

## Heads-up vitreoretinal surgery system debuts

### New platform increases surgeon comfort, enhances visualization, minimizes light exposure

October 01, 2016

By [Cheryl Guttman Krader](#)

Reviewed by Jason Hsu, MD

**Philadelphia**—A new platform for heads-up digitally assisted vitreoretinal surgery (DAVS) is a true paradigm shift for surgeons and patients. Benefits bring better ergonomics, improved visualization, and potential for greater safety, according to Jason Hsu, MD.

The technology (NGENUITY 3D Visualization System) was launched by Alcon Laboratories in collaboration with TrueVision 3D Surgical at the 16th EURETINA Congress and the XXXIV Congress of the ESCRS. It was slated to be available in the United States and certain European countries by mid-September 2016.

Related: [What ophthalmologists need to know about diabetes](#)

The system integrates a three-dimensional (3-D) camera, which is attached to the operating microscope optics, and a flat panel, high-definition 4K OLED monitor on which the surgeon views a 3-D, stereo image of the surgical field through passive glasses.

“Digital technology has transformed our lives over the past decade, and the DAVS system brings the changes to the operating room,” said Dr. Hsu, co-assistant director of retina research, Wills Eye Hospital, and assistant professor of ophthalmology, Thomas Jefferson University School of Medicine, Philadelphia.

Recent: [Managing silicone oil complications](#)

#### TAKE-HOME

► *A digitally assisted vitreoretinal surgery system offers enhanced visualization for surgeons and observers, better ergonomics for greater surgeon comfort, and may improve patient safety by allowing use of lower endoillumination levels.*

“Using the system myself, I quickly appreciated its benefits and was able to perform even complex cases without any real learning curve,” he said.



**IN VIEW:** The new platform for digitally assisted vitreoretinal surgery allows ophthalmologists to operate by looking at a high-definition, three-dimensional screen, instead of through the eyepiece of a microscope. (Image courtesy of Alcon Laboratories)

“There is a tendency for individuals in any field to balk at adopting new technology because of familiarity and comfort with the status quo,” Dr. Hsu said. “I hope that does not present an obstacle that prevents other vitreoretinal surgeons from giving this new platform a chance because I really think they will love it like I do.”

Related: [Is facedown position really needed after macular hole surgery?](#)

Dr. Hsu said that one of the first things he noticed was greater comfort operating because of the ergonomics difference.

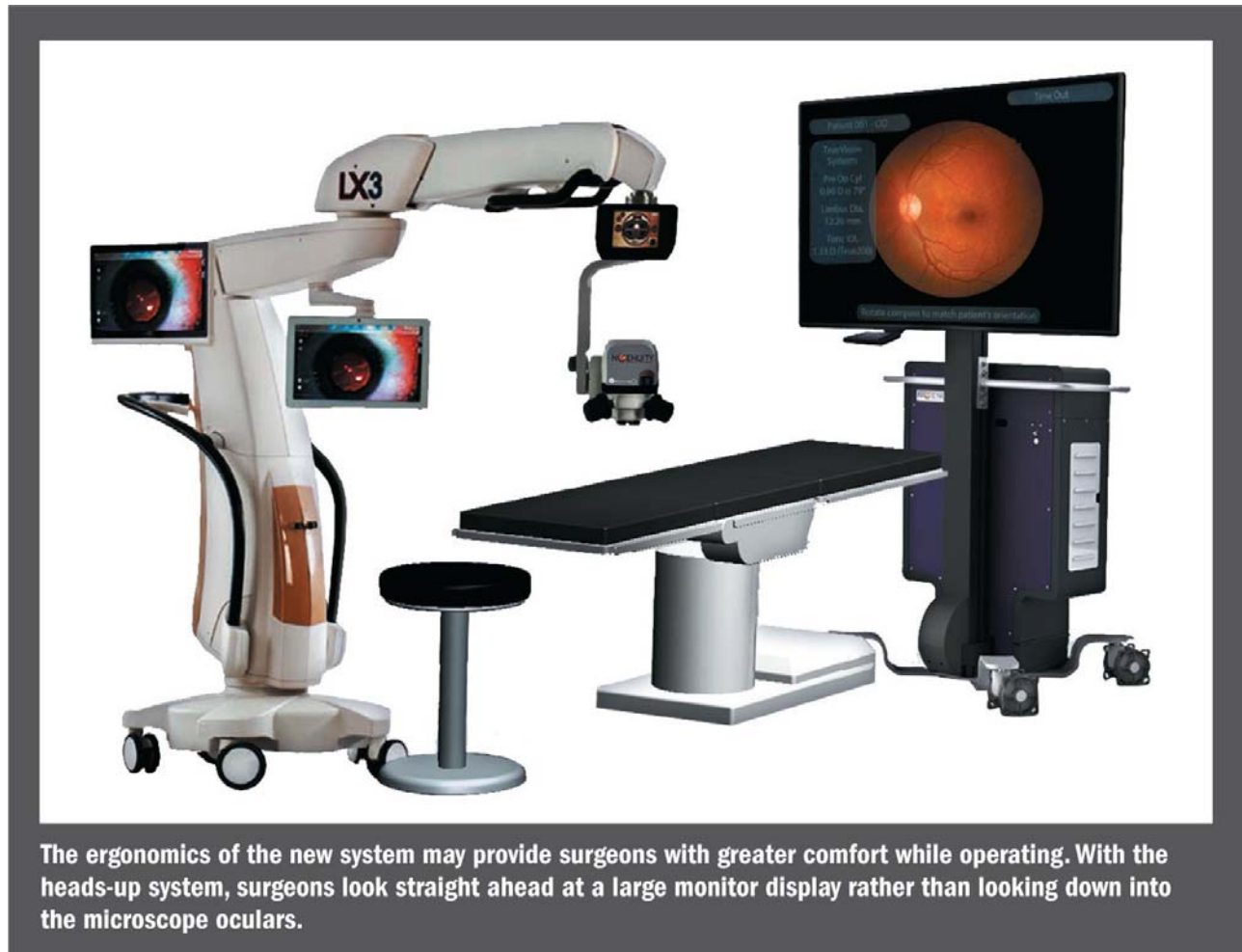
### [Avoiding back problems](#)

With the heads-up system, surgeons look straight ahead at a large monitor display rather than looking down into the microscope oculars, he noted.

“Over time, surgeons spending long hours in the operating room bent over the operating microscope can develop back problems,” he said. “I really think the heads-up system is going to prevent or at least alleviate that from happening.”

Related: [Coin-sized retina scanner targets improved diagnosis](#)

Dr. Hsu said he was also struck by the ease with which he was able to transition from performing surgical manipulations while looking down through the oculars versus looking up at the monitor display.



“A paper presented at the American Society of Retina Specialists meeting this summer reported no difference in operating time comparing the two approaches, and my experience is consistent with that evaluation,” he said. “Operating with the heads-up system is very intuitive, very natural, and does not slow me down.”

Dr. Hsu added that he made no effort to restrict his initial use of the system to relatively straightforward vitrectomy cases.

Recent: [10 least eye-healthy cities in the United States](#)

“I really wanted to see what I could do with the new system, and so my cases on the first days included a membrane peel, complex tractional retinal detachment repair, and rhegmatogenous retinal detachment,” he said. “The first case felt a little different, but still completely natural.

“Perhaps the easy transition has to do with the fact that I developed good hand-eye coordination skills being part of a generation that grew up playing video games, but the bottom line is that I did not encounter any significant learning curve,” Dr. Hsu added.

[Image differences](#)

**Image differences**

Dr. Hsu said he wondered about depth-of-field perception when operating with the heads-up system, but any concern was immediately allayed. Furthermore, the large field of view available with the image displayed on the 4K monitor proved advantageous.

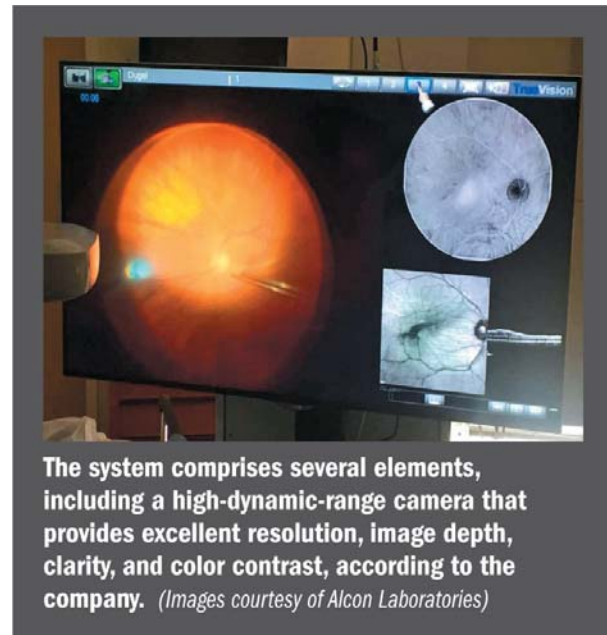
“Surgeons have a very narrow field of view when doing macular pucker surgery using the operating microscope and a contact lens,” he said. “In contrast, using the heads-up platform, I can do the procedure with a noncontact, wide-angle viewing system and get a detailed view of the area where I am peeling while still being able to see well outside that immediate region.”

Related: [Similarities seen in ocular protein deposits in glaucoma, dementia](#)

Dr. Hsu acknowledged that while the monitor of the heads-up system is 4K OLED technology, the microscope still offers higher resolution. Yet, he does not feel the difference is noticeable or a limiting factor considering the resolution limits of the human eye.

“In the future we can expect to see the introduction of higher definition monitors,” he said. “However, that will likely be an incremental improvement considering the level of detail that can be humanly distinguished.”

More retina: [Lower treatment burden with earlier administration of anti-VEGF therapy for DME](#)



Overall, the combination of the high-definition monitor and the larger image with the system provides greater comfort vision-wise than operating through a microscope, he noted.

As another benefit of the system, electronic amplification of the camera signal allows for increased image brightness and therefore reduced endoillumination levels. Dr. Hsu said that a study performed at Wills Eye Hospital evaluated how low the endoilluminator output could be reduced without compromising surgeon's comfort operating.

Related: [Why collaboration needs to exist between retinal, glaucoma specialists](#)

“The results showed that the endoilluminator output could be lowered to just 5% to 10% of maximum, and that is quite a significant reduction compared with our traditional approach where we usually operate with 40% output,” he said. “The difference in intensity would be analogous to the difference between a dim flashlight and a super bright LED light.”

The reduced endoillumination level should translate into reduced risk of macular phototoxicity, which is something surgeons worry about in cases with longer operating times or use of photosensitizing dyes, he said.

The system also allows surgeons to use different filters as a means to highlight various ocular structures.

Dr. Hsu said he has not found a need to use the filters for that purpose because he felt the natural image was so good. He does see potential, however, to use a filter to highlight visualization of indocyanine green (ICG) that may translate into the ability to use a lower concentration of the dye.

“ICG is potentially toxic to the retina and retinal pigment epithelium,” he said. “Our hypothesis is that by digitally enhancing the images using a filter we might achieve the necessary visualization of the internal limiting membrane using a lower concentration of ICG.”

### [Enhancing training](#)

#### Enhancing training

In offering a large stereoscopic display of the surgical field, the system also provides an important teaching advantage, Dr. Hsu noted.

“This is a huge benefit at our institution where we have residents, fellows, practicing retina specialists, and medical students in the operating room,” he said. “Even though we now have large monitors available in the operating room that display the surgical field when operating with a traditional system, those standard screens provide no depth perception.”

Related: [Current generation equipment brings benefits of 27-gauge vitrectomy to more eyes](#)

The real-time, panoramic, stereoscopic view available with the system is “a real game changer” for allowing observers to understand what the operating surgeon is doing, Dr. Hsu said.

It is also a benefit for surgeons who are watching trainees.

Recent: [Study tracks clinical use of dexamethasone implant for DME](#)

“It is really nice for me to be able to have the depth perception and exact view of what the operating surgeon is seeing that is lacking when I am looking through a side microscope,” he said.

More: [Retinal prosthesis system ranks high in safety, performance](#)

Jason Hsu, MD

E: [jhsu@midatlanticretina.com](mailto:jhsu@midatlanticretina.com)

Dr. Hsu has no relevant financial interest to disclose.