

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

OMI-DUV 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 UV->NIR wavelength ranges



More than 25 years' experience in accurate metrology

TECHNICAL SPECIFICATIONS

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)	32x32 (DUV-VIS-NIR) for a pupil size of 6.5mm
Diameter and focal length of standard lenslet arrays	• $\phi=0.2\text{mm}, f=22\text{mm}$ – for UV-Vis region from 120-750nm • $\phi=0.2\text{mm}, f=11\text{mm}$ - for NIR region – from 751-1000nm

SOFTWARE

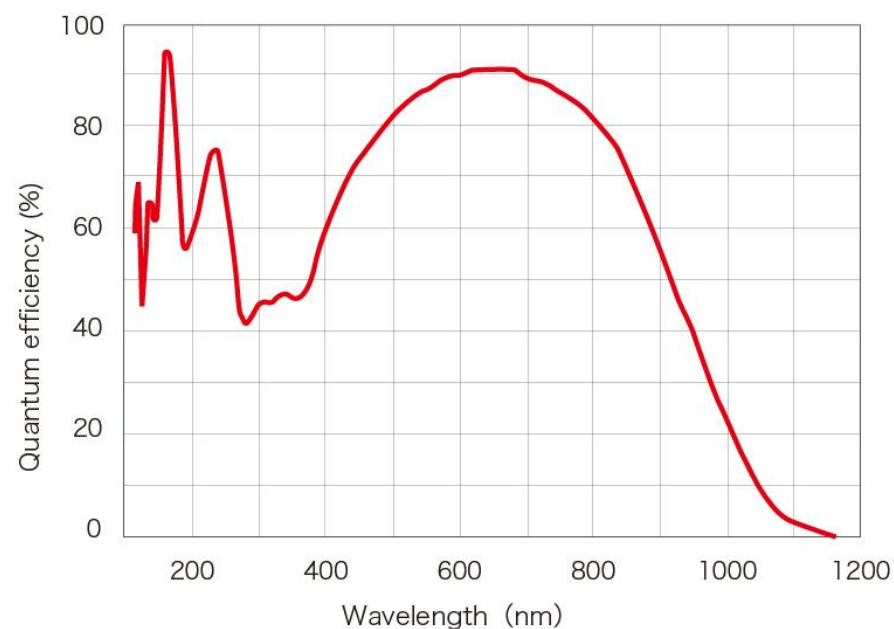
Software (control and analysis)	Sensoft for 64bit Win7, Win 8.1, Win 10
RMS repeatability of Zernike coefficients	<2nm rms ($\lambda/800$ @ 1550nm)
RMS repeatability of modal wavefront measurements	< $\lambda/100$
Accuracy and dynamic range	$\lambda/20$ - $\lambda/100$ (calibration dependent), $\pm 50 \lambda$

CAMERA

Detector, wavelength range and cooling	Back Thinned CCD (DUV-VIS-NIR). High quantum efficiency: Over 60 % at 200 nm, Over 90 % at 650 nm Uncooled.
Resolution, pixel size, chip size	640 x 480 pixels, each of 14.0 μm . 8.96 x 6.72 mm ²
Connection, A/D convertor bits	CameraLink, 12-bits
Acquisition speed	31 Hz (CCD)
Triggering	Yes
Exposure time (max)	1sec

ACCESSORIES

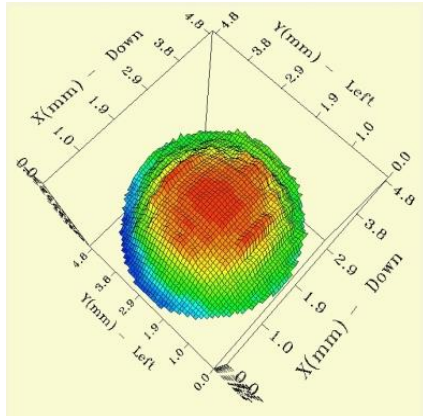
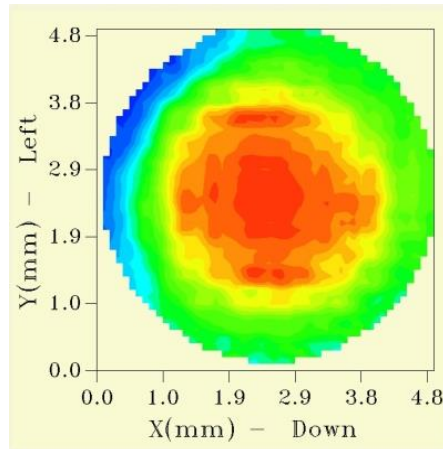
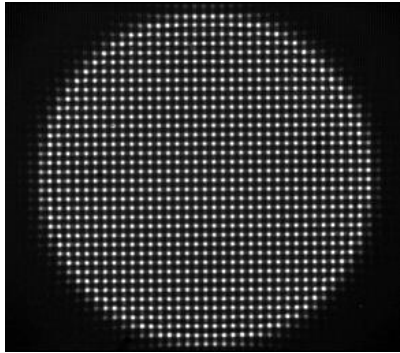
Light sources, beam expanders and compressors	High quality LD with lens at test wavelength, beam expanders/compressors
---	--

OMI DUV-VIS-NIR (from 120nm-1100nm)**Quantum efficiency curve of CCD****Other details**

- Resolution: 640 x 480 pixels
- Pixel size: 14.0 μm x 14.0 μm
- Chip size: 8.9 mm x 6.7mm
- Image rate: 31.0Hz (full resolution)
- Interline transfer sensor. Saturation: $\geq 30,000\text{e}^-$
- Max. exp. time: 1 sec
- Connection: CameraLink

Other details

- Resolution: 32x32 spots (max) with 200 μm grid
- Lenslet pitch and focal length (UV and VIS): 0.2mm, 22mm
- Lenslet pitch and focal length (NIR): 0.2mm, 11mm
- 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

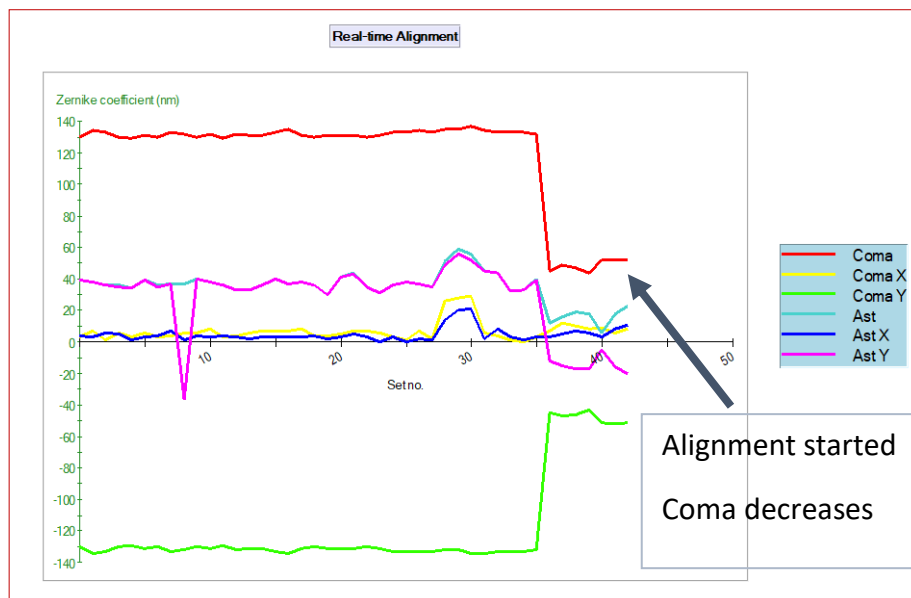
Sensoft: The modular software package

- 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:

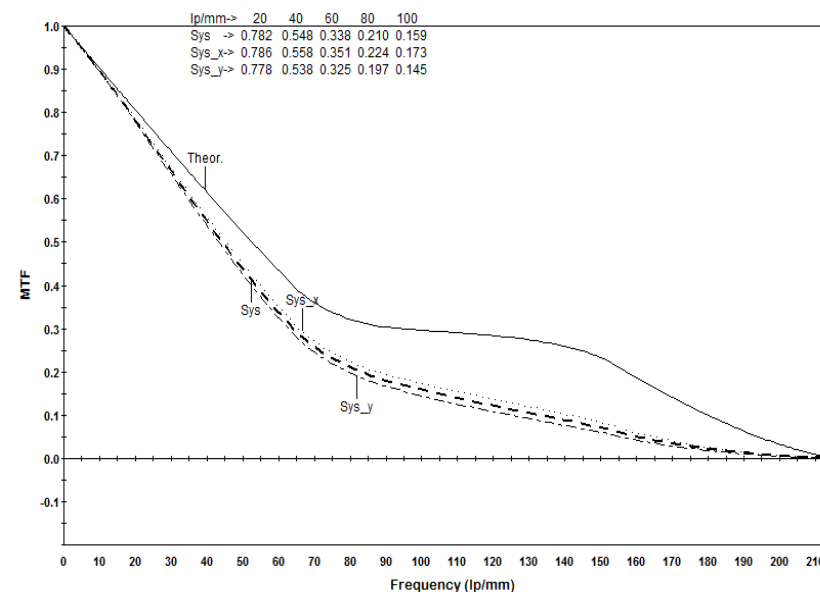
- OMI – with its own PC - can easily be adapted to the production line
- It can work in a closed-loop with the PC of the manufacturing machine
- A software module defines the IP communication protocol and transfers the results between the PCs in the Local Area Network

ON-LINE ALIGNMENT IN A FAST LOOP



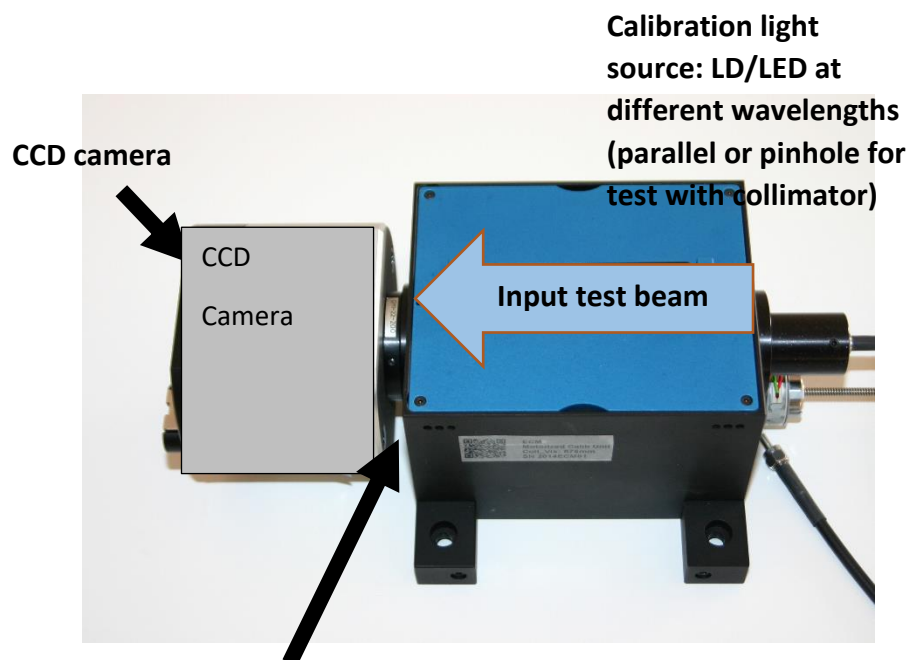
- The alignment of complex optical systems becomes easy by monitoring coma and astigmatism in a continuous loop
- The individual (x, y) components of coma and astigmatism, as well as the total coefficients are displayed
- The optimization can be done for one component at a time, as the software can display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

MTF MEASUREMENTS



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

OMI on ECM with DUV-VIS CAMERA



OMI

- $f_l=22\text{mm}$, $\phi=0.2\text{mm}$ for UV-Vis (193-750nm)
- $f_l=11\text{mm}$, $\phi=0.2\text{mm}$ for NIR (750-1000nm)
- Max. Resolution 32x32 spots for a pupil size of 6.5mm

PHYSICAL

Camera:

CCD, CameraLink, 12bits (120-1000nm)

Dimensions

150 (L) x 82 (W) x 82 (H) mm

Weight: ~800gm

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

- Full waterfont 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