



## MedicalVR

Innovative healthcare startup expedites development of patient 3D visualizations to dramatically advance complex surgical outcomes with HP Z8 Fury Workstation



# surgery

## MedicalVR

**INDUSTRY**  
Healthcare

### OBJECTIVE

Accelerate development of patient-specific 3D surgery planning and intraoperative navigation to improve surgical outcomes

### APPROACH

Mobilize HP Z8 Fury desktop workstation to fast-track deep learning model training and free resources to train more models in parallel

Lung cancer, the leading cause of cancer deaths globally, is a terrifying diagnosis, exacerbated by the specter of surgery, radiation, chemotherapy, and other treatments. In the Netherlands, pioneering tech start-up, MedicalVR, is working to significantly improve outcomes for lung cancer patients.

Lung anatomy differs from patient to patient, making the organ among the most challenging to operate on. In addition to the unique anatomy of each individual, lungs are complicated structures that change shape as they deflate, making visual mapping even more difficult. Traditionally, surgeons have relied on static, two-dimensional CT scans to prepare for surgical cases, requiring the physician to create a 3D representation of the patient's anatomy in their mind.

MedicalVR has a mission to meet surgeons where they are now with pre-operative planning support — by enabling a walk-through of each patient's anatomy, as well as in the OR by integrating with robotic technology solutions, such as the Da Vinci Surgical Robot by Intuitive.

**“ Z by HP equipped with NVIDIA RTX™ 6000 Ada Generation GPUs slashed the time needed to train a model from several days to just four to eight hours. That means we can iterate faster, and also feed the model more diverse data ”**

MIKE DE BOER  
CTO, MedicalVR

## A prescription for success

MedicalVR Viewer gives surgeons a digital twin of the patient, allowing a dynamic visualization of the airways, arteries, veins, tumor and segments of the lungs, empowering the doctor to position the image and highlight specific structures. MedicalVR Viewer preoperative planning is currently in use at nine hospitals throughout the Netherlands, enabling surgeons to optimize the surgical plan based on patient-specific anatomy, minimize unexpected risks and complications, spare lung tissue, and speed surgery time to minimize the length of time a patient is under anesthesia. The solution is so powerful that Mike de Boer, CTO at MedicalVR revealed, “Using MedicalVR Viewer, surgeons had a 52% deviation in surgical plan, meaning they changed their approach based on the insights provided by the visualization.”

He added, “By tackling the complex lung first, we will be able to apply that work to mapping the rest of the human body’s key organs and structures.”

## Velocitizing iteration, amplifying productivity

Creating a detailed digital twin of a patient’s lungs is a compute-intensive undertaking, one that has been dramatically accelerated with the HP Z8 Fury G5 Workstation with four NVIDIA RTX 6000 Ada GPUs. The work is projected in stunning color and detail on the HP Z40c G3 WUHD Curved Display.

Previously, the MedicalVR team relied on their personal laptops — ‘state-of-the-art, beefy gaming laptops’ according to de Boer — to run both the MedicalVR software and for the preoperative visualizations.



### ABOUT MEDICALVR

MedicalVR merges medical perspectives, clinical insights, and feedback from professionals with superior hardware and software to create innovative technological solutions to revolutionize healthcare. The company’s 3D surgery platform gives surgeons the ability to dramatically improve the planning and performance of complex surgeries.





While those laptops had the robust graphics cards required for high-definition video, the training of data models took days, an inefficiency that was aggravated by the fact that during that time, a laptop was completely offline for any other work.

“Training an AI/Deep Learning model requires a lot of iteration and tweaking hyperparameters and our model accuracy scores were not where we wanted them to be,” De Boer explained. “Z by HP equipped with NVIDIA RTX 6000 Ada GPUs slashed the time needed to train a model from several days to just four to eight hours. That means we can iterate faster, and also feed the model more diverse data.”

He continued, “It’s a massive boost in raw performance and, because of the four graphics cards, we can run several models in parallel, allowing us to diversify our solution and create models for the aorta, small intestines, and other organs.”

“Our HP Z8 Fury with the powerful NVIDIA RTX 6000 Ada Generation GPUs runs non-stop, tackles any job we throw at it, and has boosted productivity at least 200%. It’s incredibly important to us.”

## Smarter, more secure patient visualization

Furthermore, the HP Z8 Fury allows the MedicalVR team to achieve more granular detail. For instance, lungs have ten segments, features that are difficult to discern with the naked eye. MedicalVR is masking out large regions of a CT scan to isolate a specific segment and automate the segmentation process, making visualization more efficient and detailed.

Z by HP also advances patient privacy and data security. De Boer shared, “We are working to deploy our models locally so that patient data doesn’t need to leave the hospital. Z enables us to train more models and then ship them to live on-site at the hospital, making local inferencing more efficient.”

The ability to remotely access the HP Z8 Fury has also multiplied productivity. For lung segmentation, for example, clinical technology students access CT scans and manually color the structures used to train the model. MedicalVR provides the students with separate logins to the HP Z8 to do the



## Galvanizing the pace of business

To bring the MedicalVR experience to more healthcare teams, the company is developing a device that will bring 3D visualization to more operating rooms by connecting the solution to the various existing medical systems. A critical milestone in that journey is certification from the U.S. Federal Drug Administration (FDA) and the EU Medical Device Regulations (EU MDR). De Boer elaborated, “To achieve certification, we need to present clinical validation of claims. For us, that means a verification flow cycle that demonstrates continuous improvement in our AI models as well as third-party expert validation.”

segmentation work, which can then be checked by a physician or radiologist. “Z by HP with NVIDIA RTX 6000 Ada GPUs not only has the horsepower to handle the graphics as well as multiple workstreams, it also gives us the confidence that the data is secure,” de Boer acknowledged.

In addition to using the HP Z8 Fury to train and evolve deep learning models and compute algorithms, the MedicalVR team also utilizes the HP Z2 Mini, to visualize the patient’s digital twin with segmentations provided by the company’s proprietary AI. Taking full advantage of the desktop’s compute power, local inferencing on the HP Z2 Mini of the lung lobes, bronchus, arteries, and veins takes just five to ten minutes and is fully integrated into MedicalVR software. De Boer expounded, “We occasionally use the HP Z2 Mini to deploy our visualization software at the hospital.”



**“Our HP Z8 Fury with the powerful NVIDIA RTX 6000 Ada GPUs runs non-stop, tackles any job we throw at it, and has boosted productivity at least 200%. It’s incredibly important to us”**

MIKE DE BOER  
CTO, MedicalVR



### IT MATTERS

- Four NVIDIA RTX 6000 Ada GPUs slash compute-intensive data science model training from days to hours
- Always-on, high performance HP Z8 Fury boost productivity 200%+
- Remote access allows secure log-in to maintain data privacy while enabling simultaneous workflows

### BUSINESS MATTERS

- Provide surgeons with patient-specific 3D visualizations to improve surgical outcomes
- Optimize resources to facilitate greater idea exploration and development time
- Speed validation process required for medical device certification

The speed and power of the HP Z8 Fury also shortens development timelines and frees resources to explore new ideas. “Tools like the HP Z8 Fury that make it more efficient in terms of time and cost are a valuable asset,” de Boer emphasized.

## A bright prognosis

The feedback from surgeons has been overwhelmingly positive. De Boer observed, “The response has been that doctors were not aware that we have a solution that they now can’t live without.”

That reaction bolsters the MedicalVR teams’ goal to provide all surgeons with effective, powerful visualization tools to facilitate more personalized, effective patient education and pre-operative to intraoperative and even post-surgical care at every step.



# Z by HP for Data Scientists & Analysts

Get rapid results from your most demanding datasets, train models and create visualizations with Z by HP data science laptop and desktop workstations.

[LEARN MORE](#)

