THE LUNAR SURFACE INNOVATION CONSORTIUM: YEAR IN REVIEW AND PATH FORWARD.
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Introduction: The Lunar Surface Innovation Consortium (LSIC) was established by NASA's Space Technology Mission Directorate and is managed by the Johns Hopkins Applied Physics Laboratory. The primary goal of LSIC is to bring together universities, nonprofit institutions, commercial companies, NASA, and other government agencies to advance technologies and overcome challenges involved in establishing a sustained presence on the Moon. LSIC consists of four Capability Areas, all of which aim to enable a sustained presence on the surface of the Moon, including fostering communication within and between members of the community:

- In-Situ Resource Utilization (ISRU) advances technologies for the collection, processing, storing, and use of material found or manufactured on the Moon;
- Excavation & Construction (E&C) evaluates technologies that enable affordable, robust, autonomous manufacturing and construction on the lunar surface;
- Surface Power (SP) addresses the technologies for generating, distributing, and storing power on the lunar surface; and
- Crosscutting Capabilities (CC) focuses on the topics, technologies, and capabilities needed to enable a functional infrastructure to support a sustained presence in the harsh lunar environment.

LSIC Workshops: In July 2025, the ISRU group hosted the ISRU Testing, Interfacing, and Funding Workshop, which covered technology maturation, testing regimes, and success stories from various non-lunar fields [1]. The workshop included discussions on standardizing interfaces for lunar infrastructure and exploring non-governmental funding opportunities for lunar technology development. Our key findings included: (1) the O2fR Collaborative Systems Interface Database continues to be a valuable resource to the lunar ISRU community; (2) the coordination of testing facilities and capabilities into a network can enhance testing efficiency, enable shared resources, and facilitate interdisciplinary collaboration; and (3) the future of lunar exploration will rely on government leadership to drive large-scale lunar infrastructure development.

In September 2025, the E&C group hosted the Maintenance and Repair for Sustainable Lunar Surface Infrastructure Workshop, which explored the critical role of maintenance and repair of lunar infrastructure, including landers and rovers [2]. The meeting drew relevant knowledge from extreme terrestrial environments and applications, such as mining operations. Major takeaways included incorporating maintainability and repairability early in the design phase, and that digital engineering approaches, resource management, and integrative testing will be required to advance maintenance and repair on the lunar surface.

In September 2025, the SP group hosted the Lunar Power Applications at Varying Scales Workshop, which explored applications on the lunar surface for power at low (~1 kW), medium (10s kW), and high (50+ kW) demands [3]. Content also included discussions of power architectures and ConOps for meeting the needs of such applications. A prominent takeaway from this workshop was that high-power infrastructure must be supported with phased maturation, beginning with small demonstations and expanding to interconnected nodes and regional grids. Furthermore, power infrastructure will rely on interoperability and standards for components like connectors, voltages, and interfaces.

Also in September 2025, APL hosted the commercial community to discuss the Lunar Infrastructure Technologies (LIT) campaign [4] and receive feedback to inform the campaign's approach. Many participants were emphatic that the campaign was viable and urgently needed, and that NASA should act now or risk a decrease in U.S. commercial interest in a long-term presence on the Moon. Core objectives included: co-locating multiple assets at a high-value lunar site, demonstrating interoperable communications and positioning/navigation/timing, distributing and sharing power across landers and payloads, and enabling mobility between assets. There was a resounding call during this working session for NASA to lead the nation in delivering the first-ever moon base for a new era of exploration.

Crosscutting Activities: The Crosscutting Capabilities group contributed to the LSIC Workshops and coordinated several joint telecons with the other three capability areas, ensuring cross-talk within the LSIC community, and highlighting the need to remove stovepipes between our groups and within the lunar technology development community. The joint CC-ISRU meeting focused on reduced gravity testing, the joint CC-E&C meeting focused on lunar habitats, and the joint CC-SP meeting focused on radiation hardening and cryogenic effects. Furthermore, a joint telecon between all four capability areas emphasized the need to ensure the supply and demand of resources is well-matched in order to enable a sustained presence.

This Year: Over the next year, LSIC's capability areas will direct their efforts toward surface sustainability and logistics, ensuring that interoperability, reliability, and maintainability are woven into all future LSIC activities. We continue to invite participation in these activities through active involvement with the capability areas, and are excited to continue engaging with the lunar resources community in 2026.

References:

[1] ISRU Testing, Interfacing, and Funding Workshop: https://lsic.jhuapl.edu/Events/Agenda/index.php?id=624.

[2] E&C Maintenance and Repair for Sustainable Lunar Surface Infrastructure Workshop: https://lsic.jhuapl.edu/Events/Agenda/index.php?id=614.

[3] SP Lunar Power Application and Varying Scales Workshop: https://lsic.jhuapl.edu/Events/Agenda/index.php?id=638.

[4] Lunar Infrastructure Technologies Working Session: https://lsic.jhuapl.edu/Events/Agenda/index.php?id=648.