

# Callisto Eye: Seamless Integration With Other Products

This device is designed for use with the IOLMaster and Lumera microscope.

BY GILLES LESIEUR, MD

Since the beginning of 2014, Callisto Eye (Carl Zeiss Meditec) has been available in Europe. The Callisto technology was originally designed for customization of the capsulorrhexis, but over the years several advances have improved its functionality; now, it can be used for toric IOL alignment and image-guided cataract surgery.

Earlier generations of the Callisto could also be used for toric IOL alignment; however, surgeons were required to manually mark the cornea before surgery, a process that was cumbersome and time-consuming (eyetube.net/?v=ehape). The Callisto Eye system now includes Z Align, an eye-tracking technology that overlays a previously captured image over the live microscope image, thereby allowing accurate and markerless toric IOL alignment.



I have used the Callisto technology for many years and have extensive experience with image-guided cataract surgery. One of the things I like most about the newest Callisto Eye surgical guidance system is that it is designed to integrate with the IOLMaster 500 and the Lumera operating microscope (both by Carl Zeiss Meditec).

## FIRST STEPS

The Option Reference Image (ORI) of the IOLMaster 500 is the first step in markerless toric IOL alignment. Now, in addition to taking the keratometry reading, the IOLMaster 500 can capture an image of the eye using the ORI software (Figure 1) and send it to the Callisto Eye (Figure 2) for projection in the oculars of the Lumera. I am able to view any of three digital overlay templates (ie, assistance functions)—incision and limbal relaxing incisions, capsulorrhexis, and Z Align toric assistant—through



Figure 1. The IOLMaster 500 with ORI: The green light is used to ensure alignment for reference imaging.

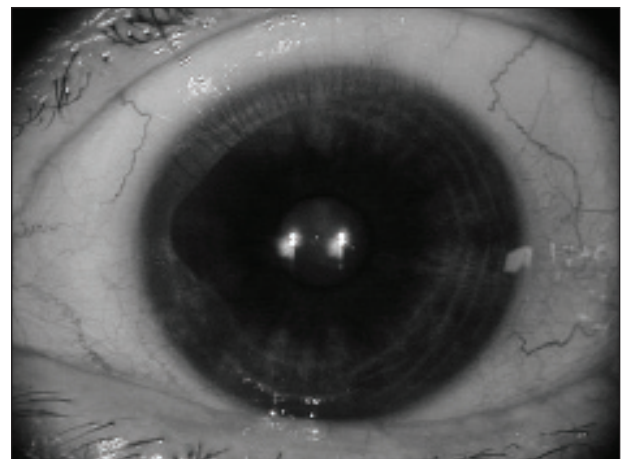


Figure 2. Image of an eye scheduled for surgery, captured by the IOLMaster 500.

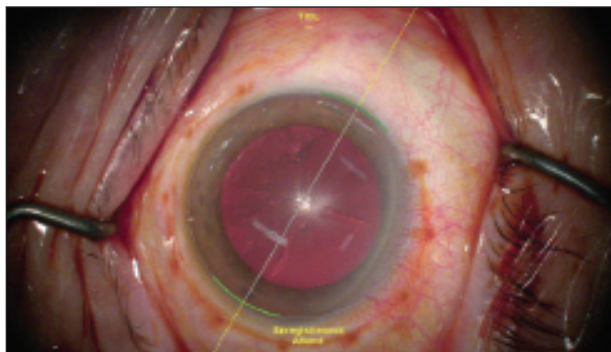


Figure 3. Incision/LRI positioning at 180°.

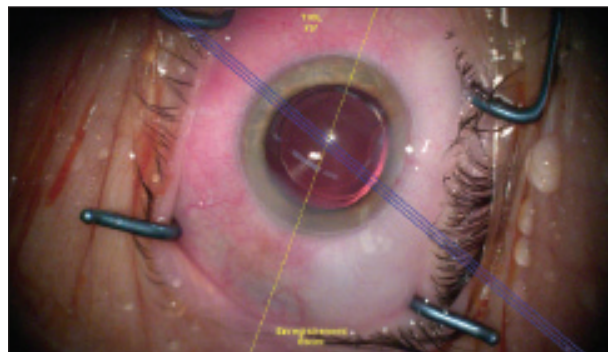


Figure 4. Toric IOL positioning at 70° with Z Align.



Figure 5. A capsulorrhexis size of 5 mm.

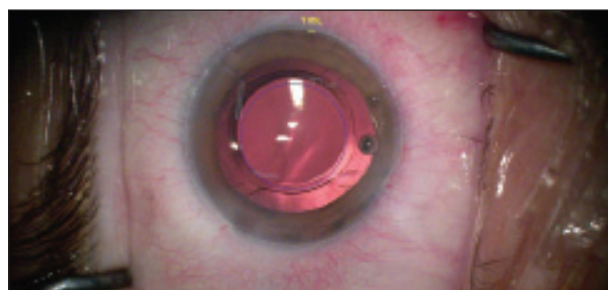


Figure 6. Good centration of the capsulorrhexis and IOL.

the oculars or on a screen attached to the Lumera. The templates adjust for changes in ocular movement using a data injection system (DIS)—an internal DIS for the OPMI Lumera 700 and external DIS for all other OPMI Lumera microscopes. Our center was the first in France to use the external DIS with Callisto Eye 3.5.

When biometry is performed with the IOLMaster 500, it is important to ensure that the patient's head is perfectly positioned in order to avoid using a false horizontal axis. To achieve the best quality picture with the ORI, the patient's eyelids must be widely opened and the light in the room must not be too bright in order to avoid reflections on the sclera. Then, with the patient lying on the surgical bed, the Lumera is positioned and the patient is asked to fixate on the light while scleral vessels on the nasal and temporal sides are matched with the previously captured image. For easiest matching, the microscope image must include the entire limbus around 360° with good magnification and focus and without any liquid accumulation on the cornea.

I find it easier to use coaxial stereoscopic illumination with the microscope vertically oriented to obtain a good red reflex. A yellow line outlines the horizontal axis, and an eye tracker follows each eye movement. In some circumstances, such as with instruments entering the eye or a ballooning conjunctiva, the eye tracker can disengage; however, this happens rarely, and the current system is a huge improvement compared with the previous version of this eye tracker.

## BENEFITS OF IMAGE-GUIDED SURGERY

There are many benefits of image-guided cataract surgery. Following are what I consider to be the most valuable benefits of the Callisto Eye:

**Limbal relaxing incisions (LRIs).** LRIs can be made with different lengths on one or both sides (Figure 3); the capability to project two different length LRIs is not yet available.

**Axis projection for toric IOL alignment.** A markerless system avoids the errors associated with ink markers and horizontal axis misalignment (Figure 4).

**Capsulorrhexis.** The capsulorrhexis can be formed with an optical zone of 4 to 9 mm and with one or two circles (Figure 5).

**Full HD video.** Procedures can be recorded in high-definition, and photographs of the different steps can be taken.

## PREFERENCES

For the capsulorrhexis, I prefer to use one circle of 5.2 mm for IOLs with 6-mm optics and one circle of 5 mm for IOLs with smaller optics. I center the capsulorrhexis on the geometric center (Figure 6). Alternatively, one can center the capsulorrhexis on the visual axis, which is labeled with a cross by the assistance function of the Callisto Eye. I use the capsulorrhexis image-guided assistance function for centration and to begin the capsulorrhexis; afterward, I prefer to follow my squeeze-handle forceps, because it can be difficult to follow a projected circle during the entire capsulorrhexis creation. Also, the DIS can be switched off

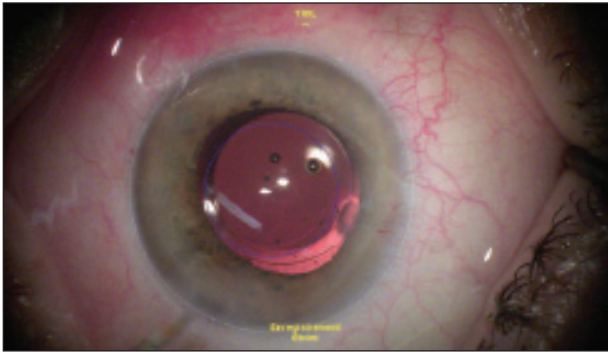


Figure 7. An IOL is slightly decentered despite a well-centered capsulorrhexis.

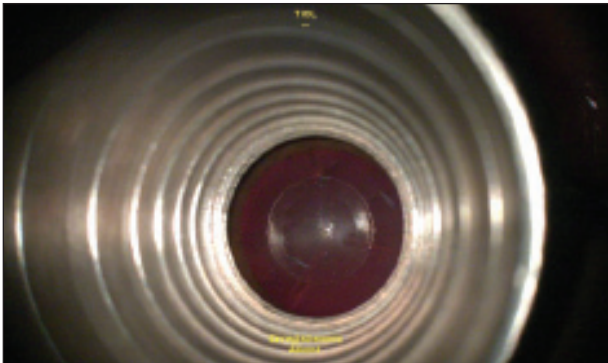


Figure 8. Maloney keratoscope.

and on with the Lumera's footpedal during this time.

Sometimes the center of the limbus or the visual axis can significantly differ from the anatomic center of the lens (Figure 7). Use of capsulorrhexis forceps with a ruler on the tips can help to achieve a well-centered rhexis and IOL.

No keratoscope is available on the external DIS system that we use with Callisto Eye, but corneal curvature variation (K Track) is available on the internal DIS system with the Lumera 700. We use a Maloney keratoscope (Figure 8) instead with the external DIS system.

## CONCLUSION

The Callisto Eye system is an evolution in image-guided cataract surgery. It incorporates biometry and digital overlays into the procedure in order to permit more accurate results and safer surgery for our patients. ■

*Gilles Lesieur, MD, is an anterior segment and refractive surgeon at the Ophthalmologic Center Iridis in Albi, France. Dr. Lesieur states that he is a paid consultant to PhysIOL, receives royalties from PhysIOL and Rumex, and is an investigator for Bausch + Lomb and Carl Zeiss Meditec. He may be reached at e-mail: g.lesieur@centre-iridis.fr.*

