DEVICE
OPHTHALMIC
TECHNOLOGY

HAAG-STREIT
INTERNATIONAL

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.

OCTOPUS 900
FLEXIBILITY AND RELIABILITY

PIONEERING ***OPHTHALMIC TECHNOLOGY***

OCTOPUS 900

GOLDMANN PERIMETRY FOR THE FUTURE

In 1945, Professor Hans Goldmann of the University of Berne, together with Haag-Streit, developed the Manual Goldmann perimeter. This instrument is still the reference for kinetic perimetry today and all of its capabilities and specifications are built into the Octopus 900. Furthermore, Haag-Streit has pioneered many significant innovations, including automated static perimetry, the G-Program and the direct projection system, as well as fast strategies and outstanding software for visual field analysis.

Addressing major perimetry needs, the Octopus 900 is the perimeter of choice for anyone who wants diagnostic flexibility to analyse, assess and track patients' visual fields.

It makes it possible to run standard central and peripheral visual fields with minimal test duration, seamlessly integrated into your practice environment. This supports high patient throughput and effective practice management. With its built-in reliability features, the Octopus 900 is easy-to-use and delivers results you can trust.

FULL FIELD STANDARD WHITE-ON-WHITE PERIMETRY

The Octopus 900 performs standard white-on-white threshold testing in just 2–4 minutes in the central visual field. Due to its 90 degree cupula, full 180-degree peripheral testing is possible. This allows for disability testing, including ptosis examination, as well as binocular driving tests.

RELIABLE RESULTS MADE EASY

Worry less about patient compliance. The Octopus 900 automatically recognises any fixation losses and adjusts patients accordingly until optimal test conditions are achieved. Thus, the Octopus 900 produces results you can trust.

TRUE GOLDMANN KINETIC PERIMETRY

With the Octopus 900, kinetic vectors can be defined with all the characteristics available in the Manual Goldmann perimeter. Additionally, user defined templates help generate fast and reproducible results when defining standard isopters and mapping the blind spot, as well as for ptosis, driving and disability examinations.

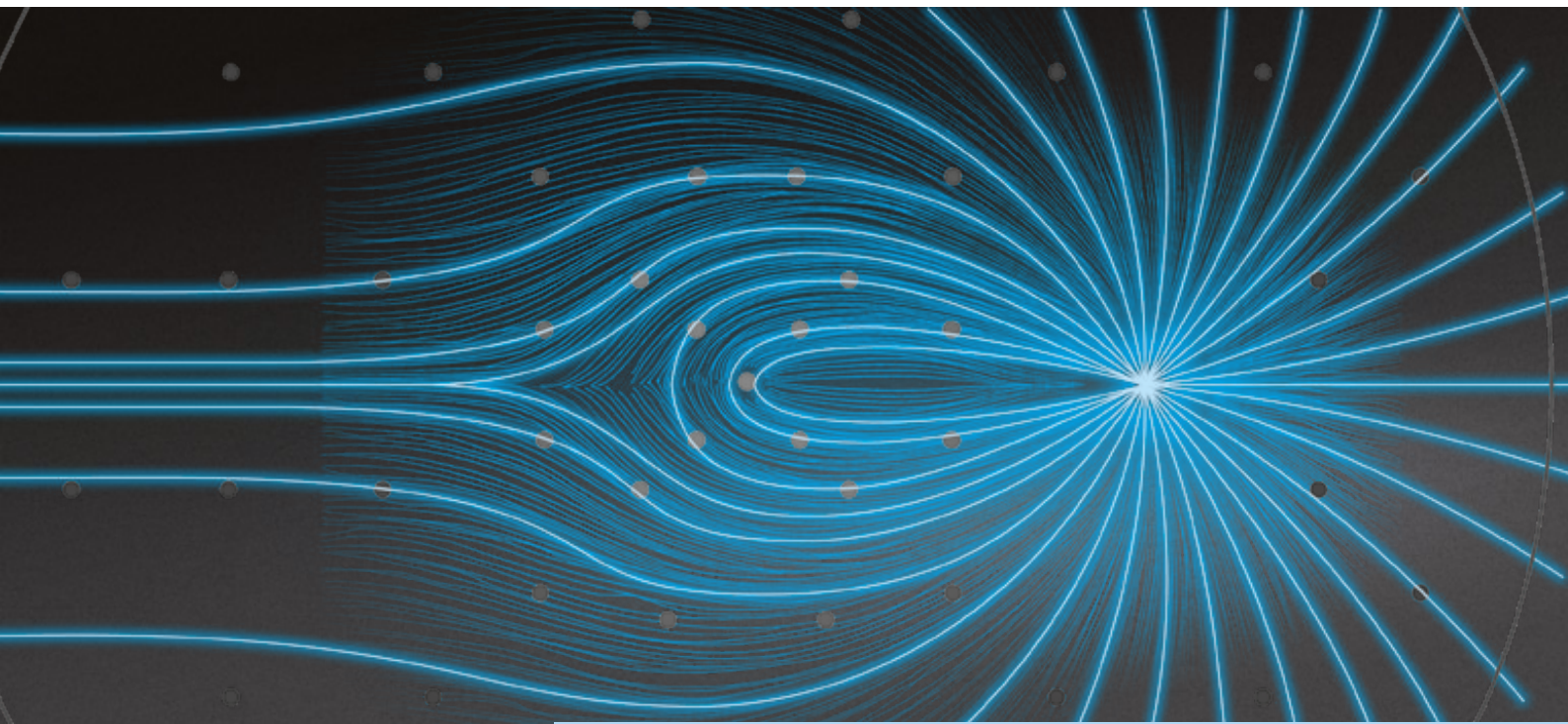
OCTOPUS 900

FULL FIELD STANDARD WHITE-ON-WHITE PERIMETRY

The Octopus 900 offers a wide range of static test patterns, including 32, 30-2, 24-2, and 10-2. In addition, there are two physiology-based patterns: the G-Program (a 30-degree field for glaucoma assessment) and the M-Program (a 10-degree field for analysing the macula). They are both correlated with a nerve fibre bundle map and thus make it possible to test the points which are most important for a structure-function correlation. These examination patterns offer a higher density of stimuli in the centre, which supports the discovery of paracentral scotomas that are often missed by the common 32 pattern.

The Octopus 900, with its 90-degree radius Goldmann bowl permitting 180-degree full field testing, allows additional testing in the periphery for driving and disability examination. Common tests like monocular and binocular Estermann tests as well as a ptosis test are already built into the device for ease of use.

Further test patterns can be created and saved using the Custom Test function built into the Octopus 900. For low vision patients, testing with the larger size V Goldmann stimulus not only extends the dynamic testing range, but also decreases the level of fluctuation between tests[1,2].



PROGRESSION ANALYSIS

IMMEDIATELY IDENTIFY LEVELS OF CHANGE

EyeSuite Perimetry software is included as standard, featuring advanced EyeSuite Progression analysis for following up visual fields. As recommended by the International Glaucoma Society, the global progression rate is calculated in dB per year, including the probability level. Areas for normal range (grey band), impaired vision (15 dB) and legal blindness (25 dB) provide a starting point for further investigation.

Often, progression is local and not noticeable on global progression analysis. No more counting of single points and looking for clusters. EyeSuite does the work for you! The EyeSuite Cluster Trend analysis is based on specific “clusters” of test points that are matched to the nerve fibre bundles, while the Polar Trend analysis allows direct comparison with structural findings. With these two local progression analyses, even small local changes that are not visible at a global level can be easily detected and followed up[6,7].

Intuitive colour codes save time by immediately identifying levels of change. A red triangle will indicate significant worsening, a yellow diamond increased fluctuation and a green triangle significant improvement.


INTUITIVE TRAFFIC LIGHT SYMBOLS

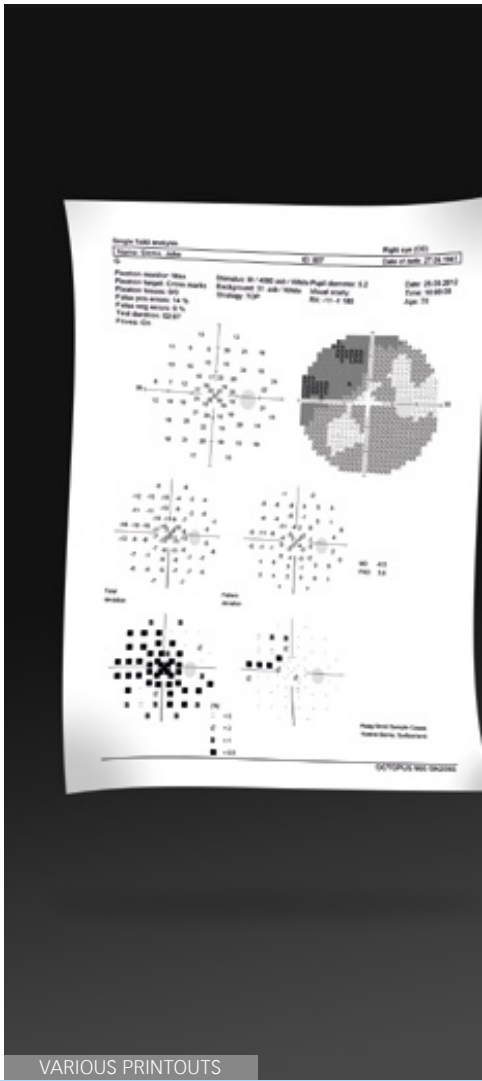

EYESUITE CLUSTER TREND ANALYSIS

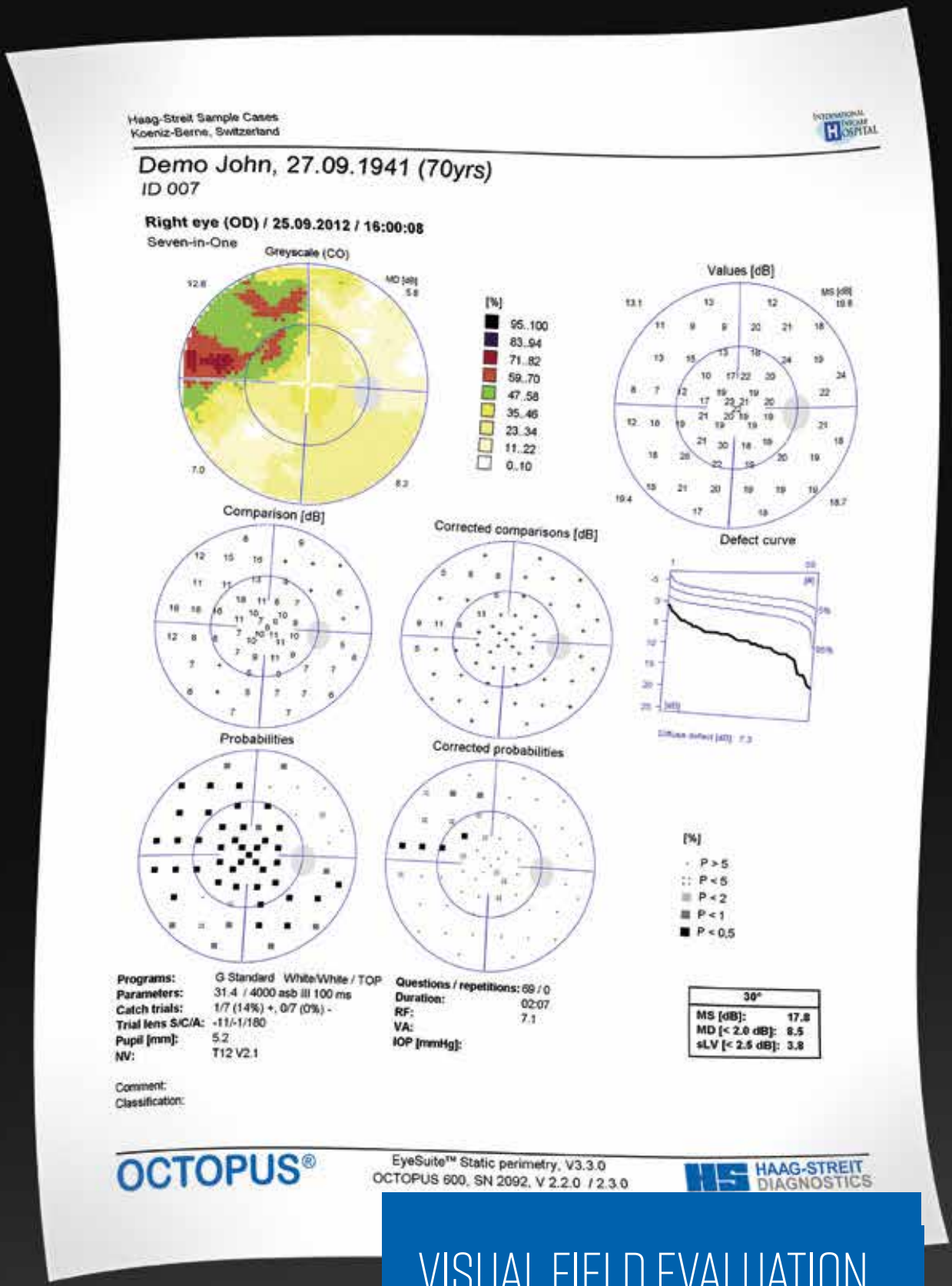
VARIOUS PRINTOUTS

INTUITIVE INTERPRETATION OF VISUAL FIELD RESULTS

Configure your favourite printout and graphics representation, in order to reduce the time necessary to interpret the results. Choose either the Octopus 7-in-1 printout containing the cumulative defect curve (Bebie curve) or the HFA-style printout. Furthermore, the 4-in-1 printout or the series report can also be customised.

Don’t want a paper copy? Save the report as an image or PDF and view it on your screen or export it to your electronic medical record (EMR) system.


VARIOUS PRINTOUTS



VISUAL FIELD EVALUATION IS MADE SIMPLE WITH THE WIDELY-USED OCTOPUS 7-IN-1 PRINTOUT.

TOP FAST-THRESHOLDING STRATEGY

INCREASED EFFICIENCY

Tendency Oriented Perimetry (TOP) presents a further optimisation in fast-threshold testing by reducing the examination time by nearly 80% to just 2–4 minutes[3,4] compared to 6–8 minutes (Dynamic strategy) or 10–12 minutes (Normal strategy). The TOP algorithm is a systematic method which takes the correlation of the threshold values in neighbouring locations into account.

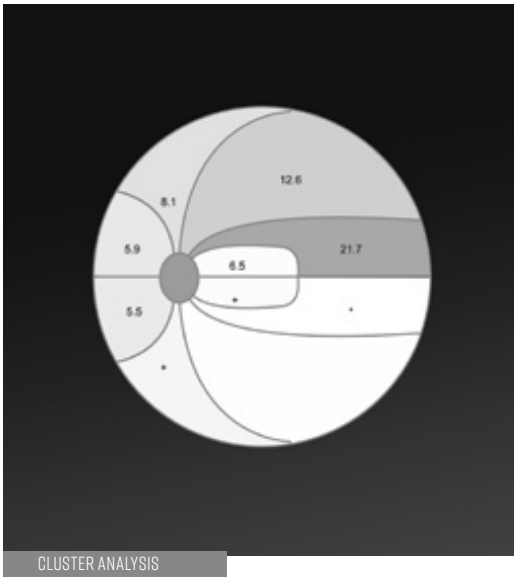
Since the first test points are presented at a supra-threshold level, even inexperienced patients quickly understand the nature of the test.

TIME COMPARISON BETWEEN TEST STRATEGIES

CLUSTER ANALYSIS

PROVIDING MEANINGFUL RESULTS

Cluster analysis combines high sensitivity with good specificity[5]. Test locations are grouped (clustered) along nerve fibre bundles, to better analyse changes in crucial areas such as the nasal step or the macula. This eliminates the time-consuming method of counting isolated points. A combined probability/deviation graph highlights pathological regions.

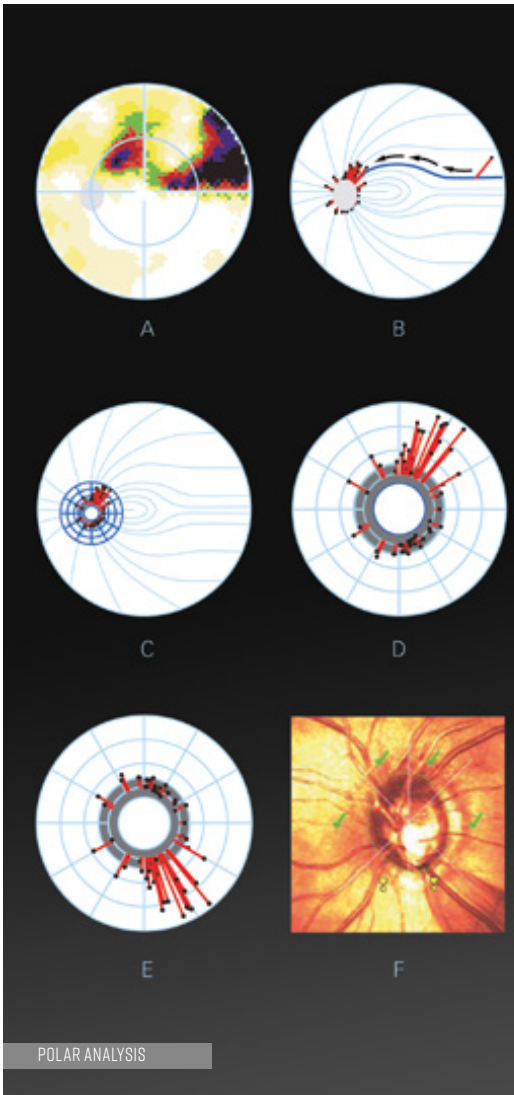


CLUSTER ANALYSIS

POLAR ANALYSIS

COMBINING STRUCTURE AND FUNCTION

Combining the results of both structure and function (see picture: A) is key to obtaining a comprehensive assessment of the onset and progression of Glaucoma. With the Octopus Polar analysis, the nerve fibre bundles that are in danger or defective are easily identified. Local defects are projected along the nerve fibres to the optic disk and are represented as red lines (B). The projected defects (C, D) are vertically mirrored and scaled with rings for 10, 20 and 30 dB deviation (E). The Octopus Polar analysis allows for direct comparison with structural (F) findings[6].



POLAR ANALYSIS

FIXATION CONTROL

RELIABLE RESULTS MADE EASY

Fixation losses due to low patient compliance are a major reason for unreliable visual fields. The Octopus 900 gives you less reason to worry about these. Blink Control, Pupil Position Control and Automated Eye Tracking (AET) continously support the correct patient and eye position for a reliable result you can trust.

BLINK CONTROL

NEVER MISS A POINT

Normal blinking prevents dry eyes and helps the patient to relax and concentrate during examination. With Octopus Blink Control, you need not worry about missing a stimulus presented in static perimetry. Stimuli interrupted by the patient's blinking are automatically repeated later during the test. This means that every test location is tested reliably.

PUPIL POSITION CONTROL

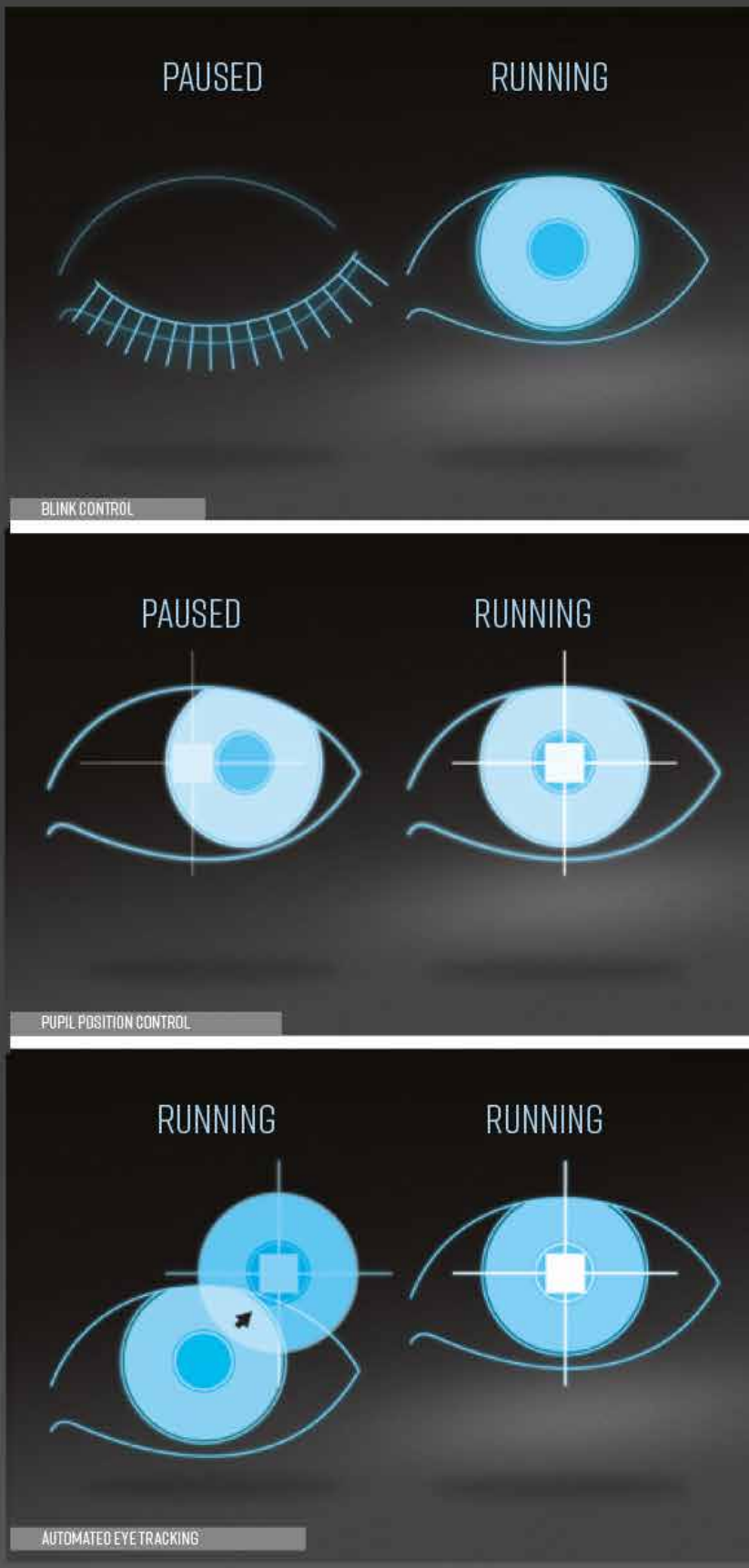
CONTROLLED POSITION

Maintaining the correct pupil position during examination is essential for correct identification of the location of a defect. If the pupil position changes during stimulus presentation, due either to shifiting of the head or eye movement, the Pupil Position Control pauses the examination automatically until the pupil is recentred. This stimulus is automatically repeated later during the test. The result is a visual field that you can trust.

AUTOMATED EYE TRACKING

MINIMISE ARTEFACTS

Positioning the pupil in the centre of the trial lens is essential to preventing lens rim and anatomical artefacts. Automated Eye Tracking (AET)* recognises the position of the pupil and keeps the pupil centred by automatically moving the head and chin rest into the ideal position. Thus, the Octopus 900 provides optimum conditions for reliable and undelayed results.



*Automated Eye Tracking checks the location of the pupil, but not the gaze direction.

TRUE GOLDMANN KINETIC PERIMETRY
SIMPLIFIED OPERATION AND GREATER RELIABILITY

The Octopus 900 is the true successor of the Manual Goldmann Kinetic perimeter, as the computer assisted perimeter that retains the capabilities and specifications of the original Goldmann standard. It performs equivalent testing times and attains the same results with greater reliability[8, 9, 10].

TRUE GOLDMANN KINETIC PERIMETRY

COMPLETE FLEXIBILITY WITH VECTORS OF YOUR CHOICE

All of the basic functionality of the original Manual Goldmann Kinetic perimeter is included in the Octopus 900. This includes: choice of standard stimulus sizes from I to V in a combination of <1a> to <4e> stimulus intensities, the ability to plot static points within the kinetic field, and manual vector selection to plot freestyle vectors.

CONTROLLED VECTOR SPEED & REACTION TIME COMPENSATION

STANDARDISED OPERATION FOR RELIABLE RESULTS

Vector speed is now controlled and thereby repeatable. Additionally, the patient response is immediately marked by pressing the response button. Furthermore, patient reaction time can be measured and isopter size automatically adjusted. All of these features increase test-retest repeatability and reduce operator variability[11,12].

QUANTIFICATION OF ISOPTER AREA

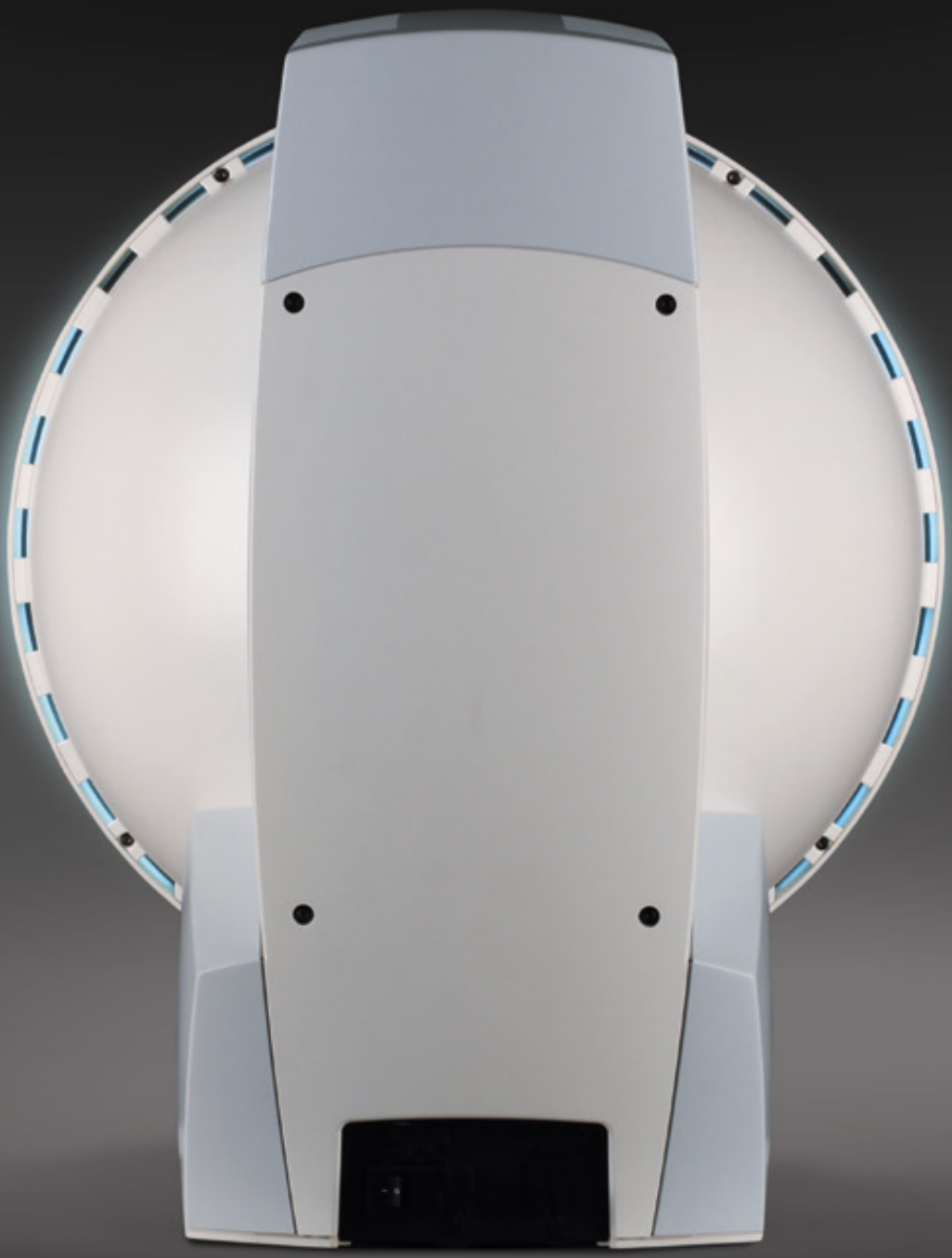
SIMPLE IDENTIFICATION OF PROGRESSION

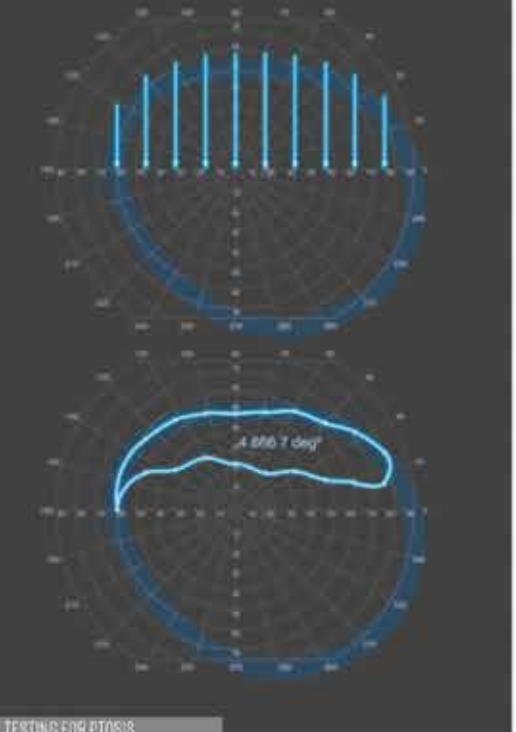
Identifying change in consecutive kinetic visual fields is both time consuming and challenging. A built-in function of the Octopus 900 allows calculation of isopter areas with one simple click. This makes identifying progression both fast and easy, for increased efficiency.

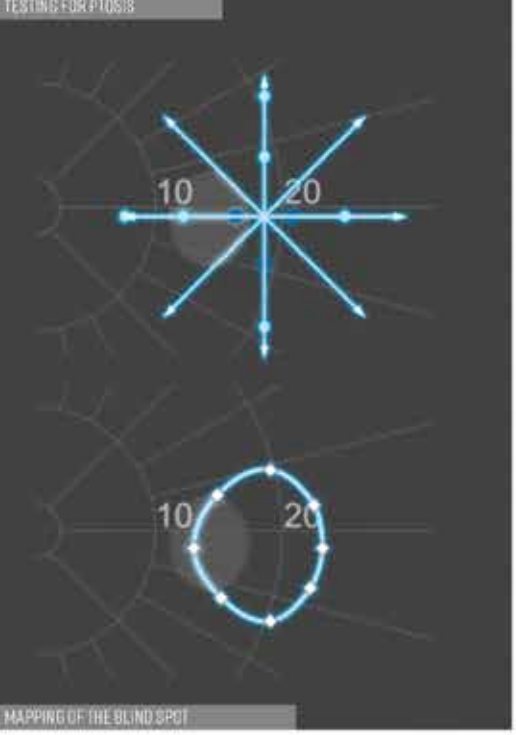
USER-DEFINED TEMPLATES

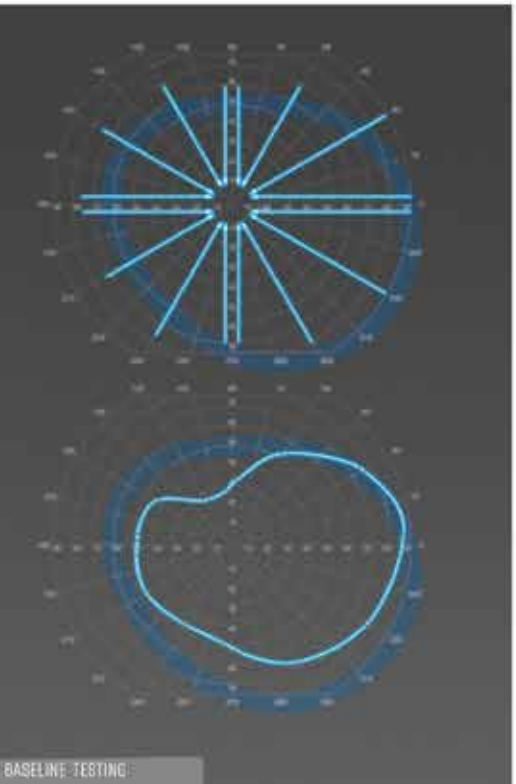
REPRODUCIBLE RESULTS WITH ADDED FLEXIBILITY

The Octopus 900 allows for customised templates to match your current testing methodologies. This ensures that each examination is performed the same way for every patient. In addition, a follow-up button allows high reproducibility of the patient's previous examination. The templates still allow the operator to add vectors, as necessary, in order to accommodate the patient's needs.









FAST AND REPRODUCIBLE RESULTS

SEMI-AUTOMATED KINETIC PERIMETRY

HIGH RESOLUTION AND FAST PERIPHERAL TESTING

It takes a long time to examine peripheral defects, or areas that need high resolution, with static perimetry. Why not benefit from the advantages of the semi-automated Goldmann perimetry available with the Octopus 900? It helps generate fast and reproducible results in the periphery because large areas can be covered quickly. Additionally, it provides high resolution because answers can be marked anywhere on a vector.

Pre-defined testing methodologies or even templates help to generate fast and reproducible results. Below are some examples that are easy to learn and use.

PTOSIS TEMPLATE

PTOSIS TESTING IN JUST 2–4 MINUTES

Testing for ptosis becomes fast and easy. With a line of simple, vertical vectors the edges can easily be mapped in a matter of 2–4 minutes. This is faster than with static automated perimetry[13].

BLIND SPOT TESTING METHODOLOGY

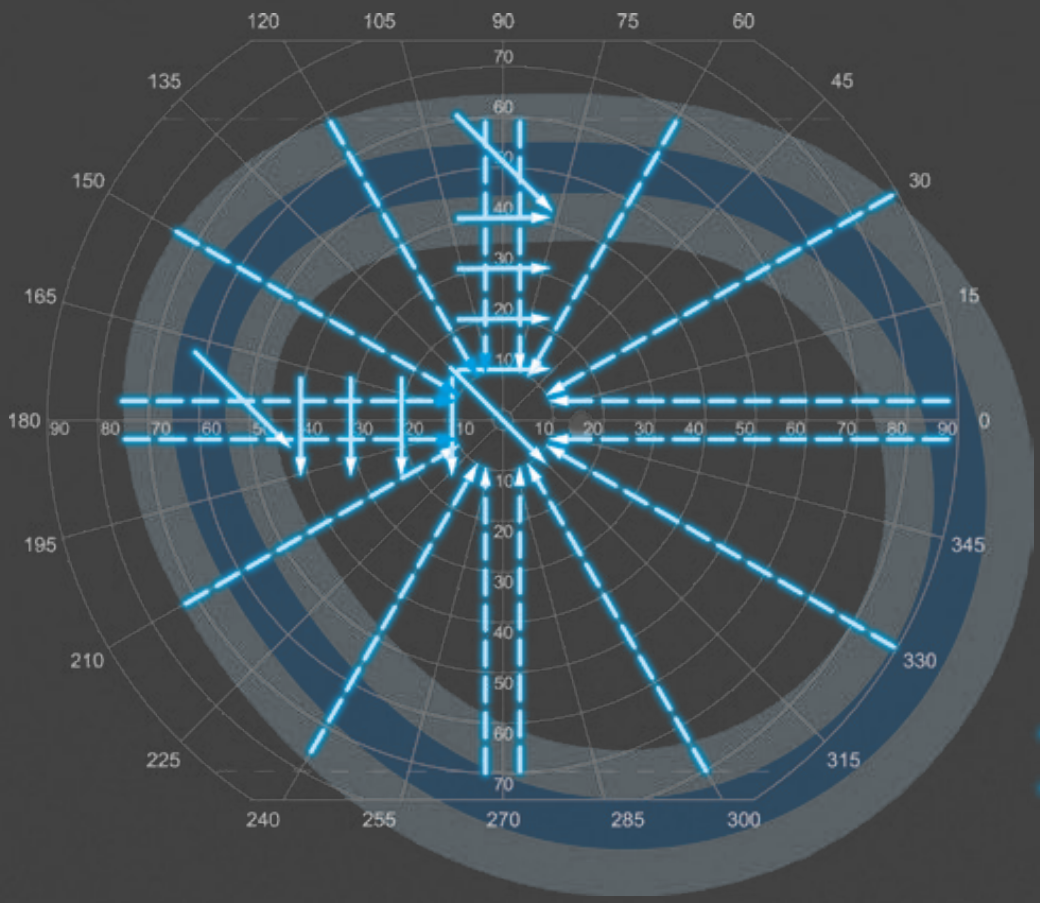
DETAILED OUTLINE OF BLIND SPOT

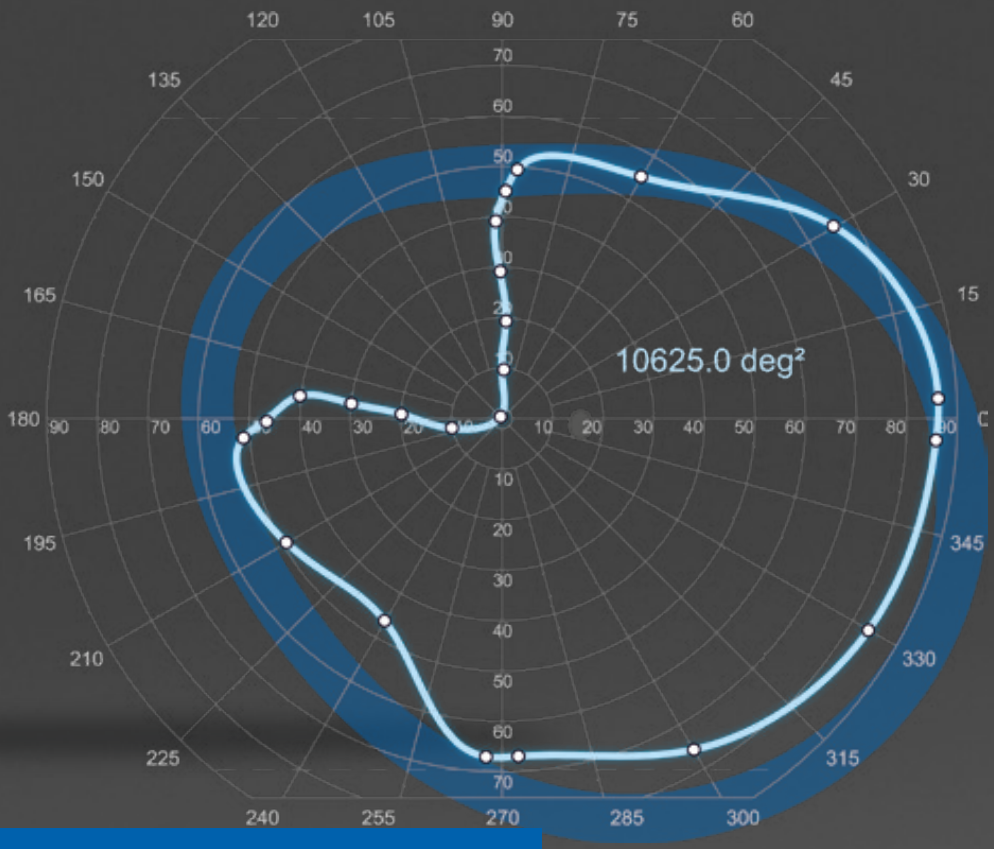
Use kinetic perimetry to quickly map the blind spot in very high resolution. First, identify a point within the blind spot with some horizontal and vertical static points. Then use radial kinetic vectors to define the boundaries of the blind spot in high resolution. This fast and repeatable procedure provides you with more detailed information than standard static programs where test points are often several degrees apart.

GENERAL BASELINE VECTOR TEMPLATE

AUTOMATE BASELINE PERIPHERAL TESTING

You want to check for neurological defects, glaucoma, diabetic disease and disability in a fast, patient-friendly and reproducible manner? By using a preset template with a few radial vectors moving to the centre, you can generate your baseline isopters with minimal effort. Once the baseline is established, you can continue with your individual testing.





ORIGINAL GOLDMANN KINETIC PERIMETRY TO CREATE ISOPTERS THAT ARE ACCURATE, CONSISTENT AND REPEATABLE

EYESUITE PLATFORM

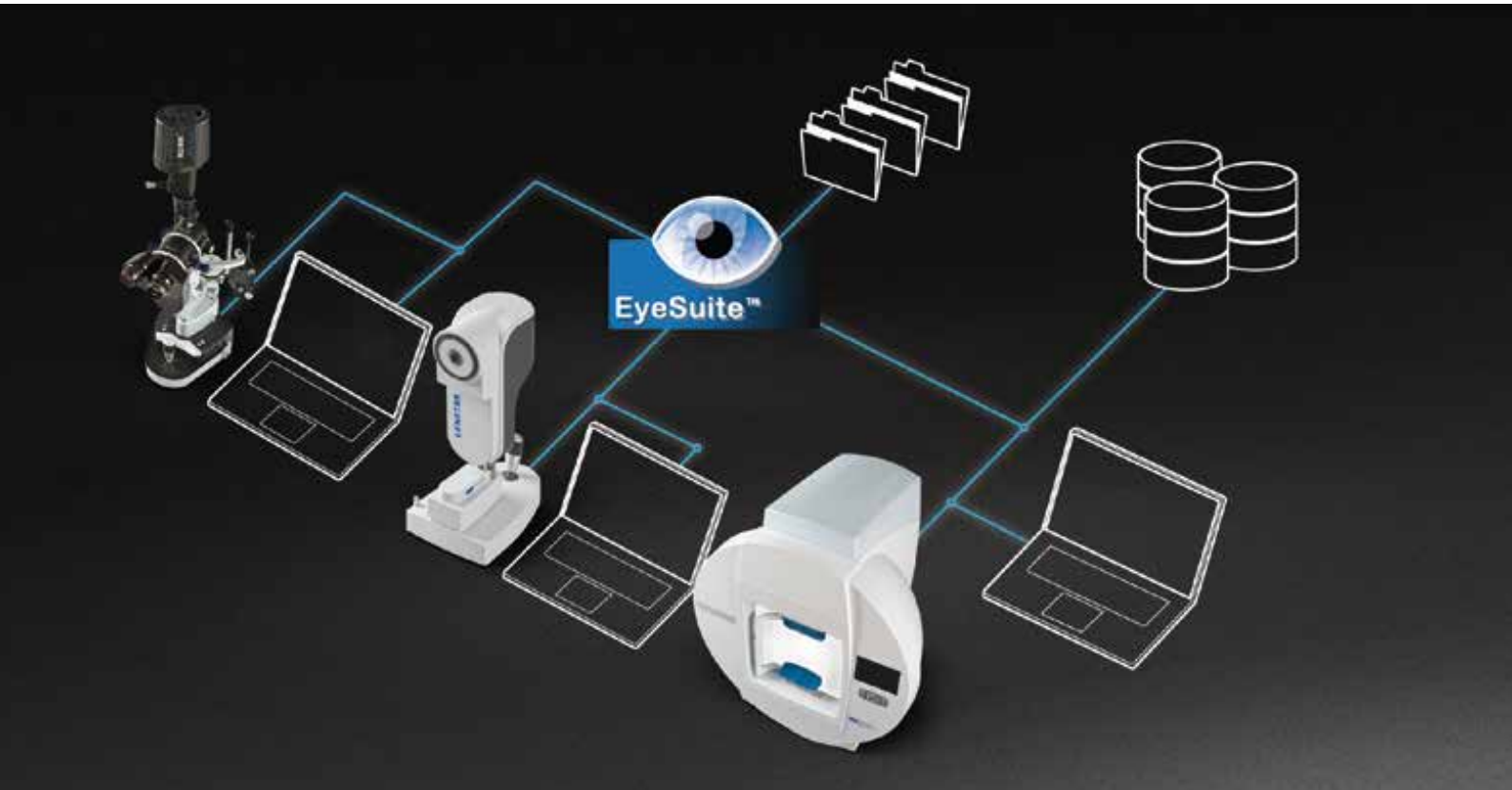
FLEXIBLE INTERFACES FOR EASY INTEGRATION INTO YOUR NETWORK

The EyeSuite software is designed for optimum patient flows in busy practices. It is very easy to use, making the Octopus 900 fully networkable both with other Haag-Streit devices and your practice network. EyeSuite does not require any proprietary third-party software to provide connectivity.

If the Octopus 900 is connected to an EyeSuite Server, all of its data can be accessed remotely from any number of viewing stations connected to the same database. This truly means going beyond a predefined printout and provides you with real-time access to your data from anywhere in your network.

Furthermore, the EyeSuite Script Language or standardised interfaces, such as GDT or DICOM, connect easily to almost any electronic medical record (EMR) system. Patient orders can be received from the EMR system and the measured results are then automatically sent back to the EMR system.

With all these features available, you can save valuable staff time and eliminate the risk of transcription errors.



TECHNICAL SPECIFICATIONS
OCTOPUS 900

		Octopus 900 Basic	Octopus 900 Pro
Stimulus generation	Mirror projection system	■	■
Peripheral range (distance)	180° (30 cm radius Goldmann bowl)	■	■
Background illumination (asb)	0/4/31/314	■	■
Stimulus size (Goldmann)	I, II, III, IV, V	■	■
Stimulus duration (ms)	100, 200, 500, 1000, infinite	■	■
Stimulus intensity (asb, dynamic range)	0.2–10000 (47 dB)	■	■
Fixation control	Blink Control, Pupil Position Control, AET (Automated Eye Tracking)	■	■
Networking	DICOM, EMR, Ethernet	■ (DICOM optional)	■ (DICOM optional)
Data Import	Octopus 101, 123, 300 and 600; HFA	■	■
Measures (W x L x H)	648 mm x 519 mm x 796 mm; 25.5'' x 20.4'' x 31.3''	■	■
Weight	25 kg; 55 lbs	■	■
Test methods	Standard white-on-white perimetry SAP	■	■
	Blue/yellow perimetry SWAP	○ (Package Blue/Yellow Perimetry)	■
	Flicker perimetry for early diagnosis	○ (Package Flicker Perimetry)	■
	Red/white perimetry (custom tests only)	○ (Package Scientific)	
	Goldmann Kinetic Perimetry	○ (Package Goldmann Kinetic Perimetry)	■
Test strategies	TOP (Tendency Oriented Perimetry, 2–4 min)	○ (Package TOP fast strategy)	■
	Dynamic (adaptive step size, 6–8 min)	■	■
	Normal (4-2-1 bracketing, 10–12 min)	■	■
	Other (LV: Low Vision with Goldmann size V; 2-LT: 2-Level Test, 1-LT: 1-Level Test; GST: Glaucoma Screening Test)	■	■
Test patterns	General/Glaucoma 30° (G1-Program, 32, 30-2, 24-2)	■	■
	General/Glaucoma Periphery (G2-Program: 60°; 07-Program: 75°)	■	■
	Macula (M-Program (10°/30°); 10-2)	■	■
	Screening (ST)	■	■
	Driving (Estermann monocular/binocular; FG: German Driving Licence)	■	■
	Disability (BT – Blepharoptosis; BG: German Blindness)	■	■
	Other Pathology (N1: Neurological; D1: Diabetes)	■	■
	Custom tests	○ (Package Scientific)	■
Progression analysis	Global progression (MD, sLV)	■	■
	Cluster Trend/Polar Trend	○ (Package Cluster/ Polar Trend)	■

■ Included ○ Optionally available

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SOURCES:

1. Wall M, Woodward KR, Doyle CK, Zamba G. The effective dynamic ranges of standard automated perimetry sizes III and V and motion and matrix perimetry. Archives of ophthalmology 2010; 128(5): 570-6 **2.** Wall M, Doyle CK, Zamba KD, Artes P, Johnson CA. The repeatability of mean defect with size III and size V standard automated perim-etry. Invest Ophthalmol Vis Sci 2013; 54(2): 1345-51. **3.** King AJ, Taguri A, Wadood AC, Azuara-Blanco A. Comparison of two fast strategies, SITA Fast and TOP, for the assess-ment of visual fields in glaucoma patients. Graefes Arch Clin Exp Ophthalmol. 2002 Jun;240(6):481-7. **4.** Wadood AC, Azuara-Blanco A, Aspinall P, Taguri A, King A. Sensitivity and specificity of frequency-doubling technology, tendency-oriented perimetry, and Humphrey Swedish interactive threshold algorithm-fast perimetry in a glaucoma practice. Am J Ophthalmol. 2002 Mar;133(3):327-32. **5.** Kovalska MP, Bürki E, Schoetzau A, Orguel SF, Orguel S, Grieshaber MC. Clinical evaluation of a novel population-based regres-sion analysis for detecting glaucomatous visual field progression. Klin Monbl Augenheilkd. 2011 Apr;228(4):311-7. **6.** Holló G, Naghizadeh F. Evaluation of Octopus Polar Trend Analysis for detection of glaucomatous progression. Eur J Ophthalmol. 2014 Jun. DOI: 10.5301/ejo.5000504. **7.** Naghizadeh F, Holló G. Detection of early glaucomatous pro-gression with Octopus Cluster Trend analysis. J Glaucoma. 2014 Jun-Jul;23(5):269-75. **8.** Rowe FJ, Hanif S. Uniocular and binocular fields of rotation measures: Octopus ver-sus Goldmann. Graefes Arch Clin Exp Ophthalmol. 2011 Jun;249(6):909-19. **9.** Nowomiejska K, Vonthein R, Paetzold J, Zagorski Z, Kardon R, Schiefer U. Comparison between semiautomated kinetic perimetry and conventional Goldmann manual kinetic perimetry in advanced visual field loss.Ophthalmology. 2005 Aug;112(8):1343-54. **10.** Vonthein R, Rauscher S, Paetzold J, Nowomiejska K, Krapp E, Hermann A, Sadowski B, Chaumette C, Wild JM, Schiefer U. The normal age-corrected and reaction time-corrected isopter derived by semi-automated kinetic perimetry. Ophthalmology. 2007 Jun;114(6):1065-72. **11.** Nowomiejska K, Vonthein R, Paetzold J, Zagorski Z, Kardon R, Schiefer U. Reac-tion time during semi-automated kinetic perimetry (SKP) in patients with advanced visual field loss. Acta Ophthalmol. 2010 Feb;88(1):65-9. **12.** Nowomiejska K, Brzozowska A, Zarnowski T, Rejdak R, Weleber RG, Schiefer U. Variability in isopter position and fatigue during semi-automated kinetic perimetry. Ophthalmologica. 2012;227(3):166-72. **13.** Riemann CD, Hanson S, Foster JA. A comparison of manual kinetic and automated static perimetry in obtaining ptosis fields. Arch Ophthalmol. 2000 Jan;118(1):65-9.

RA-21062021FS

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