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Science Operation Concept of BepiColombo/Mercury Magnetospheric Orbiter (MMO) based on 'the MDP scheme'

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BepiColombo / Mercury Magnetospheric Orbiter (MMO), which will be launched in 2014, is mostly dedicated to the first detailed study of magnetic field and plasma environment of the planet Mercury, with wide-range observational capabilities for charged particles and energetic neutral atoms, magnetic field, electric field / plasma waves / radio waves, dust, and exospheric constituents. The scientific operation of this spacecraft is coordinated with the Mission Data Processor (MDP), which operates all payload groups aboard the MMO, MGF (Magnetic Field Investigation) for magnetic field with 2 sub instruments, MPPE (Mercury Plasma Particle Experiment) for plasma and neutral particles with 7 sub instruments, PWI (Plasma Wave Investigation) for electric field, plasma waves, and radio waves with 7 sub instruments, MSASI (Mercury Sodium Atmosphere Spectral Imager), an imaging system for the sodium exosphere, and MDM (Mercury Dust Monitor) for dust information around Mercury and the inner heliosphere.

In this paper, the summary of the science operation plan based on this 'MDP scheme' is presented. Under this concept, all payload packages will perform integrated in-situ measurements of particles and fields in and around the magnetosphere of Mercury, under the control by MDP. It enables us to obtain survey data (L-mode), normal data (M-mode), and burst data (H-mode) with coordinated manner within limited telemetry resource. Data triggering concept for H-mode is also presented. These definitions are now implemented into the flight model, and finally formalized in the MMO Science Working Group meeting in March 2011.

Keywords: Mercury, Magnetosphere, Exosphere, BepiColombo, Mercury Magnetospheric Orbiter