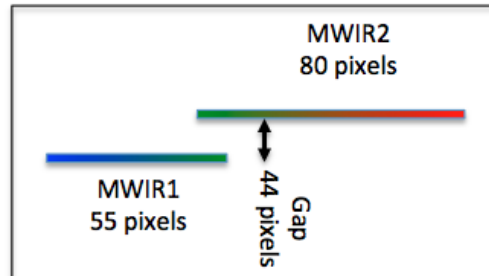
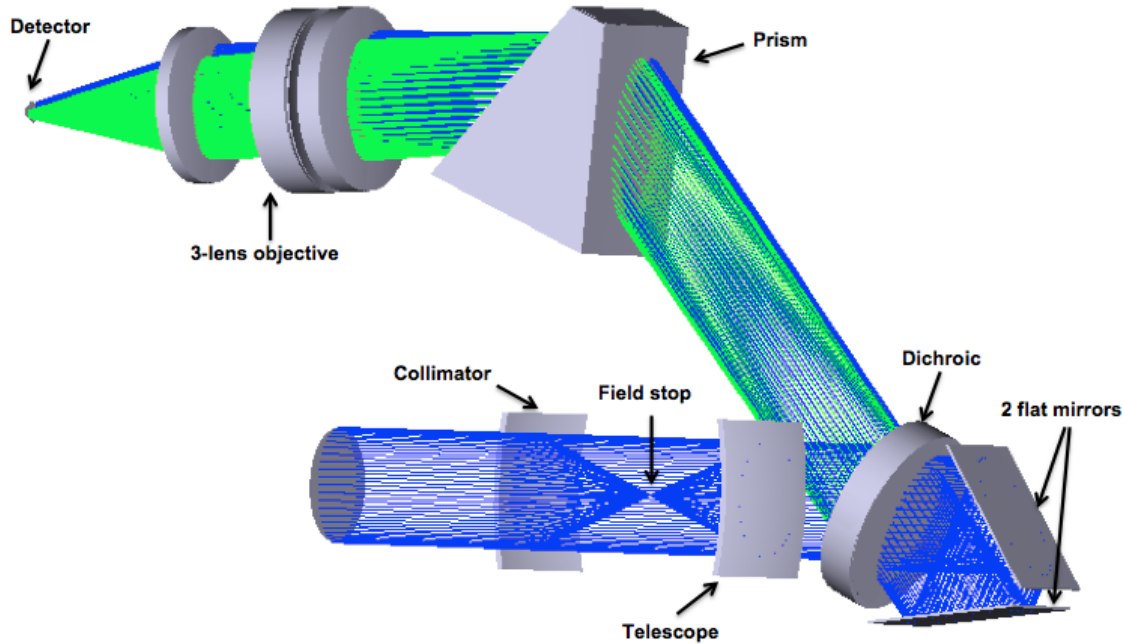
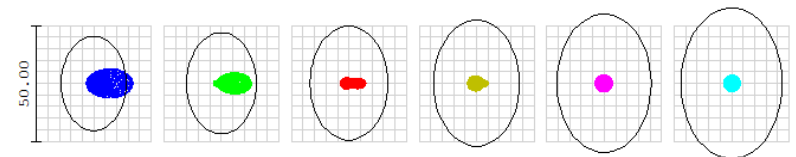
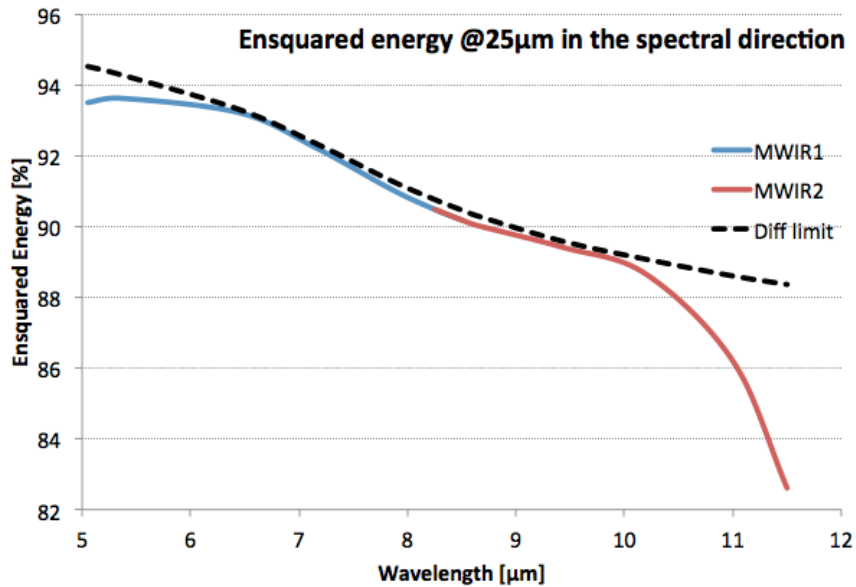


# Optical design

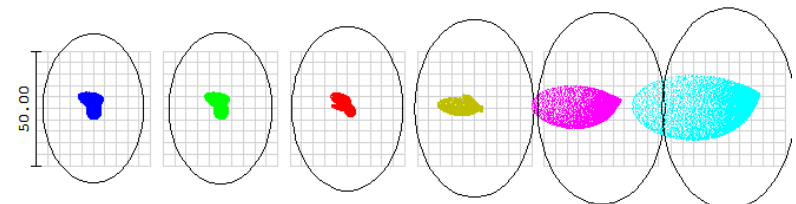


Parameter	Value
Band pass	[5.05-8.5] $\mu\text{m}$ [8.25-11.5] $\mu\text{m}$
Airy disk radius @8.5 $\mu\text{m}$	22.2 $\mu\text{m}$ in the spectral direction (F/2.1) 32.5 $\mu\text{m}$ in the spatial direction (F/3.1)
Pixel size	25 $\mu\text{m}$
Prism material	Cleartran
Objective material	3 lenses ZnSe/Cleartran/ZnSe
Objective surface type	Spherical

# Optical performances



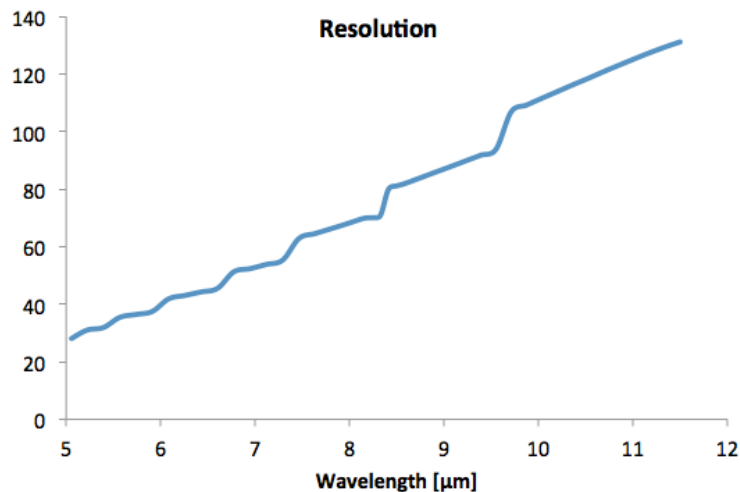
5.05 $\mu$ m 5.75 $\mu$ m 6.45 $\mu$ m 7.15 $\mu$ m 7.85 $\mu$ m 8.50 $\mu$ m



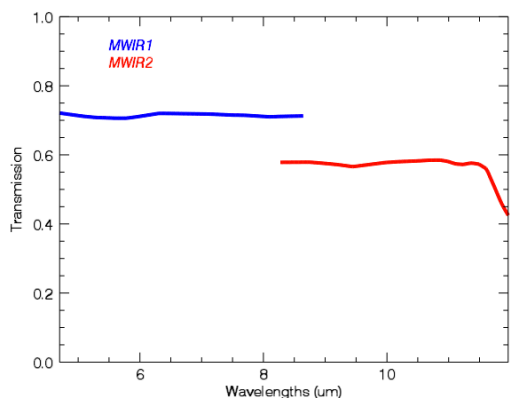
8.25 $\mu$ m 8.65 $\mu$ m 9.43 $\mu$ m 10.2 $\mu$ m 11.0 $\mu$ m 11.5 $\mu$ m

# Spectral resolution and transmission

Sampled spectral resolution (spectral element on 2 pixels)



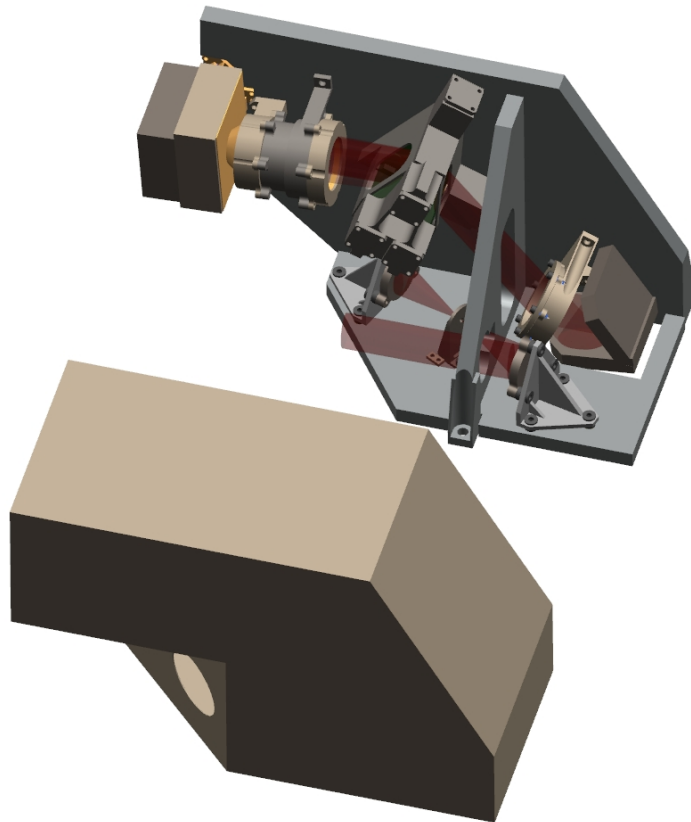
Transmission



Includes

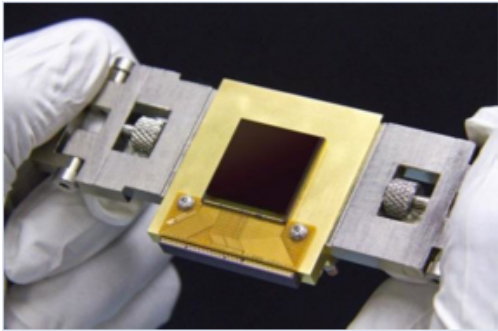
- Internal transmissions of glasses
- 98% spectrally flat AR coating per glass surface
- 99% reflection per mirror
- 90% transmission / reflection of the dichroic
- No Qe consideration

# Mechanical design

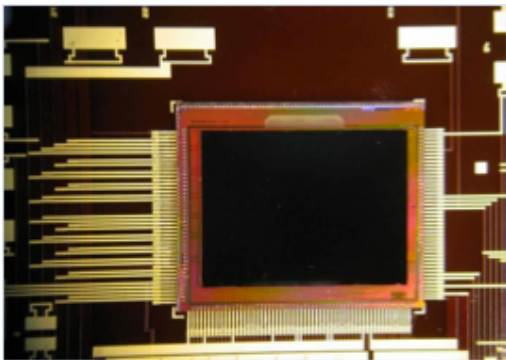


Part	Mass (g)
Detection chain & mount	720
Opto-mechanical parts	1307
Optical bench and covers	2500
Thermal parts	200
Fasteners	100
<b>TOTAL with 20% margins</b>	<b>5792</b>

# Detector design: Teledyne vs Leti



Teledyne NeoCam



LETI detector

Parameters	MWIR Specification		baseline	Alternative
Manufacturer			Teledyne	CEA/LETI
Materiel			HgCdTe	HgCdTe
Wavelength coverage ( $\mu\text{m}$ )	5.15-8.65	8.25-11.5	$\lambda_c=10.6$	$\lambda_c=10.4$
Pixel size ( $\mu\text{m}$ )	25-30		18	30
Format minimum size	90x10	60x10	1024x1024	240x320
RQE	>60%		65% <sup>(1)</sup>	70%
Dark current ( $e^-/s/\text{pixel}$ )	<270	<200	<200	40 <sup>(2)</sup>
well depth (ke)	65 to 1Me		>55ke	1120 ke <sup>(3)</sup>
Readout noise(e)	<60 if FWC=65ke <250 if FWC=1Me		22e	150e <sup>(3)</sup>
Operating temperature	40K - 30K		40K - 30K	40K - 30K
ROIC type	/		SFD	CTIA
Readout mode	Window		/	/
Program			NASA technology development for NEOCam	CNES/CEA technology development for ECHO
TRL	TR5 in Q3 2015		TRL4	TRL3