

SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)
Future Space Transportation Systems (4)

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HTV-X SYSTEM INTEGRATION PLAN

Abstract

Since ISS operation has been extended up to 2024 and H-2 Transfer Vehicle (HTV) will finish cargo supply service around 2020, a new spacecraft HTV-X, an advanced version of HTV, is being developed. HTV-Xs are planned to be launched after 2022. HTV-X has several major characteristics different from HTV. First, the system design concept is to simplify the module composition. As a result, the module number is reduced to two: Pressurized Module (PM) and Service Module (SM). Also, it has been studied to make the module interface simple by isolating functions into each module at the most. As a reference, HTV consists of four modules, Pressurized Logistic Carrier (PLC), Unpressurized Logistic Carrier (ULC) with Exposed Pallet (EP), Avionics Module (AM), and Propulsion Module. HTV-X takes advantage of the heritage of HTV's PLC as much as possible, except for adding a side hatch for late access cargo and an adapter for launch vehicle interface. SM has the function almost equal to HTV AM, EP and Propulsion Module. Note that SM is upside and PM is bottomside in the launch configuration. The exposed cargos are carried on top of SM, instead of loading them on EP into the inside of ULC. A special characteristic in terms of appearance is that SM has deployable Solar Array Panels (SAPs), not body mounted SAPs as HTV. Second, the exposed and pressurized cargo service capability is improved in terms of transferred cargo mass and reception schedule. Finally, HTV-X can offer an opportunity for on-orbit demonstration mission that can be extended up to 1.5 years at the maximum after departing from ISS, with supplying electrical interfaces and mounting area on the top of SM. System integration plan is studied to minimize based on HTV-X system design and HTV experience. Current system test plan has acoustic and thermal system level tests as environmental tests, and electrical tests in assembled configuration before/after the environmental tests. After the system tests, SM and PM will be transported separately to Tanegashima Launch Site (TNSC). After propellant loading and battery charge for SM, and cargo loading for PM and SM, the two modules will be assembled to be launched by H3 rocket. These launch site operation duration will be improved to be half of the HTV duration.