Lunar Surface Innovation
CONSORTIUM

LSIC Excavation and Construction Focus Group

http://lsic.jhuapl.edu/

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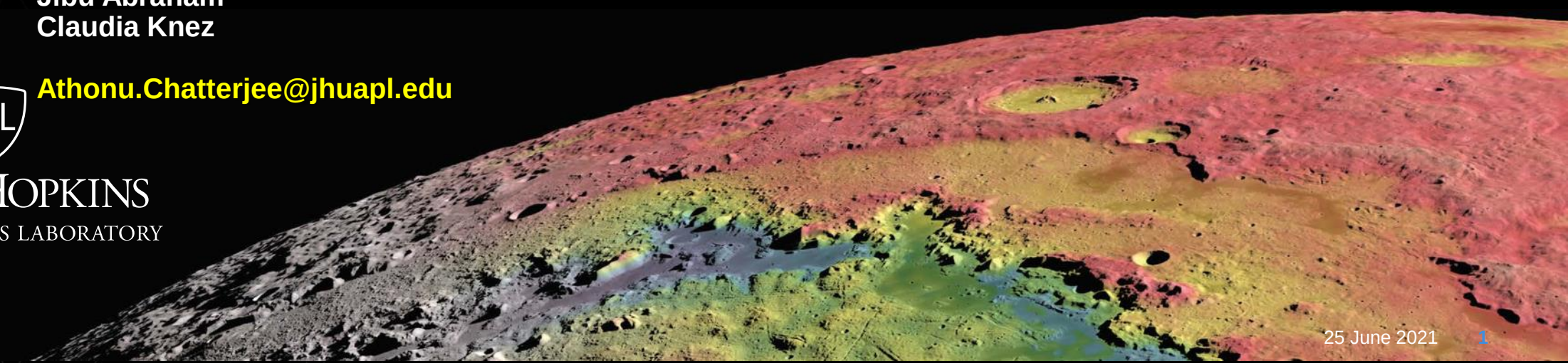


Friendly Reminders

- Slides, chat and recording will be posted in our website in 2-3 days. (http://lsic.jhuapl.edu/Focus-Areas/Excavation-and-Construction.php)

- Feel free to post your questions/suggestions in ‘chat’.
  - We can move the discussion to Confluence.

- Mute yourself if you are not speaking.

Contact me if you want to present in this meeting.

Agenda

- Focus group updates.

- Two ~20-minute presentations:

  (1) Giulio Buscaroli from **WASP** (Ravenna-Italy) will talk about their 3D printing technology. *WASP- World's Advanced Saving Project* designs, produces and sells 3D printers all over the world.

  (2) Daniil Blyum from **Built Robotics** (San Fransisco, CA) will talk about their work in autonomous construction area. By upgrading off-the-shelf heavy equipment with AI guidance systems, Built's technology enables machines to operate fully autonomously.

E&C Workshop on August 20th , 2021

- ***Save the date : August 20th, 2 PM - 4:30 PM, Eastern***
- An extended monthly meeting in lieu of regular meeting.
- Workshop Theme: **High-TRL Technologies for initial infrastructure development for gaining initial foot-hold.**
- Tentative Agenda:
  - NASA E&C Roadmap and CLPS missions.
  - Break-out sessions
  - Talks from industry.
  - Wrap-up

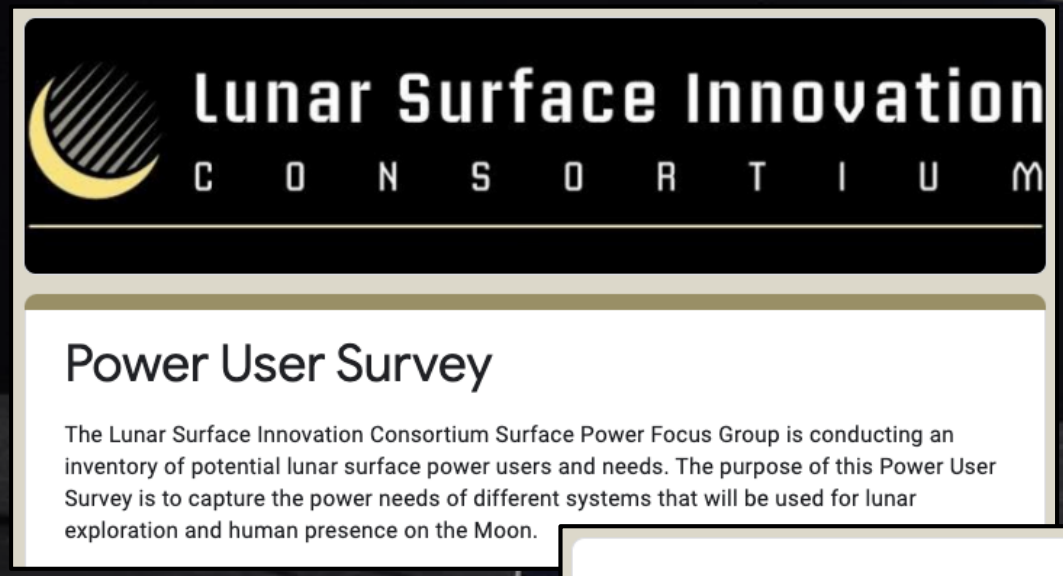
Your participation will help shape these activities. More information will be shared in the coming weeks.

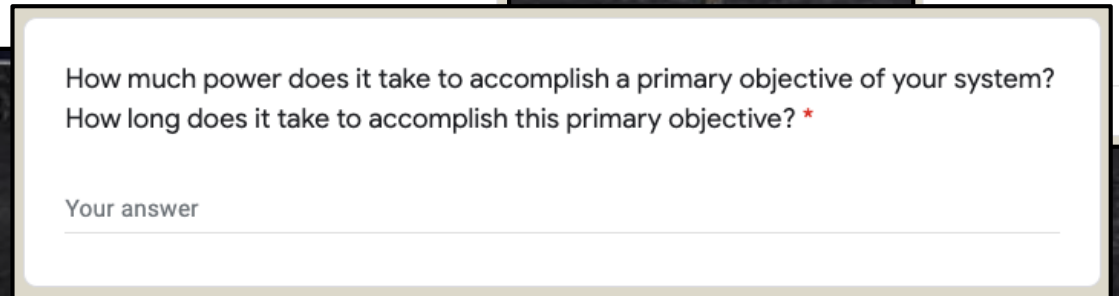
LSIC | Surface Power User Survey

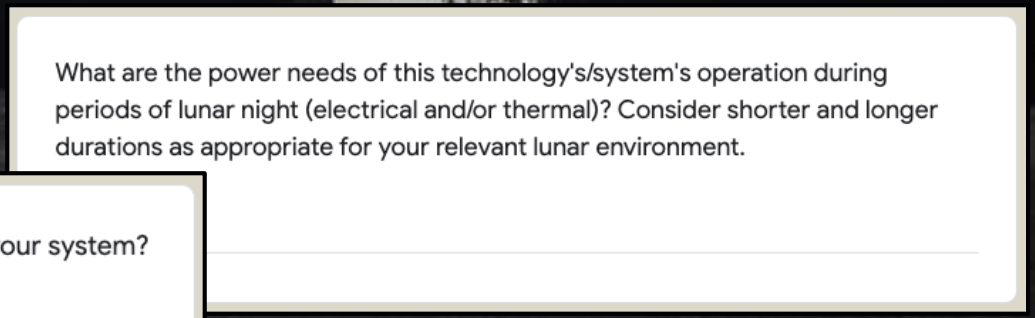
- Inventory of potential lunar surface power users and needs
- The information you provide will shape our feedback to NASA, which can **directly influence future solicitations and the direction of the field.**

Responses will be anonymized, and can be updated on Confluence as technologies develop

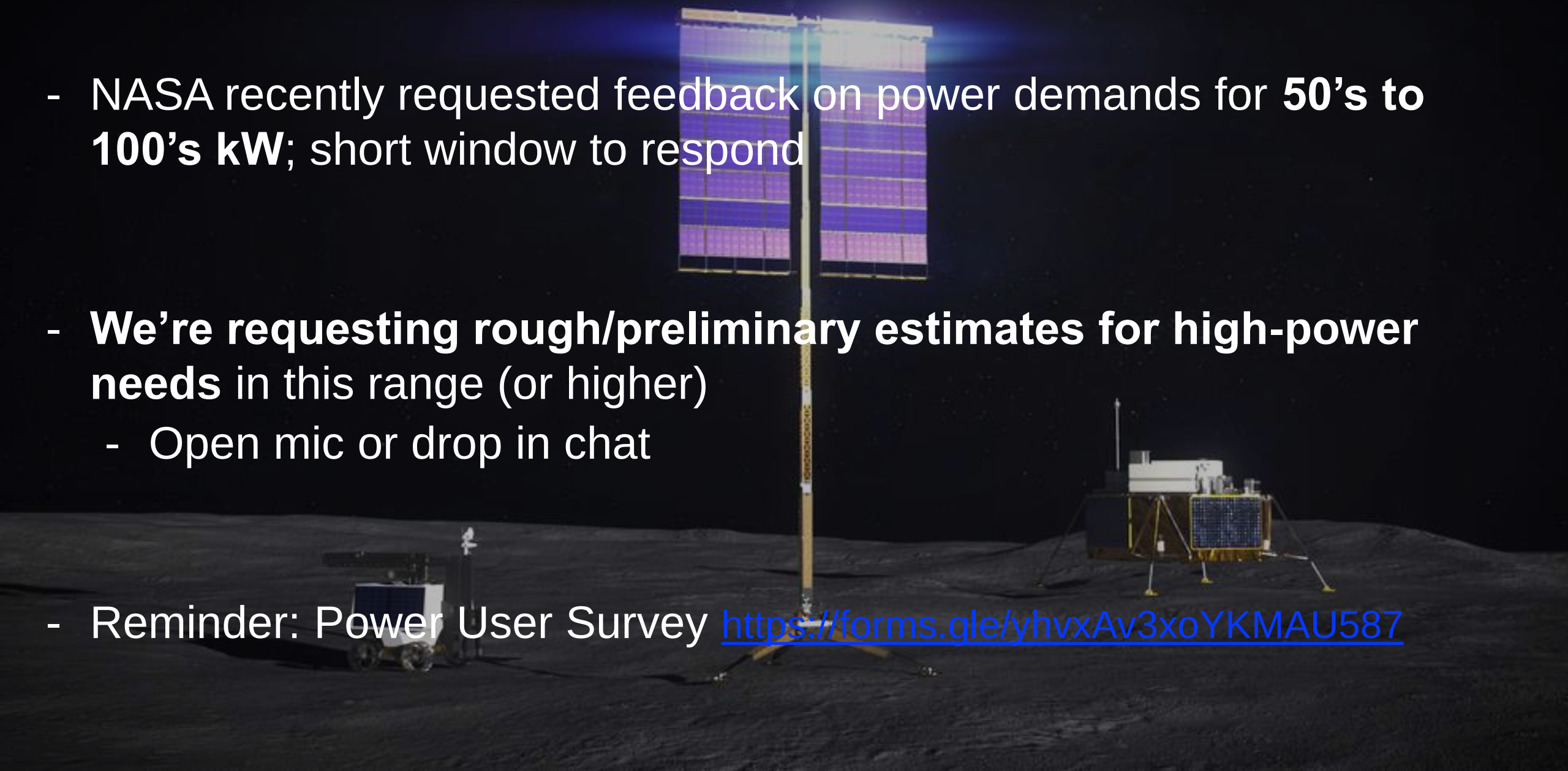
https://forms.gle/yhvxAv3xoYKMAU587







LSIC | Surface Power User Demands ~100s kW Scale



- NASA recently requested feedback on power demands for **50's to 100's kW**; short window to respond

- **We're requesting rough/preliminary estimates for high-power needs** in this range (or higher)
  - Open mic or drop in chat

- Reminder: Power User Survey https://forms.gle/yhvxAv3xoYKMAU587

Today's Talks

(1) Giulio Buscaroli from **WASP** (Ravenna-Italy) will talk about their 3D printing technology and in particular Crane WASP, the modular 3D printer for building. *WASP- World's Advanced Saving Project* designs, produces and sells 3D printers all over the world.

(2) Daniil Blyum from **Built Robotics** (San Fransisco, CA) will talk about their work in autonomous construction area. By upgrading off-the-shelf heavy equipment with AI guidance systems, Built's technology enables machines to operate fully autonomously.

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E&C Technical Areas Google Survey Results

Habitat construction in lunar conditions. (Inflatable habitat, underground habitat, radiation shielding, multi-functional materials/structures)	**70.5%**
Manufacturing processes for lunar construction. (Additive manufacturing, sintering, regolith fiber pulling)	63.6%
Excavation technology for hard regolith/icy material. (Drilling, mining, lightweight construction equipment)	61.4%
Autonomous vehicles and robots for E&C on lunar surface.	59.1%
Lunar surface structure development. (Landing pads, berms, roads)	54.5%
Increased autonomy of operations.	34.1%
Virtual lunar terrain simulation.	29.5%
Beyond additive technology.	22.7%
Long duration robust , easily maintainable robot design for industrial scale use (not science)	2.3%
Subsurface and interior imaging and composition analysis	2.3%
Compressed, sifted regolith as a building material	2.3%
Spacecraft refueling station development	2.3%

LSII System Integrator - APL

A key tenet of LSII is to implement a multitude of novel collaborations across industry, academia, and government in order to successfully develop the transformative capabilities for lunar surface exploration.

Origin of the APL Task

- NASA was investigating using a University Affiliated Research Center (UARC) to bring efficiencies to development
- LSII initiated a tasked APL, to assess system integration role for the Lunar Surface Innovation Initiative
- APL established a Lunar Surface Consortium with academia and industry representatives, as well as NASA experts, that span a broad range of capabilities to execute timely studies, tasks, and/or acquisitions

The Consortium will assist NASA in

- Identifying lunar surface technology needs and assessing the readiness of relative systems and components
- Making recommendations for a cohesive, executable strategy for development and deployment of the technologies required for successful lunar surface exploration
- Providing a central resource for gathering information, analytical integration of lunar surface technology demonstration interfaces, and sharing of results