

# HOCT-1/1F

All-in-One Optical Coherence Tomography with Fundus Camera, Angiography, Biometry and Topography

+ Innovative Ophthalmology Solutions

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# HOCT-1/1F

## Specification

OCT	Principle	Spectral domain OCT, Fundus digital photography
	Light source	840 nm
	Scan speed	Max. 68,000 A-Scan/sec.
	Resolution in tissue	20 um (Lateral), 7 um (z-axis) at index 1.36
	Scan Range	X : 6~12 mm, Y : 6~9 mm, Z : 2.34 mm
	Display resolution	X : 5.85 um, Y : 23.40 um, Z : 3.05 um
	Minimum pupil diameter	2.5 mm
	Scan patterns	Macular : Macular Line, Macular Cross, Macular Radial, Macular3D, Macular Raster, Angio (Option) Disk : Disc Circle, Disc Radial, Disc 3D, Disc Raster, Angio (Option)
	Optical power at cornea	≤ 650 uW
	Acquisition time of 3D image	1.4 sec. (Normal mode, A512 x B96)
Depth Accuracy (measuring 1 mm glass)	±3%	
OCT Angiography - Option (HOCT-1, HOCT-1F)	Angiography Range	3~9 mm
	Angiography Map	Superficial, Deep, Outer, Choriocapillary, Retina, Custom, Enface, Thickness map, Depth coded map
	Angiography Analysis	FAZ, Vessel Density
Fundus Camera (HOCT-1F)	Type	Non-mydratic fundus camera
	Resolution	60 line pair/mm or more (center) 40 line pair/mm or more (middle) 25 line pair/mm or more (periphery)
	Angle of view	45°
	Camera	Built-in 12M pixel, Color or Built-in 20M pixel, Color
	Minimum pupil diameter	4.0 mm (Normal mode), 3.3 mm (Small pupil mode)
	Flash light	White light, 10 levels
	Pixel pitch at fundus	3.69 um (20M pixel Color) 4.63 um (12M pixel Color)
Common specification	Capture mode	Single, Stereo, Widefield Panorama
	Working distance	33 mm
	Display	12.1 inch, 1280 x 800 pixel, Touch panel color LCD
	Dioptric compensation for patient's eye	-33D~+33D total -13D~+13D with no compensation lens +7D~+33D with plus compensation lens -33D~-7D with minus compensation lens
	Fixation target	LCD (internal), White LED (external)
	Fundus illumination light	760 nm
	Horizontal movement	70 mm (back and forth), 100 mm (left and right)
	Vertical movement	30 mm
	Chinrest movement	62 mm (up and down), motorized
	Auto tracking	30 mm (up and down), 10 mm (right and left), 10 mm (back and forth)
	Power supply	AC 100 - 240 V, 50/60 Hz, 1.6 - 0.7 A
	PC	Built in computer
	LCD Tilting Angle	70°
	External port	2 USB, 1 DP, 1 RGB, 2 LAN
	Dimensions / Mass	330 (W) x 542 (D) x 521 (H) mm / 30 kg
Anterior segment adapter (optional)	Working distance	15 mm
	Scan range	6 ~ 9 mm (width), 2.3 mm (depth)
	Scan pattern	ACA line, Anterior Radial
	Software Analysis	Corneal Layers, Thickness Map, Thickness, Angle
Wide Anterior segment adapter (optional)	Working distance	15 mm
	Scan range	16 mm (width), 2.3 mm (depth)
	Scan pattern	ACA line, Anterior Radial, Full
Biometry (optional)	Software Analysis	Dimension, Angle
	Metric	AL, CCT, ACD, LT, WtoW
Topography (optional)	Supported Maps	Axial map, Tangential map, Keratoconus Screening
HIS-1	Feature	Web-Based, Multi users can be accessible Progression analysis, Comparison analysis, 3D Analysis

\* Specification and design are subject to change without notice.



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W2ARAA-19-00001 Rev.2





3D OCT  
FUNDUS CAMERA  
ANGIOGRAPHY  
BIOMETRY  
TOPOGRAPHY

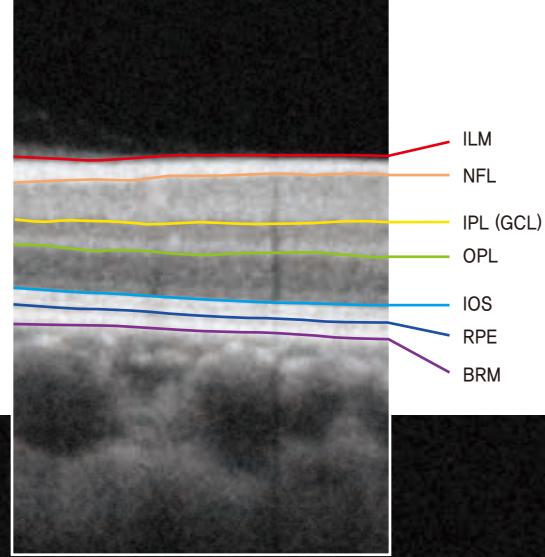
**See more, Do more, Save more  
Huvitz 5-in-1 OCT**

3D OCT with Fundus Camera and Angiography  
HOCT is now even more advanced with the  
addition of Biometry and Topography.

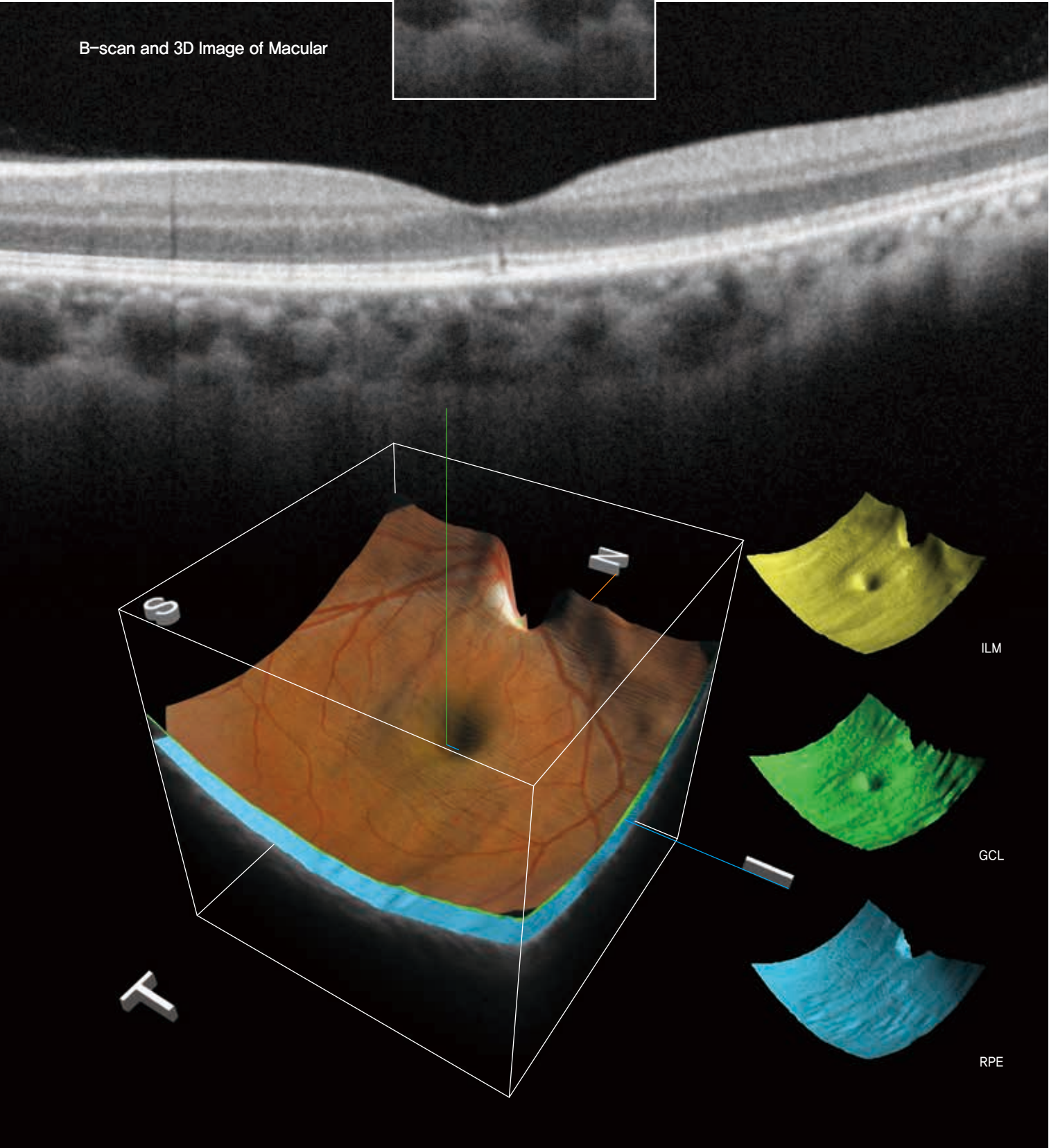
Not only Anterior and Posterior disease diagnosis, but also  
gathering the necessary data for an Ophthalmologist's  
cataract surgery.

Because the HOCT acquires all the necessary information  
in one instrument, it becomes efficient and convenient for  
you and your patients.

Segmentation of Seven Retinal Layers



B-scan and 3D Image of Macular



# High-Speed & High-Quality

Incredible speed of 68,000 A-scan/sec. :  
More Realistic and Clearer image in high resolution

Provides High-speed Scan, High-quality Image by using Huvitz's outstanding optical technology and innovative image software. Shows extensive information, such as 3D structure of Retina, Macula's thickness and separation in a vivid image.

### High Resolution Image – min. 60 lines/mm of central Fundus

Creates 3 um OCT Digital Resolution medical images, allows more precise Retina observation and useful follow-up examinations.

### Accurate and Stable Image Averaging

It is very important to obtain high-quality images that are accurate and stable in all OCTs. However, it's not easy to capture these due to patient eye movement over the period of the test. The HOCT detects fast eye movements with image processing algorithms of fast Scan Speed\* and Smart Viewing Technology (SVT)\*\* and scans up to 68,000 points per second, and calibrates to create a high-quality optical image. HOCT can acquire high-quality images without any repetitive operation for first time users.

\* 68,000 A-scan / sec., Less than 1.4 sec. in 6 x 6 mm<sup>2</sup> 3D shooting

\*\* Smart Viewing Technology : Huvitz's Speckle-Noise-Reduction System & Pre-Acquiring Algorithm to acquire high-quality images

### Vividly Visualized Retinal Layers

Visualizing with precise B scans and smooth 3D images at faster scan speed makes it easier to observe pathological shapes and status in stratified Retinal Layers. It is also useful to further elucidate the pathological rheobase of Macula and Optic Disc, including factors that impair Photoreceptor Function, Retinal & Choroidal Vasculature (vascular system) in a slice image for Retinal Layer consists of 7 pieces.

### Brightness Level Adjustment

Precisely identify lesions by minutely adjusting image's brightness and contrast. In this way, specific parts of lesions can be highlighted which help users to easily see details.



Macular – Radial

Optic Disc – 3D



## One for All System

Integration of OCT, Fundus Camera, Angiography, Biometry & Topography : more accurate and useful by adding all 5 functions.

By combining OCT Angiography, Full Color Fundus Camera, and PC, it can generate high resolution images providing multi-purpose functions for diagnosis. It saves both time and space by performing frontal view (Enface) of eye diseases, Tomography, cross-compare and diagnosis in a single run.

### Upgraded Combined-One

Provides maximum psychological stability to the patient without re-shooting and reduces stress during shooting\*.

Easily checking lesion's position by Fundus Image, it precisely guides the location of the OCT Scan Image.

\*Motion detection technology: Smart Scan Technology (SST) is applied to achieve perfect images without re-shooting even though there're flicker or movement (see Smart Scan page).

### Compact Design – it can be installed in a small space

Thanks to HOCT's space-saving design, it is perfect for hospitals and research areas with a variety of diagnosis devices & treatment equipment. HOCT can maximize the convenience for users as well as patients by saving time & space.

### Web Browsing System to view data anytime, anywhere

Patient's test data can be analyzed anywhere on the Internet. You can check and analyze all data of HOCT through Web Browser such as Internet Explorer, Safari, Chrome without installing special software separately.



## User Friendly

Auto Tracking & Auto Shooting : makes it easy to use and obtain reliable data

HOCT is smart.– Obtains reliable data with minimum deviation of image quality according to user's measurement proficiency.

### Fast and Stable Full Auto Mode

Simply press the button once to capture the image quickly and easily without any errors with Auto Tracking, Optimize, Auto Shooting at the correct position.

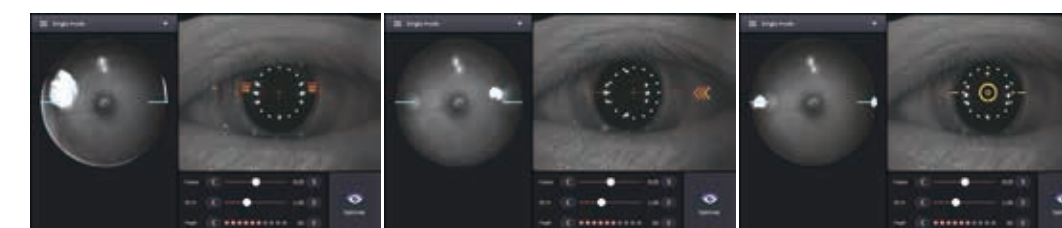
Depending on the application, select Semi Auto to obtain more detailed images.

### Semi Auto Mode for more precise images

You can obtain a more precise image by shooting Semi Auto Mode turning one's gaze to the side for patients with eye diseases such as cataract, strabismus, or optic disk and peripheral measurements. Semi Auto Mode can also be applied to eyes with weak signals.

XY alignment, focus is automatically adjusted, and manual operation during auto adjustment is also possible.

Focusing and Firing functions can be judged and involved by users so that users can obtain images in an intuitive way.



Forward - Back

Left - Right

Optimized Focus

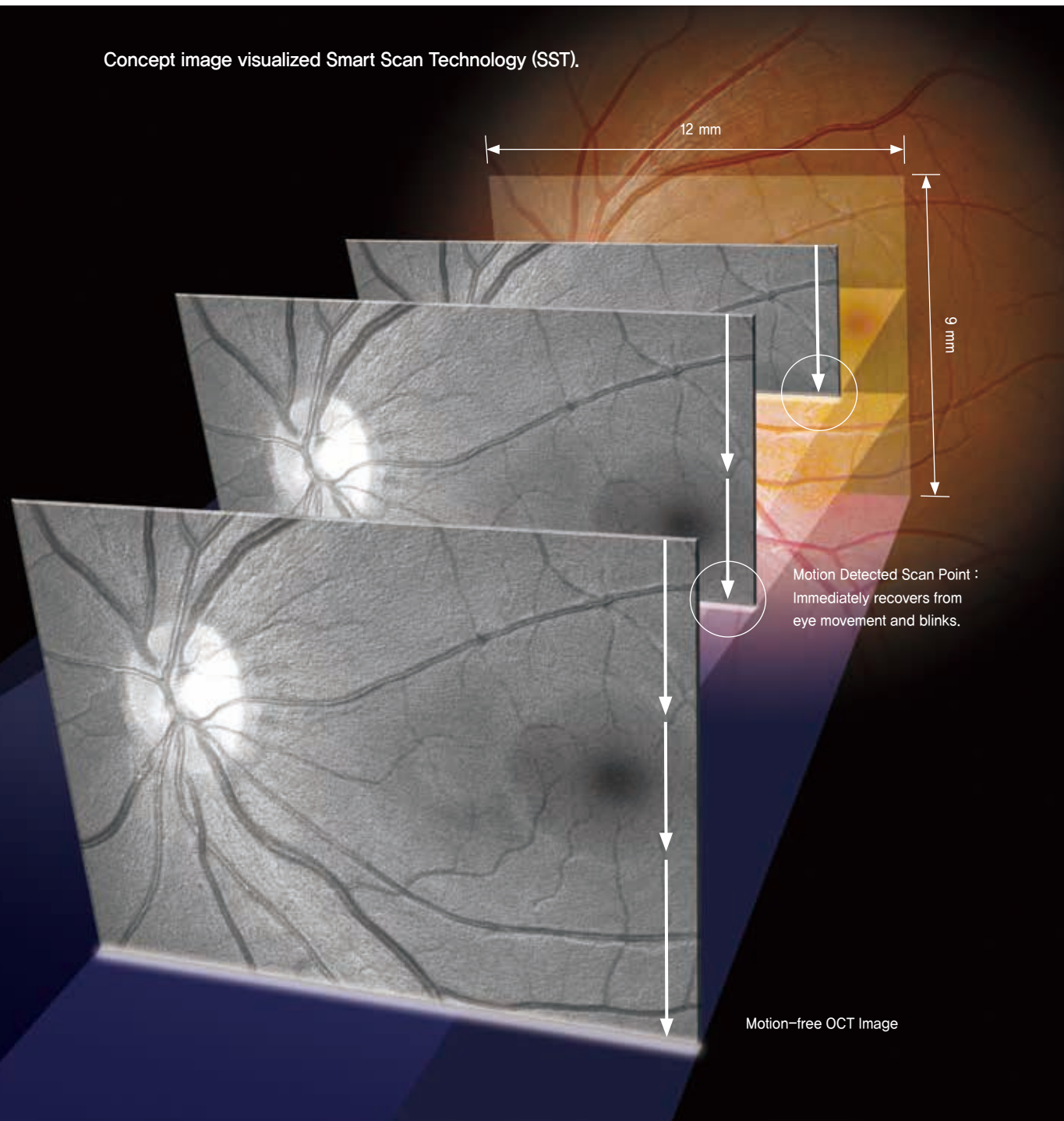
# Smart Scan

Start and finish instantly through only one-click :  
Speedy process reduces errors in forward looking of patients

It provides convenience & accuracy by offering easy & various scanning functions with Macula, Optic Disc, and Anterior.



Concept image visualized Smart Scan Technology (SST).



## Wide Area Scan (12 mm x 9 mm) for efficient diagnosis

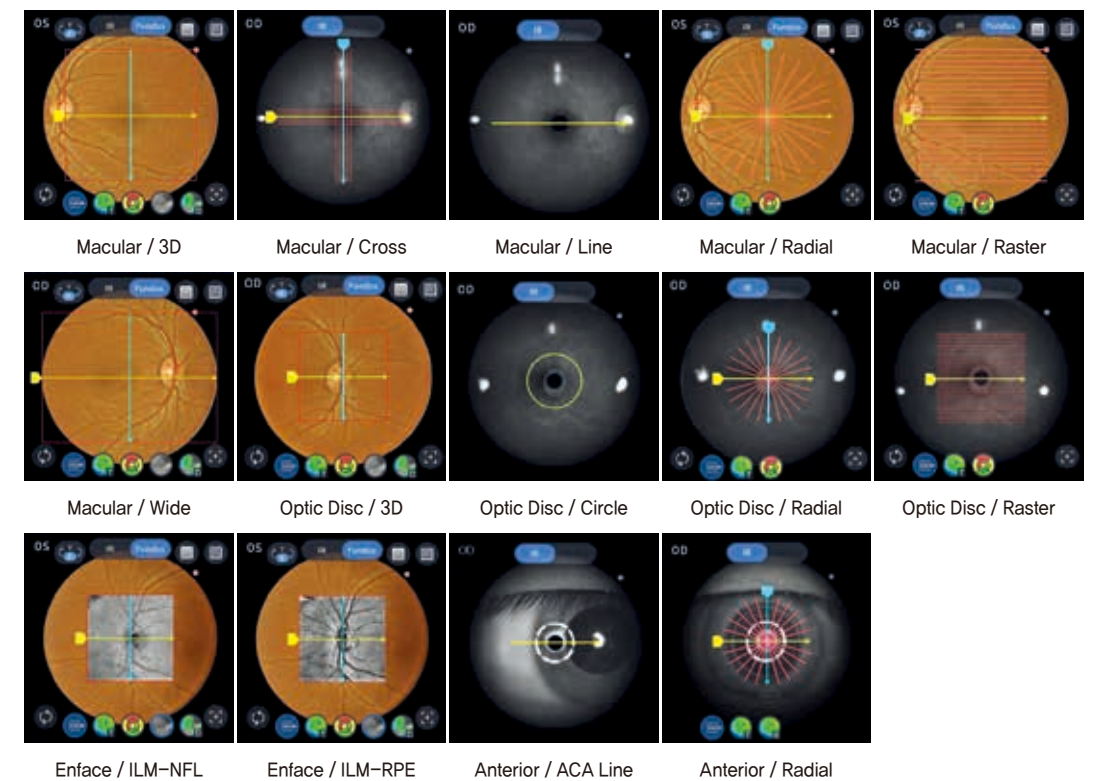
A quick scan covers Macula and Optic Disc areas extensively. By scanning around Optic Disc or Macula for patient's pathological status, you can check the Thickness Maps between RNFL (Retinal Nerve Fiber Layer), GCL (Ganglion Cell Layer) and RPE Layers.

## Smart Scan Technology with Motion Detection

Image analyzer with Huvitz's unique Smart Scan Technology (SST) obtains a complete and perfect C-scan image by detecting any motion of eye flicker or movement that would prevent disappearance of scan line and image collection during measurement.

## Providing Various and Useful Scan Patterns

12 different patterns make it available to choose and apply the optimized pattern to the main symptoms or the area of retinal disease without repetitive work or time-wasting.



# Accurate Analysis

## Accurate segmentation and measurement : Analyze pathology status from various perspectives

A complete analysis helps you observe symptoms, illnesses and progress of each patient at a glance. Key indicator values compared to Normative Data are displayed in table and chart format.

### Progression to track pathological changes

OCT scan and fundus image of a patient can be compared at a glance to sequential measurement results from baseline to present.

Progression from past to present helps analyze disease progression and treatment process.

Thickness, Enface, and ETDRS can be superimposed on the IR or Fundus at each measurement point so that the change in thickness of nerve fiber can be confirmed according to the transition.

It also provides a trace graph so you can study at a glance.

### Compare before and after patient's symptom

You can compare and analyze the baseline data of a patient with the current data.

### 3D modeling in high speed and wide area

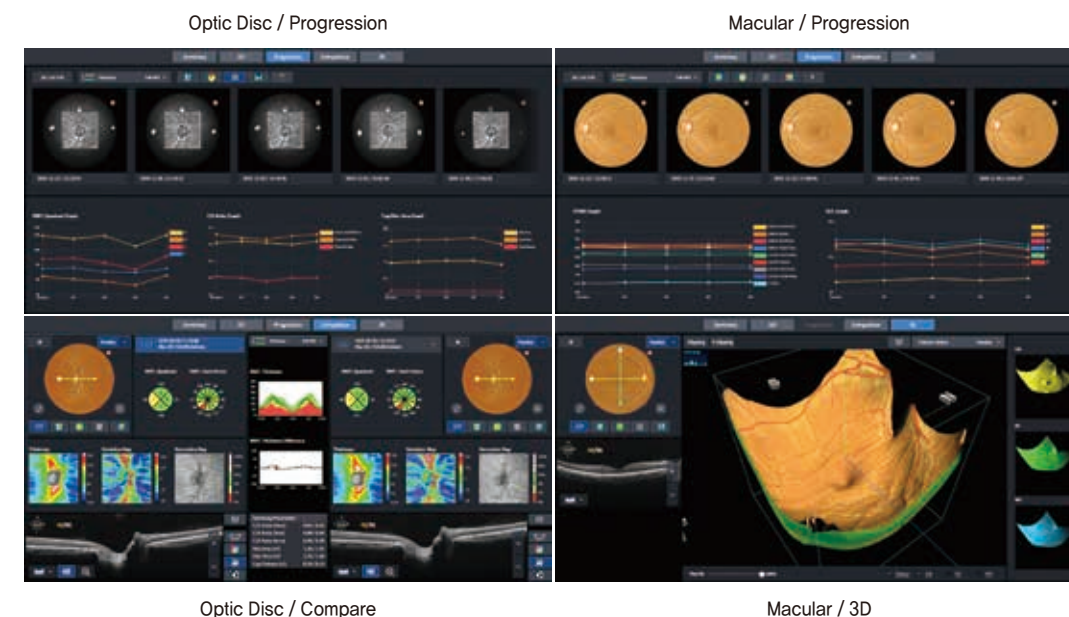
High-speed, wide area (12 mm x 9 mm) 3D images help you quickly and comprehensively understand the condition of the Retina. Also, layer thickness maps can be used from ILM to RPE, respectively and Morphological changes on the measured surface of the layers can also be visually confirmed.

### OU to cross-analyze function of binocular

Provides comparative analysis for Macular Thickness, RNFL Thickness, ONH (Optic Nerve Head) of binocular.

### Summary : Monocular-Scan and OCT / Fundus image

Provides a summary analysis of Macula retina, RNFL, ONH at a glance. Helps identify whether follow-up examinations are needed or not. Easy to explain the results to the patient after diagnosis.

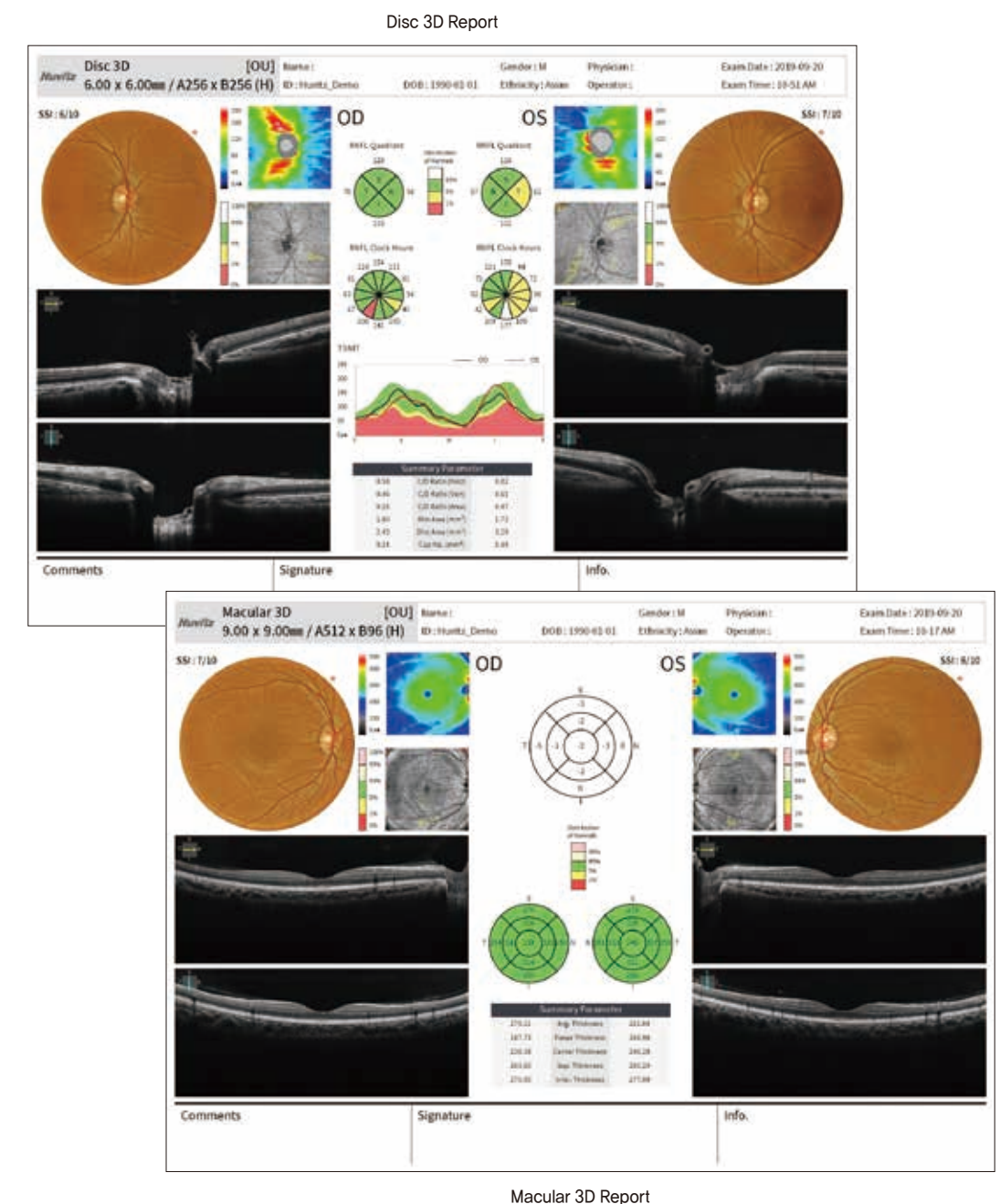


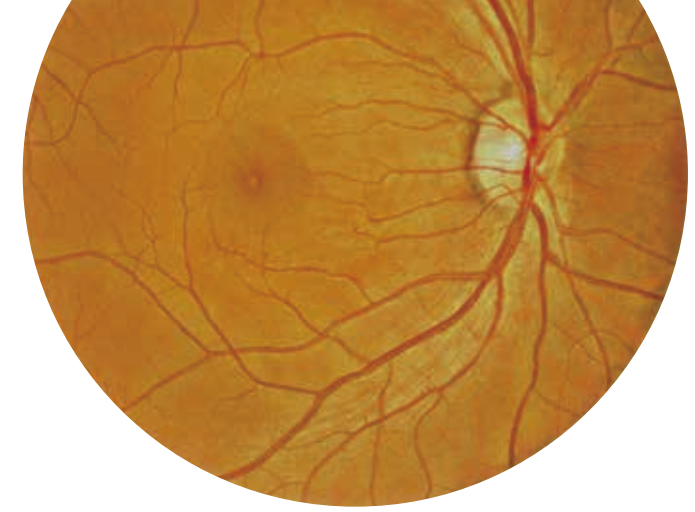
# Detailed Report

## From quick summary to simple comparison and complex evaluation : Complete a perfect report

Provides patient's pathological structure and relevant & important data in easy-to-read format and also can print out the report on analysis screen.

Analysis results can be viewed via Web Browser and printed out with different types of report.





## Anterior Measurement

**One Single System :**  
**Start and finish in one place, making patient more comfortable**

Anterior Segment Module allows measurement and analysis of cornea thickness, angle and 3D image. It helps users work more efficiently by acquiring both anterior and posterior in one place.

### 9 mm (16 mm)\* Wide Chamber View

Measurement of ACA (Anterior Chamber Angle) between cornea and Iris allows diagnosis and management of angle-closure glaucoma patients.

\*9 mm & 16 mm of Anterior Segment Lenses are optional.

### 9 mm High Resolution Cornea Thickness Measurement

9 mm High Resolution Cornea Scan provides an objective view of the structure of the eyeball. It displays a cross-sectional image of the measured corneal thickness.

### Corneal Thickness Map

Corneal's irregularity, Thinnest point can be identified with a corneal thickness map to visualize the patient's corneal thickness at a glance.



ACA Measurement

Corneal Thickness Measurement

## Full Color Fundus Image

**Insight of Posterior Segment of Eye :**  
**for Comprehensive diagnosis**

Color Retinal Images optimized with high-resolution and contrast are very useful in analysis and clinical diagnosis.

Best images are provided by Low intensity of flash, fast capture speed, quiet operation, small pupil mode and automatic flicker detection.

### High resolution and performance Color Camera

High performance camera with Motion Artifact Suppression Technique provides high resolution images and also its low intensity of flash, fast & quiet operation maximize measurement quality.

### Auto-Detection Of Pupil Size and Auto Flash Level Function

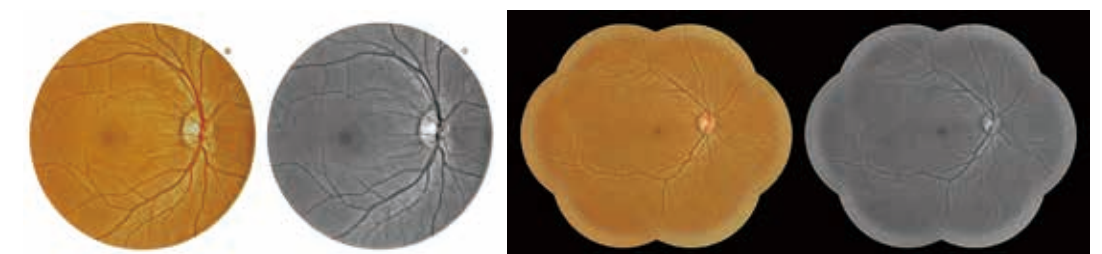
It accurately measures the pupil size and automatically adjusts the intensity of light according to pupil size. Even patients with small pupil sizes can be easily measured without switching mode. Small Pupil Mode can be an option to adjust more intensive light for the small pupil size.

### Fixation Target for flexible configuration

Fixation target can be set on the display for fine adjustment of a specific part of the eyeball.

### Panorama function for wide range of peripherals

Multiple built-in capture color fundus images at different positions and automatically stitch them to optimized total overview. By providing high-resolution images with minimal distortion, you can immediately see key information for a comprehensive assessment of patient's eye.



Fundus Image

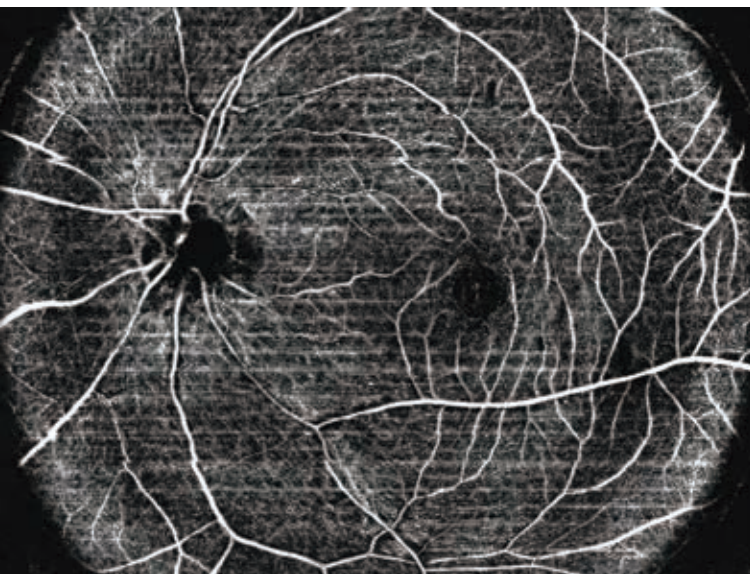
Panoramic Image(Non-Mydriatic Composite Retinal Image)

# Innovative Angiography

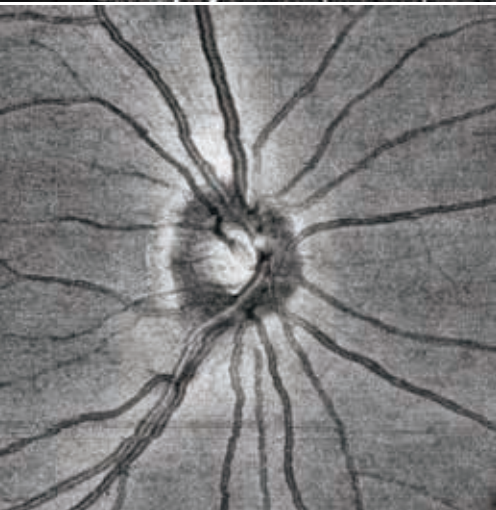
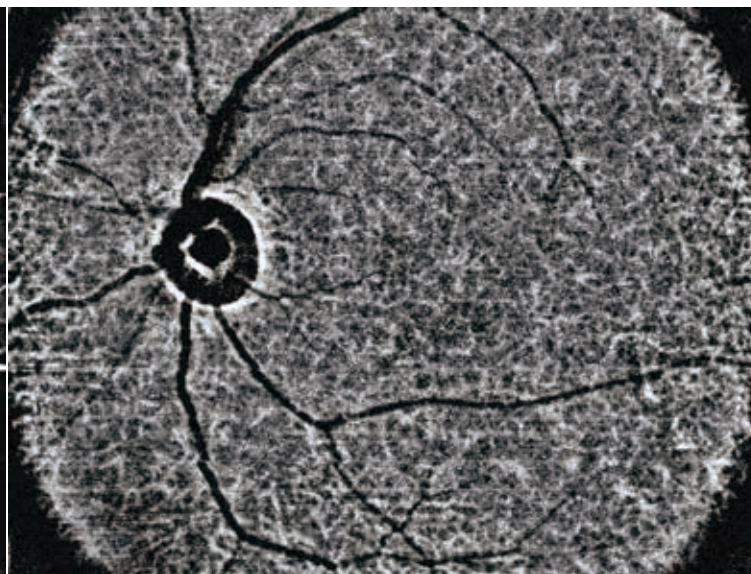
## Auto-Analysis of Retina & Microvessel of Choroid : Customized Treatment per Patient with Details

Huvitz's own optical technologies, Real Time Tracking / Noise Cancelling / Motion Correction are inter-operating, and automatically analyzing & visualizing Retina, Microvessel of Choroid.

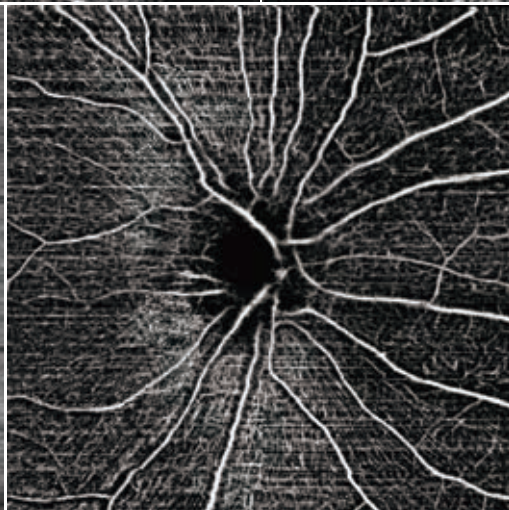
12 mm x 9 mm Superficial



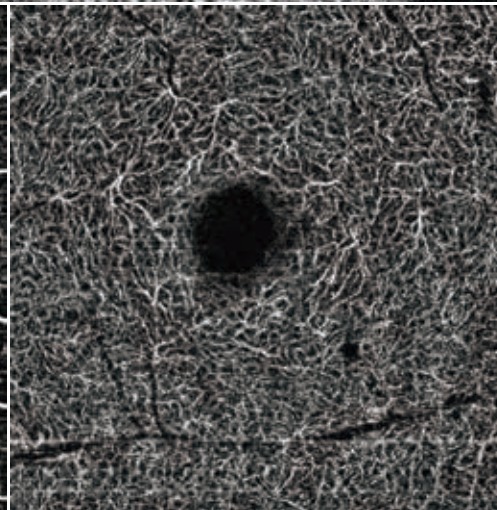
12 mm x 9 mm Choriocapillaris



6 mm Disc Enface



6 mm Disc Superficial



4.5 mm Retina Deep

## The Innovation of Optical Technologies : Faster & More Convenient Analysis is Now Able

HOCT provides reliable results by minimizing measurement errors with combination of Huvitz' own optical technologies which are called as TAT (Triple Angiography Technology).

### Three Innovative Optical Technologies – TAT (Triple Angiography Technology)

#### Real Time Tracking

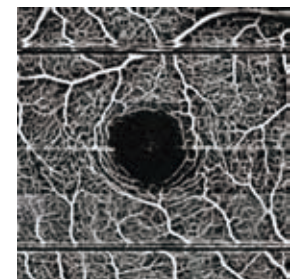
With A-scan 68,000/per second, Real Time Tracking technology creates connecting vessel images by minimizing Motion Artifact caused by eye blinking, movement of eyeballs.

#### Noise Cancelling

Visual Processing Algorithm refines details of images in an instant. Therefore, it visualizes vessel conditions of Retina' s layers as high quality images.

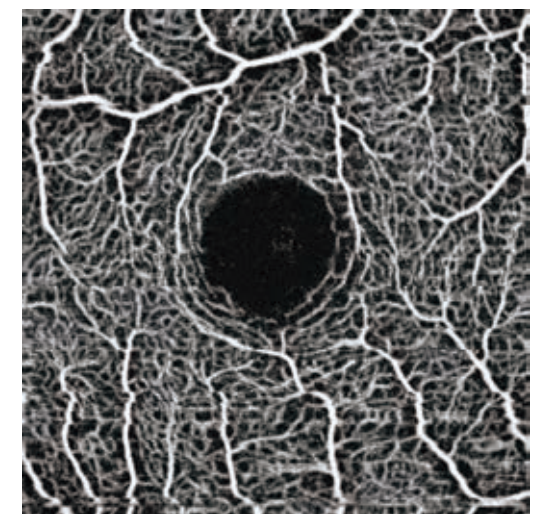
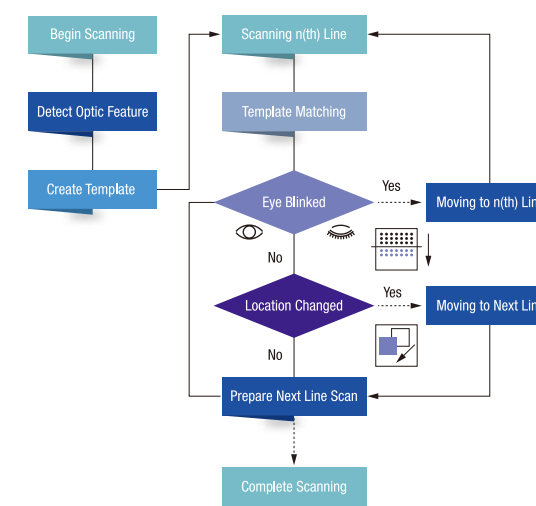
#### Motion Correction

Motion Correction Technology helps to make the Angiography images without distortion by fine correction of vessels' dislocation.



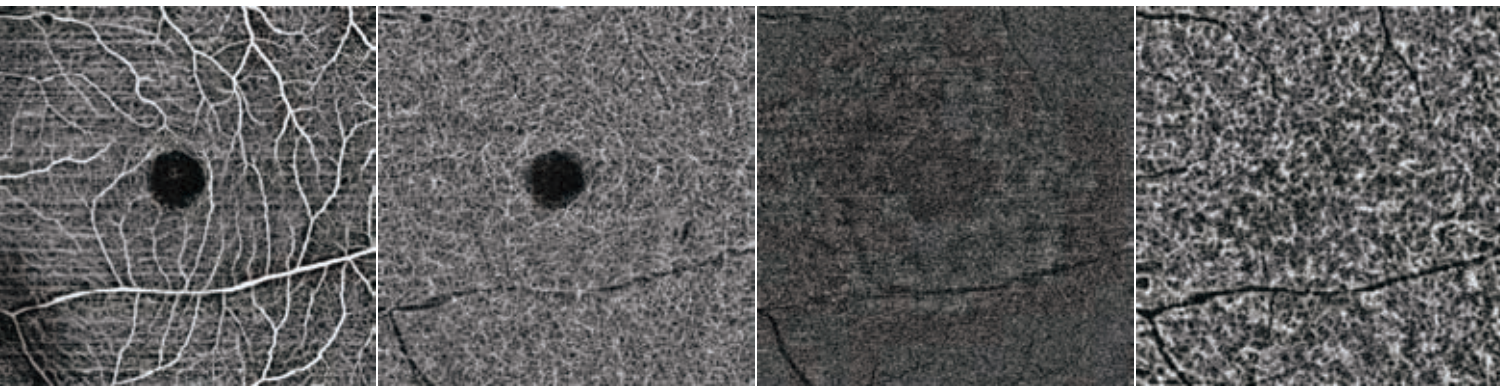
Unapplied Real Time Tracking

### Real Time Tracking Technology Algorithm



Applied Real Time Tracking





6 mm Superficial      6 mm Deep      6 mm Outer      6 mm Choriocapillaris

# Innovative Angiography

68,000 scan/sec by One Button :  
High-Resolution Images with Quantified Index

By One-Button, accurate details are provided with high-resolution images for vessels of retina & choroid and data of FAZ, flows, density.

## Retina Layer Auto-Analysis

The function provides high-resolution images for vessels of retina & choroid with quantified index. It can be utilized with early diagnosis & treatment progression for macular degeneration, diabetic retinopathy, glaucoma, hypertensive retinopathy and retinal vein occlusion.

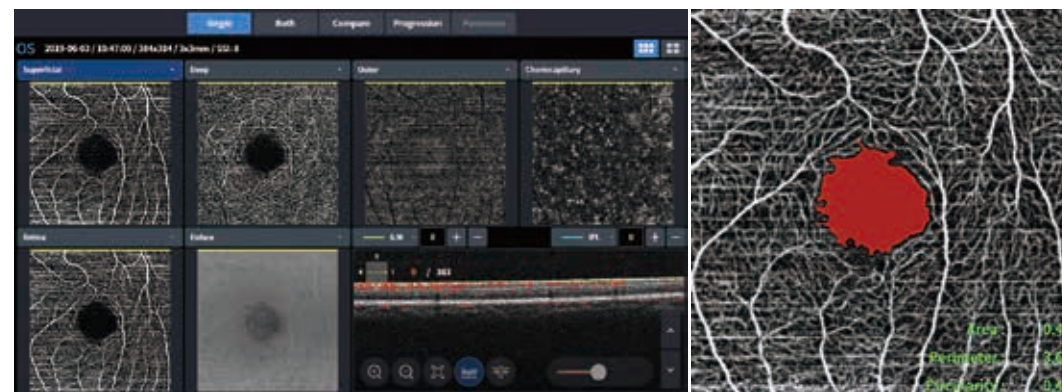
Also, users can check abnormal vasculature in Custom View.

Since the analysis shows index for FAZ, Flows, Density, it's easy to establish treatment plan.

## Detail Display for Accurate Index and Evaluation

In Detail Mode, users can specifically observe vascular network per layer.

Using analyzing tool, details of FAZ can be acquired conveniently.



Retina Layer Auto-Analysis

FAZ Auto-Detection

## Progression

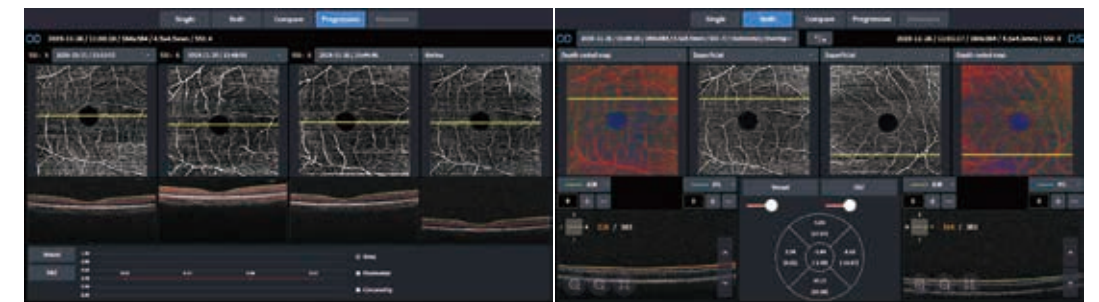
The Progression mode helps users to follow up the pathology of a disease.

## Binocular Comparison (OU)

In the Comparison Mode, users can check vascular network by layer in detail.

By indicating layers in different colors, it's easy to check and understand the pathology of a disease.

In case of comparison for diabetic retinopathy, the mode helps to track the pathology and establish treatment plan.

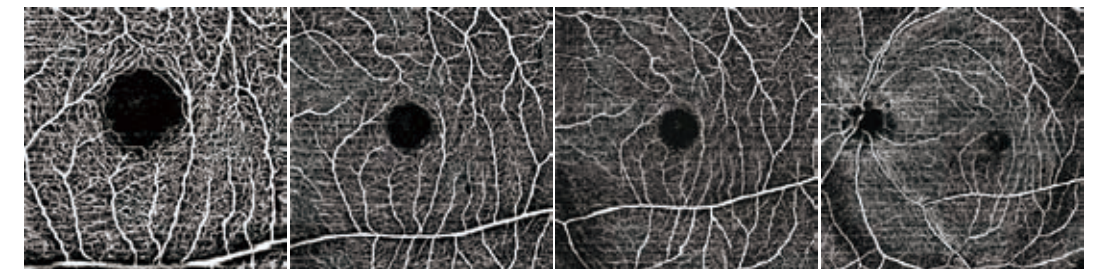


Progression

Binocular Comparison

## A Variety of Scan Sizes : 3 mm / 4.5 mm / 6 mm / 9 mm

HOCT-Angiography supports a variety of scan sizes, users can choose and observe per needs & cases.

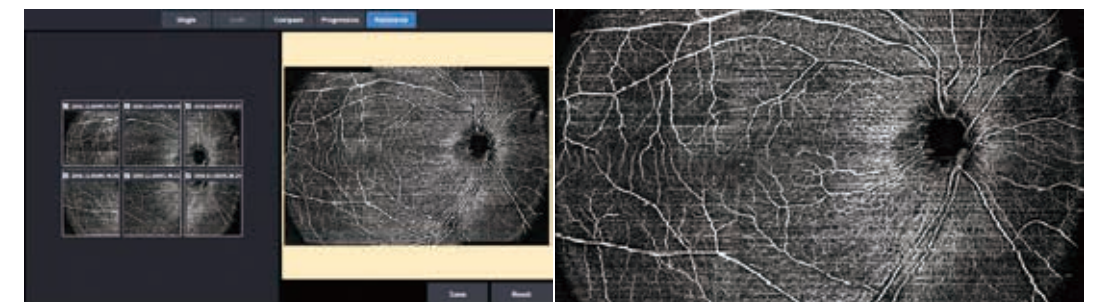


Various Scan Sizes : 3 mm / 4.5 mm / 6 mm / 9 mm

## Angio Panorama

In case of checking Angiography image with large size, it is convenient to utilize the Angio Panorama function.

\*3 mm (Max. 12 mm x 9mm), 4.5 mm (Max. 13.5 mm x 9 mm) & manual mode are available



Panorama Mode / Panoramic Image

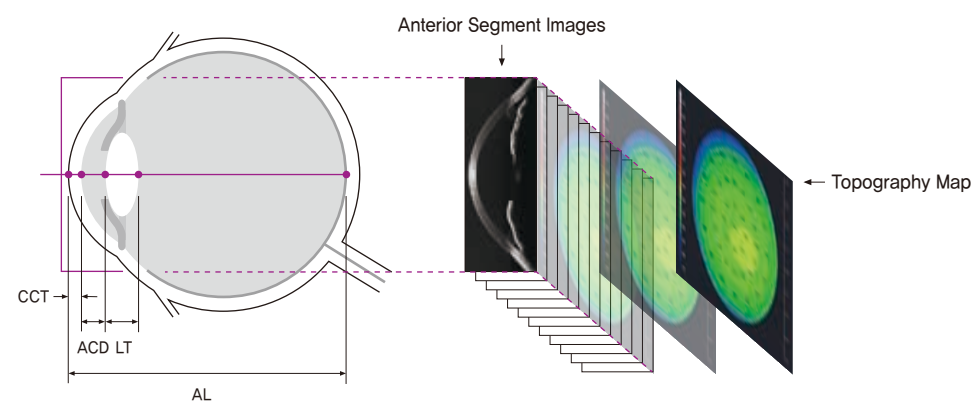
## 1TB Storage

By internal 1TB Storage of HDD, users can manage data with enough space.

# OCT Biometry + Topography

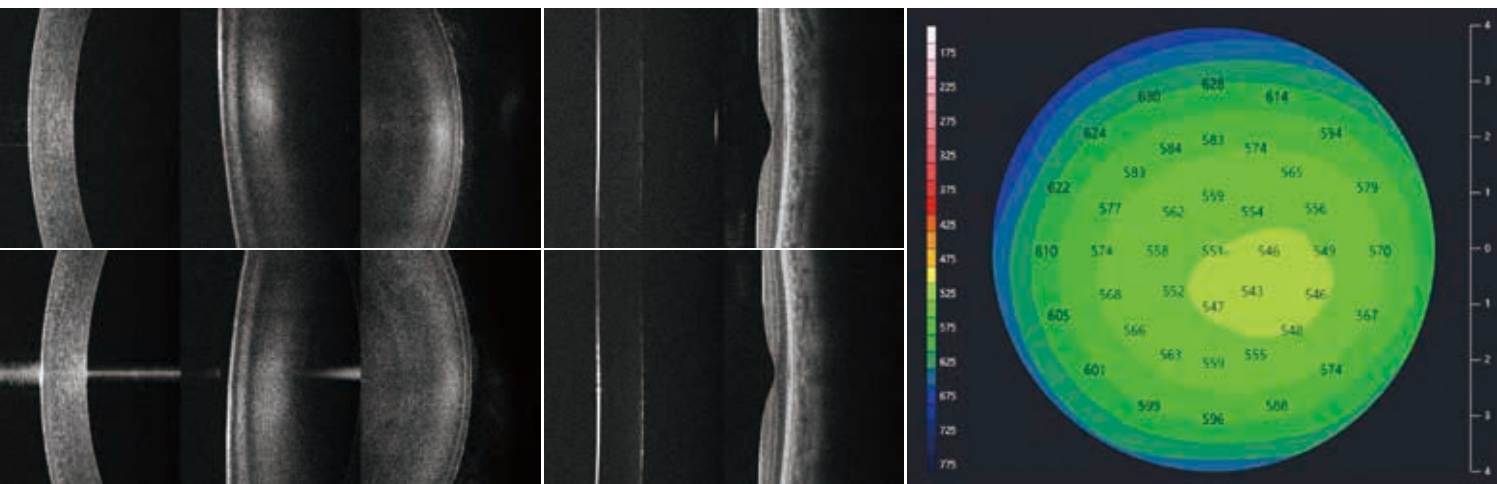
## Innovative Fusion : A Paradigm shift in OCT Technology

It analyzes Biometry and Topography comprehensively. HOCT provides all the data you need for quick and easy calculations for optimizing the IOL lens power.



Biometry / LT

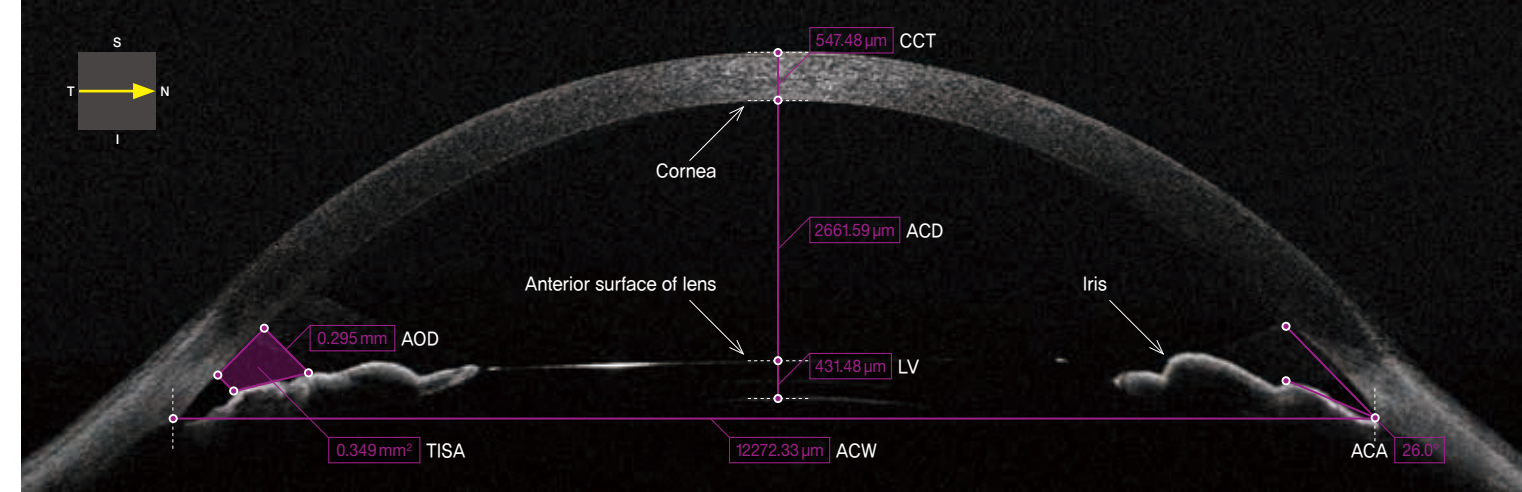
Biometry / AL



Biometry / Cornea - Lens (Front, Rear)

Biometry / Cornea - Macular

Topography Map / Pachymetry



Images of the Anterior Segment and Measurement

## Sophisticated Biometry Data

### Biometry from the Cornea to the Macula

From the Cornea to the Macula, HOCT displays 2D images and provides all data along the anterior and posterior segments. After measurement is complete, the User can identify and make adjustments where necessary. Also, it is possible to evaluate a dense cataract or defects in the macula.

### Visible Measurement by 2D Image

User can easily adjust lines to analyze structures, by moving the cursor on the monitor in real-time. This can allow for a customized treatment of the non-typical Patient.

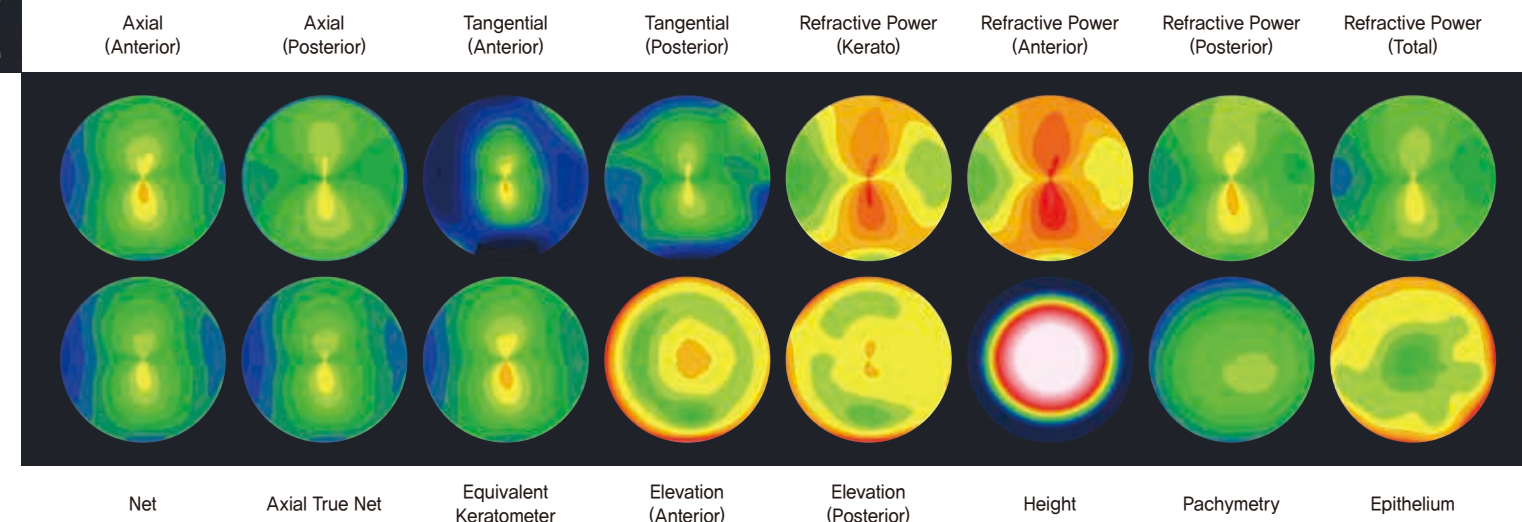
## 16 Map Types for Anterior & Posterior Topography

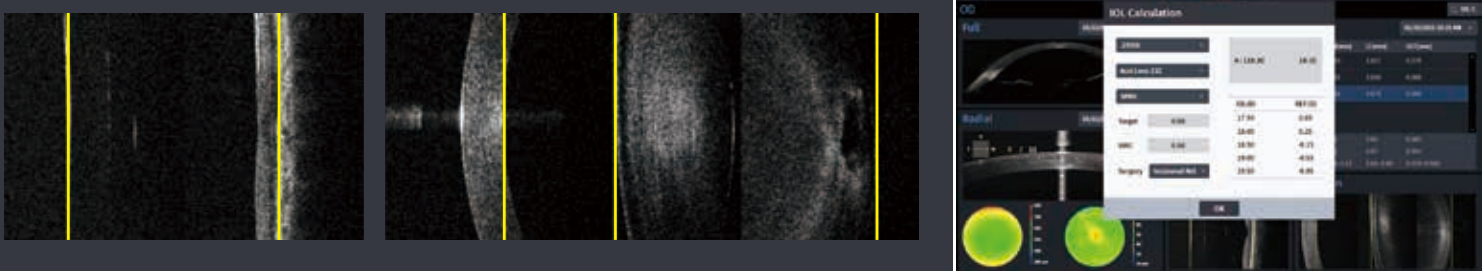
### OCT Topography Methods by Optical Measurement

The HOCT Topography provides curvature data on both the anterior and posterior surface of the cornea, as well as corneal thickness measurements, with a higher accuracy than the Placido or Scheimpflug methods. It minimizes motion artifacts because of its 2-second high speed capture rate.

### 16 Map Types for Customized Treatment

HOCT provides 16 map types including the anterior & posterior surfaces of the cornea. Users can display a wide variety of options to analyze and diagnose. In particular, posterior corneal surface measurements that allow for more accurate surgical outcomes.





Confirmation Display

IOL Calculation

# More Precise Biometry

## Accurate Measurement by 2D Image : Visualize & Measure in Full Anterior Image of 16 mm

### Confirmation Display able to Choose & Readjustment

Users can make adjustments along the axial line, as well as remove measurements that fall outside of normal in order to create accurate statistics for the IOL calculation.

### Full Anterior Image for Wider Evaluation

With the Wide Lens measurement, Users can obtain a full anterior image. With a simple click the CCT, ACD, ACA, W-to-W, LV, TISA, and TID\* can be identified to aide in the diagnosis and management of Glaucoma.

\*CCT : Central Cornea Thickness, ACD : Anterior chamber depth, ACA : Anterior chamber angle, W-to-W : White to White, LV : Lens vault , TISA : trabecular-iris space area, TID : trabecular-iris distance

### Contact Lens Fitting with Instant Check

HOCT allows Users to check the suitability of Hard & Soft Contact Lenses for their Patients. It can also check the fit of an existing Contact Lens, quickly & precisely.

### Reliable IOL Lens Recommendation

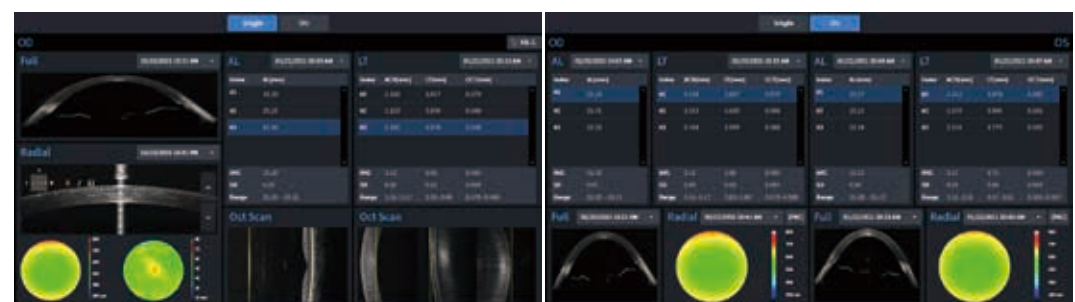
HOCT recommends the optimal IOL Lens Power, based on biometry & corneal curvature with clinical data so that Users can easily make their surgical plan taking into consideration dense cataracts, corneal disease, or glaucoma.

### View Function to Check the Basis of Disease

Full Anterior Image, 12 types of Cornea Tomograph, Biometry Data (AL, LT, CCT, ACD)

Tomography Image of Cornea

Comparison of asymmetry between left & right eyes with OU display



Single

OU

# More Exquisite Topography

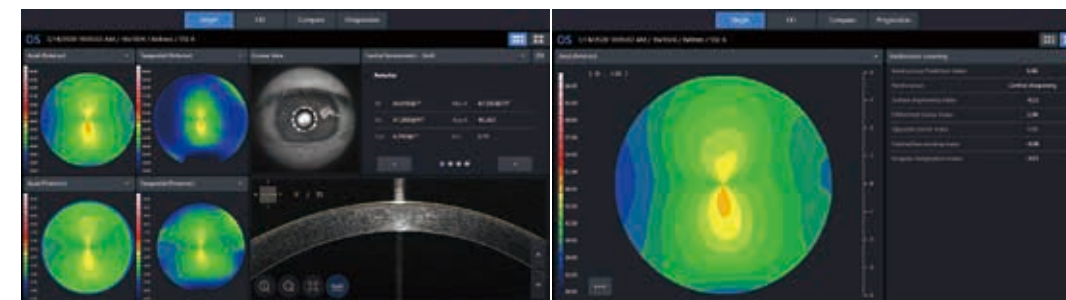
## Comprehensive Analysis by Topography in OCT Method : Providing Total Cornea Power Map able to measure Anterior & Posterior.

### Total Cornea Power Map

Since the HOCT can analyze the posterior of the cornea, Users can now minimize errors caused by anterior & posterior axis of the cornea, corneal thickness, and refractive errors caused by the vitreous and corneal structures.

### Compact Layout with Various Options

With 16 Map types, Users can analyze Sim-K, Meridian, and Keratoconus data



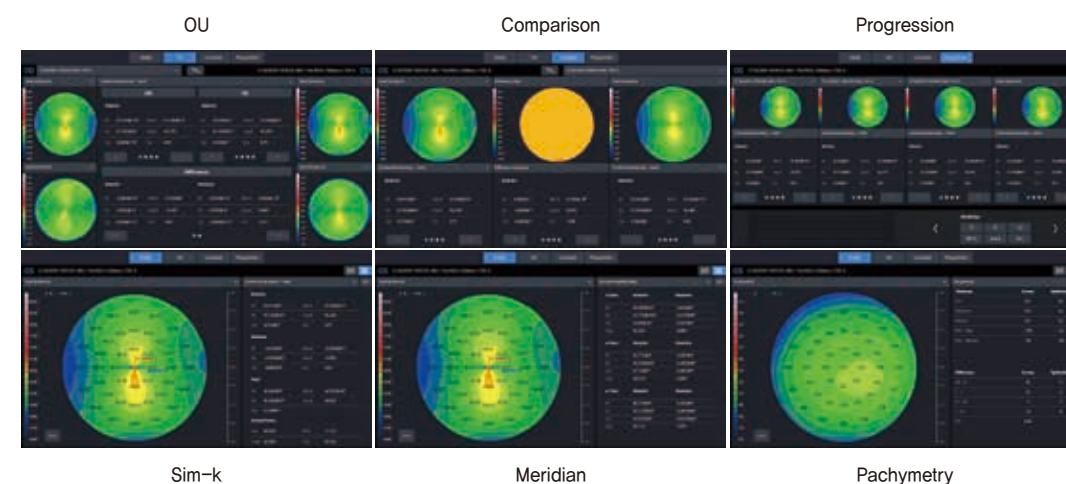
Simple setting & integrated Display

Keratoconus Analysis

### Analysis Display / Numerical Information

Users can analyze with either Single Eye, OU, or Comparison functionality. It is also possible to check for clinical changes after treatment or surgery with the Progression function. Because the Map displays accurate distance, size, and area with numerical information, the User is able to perform their analysis with confidence.

- Sim-K : Typical curve in order to utilize optimal IOL Lens calculation
- Meridian : Provide  $\phi$ 3, 5, 7 mm meridian by dividing the cornea into 3 areas
- Pachymetry : Total Thickness of Cornea
- Epithelium : Provide epithelium thickness at each point



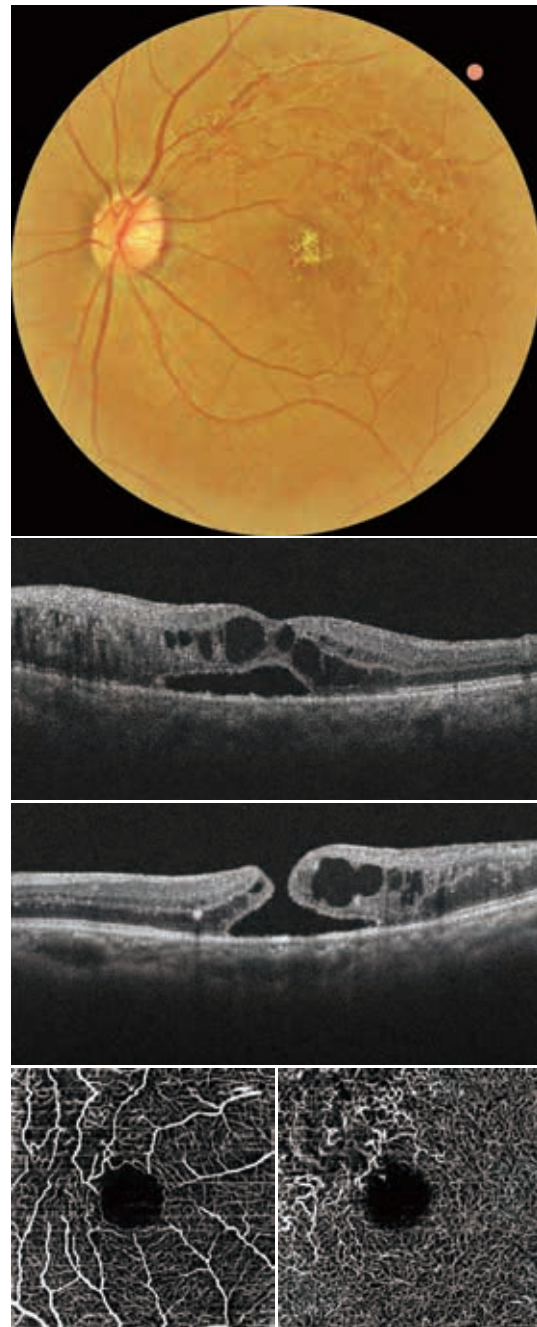
Sim-k

Meridian

Pachymetry

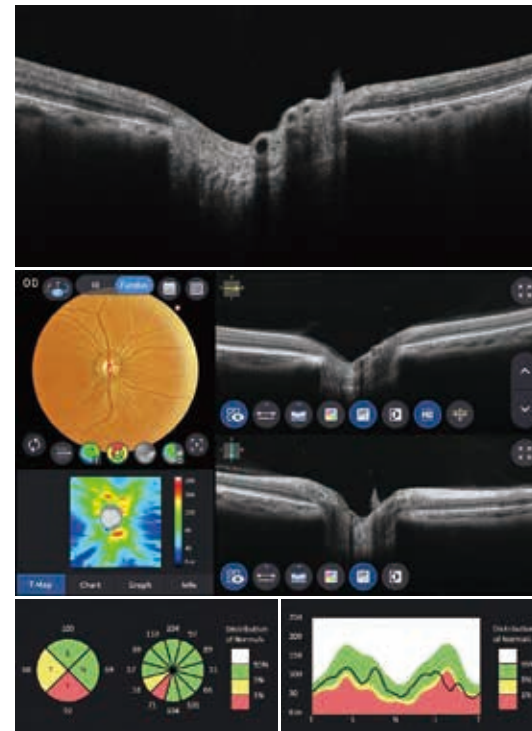
# Clinic Exams

High-quality, high-resolution OCT and color fundus images from HOCT are extremely useful for analysis and clinical diagnosis as the pathologic structure and status of each layer are accurately observed and recorded.



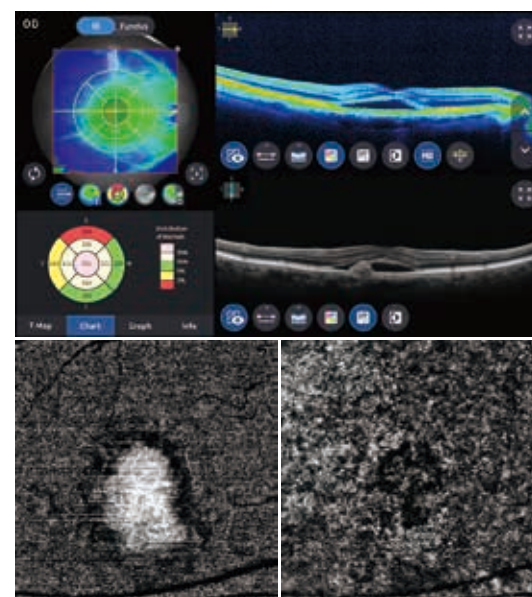
## Macular Hole (MH), RVO (Retinal Vein Occlusion)

A macular hole is a retinal break commonly involving the fovea. Severe stage of RVO progressed to a macular hole.



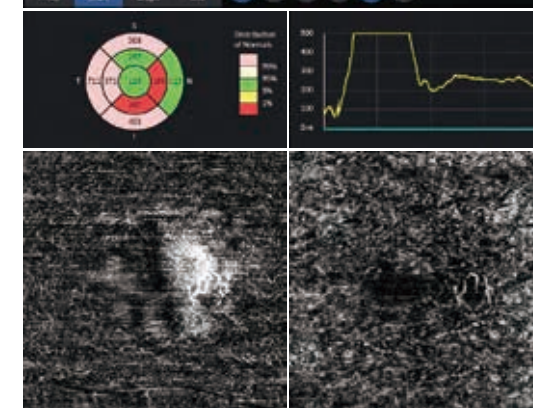
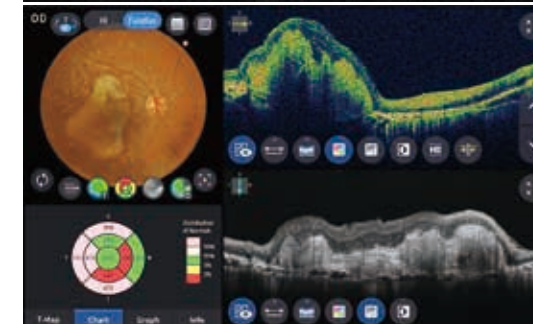
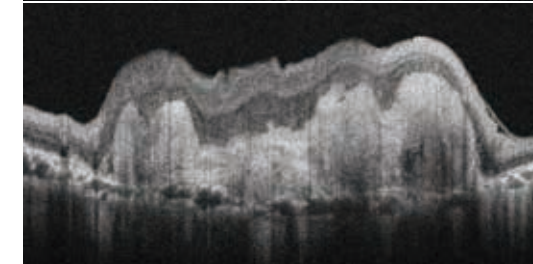
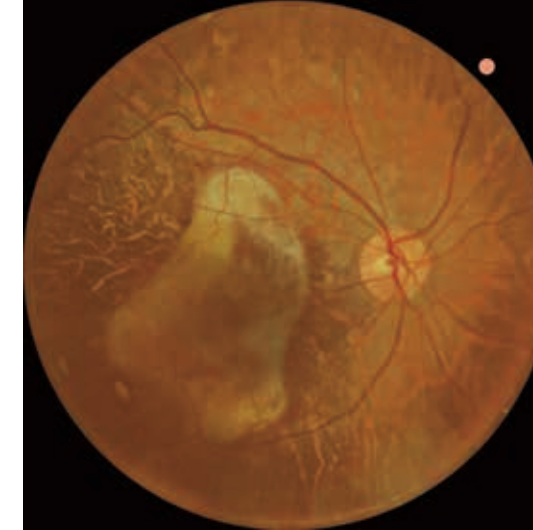
## Glaucoma

Glaucoma is a disease that damages your eye's optic nerve. The same symptoms are found at Thickness map, Fundus, TSNIT chart, Clock chart.



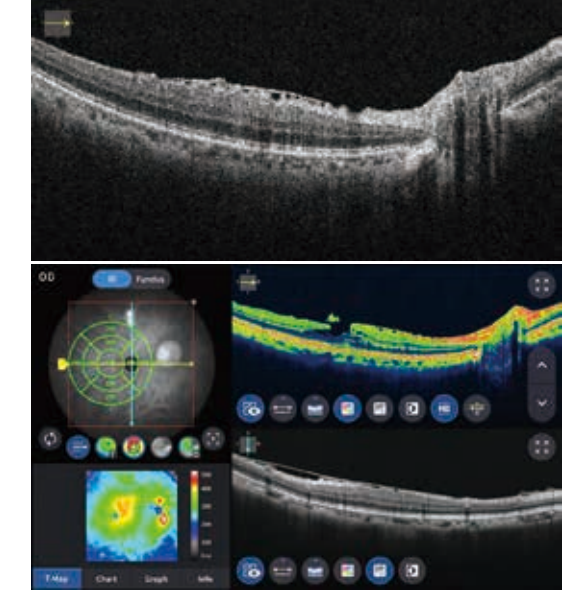
## Macular Degeneration (MD)

Age-related macular degeneration is a disease that blurs the sharp, central vision you need for straight-ahead activities.



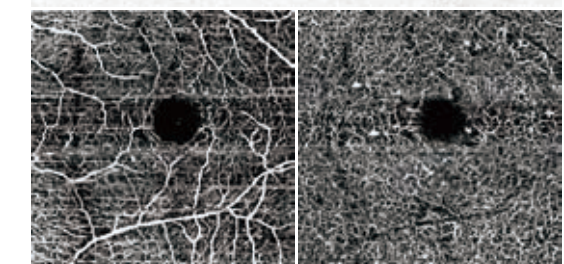
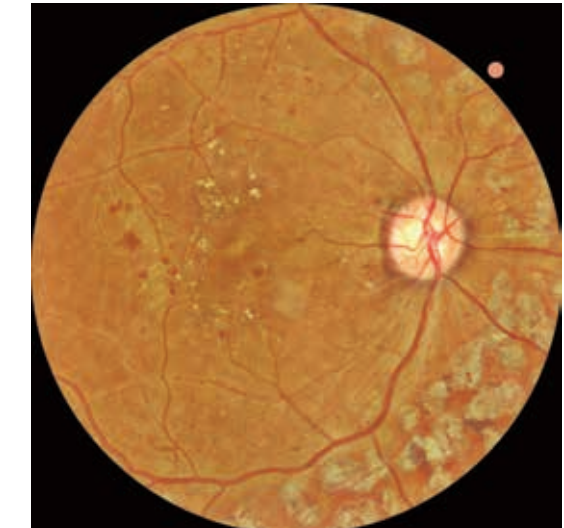
## Choroidal Neovascularization (CNV)

Choroidal neovascularization refers to condition that new blood vessels created in the choroid layer. In this case, because of huge choroidal neovascularization, distort the normal alignment of the overlying retina. It can be seen that the overlying photoreceptor layer is not clearly delineated from the other retinal layers, and the temporal retina also has the geographic atrophy of the photoreceptor layers and retinal pigment epithelial layers. This results is also visible on the Fundus photograph and Outer retina of angiography.



## Epiretinal Membrane (ERM)

Epiretinal membrane is a disease of the eye in response to changes in the vitreous humor or more rarely, diabetes.



## Diabetic Retinopathy (DR)

Diabetic retinopathy is when high blood sugar levels cause damage to blood vessels in the retina. These blood vessels can swell and leak. Or they can close, stopping blood from passing through. Sometimes abnormal new blood vessels grow on the retina.