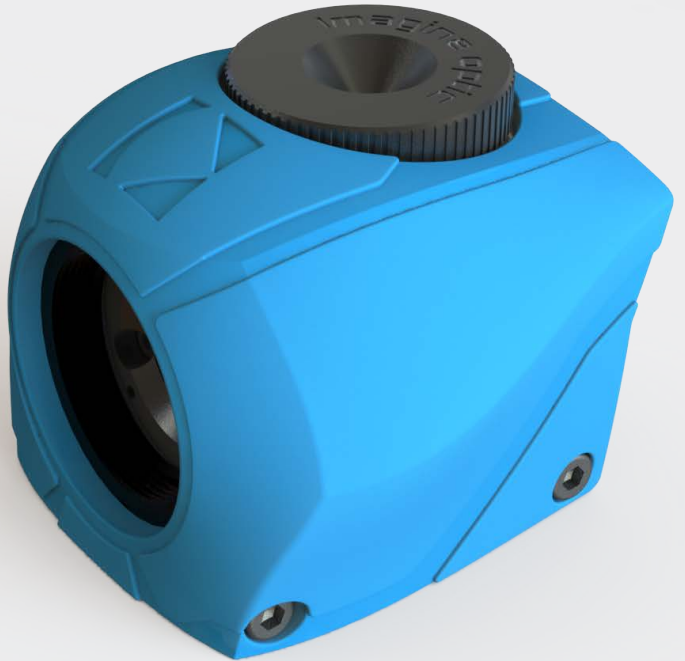


**ADVANCED**  
METROLOGY WAVEFRONT SENSOR

**FULL CALIBRATION**  
 $\lambda = 400-1100$  nm

**COMPACT**  
AND VERSATILE

**EASY**  
TO USE



**“An excellent instrument, indeed! So powerful and easy to use.”**

Bill Dougherty PhD, Senior Scientist  
Applied Precision  
A GE Healthcare Company

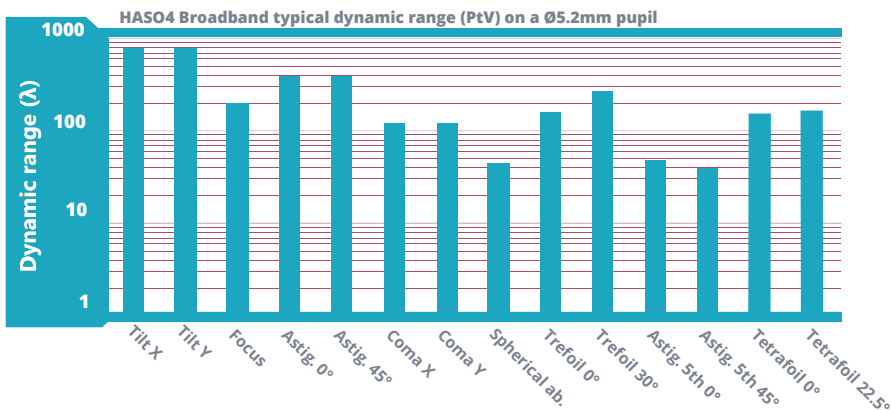
## A UNIQUE SET OF ADVANTAGES

- Full spectral range calibration over  $\lambda = 400-1100$  nm
- $\lambda/100$  rms absolute accuracy over  $800\lambda$  dynamic range
- Patented technology for simultaneous and independent measurements of phase and intensity
- 20 Hz acquisition frequency
- External trigger capability
- Optimized for polychromatic and monochromatic beams over the wide spectral range (400-1100 nm)
- C-mount compatible entrance aperture
- Easy to deploy with USB 3.0 connectivity or Ethernet interface
- Bundled with WaveView, the industry's most advanced metrology software
- Compatible with WaveKit (Software Development Kit) in C, MATLAB, and LabVIEW

# THE ADVANCED METROLOGY WAVEFRONT SENSOR

Providing outstanding performance, the HASO Wavefront Sensor family is used in the most demanding applications in optical metrology, microscopy and laser diagnostics worldwide. We offer a unique combination of expertise in high quality microlens production, software development and accurate factory calibrations. This allows the HASO4 Broadband to provide a level of performance beyond comparison for application over the full spectral range of silicon ( 400-1100 nm ).

- $\lambda/100$  rms absolute accuracy on a huge dynamic range (see the graph below)
- Patented wavefront correction algorithms for intensity beam variations (laser, Gaussian, hyper Gaussian, apodized beams...)
- Measurement up to 64 Zernike polynomials with individual accuracy better than 6nm rms
- Calibrated for the 400-1100 nm spectral range



## OUTSTANDING PERFORMANCE EXAMPLES WITH

- Beam collimation with an accuracy better than 300m radius of curvature
- A 20mm focal length measurement with a sensitivity of 1µm rms
- Direct wavefront acquisition of converging and diverging F/5 beams with an accuracy of about  $\lambda/100$  rms including astigmatism and high order aberrations
- Control and adjustment of axial laser beam deviation better than 3µrad rms
- 3D localization of a focal spot up to 0.1 µm rms and 1µm rms for lateral and axial resolution respectively (0.1 NA beam)

## SOFTWARE

- WaveView is the most advanced wavefront measurement and analysis software. It offers more than 180 functions and tools optimized for a wide range of highly demanding applications. WaveView development philosophy is based on tens of years of customer's feedback, improving the user experience at each version. Modules dedicated to PSF, Strehl ratio, MTF, M<sup>2</sup> are available.
- WaveKit is a SDK, providing the basis blocks on which one can build a fully customized software for specific HASO based applications or WaveView data processing routines. WaveKit is available on request.

Aperture dimension	7.0 x 5.2 mm <sup>2</sup>
Number of microlenses	68 x 50
Tilt dynamic range	> ± 3 °
Focus dynamic range	± 0.026 m to ± ∞
Repeatability (rms)	< $\lambda/200$
Wavefront measurement accuracy in absolute mode (rms): $\lambda$ between 350 and 600 nm $\lambda$ between 600 and 1100 nm	< 6 nm < $\lambda/100$
Spatial resolution	~ 105 µm
Maximum acquisition frequency	20 Hz
External trigger	TTL signal
Calibrated spectral range	400 - 1100 nm
Dimensions / Weight	46 x 57x 57 mm <sup>3</sup> / 150g
Working temperature	15 - 30° C
Interface / Power consumption	USB 3.0 / 2.9 W Ethernet / 2.9 W
Operating system	Win XP, Win 7 (x86 / x64)