

SpotOptics s.r.l. – leaders in accurate metrology

OMI-45 VIS to NIR

VERSATILE WAVEFRONT SENSOR

- Accurate metrology in single pass
- Optical elements, lasers and laser diodes
- Test any focal length and diameter (with accessories)
- Large dynamic range
- For R&D and production
- Optimized for VIS->NIR wavelength ranges (400-1000nm)



More than 25 years' experience in accurate metrology

TECHNICAL SPECIFICATIONS (GENERAL)

HARDWARE

Test	Optical elements, lasers and laser diodes
Power of laser diode that can be tested	Few mW. Higher powers require a power reduction system (available)
No of spots (see cameras below)	45x45 spots for a pupil of 9mm
Diameter and focal length of standard lenslet arrays	• $\phi=0.2\text{mm}$, $f=22\text{mm}$ or 11mm • Other lenslets available on request

SOFTWARE

Software (control and analysis)	Sensoft for 64bit Win 8.1, Win 10, Win 11
RMS repeatability of Zernike coefficients	<2nm rms
RMS repeatability of modal wavefront measurements	< $\lambda/100$
Accuracy and dynamic range	$\lambda/20$ - $\lambda/100$ (calibration dependent), $\pm 50 \lambda$

CAMERAS

Detector, wavelength range and cooling	CMOSIS (VIS-NIR). Uncooled. See QE curves below
Camera: Resolution, pixel size, chip size	2048 x 2048 pixels, $5.5\mu\text{m}$, $11 \times 11 \text{ mm}^2$
Connection, A/D convertor bits	USB 3.0, 8-10-bits (8bits used in SenSoft)
Camera: Acquisition speed	90Hz
Analysis: Analysis speed	~20Hz at full resolution (45x45 spots)
Triggering	Yes
Exposure time (max)	~1sec

ACCESSORIES

Light sources, beam expanders and compressors	High quality LD with lens at test wavelength, beam expanders/compressors
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OMI-45 VIS-NIR (from 400nm-1000nm)

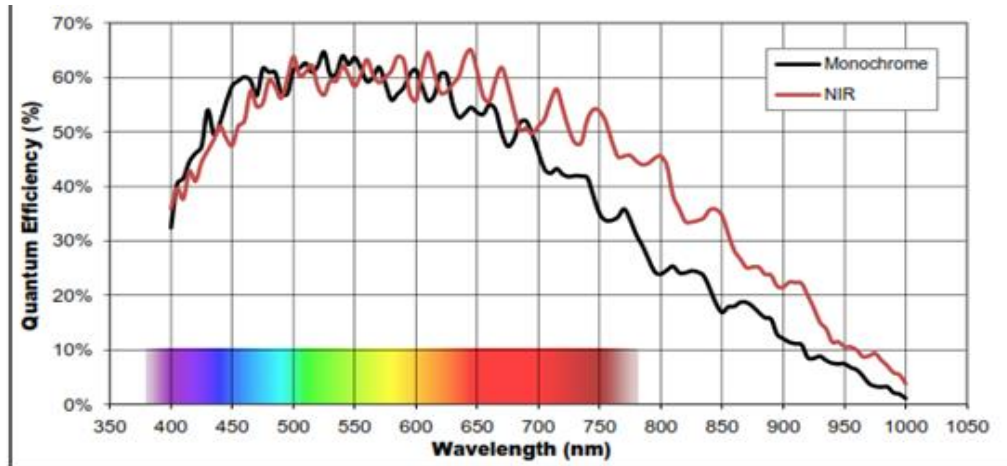


figure 3-21, CMV4000-mono and NIR (E12), quantum efficiency curves, ©CMOSIS

Quantum efficiency curve of CMOS

Other details

- Resolution: 2048 x 2048 pixels
- Pixel size: 5.5 μm x 5.5 μm
- Chip size: 11.2 mm x 11.2 mm
- Image rate: 90Hz (full resolution)
- Max. SNR: 41
- Max. exp. Time: ~1 sec
- Connection: USB 3.0



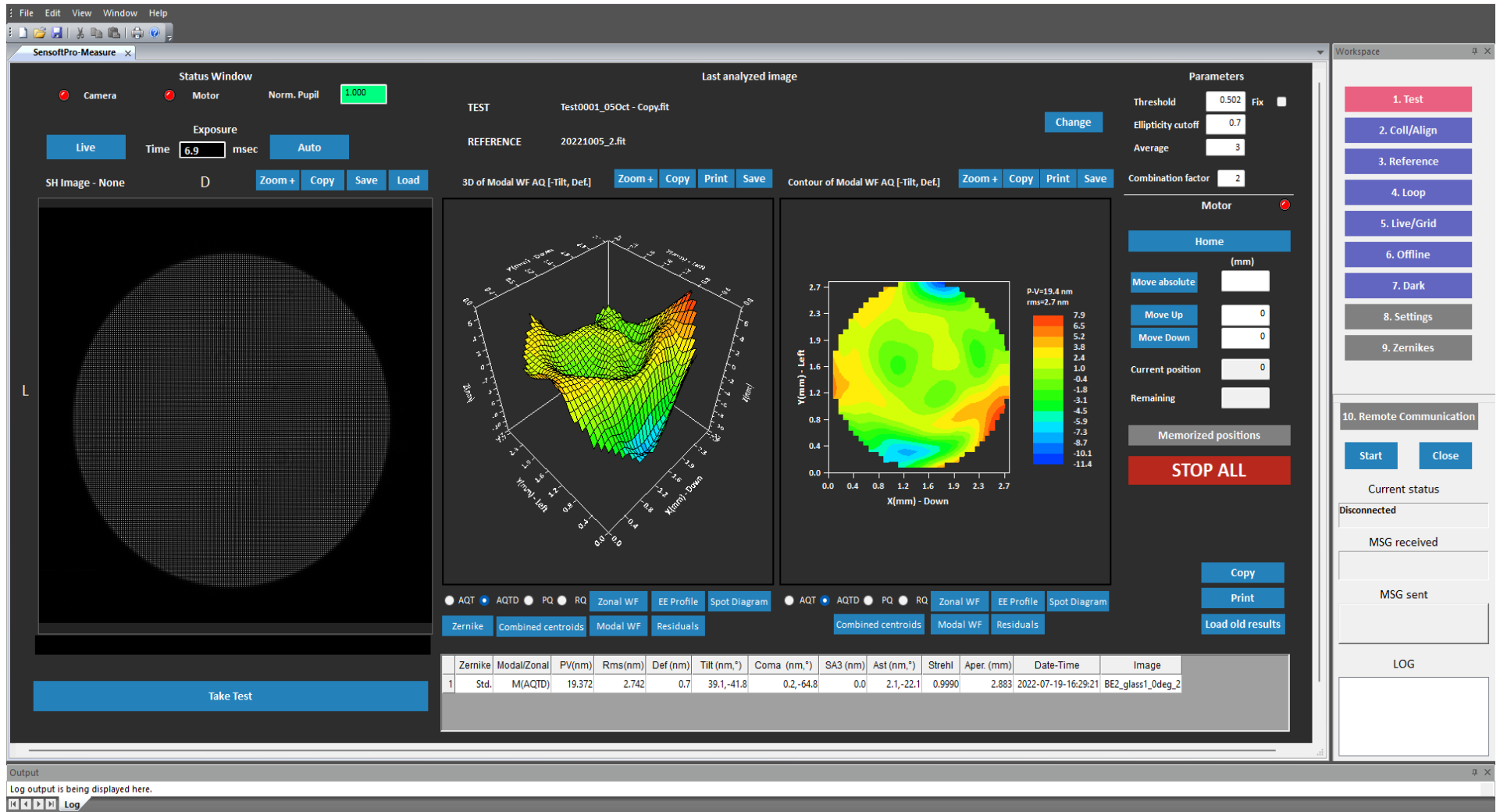
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OMI 45-VIS-NIR

Other details

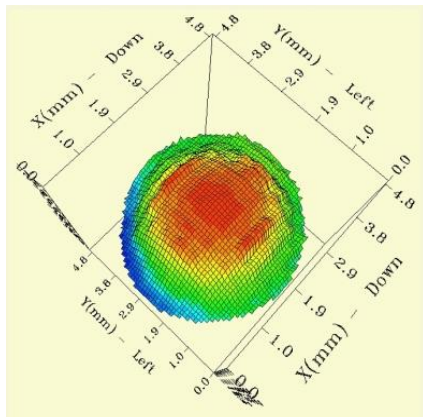
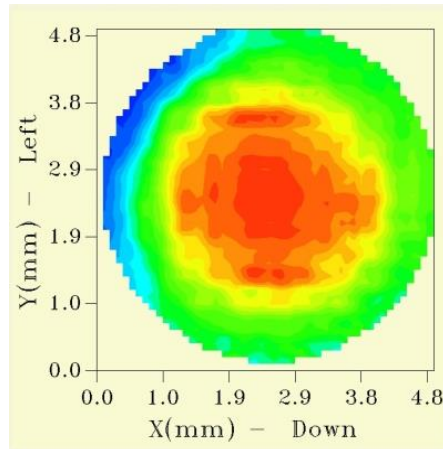
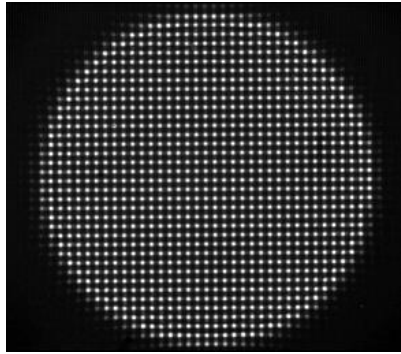
- Resolution: 45x45 spots (max)
- Lenslet pitch and focal length 0.2mm, 22mm
- Calibration unit for parallel light: Static or motorized high-quality collimator with LD/LED at test wavelength
- Motor step: 2.5 μm

SENSOFT: THE SOFTWARE



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SenSoftPro GUI



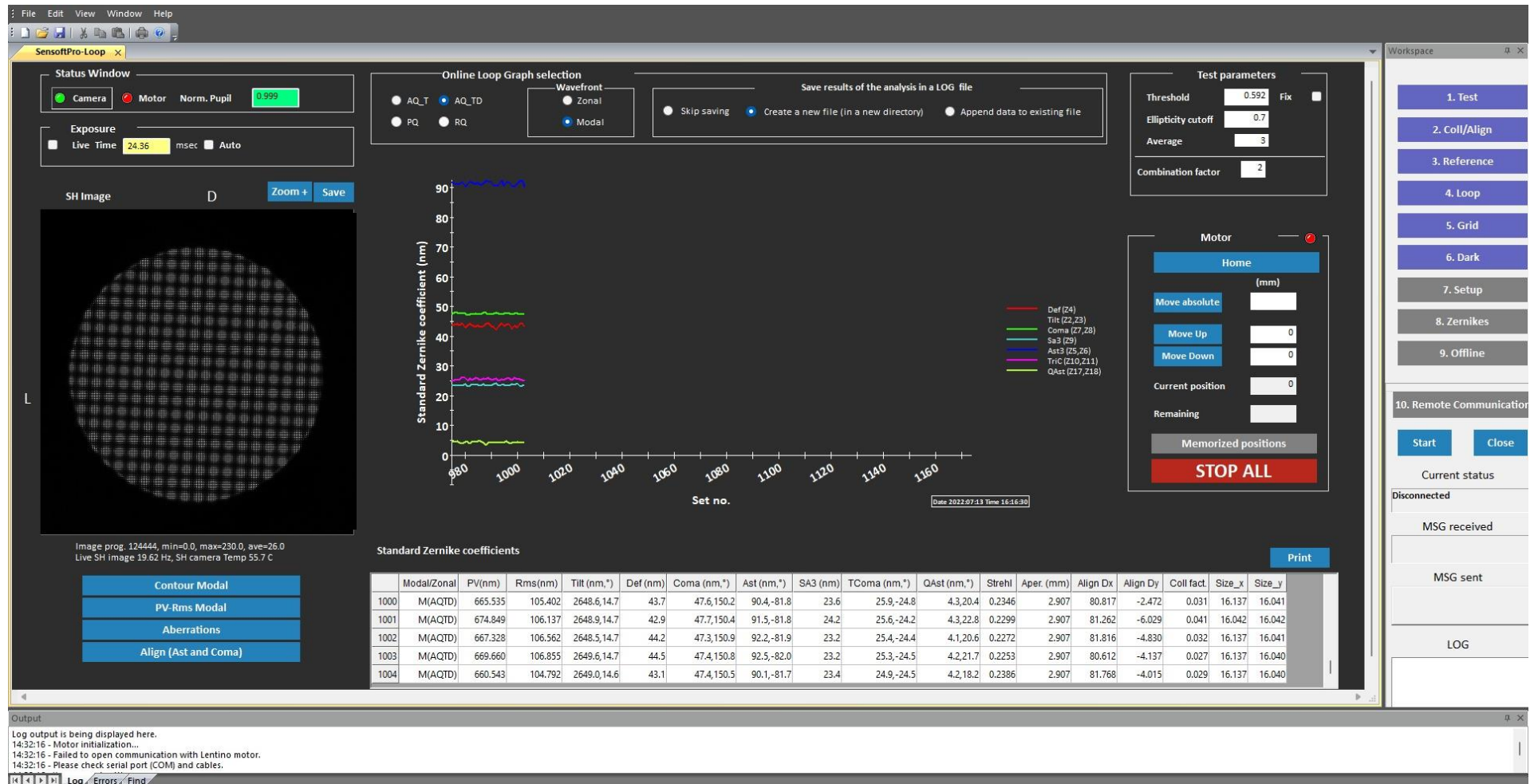
Sensoft: The modular software package

- Fully controls the hardware of OMI
- Performs the Shack-Hartmann (SH) analysis
- Computes Zernike coefficients, diagnostics (alignment and correct focal plane), zonal and modal wavefront, MTF, spot diagram
- Has a Loop mode for on-line adjustment of optical systems

OMI in your production line:

- OMI – with its own PC - can easily be adapted to the production line
- It can work in a closed-loop with the PC of the manufacturing machine
- A software module defines the IP communication protocol and transfers the results between the PCs in the Local Area Network

ON-LINE OPTIMIZATION OF OPTICAL SYSTEM IN A FAST LOOP



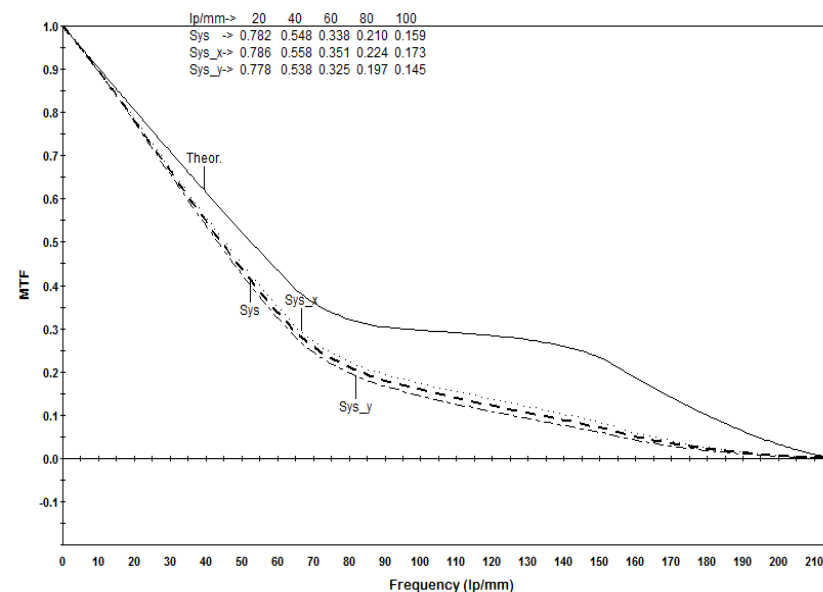
- The optimization of complex optical systems becomes easy by monitoring the individual aberrations in a continuous loop
- The individual aberration coefficients, as well as PV and Rms of (zonal or modal) wavefront are given

ON-LINE ALIGNMENT IN A FAST LOOP



- The alignment of complex optical systems becomes easy by monitoring coma and astigmatism in a continuous loop
- The individual (x, y) components of coma and astigmatism, as well as the total coefficients are displayed
- The optimization can be done for one component at a time, as the software can display one component of interest

MTF MEASUREMENTS

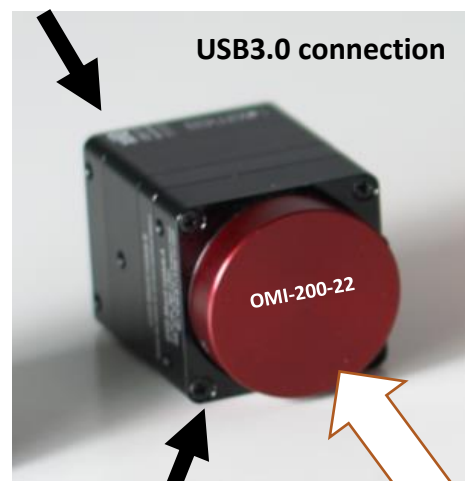


MTF after subtracting the contributions of tilt and defocus present in the data.

OMI-45 with VIS-NIR CAMERA

Calibration light source: LD/LED at different wavelengths (parallel or pinhole for test with collimator)

CMOSIS camera



OMI

Input test beam

- $f_l=22\text{mm}$, $\phi=0.2\text{mm}$
- Max. Resolution 45x45 spots

PHYSICAL

Camera:

CMOSIS, USB 3.0, 8-bits (400-1000nm)

Dimensions

26 (L) x 26 (W) x 40 (H) mm

Weight: ~100gm

KEY FEATURES

Measurement technique

Shack-Hartmann wavefront sensor

Test in parallel light or at the lens focus in single pass

Parallel light (with a calibration unit)

At the focus of the lens (with pinhole calibration unit)

Light sources with different wavelength available

Calibration units available

High-quality parallel light source (motorized or manual)

Pinhole calibration unit

Accessories

Light sources and beam expanders/compressors. Collimators

SOFTWARE: SenSoft

- Full waterfront analysis: Zernikes, zonal and modal WF, Spot diagram, MTF, EE, PSF, M^2
- Easy alignment of lens group via software: graphical indication for correction using coma and astigmatism
- Stabilization of lasers: graphical indication of focusing of laser beam