



# Lunar Surface Innovation

C O N S O R T I U M

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## Extreme Access Focus Group Telecon

**September 8, 2022**

**We'll start around 3:03-3:05**

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**JOHNS HOPKINS**  
APPLIED PHYSICS LABORATORY

## 08 September 2022

Created by Angela Stickle, last modified just a moment ago

Welcome to the September Monthly telecon for the Extreme Access focus group!

Please comment below to sign in!

<https://lsic-wiki.jhuapl.edu/x/PAlIAw>

### Agenda

General LSIC Updates

Designing for the Extremes quick feedback

Technology Spotlight: Robert Brumley, lunar communications

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# Today's Agenda

- LSIC Updates
- MOSA Update
- STMD RFI: LAND and EXPLORE
- Reminder: Data Buy Survey
- Designing for the Extremes Quick-Chat
- Technology Spotlights
- Open floor

# LSIC Updates

## *Funding Opportunities*

- Phase 2 Break the Ice Challenge
  - <https://breaktheicechallenge.com>
  - Register by September 30, 2022
  
- Space Technology Research Institutes
  - University-led, sustained, multidisciplinary space technology research focused in strategic areas for transformative impact to future NASA exploration and science
  - Accelerating Additive Manufacturing Certification with Model-Based Tools
  - Quantum Technologies for Remote Sensing
  - 5 years, up to \$15M
  - Invited full proposals due November 3
  
- Please visit LSIC website for full list
  - <http://lsic.jhuapl.edu/Resources/Funding-Opportunities.php>

The screenshot displays a grid of 12 mission-related cards, organized into three main sections: Land, Live, and Explore. Each card includes a title, a brief description of the mission goal, a small image, and download/watch options.

- Land** (Expanded Access to Diverse Surface Destinations):
  - Precision Landing and Hazard Avoidance (2.1 MB PDF, Watch)
  - Entry, Descent, and Landing to Enable Science Missions (1.9 MB PDF, Watch)
  - 20t and Lunar/Mars Global Access (2.3 MB PDF, Watch)
- Live** (Sustainable Living and Working Farther from Earth):
  - Advanced Habitation Systems (AHS) (4.3 MB PDF)
  - In-Situ Resource Utilization (2.8 MB PDF, Watch)
  - Power and Energy Storage Systems (2.8 MB PDF, Watch)
  - Thermal Management Systems (1.9 MB PDF, Watch)
  - Excavation, Construction, and Outfitting (ECO) (3.6 MB PDF, Watch)
- Explore** (Transformative Missions and Discoveries):
  - Advanced Avionics (2.2 MB PDF)
  - Advanced Manufacturing (2.6 MB PDF)
  - Autonomous Systems and Robotics (4.7 MB PDF)

## STMD RFI for the EXPLORE and LAND thrusts

The following information is requested

- Are the Envisioned Futures charts (see below) inclusive of space community needs? Please provide specific recommendations for improving the provided Envisioned Future charts.
- Are the State-of-the-Art summaries complete and accurate or are there technologies that exist that we may not be aware of that satisfy these needs?
- Are the technology gaps stated in the Envisioned Futures charts inclusive of the work needed to reach these Envisioned Futures? What technology advances are not included that would be necessary to reach these goals?

# RFI Response, how to

- **EXPLORE&LAND Thrusts Envisioned Futures charts:** charts, along with the Strategic Outcomes, can be downloaded from NASA TechPort: <https://techport.nasa.gov/framework>
- **Responses to this RFI are due October 06, 2022 at 5:00 p.m. ET.** Responses to this RFI must be submitted electronically using NSPIRES at <https://nspires.nasaprs.com/>. Any questions to this RFI may be submitted to [HQ-STMD-STAR-RFI@nasaprs.com](mailto:HQ-STMD-STAR-RFI@nasaprs.com) at any time before the due date for responses.
- STMD is seeking responses not to exceed 10 pages, and should be uploaded as a single PDF file attachment not to exceed 10MB at the NSPIRES website (<https://nspires.nasaprs.com>).
- **To view the RFI and instructions on how to submit a response, visit:**
- <https://nspires.nasaprs.com/external/solicitations/summary.do?sollid={1B6EF822-99AE-AECA-6440-6F68C4A3FD31}&path=&method=init>



# Upcoming Meetings

- Focus Group Telecons (2<sup>nd</sup> Thursday each month, 3-4 pm EST)
  - September 8, 2022
  - October 13, 2022 – Guest speaker: Chuck Quintero, Conceptual Design for Communications Network for Earth-Lunar Communications
- Subgroup Meetings:
  - Communications: September 21, 4 pm ET
  - PNT: September 15, 3 pm ET (discussion of communications and navigation envisioned future document)
  - Mobility: September 22, 1 pm ET
- LSIC Fall Meeting November 2-3 (University of Texas, El Paso + Online)
  - Theme: Excavation and Construction
  - Abstracts due: September 13
  - <https://lsic.jhuapl.edu/Events/Agenda/index.php?id=350>



# LSIC Fall Meeting – Call for Abstracts

- **Contributed abstracts will be presented as posters.**
- We invite abstracts **describing technical capabilities within the six LSIC focus areas**, as well as those that **identify lunar surface technology needs and assess the readiness of relative systems and components**. Other topics of interest include defining the parameters and constraints of the architecture required to support a sustained presence on the lunar surface, as well as economic and policy considerations.
- The six LSIC technical focus areas are:
  - Dust Mitigation
  - Excavation & Construction
  - Extreme Access
  - Extreme Environments
  - In Situ Resource Utilization
  - Surface Power
- **All abstracts are due by 11:59PM ET on September 13<sup>th</sup>.**
- Abstracts should be submitted in pdf format, and are limited to 1 page. Please use the abstract template that will be provided on the meeting webpage.



- International Astronautical Congress
  - September 18-22, Paris France
  - <https://iac2022.org>
- Lunar Surface Science Workshop – Implementing a Coordinated Lunar Resource Evaluation Campaign
  - October 14, 2022
  - Abstracts due September 16
  - Free, but registration is required!
  - <https://www.hou.usra.edu/meetings/lunarsurface2020>
- AIAA ASCEND Conference
  - October 24-26, 2022 in Las Vegas, NV
  - <https://www.ascend.events/call-for-content/>

# 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?
- What does this data set enable?
- How do you put a value on a data set (financial or otherwise)?
- What is the value of this data set to your LSIC/STMD/ESDMD, etc. mission?
- 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

# 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 or surface data set
- Monitoring Data for Situational Awareness
  - Rover locations and movement
  - Charging operations
  - Search and Rescue for lost rovers
  - Comm quality/performance

# LSII | Our Survey Says.....

<https://forms.gle/tuhzwAUaQLDivQ2D7>

# Designing for the Extremes

A Joint Workshop between Extreme Access and Extreme Environments

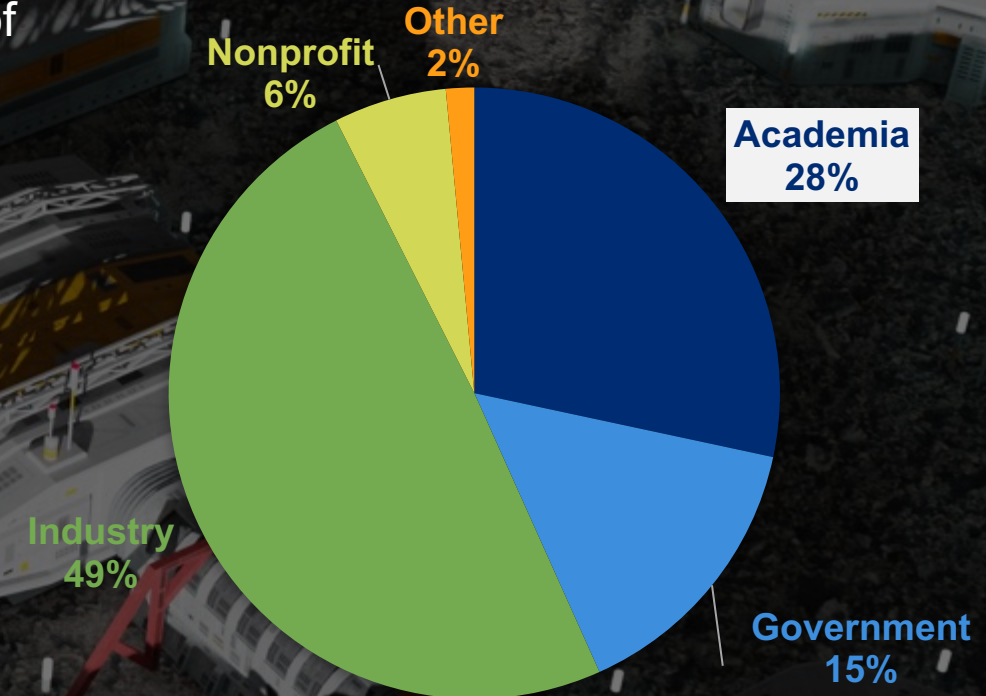
Virtual workshop on August 5, 2022  
129 participants, 249 registered attendees

Many environmental factors contribute to the engineering and testing of necessary hardware to successfully access and maneuver polar ISRU sites. This interactive workshop consisted 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.

## Top Themes from Discussions

- There are many open questions around material properties and performance at cryogenic temperatures and how those affect engineering design.
- Knowledge of surface properties on the Moon (in polar regions) is vital for design and test. Geotechnical properties for lunar regolith affected by gravity can't easily be measured on Earth.
- In situ testing is needed to validate the simulation tools and provide an avenue to accurate terrestrial based testing.

## ATTENDEE ORGANIZATION TYPE



# Passing the Reins

# Technology Spotlight

Robert "Bob" Brumley (Commstar Space Communications) : Lunar relay communications system



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- Confluence is our record of discussions and a good repository
  - Confluence is free to you and available to all registered LSIC members
  - We will be using Confluence to document discussions and provide resources to LSIC members. All focus groups have a separate page so it's a good collaboration space.
  - To request an account, please email Andrea Harman: [ams573@alumni.psu.edu](mailto:ams573@alumni.psu.edu)
- Technology Spotlights/Lightning Talks at monthly telecons
  - Anyone can volunteer to give a lightning talk (10-20 mins)
  - Email Angela or Sarah, or comment on Confluence, to sign up!
- Updates to the webpage - <http://lsic.jhuapl.edu/Focus-Areas/Extreme-Access.php>
  - Notes, slides, recordings from telecons posted here

Follow the Code of Conduct for all Focus Group communications



# Contact information

LSIC Director: Rachel Klima, [SES-LSIC-Director@jhuapl.edu](mailto:SES-LSIC-Director@jhuapl.edu)  
<http://lsic.jhuapl.edu>

Focus Group Area	Listserv address	Facilitator
In-Situ Resource Utilization	<a href="mailto:LSIC_ISRU@listserv.jhuapl.edu">LSIC_ISRU@listserv.jhuapl.edu</a>	Karl Hibbitts
Surface Power	<a href="mailto:LSIC_Power@listserv.jhuapl.edu">LSIC_Power@listserv.jhuapl.edu</a>	Wes Fuhrman
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Excavation and Construction	<a href="mailto:LSIC_ExcavationConstruction@listserv.jhuapl.edu">LSIC_ExcavationConstruction@listserv.jhuapl.edu</a>	Athonu Chatterjee
Dust Mitigation	<a href="mailto:LSIC_DustMitigation@listserv.jhuapl.edu">LSIC_DustMitigation@listserv.jhuapl.edu</a>	Jorge Núñez

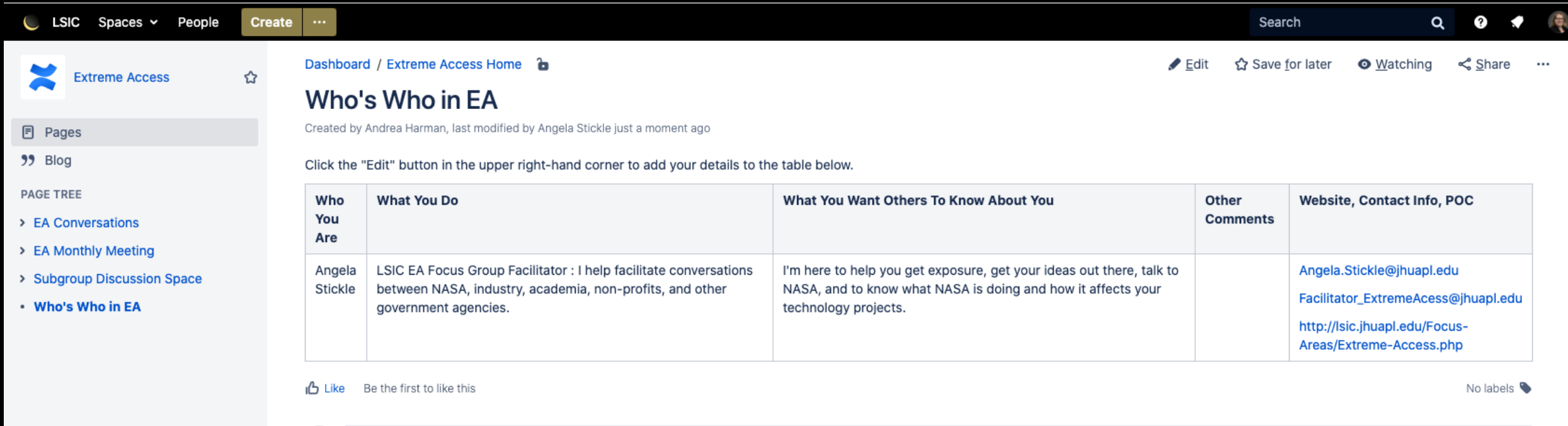


# LSIC Meeting Cadence

- **Bi-Annual Meetings (Spring and Fall)**
- **Monthly Focus Group Meetings**
  - 2<sup>nd</sup> Tuesday of the Month 3:00-4:00 pm – Extreme Environment
  - 2<sup>nd</sup> Thursday of the Month 3:00-4:00 pm – Extreme Access
  - 3<sup>rd</sup> Wednesday of the Month 3:00-4:00 pm – ISRU
  - 3<sup>rd</sup> Thursday of the Month 12:00-1:00 pm – Dust Mitigation
  - 4<sup>th</sup> Thursday of the Month 11:00 am-12:00 pm – Surface Power
  - 4<sup>th</sup> Wednesday of the Month 2:00-3:00 – Excavation and Construction
- **Thematic Workshops (as identified by FGs and NASA POCs)**
  - Workshops In development Funding, CLPS Provider

# Get to know the community

<https://lsic-wiki.jhuapl.edu/x/0IVf>



LSIC Spaces People Create ... Search

Extreme Access

Dashboard / Extreme Access Home

## Who's Who in EA

Created by Andrea Harman, last modified by Angela Stickle just a moment ago

Click the "Edit" button in the upper right-hand corner to add your details to the table below.

Who You Are	What You Do	What You Want Others To Know About You	Other Comments	Website, Contact Info, POC
Angela Stickle	LSIC EA Focus Group Facilitator : I help facilitate conversations between NASA, industry, academia, non-profits, and other government agencies.	I'm here to help you get exposure, get your ideas out there, talk to NASA, and to know what NASA is doing and how it affects your technology projects.		<a href="mailto:Angela.Stickle@jhuapl.edu">Angela.Stickle@jhuapl.edu</a> <a href="mailto:Facilitator_ExtremeAccess@jhuapl.edu">Facilitator_ExtremeAccess@jhuapl.edu</a> <a href="http://lsic.jhuapl.edu/Focus-Areas/Extreme-Access.php">http://lsic.jhuapl.edu/Focus-Areas/Extreme-Access.php</a>

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Who's Who in ISRU: <https://lsic-wiki.jhuapl.edu/display/ISRU/Who%27s+Who+in+ISRU>

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Who's Who in E&C: <https://lsic-wiki.jhuapl.edu/pages/viewpage.action?pageId=6260179>

Who's Who in EE: <https://lsic-wiki.jhuapl.edu/display/EE/Who%27s+Who+in+LSIC-EE>