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LUNIR: A CUBESAT SPACECRAFT PERFORMING ADVANCED INFRARED IMAGING OF THE
LUNAR SURFACE**Abstract**

As a part of NASA's NextSTEP program, thirteen CubeSats will fly along on the launch of the Orion spacecraft on Exploration Mission-1. Their mission is to collect scientific data to help solve Strategic Knowledge Gaps (SKGs) that NASA uses to represent gaps in knowledge for future exploration missions to the moon, Mars and beyond.

Lunar InfraRed (LunIR) is one of those CubeSats, and will be using a new, compact mid-wave infrared sensor payload to scan and image the surface as it flies over the moon. Lockheed Martin Space (LMS) is investing research and development funds for the LunIR mission supporting a public-private partnership with NASA. The LunIR 6U bus is designed, integrated, and operated by Tyvak Nanosatellite in Irvine, California under contract to LMS. LMS is providing project management and oversight as well as leading the mission integration effort for LunIR with the NASA secondary payload office at Marshall Space Flight Center under the NextSTEP contract. The payload was developed by the Lockheed Martin Optical Payload Center of Excellence in Palo Alto, California and includes an advanced infrared imaging sensor from Lockheed Martin Santa Barbara Focalplane and a micro-cryocooler from the Lockheed Martin Advanced Technology Center.

This paper will detail the planned mission trajectory and operation, the infrared sensor, the 6U spacecraft, and the launch integration plans for this ambitious mission as the team works to extend the reach of CubeSats in the solar system. By the time of the 2019 International Astronautical Congress, the IR sensor will be integrated into the spacecraft, testing will be complete, and the space vehicle awaiting the SLS flight in 2020.