EARTH OBSERVATION SYMPOSIUM (B1)
Earth Observation Sensors and Technology (3)

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THE PRISMA MISSION HYPERSPECTRAL PAYLOAD

Abstract

The PRISMA (PRecursore IperSpettrale della Missione Applicativa) Programme is an ASI (Agenzia Spaziale Italiana) hyperspectral mission for Earth observation based on a mono-payload satellite. An Italian Consortium is in charge to realize the mission; Selex ES has the full responsibility of the hyperspectral payload, composed by a high spectral resolution spectrometer optically integrated with a medium resolution panchromatic camera, and the related calibration activities. PRISMA, from a sun-synchronous orbit at about 620Km altitude, acquires areas with a swath width of 30km with a Ground Sampling Distance (GSD) of 30m, covering the wavelength range from 400nm to 2500nm with two partially overlapped spectrometer channels dedicated to VNIR and SWIR. Simultaneously, a panchromatic camera acquires the same area with a spatial resolution of 5m GSD. The optical design is based on a high transmittance optical assembly, including a reflective common telescope in Three-Mirror Anastigmat (TMA) configuration, a single slit aperture, a panchromatic camera (700-900 nm) and a spectrometer with two channels (VNIR and SWIR), spectrally separated by a beam splitter, using prisms as dispersive media in a configuration conceived to minimize the number of optical elements. High performance MCT-based detectors represent the core of the instrument. To provide the required data quality for the entire mission lifetime of 5 years, an accurate and stable on-board calibration unit, both radiometric and spectral, will guarantee continuous in-flight instrument calibration. The thermal design is based on a cold-biased, passive cooling system: a double stage radiator, suitable oriented and protected from environmental heat fluxes, high performance cryogenic heat pipes and an operational heaters network is the solution adopted to achieve the required thermal stability. PRISMA is scheduled to be launched before the end of 2017.