

IAF SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)  
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APPLICATION SCENARIO OF COMPOSITE MATERIALS TO THE HTV-X FOR ISS AND BEYOND

**Abstract**

We have been developing the HTV-X, a cargo transfer vehicle to the ISS, and also studying a cargo transfer vehicle to Gateway, a lunar orbiting station. In order to maximize the amount of cargo transport, it is essential to reduce the weight of the vehicle. Considering that conventional spacecrafts generally have aluminum structures, we are working on the following two steps to apply composite materials with lower mass density ratio to the flight structure.

- (1) Use of composite materials in the HTV-X for the ISS The HTV-X is capable of providing on-orbit demonstration opportunities for experimental equipment during its solo flight after the ISS cargo resupply. We will apply composite materials to the mounting structure of the payloads planned for the HTV-X2.
- (2) Application of composite materials to the advanced HTV-X for the Gateway We are studying the concept of using an advanced version of the HTV-X to contribute to the resupply of the Gateway. The Gateway requires a pressurized cargo amount equivalent to that of the HTV-X, which cannot be achieved with the HTV-X mass as it is. In order to maximize the cargo quantity, we are considering the HTV-X weight reduction scenario by applying composite materials in the pressurized structure, utilizing the experience of (1).