

IAF SPACE EXPLORATION SYMPOSIUM (A3)
Solar System Exploration including Ocean Worlds (5)

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BEPICOLOMBO: THE NEW EXPLORATION OF MERCURY

Abstract

The ESA-JAXA BepiColombo mission has been launched on 20 October 2018 and will arrive at Mercury in December 2025. It represents a Cornerstone for ESA with the important contribution of the Japanese Space Agency (JAXA). It is composed by two orbiters; the Mercury Planetary Orbiter, including instruments realized in Europe, devoted to the observation of the surface, the environment and internal structure of Mercury; and the Mercury Magnetospheric Orbiter, called Mio, realized in Japan, that will perform measurements of the planet environment and the interplanetary medium. The mission has important scientific objectives not only related to the planet Mercury, but also to the interplanetary medium and to the fundamental physics, specifically related to the General Relativity theory of Einstein. The Italian scientific community is strongly involved in the mission with the responsibility of 4 instruments on board the MPO: ISA, the accelerometer that will measure the non-gravitational forces acting on the spacecraft; MORE, the radio science experiment that will carry out accurate measurement of the hermean gravity field and tests of relativistic gravity; SERENA, the suite of 4 sensors that will measure neutral particles and ions of the environment; and SIMBIO-SYS, the suite of 3 remote sensing instruments that will provide global mapping in stereo and spectral mode, and high resolution images of the surface. They represent a great effort of the Italian Space Agency, that funded the realization of the instruments, and of the industrial primes as Leonardo, Thales, OHB and AMDL. BepiColombo will work in a harsh environment being very close to the Sun and facing the hot hemisphere of the planet. The two orbiters will be put in polar orbits at different distances from the planet to investigate different phenomena. The mission is challenging as the thermal and radiation issues are more demanding than other deep space missions. This is the reason why 82So far only some instruments were allowed to perform scientific observation. Specifically MORE (tests of general relativity during superior solar conjunctions), ISA and SERENA ion sensors, have already obtained interesting measurements during cruise and Mercury fly-bys. The two orbiters will start the one year nominal mission on April 2026, with the likely possibility to have an extension of one more year.