

# HASO SWIR

**CALIBRATED FOR**  
0.9 - 1.7  $\mu\text{m}$

**LAMBDA/100**  
ABSOLUTE ACCURACY

**20HZ LIVE**  
WAVEFRONT DISPLAY

**ULTRASHORT**  
EXPOSURE TIME OPTION



High accuracy Shack-Hartmann wavefront sensor for SWIR

## A UNIQUE SET OF ADVANTAGES

SpotTracker

- Calibration for 0.9 - 1.7  $\mu\text{m}$
- $\lambda/100$  rms absolute accuracy over 400 $\lambda$  PtV dynamic range
- Up to 150Hz in sequence mode
- Fast mode available for adaptive optics
- Patented technology for simultaneous and independent measurements of phase and intensity
- External trigger capability
- Absolute wavefront measurements without alignment, thanks to the new SpotTracker technology
- Optimized for polychromatic and monochromatic beams over a wide spectral range
- C-mount compatible entrance aperture
- Easy to deploy with USB 3.0 connectivity
- Bundled with WaveView, the industry's most advanced wavefront metrology software
- Compatible with WaveKit (SDK) in C/C++, LabVIEW and Python

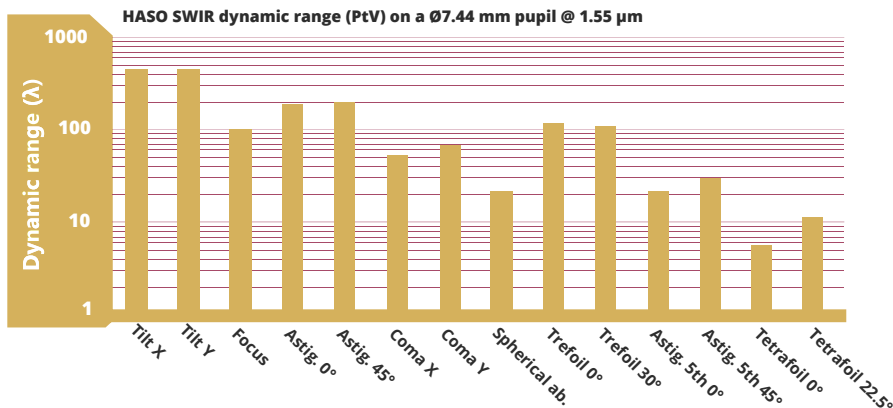


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Providing outstanding performance, the HASO Wavefront Sensor family is used in the most demanding applications in optical metrology, free-space communication and laser diagnostics worldwide. We offer a unique combination of expertise in high quality microlens production, software development and accurate factory calibrations. The new HASO SWIR provides a level of performance beyond comparison for applications over the short wavelength infrared range, 0.9 - 1.7  $\mu$ m.

- $\lambda/100$  rms absolute accuracy for incoherent and  $\lambda/50$  rms for coherent light on a huge dynamic range (see the graph below)
- Measurement more than 150 Zernike polynomials with individual accuracy better than 5 nm rms



## EXAMPLES OF APPLICATIONS

- Checking beam collimation with an accuracy better than 300m radius of curvature
- 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 5 $\mu$ rad rms
- Optical quality control, metrology, LIDAR and adaptive optics

## SOFTWARE

- WaveView is the most advanced wavefront measurement and analysis software. It offers more than 150 features 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,  $M^2$  are available.
- WaveKit is a SDK in C/C++, LabVIEW and Python, 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.
- Patented wavefront correction algorithms for intensity beam variations (laser, Gaussian, hyper Gaussian, apodized beams...)

## SPECIFICATIONS

Aperture dimension	9.30 x 7.44 mm <sup>2</sup>
Number of microlenses	40 x 32
Tilt dynamic range	> $\pm 3^\circ$
Focus dynamic range	$\pm 0.042$ m to $\pm \infty$
Repeatability	$\sim \lambda/200$ rms
Wavefront measurement accuracy in absolute mode	$\sim \lambda/100$ rms
Spatial sampling	232.5 $\mu$ m
Maximum acquisition frequency	150 Hz
External trigger	Possible
Calibrated spectral range	0.9 - 1.7 $\mu$ m
Dimension / Weight	75 x 78 x 63 mm <sup>3</sup> / 250g
Working temperature*	5 - 35°C
Interface / Power consumption	USB 3.0 / < 5W
Operating system	Windows10
Minimum power**	0.3 pW
Exposure time for Gated option	100ns - 9 $\mu$ s

\* Internally stabilized temperature at 15°C

\*\* On the largest circular pupil with 1s exposure duration



*This new Imagine Optic technology provides easy HASO installation and the capability to precisely follow absolute tilt/wavefront evolution over time.*



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