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# The High Resolution Imaging Channel of the SIMBIO-SYS instrument aboard the BepiColombo mission to Mercury.

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## Abstract

SIMBIO-SYS is an instrument suite aiming at imaging and spectroscopic investigation of Mercury surface from on-board the Mercury Planetary Orbiter (MPO), part of the ESA-JAXA BepiColombo mission, planned at launch in 2014 [1].

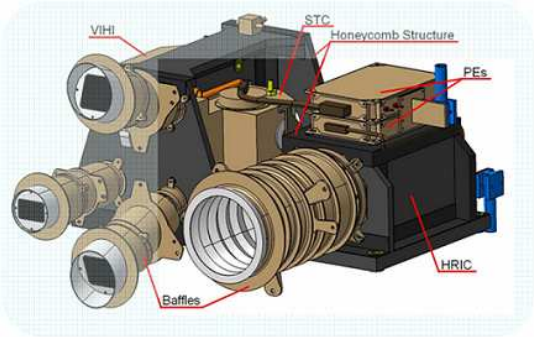


**Figure 1: The High Resolution Imaging Channel (HRIC) of SIMBIO-SYS suite.**

The High Resolution Imaging Channel (HRIC) of SIMBIO-SYS (Figure 1) has the main objective of observing key surface features (e.g. craters, scarps, lava flows and plains) at very high spatial resolution (pixel scale = 5 m $pxl^{-1}$ at 400 km from planet surface), providing crucial information on their relation with internal (e.g. tectonics, volcanism) and external (e.g., meteor bombardment) processes. In addition, HRIC images will be of paramount importance to support experiments aiming at the identification of Mercury orbital parameters, such as the obliquity and the amplitude of the planetary libration.

The HRIC optical configuration is catadioptric and is diffraction limited at 400 nm [2]. The field of view (1.47 deg) will be covered by an innovative 2k x 2k CMOS hybrid sensor of 10 µm pixel size. One panchromatic and three band-pass filters are foreseen to help in geophysical and geo-mineralogical characterisation of surface features.

Operations have to be carefully planned to properly combine BepiColombo orbital characteristics with HRIC optical performances, in order to achieve the main goals of the mission with efficient resource usage. For this purpose, a complete modelling chain including a radiometric model and an instrument simulation tool have been developed, capable to reproduce the expected image characteristics as a function of operative conditions.

We will present the scientific objectives and main technical characteristics of HRIC and will describe the radiometric model and the instrument simulation tool, which are capable to reproduce the expected image characteristics as a function of operative conditions.

## References

[1] Schulz R. and Benkhoff J. 2006, Advances in Space Research, Volume 38, Issue 4, p. 572-577.

[2] Marra G., et al. 2006, Optomechanical Technologies for Astronomy, SPIE, Vol. 6273.