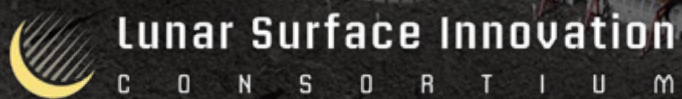


LSIC Surface Power Telecon

February 22nd, 2024

Begins at 11:03



Samantha Andrade, Dr. Sean Young
Jacob Gehrett, Dr. Joseph Kozak, Julie Peck

Johns Hopkins Applied Physics Laboratory
Space Exploration Sector

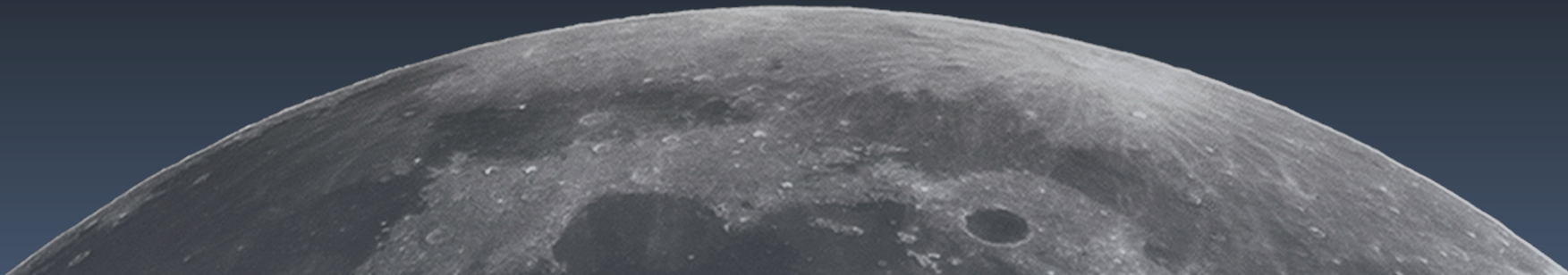
LSIC Surface Power Facilitator POC: samantha.andrade@jhuapl.edu

Community Updates:

- SP End-of-the-Year Survey Highlights
- LOGIC
- Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR) Solicitations
- Conferences/Workshops/Telecons
 - Upcoming 2024 Surface Power Telecons
- LSIC Organization Change Overview

Today's Topic: *"Hybrid Switched Capacitor Converter with WBG Devices for Medium Voltage DC Transmission in Space Environments"*

- Dr. Jason Neely (Sandia National Laboratories)
- Dr. Bob Kaplar (Sandia National Laboratories)



What theme would you be most interested in being the focus of a ~0.5-1 day long virtual workshop in 2024?

Responses include:

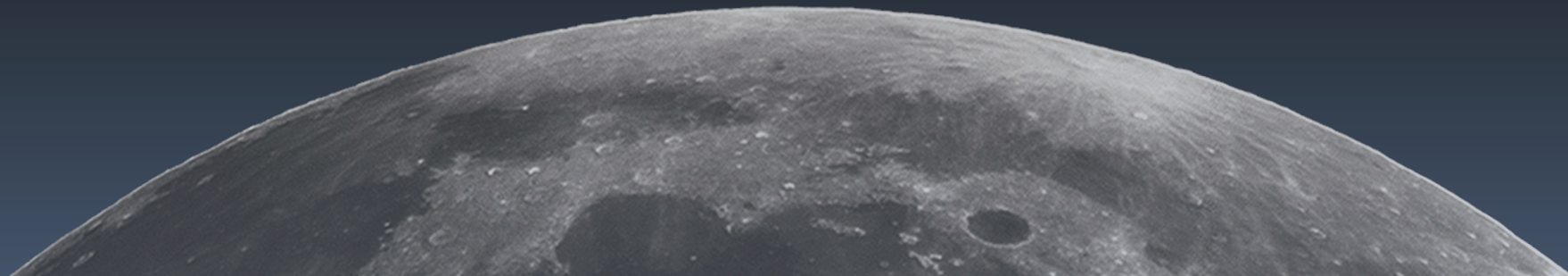
- Lunar Surface Power Interoperability Standards
- Autonomous Power System Control and Monitoring
- Step-wise power architecture roadmap
- Dust and Surface Power
- Lunar Environment and Reactor Shielding
- *And many more!*

What technology gap is the biggest, and in critical need of additional attention and investment?

Responses include:

- Grid-scale storage (Regenerative Fuel Cells)
- Low-Temperature Batteries
- Fission Surface Power (FSP)
- Rad-hard Electronics
- Transmission Cables

~70% of responses indicate they would benefit from a more developed networking feature within the LSIC web resources



LSIC | LOGIC Sign Up

The Lunar Operating Guidelines for Infrastructure Consortium (LOGIC) is a catalyst for developing a set of guidelines and standards that enable lunar interoperability.

- LOGIC Kickoff Meeting was on January 23rd
- First LOGIC Working Group Meeting is:
Tuesday, March 12th from 1:00-2:00pm EST
- To attend, you need to be a member of LOGIC to receive Zoom details (no advance registration is required)
<https://logic.jhuapl.edu>

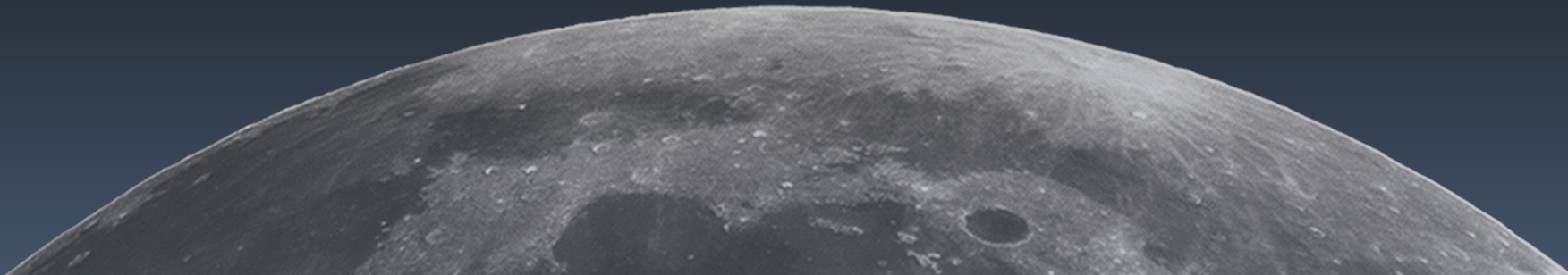


Due March 11 at 5pm ET - [link](#)

- S13.06: Dynamic Power Conversion
 - High-Efficiency Power Conversion Technologies
- Z1.05: Lunar and Planetary Surface Power Management and Distribution
 - Radiation-Tolerant, High-Voltage Power Components for Lunar and Mars Missions
 - Low-Mass, Highly Conductive Power Transmission Cables for Lunar and Mars Missions
 - Wireless Power Beaming for Lunar and Mars Missions
- Z1.09: Energy Storage for the Lunar/Mars Surface
 - Advanced Secondary Batteries
 - Regenerative Fuel Cell Systems
- Z12.03 Space Resource Processing for Consumables, Manufacturing, Construction, and Energy
 - Lunar ISRU for Energy Generation and Storage
- H5.01 Lunar Surface 50 kW-Class Solar Array Structures
 - Deployable/Retractable solar arrays

Due March 11 at 5pm ET - [link](#)

- T3.04 Advanced Low-Temperature Secondary Batteries
 - Advanced Low-Temperature Secondary Batteries
- T7.05 Climate Enhancing Resource Utilization
 - Sustainable Production of Hydrogen for Transportation and Energy Storage Applications



Check out our website! <https://lsic.jhuapl.edu/Resources/Funding-Opportunities.php>

Funding Opportunities

[Tech Development Opportunities](#) [Future Solicitations and Opportunities](#)

Future Solicitations and Opportunities

Upcoming solicitation release dates are pending and are subject to change.

[Who Let the Gas Out?: NASA Tank Venting in Microgravity Challenge »](#)

Release: 11 October 2023; Close Date: 22 February 2024

[2024 NASA Innovative Advanced Concepts - Phase II »](#)

Release: Mid-November 2023; Selections Announced: Late March 2024

[ROSES 2024 F.15 Economic, Social, and Policy Analyses of Orbital Debris and Space Sustainability »](#)

Release: 14 February 2024; Solicitation Due Date: 17 May 2024

[NASA SBIR Ignite Phase II »](#)

Release: 9 January 2024; Selections Announced: TBA

[2024 NASA Innovative Advanced Concepts - Phase III »](#)

Release: Early February 2024; Selections Announced: Mid-June 2024

[Space Technology Research Institutes »](#)

Release: May-June 2024; Selections Announced: TBA

[Tech Development Opportunities](#) [Future Solicitations and Opportunities](#)

Tech Development Opportunities

[NASA Innovative Advanced Concepts \(NIAC\) Phase II »](#)

Appendix NNN24ZTR001N-24NIAC-A2 seeks NIAC Phase II awards that will continue the exploration and development of revolutionary advanced concepts started through a NIAC Phase I award. While the Phase I study establishes basic feasibility and clear potential benefit, the Phase II study extends, refines, and builds upon this foundation. Phase II studies address key remaining unknowns, assumptions, risks, and paths forward. This should explicitly include cost, performance vs. alternatives, development steps and associated schedule, and key enabling technologies. These results aim to provide a sound basis for NASA to consider the concept for further development and a future mission, substantiated with a description of applicable scientific and technical disciplines necessary for development.

[NASA Seeks Development of Universal Payload Interface \(Universal Payload Interface Challenge\) »](#)

Registration deadline: February 1, 2024, at 5pm ET Application deadline: February 22, 2024, at 5pm ET

[SBIR/STTR Phase I »](#)

Proposal due date of March 11, 2024

[Early Career Initiative »](#)

Concept Slides Due: January 19, 2024; Draft Proposal Due: February 16, 2024; Video & Final Proposal Review: March 12, 2024 (tentative); Proposals Due to HQ: March 15, 2024 (5:00 PM ET)

[Aqualunar Challenge »](#)

The Aqualunar Challenge is calling innovators to create innovative technologies for use on the Moon to remove contaminants found in lunar water. Due Date: 3pm BST 8 April 2024

[Fission Surface Power Advanced Closed Brayton Convertor \(FSP-ACBC\) system" as an Appendix to the Space Technology Mission Directorate \(STMD\) NASA Research Announcement \(NRA\), titled "Space Technology Research, Development, Demonstration, and Infusion »](#)

Inactive Date: Jul 01, 2024

LSIC | IM-1 Odysseus Landing TODAY!!!



- Landing will be the first accomplished by a private company, and the first American landing since Apollo
- Landing is expected to be no later than **5:30 EST today, Feb 22**. You can tune in on NASA and Intuitive Machine webcasts.

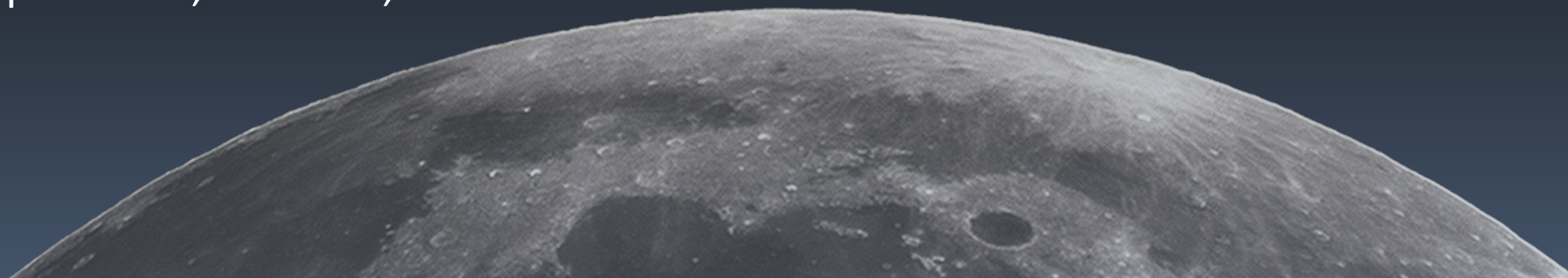


LSIC | Upcoming Meetings and Workshops



- **IEEE Aerospace Conference**
March 2-9, Big Sky, MT
- **LSIC 2024 Spring Meeting**
April 23-25, Laurel, MD (hybrid)
- **Lunar and Planetary Science Conference**
March 11-15, The Woodlands, TX
- **Nuclear and Emerging Technologies for Space (NETS)**
May 6-10, Santa Fe, NM
- **LOGIC Working Group Meeting**
March 12, virtual
- **IEEE Energy Conversion Conference & Expo (ECCE)**
Papers due March 8th
(Held October 20-24, Phoenix, AZ)
- **Space Power Workshop (SPW)**
April 23-25, Torrance, CA

Check out the LSIC website for a more complete calendar and email for additional events!





SAVE THE DATE

LSIC 2024 Spring Meeting | April 23 – 25

*Johns Hopkins Applied Physics Laboratory,
Kossiakoff Center, Laurel, MD (hybrid)*



This spring, our focus is engaging our community on how to get back to the Moon together including NASA's plans and updates, infusion paths, partnerships, current technology investments, and more!

Registration opens
February 16th

Abstract Portal open until
March 1st



Lunar Surface Innovation

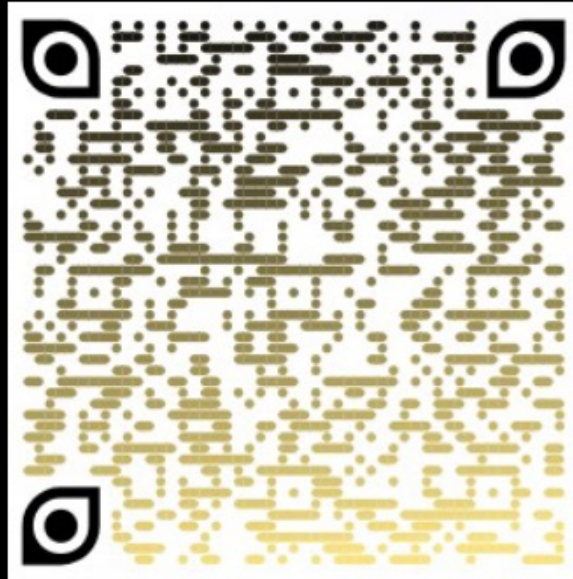
C O N S O R T I U M

LSIC 2024 Spring Meeting **ATTENTION STUDENTS**

Apply to be considered for free in person registration!

This sponsorship will include covered registration fees and an opportunity to meet with NASA STMD leadership. Through this opportunity, enthusiastic students will have the chance to interact with the lunar technology community and gain first-hand knowledge of deployed technologies needed for the current and future lunar surface exploration.

Applications will be open
February 1st – March 1st

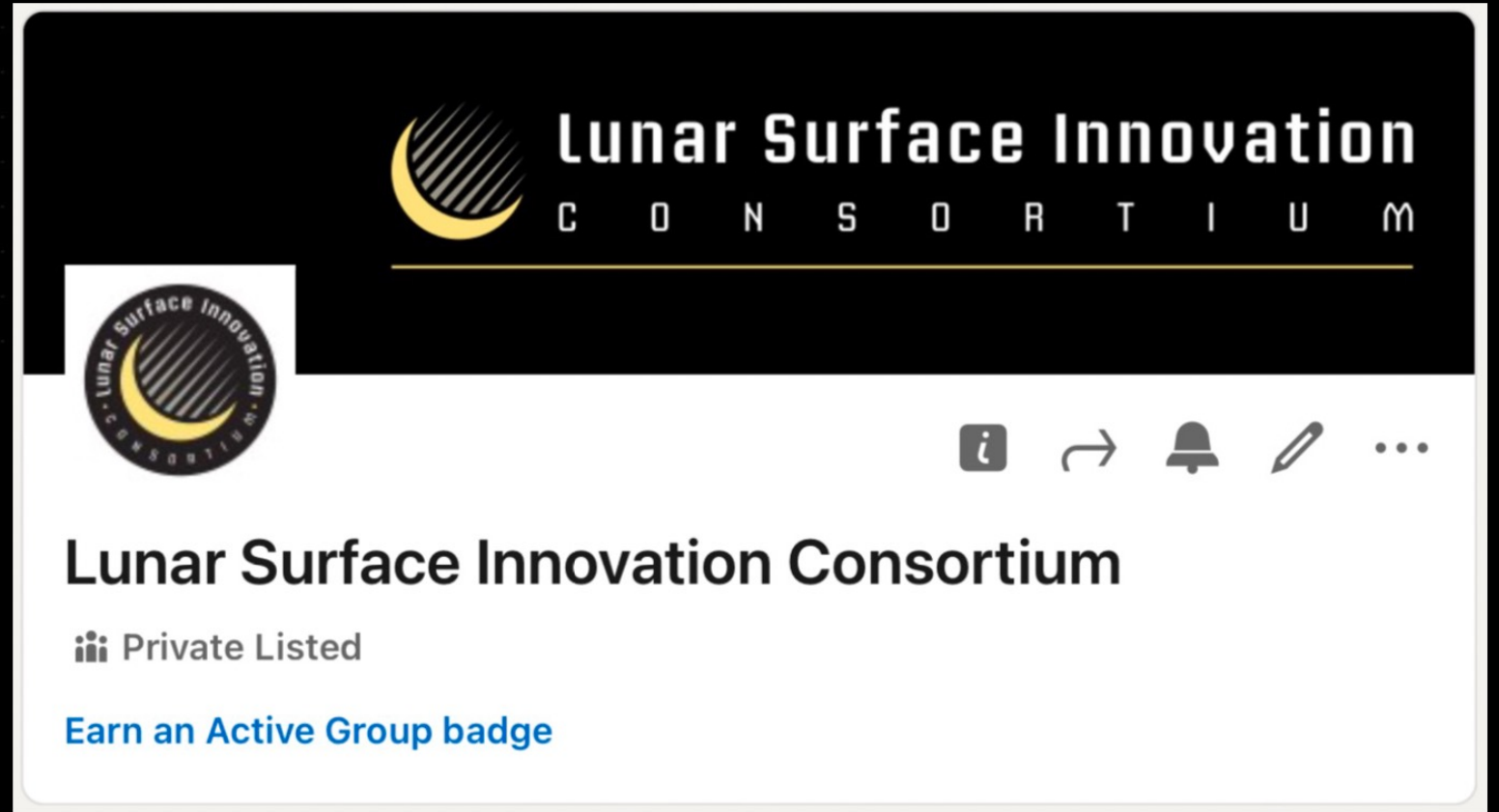
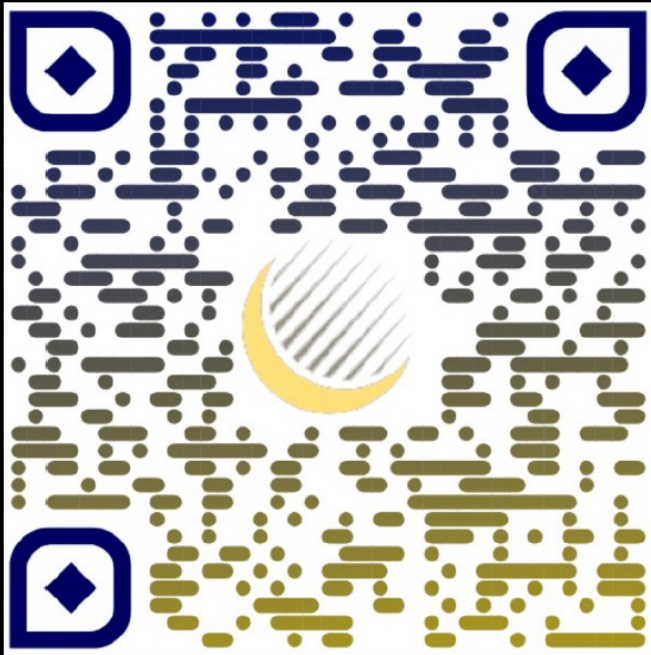


Sponsorship awards are dependent on
sponsor availability and relevance



Lunar Surface Innovation
C O N S O R T I U M

LSIC is on LinkedIn!!!



Join our LSIC group on LinkedIn to follow NASA and technology news, LSIC meetings and updates, networking, and more!

LSIC | Employment, Internship, and Mentoring Opportunities



Check out our website! <https://lsic.jhuapl.edu/Resources/Opportunities.php?f=Job>



The screenshot shows the LSIC website's "Opportunities" page. At the top, there's a header with "Employment, Internship, & Mentoring Opportunities" overlaid on a background image of a lunar base. Below the header are three tabs: "Jobs", "Internships", and "Mentorships". To the right of these tabs is a yellow button that says "+ Submit a New Opportunity". Under the "Jobs" tab, the word "Jobs" is displayed in a large, bold font. Below this, there's a row of category tags: "All Categories", "Surface Power", "Dust Mitigation", "Crosscutting Capabilities", "Extreme Environments", "Extreme Access", "Excavation and Construction", "In Situ Resource Utilization", "Lunar Simulants", and "Interoperability". To the right of these tags is a search bar with the label "Search:". Below the search bar, a job listing is shown for "Young Graduate Trainee in Simulant Research and Development (Vulcan Facility)". The listing includes the employer "European Space Agency", the date "Posted on 10 Feb 2024", the "Opportunity Type: Job", and "Related Topics: Crosscutting Capabilities, Lunar Simulants". At the bottom of the listing are two links: "VIEW SUMMARY" and "APPLY".

Employment, Internship, & Mentoring Opportunities

Jobs Internships Mentorships [+ Submit a New Opportunity](#)

Jobs

All Categories [Surface Power](#) [Dust Mitigation](#) [Crosscutting Capabilities](#) [Extreme Environments](#) [Extreme Access](#) [Excavation and Construction](#) [In Situ Resource Utilization](#) [Lunar Simulants](#) [Interoperability](#)

Search:

Young Graduate Trainee in Simulant Research and Development (Vulcan Facility)
European Space Agency
Posted on 10 Feb 2024
Opportunity Type: Job
Related Topics: Crosscutting Capabilities, Lunar Simulants
[VIEW SUMMARY](#) | [APPLY](#)

LSIC | Upcoming Surface Power Telecons



We hope to see you all at our upcoming telecons. As a reminder, Surface Power Telecons typically take place on the **fourth Thursday of every month at 11AM ET.**

March 28th

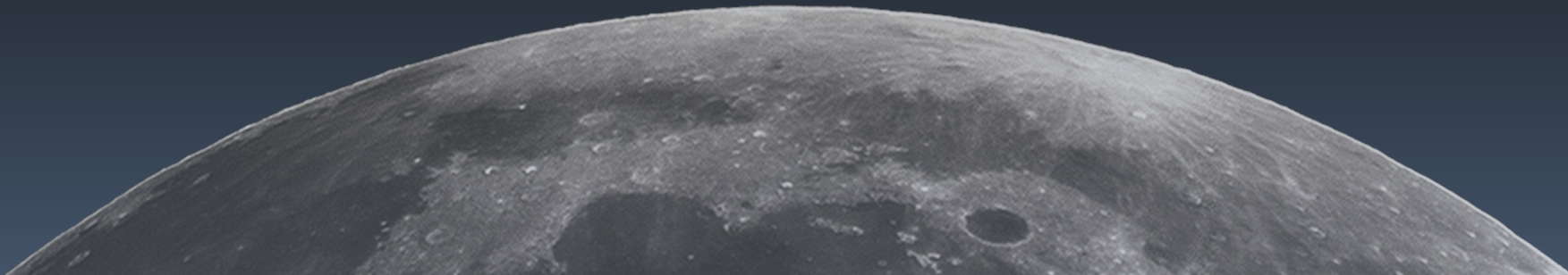
- Topic: Modular Power Generation and Delivery Systems from Programmable Metamaterials
- Speaker: Olivia Formoso (NASA Ames Research Center)

April (Spring Meeting)

- **NO TELECON**

May 23rd

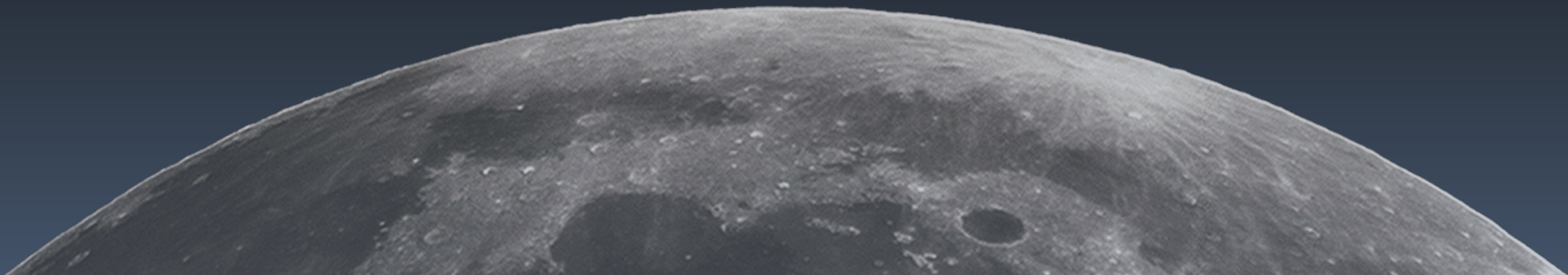
- Topic: Laser Power Beaming on the Moon
- Speaker: Tom Nugent (PowerLight Technologies)





LSIC Organization Change Overview

Danielle Mortensen





History and Context

History

- When LSIC started in Feb 2020, the National Cislunar Strategy, NASA Moon2Mars Blueprint Objectives, Space Tech Envisioned Futures and Priorities, etc. were not yet established
- Now LSIC includes:
 - Nation-wide, Agency, and Space Tech clarity on exploration plans and associated technology gaps
 - Large and eager/engaged community, including interfaces with and feedback from external stakeholders
 - Understanding of community needs and lessons-learned based on >3 years of feedback

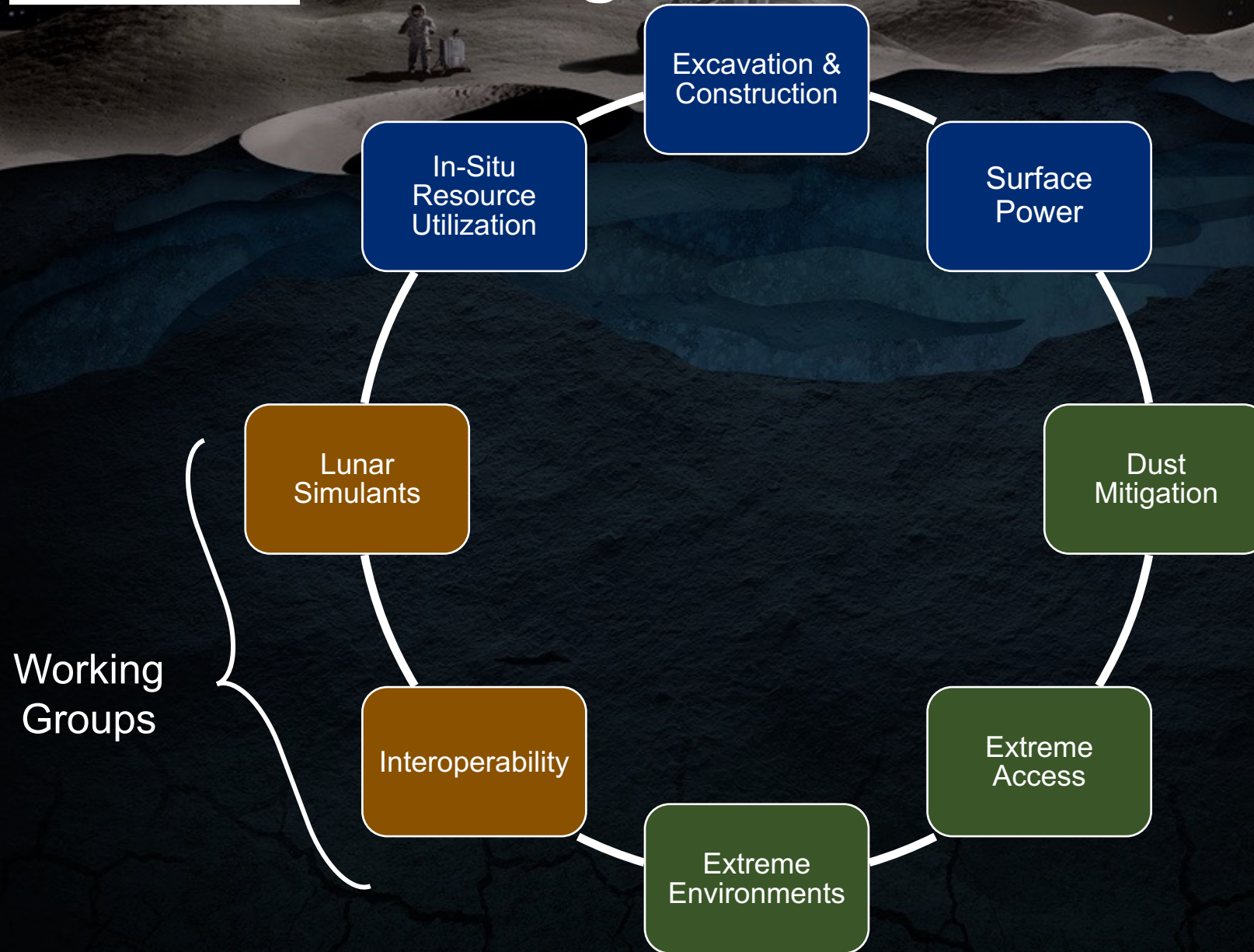
Looking forward to the future...

- Ensure that LSIC is balanced to meet the key technology gaps and priorities
- Meet community needs with efficiency and incorporate/respond to communities' feedback and key themes
- Facilitate sustainable growth
- Bolster crosscutting needs and discussions



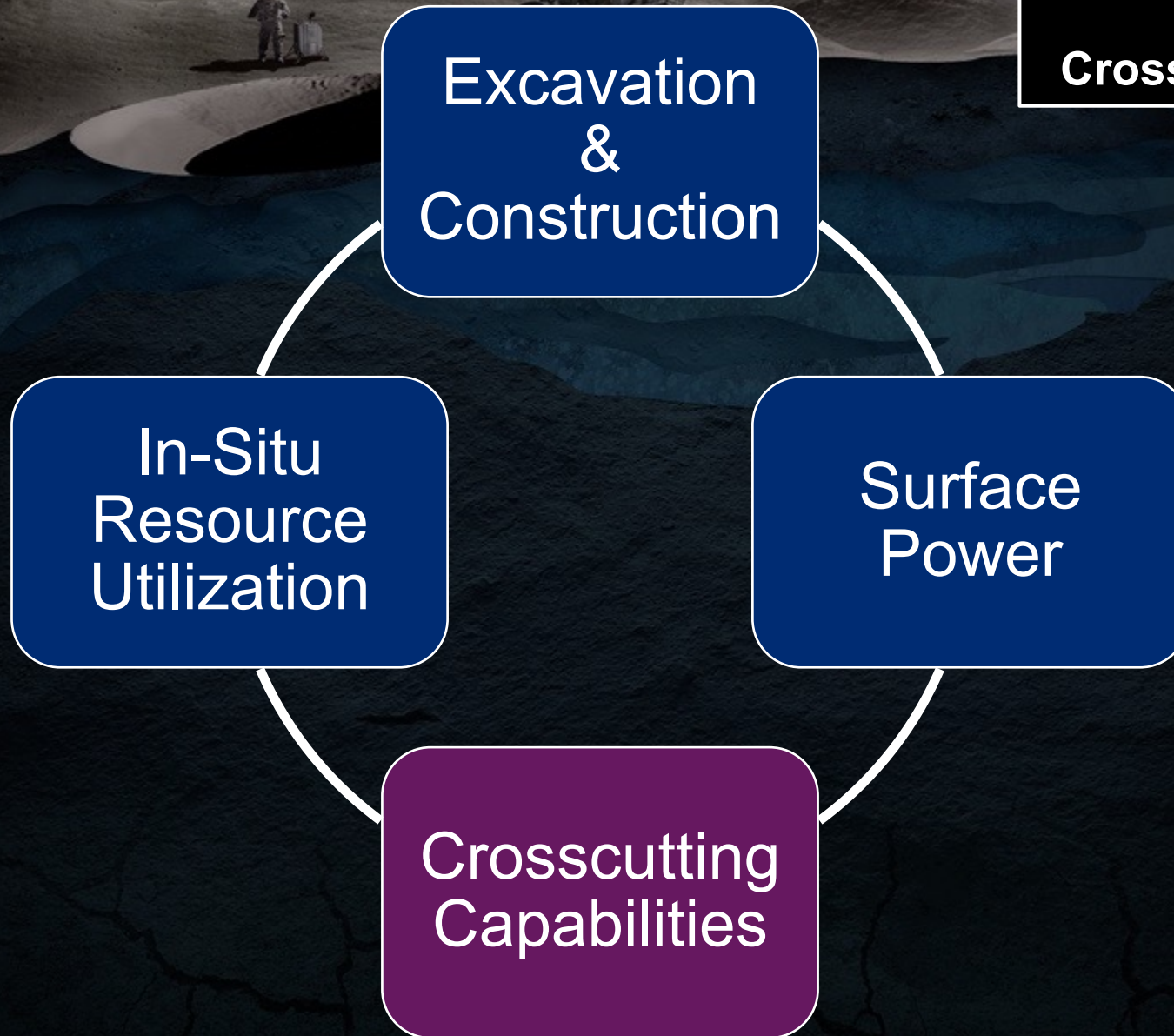
Current LSIC Organization

6 Focus Areas
+
2 Working Groups
+
32 Subgroups





New LSIC Structure



3 Focus Areas
Crosscutting Capability Area



New LSII/LSIC Structure

Lunar Infrastructure Foundational Technologies

Focus Groups ~ System Integration

Excavation &
Construction

Surface
Power

In-Situ
Resource
Utilization

Continue Monthly Focus Groups Meetings

Crosscutting Capabilities (CC)

Integration ~ Coordination ~ Studies

- Extreme Environments
- Dust Mitigation
- Extreme Access
- Interoperability
- Lunar Simulants

APL will facilitate meetings as needed with internal and external stakeholders (e.g., LSIC Focus Groups, NASA Mission Directorates, and Other Government Agencies)



New LSII/LSIC Structure - Meetings

Focus Areas

Monthly Telecon Schedule

Excavation & Construction

Last Wednesday at 2 PM Eastern

In Situ Resource Utilization

Third Wednesdays at 11 AM Eastern

Surface Power

Fourth Thursdays at 11 AM Eastern



Lunar Surface Innovation
CONSORTIUM

Crosscutting Capabilities

Extreme Environments

Dust Mitigation

Extreme Access, Autonomy & Robotics

Interoperability

Lunar Simulants

Meetings, as needed, see LSII Calendar



In summary...

Merging into one Crosscutting Capabilities area:

Extreme Environments

Dust Mitigation

Extreme Access, Autonomy & Robotics

Interoperability (formerly MOSA)

Lunar Simulants

Lunar Infrastructure Foundational Technologies Focus Areas Remain:

In-Situ Resource Utilization (ISRU)

Excavation & Construction

Surface Power

Allowing us to :

Emphasizing interoperability

Enable systems discussions across the board

Cross-collaboration

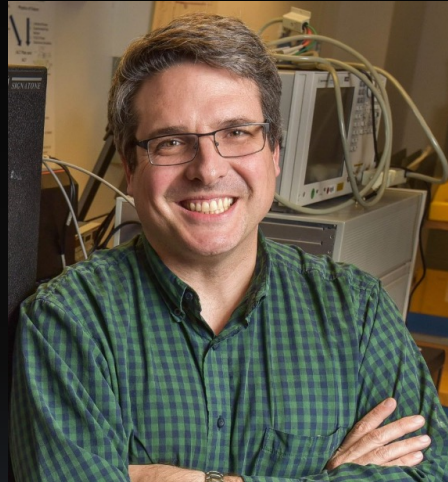
Engaging the needs of the community

Discussing specific use cases

“Hybrid Switched Capacitor Converter with WBG Devices for Medium Voltage DC Transmission in Space Environments”



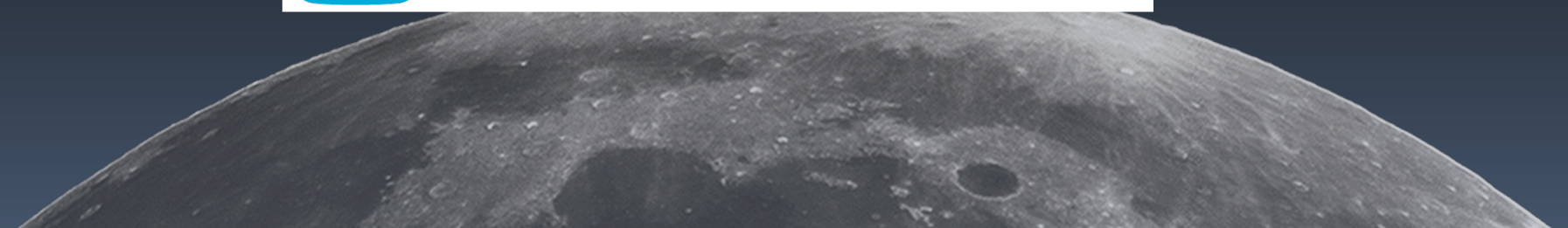
Dr. Jason Neely



Dr. Bob Kaplar



Sandia National Laboratories





JOHNS HOPKINS
APPLIED PHYSICS LABORATORY

