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CUBEROVER: AN ENABLING TECHNOLOGY FOR PLANETARY EXPLORATION

Abstract

CubeRovers are a series of lightweight planetary rovers built to survive the harsh environment of planets and our Moon. The purpose of the CubeRover platform is to develop and deliver a small rover that can serve as a platform to standardize and democratize planetary surface mobility, analogous to the transformation that CubeSats brought to the domain and economics of Low Earth Orbit. This abstract details the path to flight that the team intends to follow in order to deliver a CubeRover to customers for infusion into a lunar mission.

If successful, CubeRover stands to provide users with more access to the Moon than ever before. Countries, organizations, and universities would have affordable access to mobility platforms capable of exploring the surfaces of other worlds for the first time. The standardized format of CubeRovers will drive the space community to commoditize systems, components, and instruments, lowering costs while increasing functionality. Advancements to date have focused on the development of system design and requirements, as well as a concept of operations for a scientific mission. An engineering prototype robot has been built and is undergoing testing in preparation for a Preliminary Design Review.

Akin to the CubeSat revolution that standardized satellite development and pioneered low cost access to space-based data, CubeRovers are positioned to pioneer planetary exploration through standardization and at a fraction of historical costs. The form factor of a CubeRover is cross-compatible with many CubeSat parts, facilitating installation and interchange of components if desired. The CubeRover design is modifiable and scalable to support hosted payloads with minimal system changes. The CubeRover team has already engaged with large commercial and government entities to validate the platform for proposed applications.

CubeRover has been awarded a United States Small Business Innovation Research (SBIR) Phase I contract that has been successfully completed with guidance and expert support from Carnegie Mellon University and NASA Kennedy Space Center.

Separate from physical hardware sales, CubeRover plans to offer data as a service for users interested in procuring existing data without the cost of purchasing a rover. This data will be captured by the rover and communicated down through the lunar or planetary lander platform. Some of these market segments include, but are not limited to, 3-D terrain mapping, radiation and temperature sampling, in-situ resource utilization, and seismographic measurements.