

DIGITIZING FIELD DATA

Improving operational efficiency and
decision-making



Field data is the basic building block for construction projects. Most construction data is generated at the very heart of the action: at jobsites and within partners' operational hubs. Site workers, engineers, surveyors, sub-contractors, field inspectors, and project managers—all play a part in accumulating a sizable dataset during each construction phase. This data can prove to be powerful if stored in accessible data repositories and distributed to users. An example is when engineers and surveyors conduct their daily site walks, where they often record their data in notebooks. Unfortunately, most of the data recorded is non-standardized and prone to being misplaced (anyone using notebooks knows they have a mysterious tendency to get lost). On the other hand, there are field surveyors who expertly

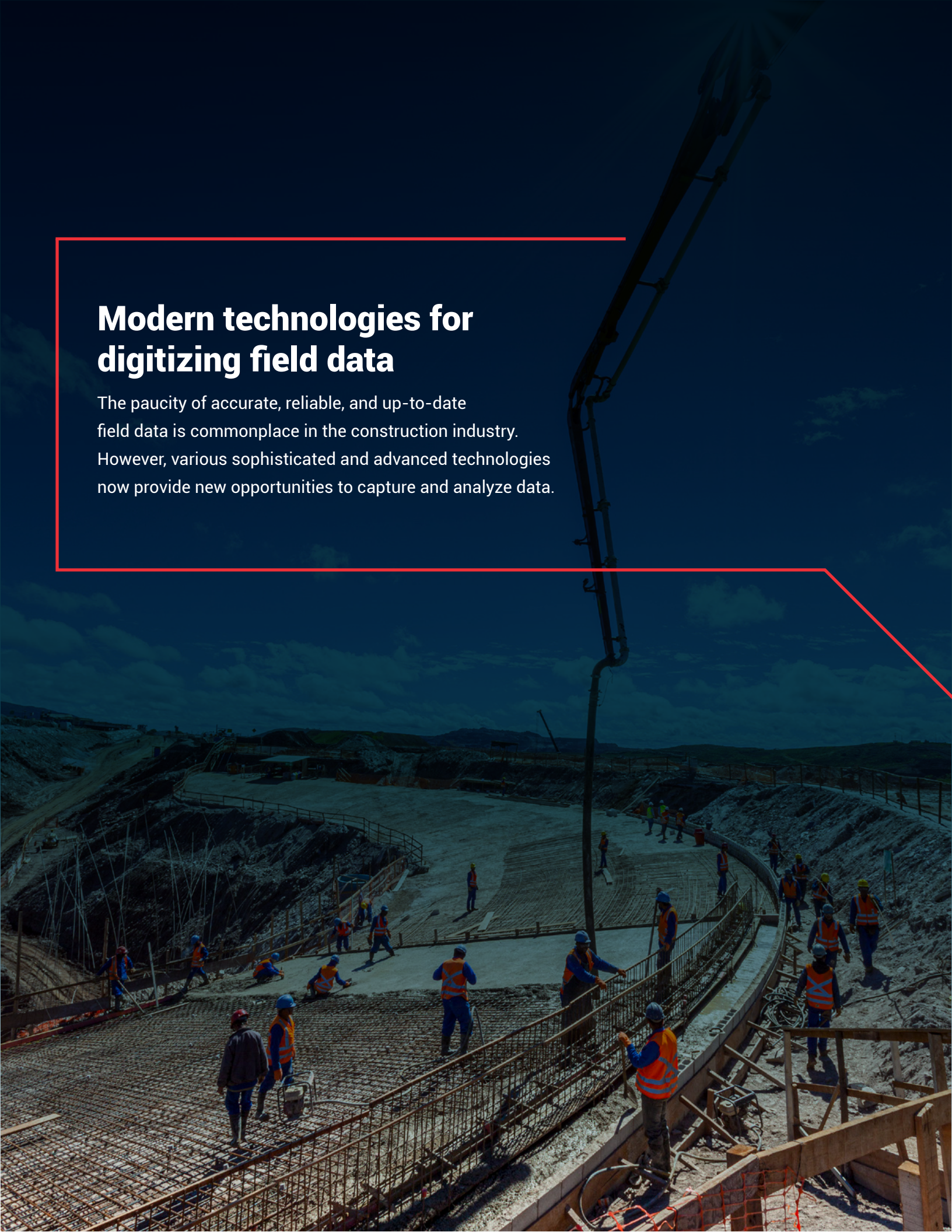
navigate execution through punch lists, contracts, and change orders. Transforming raw data into actionable insights, these experts must meticulously upload, cleanse, structure, and standardize field data, conquering a challenging and intricate process to fuel project success. But the construction industry is undergoing change. Traditional processes, prone to human errors, delays, and subjective interpretations, are giving way to digital applications that significantly enhance the accuracy and availability of data.

Result: Improved operational efficiency, data placed quickly into the hands of users for real-time oversight of performance, productivity, quality, risks, and safety improvements.



Modern technologies for digitizing field data

The paucity of accurate, reliable, and up-to-date field data is commonplace in the construction industry. However, various sophisticated and advanced technologies now provide new opportunities to capture and analyze data.





Field administration

Digitization makes the administration of on-site activities such as daily progress reports, punch lists, safety incident reports, RFIs, and inspections much easier by freeing field personnel from endless paperwork. In contrast to traditional handwritten forms and reports, digitization offers field administrators a streamlined and efficient means of collecting and securely storing data, accessible on any device (phone, tablet, or laptop).

On-site workers can capture data using their mobile device, complete with timestamps and GPS location information, thus enhancing accuracy. They can also attach videos, photos, drawings, digital signatures, or notes to contextualize the collected data comprehensively. Once site inspections are concluded, this data can be instantly centralized, eliminating the need to visit the office to manually transfer information from notebooks or paper forms onto a digital platform. This centralization ensures consistent information is relayed and shared with multiple stakeholders such as inspectors, project managers, site supervisors, etc., and across the different projects they are working on, making it easier to spot trends. It helps anyone in the field or office to take the next step and respond, moving the process along. Allowing stakeholders to access crucial information easily on their preferred devices promotes transparency, collaboration, and the rapid resolution of issues in real time. This means problems that would have otherwise taken days to resolve can be addressed within minutes or hours.



Imaging

Thankfully, 35mm cameras and Polaroids have been replaced with tablets and mobile phones for recording site conditions and progress. This allows data to be captured as images and videos, complete with time stamps, GPS coordinates, and the device's digital signature to ensure authenticity. Furthermore, the power of instant image uploads—depending on the availability of a reliable internet or cellular connection—bridges the gap between jobsites and field offices, seamlessly delivering valuable visual data to applications and users for real-time insights and action. These devices offer a multitude of advantages for construction sites. Their lightweight design makes them easy to carry while providing convenient access to engineering blueprints. Adopting a paperless approach enhances productivity and ultimately contributes to reduced costs. Helmet-mounted 360° cameras are also becoming popular for capturing images conveniently.



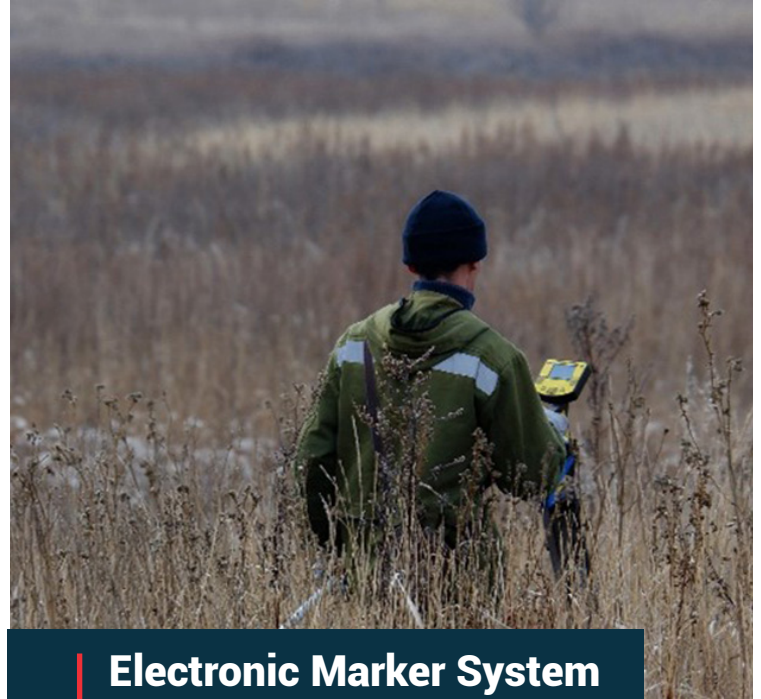
Building Information Modeling (BIM)

BIM technology has been around for decades but has only recently gained traction due to advances in technology and capabilities. BIM provides rich 2D and 3D digital models of a project's functional aspects. These models can be used from a project's start to finish to check for defects and discrepancies in the plans and provide a safeguard against change requests. In addition, BIM is handy for leveraging site data to compare deviations and anomalies in project performance against planned progress. Aurigo Masterworks includes modules that facilitate the use of BIM, including functionality that supports land surveys and feasibility studies, in addition to identifying design errors and tracking site revisions. This data empowers teams to more effectively re-forecast project KPIs, estimate resource requirements, and define equipment needs. When used effectively, BIMs can perform the work of ten people in a matter of hours without compromising accuracy or increasing job site headcount.



Drones

Unmanned Aerial Vehicles (UAVs), or drones, are fast becoming the preferred technology for capturing field data. Drones can quickly and accurately survey sites—buildings, highways, bridges, dams, cell towers, wind turbines, etc.—without the need for physical human inspection. In addition, drones can reach previously inaccessible areas to record and report data. A [recent study of the drone industry](#) found that 94% of respondents in the construction industry used drones as their primary tool for digitizing their job sites. The study also found that 39% of respondents used LiDAR to acquire field data. Other advanced technologies, such as hyperspectral imaging, can create accurate geological models of sites and excavations and identify soil types: tasks that would be difficult using traditional methods.



Electronic Marker System (EMS) Locators

EMS locators transmit Radio Frequency (RF) signals to markers buried at construction sites. These markers dramatically reduce the time and money required to search for assets or facilities and are widely used in power, gas, water, wastewater, and telecom sites.

The value of digitizing field data

The primary value of using digital technologies to capture and manage data is the ability to lower labor inputs for manual tasks that can be automated and improved. This lets owners and contractors allocate labor resources to more critical areas.

Field data digitization also plays a crucial role in tackling the pervasive challenge of human error within the construction industry. It can often be difficult to identify mistakes using manually recorded site survey data simply due to the sheer volume of data collected. Additionally, the

subjectivity of manual data collection can compromise the integrity of downstream decision-making, highlighting the need for a systematic approach to gathering information.

Finally, delays in surveys and reports caused by bad weather and other factors are eliminated. Site teams may be tempted to use excuses, such as 'it was raining' or 'the job site was flooded' (when there may have been clear conditions), in order to justify delays in data collection if they are behind schedule. These technologies automatically record existing weather conditions.



Unlocking opportunities: Advantages of digitizing field data



Accuracy of data

The data is geotagged, time-stamped, and 100% reliable. The possibility of errors and omissions due to manual data entry can be eliminated.



Speed of inspection

Digital devices that record data are easy to carry or move around complex sites and can reach inaccessible areas, allowing for quick inspection and data capture.



Evidence-based decisions

With real-time jobsite details, you can gauge daily progress with accurate visual cues, such as images, videos, and documents. Since the data is current, it speeds up decision-making and reduces expensive program delays.



Ease of record management

There is an immediate decrease in the volume of physical, paper-based documents and the need for cumbersome storage solutions.



Environmental impact

Modern data collection technologies help construction companies lower their carbon footprint, contributing to sustainability goals.



Access to digital plans and blueprints

Devices can provide the most up-to-date digital plans and blueprints to users at the project site, enabling them to compare the data they are recording with project requirements. This can contribute to a reduction in change orders.



Long-term record keeping

Digitized project details can be preserved indefinitely and retrieved instantly, creating opportunities to generate insights that were previously unavailable for upcoming or current projects.



Disaster recovery

Notebooks, the traditional way to capture field data, can be misplaced or lost. Pages in notebooks can also become smudged, torn, or overwritten. Digital data is unchangeable. It is excellent for disaster recovery.



Track incidents and control challenges

You can track and control issues, safety incidents, resource usage, and contractor productivity using real-time weather updates.



Real-time collaboration

With digitization, real-time collaboration with project managers, field inspectors, resident engineers, and contractors becomes seamless. This also makes it easier to get approvals, reports, and alerts.



Easy integration of data

Digitization streamlines the connection between different life cycle stages, enhancing overall process control through digital data. For instance, project cost information improves future planning accuracy, and cross-referencing inspection records with payment requests ensures accurate compensation for completed tasks.

Making the shift to digital field data

Shifting to a construction management software solution like Aurigo Masterworks can help owners transition to digitizing field data. However, it places the responsibility of managing change on the organization—something that may not be easy for an industry accustomed to decades of hardwired processes. The key is to make field data digitization an organizational priority by following it up with investments in technology and upskilling your teams to leverage these modern tools.

Savvy organizations know they cannot use their data effectively through tools like SharePoint or Google Drive. Instead, the data must be migrated to an online Program Management Information Systems (PMIS) to enable it to reach its full potential.

How effective is the use of such technology?

One remarkable incident puts things in perspective. A contractor who lost a bid for a billion-dollar stadium in Florida proposed that the owners test their new BIM tool on the stadium's design and plans. This exercise introduced the owners, who had never used a BIM tool before, to the benefits of digitized data. The BIM tool identified over 20,000 conflicts in design and planning. This evidence was substantial enough for the contractor to secure the bid they had initially lost.

The trend of digitizing production and operational data has been widely adopted in other industries, such as manufacturing and consumer packaged goods. There is ample evidence that digitizing field data is both useful and inevitable. The construction industry is well-positioned for this change.



About Aurigo Software

Aurigo builds software that helps build the world. Aurigo is an AI-native company that helps capital owners connect planning, construction, and operations in a single environment, improving decision-making and execution. Trusted by over 300 organizations across infrastructure and facilities, Aurigo manages more than \$450 billion in capital programs, with over 40,000 projects throughout North America. Aurigo is a privately held U.S. corporation headquartered in Austin, Texas, with global offices in Canada, South Africa, and India.

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Schedule your demo today to learn how Aurigo Masterworks can help your organization streamline information, accurately track, forecast, and prioritize projects, and help you save time and money.



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