

The ASI PRISMA Mission Status and Perspectives

Guarini Rocchina¹, Daraio Maria Girolamo¹, Lopinto Ettore¹, Sacco Patrizia¹

1) etto.re.lopinto@asi.it, ASI

Abstract

PRISMA (PRecursore IperSpettrale della Missione Applicativa) is an Italian EO hyperspectral Mission fully funded by the Italian Space Agency. PRISMA was launched on 22 March 2019 on board the VEGA rocket. The Mission has been conceived as a pre-operational and technology demonstrator and it focuses on the space qualification of PAN/HYP payload and the development and production of PAN/HYP products up to Level 2d.

The PRISMA system includes Space and Ground facilities. The PRISMA space segment consists in a single small class spacecraft, with a mass of about 830 kg, placed on a frozen sun synchronous orbit with a repeat cycle of 29 days (430 orbits). The PRISMA Payload operates with a Pushbroom scanning concept. It is an electro-optical instrument for Hyperspectral Earth observation, composed of a high spectral resolution spectrometer optically integrated with a panchromatic camera. It records the radiation reflected from the Earth surface (spectral cubes) in 400nm – 2505nm spectral window: PAN range; 240 bands in VNIR / SWIR (partial overlap). The system, when fully exploiting its resources, allows planning acquisition and download of 223 spot (30x30 Km) images per day, corresponding to 200.000 Km², using all PAN/HYP channels. The system allows processing 223 spot images per day up to level0 and generating corresponding quicklooks. The system allows processing at least 200 Hyperspectral scenes (30x30 Km) up to level 2D per day starting from archived L0 products. The system allows archiving products (downloaded data, L0 products and support data) for a minimum of 10 years

The PRISMA GS consists of three elements: MCC – Mission Control Center, SCC – Satellite Control Center and IDHS - Image Data Handling Segment/Center. The MCC consists of a unique subsystem, the Mission Planning System (MPS). It is the G/S element responsible for the scheduling of on board operations and for coordinating ground activities, performing overall mission planning, allocating resources and solving conflicts

The SCC includes the Satellite Control System (SCS), the Flight Dynamics System (FDS), the S-band TT&C Station (TT&C) and the G/S Network (Communication infrastructure connecting the PRISMA G/S centers and facilities). The IDHS is in charge of performing all the chain from the Users requests management to the delivery of final products.

According to the PRISMA data policy, a wide use of products is allowed in order to validate the technology, maximize the return on investment and support the development of skills in an innovative sector. The user shall be enabled, through a very simple registration/accreditation step, to request new acquisitions and relevant products and products generated on the basis of archive data.

The new acquisition requests are managed through rights defined in terms of "quota« (maximum quantity of products) and "priority" in access, both attributed to the user during the accreditation phase.

A systematic validation process is foreseen both during the commissioning phase and during the operational phase. The Validation involves the assessment of the accuracy of data and products, over the relevant spatial, temporal and spectral domains. After the end of the commissioning phase it is foreseen a structured three years CAL/VAL activity, which will be performed on instrumented sites distributed in Italy for supporting the

performance characterization of the instrument, the verification and maintenance of mission performance over time and the effective use of data.

A specific project about the PRISMA data validation will be started in parallel to the commissioning, aimed to pursue a fully independent verification of the data quality and proper calibration, during a six month time frame. The Validation involves the assessment of the accuracy of data and products, over the relevant spatial, temporal and spectral domains. The overall approach for validation is based on an extensive use of ground-based data, including airborne surveys with VNIR-SWIR scanner possibly coupled with thermal LWIR multispectral data and field activities contemporary to the PRISMA acquisitions.

Keywords - Plenary