

Space Payload “Pod” Container



Name of Technology:

Payload Handling, Manipulation, and Transportation

Participating NASA Centers:

KSC (Lead)

Technological Area:

T7.02 Payload Integration and Payload Launch Preparation Interface Standards

Vision for the Technology:

Exploration missions require standardized fairings and payload containers to reduce the cost from typical unique designs. NASA needs the ability to pack payloads in a fairing to meet the following objectives to:

1. Efficiently design for maximum fairing cargo volume and mass constraints
2. Accommodate in-situ robotic systems to unload or unpack payloads from the fairing

These new modular containers would need to include stowage mechanisms (e.g. magazines or dispensers) in which potentially fragile payloads can be efficiently and individually be locked for launch. The containers would also require the ability for an in-situ robotic system to unload or unpack payloads from the fairing. Robotic systems will be required to interact with the payload as well as the stowage mechanism.

Challenges:

Currently, fixtures and containers are manufactured specific for the payload. Having multiple cargo systems across multiple launch

vehicles will contribute to higher cost for integration of that mission. Standardizing the fairing and cargo containers will reduce the per kilogram cost to orbit. A significant fraction of mission costs are typically unique designs and approaches to perform relatively routine functions.

NASA Seeks to Meet the Following Specs:

Successful closure of this gap will be determined through:

- Ability to transport 4mx2mx4m
- Form factor ~300kg
- Modules may be moved ~10m from fairing
 - <0.1 g disturbance
 - 99% reliability
- No plume impingement
- No outgassing
- Providing 20W survival power
- Pose accuracy of 2cm and 5 degrees
- Less than 2 handoffs of payloads between distinct grasping mechanisms

Overview of Student Project:

NASA seeks innovative solutions that will allow standardization of cargo/payload to launch vehicle, and interface standards to reduce the cost associated with analysis, design, and integration to configure space systems for launch.

Innovative Areas Student Projects Can Address:

- ❖ Standardized fairing payload integration including robotic unloading
- ❖ Design standardized “Pod” integrated containers system including robotic unloading
- ❖ Design fairing and cargo container integration system including robotic unloading

Project Phases

- I. Conceptual and feasibility study with characteristics
- II. Proof of Concept/Prototype in lab environment

Research Funded by NASA on this Topic:

Proposal Number: 19-1- Z4.02-3856
[HyperBus Cargo Platform](#)

References:

[T7.02 Payload Integration and Payload Launch Preparation Interface Standards](#)

[B4.02 Market Driven Space Exploration Payloads](#)