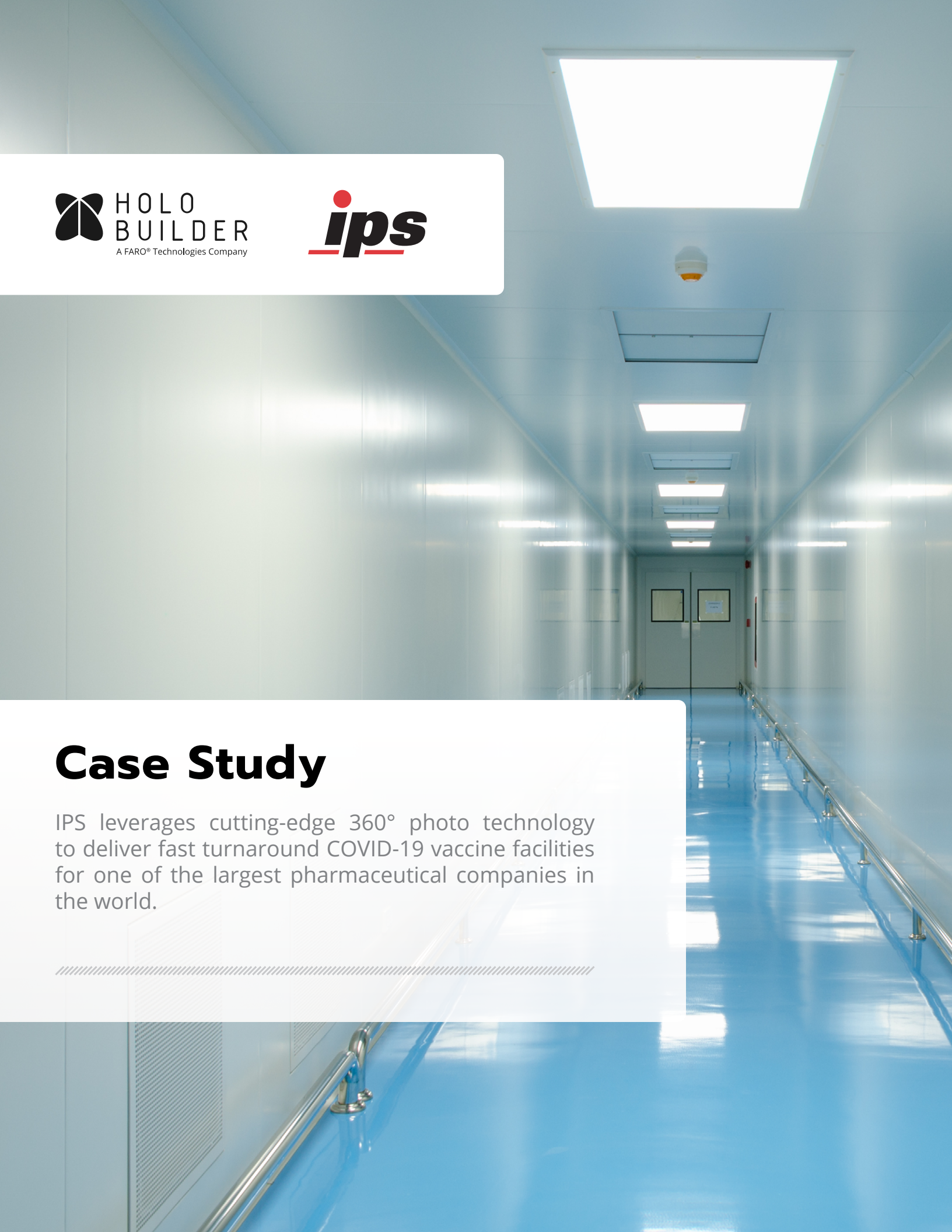

HOLO BUILDER
A FARO® Technologies Company

ips

Case Study

IPS leverages cutting-edge 360° photo technology to deliver fast turnaround COVID-19 vaccine facilities for one of the largest pharmaceutical companies in the world.

Case Study

Overview

What's it like building something while the world watches and waits?

The pharmaceutical companies producing COVID-19 vaccines know. And so do the companies like IPS, who are helping them accomplish the seemingly impossible in such a short timeframe with a novel virus and treatment method.

IPS-Integrated Project Services, LLC is a global consulting, architecture, engineering, project controls, construction management, and CQV firm for the life sciences industry. They are experts in technically complex research and development and manufacturing facilities and are actively working on multiple COVID-related projects. Included in their COVID-19 portfolio is a series of renovations and expansions to existing facilities of one of the largest pharmaceutical companies in the world to support the production of the Johnson & Johnson virus-based vaccine. There were nine phases to this project, including large-scale renovations to three buildings and several lab renovations that span six buildings. The project was highly complex and very fluid, with continual discussions about additional scope.

Because of the urgency of the work, IPS fast-tracked what would have been four months of design and construction into just two weeks which required these phases to happen concurrently. The team faced severe limitations when it came to accessing the spaces. Not only were there active COVID-19 restrictions, but the facility also remained in operation during the renovation.

To accomplish this, IPS leveraged a large EPCMV team of highly specialized people. They also selected the right tools and technology to provide them solutions to their access limitations, including 360° photos and HoloBuilder. IPS started using HoloBuilder to capture 360° photos from the start of the project. Most locations were captured twice per day, every day, some days even three times per day as the team was running three shifts (24/7), with the photos directly uploaded to the project design files and made quickly available to the design and construction teams to collaborate and coordinate. The fast and easy capture workflow of HoloBuilder's JobWalk App made the frequent capture possible.

Replacing Site Visits With Photos

Visibility into the space was critical for both the design and construction teams. However, the traditional approach of frequently visiting the site was not an option due to health and safety restrictions during the pandemic. Capturing 360° photos to increase the team's daily visibility was the perfect solution for the situation. Additionally, surveying a room in operation was complicated and had to be scheduled and planned in advance. Highly controlled areas like clean rooms and GMP manufacturing spaces also required employees to be trained on proper gowning procedures before entering. Using HoloBuilder helped to elevate some of this coordination.

"One day, we may have access into a space, and then the next day, we might not. So, it's important for us to get in and take those survey photos and get an idea of the space while we do have access to it," shared Kersti Cover, IPS Project Engineer. For Amy Shutt, IPS Mechanical Manager, the new workflow with HoloBuilder meant they only required one person to be trained in the gowning procedures rather than everyone who would have traditionally required access to the space.

Simplified and Instant Access to Site Photos

In contrast to progress photos from previous jobs, Mackenzie Nolte, IPS Project Engineer, appreciated that HoloBuilder gave structure, organization, and context to the photos they collected. Rather than a folder with 100 photos with no context as to where they were taken, the 360° photos are time-stamped, added to the exact location on the site plan, and were even tagged if necessary. Their new process eliminates the problem of reviewing and trying to recall photo details down the road accurately. Being able to rely on those 360° photos was often the difference between needing to visit the site and not for clarity.

"It's so efficient," said Shutt. "We don't have to scroll through picture after picture after picture looking for something. We just click on the plan for the room, and you can see everything that you want to talk about." Easy, instant access to those photos was a huge time saver for the design team.

Veera Ronalter, IPS Architecture Lead, shared that without HoloBuilder, she may have had to rely on archived folders for 2D photos from historical projects on the site. Or, they would have sent someone to the site and "crossed their fingers" that they captured everything that they might need.

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>
> **Amy Shutt, IPS Mechanical Manager**

One Photo Serves Everyone

Historically, projects accumulated folders and folders of photos because each discipline took its own based on their priorities. With HoloBuilder, IPS could have one on-site person as the eyes for the entire team. They captured each space at 360° so a single series of photos served everyone's purpose regardless of discipline. They used the 2D Photo function in HoloBuilder to zoom in on the details of a specific piece of equipment or element when necessary.

However, when something was hidden or difficult to see, Shutt utilized the existing 360° photos to show the construction team the different areas that she required detailed photos of so they could capture it on the next site visit.

Staying up to Speed on Construction Progress

The combination of a fast-tracked schedule, construction in multiple shifts, and limited access to the site could have been a nightmare for Nolte and Cover as they needed to be on top of construction progress. However, capturing spaces at least twice a day and having access to those 360° photos saved the day.

"Our projects are often spread across various floors, buildings, and areas. The benefit of the program is that it allows us to visit them all in one sitting without having to access the spaces physically. That's why it's really good that we can see the photos on the drawings with HoloBuilder," shared Cover. "I could compare the beginning of the day photos and the end of the day photos to see the progress. It lets me see all the processes they were going through day-to-day," she added.

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Simplified Communications

For both the design and construction teams, accessing current site photos in HoloBuilder allowed for quick decision-making and problem-solving. It was a critical factor in meeting the tight timeline and eliminated the need for additional site visits, follow-up meetings, or long email communications. Prior to HoloBuilder, they would have held a site meeting followed by a lot of back and forth to confirm details and a second logistics meeting to work out things like bringing equipment to the site. With HoloBuilder, she presented the site conditions virtually and could address all the questions regarding the site, the design, and the logistics inside a 30-minute meeting.

Ronalter and the architecture team also used HoloBuilder during client meetings. She'd share the design alongside the photos to easily show the client potential locations for different elements within the context of the room. They used tools like Bluebeam to draw a line on the 360° photos where a new wall would be so the client could visualize it better. Contractors also used the 360° photos to get familiar with the site conditions prior to the start of their work. The photos were referenced for logistics and confirmed if a piece of equipment would fit through a specific location, for example.

Design Verification

Verifying actual conditions for the design was fundamental to meet the project schedule. In the absence of reliable as-built drawings, the design team relied on the 360° photos to verify actual conditions. "Throughout the project, we've been able to see things that are actually in the space that aren't documented anywhere," explained Shutt. "We are able to react to it during the design phase as opposed to reacting to it during construction." "Even if the drawing is close, we can't trust it," said Ronalter. "Knowing our construction schedules, it's imperative that we can design it instead of reacting to it."

A specific example revolved around a forklift battery charger in a temperature-controlled warehouse split off from a larger warehouse space. The design team was unsure of the charger's exact location.They considered purchasing a charger for the new space rather than moving the existing one. With photos from HoloBuilder, the team determined the exact location and that it did not need to be moved.

The mechanical team also relied on the HoloBuilder measurement tools for their designs. Pharmaceutical space design requires volume-based calculations and leakage estimates so measuring ceiling height on the 360° photos was critical for the proper design. Without the photos, Shutt's team would have had to estimate or travel to the site for additional measurements. Understanding how even small design changes will affect the accessibility and usefulness of a space can only be achieved when you have complete visibility into existing conditions. HoloBuilder gave that to the design team.

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>
> **Veera Ronalter, IPS Architecture Lead**

Making Concurrent Design and Construction Possible

"Because of the speed and the importance of the project, we were designing and building at the same time, as much as possible," shared Shutt. Construction on the project had to begin before the design was fully defined. It became increasingly complex as scope and requirements changed, resulting in a continually evolving design and process.

HoloBuilder became an essential tool as the design team modified requirements. Because photos were being captured every day, Shutt, Ronalter, and their teams could reference current photos and provide instructions to the construction team. Sometimes this meant putting a halt to something pending a modified design, and other times they'd reference the photos to provide clarification and assistance to the field.

For example, the design team used 360° photos to coordinate pipe routing and connections with a contractor. A better understanding of the site conditions the contractor faced resulted in a modified design and easier installation.

The team also used HoloBuilder to manage installation modifications to two pieces of process equipment that didn't match the specifications when they arrived. The equipment was installed, and the design team used the photos to modify the connections to accommodate the actual equipment specifications.

Project Success and ROI

Not only was HoloBuilder an important tool to achieve the project timeline, but it also proved to be a positive investment for IPS. The construction and design teams were both able to eliminate site visits without making compromises. In fact, fewer site visits contributed to their productivity. "In my mind, HoloBuilder is double productive because not only are we not spending the hour for the commute, but you can now use that hour to do work," shared Shutt.

Without the technology, Nolte would typically have an engineer go to the site to check on specific details, possibly requiring a whole day in travel and time on site. "If a site visit required multiple engineers, that's a few $1,000 right there," explained Nolte. "Say they needed to visit the site ten times – you could be saving upwards of hundreds of thousands of dollars just in time."

While Nolte and Cover still spent time on site, they were more efficient with their time and it saved about an hour per day during the project. Virtual site visits replaced some of their on-site time plus allowed them to work within COVID-19 restrictions. "Sometimes, we don't have an extra hour in our day to go walk the site." Nolte shared. "If we can just hop on HoloBuilder real quick and find what we're looking for, that's obviously a lot faster."

The design team included approximately 15 people across multiple disciplines. They could designate a single person to go on the site rather than what likely would have been as many as seven making trips back and forth. Shutt estimates that they would have required at least 13 site visits for this project had they not had access to HoloBuilder. In fact, her mechanical team did not go to the site once for the project. They replaced all their visits with the 360° photos.

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> **Mackenzie Nolte, IPS Project Engineer**

Designing and renovating a space to produce a vaccine the world is waiting for is undoubtedly a high-pressure job. Compromises can't be made, and it is imperative that schedules are met. Access to current site conditions at the facility was necessary and 360° photos were the only way that was possible given the restrictions. Using HoloBuilder technology, the IPS team was more efficient with their time, had access to the details they required for their design, and wasn't held back by site restrictions.

So, what's it like building something while the world watches and waits? The IPS team will probably tell you it was high-stress work, but they were up for the challenge.