

Image ©Carnegie Mellon University

Suddenly everyone wants to go to the moon

For decades, it seemed like the world had lost interest in Earth's smaller companion. Now science has rediscovered the moon. Several landing missions are planned for the coming years. An American university is leading the way with a mini rover.

It seemed like the moon had lost its luster. After the end of NASA's program for manned missions to the moon in the early 1970s, the major aerospace agencies focused on other priorities: ISS, Mars, exploring the galaxy, to mention just a few. Now, after four decades, the moon is back in the spotlight. Countries such as China, Japan, and India have already conducted landings or are planning rover missions in the coming years. A small company might beat them to it.

Setting sights on Google's prize

Astrobotic Technology, a start-up based in Pittsburgh, USA, wants to send a lander and rover to the moon in the summer of 2016. A success of this mission would be a small sensation – the first private space mission to touch down on Earth's companion. Astrobotic would also win the Lunar X Prize, a competition initiated by Google. The grand prize of 20 million dollars goes to the first private company that lands a rover on the moon, moves it 500 m, and sends the images back to Earth. The deadline has been postponed several times and is now the end of 2016.

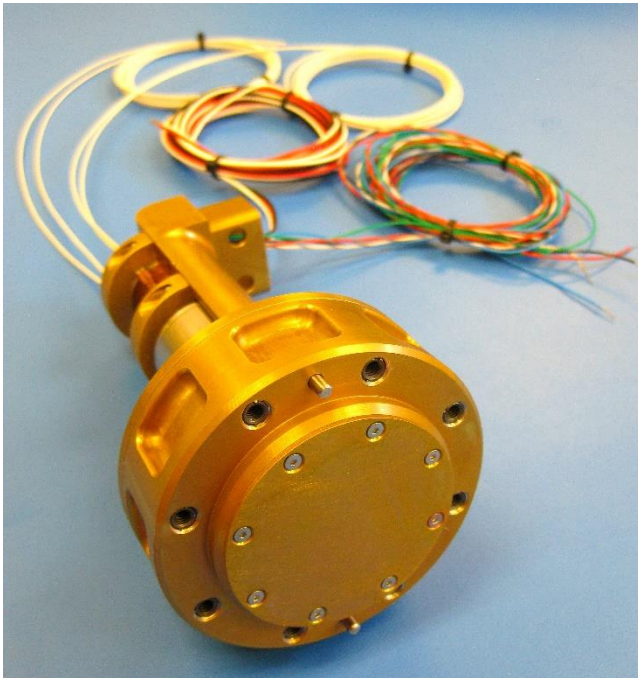
Astrobotic is a young company founded in 2008 by robotics specialist William "Red" Whittaker as a spin-off of the Robotics Institute at Carnegie Mellon University (CMU), with which it still cooperates closely. The company's long-term goal is to provide low-cost cargo transportation to the moon.

Rover looks for caves

On the first mission, Astrobotic's Griffin Lander will also bring the rover Andy to the moon's surface. The vehicle, which was built by a group of researchers and students at Carnegie Mellon University, is going to focus on the search for caves. Scientists believe that certain caves discovered on the moon might be entries to subterranean tunnel systems. Such systems would be ideal for future human bases, as they would provide protection from radiation, small asteroids, and temperature fluctuations.

In pole position

It remains to be seen whether Andy will win the Google prize. After all, Astrobotic is planning to have other Lunar X Prize candidates on board for the ride – provided they pay for their ticket on the lander. Negotiations are in progress. Mankind might therefore soon witness the first rover race on the moon. Currently Astrobotic and CMU are clearly in the pole position. This is evidenced by the three milestone prizes totaling USD 1.75 million that Google awarded in January 2015, in the categories of Landing, Imaging and Mobility. The teams had to demonstrate that their rovers function under vacuum conditions and in the harsh environment of the moon. The rover Andy impressively showcased these abilities in many tests.



The brushless EC-4pole 22 used in Andy is a true powerhouse. The rotor has two pole pairs for very high power density and high torque. The motor is combined with the planetary gearhead GP 32 HD, which was developed specifically for use under harsh environmental conditions. On the left: the compact assembled drive unit. Image ©Carnegie Mellon University

During the nine-month development of Andy, the developers and students at Pittsburgh University focused on building a rover that is economical and practical, using standard components wherever possible. The four wheels will be driven by brushless maxon EC 4-pole motors with GP 32 HD planetary gearheads. "This combination gives us more than enough torque to conquer any obstacles," says Jon Anderson, a Robotics Masters student at CMU and technical director of the Andy project. To withstand the conditions in space, small modifications were made on the drives, for example to the lubricant and the switch boards. The team values maxon motor's extensive experience with space projects. Anderson says: "It makes our job easier. There are so many obstacles to overcome on the way to the moon, so it's nice to have a reliable partner like maxon to solve our motor problems."

Rover Andy

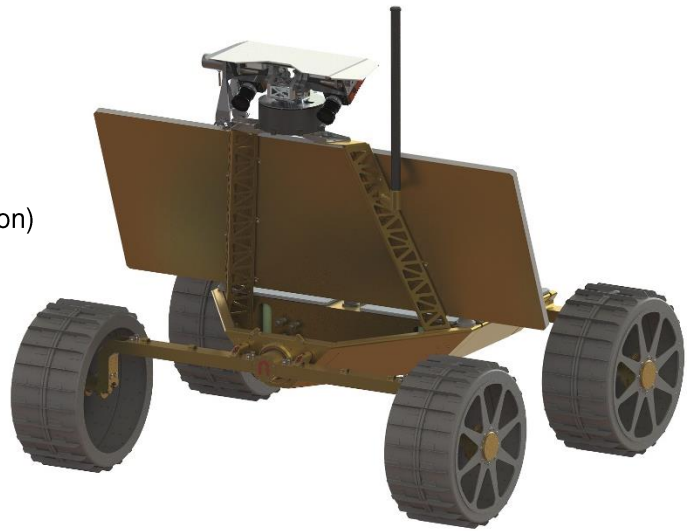
Size: 102 cm

Dimensions: 33 kg (weighs only about 5 kg on the moon)

Velocity: 18 cm/sec

Max. inclination: 30°

Max. size of obstacles: 15 cm



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