



Benefits of using Avvir to Track and Monitor your Data Center Project

Avvir, Your reality analysis platform.

Harness the power of reality capture data by automating progress & earned value tracking, quality control, & as-built creation to build a true system of record.



A new level of analysis for the built world.

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How construction quality drives data center performance.



The commercial viability for investment in data center projects is based on the reliability of the completed project. Customers demand that data centers meet strict guidelines for tier certification (TCCF I-IV) to match a particular business function and defined criteria for maintenance, power, cooling and fault capabilities.

Monitoring construction progress, and in particular deviation against as-designed specifications, is critical in proactively ensuring completed data center projects will meet certification standards.

Data center facilities vary in size depending on the planned usage. They may range up to a million square feet or more and occupy vast campuses

covering many acres. With the complexities in design, infrastructure, and systems, it is critical for owner operators to have visibility on construction progress through each phase of the project.

Monitoring each phase in construction involves tracking progress against schedule, identifying construction deviations to prevent costly re-work, and tracking project costs to manage cash flow.

Avvir offers project owners, and their general contractor partners, a platform for managing large, complex data center projects. In addition to monitoring progress through the construction phase, the Avvir software also helps GC's to develop critical documentation for handover requirements that support project operation and ongoing maintenance and renovations.

Even sophisticated owners with multiple data center projects under their belt understand that managing construction quality is not easy. Each project brings it own unique complexities. However, the mega corporations commissioning the largest data centers understand the value of real-time progress tracking and frequently mandate standards for project management to ensure accuracy throughout construction.

Platforms like Avvir have become a powerful tool to ensure that the quality of construction supports the commercial performance of completed projects.

A recent study of over 500 peer-reviewed projects in 65 countries cited problems in construction as a primary driver in poor data center performance.



Identifying problems in data center construction.

Failing to address issues that arise during construction means that they may impact facility operations and performance. The Avvir platform helps project owners and general contractors mitigate deviations from design in as-built construction by comparing LIDAR scans of as-built construction against as-designed BIM data.

A recent study of over 500 peer-reviewed projects in 65 countries cited problems in construction as a primary driver in poor data center performance:

- Poor integration of complex systems
- Lack of thorough commissioning or compressed commissioning schedules
- Design changes
- Substitution of materials or products



Tracking and monitoring data center project construction.

Specifically, Avvir provides value for the integration of complex systems. This is done through the use of deviation analysis and progress tracking to ensure all of the components within scope of the design are completed. Secondly, Avvir helps track design changes by assisting teams with ensuring as-builts are accurate. This can give owner's added piece of mind in knowing that a new facility will meet expectations for reliance and third-party certification.



Deviation Analysis

Use Avvir to compare LIDAR reality scans of as-built construction against as-designed BIM and measure deviation within an eighth of an inch.



Progress Tracking

Track the progress of each trade from structural to MEP and verify the completion of work to manage scheduling and release payment on invoices.



As-Built Accuracy

As-built accuracy helps ensure that the many complex systems involved in data center operation are built with the accuracy necessary for meeting tier certification criteria.



Design Changes

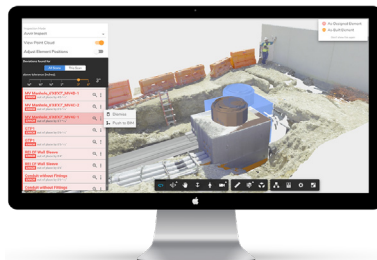
Changes in design such as incorrectly reducing the number of automatic transfer switches can compromise the fault tolerance criteria and impact data center certification.

Using Avvir Inspect to prevent costly rework.

A platform for inspecting as-built construction.

Avvir gives you a platform for inspecting as-built construction. In data center construction this is important because tolerances are extremely low. Corridor spaces or utility closets that house equipment like generators or fuel pumping systems require precise construction.

Where other types of construction might tolerate slight changes in the field, in data center construction, any deviations above 1" are considered critical.



Location of fuel supply lines and backup generators.

Backup generators are a vital component in data centers and ensure an on-demand backup power source. When they fail, the results can be costly. Diesel fuel, held in large underground tanks is the most common fuel supply for these generators. Deviations in the elevation of tanks, fuel lines, and pumps can impact system performance. LIDAR scans used in conjunction with BIM models on the Avvir platform give Project Managers real-time insight on deviations down to the eighth of an inch.



Placement of rooftop control units (RTUs) to control HVAC distribution.

Rooftop units require a specific control sequence to coordinate supply air fans with outside air dampers. When configured improperly they may react at different speeds creating over/under pressure conditions in the data hall.



Preventing rework during data center construction.

Configuration of automatic transfer switches (ATS) to ensure redundant power and isolate critical infrastructure.

Preventative maintenance is critical to maintaining data center facilities at operational standards. Automatic transfer switches that control the flow of electricity are fundamental to maintaining fault tolerance standards required by tiered certification. One common construction deviation that plagues data centers is the reduction of ATS. Avvir helps Owners Reps and Project Owners catch these mistakes and prevent the costly rework necessary to achieve certification.



Installation and configuration of fire suppression systems.

Fire Suppression Systems play a leading role in the operation and safety of data centers. With mountains of electronic equipment producing heat, fire hazards are high. If fire suppression systems are installed improperly, you can lose critical coverage. Through Avvir, you can ensure that your designs are being translated properly to the field.



Monitoring the installation of underground utilities.

Data center foundations are built with extensive underground utilities. The accurate placement of conduit within concrete is critical for the many different electrical and plumbing systems to work correctly and for completed facilities to meet owners' performance standards. Traditionally this has been difficult to manage. However, with recent advancements in LIDAR scanning technology on the job-site it is now possible to measure construction deviations underground before those elements are covered by dirt or concrete. This helps Project Managers, and their scheduling teams alert electrical and mechanical contractors to the impact on schedule and design changes before it is too late.



Using Avvir to manage data center projects.

Critical path monitoring to address tight deadlines.

Data center facilities rarely achieve the operational and capacity limits in the first year of operation. Often, the need for incremental space, changes in operational, safety, and security protocols align to impose constant facilities changes. The overarching rule in data center facilities is to design for flexibility and scalability.

Expanding existing data centers often means tight construction deadlines with little contingency built into the project schedule. Critical path monitoring helps project managers identify subcontractor delays and adjust resources based on productivity analysis.

Handover Requirements

The Avvir platform is finding increasing value in helping data center contractors with handover requirements. In particular, Record Drawings are facilitated with Avvir's Push to BIM feature which updates the federated BIM model with as-built data gained from LIDAR scans.

This helps with items like underground utilities where, historically it has been difficult to handover accurate as-builts for services that run within concrete foundations. In our eBook, *Using BIM as a Database Throughout the Project Lifecycle*, we highlight how the project database can support operations and maintenance. This is important when 27% of human error-related outages are attributed to inadequate maintenance or equipment adjustment*.

Conclusion

The mega corporations commissioning the largest data centers understand the value of measuring construction deviation and frequently mandate standards for project management to ensure accuracy throughout construction. This ensures that completed data centers meet the strict maintenance, power, cooling and fault capability standards for tier certification (TCCF I-IV).

Avvir ties together multiple sources of information from as-designed BIM models and LIDAR scans of as-built construction to track trade contractor progress, construction deviations, and deliver a new level of analysis for data center projects.

*Uptime Institute - Annual Outage Analysis, 2021

27% of human error-related outages are attributed to inadequate maintenance.





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