

# Modular Open Systems Approach (MOSA) Working Group Telecon

June 8<sup>th</sup>, 2022

Begins at 12:03PM ET

James Mastandrea and Kristin Jaburek  
Johns Hopkins Applied Physics Laboratory  
Space Exploration Sector



Join LSIC MOSA WG

## Meeting Agenda

- LSIC Community Updates
- LSIC MOSA WG Updates
- Technical Presentation
  - Title: The Standards Cabbage Patch – Where Do Standards Come From?
  - Presenter: Katherine L. Morse, PhD

# LSIC | Telecon of Interest for MOSA



## Surface Power Monthly Telecon: June 23<sup>rd</sup> 11:00 ET

**Speaker:** Martin Narendorf, Jr., Vice President of Engineering and Asset Optimization for CenterPoint Energy

**Topic:** Standards governance processes for the future lunar power system

### **Abstract:**

The utility industry has a very robust structure for terrestrial power systems national and international standards and standards governance. Associated with this standards process are numerous organizations such as ANSI, IEEE, UL, NESC and numerous national and international standards bodies that exist to develop power system standards. What standards governance process is needed and will be developed to govern the lunar power system implementation, deployment and expansion? What lessons can we take from the terrestrial power system standards process that should be applied to the lunar power system implementation and deployment? CenterPoint will discuss a summary of the body of work needed to establish these needed standards governance processes for the lunar power system.

### **Zoom Link for June 23<sup>rd</sup> 11:00 ET:**

<https://jhuapl.zoomgov.com/j/1617206812?pwd=ZWVlaW5XRURsRmxJcWd4b1ZoeFFwUT09>

# LSIC | Low-Temperature, Sub-kW Power and Energy Storage for the Lunar Surface



The Moon harbors thermal extremes with requirements far beyond most terrestrial technologies. The permanently shadowed regions near the lunar poles, rich in science and containing potentially commercially relevant volatiles, reach ultra-cold temperatures ranging down to tens of degrees Kelvin. Solutions such as battery modules that will survive or operate within these extremes, as well as strategies that ensure survival through hibernation, are immediate needs critical for operations on the lunar surface and beyond.

Topics for the workshop include:

- Context on needs and lunar thermal environments
- Panel discussion of near-term system solutions
- Lightning talks that survey recent developments
- Focused session on low temperature batteries
- Break-out discussions targeting specific scenarios

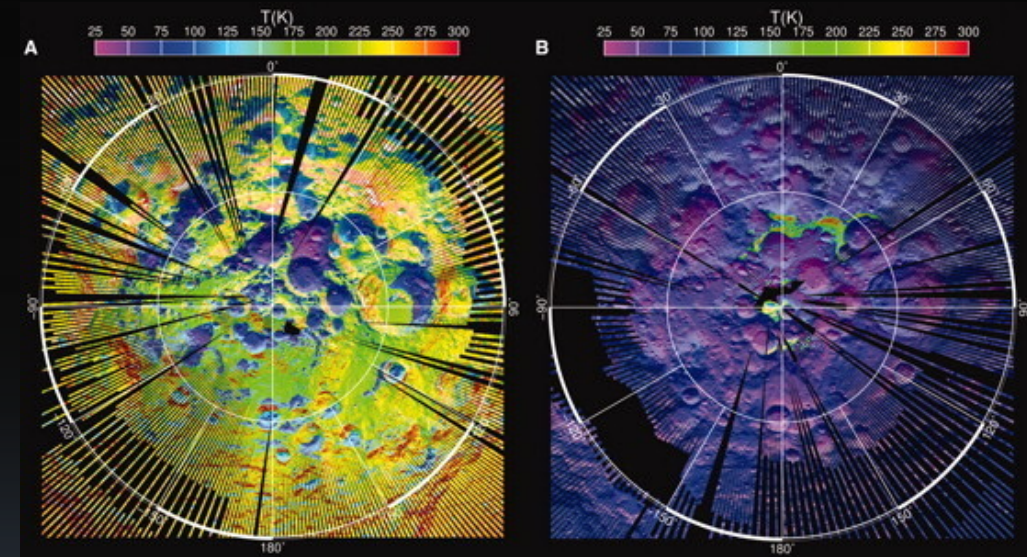
Format and date:

Virtual, Zoom Webinar (**registration required, but is fast and free**)

Lightning Talks: 400-word max abstracts due July 8<sup>th</sup>

**Thursday July 28<sup>th</sup>, 11:00 – 4:45 ET (total length subject to change)**

**<https://lsic.jhuapl.edu/Events/Agenda/index.php?id=214>**



*Diviner-measured daytime (left) and nighttime (right) bolometric brightness temperatures*

## MOSA WG Goals:

- Document community feedback on recommended lunar MOSA activities
  - Compile existing efforts and identify overlap
  - List systems that could benefit from MOSA
  - Perform system decompositions to find critical interfaces & what requirements are needed to ensure interoperability
- Host talks on lunar interoperability



## Updates on Confluence

### LSIC Home

Created by Andrea Harman, last modified on Mar 12, 2022



#### Confluence Training Sessions

If you're just getting to know Confluence, please contact [@Andrea Harman](#) for support and training.

### Focus Areas

Dust Mitigation (DM)	Excavation & Construction (E&C)	Extreme Access (EA)
Extreme Environments (EE)	In Situ Resource Utilization (ISRU)	Surface Power (SP)

### Working Groups

MOSA

Visit LSIC's external website here: [lsic.jhuapl.edu](http://lsic.jhuapl.edu)  
 Visit LSIC's LinkedIn site here: <https://www.linkedin.com/groups/13861869/>  
 LSIC's code of conduct for members is available [here](#).

## Existing Interoperability Standards & Programs

### Existing Interoperability Standards & Programs

Created by Kristin Jaburek, last modified on Mar 18, 2022

The following existing standards and programs have been collected from LSIC Community through Focus Group and Subgroup meetings. Thank you for your input. Anything we missed or understood incorrectly? Drop a comment on this page and let us know.

#### Existing Interoperability Standards & Programs

Category	Existing Standards & Programs	Link
Communications	International Deep Space Interoperability Standards - International Communication System Interoperability Standards (ICSIS)	<a href="https://www.internationaldeepspacestandards.com">https://www.internationaldeepspacestandards.com</a>
Communications	Interoperability Plenary (IOP)	<a href="https://www.interoperabilityplenary.org/home.aspx">https://www.interoperabilityplenary.org/home.aspx</a>

## Focus Group Suggested Items for MOSA

### Focus Group Suggested Items for MOSA

Created by Kristin Jaburek on Mar 21, 2022

The following suggested items to consider for MOSA efforts were gathered from the Surface Power Focus Group during the February 24, 2022 Telecon.

Category	Focus Group Suggested Items to Consider for MOSA Efforts
Voltage/Frequency/Current	AC Frequencies, Rated Power Levels, Standard Voltage Power Sets for Different Applications, Long Distance Power Transmission Voltage Standards, Acceptable Power Losses, Cell Voltage Monitoring, Power Management, Power Electronics, Interfaces to High Voltage Arrays, Tolerance to Multiple Power Sources, Customer Power Delivery Standards

## Who's Who is Lunar Interoperability

## LSIC Spring 2022 Meeting Summary

- View recordings and presentation material here:
  - <https://lsic.jhuapl.edu/Events/Agenda/index.php?id=200>

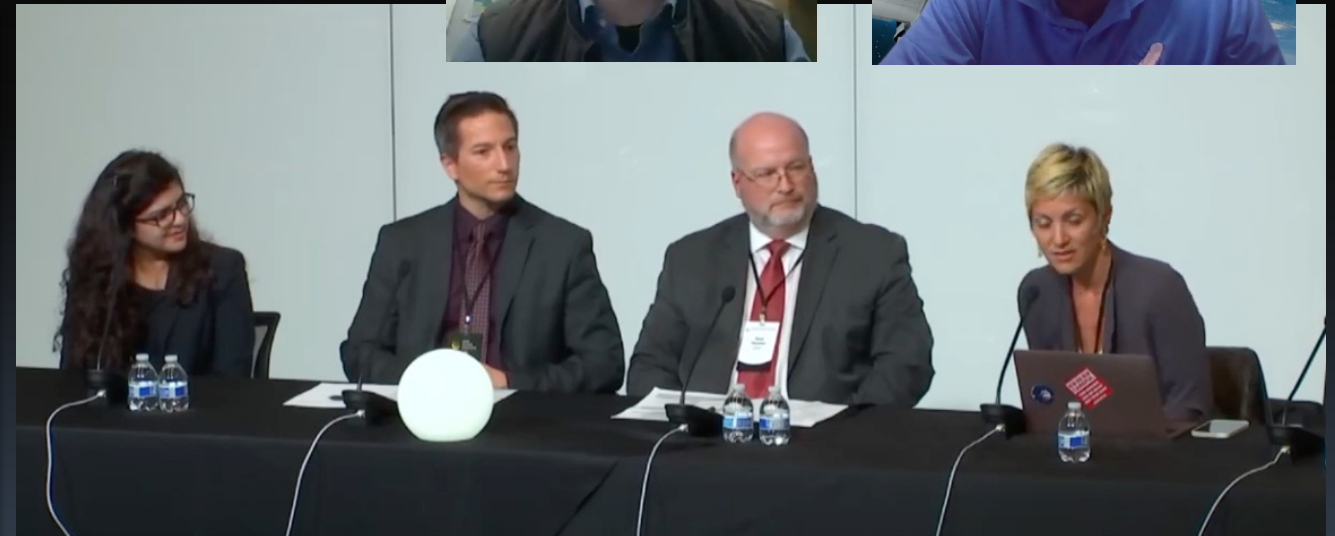
- MOSA Panel

Moderators:

- Jessy Kate Schingler, Open Lunar Foundation
- Dr. James Mastandrea, APL

Panelists:

- Mark Mazzara, Robotics Interoperability, Engineer & Project Manager, US Army
- Meera Towler, Senior Research Engineer, Southwest Research Institute
- Mathew DeMinico, Power Portfolio Manager, NASA Glenn Research Center
- Amalaye Oyake, Senior Flight Software Engineer, Blue Origin
- Chad Thrasher, Systems Interoperability Lead, NASA's Artemis Campaign Development Division



- Breakout: Space Law, MOSA, and the Big-Picture

## The Standards Cabbage Patch – Where Do Standards Come From?

Katherine L. Morse, PhD