About LandMark GSI

- LandMark GSI was founded in 2011, and in 2016 changed to focus exclusively in Oklahoma.
- We are technology provider for Oklahoma State University, working through the Center for Local Government Technology we provide CAMA, Assessment and GIS applications to 70 Oklahoma counties.
- In 2023, in cooperation with CLGT and Planet Labs, we implemented a pilot project to deliver AI-generated change detection based on medium-resolution satellite imagery to four counties in Oklahoma.

Planet Overview

WILDFIRES · Quebec, Canada · June 6, 2023

PLANET'S MISSION

To image the whole world every day and make global change visible, accessible, and actionable.

Our Public Benefit Corporation (PBC) Purpose:

To accelerate humanity toward a more sustainable, secure, and prosperous world by illuminating environmental and social change.

Planet Dove Satellite

- Always-on, broad-area monitoring
- 3 meter resolution
- 8 spectral bands

Planet SkySat Satellite

- Custom, targeted monitoring
- 50 centimeter resolution
- RGB, NIR, and Pan bands

Planet Dove Constellation

~98° Sun-Synchronous Orbit

Planet SkySat Constellation

SkySats 1-15

~98° Sun-Synchronous Orbit

SkySats 16-21

~53° Inclined Orbit

A New Era

Planet Launched Its First Hyperspectral Satellite, Tanager-1, and 36 SuperDoves with SpaceX

- Tanager-1 will expand Planet's capabilities by adding more than 400 spectral bands of data, capturing phenomena that are invisible to the human eye
- These hyperspectral satellites are designed to detect and track methane and CO2 super-emitters at a level of granularity that can support direct mitigation action
- Tanager's hyperspectral data will also be commercially available to Planet customers for a variety of additional applications, including defense and intelligence monitoring, biodiversity assessments, mineral mapping, and water quality assessments

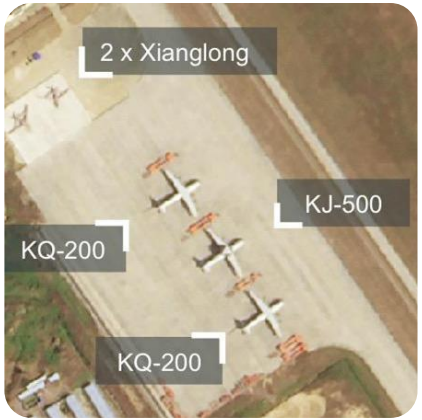
https://investors.planet.com/news/news-details/2024/Planet-to-Launch-Its-First-Hyperspectral-Satellite-Tanager-1-and-36-SuperDoves-with-SpaceX/default.aspx

A new approach

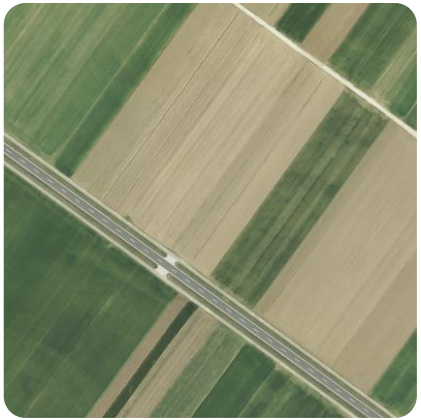
Planet provides geospatial data at the speed of change, equipping users with the data necessary for making informed, timely decisions.

Broad area management

Our customers' challenges, across industries and sectors

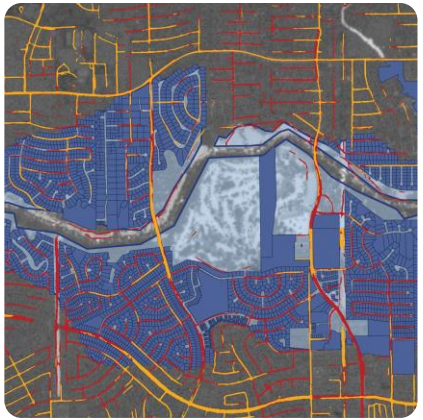


Early threat detection & intelligence



Code enforcement & compliance

Disaster lifecycle management

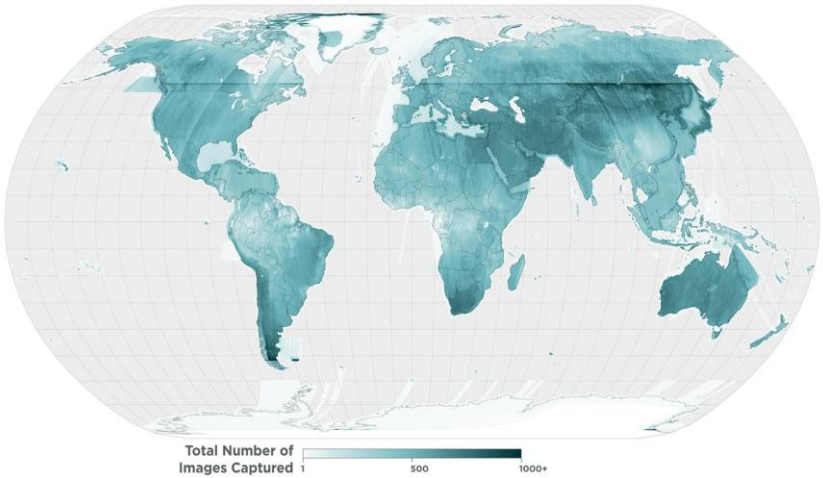


Risk & claim assessment

Planet Monitoring and Archive

50 petabytes of imagery data at your fingertips

- Average 2700+ images available for any given location on Earth
- Deep historical context - deep imagery stacks for analytics
- Untapped value for AI and computer vision algorithms
- Detect change and assess trends globally

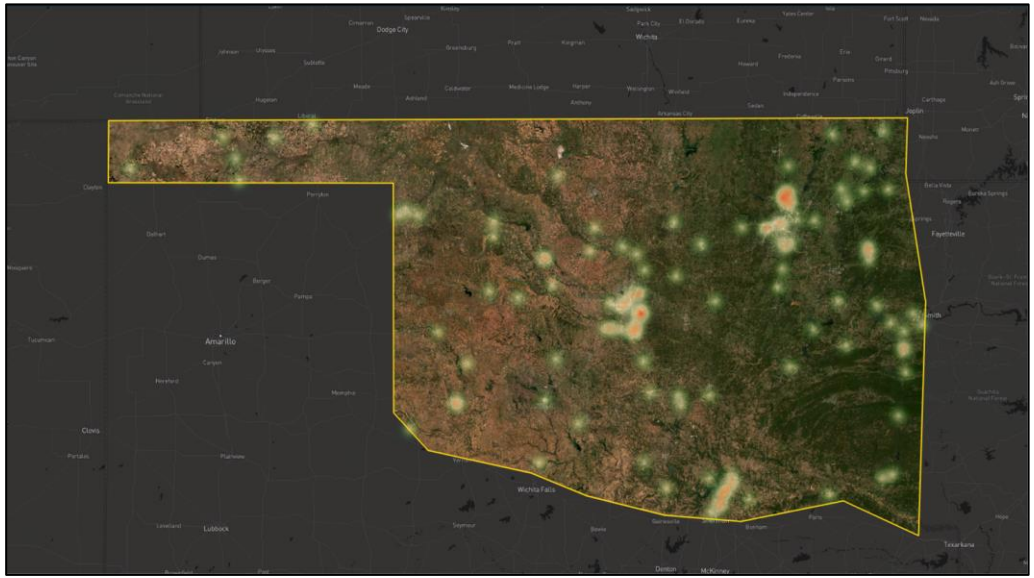


A Typical Scenario

Keeping up to date at country-wide scale

Imagine you're responsible for thousands of square miles of land

- How do you stay aware of what development is taking place?
- How do you know about development or deconstruction activities in a timely manner?



69,898 mi² (181,038 km²) in Oklahoma

A Big Data Challenge

My eyes! My eyes!

In one month, there were 13,893 Planetscope scenes published over the state of Oklahoma in July 2024 alone!

This imagery requires:

- Scale to support big data
- Imagery expertise to analyze
- Machine learning to sift through the data

ML Can Highlight Development

Automated Change Detection to focus analyst attention

Leveraging computer vision and machine learning, we can point user attention to the places that need it most.

Fusing these detections with existing records and focused areas can surface insightful answers.

Back to subscriptions

Oklahoma

Monthly Building Change Detection

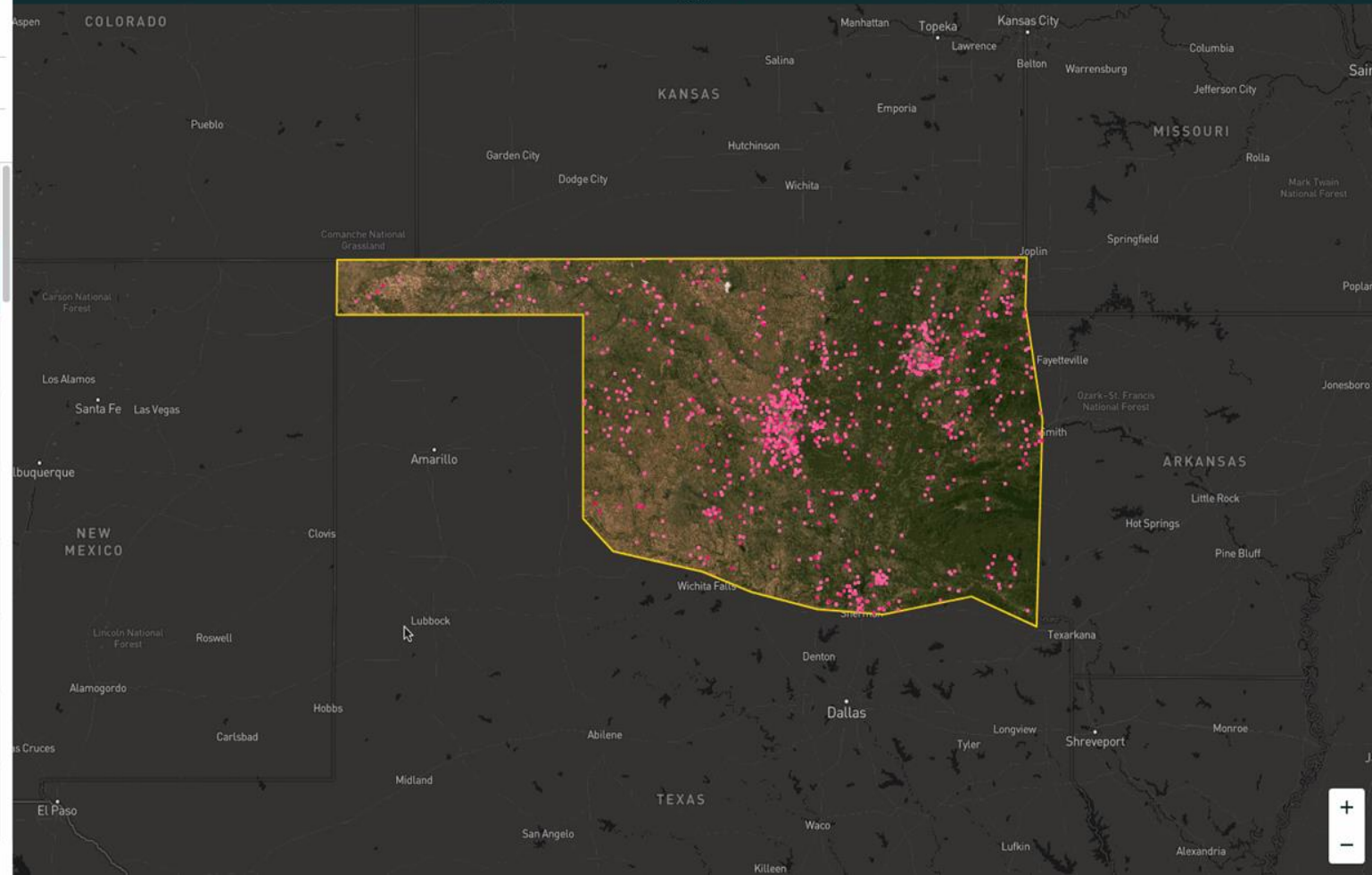
2019/12/31 - 2023/09/21

Show zero detects

August 2023 UTC	Global Monthly	813
July 2023 UTC	Global Monthly	1019
June 2023 UTC	Global Monthly	669
May 2023 UTC	Global Monthly	577
April 2023 UTC	Global Monthly	790
March 2023 UTC	Global Monthly	767
February 2023 UTC	Global Monthly	649
January 2023 UTC	Global Monthly	834
December 2022 UTC	Global Monthly	1359

Review & export detects

Visualization | Show all time | Confidence 0% 100% | View over time



Methodology

COLUMBIA GLACIER · Alaska · August 13, 2021

Road & Building Change Detection

Methodology overview

1. Segment roads and buildings from Planet imagery using a supervised segmentation model (raster result)
2. Apply pixel-wise averaging across a week of results to remove noise
3. Apply time series techniques to the weekly results to detect reliable signal that a change has occurred

Building Change Detection

Find areas of building development to update foundational maps

- Change Detections derived from Planet Imagery
- Cadence Options:
  - Weekly detections showing change from 2-3 weeks prior
  - Monthly detections showing change from 2-3 months prior
- Coverage: Global
- Output: Vector Polygons of Change (Grid Cells), GeoJSON
- Delivery: API, Viewer, OGC Features

Road Change Detection

Global monitoring to find areas where new roads are being developed

- Change Detections derived from Planet Imagery
- Cadence:
  - Weekly detections showing change from 2-3 weeks prior
  - Monthly detections showing change from 2-3 months prior
- Coverage: Global
- Output: Vector Polygons of Change (Grid Cells), GeoJSON
- Delivery: API, Viewer, OGC Features

A solution for Land Assessment

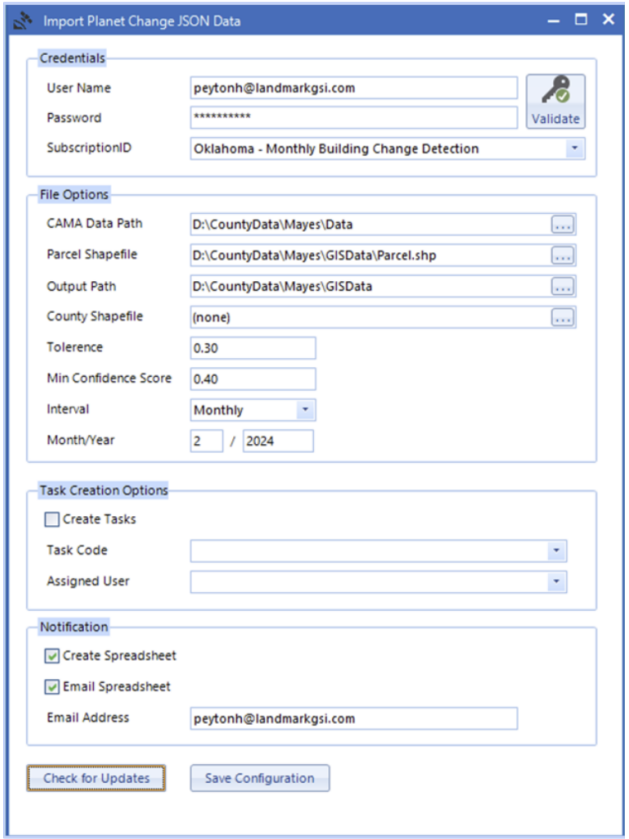
PlanetView

PlanetView Overview

- Monthly, Quarterly, or Annual Planet Change Detection Feed
- Downloads Planet's AOIs and links them to the Parcel Layer
- Easy to operate user interface
- Displays Planet Feed data over the Parcel Layer
- Utilizes external imagery sources such as Google and Bing
- Supports access to commercial base maps from EagleView or NearMaps
- Spatially links AOI polygons to PlanetScope for easy review

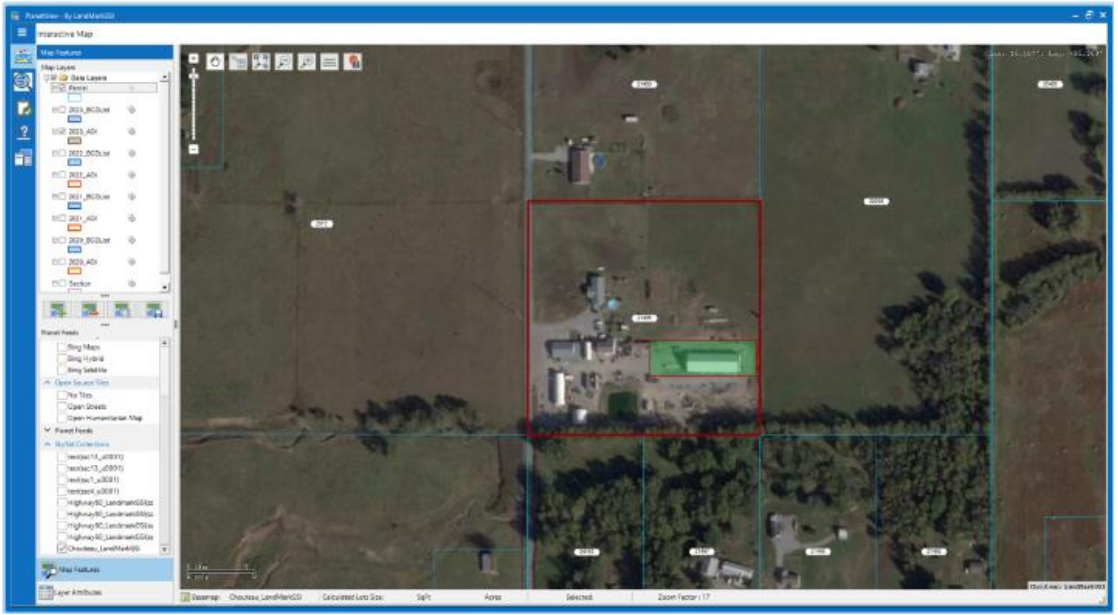
Monthly Feed Subscription

- Subscribes to the Planet Change Detection Feed
- Downloads Planet's Areas of Interest (AOI) data
- Links AOI Polygons to the local jurisdiction's parcel layer
- Generates a spreadsheet listing on each account containing an AOI polygon
- Emails the spreadsheet to a defined user
- Creates and routes tasks to a user



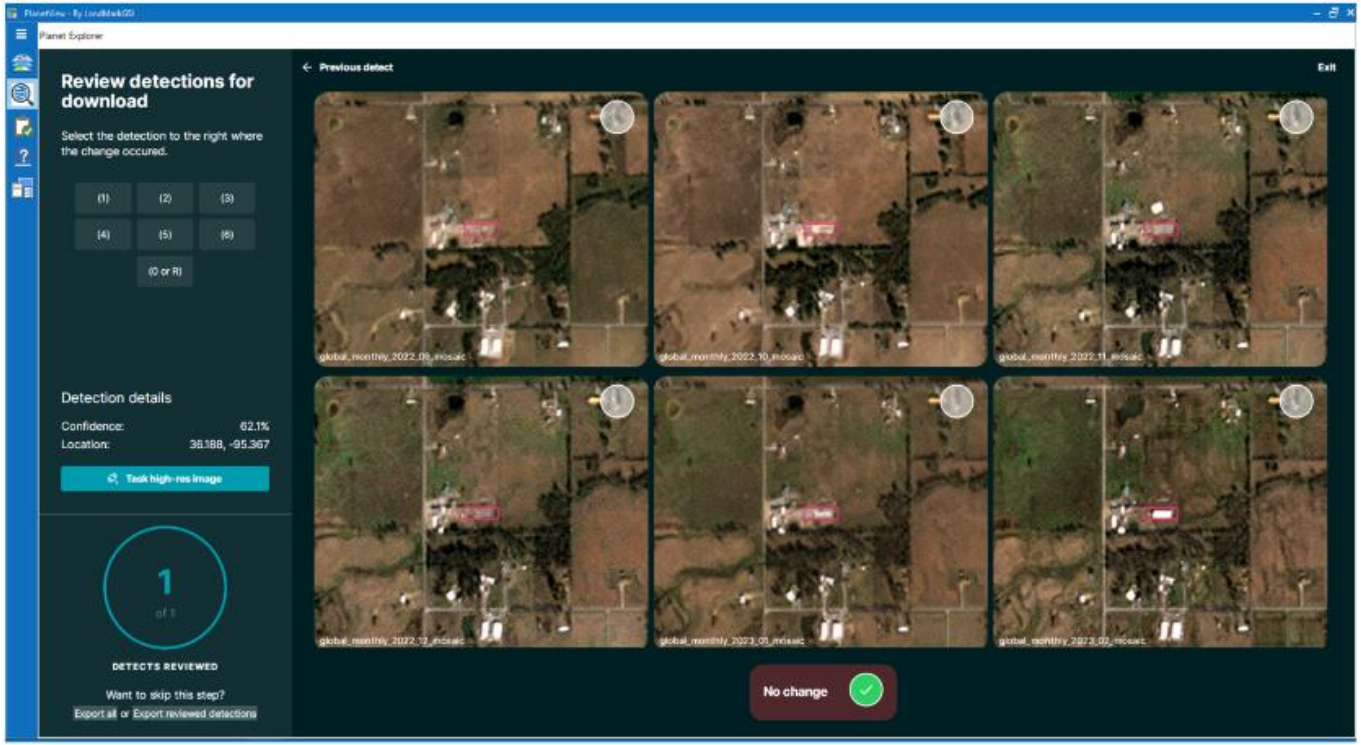
User Interface

- Displays Planet Feed data over the Parcel Layer
- Provides access to all Planet SkySat and Planet Scope Imagery
- Utilizes external imagery sources such as Google and Bing
- Supports access to commercial base maps from EagleView or NearMaps
- Spatially links to AOI polygons to PlanetScope for easy review

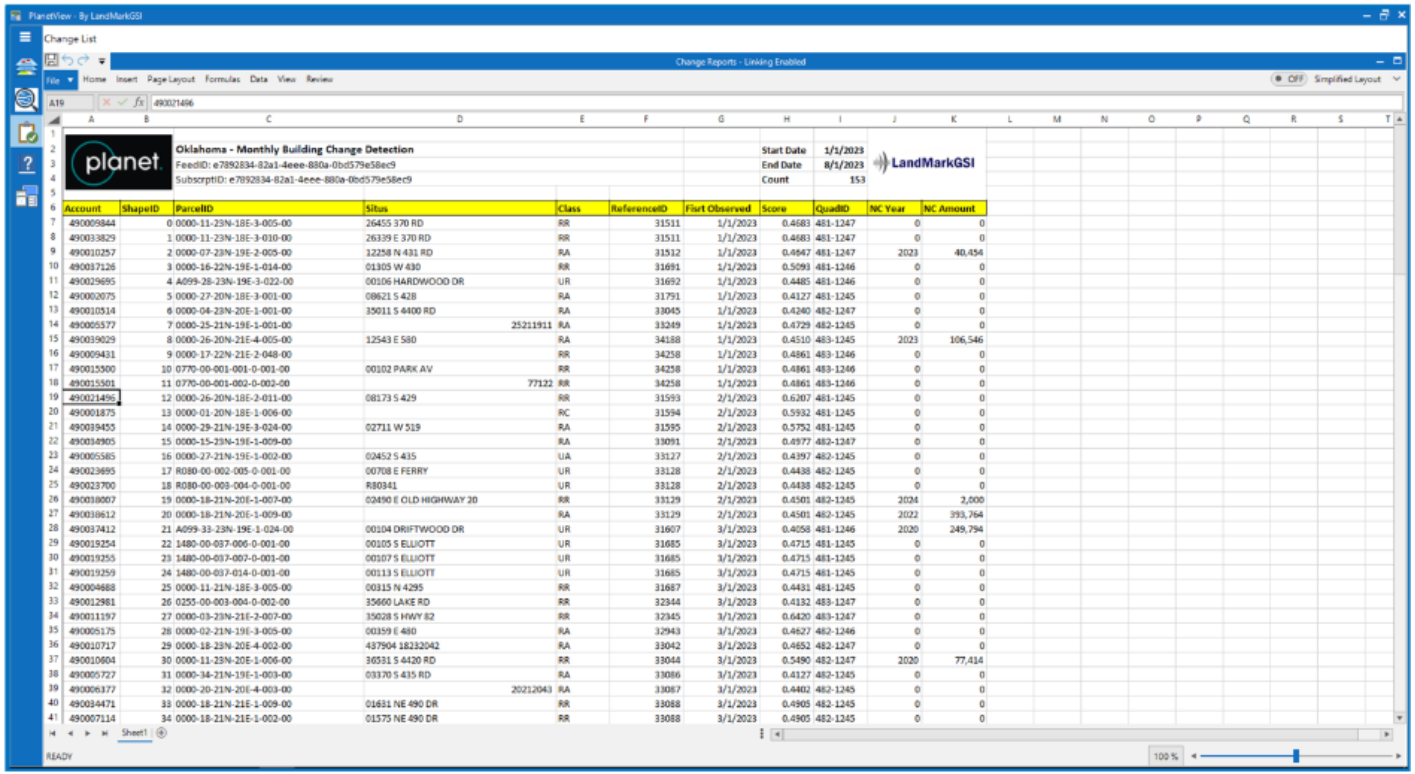


Monthly Change Mosaic

Ordering High-Res Images



Monthly Building Change Detection List



Oklahoma - Monthly Building Change Detection
FeedID: e7892834-82a1-4eee-880a-0bd579e58ec9
SubscrptID: e7892834-82a1-4eee-880a-0bd579e58ec9

Start Date 1/1/2023
End Date 8/1/2023
Count 153

LandMarkGSI

Account	ShapeID	ParcelID	Situs	Class	ReferenceID	First Observed	Score	QuadID	NC Year	NC Amount
490005844	0	0000-11-23N-18E-3-005-00	26455 370 RD	RR	31511	1/1/2023	0.4683	481-1247	0	0
490033829	1	0000-11-23N-18E-3-010-00	26339 E 370 RD	RR	31511	1/1/2023	0.4683	481-1247	0	0
490010257	2	0000-07-23N-19E-2-005-00	12258 N 431 RD	RA	31512	1/1/2023	0.4647	481-1247	2023	40,454
490037126	3	0000-16-22N-19E-1-014-00	01305 W 430	RR	31691	1/1/2023	0.5093	481-1246	0	0
490029695	4	A099-28-23N-19E-3-022-00	00106 HARDWOOD DR	UR	31692	1/1/2023	0.4485	481-1246	0	0
490002075	5	0000-27-20N-18E-3-001-00	08621 S 428	RA	31791	1/1/2023	0.4127	481-1245	0	0
490010514	6	0000-04-23N-20E-1-001-00	35011 S 4400 RD	RA	33045	1/1/2023	0.4240	482-1247	0	0
490005577	7	0000-25-21N-19E-1-001-00	25211911	RA	33249	1/1/2023	0.4729	482-1245	0	0
490039029	8	0000-26-20N-21E-4-005-00	12543 E 580	RA	34188	1/1/2023	0.4510	483-1245	2023	106,546
490009431	9	0000-17-22N-21E-2-048-00		RR	34258	1/1/2023	0.4861	483-1246	0	0
490015500	10	0770-00-001-001-0-001-00	00102 PARK AV	RR	34258	1/1/2023	0.4861	483-1246	0	0
490015501	11	0770-00-001-002-0-002-00	77122	RR	34258	1/1/2023	0.4861	483-1246	0	0
490021496	12	0000-26-20N-18E-2-011-00	08173 S 429	RR	31593	2/1/2023	0.6207	481-1245	0	0
490001875	13	0000-01-20N-18E-1-006-00		RC	31594	2/1/2023	0.5932	481-1245	0	0
490039455	14	0000-29-21N-19E-3-024-00	02711 W 519	RA	31595	2/1/2023	0.5752	481-1245	0	0
490034905	15	0000-15-23N-19E-1-009-00		RA	33091	2/1/2023	0.4977	482-1247	0	0
490005585	16	0000-27-21N-19E-1-002-00	02452 S 435	UA	33127	2/1/2023	0.4397	482-1245	0	0
490023695	17	R080-00-002-005-0-001-00	00708 E FERRY	UR	33128	2/1/2023	0.4438	482-1245	0	0
490023700	18	R080-00-003-004-0-001-00	R80341	UR	33128	2/1/2023	0.4438	482-1245	0	0
490038007	19	0000-18-21N-20E-1-007-00	02490 E OLD HIGHWAY 20	RR	33129	2/1/2023	0.4501	482-1245	2024	2,000
490038612	20	0000-18-21N-20E-1-009-00		RA	33129	2/1/2023	0.4501	482-1245	2022	393,764
490037412	21	A099-33-23N-19E-1-024-00	00104 DRIFTWOOD DR	UR	31607	3/1/2023	0.4058	481-1246	2020	249,794
490019254	22	1480-00-037-006-0-001-00	00105 S ELLIOTT	UR	31685	3/1/2023	0.4715	481-1245	0	0
490019255	23	1480-00-037-007-0-001-00	00107 S ELLIOTT	UR	31685	3/1/2023	0.4715	481-1245	0	0
490019259	24	1480-00-037-014-0-001-00	00113 S ELLIOTT	UR	31685	3/1/2023	0.4715	481-1245	0	0
490004688	25	0000-11-21N-18E-3-005-00	00315 N 4295	RR	31687	3/1/2023	0.4431	481-1245	0	0
490012981	26	0255-00-003-004-0-002-00	35660 LAKE RD	RR	32344	3/1/2023	0.4132	483-1247	0	0
490011197	27	0000-03-23N-21E-2-007-00	35028 S HWY 82	RR	32345	3/1/2023	0.6420	483-1247	0	0
490005175	28	0000-02-21N-19E-3-005-00	00359 E 480	RA	32943	3/1/2023	0.4627	482-1246	0	0
490010717	29	0000-18-23N-20E-4-002-00	437904 18232042	RA	33042	3/1/2023	0.4652	482-1247	0	0
490010604	30	0000-11-23N-20E-1-006-00	36531 S 4420 RD	RR	33044	3/1/2023	0.5490	482-1247	2020	77,414
490005727	31	0000-34-21N-19E-1-003-00	03370 S 435 RD	RA	33086	3/1/2023	0.4127	482-1245	0	0
490006377	32	0000-20-21N-20E-4-003-00	20212043	RA	33087	3/1/2023	0.4402	482-1245	0	0
490034471	33	0000-18-21N-21E-1-009-00	01631 NE 490 DR	RR	33088	3/1/2023	0.4905	482-1245	0	0
490007114	34	0000-18-21N-21E-1-002-00	01575 NE 490 DR	RR	33088	3/1/2023	0.4905	482-1245	0	0

Impact on Assessor's Offices

- A study done in Washington County using AOI identified in 2022, to show the impact of implementing Planet into Oklahoma counties revealed that between two years there was approximately $145,000 of omitted tax revenue across residential, commercial, and agricultural properties
- For rural agricultural properties specifically, there was on average a 60% omitted rate, resulting in roughly 2.5 million dollars in assessed value each year being unaccounted for
- There was an 89% accuracy rate in new building change detection using Planet's newest model
- Creates a more efficient workspace in the office by streamlining new construction building checks and reducing operational costs
- Allows for more equitable taxation of the county by being able to have a real-time building change detection
- Basemaps allow for deeper analysis and insights into property changes

Questions?

PlanetView