

# CannonDesign Increases Project Efficiency by 35% With a Collaborative, VIVE-Powered VR Platform



**I**n our interconnected world, remote collaboration is increasingly common. As a result, professionals are always seeking new tools and technology to facilitate remote collaboration. Businesses have an incentive, too: Digital collaboration enables business to cut costs and boost efficiency while maintaining support for employee's projects. Despite its advantages, remote communication still poses unique challenges for many industries. Within the field of architectural design, for example, employees must regularly communicate complex visual and spatial concepts. In such cases, video conferencing and email are woefully inadequate.

As an architectural design firm operating across 18 global offices, CannonDesign has experienced these obstacles firsthand. Although their designers frequently travel to connect with clients and coworkers, projects have traditionally relied on elaborate physical mock-ups, making it difficult to bridge the gap. Their existing design process had proven both inefficient and expensive, prompting CannonDesign to explore alternative means of remote collaboration. Through a partnership with VIVE and NVIDIA, the firm implemented a custom, enterprise-grade virtual reality solution that addressed these obstacles and radically enhanced efficiency.

## How VR Solves Collaboration for Remote Meetings

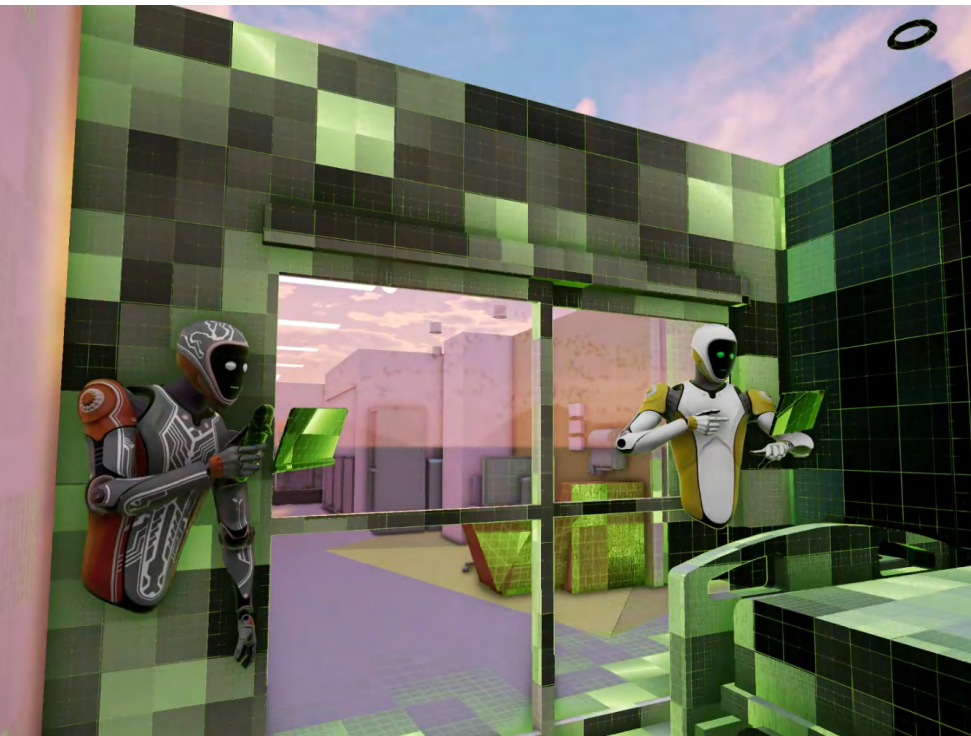
Using this combination, CannonDesign launched a preliminary design project with the University of Houston College of Nursing. Ernesto Pacheco, Director of Visualization at CannonDesign and R&D Lead for immersive technologies, explains that the College's new Simulation Lab required a 1:1 scale immersive visualization deployment to better understand the spaces and equipment requirements for the renovation. "Our main objective was to provide our client with the right tools needed to make informed decisions regarding equipment placement for a future-forward experiential learning center," said Pacheco.

This would allow designers and clients to share ideas remotely while visualizing and interacting with architecture designs in a virtual space.

CannonDesign had several specific goals to achieve with this design project:

- Quickly validate design concepts within a collaborative, multi-user VR environment.
- Host remote meetings where clients and designers can coordinate virtually without generating travel costs.
- Share virtual mock-ups with clients and make real-time adjustments based on client feedback, such as changing wall color or construction materials.
- Easily document comments, questions, and suggestions provided by the client.

NVIDIA's Holodeck met each of these requirements and was quickly adopted as the software solution for the project. The other key ingredient for this project was enterprise-grade VR hardware. That hardware needed to have professional-quality audio and visuals to provide a seamlessly immersive experience.



## Highest Quality Immersion: HTC VIVE Pro

After reviewing several enterprise-grade VR brands, CannonDesign selected VIVE for its industrial design, manufacturing quality, and high image resolution. In particular, the VIVE Pro also offered more advanced audio and visuals compared to other brands, thanks to its 2880x1600 resolution and 3D spatial audio. These features produced an immersive and compelling simulated experience that would meet CannonDesign's professional needs while communicating design concepts to clients.

Technical specifications were just one of CannonDesign's considerations. Designers were concerned that personal discomfort might draw clients out of the experience during in-depth, multi-user sessions. The company had encountered issues with accessibility and accommodating diverse users with other HMDs. The VIVE Pro set itself apart largely due to how quickly and easily it can be adjusted for different users without making the experience awkward or uncomfortable.

"One of the biggest issues that we have encountered with other HMDs is the lack of awareness regarding

different gender and ethnic hairstyles as well as people that require prescription glasses or hearing aid devices," Ernesto Pacheco, Director of Visualization at CannonDesign, said. "With the HTC VIVE Pro, we can adjust for this type of scenario without making the experience awkward for the user."

## Full-Fidelity VR Rendering: NVIDIA Quadro

Whether doing a fast mock-up or texture rich presentation, NVIDIA Quadro professional GPUs were a perfect fit. Detailed textures, accurate and undecimated models, and accurate lighting were necessary to attain the high-fidelity rendering required for this project. For an immersive VR experience the entire model asset had to be loaded into GPU memory to maintain VR frame rates—fortunately, Quadro GPUs are built specifically to support large, complex workloads. This meant CannonDesign was able to view the original model asset directly in VR, eliminating the need to compromise model quality or integrity for VR performance.



## The Obstacles To Multi-User VR

Because the experience of virtual reality is exciting and new, potential users and clients may become apprehensive. That's why comfortable, user-friendly technology is imperative to ingratiating new users to the VR space. All-new technology also presents technical hurdles, such as onboarding, that can be challenging for designers and clients.

The VIVE Pro was able to alleviate these concerns with a headset designed for comfort. An ergonomic fit, adjustable head strap, and evenly distributed weight makes it ideal for longer use. It's audio-visual qualities also allowed for an engaging experience. When integrated with NVIDIA Holodeck, users quickly grasped the necessary concepts for communicating with each other, exploring the virtual space, altering designs, interacting with objects, and much more.

## The Result

The high fidelity of the VIVE Pro's image and audio gave first-time users an immersive experience, while the comfortable fit of the HMD's adjustable design made collaborative VR accessible to a variety of users. In combination with VIVE's professional-grade VR hardware, the collaborative design platform created by Holodeck enabled users to work in and experience spaces in real-time. Clients were able to grasp and operate the hardware—along with virtual tools—easily, allowing each session to move at a pace that respected everyone's time.

With these features CannonDesign could address the obstacles that make remote client collaboration so challenging for architectural designers. Previously, in-person meetings required transport or outsourcing expenses that could add up to hundreds or thousands of dollars. Designers were also required to assemble physical mock-ups that cost up to \$35,000 and could not be altered or reused. By comparison, VR multi-user sessions allow for collaboration in a digital space, which save time and money. Each virtual environment can be assembled by a small team of designers for a fraction of the cost, reducing project times by 35%.

In 2020, CannonDesign will scale the project for use in its offices, attempting to decrease in-person meetings by 15%. Even now the technology itself is having a significant impact on the design industry. The HTC VIVE Pro can easily be customized for use with products like NVIDIA's Holodeck, creating new opportunities for multi-user VR tools.

"NVIDIA and VIVE have made it feel like we live in the future," Ernesto Pacheco, Director of Visualization at CannonDesign, said. "We have yet to see another combo that puts a smile on the faces of our clients and designers while providing the excitement of closely collaborating with tech giants. The architectural world is quickly embracing this level of immersion. Holodeck and VIVE Pro have made this an enjoyable experience for CannonDesign."

