

Deep Space Systems Commercial Lunar Payload Services Overview. S. A. Bailey¹, M. R. Allen², and A. R. Burch³, ¹President and CEO, Deep Space Systems, 8100 Shaffer Parkway, Suite 130, Littleton, CO 80127, ²CLPS Mission System Design Lead, Deep Space Systems, 8100 Shaffer Parkway, Suite 130, Littleton, CO 80127, ³Chief Imagineer, Deep Space Systems, 8100 Shaffer Parkway, Suite 130, Littleton, CO 80127.

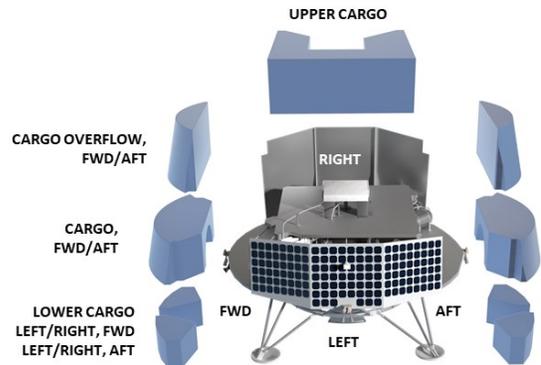
Introduction: Deep Space Systems was selected by NASA on Nov 29, 2018 as one of the companies eligible to bid on Commercial Lunar Payload Services (CLPS) Task Orders. The first Task Order Award(s) are anticipated to be made by the end of May 2019.

The CLPS Program is well supported, both within NASA and in the Congress, and is funded at \$2.6B over 10 years. DSS intends to compete for and win Task Orders that will result in several flight opportunities over the course of the CLPS Program.

The DSS CLPS Lander includes a mobility package, rotary percussive drill, and delivery of samples to onboard instruments of evolved gases, fine particles and BB sized rocklets to on board instruments.



Optionally, the lander can land and operate as a fixed base, with over 3 cubic meters of payload volume and the ability to include a robotic arm for payload deployments and local surface manipulation.



Payloads collectively have a 400W power allocation, 10 Mbps down link when stationary, 1 Mbps while mobile, 1 TB of data storage, 28, 12 or 5V switched power, and a choice of a wide range of serial interfaces including RS-422, LVDS, SpaceWire, 10/100/1000T ethernet, and SPI.

The DSS flight system includes the capability to deploy cubesat in flight, in orbit, or on the lunar surface. The landed system is specifically designed for north or south pole operations but has the capability to operate at lower latitudes as well.

The spacecraft can support closed loop heater control of the payload, with payload locations that can view both the surface and zenith per their thermal needs. Payload volumes within the thermally blanketed and controlled central enclosure are also available.

The mobile lander has the capability to maintain over 1 km/hour on average with remote time delayed drivers on Earth, with semi-autonomous safety interlocks, and the ability to “sprint” at up to 5 km/hour.

DSS optionally can provide payload drop off or deployment including the use of WiFi (802.11n), WiGig (802.11ad), or LoRa two way radios, including a radio kit for the payload.

Deep Space Systems can also provide a complete payload design, development, test and integration service for Science or Technology Principal Investigators in need of an Instrument or or Payload Provider, and will deliver Non-NASA payloads to the lunar surface on a commercial service agreement basis.