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STUDY OF SMALL PAYLOAD TYPES FOR COMMERCIAL LUNAR PLATFORMS

Abstract

As space agencies around the world look to smaller missions for scientific investigations, commercial lunar delivery service stands ready to enhance this approach, and increase small science instrument utility. By utilizing a modular spacecraft to carry multiple science payloads on a single mission to the Moon, commercial lunar delivery is enabling new payload classes in cis-lunar space for both established and emerging space agencies.

For instance, multi-unit CubeSats could offer significant scientific return in the lunar vicinity, but CubeSat propulsion limitations have prevented their deployment in lunar orbit. Deployment on a commercial lunar delivery mission could offer CubeSats a regular opportunity for investigations well beyond Earth orbit. Additionally, small rovers on the order of a few tens of kilograms with distributed communication assets on the lunar surface could enable groundbreaking science investigations in lunar caves. The size of such surface payloads has been difficult to justify under existing planetary mission paradigms, but the low cost and modular nature of commercial lunar delivery is changing the art of the possible in cis-lunar space.

Commercial lunar delivery allows the space science community to take advantage of the miniaturization trends already seen in Earth orbit, and extend them to the Moon. This paper will offer a technology study of small and medium payload types that could be sent to the Moon under this model, along with an outline of compelling science questions that could be pursued using commercial lunar delivery. With both of these perspectives in mind, commercial lunar delivery could offer an important development for small and medium sized missions in support of the scientific community. Ultimately, this model will be an important consideration for formulating requirements on future space science missions.