THE AEC PROJECT LIFECYCLE: MINIMIZING RISKS

Projects lie at the heart of the architecture, engineering, and construction industry, and the AEC project lifecycle is the focal point for everyone working in this field. There are five key elements to it: proposal, concept development, design, construction, and operations and asset management.

At each stage, there's risk. But by thinking smart, adopting agile business practices, and applying appropriate technologies, you can take a greater hold over events out of your control. Implementing these process improvements will help you reduce leakage, increase the number of projects you deliver on time and on budget, and improve your project profit margin.

Let's take a closer look at identifying the project influences and risks and how you can future-proof each stage.

PROPOSAL

Nobody has the budget to build for fun. When it comes to pursuing a project and performing feasibility studies, it's critical to identify the pertinent need and sustainability of a project. Everything that could influence a project's success comes into play, including legal, technical, economic, and scheduling considerations. For a project to move forward, it has to pass the study.

THE INFLUENCERS

Architects and **engineers** are typically brought in at the proposal stage to provide context to the project and an understanding of the surrounding areas. They visit onsite to conduct research and take photographs to document their ideas. Architects develop preliminary designs that help frame big questions to properly evaluate and scrutinize a proposal's validity. Engineers assess and analyze the property itself, considering how a project might affect not just a designated space but also the surrounding areas and structures.

RISKS

- Limited access to site
- Lost opportunities
- Optimized resources
- Can't always fly drones

### HOW DO YOU FUTURE-PROOF THE PROPOSAL STAGE?

Vertical orthography and 3D visualization tools have transformed AEC project proposals, allowing teams to consider sustainability and improve project design from the very start. Your proposals can now include accurate scenario evaluations, cost estimates, and change detection using up-to-date, crystal-clear imagery—helping you make informed decisions based on accurate data.
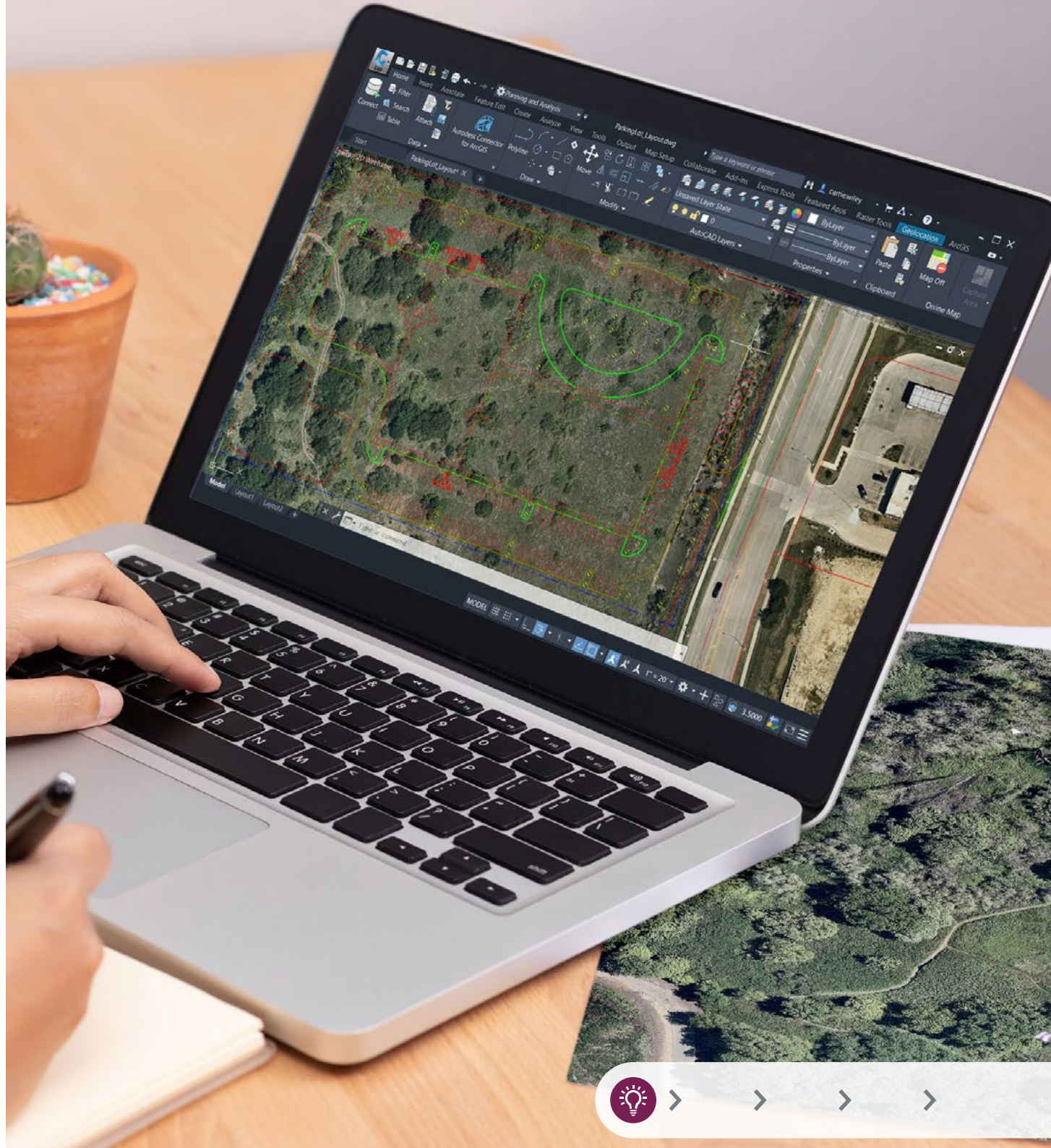
SPOTLIGHT ON… AERIAL IMAGERY

Using aerial imagery as a lens changes the way you view the world, so you can profoundly change the way you work.

We've created effortless access to the most useful, engaging, and current location intelligence in the world. Our up-to-date, high-resolution geospatial content is easy to access and analyze in our simple web mapping interface, MapBrowser—but we go one step further. We know you work with industry-leading GIS, CAD, and Integrate at the click of a button. Bring dependable data as a base layer into Autodesk, ArcGIS, Bentley Microstation, and more through simple API and WMS integrations.
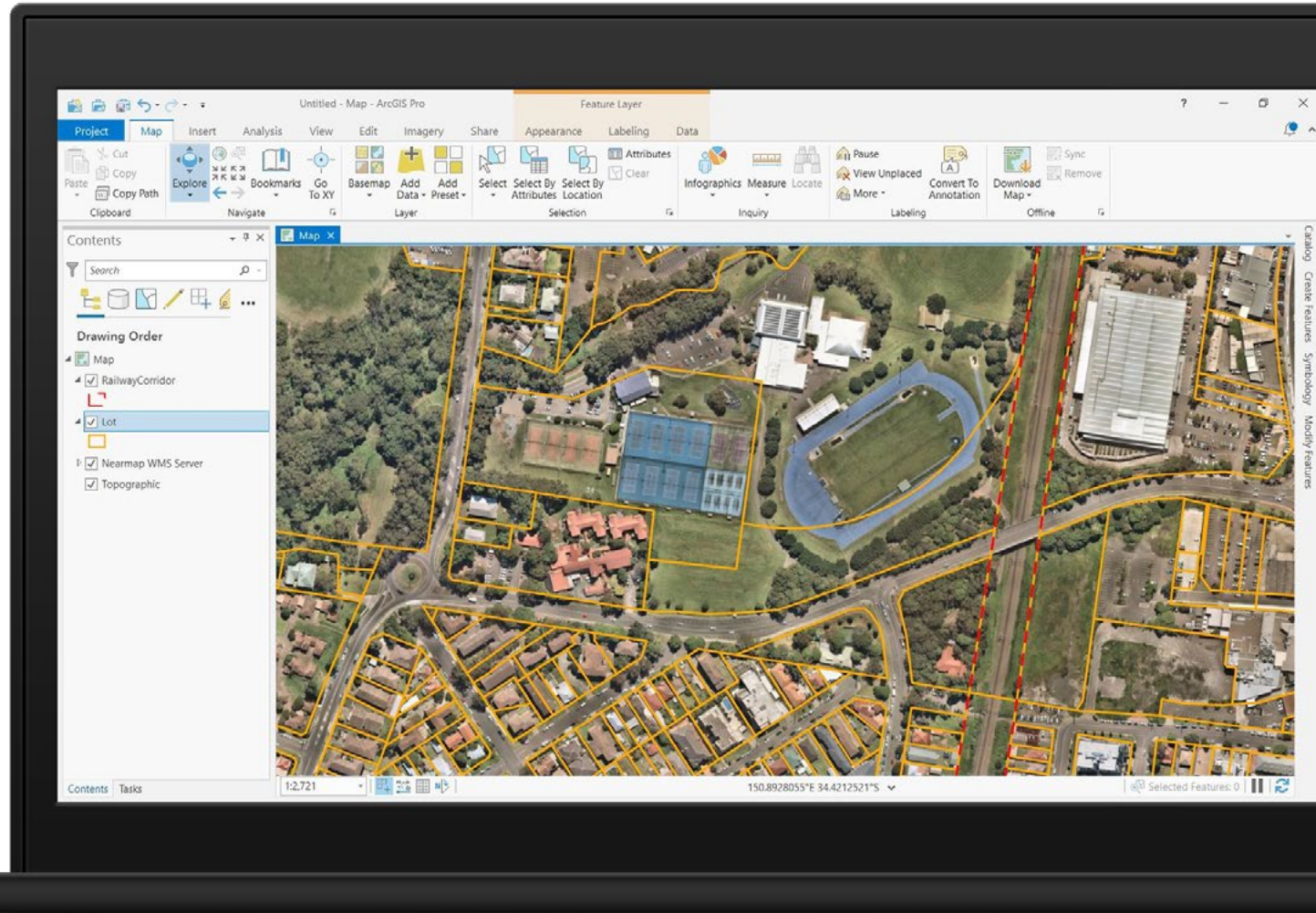
HOW DO OTHER SECTORS USE AERIAL IMAGERY?

Solar providers across the U.S. use vertical, oblique, and 3D location data to design and measure all types of roof geometry with precision. With this type of accuracy, solar providers can more readily persuade commercial and residential property owners to invest in clean energy.

Law enforcement agencies use high-res vertical and oblique imagery to triangulate and map where 911 calls come from, enabling them to respond more quickly, saving time and lives.

OCT 2020 | WASHINGTON, DC U.S.

## HOW DO YOU KNOW IF AN IDEA OR PROJECT IS WORTH PURSUING?

Not every idea is a good one. Not every project that comes your way is worth following. Before aerial imagery, those working in the AEC sector had little to no knowledge what a potential site looked like until they got there in person. They might have pulled up a free map tool that showed them a picture taken a decade ago, but what use was that?

Aerial mapping is dramatically changing prospecting. It enables you to make decisions and submit bids quickly and accurately, placing you ahead of the competition. Clear, accurate insight wins projects.

NEARMAP: INSIGHT IN ACTION

Aerial mapping adds value across your organization, from prospecting and quoting to planning and communicating effectively across project teams and stakeholders. Businesses that take advantage of it see their productivity increase by up to 60%, merely by improving onsite execution, advancing automation, and integrating technology.

It's not enough to just have access to aerial imagery—it needs to be relevant, current, and stunningly clear. Without the ability to trust what you're seeing, to know what the truth on the ground really is, the value and benefit of access to aerial maps declines significantly.
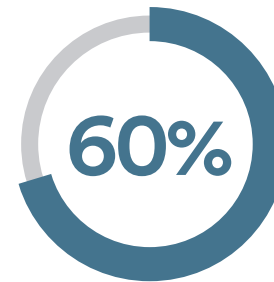
60% Increase in productivity when using aerial imagery

Nearmap takes aerial imagery one step further with our web platform, MapBrowser. Easy, quick access to web-based tools and data driven insights from machine learning help remove the guesswork from your projects. Our imagery is best-in-class and we fly multiple times per year in major metro areas.

PLANNING AND CONCEPT DEVELOPMENT

An idea doesn't truly come to life until you conceptualize how it would look in the real world. As part of the bid process, the bid manager, project manager, or business unit manager must draw on the expertise of people working within AEC functions for accurate insight and data—and they need it in time to meet the proposal deadline. If something happens that prevents them from doing this, this stage grinds to a halt. No proposal means no bid, and no chance for a potential client to see your vision.

THE INFLUENCERS

Architects use imagery to provide a backdrop to their sketches and designs. It allows them the opportunity to present contextual proposals with their design placed directly in the real world environment. This content is the foundation for the engineer's schematic diagrams.

Engineers use site and location imagery to think ahead.

Their job is to choose materials and design components that last the lifetime of the development. With the schematic diagrams, they evaluate the structural, electrical, or other systems. Engineers estimate loads and other requirements, determine appropriate materials, and assure that each element is in proper relation to all others. They also rely on historical data to understand the challenges a location may face at different times of year, and how the landscape changes over time.

RISKS

- Delayed tender response or proposal
- Missed opportunity
- Limited access to site
- Remaining competitive against larger firms

HOW DO YOU FUTURE-PROOF THE PLANNING STAGE?

Many AEC firms are building for a new world using old-world methods. If you want to create architectural concepts that bring your vision to life, along with a detailed construction plan, you must take advantage of the new technologies around you.

The more you visit a site, the more intuitive and concise your bid. However, five or six site visits isn't really feasible; it consumes time and chews up resources. Obliques, vertical orthography, and immersive 3D visualization tools remove the need for an initial site visit and give you the freedom to explore as much as you need. Walk through a neighborhood virtually, see around and between tall structures, get an understanding of ground elevation—all by using high-resolution aerial content remotely. Create without boundaries at the click of a button—take height, pitch, and length measurements, and receive an unobstructed view of your site. The outcome? Present your designs with confidence, trusting the accuracy of your architectural visualization, 3D models, construction plan, and engineering documents.
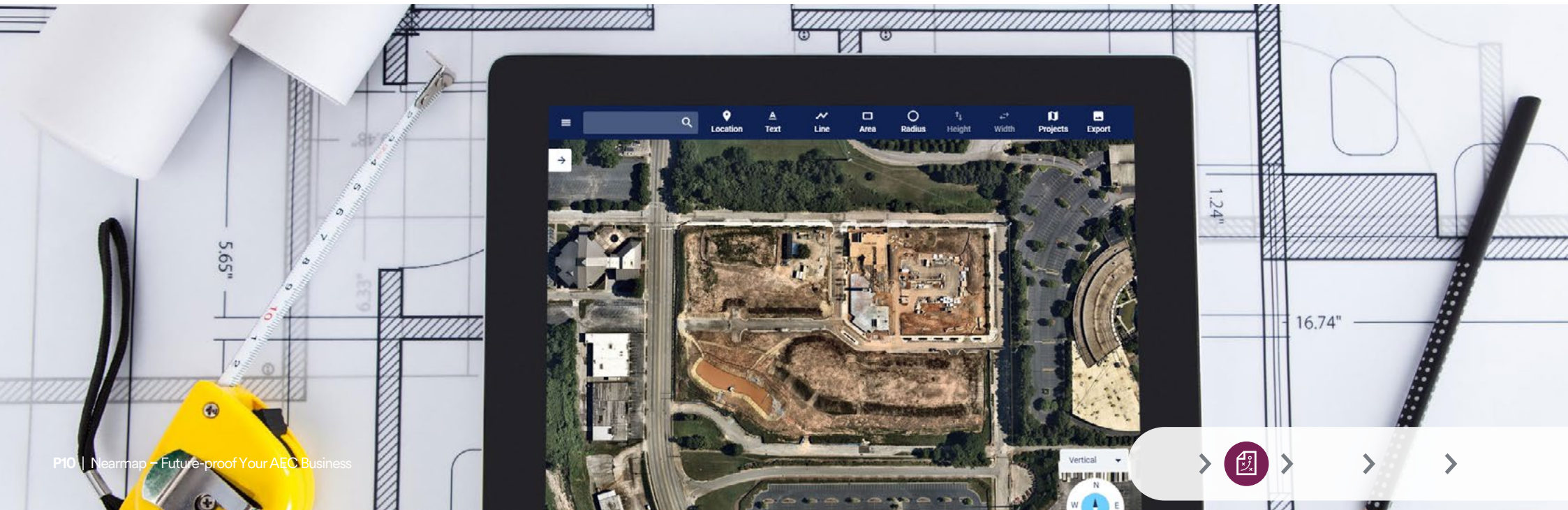
2020 AEC INDUSTRY TRENDS: BIM

Building information modeling (BIM) delivers a detailed 3D view of the built environment to document and verify designs, so you can quickly visualize the building and the impact of decisions before breaking ground and generating design documentation for construction management. Latest research shows that around half of all builders use BIM in project planning and visualization, and over 60% use it to assist with clash detection. It can save you from making costly mistakes and prevent delays from getting in the way of you getting the job done. It's no wonder it's become one of the most talked about innovations in AEC in recent years.

NEARMAP: INSIGHT IN ACTION

We're going one step further with our BIM application. Combining BIM with GIS, we help you mitigate risks, save time, meet specifications, and simplify processes without compromising quality or compliance.
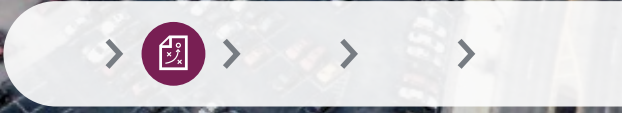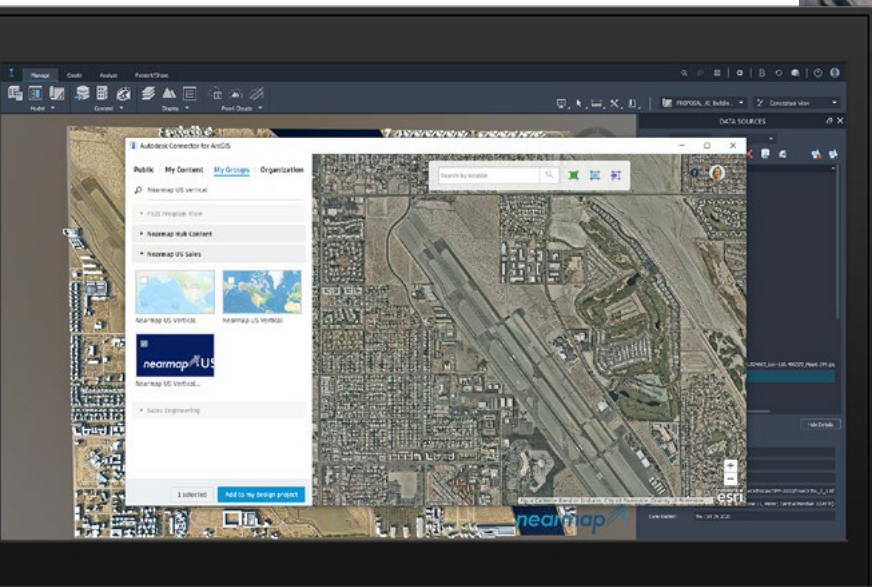
NEARMAP IN ACTION: URBAN PLANNING

CASE STUDY: HNTB

Infrastructure engineering is a meticulous, demanding field. When you're responsible for a major development in a city, two critical needs must be met: precision and clarity. Those are two facets we understand best.

However, neither is useful if you can't move quickly. Waiting for data holds you up and, more importantly, holds your client up, too. When they need in-depth, lifelike renderings, the sooner you can deliver, the better.

The team at infrastructure engineering firm HNTB had a challenge. They worked with lo-res photography, which meant they spent hours modeling and retouching animations before they could present them. Not only that, but they had to calculate height and distance measurements, slope angles, and building footprints by guesswork.

HNTB needed to be more agile, more efficient, and win more bids. This is how we helped them do that.

HNTB's requirements:

- Up-to-date, highly detailed imagery
- Speed
- Uniformity and consistency

- Accurate data they can integrate right into engineer drawings
- Data they want when they want it 24/7
- Orthographic views
- Ability to measure slopes, heights, and building footprints
- Remove the guesswork
- Efficiency

Nearmap provided:

Images ready to go, less retouching required

24/7 access to accurate, up-to-date data

"To win business, we have to be faster, more efficient and do it better." – James Pageau, Senior Media Design Leader, HNTB

Discover how HNTB and others use Nearmap by reading full case studies at: **www.nearmap.com**

MAR 2020 | NEW YORK, NY U.S.

DESIGN

Design is crucial in a project's success. It must fulfill the client's vision while also meeting building codes and regulations. You need accurate, granular data regarding the project site when developing a design to manage risks, control costs, and save time—and this is all before construction kicks off.

THE INFLUENCERS

Architects and **engineers** collaborate heavily during the design stage to reach final decisions on the build, based on the client's objectives and goals. Finished drawings detail the size of the build and what it's to be used for. They highlight the space, colors, materials, and textures, including how the development sits within the land, how it takes advantage of access points and transport links, and even how it will appear during different times of day. The more insight that goes into the design, the more likely it is to be successful.

The **construction manager** is responsible for planning, coordinating, budgeting, and supervising projects. During this stage, they begin to layout the project timetables, choose the most efficient construction method and strategies, and begin working on the budget and cost estimates. They also designate a contractor as soon as the design is completed.

RISKS

- Inaccurate design caused by pixelated or dated imagery
- Drones not always possible

HOW DO YOU FUTURE-PROOF THE DESIGN STAGE?

Due to its precise nature, a lot can go wrong during the design phase. If a measurement is even slightly off, it could render a plan unusable and set your project back. The quality of today's vertical orthographic, oblique, and 3D visualization tools mean you can trust the data you receive and revisit it time and again, without ever having to leave your desk.

JUL 2020 | WASHINGTON, DC U.S.
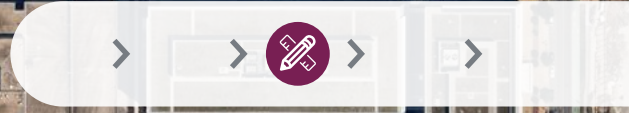
AEC INDUSTRY TRENDS: REMOTE WORKING

If there's one industry that knows about collaborative working, it's AEC.

A sector built on project management has had no choice over the years but to embrace remote teams coming together as one. Cloud adoption has been touted as an AEC industry trend long before it became a world necessity. Despite this, some AEC firms have remained slow on the uptake—and they have struggled when it mattered most.

In 2017-2018, only 25% of U.S. workers worked remotely according to the U.S. Bureau of Labor Statistics. In today's current working environment, 62% of Americans responded to a Gallup survey saying they were working from home. Flexible work situations are becoming the norm, especially as we continue to adapt to unforeseen circumstances. Savvy AEC firms can save significant resources by investing in infrastructure to support remote collaboration.

The benefits include:

- The ability to recruit the right people for the project, no matter where they are geographically
- Shared documents available to everyone in real time
- Reduced travel costs and meeting expenses
- Better quality of work/life balance for employees
- More productive team

REMOTE WORKING AND AEC

The success of the remote worker is dependent on tools that enable them to do their job from anywhere. For many in AEC, that means visiting your site without leaving your home, which requires more than merely VPN networks and home laptops.

* www.flexjobs.com/blog/post/remote-work-statistics/
** globalworkplaceanalytics.com/how-many-people-could-work-from-home
† www.dezeen.com/2020/04/01/architects-designers-working-from-home-coronavirus/

Free imagery applications such as satellite provide some level of detail, but only marginally. They show you what the site looked like at some point—potentially years past—and in not enough detail to confidently act upon.

Fortunately, adversity forces change, and AEC businesses that have embraced new solutions have won more than they expected.

Many in the AEC industry have questioned why AEC project lifecycle stages became so dependent on-site visits. We believe they don't have to, and our technology proves it.
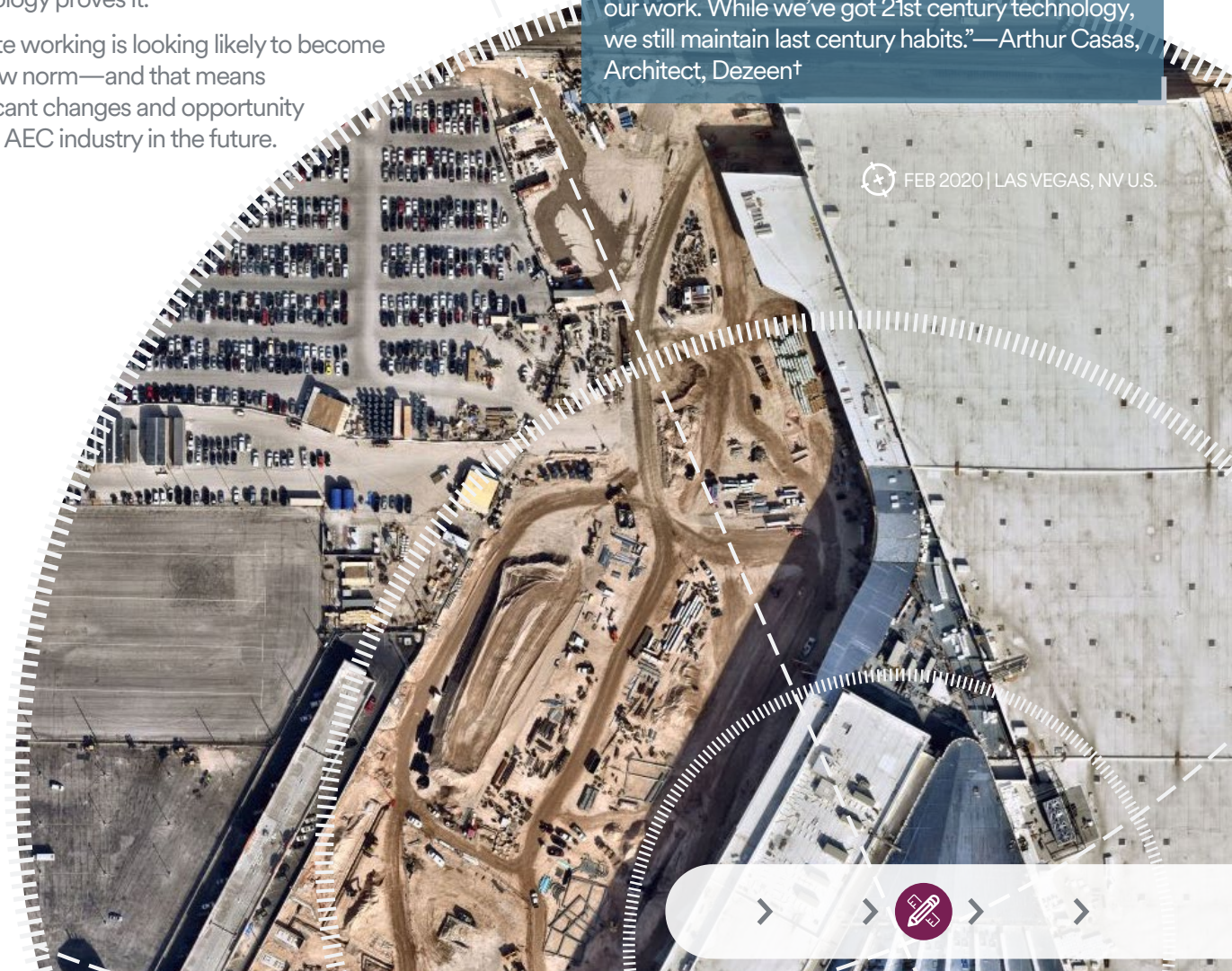
Remote working is looking likely to become the new norm—and that means significant changes and opportunity for the AEC industry in the future.

NEARMAP INSIGHT IN ACTION

Many AEC firms turn to applications like Nearmap's MapBrowser because they seek up-to-date high-resolution imagery. However, what they don't expect to find is how seamlessly the content integrates into all leading GIS and CAD platforms. The result? Within a few clicks of the mouse, their productivity and the quality of their output increases significantly.

"It's time to question if it's really necessary to always be travelling, far away or not, in order to carry out our work. While we've got 21st century technology, we still maintain last century habits."—Arthur Casas, Architect, Dezeen†

FEB 2020 | LAS VEGAS, NV U.S.

BUILD

Construction is where everything comes together. If the design stage has been completed thoroughly, most of the risks are now eliminated. However, there are still elements out of your control. The weather, natural disasters, unexpected hold-ups—these are things you must prepare for without knowing what to prepare for. Having the right tools in place means you're as ready as you can be.

THE INFLUENCERS

Engineers must be able to monitor a construction project to ensure materials are performing up to specifications. However, it's not feasible to remain on-site during the entirety of a project, and traveling back and forth might not be possible given budget and time constraints.

The **construction firm** is the team on the ground, but a ground-level view doesn't always yield the information needed. Having access to multiple views of the build site, including bird's-eye imagery, is a must.

RISKS

- Lots of stakeholders
- Construction is a risky business

HOW DO YOU FUTURE-PROOF THE CONSTRUCTION STAGE?

A construction site is unpredictable. An traffic incident can close an access route, a shipping issue can hold up materials, the weather can render it unsafe to work, and a natural disaster can undo weeks of work in a moment. You can't predict the future, but aerial-location intelligence tools, like vertical orthoimagery, obliques, and 3D visualization help make it a little less unpredictable. Using historical data, you can understand the impact of past events and take advantage of generative design learnings.

AEC INDUSTRY TRENDS: GEOSPATIAL INNOVATION

Nowadays, everyone seems to be using GIS applications. Healthcare, agriculture, the financial services and retail are just a handful of the many industries using and benefiting from geospatial data in some form. GIS applications could be in for an era of innovation as developers strive to create applications that are less complex and easier to navigate.

OCT 2019 | AUSTIN, TX U.S.

NEARMAP IN ACTION:
CIVIL ENGINEERING

CASE STUDY: HIGHPOINT ENGINEERING

In civil engineering, context is everything. Your clients need regular updates on the progress of your development with site imagery, not just your say-so. But, how do you do that if you're thousands of miles away from the site?

With Nearmap aerial imagery, you can analyze site imagery and data from your office. Or an airport. Or your home. Or even on a beach. When you're on the move, we are too.

Highpoint Engineering had enough of free satellite maps that lacked detail. They needed high-resolution, up-to-date imagery for providing real ground context in their client presentations and they needed that level of detail across most of the United States. Free tools can't do that, but Nearmap can.

Highpoint Engineering's requirements:

- Frequently updated high-resolution imagery
- Access to over 70% of the United States
- A tool they can integrate into multiple platforms
- To create high-quality presentations for their clients
- Data and lots of it, including seasonal variations and ground cover

How Nearmap deliver:

- We fly our planes up to three times a year

- We cover 72% of the United States population—over 330,000

"Adds value to the bottom line of how we present in the public eye. We can use it across multiple platforms. We use it in our ArcGIS and AutoCAD platforms. We plug it into reports, presentations, and PDF format. The clarity is outstanding," Michael Fabbiano, Vice President

Discover how Highpoint Engineering and others use Nearmap by reading full case studies at: **www.nearmap.com**

Wed Nov 7 2018   Mon Mar 9 2020

OPERATIONS AND ASSET MANAGEMENT

Understanding this phase of the AEC project lifecycle can be summed up in two ideas: delivering a finished product and maintaining it once completed. By leveraging resources—human and monetary—businesses can significantly improve their ability to reduce waste, increase client satisfaction, and turnaround and invest back into your business.

RISKS

- Optimize property management workflows and resources
- Alternative is sending crews on site
- Opportunity to be proactive vs reactive

HOW TO SAVE TIME AND MONEY ONSITE VISITS

How much time does a site visit take? All day? And how many of your team need to be on those site visits? How much more productive could your business be if you reduced the number of times you're on-site and supplement your work with virtual site visits that were as good as, if not better, than being there in person?

You don't have to work out on your own how much you save by using Nearmap imagery across your workflows. We've done the heavy lifting for you by providing a Savings Calculator on our website. Visit nearmap.com to see how much you could be saving.

We know it's not all about saving money. Site visits are invaluable for giving you real-time information on what your development looks like, what transport challenges you may face—even how seasonality affects an area of interest.

Our technology does so much more than merely show you what your development looks like. It streamlines your workflows, allows for better collaboration with cross-functional teams, and gives you improved insights for enhanced decision-making.

2020 AEC INDUSTRY TRENDS: CLOUD

We live in a world of big data and knowledge sharing. There are five billion* online searches every day, with 198 million** wearable devices sold in 2019. Consumers expect to be connected everywhere they go, 24/7.

Construction yields a vast amount of data, from design to build. In the past, data sharing was disjointed. It was manual, convoluted, and disparate. It lacked fidelity, which meant it increased project costs and time. Moving to a cloud-based platform links everyone involved in a project. They work from the same knowledge bank and benefit from real-time updates. Collaboration has never been easier.

Our proprietary web-based application, MapBrowser, instantly streams aerial images to any connected device, and you can integrate our tools with leading GIS and CAD platforms from the likes of Esri, Bentley, and Autodesk. Your custom application can also access imagery through standard mapping protocol APIs.

At Nearmap, we don't expect connectivity. We hold ourselves accountable for it.

NEARMAP: INSIGHT IN ACTION

A common challenge for many customers is the ability to maintain and share imagery; the amount of data to be hosted can bog down servers. As a cloud-based solution, we host all content on our own servers—you just log in and it's at your fingertips.

Accessing your data and using our tools couldn't be easier, and we're always here to help. We provide step-by-step tutorials on how you can bring your content, documents, and drawings to life. Plus, we're always available and ready to help at support@nearmap.com.

* www.visualcapitalist.com/how-much-data-is-generated-each-day/
** blog.microfocus.com/how-much-data-is-created-on-the-internet-each-day/

OVERVIEW
THE TOP 3 BARRIERS TO A SMOOTH-SAILING PROJECT

There won't always be a pandemic or other natural disaster occurring that will throw new challenges at your business; they'll typically be challenges you face quite frequently. We are always working to connect with architects, construction teams, and engineers to better understand how we can help you future-proof your business. Your work requirements, challenges, and frustrations are all issues we want to help solve or alleviate. The three points below are the most common pain points we hear from our customers.

JAN 2017 | AUSTIN, TX U.S.

I ACCESS FREE IMAGERY ONLINE—WHAT'S THE DIFFERENCE?

Free is always attractive, but there's a reason it's free. Did you know that 35% of a project's costs are accrued through remedial work and wasted effort? If you're working with outdated project data and imagery, you're heading towards that 35% before you even get started.

Mike at Langan Engineering felt the exact same way. He found that free aerial imagery tools he had used in the past were often outdated—sometimes up to five-years-old. His team found that using Nearmap optimized site planning and increased accuracy. Now consultants and engineers with Langan have imagery that is up to 5x more recent than previous sources.

MY PURCHASING POWER IS LIMITED TO MY AREA OF THE BUSINESS

Budgets are complicated; we get that. Interdepartmental, cross-function—everyone has a different number to hit. Rarely do we work with a team that has sole influence in the project lifecycle. It's common to have multiple sponsors across a project with a vested interest in the outcome.

Craig at Ventura Home Group struggled with outdated imagery that limited their ability to accurately analyze site conditions as well as provide more accurate financial estimates for their projects. Our solution solved their problems and their consultant's and engineer's challenges. Not only that, our solution is cloud-based, so you don't accrue costs for off-the-shelf solutions, or have to pay for IT resource support to manage it. We do that.

THERE'S ALREADY A BASE LAYER MAP IN OUR DESIGN SYSTEM, WHY DO WE NEED YOU?

Base map layers are essential—but only if they're correct.

Russell, the GIS technician at Mike Stone Associates, Inc., spent too much time on-site and manually entering measurements into ArcGIS. By integrating Nearmap as a base layer across Esri's platform, Russell no longer spends days out in the field. He's now on-site 5x less than before, and by integrating our rich image library into his GIS workflows, he's getting the job done faster with higher quality and less cost.

KEY FEATURES

INTELLIGENT SEARCH

- Intelligent search by address, point of interest or lat/long geolocation
- Locate Me feature for convenient geo-locating in the field

FLEXIBLE VIEW

- High-resolution oblique
- Smooth, unrestricted panning & zooming within imagery mosaics

PRECISE MEASUREMENT

- Accurate measurement of line, area, radius* or height** with instant unit conversion
- Dynamic adjustment of drawings & measurements

RICH VISUAL ANALYSIS

- Access to current & full historical imagery archive
- View and compare change in images over time with Split View

PURPOSE-BUILT EXPORT

- Save images for use in proposals and communications
- Include or exclude measurements

POWERFUL INTEGRATION

- APIs allow easy & seamless integration of Vertical imagery as base layer within GIS, CAD and 3rd-party applications
- Panorama Tile API allows integration of Panorama imagery with custom applications
- Oblique imagery, sourced from all four cardinal directions, now available in ArcGIS

* Feature only available for Nearmap Vertical imagery
** Feature only available for Nearmap Oblique imagery

SPECIFICATIONS

VERTICAL	
Ground Sampling Distance (GSD)	2.2 - 2.8" or 5.6 - 7.1cm
Absolute Horizontal Accuracy	11" (28cm) for HC2; 29.5" (75cm) for HC1#
Horizontal Measurement Accuracy	6" or 15cm within one photo / 30" or 76 cm between photos
Datum / Projection	WGS84 / Spherical Mercator; NAD83 / SPCS
Image Export Projection	WGS84 / Spherical Mercator; WGS84 / UTM; NAD83 / SPCS; NAD83 / UTM; GDA94 / UTM
Image Bands	RGB Natural Color
OBLIQUE	
Ground Sampling Distance (GSD)	3" or 7.5cm
Absolute Horizontal Accuracy	6" or 15cm within one photo
Horizontal Measurement Accuracy	6" or 15cm within one photo
Image Bands	RGB Natural Color
3D	
Ground Sampling Distance (GSD)	5.9" or 15cm
Absolute Horizontal Accuracy	11" or 28cm RMSEx/y
Horizontal Measurement Accuracy	15.75" or 40cm RMSEz vertical accuracy
Datum / Projection	WGS84 / Spherical Mercator; NAD83 / SPCS
Image Export Projection	WGS84; WGS84 / UTM; GDA94; GDA2020; AHD (AusGeoid09)
Export Formats	Textured mesh, DSM, Point Cloud, True ortho

\# HyperCamera 1

ABOUT NEARMAP

Founded in 2007, Nearmap is a leading aerial imagery and geospatial technology provider, delivering content at scale and covering large urban areas throughout Australia, the United States, New Zealand, and Canada.

Nearmap is one of the world's 10 Most Innovative Companies of 2020, according to Fast Company and recognized as an Australian technology pioneer, listed on the ASX and headquartered in Sydney. Nearmap combines patented plane-mounted camera systems, world-class survey operations capability, and an automated photogrammetry pipeline, to provide imagery within days of capture. Nearmap provides quality at scale, covering large urban areas to empower businesses to perform virtual site visits and make critical business decisions without leaving the office.

Every day, Nearmap helps thousands of users conduct virtual site visits for deep, data-driven insights—enabling informed decisions, streamlined operations, and significant cost savings.

www.nearmap.com

nearmap