

IAF SPACE EXPLORATION SYMPOSIUM (A3)
Mars Exploration – missions current and future (3A)

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MISSION DESIGN OF MARTIAN MOONS EXPLORATION (MMX)

Abstract

Martian Moons eXploration (MMX) is a mission under study in ISAS/JAXA to be launched in 2024. This paper introduces the mission design of MMX mission. “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 rocky planets must have been born dry. Delivery of water, volatiles, organic compounds etc. from outside the snow line entitles the rocky planet region to be habitable. Small bodies as comets and asteroids play the role of delivery capsules. Then, dynamics of small bodies around the snow line in the early solar system is the issue that needs to be understood. 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. Following the mission concepts study results presented in the previous conference, the following items will be reported in this conference. First, based on the mission goals and objectives defined, the requirements to the systems and operations are derived and their feasibility is evaluated. Second, as to the key technologies issues identified, partial models are built and their performance is evaluated. And third, collaborations with overseas space agency are discussed and the programmatic framework is defined. The details will be shown in the paper.