

IAF SPACE SYSTEMS SYMPOSIUM (D1)
Technologies to Enable Space Systems (3)

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KEYNOTE: BEPICOLOMBO - THE STATE OF ART FOR THE EXPLORATION OF MERCURY

Abstract

The European Space Agency (ESA) has already achieved many success in its plan to explore the Solar System and in this frame work, BepiColombo represents the first European mission to explore the planet Mercury, so far visited only by NASA with some close passages during Mariner 10 mission (1975) and more recently during Messenger Mission (2011). With BepiColombo, an Interdisciplinary Mission to the planet Mercury, in collaboration between ESA and ISAS/JAXA of Japan, the ESA's goal is much more ambitious: to carry out a complete and systematic mapping of the planet, for at least 1 consecutive year and from an even closer distance, using a full suite of Scientific Instruments installed on board of two different orbiters, the Mercury Magnetospheric Orbiter (MMO), entirely provided by the Japanese Agency JAXA, for the observation of the Mercury magnetosphere and the European the Mercury Planetary Orbiter (MPO) that will orbit around the planet and the Mercury. It might be thought that Mercury, the innermost planet of the solar system, has so far been a bit neglected by space explorations because it is less interesting than Mars, Venus or Saturn, already visited by previous scientific ESA missions, but is not so. The reason lies in the fact that Mercury is an extreme difficult planet to explore: indeed a considerable amount of energy is needed in order to reach its orbit (to brake the satellite and thus counterbalance the very strong Sun gravity) and once at destination the operating environment of the satellite will be extraordinarily hostile, in terms of thermal radiations, ultraviolet and ionized particles flow. For this reason the BepiColombo satellite has required highly innovative design solutions and the development of many ad hoc technologies, especially in the field of thermal control, solar panels and ion propulsion. From the start of the implementation phase in 2006 to its launch on 20th October 2018, the development of the satellite took about 12 years, involving the best European space companies under ESA guidance. This paper intends to give an overview of the BepiColombo Mission characteristics, objectives, challenges, together with a summary of the remarkable technology development and effort that has been required in particular to Thales Alenia Space – Italy, to develop and qualify such complex Satellite.