USGS 3DEP Data:

Additional classifications and data products; USGS 3DHP Overview and Update

Angie Pelkie

May 3, 2024

Presentation Overview

1 Introduction to FUGRO

2 USGS 3DEP Data for Oklahoma

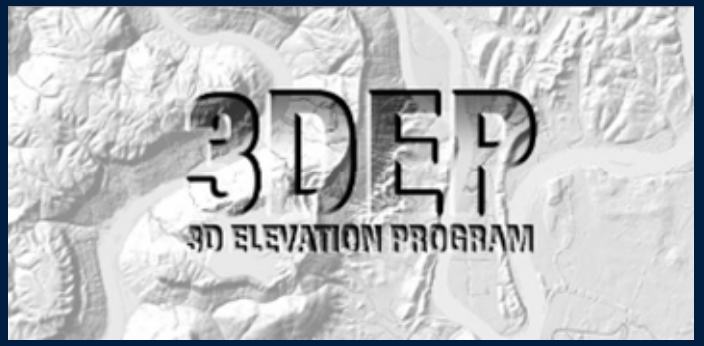
3 Maximizing the USGS data

4 Airborne Lidar Bathymetry Introduction

5 USGS 3DHP Program

6 USGS DCA Process

7 Q&A



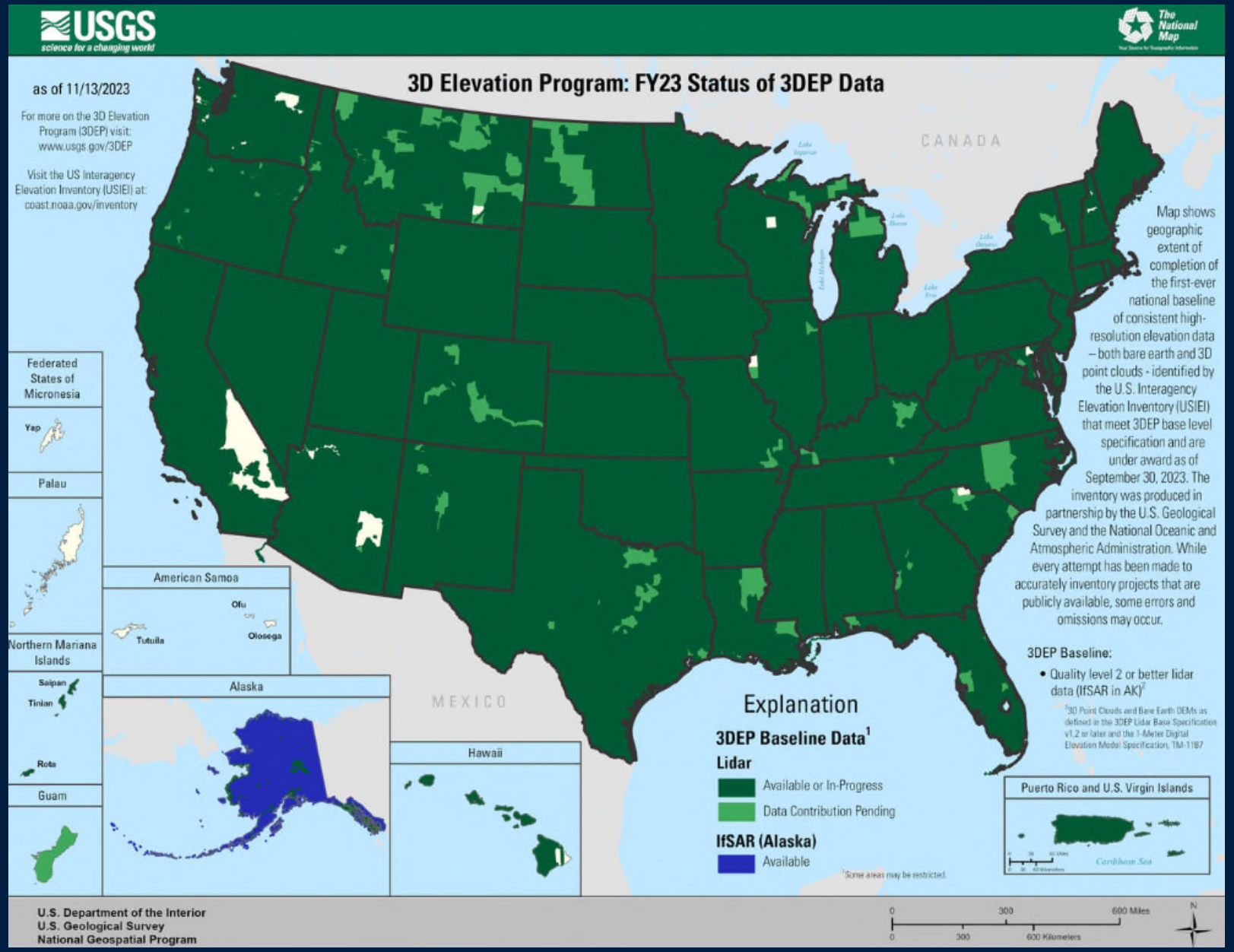
USGS
science for a changing world

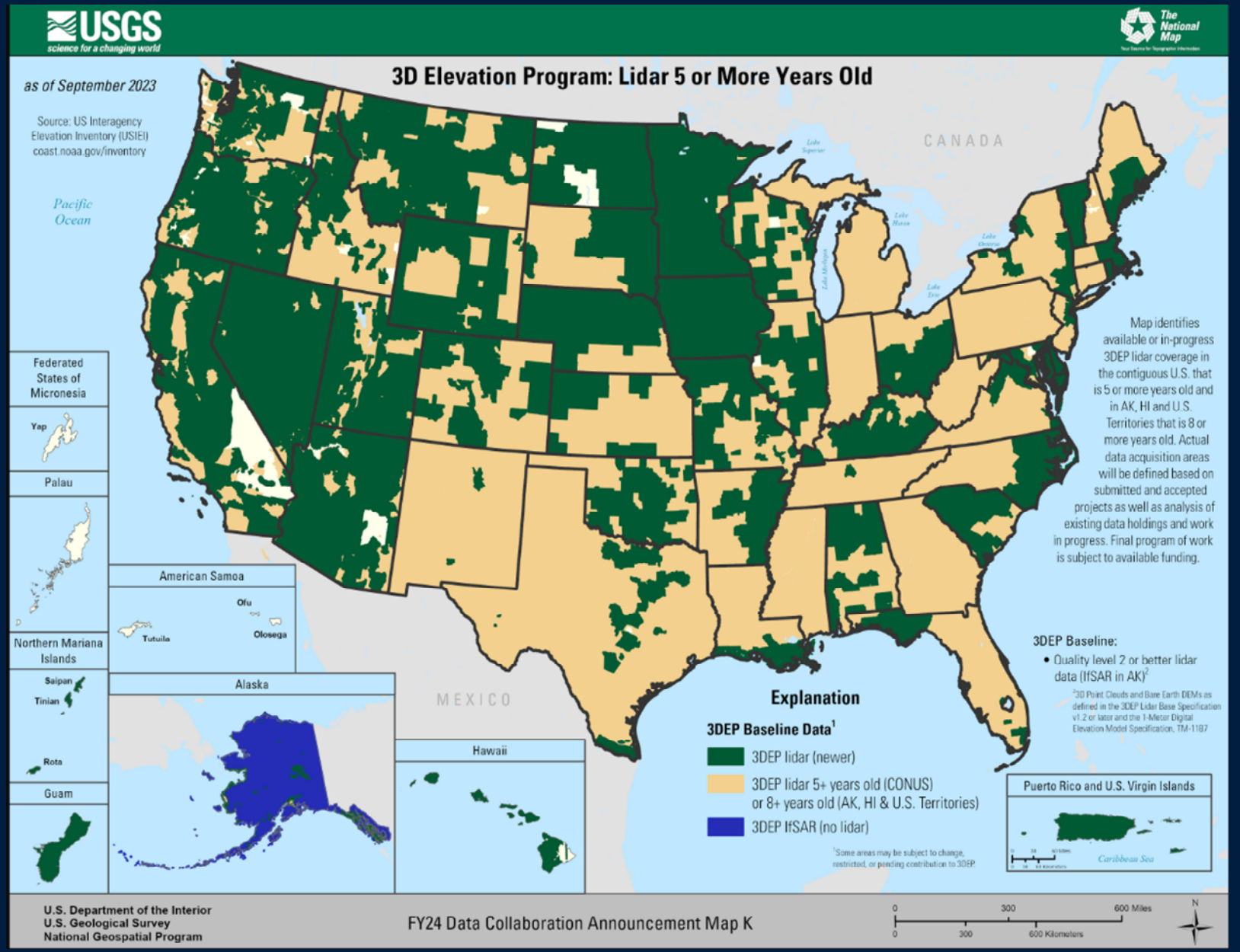
FUGRO

1
Introduction


FUGRO
TOGETHER WE CREATE A SAFE & LIVEABLE WORLD
WATER
ENERGY
INFRASTRUCTURE
PEOPLE
MAP
MODEL
MONITOR
climate change
urbanisation
satellite positioning
connected devices
engaged society
population growth
artificial intelligence
predictive analytics & cloud automation
subscription services
DIGITAL TWIN
visuele verbinders
world's leading Geo-data expert
technology sales
closer partnerships
uncrewed vehicles
autonomous robots & sensors
coastal resilience
protect the natural environment
remote operations & support
DETERMINED TO DELIVER
PREPARE FOR TOMORROW
WE DO WHAT'S RIGHT
WE BUILD TRUST

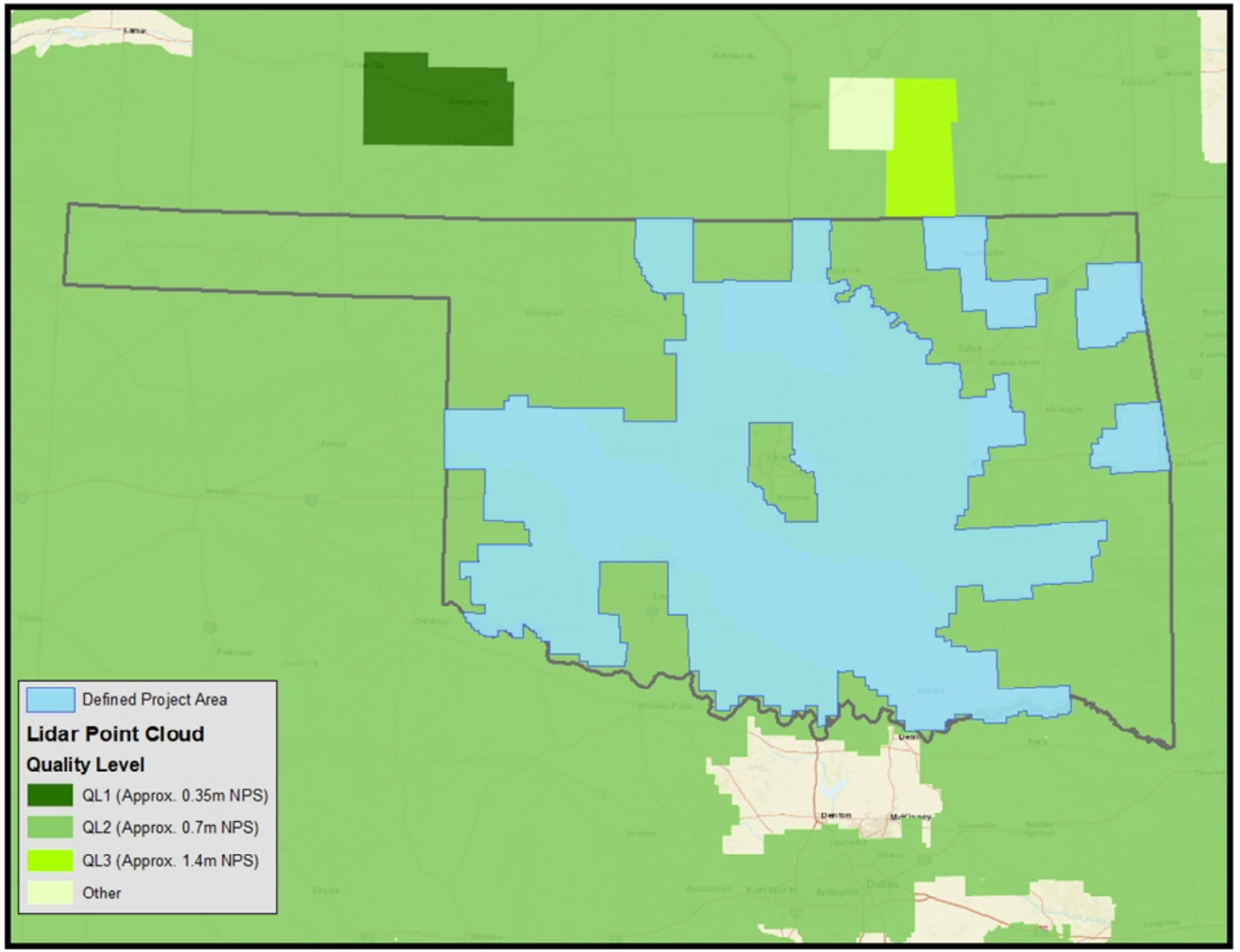
2
USGS 3DEP Data for Oklahoma


USGS
science for a changing world
The National Map
3D Elevation Program: FY23 Status of 3DEP Data
as of 11/13/2023
For more on the 3D Elevation Program (3DEP) visit: www.usgs.gov/3DEP
Visit the US Interagency Elevation Inventory (USIEI) at: coast.noaa.gov/inventory
CANADA
MEXICO
Map shows geographic extent of completion of the first-ever national baseline of consistent high-resolution elevation data – both bare earth and 3D point clouds - identified by the U.S. Interagency Elevation Inventory (USIEI) that meet 3DEP base level specification and are under award as of September 30, 2023. The inventory was produced in partnership by the U.S. Geological Survey and the National Oceanic and Atmospheric Administration. While every attempt has been made to accurately inventory projects that are publicly available, some errors and omissions may occur.
3DEP Baseline:
• Quality level 2 or better lidar data (IfSAR in AK)[2]
[2]3D Point Clouds and Bare Earth DEMs as defined in the 3DEP Lidar Base Specification v1.2 or later and the 1-Meter Digital Elevation Model Specification, TM-11B7
Explanation
3DEP Baseline Data[1]
Lidar
Available or In-Progress
Data Contribution Pending
IfSAR (Alaska)
Available
[1]Some areas may be restricted.
Federated States of Micronesia
Yap
Palau
Northern Mariana Islands
Saipan
Tinian
Rota
Guam
American Samoa
Ofu
Olosega
Tutuila
Alaska
Hawaii
Puerto Rico and U.S. Virgin Islands
Caribbean Sea
U.S. Department of the Interior
U.S. Geological Survey
National Geospatial Program
0 300 600 Miles
0 300 600 Kilometers
N


USGS
science for a changing world
The National Map
3D Elevation Program: Lidar 5 or More Years Old
as of September 2023
Source: US Interagency Elevation Inventory (USIEI)
coast.noaa.gov/inventory
Pacific Ocean
CANADA
MEXICO
Federated States of Micronesia
Yap
Palau
American Samoa
Ofu
Olosega
Tutuila
Northern Mariana Islands
Saipan
Tinian
Rota
Guam
Alaska
Hawaii
Puerto Rico and U.S. Virgin Islands
Caribbean Sea
Map identifies available or in-progress 3DEP lidar coverage in the contiguous U.S. that is 5 or more years old and in AK, HI and U.S. Territories that is 8 or more years old. Actual data acquisition areas will be defined based on submitted and accepted projects as well as analysis of existing data holdings and work in progress. Final program of work is subject to available funding.
3DEP Baseline:
• Quality level 2 or better lidar data (IfSAR in AK)[2]
[2]3D Point Clouds and Bare Earth DEMs as defined in the 3DEP Lidar Base Specification v1.2 or later and the 1-Meter Digital Elevation Model Specification, TM-1187
Explanation
3DEP Baseline Data[1]
3DEP lidar (newer)
3DEP lidar 5+ years old (CONUS) or 8+ years old (AK, HI & U.S. Territories)
3DEP IfSAR (no lidar)
[1]Some areas may be subject to change, restricted, or pending contribution to 3DEP.
U.S. Department of the Interior
U.S. Geological Survey
National Geospatial Program
FY24 Data Collaboration Announcement Map K
0 300 600 Miles
0 300 600 Kilometers
N

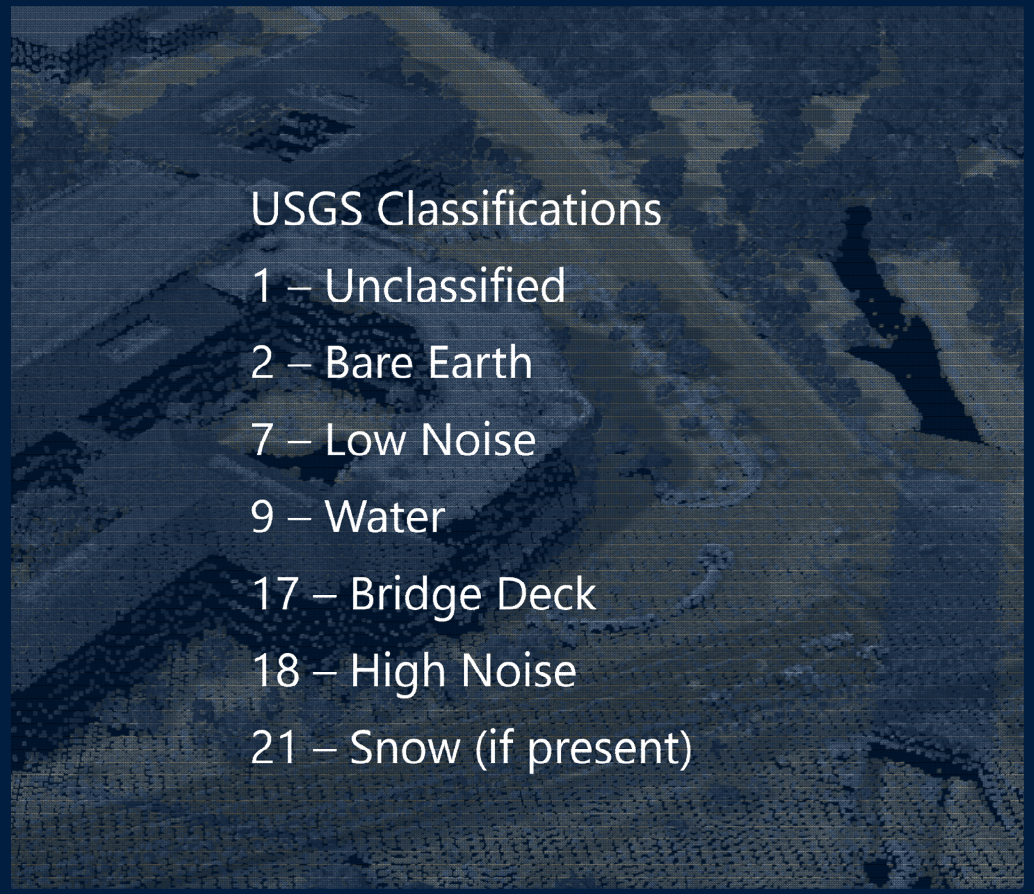
Defined Project Area – Lidar Collect for USGS

36,043 square miles of QL2 acquired in the state of Oklahoma



3
Maximizing the USGS 3DEP Data

Added and Enhanced Classifications



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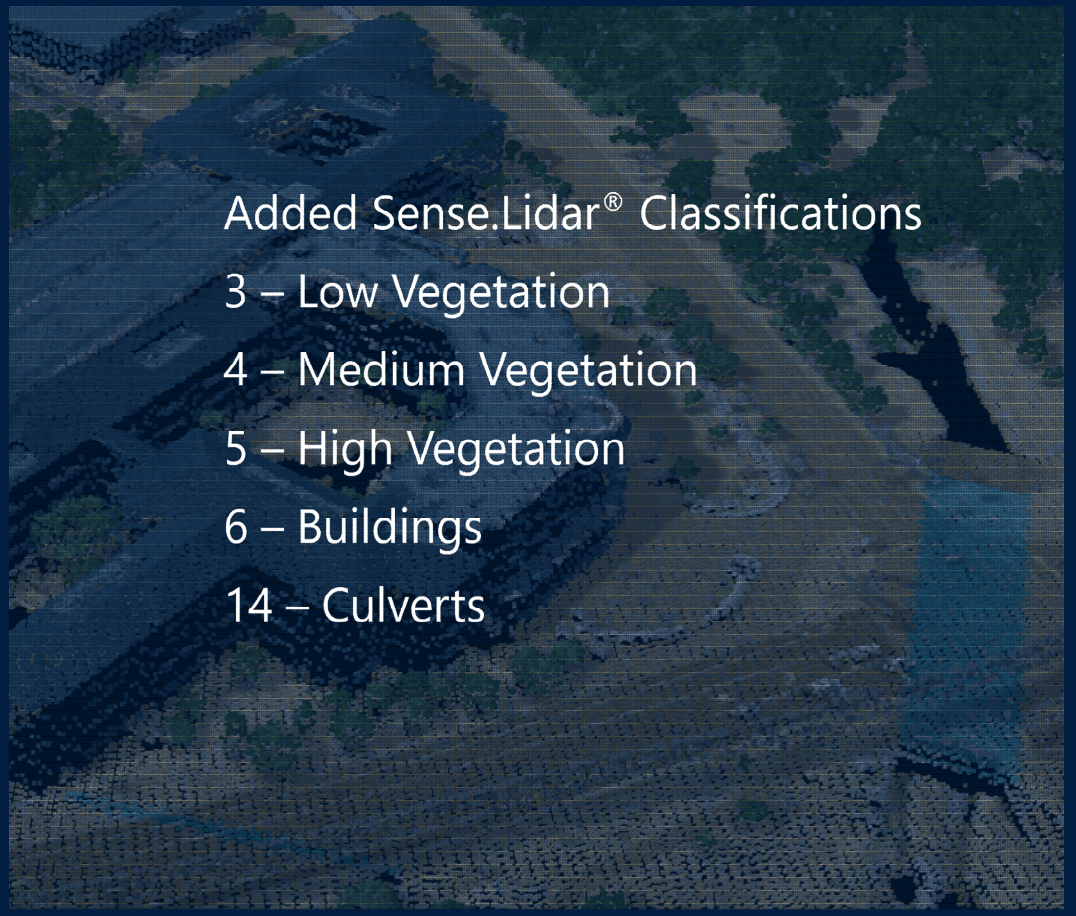
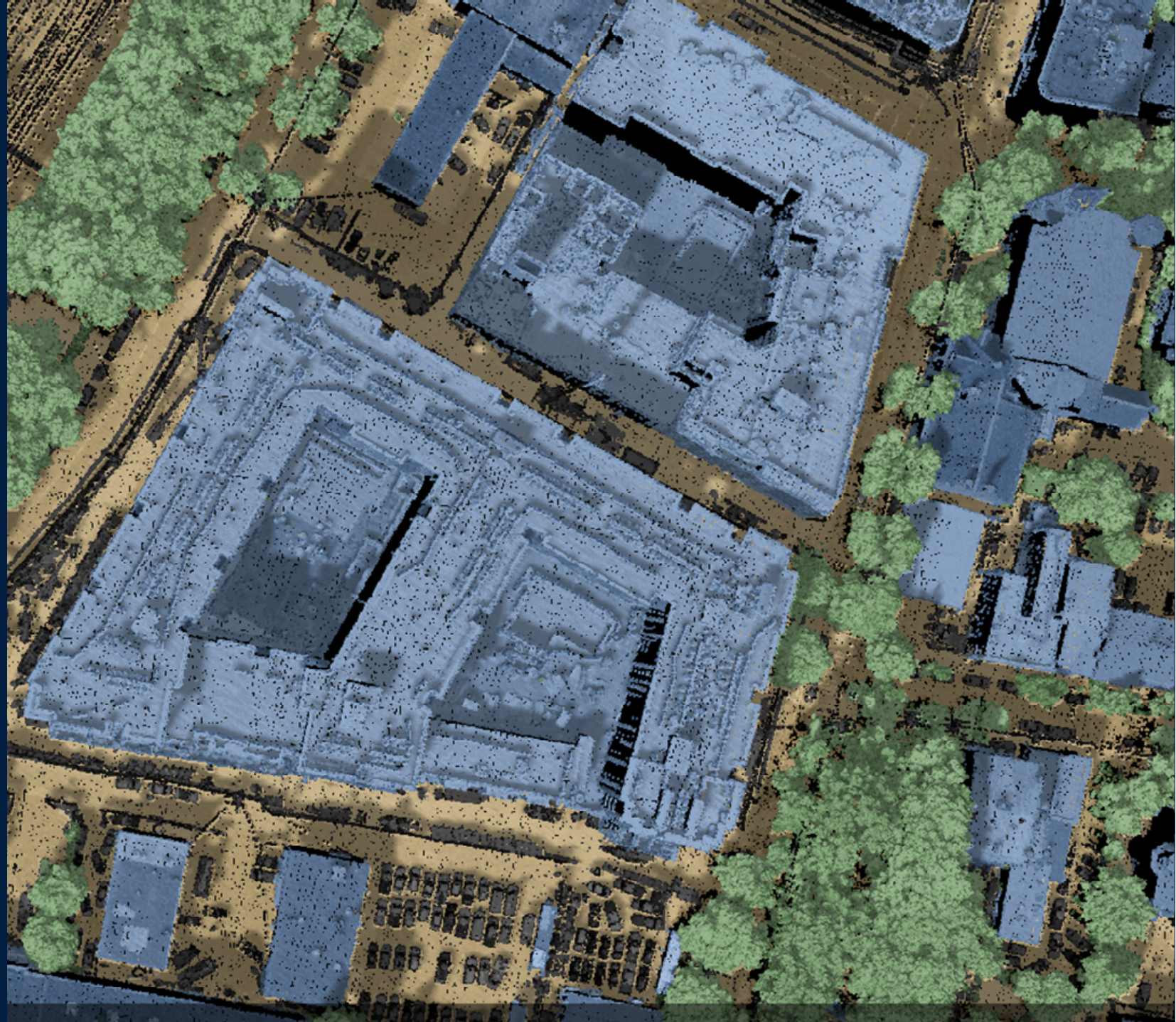
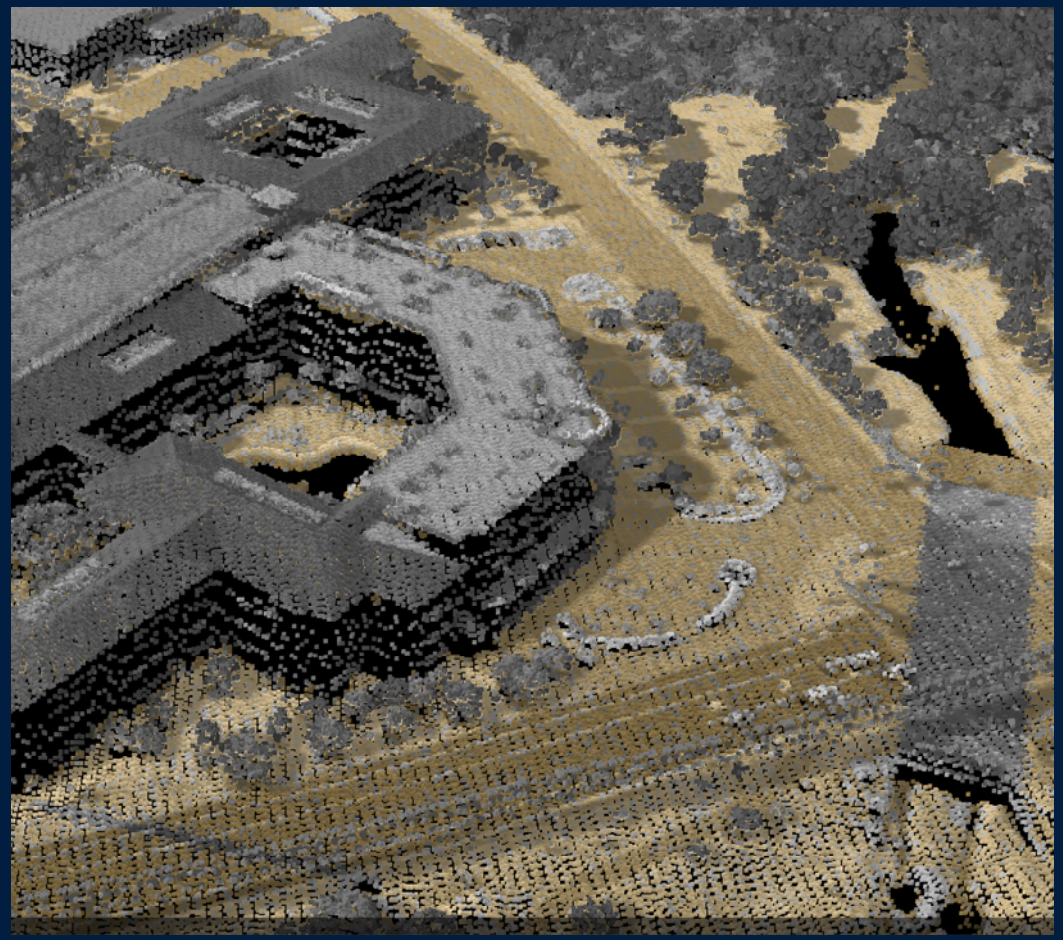


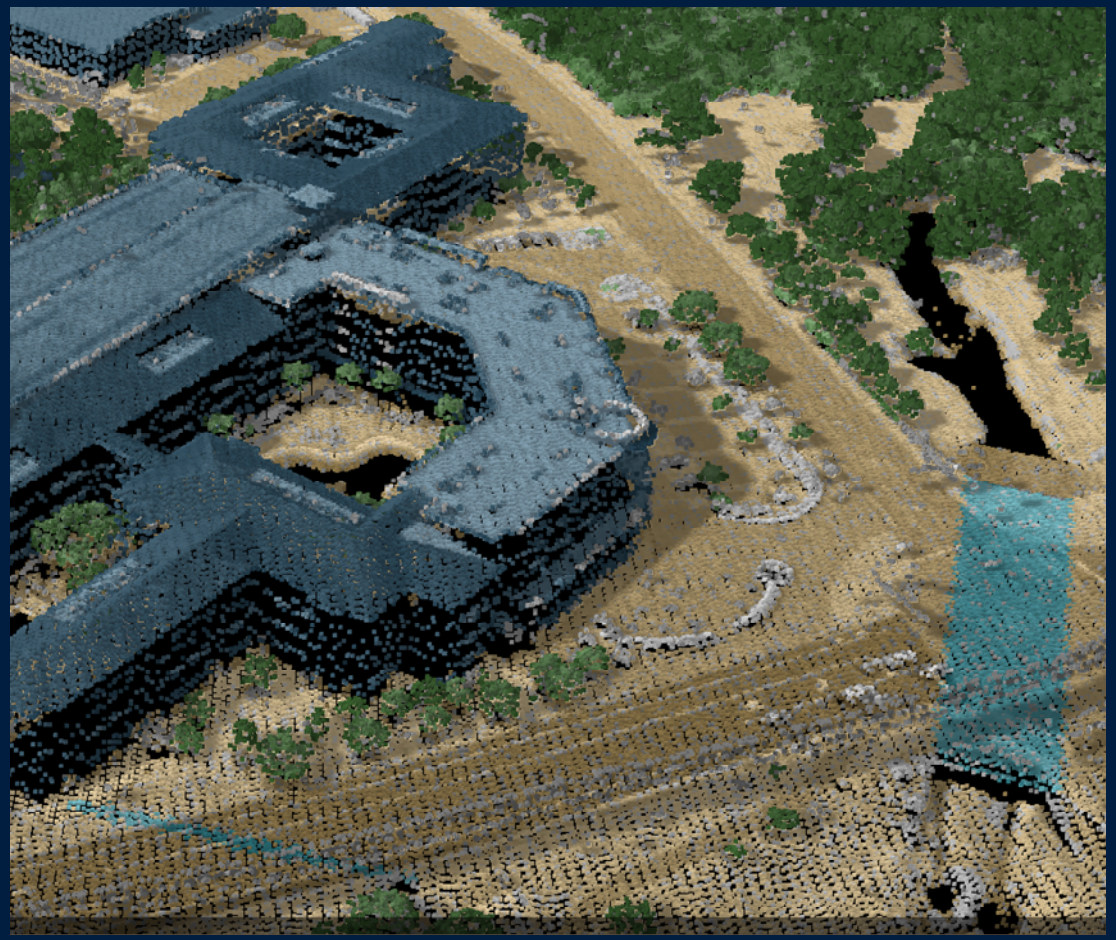
About Sense.Lidar®

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

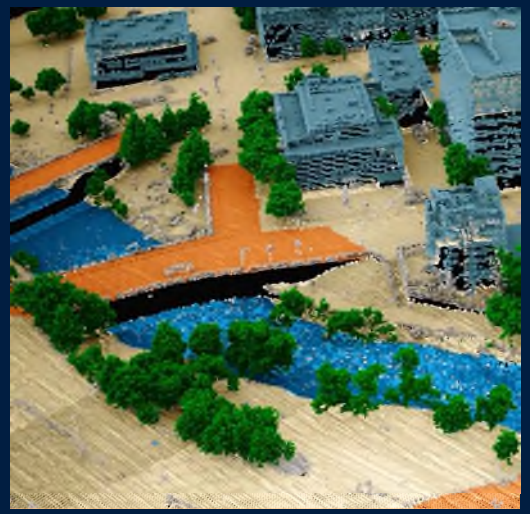


Convert USGS Classifications to State Specifications

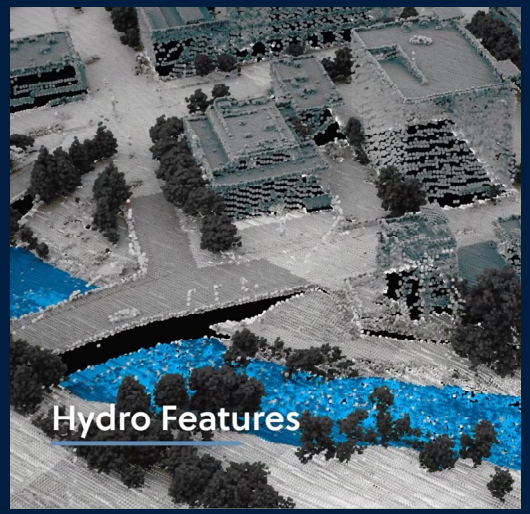




Sense.Lidar® Added Classifications



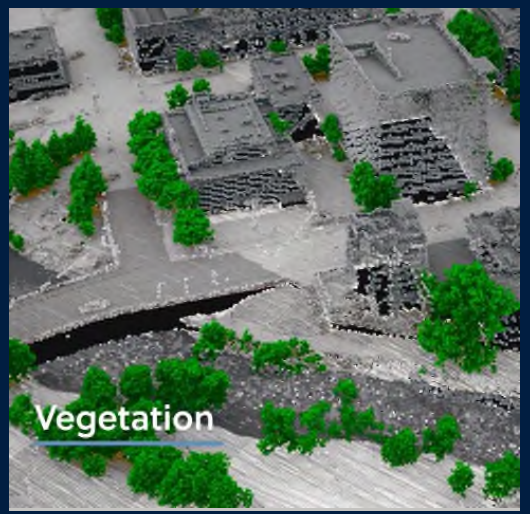
Classified lidar to 99% accuracy



Added hydro features

- Culverts

Added buildings



Added vegetation

2D Building Footprints

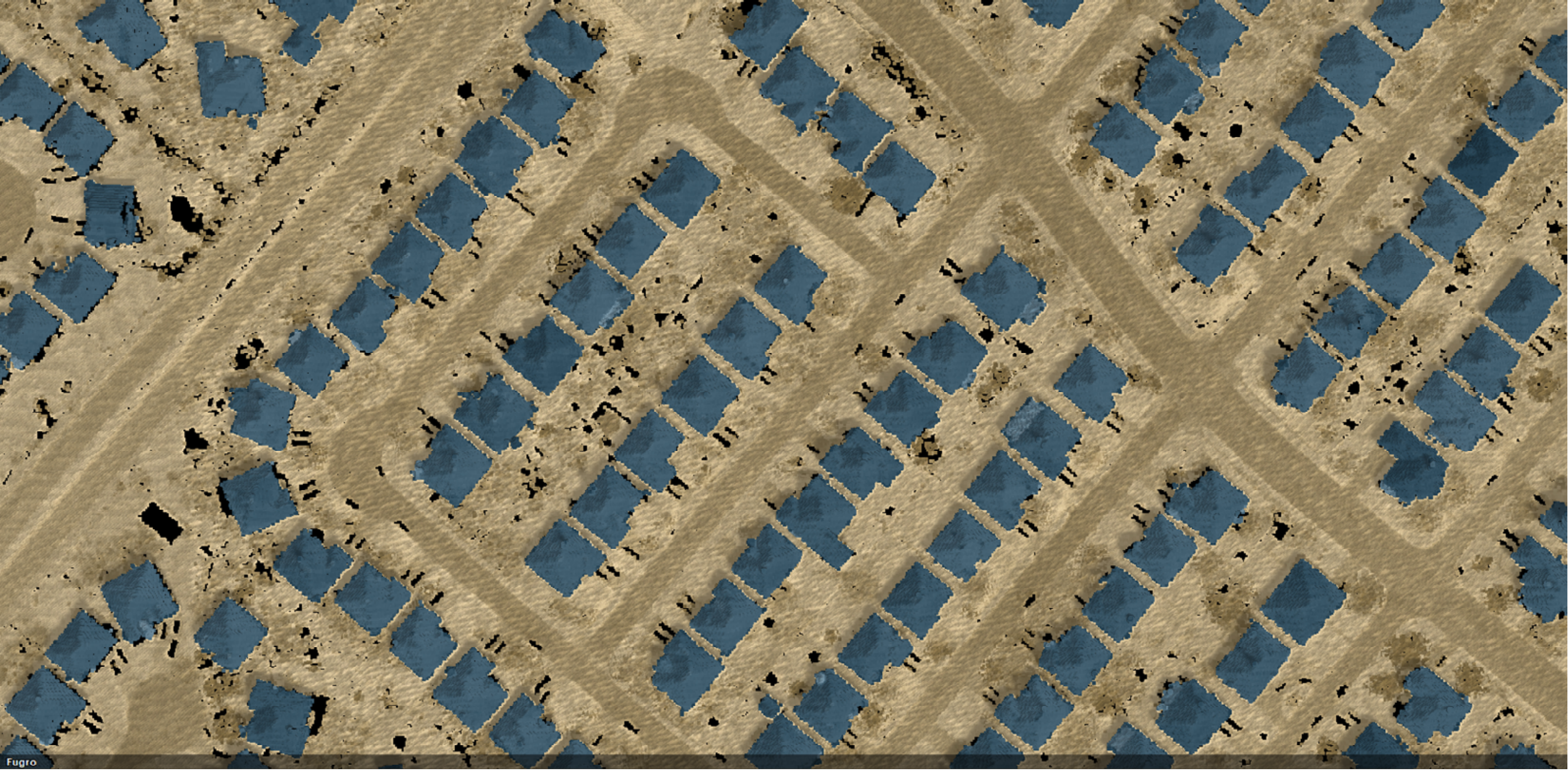
1. Use available lidar >2ppsm
2. USGS 3DEP data

Building Locations and Volume Calculations

3D Building Models

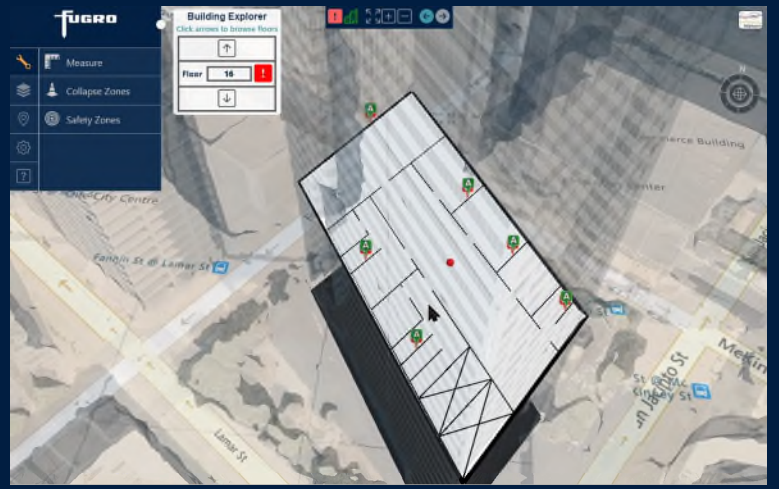
1. Use available lidar >2ppsm
2. Typically, USGS 3DEP data
3. The better the density, the better the building quality
4. Building models not textured


Fugro


Fugro

Emergency Management

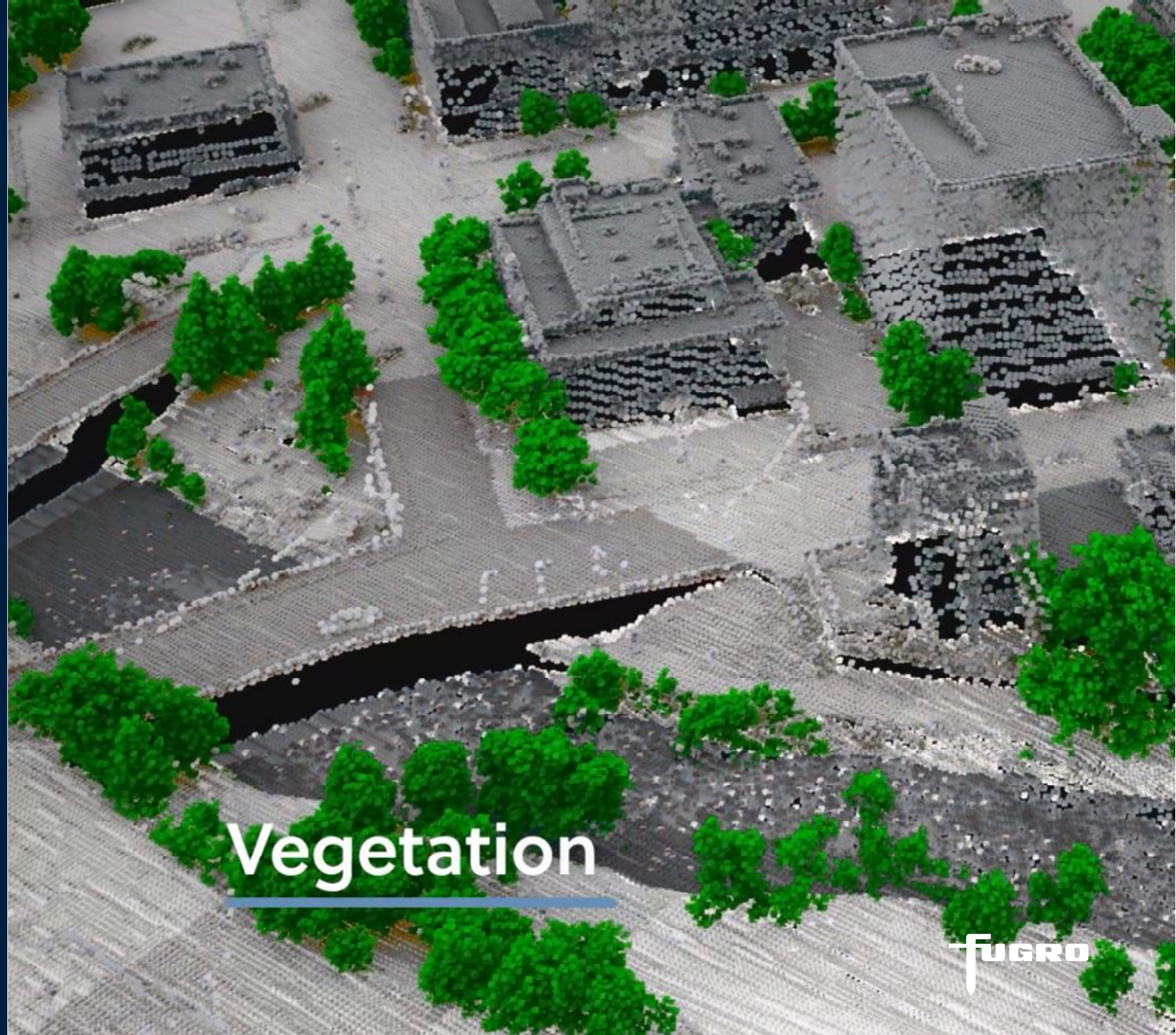
Enable ECC operator to enter 3D immersive world to improve situational awareness, helping reduce response times and ultimately save lives



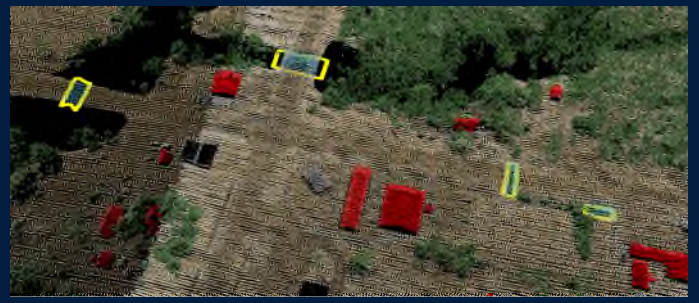
The Federal Communication Commission (FCC) estimates that 10,000 lives could be saved each year if the emergency dispatching system (9-1-1) could get help one minute sooner to those calling for emergency assistance

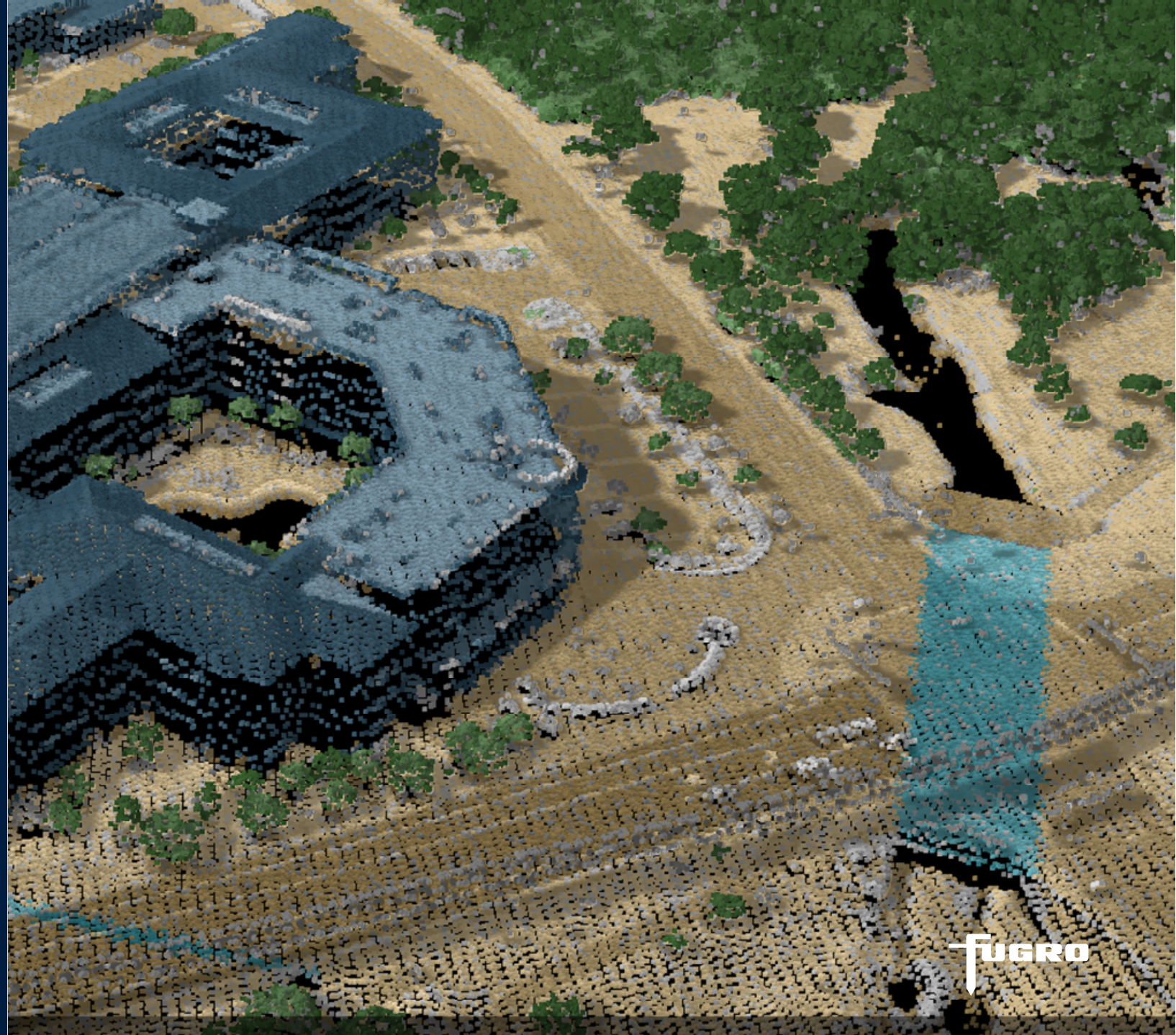
FUGRO

Vegetation Analysis

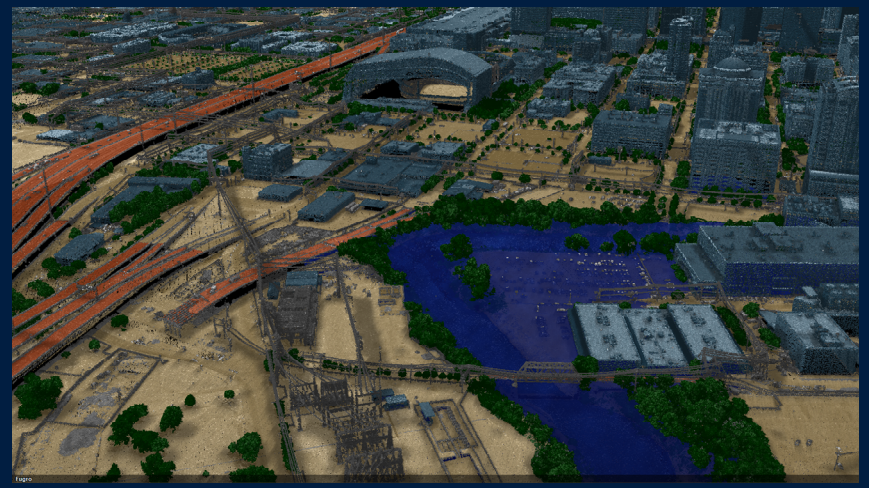


Culvert Identification and Geo-location





Flood Analysis Assistance



South, Coastal and Northeast Texas 2021

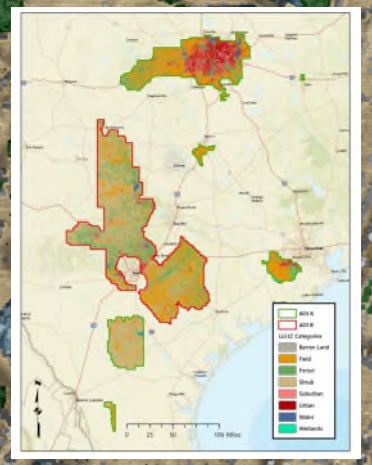
- Convert USGS lidar to Texas Specifications
- Project Date: 2021
- Area Size: 83,000 sq. mi.
- Project Description:

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.

FUGRO

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.

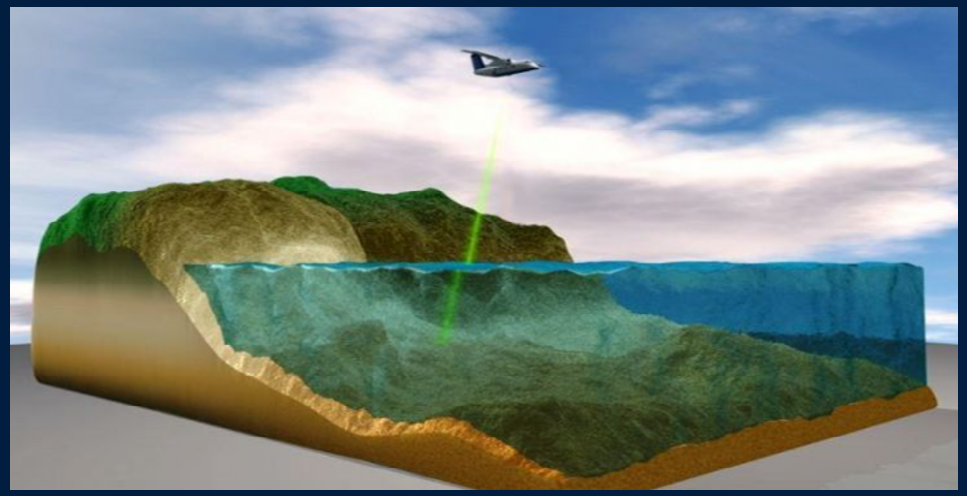
The data acquired will become part of an ongoing geospatial data collection program by the state of Texas to support state, regional, and local mapping needs.

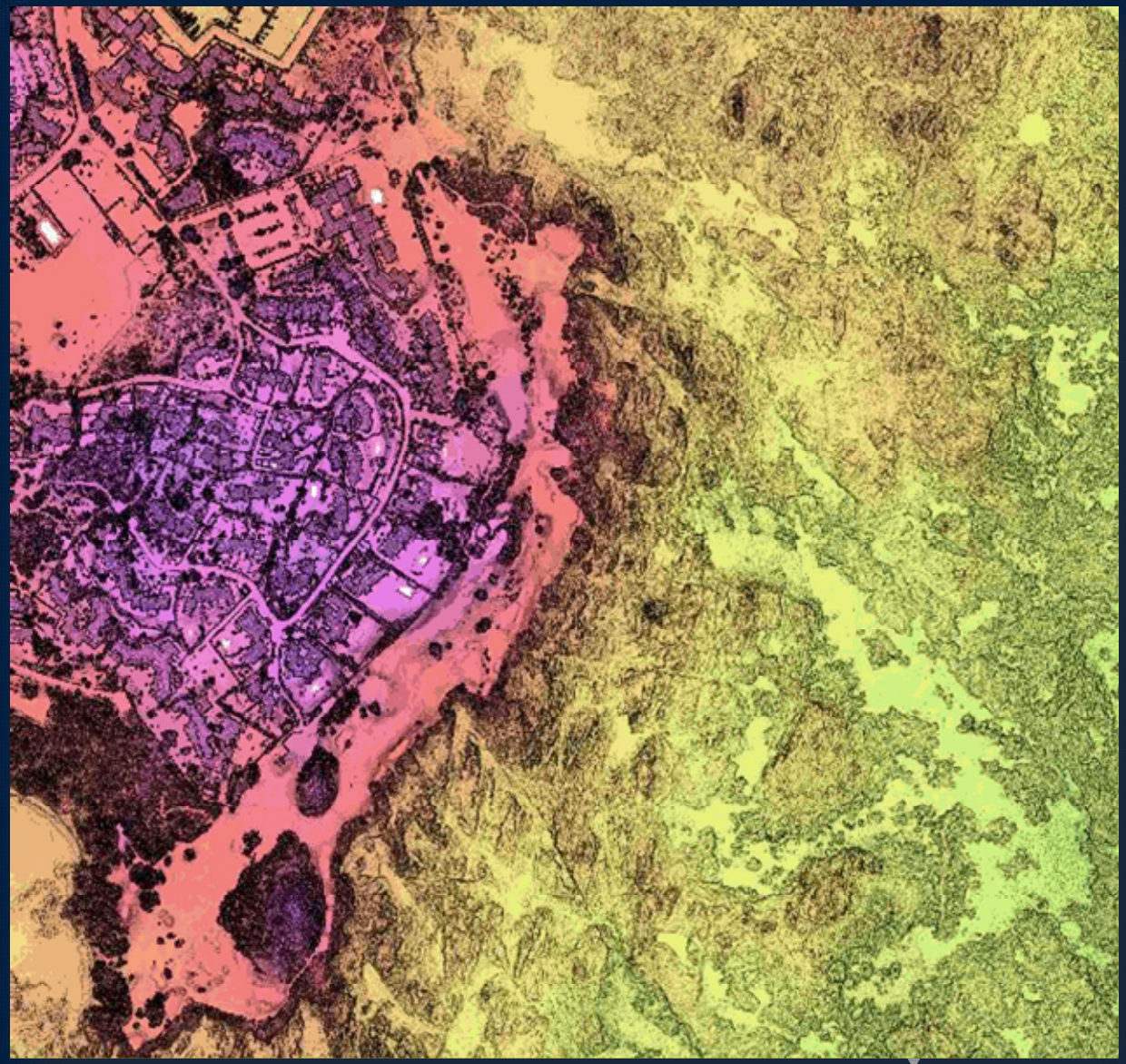
FUGRO

4
Airborne Lidar Bathymetry (ALB)

Airborne Lidar Bathymetry (ALB)

- Technique that uses a pulsed laser beam to measure the depth of shallow coastal waters from the air
- Simultaneous collection of elevation and water depth

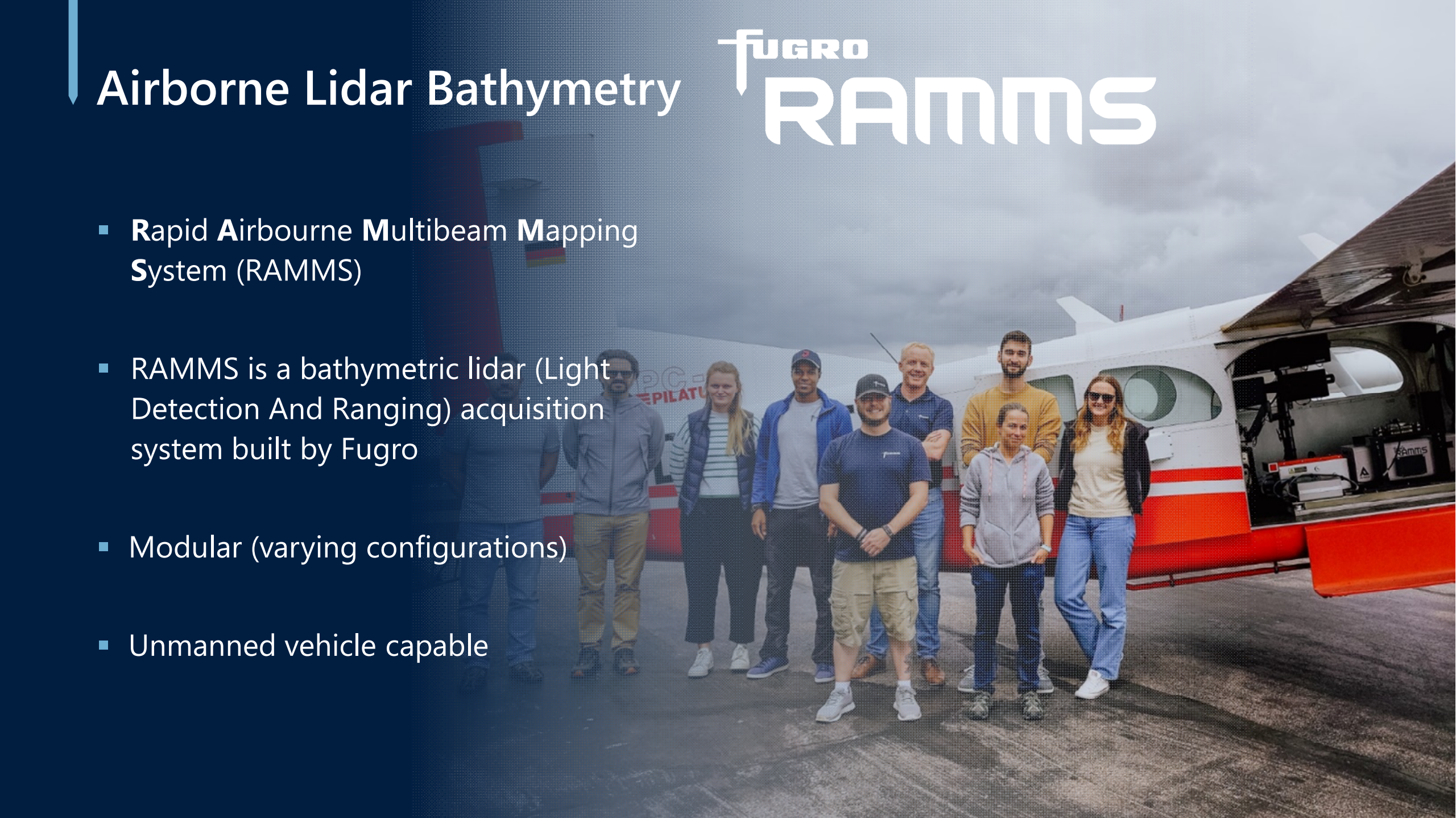




Airborne Lidar Bathymetry

FUGRO RAMMS

- **R**apid **A**irbourne **M**ultibeam **M**apping **S**ystem (RAMMS)
- RAMMS is a bathymetric lidar (Light Detection And Ranging) acquisition system built by Fugro
- Modular (varying configurations)
- Unmanned vehicle capable



Airborne lidar Bathymetry

FUGRO RAMMS

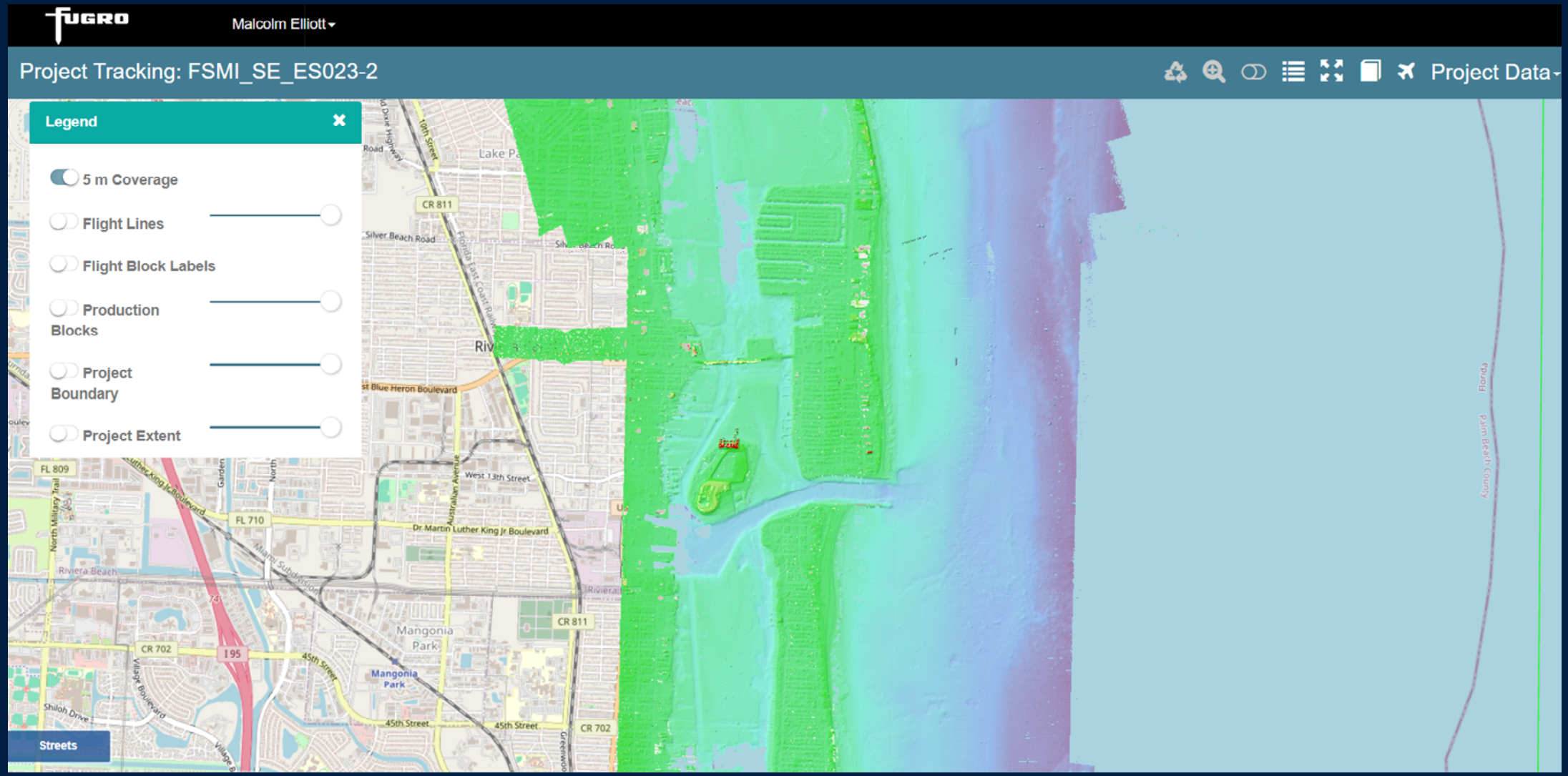
All sensors owned and operated by Fugro

Development is ongoing but sensors have been in commercial use since 2018.

Based on 20+ years of development and 3 generations of ocean-mine detection sensors – adapted by Fugro for charting and mapping requirements.

New hardware and software are being continually developed by Fugro, a latest model recently announced with upgraded capabilities.

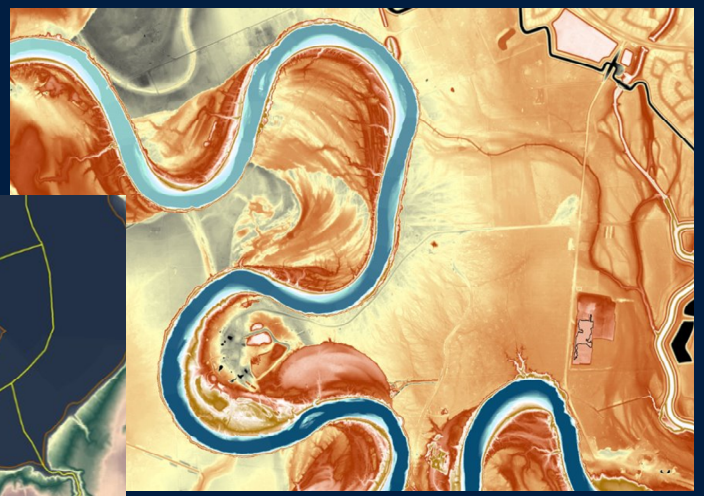
Florida Seafloor Mapping Initiative (FSMI)



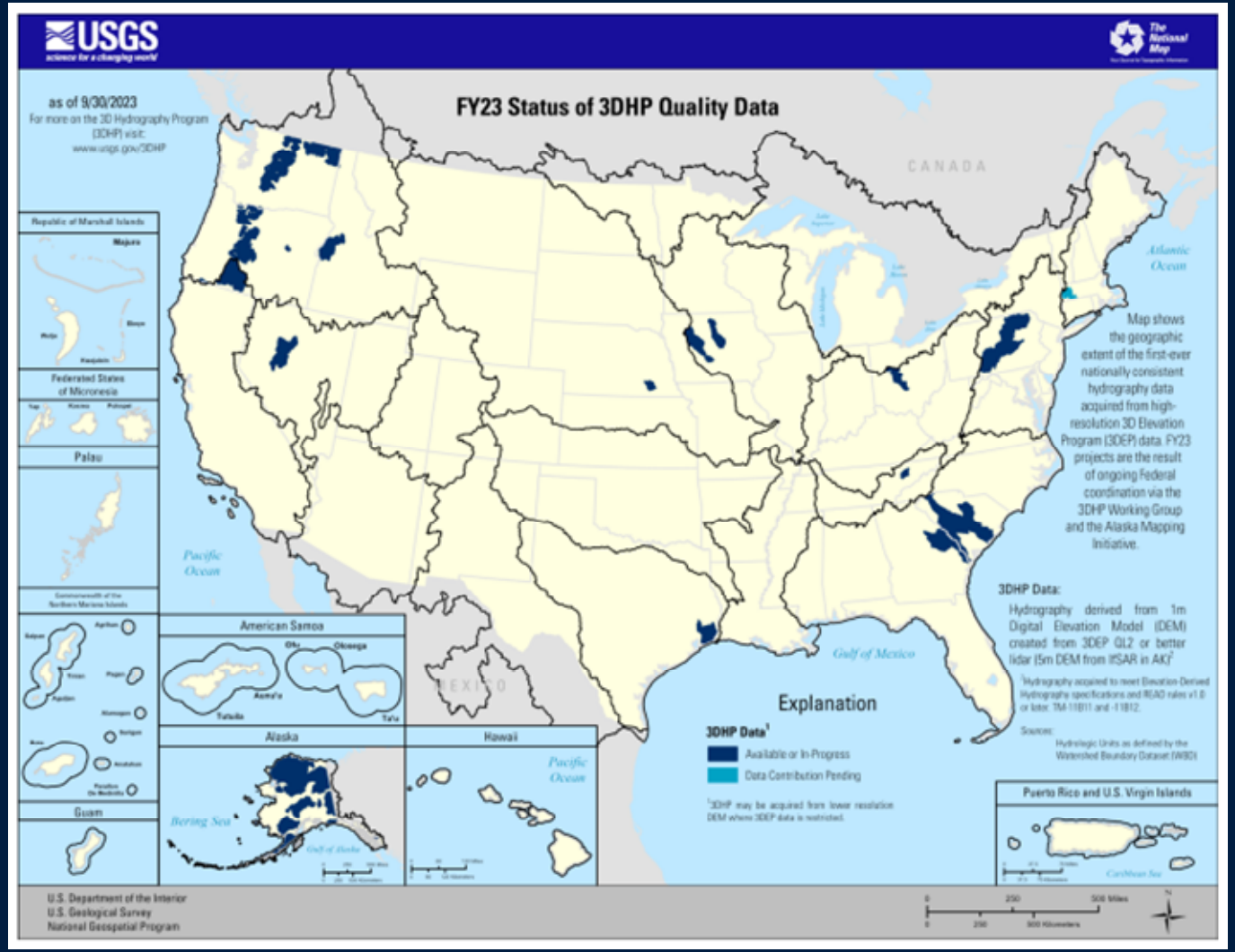
5
USGS 3DHP Program

USGS 3D Hydrographic Program (3DHP)

*The **3D Hydrography Program (3DHP)** constitutes a comprehensive hydrographic network, encompassing the hydro-enforced IfSAR as well as 3DEP 1-meter lidar DEMs, augmented by the inclusion of all artificial pathways, thereby establishing a unified hydrological network interconnecting most hydrographic features.*



USGS 3D Hydrographic Program (3DHP)



USGS 3D Hydrographic Program (3DHP)

Enhanced Spatial Accuracy in x,y,z, coordinates

Increased Channel Density

3DHP from 1m lidar DEMs

Z-elevation for every point, vertex, and node

Enhanced accuracy of channels

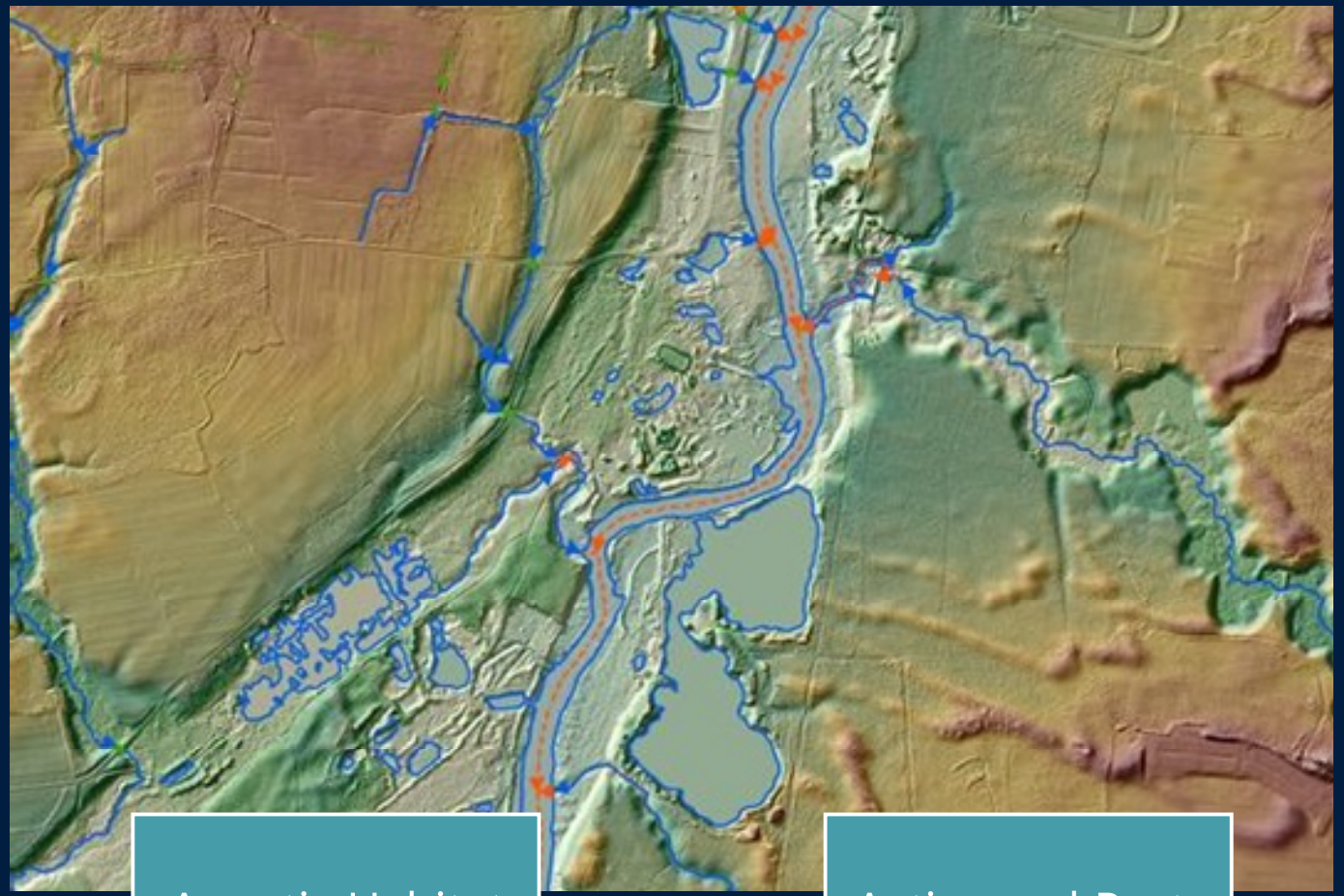
Hydro-enforced DTM

3DHP Mission Critical Applications

Water Quality Modeling and Monitoring

Spill Response

Agriculture Management



Aquatic Habitat Monitoring

Active and Post-fire Analysis

River and Streamflow Management

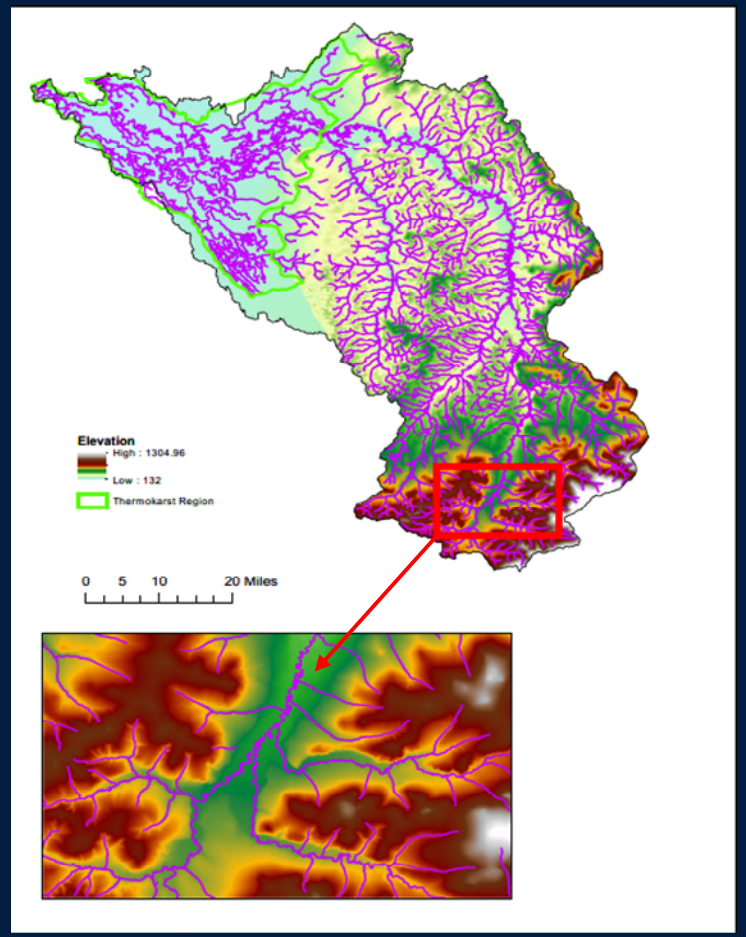
Flood Modeling

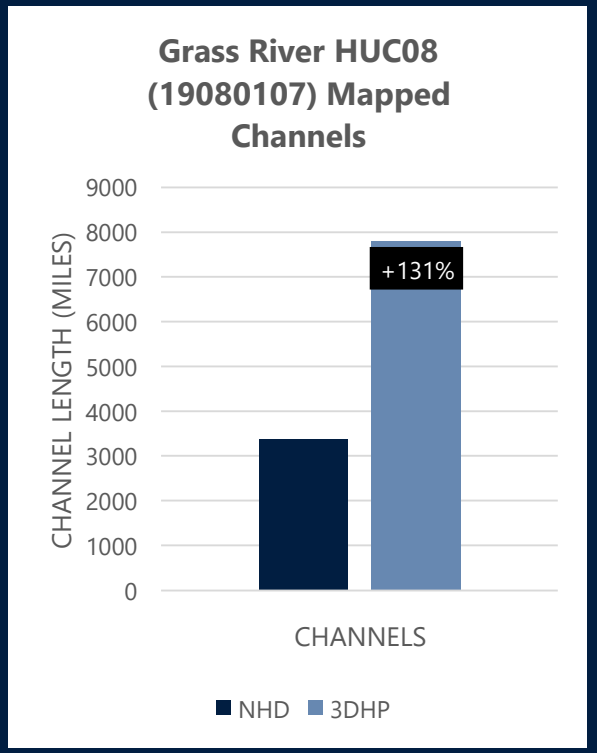
Dam Breach Analysis

FUGRO

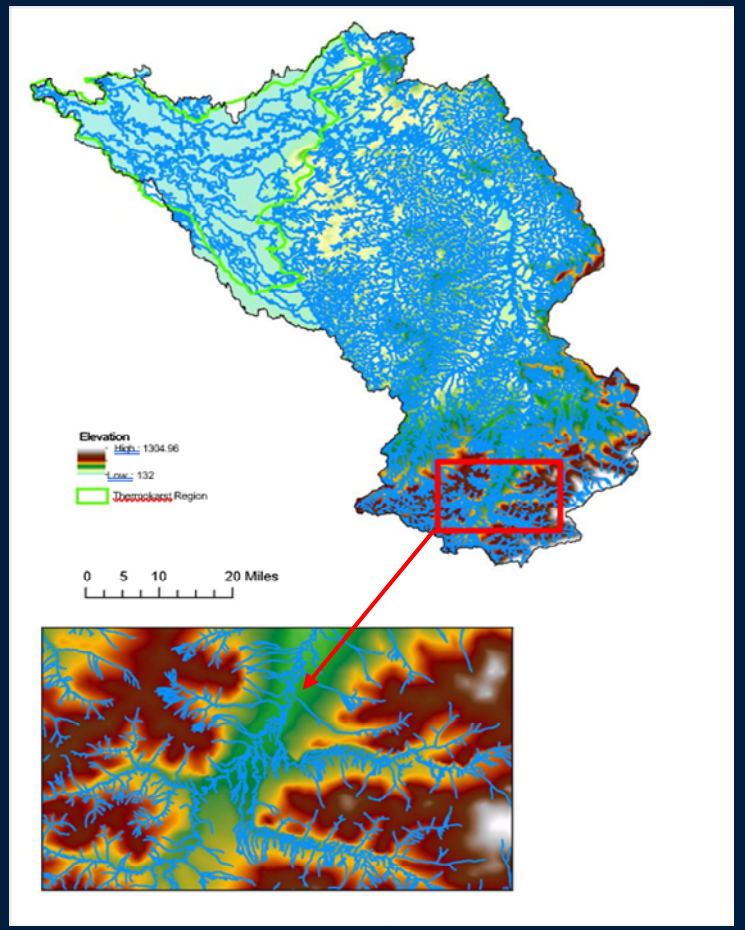
Alaska 3DHP Increased Channel Density

NHD



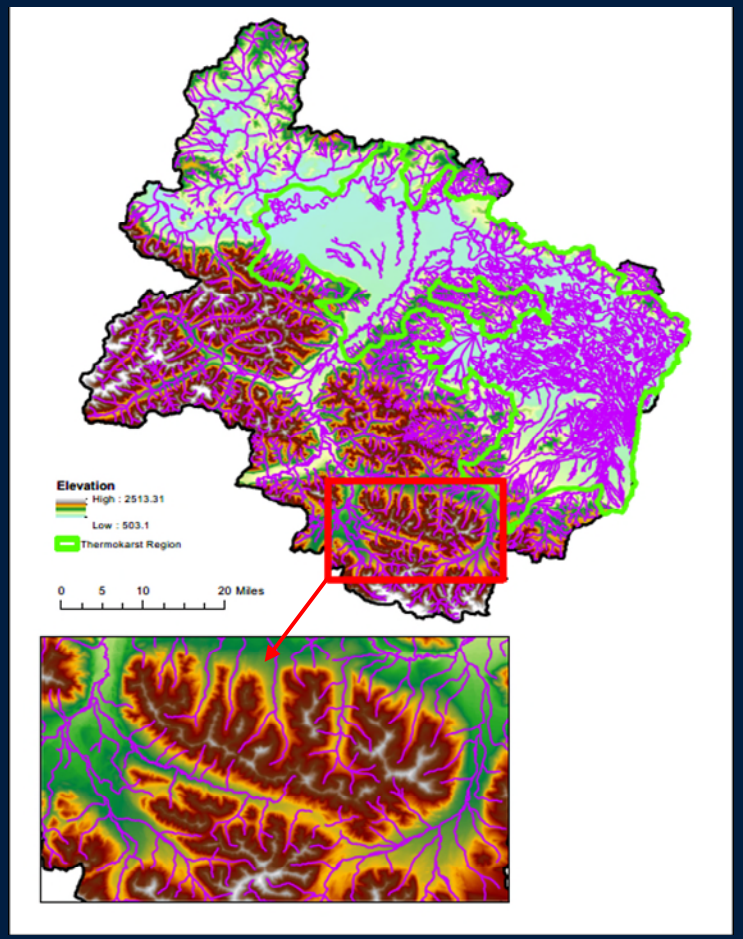


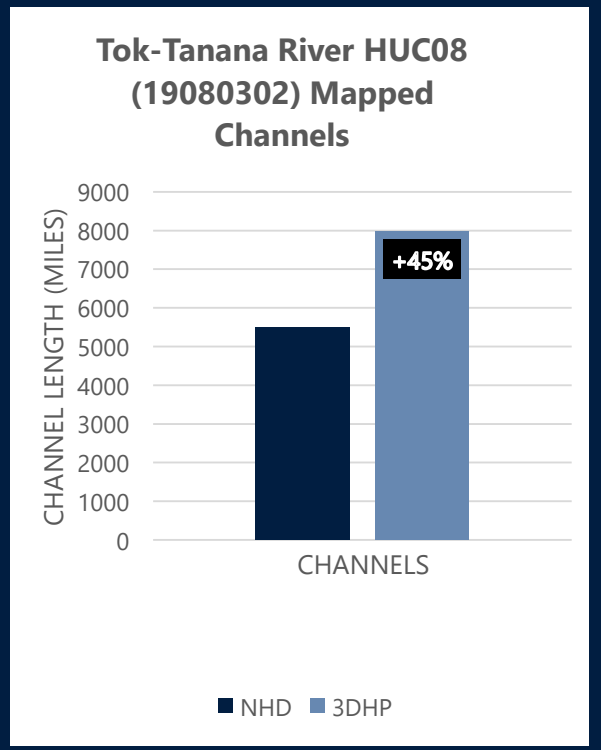
3DHP



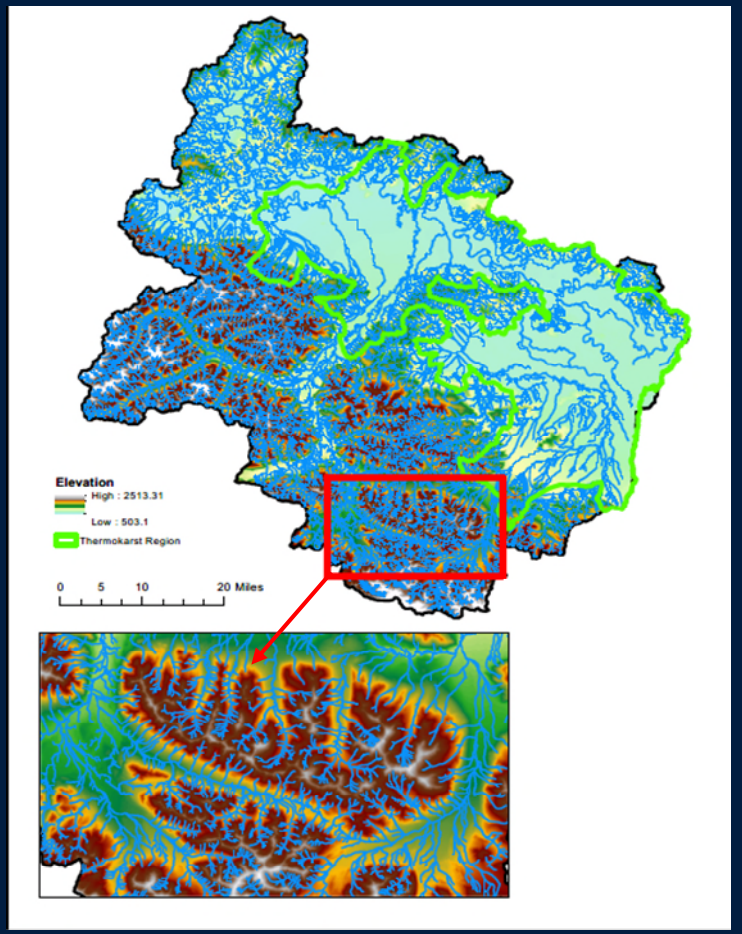
Alaska 3DHP Increased Channel Density

NHD





3DHP



6
USGS DCA Overview

Data Collaboration Announcement (DCA)

"The DCA provides a mechanism for partnering with the USGS and other Federal Agencies to acquire high-quality 3D Elevation or 3D Hydrography data to provide the Nation with high-resolution topographic products to support a broad array of applications."

Data Collaboration Announcement (DCA)

6

3DNTM Data Collaboration Announcement

Webinar Agenda

- 3DNTM overview
  - 3D Elevation Program (3DEP)
  - 3D Hydrography Program (3DHP)
- Overview of the DCA process
  - Find partnerships
  - Select approach
  - Find instructions and forms
  - Submit completed forms and GIS project files
- Timeline
- Project evaluation considerations
- Q&A

USGS science for a changing world

The National Map Your Source for Topographic Information

www.usgs.gov/3DNTM/DCA

Fugro's Customized 3DNTM Solutions

Fugro was entrusted with the second task order for 3DHP implementation in Alaska, collaborating closely with the United States Geological Survey (USGS) to shape the current iteration of the 3DHP product.

7
Questions?

FUGRO

Unlocking **Insights**
from **Geo-data**

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