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PRELIMINARY DESIGN OF MARTIAN MOONS EXPLORATION (MMX)

Abstract

Martian Moons eXploration (MMX) is a mission under development in JAXA in corporation with NASA, CNES, ESA, DLR to be launched in 2024. This paper introduces the result of its preliminary design and the latest status of MMX program. How was water delivered to rocky planets and enabled the habitability of the solar system? This is the key question to which MMX is going to answer. Solar system formation theories suggest that small bodies as comets and asteroids were delivery capsules of water, volatiles, organic compounds etc. from outside the snow line to entitle the rocky planet region to be habitable. Mars was at the gateway position to witness the process, which naturally leads us to explore two Martian moons, Phobos and Deimos, to answer to the key question. The goal of MMX is to reveal the origin of the Martian moons, and then to make a progress in our understanding of planetary system formation and of primordial material transport around the border between the inner- and the outer-part of the early solar system. The mission is to survey two Martian moons, and return samples from one of them, Phobos. Add to those MMX's contribution to the planetary science field, on the growing discussion about the International Space Exploration activities, MMX's contribution to future human Mars exploration is also considered as an important aspect of the program. Following the system definition study results presented in the previous conference, the following items will e reported in this conference. First, as a result of comprehensive completion of the Phase-B activities, the preliminary design is completed in cordination with the design of spacecraft system, mission instruments, and their operation plan. Second, Phase-C activities has started which incorporates manufacture and tests using engineering models. And third, the programmatic aspects including international cooperation frameworks and program schedule are presented. The details will be shown in the paper.