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# CONCEPT FOR A CREWED LUNAR LANDER OPERATING FROM THE LUNAR ORBITING PLATFORM-GATEWAY

**Abstract**

Mars Base Camp is Lockheed Martin's vision for sending humans to Mars, with the key aspects of operations from an orbital base camp, building on a strong foundation of today's technologies, scientific exploration as the cornerstone of the missions, a reusable lander/ascent vehicle, and Orion and Orion systems as the core and command deck of the vehicle.

Lockheed Martin is also working with NASA on the development of the Lunar Orbiting Platform-Gateway. It would be positioned in the vicinity of the Moon and allow astronauts to demonstrate they can operate for months at a time well beyond Low Earth Orbit. The Gateway is evolvable, flexible, and modular, and is a precursor and demonstration mission directly on the path to Mars.

Orion is a highly capable vehicle with unique features designed to meet deep space environments and keep crew members safe. The investments made in Orion can be leveraged to reduce the cost, complexity and development timeline for new crewed vehicles. The -Gateway and Mars Base Camp can be designed to utilize the redundancy, performance, and safety built into Orion.

LM has a long history of designing, building, and operating planetary landers going back to Viking, including this year's InSight launch to study Mars' interior structure to answer key questions about the early formation of rocky planets.

With the direction to enable long term deep space exploration, lunar exploration systems can't be point solutions for the moon. Just as ISS is preparing us for deep space, lunar activities will prepare us for Mars. This paper will discuss the conceptual design, concept of operations, systems based on Orion, propulsion system trades, and the direct tie to Mars entry-descent and landing.