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SIMBIO-SYS FOR BEPICOLOMBO: A COMPACT OPTICAL SUITE FOR MERCURY

Abstract

The SIMBIO-SYS (Spectrometer and Imaging for MPO BepiColombo Integrated Observatory SYStem) is an complex instrument suite part of the scientific payload of the Mercury Planetary Orbiter for the BepiColombo mission, one of the cornerstone mission of the European Space Agency (ESA) science program, in collaboration with the Japanese space agency JAXA, devoted to the study of the planet Mercury and its environment. The SIMBIOSYS instrument consists of three channels: the STereo imaging Channel (STC), with broad spectral band in the 400–950 nm range and medium spatial resolution (up to 50 m/px); the High Resolution Imaging Channel (HRIC), with broad spectral bands in the 400–900 nm range and high spatial resolution (up to 5 m/px), and the Visible and near-Infrared Hyperspectral Imaging channel (VIHI), with high spectral resolution (up to 6 nm) in the 400–2000 nm range and spatial resolution up to 100 m/px. The scientific objectives of the instruments are: the study of the surface geology of Mercury (stratigraphy and geomorphology), of magmatic activity (lava plain emplacement, identification of volcanoes), the global tectonics (structural geology, the mechanical properties of lithosphere), the age of the main geological provinces (crater population and morphometry, degradation processes) and the surface composition (maturity and crustal differentiation, weathering, rock forming minerals abundance determination). SIMBIO-SYS will provide unprecedented high-resolution images, the Digital Terrain Model of the entire surface, and the surface composition in wide spectral range.

Selex –SeS is realizing the instrument under a contract of the Italian Space Agency (ASI), with CNES contributions, i.e. the development of VIHI PE, ME and system final calibration. In this paper, the final design qualification results, the main calibration aspects of SIMBIOSYS instrument and its scientific capabilities are described.