

# HASO SWIR

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

**Lambda/100**  
ABSOLUTE ACCURACY

**COMPACT**  
AND VERSATILE



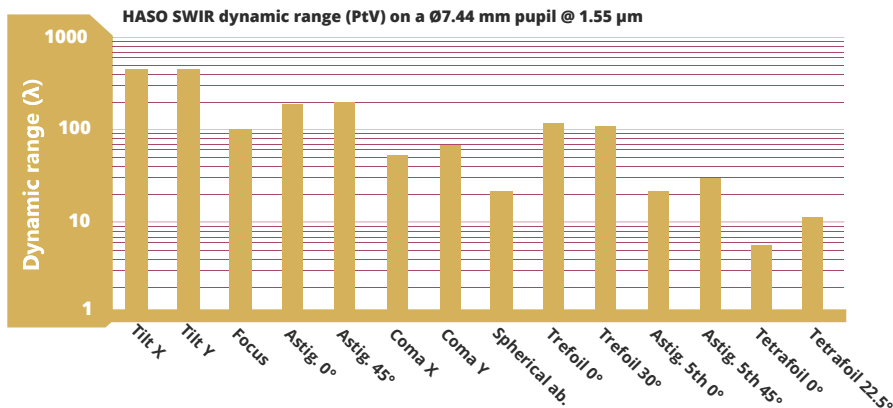
High accuracy Shack-Hartmann wavefront sensor for SWIR

## A UNIQUE SET OF ADVANTAGES

- Calibration for 0.9-1.7  $\mu\text{m}$
- $\lambda/100$  rms absolute accuracy over 400 $\lambda$  PtV dynamic range
- Patented technology for simultaneous and independent measurements of phase and intensity
- Up to 99Hz acquisition frequency
- External trigger capability
- 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 (Software Development Kit) in C, MATLAB, and LabVIEW

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 up to 64 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
- 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, LabVIEW and MATLAB, 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                                | $\sim 232$ $\mu$ m                       |
| Maximum acquisition frequency                   | 99 Hz                                    |
| External trigger                                | Possible                                 |
| Calibrated spectral range                       | 0.9 - 1.7 $\mu$ m                        |
| Dimension / Weight                              | 79 x 75 x 65 mm <sup>3</sup> / 250g      |
| Working temperature                             | 5 - 35°C                                 |
| Interface / Power consumption                   | USB 3.0 / < 5W                           |
| Operation system / Software                     | Windows 7 & 10 / WaveView 3.1.8 or later |
| Minimum power*                                  | 0.3 pW                                   |

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

