

SEEING

Small satellite Instrument for Earth imaging

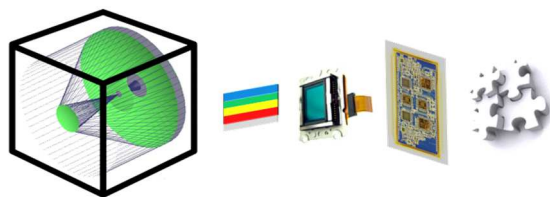


SEEING : SAFRAN advanced EO payloads for micro-nanosatellites & cubesats

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 fitted with multi 10 Mpixel CMOS camera.

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 or better

9 x 6 km FoV from 500 km orbit

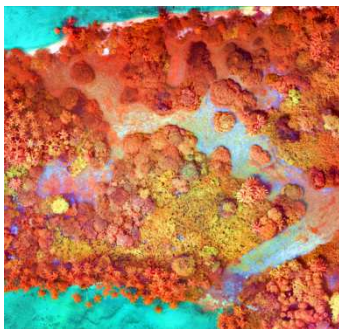
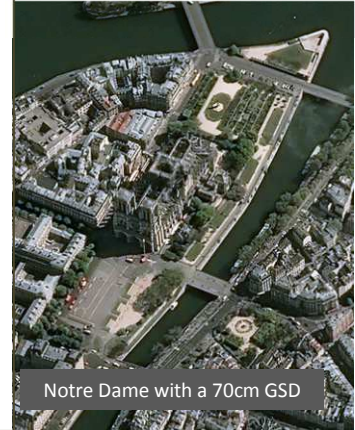
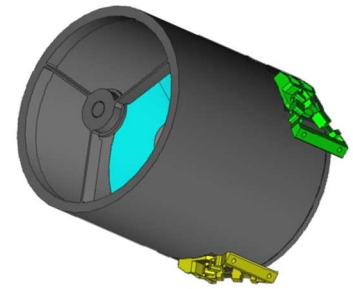
Ultra-low Swap

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

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 the 35 mm full-frame image format for multi 10 Mpixels CMOS sensor.

A multi capable wide field instrument

High NA optics for high SNR, low light level, 8-m GSD PAN images @ 500 km

Butcher block filter for R,G,B,NIR + Red Edge MS imagery

Linear variable filter for 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 μm .

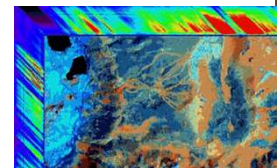
Diffraction limited & ultra-low distortion high image quality through the entire 35 mm image format.

Athermal design within a robust structure.

Low SWaP for system advantages

Low mass below 8 kg saving launch costs.

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 deg² FoV – Volume 25x25x40 cm – Mass < 12 kg

SNR 3 for Mag > 18 with 10 sec exposure



Common features

Designed, developed and tested per SAFRAN 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