

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

OMI-DUV to NIR

VERSATILE WAVEFRONT SENSOR

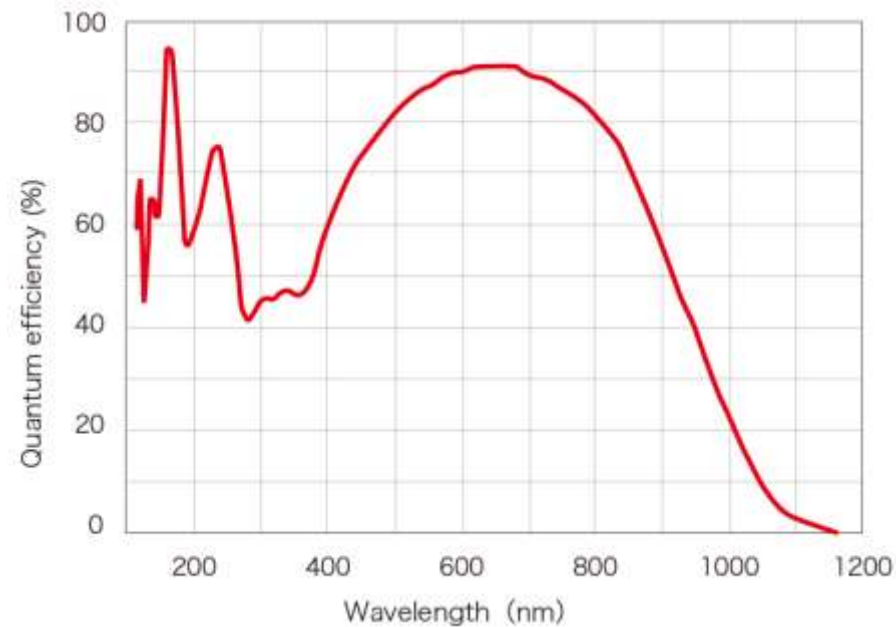
- Accurate metrology in single pass
- Optical elements, lasers and laser diodes
- Test any focal length and diameter (with accessories)
- Large dynamic range
- For R&D and production
- Optimized for UV->NIR wavelength ranges



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 | <ul style="list-style-type: none"> • $\phi=0.2\text{mm}, f=22\text{mm}$ – 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 |

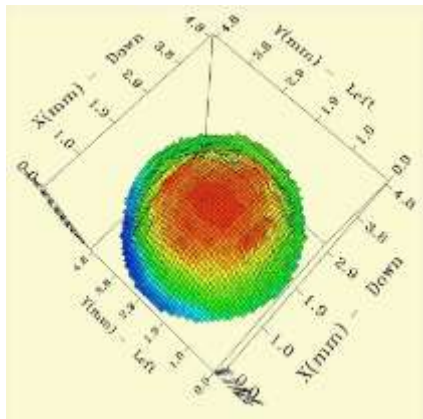
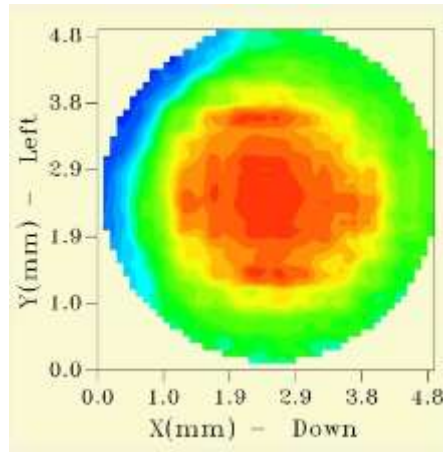
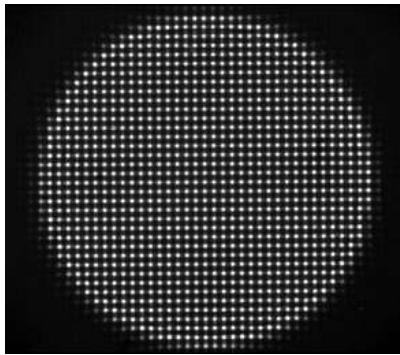
OMI DUV-VIS-NIR (from 120nm-1100nm)

**Quantum efficiency curve of CCD****Other details**

- Resolution: 640 x 480 pixels
- Pixel size: 14.0 μm x 14.0 μm
- Chip size: 15.15 mm x 15.15mm
- Image rate: 31.0Hz (full resolution)
- Interline transfer sensor. Saturation: $\geq 30,000e^-$
- Max. exp. time: 1 sec
- Connection: CameraLink

Other details

- Resolution: 32x32 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

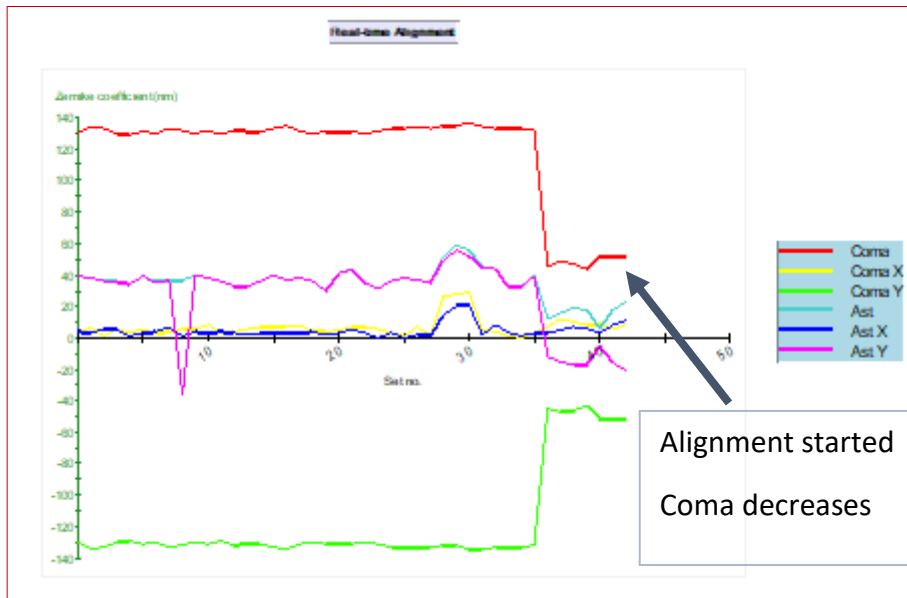
Sensoft: The modular software package

- 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

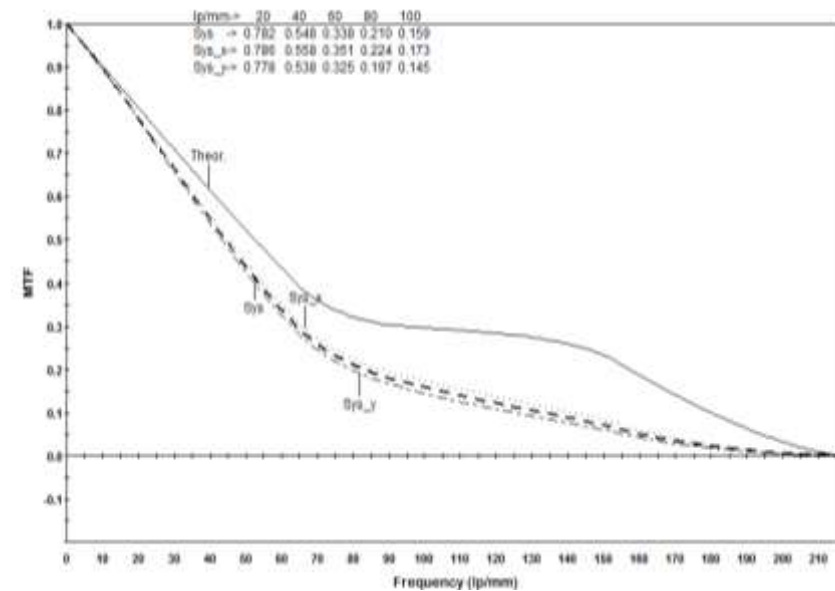
OMI in your production line:

- 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



MTF MEASUREMENTS

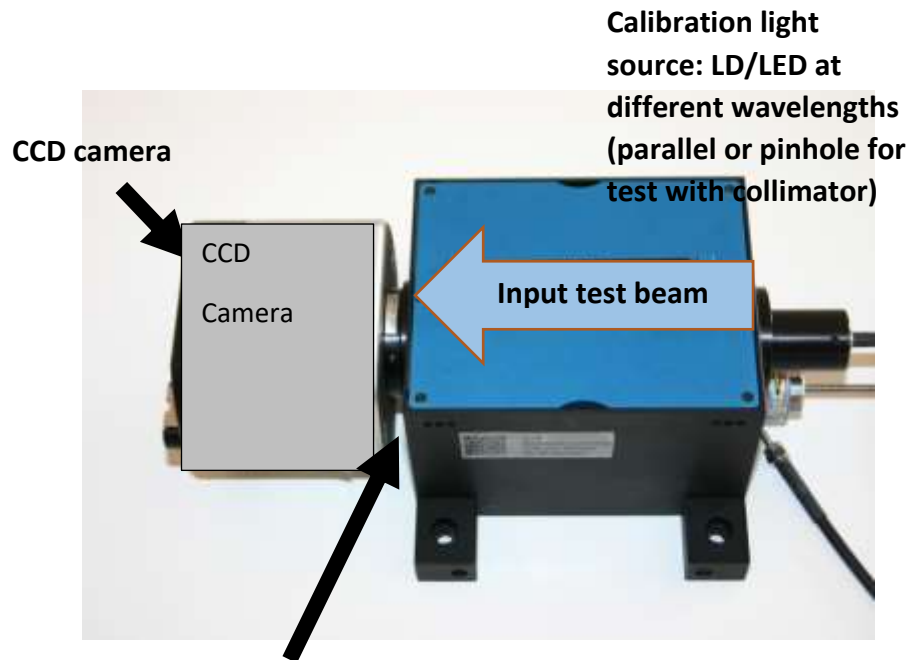


5

- 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 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