

SEEING a family of high performance imagers for Earth Observation applications

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Safran Reosc has developed a family of high performance, ultra-compact, space-based payloads for Earth observations applications and space-based surveillance awareness.

The SEEING 230 Wide is compact imager designed to achieve a medium ground sampling distance of 8 meters at an altitude of 500km and a field of view of 60km. This instrument provides imaging mode in panchromatic as well as multispectral channels in seven different spectral bands. The instrument has a total mass of less than 9kg in a volume less than 230mm x 230 mm x 450 mm (including the external baffle). The first unit has been launched in January 2025 and the in-orbit performances of the imager will be presented.

SEEING 230 IDENT is a compact imaging instrument featuring a main structure entirely made of ZERODUR glass from SCHOTT, with all optical elements structurally interconnected through this material. Designed to achieve a ground sampling distance of 1 meter at an altitude of 500 km, the instrument has a total mass of less than 13 kg and fits within dimensions of 305 mm in length and 330 mm in diameter, including the baseplate. It offers a $1.11^\circ \times 0.83^\circ$ field of view, corresponding to ground coverage of $9.7 \times 7.2 \text{ km}^2$ at 500 km altitude. The optical system has a 1550 mm focal length and a 230 mm entrance pupil diameter, yielding an F/6.7 aperture.

Thanks to the high-precision manufacturing capabilities of Safran Reosc, the mirrors have been aligned with tolerances below $5 \mu\text{m}$. This alignment accuracy, combined with stringent polishing tolerances, enables Safran Reosc to achieve a wavefront error of 40–55 nm RMS across the entire field of view. As a result, the on-ground measured modulation transfer function (MTF) for the first instrument ranges from 10% at the Nyquist frequency (panchromatic band) to 23% at half the Nyquist frequency (multispectral bands), including the detector.

The first imagers have been delivered to our customers, and the launch of the first payloads are scheduled during the fourth quarter of 2026.

The SEEING VHR is the latest imager in the Seeing family currently in the development phase. This payload will provide a very high resolution of 0,5 meter from a ground distance of 500 km. The use of an innovative optical design will allow to reduce the total volume of the payload to 550mm x 550mm x 700mm. The current development plan foresees the first payload to be available mid of 2026.