HASO
FAST

Wavefront sensor
The kHz

High-speed
High accuracy
Compact & versatile

neo compatible

imagine optic

HASO FAST

Ideal for measuring rapid changes in wavefronts, the HASO FAST Shack-Hartmann Wavefront Sensor, with a frame rate of 1 kHz, meets all demanding dynamic applications.

This HASO is included in CIAO VIS, our standard and simple solution to integrate adaptive optics on a telescope.

APPLICATIONS

Successfully used in the most demanding applications in optical metrology that require high speed and high wavefront measurement accuracy, fast adaptive optics correction and free-space communications, the HASO FAST performs multiple functions :
+ Quantify the transitional regime of active optical elements such as variable focal length lenses
+ Quantify the pointing stability of high frame rate laser
+ Drive a deformable mirror in high frame rate adaptive optics setups
+ Fast inspection: measure the optical system's aberrations and verify that the optics comply with specifications

FEATURES

+ Direct wavefront acquisition of converging and diverging F/5 beams with an accuracy of $\lambda/100$ RMS including astigmatism and high-order aberrations
+ Perfect knowledge of the measurement time by using the external trigger feature
+ Latency optimized to less than 2.7 ms, including wavefront measurement, allowing high performance adaptive optics
+ Only 26 pW power level needed on the sensor to acquire the wavefront with an accuracy of 30 nm RMS at 1 kHz
+ Patented technology for simultaneous and independent measurements of phase and intensity : no bias in presence of strong scintillations
+ Optional : possibility to setup this HASO in extended source mode (to perform adaptive optics on large objects)

SPECIFICATIONS*

OPERATING SPECS

|	
Aperture dimension	1.85 x 1.85 mm²
Number of microlenses	13 x 13
Maximum acquisition frequency	980 Hz
Calibrated wavelength range	350 - 1100 nm
Minimum power	10pW (@950Hz)
External trigger	TTL signal

OPERATING SYSTEM

Windows 10 & 11

OPTICAL SPECS

|	
Repeatability	$\lambda/200$ RMS
Absolute wavefront measurement accuracy	
• λ between 350 - 600 nm	≤ 6 nm RMS
• λ between 600 - 1100 nm	$\sim \lambda/100$ RMS
Spatial sampling	~ 140 µm
Tilt dynamics range	$> \pm 3°$
Focus dynamics range	± 0.008 m to $\pm \infty$

MISC

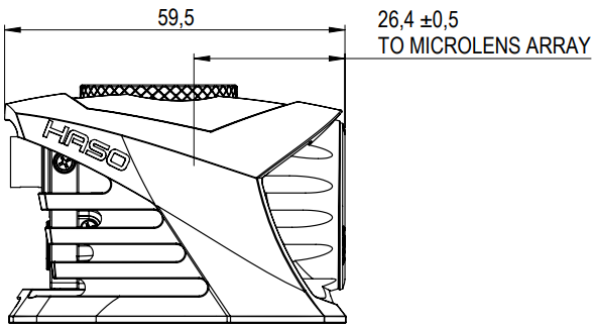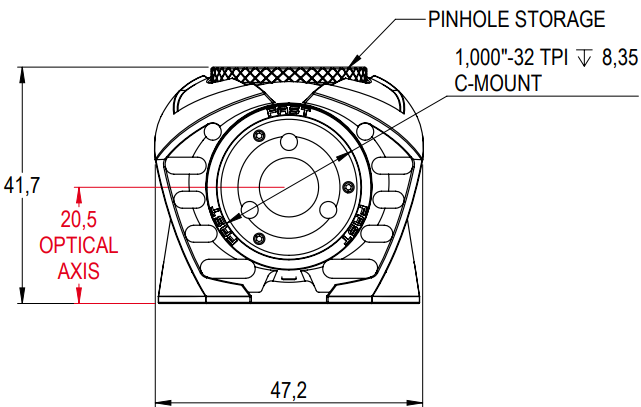|	
Dimensions (Height x Width x Length)	42 x 48 x 60 mm³
Weight for USB version	185 g
Working temperature	15 - 30 °C
Interface	USB 3.0
Power consumption	3 W
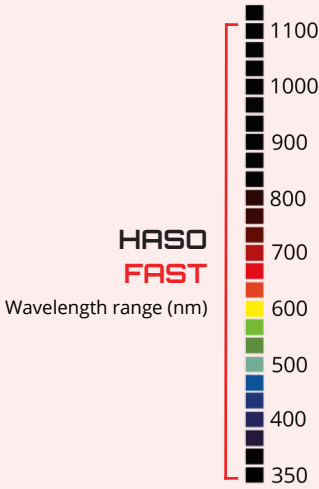
HASO FAST
Repeatability at low flux
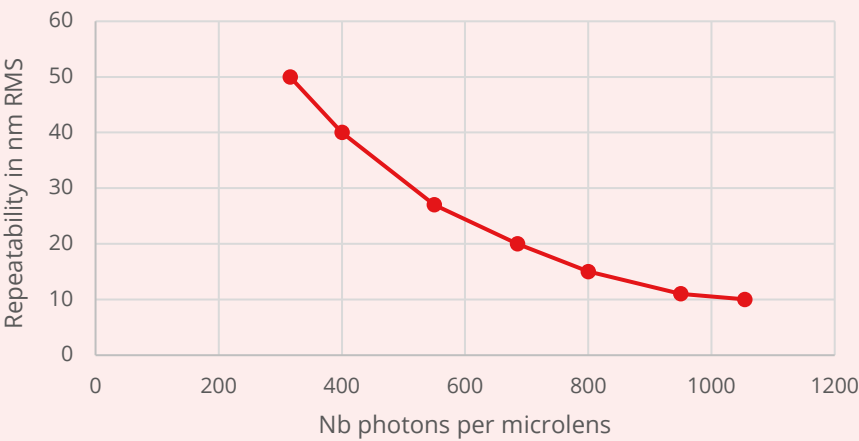
*Subject to changes without further notice
/!\ Acquisition & processing frequencies depend on computer

HASO
FAST
Wavelength range (nm)

1100
1000
900
800
700
600
500
400
350

HASO FAST repeatability @550nm

DIMENSIONS (mm)

PINHOLE STORAGE
1,000"-32 TPI ⍌ 8,35
C-MOUNT
41,7
20,5
OPTICAL
AXIS
47,2

59,5
26,4 ±0,5
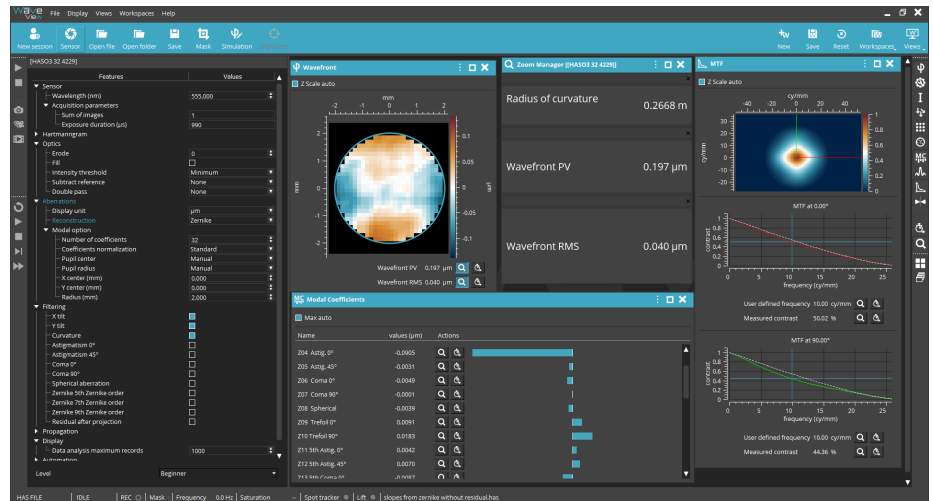TO MICROLENS ARRAY

SOFTWARE

WAVEVIEW
Metrology 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.

Options :

+ Extensions for PSF, MTF, M², Strehl ratio and advanced Zernike

+ Optional SDK in C/C++, LabVIEW and Python

WAVETUNE
Adaptive Optics Software

WAVETUNE is a unique software that seamlessly combines wavefront measurement and correction features with extensive instrument diagnostics.

It is perfectly adapted to our HASO wavefront sensors, ILAO STAR, MIRAO and mu-DM deformable mirrors, as well as to a wide range of active components.

Options :

+ Optional SDK in C/C++, LabVIEW and Python
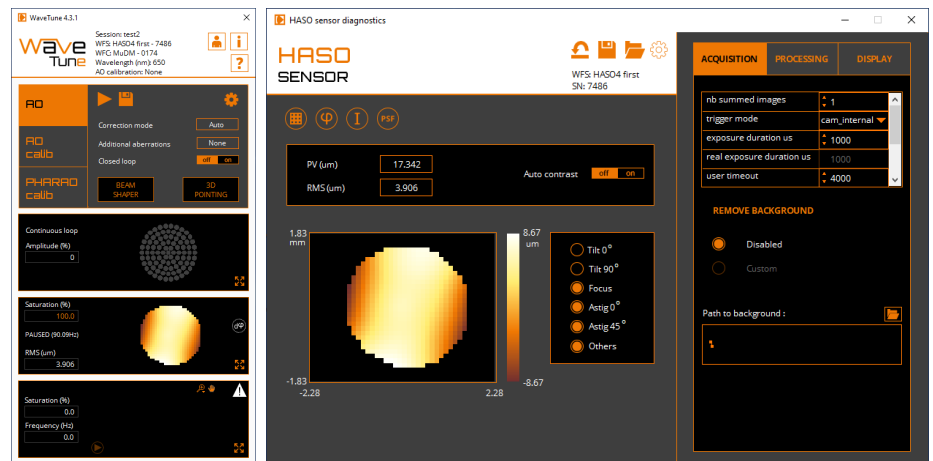
WAVESKY
Adaptive Optics for Astronomy Software

WAVESKY is an AO software optimized in terms of speed and latency to drive fast deformable mirrors and remove high speed turbulences.

Simply connect your program to WAVESKY kernel and switch on AO when you need it.

This software is compatible with Python.

CONTACT US

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