Delivering digital twins with Precision: a modern approach for a new kind of healthcare

From pilot project to pioneering digital twin technology for healthcare: Mark III Systems used Dell Technologies Precision AI workstations with NVIDIA RTX™ GPUs to transform a hospital's strategy, operations, and care.

Texas Children's Hospital needed a solution to enable a dispersed team to design and build labor rooms at a remote site. Precision AI workstations with NVIDIA RTX™ GPUs were used to create digital twins of the rooms, revolutionizing the hospital's approach to strategy and care, driving efficiencies and creating a blueprint for the future of healthcare.

Solutions at a glance

- Dell Precision AI-Ready workstations with NVIDIA RTX™ GPUs

- Dell AI Factory with NVIDIA

- Edge Computing Solutions

Business results

- Unlocked efficiencies by reducing cost, waste, environmental impact, and manual processes.

- Transformed and accelerated the process of strategy and planning of the built environment.

- Introduced new, virtual forms of collaboration by stakeholders working remotely.

- Freed up team members' time to focus on creative and value-adding tasks and put patient care first.

- Enhanced patient experience and wellbeing, and increased staff job satisfaction.

⊙NVIDIA.

Remote collaboration optimizes user and operational efficiencies which ultimately means better patient care.

Bringing a hospital to virtual life

As a digital transformation specialist, Mark III Systems must remain at the fore of developments in technologies like AI and AR/VR. Innovation is developing at pace, meaning use cases often emerge and change during the course of deployments. Mark III Systems' mission goes beyond delivering on a customer's initial needs. Its agile approach means customizing tech and changing course as projects develop and requirements change. This was demonstrated in a project with Texas Children's Hospital in Houston.

The hospital sought a tech stack that would enable multiple stakeholders, from its innovation team and care staff to architects and construction workers, to collaborate remotely on the design, build and marketing of new labor and delivery rooms being at a site in Austin. With the rooms under construction, the hospital needed a way of re-creating the physical space in a virtual environment that allowed for 'walk-throughs' of the rooms. This AR/VR element demanded a stack that could guarantee high levels of processing and performance power, in a form that was physically accessible – and with workflows virtually accessible – in real-time, from anywhere. To bring the project to life, a reliable, enterprise-grade solution was required.

Texas Children's Hospital had a long-standing relationship with Mark III Systems, so building on this foundation was an obvious next step. The company deployed a tech stack leveraging Dell's Precision AI-ready workstations with NVIDIA RTX™ GPUs. Offering scalable performance for advanced technologies, these desktops could be housed on premises, negating the need for Mark III Systems' data center resources. They were also powerful enough to support the AI workloads used to create digital twins (visual representations) of the new rooms.

The digital twin technology and the agility and responsiveness which characterized Mark III Systems' deployment has seen Texas Children's Hospital realize vast improvements in four key areas: strategy and planning, remote collaborate, efficiency of construction, and staff and patient satisfaction.

Strategy and planning

Mark III Systems' solution has transformed the hospital's design and planning process. It can re-create to-scale replicas of rooms as well as digital renderings of objects that can be manipulated in a virtual work environment. Physical materials and their interactions with other objects are perfectly mimicked: drop something on a fragile asset and it'll break; throw another and it'll move the correct distance based on the power of the throw.

Hospital staff could use 3D avatars to navigate the space, or put on a VR headset to embody the avatar. This was critical as it allowed valuable input on room design, layout, and functionality. By sharing their experiences with construction workers and designers, medical staff could access equipment more efficiently, reduce their number of steps and ultimately provide a better experience for patients.

Remote collaboration

Using the digital twin technology allowed architects, construction firms and medical staff to collaborate on the design of the new labor rooms, no matter where they were based. This allowed Texas Children's Hospital to overcome the challenge of a dispersed team of stakeholders by bridging the communication gap between individuals in Houston, Austin and the State of Washington.

One person may be looking at design blueprints while another may be designing via AutoCAD. Each set of tools is converted to OpenUSD within the digital twin application developed on NVIDIA Omniverse™ platform so that everyone has the same digital view and is 'speaking the same language'.

Enabling remote collaboration has saved the hospital significant time and money in removing the need for individuals to travel to the site, reducing its environmental footprint.

> **"** **As we discovered we wanted to build our application on the NVIDIA Omniverse™ platform, we needed NVIDIA RTX™ GPUs to drive this. And the perfect fit for this is within the Precision line."**
>
> **Seth Sweetin,**
> Systems Architect, Mark III Systems

> **The Precision workstations were a key tool in building this digital twin. It was the perfect solution to meet performance requirements whilst allowing deployment at the edge."**
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> **Seth Sweetin,**
> Systems Architect, Mark III Systems
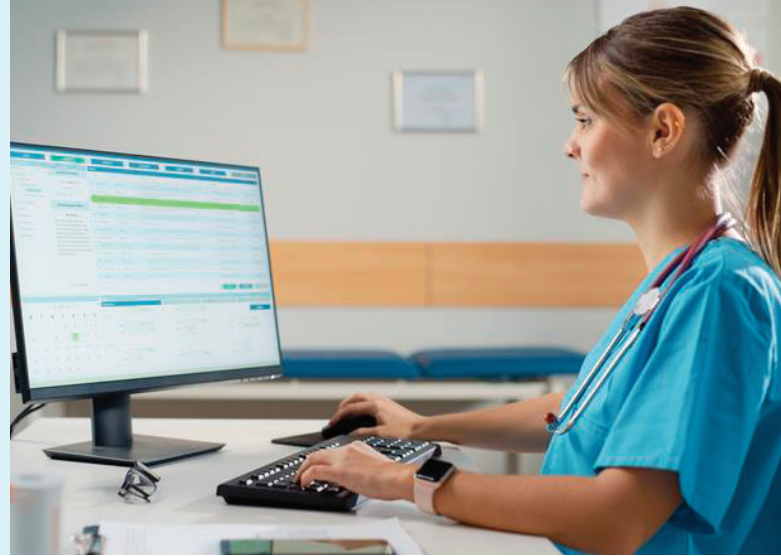
Efficiency of construction

Creating a replica of a physical environment prior to and during construction meant decisions could be made before investments in building materials etc. were taken. This reduced the need for costly changes during each phase and ensured the best use of physical resources.

Patient and staff satisfaction

The exceptional performance of the Precision workstations with powerful NVIDIA RTX™ GPUs has facilitated the creation of optimally functional spaces tailored to healthcare needs. For future patients, the ability to virtually tour their care environment before arrival, from anywhere, presents greater peace of mind.

Looking to the future

The results of the project are just the beginning, for both the Texas Children's Hospital and the technology, which continues to evolve rapidly. Mark III Systems' solution can be scaled up to create digital twins of buildings and whole cities: comprehensive simulations of the real world.

New projects will incorporate generative AI, creating entirely original digital replicas of physical assets based on user prompts. The Dell AI Factory with NVIDIA plays a pivotal role in this process. Combining Dell's AI infrastructure and services with NVIDIA's industry-leading GPUs, high-performance

networking, and software with comprehensive turnkey strategies and automated workflows, Mark III Systems and Texas Children's Hospital can securely develop and deploy generative AI at scale.

The partnership can also introduce IoT sensors in real-world spaces and replicate them in digital twins, allowing control of elements like lighting and air conditioning and testing 'what if' scenarios. Haptic feedback controllers can be deployed to support new kinds of training for surgeries in a fully immersive environment.

Together, Dell Technologies and Mark III Systems have created a technological blueprint for the use of digital twins in the future of healthcare and beyond.

> **The AI space is evolving but there wasn't an all-encompassing IT ecosystem for customers. Dell Technologies is solving that with its AI Factory with NVIDIA."**
>
> **Seth Sweetin,**
> Systems Architect, Mark III Systems

Learn More About Dell Technologies AI-ready Workstations

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