LSIC Surface Power Telecon

February 22nd, 2024
Begins at 11:03

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Space Exploration Sector

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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
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](https://logic.jhuapl.edu)
LSIC | SBIR Phase I Proposals

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](https://lsic.jhuapl.edu/Resources/Funding-Opportunities.php)
• 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

• Lunar and Planetary Science Conference  
  March 11-15, The Woodlands, TX

• 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

• LSIC 2024 Spring Meeting  
  April 23-25, Laurel, MD (hybrid)

• Nuclear and Emerging Technologies for Space (NETS)  
  May 6-10, Santa Fe, NM

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**
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
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](https://lsic.jhuapl.edu/Resources/Opportunities.php?f=Job)
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

- Excavation & Construction
- In-Situ Resource Utilization
- Surface Power
- Crosscutting Capabilities
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

**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

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

23 February 2024
“Hybrid Switched Capacitor Converter with WBG Devices for Medium Voltage DC Transmission in Space Environments”

Dr. Jason Neely

Dr. Bob Kaplan

Sandia National Laboratories