



Lunar Surface Innovation

C O N S O R T I U M

Extreme Access Focus Group Telecon

October 14, 2021

We'll start around 3:03

Dr. Angela Stickle
Senior Research Scientist
JHU Applied Physics Laboratory

Facilitator_ExtremeAccess@jhuapl.edu



JOHNS HOPKINS
APPLIED PHYSICS LABORATORY

Today's Agenda



- LSIC Updates
- Upcoming Meetings/Opportunities
- Fall Meeting prep
- Technology Spotlight
- Open floor and Discussion



Pages / Extreme Access Home / EA Monthly Meeting

Edit Save for later Watching Share

14 October 2021

Created by Angela Stickle, last modified less than a minute ago

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

Welcome to the October meeting of the Extreme Access Focus group!

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"

Discussion Topics

LSIC general updates

Fall meeting discussion

PNT subgroup update

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

[Isaac Witte \(APL\) - Dragonfly Terrain Relative Navigation and Low-Altitude Explora...](#)

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

LSIC Updates

LSIC Facilities Directory

- NASA and the LSIC have teamed up to create the LSIC Facilities Directory (<https://lsic-wiki.jhuapl.edu/x/HINf>)
 - LSIC Resources webpage under the LSIC wiki Tools and Resources section
- Purpose is to inform the community of facilities that might be utilized for advancement of their future lunar surface technologies that are currently under development
- Facilities include NASA, commercial, non-profit, or academic institutions
- Searchable interface with details on each facility, its location, availability, scheduling, pricing, and POC

Facilities Directory Home

Created by Andrea Harman, last modified by Josh Cahill on Aug 27, 2021

LSIC Facilities Directory

This directory is meant for any testing facilities that may be leveraged to assess or advance the technology readiness level of lunar surface technologies.

If you would like to add your facility, please do so here: <https://forms.gle/MronYz72WeWbAqdx6>

To make changes to listings, please contact [@Andrea Harman](#).

Use the search bar above to review a cultivated list of available testing facilities. While keywords/labels are listed below, the search function examines all text in the directory.

[Full List Of Facilities](#)

[Facilities Overview](#)

Click the key words below to see all the listings related to a topic.

A	B	C	D	E	F
abrasion abrasion-testing actuators adhesion aerosols air-permeability ambient anorthosite atmosphere atmospheric	balance bell-jar bending buoyancy	cathode-testing chamber cleaner closed components creasing cryo cryogenic cyclers cylinder	dark-regolith deposition development dirty-chamber dry-cleaner-tumbler drying/heating durability dust dust-box dust-deposition dust-distribution dust-testing dusty-vacuum	electrostatics endurance excavation excavation-construction	fabric fatigue-testing film filter filter-evaluation fire-safety flex flex-fold fold folding force
G-H	I-K	L-M	N-O	P-Q	
gases gas-extraction gasket glovebox	icy-regolith imaging in-situ in-situ-resource-utilization	lh2 light-regolith ln2 lo2	nasa neutral-buoyancy nondust open	paper particles pascehn-breakdown performance	

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- Facilities include NASA, commercial, non-profit, or academic institutions
- Searchable interface with details on each facility, its location, availability, scheduling, pricing, and POC
- Annual POC updates will be performed by LSIC
- POCs will be able to make edits and additions to their content within this interface at their discretion
- Institutions who would like to have their facility listed in the directory need to be a member and fill out a questionnaire (<https://forms.gle/MronYz72WeWbAqdx6>)

LSIC Updates

Community Meetings

- NASA SBIR / STTR Interactive Learning & Networking Session: Infusion & Commercialization, Part II
 - Meeting consist of a short presentation, a Q&A session with NASA experts, and open networking time to speak directly with our program representatives and other small businesses and research institutions
 - November 3rd from 12:00pm – 2:30pm ET
 - <https://sbir.nasa.gov/events>
- Next Dust Mitigation Focus Group meeting
 - Thursday, October 21st at 12 PM EDT
 - Dr. Kristen John (NASA JSC) will speak about **new** NASA Standards Document (NASA-STD-1008): “CLASSIFICATIONS AND REQUIREMENTS FOR TESTING SYSTEMS AND HARDWARE TO BE EXPOSED TO DUST IN PLANETARY ENVIRONMENTS”
 - <https://standards.nasa.gov/standard/nasa/nasa-std-1008>
 - Fill out the LSIC Survey and indicate interest in Dust Mitigation to receive event invitations: <https://lsic.jhuapl.edu/News-and-Events/survey.php>

LSIC Updates

Funding Opportunities

- Sources Sought Notice (SSN) From NASA GSFC
 - <https://sam.gov/opp/84c5924758d64c99bc42f70038a2531c/view>
 - Deadline: October 15th, 2021
- Over the Dusty Moon Challenge (Colorado School of Mines & Lockheed Martin)
 - <https://www.overthedustymoon.com/>
 - Webinar Nov 29, 2021 & 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
- NASA HATTB prize challenge
 - Software development for a software application to evaluate humans monitoring simulated autonomous objects and performing tasks
 - Up to \$160k in prizes, <https://www.nasa.gov/nasa-hattb>
- Please visit LSIC website for full list
 - <http://lsic.jhuapl.edu/Resources/Funding-Opportunities.php>



Upcoming Meetings

- Focus Group Telecons (2nd Thursday each month, 3-4 pm EST)
 - October 14, 2021
 - November 10, 2021 (TBR) ★ Note this shift because of Veteran's Day
- Lunar Surface Science Workshop
 - Landing Sites and Capabilities for Future CLPS Deliveries (November 18)
 - Free, but **registration is required**
 - <https://www.hou.usra.edu/meetings/lunarsurface2020/>
- AIAA ASCEND (November 8-10, 15-17)
 - Registration now open for in-person and online programming
 - <https://www.ascend.events/2021-ascend/program/>
- ASCE Earth and Space 2022
 - April 25-28, Denver, CO
 - <https://learn.mines.edu/earthspace2022/abstracts>



LSIC 2021 Fall Meeting – registration open

- November 3-4, 2021
- Hybrid Meeting, in-person events taking place at Bowie State University (Bowie, MD)
- Register at: <https://lsic.jhuapl.edu/News-and-Events/Agenda/index.php?id=148>

The screenshot shows the event page for the Lunar Surface Innovation Consortium Fall Meeting. At the top, there is a header with the LSIC logo and the text "Lunar Surface Innovation CONSORTIUM". To the right of the header, it says "Administered by the APL JOHNS HOPKINS APPLIED PHYSICS LABORATORY". The main content area is divided into two columns. The left column contains the event title "Lunar Surface Innovation Consortium Fall Meeting", the dates "Wednesday, November 3, 2021 - Thursday, November 4, 2021", the URL "https://lsic.jhuapl.edu/Events/Agenda/index.php?id=148", and the venue "Venue: Bowie State University, Bowie Maryland". Below this is a blue button labeled "View Event Page and Presentations". The right column is titled "EVENT DETAILS" and contains the same date and location information, followed by a blue button labeled "Register Now". Below the button is a section titled "Related Documents:" with a single link "lsic-abstract-template.docx".

Lunar Surface Innovation
C O N S O R T I U M

Administered by the
APL JOHNS HOPKINS
APPLIED PHYSICS LABORATORY

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

[View Event Page and Presentations](#)

The Fall Meeting of the Lunar Surface Innovation Consortium is scheduled for November 3-4th, 2021, and will be held at Bowie State University in Bowie, MD (with most content and some sessions also available online).

Registration for the meeting is free, and will open by early August. As we are still in the planning stage for the meeting itself, we would like to provide the community an opportunity to suggest specific technical topics or other content to consider including in the meeting. To provide input or to indicate your interest in attending the meeting, please fill out our short survey here:
<https://forms.gle/bnTb13qBZYvSjJaM7>

EVENT DETAILS

Date: Wednesday, November 3, 2021 - Thursday, November 4, 2021
Location: Bowie State University, Bowie Maryland

[Register Now](#)

Related Documents:

- [lsic-abstract-template.docx](#)

LSIC Updates

LSIC Fall Meeting (<http://lsic.jhuapl.edu/News-and-Events/Agenda/index.php?id=148>)

- Day 1
 - Keynote address
 - Brief status update on NASA's LSII and the LSIC Focus Group work
 - Community discussions
 - Bowie State's partnerships with NASA
 - Pathways for early career and students to develop networks in the lunar community
 - Panel discussing government resources for small business programs
 - Panel of technology investors
 - Technical presentations and posters
- Day 2
 - Overview of NASA's investments relative to robotics and autonomy along with overarching plans
 - Technical panels about specific projects
 - Breakout sessions will focus on examining several scenarios to understand:
 - What elements require autonomous operation?
 - What technology gaps exist?
 - Where each of our different FGs need to be engaged?



LSIC 2021 Fall Meeting discussion

- Breakout sessions will focus on technology and autonomy needs for accessing extreme areas, conducting operations and constructing & maintain infrastructure
 - Scenario: Building on NASA's break the ice challenge, we would like to explore what the robotic and autonomy needs and concerns would be for different activity types in a lunar PSR
 - Assume a NASA Power Plant, NASA Power Distribution, and a NASA Water Extraction Plant
 - What are the autonomy and robotics needs in:
 - Hour 1: establishing the infrastructure
 - Hour 2: operating the infrastructure
 - Hour 3: maintaining the infrastructure elements.



Other Notes of Interest

- Subgroup Meetings – notes on Confluence

Subgroup	Lead/Deputy	Meeting Time
Position Navigation & Timing	Sarah Withee (JHUAPL)/ Marshall Eubanks	3 rd Thursday of the month, 3 pm ET
Communications Technology	Juno Woods (Open Lunar) / Konrad Nieradka	3 rd Wednesday of the month, 4pm ET
Mobility Technology	Maneesh Verma (Stellar Space Industries) / Kevin Kempton (NASA)	Last Thursday of the month, 1 pm ET
TRN Technology	Carolina Restrepo (GSFC)/ Ike Witte (JHUAPL)	
SERVICE Sheds	Joseph Galante (GSFC)	

Lunar Surface Innovation Consortium EPNT subgroup update



Sarah Withee
LSIC Extreme Access PNT subgroup lead
Johns Hopkins Applied Physics Laboratory

Sarah.withee@jhuapl.edu

- PNT group
 - two sessions to discussion of technologies to enable lava tube exploration – notes posted in Confluence
 - presentations from
 - Alex Baikovitz of CMU and Mach 9 Robotics on using ground penetrating radar to map lava tubes and enable robot localization <https://lsic-wiki.jhuapl.edu/display/EA/PNT+telecon+videos>
 - Marshall Eubanks, clocks, or the “T” in Position, Navigation, and Timing <https://lsic-wiki.jhuapl.edu/pages/viewpage.action?pageId=19039321>
 - Session around beacons – notes in Confluence <https://lsic-wiki.jhuapl.edu/display/EA/September+16+2021+summary+of+Miro+board+from+beacons+discussion>
 - Coordinating with comms subgroup on drafting feedback to NASA on LunaNet Interoperability standards
 - Two meetings so far
 - Second meeting around use cases <https://lsic-wiki.jhuapl.edu/display/EA/Use+cases>
 - Radio telescope on far side of Moon
 - Orbiting radio telescope
 - Search and rescue
 - Geological field sampling
 - Email discussion moved to Confluence around recommended frequencies <https://lsic-wiki.jhuapl.edu/display/EA/Frequency+allocations+and+spectrum+management+for+the+Moon> and <https://lsic-wiki.jhuapl.edu/pages/viewpage.action?pageId=26706080>
 - Hosting q & a session with Joel Parker (follow-up to Ben Ashman’s presentation on LuGRE) at November PNT telecon

Technology Spotlight

Isaac Witte (JHUAPL)

Dragonfly Terrain Relative Navigation and Low-Altitude
Exploration



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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
- 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
<http://lsic.jhuapl.edu>

Focus Group Area	Listserv address	Facilitator
In-Situ Resource Utilization	LSIC_ISRU@listserv.jhuapl.edu	Karl Hibbitts
Surface Power	LSIC_Power@listserv.jhuapl.edu	Wes Fuhrman
Extreme Environments	LSIC_ExtremeEnvironment@listserv.jhuapl.edu	Ben Greenhagen
Extreme Access	LSIC_ExtremeAccess@listserv.jhuapl.edu	Angela Stickle
Excavation and Construction	LSIC_ExcavationConstruction@listserv.jhuapl.edu	Athonu Chatterjee
Dust Mitigation	LSIC_DustMitigation@listserv.jhuapl.edu	Jorge Núñez

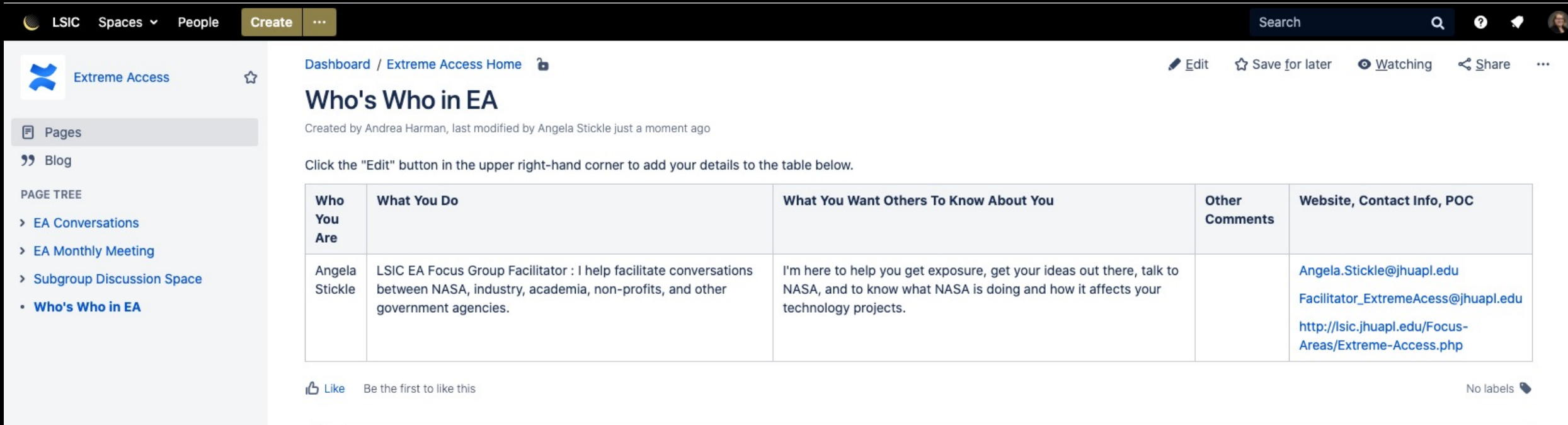


LSIC Meeting Cadence

- **Bi-Annual Meetings (Spring and Fall)**
 - May 11-12 Spring Meeting (accepting Abstracts now)
- **Monthly Focus Group Meetings**
 - 2nd Tuesday of the Month 3:00-4:00 pm – Extreme Environment
 - 2nd Thursday of the Month 3:00-4:00 pm – Extreme Access
 - 3rd Wednesday of the Month 3:00-4:00 pm – ISRU
 - 3rd Thursday of the Month 12:00-1:00 pm – Dust Mitigation
 - 4th Thursday of the Month 11:00 am-12:00 pm – Surface Power
 - 4th 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, and Power Beaming

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.		Angela.Stickle@jhuapl.edu Facilitator_ExtremeAccess@jhuapl.edu http://lsic.jhuapl.edu/Focus-Areas/Extreme-Access.php

Like Be the first to like this No labels

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>

STMD Opportunities for Academia and Industry

STMD anticipates awarding ~\$600M to academia and industry supporting 2020 solicitations & awards

STMD Tipping Point Multiple Awards: *Jan – Mar 2020*

\$250M

Small Business Innovation Research (SBIR)/Small Business Technology Transfer (STTR) Phases I, II, II-E, Civilian Commercialization Readiness Pilot Program (CCRPP), Sequential: *Phase I Solicitation Jan – Apr 2020*

\$212M

Announcement of Collaborative Opportunity (ACO): *Jan – Mar 2020*

\$10M

Flight Opportunities Tech Flights: *Feb – May 2020*

\$10M

Early Career Faculty (ECF): *Feb – Apr 2020*

\$6M

Early Stage Innovations (ESI): *Apr – Jun 2020*

\$9M

NASA Innovative Advanced Concepts (NIAC) Phases I, II, III: *Phase I Solicitation Jun – Jul 2020*

\$4M

Space Technology Research Institutes (STRI): *Jun – Aug 2020*

\$30M

NASA Space Technology Graduate Research Opportunities (NSTGRO): *Sep – Nov 2020*

\$19M

SmallSat Technology Partnerships (STP): *Sep – Nov 2021*

\$3M

Centennial Challenges: *Varied release dates*

\$8M

NextSTEP Broad Agency Announcements (BAAs): *Varied release dates*

Varies

Lunar Surface Technology Research (LuSTR) Opportunities: *Coming soon!!!*

\$30M

Note: Funding awards are approximate and subject to change

Open Solicitations as of June 5, 2020

Solicitations were/will be open in the timeframe specified in italics