

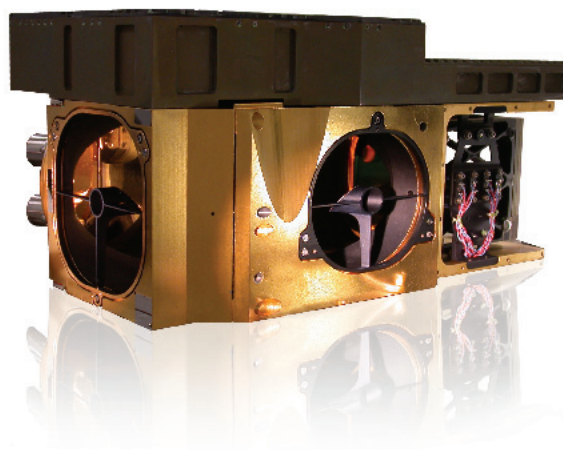
CrIS Interferometer Module

The Crosstrack Infrared Sounder (CrIS) is the new generation of weather sounder that will provide improved vertical profiles of temperature, pressure and water vapor used in weather forecasting.

The National Polar-orbiting Operational Environmental Satellite System (NPOESS) is the next US generation of low Earth orbiting environmental satellites. The NPOESS satellite will carry new sensors to monitor global environmental conditions, collect and disseminate data related to: weather, atmosphere, oceans, land and near-space environment. The Crosstrack Infrared Sounder (CrIS) is the new generation of weather sounder that will provide improved vertical profiles of temperature, pressure and water vapor used in weather forecasting.

The CrIS sensor, developed by ITT which will operate in a near circular sun-synchronous orbit (833 km nominal altitude), features an 8 cm aperture and 14.0 km IGFOVs arranged in a 3 x 3 array. ABB provides the CrIS interferometer, a dynamically aligned Michelson interferometer covering 3 bands over a spectral range of 3.92 μm to 15.38 μm (650 cm^{-1} to 2550 cm^{-1}). The instrument resolution is $\leq 0.625 \text{ cm}^{-1}$ in the LWIR, $\leq 1.25 \text{ cm}^{-1}$ in the MWIR and $\leq 2.5 \text{ cm}^{-1}$ in the SWIR.

An Engineering Demonstration Unit (EDU) of CrIS has been built to evaluate performances of the interferometer and mitigate risks on the flight model. This EDU is a flight-like model of the CrIS interferometer. It features a ZnSe beamsplitter, a porchswing (PS) mirror subsystem, a Dynamic



Alignment (DA) mirror subsystem, a laser metrology and a Neon metrology. The EDU provides redundancy for the interferometer module electronics, the laser diode launcher, the Neon bulb launcher and for motors used in the module. It also meets flight requirements for vacuum and vibration. The EDU has gone successfully through all the performance and environmental test activities thus qualifying the design for the manufacturing of the Flight Units.

The angle between the IR input and output beams of the interferometer is fixed by design to 120°. A “porchswing” mechanism drives the moving mirror to induce the optical path difference. The DA subsystem compensates for the minimal tilt between the two arms of the interferometer. The laser metrology is based on 1550 nm DFB laser diode. The Neon metrology provides systematic laser wavelength calibration.

In 2005, ABB has delivered to ITT SSD the first flight unit of the CrIS interferometer. The first CrIS sensor has been delivered to Ball Aerospace to be mounted on-board the NPOESS Preparatory Project (NPP) spacecraft.

Contact us

ABB received Excellence Award for the CrIS Project

During the manufacturing and test activities of the first Flight Unit, ABB demonstrated exceptional NPOESS teamwork in supporting the successful integration of the interferometer into the CrIS sensor. In June 2006, ABB has been presented with a NPOESS Outstanding Supplier Award from Northrop Grumman Corporation, the prime contractor of the NPOESS program.

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