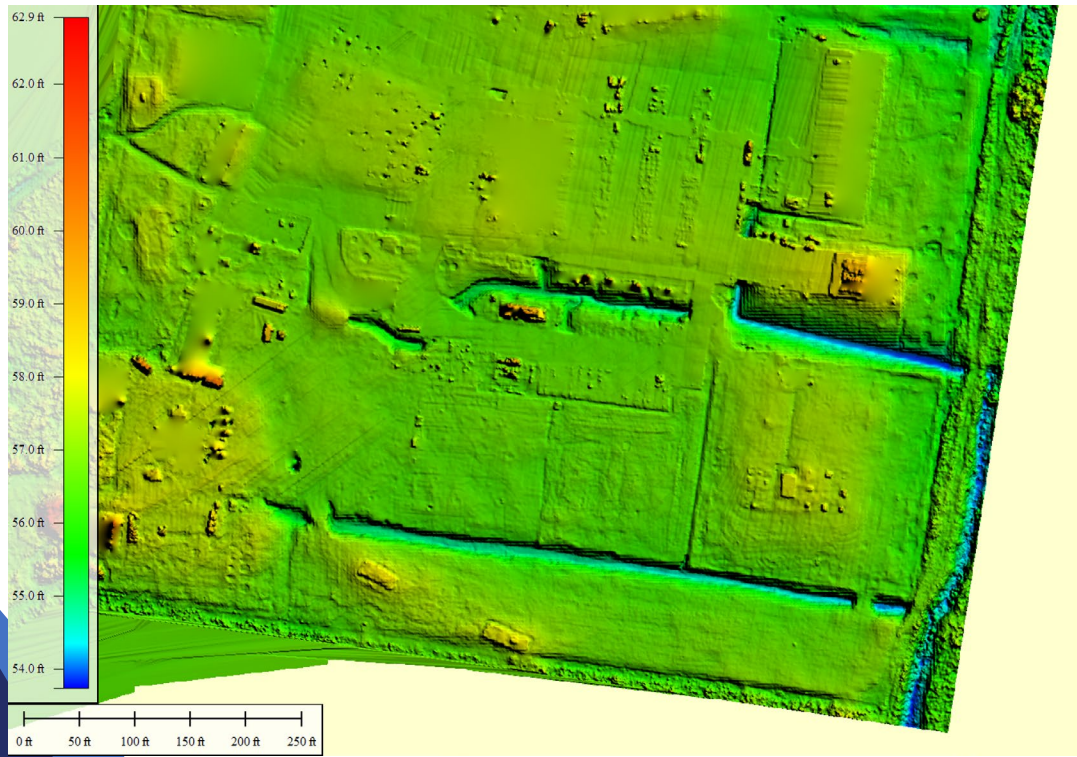
- Acquisition
- System Calibration
- Adjustment
- Correction
- Projection
- QA/QC

 TopoDOT®
MicroStation™

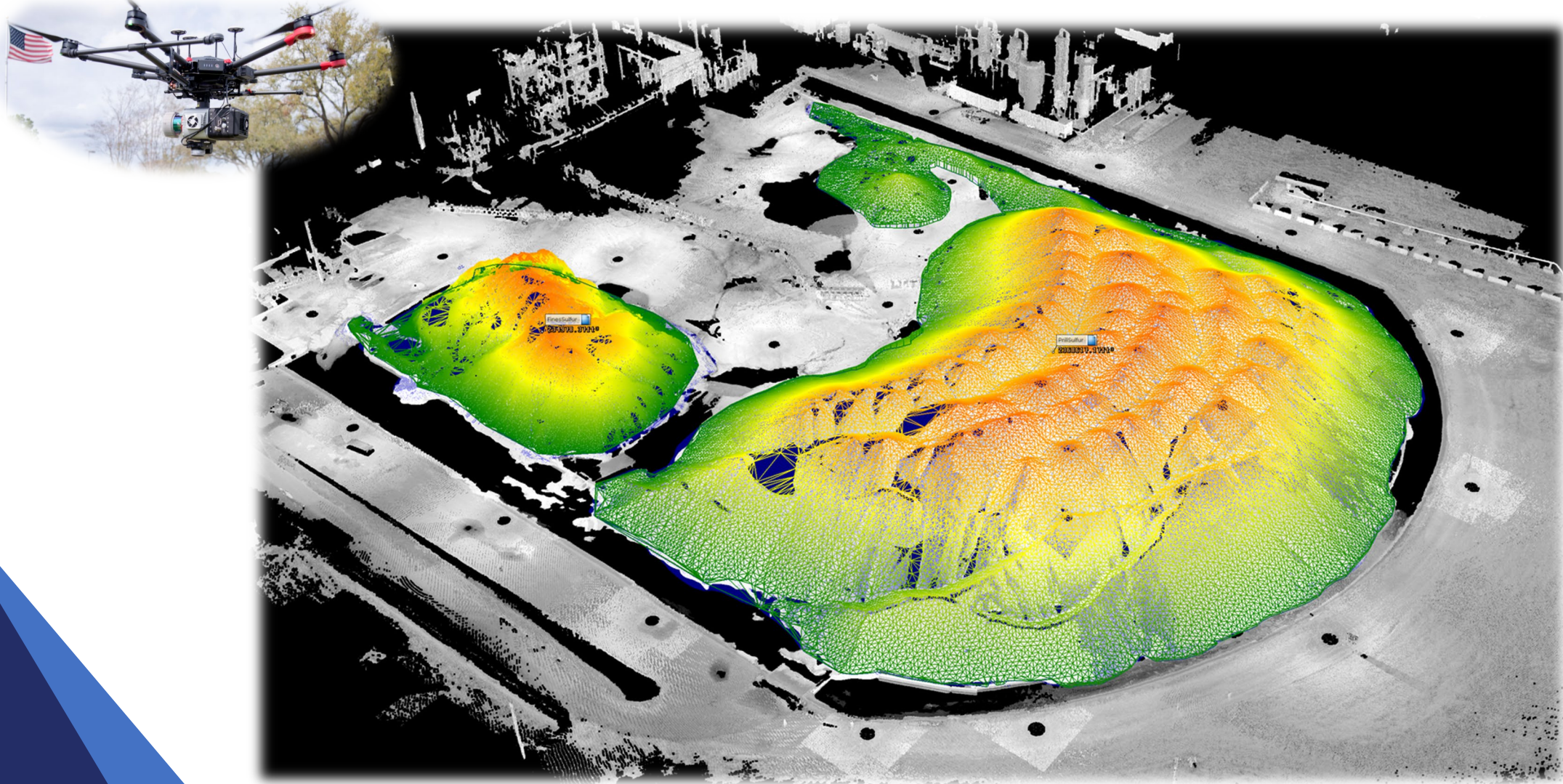
- QA/QC
- Feature Identification & Extraction
- Model Building & More

Aerial LiDAR Data Extraction

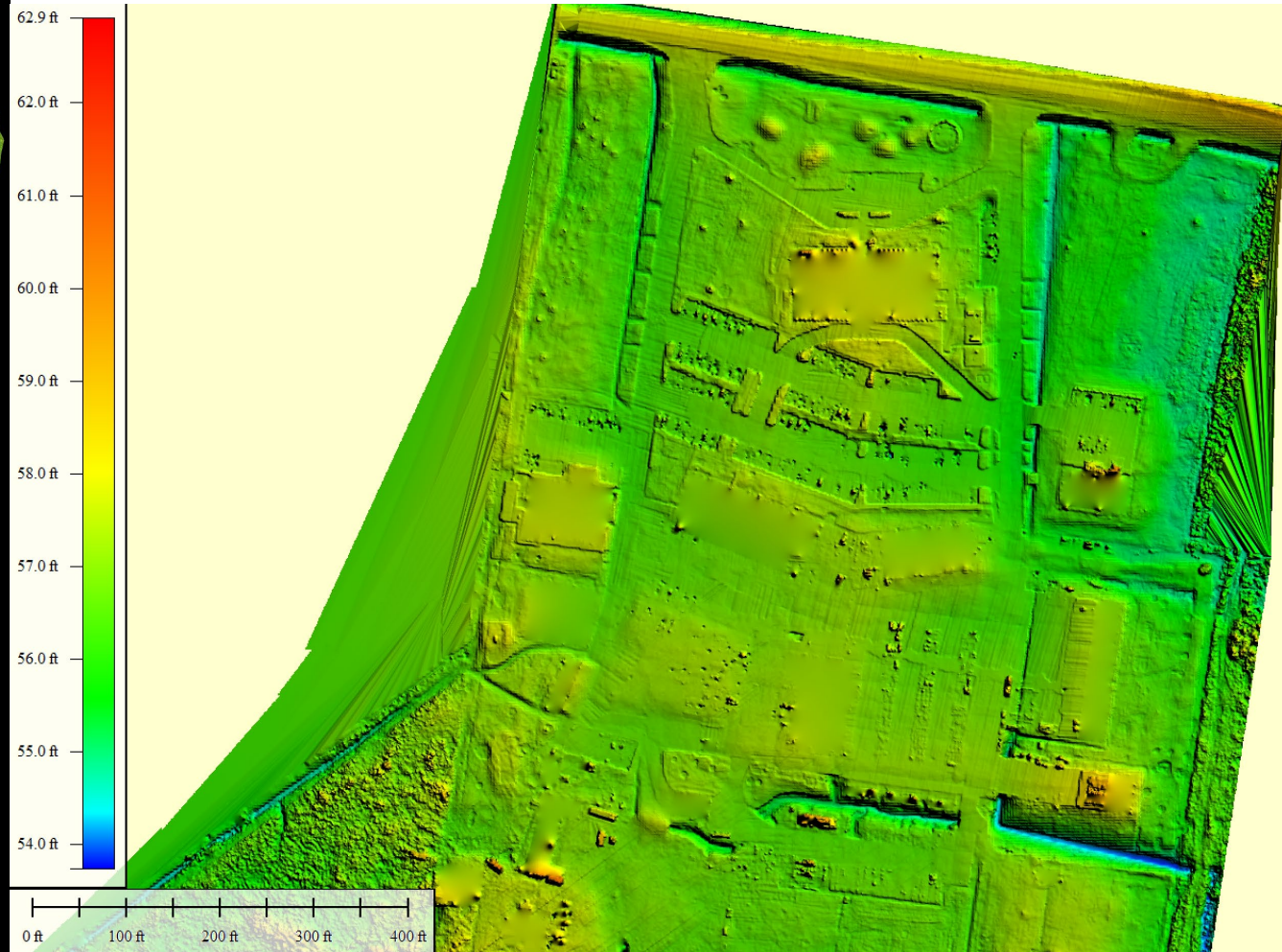
Bare Earth Classification



Project Types Volumetric Surveys



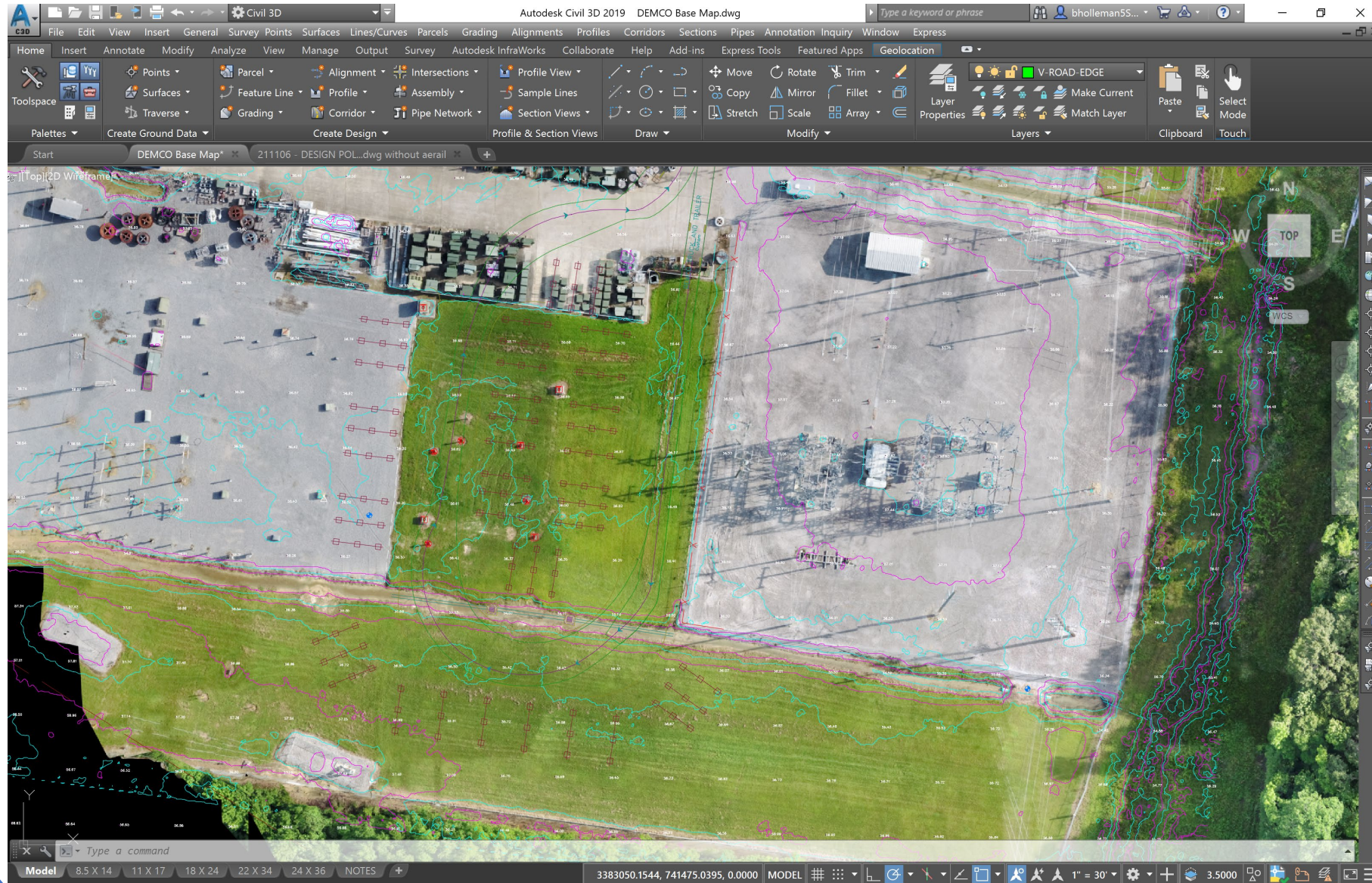
Project Types Facility Planning



Project Types Facility Planning



Project Types Facility Planning



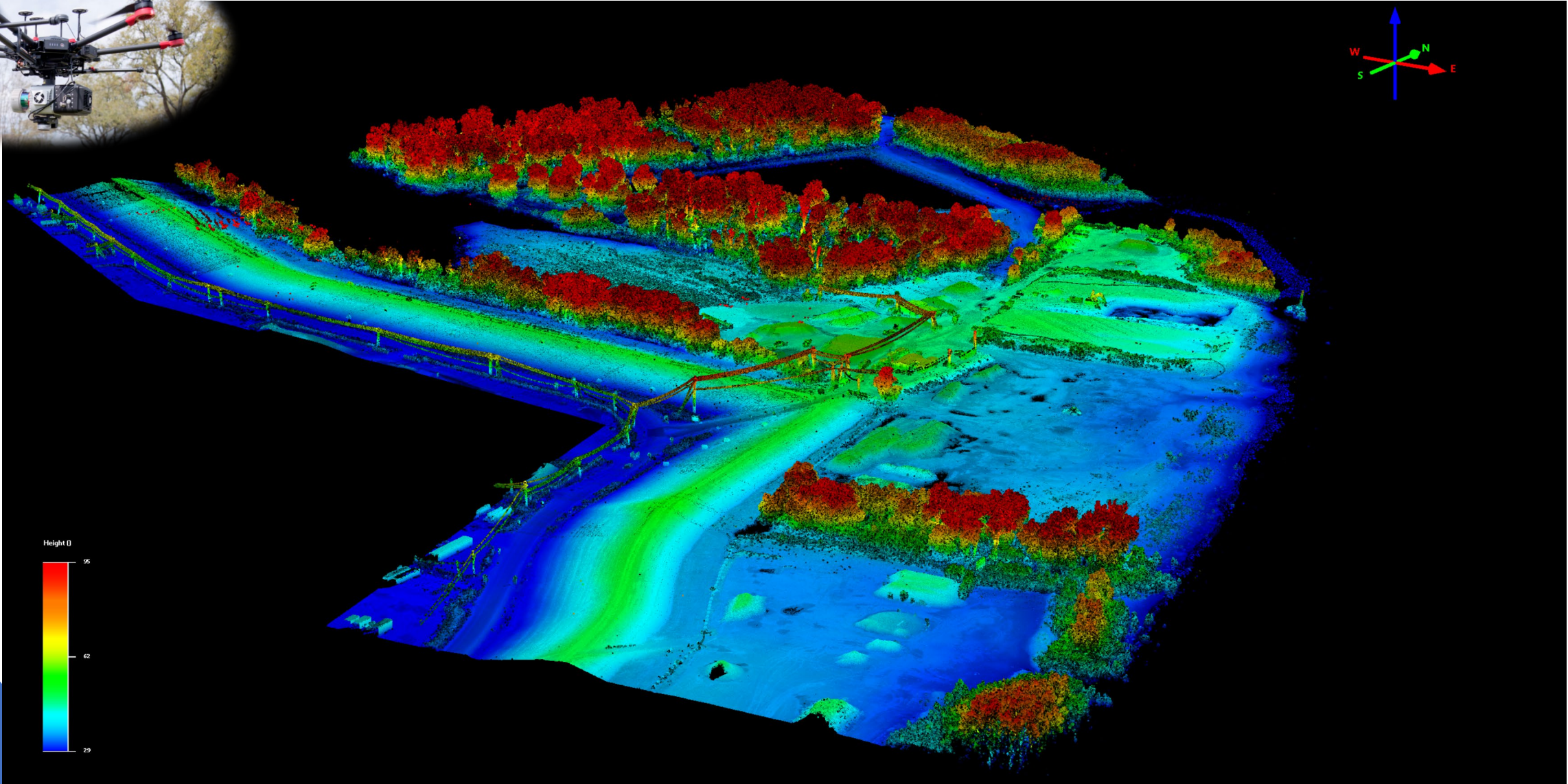
Project Types Construction Inspection



Project Types Construction Inspection



Project Types Topographic Surveys



Project Types Topographic Surveys



Drones and Legislation

LOUISIANA HAS NINE STATE-WIDE LAWS CONCERNING THE USE OF DRONES IN THE STATE:

HB 265 // 2021

increases the maximum fine for the second offense of flying a drone above critical infrastructure and Grain operations from \$2,000 to \$4,000 and increases the possible prison sentence from one year to two years.

SB 69 // 2017

This law specifies that only the state may regulate UAS, pre-empting local regulation.

SB 73 // 2016

This law adds intentionally crossing a police cordon using a drone to the crime of obstructing an officer. This law also allows law enforcement or fire department personnel to disable UAS in the area if they endanger the public or an officer's safety.

HB 19 // 2016

This law prohibits using a drone to conduct surveillance of a school, school premises, or correctional facilities, and establishes a fine of up to \$2,000 and up to six months in jail for violations.

HB 335 // 2016

This law authorizes the establishment of registration and licensing fees for UAS in the state, with a limit of \$100.

HB 635 // 2016

This law adds the use of UAS to the crimes of voyeurism and video voyeurism in the state.

SB 141 // 2016

This law specifies that surveillance by an unmanned aircraft constitutes criminal trespass, under certain circumstances.

SB 183 // 2015

This law regulates the use of UAS in agricultural commercial operations.

HB 1029 // 2014

This law creates the crime of unlawful use of an unmanned aircraft system, defined as the intentional use of a drone to conduct surveillance of a targeted facility without the owner's prior written consent. This crime is punishable by a fine of up to \$500 and imprisonment for six months. A second offense can be punished by a fine up to \$1,000.00-and one-year imprisonment.

Drones and Legislation



The purpose of the DAC is to provide an open venue in Louisiana and all unmanned stakeholders to work in partnership to identify and recommend a single, consensus-based set of resolutions for issues regarding the efficiency, safety, integration of Unmanned systems into the state of Louisiana and to develop recommendations to address those issues and challenges.

Drones and Legislation



The Impending Drone Highway

With all of the developments in drone technology and research of various use cases, what has prevented drones from being adopted into widespread use by a company or government?



Questions???