Sense.Lidar®

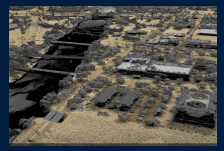
Affordable, Accurate and Quality Point Classifications

Angie Pelkie, Technical & Business Development Manager
504.430.7076, a.Pelkie@fugro.com

SCAUG 2023

Remote Sensing and Mapping

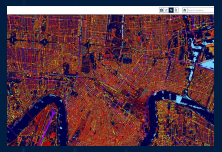
Overview of RSM, Power, and Focus Points



Lidar

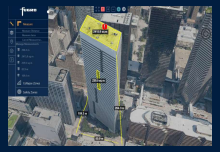
Imagery

Planimetrics



Roames for Power Utility

SIMmetry for Facility Management

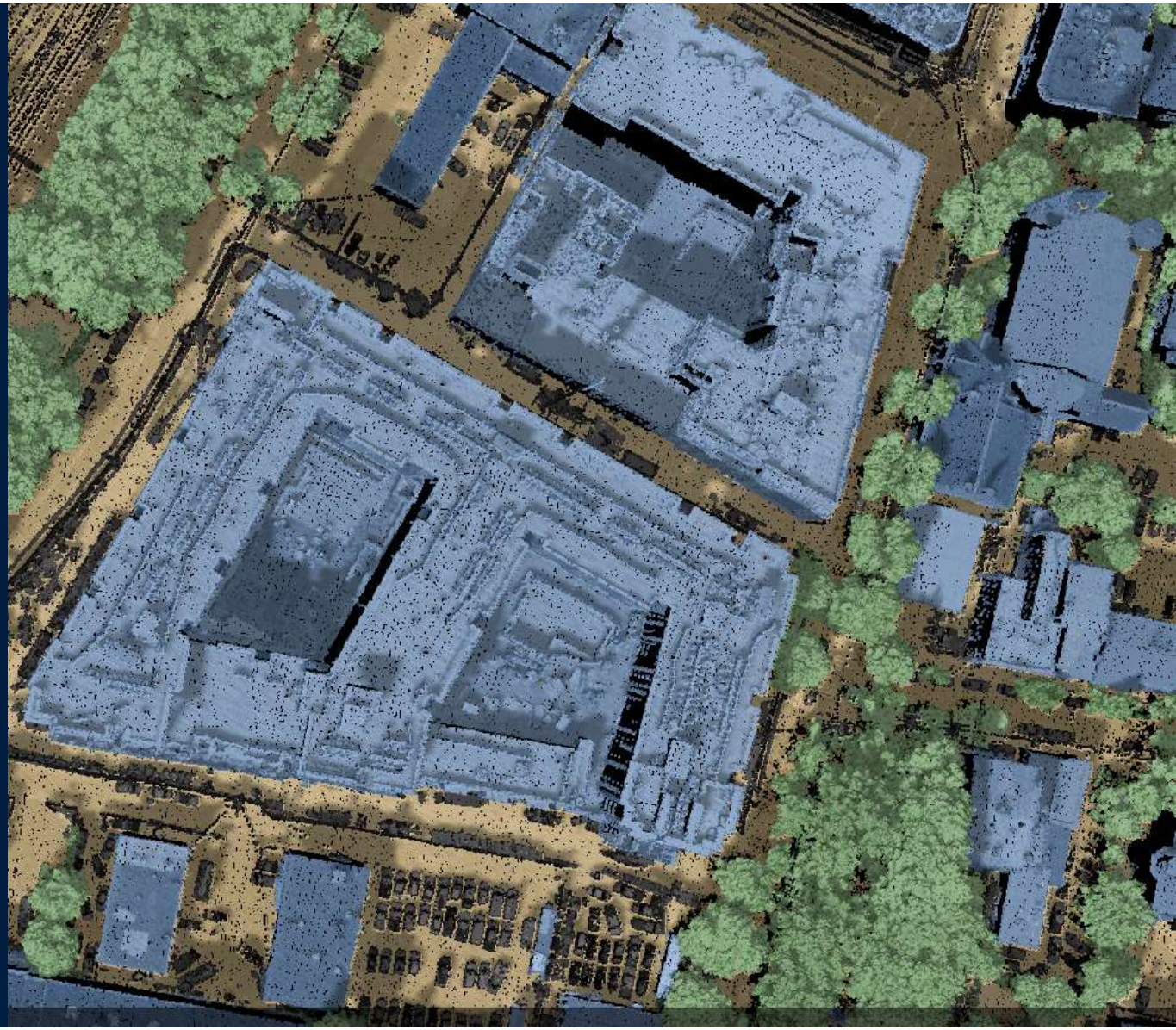


RapidSOS-ready SIMmetry

Sense.Lidar

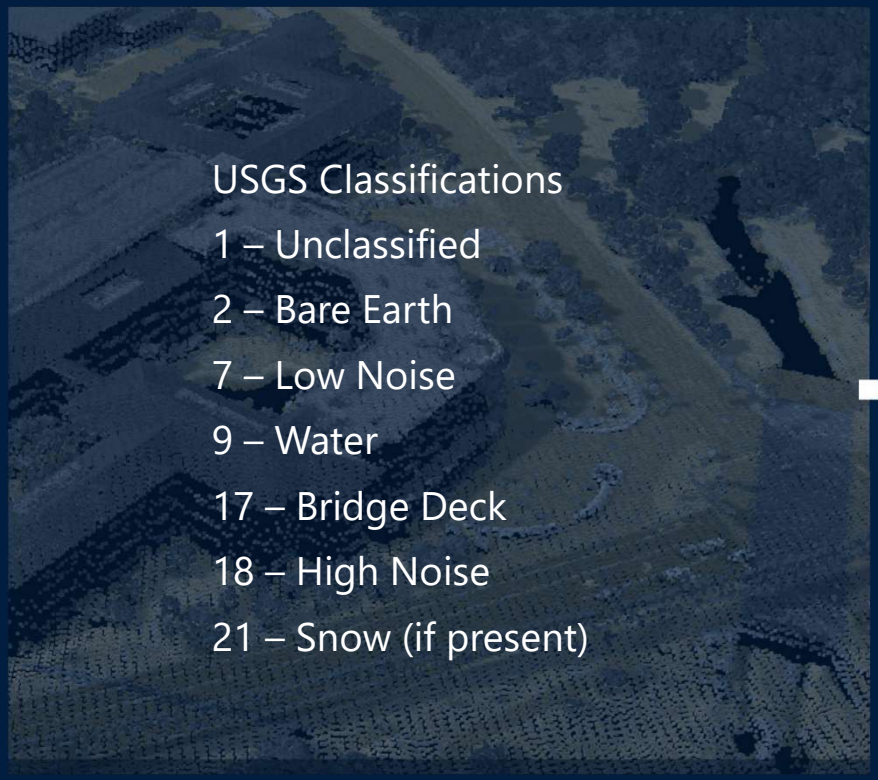
About Sense.Lidar®

Using cloud processes and AI, Sense.Lidar® accurately classifies clusters of lidar points which characterizes the details of our earth.



Convert USGS Classifications to State Specifications

Added and Enhanced Classifications



USGS Classifications

1 – Unclassified

2 – Bare Earth

7 – Low Noise

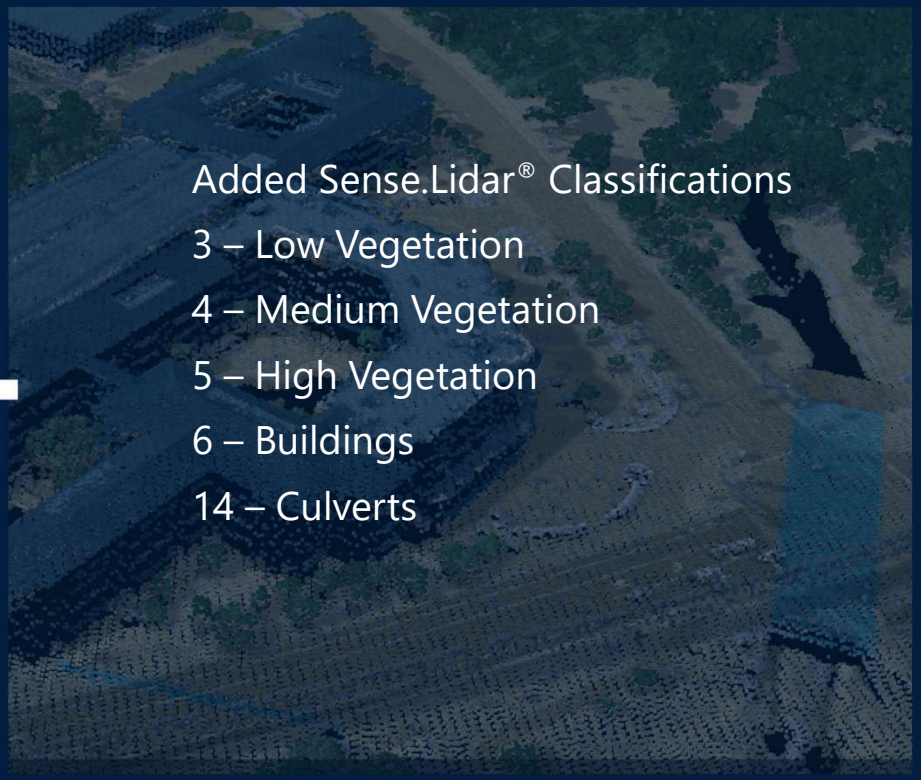
9 – Water

17 – Bridge Deck

18 – High Noise

21 – Snow (if present)

+



Added Sense.Lidar® Classifications

3 – Low Vegetation

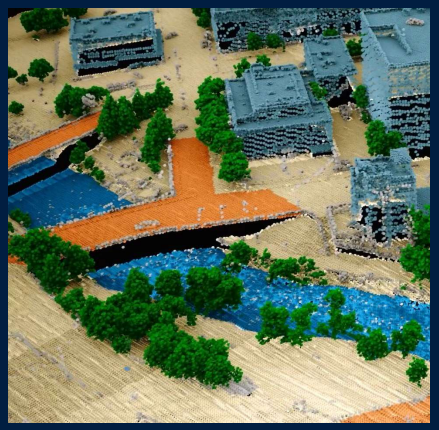
4 – Medium Vegetation

5 – High Vegetation

6 – Buildings

14 – Culverts

Sense.Lidar® Added Classifications

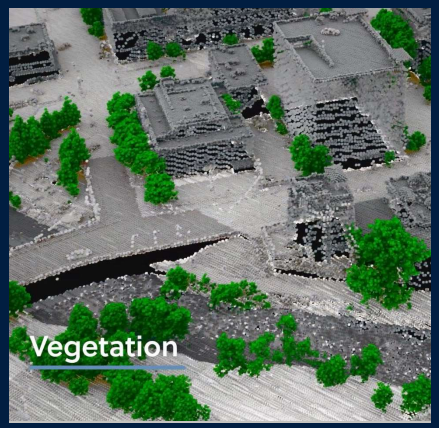


Classified lidar to 99% accuracy

Added hydro features

- Culverts

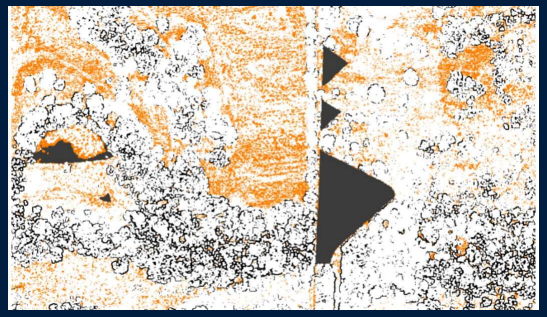
Added buildings



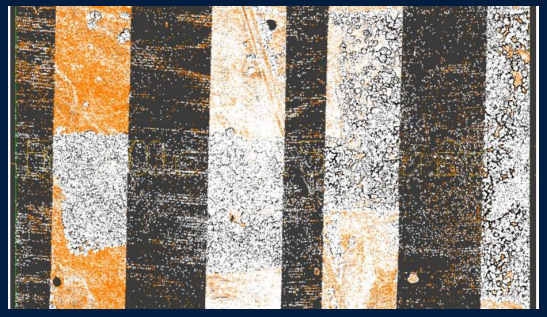
Added vegetation

Sense.Lidar® Data Management

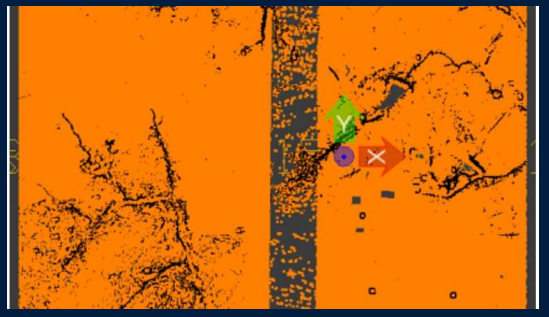
Managing data imperfections at ingest



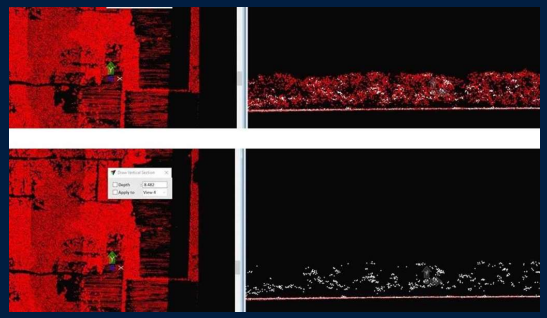
Data gaps in Class 1 & 2



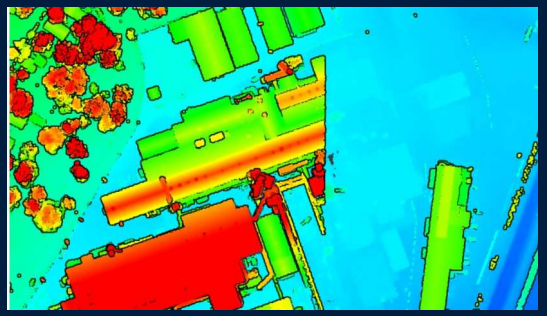
Low point density in Class 1 & 2



Data gaps and low point density in class 2



Improper class 7



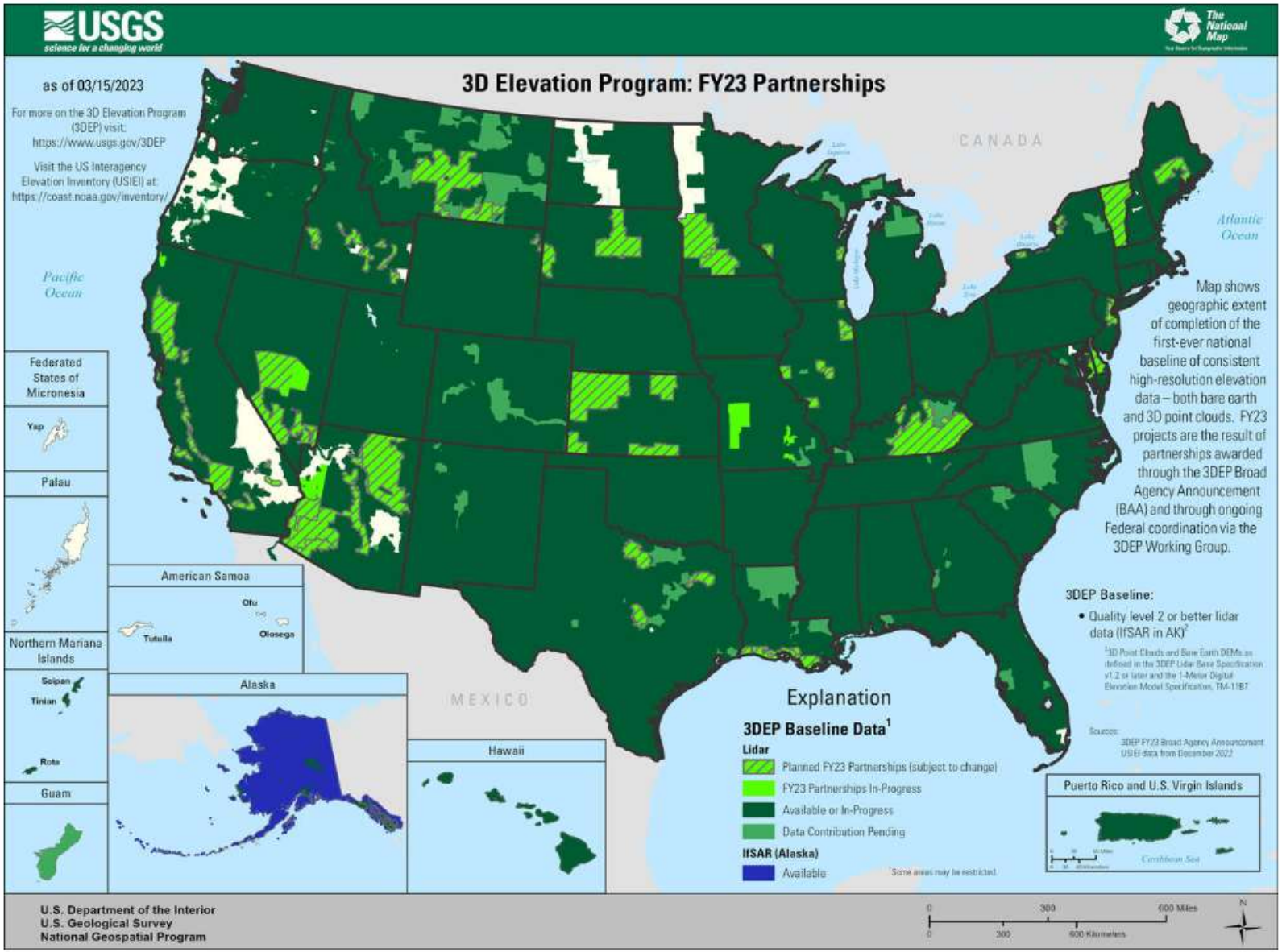
Missing partial buildings

Data gap

Why is Sense.Lidar® Necessary

Available Lidar

1. Abundance of existing lidar data
2. Lidar data vintage (3+ years) considered for new collection
3. Older datasets can be improved for better change analysis



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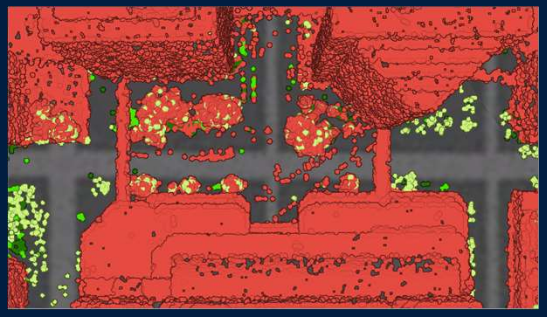
Why it is necessary

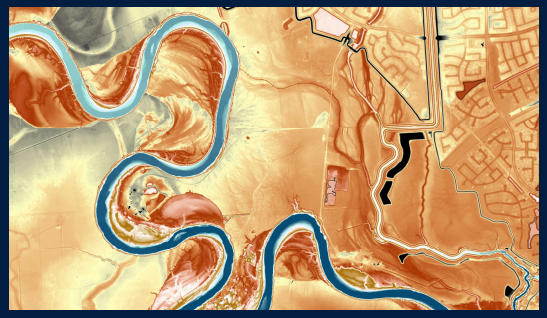
Few classifications



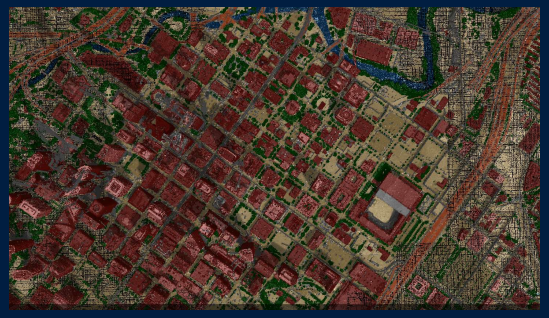
Inaccurate classifications

Time consuming

Expensive



Minimal use-cases

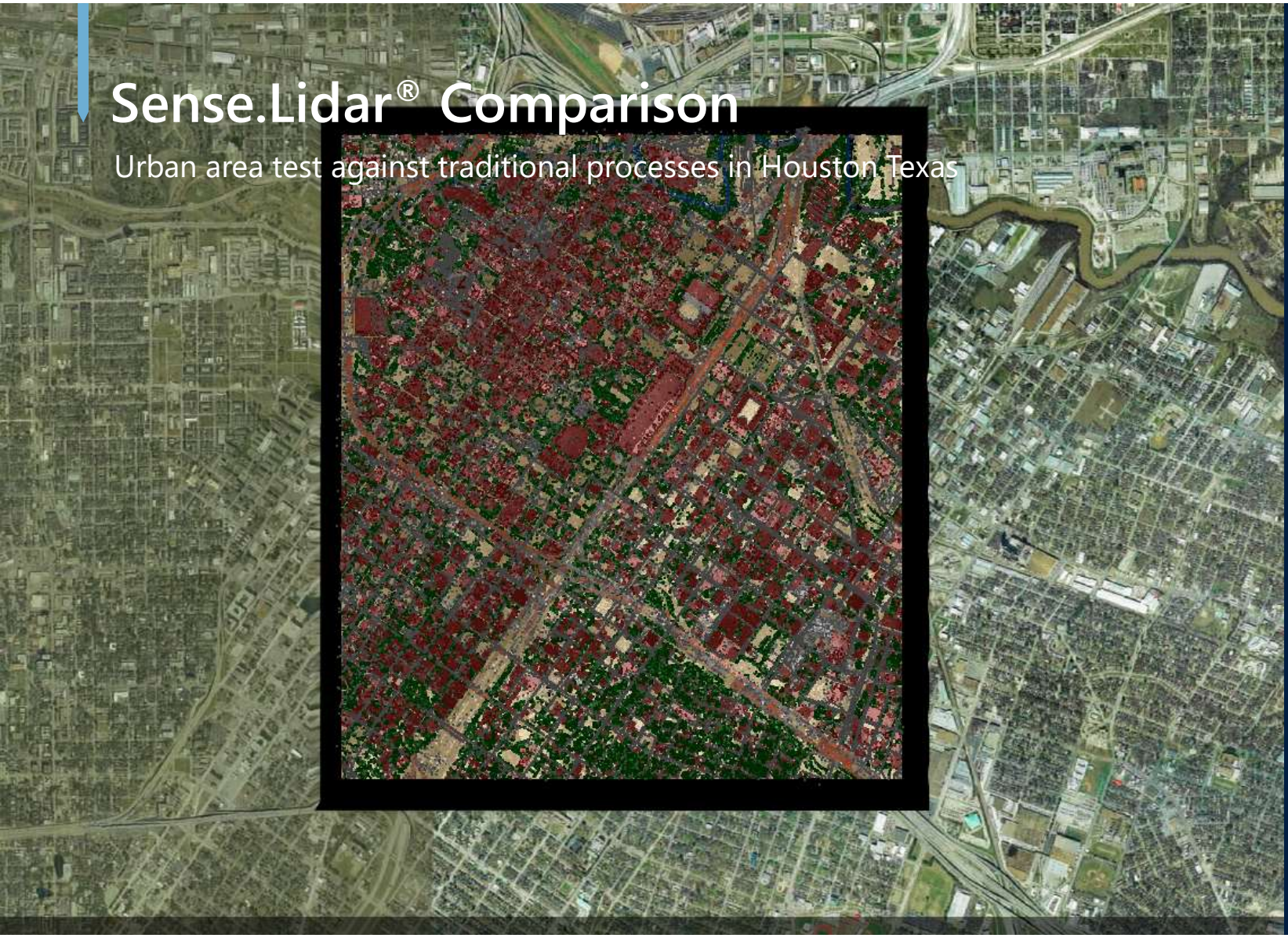


Low quality at scale

Compared to Traditional Processes

Sense.Lidar® Comparison

Urban area test against traditional processes in Houston Texas



- Using Fugro-developed 2018 topographic lidar to TNRIS specifications
- Sense.Lidar used to determine the accuracy of enhancing legacy data
- Fugro removed the lidar classification and ran the tiles through Sense.Lidar to reclassify the vegetation and buildings from the 4ppsm data

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Existing 2018 Houston data review

- Existing/vintage data used macros combined with manual techniques for classifying lidar data
- This required a production workflow that was labor intensive and expensive
- Projects often sacrificed quality to fit budgets and schedules.
- Many points in unclassified or misclassified from COTS Macro development and human assisted editing

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Existing 2018 Houston data review

- Unclassified removed to visualize existing/vintage data classification imperfections
- Powerlines, poles, buildings and other utility features show up in veg class

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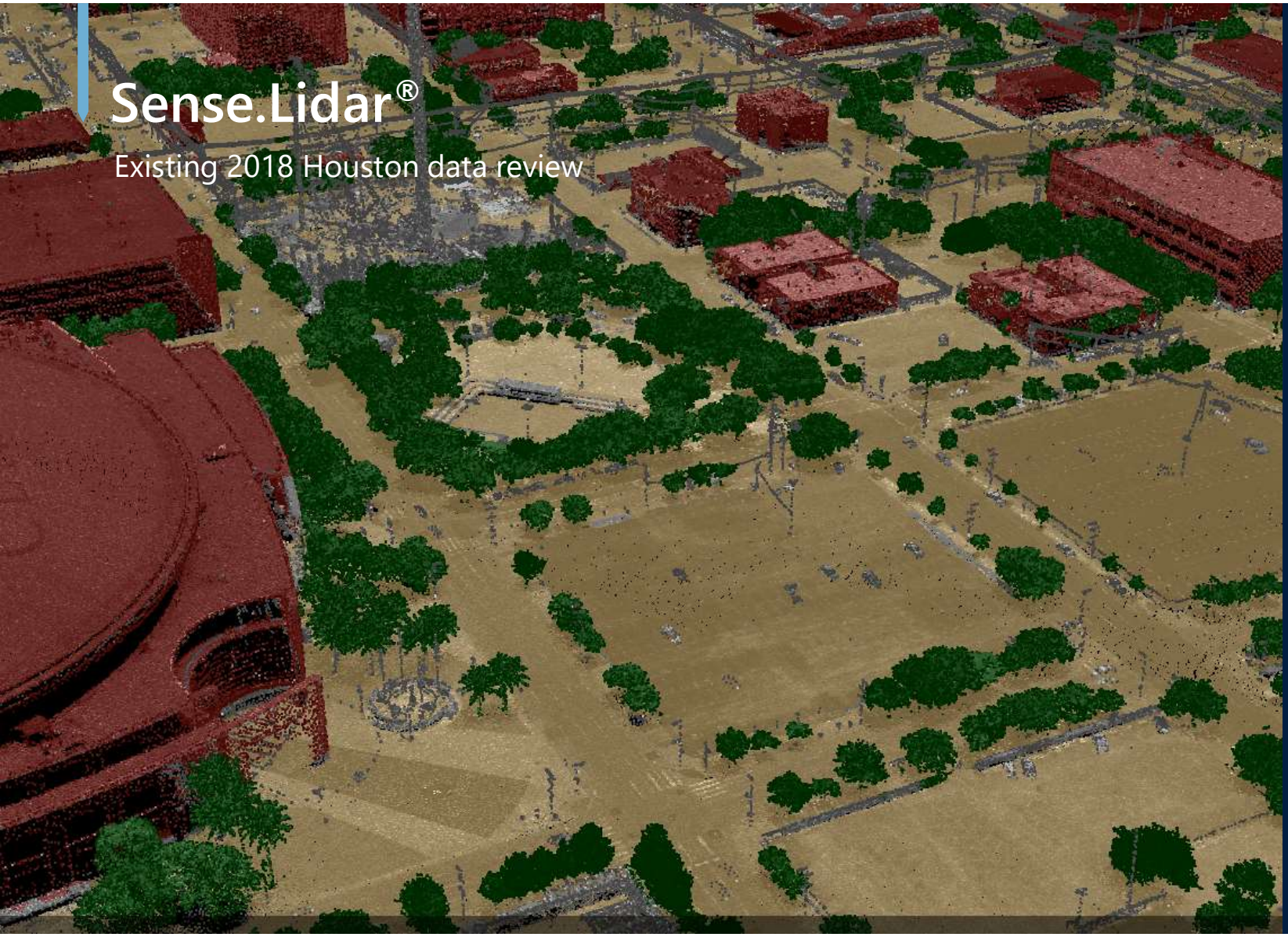
Existing 2018 Houston data review



- Sense.lidar machine learning outperforms COTS software macros and human editing
- The automated process achieves, on average, a 95% accuracy
- This provides opportunity for human-assisted feature extraction (HAFI) to focus on the fine details to achieve 99% accuracy

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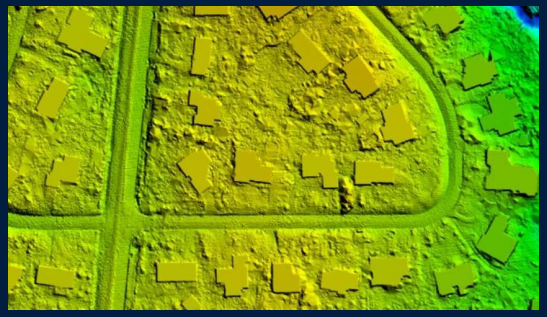
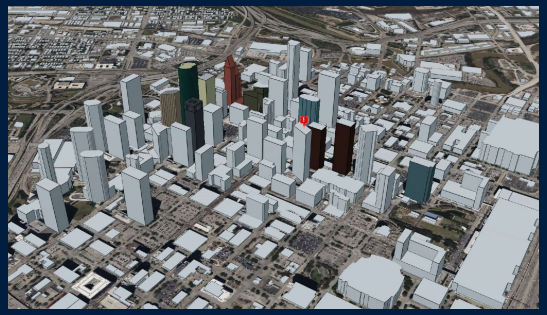
Sense.Lidar® Supports.....

Better Data with Sense.Lidar®

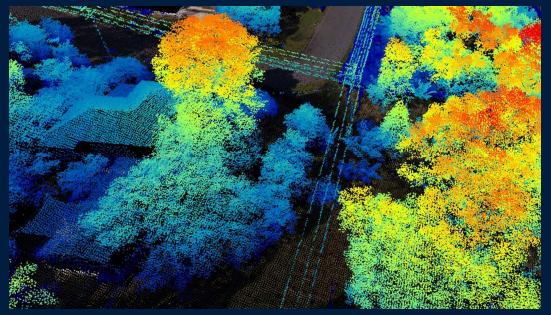
Better point classifications assist in created better data



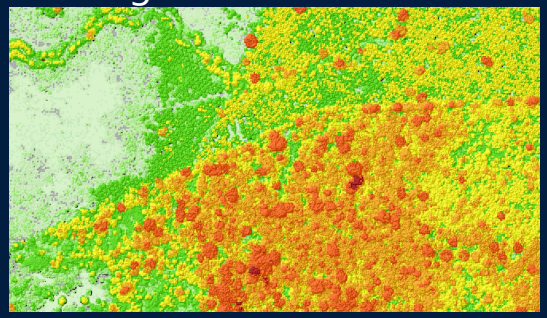
Building footprints and building flattened DEM



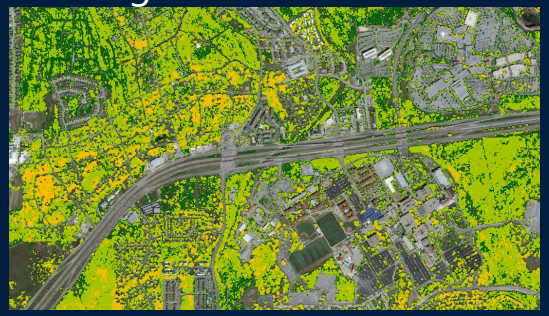
Improved LOD1 and LOD2 building models



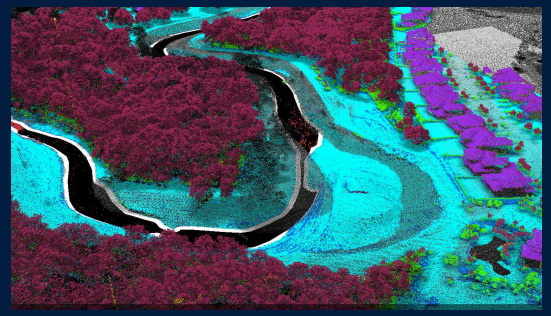
Improved asset identification



Accurate vegetation geolocation and density

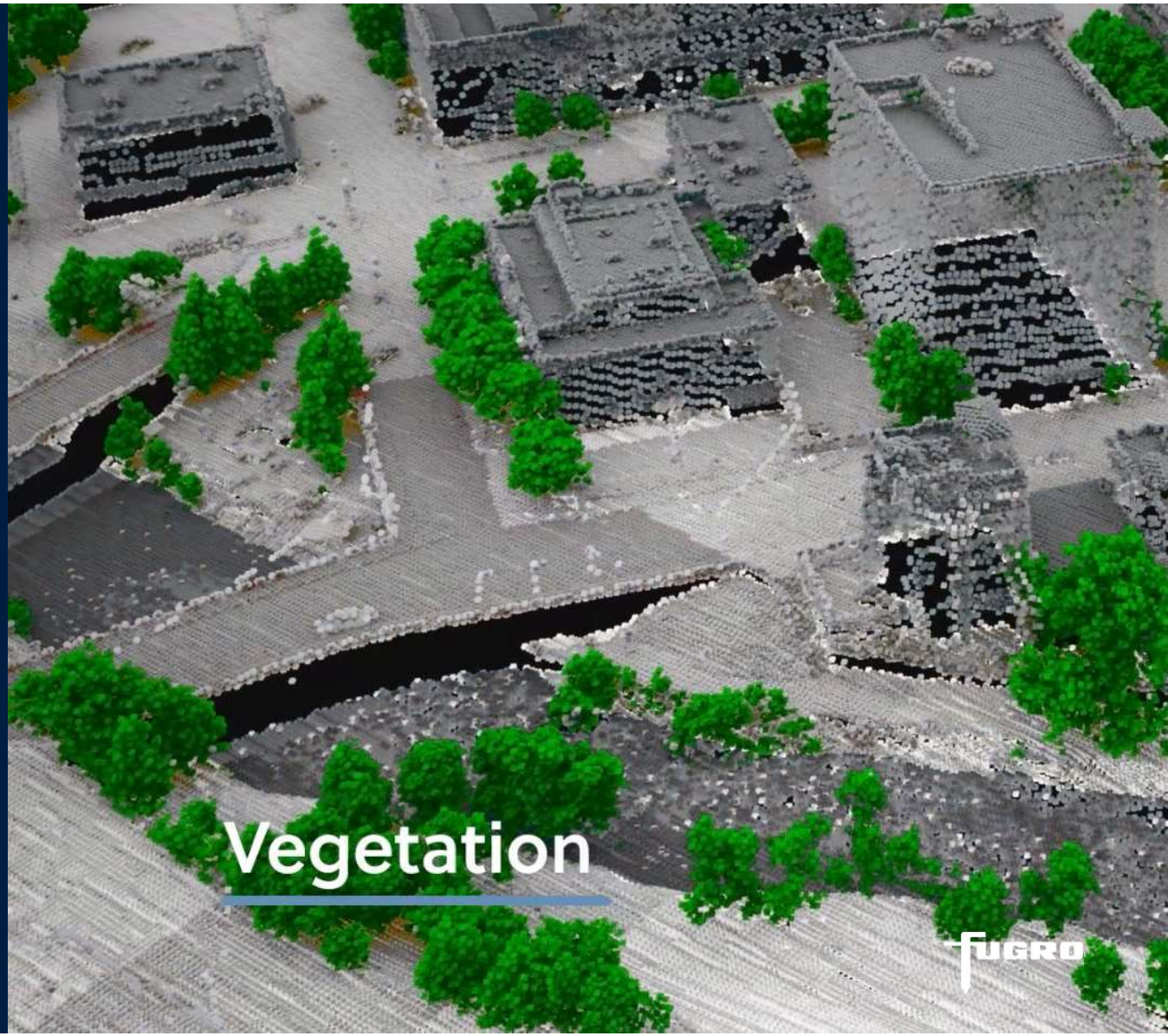


Accurate vegetation height

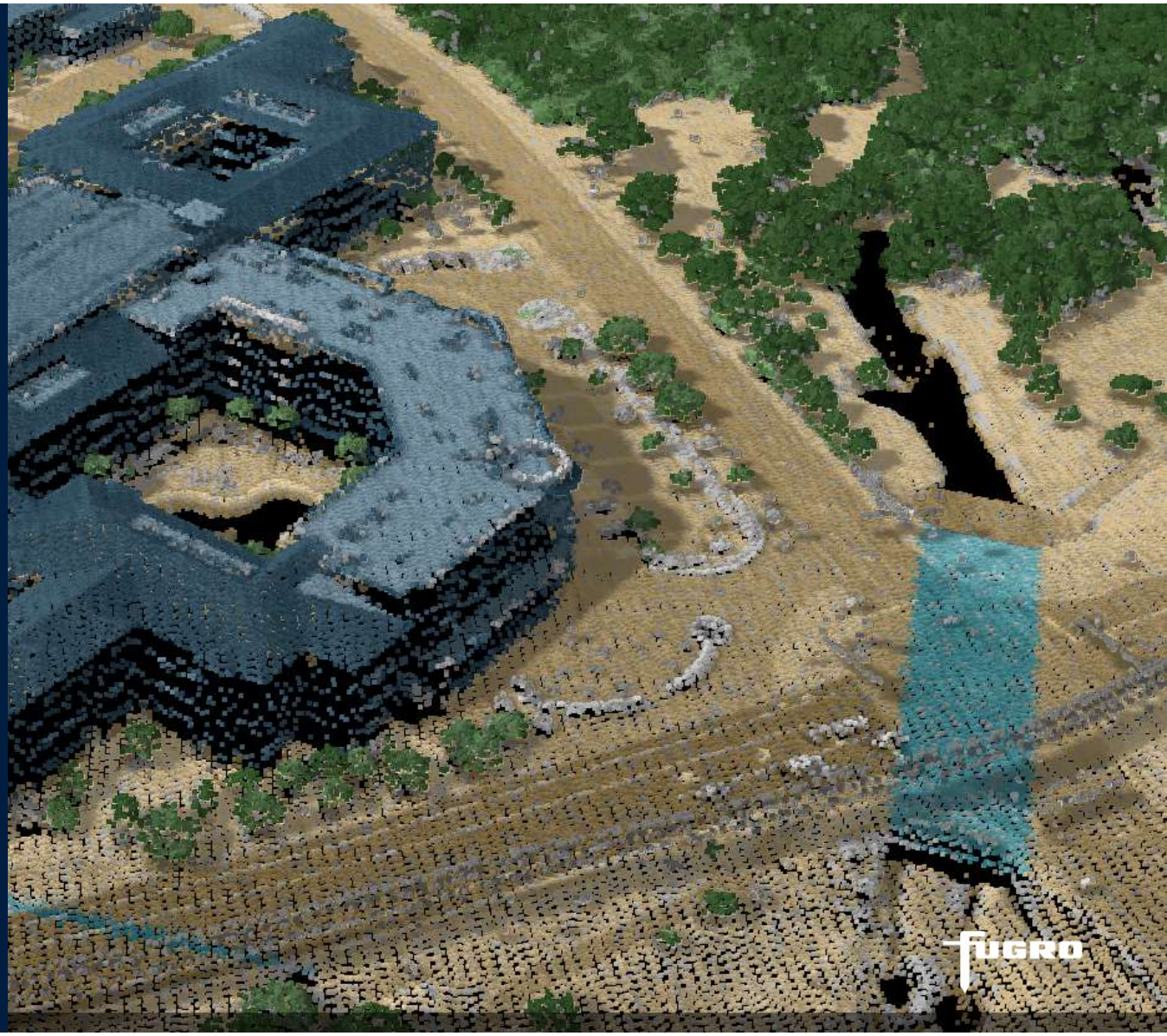


Accurate and efficient change analysis

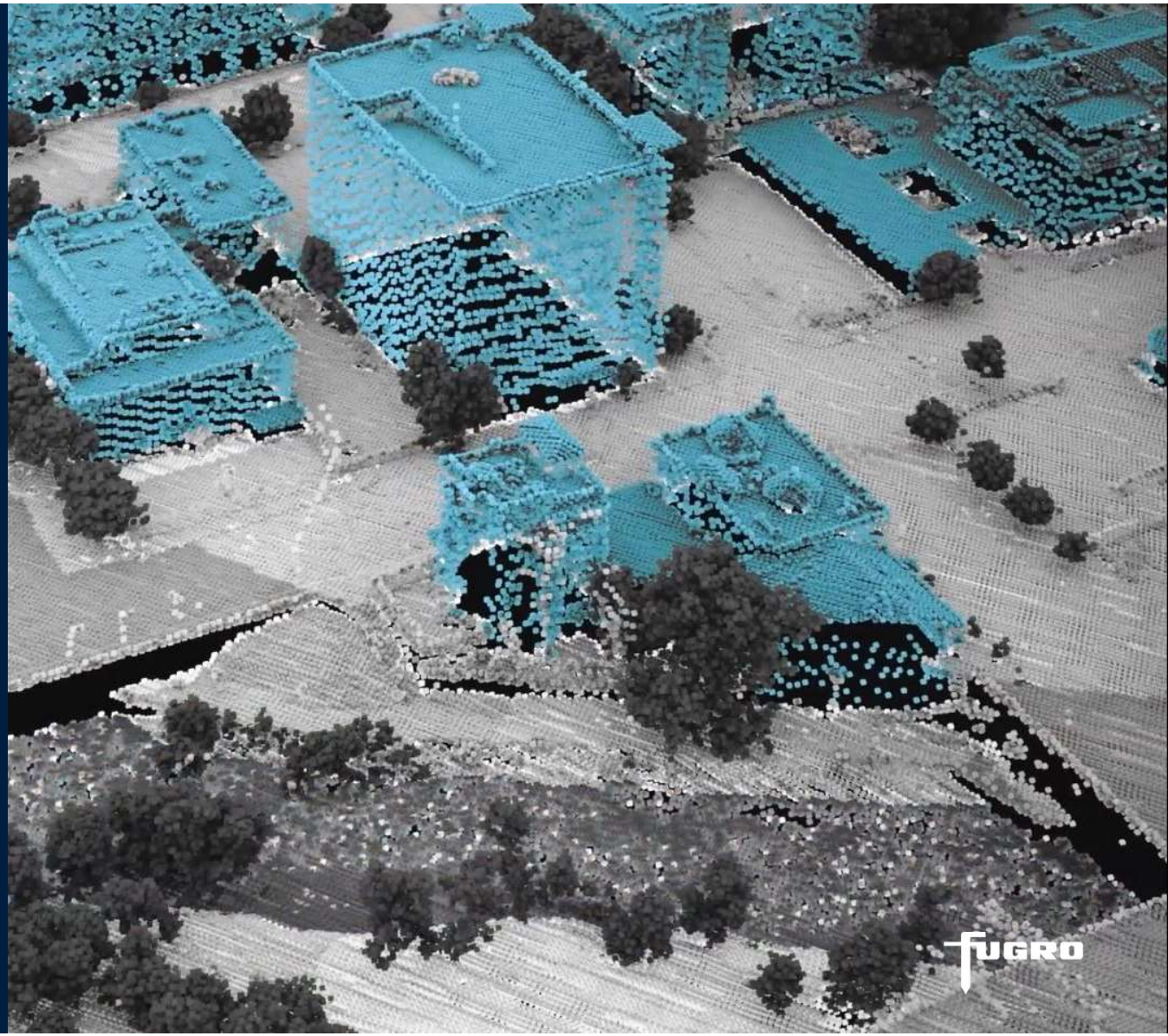
Vegetation Analysis



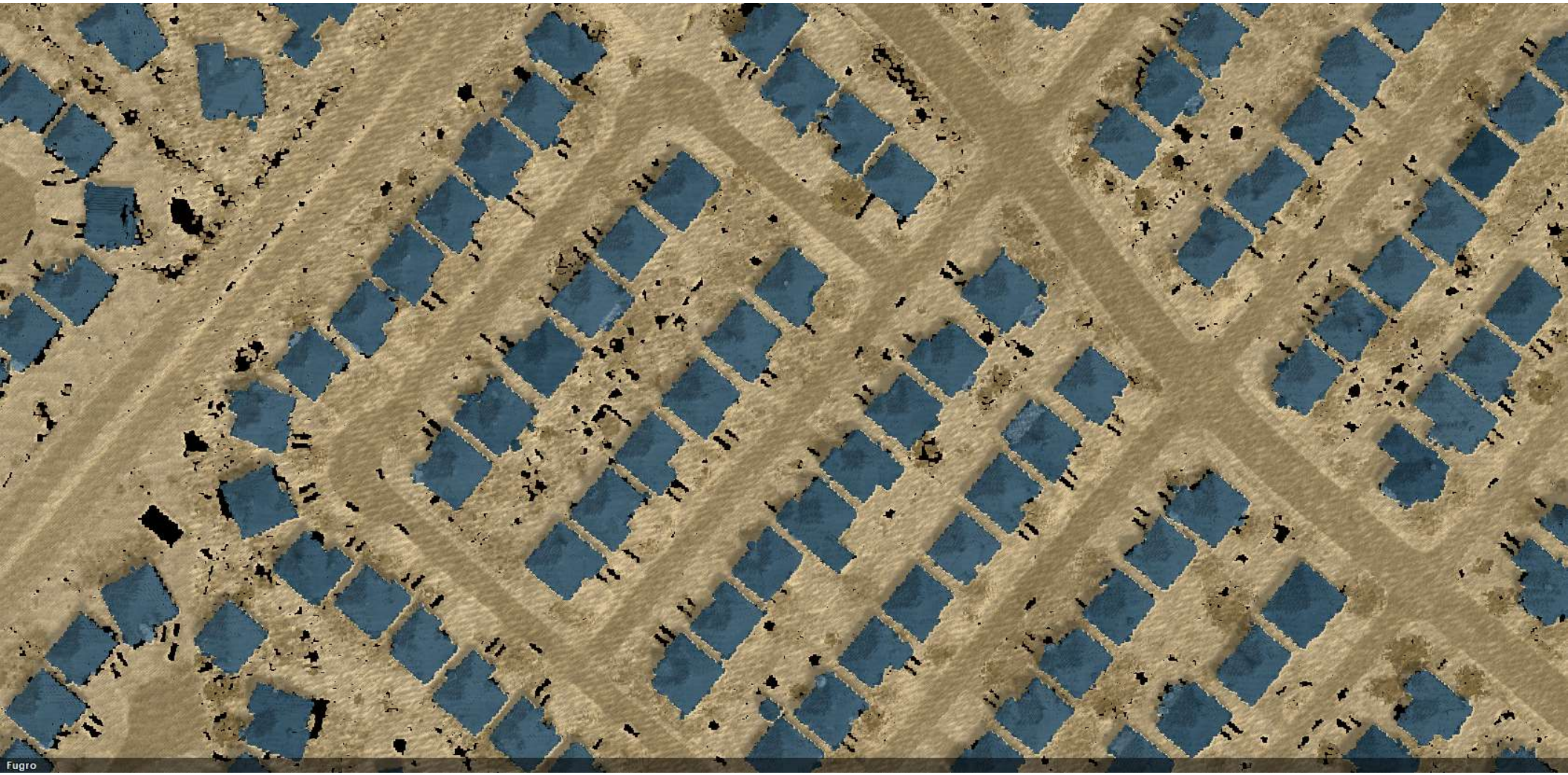
Culvert Identification and Geo-location



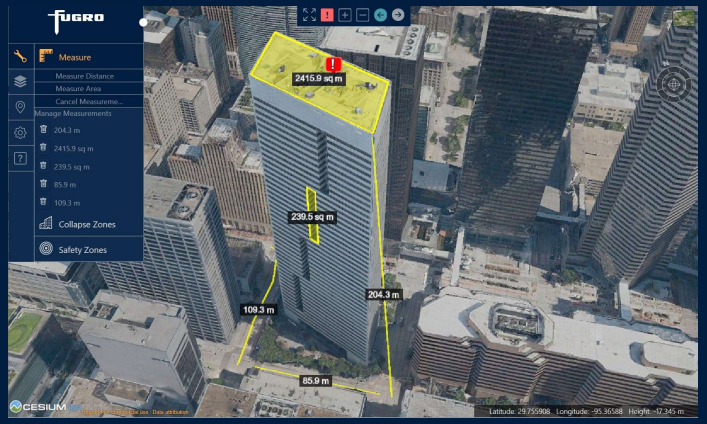
Building Locations and Volume Calculations



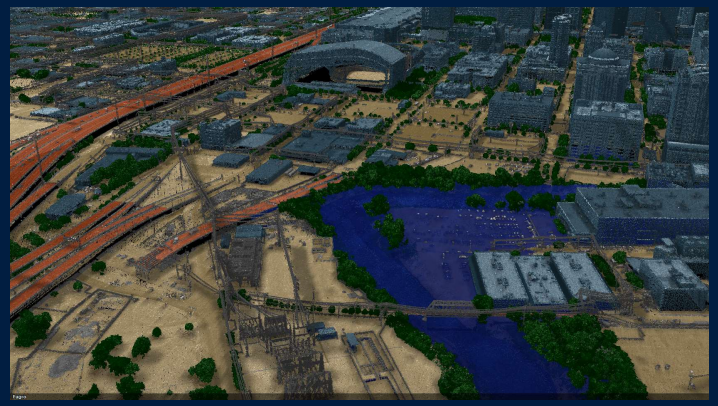

Fugro


Fugro

RapidSOS-ready SIMmetry® Building Models



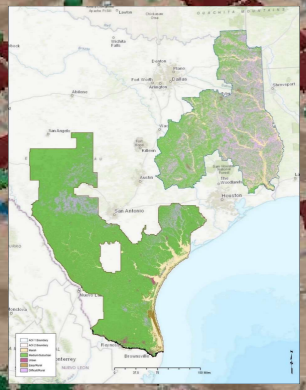
Flood Analysis Assistance



Site Characterization

Case Studies

South, Coastal and Northeast Texas 2021

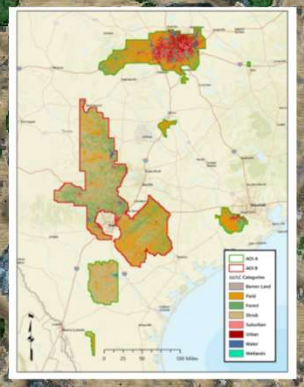


- Convert USGS Lidar to Texas Specifications
- Project Date: 2021
- Area Size: 83,000 sq. mi.
- Project Description:

The 2ppsm lidar data acquired will be used to further support initiatives in Texas for dam safety, floodplain management and planning, feature extraction, water quality modeling, stream restoration potential analysis, vegetation analysis, forest management, building footprints, change detection, and emergency management services.

The data acquired will become part of an ongoing geospatial data collection program by the state of Texas to support state, regional, and local mapping needs.

Central Texas 2023



- Convert USGS Lidar to Texas Specifications
- Project Date: 2023
- Area Size: 20,432 sq. mi.
- Project Description:

The 2ppsm lidar data acquired will be used to further support initiatives in Texas for dam safety, floodplain management and planning, feature extraction, water quality modeling, stream restoration potential analysis, vegetation analysis, forest management, building footprints, change detection, and emergency management services.

The data acquired will become part of an ongoing geospatial data collection program by the state of Texas to support state, regional, and local mapping needs.

Lidar for Portions of Ellis, Hill, Johnson, and Navarro Counties in Texas 2022

- South Dallas Fort Worth Texas Topographic Lidar
- Project date: 2022
- Area size: 3,223 sq. mi.

The project AOI resides in North Central Texas. The AOI covers watersheds South of the Dallas-Fort Worth Metroplex along the I-35 and I-45 corridors. Coverage extends mainly across Ellis, Hill, Johnson, and Navarro counties of Texas. Areas of this project are a mix of small urban, suburban, and rural land cover. Several large lakes and reservoirs reside within the area of interest.

The data acquired will be used for dam safety, floodplain management and planning, feature extraction, water quality modeling, stream restoration potential analysis, change detection and emergency management services.

Sense.Lidar was used to accurately classify the newly collected lidar data.

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New Haven, Connecticut 2021

- New Haven, CT Models from lidar and nadir imagery for 3D modelling
- Project date: 2021
- Area size: 3.5 sq. mi.

This project was a proof of concept to determine the potential for using high density lidar and nadir imagery to generate a fully-textured 3D model.

The lidar point cloud was collected at 200ppsm and reduced to 30ppsm combined with the 3-inch 4-band nadir imagery for the purpose of generating the 3D modeling.

Sense.Lidar was used to accurately classify the lidar data.

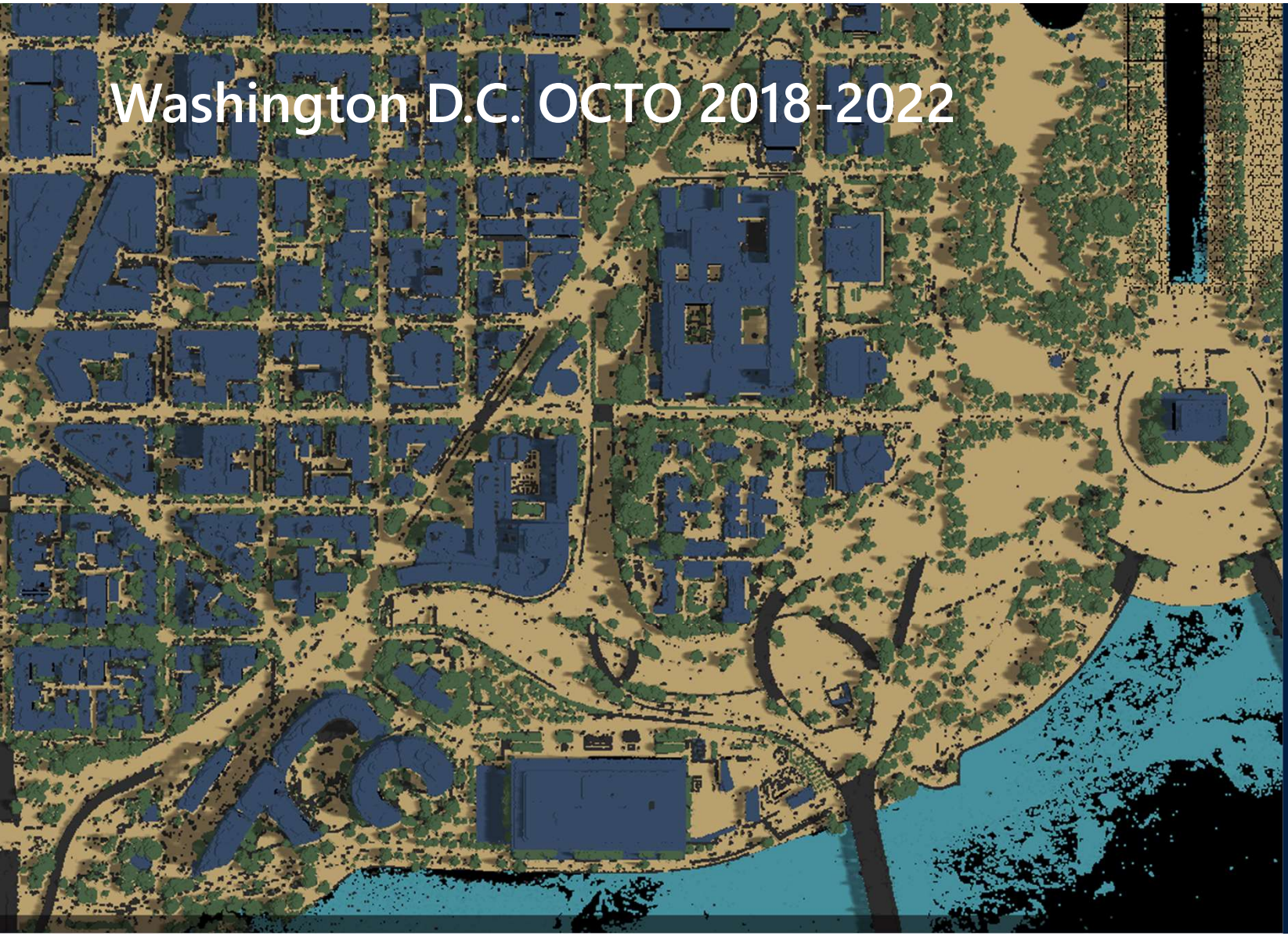
Pepperdine University, California 2022

- Pepperdine University 1”=100’ scale planimetrics, orthoimagery, lidar and 3D models
- Project date: 2022
- Area size: 1.5 sq. mi.

Fugro acquired 200ppsm lidar and 2-inch nadir 4-band imagery to generate a fully textured 3D model of Pepperdine University. Additionally, Fugro created a 1”=20’ scale planimetric geodatabase to assist with GIS-related asset management.

Sense.Lidar was used to accurately classify the newly collected lidar data.

Washington D.C. OCTO 2018-2022



- Washington D.C. OCTO Lidar, Orthos, and Planimetrics
- Project date: 2018-2022
- Area size: 65 sq. mi.

During the 5-year contract, Fugro provided Washington D.C. OCTO with orthoimagery, planimetrics and lidar data to support the various GIS-related activities within the District.

Sense.Lidar was used to accurately classify the newly collected lidar data. This data supported various drainage, flood analysis and vegetation analysis programs.

Specifically, the accurately classified vegetation is used to manage and monitor the urban forestry program in the District.

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