Introducing the ARveo digital augmented reality microscope
GLOW will be added on screen.
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.

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
Page 4-5

Choose your view, share your view:
Visualization in the OR and beyond
Page 6-7

Impossible becomes possible: FusionOptics and innovative illumination
Page 8

A decade of pioneering fluorescence:
Choose your FL mode
Page 9

Ingenious ergonomics for workflows that flow:
Comfort and maneuverability
Page 10-11

Enhancing patient safety:
Protection without interruption
Page 12-13
IT’S TIME FOR EMPOWERED DECISION-MAKING

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

The ARvuo 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.

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.
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.

**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.

*GLOW800 is not yet cleared for use in all regions*
Suddenly they see in 3D
While the entire ARveo system is built to empower your decision-making, we also recognize that you want to strengthen the skills of those who work with you.

> CaptiView image injection allows your assistant to share your view, with full depth perception, directly in their eyepieces
> 3D visualization on screen can help improve your team’s understanding of complex cases and may even increase knowledge retention
> Shared 3D viewing on large screens also enables additional students and staff to follow your every delicate move, enhancing not only education but also workflow

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 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

GLOW800 is not available in 3D
Start fast
With built-in workflow features, you don’t lose time setting up a camera or recording system.
> Get started quickly thanks to the parfocal positioning of the camera’s fine focus
> Easily adapt the focus to meet your needs or to improve the image quality for recording
> Start recording at the touch of a button

Ready to capture and save it all
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 WiFi
> DICOM/PACS integration 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

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 more, less refocusing helps streamline your workflow.

Everything is illuminated
The more you know, the more empowered you become to make the right decisions for your patients. Small Angle Illumination (SAI) combined with bright 400 W Xenon illumination allows light to penetrate to the bottom of deep, narrow cavities.

Visualization that adapts to you
> The optional magnification multiplier boosts magnification by 40%
> SpeedSpot uses two laser beams acting as a focusing reference to quickly provide a defined focus point for all viewing positions (surgeon, assistant, and camera)
> The ARveo microscope features an independent fine focus for your rear assistant with a range of +/− 5 diopters
> A range of binoculars are available, all adjustable to different heights and positioning due to full 360°-rotation
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.

FL400 fluorescence
The FL400 blue light fluorescence module is available in the USA as a Class I device. Visualization with FL400 can aid tissue differentiation as fluorophores are absorbed in different amounts by different tissue types.

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 NIR imaging with ICG and combines it with white light for a single view of natural-colored anatomy augmented by real-time vascular flow.

*GLOW800 is not yet cleared for use in all regions
INGENIOUS ERGONOMICS MAKE WORKFLOWS FLOW

Thoughtfully designed for your comfort and efficiency.

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.

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.
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 a 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.
**Optimal light intensity**

BrightCare Plus optimizes the light intensity relative to the working distance.

- **Max. illumination**
- **Max. illumination (BrightCare Plus inactive)**
- **BrightCare Plus activated**

Long working distance. Decreased working distance at same illumination setting (left) creates burn potential in conventional microscopes.

BrightCare Plus automatically adapts light intensity to the working distance, providing safer illumination (up to 80% reduction of intensity).

At low magnification, the field of illumination (yellow) fills the field of view (green) completely. Previously, as magnification increased, the field of view became smaller, but the illumination outside the field of view could potentially cause tissue burns (red).

AutoIris automatically adjusts the diaphragm so that only the visible area is illuminated.

**Optimal field of illumination**

AutoIris automatically adjusts the diaphragm so that only the visible area is illuminated.

- **Conventional microscope at low magnification**
- **Conventional microscope at high magnification**
- **ARveo microscope with AutoIris**

Maximum light

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

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.

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.
## OPTICS AND ILLUMINATION

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<td>Magnification</td>
<td>6:1 zoom, motorized&lt;br&gt;optional magnification multiplier</td>
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<td>Fine focus</td>
<td>±5 diopter available for opposite assistant (ULT)</td>
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<tr>
<td>Objective / working distance</td>
<td>225–600 mm, motorized multifocal lens, continuously adjustable and manual adjustment option</td>
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<tr>
<td>Eyepieces</td>
<td>Wide-field eyepieces for persons wearing glasses 8.3×, 10× and 12.5× diopter adjustment, ±5 diopter settings and adjustable eyecup</td>
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<tr>
<td>Observation</td>
<td>Full stereo view for main surgeon and opposite assistant, semi stereo view for 2 side assistants</td>
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<tr>
<td>Integrated 360° rotatable adapter</td>
<td>For main surgeon binocular and opposite assistant</td>
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<td>SpeedSpot</td>
<td>Laser focusing aid for fast and exact positioning of the microscope</td>
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<tr>
<td>Illumination</td>
<td>- High-output 2x 400-W redundant xenon arc-lamp systems via fiber optics cable&lt;br&gt;- Continuously variable illumination field diameter&lt;br&gt;- Continuously adjustable brightness at constant color temperature&lt;br&gt;- Automatic activation of 2nd illumination</td>
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<tr>
<td>Autolins</td>
<td>Built-in automatic zoom-synchronized illumination field diameter, with manual override and reset feature</td>
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<tr>
<td>BrightCare Plus</td>
<td>Safety function through working distance-dependent limitation of the brightness, controlled by built-in luxmeter</td>
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## MODULAR OPTIONS

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<td>2D/3D video options</td>
<td>- 2D HD touch screen monitor&lt;br&gt;- 4K 3D monitor on microscope&lt;br&gt;- 4K 3D monitor on optional cart system with 31-inch or 55-inch monitor&lt;br&gt;- Video fine focus&lt;br&gt;- Integrated auto focus&lt;br&gt;- 3 surgeon-controlled digital zoom levels</td>
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<td>HDMI P ro system from Med X Change</td>
<td>- Fully integrated 2D and/or 3D recording and editing&lt;br&gt;- DICOM/PACS integration&lt;br&gt;- Wireless connectivity&lt;br&gt;- Live video streaming to mobile or desktop devices&lt;br&gt;- Patient data and modality worklist import</td>
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<td>Universal drape air removal with SMA RS</td>
<td>- One-button drape air removal system&lt;br&gt;- Compatible with all surgical microscope drapes</td>
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<td>- Easy integration of IGS, laser systems and other inputs (ask your Leica Microsystems representative)&lt;br&gt;- Prepared for integration of video camera systems and digital recording systems</td>
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## TECHNICAL SPECIFICATIONS

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<td>XY speed</td>
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<td>Robotic function</td>
<td>- Motorized XY movement&lt;br&gt;- Externally controllable (optional)</td>
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<tr>
<td>Control</td>
<td>- Freely programmable handles</td>
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<tr>
<td>Balancing</td>
<td>- Automatic balancing of stand and optics&lt;br&gt;- Automatic intraoperative balancing</td>
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<tr>
<td>Microscope carrier</td>
<td>“Advanced Movement” system for balancing six axes and vibration damping technology</td>
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<td>Carrier for monitor</td>
<td>Flexible arm with 4 axis for rotation and inclination</td>
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<td>Power connection</td>
<td>- 1200 VA 50/60 Hz&lt;br&gt;- 100 V - 240 V (± 10%)</td>
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<tr>
<td>Protection class</td>
<td>- Class 1</td>
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<tr>
<td>Materials</td>
<td>- All solid metal construction coated with antimicrobial paint</td>
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<tr>
<td>Load</td>
<td>- Swing arm: Min. 6.7 kg, max. 12.2 kg from microscope dovetail ring interface&lt;br&gt;- Monitor arm: max. 16kg</td>
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<tr>
<td>Weight</td>
<td>- Approx. 320 kg without load</td>
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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.