



3D Scanning Made Simple

How to Unleash the Power of 3D Laser
Scanning to Save Time and Money

Introduction

When 3D laser scanning appeared on the construction scene in the early 2000s, there was finally a tool that could scan and collect precise, as-built measurements and site conditions. Scanning could replace previous manual processes that were far less accurate and more tedious, like tape measures and 2D drawings.

But only recently has the computer hardware and CAD software technology evolved to support scan data, allowing it to more fully enable BIM and other construction workflows. This has led to the rapid rise of scanning and turned it into a go-to tool among contractors.

3D laser scanning is especially useful for:

- **Renovation and redevelopment projects** that lack existing or current drawings and maintenance documents, giving you the ability to capture as-built conditions.
- **New construction projects**, where having reliable scan data about project conditions ensures accurate construction of the prefabricated assembly before installation, minimizing mistakes and rework.
- **Construction project progression**, by allowing you to track and compare each new phase of work against a model or drawings, as well as record project milestones and produce accurate as-built documentation.

While there's no doubt that 3D laser scanning brought important capabilities to the construction industry, today's laser scanning tools also have limitations and present three common hurdles that can cost you time and money:

- Specialized technical training is required to use the tool
- Incomplete or inaccurate project information creates inefficiency and costly rework
- Required calibration takes the instrument out of commission, hurting productivity

Let's take a closer look at these challenges and explore solutions that can help you improve and expand upon your current workflows and scanning processes.

¹ Kite-Powell, Jennifer. "Using 3D Scanning and Augmented Reality to Connect, Create, and Preserve." Forbes. July 29, 2017.



The global 3D scanning market is predicted to reach \$5.7 billion by 2021.¹

Challenge #1: Specialized training requirements

Every new tool comes with a learning curve, and 3D laser scanners are no different. In fact, their technical complexity is why 3D scanners have traditionally been relegated to the mysterious world of special technicians and haven't typically been used by Architecture, Engineering & Construction (AEC) professionals.

Because many of the currently available 3D scanners were developed for geospatial and long-range applications, they require specialized training to operate. Their cost is prohibitive for some, and their capabilities may be overkill for many applications.

So scanning specialists have stepped in to handle the job. But outsourcing to them makes you entirely dependent on the data they return, when they return it. If you could make the technology available to others on your team for mid-range applications, you'd gain the ability to capture the data that's pertinent to your needs, as well as realize greater in-field efficiency.

Solution: Make 3D laser scanning more accessible

You need a 3D laser scanning solution that doesn't require outside resources or specialized training to operate. When you can make 3D scanning directly available to those who need the information—like your BIM managers, engineers, and layout pros—they can capture the exact measurements they need right in the field. This streamlines the entire workflow and enables them to make better and faster decisions on their own.

There are scanners available today that are easy to learn and operate, requiring minimal training to get up to speed. When you integrate these scanning capabilities with an easy-to-use hardware-to-software solution, you can remove the mystery around scanning and break down barriers between the field and your CAD software to drive improvements in productivity and efficiency.



What's Possible with an Intuitive 3D Laser Scanning Solution

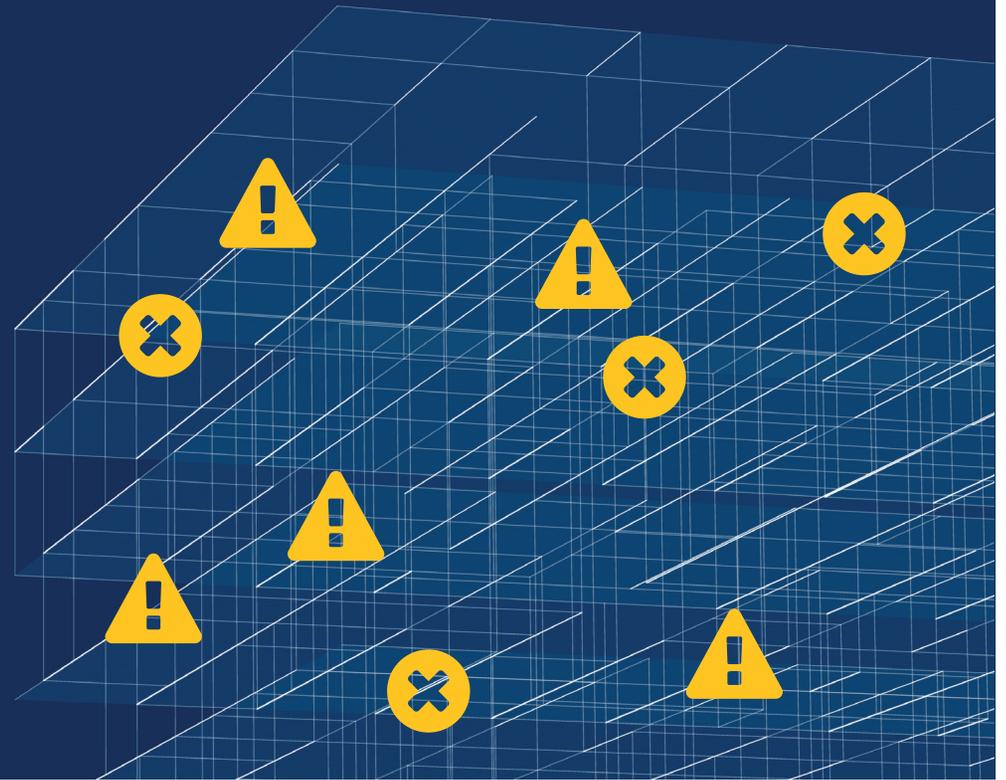
3D laser scanning has traditionally been the domain of trained technical specialists. But there are many roles in construction that could benefit from using 3D scanners for mid-range field applications, like:

- **BIM managers** who need accurate and usable data to import into other software applications
- **BIM coordinators** who need professional workflows to generate and manage digital models
- **Project and field engineers** who need ready access to information so they can effectively plan, design, and manage construction projects
- **Field layout specialists** who need the ability to quickly and easily capture field conditions

Despite the pressures of a labor shortage and stagnant productivity, the construction industry still lags behind when it comes to training workers in new skills.² By putting the power of 3D laser scanning into the hands of those who need it most, when and where they need it, you open up a range of possibilities to develop your current employees and begin to solve the productivity problem that pervades the construction business.

² Supporting Worker Success in the Age of Automation. Monitor Institute by Deloitte and Autodesk Foundation. June 2019.

Challenge #2: Incomplete or inaccurate information



The construction workflows involved in creating a constructible model demand that every wall, floor, window, and ceiling, as well as every electrical, HVAC, and plumbing placement be accurately captured. But if you're relying on existing drawings to do your project planning and detailing, it's hard to know if the documents are an accurate representation of the actual project conditions.

Inaccurate construction models can lead to unforeseen errors and inefficiencies later in the project. Not only do [layout inefficiencies hurt your bottom line](#), errors that aren't caught right away could affect the overall design and layout of building systems and will almost certainly require rework.

Layout can account for up to 25% of a project's cost.³

At the same time, if you're unable to integrate both 3D models and scans with other workflow applications, such as a robotic total station (RTS) or BIM software, your teams lose valuable time trying to input data into disparate systems and manipulate it to meet their needs. This lack of integration hinders cross-functional communication and collaboration, another leading cause of rework.

³ Williams, Bryan. "The Real Cost of Inefficient Construction Layout." Constructible Blog, August 13, 2019.



The Astronomical Costs of Rework⁴

Construction rework consumes time, resources, and profits.

- Project team members spend 4 hours per week dealing with rework-related activities.
- The median global cost of rework is 5.04% annually.
- Rework costs the U.S. construction industry alone more than \$31 billion.
- The average mid-sized construction company can see costs exceeding \$2 billion per year due to rework.
- 52% of rework globally is caused by poor data and miscommunication.



Solution: Get accurate and complete information the first time

You need a 3D laser scanning solution that makes it easy to quickly and accurately capture the as-is conditions of the project. A solution that's capable of in-field registration creates a point cloud as you scan, providing fully visualized details of what's been captured before you leave the jobsite. When you can rely on the ability to get accurate and complete scan data the first time, you avoid the need to budget additional time for remeasuring to obtain missing project information. Plus, you can reduce the risk of costly change orders after construction has already started.

You also need the ability to integrate the scan data with CAD and other applications to streamline workflows, promote project collaboration, and enable better data sharing. Scan-to-model capabilities help you overcome the complexities of project communication by creating scan data that is aligned to the project coordinate system and is immediately shareable with other applications and project stakeholders.

1ST
TIME

⁴ Thomas, Eric; Bowman, Jay; Schott, Peter; Snyder, Jay; Spare, Natalie. 2018 Industry Report: Construction Disconnected. FMI/PlanGrid. August 2018.

Challenge #3: Required annual service

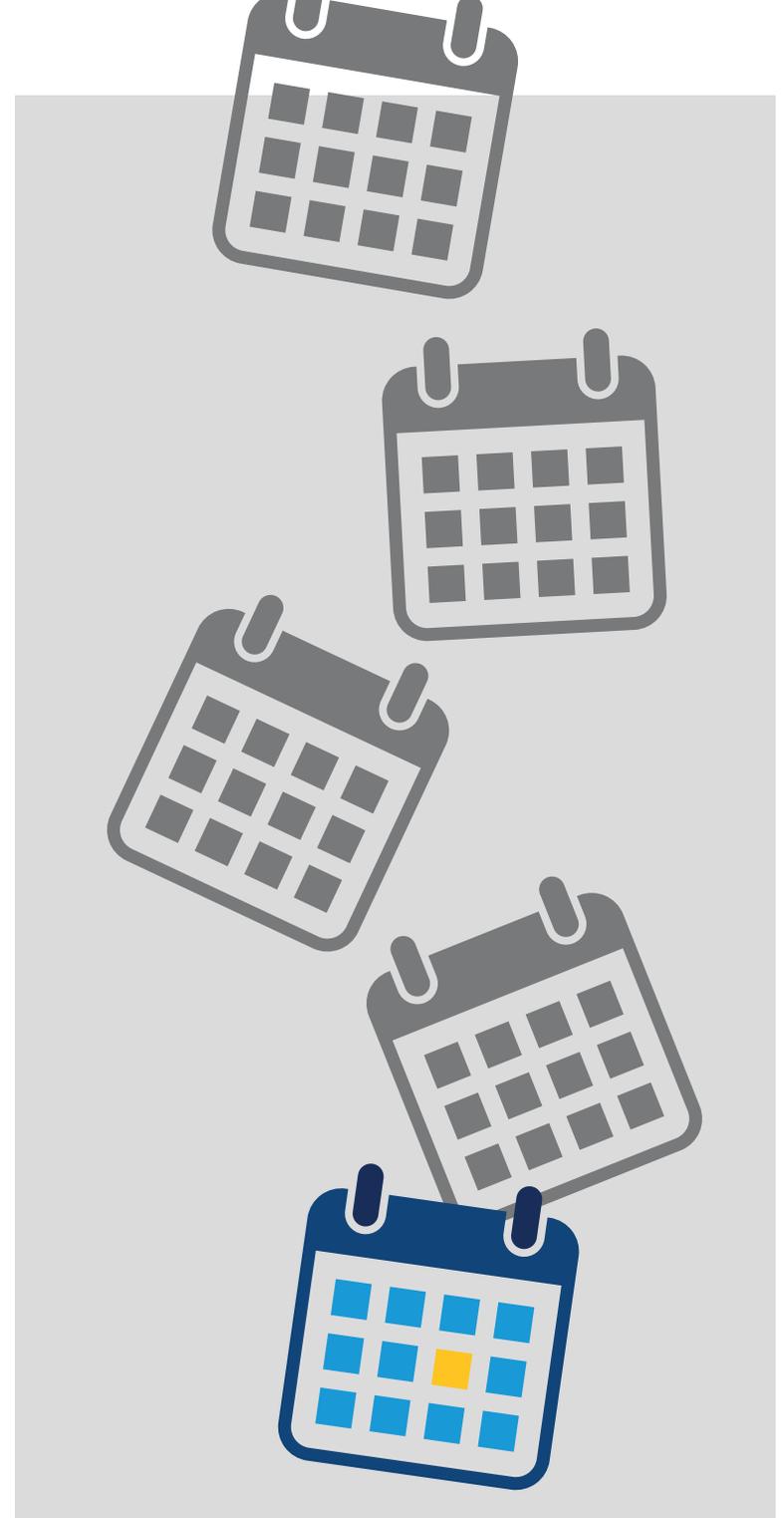
Traditional 3D laser scanners require regular calibration to keep them operating at peak performance. But as mentioned previously, these scanners, while ideal for their intended applications, may be more than what's needed for many applications, including the information that's needed most by AEC professionals.

While annual service is a typical requirement of many 3D laser scanners, it can put a scanner out of commission for weeks at a time, resulting in costly downtime that kills productivity. In fact, you could be without a scanner for up to six weeks, or 12% of your work year. This type of interruption is part of the larger productivity problem that plagues the construction industry—where cost and schedule overruns are already more often the norm than the exception.

Over the past 20 years, global construction productivity has grown at only 1% annually, only around one-third the rate of the world economy and only around one-quarter the rate in manufacturing.⁵

You need dependable, easy-to-maintain tools to effectively keep up with today's demands for greater productivity. And, just like you wouldn't use a jackhammer to pound in a nail, you need a scanning solution that's the right fit for your needs.

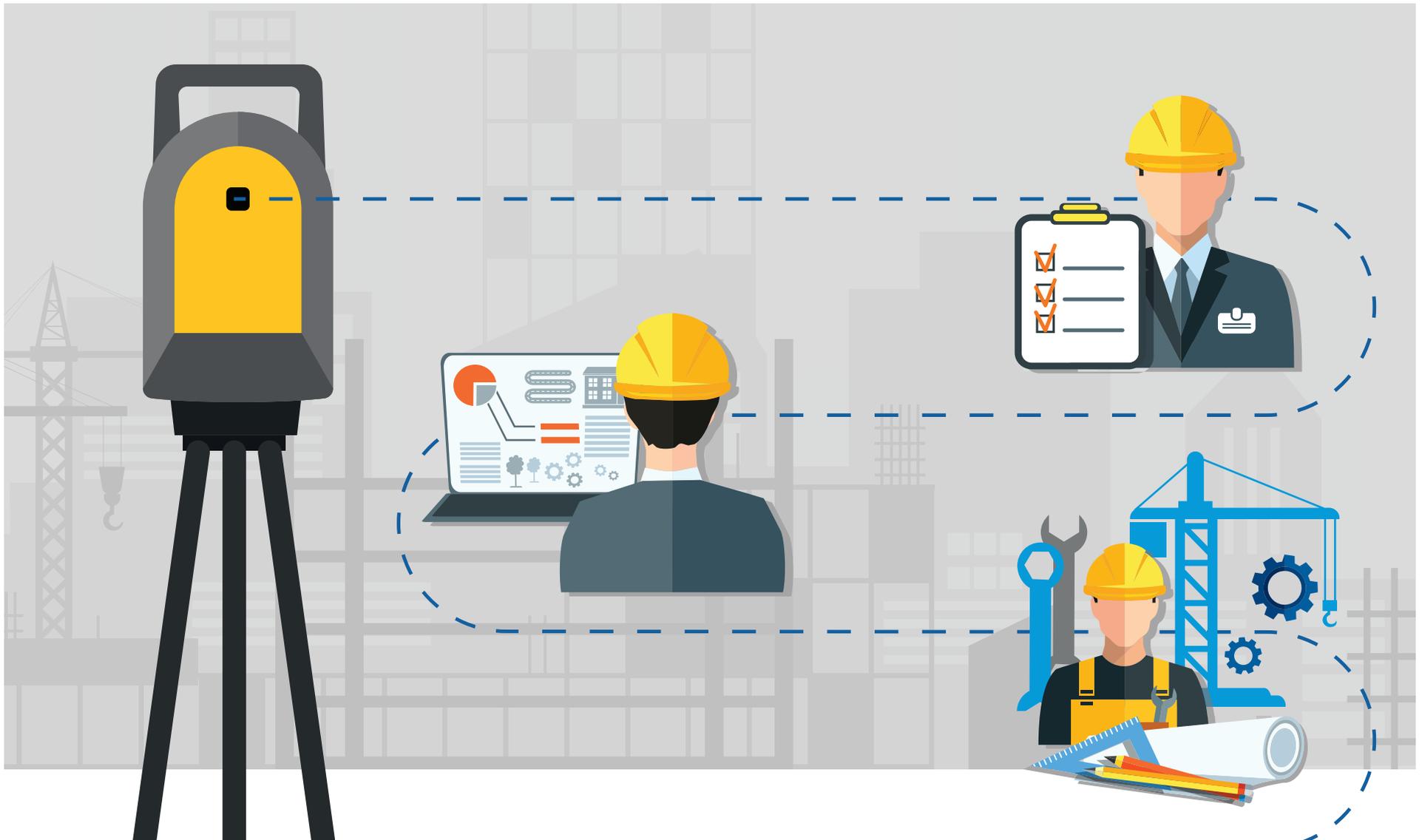
⁵ Woetzel, Jonathan; Sridhar, Mukund; Mischke, Jan. "The Construction Industry Has a Productivity Problem—and Here's How to Solve It." MarketWatch. March 6, 2017.



Solution: Find a solution that works as hard as you do

Laser scanning should streamline your workflows and empower you to complete work on time and on budget, not require you to budget more time than is needed or create additional delays. A self-calibrating and self-leveling 3D scanner with minimal maintenance requirements helps you do both. You get to experience all of the benefits that 3D laser scanning provides, while minimizing downtime and lowering your total cost of ownership.

When you have a 3D scanning solution that's purpose-built for your needs and can be quickly deployed in the field, by anyone at anytime, you can keep construction projects moving at the required pace. Your teams are able to fully unleash the possibilities of 3D scanning to get the information they need when they need it, creating efficiency and productivity gains across all of your projects.



Save Time & Money with 3D Laser Scanning

A 3D laser scanner is a powerful tool that has the potential to dramatically improve construction efficiency and productivity. But when you have to rely on outsourced services, specialized technicians, or overly complex tools, you're not able to take full advantage of the power that 3D scanning holds.

You can now make 3D scanning accessible to a range of AEC professionals. When you put this potent tool in the hands of those who need it most, you're able to shave unnecessary steps from your workflows and begin to shift the over-budget, over-schedule stereotypes that persist in the construction industry.

The latest innovations in 3D laser scanning enable you to:

- Extend scanning capabilities to more members of your team
- Produce accurate as-built drawings
- Save time early on and throughout the construction process by gathering all the data you need, when you need it
- Avoid costly rework and change orders
- Document and demonstrate a project's progress and archive the work performed to review at a later time
- Increase productivity through minimal maintenance and no downtime

A mid-range, self-calibrating 3D laser scanner with in-field registration that your whole team can use allows you to streamline construction workflows, ultimately saving you both time and money. By opening up the tool to a wider user base, increasing the accuracy and completeness of your scan data, and improving scanning efficiency and productivity, you can finally unleash the power of 3D laser scanning.

To learn how to integrate 3D scanning into your BIM workflow for increased efficiency, get the [Scan to BIM Best Practices eBook](#).

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