

SpotOptics

The software people for optics

OPTINO

VERSATILE WAVEFRONT SENSOR

- Accurate metrology in single and double pass
- Lenses, mirrors and laser beams
- Any focal length and diameter
- Large dynamic range
- Adaptable for production
- Wide wavelength range with different cameras (193nm-10.6 μ)
- Different lenslets available according to application



Optino: models



OPTINO-MU

Small Footprint. Max: 45x45 spots
 USB3
 Wavelength range: 380nm-1100nm
 Readout speed: 90Hz
 Processing speed: 15Hz
 37(H) x 30(W) x 79(L) mm



OPTINO-UV-VIS

Max 75x75 spots
 Thinned CCD chip
 Gigabit Ethernet
 Wavelength range: 193nm-1100nm
 Readout speed: 7.5Hz
 Processing speed: 7.5Hz



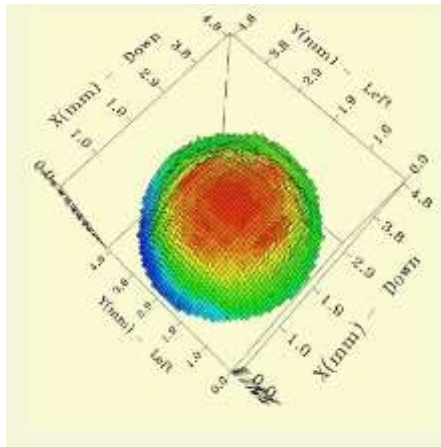
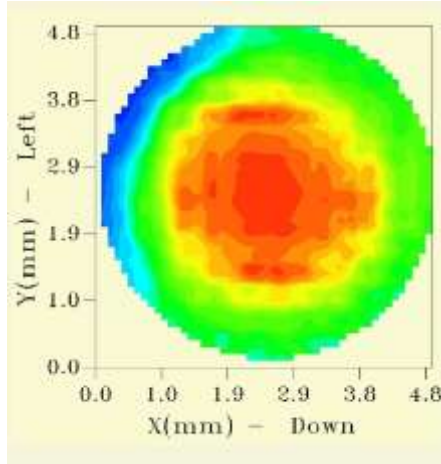
OPTINO-SWIR

Max 45x45 spots
 InGaAs camera
 Gigabit Ethernet
 Wavelength range: 950nm-1700nm
 Readout speed: 100Hz
 Processing speed: 50Hz

Technical Specifications: Hardware

Focal ratios covered	Practically any focal ratio can be tested with appropriate collimator
Diameter of optical element that can be tested in parallel light	Practically any diameter can be tested with appropriate accessories
Test setup	Double or single pass
Diameter and focal length of standard lenslets	(0.2mm, 11mm), (0.2mm, 22mm), (0.3mm, 41mm). Others: (0.13mm, 7mm). Special
Camera - connections	Cameras with Gigabit and USB2 and USB3 connection available. 10-bits to 16-bits
No of spots (0.2mm diameter lenslet array and USB3 camera). 9mm pupil	45x45 with (with 0.2mm array). 69x69 spots (with 0.13mm array)
Maximum no. of spots (array with Gigabit camera). 15mm pupil	75x75 (with 0.2mm array). 115x115 spots (with 0.13mm array)
Measure aspherical elements	~15% variation in longitudinal spherical aberration
RMS repeatability of computation of Zernike polynomials	1-2nm rms ($\lambda/600$ - $\lambda/300$) at 633nm
RMS repeatability of wavefront measurements	$< \lambda/200$
Accuracy	$\lambda/10$ - $\lambda/100$ – depending on the accuracy of the calibration elements
Dynamic range of measurements sub-pupil (tilt subtracted)	$\pm 50 \lambda$
Wavelength range	UV (0.193-1.1 μ), Vis (0.193-1.1 μ), 0.95-1.7 μ
Light sources	LEDs, LDs and Halogen lamps available (at one wavelength or in white light)
Software (control and analysis)	Sensoft
Acquisition speed	15-500Hz (camera dependent)
Processing speed	5-150 Hz (camera and PC dependent)
Power requirement for collimator stepper motor (motorized version)	12V/2A DC
Trigger	TTL 5V

SENSOFT: THE SOFTWARE



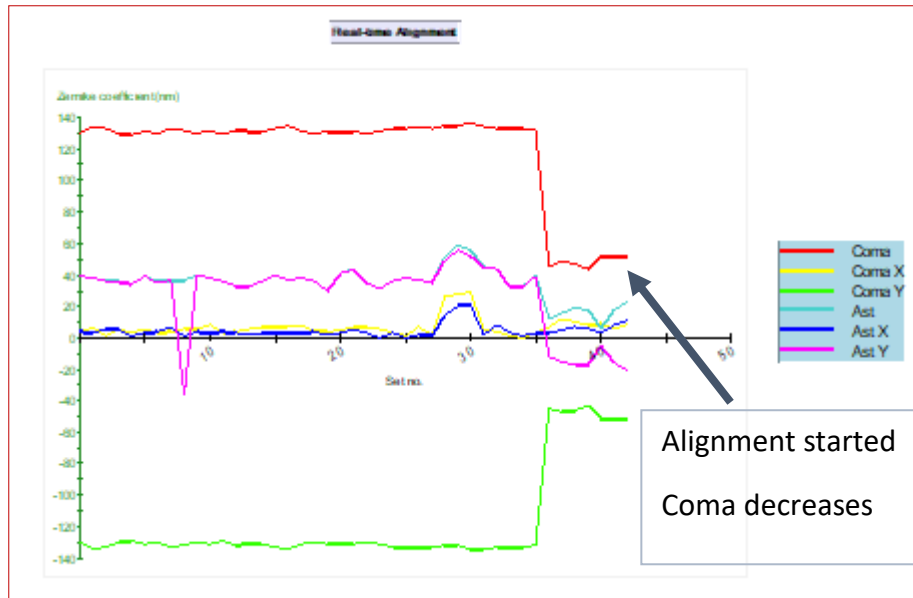
Sensoft: The modular software package

- ✓ Hardware control of Optino (camera, light source and motor)
- ✓ Full Shack-Hartmann (SH) analysis
- ✓ Zernike aberration coefficients: Annular, Standard and Fringe
- ✓ Aberration coefficients: Seidel
- ✓ Wavefront: Zonal and modal
- ✓ MTF, PSF and EE
- ✓ Strehl ratio
- ✓ Spot diagram and
- ✓ Diagnostics (alignment and best focal plane)
- ✓ Loop mode for on-line alignment and best focal plane) using coma, astigmatism and spherical aberration
- ✓ Loop mode for on-line adjustment of spacing of elements to get best focal plane using spherical aberration
- ✓ Average of SH images to decrease noise
- ✓ Automatic control of exposure time

Optino in your production line:

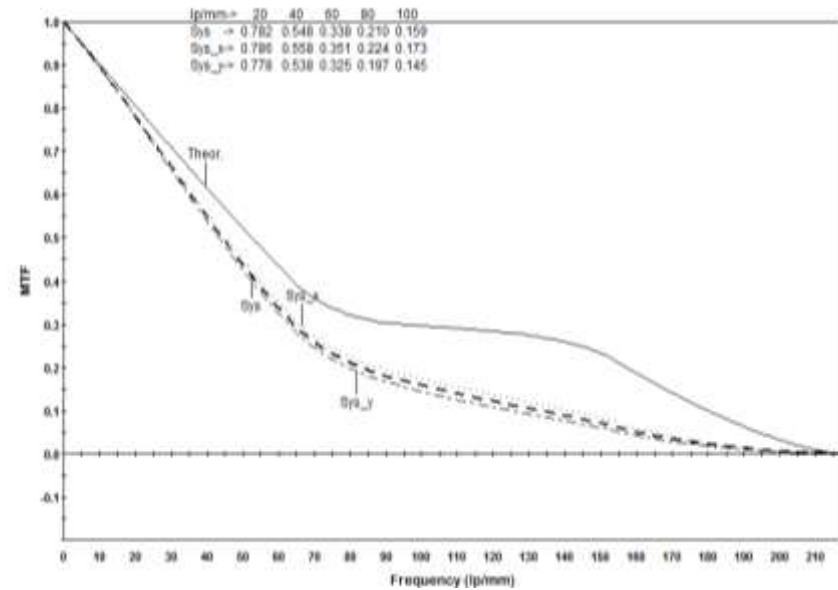
- ✓ Optino – with its own PC - can easily be adapted to the production line
- ✓ Work in a closed-loop with the PC of the manufacturing machine
- ✓ A software module defines the communication protocol and transfers the results between the control PC of Optino and the production PC, minimizing cost and time to develop special software to install on user PC

ON-LINE ALIGNMENT IN A FAST LOOP



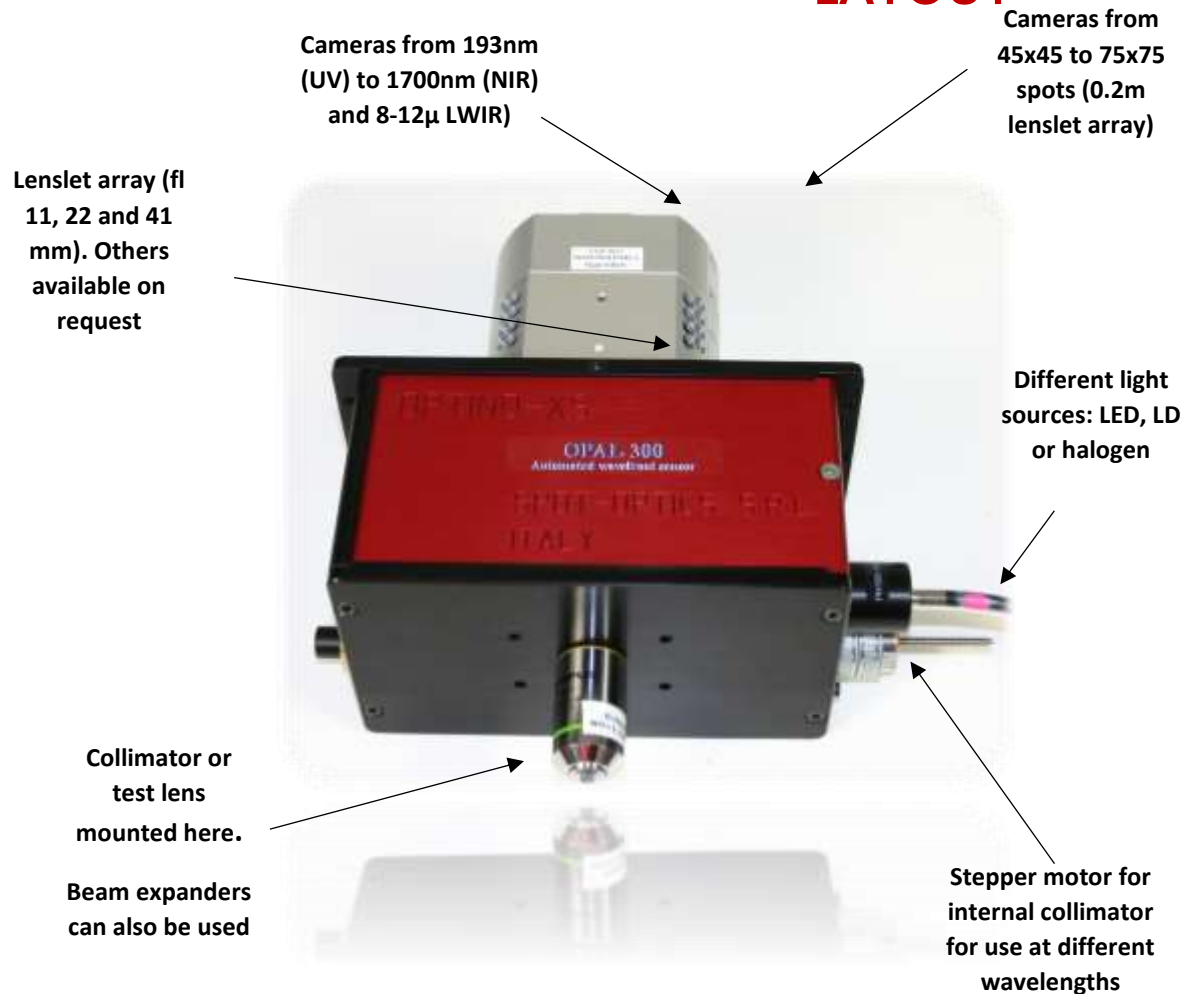
- The alignment of complex optical systems becomes easy by monitoring coma and astigmatism in a continuous loop
- The individual (x, y) components of coma and astigmatism, as well as the total coefficients are displayed
- The optimization can be done for one component at a time, as the software can display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

MTF MEASUREMENTS



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

LAYOUT



PHYSICAL

Dimensions: 17 (L) x 10 (W) x 10 (H) cm

Weight: 3 Kg

Cameras: USB3, Gigabit Ethernet

Motor power supply: 12V, 2A

KEY FEATURES

Measurement technique

Shack-Hartmann wavefront sensor

Test in parallel light or at the lens focus

Parallel light (with a collimator)

At the focus of the lens (with a pinhole)

Light sources with different wavelength available

Calibration

High-quality parallel light source

Pinhole calibration unit

$\lambda/20$ Spherical and flat reference mirrors

Versatile

Test any element in double or single pass

Accessories

Full set of accessories available

SOFTWARE

Easy alignment of lens group via software: the software gives graphical indication of the misalignment of the optical system, using coma and astigmatism.