

Astrobotic the first Commercial Moon-Company

“We’re empowering a thriving human presence in space to explore the universe beyond Earth orbit. We believe in the elegant, pragmatic use of robotics to make space accessible to the world”. [1]

Astrobotic is the first commercial ‘Moon-company’ acknowledged by NASA. They are specialized in making robotic space missions feasible and more affordable for science, exploration, and commerce. As a lunar logistics company, they are going to provide end-to-end delivery services for payloads to the Moon.

Astrobotic (“We think the Moon is a great place to start”) is a private aerospace company based in Pittsburgh, Pennsylvania, USA. It was founded in 2007 by Dr. Red Whittaker, a professor at Carnegie Mellon University, with the goal of developing technology for lunar exploration and providing commercial lunar payload delivery services.

Early Years (2007-2010): Astrobotic was founded with the intent of competing for the Google Lunar XPRIZE, a competition that challenged private companies to land a rover on the Moon, travel 500 meters, and transmit high-definition video and images back to Earth. While the prize ultimately ended without a winner in 2018, Astrobotic continued to develop its technology.

NASA Contracts (2010-2019): Astrobotic received multiple contracts from NASA, including funding from the Lunar Cargo Transportation and Landing by Soft Touchdown (Lunar CATALYST) initiative program, which aimed to develop commercial lunar transportation capabilities. These contracts helped Astrobotic develop its Peregrine Lander, a spacecraft designed to deliver payloads to the Moon's surface.

Partnerships and Collaborations: Astrobotic has collaborated with various organizations and companies, including United Launch Alliance (ULA), Airbus and the DHL Group (Deutsche Post) to facilitate the transportation and delivery of payloads to the Moon for Mexico, Hungary, Seychelles, UK and Germany [2]

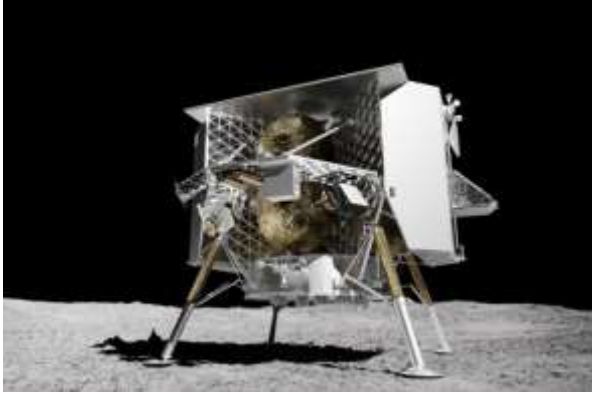
Since its founding in 2007, Aerobotic has grown to more than 130 employees. The company is building and operating spacecraft, landers, rovers and payloads on-site at their “Moon Base” headquarters, located in the heart of Pittsburgh’s North Side.

The 47,000 square foot complex is the largest private facility in the world dedicated to lunar logistics. Spacecraft, landers, rovers and payloads will be controlled directly from the Mission Control Center (MCC) at the Astrobotic premises. [1].

Missions, Landers and Rovers

The first Peregrine mission (planned for December 2023), Astrobotic's flagship mission is the Peregrine Lander, designed to deliver payloads to the lunar surface. The mission will provide affordable lunar payload delivery services for a variety of customers, including scientific instruments, technology demonstrations, and commercial payloads.

A true commercial payload example is the ‘DHL MoonBox’. It is a mementos box that will be delivered to the Moon by DHL, the official German packet service, on the first Peregrine mission. The DHL MoonBox contains 28 capsules all of which have been filled containing memorabilia items from the USA, UK, Canada, Nepal, Germany and Belgium. The descriptions of the 31 payloads are listed in Wikipedia. [3]



Peregrine Lander

Peregrine is our small-class lunar lander. It is poised to carry out the first commercial mission to the Moon, and be the first American spacecraft to land on the Moon since the Apollo program

Capacity : 120 kg

Power: 1.0 W/kg

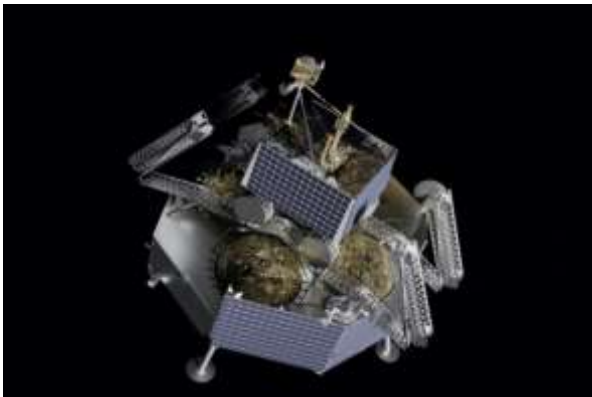
Bandwidth: 10 kbps/kg

Payload Operations: 1 Lunar day (192 hrs)

Landing precision: 100 meters

Price to Surface: \$ 1.2 M/kg

Price to Lunar orbit: \$ 300/kg [1]



Griffin Lander

Griffin is a medium-class lunar lander and was selected to deliver NASA's water-hunting Volatiles Investigating Polar Exploration Rover (VIPER) rover to the lunar south-pole in late 2024.

Capacity: 625 kg

Power: 1.0 W/kg

Bandwidth: 10 kbps/kg

Payload Operations: 100 meters

Price to Surface: \$ 1.2 M/kg

Price to Lunar Orbit: \$ 300K [1]

CubeRover®

CubeRover® is a modular vehicle designed to provide affordable mobility for scientific instruments and other payloads to operate on the surface of the Moon. Because CubeRover® can be so light — as light as four kilograms — it dramatically reduces flight costs, making the Moon more accessible



CubeRover

A trip to the Moon and all the services are included in a \$4.5M per kilogram of payload price. Essentially, the CubeRover (4 kg) comes with everything except the payload.

A flight-qualified CubeRover can be ready as soon as 15 months after the order is placed.

The rovers come in multiple sizes with the ability to accommodate standard and nonstandard configurations: 2U, 4U, and 6U Cube sizes. [1]

Polaris

Polaris was designed to accommodate diverse lunar payloads with distinct mission profiles, like lunar regolith digging or water ice harvesting. Polaris can support up to 90 kg of payload mass, traverse long distances, and provide direct-to-Earth (DTE) communication.



Polaris


Diverse lunar payloads can be send to the Moon on Polaris for \$4.5M per kg payload.

For every kilogram, also 0.5 W of continuous power is provided, and 10 kbps of bandwidth.

Additional power and bandwidth are available for purchase upon request.

This price covers end-to-end delivery service, including but not limited to payload integration, launch, and surface operations.[1]




ASTROBOTIC *Technology's show room at Pittsburgh, Pennsylvania, USA*

References:

- [1] Astrobotic Technology, <https://www.astrobotic.com/>
- [2] chatGPT, edited and verified by J.J. Kehr
- [3] https://en.wikipedia.org/wiki/DHL_MoonBox

October 2023, Joachim J. Kehr, Editor Journal of Space Operations & Communicator
<https://opsjournal.org>