

NAVIGATING DIGITAL TRANSFORMATION

How Location Technology
Drives Success





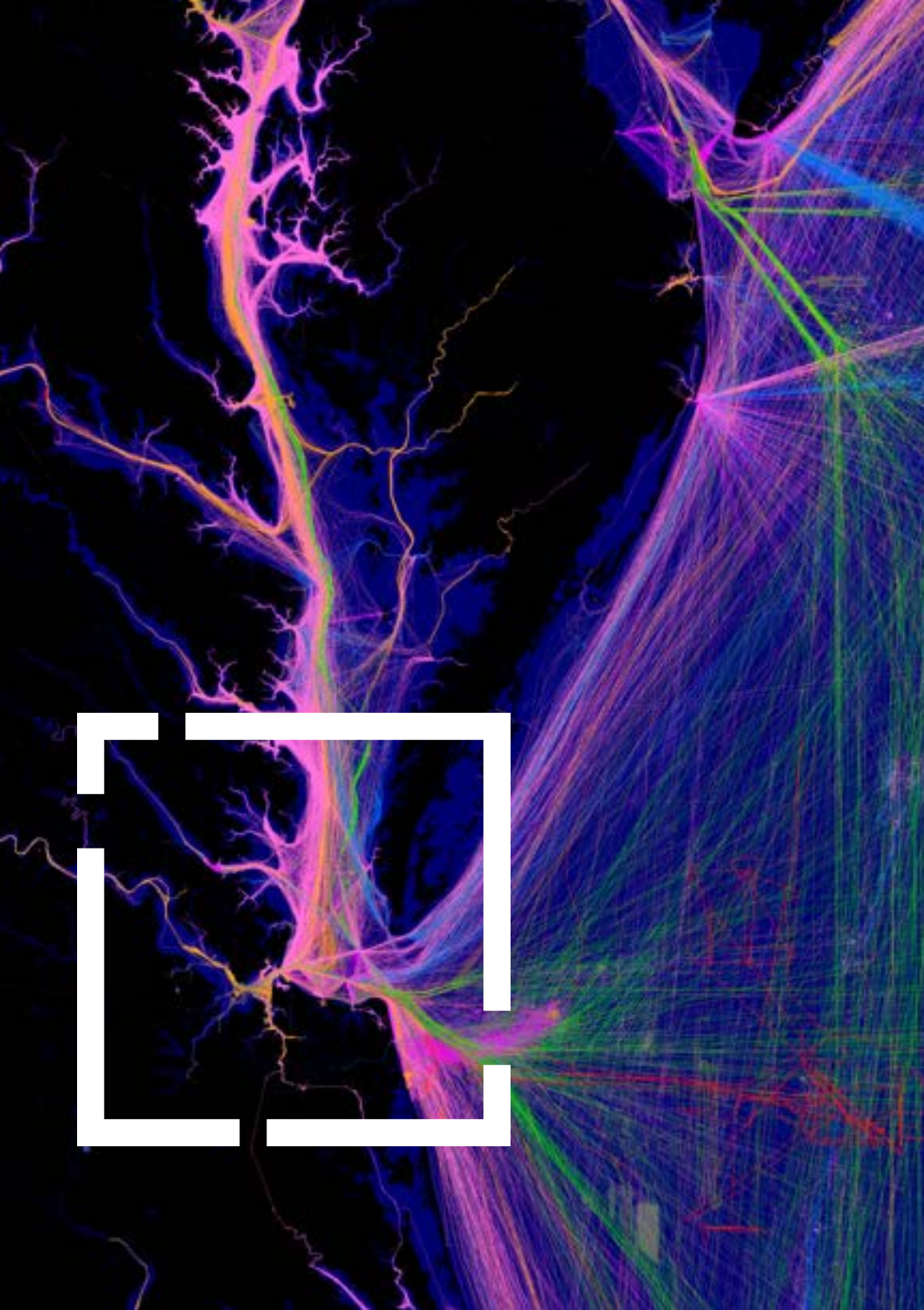
// Digital transformation is not about technology. It's about using technology to improve the way we live, work, and play. And one of the most powerful ways to do that is through maps and location. //

—Jack Dangermond, President, Esri



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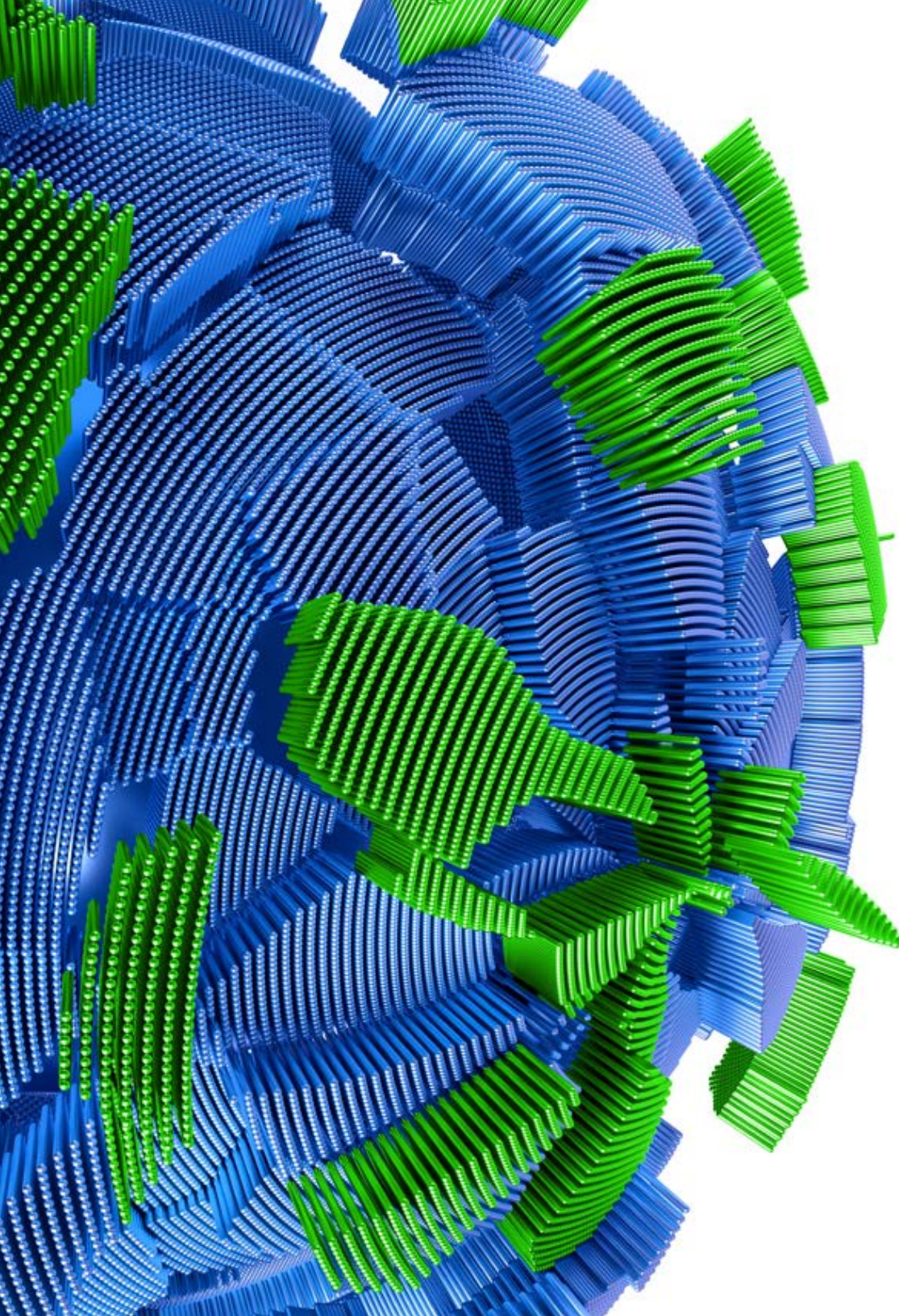
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Making Sense of Digital Transformation

Big data, artificial intelligence, sensors, advanced analytics—yes, these terms define our time, but that's not why we should be concerned about them. Fundamentally, technology helps us build capabilities for businesses and organizations—and the power to solve real problems.

What's most important about the term *digital transformation* is that it represents a new era. More and more physical assets, networks, cities, and systems are now complemented by a digital twin—a virtual mirror image composed of data about performance, the environment, impact, and location, both in real time and across a life cycle. These living datasets hold the potential to improve everything about a business or enterprise, from operations and efficiency to worker productivity, from predictive scenario planning to connecting with customers and stakeholders. ▶



Making Sense of Digital Transformation (continued)

However, data can only be transformative if you clearly understand which data is relevant to specific problems, goals, or opportunities. Without an intelligent strategy, organizations succumb to “information overload,” suffocating under the sheer volume, variety, and velocity of data they collect.

To thrive in a world with massive data flows, organizations are rushing to increase their digital maturity. Every company or entity seeking sustained viability and long-term competitive advantage must define a meaningful digital strategy. To pull that off, you must mine and optimize a dizzying array of data.

One obvious but often underappreciated insight has helped many organizations: Everything happens *somewhere*. It’s a sensible truth that takes on great significance when charting your path through big data on the way to a fully realized digital transformation.

In this report, we look at digital transformation from a practical perspective and discuss how companies can ground themselves for effective transformation in our continuously evolving digital world. ■



Understanding the Full Potential of Data

Typically, businesses and governments approach data analysis statistically, using standard deviations and other methods to create numerical models. This type of analysis confines active, thoughtful exploration of data to spreadsheets, requiring the extrapolation of key figures and statistics to make critical decisions.

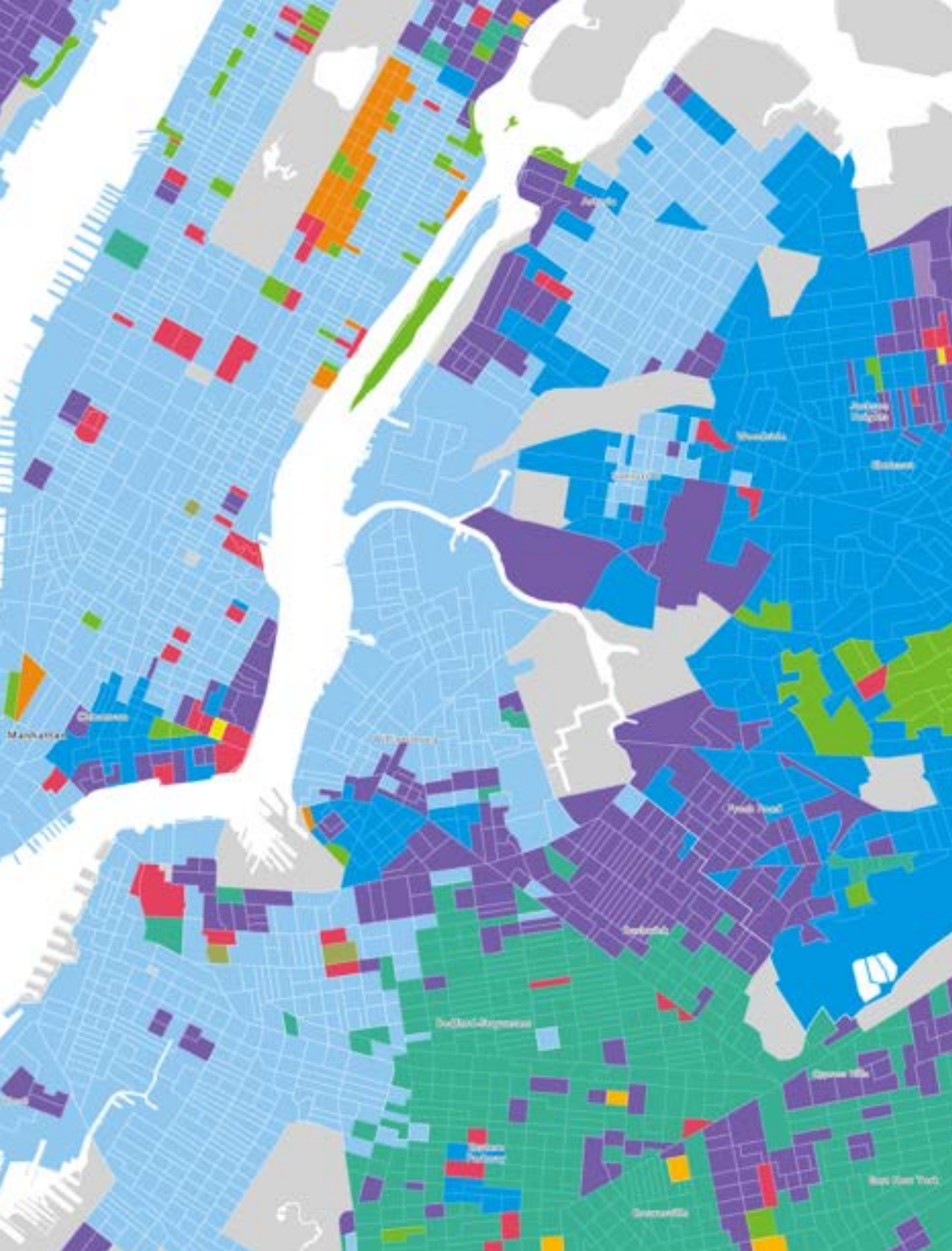
Even more limiting, it is often only professional analysts with number-crunching expertise who can see insights in a spreadsheet. Such limitations equate to increased risks, costly inefficiencies, and lost opportunities for growth and success.

A far more inclusive and powerful approach is to visualize the data—to see it on a shared map or dashboard. Using location to add a visual dimension grounds the data in reality. Doing so will reveal patterns, connections, and opportunities that are difficult—often impossible—to decipher from spreadsheets and numbers alone.

For instance, one of the largest restaurant chains in the US, with annual systemwide sales of more than \$5 billion, experienced a meteoric rise that has almost as much to do with location technology as it does taste.

In recent years, the company has integrated spatial analytics and location intelligence into its daily operations, infusing business value across thousands of owner-operated establishments in almost all 50 states. The decision to map data with state-of-the-art geographic information system (GIS) technology stemmed directly from the company's mission of wanting to understand customers more deeply and better serve local communities.

The company uses GIS software to map large amounts of data about current and potential customers. Visual patterns emerge from the data, allowing the organization to make smarter decisions about new site locations and operations throughout the life cycle of a single store (or many stores in a specific region). ►



Understanding the Full Potential of Data (continued)

By enhancing internal data with demographic and psychographic datasets from multiple sources, the company gains a nuanced view of local markets and can analyze how it might cater to different customer bases. What's one thing the company looks for? Who the most promising customer segments are and where they're located.

Easy-to-use maps and spatial analytics provide the company with the confidence to make serious and often very expensive decisions. With mobile and desktop access, more than 200 users across the organization are making accurate, real-time business decisions and collaborating from the field to the office and back.

According to one of the company's executives: "Success as a data-driven organization depends on linking various arms of the business together. People are realizing that success means going beyond the confines of a singular department."

Presenting data visually on location-enriched maps and dashboards allows all stakeholders to understand what happened, where, and why. In this way, digital maps make big data instantly more comprehensible and valuable. ■



CASE STUDY

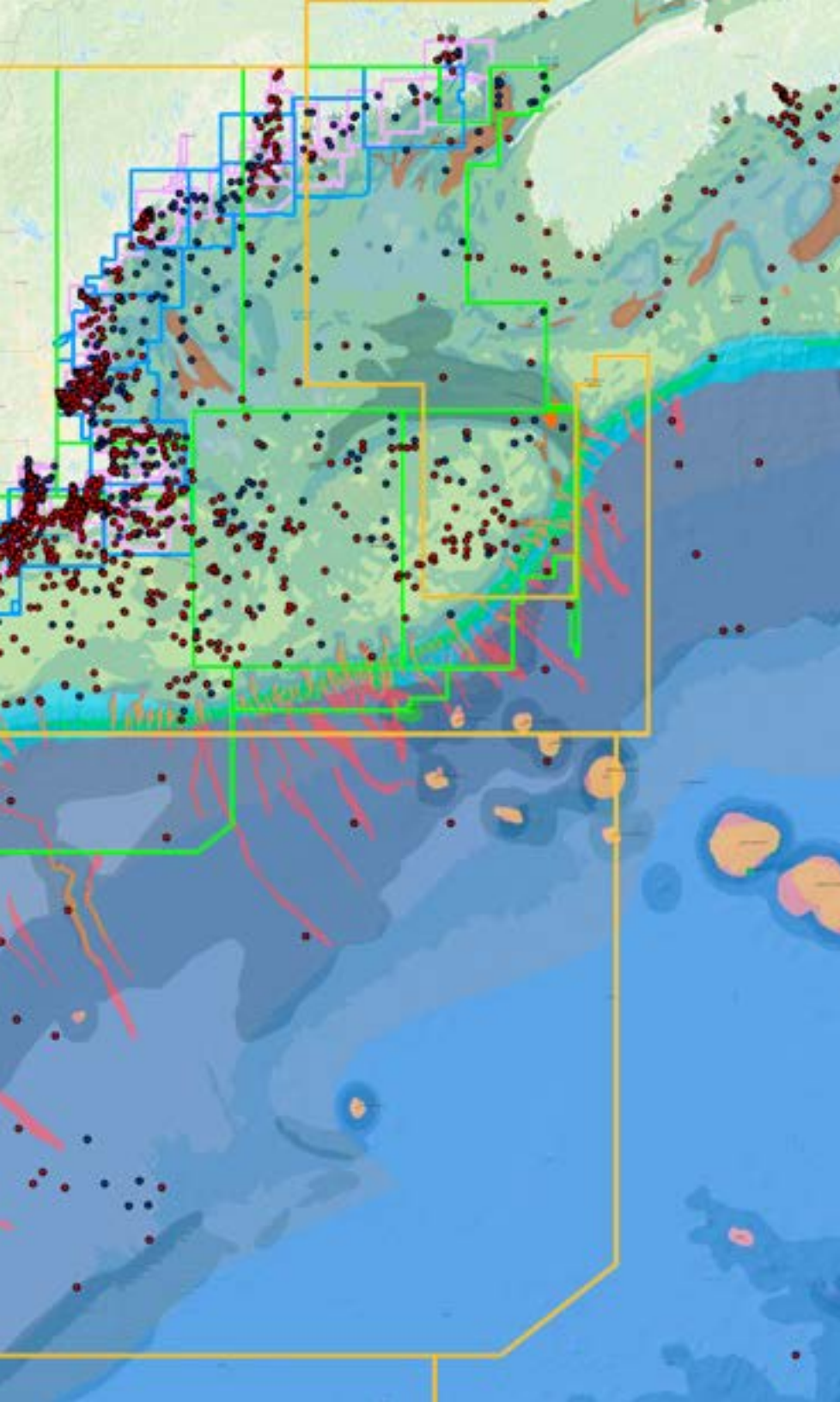
Seafloor Maps Drive Sustainable Success

Clearwater Seafoods

Situation: Clearwater Seafoods, a brand based in Nova Scotia, specializes in luxury seafood—scallops, clams, crab, shrimp, and lobster—that is largely gathered from the seafloor. Traditionally, its approach relied on surface charts, which lacked detailed information about what lives below the water's surface. This changed with the help of sonar imaging and 3D seafloor models. Robust data and mapping transformed Clearwater's strategy and revealed new possibilities.

Challenge: Catching seafloor-dwelling species is labor-intensive and costly. Clearwater needed to know when and where to harvest while protecting resources and the environment. The directive was to improve harvest operations and practice sustainability. The company's traditional methods lacked precision and needed to be enhanced.

Solution: The Clearwater team members invested in technology to track ocean depths and sediment types. With GIS technology, they created detailed depth contours and topographic seafloor maps and derived information about underwater features. They collected data on seabed types, rock structures, and other ecosystem conditions. These data layers were combined to gain location intelligence, enabling Clearwater to predict and act, targeting fishing sites with high precision. ►



“We’re really moving the operation from just considering ourselves as hunters to being one of culturing and nurturing. To be able to look at the seafloor and understand population characteristics—these are the tools we need to do that. It supports the objectives of sustainability our company has.”

—Jim Mosher, Director of Harvest Science, Clearwater Seafoods

Clearwater Seafoods (continued)

Result: Clearwater’s precision approach to fishing, supported by GIS, transformed operations. The company shifted from a sensing and responding approach to one that predicts and acts. By digitizing images, conducting analysis, and generating density models, Clearwater optimized harvest operations. The company has improved its sustainability, traceability, and food safety. These efforts helped maintain the highly coveted Marine Stewardship Council certification, which reflects adherence to strict environmental and production standards. ■

→ [Read the full story](#)



Driving Digital Transformation

Geography has always been a powerful way of thinking about the world. But geography is being revitalized, even magnified, by a world of inexpensive sensors and internet connections. It's a world in which any object can report its location. It's a world in which data on everything can be refined down to specific city blocks, buildings, and locations. Combined with today's high-powered GIS technology, designed specifically to layer all kinds of data, we can produce more than a map—we can make a really smart map.

Geography isn't just dynamic, it's a narrative—it shows you a place and tells a story about that place, what's happening there now, and what will happen next.

More than ever, geography is a way of seeing important connections and relationships that would otherwise stay hidden. The dynamic awareness that comes from modern GIS technology changes everything: the questions we can ask and answer about a place or a problem and the insights we can discover. ►



“Visual language has the potential for increasing human ‘bandwidth,’ the capacity to take in, comprehend, and more efficiently synthesize large amounts of new information. It has this capacity on the individual, group, and organizational levels.”

– Robert Horn, Professor, Stanford University

Driving Digital Transformation (continued)

Through high-tech maps and spatial analysis, GIS provides powerful tools to improve a wide range of operations across organizations of all sizes, from performance management to customer engagement to climate action. Fed by data from billions of sensors, GIS-based spatial analytics add indispensable context to every part of a value chain and all levels of leadership.

Operationally, digital transformation enriched by geospatial technologies such as GIS, digital maps, spatial analysis, and digital twins magnifies the essentials of any enterprise: decision-making, collaboration, risk management, asset management, data analysis, and customer connection. ■



CASE STUDY

Dynamic Twin Transforms Operations

San Francisco International Airport

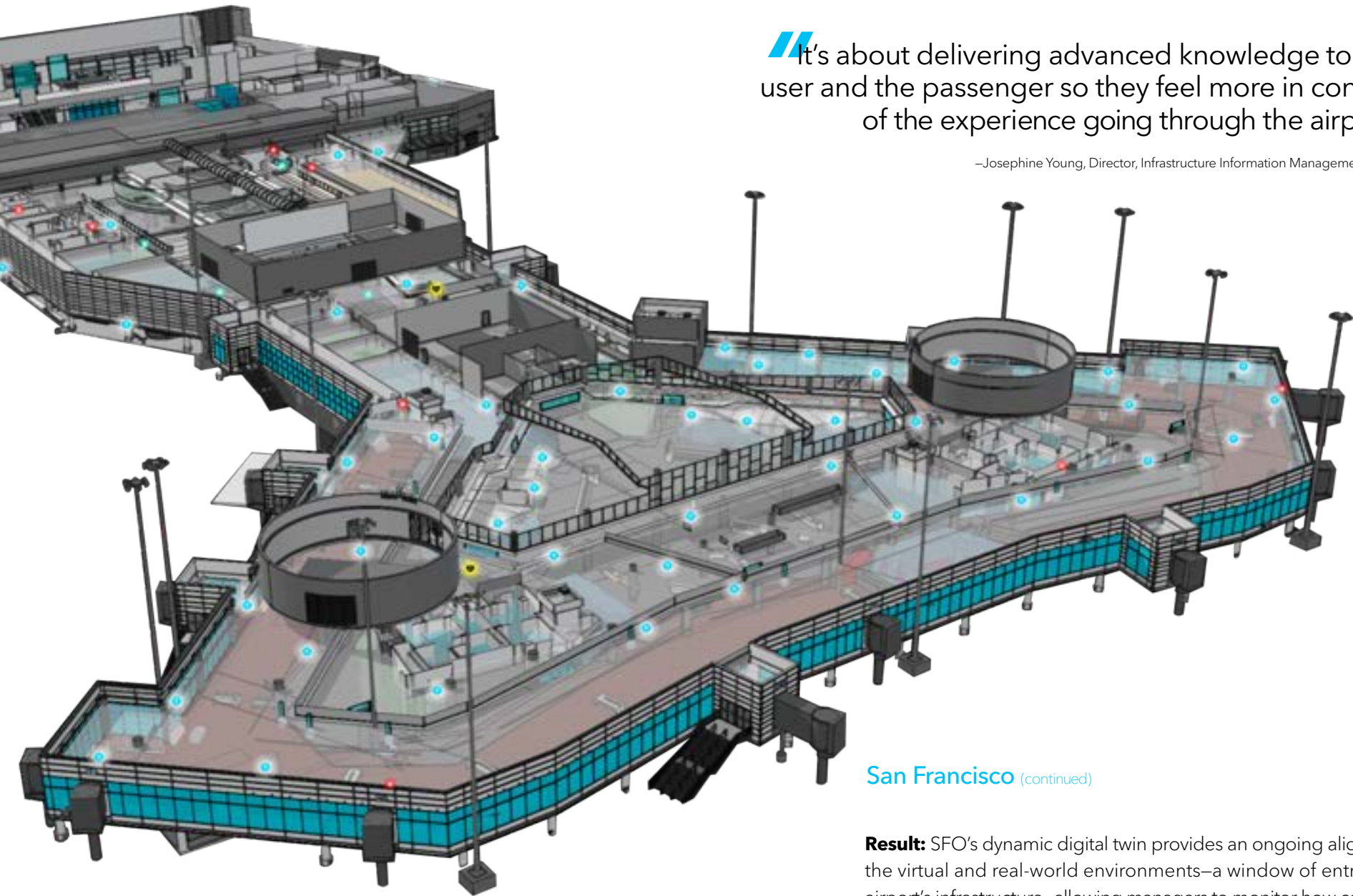
Situation: San Francisco International Airport (SFO) has been at the forefront of modernization. It was an early adopter of GIS as part of the Federal Aviation Administration's mandate to use the technology to manage horizontal infrastructure—runways, taxiways, and pavement. SFO saw the results and adopted a vision to expand GIS use to encompass the majority of airport operations.

Challenge: This desire to expand the use of GIS at SFO reflected an understanding that airports are enormously complex environments. Like cities, they function using many systems operating separately while remaining connected. Furthermore, they are all linked to the continued maintenance of the airport's systems, everything from HVAC and elevators to rail links to terminals. All must be operating to move people and goods efficiently. SFO wanted a way to integrate its systems into one digital environment.

Solution: SFO built a dynamic digital twin using GIS to incorporate other technologies such as building information modeling (BIM) software used for construction plans and work order management systems that capture maintenance details. SFO's dynamic digital twin reflects the dimensions of both the interior and exterior of the airport's facilities as well as the activities of most of its assets. The digital twin portrays the airport in great detail, down to the manufacturer and model number of critical components. ▶

“It’s about delivering advanced knowledge to the user and the passenger so they feel more in control of the experience going through the airport.”

—Josephine Young, Director, Infrastructure Information Management, SFO



San Francisco (continued)

Result: SFO’s dynamic digital twin provides an ongoing alignment of the virtual and real-world environments—a window of entry into the airport’s infrastructure—allowing managers to monitor how components and systems are functioning. The integration has been essential to pulling off the airport’s ambitious and transformative \$7 billion renovation, modernizing it by adding a hotel, revamping two terminals, adding parking, and creating tighter transit connections across the region. ■

→ [Read the full story](#)



Where to start | A real-world framework for action

A digital transformation powered by leading geospatial technology is especially relevant for organizations aiming to build sustainable prosperity and business resilience. Digital transformation enabled by modern, enterprise-level GIS technology provides more sustainable, powerful analytic and operational capabilities than legacy systems or point solutions.



Assess actionable areas

Identify your most critical business functions, assets, and strategic priorities to optimize. These could include supply chain, network optimization, or customer engagement.



Demonstrate quick wins

To see the technology's capabilities and socialize the potential of digital transformation powered by GIS, identify and capture some early achievements. Identify a few low-risk, quick-reward opportunities to capture savings, enter new markets, or reach other measurable benefits.



Build data, advanced analytics, and visualization capabilities

Determine data gaps (e.g., climate, imagery, demographics, regulatory, geopolitical, economic). Assess large-scale data management capabilities and AI-fueled analysis. Create real-time dashboards to monitor and manage.



Develop geospatial expertise

At least 80 percent of all data has a location component, making now the ideal time to develop and hire skills in location intelligence analytics and workflows.



Harmonize within the enterprise, cloud-first

Use GIS data collection and management capabilities to break down silos across ERP, SCM, CRM, and other enterprise IT systems and data.



Set the vision for digital twin and reality capture

Create a comprehensive and responsive 3D representation of your physical assets, facilities, networks, and infrastructure to enable real-time precision, optimization, and multifactor prediction.



Optimize for risk management and opportunity

Use that digital twin and location intelligence insight to create an actionable model of your risk and opportunity landscape. Run scenarios to predict and automate where to make optimal interventions.



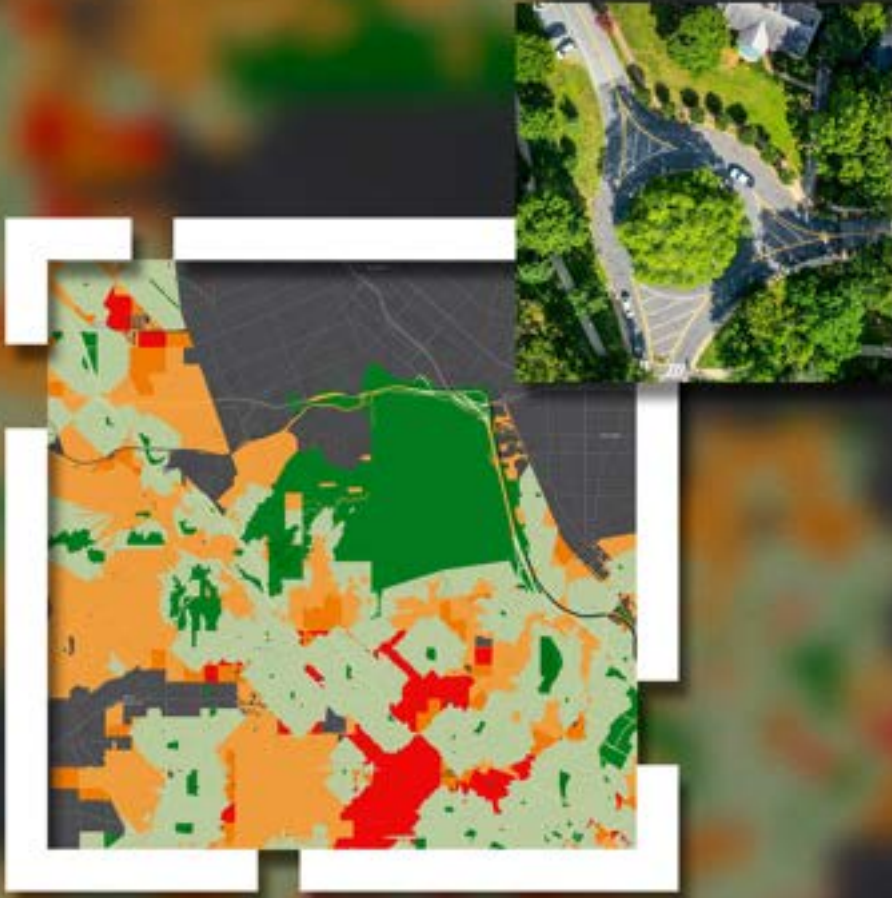
Drive and expand adoption

Bring a strategic geographic approach and change management to the board, executive and operational levels, and all stakeholders.



Foster resilience and sustainability

Make location intelligence central to strategies for ESG and clean energy, which are highly location sensitive. Not only regulators but also employees, customers, neighbors, and ecosystem partners will demand this. ■



Digital Transformation Maturity Model:

The Progression Path to
Sustainable Prosperity

Stage 1 Efficiency

- Asset tracking and analysis—
both fixed and moving assets
- Field operations, resource allocation,
site analysis, and territory planning optimization
- Facility management at floor and office levels,
including return to work and hybrid offices



CASE STUDY

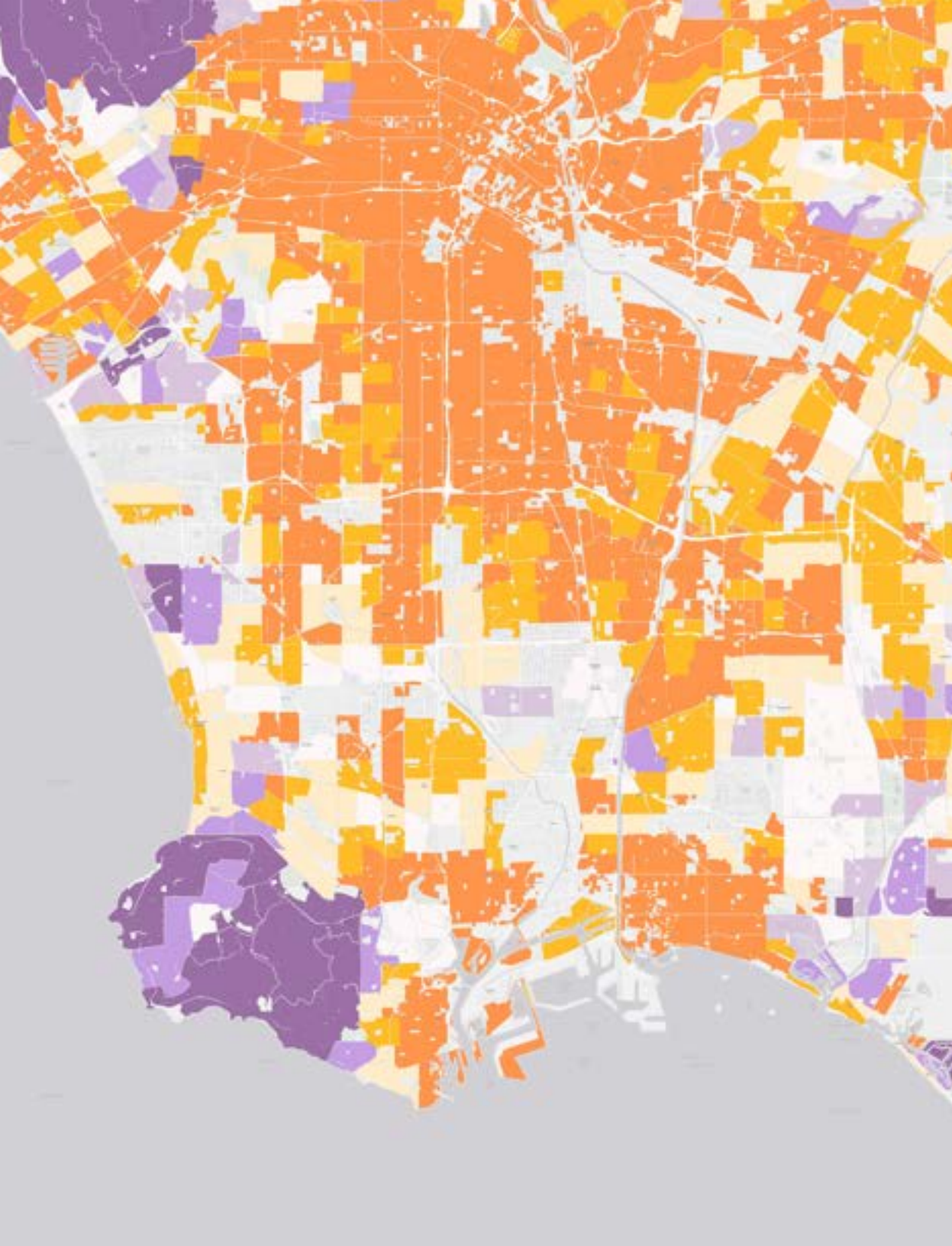
Transforming Commercial Real Estate with Local Insights

JLL

Situation: In the competitive realm of commercial real estate, JLL, the world's second-largest real estate brokerage by revenue, faces the challenge of meeting evolving client demands in an ever-changing global economy. To succeed, JLL must offer innovative solutions that address client needs across various sectors and locations worldwide.

Challenge: Serving diverse clients in different industries and markets requires deep insights into business advantages specific to various locations. JLL needs to provide its professionals with access to data-rich maps and location intelligence that provide a comprehensive understanding of market labor pools, wage levels, and competitors to guide crucial real estate decisions.

Solution: JLL leverages GIS technology to provide two distinct approaches: self-serve and full-serve GIS. More than 3,000 JLL leasing agents, brokers, capital markets analysts, valuation team members, and technical professionals use self-serve GIS to incorporate data-rich maps into client presentations and analyses. The full-serve GIS team acts as hands-on advisers, helping brokers harness location intelligence to serve clients with complex requests. Some team members are dedicated to specific markets, such as New York City and Los Angeles, while others provide on-demand support for less-populated regions. ►



“Most of our clients want to back up the decisions but not go through millions of lines of data in an Excel spreadsheet. GIS is a great way to visualize that data.”

—Shannon Happ, Director of GIS, JLL National

JLL (continued)

Result: By integrating GIS technology comprehensively into its operations, JLL empowers its analysts and brokers to make evidence-based recommendations that improve their clients’ real estate decisions. Smart maps and data visualizations make it easy for clients to justify their choices. The two-pronged GIS approach gives everyone in the company access to a single source of location intelligence, enhancing efficiency, authority, and collaboration. As a result, JLL has positioned itself as a leader in the digital transformation of commercial real estate, providing location-based insights that drive business growth and competitive advantage for its clients. ■

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CASE STUDY

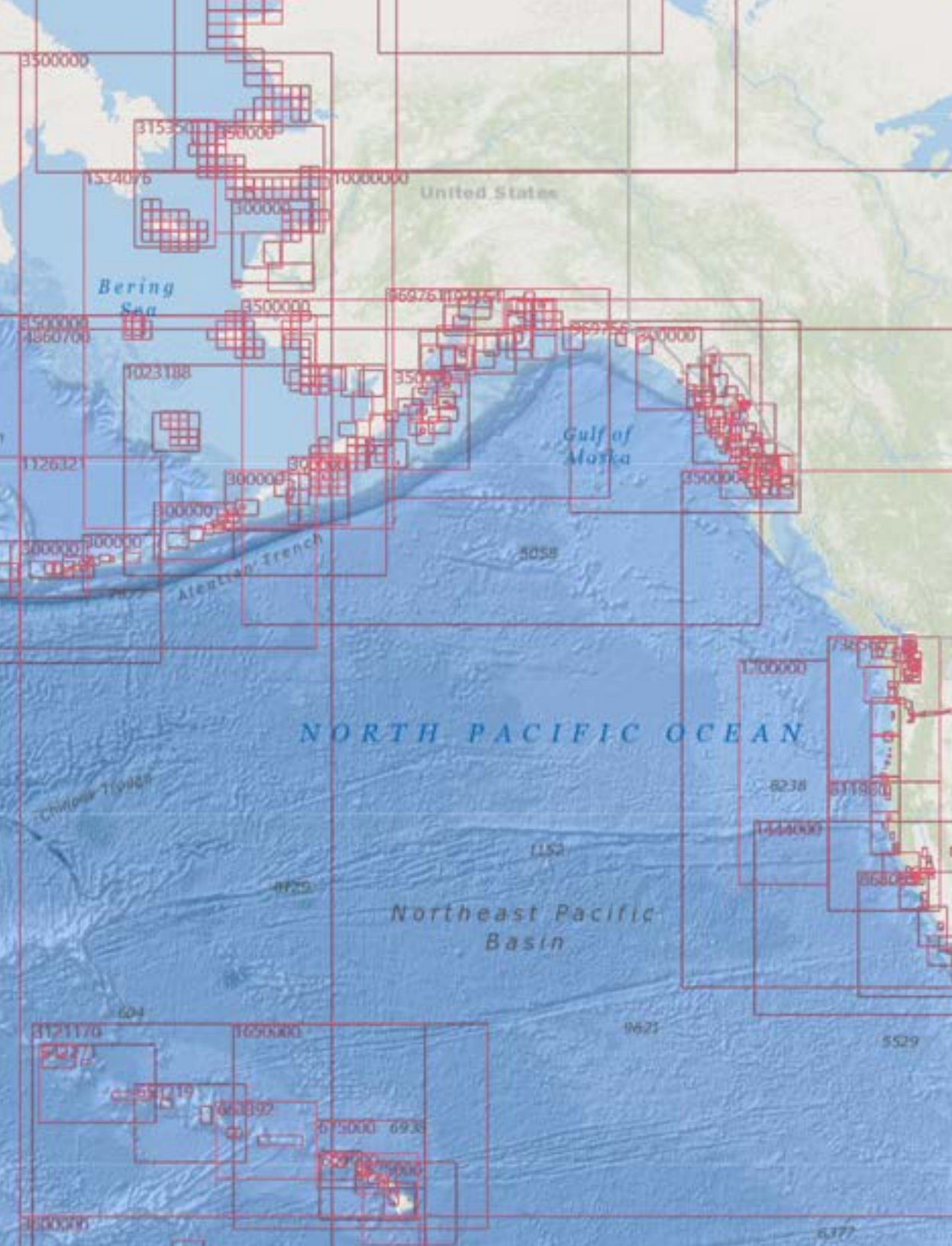
Navigational Charts Go Digital to Benefit Safety and Efficiency

National Oceanic and Atmospheric Administration

Situation: The National Oceanic and Atmospheric Administration (NOAA) Office of Coast Survey is responsible for guiding mariners. Part of this mission involves producing charts for safe navigation along 95,000 miles of US shoreline and 3.4 million square nautical miles of the US exclusive economic zone. NOAA decided to sunset the production of paper charts and transition to electronic navigational charts (ENCs).

Challenge: This change was meant to resolve past mapping inaccuracies and keep sea captains updated on ocean conditions, but the transition from paper charts to ENCs presented a challenge. The complexity and duplication of paper charts created a longstanding issue, requiring significant effort to update and maintain accuracy. NOAA's goal was to improve the quality and consistency of chart information.

Solution: NOAA is leveraging GIS technology to increase efficiency and enhance the transition to ENCs. By integrating survey data into a GIS, NOAA can streamline the charting process and reduce manual tasks. Simplified scales and data-driven GIS maps automate many manual processes, allowing instantaneous updates and smoother navigation transitions. GIS enables NOAA to spend more time improving the accuracy and quality of ENCs, ultimately offering greater safety gains for mariners. ►



“Our raster sunset plan is a natural progression as part of the evolution of navigation over the past 20 years. Brand-new ways of doing things back then are now the way it is, and people can’t even conceive of doing it the old way.”

—Captain Christiaan van Westendorp,
Chief, NOAA Office of Coast Survey Navigation Services Division

NOAA (continued)

Result: GIS technology hugely benefits NOAA’s charting operations. The transition to ENCs offers faster updates, ensuring mariners receive accurate and timely information. Weekly updates of ENCs allow for tracking changes in areas prone to frequent alterations, such as turbulent waters and receding glaciers. Now, NOAA can deliver data more effectively, improving navigation safety and reliability. The transition to electronic methods, supported by GIS, sets a new standard that provides mariners with the tools they need. ■

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Stage 2

Agility

- Real-time visualization, data analytics, and location tracking
- Agile delivery, route management, event planning, and performance monitoring
- Risk management and situational awareness—including emergency management



“It was getting into the mapping of our territories that I think really opened the eyes of the executives [on] how we utilized GIS in our organization.”

—Lela Davis, Chief Meteorologist and GIS Project Manager, SERVPRO

CASE STUDY

How Weather Forecasts Improve Business Growth

SERVPRO

Situation: SERVPRO is one of the nation’s leading providers of cleanup and restoration services, including large-scale disaster recovery. Across 50 states and Canada, its 2,000-plus franchisees help residents and companies recover from burst pipes, flooding, fire damage, and other disasters that often result from extreme weather.

Challenge: Fast response is critical to customer satisfaction, and it can be difficult to keep track of every storm that inflicts damage across SERVPRO’s huge territory.

Solution: The [smart maps](#) SERVPRO creates—layered with data on storm movements, franchise territories, topography, population, drive times, and other key metrics—inform decision-making across the company, from executives to fast-response field teams. Franchisees use location intelligence to decide which equipment they’ll need, where to stage operations, and whether to join regional response teams after far-reaching incidents.

Result: SERVPRO’s analyst created an interactive GIS dashboard that gave the company’s franchise expansion team a first-ever comprehensive view of every franchise and its surrounding market opportunity. By analyzing [customer demographics](#), weather patterns, drive times, and urban and rural characteristics by location, smart maps helped show executives where to draw new lines to best serve their markets. Sales managers identified submarkets where the company wasn’t active and signed up an additional 30 to 40 franchises to drive company growth and serve new customers. ■

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CASE STUDY

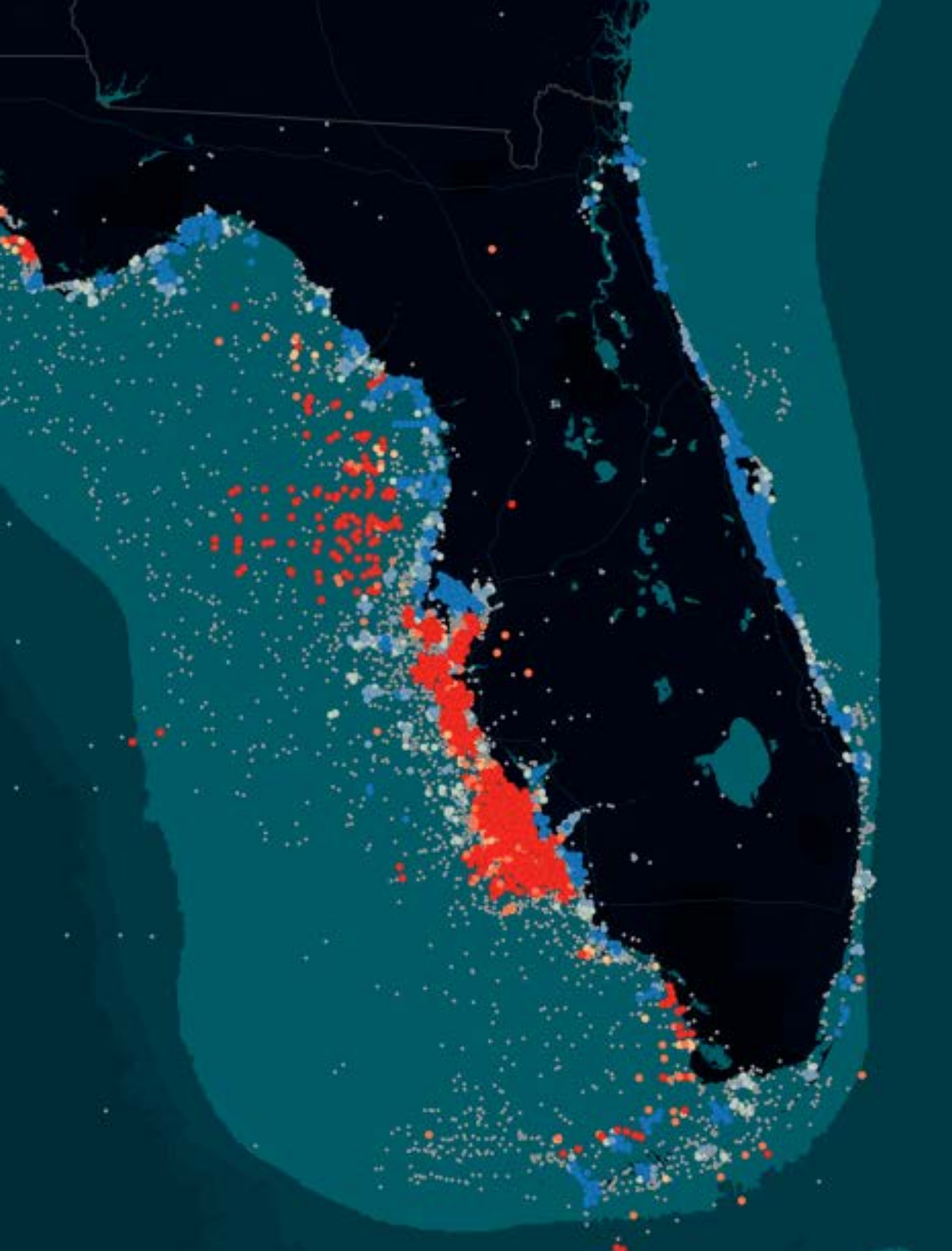
Mitigation Considers Dimensions of Social Vulnerability and Climate Forecasts

Florida Division of Emergency Management

Situation: Mitigation managers in every US state must complete a five-year hazard mitigation plan and deliver that to the Federal Emergency Management Agency to be eligible for project funds. Recently, an analysis of social vulnerability and climate forecasts was required to prioritize the work where it is most needed.

Challenge: Staff from the Florida Division of Emergency Management (FDEM) reached out to stakeholders and learned their traditional 500-page PDF approach wasn't useful. Counties and municipalities simply became overwhelmed by the data. And the statewide view wasn't detailed enough to help them design projects or prioritize the work they needed to do.

Solution: FDEM implemented a GIS-based approach to analyze added parameters and provide interactive maps to guide local decisions. The team layered data about risks and hazards on top of social vulnerability. These smart maps clearly showed the locations of communities in need of more help and areas where climate risks are highest. ►



// We created a tool that allows local jurisdictions to ask where dollars will best be spent. They can look at how successful projects are, but also at where they haven't yet focused on mitigation. //

—Kristin Lentz, Disaster Mitigation Manager, FDEM

Florida (continued)

Result: With GIS mapping, a more comprehensive picture of risk in Florida emerged. The analysis exposed social vulnerability along the central spine of the state. Added analysis reveals why those regions are vulnerable and helps identify what might be done. The new map has opened everyone's eyes to real challenges and overturned long-held assumptions. ■

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Stage 3

Leadership

- Market and customer analysis, including predictive analytics
- Supply chain sustainability, stakeholder prosperity, and environmental health
- Industry leadership, market wisdom, insights at scale, and freedom of action



CASE STUDY

How One AEC Firm Finds Balance between Profitability and Sustainability

Langan

Situation: Location is the common point of reference for nearly everything in the world of architecture, engineering, and construction (AEC). During the Great Recession of 2008 and 2009, many firms had to lay off staff. But environmental services firm Langan saw something different in the wake of the crisis: a growth opportunity.

Challenge: Langan executives wanted to leverage the data readily available to them to make smarter decisions. Teams could become more efficient by using technology to analyze and visually model large datasets. Dashboards could boost collaboration by hosting relevant information in one place. Brett Milburn, Langan's director of applied technologies, set his sights on hiring a GIS team.

Solution: After building a GIS team to manage data and digital tools, the firm saw internal and external improvements. Company executives used GIS dashboards to track office-by-office sustainability metrics—such as paper use and carbon emissions. The technology is also critical to winning project bids and staying ahead of the competition. The GIS team synthesizes acreage, drive time, demographic, and tax zone data to identify potential property sites before they go up for sale. Clients say that making data-driven decisions based on this analysis saves invaluable time. ▶



“People are now seeing the power of [GIS], and they’re understanding their projects at a higher level. They’re not running into those unnecessary meetings [about] where things are located and spending extra time and resources to understand the picture before they move forward.”

—Tony Yates, Senior GIS Manager, Langan

Langan (continued)

Result: With the help of GIS dashboards, apps, and maps, consultants can draw on in-house expertise. A map of sustainability-focused projects allows employees to identify which organizations achieved LEED certification or reduced their carbon footprint and provides opportunities to connect with relevant project leaders. Geospatial tools and location intelligence help the firm streamline workflows and uncover inefficiencies in projects in many industries, from higher education to health care. Now, Langan is known for enterprising problem-solving. ■

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CASE STUDY

A Network Digital Twin Helps Brazil Utility Expand Renewable Energy

Eletrobras Chesf

Situation: Eletrobras Chesf, a Brazilian electric utility operator, was quickly expanding renewable energy generation, from hydro to wind to solar. Growing demand for renewable energy created urgency, and environmental impact assessments posed delays. What Eletrobras Chesf needed was a way to capture its assets and their interface with the natural world.

Challenge: Engineers at Eletrobras Chesf needed data. Expansion plans and maintenance requirements called for a complete picture of the network. They had data about the company's 12 hydroelectric plants, 14 wind power parks, 136 substations, and 21,000 kilometers of transmission lines. The data, however, lacked clarity and could not easily be explored and shared across the organization.

Solution: To fill data gaps, Eletrobras Chesf went all-in on reality capture technology. The company purchased laser equipment for airborne and on-the-ground surveying. Engineers captured imagery with drones. The company incorporated BIM data from Autodesk for 3D models of substations. Engineers stitched the high-resolution data using GIS technology. The result was GeoPortal, a network digital twin for planning, operations, and construction projects. ►



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Conclusion

People process information faster when it's presented visually. Maps and location simplify big data and ease digital transformation. What's more, technology optimizes operations across the enterprise by revealing hidden insights, creating efficiencies, and increasing productivity as well as profits.

As we advance into the fourth industrial revolution—the continuing fusion of the digital and physical worlds—we can only speculate as to what the coming years will bring. But location-based sensor proliferation, digital twins, reality mapping, and artificial intelligence indicate a clear direction.

The need to make sense of waves of data will only continue to grow. The businesses, government agencies, and organizations that can discover real, actionable intelligence from big data and use it to make smarter decisions in real time will survive and thrive. ■



About Esri

Esri, the global market leader in geographic information system (GIS) software, location intelligence, and mapping, helps customers unlock the full potential of data to improve operational and business results. Founded in 1969 in Redlands, California, USA, Esri software is deployed in hundreds of thousands of organizations globally, including Fortune 500 companies, government agencies, nonprofit institutions, and universities. Esri has regional offices, international distributors, and partners providing local support in over 100 countries on six continents. With its pioneering commitment to geospatial technology and analytics, Esri engineers the most innovative solutions that leverage a geographic approach to solving some of the world's most complex problems by placing them in the crucial context of location.

For more information, visit our [**Digital Transformation page**](#).



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