



# OEC

## Optical Engineer Companion

Metrology solution  
**The all-rounder**

Metrology on-the-go  
Modular system  
Upgradable



 compatible



# OPTICAL ENGINEER COMPANION +

**Our family of products now team up to support your optical metrology**



Compatible with the **Optical Engineer Companion** modular system: easily combine the accessories you need.

## CONFIGURATION

The OEC refers to a family of standard sensors and accessories that can be instantaneously combined to create the configuration you need for your optical tests.

Select the modules among:

- 1 a variety of metrology sources from UV to SWIR
  - 2 a large range of HASO™ or LIFT wavefront sensors
  - 3 several R-FLEX™ illumination systems
  - 4 a choice of R-FLEX LA™ beam expanders
- ...and use them in combination or separately.

### 1 METROLOGY SOURCE: MS



**MS-λ**  
400 - 1550 nm

Perfect wavefront metrology source:

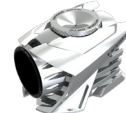
- + Monomode fiber
- + Manual or computer control
- + Adjustable intensity
- + Trigger input
- + Optical power: 5 mW

Reference	Wavelength (nm)
MS-405	405
MS-488	488
MS-520	520
MS-635	635
MS-785	785
MS-830	830
MS-1064	1064
MS-1550	1550
MS-CUSTOM	contact us for specific wavelength

### 2 WAVEFRONT SENSOR: HASO™ & LIFT



**HASO LIFT 680**  
680 x 504 phase points



**HASO LIFT 272**  
272 x 200 phase points



**HASO4 126**  
350 - 1100 nm  
**HASO4 126 BROADBAND**  
13.8 x 10.2 mm



**HASO4 BROADBAND**  
350 - 1100 nm



**HASO4 FIRST**  
 $\lambda/100$  RMS at custom wavelength



**HASO4 FAST**  
1.25 kHz

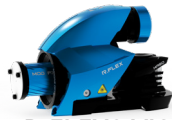


**HASO SWIR LIFT**  
160 x 128 phase points



**HASO SWIR**  
0.9 - 1.7  $\mu$ m

## ILLUMINATION SYSTEM: R-FLEX™



**R-FLEX2 VIS**  
400 - 1100 nm



**R-FLEX2 SWIR**  
1 - 1.7 μm

R-FLEX VIS and SWIR are illumination systems coupling our sources with our wavefront sensors for testing:

- + in double pass optical configuration
- + concave surfaces or refractive optics of any f/# choosing the appropriate focusing module (MOD F) below:

**Compact, lightweight, insensitive to vibrations and atmospheric turbulences, R-FLEX is easy to align onto the optics to be tested.**

It is the perfect solution for large telescopes, optics in vacuum chambers.

Reference	Focal length (mm)	Back power required (%)	Working distance <sup>1</sup> (mm)	Module length <sup>2</sup> (mm)	HASO LIFT 680	HASO LIFT 272	HASO4 126 / BROADBAND	HASO4 BROADBAND	HASO4 FIRST	HASO4 FAST	HASO SWIR LIFT	HASO SWIR
					f/#, (wfe <sup>3</sup> ) (nm RMS)	f/#, (wfe <sup>3</sup> ) (nm RMS)	f/#, (wfe <sup>3</sup> ) (nm RMS)	f/#, (wfe <sup>3</sup> ) (nm RMS)	f/#, (wfe <sup>3</sup> ) (nm RMS)	f/#, (wfe <sup>3</sup> ) (nm RMS)	f/#, (wfe <sup>3</sup> ) (nm RMS)	
MOD F4.5	4.5	50	0.6	205.9	-	0.9 (120)	-	0.9 (120)	1.3 (30)	3.8 (5)	-	-
MOD F9	8.9	50	1.2	250.0	-	1.8 (40)	-	1.8 (40)	2.5 (10)	7.5 (5)	-	-
MOD F9 HR	9	50	0.6	247.8	0.9 (130)	-	0.9 (130)	-	-	-	-	-
MOD F18 HR	17.8	50	1.2	247.2	1.8 (50)	-	1.8 (50)	-	-	-	-	-
MOD F20	20.4	3	10.4	50.3	-	4 (160)	-	4 (160)	5.6 (40)	17.2 (5)	-	-
MOD F20 SWIR	20	3	10	71.8	-	-	-	-	-	-	2.7 (250)	2.7 (250)
MOD F31	30.3	3	-0.7	66.6	3 (250)	5.9 (20)	3 (250)	5.9 (20)	8.4 (10)	25.5 (5)	-	-
MOD F31 SWIR	31	3	10	114.7	-	-	-	-	-	-	4.2 (150)	4.2 (150)
MOD F40	41.7	3	8	40.8	4.1 (150)	8.1 (15)	4.1 (150)	8.1 (15)	11.5 (10)	35.1 (5)	-	-
MOD F40 SWIR	40	3	3.3	62.2	-	-	-	-	-	-	5.4 (100)	5.4 (100)
MOD F50	51.7	3	3.6	103.1	5.1 (100)	10 (10)	5.1 (100)	10 (10)	14.2 (5)	43.5 (5)	-	-
MOD F50 SWIR	50	3	3.3	92.1	-	-	-	-	-	-	6.8 (25)	6.8 (25)
MOD F60	60.1	3	15.2	42.5	5.9 (30)	11.7 (8)	5.9 (30)	11.7 (8)	16.5 (5)	50.5 (5)	-	-
MOD F60 SWIR	60	3	12.8	45	-	-	-	-	-	-	8.1 (50)	8.1 (50)
MOD F75	75.1	3	12.8	73.6	7.4 (20)	14.6 (5)	7.4 (20)	14.6 (5)	20.6 (5)	63.1 (5)	-	-
MOD F76 SWIR	75.3	3	12.8	74.3	-	-	-	-	-	-	10.2 (25)	10.2 (25)
MOD CUSTOM					contact us for specific aperture, working distance, etc.							

All focusing modules have pupil imaging: the microlens array of the wavefront sensor is imaged at the infinity by the focusing modules

<sup>1</sup>Distance between the focal plane and the first mechanical interface of the module (with centering tool removed)

<sup>2</sup>Distance from the mounting interface of the module to the first mechanical interface of the module (with centering tool removed)

<sup>3</sup>Wavefront Error (wfe) at the output of the module for a circular pupil corresponding to the nominal f-number (f/#)

## BEAM EXPANDER: R-FLEX LA™



**R-FLEX LA VIS 100**  
100 mm test beam



**R-FLEX LA SWIR 150**  
150 mm test beam

R-FLEX LA VIS and SWIR are beam expander coupling our R-FLEX for testing:

- + in double pass optical configuration
- + flat wavefront or surfaces of any diameter choosing the appropriate platform reference below:

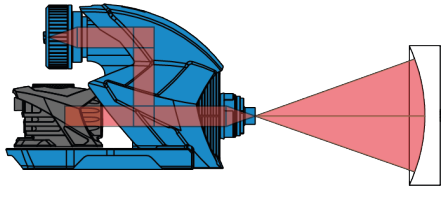
Reference	Test diameter (mm)	Spectral range
LA.30	30	VIS, SWIR
LA.75	75	VIS, SWIR
LA.100	100	VIS, SWIR
LA.150	145	VIS, SWIR
LA.200	200	SWIR
LA.CUSTOM	contact us for specific diameter	

**At wavelength, easy alignment and characterization of**

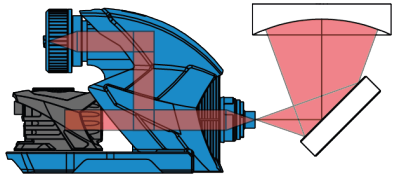
beam expanders  
filters, dichroic beamsplitter  
flat mirrors  
optical windows  
polarization scramblers.

# OPTICAL SETUPS

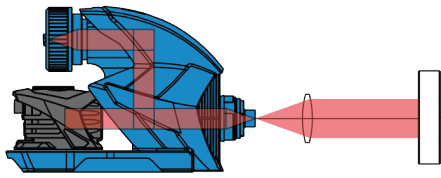
## Concave surfaces / refractive optics testing: use R-FLEX™



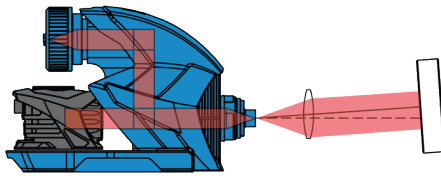
(Uncoated) Small to large concave mirrors



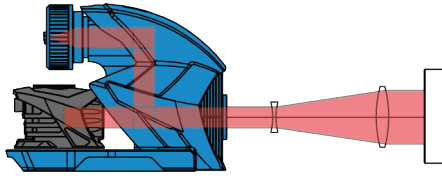
(Very) Large telescopes and collimators characterization and alignment



Lenses of any diameter, on-axis

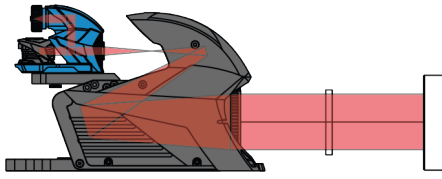


Lenses of any diameter, in the field

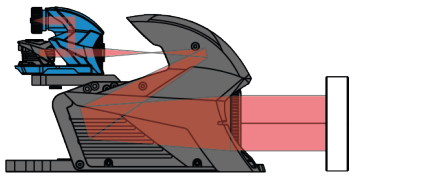


Beam expanders characterization and alignment

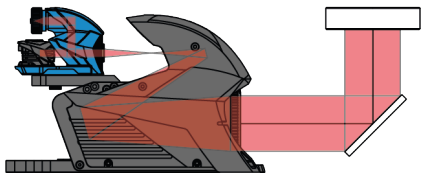
## Flat wavefront / surfaces testing: use R-FLEX™ + R-FLEX LA™



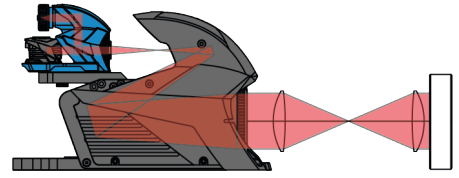
Filters, windows in transmission



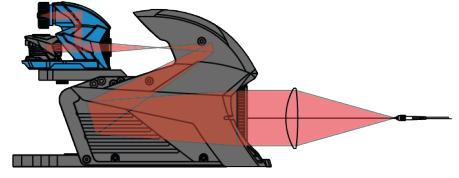
Mirrors, filters in reflection



Head-Up displays, dichroics, beamsplitters



Beam expanders, afocal systems characterization and alignment



Collimated lasers and external sources



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