AUGMENT YOUR REALITY

Introducing the ARveo digital augmented reality microscope
First, came the microscope, which transformed previously unseen parts of the body into entire fields of expertise. Then came surgical fluorescence, which helped reveal more detail within the body. Now, augmented reality built directly into the ARveo digital surgical microscope is set to push the boundaries of surgical visualization, by making the previously unknowable, known.

The ARveo is our most advanced microscopy imaging solution to date. Designed for the most complex surgical interventions, it features sophisticated digital imaging technology, including imaging sensors and advanced algorithms, outstanding optics and the ability to capture and share surgery in 3D. What’s more, only ARveo with GLOW AR technology provides a real-time augmented reality view of the surgical field, supporting you to assess and perform procedures with complete confidence.

A SINGLE VISION FOR THE FUTURE

Discover the game-changing features, world-class technology and innovative design upgrades that make up the ARveo digital augmented reality microscope:

- It’s time for empowered decision-making: GLOW AR technology.
- Choose your view, share your view: Visualization in the OR and beyond with HD & 3D visualization and recording.
- Impossible becomes possible: FusionOptics and innovative illumination.
- A decade of pioneering fluorescence: Choose your FL mode.
- Ingenious ergonomics for workflows that flow: Comfort and maneuverability.
- Enhancing patient safety: Protection without interruption.

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IT’S TIME FOR EMPOWERED DECISION-MAKING

With a single, complete picture of what lies ahead, you can go forward with confidence.

The ARhero microscope platform integrates our proprietary GLOW AR technology. Building on a decade of leadership in fluorescence imaging, this new innovation is ready to revolutionize the way you navigate your most challenging neurosurgical procedures.

Assess. Establish. Advance with GLOW AR

Groundbreaking GLOW AR technology is based on a sophisticated imaging sensor and algorithms which capture, optimize and combine multiple spectral bands of visible and fluorescent light. The result is a single, augmented view of the surgical field.

What’s more, the GLOW AR platform is future ready, so whenever a new GLOW imaging modality is introduced, you can immediately upgrade.

GLOW800: The difference you can see in vascular neurosurgery

GLOW800 AR fluorescence is the first of many modalities that will be based on GLOW AR technology. It harnesses the high contrast of ICG and integrates with the white light image to create a striking visual distinction between anatomy and blood flow. See the natural coloring of tissue anatomy, experience full depth perception, and get a real-time augmented view of vascular flow, for enhanced confidence to make precise treatment decisions.

One complete picture without interruption

> No need to pause surgery to watch a black & white NIR fluorescence video, no more mental gymnastics to recall and reconcile this with the natural anatomical view. Just activate GLOW800 and continue!
> Depth perception without dark peripheries, through image homogenization, supports clear spatial orientation
> Whether AVM, aneurysm, bypass, or microvascular decompression, you always have the full view you need to confidently work in GLOW800 mode

GLOW800 supports your aneurysm clipping

Visualization with GLOW800 AR fluorescence supports each step of surgery. During aneurysm clipping, it helps you:
> Assess clip placement and aneurysm occlusion
> Check if all branches proximal and distal to the clipped aneurysm are perfused and whether there is orthograde filling of the blood vessels
> Confirm the clip has not caused any compromise of surrounding blood vessels, such as kinking or partial obstruction

Right before your eyes

Opt to observe GLOW AR* fluorescence directly through the eyepieces with the CaptiView image injection module. And while you’re focused on the task at hand, the whole team can follow in detail on the large 4K 3D monitor.

Advancing together

“Leica Microsystems works closely with neurosurgeons to bring new technologies to the market that really respond to our needs. GLOW AR technology is an exciting new approach which provides a totally new view during vascular neurosurgery. I believe GLOW800 will have a significant impact on surgical outcomes in the future.”

Cleopatra Charalampaki, Professor of Neurosurgery, Cologne Medical Center, Germany.

First impressions of GLOW800 AR fluorescence

“GLOW800 worked straight away. Suddenly we had the blood vessels lighting up but we could still see the brain structures around them. Now we can keep oriented in the surgical environment.”

Professor Raphael Guzman MD, Professor of Neurosurgery, Vice Chairman of the Department of Neurosurgery, University Hospital and University Children’s Hospital, Basel, Switzerland.

Select from a range of colors according to your preference and for optimal contrast to the tissue.
CHOOSE YOUR VIEW, SHARE YOUR VIEW

Get the best view for you and share your surgery with others.

Neurosurgical procedures require your complete focus, so we’ve put you at the core of our design. The ARveo microscope makes viewing, capturing and sharing footage of surgery effortless.

Right before your eyes
With CaptiView image injection there’s no need to look away from the surgical site to the monitor during surgery.

- View GLOW AR fluorescence, IGS data from leading manufacturers, microscope information, endoscope, and additional input streams thanks to the OpenArchitecture design
- Rely on full-HD 1080p resolution and 500:1 contrast
- Overlay data on the live surgical image or view as non-correlated in left, right (GLOW800) or both eyepieces
- Your assistant can share your view directly in their eyepieces

Look forwards to a 3D future
Continue to work with the full depth perception and high resolution you require without needing to look through the eyepieces.

- Visualize minute anatomical details on a much larger scale and with natural color differentiation on 31-inch or 55-inch 4K 3D monitor
- Choose to work heads-up and achieve a comfortable upright posture by positioning the optics carrier and cart-mounted 3D monitor exactly where you need them, this limits physical strain on the spine which can have a compounding effect over years in the OR
- Feel even more immersed in your surgical procedure thanks to the magnified view and uncompromised working position

Suddenly they see in 3D
The ARveo empowers your decisions, but it can also help you strengthen the skills of your team.

- Enhance your teaching program with everyone able to follow each surgery magnified on a large 4K 3D monitor
- A shared 3D view supports workflow as your full OR team can follow your every delicate move and be ready for the next step, even in complex cases

Ready to capture and save
Customize your recording, editing and video replay with the fully compliant and secure HDMD Pro from Med X Change.

- Record video and still images to USB or your hospital network via cable or Wi-Fi
- DICOM/PACS compatibility allows you to document cases and save with patient data
- Easily edit your recordings for education and presentation

Go beyond the OR
With the integrated Med X Change HDMD Pro you can stream live video instantly to mobile or desktop devices for flexible viewing and education beyond the OR.

- Share your skills live with students and peers
- Remotely observe your residents as they prepare the surgical site, without leaning over their shoulders
**FUSIONOPTICS: IMPOSSIBLE BECOMES POSSIBLE**

Optical quality is at the heart of the ARveo surgical microscope.

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**FusionOptics Technology**

1. Two separate optical paths
2. One path provides depth of field
3. The other provides high resolution
4. The brain merges the two images into a single, optimal spatial image

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For too long neurosurgeons have had to compromise between high resolution and greater depth of field – but not anymore. FusionOptics utilizes stereo microscopy to create two separate beam paths that carry separate information. Your brain then merges both images into a single, optimal spatial image. The result? A more complete view thanks to a significantly expanded area in full focus. And what’s more, less refocusing helps streamline your workflow.

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**A DECADE OF PIONEERING FLUORESCENCE**

Leading the way in fluorescence visualization.

We have been leading the way in fluorescence technology for the past 10 years and this dedication has enabled us to remain at the forefront of new developments. GLOW800 AR fluorescence plus two other fluorescence filters can be fully integrated into the ARveo. Switching between white light and fluorescence or between fluorescence modes needs just a few clicks.

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**FL400 fluorescence**

The FL400 blue light fluorescence module is available in the USA as a Class I device. Visualize fluorophores in an excitation range of ~380 – ~430 nm (blue) and with a spectral band of ≥ 444 nm.

**FL560 fluorescence**

FL560 was the first microscope filter with FDA 510(k) clearance for FL560 fluorescence. It allows you to view non-fluorescent tissue in natural color and simultaneously observe fluorescence in a bright yellowish-green color.

**NEXT GENERATION: GLOW800 AR fluorescence**

GLOW800 augmented reality fluorescence takes the high contrast of NIF imaging with ICG and combines it with white light for a single view of natural-colored anatomy augmented by real-time vascular flow.
INGENIOUS ERGONOMICS MAKE WORKFLOWS FLOW

Any giant leap in technology is only useful if it’s used. The ARveo has been expertly designed so that it easily adapts to your preferred style of working and body frame. With ergonomics and efficiency factored into every design decision, from software to switch, you can experience all the benefits of augmented reality-enhanced surgery, without interrupting workflow.

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**Positioned for your comfort**
- A range of binoculars with full 360°-rotation for main surgeon and assistant to accommodate different operating positions and body frames
- The design of the optics carrier enables both main and opposite assistant to achieve a comfortable upright working posture
- 600 mm working distance allows for easy maneuvering and passing of the long instruments often used in spine procedures
- Limit potential strain of harsh movements thanks to the lightweight handling and extensive range of movement of the optics carrier

**Integrated and under control**
Created to enable you to work uninterrupted, the streamlined design of the ARveo microscope integrates digital AR technologies and recording systems. Control functions via handle, footswitch or new multi-directional mouthswitch.

**Achieve perfect balance**
Single button AutoBalance saves valuable time. With two pushes of a button, the system fully balances all six axes. Simply push the AC/BC button located above the optics carrier to re-balance the microscope intraoperatively, even through a sterile drape.

**One-touch drape air removal**
Prepare for surgery with speed and ease thanks to the integrated drape air removal System. Drape your ARveo microscope with any surgical microscope drape, activate the system on the microscope arm with one touch, and start working.

**Position and maneuver with ease**
The extensive range of movement and tilt of the optics carrier, combined with the long stand reach and fast stabilization, allow for quick adjustment and adaptation to different surgery steps and procedures.

**Made to withstand**
The premium overhead stand from our partner Mitaka was designed and built for intensive, flexible use in the operating room. Based on aerospace technology, it has a robust full-metal construction with long reach and a compact footprint.
ENHANCING YOUR PATIENTS’ SAFETY

Safer light levels and reliable operation built-in

Equipment downtime and distracting stops and starts have no place in the modern operating room. The ARveo system has been designed to optimize safety while minimizing the risk of interruption. Our reliable illumination system with its independent lamps and boards reduces the risk of equipment downtime, while the microscope and video benefit from completely independent operating systems.

Stay operational
To ensure full operability the microscope and the video recording system are fully independent. In the rare case of a video system error, the microscope retains full functionality and surgery can continue uninterrupted.

Protection for team and patients
The ARveo features special AgProtect coating for superior hygienic conditions. This surface coating with antimicrobial nano silver minimizes pathogens on the microscope as well as possible transmission to team members using it.

Maximum light
The efficient light transmission of the ARveo microscope ensures that the maximum possible light of the microscope is always provided. Therefore, you can operate at safer light levels and still see more than ever before.

Consistent light
The BrightCare Plus system compensates for decreased light intensity as bulbs age to ensure consistent lighting. The internal luxmeter provides real-time light intensity data to BrightCare Plus ensuring that light intensity is measured from actual bulb output not via an algorithm or formula.

Reliable light
The ARveo features two 400-Watt xenon arc-lamp illumination systems. Dual, independent lamps and boards reduce the possibility of equipment downtime due to bulb failure. The second illumination system is automatically activated if needed.

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TECHNICAL SPECIFICATIONS

OPTICS AND ILLUMINATION

FusionOptics | For increased depth of field and high resolution for main surgeon
Magnification | 6.1 zoom, motorized optional magnification multiplier
Objective / working distance | 225–600 mm, motorized multifocal lens, continuously adjustable and manual adjustment option
Eyepieces | Wide-field eyepieces for persons wearing glasses with adjustable eyecup
Observation | Full stereo view for main surgeon and opposite assistant, semi stereo view for 2 side assistants
Integrated 360° rotatable adapter | For main surgeon binocular and opposite assistant
SpeedSpot | Laser focusing aid for fast and exact positioning of the microscope
Illumination | - High-output 2x 400-W redundant xenon arc-lamp systems via fiber optics cable
- Continuously variable illumination field diameter
- Continuously adjustable brightness at constant color temperature
- Automatic activation of 2nd illumination
AutoIris | Built-in automatic zoom-synchronized illumination field diameter, with manual override and reset feature
BrightCare Plus | Safety function through working distance-dependent limitation of the brightness, controlled by built-in limiter

MODULAR OPTIONS

GLOW800 | - Fluorescence excitation 790 nm
- Fluorescence signal 835 nm
- Image sensor 1x 1/1.2"
- Dedicated high-sensitivity HD IR video camera
FL400 | - FL400 fluorescence module
FL560 | - FL560 fluorescence module
CapTV | Full-HD image injection module
2D/3D video options | - 2D/3D HD touch screen monitor
- 4K 3D monitor on microscope
- 4K 3D monitor on optional cart system with 31-inch or 55-inch monitor
- Video fine focus
- Integrated auto focus
- 3 surgeon-controlled digital zoom levels
HMD Pro system from Med X Change | - Fully integrated 2D and/or 3D recording and editing
- DICOM/PACS integration
- Wireless connectivity
- Live video streaming to mobile or desktop devices
- Patient data and modality worklist import
Universal drape air removal with SMARTS | - One-button drape air removal system
- Compatible with all surgical microscope drapes
Additional controls | - Mouthswitch with multi-directional movement
- 12-function wireless footswitch
OpenArchitecture | - Easy integration of INS, laser systems and other inputs (ask your Leica Microsystems representative)
- Prepared for integration of video camera systems and digital recording systems

MANEUVERABILITY AND CONTROL

XY speed | Zoom linked XY speed
Robotic function | - Motorized XY movement
- Externally controllable (optional)
Control | - Freely programmable handles
Balancing | - Automatic balancing of stand and optics
- Automatic intraoperative balancing
Microscope carrier | "Advanced Movement" system for balancing six axes and vibration damping technology
Carrier for monitor | Flexible arm with 4 axis for rotation and inclination

TECHNICAL DATA

Power connection | - 1200 VA 50/60 Hz
- 100 V - 240 V (± 10%)
Protection class | - Class I
Materials | - All solid metal construction coated with antimicrobial paint
Load | - Swing arm: Min. 6.7 kg, max. 12.2 kg from microscope dovetail ring interface
- Monitor arm: max. 16 kg
Weight | - Approx. 320 kg without load
Regulations and Standards

Class I surgical microscope ARveo incl. accessories
Class IIa GLOW800

- IEC 60601-1 / EN 60601-1 Medical Electronic Equipment, Part 1: General requirements – including national differences of EU, CA, US.

The Medical Division, within Leica Microsystems (Schweiz) AG, holds the management system certificates for the international standards ISO 13485, and ISO 14001 relating to quality management, quality assurance and environmental management.