

Leveraging Multiple Aerial Collections + AI Insights to Enhance Productivity and Decision Making

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Agenda

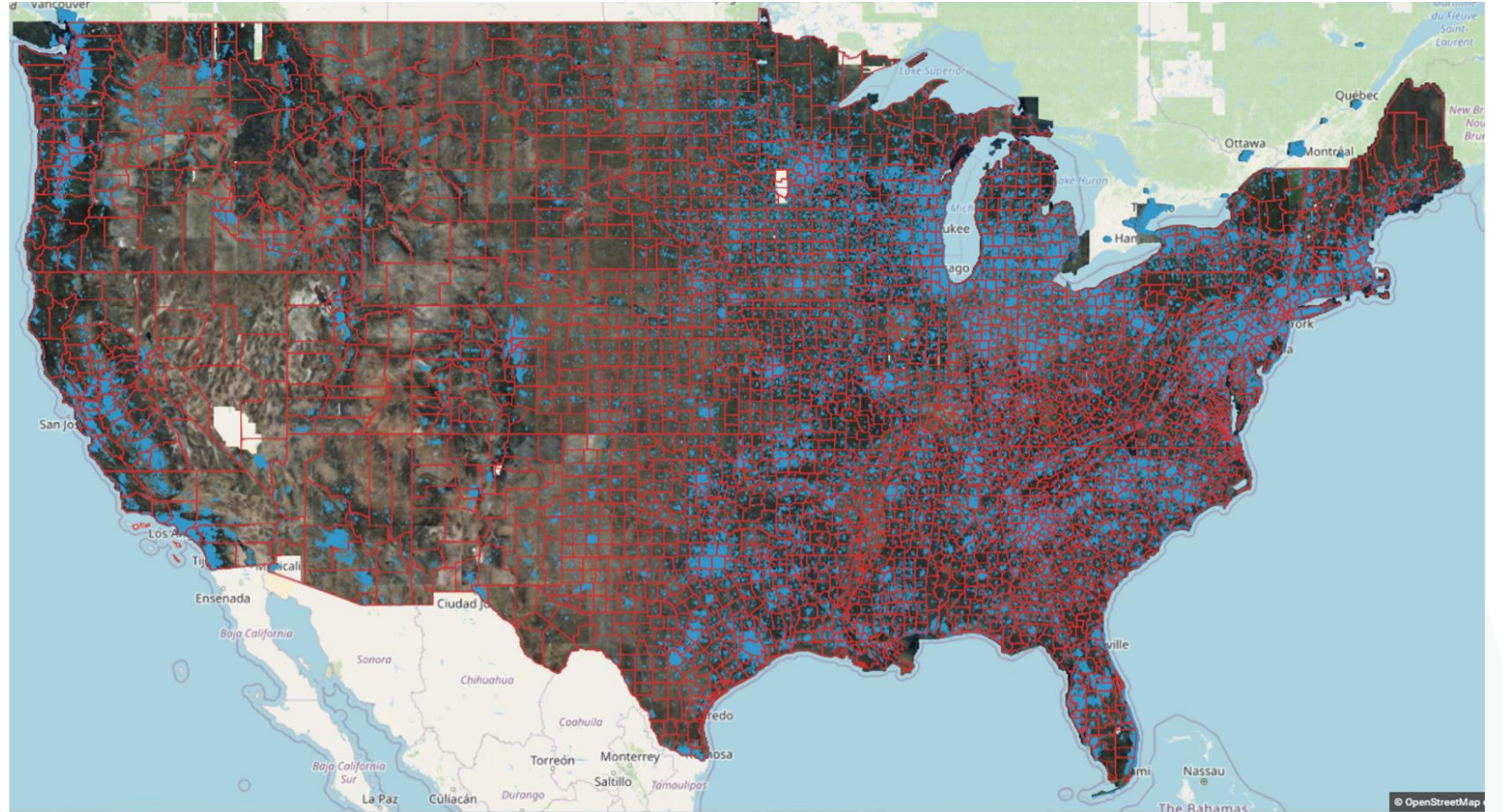
- 1 Aerial Needs and Challenges
- 2 Coverage, Cadence, Data Stack
- 3 Vexcel Elements- AI Insights
- 4 Open discussion – Government Use Cases



Wilmette, IL

Aerial Needs and Challenges

- Geographic AOI
- Time of year
- Data stack
- Historical and Current Data
- Accuracy and Reliability
- Data Quality and Integration
- Cost of data collection



About Vexcel

Global leader in aerial imaging for 30+ years



Vexcel Imaging



Vexcel Fleet

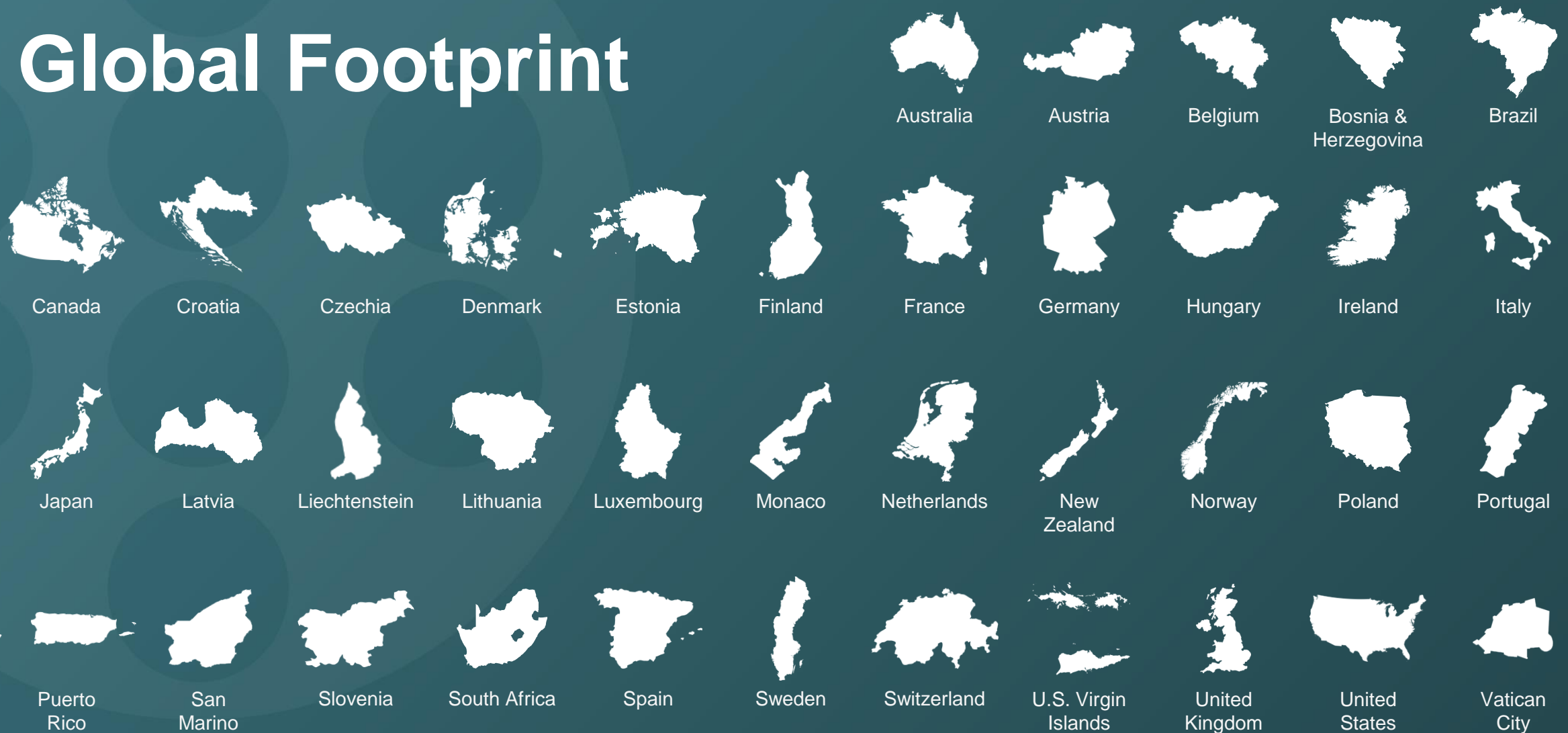


Vexcel Data Program

Benefits:

- ✓ Largest aerial collection program
- ✓ Unmatched quality & accuracy
- ✓ Consistency across products
- ✓ Frequent updates

Global Footprint



Coverage, Cadence, & Accuracy

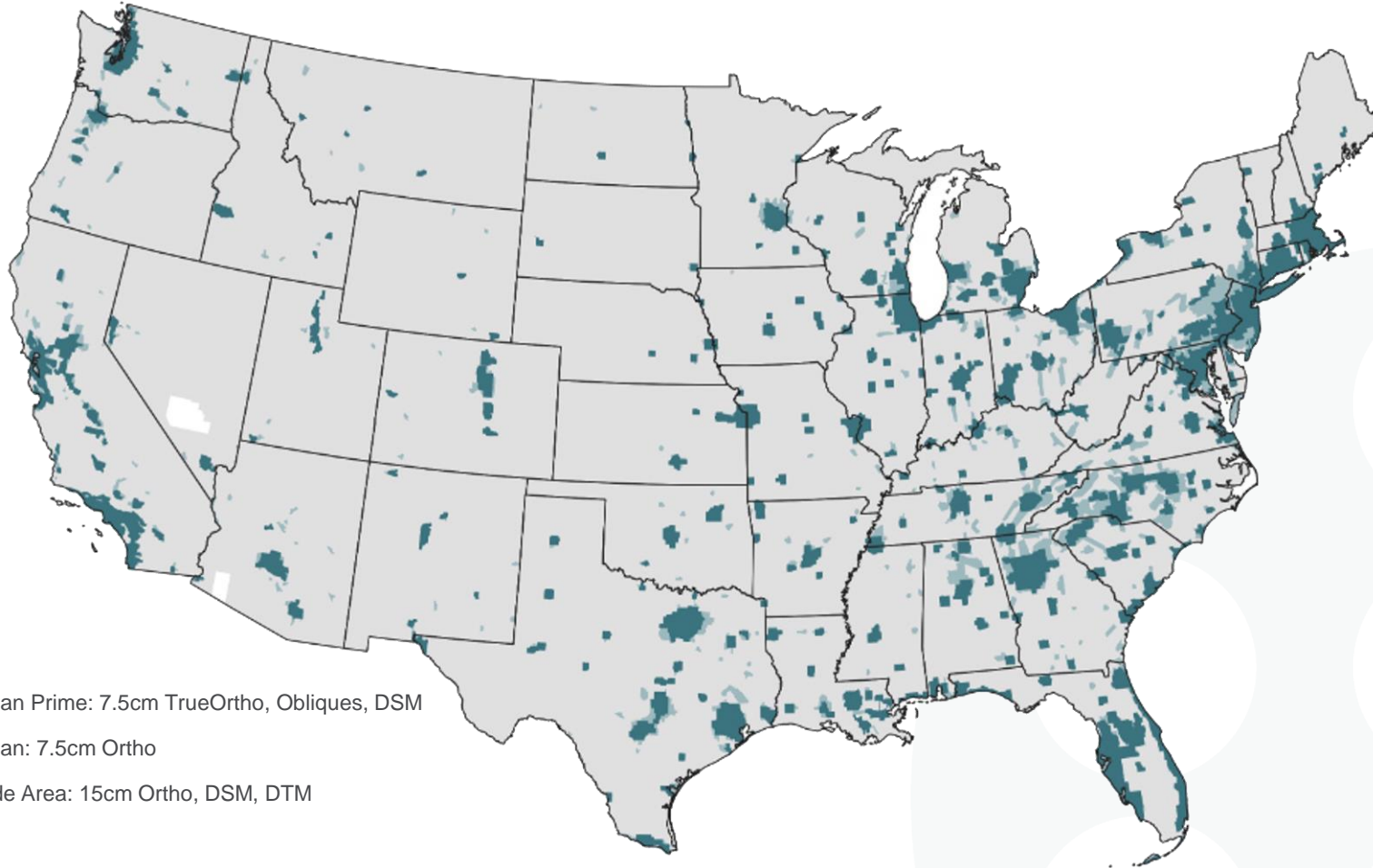


VEXCEL
DATA PROGRAM

Memphis, TN



U.S. Collection Program



- Urban Prime: 7.5cm TrueOrtho, Obliques, DSM
- Urban: 7.5cm Ortho
- Wide Area: 15cm Ortho, DSM, DTM

Current Library



49 states



Urban & rural collections



99.6% U.S. population



127 million U.S. households

2024 Plan



Up to 3 collections in urban areas



Refreshing 4.4 million km² & 93% population

Resolution Comparison



VEXCEL WIDE AREA PROGRAM



VEXCEL URBAN PROGRAM

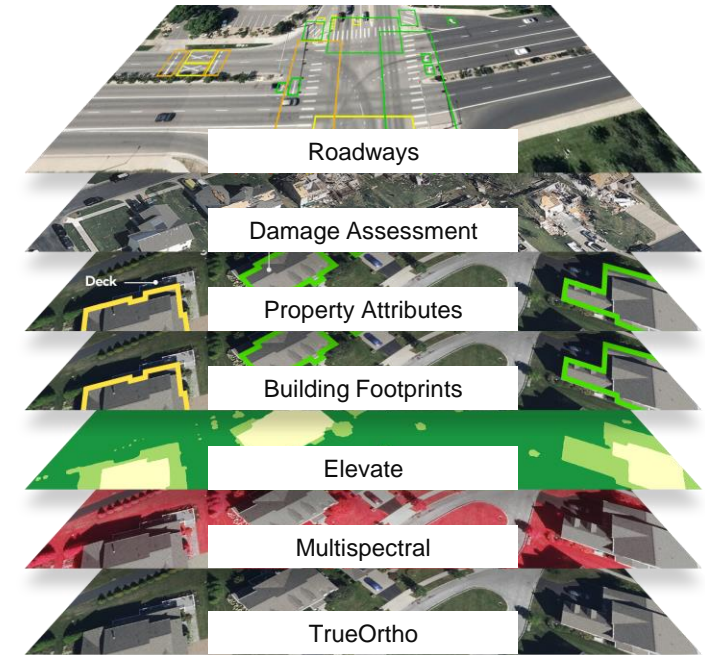


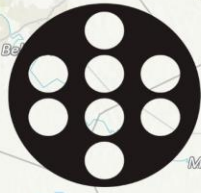
Positional Accuracy

- Data is matched against professional-grade ground control points (GCPs) 17,683 in U.S.
- Pixel-to-data match across multiple mapping-grade products and derivatives
- Datasets are produced to meet the ASPRS accuracy standards (2024) for each specific product

High Quality

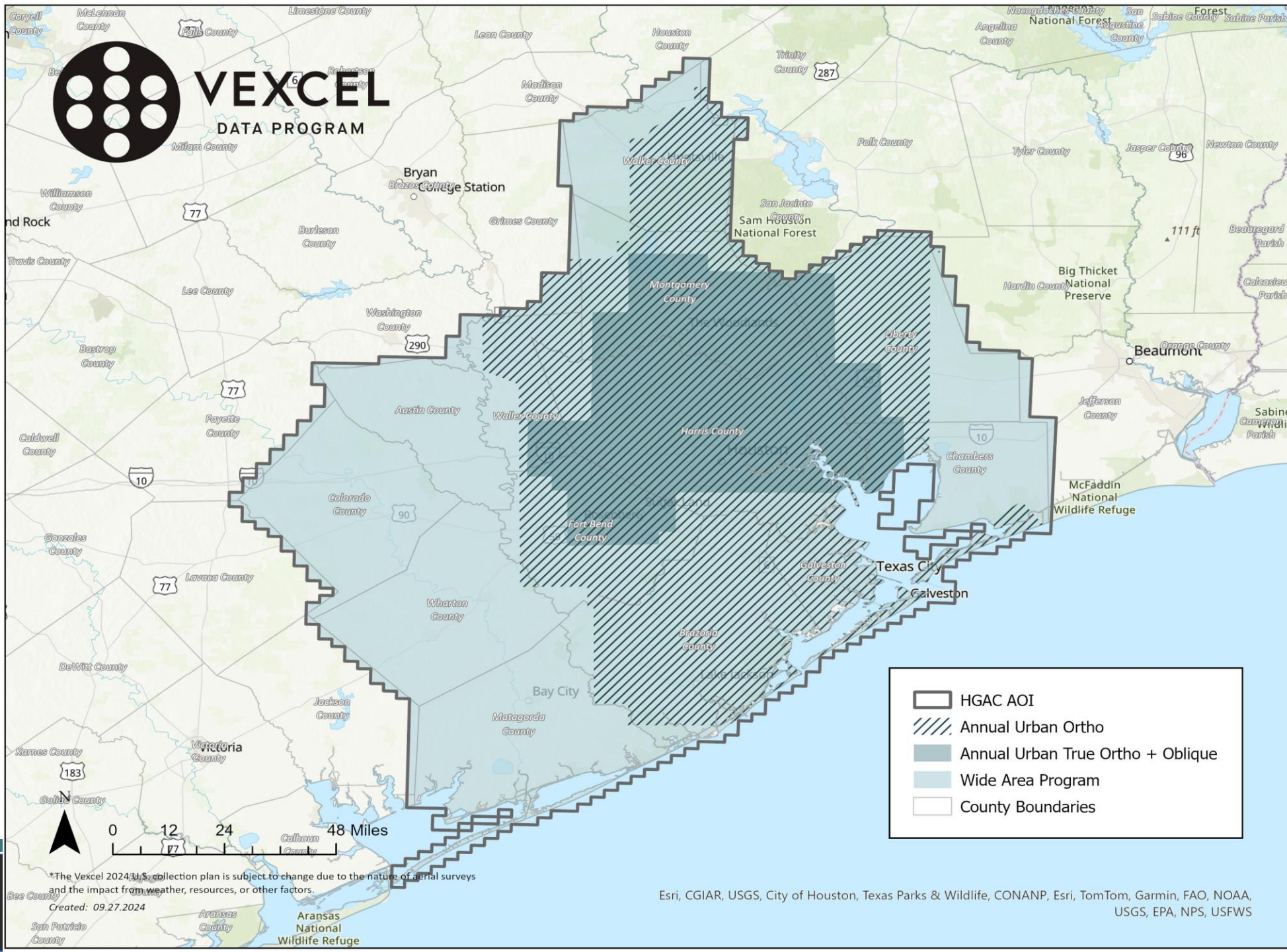
- Stringent collection spec (sun angle, no clouds, no fog, etc.)
- World-class imagery processing pipeline
- Optimized for AI and ML applications
- Up to 16x finer resolution than the best satellite imagery available in U.S.





VEXCEL

DATA PROGRAM



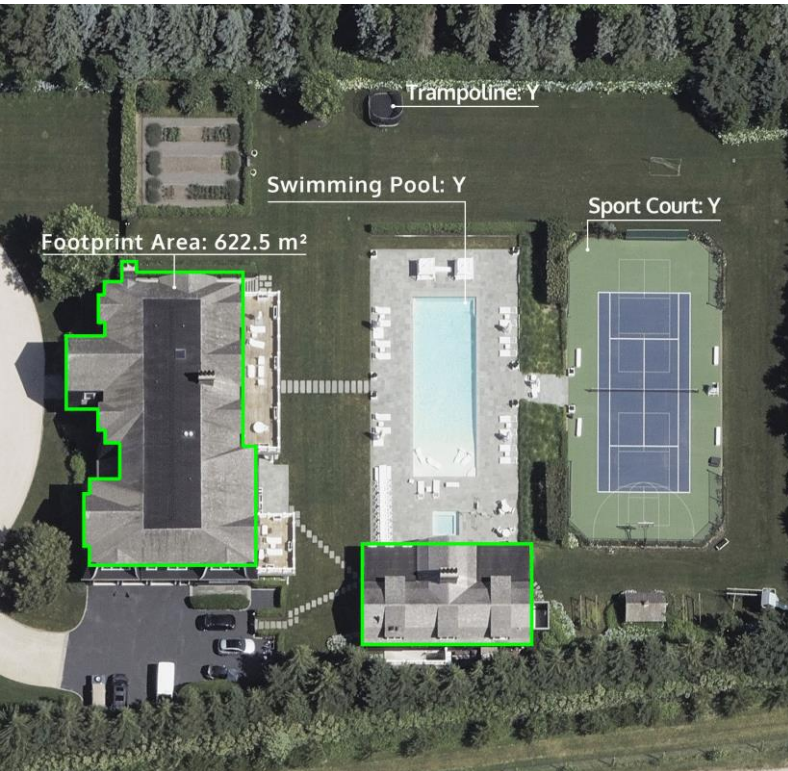
*The Vexcel 2024 U.S. collection plan is subject to change due to the nature of aerial surveys and the impact from weather, resources, or other factors.

Created: 09.27.2024

Esri, CGIAR, USGS, City of Houston, Texas Parks & Wildlife, CONANP, Esri, TomTom, Garmin, FAO, NOAA, USGS, EPA, NPS, USFWS

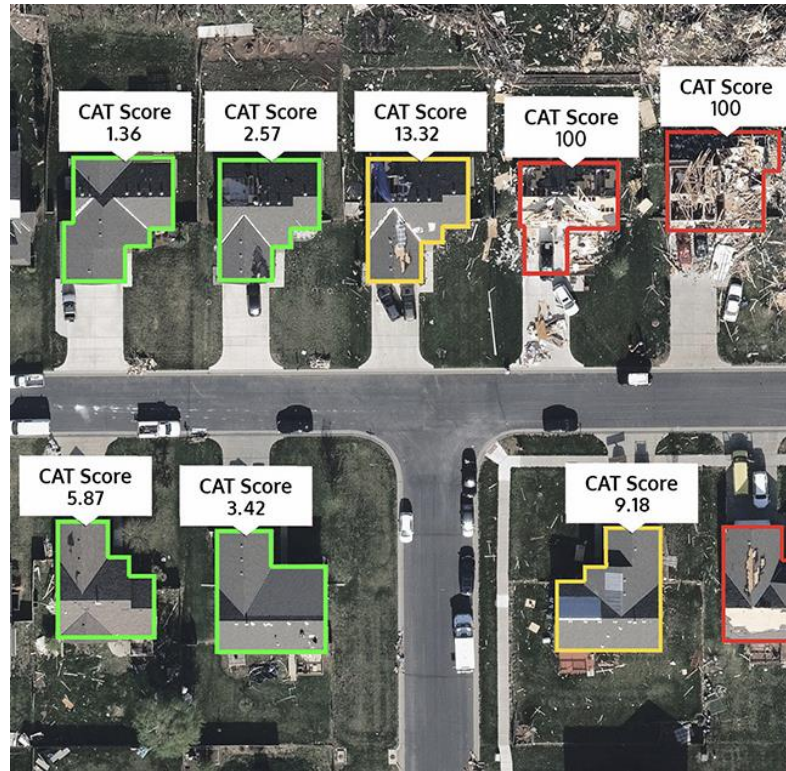


Elements: AI-derived products at scale



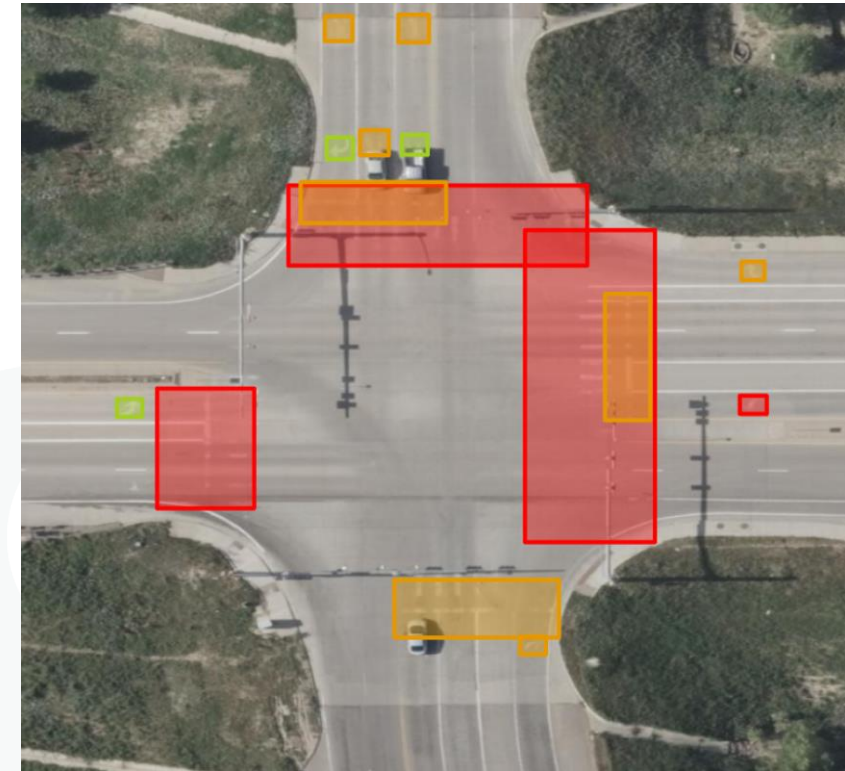
Properties & Buildings

- **40+** building & property attributes
- Footprint, roof condition, solar panels, hardscapes, defensible space, pools, and more
- **127 million** properties in U.S.; buildings in **40+** countries



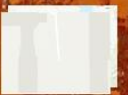
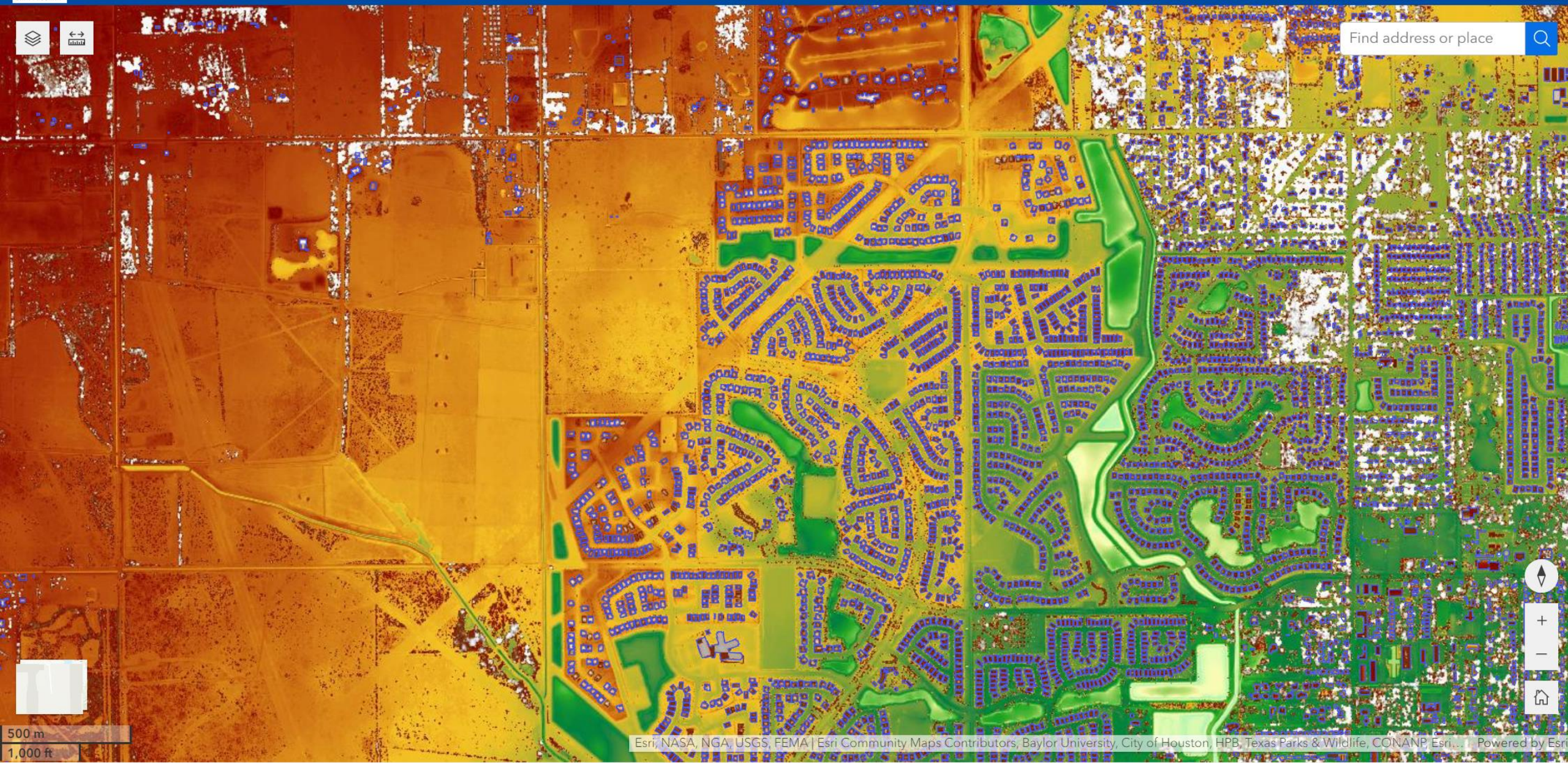
Damage Assessment

- Wildfires, hurricanes, tornadoes
- Post-disaster analysis on impacted properties
- Compare pre- and post-disaster imagery



Roadways

- Automated insights on non-highway roads in **3,389** cities in U.S.
- **30+** features: infrastructure & pavement markings
- Assess inventory, condition, safety analysis

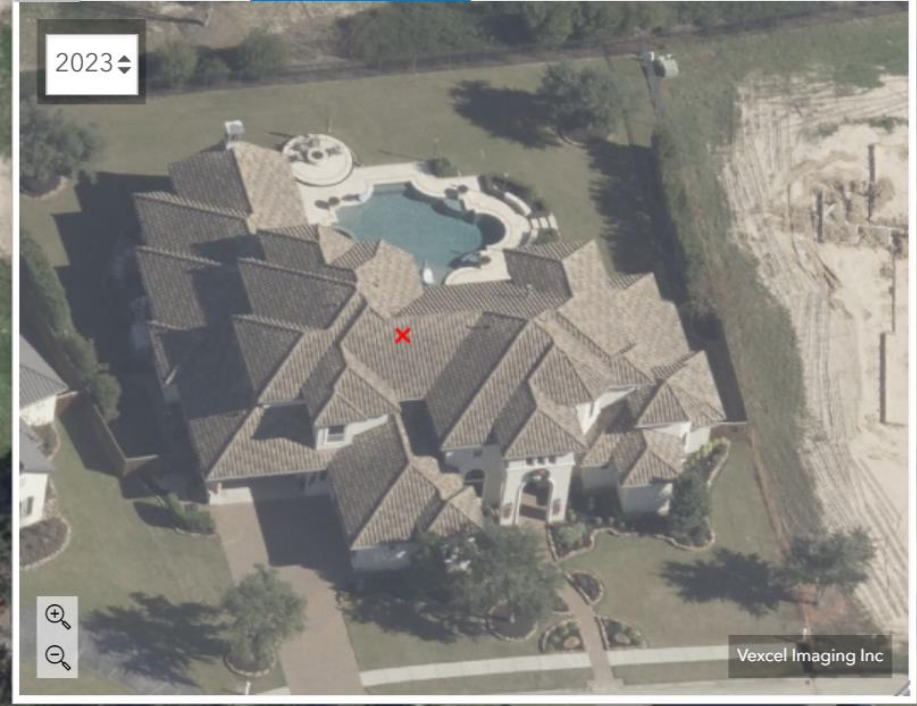


500 m
1,000 ft

Oriented Imagery

Map navigation toolbar with icons for location, layers, pan, zoom, and other map controls.

2023

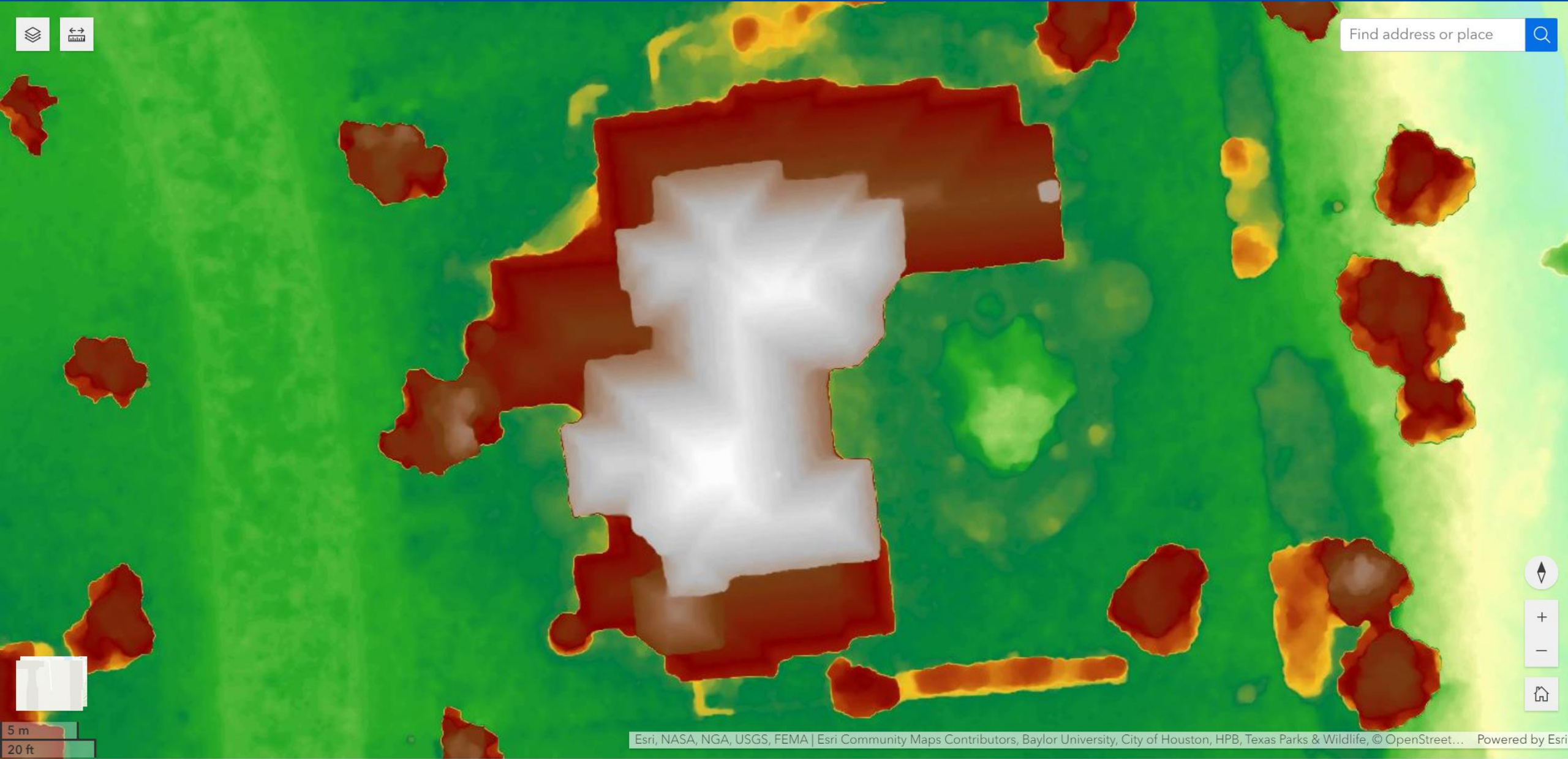


20 m
50 ft





Find address or place



2023





Sport court No
 Vehicle(s) No
 Tree Cover 4%

Primary Building Info

Building Footprint POLYGON((-95.847
 Primary Structure Yes
 Footprint Area 8933.3 ft²
 Building Tree Cover 0%
 Ground Elevation 152.0 ft

Primary Roof Info

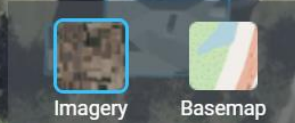
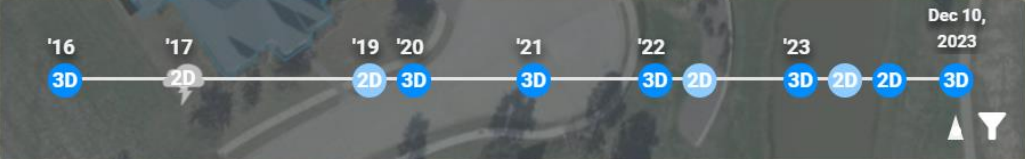
Rooftop Geocode POINT(-95.847339
 Rooftop Shape hip
 Roof Material tile
 Roof Discoloration No
 Roof Tarp No
 Roof Debris No
 Roof Missing Material No
 Roof Condition 5 = Great condition
 *Roof condition scale:
 1=bad, 2=poor, 3=fair, 4=good, 5=great

Primary Roof Features

Roof Solar No
 Air Conditioning No
 Chimney 1
 Roof Vent 3
 Satellite Dish No
 Skylight No

Primary Building Defensible Space

Tree coverage within 5 feet 2%
 Tree coverage within 30 feet 4%
 Tree coverage within 100 feet 7%
 Tree coverage within 200 feet 6%
 Other buildings within 5 feet -
 Other buildings within 30 feet -
 Other buildings within 100 feet 7%



- Gray Sky Contrast
- Damage footprints
- Building footprints
- Street Labels

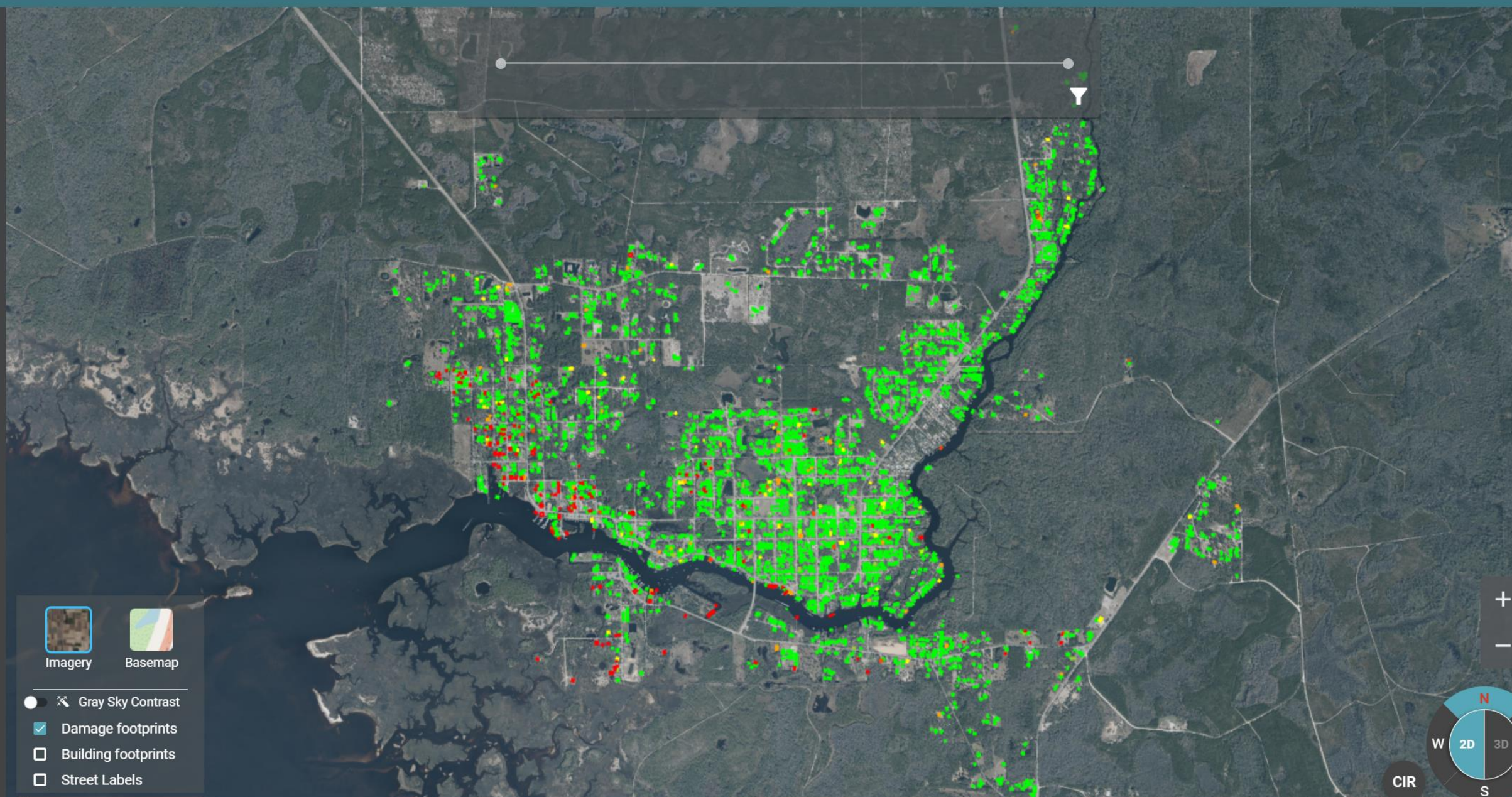
Overlays 20 m

Gray Sky Program

- Collecting post-CAT imagery since 2017
- Dedicated program to monitor weather and major disasters
- Collecting imagery of impacted properties after wildfires, tornadoes, and hurricanes in U.S.
- On-demand Gray Sky collections
- Imagery published ASAP; usually within 24 hours of aircraft wheels down
- Automated damage assessments on Gray Sky imagery with computer vision models
- Before/after comparisons



Hurricane Ian



Imagery
 Basemap

Gray Sky Contrast

Damage footprints

Building footprints

Street Labels

Overlays

1000 m

+
 -
 N
 W 2D 3D E
 S
 CIR



Show property measurement units in:

Imperial Metric

Show property footprints [Copy table](#)

Damage Assessment

Primary Building Info

Catastrophe Score 100/100
Approx. FEMA Score 6 - Destroyed

Primary Roof Condition

Missing roof material
Roof structural damage
Tarp coverage
Debris coverage
Discoloration

Additional Building Info

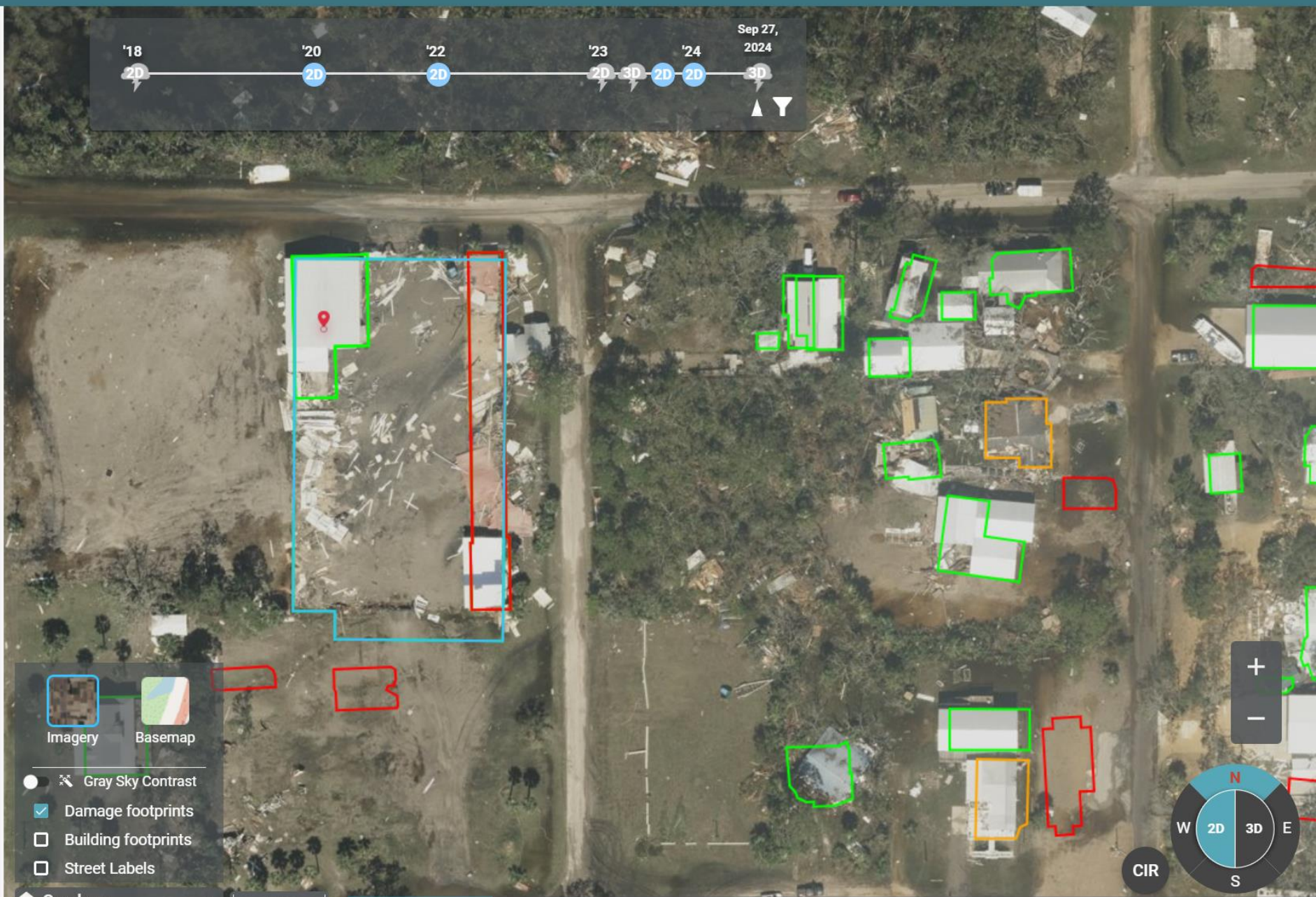
Catastrophe Score 0/100
Approx. FEMA Score None - No damage

Additional Roof Condition

Missing roof material 0%
Roof structural damage 0%
Tarp coverage 0%
Debris coverage
Discoloration 0%

Pre-Damage Structure Information

Parcel Boundary POLYGON((-83.393
Pool No
Diving board No
Waterslide No
Deck No
Enclosure No
Trampoline No
Playground No



Imagery Basemap

Gray Sky Contrast

Damage footprints

Building footprints

Street Labels

Overlays

+ -

W 2D 3D E

S

CIR



Timeline slider showing '23 and Sep 2024 3D. Includes play and stop icons.



Imagery Basemap

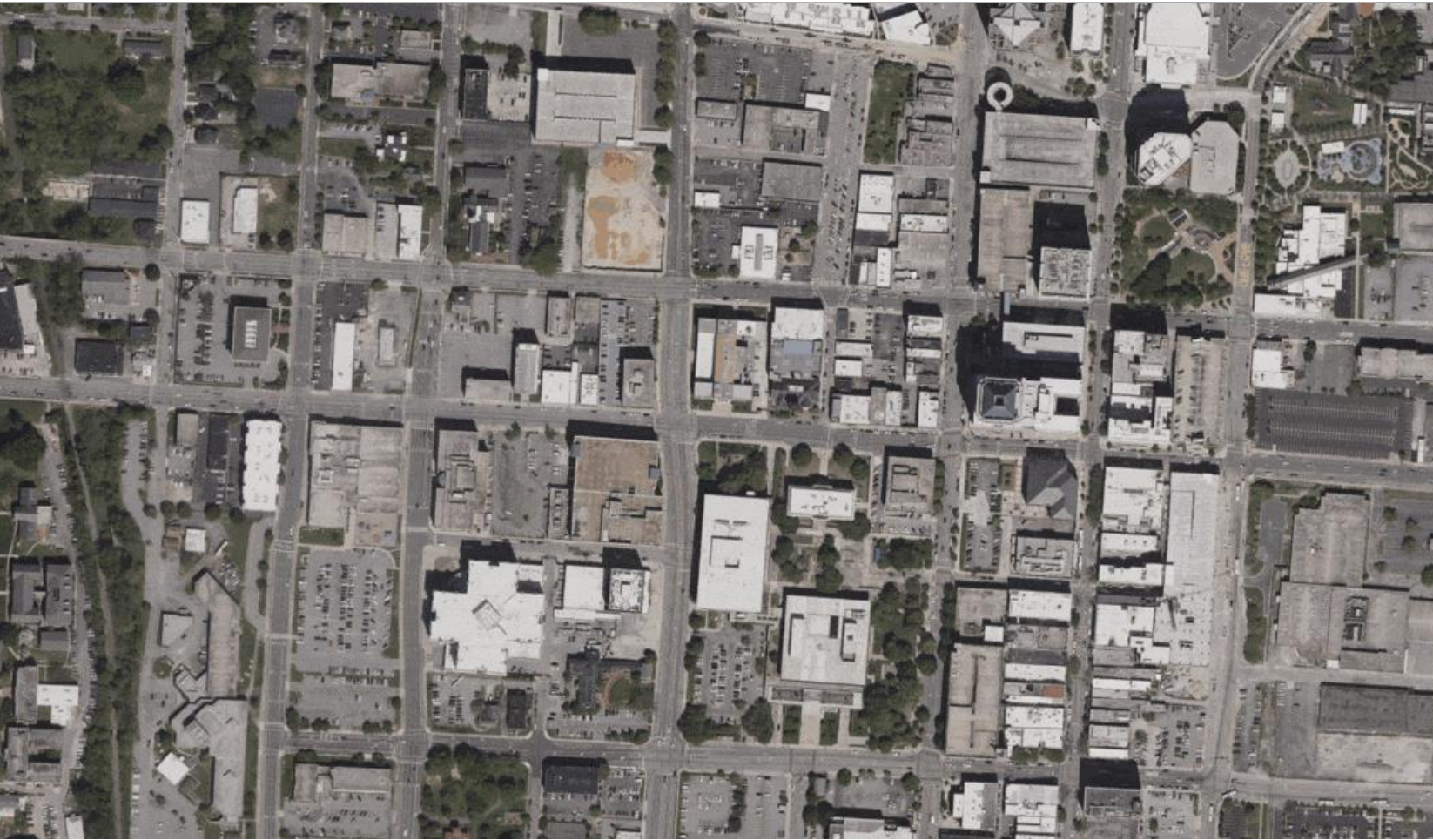
- Gray Sky Contrast
- Damage footprints
- Building footprints
- Street Labels

Overlays

Map navigation controls including zoom in (+) and zoom out (-) buttons, a compass, and a 3D view selector (2D, 3D, S, W, E, N).

Elements - Roadway

Access 35+ attributes for better, more precise roadway analysis



Pavement Markings

- Crosswalks
- Bicycle symbols
- Arrows
- Words
- Available for current and historical imagery

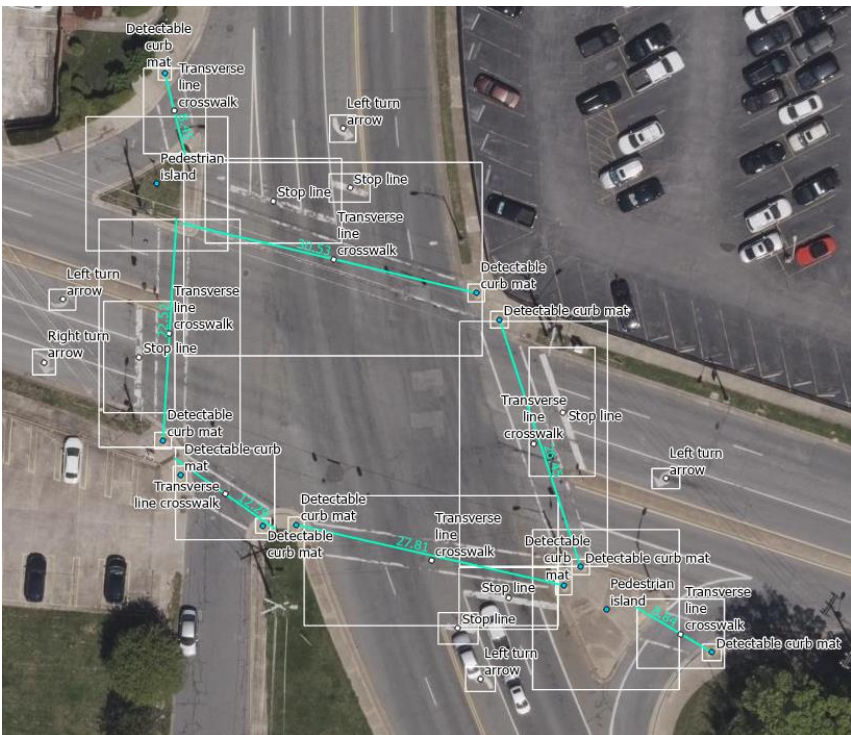
Infrastructure

- Pedestrian refuge islands
- ADA truncated domes “curb mats”
- Intersection-junctions
- Available for current and historical imagery

Condition Assessment

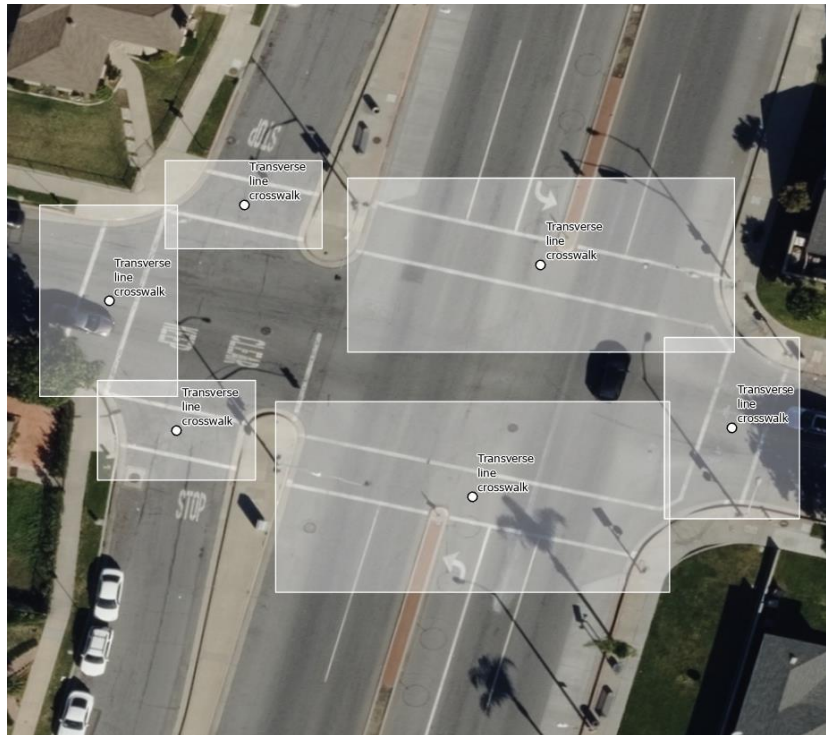
- Pavement marking quality score for prioritizing maintenance
- Available for current and historical imagery

Use Cases



Inventory

Pavement markings, curb mats, pedestrian islands



Safety

Low Visibility Crosswalks



Maintenance

Pavement marking condition scoring



Property Information

Analysis run on 16-AUG-2023 imagery

Show property measurement units in:

Imperial Metric

Show property footprints Copy table

Property Features

Parcel Boundary	POLYGON((-77.093
Pool	No
Diving board	No
Waterslide	No
Deck	No
Hardscapes - Area	8.6 ft ²
Hardscapes - Parcel area percent	16%
Enclosure	No
Trampoline	No
Playground	No
Sport court	No
Vehicle(s)	No

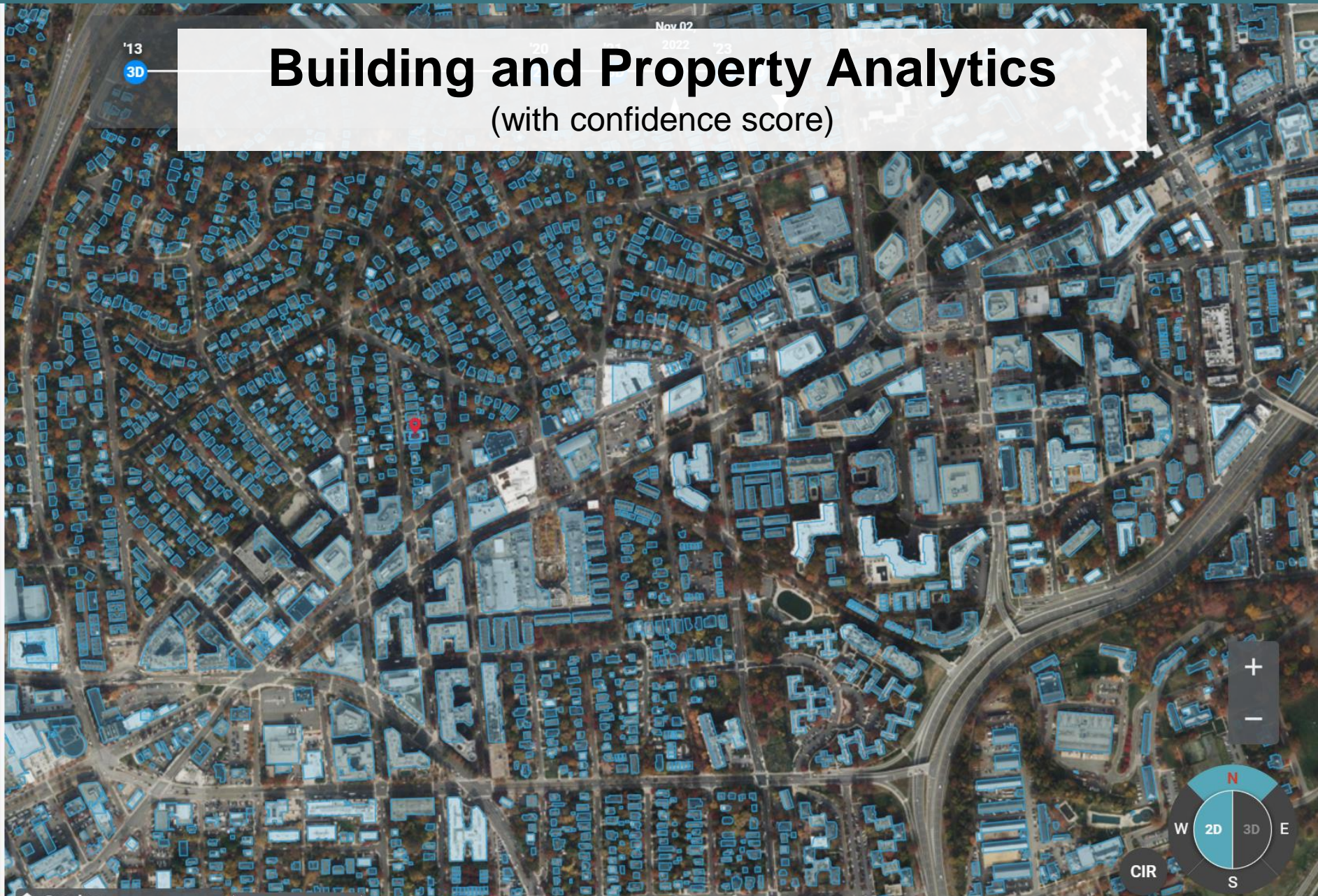
Primary Building Info

Building Footprint	POLYGON((-77.093
Primary Structure	Yes
Footprint Area	1907.5 ft ²
Building Tree Cover	1%

Primary Roof Info

Rooftop Geocode	POINT(-77.094019
Rooftop Shape	hip
Roof Material	shingle
Roof Discoloration	No
Roof Condition	5 = Great condition
Roof condition scale:	1=bad, 2=poor, 3=fair, 4=good, 5=great

Primary Roof Features



Building and Property Analytics

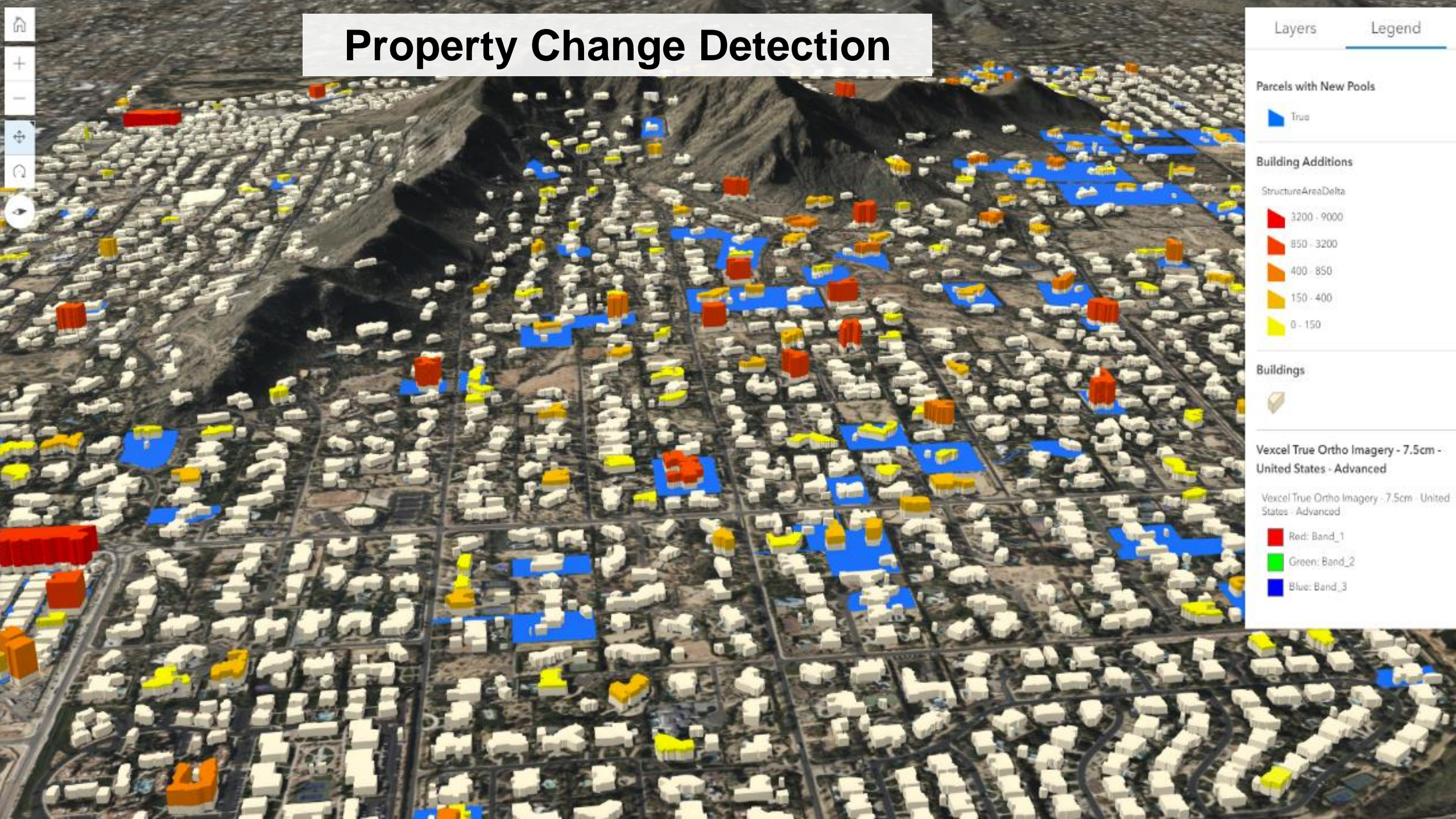
(with confidence score)

Overlays

200 m

Final Ortho

Property Change Detection



Layers

Legend

Parcels with New Pools

True

Building Additions

StructureAreaDelta

3200 - 9000

850 - 3200

400 - 850

150 - 400

0 - 150

Buildings



Vexcel True Ortho Imagery - 7.5cm - United States - Advanced

Vexcel True Ortho Imagery - 7.5cm - United States - Advanced

Red: Band_1

Green: Band_2

Blue: Band_3



Primary Building Info

Catastrophe Score 91/100
Approx. FEMA Score 6 - Destroyed

Primary Roof Condition

Missing roof material 8.8%
Roof structural damage 34.85%
Tarp coverage 0%
Debris coverage
Discoloration 0.2%

Pre-Damage Structure Information

Parcel Boundary POLYGON((-156.67
Pool No
Diving board No
Waterslide No
Deck No
Enclosure No
Trampoline No
Playground No
Sport court No

Primary Building Info

Building Footprint POLYGON((-156.67
Primary Structure Yes
Footprint Area 3759.2 m²
Building Tree Cover 0%

Primary Roof Info

Rooftop Geocode POINT(-156.67834;
Rooftop Shape flat
Roof Material membrane
Roof Solar No
Roof Condition 3 = Fair condition
*Roof condition scale:
1=bad, 2=poor, 3=fair, 4=good, 5=great

Primary Building Defensible Space



Imagery



Basemap

Gray Sky Contrast

Damage footprints

Building footprints

Street Labels

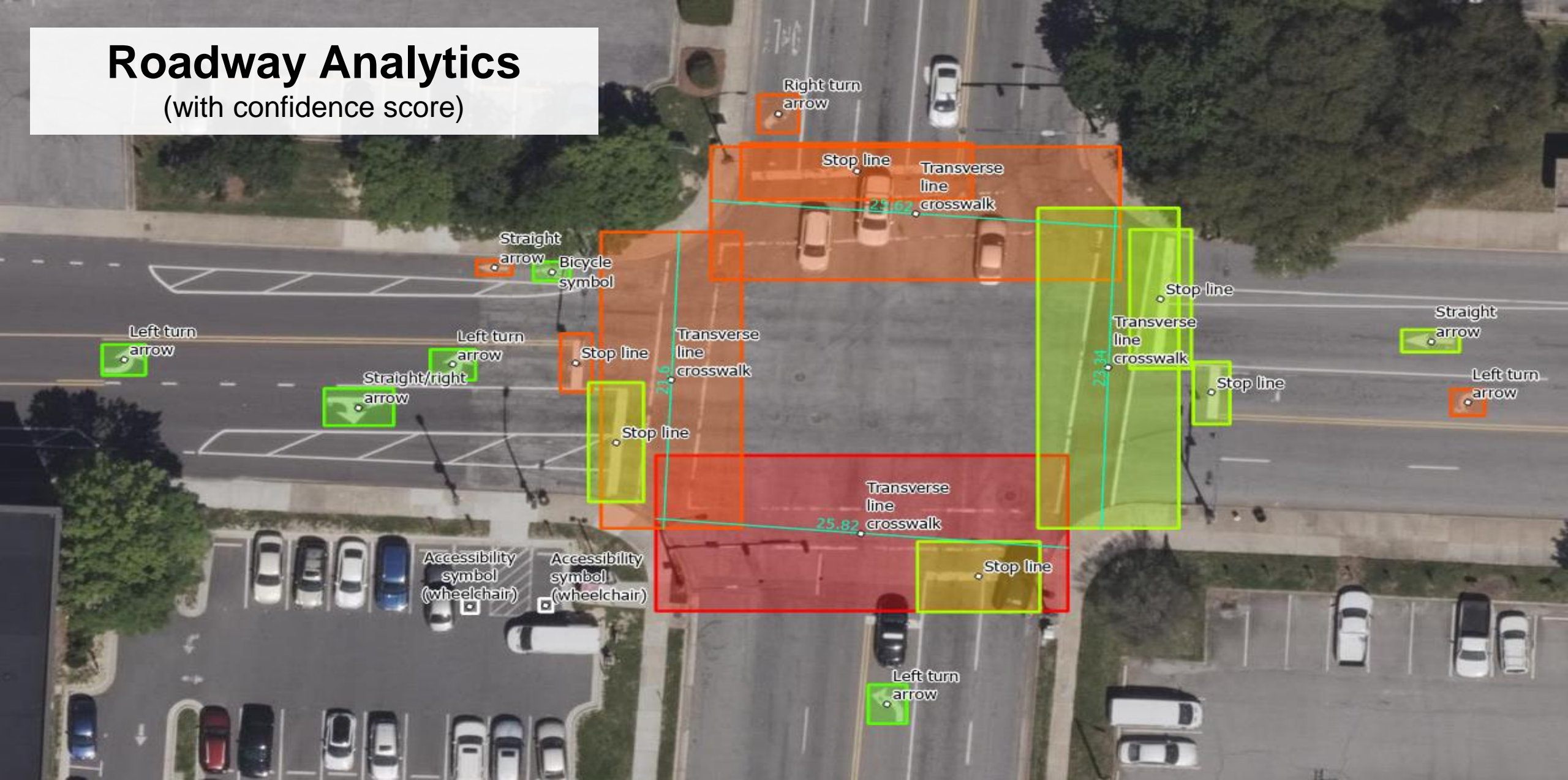
Overlays

100 m

Gray Sky Ortho

Roadway Analytics

(with confidence score)



In Summary



Market leading camera sensors



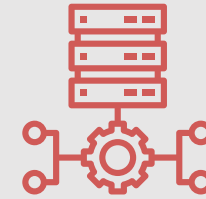
Dedicated fleet



40+ countries



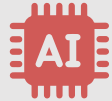
Mapping-grade accuracy



World-class imagery processing



40+ Property attributes



Optimized for AI & ML



API & GIS Integrations



Cloud-based data



High-res orthos & obliques



Elevation data



Damage Assessment



Top class support



Disaster imagery



Urban + rural areas

Contact

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Diamond Head, HI

