

Integrating the NGENUITY® System into Every Case

Alcon's 3D Visualization System increases depth of field, enables higher magnification, and now features simultaneous view of procedure parameters

Much of the initial buzz surrounding the NGENUITY® 3D Visualization System (Alcon) focused on the idea of “heads-up” surgery. **Steve Charles, MD**, founder of Charles Retina Institute in Germantown, TN, is most impressed with the level of magnification and depth of field the system brings to his procedures. As the first U.S. buyer of the NGENUITY® 3D Visualization System, and someone who performs 700 surgeries per year on average, Dr. Charles has extensive experience with the technology. He uses it for every case.

WHAT THE NGENUITY® 3D VISUALIZATION SYSTEM IS ALL ABOUT

Dr. Charles has many positive things to say about the NGENUITY® 3D Visualization System, including the benefits of the new DATAFUSION (1.2) software, but first a few basics. The system is designed to improve the surgeon's experience by enhancing visualization. The 3D stereoscopic, high-definition digital video camera and workstation provide magnified stereoscopic images of the surgical field. Magnification can be increased while a greater field of view is maintained, and digital filters can be used to customize the view and highlight ocular structures and tissue layers. The system also enables reduced light exposure to the patient's retina.¹ The NGENUITY® 3D Visualization System is an adjunct to the surgical microscope, but rather than looking through the microscope eye-piece, the surgeon sees what he or she is doing in 3D on a nearby high-definition screen. As an additional benefit, the immersive, 3D view is ideal for facilitating collaboration and teaching in the operating room. Everyone sees what the surgeon sees in real-time.

“For me, it's all about the depth of field and the enormous magnification,” Dr. Charles says. “The 2.7 times greater depth of field² than we're accustomed to and the 55-inch screen 4 feet away enable much greater magnification with outstanding resolution edge to edge, not just at the center of the picture. The eye appears 3 feet

tall, so I can use my sharpest vision to look around the incredibly magnified image and see remarkable detail.”

WHAT'S NEW WITH DATAFUSION (1.2) SOFTWARE?

Dr. Charles recently began using the NGENUITY® 3D Visualization System with DATAFUSION (1.2) software, which integrates the viewing system with the CONSTELLATION® Vision System. Data overlay from the CONSTELLATION® can be displayed in the 4 corners of the 16:9 aspect ratio screen that aren't occupied by the circular eye image. “I can keep track of surgical parameters such as IOP, flow rates, infusion pressure, laser power, and illumination on the screen as I work,” he explains. “The overlay is transparent so there's no glare. The information is always present, yet unobtrusive.”

Along with several new features designed to simplify the user experience but also allow surgeon customization, the v1.2 software improves the white-balancing process, Dr. Charles explains. “It's been streamlined,” he says. “It provides better image quality because the white balance is always as it should be.

“In addition,” he continues, “The new software introduces four preset imaging modes, but I can create custom modes based on light profile, camera orientation, gain level, picture settings, and color channels.” Dr. Charles appreciates, too, that “electronic inversion of the image obviates the need for bulky optical inverters, which degrade image quality.”

HOW TO SURGERY LIKE STEVE

To use the NGENUITY® 3D Visualization System most effectively, Dr. Charles recommends that surgeons:

- Set the aperture at 30% to take advantage of the depth of field.
- Position the 55-inch screen 4 feet from the surgeon.
- Fill the display vertically to make use of magnification, a key benefit of the system.

- Move the endoilluminator in and out to adjust light levels.
- Use the cannulas as the target objects for focusing properly at the beginning of the case. That way, when an instrument does enter the eye, behind the natural lens or behind the IOL, it's already in focus. Then, as you remove vitreous and move deeper into the eye, continuously follow focus down. When you reach the retinal surface for membrane or ILM peeling, optimize the focus again at the highest magnification.

MORE TO COME

Additional features for the NGENUITY® 3D Visualization System will be introduced soon. These include more

CONSTELLATION® SYSTEM WITH PUREPOINT® LASER BRIEF STATEMENT

CAUTION: Federal law restricts this device to sale by, or on the order of, a physician.

INDICATIONS FOR USE: The CONSTELLATION® Vision System is an ophthalmic microsurgical system that is indicated for both anterior segment (i.e., phacoemulsification and removal of cataracts) and posterior segment (i.e., vitreoretinal) ophthalmic surgery.

The ULTRAVIT® Vitrectomy Probe is indicated for vitreous cutting and aspiration, membrane cutting and aspiration, dissection of tissue and lens removal. The valved entry system is indicated for scleral incision, canulae for posterior instrument access and venting of valved cannulae. The infusion cannula is indicated for posterior segment infusion of liquid or gas.

The PUREPOINT® Laser is indicated for use in photocoagulation of both anterior and posterior segments of the eye including:

- Retinal photocoagulation, panretinal photocoagulation and intravitreal endophotocoagulation of vascular and structural abnormalities of the retina and choroid including: Proliferative and nonproliferative retinopathy (including diabetic); choroidal neovascularization secondary to age-related macular degeneration; retinal tears and detachments; macular edema, retinopathy of prematurity; choroidal neovascularization; leaking microaneurysms.
- Iridotomy/Iridectomy for treatment of chronic/primary open angle glaucoma, acute angle closure glaucoma and refractory glaucoma.
- Trabeculoplasty for treatment of chronic/primary open angle glaucoma and refractory glaucoma.
- And other laser treatments including: internal sclerostomy; lattice degeneration; central and branch retinal vein occlusion; suturelysis; vascular and pigment skin lesions.

The FlexTip* laser probe is intended to be used with ALCON® 532nm laser systems.

CONTRAINDICATIONS:

- Patients with a condition that prevents visualization of target tissue (cloudy cornea, or extreme haze of the aqueous humor of the anterior chamber of vitreous humor) are poor candidates for LIO delivered laser treatments.
- The infusion cannula is contraindicated for use of oil infusion.

IMPORTANT PRODUCT INFORMATION FOR NGENUITY® 3D VISUALIZATION SYSTEM FOR THE DIGITALLY ASSISTED VITREORETINAL SURGERY PLATFORM

IMPORTANT PRODUCT INFORMATION

CAUTION: Federal (USA) law restricts this device to sale by, or on the order of, a physician.

INDICATION: The NGENUITY® 3D Visualization System consists of a 3D stereoscopic, high-definition digital video camera and workstation to provide magnified stereoscopic images of objects during micro-surgery. It acts as an adjunct to the surgical microscope during surgery displaying real-time images or images from recordings.

WARNINGS: The system is not suitable for use in the presence of flammable

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control of the NGENUITY® 3D Visualization System console from the foot pedal of the CONSTELLATION® Vision System. In the meantime, says Dr. Charles, "I've been delighted with this technology from the start, I'm in love with the features of the latest software upgrade, and I use the NGENUITY® 3D Visualization System on a daily basis."

References

1. Eckardt C, Paulo EB, Heads Up Surgery for Vitreoretinal procedures: An Experimental and Clinical Study. *Retina*. 2016; 36(1):137-147.
2. Alcon Data on File. Yin L, Sarangapani R. Assessment of visual attributes for NGENUITY® 3D Visualization System 1.0 for digitally assisted vitreoretinal surgery. Alcon Modeling and Simulation. January 2016.

Dr. Charles has received compensation from Alcon for this article.

COMPLICATIONS: Corneal burns, inflammation, loss of best-corrected visual acuity, loss of visual field and transient elevations in intraocular pressure can occur as a result of ophthalmic laser treatment. Unintentional retinal burns can occur if excessive treatment beam power or duration is used.

WARNINGS AND PRECAUTIONS:

- The disposables used in conjunction with ALCON® instrument products constitute a complete surgical system. Use of disposables and handpieces other than those manufactured by Alcon may affect system performance and create potential hazards.
- Attach only Alcon supplied consumables to console and cassette luer fittings. Do not connect consumables to the patient's intravenous connections.
- Mismatch of consumable components and use of settings not specifically adjusted for a particular combination of consumable components may create a patient hazard.
- Vitreous traction has been known to create retinal tears and retinal detachments.
- The closed loop system of the CONSTELLATION® Vision System that adjusts IOP cannot replace the standard
- of care in judging IOP intraoperatively. If the surgeon believes that the IOP is not responding to the system settings and is dangerously high or low, this may represent a system failure. **NOTE:** To ensure proper IOP Compensation calibration, place infusion tubing and infusion cannula on a sterile draped tray at mid-cassette level during the priming cycle.
- Leaking sclerotomy may lead to post operative hypotony.
- Back scattered radiation is of low intensity and is not harmful when viewed through a protective filter. All personnel in the treatment room must wear protective eyewear, OD4 or above at 532nm, when the system is in Standby/Ready mode as well as during treatment. The doctor protection filter is an OD greater than 4 at 532nm.

ATTENTION: Please refer to the CONSTELLATION® Vision System Operators Manual for a complete listing of indications, warnings, and precautions.

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anesthetics mixture with air or oxygen. There are no known contraindications for use of this device.

PRECAUTIONS: Do not touch any system component and the patient at the same time during a procedure to prevent electric shock. When operating in 3D, to ensure optimal image quality, use only approved passive-polarized glasses. Use of polarized prescription glasses will cause the 3D effect to be distorted. In case of emergency, keep the microscope oculars and mounting accessories in the cart top drawer. If there are any concerns regarding the continued safe use of the NGENUITY® 3D Visualization System, consider returning to using the microscope oculars.

ATTENTION: Refer to the User Manual for a complete list of appropriate uses, warnings and precautions.

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