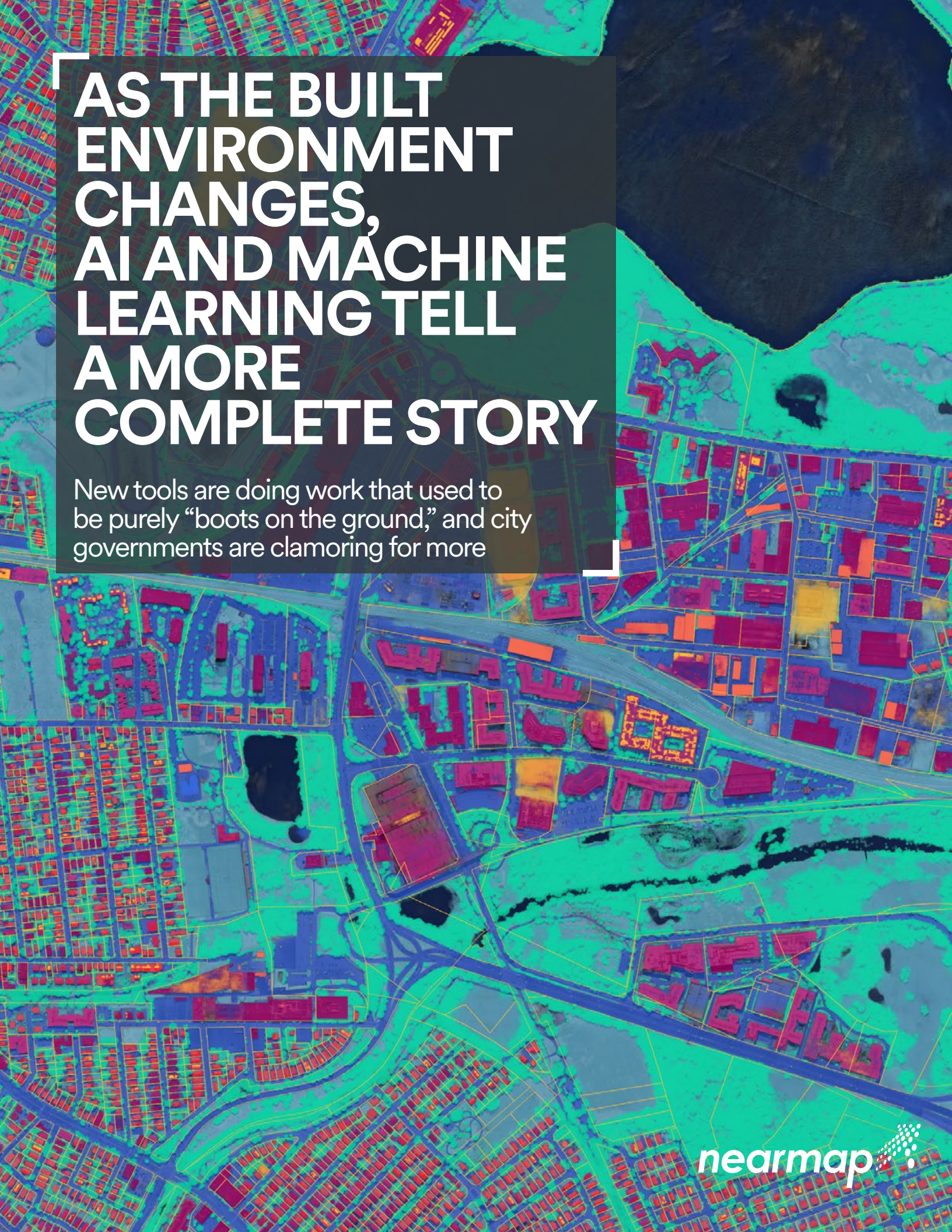


AS THE BUILT ENVIRONMENT CHANGES, AI AND MACHINE LEARNING TELL A MORE COMPLETE STORY

New tools are doing work that used to be purely “boots on the ground,” and city governments are clamoring for more

nearmap

INTRODUCTION

Artificial Intelligence (AI) is a computer software that performs complex tasks of human-level reasoning. Machine learning (ML) is a subset of AI that uses algorithms trained on data to produce models that can perform those tasks. AI-powered systems learn from each interaction, allowing them to grow stronger and more capable with repeated access.

The field of AI is now more than 50 years old. The last several years have seen a dramatic increase in AI's impact on technology, business, supply chains, health care, and more. AI has also become an indispensable tool for city governments for planning, emergency services, transportation, utilities, property assessment, inspections, parks and recreation, and other service activities. This article will outline some of the key ways that intelligent imaging, data retrieval and AI-driven analysis can provide ongoing benefits like cost and labor savings, and increased transparency at every level of public sector operations.

MONITORING THE BUILT ENVIRONMENT

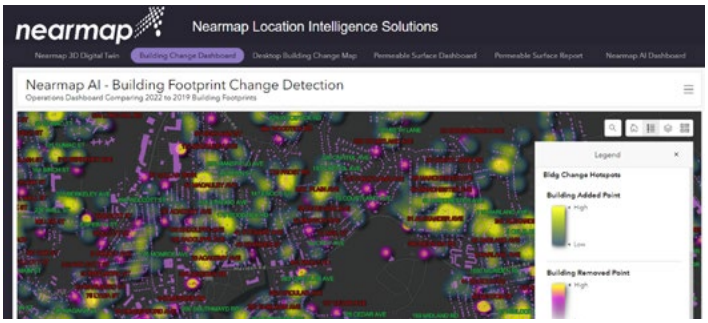
To function efficiently and effectively, cities need high-quality location data for planning, ongoing operations, and disaster response. On a street-by-street level, municipalities have often relied on staff inspections and drive-bys, which can yield incomplete, inconsistent, or incorrect data. Even cities with the time and budget to procure aerial imagery may lack the capacity to keep it refreshed and consistent.

AI-supported monitoring of the built environment is transforming communities across the country and around the world. With skilled analysis of updated images and data derived from them, personnel can perform remote site assessments, easily identify objects, observe location attributes, and accurately detect changes. The benefits are real, and they're growing in scope and depth every day. Monitoring allows cities to assess and fine-tune services, verify permit compliance, and correctly assess utility fees and parcel values, all while simplifying the process of refreshing data about assets.

That's where Nearmap, a leading aerial imagery and location intelligence company, can help. Instead of relying on often costly and inefficient ways to collect aerial data for monitoring, local governments are moving to the recurring aerial captures and derivative data we provide to help them understand change at scale.

HOW GOVERNMENTS ARE USING AI MONITORING

Location intelligence is a factor in most decisions governments make. Any organization that can benefit from a geospatial platform for planning, stakeholder collaboration, or decision support is a good candidate for monitoring the built environment. This usefulness extends to the natural world, where geospatial data can help identify patterns and anomalies, environmental change, and culturally sensitive areas. For instance, frequently captured imagery can identify the addition of a storage shed with a rain garden on a parcel. This change informs tax assessment, surface permeability and stormwater fee calculations, and localized flood models for a neighborhood. Here's how municipal departments are using this monitoring:



Assessment

With aerial imagery monitoring, assessors are able to conveniently and accurately inspect land, structures, ground surfaces, and other taxable items for correct property valuations. They can remotely inspect parcels to identify new taxable activity and successfully defend against appeals. Inspectors rely on date-stamped aerial imagery to identify properties on which to focus attention. This reduces wasted trips to sites where inspection points are not yet ready.

Emergency response and impact response

High-resolution basemaps are essential for initial response and subsequent recovery from emergencies and natural disasters. Nearmap ImpactResponse flights can help in the safe routing of police, fire, and response teams. And once the immediate danger is over, municipal teams can use the data to assess impacts to the community for road damage, washouts, flooding, street blockages, downed trees, and even identify roof repairs to accelerate the insurance claim process for residents.

Environmental, social, and governance (ESG) initiatives

ESG is a growing movement to measure how organizations approach and impact environmental and social issues. What started as an initiative to assess impacts by large corporations is now becoming a common thread in municipal planning and governance activities. Climate change and resiliency, service distribution, green architecture, public safety, and energy are all facets of ESG assisted by monitoring of the built environment. These components of quality of life for residents can be identified, quantified, and analyzed by leveraging current imagery products and asset data. One example is planning the distribution of mass transit stops equitably throughout the various neighborhoods of a city. A second is assessing the route and walking distance to local green spaces, and the amenities at those locations.

Planned development modeling

Location intelligence is valuable to every stakeholder of planned developments. With the combination of imagery, 3D digital elevation models, and AI-derived features on the landscape, the current environment becomes a basemap upon which to overlay alternative design plans and assess the impacts of proposed changes. Nearmap has fully textured and colorized 3D mesh, providing an enhanced understanding of actual conditions in a 360-degree view, which leads to better visualization for stakeholders and more comprehensive information for decision making.

SHORTFALLS OF TRADITIONAL MONITORING

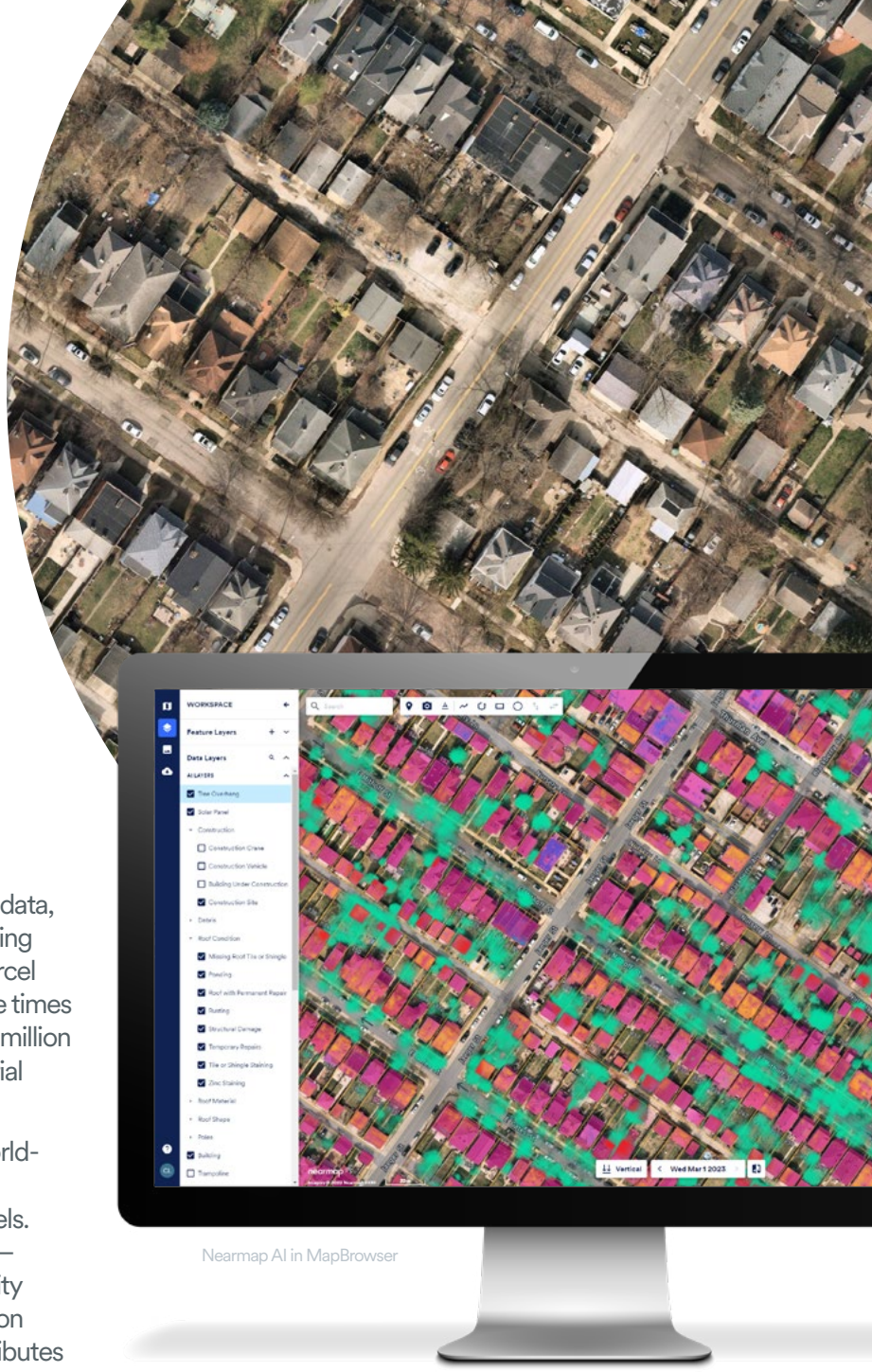
Municipalities have long realized the drawbacks to relying on costly and time-consuming in-person visits for reliable monitoring. The transition to heads-up digitizing using aerial imagery was a significant improvement in convenience and efficiency but did not mitigate the risk of human error and interpretation. The cost and time demand of this method has constrained governments in refresh cycles for two decades. Nearmap deep learning modules automatically identify, extract, and classify features from aerial imagery and other derivative data, eliminating labor-intensive digitizing and freeing those person-hours for more meaningful services. This step-change in process opens doors for governments to refresh their geospatial data more frequently.

HOW WE DO IT

Effective machine learning requires training data. Machine learning models improve over time with the inclusion of more training data. Nearmap proactively captures and processes aerial imagery and positional data, providing subscription-based access to an ever-growing library of geospatial content. Over 80% of the U.S. parcel base is captured annually at a frequency of up to three times per year. In 2022 Nearmap captured data for over 1.7 million square kilometers across North America. Our U.S. aerial data image library dates back to 2014.

All new imagery captured is made available to our world-class data science team, who continuously work to incorporate new data to optimize deep learning models. We also regularly train models to add more features — examples include crosswalks, pavement marking, utility and light poles, and manhole covers. All this information is transformed into a collection of assets and their attributes that are incredibly specific, and invaluable to monitoring condition, use, and change.

We've built and managed our entire technology stack, from patented sensing systems to processing pipelines to delivery solutions. This proprietary digital "ecosystem" optimizes the quality, consistency, and speed of deliverables while minimizing the operational risk associated with capturing petabytes of data globally. HyperCamera 2, the current generation of camera system, captures vertical imagery at a Ground Sample Distance (GSD) of 5.5cm (2.2") and horizontal accuracy of 19.8cm (7.8"), and vertical accuracy of 37.8cm (14.9"). Oblique imagery and positional data are acquired concurrently. A full complement of 3D content and AI-derived data layers are provided with each capture: 3D textured mesh, digital elevation models (DSM and DTM), point clouds, and more than 75 thematic AI-based raster and vector datasets. Our new camera system, HyperCamera 3, which rolls out in 2023, will provide substantial technological advances that significantly enhance spatial and spectral resolution, add Near Infrared (NIR) imagery, as well as improve the processed deliverables.



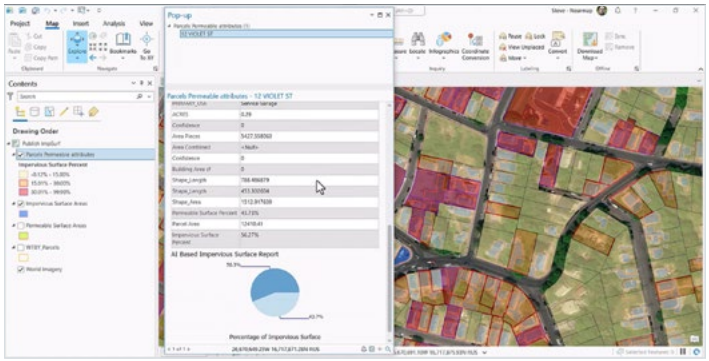
Nearmap AI in MapBrowser

Nearmap cloud-based data processing pipeline generates these products for streamed access to customers, often within days of capture. Delivering industry standard data formats and multiple integration options makes consuming Nearmap content in GIS, CAD, asset management, and other decision support systems simple, and enriches their content and context. The imagery, 3D, and AI content serve as sources of truth to power a government's Common Operating Picture (COP), allowing cities to maximize the value of their location intelligence assets.

BENEFITS OF NEARMAP MONITORING

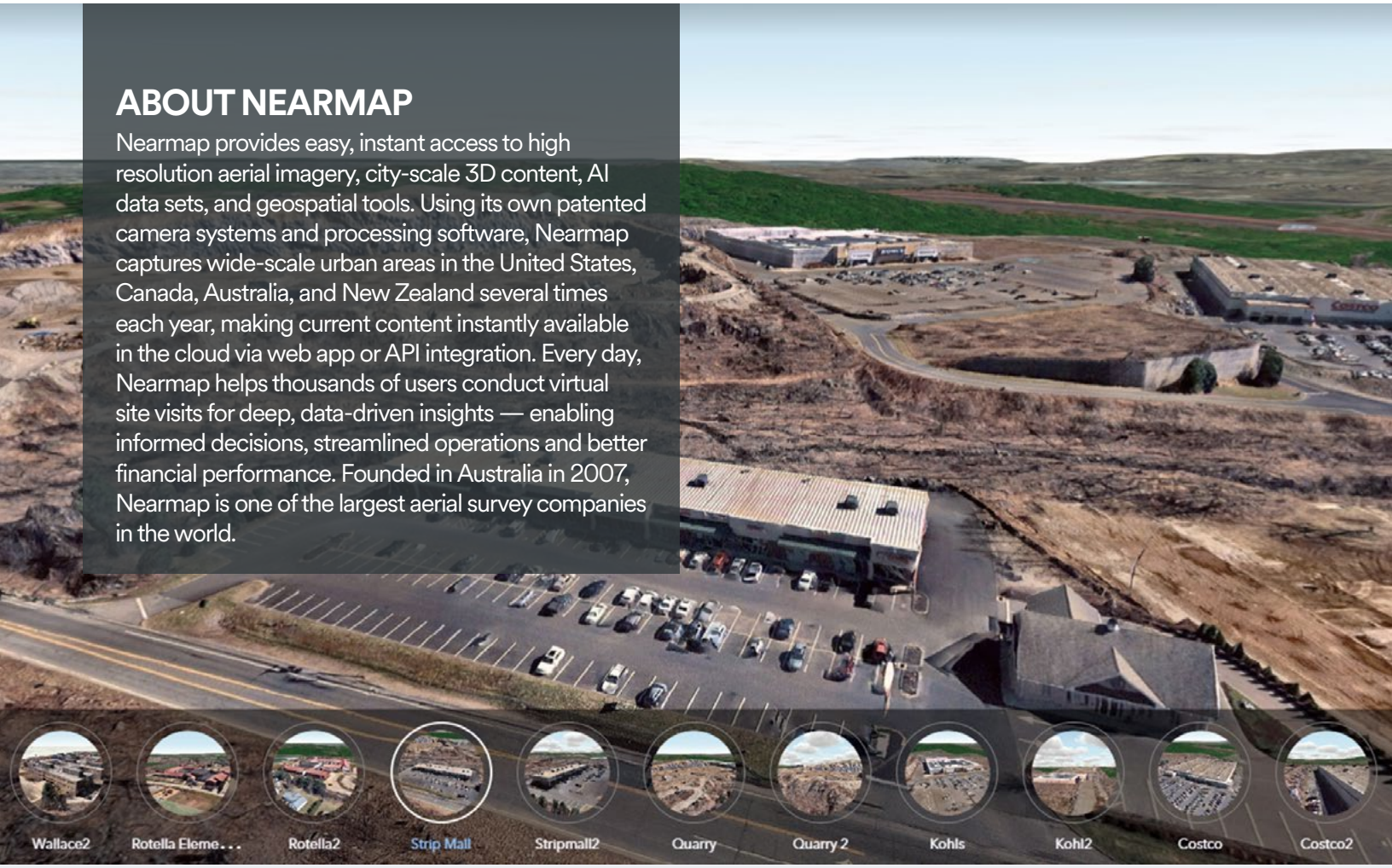
Since we've been in business, we've found that AI feature extraction can help solve problems that our customers have in monitoring change. They are no longer faced with situations in which essential construction oversight (think permitting and compliance reporting) can fall between the cracks for hard-working city employees. Issues like permeability impacts, environmental inspections, and construction of fencing are now easy to review and act upon. As cities work to launch digital transformations, these machine learning-powered systems will become more important than ever, supporting internal workflows across all government departments, and enhancing outreach within the community. Our customers tell us that they're acquiring more important data and spending less time doing so, leading to increased transparency and enhanced cross-departmental communication. Their analysis of this rich data is impacting lives and our livable world.

Nearmap AI Buildings Change Detection Dashboard


Nearmap AI Surface Permeability Report

ABOUT NEARMAP

Nearmap provides easy, instant access to high resolution aerial imagery, city-scale 3D content, AI data sets, and geospatial tools. Using its own patented camera systems and processing software, Nearmap captures wide-scale urban areas in the United States, Canada, Australia, and New Zealand several times each year, making current content instantly available in the cloud via web app or API integration. Every day, Nearmap helps thousands of users conduct virtual site visits for deep, data-driven insights — enabling informed decisions, streamlined operations and better financial performance. Founded in Australia in 2007, Nearmap is one of the largest aerial survey companies in the world.



NEARMAP AI FOR GOVERNMENT:

If you'd like to learn more about Nearmap and how it can help you streamline environmental monitoring in your community, visit us at **www.nearmap.com/trynow**

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