Astrobotic Selected for NASA Award to Develop Sensor for Precise Planetary Landings

Astrobotic’s precision landing sensor will unlock compelling new destinations on the Moon for science, exploration, and commerce.

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Pittsburgh, PA – NASA’s Space Technology and Mission Directorate (STMD) announced today the selection of Astrobotic for a “Tipping Point” award to develop a novel terrain relative navigation (TRN) sensor for precise lunar landings. This sensor will enable spacecraft to land with unprecedented precision at the most challenging and promising scientific and economically compelling destinations on the lunar surface, such as lunar skylights and the ice-rich poles of the Moon.

Astrobotic will lead a public-private partnership team that includes Moog Space and Defense, Moog Broad Reach, NASA Jet Propulsion Laboratory (JPL), and NASA Johnson Space Center (JSC) to develop a commercial TRN and visual velocimetry sensor for lunar and planetary landers. The sensor will provide real-time vision-based navigation measurements, enabling a spacecraft to autonomously land within 100 meters of any destination on a mapped planetary surface. This level of precision is orders of magnitude better than conventional landing systems.

“Most terrestrial robotic systems rely on GPS for precise navigation. Since GPS is not available at the Moon and other planets, we are developing a sensor that uses on-board cameras and computer vision algorithms to detect features on the lunar surface and match these features to onboard maps. Robust, high-speed image processing allows us to accurately determine the position of a spacecraft as it descends towards the surface,” said Kerry Snyder, the project technical lead at Astrobotic.

In addition to the sensor hardware and software development, the team will develop two critical tools needed to make TRN a multi-mission commercial product: a fast, high-fidelity lunar landing camera simulator to test the TRN sensor hardware and software, and an accurate and precise lunar map generator. This is especially important at areas of the lunar poles where sweeping shadows cause the visual landscape to vary dramatically over the course of a lunar day. These tools will allow Astrobotic to provide precision landing for any landing site, at any time during the lunar day.
Concept of operations for Astrobotic terrain relative navigation sensor

Astrobotic’s terrain relative navigation sensor will enable precise lunar landings with its Peregrine Lunar Lander
“Our TRN solution for precision lunar landing will allow missions to target and land in the most scientifically and economically compelling locations on the Moon. This selection by NASA STMD will allow us to develop this novel capability in a reliable and affordable package for nearly any landed lunar mission,” said Fraser Kitchell, Director of Astrobotic's Future Missions and Technology department.

The Astrobotic team will test the sensor as a technology demonstration on the company’s commercial lander, Peregrine. The flight demonstration will prove the technology for infusion into high-priority NASA and commercial missions.

“Precision landing with TRN will give our customers unprecedented access to the Moon, unlocking compelling new destinations for science, exploration, and commerce. This proposal selection and technology development is a win for NASA and for our lunar payload customers around the world,” said John Thornton, CEO of Astrobotic.

About Astrobotic:

Astrobotic Technology, Inc. is a lunar logistics company that delivers payloads to the Moon for companies, governments, universities, non-profits, and individuals. The company’s spacecraft accommodates multiple customer payloads on a single flight, offering flexibility at an industry-defining low price of $1.2 million per kilogram. Astrobotic is an official partner with NASA through the NASA Lunar CATALYST program, has 28 prior and ongoing NASA contracts, a commercial partnership with Airbus DS, a corporate sponsorship with DHL, 12 deals for its first mission to the Moon, and 130 customer payloads in the pipeline for upcoming missions. Astrobotic was founded in 2007 and is headquartered in Pittsburgh, PA.