

# Aerial Imagery Guide

AN INTRODUCTION FOR STATE AND LOCAL GOVERNMENTS

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## Executive Summary

*Aerial imagery is a powerful tool for state and local governments. It can help officials, employees, and residents see things from a new perspective, make smarter decisions, and use resources wisely.*

*If you're a government leader wondering about the benefits of aerial imagery, this guide is for you. We created it to help you understand:*

- *The three main types of aerial imagery and their associated features.*
- *How using aerial imagery can help you make better decisions, save time and money, and work more efficiently.*
- *Use cases for aerial imagery in different government departments.*

*Aerial imagery is more than just pictures from the sky. Dive in to learn how it can be a smart investment for your community.*



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**Part 1:**

# **An Introduction to Aerial Imagery Technology**



# What is Aerial Imagery?

At the intersection of technology and governance lies aerial imagery, a tool that empowers state and local governments with a comprehensive view of their jurisdictions. Leveraging the capabilities of satellites, fixed-wing aircraft, and drones, aerial imagery provides crucial insights into land use patterns, infrastructure conditions, and environmental factors, informing policy and fostering a data-driven approach to governance.

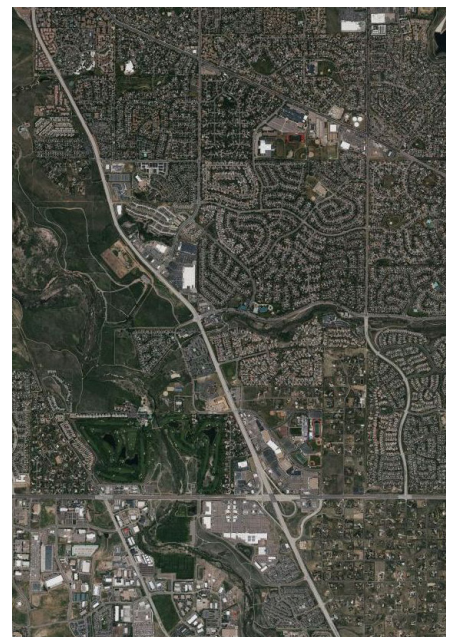
Each method has its strengths and weaknesses. For example, satellites can capture large areas all at once, but their pictures might not show the tiny details. However, planes and drones fly lower, so they can capture more detailed images, but of smaller places. So, when choosing, it's a balance between capturing a large area and seeing clear details.



## Satellite imagery

Satellites, positioned far above the Earth, capture comprehensive images of our planet's surface, encompassing its physical, biological, and chemical compositions. These powerful tools can map vast areas, tracking not only geographical formations and land use patterns but also monitoring weather events, pollution levels, deforestation, and climate change impacts.

- Satellite imagery generally covers a wide area and can be useful for getting a broad view of your county or municipality, often available for free.
- Imagery is captured at extremely high altitudes (2.6 million feet or more) and provides top-down property views at lower resolution compared to fixed-wing services and drone imagery.
- Satellite imagery requires a clear line of sight. Obstacles like clouds and treetops can block visual access.
- Satellite imagery is often stitched together in ways that limit the accuracy of the images—both for location data and ability to measure distances or structures.



## Fixed-wing aerial imagery

Fixed-wing aerial imagery is taken from manned planes mounted with high-resolution cameras and is typically captured at an altitude between 5,000 - 10,000 feet. This method can capture objects in sharp detail such as fences, roads, and waterways.

- Captured at a lower altitude, fixed-wing aerial imagery provides detailed images across a broad terrain and is useful for government, commercial, and planning applications.
- Depending on the camera equipment used, fixed-wing aerial imagery can provide images with resolutions as fine as 0.75-inch ground sample distance (GSD). See “The Role of Resolution in Aerial Imagery” for more detail on GSD.
- Fixed aerial imagery can be captured at varying degrees, providing a 90-degree top-down view of locations, as well as 40 to 50 degree side-angled views to identify geographical features and landmarks.



## Drones

Unmanned aerial vehicles (UAVs) —more commonly known as drones—are generally operated by remote control with degrees of autonomy ranging from manually operated to completely autonomous.

- Drones can capture imagery at very high resolution, but their ability to cover large areas is limited.
- Fully autonomous drones can create facet-by-facet flight plans for consistent, comprehensive image capture.
- Drones provide convenient and immediate capture, but because of their limited range, they often require someone to be on-site to deploy and operate.
- A Training and Remote Pilot Certificate from the FAA may be needed. Please check with each drone solution provider for more details about piloting options and licensing requirements.



# Understanding Aerial Imagery Perspectives and Resolutions

There are various perspectives and resolutions associated with aerial imagery.

## Aerial Imagery Perspectives

### *Orthogonal (Top-down)*

Otherwise known as a top-down or vertical view, orthogonal imagery is captured looking straight down at a 90-degree angle and does not offer perspective on object height. It is generally considered an accurate representation with uniform scale of the Earth's surface and can be used to measure true distances as it is aligned to a map grid.

**For state and local governments, orthogonal aerial imagery can:**

- Show building outlines and parcel lines used for property assessment.
- Serve as a base map for geographic information systems (GIS) data to provide a better understanding of properties, land features, local topography, and more.

### *Oblique (Side-angled)*

Oblique imagery is side-angled, meaning it is taken at a 40-to-50-degree angle from low-flying aircraft. This imagery type captures images from all cardinal directions and is extremely useful for a variety of applications on account of the context provided by 360-degrees views around structures or objects, including condition, features, and height.

**For state and local governments, oblique aerial imagery can:**

- Allow assessors to review properties in great detail given the additional context of 360-degree views, efficiently assess the value of parcels, and stay on top of new construction.
- Enable GIS analysts to use oblique imagery and geospatial intelligence to more efficiently deploy assets; identify geographical context, patterns, and issues; make smarter decisions
- Equip Public Safety teams with the information and data they need to accurately locate 911 callers, gain clear visibility of incident locations, enhance situational awareness, and save lives.
- Provide Public Works with the ability to remotely measure, track, verify, inspect, and report on the status of infrastructure and assets.







## The Role of Resolution in Aerial Imagery

Resolution plays an important role in aerial imagery because it indicates how detailed your imagery will be. The higher the resolution, the more detailed the image. For government organizations, getting higher resolution images means gaining a greater ability to analyze landscapes, visualize projects to improve your jurisdiction, and make smarter decisions.

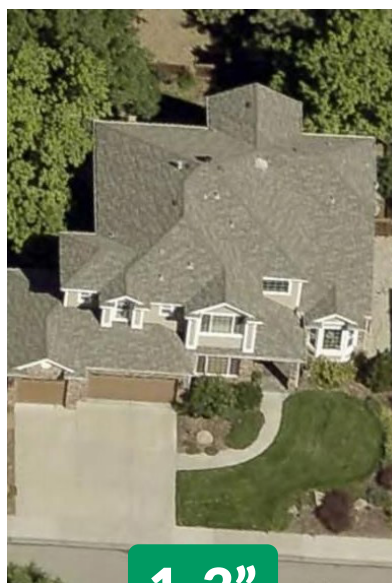
### Ground Sample Distance (GSD)

GSD is the distance between pixel centers measured on the ground and indicates image resolution limitation. For example, an image with a one-inch GSD means that each pixel represents a one-inch by one-inch space on the ground. So, the smaller the GSD, the higher the resolution. See the examples below:



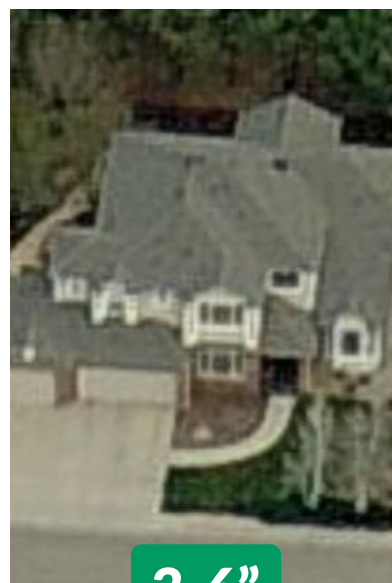
#### SUB 1-INCH GSD

The highest resolution allowing users to clearly see property-level detail such as building materials and condition as well as read text on government assets like road signs and even manhole covers.



#### 1-3-INCH GSD

High-resolution imagery allowing users to confidently make a variety of decisions based on available detail, including road and asset condition.



#### 3-6-INCH GSD

A high resolution that's best used for areas where finer detail isn't required (e.g., rural areas). Objects that can be visible at this resolution include individual small trees, structures, power poles, road markings, and other infrastructure details.

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**Part 2:**

# Benefits of Aerial Imagery for Government



# Unlocking the Benefits of Aerial Imagery for Government

Local and state government agencies and organizations are using aerial imagery as a way to modernize and improve multiple types of projects.

## Get actionable insights to make more informed decisions

Aerial imagery delivers clear, accurate images, tools, and data that government organizations use to make more informed decisions—with greater confidence—about projects that improve communities. The geospatial data you get from aerial imagery can be applied across a range of use cases, including how to better manage resources and plan infrastructure projects.

Information can be derived from building an imagery program over time. Comparing changes to current and historical imagery can provide details about land use, population growth, erosion, and more that help inform how your environment is changing—giving you the data you need to help your community evolve.

### Some common examples of how state and local governments can use aerial imagery include:

- Better manage assets and facilities
- Assess risk
- Respond to emergencies
- Plan and develop
- Validate parcels
- Track change over time

It takes the guesswork out of operations that have the potential to be life-saving (in the case of public safety) and drives additional revenue for your jurisdiction (in the case of identifying taxable property value). With clear, detailed information about properties and locations, you'll confidently make decisions that have long-lasting positive effects on your constituency and region.







## Drive cost-savings and overall efficiency

The value of high-resolution aerial imagery spans across many government agencies, facilitating collaboration, cost-sharing, and overall efficiency. The same image portfolio that helps the public safety team pinpoint a 911-caller's location can also help the assessor's office detect property changes and provide an accurate valuation, as well as enable GIS and public works teams to maintain timely and reliable data about community infrastructure and assets.

Plus, all of the imagery can be accessed directly from employees' desks - rather than a visit out to the field. By avoiding site visits and enabling teams to review and inspect areas remotely, it's easier to stay on top of changes, maximize staff productivity, and realize greater cost efficiency.

Minimizing the need for on-site inspections also helps keep personnel safe, limits their time on the road, and curbs interactions with the public.

## Maximize technology investments

Government teams are increasingly being asked to do more with less. Finding the right balance between adopting new technology to keep up with the changing world, and getting the most value possible out of your existing technology is key. Rather than require expensive upgrades or changes in processes in order to function efficiently, aerial imagery solutions can integrate with your existing platforms and enhance your current workflows.

In this sense, investment in aerial imagery technology can help "do no harm" to existing processes and workflows. Rather, it can augment and amplify their impact.

## Build trust and transparency with the public

Public trust is imperative for effective governance. Many government agencies benefit from using their aerial imagery solutions in public-facing applications, such as searchable tax assessment portals. These secure interfaces allow homeowners to search by parcel ID and use a secure PIN to view important information about their property and its assessed value.

In another innovative use case, an emergency management department set up a community portal in the wake of extensive wildfires. When homeowners had to evacuate their homes, the local fire chief worked with his team to make post-disaster imagery available to residents, so they could quickly and safely assess the damage to their properties before returning to the area.

By offering the public access to relevant high-quality imagery, you can build trust and transparency within your community.



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**Part 3:**

# Applications for Aerial Imagery

# Imagery Applications for Every Department

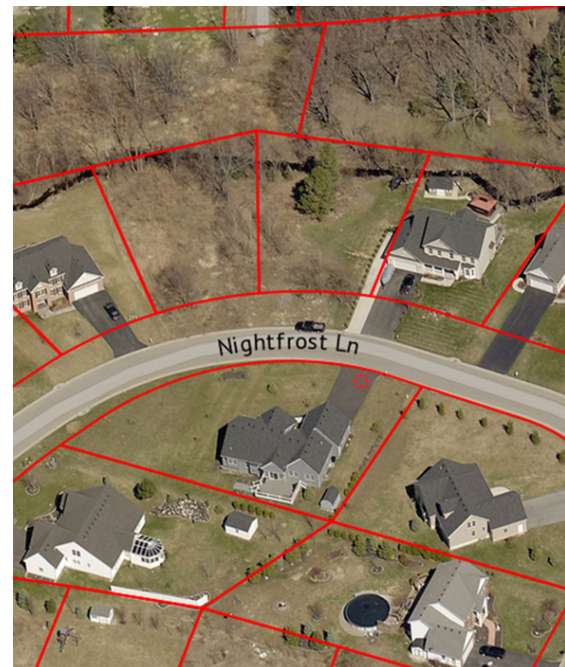
There are several ways aerial imagery improves local and state government work. Here we outline some of the most common use cases by department.

## Property Assessment

Assessment departments are charged with delivering a timely, equitable tax roll while keeping their teams safe and productive. Time-intensive field visits can limit efficiency, add cost, and potentially place assessors at risk.

Aerial imagery helps counties efficiently calculate the value of parcels and stay on top of improvements and new construction. Depending on the platform, aerial imagery may support a fully remote assessment workflow.

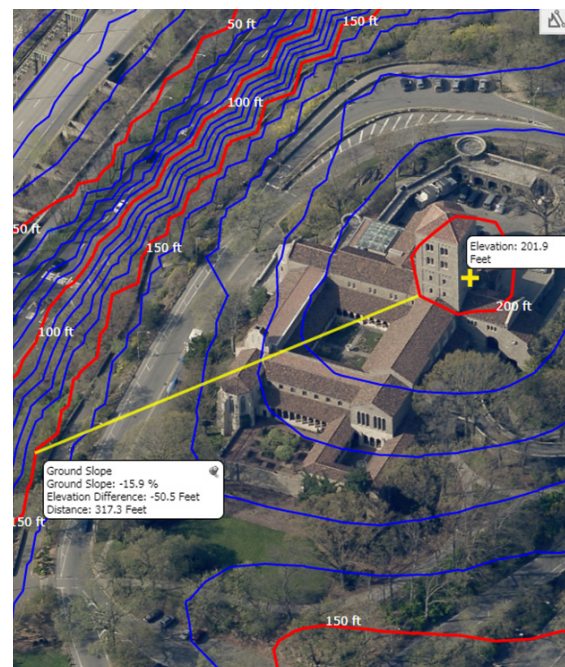
- Leverage high-resolution property views and change detection solutions to identify additional taxable value.
- View your county and detect changes far more quickly than with traditional site visits.
- Decrease costs from vehicle wear and tear, fuel, and staffing needed for field visits.
- Use oblique imagery to see all sides of a structure, providing important context and detail.



## GIS

High-resolution aerial imagery helps GIS teams visualize geospatial data, which supports the agencies they serve:

- Get actionable intelligence, set priorities, make better decisions, and efficiently deploy assets.
- Identify geographical context, patterns, and issues.
- Monitor geographical and structural changes.
- Maintain asset inventory and enable remote asset management.





## Public Safety

Public safety teams must respond to situations at all hours and in all conditions. Access to accurate and timely location information is crucial to their success.

Oblique aerial imagery saves critical time during emergencies—providing dispatchers, public safety teams, and law enforcement with the intelligence they need to:

- Communicate essential details to emergency personnel.
- Quickly pinpoint a 911 caller's location and understand the situation on the ground.
- Conduct site reviews when planning for SWAT raids, serving warrants, and identifying surveillance and staging areas.

Gain more context on a vertical surface view that would otherwise be obscured by an orthogonal view (e.g., location of windows, doors, and fire hydrants).

## Disaster Preparedness and Planning

Pre- and post-event imagery is critical to helping public safety, emergency management, GIS, and other government agencies plan, prepare, and respond to catastrophic events (see above).

- View both recent and historical imagery to identify risks for flooding, inclement weather incidents, wildfires, and other potential hazards.
- Use oblique imagery to add additional context to county GIS maps and better understand the potential impact of flooding.
- Quickly assess damage in the immediate aftermath of a disaster and share aerial image data when applying for recovery assistance from state and federal aid programs.

## Public Works

Oblique aerial imagery reveals greater detail of structures and provides a more complete understanding of assets without a physical inspection, helping public works teams:

- Remotely measure roads, bridges, and other key infrastructure.
- Preplan infrastructure projects and inspect field assets.
- Track, verify, and report on the status of key infrastructure components.
- Visualize environmental conditions for public assets.







# Bringing Aerial Imagery to your Government Agency

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There are plenty of reasons to bring aerial imagery to your government organization - from enabling more informed decision making to driving cost-savings and supporting digital transformation. If you're interested in learning more about aerial imagery, please get in touch with our team.

## Contact Us

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[eagleview.com/government/contact](https://eagleview.com/government/contact)



