Lunar Surface Innovation
CONSORTIUM

LSIC ISRU Focus Group Monthly

http://lsic.jhuapl.edu/
http://lsic-wiki.jhuapl.edu/ ("Confluence" sign-up required)

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Agenda

- Our Agenda will be as follows:
- General updates and house-keeping from Karl and Yours Truly
  - APL is happy to consult as appropriate with ISRU and related technologies. We can provide advice on how to build for launch and operating in extreme environments. We are considering posting guidelines and holding “Office Hours”. Comments solicited.
  - NASA funding opportunity update
- Melissa Roth from Off Planet Research (OPR), speaking on simulant/regolith civil engineering considerations—will include lots of Q&A
- Prof. Lucas de Melo from Johns Hopkins University and Geosyntec Consultants on Soil Mechanics 101
- Karl Hibbitts on LSSW #17 “Defining a Coordinated Lunar Resource Evaluation Campaign
- Breakout Groups
  - WaterIce, O2/Metals, MOSA, Resource Evaluation, etc.

Upcoming Meetings

Some upcoming IRSU related meetings you might not be aware of

- LEAG. 23- 25 August. Hybrid. Laurel, MD. Abstracts (already due).
- IAC. 18-22 Sept. Paris, France. In-person. Abstracts (already due).
- Lunar Surface Science Workshop. Sept. "Lunar Resource Evaluation Campaign - Implementing"
- **NASA Innovation Corps™ Pilot. July 22 cutoff**
- **NASA TechRise 2022; Late August**
- **SBIR Ignite: "The Small Business Innovation Research (SBIR) Ignite Solicitation is a limited pilot program focused on technologies with a strong commercial pull." https://sbir.nasa.gov/solicit/80089/detail?l1=97183**
- **NSF's Regional Innovation Engines Program**

The long-awaited Designing for the Extremes workshop has been rescheduled for August 5! Registration is now open: https://lsic.jhuapl.edu/Events/Register/index.php?id=232&mode=p

Note that registration closes on JULY 28, so please register soon if you want to attend!

Workshop Synopsis
Virtual workshop on August 5, 2022
Start time: 9 am PT /12 pm ET
End time: 430 pm ET

Extreme Access (EA) and Extreme Environments (EE) are inviting you to a half day virtual workshop to talk through the many challenges associated with regolith excavation and transport. Many environmental factors contribute to the engineering and testing of necessary hardware to successfully access and maneuver these sites. Environmental effects need to be explored for technology and data development. This workshop will provide an opportunity to discuss these risks and technologies needed to address them. This interactive workshop will consist of an overview of the Robotics Lunar Surface Operations 2 (RLSO2) study, an Environmental Effects panel with Q&A , a panel with Q&A on technology needed to access these sites, and breakout sessions.

Break The Ice: $3.5M

Excavate Icy Regolith

Register by Sept. 30.

For the announcement and details: https://www.nasa.gov/directorates/spacetech/centennial_challenges/nasa-opens-second-phase-of-35-million-lunar-excavation-competition.html

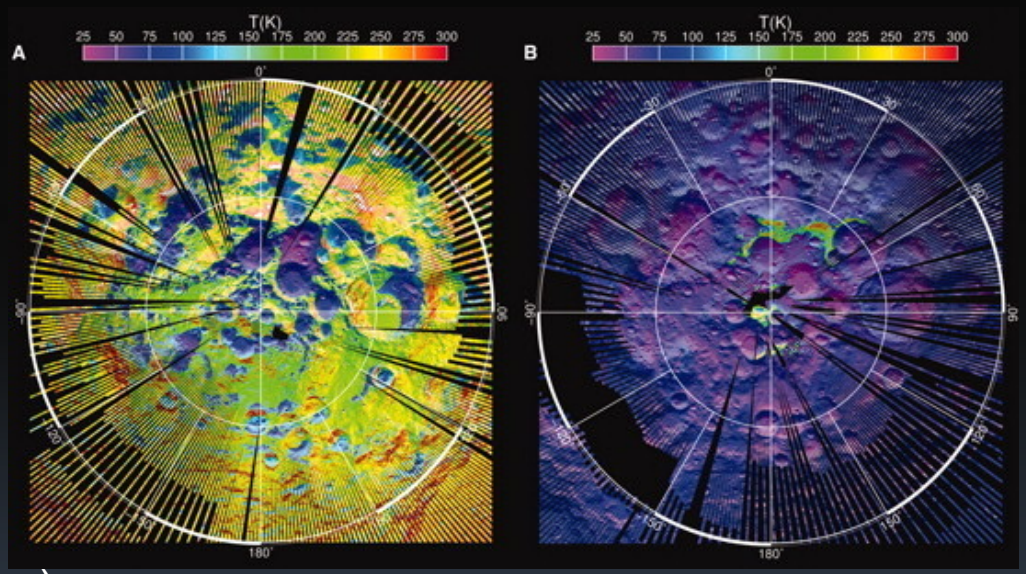
For more information about the challenge: https://breaktheicechallenge.com

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



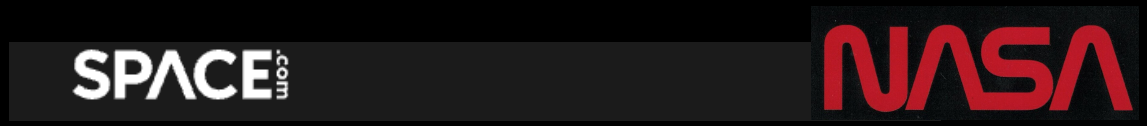
Diviner-measured daytime (left) and nighttime (right) bolometric brightness temperatures

Format and date:
Virtual, Zoom Webinar (**registration required, but is fast and free**)
Lightning Talks: ~~400-word max abstracts due July 8th (past)~~
Thursday July 28th, 11:00 – 4:45 ET (total length subject to change)

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

Notable News

- Notable news



Topical Discussion

Melissa Roth & Vince Roux

Simulant/Regolith Mechanics

Topical Discussion

Lucas de Melo
Johns Hopkins University and Geosyntec Consultants

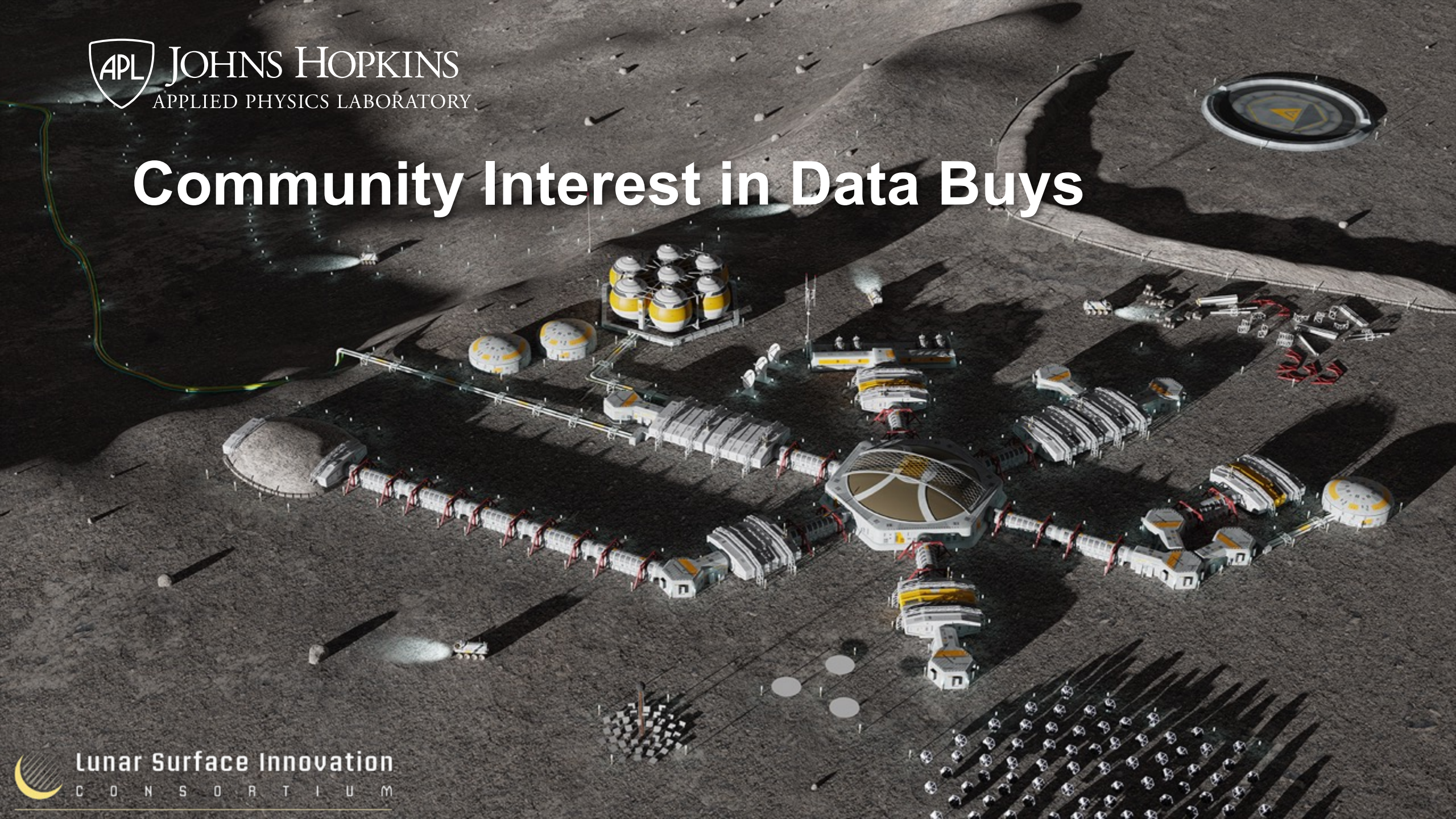
Soil Mechanics 101 for the Moon

Topical Discussion

Karl Hibbitts

Johns Hopkins APL/LSIC

Out-Brief of the LSSW #17: “Defining a Coordinated Lunar Resource Evaluation Campaign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Community Interest in Data Buys
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LSII | Data Buys

- NASA is interested to learn more about the interest in the LSIC community of NASA conducting data buys from commercial providers

- There are two types of data to consider
  - Data acquired as a by product of landing on the Moon
  - Dedicated data that require a specific instrument to be flown

- What kind of data access is required?
  - Does NASA buy an entire data set and put it in PDS?
  - Do users buy data directly from the providers?

LSII | By-Product Data

- Data acquired as a by product of landing on the Moon
  - Environmental Data
    - Radiation, thermal, illumination, dust
  - Descent & Landing Imagery
    - Images of terrain during descent, surface panorama after landing
  - Landing & Post-landing effects
    - Plume/surface interactions
  - Technology/System Performance
    - Navigation performance, comm performance

- Are there additional data sets you would want?
- Are there data sets the lander will naturally acquire, but perhaps you need a variation of those data, e.g. a certain data set to be acquired at a higher cadence?

LSII | New Data Sets

- What data would enhance your ability to plan lunar surface operations?

- Data sets that require a dedicated instrument to be flown
  - E.g. New topography, or mineral map data sets
  - Could be either an orbital of surface data set

  - Monitoring Data for Situational Awareness
    - Rover locations and movement
    - Charging operations
    - Search and Rescue for lost rovers

LSII | General thoughts/questions

- Are there any Data privacy, Intellectual Property or Distribution Concerns
- Are these data global or regional in nature?
- Is there a different financial value for different data qualities, e.g. spatial or spectral resolution?
- How do you put a value on a data set?
- If you are a potential provider, what level of funding, if successful, is required for you to consider acquiring these data?
- Is the data you want a one-time acquisition? Every landing?
- Do you need it only for a particular region

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Wrap-Up and Transition to Breakout Groups