

National Aeronautics and Space Administration



LEAG Perspectives: Human Landing System

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Tuesday, October 29, 2019



Support Across Mission Directorates

STMD

- Tipping Point Selections
- Other

SMD

- Commercial Lunar Payload Services (CLPS)
- Prioritize science objectives of Artemis III (2024 mission) and coordinate with HEOMD on science objectives for Artemis IV and beyond





HLS Program Objectives

Identifier	Title	Statement	Rationale
HLS-Obj-009	Science Experiment and Technology Demonstration Accommodation	The HLS will accommodate at least 100 kg of science experiments and technology demonstrations, including at least 35 kg of return mass to Lunar Orbit.	The HLS is intended to support diverse science activities and support closure of Strategic Knowledge Gaps. Down mass 100 kg and up mass of 35 kg is inclusive of tare. Additional details provided in the HLS requirements.

HLS-R-0056 Scientific Payload Return to Lunar Orbit



The HLS shall be capable of returning scientific payload of at least 35 kg and 0.07 m³ volume (threshold) and 100 kg and 0.16 m³ volume (goal), inclusive of tare, in accordance with the mass, volume, dimension and environments parameters specified in Table 10, from the South Pole to Lunar Orbit.

Rationale: Empty sample return containers are assumed to have a mass of 20 kg (goal), each with dimensions of at least 48 cm x 30 cm x 20 cm with an expected return of at least 2 containers (goal).

Table 10: Scientific Payload Return

Items	Qty	Mass (kg)	Storage Environment	Geometry	Length (cm)	Height (cm)	Width (cm)	Volume (m3)	Notes
Up Mass Total (Goal)		100							
Sample Return Equipment		20						0.16	total volume of all containers.
sample return container	2		Pressurized	box	48	30	20		Dimensions are for each container, 0.06 m3 for both
sample return collection bags	7		Pressurized	box	42	22	15		Dimensions are for each container, 0.1 m3 for all
Lunar Samples		80	Pressurized						would be contained in the Sampler Return volumes above
Up Mass Total (Threshold)		35							
Sample Return Equipment		9						0.07	total volume of all containers.
sample return container	1		Pressurized	box	48	30	20		Dimensions are for each container
sample return collection bags	3		Pressurized	box	42	22	15		Dimensions are for each container
Lunar Samples		26	Pressurized						would be contained in the Sampler Return volumes above

Note: Orion does not have specific storage to match the HLS sample return volume. Sample return mass to Earth via Orion might require mission-by-mission decisions on storage within Orion and possible considerations for different sample return container/bag design.





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