

Experience Modus V™

Synaptive's fully automated robotic digital microscope

Synaptive



Welcome to Modus V™

We see connected operating rooms with uncompromised visualization and surgical workflows.

We believe in accessible, easy-to-use products that equip you with the right information for complex surgical decisions.

We designed Modus V to push the boundaries of what is possible in optics, automation and digital augmentation to deliver future-forward ingenuity that solves your operating room challenges.

See more with our industry-leading optics and optimize your workspace with the customization available through our advanced platform.

Welcome to your modern workflow.



The limits of outdated analog technology

Much of the technology in today's surgical suite dates to the 1960s. These analog breakthroughs can no longer deliver the flexibility you need.

It's time to evolve outdated technology that was not built for the digital age. It's time to challenge the limits holding you back.

Does a microscope's restricted views provide the detail you need?

A restricted field of view and depth of field reduce what your eye can see, limiting the amount of information on which you can base critical decisions for your patient.

They also limit tool options and collaboration within your team, making it harder to work together while increasing OR time.

Are you tired of equipment disruptions?

Conventional microscopes often get in your way during instrumentation and imaging, requiring constant manipulation that adds to workflow disruption and ultimately surgical time. For these reasons, you may choose to use loupes, which don't always give you the magnification you need, and force you into uncomfortable operative positions.

Are you at your best when you're in pain?

Chronic strain associated with conforming to technology may injure your neck and back over time which puts you at high risk for musculoskeletal disorders. A JAMA Surgery study looking at the ergonomic risk of surgery across multiple specialties including orthopedics and neurosurgery found that more than 50% of operative time is spent with the surgeon's neck in a high-risk position.² The consequence is that 27% of spine surgeons have symptomatic cervical disc herniation/radiculopathy, and 12% with these work related MSDs require a leave of absence, practice restriction, or early retirement.³

We see a better way.

1. Eivazi, et al. 2015
2. Meltzer, et al. 2020
3. Epstein, et al. 2017

18% Operative time spent adjusting microscopes¹

44 Average number of minutes per procedure that surgeons worked on edge view¹

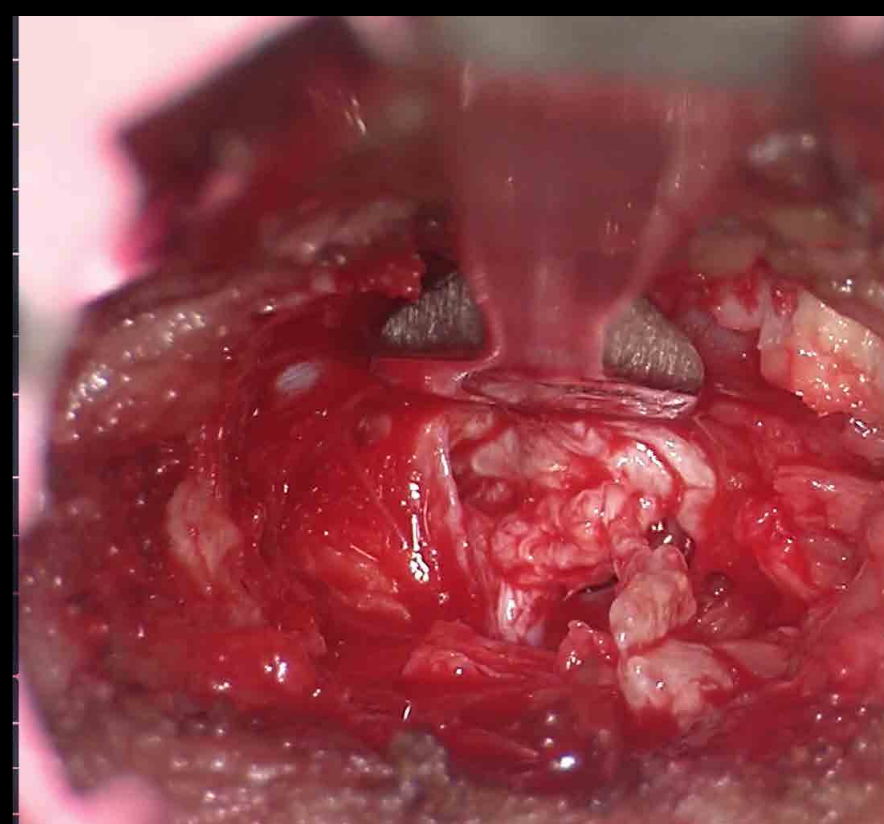


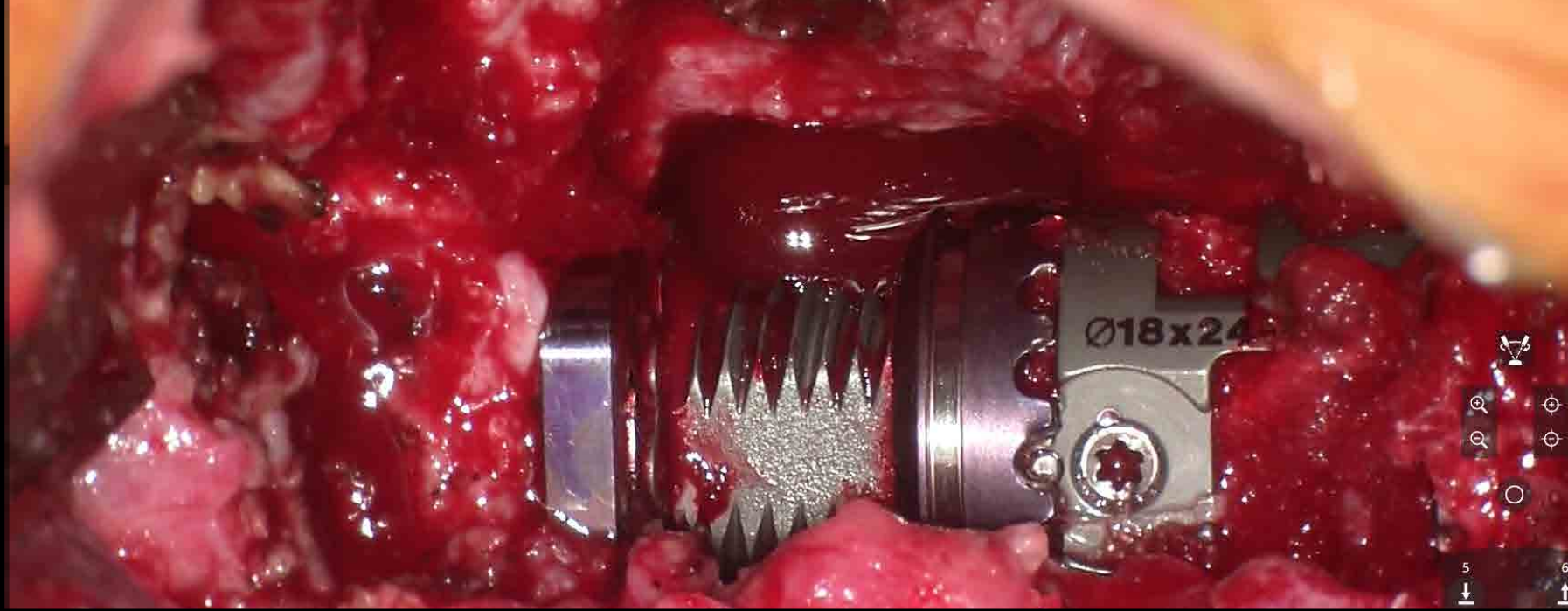
Meet Modus V

Modus V is Synaptive's robotic digital microscope. Derived from technology originally created for the International Space Station, Modus V seamlessly combines advanced engineering with the latest breakthroughs in 3D optics, video processing, and robotic automation to deliver a new kind of operating experience.

From its optical payload and robotic arm to digital technology that enhances and augments your surgery, Modus V supports a wide range of surgical approaches across all surgical disciplines.

We want to be your partner in the operating room as you deliver the best possible care to your patients.





See more

3D digital microscopy

During an operation, unobstructed clear views of the surgical site are necessary for making in-the-moment decisions that may help you deliver more precise and responsive treatment. Modus V provides 3D visualization of critical anatomical structures with natural depth perception to help you visualize critical anatomical structures to help you stay focused on your patient.

Modus V's large depth of field and wider field of view—greater than those of a traditional surgical microscope—provides a larger volume of view to maximize the portion of the surgical field that is always in focus. The system also enhances your surgical visualization with a 12.5× optical zoom and under 10 µm resolution, doubling the magnification of comparable microscopes.

Built for collaboration

In a modern workflow, the immersive surgical experience extends well beyond the primary surgeon.

Modus V's digital monitor alleviates uncomfortable viewing angles and gives your entire surgical team ideal visualization, dramatically improving ergonomics and workflow.

Our 55" 3D Ultra HD 4K monitors with 10-bit color are ideal to showcase surgical overlays providing you and your team real-time intra-operative feedback, including tracking information, optical parameters and functionality. Unobstructed 3D digital visualization creates a collaborative environment that is also ideal for academic teaching.



Enhance performance

Robotics create value in the operating room by accurately automating repetitive tasks, allowing you to focus on your patient and make complex surgical decisions.

Through consultation with leading surgeons, our engineering and design teams have determined the points in a surgery where machine learning, advanced algorithms and robotic automation add the most value to the care you deliver.

Immersive surgical views

The power in Synaptive's optical system lies not just in the magnified field of view, but also in the automation that ensures your visualization is never compromised.

Modus V's optical system automatically adjusts lighting and camera conditions to provide an optimal view of the surgical field. The enhanced LED light source delivers the bright, consistent light you need to perform an open resection or operate down a deep corridor.

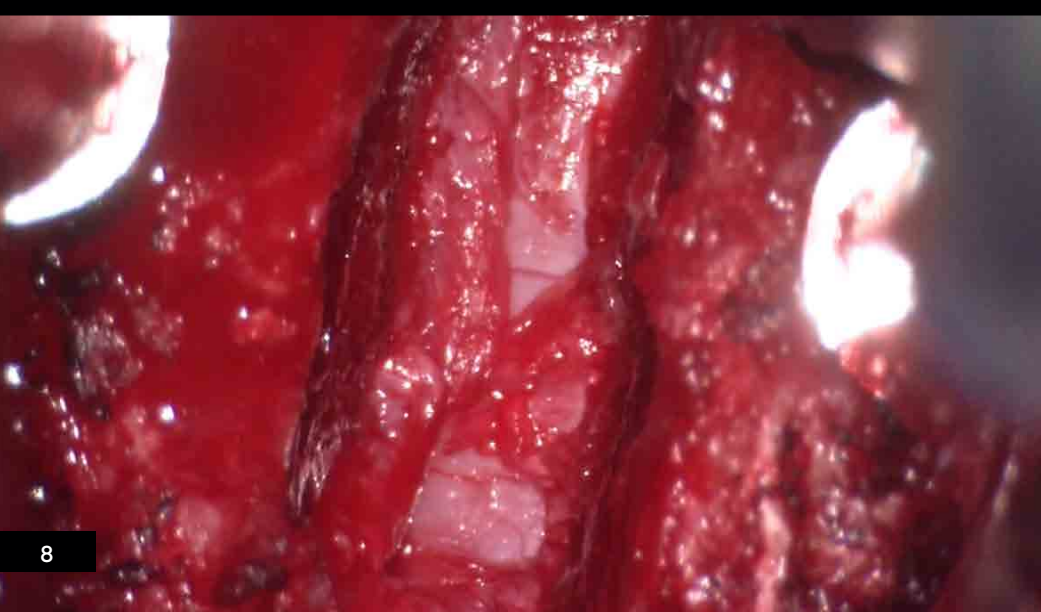
With six video presets —refined through consultation with leading industry experts—and 10 additional presets for further customization, you see what's most important within your surgical field.

Hands-free control

Synaptive's tracked surgical instruments—including suction, pointer and port tools—integrate with Modus V's hands-free robotic movement and voice-activated control to provide AutoFocus control, eliminating the need for manual focus adjustments.

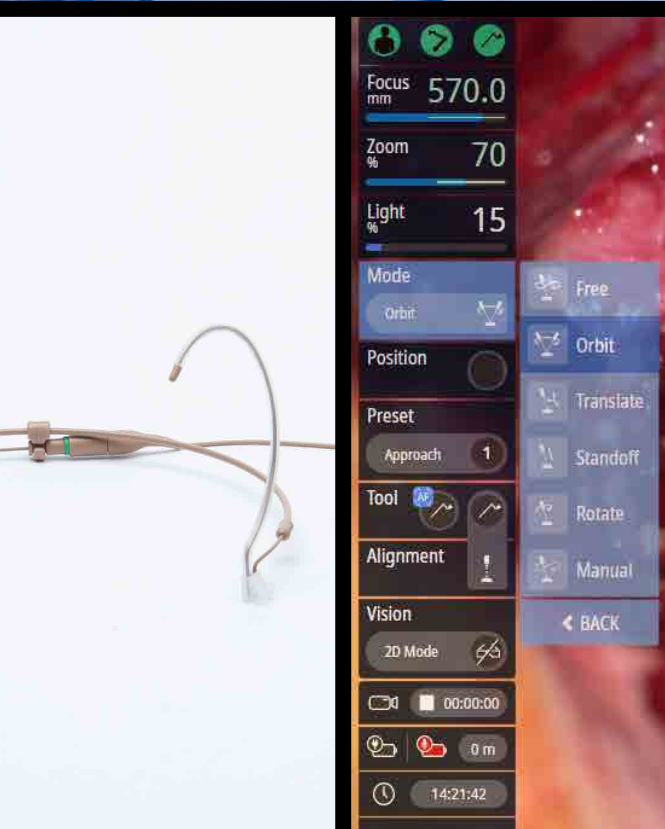
Modus V also bookmarks critical views of anatomy, known as Memory Positions, during the procedure for fast recall, minimizing time lost to repositioning and refocusing.

Constantly anticipating and adapting to your changing needs during surgery: that's Modus V.









Work smarter

Given the combination of instruments required during complex surgical procedures, it's imperative your visualization system gives you room to work instead of forcing you to work around it.

With a working range of up to 650 mm, Modus V gives you unprecedented flexibility, making it easier to deploy less invasive surgical techniques without compromising your optics, tool selection or working distance.

Robotically-assisted movements

Delegating awkward positioning to Modus V's robotic arm allows you to keep your focus on the surgical field while maintaining your health and well-being.

When you do choose to get hands-on, responsive movement detection anticipates your intended directional movement, making Modus V easier to position. Robotically-guided modes help you drive the robotic arm with greater accuracy and control for the optimal surgical view. For example, Orbit Mode allows users to visualize a fixed focus point from different orientations to see around a surgical area of interest.

Modus V's wide range of motion also simplifies operating room positioning and setup to help place surgical equipment where it's most effective. We've also solved the problem of microscope drift and balance, so your view stays set to what you want to see.

Voice-activated control

Synaptive's voice-activated control adds another opportunity to fully unencumber yourself and optimize your workflow. Utilize a low-profile microphone and deliver voice commands to allow control of system settings from the sterile field, including optics and robotics, for an uninhibited surgical workflow.

Quick menu

The Modus V quick menu provides easy access to the system settings from the sterile field with the use of the switch and trigger buttons.

Explore the possibilities with Modus V

The surgical application of Modus V spans neurosurgery, orthopedics, ENT, cardiac, and plastics. In contrast to other robotic technologies, Modus V is not simply indicated for one clinical application such as screw placement or stereotactic alignment; it can be leveraged wherever visualization is required.

Technology that enables less invasive procedures is crucial to delivering high economic benefit and driving positive patient outcomes in a value-based healthcare system. MIS techniques have advanced rapidly in the last decade, in part due to the development and optimization of advanced digital visualization tools, improving the clarity and resolution of anatomical structures.⁴ MIS approaches promote reduced tissue disruption through alternate, atraumatic methods that can reduce analgesia time, length of stay, blood loss, skin incision size, infection, and muscle injury, while yielding positive and impactful patient outcomes.⁴

Why Modus V?

Modus V's robotics, coupled with superior optical design and uniform light delivery, provide precise views during the most critical parts of complex MIS approaches without compromising your surgical view, workflow, or time. The robotic arm automatically re-positions your optics when adjusting retractors, and can align to extreme angles such as at the lumbosacral junction, optimizing your workflow and dramatically improving ergonomics.

Modus V is a key piece to developing a modern surgical spine program.





Position 1
Preset
Approach 1
Tool  
Alignment 
Vision
2D Mode 
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14:18:14
modus v

SYNAPTIVE MEDICAL

Versatile setups for every OR

Modus V's superior 3D optics and robotic automation enable a wide range of procedure types and operating room setups. Here are a few examples of how Synaptive's Surgical technology positively impacts procedures across a variety of surgical disciplines.

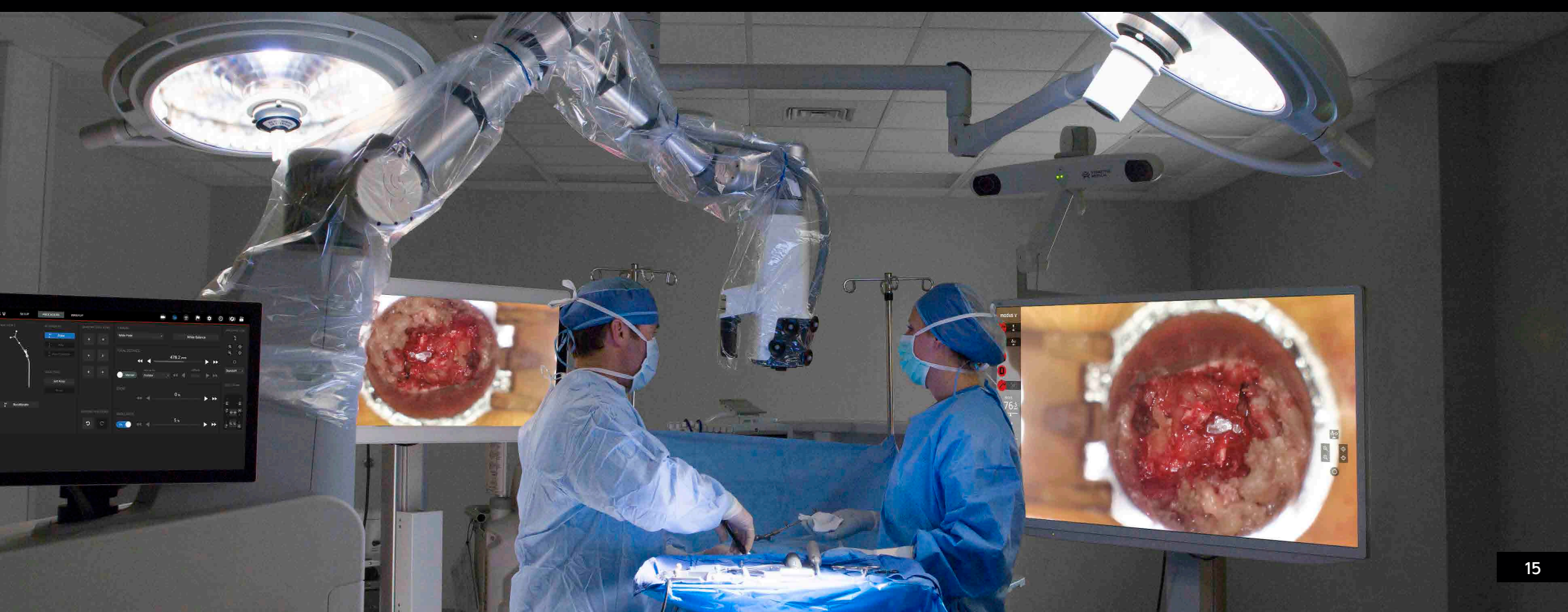
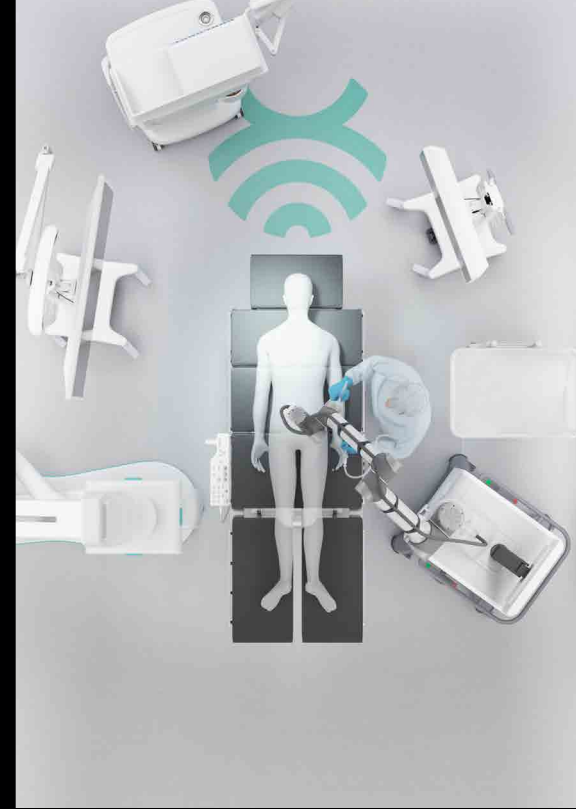
Spine procedure: ACDF

- Store and recall memory positions on the ipsilateral and contralateral side to effortlessly achieve proper visualization without workflow disruptions
- Use Modus V's high-powered 3D optics and light control, combined with the highest stand-off distance in the market, to achieve an ideal 3D procedural view without compromising the space you need to perform surgical tasks
- Optimize your visualization of nerve roots, bone and ligaments on a 4K 3D monitor through Modus V's unparalleled digital resolution and clarity



Spine procedure: Lumbar decompression

- Maintain your optimal visualization and ergonomic posture while operating at the difficult lordotic angles encountered in the lumbar spine, such as the L5-S1 segment. Modus V keeps your eyes on the 4K 3D surgical monitor, letting the robotic arm do the work for you
- Use uniform light delivery and digital image processing to ensure your distal illumination is optimized and clear, particularly for deep, tube-based lumbar approaches
- Deploy Modus V's robotic memory functionality to store your critical visualization positions to optimize your workflow. This functionality also allows you to quickly remove Modus V from the surgical space to accommodate other devices such as x-ray imaging equipment and, when repositioned, robotically recall your saved positions, all from the sterile field, hands-free using Voice-Activated Control



Clinical and economic benefits

Modus V was designed and developed to answer today's most critical clinical and economic problems. This robotic platform works as a stand-alone device or alongside other technology, with the intention to maximize efficiency and improve patient outcomes. Modus V's combined advanced visualization and robotics capture and deliver patient data when and where it matters most for surgical decision making.

Improve clinical and economic outcomes

- Superior volume of view and hands-free control provides optimal view without compromise^{5,6}
- Superior tissue differentiation over conventional imaging⁷
- Reduced blood loss when compared with conventional imaging⁷
- Enables MIS approaches with adequate light delivery and clear visualization⁸, which has been found to reduce complications⁸⁻¹¹, anesthesia^{4,9}, length of stay^{4,8-11}, and OR time^{4,8} and contribute to significant cost reduction^{12,13}

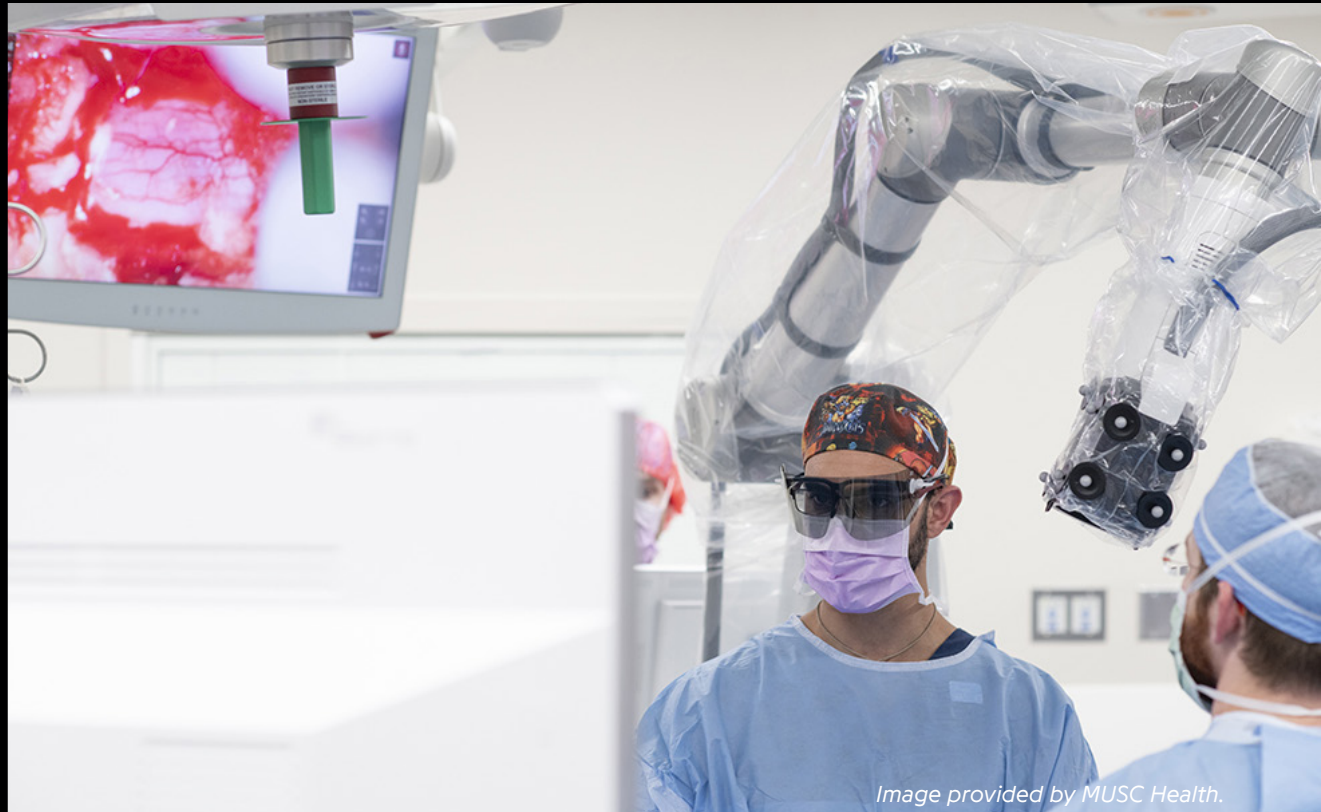


Image provided by MUSC Health.

“Usually by the end of the case, your neck is just dying, your head hurts, your eyes hurt because you’ve been looking through a microscope for ‘X’ number of hours. [With Modus V you have] better visuals with more detail and a larger field of view that is visible to everyone working on the surgery, along with improved ergonomics - and the result is better outcomes for patients.”

Dr. Ramin Eskandari, MUSC Health



Immersive technology to transform your OR

Enhance your entire team's surgical experience by operating upright on an ultra 4K 3D monitor, ensuring all OR staff experience the same view of the procedure.

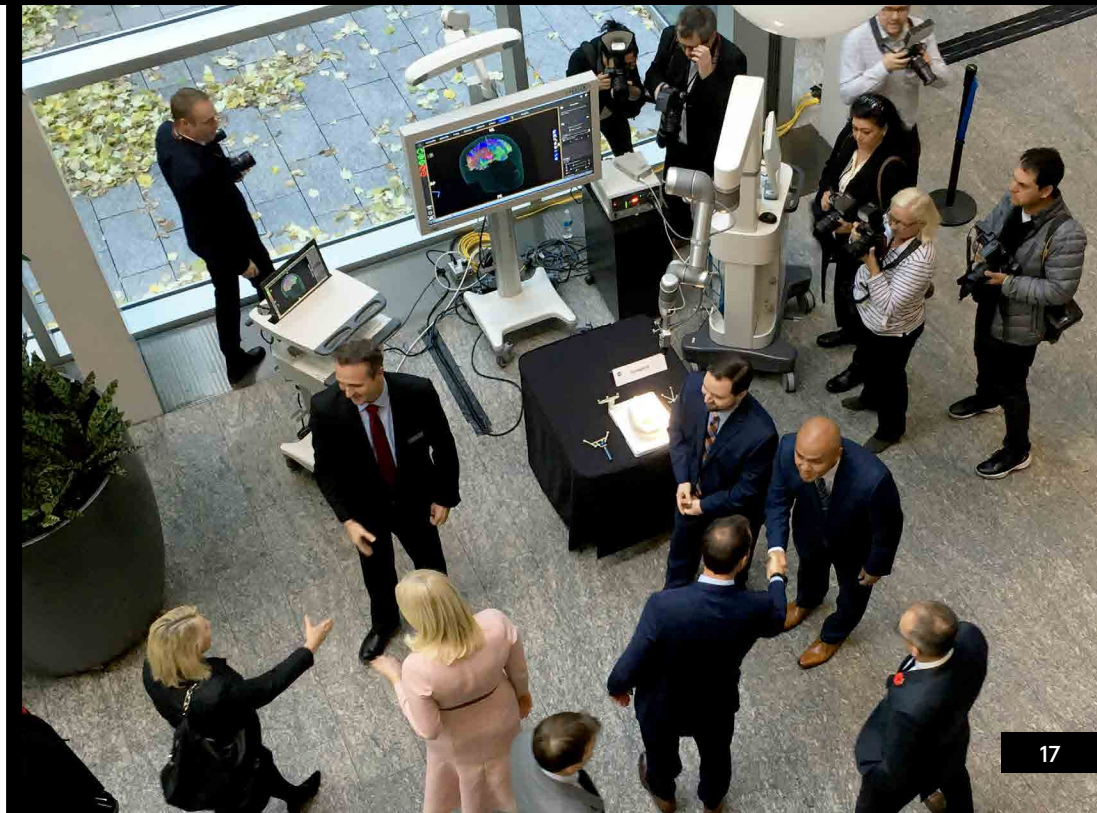
This approach to visualization:

- Increases workflow efficiencies through enhanced communication and collaboration across the surgical team
- Minimizes neck and back strain by allowing you to operate in an upright ergonomic position
- Maximizes opportunities to teach and train future surgeons

Differentiate your surgical program

Modus V's technology combines advanced optics with robotics originally developed for the International Space Station. Applied in your operating room, Modus V creates **opportunities to build your robotics program** and surgical practice:

- Build a center of excellence that attracts and retains top clinical talent
- Grow and sustain your surgical activities by providing your patients, residents and surgical team with breakthrough technology
- Differentiate your program by demonstrating your team's commitment to innovation, which creates opportunities to drive awareness of your practice within your local community and further afield
- Attract an educated, empowered patient base who expect leading-edge technology





Telling your story together

Robotics offer an exciting opportunity to differentiate your hospital and tell a new story to your community. Synaptive's team will work closely with your hospital to ensure that you realize the full value of your system.

Robotic program launch support

Provides you with material to introduce Synaptive's technology to your health community from installation through to marketing support.

Adoption strategy

Our team will work with you to develop guides for patient education, referral campaign planning and media outreach.

Media launch plan

Robotics and automation offer compelling footage for reporters looking to understand how technology breakthroughs may create transformative difference in the lives of patients and their families. Our team will work with you to reach patients, medical professionals and local media outlets who would benefit from learning about your capital equipment acquisition and the treatment options it opens.



Experience the
Future of Surgical
Robotics

Modus V specifications

Optics and illumination	
Optics	Apochromatic 3D optics for enhanced image sharpness and natural color reproduction
Zoom	12.5:1 Zoom Ratio
Field of view	6.8mm - 208mm
Autofocus	Automatic focus to tracked instruments
Working distance	650mm maximum working range with continuous and manual adjustment
Illumination	<p>Four LED camera illuminators for co-axial light delivery</p> <p>Four LED light sources</p> <ul style="list-style-type: none"> • Two primary light sources • One back-up light source • One auxillary light source with universal connector (ACMI, Olympus, Storz, Wolf) for ancillary equipment

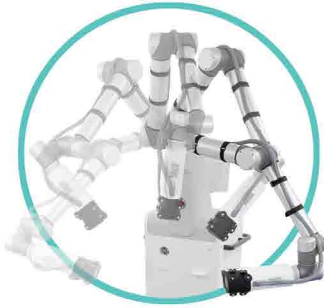
Automation	
Automated optical control	<p>Automated positioning of the optics through tracked instruments</p> <ul style="list-style-type: none"> • Synaptive Pointer tool • Synaptive Malleable and Standard Suction tools • NICO BrainPath® Port tool
Robotic arm	XYZ automated movement on six axes
Memory positions	Store up to six bookmarked positions
Position recall	Automatically recall previous positions

System control	
Robotically-assisted manual motions	Five robotically-assisted modes for guided control
Voice-activated control	System settings control using low-profile headset microphone
Quick menu	System settings control using the active menu
Fixed focus point automation	Orbit Mode allows rotation around a fixed point
User touchscreen	Touchscreen interface for user control
Foot pedal	Multi-function and single function foot pedals included

Technical data	
Base dimension	734.45mm x 759.45mm
Weight	320kg

Digital video	
White balance	Automatic
Video processing image optimization	Six clinical presets and ten customizable presets
Surgical monitors	55" Sony 4K 3D Monitor (10 bit color) 31" Sony 4K 3D Monitor (10 bit color)
Surgical video overlay	Intraoperative system settings digital overlay
Video outputs	5 × 3G-SDI 2 × DVI
Video recording	800 GB of M4V file video storage

Setup	
Drapes	Modus V™ custom arm drape Modus V™ custom skirt drape Modus V™ custom monitor drape
3D eye shield kit	



Over 180 degrees of full arm articulation for uninhibited maneuverability



Control all system settings with voice commands from the sterile field, including optics and robotics, for an uninhibited surgical workflow



Multifunction handgrip with built-in force sensor provides seamless control of the robotic arm



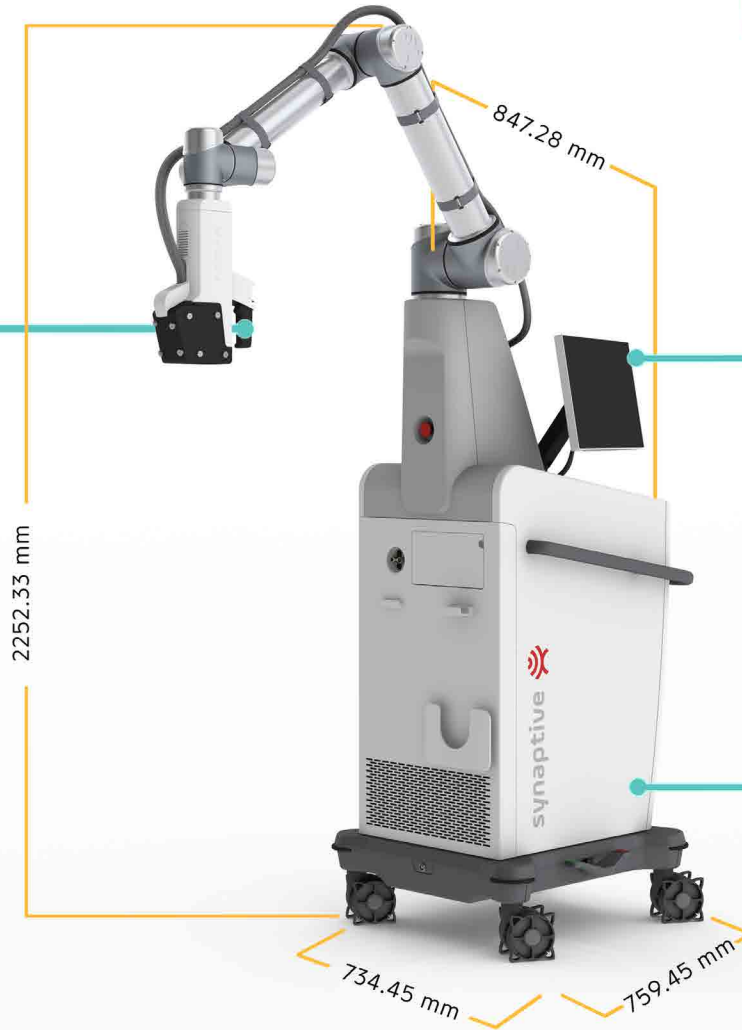
21.5" touchscreen for intuitive control of system settings



Quad LED illumination provides uniform light delivery with low-heat emission



Sleek profile provides reduced OR footprint and easy storage



Auxillary light source with universal connector for ancillary equipment

About Synaptive Medical

Founded in 2012, Synaptive Medical is a medical device and technology company with products installed at academic, private, and community hospitals worldwide. We see new technology pathways to revitalize and connect operating rooms to deliver crucial patient information where and when it's needed most.

We partner with leading clinicians and healthcare systems who also wish to see better integration across the devices and services available in the OR, eliminating silos and ensuring that patients receive the best possible care.

Based in Toronto, we bring a multidisciplinary perspective to technological innovation. Together, we've filed over 800 patent applications and hold 160 awarded patents.

We've applied our technology to many different types of procedures across multiple surgical specialties, including cranial, spine, ENT, orthopedics, and plastics.

Come grow with us and see what's possible for your practice.



Citations

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