

LSIC Surface Power Telecon

October 28, 2021

Begins at 11:02



Dr. Wesley T. Fuhrman
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Space Exploration Sector

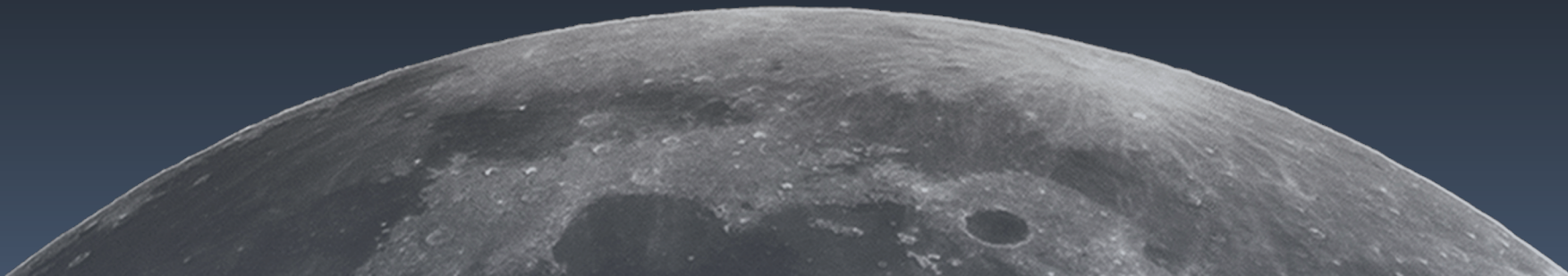
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Confluence Discussion:
<https://lsic-wiki.jhuapl.edu/display/SP/28+October+2021>

Agenda



- Community Updates
 - LSIC Fall Meeting: Next Week!
 - Potential for site visits
- Technical Presentations
 - Lockheed Martin – Tritium RTG
 - USNC-Tech – Chargeable Atomic Batteries
 - Philip Lubin – Minimal power/thermal needs for survival
- Breakout discussion
 - Beta-testing a new sub-group format



Lunar Surface Innovation Consortium Fall Meeting

Wednesday, November 3, 2021 - Thursday, November 4, 2021

<https://lsic.jhuapl.edu/Events/Agenda/index.php?id=148>

Venue: Bowie State University, Bowie Maryland

The Fall Meeting of the Lunar Surface Innovation Consortium will be held on November 3-4th, 2021 at Bowie State University in Bowie, MD (with most content and some sessions also available online). The technical focus of the meeting is autonomy and robotics, specifically understanding current capabilities and investments and discussing the use cases for these technologies on a future lunar base. In addition, the meeting will highlight partnerships among academia, industry, and government, and how these partnerships can provide opportunities for new innovators throughout the country to join in on the efforts to return to the lunar surface.

The meeting will feature plenary presentations, panel discussions among members of industry, government, and academia, and networking and breakout sessions (on zoom and in person). The agenda for the meeting is posted below.

Registration for the meeting is free. In-person registration is currently closed, and **virtual registration will close on Tuesday, October 26th.**

EVENT DETAILS

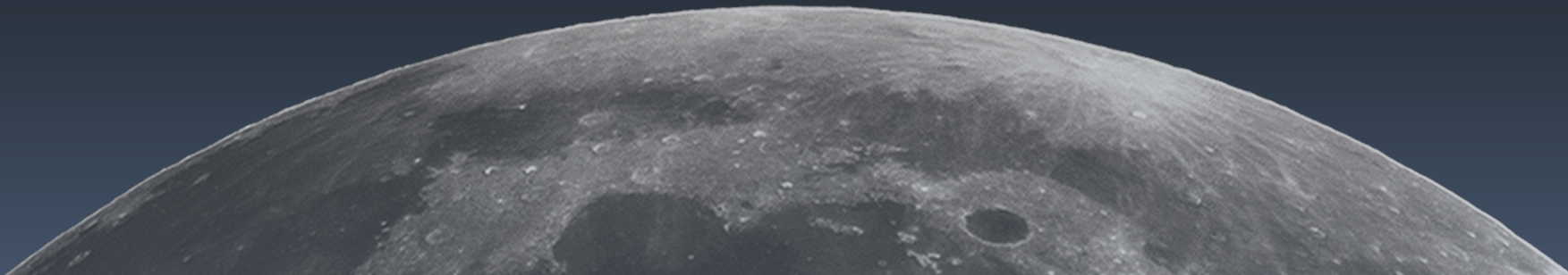
Date: Wednesday, November 3, 2021 - Thursday, November 4, 2021

Location: Bowie State University, Bowie Maryland

LSIC Site Visits



- APL is reaching out to the community for those interested in site visits
- Information from these meetings inform our technical assessments and be integrated into feedback for STMD
- Reach out to APL if you are interested in a site visit.
 - ~Unlimited virtual site visits and smaller discussions
 - Limited number of physical site visits possible
 - Contact me via email for more information
 - Wesley.Fuhrman@jhuapl.edu



LSIC Poster Session

MilliWatt Radioisotope Thermoelectric Generator
Brian Dempsey / Lockheed Martin



Overview

This internally funded project aims to develop a compact, 100mW, tritium radioisotope thermoelectric generators (RTG) as an alternative to plutonium RTGs.

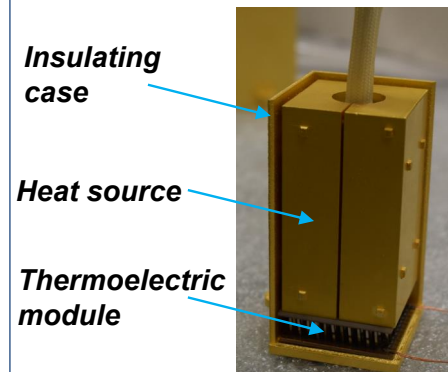
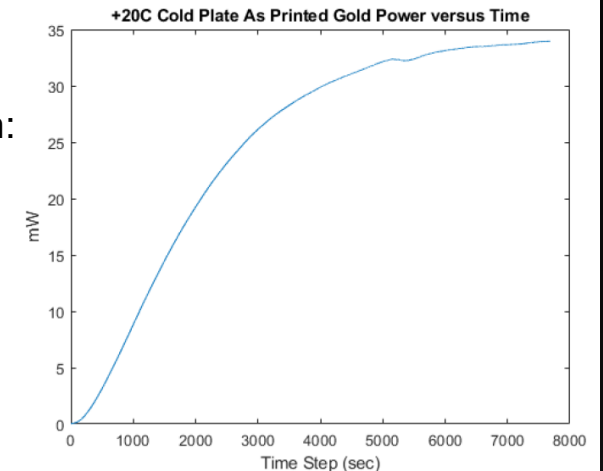
- Tritium is a preferable heat source because it can be commercially owned and the only decay products are He3 and low energy beta (no bremsstrahlung x-rays like e.g. Sr90)
- Proof-of-concept testing complete

Applications

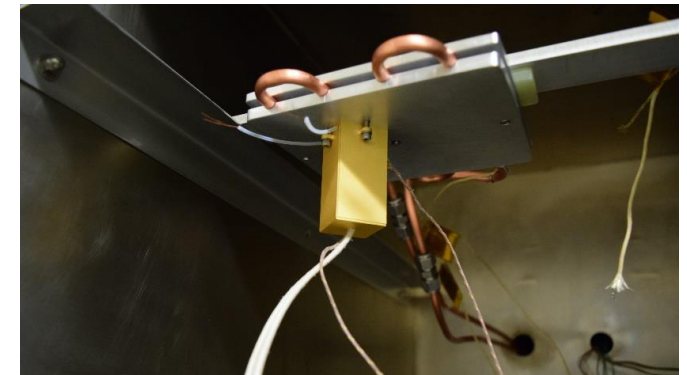
- Heat to survive the lunar night and power to trickle charge a small battery
- Exploring lunar areas in permanently shadowed regions with miniature rovers. I.e., craters, pits and lava tubes
- Ride along SmallSats for outer planet Decadal Survey missions

Investigation specifics

- Mass: ~ 110g
- Electrical Power Generation: 100 mW at 3.2-4.2 volts
- Thermal Power Generation: 2W heat source
- Envelope: 2.5 x 2.5 x 5cm
- Current TRL: 4



Cutaway view



Electrically heated unit under test

Chargeable Atomic Batteries

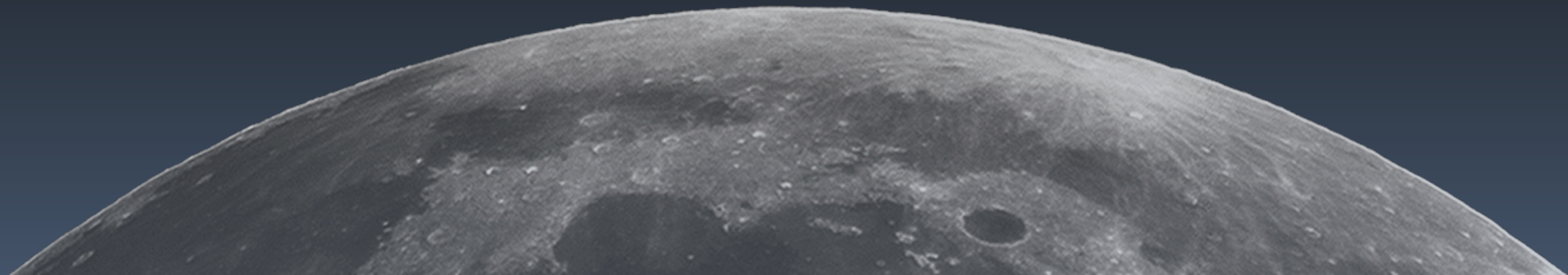
Chris Morrison, USNC-Tech



Tech Showcase



Philip Lubin, UCSB



Transition to Breakout Discussion



Subgroup Discussions:

Rather than maintaining multitudinous additional meetings, we can use the ends of our monthly meeting to have subgroup tag-ups. If discussion warrants additional coordination, we can setup additional off-cycle meetings.

This month: **Try the format**, discuss industry investment/NASA costs

Miro board: Suitable for brainstorming – congruent or asynchronous

https://miro.com/app/board/o9J_lzokj7M=?invite_link_id=855209224086

PW: LSICLSIC

Email me with additional thoughts/comments, points for next month, need to organize additional sessions, etc. Wesley.Fuhrman@jhuapl.edu

Transition to Breakout Discussion



Breakouts will start as random. You can follow the group to the topic you were placed into, or open the breakout window and click 'join' for the room you'd like to join.

1. Nuclear

- FSP, DRPS, Small-scale options

2. Rad-Hard Electronics

- Suite of power management, control, and regulation circuits

3. Fuel Cells

- H₂/O₂ and LO₂/LCH₄, etc.

4. Batteries

- Low-temperature focus

5. Solar

- Durable PV blankets suitable for lunar polar environment

6. Transmission

- Cables and connections, point-to-point, up to 10's of kWe for lunar polar application
- Beaming: up to 10 kWe scale, especially for mobility.

Transition to Breakout Discussion



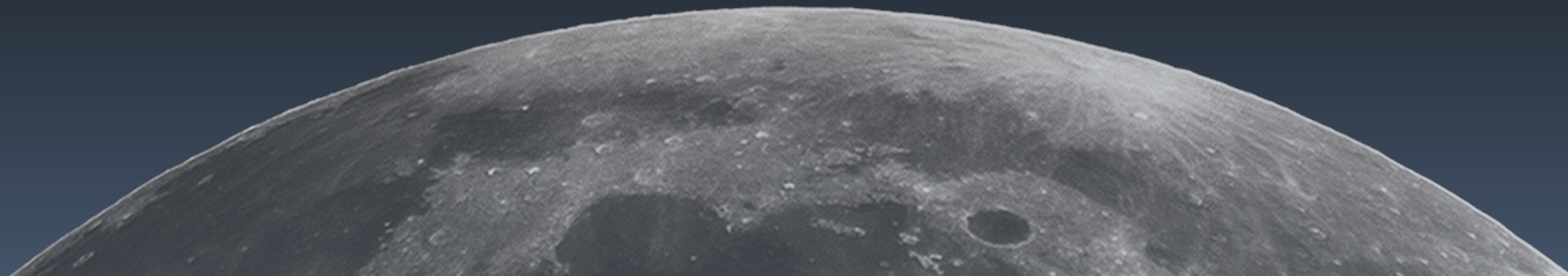
Miro best practices:

Try things, don't worry about mistakes – getting content down on the page is valuable. Qualitative community input informs where more rigorous follow-up is necessary.

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https://miro.com/app/board/o9J_lzokj7M=?invite_link_id=855209224086

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JOHNS HOPKINS
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