

PARALLEL TECHNOLOGIES PARTNERS TO DELIVER FAST-TRACK, COMPREHENSIVE SECURITY SOLUTION



A U.S. CAD White Paper
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When a premier client needed help designing a security solution for a large, fast-track hyperscale data center, Parallel Technologies needed a partner to help it scale up with ease. The new two-story 100 MW capacity facility includes over one million square feet of data center colocation space.

John Ray, Design and Estimation at Parallel Technologies, knew his team would need some help to meet the tight project timeline. “This facility is about six times the area of the previous projects that we’ve done for this client. It’s also more complex requir-

ing a multi-phase construction approach all in an abbreviated timeline of 10 months.”

Along with large scope and scale, the security systems had to be fully designed in Autodesk Revit to facilitate clash detection.

“While we have Revit experience, the scope and timeline of this project was such that we knew we needed to bring on seasoned talent to help us,” says Ray.

After evaluating top BIM services companies, Parallel Technologies selected U.S. CAD.

Ray notes, “We had little margin for error or delay. We needed a partner with the ability to scale quickly and easily. From the first meeting, the highly trained U.S. CAD BIM production staff demonstrated a depth of experience and knowledge as well as the availability to help us meet this deadline.”

2D-TO-3D EASE

The first step was for the U.S. CAD team to translate Parallel Technologies’ 2D designs from both AutoCAD and PDF into a 3D Revit model. These designs incorporate comprehensive combination of access control, surveillance, and redundant low voltage communications system.

One of the earliest challenges in the design and development of Parallel Technologies’ 3D model was the limited library of security solutions.

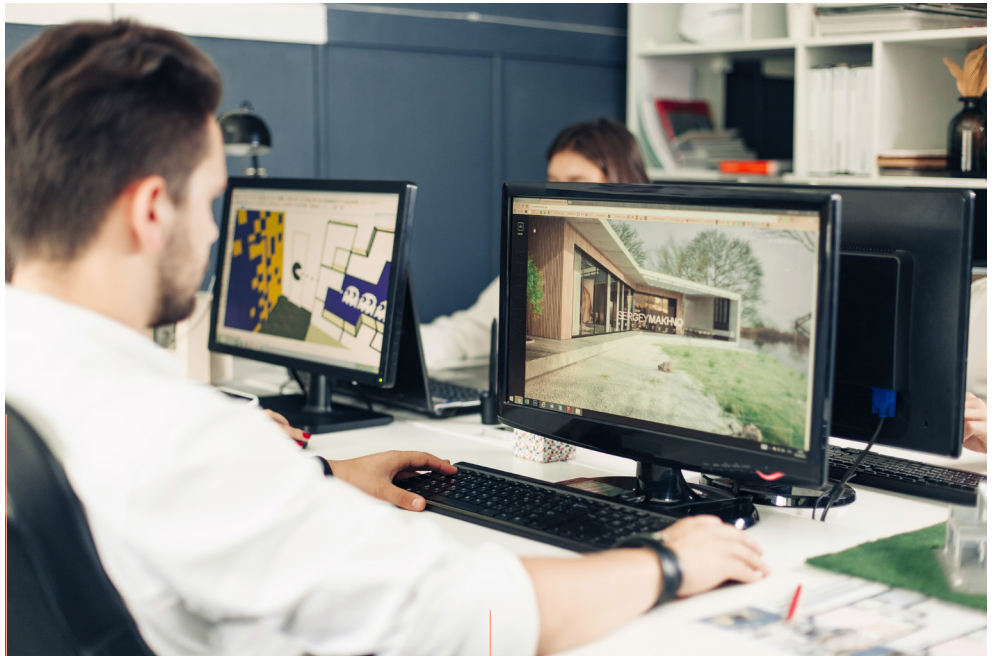
BEHIND THE BIM CURTAIN

From building design to civil infrastructure, U.S. CAD serves a wide range of clients, including numerous companies ranked on Engineering News-Record's top lists of contractors and design firms. Recognized as a trusted partner and advisor in the AEC industry, U.S. CAD has been involved in over 2,000 successful BIM projects.

With BIM advancing at a more rapid pace, our goal is to help design and build professionals utilize it to complete projects on time, on scope, and on budget. To achieve this for customers, U.S. CAD relies on best-of-breed technology, software and innovative consulting and training. As one of the largest Autodesk Authorized Platinum Partners in North America and a Bluebeam Platinum Partner, plus its relationships with various leading AEC technology manufacturers, the company is well poised to help clients improve their BIM project outcomes from conception through construction.

Areas of expertise include BIM processes and standards throughout the lifespan of the projects including: BIM implementation and training, BIM content creation, BIM modeling in multiple solutions such as Autodesk and Bluebeam solutions, BIM coordination, fabrication and shop drawings, LOD 300/350/400 fabrication level modeling, constructability reviews, laser scanning, 4D scheduling, 5D estimating, 3D spatial coordination, virtual mock-ups digital lift drawings, record model close-out, 2D/3D site planning, 2D survey layout, project staff augmentation, project scheduling, software training, lean construction planning, and project management.

U.S. CAD has two decades of experience in the field of design and build technology and complementary consulting and training services. The company is supported by a large and talented team of BIM and construction experts located in multiple offices across various time zones – Irvine, Calif., Los Angeles, Calif., Las Vegas, Nev., San Diego, Calif., Denver, Colo., Honolulu, Hawaii, Gilbert, Ariz., Salt Lake City, Utah, Minneapolis, Minn., and Kansas City, Mo., as well as through our strategic partner based in Argentina. U.S. CAD currently participates in projects of all sizes. Visit uscad.com for more information.



"Parallel had some good content that they were able to provide, such as equipment racks," recalls Maggie Terry, BIM Engineer with U.S. CAD and lead on this effort. "Additional content either came from manufacturer content from the Axis plugin for Autodesk Revit or, in some cases like with security monitors, we developed from scratch. When it was possible, I tried to incorporate Revit families from manufacturers that Parallel Technologies typically specs out."

The team also added custom parameters to the camera "family" to allow for lens information and each camera had a unique identifier that was included in the equipment schedule.

Camera identification in an elevation view can be vital during the installation process. Terry says, "In a plan view, you see the same tags, but the mounting height information is lost, so the elevations views with those same tags puts placement in perspective."

The detailed model interior included ladder rack and vertical ladder rack support to floor above, the full ring fiber optic backbone pathway to ev-

ery security closet as well as vertical pathways between security closets, security surveillance, access control and monitoring fixtures, devices, and equipment.

It was important to get the exterior camera mounting height information solidified. The exterior model included site security surveillance utilizing exterior wall mounted and pole mounted cameras coordinated with light pole locations along with site access control at each gate entrance to the site. Each system had its own plans with specific devices, fixtures, equipment and conduit all modeled. The cameras all had unique identifiers on exterior building elevations. The team also developed a conduit plan to show access control and camera conduit and devices on the same plan as part of Revit model.

The conduit plans provided by U.S. CAD were more extensive than conventional practice. Early on in the process we had the conduit on their own section of sheets but then later on in the process we decided to compile that information. Conduits serving video surveillance system would be shown on their own sheets, and the conduits serving access

control system would be shown on separate control system sheets.

“Maggie helped us model and render the line of site of the cameras for optimal placement and to verify coverage to provide security line of sight within the model,” says Ray. “This information is particularly useful to both the client and to the engineering team as it can help solidify the quantity and placement of security cameras throughout a building.”

Another U.S. CAD BIM expert (Sunny Watts) set up the Cover Sheet’s site view, team list, and sheet list. The cover sheet provide pertinent project information including sheet list, area maps, team information, and occasional code information. “You wouldn’t think this was such a big deal, but this set of documents opens the door to all the rest of the work. It has to be right. The U.S. CAD team developed it perfectly,” says Ray. Ray adds, “As the project and the process moved forward, and we learned

more about Maggie’s capabilities, the Revit model development took on a life of its own. U.S. CAD’s ability to scale the project as we needed was amazing. They found additional bodies to help us out every time we needed it.”

3D INTERACTION

The 3D model provided almost instant value. Early on in the design, Parallel Technologies and U.S. CAD team sorted space throughout the data center into five custom color-coded Security Zone Maps using Revit space tools.

- Security Level 1 - Bio In / Bio Out
- Security Level 2 - Bio In / Card Out
- Security Level 3 - Card In / Card Out
- Security Level 4 - Card In / Rex Out
- Security Level 5 - No Access Control

Since every piece of equipment, device and fixture was modeled into a five-page equipment schedule, Ray was able to utilize the embedded data

within those elements to create schedules. All schedules used a security closet as a control room that was further broken down and linked to other rooms and doors within the building. The Security Zone Maps allowed Parallel Technologies to also communicate to the client the security level of each specific room or pathway, which can be easier to read than a schedule.

One of the biggest benefits of using Revit over AutoCAD is that a Revit model is of course, the 3D perspective. On this project, the architectural team utilized BIM 360 Team to coordinate each disciplines’ Revit models. Through this site, each member of the data center project team had a live link to every model that was referenced in their own model (e.g., mechanical could see electrical design). This virtual connection greatly streamlined coordination as nobody had to wait for manual email or shared site updates.

For instance, the architect designed a data center lobby that was entirely



WHAT IS HYPERSCALE?

Hyperscale is the ability of an architecture to scale appropriately as increased demand is added to the system. This typically involves the ability to seamlessly provision and add compute, memory, networking, and storage resources to a given node or set of nodes that make up a larger computing, distributed computing, or grid computing environment.

encased in glass walls, which creates challenges when it comes to mounting cameras. Ray confirms, “This was a very effective tool that we used in the initial design review to visually represent the layers of the security system. The client was able to provide quick feedback for us to adjust as needed. If not for the Revit model, we would be walking the entire site “door by door” to explain the design.”

With the modeled security elements including support structure Ray and his team were able to show the client the challenges of an all glass system. He adds, “Because of different profiles in the architecture of the building, control joints in the concrete panels, and other services entering in the building the most ideal place for placing the cameras were not always feasible, but with the elevations and we were able to

come up with solutions that wouldn’t compromise the ability of the security cameras to do their job.”

The Parallel Technologies team was also able to adjust security room parameters. These rooms become the centralized location for all things related to security, communication and monitoring which results in the room being undersized.

Of course, one of the biggest benefits of 3D modeling is the ability to ‘see’ how mechanical, electrical, plumbing and fire protection systems come together throughout the building.

“With the U.S. CAD-developed 3D model, we were able to quickly identify and communicate issues to the owner, the architect and the contrac-

tor,” Ray said. “In particular, we were able to model the network pathways along corridors and show how those conduits and cables fit share space with MEP and fire protection.”

Ultimately, the Parallel Technologies/U.S. CAD team met the imposed deadline for the Phase 1 security solution. The same model can now be utilized to finish out the other phases of the project as well as to support future BIM coordination that may be needed.

Ray concludes, “This was a big win for us – both in terms of meeting the client’s schedule, and for our BIM education and advancement. We learned a lot from this project and know we have a trusted partner to help us continue our 3D evolution.”

ABOUT PTI

Established in 1983, Parallel Technologies, Inc. is a multidiscipline low voltage engineering and installation contractor. For more than 30 years, the company has been working with clients providing design, build and management infrastructure solutions for businesses and government entities. Its customers include major medical manufacturers, government entities, schools districts, major manufacturing companies, financial institutions and banks. Parallel Technologies employs 115 engineers, technologists, and professionals to serve the Midwest marketplace. To learn more about Parallel Technologies, please visit www.ptnet.com.

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