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JPL's Planetary CubeSat Missions in Implementation: MarCO, Lunar Flashlight, and NEA Scout

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JPL is currently developing three planetary CubeSat missions to launch in the near future to Mars, the Moon, and a Near Earth Asteroid. Mars CubeSat One (MarCO) would become the first interplanetary CubeSat, currently slated to launch with the NASA InSight Mars lander in March of 2016. MarCO is designed to provide real-time relay of InSight's Entry, Descent, and Landing (EDL) telemetry to complement recorded and replayed data from MRO. In addition to MarCO, JPL is designing the flight systems for Lunar Flashlight and NEA Scout, developed jointly with the NASA Marshall Space Flight Center to be launched on the first uncrewed mission of the Space Launch System (SLS) in 2018. Lunar Flashlight would use a solar sail developed at the NASA Marshall Space Flight Center to achieve a lunar orbit and reflect sunlight into permanently shadowed regions of the Moon. Using the reflected photons and a simple spectrometer, Lunar Flashlight would be capable of mapping lunar volatiles, including water ice, at the lunar south pole. Lead by Marshall Space Flight Center, NEA Scout would use the same solar sail and JPL-developed deep space nano-spacecraft bus as Lunar Flashlight. NEA Scout would optically characterize a Near-Earth Object during a slow (<20 m/s) and close (<1 km) flyby. All three missions leverage technology and procedures developed for the JPL Interplanetary Nano-Spacecraft Pathfinder in a Relevant Environment (INSPIRE) mission, which has completed development and is currently awaiting launch.