

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

OMI-UV 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 (300-1100nm)
- High sampling



More than 25 years' experience in accurate metrology

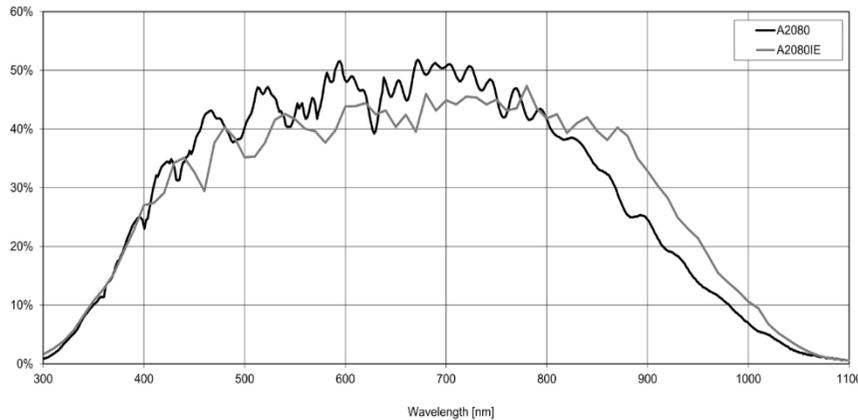
TECHNICAL SPECIFICATIONS (GENERAL)

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)	75x75 (UV-VIS-NIR) for a pupil of 15mm
Diameter and focal length of standard lenslet arrays	<ul style="list-style-type: none"> • $\phi=0.2\text{mm}, f=22\text{mm}$ – for UV-Vis region from 300-750nm • $\phi=0.2\text{mm}, f=11\text{mm}$ - for NIR region – from 750-1100nm
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	CMOS (UV-VIS-NIR). Uncooled.
Resolution, pixel size, chip size	2080 x 2080 pixels each of 8.0 μm . 16 x 16 mm ²
Connection, A/D convertor bits	Gigabit Ethernet, 12-bits
Acquisition speed	15Hz
Triggering	Yes
Exposure time (max)	~500msec
ACCESSORIES	
Light sources, beam expanders and compressors	High quality LD with lens at test wavelength, beam expanders/compressors



OMI UV-VIS-NIR (from 300nm-1100nm)

Quantum Efficiency Image Sensor



Quantum efficiency curve of CMOS

Other details

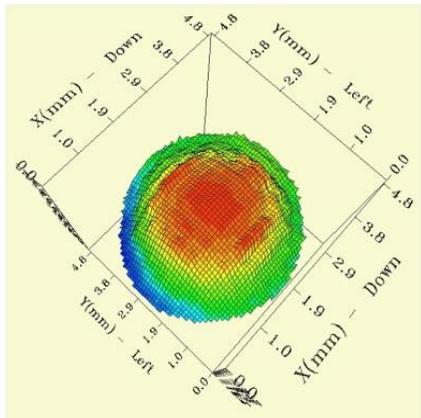
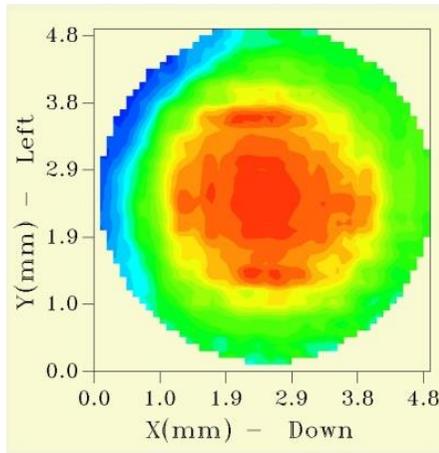
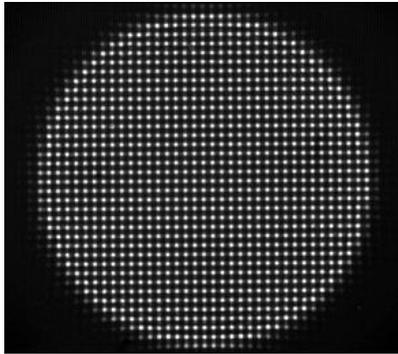
- Resolution: 2080 x 2080 pixels
- Pixel size: 8 μm x 8 μm
- Chip size: 16 mm x 16 mm
- Image rate: 15Hz (full resolution)
- Saturation: $\geq 900,000e^-$ SNR: 300
- Max. exp. Time: ~ 500 ms
- Connection: Gigabit Ethernet



OMI UV-VIS-NIR

Other details

- Resolution: 75x75 spots (max)
- 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

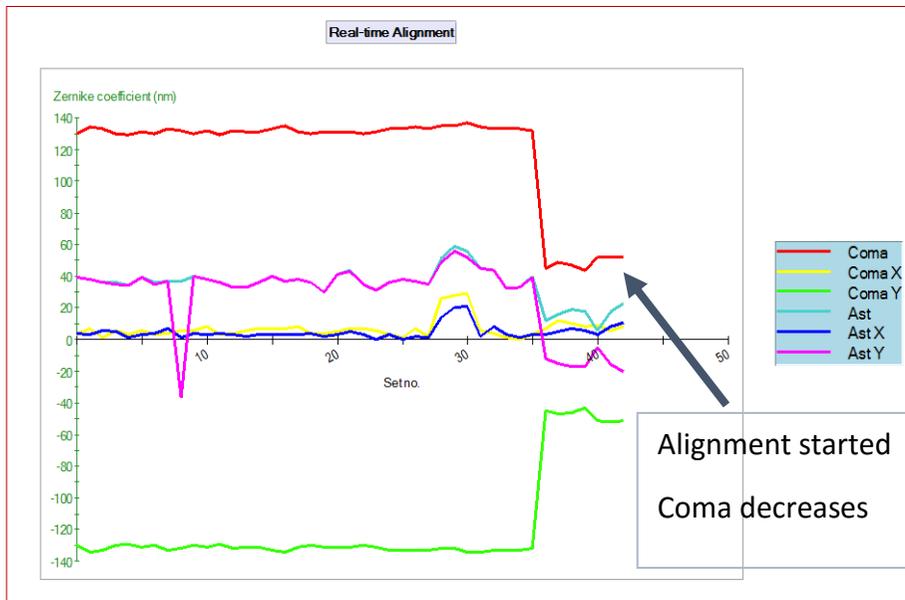
Sensoft: The modular software package

- 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:

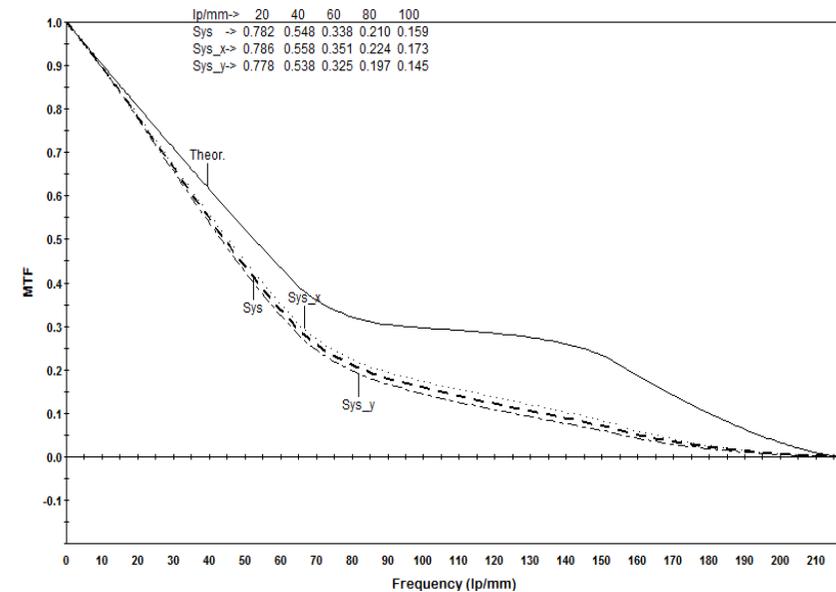
- OMI – with its own PC - can easily be adapted to the production line
- It can work in a closed-loop with the PC of the manufacturing machine
- A software module defines the IP communication protocol and transfers the results between the PCs in the Local Area Network

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

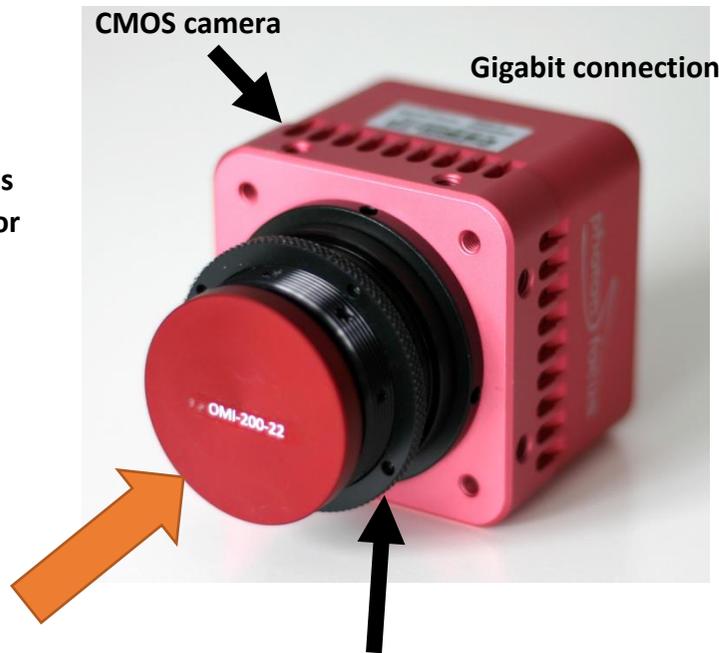
MTF MEASUREMENTS



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

OMI with UV-VIS CAMERA

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



Input test beam

OMI

- $f_l=22\text{mm}$, $\phi=0.2\text{mm}$ for UV-Vis (300-750nm)
- $f_l=11\text{mm}$, $\phi=0.2\text{mm}$ for NIR (750-1100nm)
- **Max. Resolution 75x75 spots**

PHYSICAL

Camera:

CMOS, Gigabit Ethernet, 12-14bits (300-1100nm)

Dimensions

120 (L) x 60 (W) x 60 (H) mm

Weight: ~500gm

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