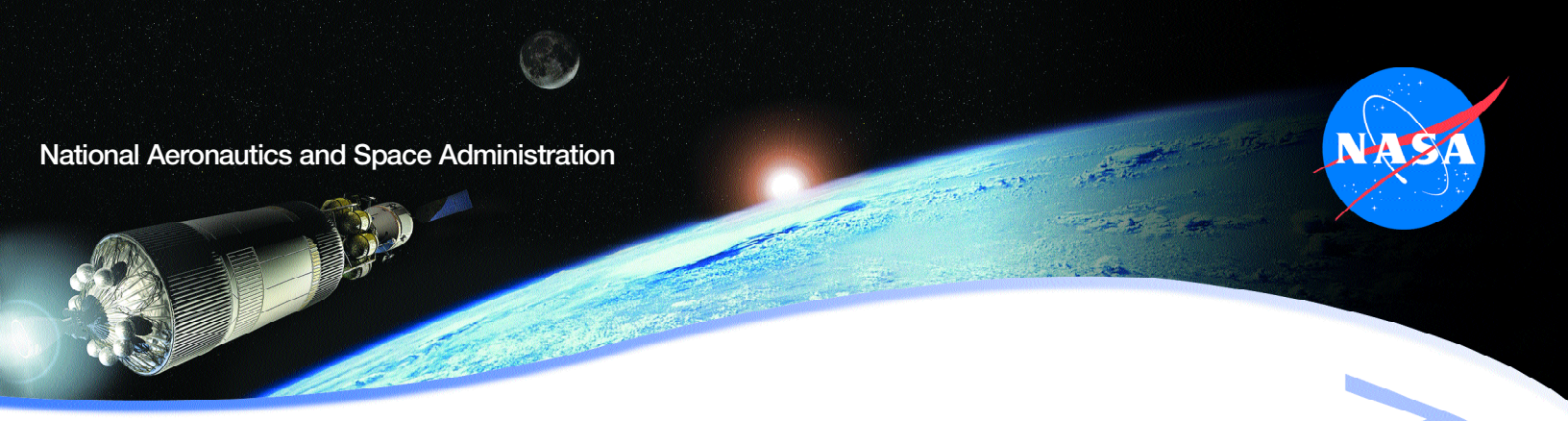

Unpressurized Cargo Initiative

Using Constellation Infrastructure to Enable Science and Technology

goddard technology

About the Effort

A need exists to accommodate science, technology, engineering, and education payloads on NASA's next-generation transportation system—particularly on the Orion, ARES V, and Altair. The Goddard Space Flight Center (GSFC) is now leading NASA's effort to:

- Characterize, design, and implement accommodations aboard the Orion Service Module.
- Study carrier accommodations aboard ARES V.
- Develop designs for a surface carrier system that would transport and support experiments on the Moon via Altair.

Significance of the Effort

In 2006, NASA studied the feasibility of adding an unpressurized cargo (UPC) delivery capability to the Service Module of the Orion Crew Exploration Vehicle and Lunar Lander. The study polled potential science, technology, engineering, and education users and found unequivocally that a demand existed for a carrier system to accommodate their payloads.

Benefits of the Technology: At-A-Glance

- Accommodates fixed science/technology payloads on the Orion Service Module, including sensors, detectors, and cameras.
- Provides a means to attach payloads to the exterior of the International Space Station.
- Offers a means to deploy payloads in low-Earth, translunar, cis- lunar, or other compatible orbits.
- Provides cargo and payload delivery accommodations to the lunar surface.

Origins

Using available crewed spacecraft volume to accommodate attached, removable and ejectable payloads is not new to NASA. During the Apollo era, the aft portion of the lunar orbiter system, called the Service Module, carried science payloads. The Hitchhiker, Spartan, Getaway Special, and the Science Experiment Module also offered different configurations and accommodations for experimenters onboard the Space Shuttle.

Orion Unpressurized Carriers Potential Capabilities

Parameter	Capability
Orbit	LEO 400 km, 52º inclination; transitional
Duration of Flight	Varies 6 months to 5 years
Volume	<2.92 (m3 (103 ft. 3)
Mass	< 600 kg
Power	< 300 W
Data Rate	< 30 Mbps (TBD, spacecraft dependant)
Thermal	Passive
Field of View	Zenith through nadir

Looking Ahead

The Exploration Systems Project is establishing a UPC Project to manage and engineer accommodations on Constellation Program spaceflight vehicles. GSFC is communicating with scientists and engineers to further define potential needs for accommodating experiments on the Orion Service Module and ARES V, and delivering payloads to the lunar surface.

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