Phaco Platforms: From Large to Small

An overview of several systems on the market today.

ALCON

CENTURION VISION SYSTEM

According to company literature, the Centurion Vision System is the only intelligent phaco technology designed to optimize every phase of cataract removal. Its Active Fluidics Technology enables surgeons to set and maintain a target intraocular pressure (IOP) throughout the cataract procedure for improved chamber stability and IOP control. Its Balanced Energy Technology enhances phaco efficiency through the Ozil Intelligent Phaco and Intrepid Balanced Tip probe. Applied integration design enables the Centurion Vision System to be compatible with multiple cataract surgical technologies from Alcon, including the LenSx laser, the Verion Image Guided System, the LuxOR LX3 with Q-VUE ophthalmic microscope, and the AutoSert IOL Injector. The Centurion Vision System offers an improved ergonomic design, wireless footswitch, and 17-in touchscreen display, and its design allows easy upgrades over time.


INFINITI VISION SYSTEM

The Infiniti Vision System incorporates Ozil Intelligent Phaco software upgrades, according to company literature. The Ozil Torsional Handpiece features side-to-side oscillating ultrasonic movement, and the Ozil Intelligent Phaco software continuously monitors and responds to phaco conditions throughout the cataract procedure. The Infiniti Vision System features customized power modulations that provide pulse, hyperpulse, smart pulse, and linear burst energy options.

The Infiniti Vision System’s fluidics parameters can be customized based on surgical technique and patient pathology. By monitoring and adjusting fluidics parameters, the software provides increased fluidic versatility and control. With real-time intelligence and instantaneous adjustments of the intraocular environment, it also allows customized lens acquisition while minimizing fluidic flow and turbulence.

The Infiniti Vision System console increases setup efficiency through front-access connections for consumables and accessories and improves readout visibility through a large touchscreen that tilts and rotates 180° on two axes. The footswitch adjusts to surgeon preferences, provides six-function activation for simplified control parameters and adjustment of surgical settings and steps, and eases access and cord management through front-panel storage. The compact, wireless remote control that mirrors key touchscreen controls can be used by the surgical staff in most locations within the operating room (OR).


ABBOTT MEDICAL OPTICS

SOVEREIGN COMPACT

The Sovereign Compact Phacoemulsification System features advanced digital fluidics and continuously monitors and controls intraocular conditions. Its programmable occlusion mode virtually eliminates surges, even at high settings, according to the manufacturer. The Sovereign Compact incorporates Ellips FX technology, which is designed to help surgeons achieve smooth cutting and excellent efficiency without altering their techniques, to enhance followability, and to hold fragments at the tip end. Ellips FX technology is reportedly the only technology that optimizes cutting efficiency by simultaneously combining longitudinal and transverse motions.

The Sovereign Compact Phacoemulsification System is a full-featured phaco machine in an affordable, space-saving package. The device features a durable, light, compact design for easy mobility between offices as well as an enhanced user interface and one-touch prime-and-tune. Users also have the ability to incorporate a system remote and open-toe footpedal.

WHITESTAR SIGNATURE

The Whitestar Signature Phacoemulsification System combines the safety of Fusion Fluidics with the optimized cavitation of Whitestar technology. The platform is equipped with Ellips FX Technology and a fusion pump that allows surgeons to switch between peristaltic and venturi intraoperatively. Fusion Fluidics technology anticipates intraocular changes and proactively adjusts the vacuum before occlusion breaks, according to the company.1

The Whitestar Signature features a footpedal with a full wireless range of approximately 3 m via secure Bluetooth connection. It offers traditional and dual-linear functionality. The Whitestar Signature features a fast prime-and-tune cycle, and surgeon settings can be uploaded to any Whitestar Signature System from a memory stick. The machine incorporates wireless Bluetooth accessories and multilingual voice confirmation, a 17-in LCD panel touchscreen with one-touch access to all settings, and a wireless remote.

BAUSCH + LOMB

STELLARIS VISION ENHANCEMENT SYSTEM

The Stellaris Vision Enhancement System enables microincision cataract surgery (MICS) through a flexible, hybrid approach to fluidics and advanced cutting dynamics. Stable chamber fluidics yields chamber stability throughout the procedure and can be customized based on surgeon preference, with choice of flow or vacuum control. The Stellaris’ Attune Energy Management System delivers efficient cataract removal with minimal energy; the six-crystal Attune handpiece delivers optimized 28.5-kHz frequency. The Attune advanced software, featuring dual-linear control, a front- or back-loading profile control, and programmable waveform modulation, enhances followability, reduces heat generation, and improves phaco efficiency, according to the company.1

With the Stellaris, surgeons can transition to 1.8-mm MICS with no change in their phaco techniques, according to Bausch + Lomb. Key features include a Bluetooth footpedal, 18-inch user interface, and video inlay and overlay.

Also available from Bausch + Lomb is the Stellaris PC, a platform that gives surgeons procedural choice by providing advanced technology for both vitreoretinal and cataract surgery, according to company literature.2 The Stellaris PC offers surgeons a platform for the smallest incisions, including 1.8-mm MICS, and has a small footprint.

CARL ZEISS MEDITEC

VISALIS 100

The Visalis 100 phaco machine features a capturing followability that attracts and continuously engages nucleus fragments on the phaco tip, according to company literature.1 The Adaptive Power Control microprocessor controls, measures, and stabilizes the tip stroke intraoperatively, and the surge security system maintains chamber stability at occlusion break. Pulse modes can be adjusted based on need. Surgeons can control aspiration and vacuum with the peristaltic pump and aspiration rise time setting, providing a venturi-like effect. The Visalis 100 can be used in MICS procedures with 1.8-mm incisions. According to the company, it is the only system in its class with a pneumatic guillotine cutter that includes an integrated compressor. Its graphical user interface and ergonomic footswitch with simultaneous linear control of aspiration and ultrasound offer optimal usability.


VISALIS 500 FAMILY

The Visalis S500 and Visalis V500 phacoemulsification systems are equipped with Advanced Power Modulation (APM), an automated pulse shaping modulation technology that combines burst and pulse ultrasound energy into one modulation pattern. According to Zeiss, APM can lower the measured effective phaco time by as much as 73%, and its capturing followability attracts and continuously engages nuclear fragments on the phaco tip without repulsion. APM provides the efficiency of the burst to impale the nucleus and the speed of the pulse to remove the quadrant.1

Surgeons can switch between peristaltic and venturi pumps as needed during surgery. Two vacuum levels allow precise aspiration control, and the foot control panel supports dual-linear control. Visalis 500 devices can be used for MICS procedures with incisions as small as 1.8 mm. With a modern space-saving design and small footprint, machines in the Visalis 500 family can be used even in tight OR suites. One cassette for both pumps supports combined cataract and retina surgery, and preferred system configurations can be preprogrammed for up to 30 users and 60 programs.

CROMA-PHARMA

**QUBE**

The Qube phaco system features one-handed cassette changing and 14 phaco modes that help reduce the amount of energy delivered to the eye. Qube’s pump system, which includes a venturi pump, extra-thick irrigation tubing, an auto-backflush function, and fast venting in the cassette for increased safety, according to company literature. Qube is equipped with an infusion pressure control function, useful for pressurizing the infusion bottle.

Qube features an intuitive graphical user interface and a dual-linear footswitch with programmable bumpers for maximum individuality. Other key features of Qube include selection of continuous, pulsed, or high-pulsed phaco; bimanual or coaxial phaco; burst mode; and MICS compatibility. The system features an intuitive user interface and a 12.1-inch touchscreen.


**DORC**

**EVA**

The Eva vitrectomy and phacoemulsification device features an advanced fluid control system called VacuFlow Valve Timing Intelligence (VTi). This system uses VTi to control the transportation of fluids in either vacuum or flow modes, according to company literature. Eva features LEDStar endoillumination for minimal light damage to the retina. The platform also incorporates a 19-inch touchscreen, and its multilingual graphical user interface features voice feedback, an integrated stylus holder, and a remote control.


**GEUDER**

**MEGATRON S4HPS**

The MegaTRON S4HPS has capabilities for use in both the anterior and posterior segments. For anterior segment surgeons, highlights of the machine include its hybrid pump system, which features a hot-switch function and venturi effect in the peristaltic mode, intelligent fluidics management, and maximum exploitation of cavitation. The device is upgradeable, and costs per case are low and controllable, according to Geuder. The system uses a single cassette. The MegaTRON S4HPS offers maximum mobility and modularity, a large variety of accessories, a programmable dual-linear footswitch, and text-to-speech in eight languages.


**MEGATRON COOL**

Megatron Cool is a microprocessor-controlled ophthalmologic system for the anterior and posterior segments.

According to Geuder, Megatron Cool phaco technology significantly reduces ultrasonic power compared with traditional pulse mode, enabling the system to be used in MICS. The peristaltic pump is ideally suited for high-vacuum phaco and provides a realistic venturi effect with adjustable vacuum rise time. The Megatron Cool has a real-time vacuum sensor and airless aspiration line. The footswitch provides dual-linear control and flexible individual programming.


**iVis TECHNOLOGIES**

**EASY**

The Easy phaco machine features Vacuum Control Mode (VCM) technology. The VCM energy management system automatically and continuously adjusts energy levels in response to the vacuum level, according to the company. The device features a user-friendly design and intuitive user interface, patented ultrasonic energy delivery management, and additional legacy operational modes, including continuous, pulsed, burst, and multiburst. The Easy device can be controlled by footswitch or touchscreen.

NIDEK

FORTAS CV-30000

The Ophthalmic Surgical System Fortas CV-30000 for cataract and vitreoretinal surgery features the Fortas peristaltic pump, which achieves vacuum rise at shorter times than a venturi pump, according to company literature. The platform’s cassette system incorporates Nidek’s Irrigation Assist Bottle (IAB), which contains irrigation solution and air; when occlusion breaks, the air in the IAB expands, enabling surge reduction with instant increase of irrigation flow into the anterior chamber.

The Fortas CV-30000 features Variable Intervals and Strokes technology, which provides dual oscillation with conventional pulse and ultrashort-duration pulse. The Auto Pulse System-Plus enables efficient control of ultrasound and aspiration pump: Both ultrasound and aspiration pump automatically stop after occlusion breaks. When the phaco tip is occluded, an automatic increase in the pulse duty provides efficient control of phacoemulsification.

With the Fortas CV-30000, the cutting rate, flow rate, and vacuum can be independently controlled and modified in three dimensions. The system’s navigation screen uses images to aid in the set-up procedure for ease of use, and operation modes can be switched using the footpedal. Footpedal functions are customizable with up to eight positions.

CV-9000 AND CV-9000R

The Ophthalmic Surgical System CV-9000 features an intuitive graphical user interface with a pop-up window that enables the surgeon to activate a function or customize parameters. Nine languages are available. The CV-9000 is designed to work with both reusable and disposable tubes and features a high-speed cutter for anterior vitrectomy. Also available is the CV-9000R, which features reusable I/A tubing that can be autoclaved up to 10 times. The unit also offers MICS capabilities. With both the CV-9000 and CV-9000R, three optional software packages are available to enhance aspiration and ultrasound performance, according to Nidek.

OERTLI

OS3

With the addition of individual modules, the OS3 can be upgraded from a cataract surgery platform to a comprehensive anterior and posterior segment system. The OS3 fluidics system includes peristaltic and venturi pumps that can be switched via the TwinVac cassette within seconds. The OS3 features Oertli’s easyPhaco technology, which uses high vacuum and flow values for the attraction, holding, and emulsification of lens fragments, according to the company. With the OS3, certain parameters can be set in the ParaProg background program. The programmable dual-linear footpedal allows independent control of individual values such as flow, vacuum, and power. Total control of the whole system can be achieved from the sterile environment, as the control panel can be placed on the instrument table. The OS3 can be purchased as an anterior segment device and subsequently upgraded to a combined device with addition of the Novitrex module.

CATARHEX 3

Weighing only 5 kg, the CataRhex 3 is a compact, portable phaco platform that fits into any pilot case for easy transportation. During surgery, the CataRhex 3 can be attached to any IV pole and works reliably with voltages from 100 to 240 V in any environment. The CataRhex 3 features advanced direct and reliable processor control and a fluidsics system that enables safe and efficient work even at high settings. With Oertli’s easyPhaco technology, accurately controllable ultrasound is available for every degree of lens hardness, according to the company. The CortexMode provides precise, efficient cortex removal and capsule cleaning, and the integrated high-frequency deep sclerotomy glaucoma function enables combined glaucoma and phaco surgeries.

The CataRhex 3 does not require a Windows or PC operating system, as its integrated USB interface enables device updates at any time. With the DirectAccess cassette, various functions are individually stored for up to 20 surgeons and their operating techniques, and all instruments are plugged in from the front. With the CataRhex 3 control pedal, there are four scopes of movement for fine linear control of all instruments, for retrieving information, and for switching functions on and off.

FAROS

Faros is a slim, lightweight platform (footprint, 55 X 55 cm). It can be used as a phaco device or as a combined device for anterior and posterior segment surgery, according to Oertli.1 Faros incorporates Oertli’s easyPhaco technology and can be used for 1.6-mm MICS. With the Faros user interface, DirectAccess makes menu navigation unnecessary, as the system features a glass display plate with gleaming displays that can be read from a distance; each of the operating keys is always linked to the same function. The possibilities for programming Faros can be individualized for up to 50 people; using Oertli’s ParaProg program, functions can be set individually for each surgeon, technique, and operation.

OPTIKON

PULSAR MINIMALSTRESS

With the Pulsar MinimalStress phacoemulsification unit, the surgeon controls how much ultrasonic energy is delivered to the eye, according to company literature.1

The Pulsar real-time stroke measurement system is not affected by handpiece efficiency, and the handpiece’s maximum delivered stroke is determined preoperatively. Pulsar MinimalStress minimizes trauma at the phaco incision, reduces total ultrasound energy delivered to the eye, eliminates cavitation for increased visibility during surgery, and prevents bouncing of the nucleus.

Key features include an ultralight ultrasonic handpiece, a high-performance peristaltic pump, an anterior chamber stabilizer, and a simultaneous dual-linear footpedal. Additional models, the Pulsar2 MinimalStress and the Pulsar2 ESP MinimalStress, are also available from Optikon.2,3

R-EVOLUTION

Designed by Guigiaro Design and Optikon, R-Evolution is an advanced ergonomic phaco system programmed to be updated regularly to ensure up-to-date technology. R-Evolution was designed with advanced fluidics with performance optimization based on the use of three types of pumps.

A series of Optikon-patented solutions enhances key areas of surgery, including a lighting system with dual-operating temperature and filters designed to reduce phototoxicity, an asymmetric duty cycle system for retinal surgery, and the patented MinimalStress technology for optimal energy control during cataract surgery. Key features include a 19-inch high-definition touchscreen graphical user interface, a wide motorized instrument tray, and a fully programmable Bluetooth footpedal.

SUN COAST MEDICAL

PHACO SYSTEM 2000

The Phaco System 2000 is an ergonomically designed platform with large, easy-to-read displays and a user-friendly console. The device features an all-titanium lightweight ultrasound handpiece, and its low-cost reusable tubing kit can be autoclaved and used repeatedly, according to the company.1

The Phaco System 2000’s low-pulsation, six-roller peristaltic pump gives surgeons complete control of vacuum and aspiration flow rate for freedom from anterior chamber shallowing. Audio vacuum feedback informs the surgeon of what vacuum level has been achieved, and advanced high-powered ultrasonics can emulsify a range of cataract densities.

According to the company, the Phaco System 2000 is compact enough to carry in a briefcase and rugged enough to withstand transportation.1


