EYESTAR 900
Precision OCT

Tradition and innovation – Since 1858, visionary thinking and a fascination with technology have guided us to develop innovative products of outstanding reliability: anticipating trends to improve the quality of life.

HS HAAG-STREIT DIAGNOSTICS

EYESTAR 900
All swept-source OCT precision measurements and imaging for greater safety and improved outcomes

With the Eyestar 900, Haag-Streit is opening a new chapter in measuring, imaging and diagnosing the human eye with the introduction of a complete swept-source OCT-based eye analyzer. The Eyestar 900 features swept-source technology, enabling precise measurement as well as topographic assessment of the front and back corneal surface and the anterior chamber, including the lens, as well as imaging of all these structures. It also includes cornea-to-retina biometry of the entire eye.

The swept-source OCT-based technology provides topography of the front and back corneal surface, pachymetry maps, biometry and A- as well as B-scan imaging in a single measuring procedure on a single device. All data is based on swept-source OCT, enabling precise measurements, stunning imaging and excellent cataract penetration in a single, fully automated and fast data acquisition process. The device also features well established dual zone reflective keratometry, specifically for cataract applications, providing precise and IOL constant compatible keratometry and stigmatism measurements. The pooled information enables the eye care specialist to improve outcomes of surgical interventions (e.g., cataract surgery), diagnose diseases (e.g., keratoconus) quickly and reliably and document eye status and surgical outcomes.

The Eyestar 900 is powered by EyeSuite, the intuitive software tool that enables seamless integration of the device into any practice environment. It also includes the often copied never equalled EyeSuite IOL cataract planning software, for excellent planning of cataract interventions based on latest-generation IOL calculation methods such as Hill-RBF, Barrett and Olsen.

Precise measuring data for certainty

The Eyestar 900's swept-source OCT provides precise measurements of the entire eye, from cornea to retina. This is the basis for reliable diagnosis and accurate surgical planning by the eye care specialist.

Fully automated measurement for efficient workflow

The fully automated measurement process enables the user to reliably acquire precise measurement and swept-source OCT imaging data of both eyes in less than 40 seconds. The workflow optimized automation enables easy-to-delegate data acquisition, thus improving workflow efficacy in a busy practice.

Swept-source OCT for greater safety

Imaging of the entire anterior chamber, including the crystalline lens, allows the user to easily verify any measurement and to identify anatomical anomalies that may interfere with planned surgical procedures. Topographic maps of the anterior and posterior cornea and pachymetry maps enable users to improve their surgical plan and review patients' suitability for specific interventions, such as toric- or multifocal IOL.

Swiss made

EYESTAR 900
Measure, visualize, understand

Eyestar's swept-source OCT provides the user with excellent measurements, topography maps and crosssectional eye images.

The additional information allows better diagnosis, combining axial and keratometric measurements with topographic imaging data, pachimetry maps and swept-source OCT B-scans. This combined data set comprises all the information enabling the eye care specialist to accurately diagnose a patient, plan surgical procedures, predict outcomes and to control the intervention efficacy of cataract, refractive and anterior chamber surgeries.

SWEPT- SOURCE OCT TECHNOLOGY

# **Reliable diagnoses, improved outcomes, fewer surprises**

Having topography, tomography (imaging) and biometry data available in a single fully automated measurement process enables the surgeon to better understand the patient's disease status and to initiate the necessary steps for the procedure.

Eyestar 900 provides this comprehensive information set based on a single technology: swept-source OCT. This improves data quality, usability and patient comfort, acquiring all data simultaneously, in a fast, fully automated measurement process.

Quantify what you see…

The refraction-corrected B-scan OCT imaging of the anterior chamber allows visual anatomy assessment in 16 cross-sections. In addition, the software also determines the three-dimensional lens orientation and location and displays the respective information in an intuitive detail result screen, featuring the B-scan cross-section in the direction of the maximum lens tilt.
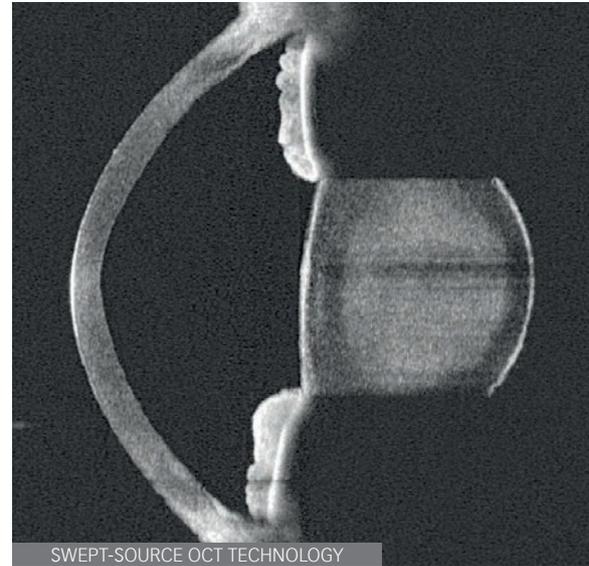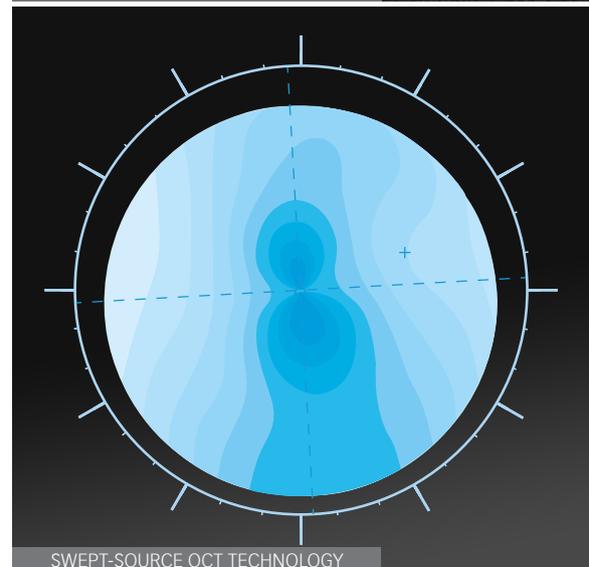

SWEPT-SOURCE OCT TECHNOLOGY

Tear film independent topography…

Eyestar 900 provides corneal topography in compliance with Class A topographer standards. The maps of the cataract suite cover 7.5 mm in diameter and provide comprehensive information of the front as well as the back of the cornea and pachymetry. More detailed data and analysis will be part of the soon-to-be-released anterior chamber suite.
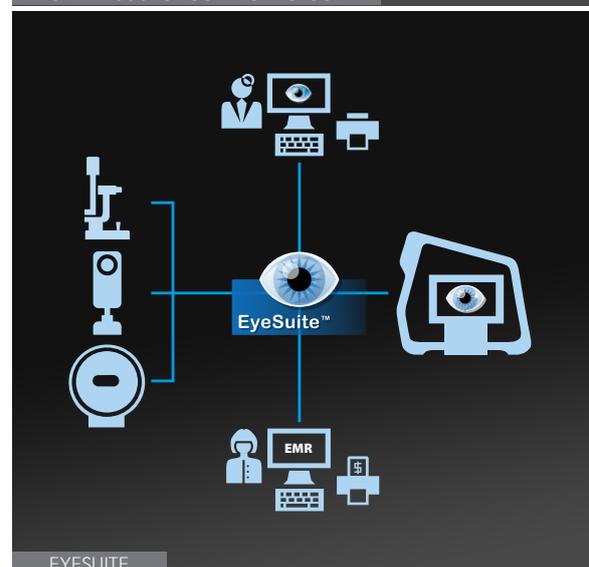

SWEPT-SOURCE OCT TECHNOLOGY

Efficient workflow integration…

The EyeSuite software has been designed for optimum patient flow in a busy practice. It controls all Haag-Streit devices and allows them to be networked with other Haag-Streit devices, your office computer and your EMR system with no need for any expensive third-party software.


EYESUITE

Cataract Suite
Optimized workflow, fewer surprises

Eyestar's Cataract Suite enables acquisition of all measurement data necessary for state-of-the-art cataract planning in a optimized, fully automated measurement workflow. The binocular measurement is typically completed in less than 40 seconds, from the time the patient is asked to look into the device to the finalization of the measurements. In this short time, all data useful for planning of spherical, toric, multifocal and phakic IOL is collected.

The result overview presents all data from axial measurands to topography maps and B-scans of the anterior chamber in an intuitive display. All data may be reviewed on detail screens.
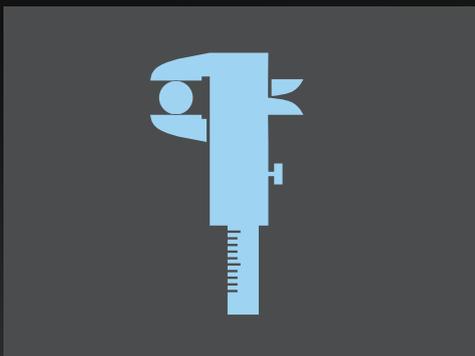
Measurements taken include axial measurands of all eye compartments, corneal front and back topography as well as keratometry, B-scan imaging of the anterior chamber including the lens and assessment of lens tilt and decentration.
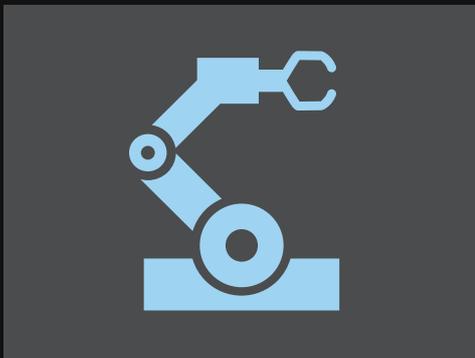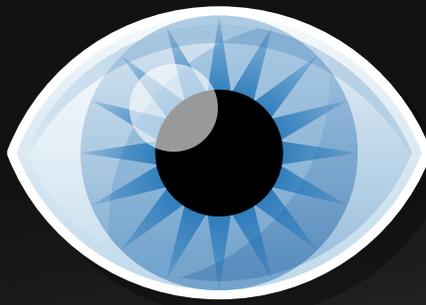
FULLY AUTOMATED, EASY-TO-DELEGATE MEASUREMENT PROCESS

FAST, EFFICIENT AND PATIENT-FRIENDLY ACQUISITION

PRECISE, COMPREHENSIVE MEASUREMENTS FOR IMPROVED OUTCOMES AND FEWER SURPRISES

EXTENSIVE GRAPHICAL IOL PLANNING BASED ON LATEST-GENERATION CALCULATION METHODS

Precise and efficient

Fast and reliable measurement acquisition is the key to efficiently achieving excellent outcomes. Providing a fully automated and quick acquisition process enables easy delegation and improved patient comfort and compliance. Built-in tear film quality assessment leads to highly precise keratometry, complemented by swept-source OCT based laser precision biometry, topography, pachymetry and tonometry of the entire eye.
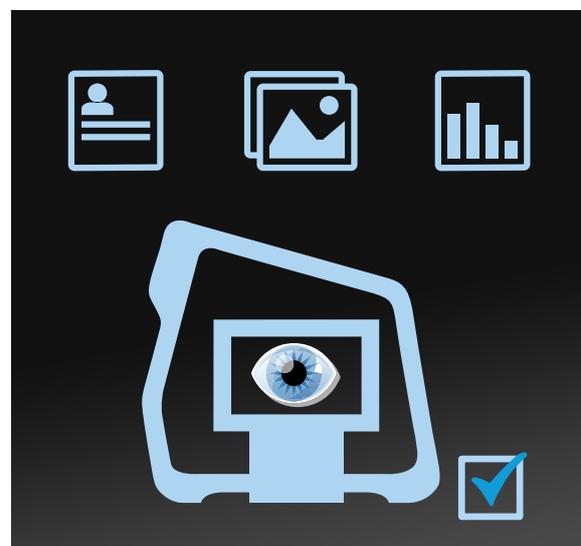
SWEPT-SOURCE OCT TECHNOLOGY

More information, improved outcomes

Biometry based on swept-source OCT provides the user with much more than just axial length measurements and keratometry. Detailed information on the cornea front and back surface have the potential to significantly improve cataract planning for astigmatic and post-refractive patients. The Topography maps allow the surgeon to screen for signs of corneal pathologies, that may limit the patient's post-cataract surgery visual potential. In toric candidates, the symmetry and regularity of the astigmatism on the cornea front and back are readily available, allowing a thorough judgement of the patient's eligibility for a premium IOL.
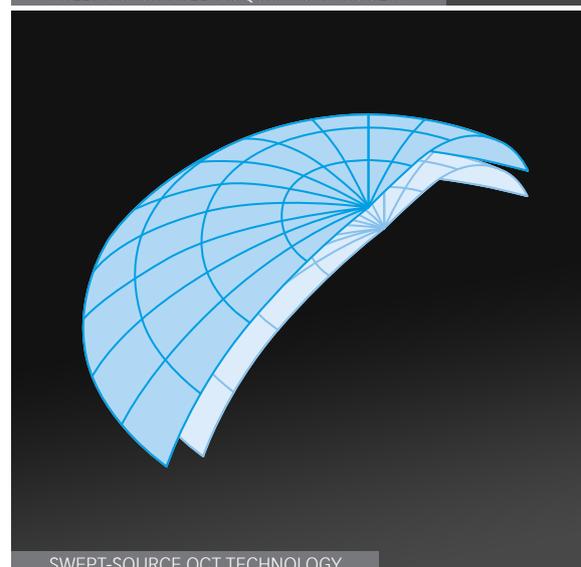
MORE DATA FOR BETTER DIAGNOSIS AND OUTCOMES

Measure, visualize, understand

Anterior chamber B-scan imaging, including the lens, and identification of lens tilt and decentration are beneficial for patient education, particularly when it is a question of premium toric or multifocal IOL. In cases like these setting the proper expectations is crucial to attaining patient satisfaction.

FULLY AUTOMATED ACQUISITION PROCESS

SWEPT-SOURCE OCT TECHNOLOGY
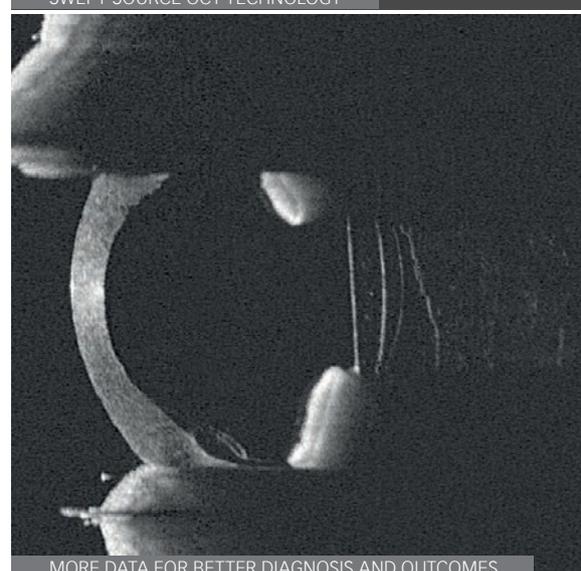
MORE DATA FOR BETTER DIAGNOSIS AND OUTCOMES

EyeSuite IOL
The ultimate planning platform for any IOL

EyeSuite IOL features a comprehensive set of state-of-the-art IOL calculation formulas for any IOL-type or corneal condition in cataract surgery. It includes the latest generation calculation methods – Hill-RBF, Barrett and Olsen – for spherical as well as toric IOL calculations.

One of the key features of these methods is the use of biometry data beyond axial length (AL) and keratometry (K). Central corneal thickness (CCT), anterior chamber depth (ACD), lens thickness (LT) and white-to-white (WtW) are additional parameters that improve prediction accuracy.

Extreme and unusual eyes, in particular, will benefit from the additional information. All toric calculations incorporate the front and back corneal surface for increased accuracy in calculating the IOL spherical equivalent, cylinder power and orientation. This information is then displayed in an intuitive graphic planning tool, enabling accurate transfer of the plan to the operating room.

For post-refractive cases, EyeSutie IOL again features a complete set of state-of-the-art calculation methods such as Barrett's True K and True K Toric, which both incorporate measurement of the posterior cornea, the Masket formula or Shammas no history method.
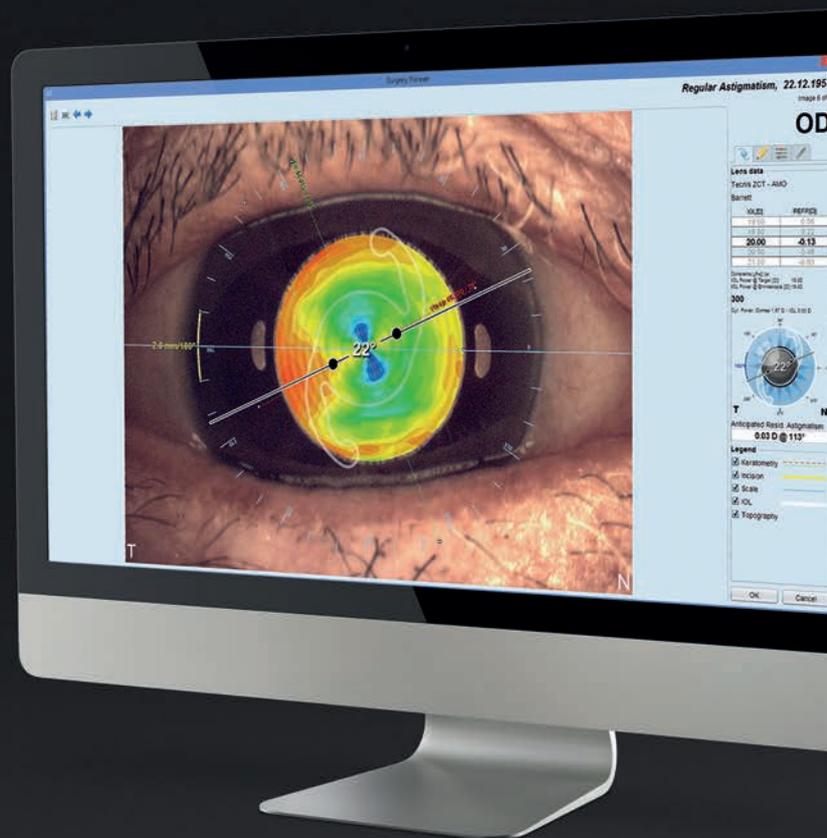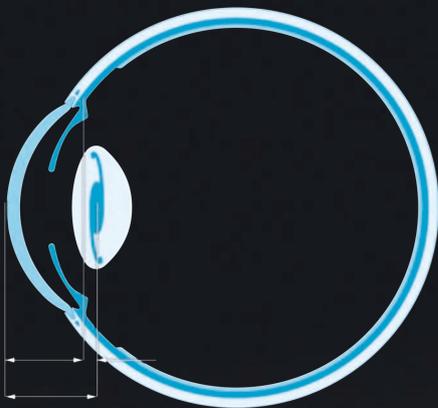
Flexible integration

EyeSuite software is designed for optimum patient flow in busy practices. The easy-to-use Eyestar 900 is fully networkable with both Haag-Streit devices and your own practice network. The EyeSuite script language or command line interface works fluently with almost any EMR system, and supports standard interfaces like DICOM for excellent compatibility.

Certainty

Hill-RBF is a purely data-driven IOL calculation technique incorporating pattern recognition and sophisticated data interpolation. It features a boundary model, informing the user of the calculation's reliability. Hill-RBF performs equally well on long, normal and short eyes. It clearly outperforms second- and third-generation formulas. Paired with the Abulafia-Koch method, Hill-RBF is available for spherical and toric IOL calculations. Unlike static theoretical formulas, the Hill-RBF Method is an ongoing project and is continuously updated for even better overall depth of accuracy.

Identify the unusual

Having B-scan swept-source OCT images of the entire anterior chamber available at the time of measurement allows visual identification of unusual tilt and decentration of the crystalline lens. Furthermore, it facilitates easy checking of automated gate positions for the biometry measurements. All this additional information enables further minimization of refractive surprises.

SWEPT-SOURCE OCT TECHNOLOGY

Artificial intelligence
Hill-RBF 2.0
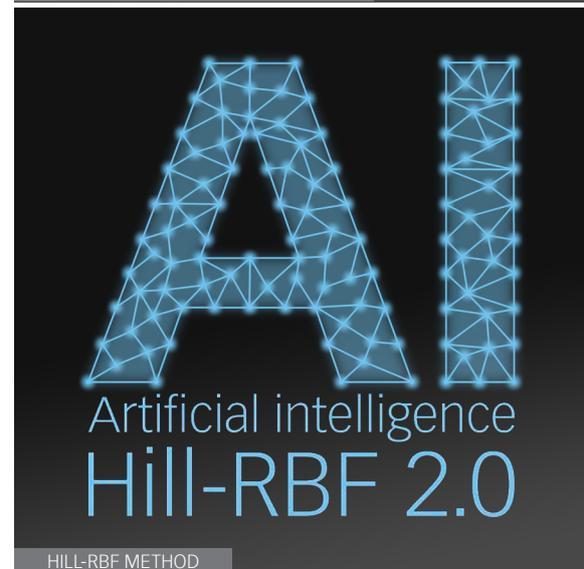
HILL-RBF METHOD
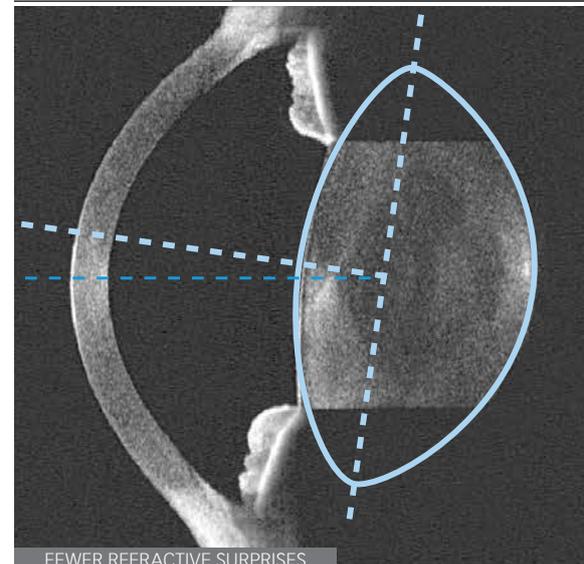
FEWER REFRACTIVE SURPRISES

Intuitive and efficient
Ergonomics for patient comfort and precision

Precise measurement data, intuitive map information and OCT imaging of the anterior chamber is essential to efficiently diagnosing and treating patients. The combination of swept-source OCT, reflective keratometry, high resolution imaging and the fully automated measurement allow efficient, patient-friendly, simultaneous acquisition of all this information in a single device.

Patient comfort and short examination time are key contributors to optimized data quality. Moreover, data collection delegation is crucial to efficiently running a busy practice. Taking this into account, Haag-Streit developed a unique fully automated measurement process for the Eyestar 900, minimizing the user's learning curve and optimizing patient comfort.

Patient compliance and efficacy

Patients, especially elder patients, tend to tire quickly during an eye exam, impairing optimal data collection. The fully automated data acquisition process and its fast measurement with simultaneous data recording lead to excellent patient comfort and thus improve cooperation, which has a positive effect on the measurement quality.

Optimized workflow

The familiar look and feel of the touch-screen optimized EyeSuite software used in all Haag-Streit devices enables efficient interaction and improved adaptation. Like any Haag-Streit device, the Eyestar 900 is easy to integrate into almost any practice management system.

Fits any room

The Eyestar 900 touch screen can be mounted on either side of the device or even on its back. In combination with the all-in-one device's small footprint, this makes it a space-saver that will fit in any examination room.

FULLY AUTOMATED ACQUISITION PROCESS

INTUITIVE USER INTERFACE


FLEXIBLE AND SPACE-SAVING
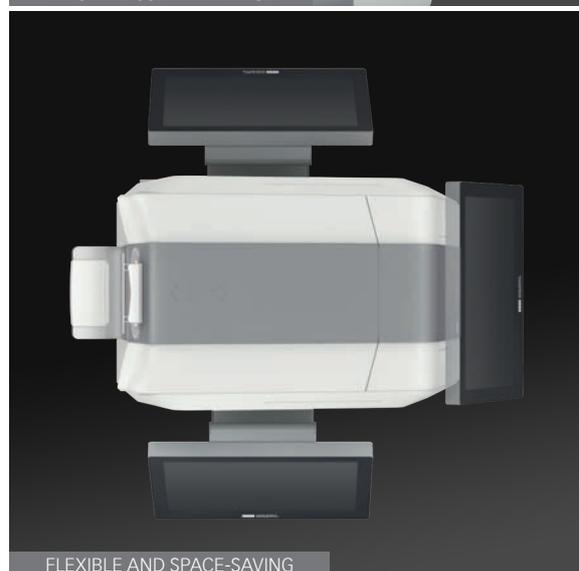
Anterior Chamber Suite
Thorough diagnosis, clear visualization and more…

The Cataract Suite presented in this brochure is just the first of a variety of soon available application suites for use with the Eyestar 900.

The first two extensions are going to focus on topography and anterior chamber analysis in more detail. The topography maps are going to be extended to 12 mm diameter and analysis tools like Zernike wavefront, vision simulation, keratoconus screening and more will follow.

The imaging extension is going to allow the user to create custom B-scan images of the anterior chamber, including the lens. This tool may serve as a diagnostic aide and for documentation purposes.
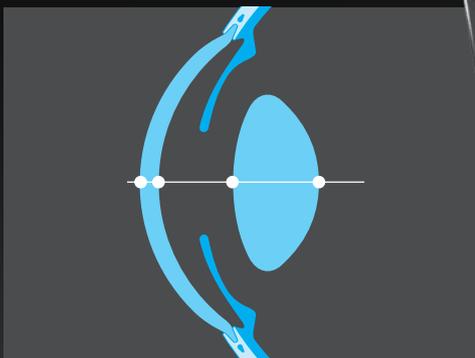
Other extensions in the pipeline will focus on the chamber angle for glaucoma diagnosis, and further improvements to the cataract suite, e.g., an analysis tool for refractive surprises or outcome documentation for phakic IOL.
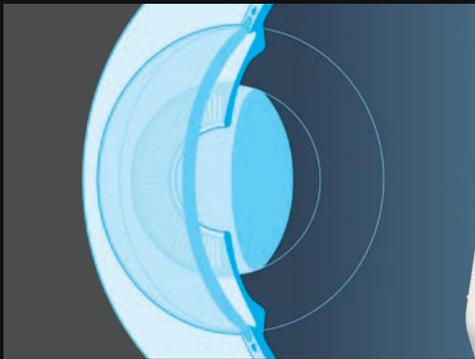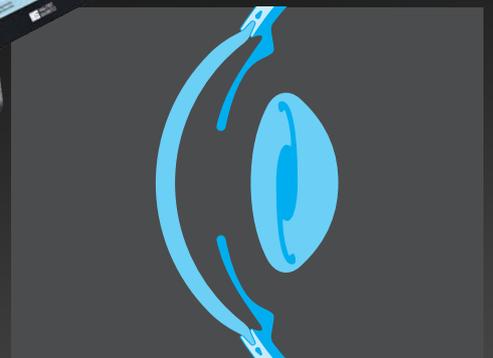

VISUALIZE THE ANTERIOR SEGMENT
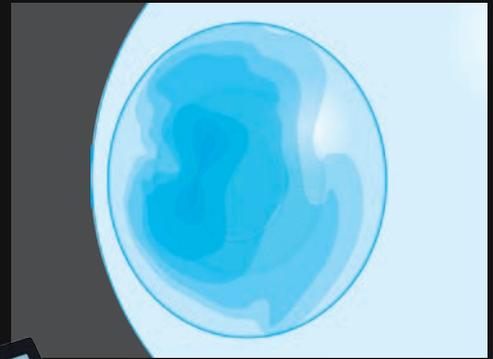
TOPOGRAPHY AND KERATOMETRY OF THE ENTIRE CORNEA

ANTERIOR CHAMBER BIOMETRY

BIOMETRY AND IOL CALCULATION

Topography…

Even though most topography applications are based on maps with a diameter of 7.5 to 8 mm, some applications may need more. Therefore the Topography Suite may provide maps with up to 12 mm coverage. In addition, detailed result displays and progress analyzes tailored to the application as well as tools for disease screening will complement the functionality of this Eyestar 900 add-on and make it a fully-fledged AC analyzer.


+33%

SWEPT-SOURCE OCT TECHNOLOGY

Imaging…

Visualisation and documentation of clinical findings and surgical outcomes are of increasing importance. The Imaging Suite will enable creation of OCT B-scans at any eye location. Sections of up to 18 mm length will be possible, and with eccentric fixation of the patient almost any point on the eyeball visible from the front will be able to be imaged with the swept-source OCT, through the high-resolution imaging system.
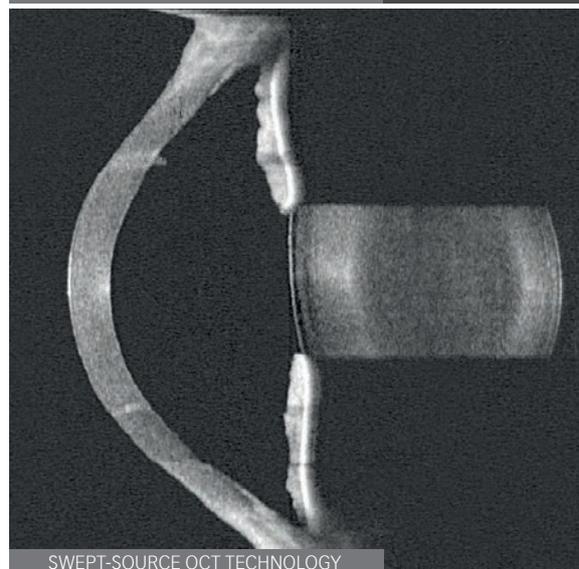

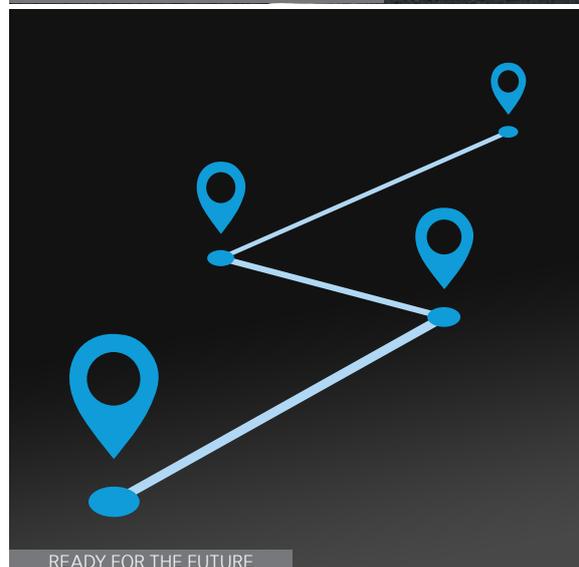SWEPT-SOURCE OCT TECHNOLOGY

And more to come…

Swept-source OCT-based biometry, topography and AC analysis offer many options for new anatomical and surgical assessment. The planned tools for the assessment of phakic IOL implants and for analyzing post operative surprises, including the in-vivo estimation of IOL power are only two of the many options under development for Eyestar 900. An investment in Eyestar 900 technology is thus not only an investment in state-of-the-art technology, but also an investment in the future that will provide added value over its full lifetime.
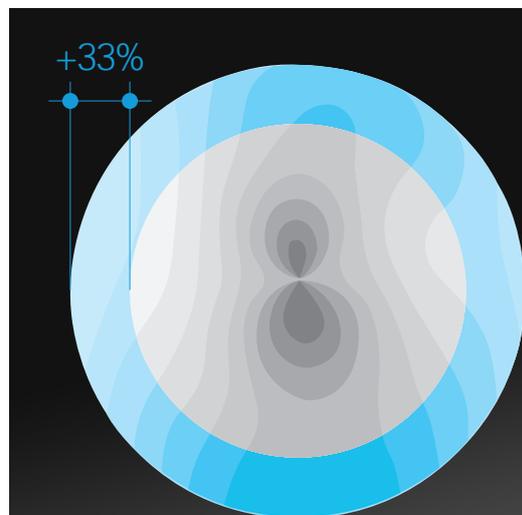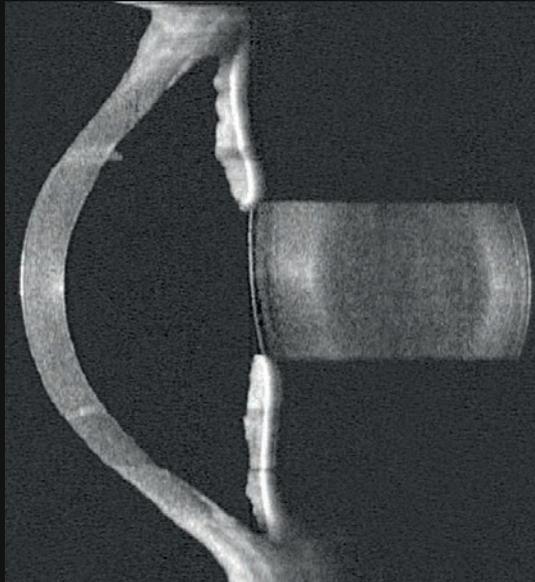

READY FOR THE FUTURE

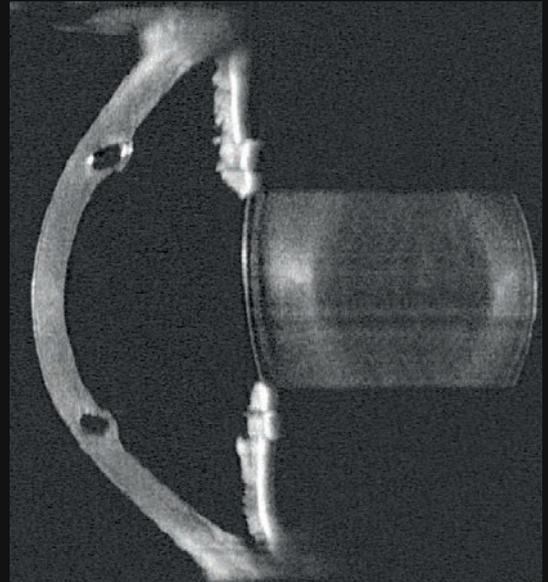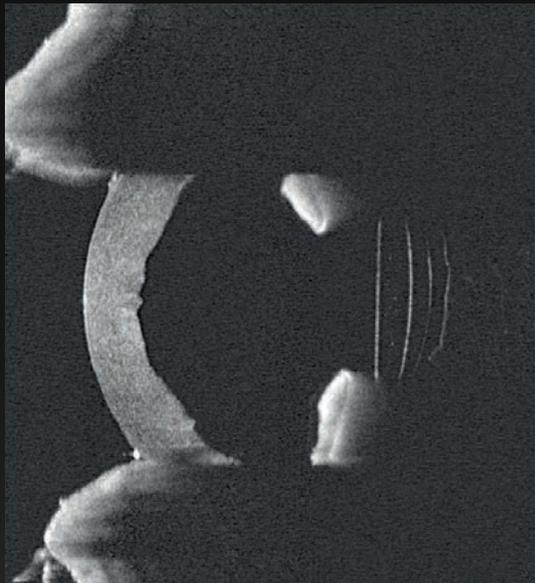CORNEAL TRANSPLANT

INTRA CORNEAL RING SEGMENTS (INTACS)

DMEK PRE-OP AND IOL

DMEK POST-OP AND IOL

Swept-source OCT
visualizes details in high
definition

Technical specifications
Eyestar 900

Technology

Swept-source OCT
Wave length	1060 nm
Scan Speed	30 kHz

Topography, Imaging, Measurement

Dual Zone Keratometry
Infrared LED	850 nm
Measurement points	32

Anterior Keratometry

High resolution imaging
Resolution	Full HD 2080p

Color and Infrared
Enface eye imaging, Measurement

Measurement variables and modes

Corneal Thickness CCT
Measurement range	300–800 µm
Display resolution	1 µm

Anterior chamber depth ACD
Measurement range	1.8–6.3 mm
Display resolution	0.01 mm

Lens thickness LT
Measurement range	0.5–6.5 mm
Display resolution	0.01 mm

Axial length AL
Measurement range	14–38 mm
Display resolution	0.01 mm

Anterior Keratometry K
Measurement range	32.1–67.5 dpt
Display resolution	0.01 dpt

Posterior simulated Keratometry SimPK
Measurement range	3.9–9.5 dpt
Display resolution	0.01 dpt

White to white WTW
Measurement range	7–16 mm
Display resolution	0.01 mm

Pupillometry PD
Measurement range	2–13 mm

Topography
Topography system	Type A
Map display	
Cataract Suite	7.5 mm
Map display Anterior	
Chamber Suite*	up to 12 mm

Maps:
Anterior and posterior corneal topography
Pachymetry

* part of a future software release

Measurement Modes
«Normal» eye
Aphakic eye
Pseudophakic eye
Silicone oil filled eye
Combinations of the above

Laser safety
Class 1 laser product

Onboard IOL Calculation methods
Hill-RBF
Hill-RBF/Abulafia-Koch for toric IOL
Barrett Universal 2
Barrett Toric Calculator
Barrett True K and True K Toric
Olsen and Olsen Toric
Haigis
HofferQ
Holladay 1
SRK/T and SRK II
Masket and Modified Masket
Shammas no-history

IOL calculation data interfaces
Holladay IOL Consultant
PhacoOptics
Okulix

Supported EMR interfaces
DICOM
EyeSuite script language
GDT
Eyesuite command line interface

The above-mentioned measurement ranges are based on the standard settings of the device for automatic measurement and analysis.

Eyestar 900 Intended Use

The EYESTAR 900 is a non-invasive, non-contact biometer used for obtaining following information:

- Corneal shapes
- Axial eye length
- Lens dimension and position
- Anterior chamber dimensions
- Front- and cross-sectional images

Indications:

The device indications for the use are measuring biometry data necessary for lens implant surgeries and measuring biometry data for analyzing the anterior chamber

Contraindication:

There are no known contraindications.

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