

Enabling Science and Exploration Objectives with Lunar Services

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Abstract: As part of the Artemis era of space exploration, space agencies will be working together with their industry partners to establish systems and infrastructure that enable sustained lunar missions and develop capabilities for Mars. The planning for this next phase is possible now that Orion and the Space Launch System are about to perform their initial missions together, the initial Gateway elements are in design and production, and the set of regular lunar robotic landing missions from a diversity of countries and companies has begun. Each mission to the lunar surface, both crewed and robotic, offers the opportunity to perform new scientific investigations and demonstrate new technologies and operations. And the barrier of entry for these investigations can be lowered with the delivery of systems that can provide power, communications, and mobility services for these missions.

For this presentation, we will discuss how various lunar science and exploration objectives can be enabled by power, communications, and mobility services. A list of objectives that are being established for the Artemis program will be shown, along with an analysis of the kinds of capabilities that other systems can provide as a service to enable achieving those objectives. Also, the capabilities of several systems that are under development will be discussed, and how those capabilities can be provided as a service. These systems include vertical solar array technology (VSAT), mobility vehicles, and communication satellites. This infrastructure will be a key aspect in supporting growing capabilities on the lunar surface, lowering the barrier of entry, and both enabling the Artemis missions and providing the basis for a lunar economy.

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