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COMMERCIAL PAYLOAD DELIVERY TO THE LUNAR SURFACE ON ASTROBOTIC TECHNOLOGY'S INITIAL MISSIONS

Abstract

Researchers are now able to purchase lunar delivery services on a by-the-kilogram basis on expeditions operated by Astrobotic Technology Inc., utilizing the robotics expertise of Carnegie Mellon University. The company has signed a commercial contract for launch to lunar trajectory on a Falcon 9 from SpaceX, expected as early as December 2013. This robust vehicle's capabilities enable the delivery of 110 kg of payloads for space agencies, universities, and corporations. In addition, a 100-kg rover on the expeditions provides mobility for select payloads and off-board views of payloads that remain on the lander. Payloads receive both delivery to the surface and essential utilities, such as power, thermal regulation and communications to Earth. The initial expedition will land near an equatorial Apollo site, and will be able to inspect the descent module to determine the weathering effects of the lunar environment. The second expedition in July 2015 will land at the south pole to prospect for volatiles in periodically illuminated regions where the frozen water, methane, ammonia and other compounds may be covered by 10-30 cm of dry soil. Astrobotic has a $10 million contract from NASA to furnish engineering data from its initial mission, with emphasis on precision landing within 100 meters of its aim point and the ability to avoid hazards. Software and sensing for this task is being adapted from the Carnegie Mellon University autonomous vehicle that won the DARPA Urban Challenge for its ability to navigate city traffic without a driver. In addition to delivering payloads, the initial mission is intended to win up to $24 million in the Google Lunar X Prize. Other activities include conducting art and music initiatives as well as promoting corporate sponsors.