

How to Choose a 3D Laser Scanner for Your Specific Construction Needs

Your guide to making a smart 3D laser scanning investment that ultimately saves you time and money



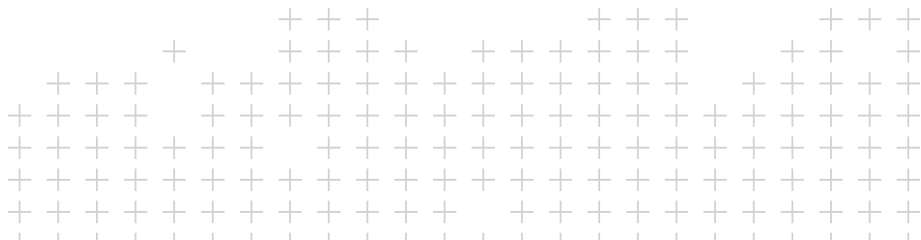
Introduction

As an AEC professional, you know the importance of having access to complete and accurate project information. Whether you're working on a new build or a renovation, your ability to understand site conditions and existing as-built structures are key to your success.

Without access to reliable information, your project teams can't work as productively or communicate as effectively. Inaccurate data and poor communication put you at risk of [costly rework](#), schedule and budget overruns, and damage to your professional reputation.

If you're a specialty contractor responsible for structural elements or MEP systems, your ability to recognize and resolve potential issues before construction begins is even more critical. If you can't verify the accuracy of models or document your work in relation to the existing site and other systems, you can't use prefabrication to your best advantage and could be at greater risk of change orders, RFIs, and costly rework.

The lack of complete or correct project data is responsible for 26% of rework in construction.¹



The use of [3D laser scanning](#) can help you address many of the challenges you face. But if you have to outsource scanning or wait for an in-house expert to be available, you're not able to take full advantage of the immediate power and possibilities of 3D laser scanning.

A versatile, mid-range 3D laser scanning solution puts the power of scanning in the hands of those who need the information the most, making scanning accessible to a range of AEC pros and specialty contractors with no special training required. Equipped with [your own 3D scanner](#), you can:

- Get accurate site condition and as-built data
- Avoid costly rework and change orders
- Better communicate among teams and coordinate work
- Document and demonstrate a project's progress and archive the work performed
- Increase efficiency and productivity

Your team can get the information they need when they need it, without having to rely on experts. With access to accurate and thorough site data, they can identify and resolve issues earlier and make faster decisions.

Not all scanning solutions have the capabilities to solve your specific construction challenges, though. Read this guide to learn:

- How a 3D scanning solution benefits your project teams
- What to look for in a 3D scanning solution
- How to make the best decision for your needs





How a 3D Laser Scanner Helps Structural Pros Solve Costly Problems

If the structure of a construction project isn't sound, every other part of the build is at risk. 3D laser scanning helps you address the critical challenges structural pros face. When you can own and operate your own scanning solution, you can verify:

- All necessary measurements for steel and concrete work
- Correct placement of anchor bolts, steel embeds, foundation steps, and other elements
- Levelness of concrete slabs and floor flatness
- Deformation of concrete and steel beams and columns
- Post-tension cable and precast concrete setup
- Prefabrication skid for quality assurance
- Correct construction of prefabricated elements
- The right amount of materials to avoid waste

You can also track and document your work as you go, comparing it to the model to avoid costly errors or omissions that can lead to rework. To learn more about how scanning can help concrete and steel contractors solve their most costly problems, download the eBook.

Why You Need a 3D Laser Scanning Solution Specifically for Your Needs

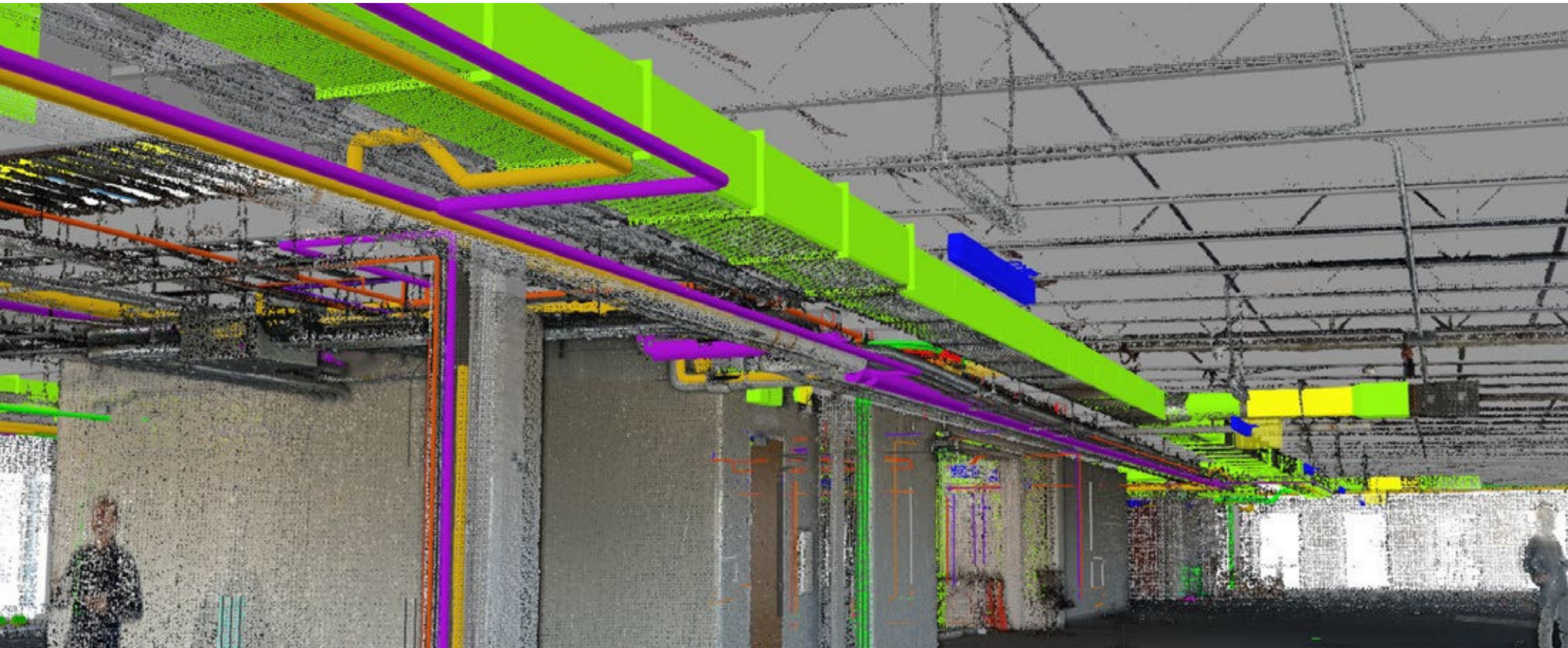
3D laser scanning has been used in construction for awhile, but many traditional scanning solutions weren't designed for construction or the specific challenges your teams face every day. Instead, traditional scanning solutions were developed for long-range or geospatial capabilities, making them too robust for many of your most common applications. This also makes them complicated to use, which means you either have to outsource scanning to service providers or employ a specialized technician on your team.

If a service provider or technician needs to scan for you, it can be difficult to schedule their time, or to ensure that they're getting all the data your teams need the first time. If a rescan is required, it can cause delays in the schedule.

In fact, sometimes teams will budget extra time for remeasuring because they just assume they'll need it.

Traditional scanners also require regular recalibration and maintenance, which could lead to significant downtime. Routine maintenance needs could leave you without a scanner for up to six weeks, or 12% of your work year.²

A versatile, mid-range 3D laser scanner allows a range of professionals to gather the specific data they need, when they need it. With this type of scanning solution, you can:



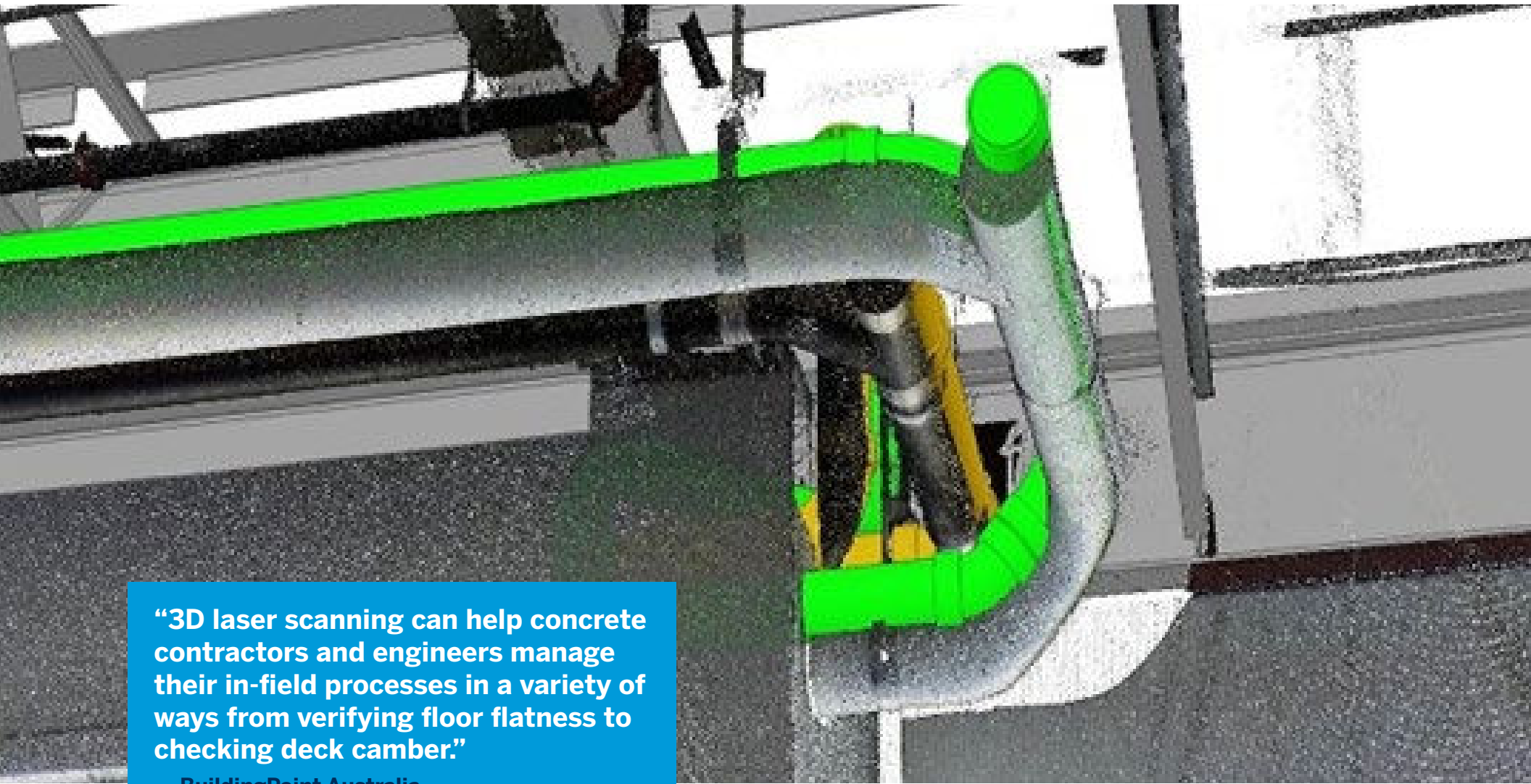
Open up scanning to a range of users and workflows

The tool is simple and intuitive enough to learn and use, with only minimal training required. This allows a range of AEC pros and specialty contractors to take advantage of 3D scanning and incorporate it into their workflows. Because the learning curve isn't a burden, you can also cross-train more of your current workforce to do scanning, helping you get the most out of your workers and improve productivity.

“The ability to scan and register on the fly has been brilliant. So easy to use with little to no training.”

— Brian Hammonds, Registered Surveyor, Fyfe Pty Ltd.





“3D laser scanning can help concrete contractors and engineers manage their in-field processes in a variety of ways from verifying floor flatness to checking deck camber.”

— BuildingPoint Australia

Gain visibility into existing site conditions and as-builts

Scan, model, and layout data can be viewed together and compared with actual site conditions in real time. Scan data can be incorporated with other BIM software to enable quick, on-the-spot decision making and problem solving. When you have access to thorough, reliable, accurate data about site conditions, you reduce the chance of costly rework.

Connect the field to the office

After you scan, you can leave the jobsite with a registered composite point cloud so you know you've captured all of the data you need, eliminating any reason to rescan and cause disruptions to the schedule. Features like in-field referencing tie your collected scan data to real-world coordinates in the field, providing greater visibility to off-site teams.

“This scanner has finally put to rest the painstaking processes of indexing, processing, registering, and comparing the point cloud to the model in the office by bringing it to the field.”

— Ryan Pastor, Construction Technologist, BuildingPoint Southeast



Enable greater collaboration

It's easier for teams and stakeholders to collaborate and coordinate efforts when everyone can access and view the same site conditions and as-built information. Scanning lets your teams surface potential concerns upfront before they turn into problems later, and work together to address them.

“We could start 3D modeling immediately based on the data we had just collected, because everything was registered automatically.”

— Marius Putrimas, Product Manager, UNDET

Reduce downtime and maintenance concerns

Auto-calibration not only ensures greater data accuracy, it also eliminates downtime and reduces the need for lengthy maintenance. When you can use the scanner more often for more projects, you end up lowering the total cost of ownership while boosting your productivity as well.

“[The scanner] increases our productivity and enables us to better serve our clients with more robust data sets collected and registered in a fraction of the time.”

— Brandy Tabor, President, Landesign Services, Inc.





How MEP Contractors Can Improve Accuracy and Competitive Advantage with 3D Laser Scanning

MEP systems have to work together and be installed correctly to make the building functional and habitable. 3D laser scanning helps address the unique challenges MEP pros face. With your own scanning solution, you can:

- Plan MEP systems with more precision and confidence
- Increase the use of prefabricated components
- Identify and resolve system clashes and conflicts before they derail the project
- Capture as-built conditions before work begins
- Record your progress to provide insurance in the event of RFIs or change orders
- Model the final as-built for project owners once the project is complete to use for building maintenance or future renovation
- Improve collaboration among various MEP teams, especially those whose systems integrate with or are dependent on each other

About 90% of construction pros improve productivity, quality, and schedule certainty when using prefabricated and modular methods compared to traditional stick-built construction.”³

To learn more about how 3D laser scanning can help MEP contractors be more accurate and competitive, download the eBook.

What to Look for in a Scanning Solution

Before you invest in a scanning solution, it's important to define your business objectives. For example, companies who adopt a versatile, mid-range scanning solution are able to:

- Speed up and simplify the scanning process by putting scanning capabilities directly in the hands of those who need it most, with only minimal training needed
- Use scanning for many different workflows, before and during the build, to capture accurate data and be able to compare it in real time to plans and models throughout the project
- Avoid the cost of outsourcing to service providers or special technicians
- Increase productivity by reducing tool maintenance and downtime

Your objectives may vary, but you'll want to clarify them so you're clear about what success looks like and can demonstrate a return on your investment.



Checklist: Scanning Features to Prioritize

Once you know what your objectives are, you can outline your requirements for a scanning solution. Use this requirements checklist as a guide:

Does the scanner perform phase-based or time-of-flight measurement?

Why it's important: The speed at which the laser pulses depends on whether the scanner uses phase-based or time-of-flight measurement. Phase-based scanners pulse faster and are appropriate for close-range, high-definition scanning (think millimeter accuracy), while time-of-flight scanners are typically ideal for longer-range measurements, from a meter to a kilometer. Scanners are not a one-size-fits-all solution, so choosing the right measurement method for your applications is the first step.

Is it intuitive enough for anyone to use?

Why it's important: With an intuitive scanner, your teams can quickly get trained on it and start confidently using it in the field, which saves you from having to outsource scanning to service providers or special technicians and incur the extra cost or delays that can sometimes come with those requirements.

Does it auto-calibrate?

Why it's important: A scanning solution with auto-calibration not only ensures greater accuracy during scanning, it also eliminates the need for annual calibration service and downtime, effectively reducing your maintenance costs and total cost of ownership.

Does it offer in-field registration capabilities?

Why it's important: In-field registration allows you to gather measurements of all the points on a site and build a composite point cloud you can take back to the office to incorporate into CAD software, reducing the risk of missing data and having to return to the field to rescan.

Does it offer in-field referencing and model verification?

Why it's important: In-field referencing and model verification software allows you to process, view, compare, and validate scan data and models right in the field so you can uncover potential design or layout issues, solve problems, and make faster decisions on the spot.

Does it support in-field workflows?

Why it's important: A scanner that supports in-field workflows enables you to perform tasks, such as in-field registration of point cloud data, using a tablet controller without having to return to the office. You can make more efficient use of your time during scanning because the data is registered when you leave the jobsite.

Can it effectively scan all kinds of surfaces?

Why it's important: Traditional laser scanners aren't always effective at scanning black, reflective, or shiny surfaces, so a scanning solution that can capture measurement data on these and all surfaces using high dynamic range (HDR) electronic distance measurement (EDM) ensures you're getting complete and accurate scan data.

Does it provide automatic level detection?

Why it's important: A scanning solution that uses automatic level detection can determine where the level plane is in the scan by taking measurements before you scan. This ensures the accuracy of the overall registration. Automatic level detection also allows you to be more efficient in the field since you can simply set up the scanner and start scanning, instead of leveling the instrument yourself.

Does it offer an integrated laser pointer?

Why it's important: An integrated laser pointer lets you register scans to the project coordinate system and provide basic field layout of points in the model. When your scans are on the project coordinate system in the field, the data shared after scanning will align with the 3D models being used by the design and construction teams without the need for additional processing in the office.

How to Evaluate Scanning Solutions

With your scanner requirements in hand, follow this five-step process to find the right vendor:

Step 1: Identify vendors to consider

Research vendors that offer mid-range, self-calibrating 3D laser scanners for construction applications. Ask for satisfied customer reviews or case studies that match your business needs. You can also search reputable scanning product review sites. When assessing vendors, make sure to get answers to the following:

- How long has the vendor been in business?
- Is the vendor a recognized leader within the industry, with enough demonstrated expertise to understand your business needs?
- Does the vendor engage in continual R&D to improve and enhance products and meet evolving industry and customer demands?
- Does the vendor have distribution partners that are located close to you who can offer training, knowledge, and support?

Step 2: Create a short list of vendors to evaluate

With a list of up to five vendors, you'll have enough options to consider without having to manage too many responses and getting overwhelmed. Share the requirements checklist with each vendor and ask them to prepare a proposal as well as share any other relevant materials with you that substantiates their features and benefits. Give them a clear deadline to keep the process moving.

Step 3: Rate each vendor

Come up with a rating system, such as a simple point-based one, to help you understand how well each vendor can meet your requirements. For example:

- 0** = does not meet requirement
- 1** = limited support for requirement
- 2** = somewhat supports requirement
- 3** = meets or exceeds requirement

For each vendor, list each of your requirements and assign a number to it, then add up the scores.

Step 4: Try out the solution

Ask to demo the 3D scanner to experience the features and benefits in person. Thoroughly test the tool to make sure you have a clear understanding of its pros and cons. Ask lots of questions and voice any concerns.

Step 5: Finalize your decision

With your final decision made, work with your chosen vendor to finalize the details and sign a contract. Take care to involve other teams who will be impacted by the decision, and make sure to identify metrics that will help you define and measure success.



Take the Next Step Toward Greater Accuracy, Productivity, and Profitability

To realize the full benefits of 3D laser scanning for construction, you need to make scanning available and accessible to a wide variety of project teams to enable accurate data collection, faster decision making, and better collaboration. You can achieve this with a versatile, mid-range 3D laser scanning solution.

When you rely on a powerful scanning tool that's intuitive and easy to implement, you can:

- **Improve efficiency** across many construction workflows
- **Increase productivity** by putting scanning capabilities directly into the hands of those who need it most
- **Reduce rework** by capturing thorough, accurate data about current site conditions and as-builts
- **Improve communication** between the field, office, and project stakeholders
- **Save time and money** by doing scanning yourself instead of relying on specialized technicians or outsourced providers
- **Realize a quick return on investment**

You can use the information you've learned here to confidently move forward with choosing and purchasing your own scanning solution.

Ready to experience what a 3D laser scanner can do for you?

[REQUEST A DEMO NOW](#)



Footnotes

1. Construction Disconnected. FMI/PlanGrid. Aug. 2018.
2. 3D Scanning Made Simple. Trimble. Jan. 23, 2020.
3. Prefabrication and Modular Construction 2020. Dodge Data & Analytics.