



# Lunar Surface Innovation

C O N S O R T I U M

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## Extreme Access Focus Group Telecon

**December 9, 2021**

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

Dr. Angela Stickle  
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JHU Applied Physics Laboratory

Facilitator\_ExtremeAccess@jhuapl.edu



JOHNS HOPKINS  
APPLIED PHYSICS LABORATORY

# Today's Agenda



- LSIC Updates
- Upcoming Meetings/Opportunities
- Fall Meeting Summary
- Mobility Subgroup Update
- Technology Spotlights
- Open floor and Discussion



Pages / [Extreme Access Home](#) / [EA Monthly Meeting](#)

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## 9 December 2021

Created by Angela Stickle, last modified on Dec 03, 2021

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

Add a comment below to sign in and discuss.

Please add yourself to the [Who's Who](#) if you haven't had a chance. Feel free to add any info about what you're hoping to get out of the LSIC network (collaborations, etc) in "other comments"

[Check out the LSIC Facilities Database!!](#)

### Agenda:

LSIC updates, brief fall meeting stats

Subgroup update: Mobility

Technology Spotlights

Open floor

1. Add a comment to sign in
2. Select an agenda topic and comment your thoughts
3. Follow-up after the telecon to continue to discussion!

### Technology Spotlights

[Technology Spotlight: Cathy Sham, NASA Spectrum Management](#)

[Technology Spotlight: Elliott Hawkes, highly mobile self-anchoring robots for coordinated, high-force environmental interaction](#)

Confluence is an important resource to provide asynchronous discussion opportunities and a record of conversations

# LSIC Updates

## *Funding Opportunities*

- Over the Dusty Moon Challenge (Colorado School of Mines & Lockheed Martin)
  - <https://www.overthedustymoon.com/>
  - Deadline for entries: Dec 20, 2021
- 2022 Breakthrough, Innovative and Game-Changing (BIG) Idea Challenge: Extreme Terrain Mobility Challenge
  - <http://bigidea.nianet.org/competition-basics/>
  - Proposal and Video deadline: January 18, 2022
- PNT Subgroup meeting, December 16, 2021
- Comms and Mobility next meetings in January
- Please visit LSIC website for full list
  - <http://lsic.jhuapl.edu/Resources/Funding-Opportunities.php>

- NASA + Blue Origin are collaborating on the Space Robot Operating System (SpaceROS)
- The SpaceROS team has posted an RFI to gauge interest
- Want feedback from diverse academic, commercial, and government entities to help steer the development of Space ROS capabilities and requirements.
- The information provided will help focus development of the Space ROS community and technology roadmap.
- <https://sam.gov/opp/eec121cac3bb483e93f04ce38714ed64/view>
- Feedback due: **31 January 2022**
- Template provided in RFI to guide response





# Upcoming Meetings

- Focus Group Telecons (2<sup>nd</sup> Thursday each month, 3-4 pm EST)
  - December 9, 2021
  - January 13, 2022
- Lunar Surface Science Workshop
  - Inclusive Lunar Exploration, January 26-27, 2022
  - <https://www.hou.usra.edu/meetings/lunarsurface2020/>
  - Free, but registration is required



# LSIC | Fall Meeting, November 3-4, 2021

The Lunar Surface Innovation Consortium (LSIC) Fall Meeting, held at Bowie State University, in Bowie, MD, provided a forum for NASA and the space technology community to discuss technology development for establishing a sustained presence on the lunar surface, focusing in particular on investments, needs, and concerns associated with autonomy and robotics.

Over 400 attendees representing more than 125 institutions joined the meeting over the course of two days. 39% of those registered for the meeting had not previously attended an LSIC meeting.

- Featured presentations

- Welcome addresses: Hon. Angela Alsobrooks, Prince George's County Executive; Dr. Aminta Breaux, Bowie State President; Dr. Pamela Melroy, Deputy Administrator NASA
- Jim Reuter, NASA Associate Administrator for Space Technology
- Bowie State University & SAIC: Partnering to Expand Opportunities at an HBCU

- Moderated panel discussions

- Technology Investors (VC): Future Space Economy
- Fostering Innovation in Industry and Academia
- Robotic Flight Demonstrations
- Robotics and Autonomy – The Big Picture

- Invited technical presentations

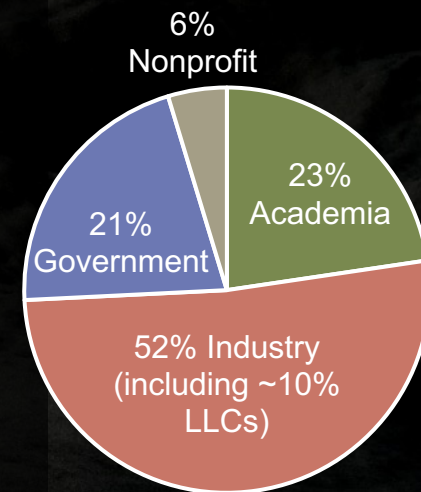
- Autonomous Operations on Earth: Trustworthy AI and Autonomy, Dr. Cara LaPointe, JHU
- NASA Autonomous Systems & Robotics: Roadmap and Investments, Dr. Terry Fong, NASA

- Key findings common among breakout sessions

- Some of the most critical technology gaps for autonomous operations on a Lunar base are free space optical communications and radiation hardened computer hardware. *Government needs to prioritize investment in communications and position, navigation, and timing (PNT) as well as ensuring standards for these are developed.*
- An understanding of the resources available and their extractability is critical, and currently lacking. *A resource prospecting campaign for water ice reduces risk and focuses the direction of technology development to build towards a sustained presence on the Moon.*



Videos of the event can be accessed at <https://lsic.jhuapl.edu/Events/Agenda/index.php?id=148>



Institutional Breakdown



# Mobility Subgroup Update

## Maneesh Verma, Subgroup lead

Pages / Extreme Access Home / Subgroup Discussion Space Edit Save for later

## Mobility Technology

Created by Angela Stickle, last modified by Maneesh Verma 33 minutes ago

Please add your name to the Participants list if you are interested in being a member of this subgroup with your name and email.

**Useful Links**

- [Subgroup's Introductory Information](#)
- [Shared Resources](#)


### Meeting Organisation:

- Next meeting 📅 27 Jan 2022  
EDT (UTC -4) : 13:00 hrs
- For meeting link, click [here](#).
- Add monthly meeting event to your calender: [invite.ics](#) or [Google Calender](#)
- Meeting occurs every month, 4th Thursday of the month at 13:00 hrs EDT
- One session will last for one hour, while more detailed discussions can continue after the core meeting in breakout rooms.

### Meeting Notes:

- [2021-09-23 Meeting notes #1](#)
- [2021-10-28 Meeting notes #2](#)
- [2021-12-02 Meeting notes #3](#)

### Quad Chart



### Subgroup's Roadmap

#### Collaboration Opportunities:

- [Big Idea Challenge on extreme mobility](#) (September 24, 2021 Deadline to submit a Notice of Intent)
- [Lunar heliostat challenge](#) (Deadline: September 13, 2021)
- [Over the Dusty Moon Challenge](#) (More info: webinar on Sept 24, 2021, Deadline for entries by Nov 29)



# Technology Spotlight

**Cathy Sham (NASA)**

Spectrum Management on the Moon

# Technology Spotlight

**Elliot Hawkes (UC Santa Barbara)**

Highly mobile self-anchoring robots for coordinated, high-force environmental interaction



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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>

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Surface Power	<a href="mailto:LSIC_Power@listserv.jhuapl.edu">LSIC_Power@listserv.jhuapl.edu</a>	Wes Fuhrman
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Dust Mitigation	<a href="mailto:LSIC_DustMitigation@listserv.jhuapl.edu">LSIC_DustMitigation@listserv.jhuapl.edu</a>	Jorge Núñez



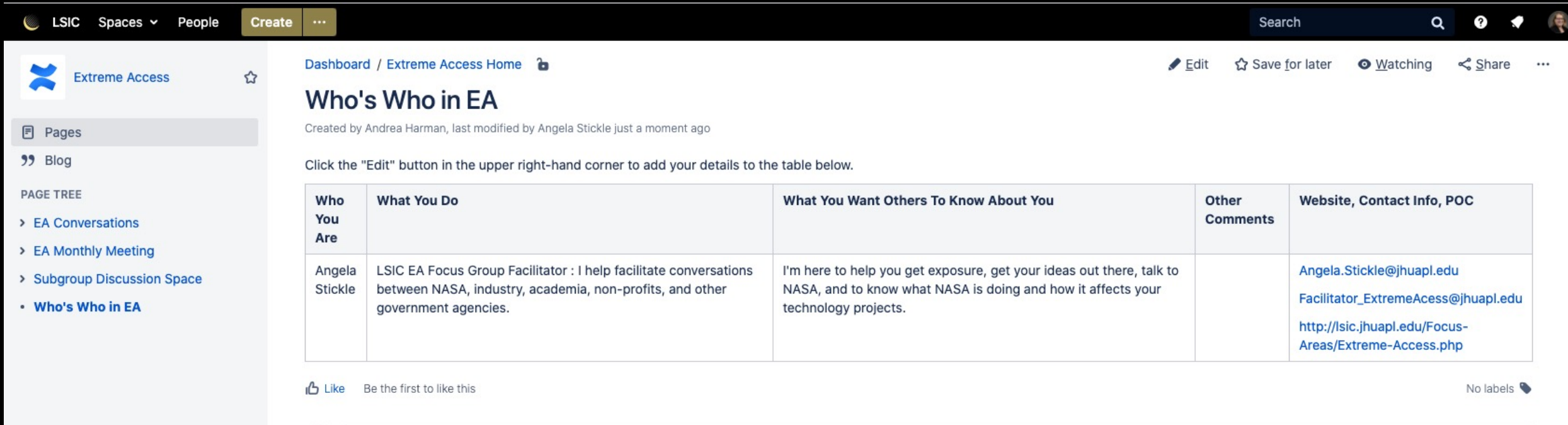
# LSIC Meeting Cadence

- **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

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## 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>

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

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>