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HTV-X FOR GATEWAY CONCEPT STUDY STATUS

Abstract

As part of its international contribution to the Gateway Program, a human-tended space station in lunar orbit being developed in the NASA-led international space exploration program "Artemis Program," Japan is considering utilizing its technologies developed through the HTV and HTV-X to transfer logistics resupplies to the Gateway. A Memorandum of Understanding for Gateway was signed between the Japanese government and NASA in December 2020, and a more detailed Gateway Implementing agreement was signed in November 2022. HTV-X for Gateway (HTV-XG) must meet the Gateway's specific I/F requirements, which differ from those of the ISS, and the amount of logistics resupplies specified in the Gateway Implementing Agreement. First, a concept of operation has been established, and then the Gateway interface requirements to logistics vehicles have been analyzed to identify the necessary functions. While the interface conditions and the amount of logistics resupplies equivalent to or greater than those of the resupply mission to the ISS are required, Gateway which is the destination is located far from the ISS, and the required delta-V is extremely large. Therefore, a drastic mass reduction of the HTV-XG vehicle mass is essential, and a preliminary mass reduction study has been conducted, including a reconsidering of the materials of the vehicle structure. As a result, the feasibility of the interface with Gateway and the amount of logistics resupplies has been determined. The above study is expected to promote the launch of the HTV-XG project and contribute to future inter-orbit transportation technology. Specifically, the HTV-XG project is expected to contribute to efficient cargo transport to low-orbit commercial space stations.