

National Aeronautics and Space Administration



Lunar Delivery Challenge Webinar

<https://www.herox.com/LunarDelivery>

Tracy Gill/KSC - NASA

Paul Kessler/LaRC – NASA

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www.nasa.gov

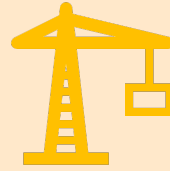
NASA's Artemis Program

- 2024: Land first woman and next man on the moon
- Prior to 2030: Create a sustainable base camp

Basecamp serves as a hub for scientific research and a base for Mars exploration



Artemis Delivery Needs



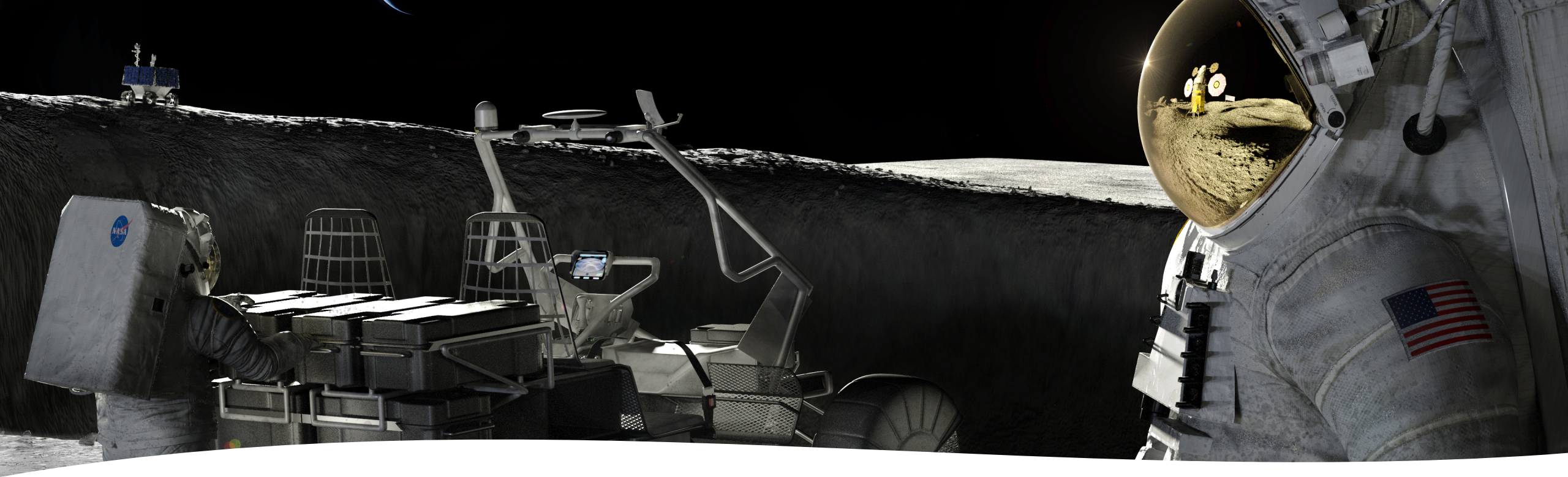
- Cargo needs to be offloaded from a lander



- Robust and reliable cargo-handling in lunar environment



- Compatible with a broad array of lunar lander configurations



Context

- NASA has developed some concepts and prototypes
- These methods are effective at some operations
- Concepts may not optimize cost, mass, and simplicity

The Ask

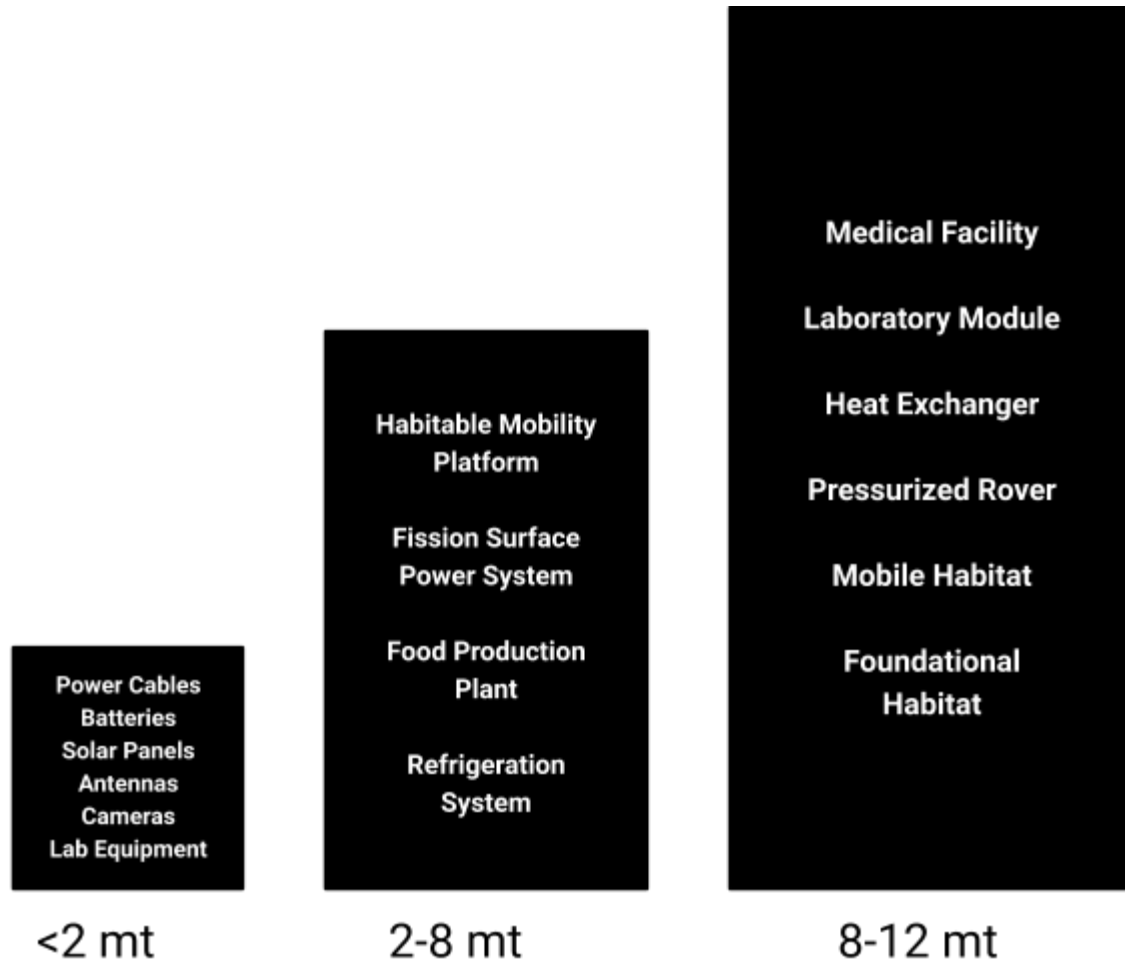
- NASA is seeking ideas from the public to inform the direction of future development

Who can participate

- Anyone age 18 or over from any background



Payloads to be Offloaded



Example payloads

- Lunar terrain vehicle or [LTV](#), transports crew
- Habitable mobility platform crew trips lasting up to 45 days
- Lunar foundation surface habitat houses four crew members

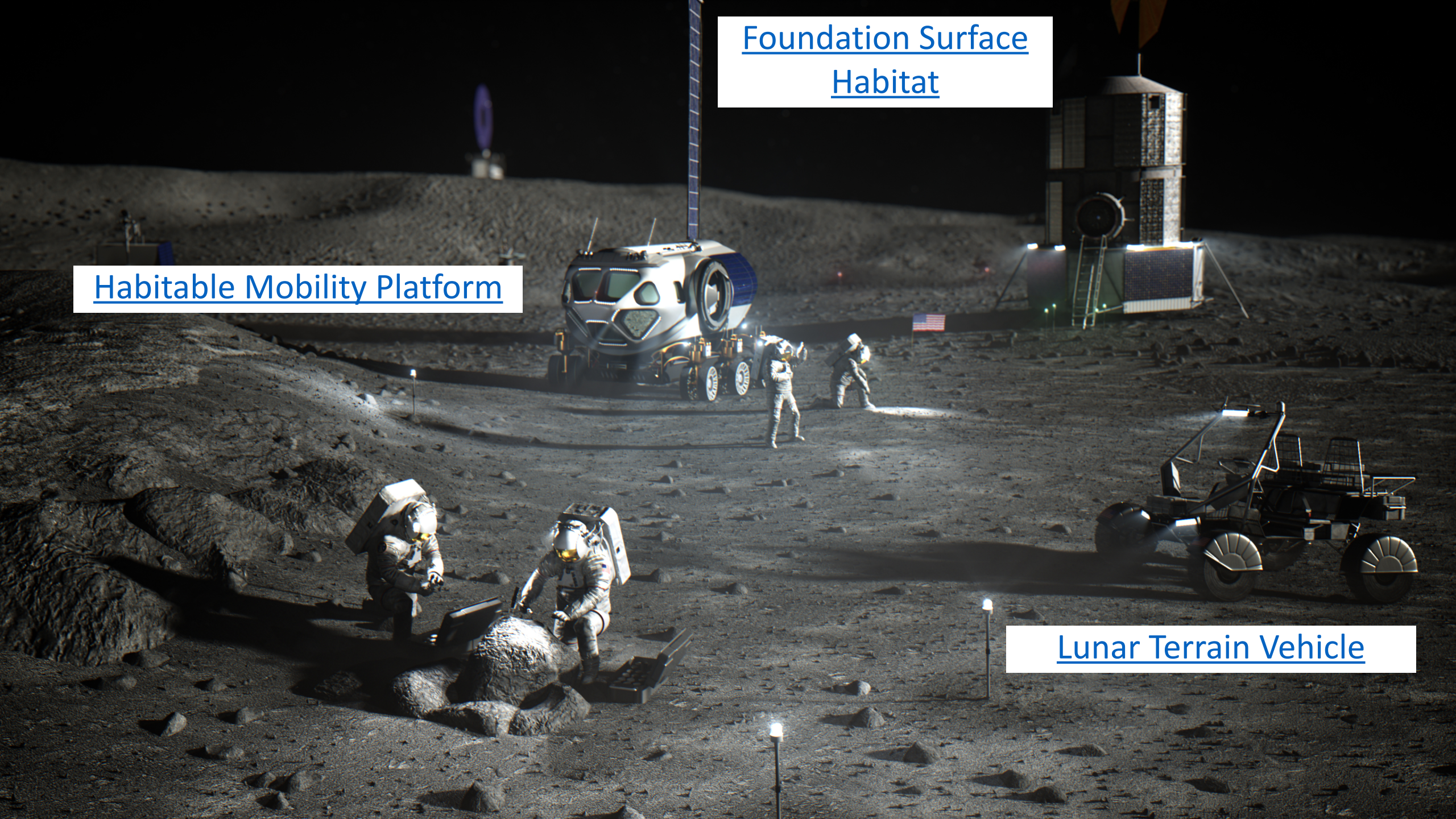
[NASA Outlines Lunar Surface Sustainability Concepts](#)

Consider interfaces and standards for compatibility to variety of payloads and landers

Foundation Surface
Habitat

Habitable Mobility Platform

Lunar Terrain Vehicle



The background image shows a lunar lander on the moon's surface. The lander has a cylindrical body with an American flag on the side and four landing legs. An ascent stage is hovering above it, with a bright engine plume. A large, semi-transparent white circle on the left contains the title and list. The Earth is visible in the sky.

Lander Configurations

Consider the three height ranges of lunar landers

- 0-4 meters (0-12 ft.)
- 4-10 meters (12-30 ft.)
- 10 meter (30 ft.) or greater

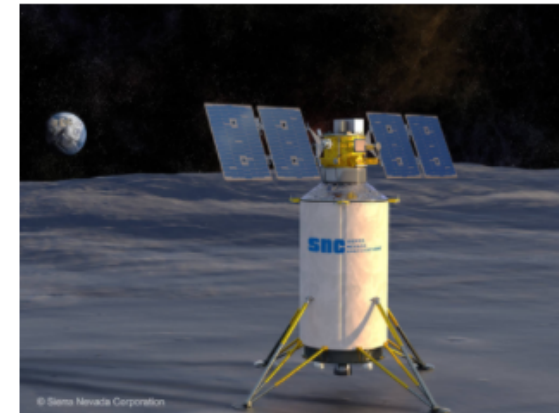
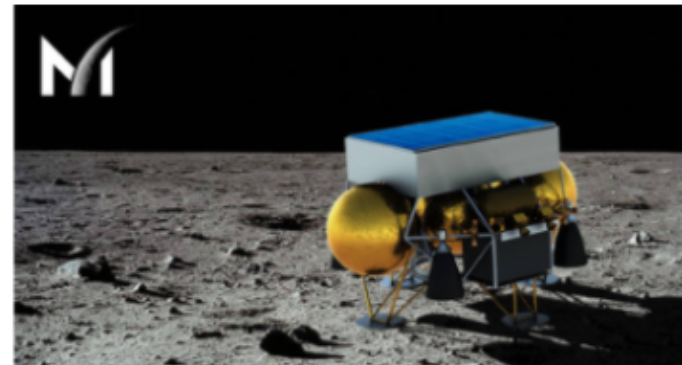
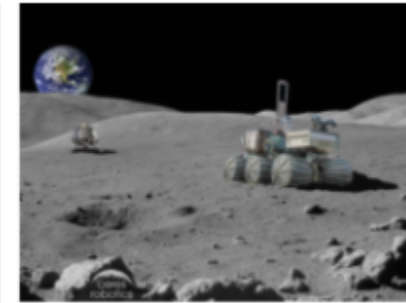
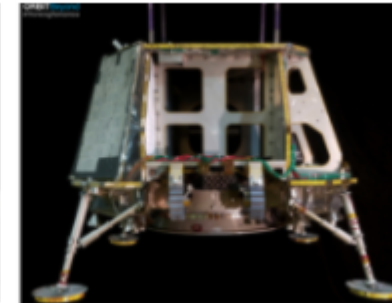
Competitors should decide if solution will be limited to single height range or versatile

Commercial Lunar Payload Services



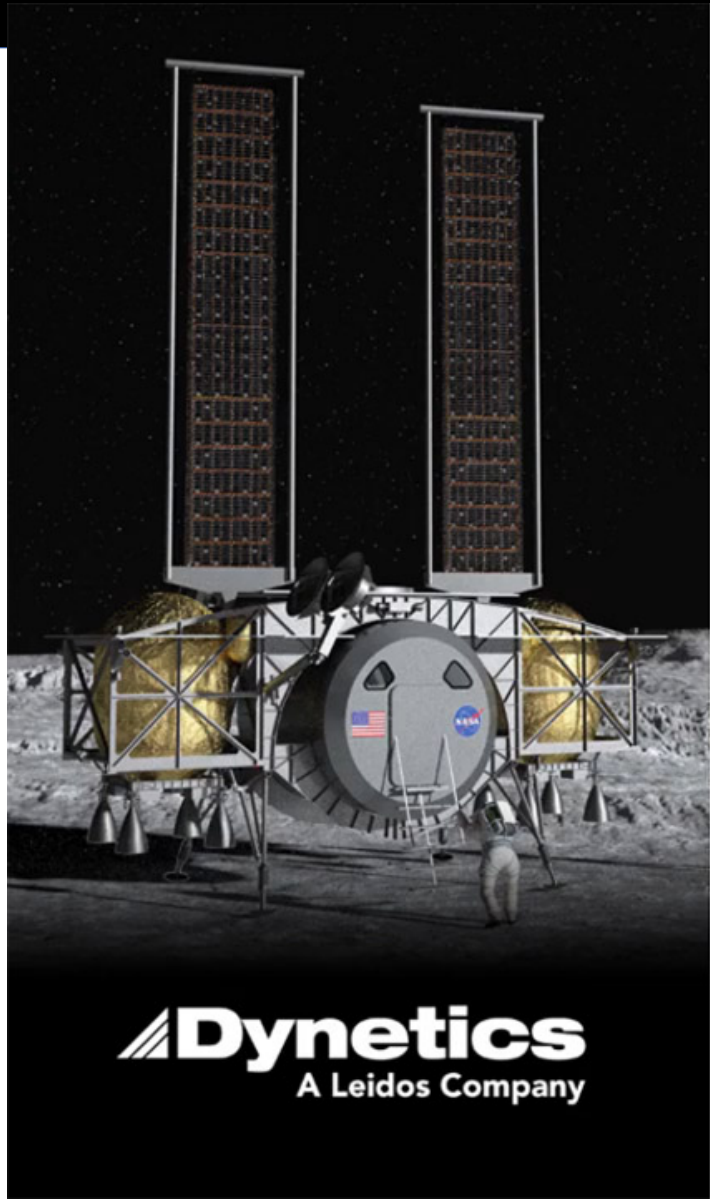
Fourteen qualified providers to deliver science and technology to the lunar surface

- <https://www.nasa.gov/content/commercial-lunar-payload-services>



Human Landing System competitors

<https://www.nasa.gov/feature/nasa-selects-blue-origin-dynetics-spacex-for-artemis-human-landers>



Gateway Logistics Services (GLS)



- SpaceX selected as the first U.S. commercial provider under the Gateway Logistics Services contract to deliver cargo, experiments and other supplies to the agency's Gateway in lunar orbit
- Multiple supply missions planned
 - 5 MT delivered cargo capability
 - Power to internal and external payloads
 - Trash removal
 - Automated RPOD (docking/undocking)
- Firm-fixed price, indefinite delivery/indefinite quantity contract
 - Guaranteed two missions per logistics services provider with a maximum total value of \$7 billion across all contracts as additional missions are needed



<https://www.nasa.gov/press-release/nasa-awards-artemis-contract-for-gateway-logistics-services>

Other Considerations

- Pros/cons landing capability for each payload or reusing across architecture with dedicated landing
- Payload access location and elevation from surface
 - Could be a primary driver
- Payload handling interfaces and standards
- Mission specific lander configuration may drive design
- Modularity and evolution paths may be considered in the design



Section	Description	Overall Weight
Reliability/feasibility	Level of robustness; high degree of confidence that device or technique will be able to 30 offload payloads.	
Case for Mass and Volume Optimization	Idea considers mass and volume: case is made for either leaving a solution on the moon or including it in the lander or a combination of approaches.	25
Autonomy	The degree to which the technique can work autonomously or has the potential to work autonomously	15
Proposal quality	Quality of proposal: clear, concise writing; thoughtful and complete explanations of how the unloading design concept meets the specifications listed.	10
Flexibility of design	The design considers the ability to work with a variety of payloads and landers. Proposes recommendations for standardizing mechanical and electrical interfaces.	10
Applicability to the lunar surface	Ideas consider lunar environment factors such as: thermal, temperature, solar, dust, vacuum, etc.	10

While complete solutions are likely to score higher in the judging criteria, NASA is also interested in partial solutions. If you have a partial solution, we recommend forming a team to submit a complete approach.

Judging Criteria



Monetary Prizes

This challenge will award up to \$25,000 in total prizes for up to 6 teams:

- One 1st place winner: up to \$10,000
- Two 2nd place winners: up to \$4,500 each
- Three 3rd place winners: up to \$2,000



Other Prizes

- Present concept to NASA engineers
- Conference/virtual event for prize winners to present and interact with NASA (pending availability)
- Publicity announcing the winners
- Wide promotion of the winner on social media
- Participation in a webinar showcasing winning solutions to public

*State Department restrictions may apply

Questions?

- See <https://www.herox.com/LunarDelivery> for more details on guidelines, timeline, and the challenge forum.

