MonCV One

Automated Static Perimetry
Goldmann Interactive Perimetry

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ISO 13485: 2016
certified quality system

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The clinical examples presented in this document have been kindly provided by Dr Zanlonghi (Nantes), Dr Smirnov (Lille) and their collaborators

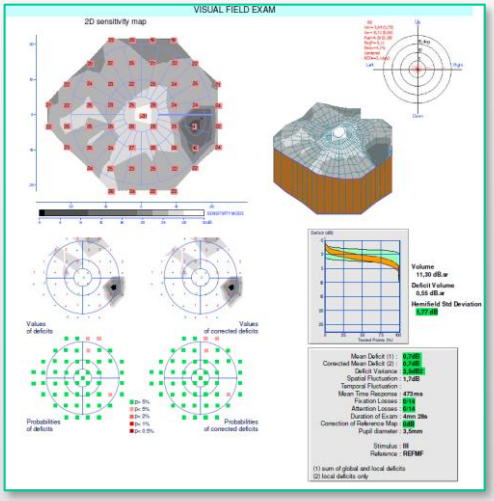
Automated static perimetry

STAT, FAST and MIXED perimetry

STAT perimetry uses a standard square grid with a uniform distribution of test points for the detection and monitoring of glaucomatous visual field defects. A full-threshold determination is performed using an adaptive thresholding algorithm to achieve measurement accuracy while reducing examination time

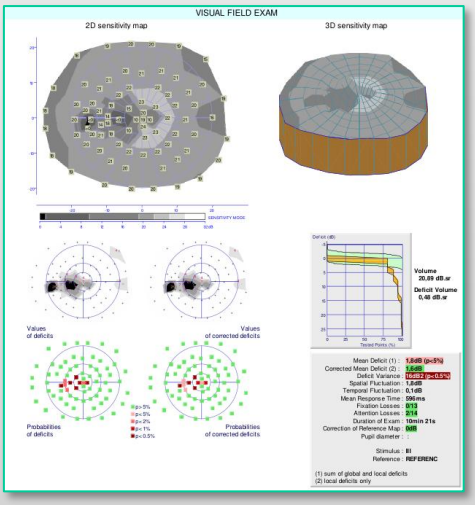
Key points:

- *STAT perimetry for glaucoma;*
- *FAST perimetry for neuro-ophthalmology;*
- *MIXED perimetry for comprehensive visual field assessment.*



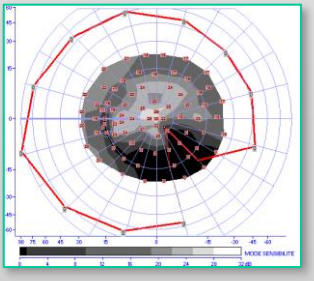
STAT-24 result

FAST perimetry (Functional Anatomy Static Testing) provides a: higher density of points in the central and cecocentral field for the detection of optic neuropathies and test points located close to the vertical end horizontal meridians to improve the detection and delineation of hemianopic, quadrantanopic and altitudinal defects.



FAST-24 result with centro-cecal scotoma

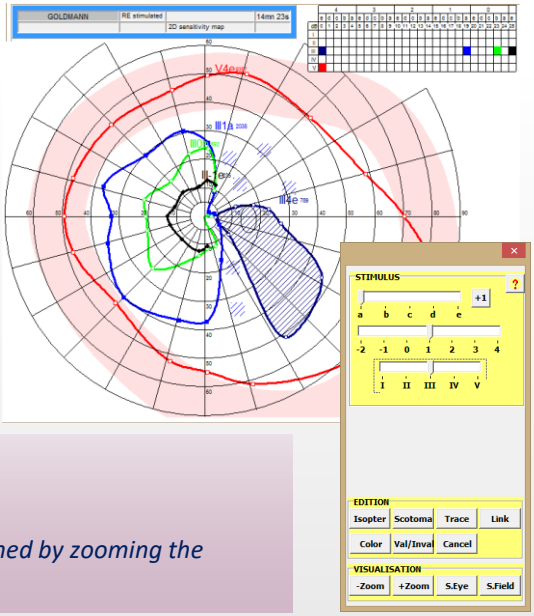
MIXED perimetry combines central static perimetry with a peripheral kinetic isopter to assess both central sensitivity and peripheral extent.



Interactive (Goldmann) perimetry

Interactive perimetry is needed in a number of clinical situations:

- for patients who are not able to perform automated perimetry,
- for the control of abnormal results obtained with automated perimetry,
- for the evaluation of acute visual field loss.



Key points:

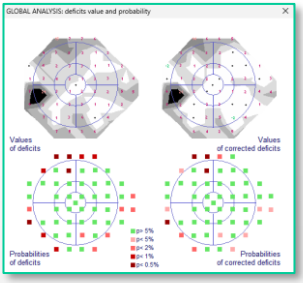
- *Direct mouse control of the stimulus;*
- *Detailed evaluation of the macula obtained by zooming the central field.*

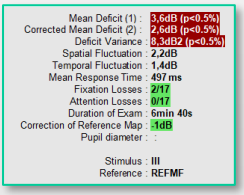
Quantitative analysis

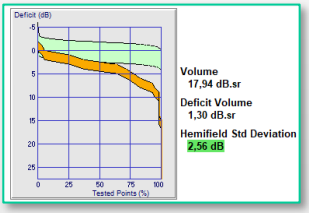
Statistical analysis

This analysis includes:

- the map of deficits relative to normal, age-corrected thresholds,
- the map of corrected deficits obtained after subtraction of the diffuse component,
- the global indexes (mean, corrected mean and variance, volume of the visual field and deficit volume),
- the distribution of deficits (cumulative defect curve of Pr Bebie)





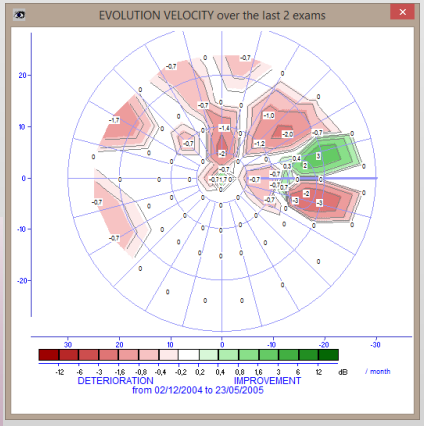


Key point:

- *Comparison of the patient's result with age corrected normal data.*

Follow-up analysis

Follow-up analysis uses the patient's successive visual field results to assess changes over time. It includes a graph showing the evolution of the mean defect and a progression map identifying the location and magnitude of visual field changes.

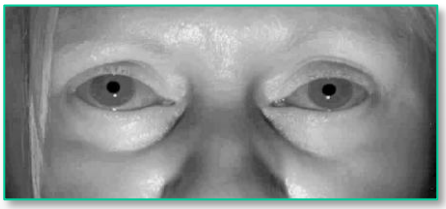


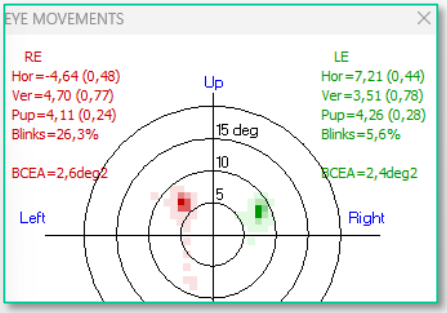
Key point:

- *The progression map helps distinguish the pattern of change, supporting differentiation between progression related to glaucoma and changes associated with other conditions such as cataract or AMD*

Driver visual field

Driver visual field test is available with either automated static perimetry or interactive perimetry
The interactive mode provides free mouse control of stimulus position and parameters, allowing flexible exploration of the visual field.
The automated static mode performed under binocular conditions, uses a 3-level strategy to classify each test location as normal, relative defect or absolute defect.
The procedure can be adapted to specific national or local requirements with customizable test-point layouts and suprathreshold stimulus levels.





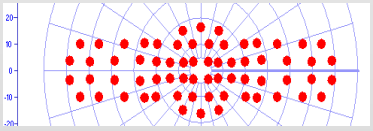
Key points:

- *Binocular fixation monitoring;*
- *Documentation of the stability of fixation;*
- *Adaptability to specific national or local requirements.*

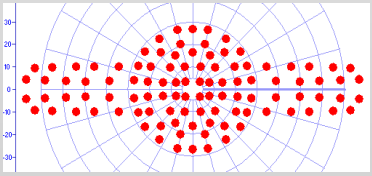
The default implementation includes two procedures, that correspond to the requirements of European Directive 2009/113/EC:

Group 1: The test evaluates the absence of significant visual field defects within the central ±20° and along the horizontal meridian up to 60° eccentricity.

Group 2 – Professional drivers: The test provides a wider assessment, covering the central ±30° and extending along the horizontal meridian up to 80° eccentricity.



Test for group 1

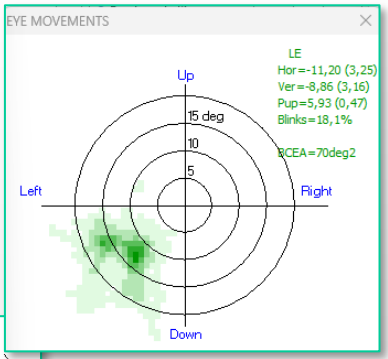


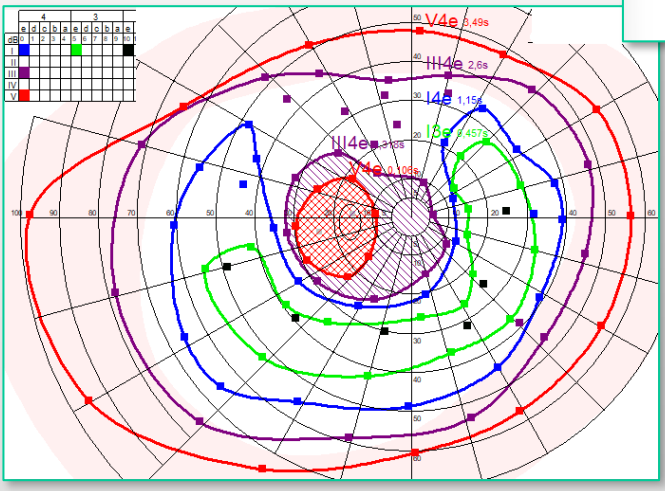
Test for group 2

Low vision visual field

With interactive perimetry, easy control of **stimulus size, luminance and position** allows the examination to be adapted to the patient's residual vision, eccentric fixation and ability to respond. This flexibility is particularly useful for exploring **residual functional vision and scotoma boundaries** when conventional automated perimetry is no longer suitable.

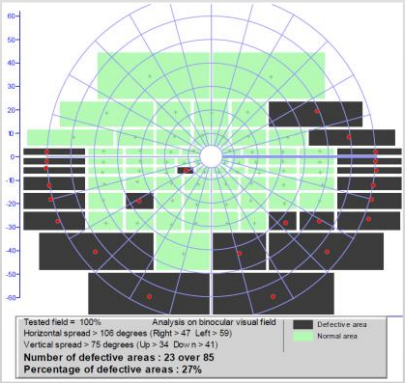
Eye-movement recording provides objective assessment of **fixation stability and eccentric fixation strategies**, helping to guide and monitor visual rehabilitation.





Patient with central scotoma. The eye movement recording (top right) shows the eccentric fixation.

Esterman binocular testing measures the patient's remaining binocular functional field. It can be performed using either automated or interactive perimetry, depending on the patient's ability to respond.



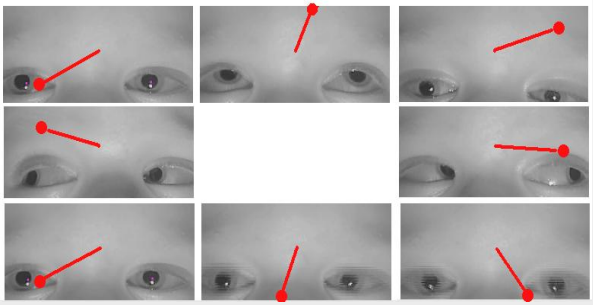
Attraction perimetry

Attraction perimetry is an objective behavioral method for assessing the visual field in patients who cannot reliably provide a verbal or manual response, particularly young children or patients with limited cooperation.

A visual stimulus is first presented at the center of the screen to attract and establish the patient's fixation. Once fixation is obtained, the stimulus is presented at a peripheral location. An eye and/or head movement toward the stimulus indicates detection and is recorded as a response.

Key points:

- *Wide field camera enables binocular eye recording even in the presence of large head movements;*
- *Synchronized video recording allows the examiner to review and validate the patient's responses.*

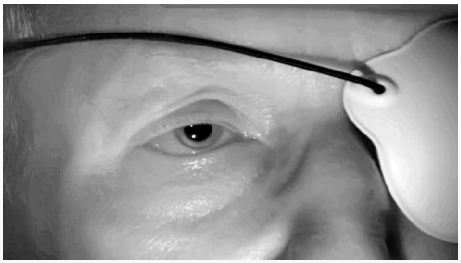


Ptosis visual field

The ptosis visual field test is a relatively short examination focusing on the superior visual field (10°–50°), where eyelid-related visual field loss is most likely to occur.

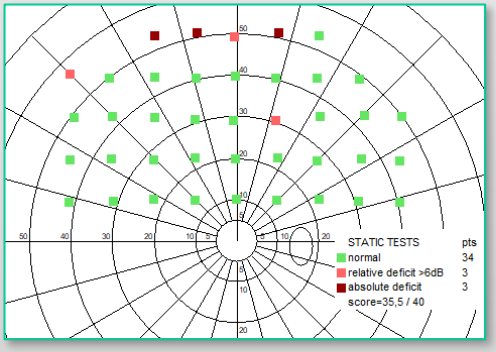
The test can be performed using automated static perimetry or interactive perimetry, typically in two conditions: first with the eyelid in its natural position, and then with the eyelid elevated and secured. Comparison of the two results allows the functional impact of the ptosis to be documented.

Video recording of the eyelid during perimetry provides objective confirmation that the eyelid remained in the intended position throughout each test condition. Snapshots extracted from the video can be included in the examination report to document eyelid position and palpebral opening.

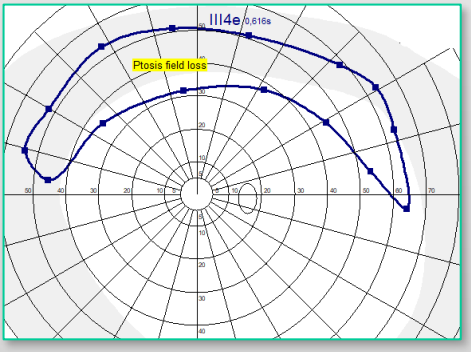


Key points:

- *The upper field is tested up to 50 degrees of eccentricity;*
- *Extract from the video can be included in the examination report.*



Automated static perimetry

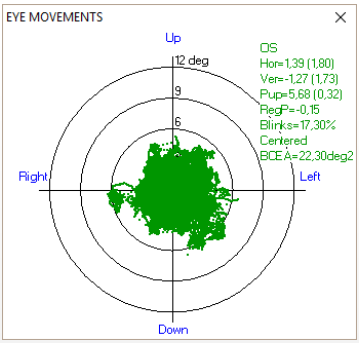


Interactive perimetry

Oculomotor assessment

Fixation stability

Eye movements are recorded throughout the entire exam allowing the generation of a report on the stability and deviation of the patient's fixation.

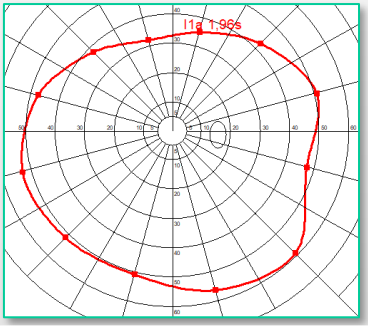


Key points:

- *Quantified stability of fixation with the bivariate contour ellipse area (BCEA);*
- *Pupil size average and fluctuations;*
- *Blinks frequency.*

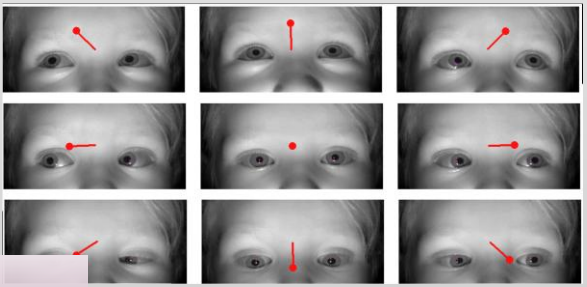
Field of fixation

The target is presented at progressively increasing eccentricities in different directions. The patient is instructed to look at the target while keeping the head stationary and to press the response button when he/she can no longer fixate the stimulus. The maximum target eccentricity successfully fixated is recorded for each direction.



Cardinal positions of gaze

The target is presented successively in the cardinal gaze directions. The camera records the face and both eyes, allowing the examiner to identify clinically apparent under-action, overaction, asymmetry or restriction.



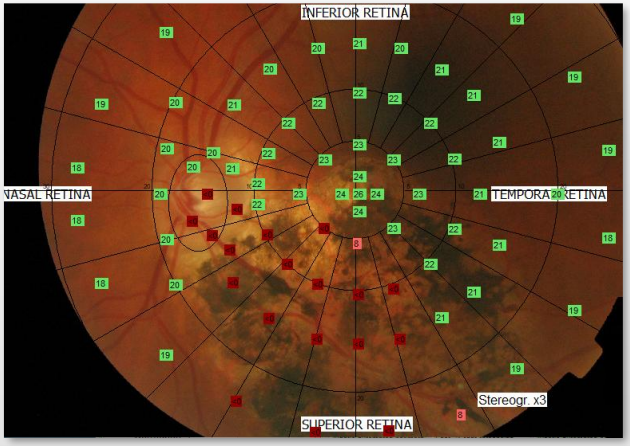
Key points:

- *Binocular video recording;*
- *Images extracted from the video included in the report.*

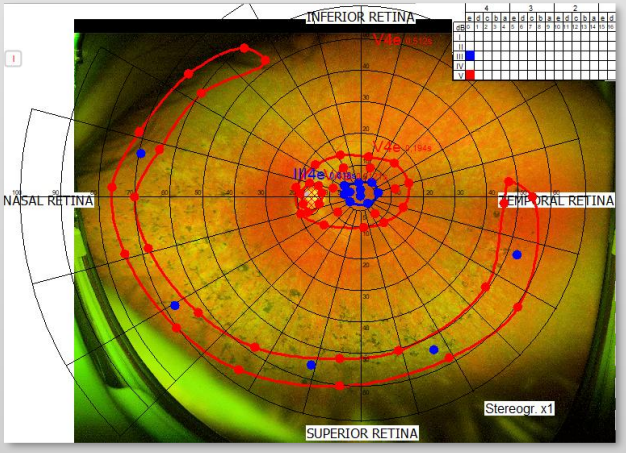
Eye fundus comparison

Superimposition of visual field results on the fundus image helps determine whether **functional abnormalities correspond to visible fundus lesions**, by displaying deficient test points in static perimetry and isopters in interactive perimetry at their corresponding retinal locations.

Superimposition is performed by identifying the **fovea and optic disc** on the fundus image, allowing the software to automatically align and scale the visual field with the retinal anatomy. For **ultra-widefield images**, the visual field projection is adjusted to the stereographic geometry of the fundus image to provide anatomically consistent localization of visual field defects.



Automated static perimetry superposition with eye fundus in ocular trauma



Interactive perimetry isopters superposition in retinitis pigmentosa

Correction of refractive errors

MonCV *One* is supplied, as an option, with a set a large field lenses (55 mm in diameter).

Key points:

- *Large-field lenses minimize peripheral visual field artifacts caused by the lens rim or lens misalignment;*
- *Greater tolerance to patient movement: the large optical field reduces the need for frequent patient repositioning;*
- *Fast magnetic fixation enables quick and easy lens positioning.*

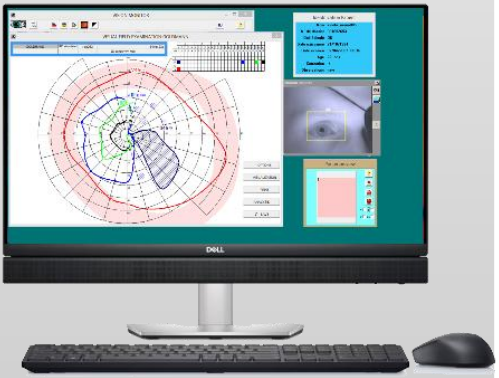
Eye tracker

The near-infrared (940 nm) wide-field eye tracker gives the operator accurate, real-time information on eye fixation and occluder position. Eye movements and pupil size can be recorded throughout the examination at 30 Hz and included in the report, offering objective information to assess and document examination reliability.

Computer interface

MonCV *One* is controlled from a standard PC operating under Windows 11 PRO.

It can be connected to a computer network allowing the access to results from a work station and their exportation under **PDF** or **DICOM** formats.



Specifications

- Hemispherical cupola with 30 cm radius
- Test projection up to **105 degrees of eccentricity** (temporal)
  65 degrees (nasal), 60 degrees (up), 70 degrees (down)
- **Background**
  Default values = 10 cd/m2 for white
  100 cd/m2 for yellow
- **Test colors & sizes**
  Goldmann I, II, III, IV, V white, V blue, III red
- **Test luminance**
  Maximum luminance = 3180 cd/m^2 (10 000 asb),
  64 dB dynamic range
- **Dimensions:** footprint=62x35cm height=74cm
- **Weight:** 23 kg (without PC, printer and electric table)
- **Power supply:** 110-240V, 3.6-1.8A , 50-60Hz

Key point:

- *Tests the full extent of the visual field;*
- *Hemispherical cupola for optimal accuracy in the far periphery.*

Examinations and options

Automated static perimetry

FAST-30, FAST-24, FAST-12, Fovea
STAT-30, STAT-24, STAT-10, Fovea
MIXED-30, MIXED-24, MIXED-12
Driver Group 1, Driver Group 2
Low vision

SWAP perimetry

BY-30, BY-24, BY-12

Interactive perimetry

Goldmann perimetry, Attraction perimetry,
Esterman test, Ptosis test, Field of fixation

Hardware options

- Electric table
- Set of large field lenses
- DICOM interface

Additional applications (options)

- Vision electrophysiology
- Dark adaptometry
- Pupillometry
- Chromatic perimetry
- Chromatic FST

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