

# SEEING

Small satEllite Instrument for Earth imaging

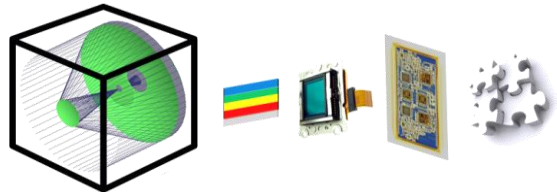


## SEEING : SAFRAN advanced EO payloads for micro-nanosatellites & cubesats

Safran Reosc, European leader in high performance space optics, is proud to offer turn-key high performance and ultra-low SWaP EO payloads for small satellites benefiting from SAFRAN decades of heritage in opto-mechanics, electronics and critical software.

### The concept

Market's most compact & hi-perf optics  
Option: Filter for MS – HS imagery  
35 mm image format & sensor  
Power & Thermal control electronics  
Option: Safran image processing module



### The missions

High resolution – Wide FoV – High detectivity – PAN-MS-HS

### The Value

Ultra low SWaP factor – High performance - Minimum total mission cost

## SEEING 230 Ident

A unique all-mirror telescope system offering perfect high resolution imagery within ultra-low SWaP factor.

### High Resolution

Mirror only optics able to handle any spectral domain delivering diffraction limited image quality through entire FoV.

Vis-NIR total spectrum

1-m GSD from 500 km orbit

Super-resolution mode possible for approaching 70 cm GSD

9 x 6 km FoV from 500 km orbit

### Ultra-low Swap

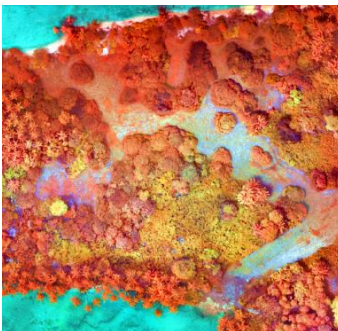
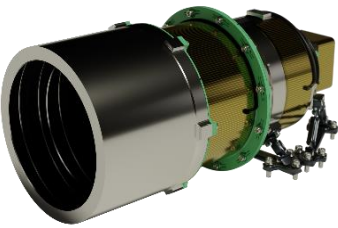
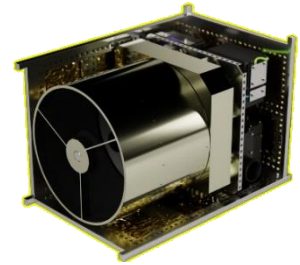
Made of advanced ceramic material for strength during launch and stability during operation in space.

Size in mm : 250 x 250 x 280

Low mass below 8 kg saving platform & launch costs.

Robust design and various options of flexure links to the platform.

Athermalized and gradient insensitive design between -10°C to +50°C.



## SEEING 130 Wide

A unique medium focal length catadioptric optics offering perfect imagery over for 35 mm full-frame image format.

### Multi capable wide field instrument

High NA optics for high SNR with MS, HS and low light level imagery

R,G,B,NIR + Red Edge MS imagery

23 bands, 30-m GSD HS imagery

Wide FoV of  $6.3^\circ \times 4.3^\circ = 54 \times 36 \text{ km}^2$  from 500 km orbit

Broad spectral domain of 0.475 – 0.9  $\mu\text{m}$ .

Diffraction limited, ultra-low distortion high image quality through its entire 35 mm image format fitted with multi-10 megapixel sensor.

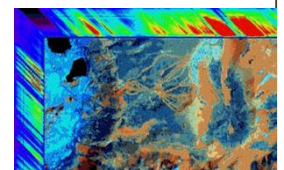
Athermal design within a robust structure.

### Low SWaP for system advantages

Low mass below 8 kg saving launch costs.

Size in mm : 215 x 215 x 450

Robust design and flexure links to the platform.



## SEEING 230 Detect

A patented compact optical design for highest efficiency debris & satellite detection on-board small satellite.

230 mm aperture – 24 deg<sup>2</sup> FoV – Volume 25x25x40 cm – Mass 12 kg only

SNR 3 for Mag > 18 with 10 sec exposure



## Common features

Designed, developed and tested per conventional space standards integrating our long heritage technology portfolio : design, optical fabrication, thin films, assembly-bonding, alignment , testing.

Proto-flight model philosophy

Enhanced lifetime of more than 5 years