National Aeronautics and Space Administration

Breakout Session: Technology and Infrastructure

STMD's Investments Support Later Segments

Human Lunar Return

Initial capabilities, systems, and operations necessary to re-establish human presence and initial utilization on and around the Moon.

Foundational Exploration

Expansion of lunar capabilities, systems, and operations supporting complex orbital and surface missions to conduct utilization and Mars forward precursor missions.

Sustained Lunar Evolution

Enabling capabilities, systems, and operations to support regional and global utilization, economic opportunity, and a steady cadence of human presence on and around the Moon.

Future Segments

Humans to Mars

Initial capabilities, systems, and operations necessary to establish human presence and initial utilization on Mars and continued exploration.

Lunar Infrastructure Technology Investments

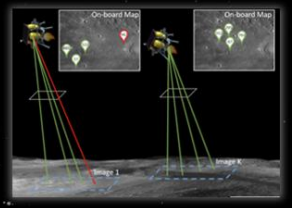
LI-1[L]: Develop an incremental lunar power MI-1[M] generation and distribution system that is evolvable to support continuous robotic/human operation and is capable of scaling to global power utilization and industrial power levels.

LI-2[L]: Develop a lunar surface, orbital, and Moon-to-MI-2[M] Earth communications architecture capable of scaling to support long term science, exploration, and industrial needs.

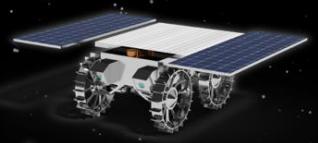
LI-3[L]: Develop a lunar position, navigation and MI-3[M] timing architecture capable of scaling to support long term science, exploration, and industrial needs.

LI-4[L]: Demonstrate advanced manufacturing and autonomous construction capabilities in support of continuous human lunar presence and a robust lunar economy.

Current STMD Investment Areas

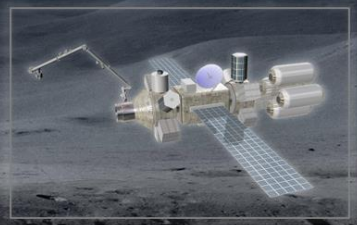


LI-5[L]: Demonstrate precision landing capabilities in support of continuous human lunar presence and a robust lunar economy.

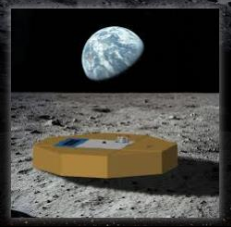


LI-6[L]: Demonstrate local, regional, and global surface transportation and mobility capabilities in support of continuous human lunar presence and a robust lunar economy.

LI-7[L]: Demonstrate industrial scale ISRU capabilities MI-4[M] in support of continuous human lunar presence and a robust lunar economy.



LI-8[L]: Demonstrate technologies supporting cislunar orbital/surface depots, construction and manufacturing maximizing the use of in-situ resources, and support systems needed for continuous human/robotic presence.

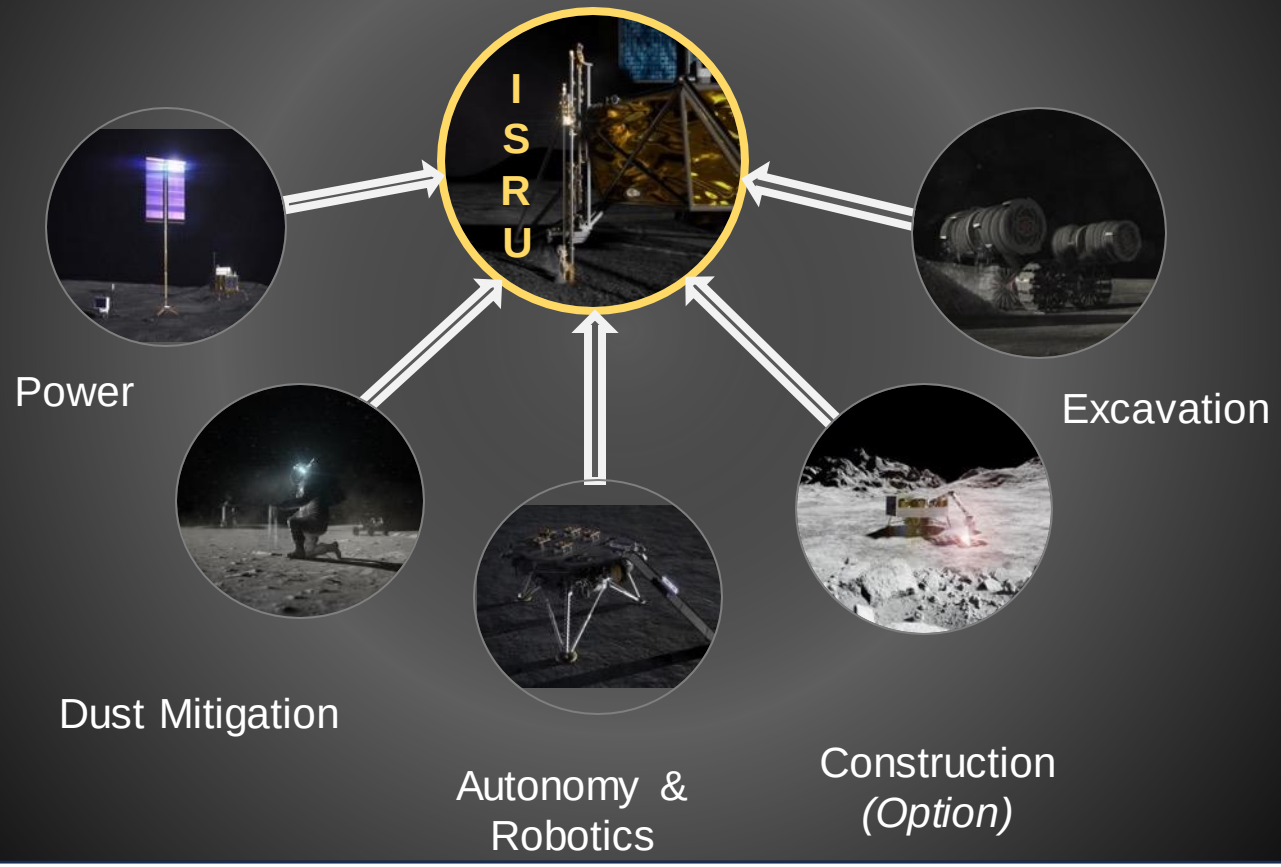


LI-9[L]: Develop environmental monitoring, situational awareness, and early warning capabilities to support a resilient, continuous human/robotic lunar presence.

Lunar Infrastructure Foundational Technologies (LIFT-1) RFI Status

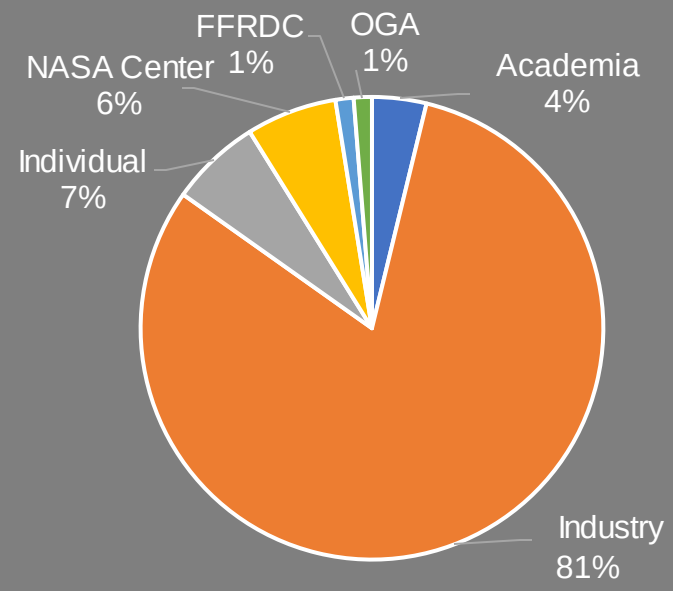
Demonstration of ISRU technologies to extract oxygen from lunar soil, to inform eventual production, capture, and storage.

79 Submissions from 73 Unique Organizations representing 21 US States and 8 Foreign Countries



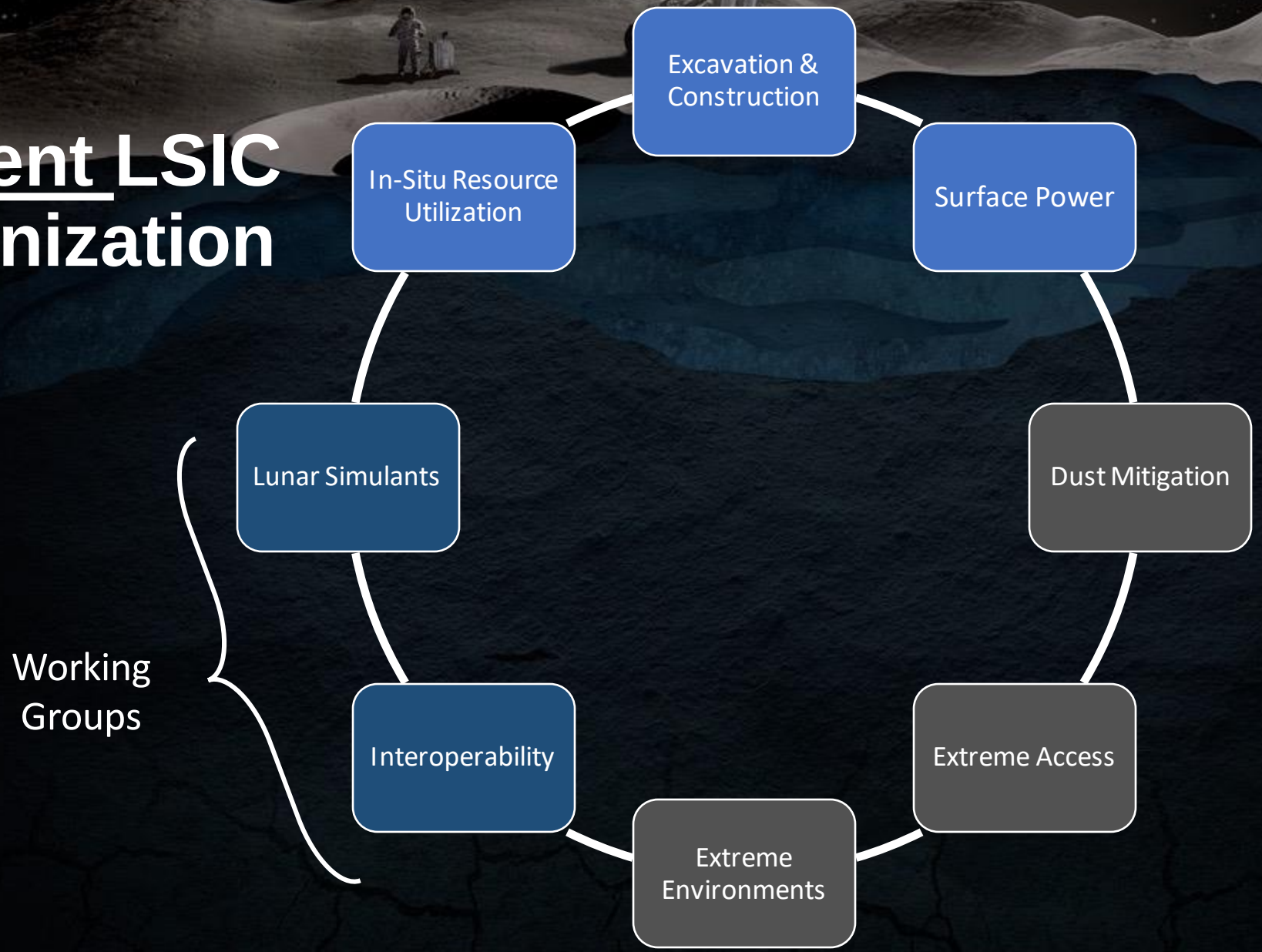
RFI Released 6 Nov 2023
RFI Responses Received 18 Dec 2023

Organization Type



Lunar Surface Innovation Consortium (LSIC)

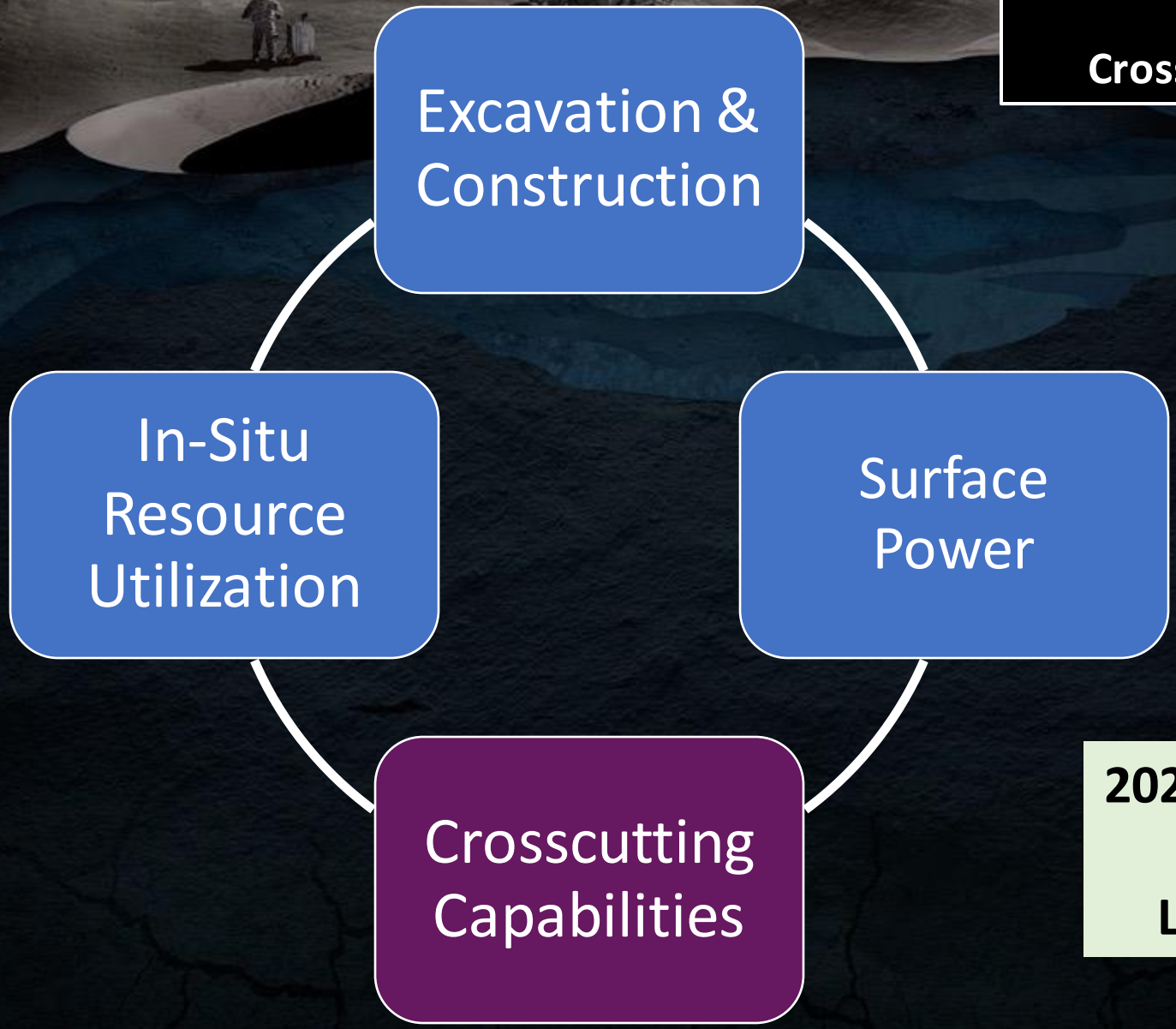
Current LSIC Organization



6 Focus Areas
+
2 Working Groups
+
32 Subgroups

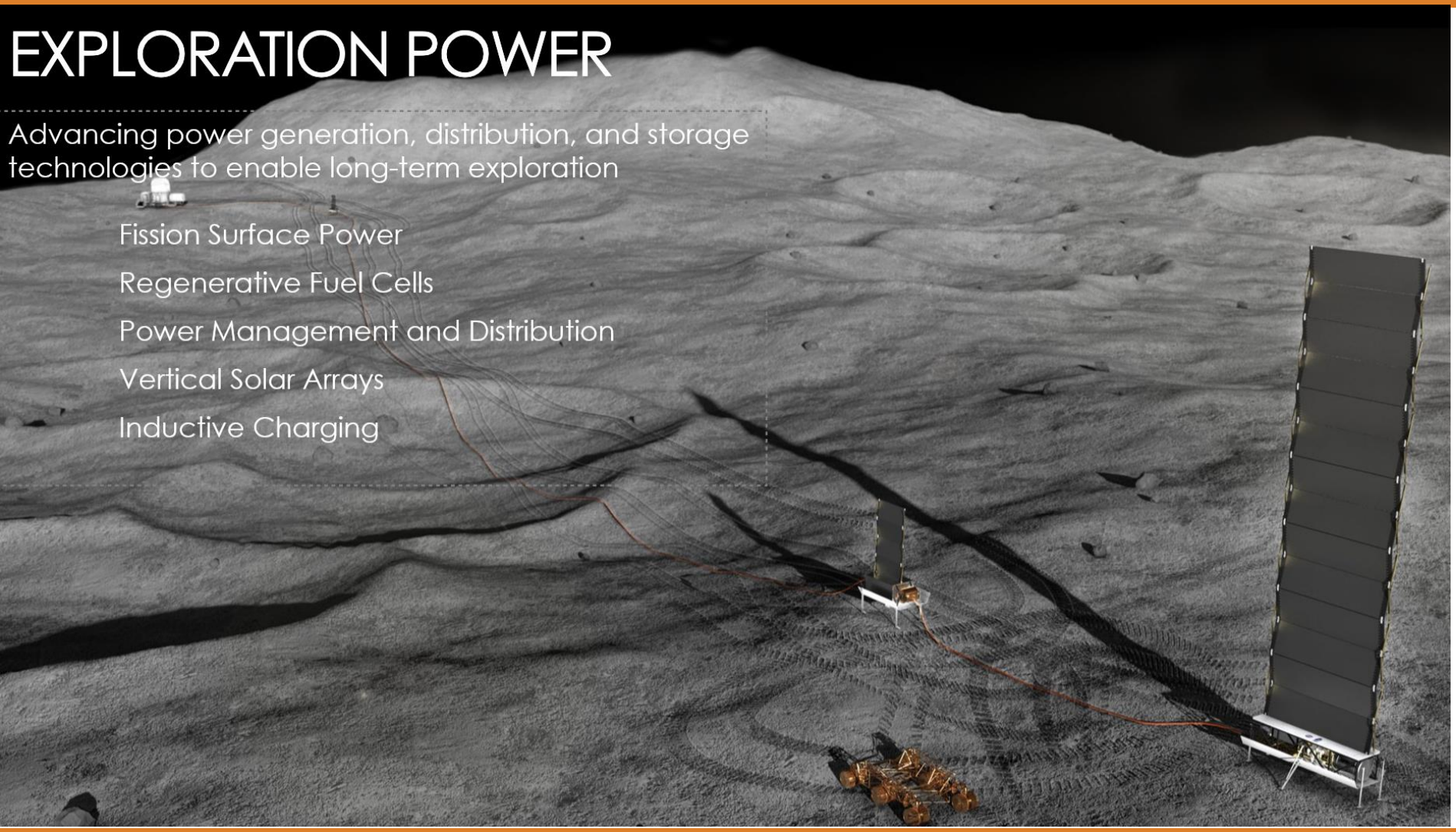
New LSIC Structure

3 Focus Areas
Crosscutting Capability Area



2024 Spring LSIC meeting
23-25 April 2024
Laurel, MD & Hybrid

Lunar Surface Power Investments



- Related to:

MARS SURFACE POWER GENERATION TECH

- Advanced Power Capability Review completed Aug 2023 (internal)
- Investments to enable LI-1, MI-1

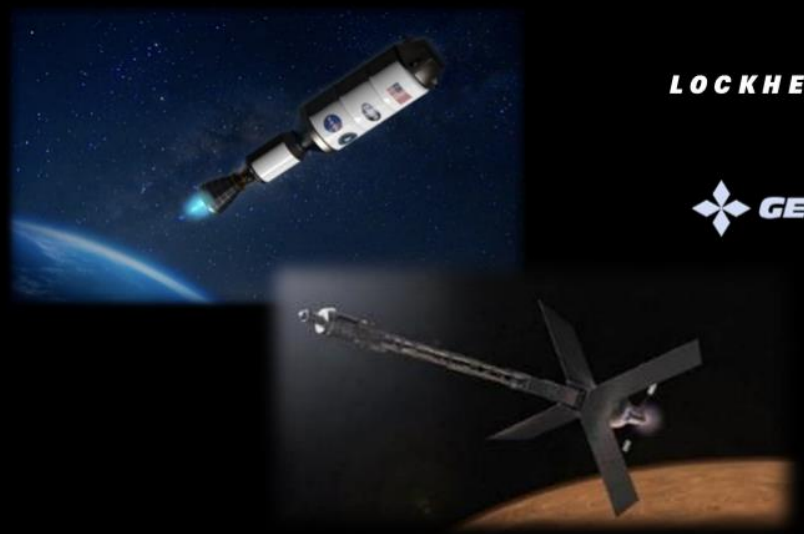
Nuclear Propulsion

- Provides a robust and reliable energy to human and scientific exploration missions
- Offers energy-dense systems with high ratios of power to mass and volume
- Shares a strong interest from industry and other government organizations for space transportation

Propulsion: Speed, Maneuverability, Resiliency

- High-thrust gravity maneuvers
- Rapid cis-lunar transit
- Robust transportation for Mars human exploration
- Higher value deep-space science missions

Interagency Commonality



Industry Engagements

LOCKHEED MARTIN

USNC
ULTRA•SAFE•NUCLEAR

GENERAL ATOMICS

BWXT
BWX Technologies, Inc.

STMD 2024 Role in Architecture Development

- Supporting Objectives Decomposition
- Participating in virtually all SAC24 tasks: coordination, SME analysis
- Significant role in Mars Surface Power Technology Decision activity
- Working gap prioritization processes across the architecture
- Leading task to define and document technology on-ramp strategies