

Commercial Lunar Payload Services (CLPS)



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Agency Priorities

To achieve a sustainable presence on the moon through innovative public-private partnerships with US commercial companies and international partners.



Phased Approach

- Gateway to Lunar Surface *will facilitate*
 - Human lunar landing by 2024
 - Sustainable missions by 2028
- New Lunar Science and Technology *enabled by*
 - Small commercial lunar landers as early as 2020
 - Medium-size landers and rovers by 2023



Commercial Lunar Payload Services

- NASA wants to be a marginal customer, one of many payload providers. NASA does not intend to manage or direct these commercial missions.
- Sponsored (programmatic and funding) by the Science Mission Directorate in support of NASA's science, human exploration and technology goals.
- Master contract awarded to vendors to safely integrate, accommodate, transport, and deliver NASA payloads using contractor-provided assets, including launch vehicles, lunar lander spacecraft, lunar surface systems, Earth re-entry vehicles, and associated resources.

Contract Details

- **CONTRACT TYPE:** The Government awarded 9 fixed-price, indefinite delivery indefinite quantity contracts in November 2018 and added 5 more vendors in November 2019.





Contract cont'd

- **ESTIMATED VALUE:** Min \$25k Max \$2.6B per each contract awarded. The maximum ordering value of the firm fixed price contracts and associated task orders is \$2.6B, individually and cumulatively.
- **CONTRACT PERFORMANCE PERIOD:** 10-year Effective Ordering Period.
- **ON-RAMPING:** Every two years, or as needed, the government will perform a market analysis to assess capability growth across the industry and space transportation sector.
 - If warranted, the government will issue requests for proposals to on-ramp additional vendors as industry emerges with new candidates and capabilities.
 - No further on-ramping will occur after Contract Yr. 8
 - First on-ramp completed in November 2019

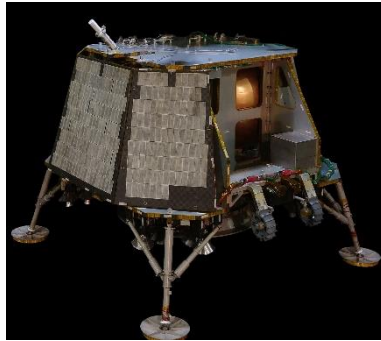
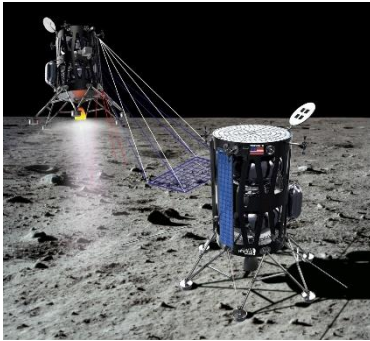
Task Order Process

- Task orders will be issued on an “as needed basis”
- Vendors must respond to each task plan requested by NASA
- Task Order’s SOW will describe the specific requirements
- The period of performance shall be specified on each individual task order
- Mission success criteria will be defined for each task order
- Task orders will be competed among all vendors in the contract pool

Task Order History

- Task Order #1 – Payload User's Guides
 - Received from first 9 companies; reissued to 5 new companies
- Task Order #2 – First Payload deliveries to the Moon
 - Selected 3 companies
- Task Order #3 – Study on mid-sized landers
 - Selected 2 companies and finished studies in July 2019
- Task Order 20A – VIPER Mission
 - Mid-size lander to deliver NASA rover and instruments to the South Pole
 - Draft task order released November 2019
- Task Order 19C/D – Collection of science instruments
 - One mission focused on lunar pole, second mission mid latitudes
 - Draft task order released December 2019

CLPS Delivery Task Order Selections



- May 31, 2019 NASA selects first Commercial Moon landing delivery services for Artemis Program to deliver science and technology to the Moon
 - Astrobotic of Pittsburgh awarded \$79.5 million to fly as many as 14 payloads to Lacus Mortis, by July 2021
 - Intuitive Machines of Houston awarded \$77 million to fly as many as five payloads to Oceanus Procellarum by July 2021
 - Orbit Beyond of Edison, New Jersey awarded \$97 million to fly as many as four payloads to Mare Imbrium, by September 2020

VIPER (Volatiles Investigation Polar Exploration Rover)



Overview:

- Directly characterize the nature/distribution of volatiles at the lunar poles
- Understand the lateral and vertical distribution and physical state/composition
- VIPER will build Lunar resource models, steering the future commercial resource marketplace
 - Specs:
 - Mission 75-100 earth days
 - Rover + Payload Mass: 300 kg
 - Rover Comm: X-band (300kbps directional / 2kbps omni)
 - Rover Dimensions: 1.5m x 1.5m x 2m
 - Rover Power (nom): 300W
 - Max speed: 25cm/s. Prospecting: 10cm/s
 - Lander + Launch Vehicle: CLPS commercial contract

Project Timeline:

- FY19: Phase A (Formulation) thru SRR
- FY20: Phase B/C: PDR (Implementation)
- FY21: Phase C: CDR (Critical design)
- FY22: Phase D: SIR/I&T (Integration & Test)
- FY23: Launch (targeted)



Lessons Learned

- NASA is a critical player in establishing early commercial capability
- The vendor pool is both capable and robust but future market projections are very incomplete
- To create the right partnership between NASA and commercial entities requires both sides to adapt and make adjustments
 - NASA has a very hard time sticking to a set of requirements
 - NASA has to approach mission concepts in a different way when using commercial services
- Areas such as Mission Assurance and cross payload responsibilities need a lot more discussion
- The opportunity to fly to the Moon multiple times per year will have a significant impact on both Lunar science and human exploration