Report from Extreme Environments Monthly Meeting

June 2020

Quantitative Info

63 total attendees. 59 via phone, 4 dial-in.

Notes

From Discussion

Full discussion notes available on page 3

- Additional environments for consideration:
    - Low gravity
    - Secondary radiation environment
    - Impact risk
    - Swirls
    - Constrained environments

- Nickname idea: LunExtreme (Jim Keravala)

- LSIC will be working with LEAG, either by having representatives on respective Executive Committees, don't want to reproduce or re-do work that's already been done

- Need to consider differences between short- and long-term effects of exposure to various environments

From Chat

Complete chat transcript available on page 2

GENERAL INFO

- ASU is hosting virtual fall meeting

- Presentation and meeting video will be posted on the website

- Database of collaborators / focus group members is in the works

- Calendar invites will be sent for future meetings

SUGGESTED RESOURCES

- https://solarsystem.nasa.gov/resources/292/extreme-environment-technologies-for-future-space-science-missions-september-2007/ (Craig Peterson)
- Latest LEAG decadal survey (Craig Peterson)

Conversation re: environments to consider captured in discussion notes

Complete Chat Transcript

Dana Hurley : This fall, the meeting is a virtual meeting with Arizona State University as the virtual host. Thanks, ASU!

Cheol Park : low gravity

Off Planet Research_Melissa Roth : It looks fairly comprehensive.

Larry Thomsen : Secondary radiation environment

K.T. Ramesh : Is the impact risk part of the “other” category?

Jim Keravala : Constrained environments.

Michael J Poston : I missed whether swirls are listed

Jim Keravala : LunExtreme

Chris Shove : Can you put presentation in pdf and email it or put on your website?

Andrea Harman : @Chris it will be posted on the website. :-)

Chuck Lauer : Can we get contact info and short profiles of the members of this group included in the WIKI? Opt-in of course.

Craig Peterson : I mentioned this report in the overall kickoff meeting so I’m reposting the link here. https://solarsystem.nasa.gov/resources/292/extreme-environment-technologies-for-future-space-science-missions-september-2007/

Craig Peterson : The latest LEAG Decadal Survey may have some more lunar oriented technologies as part of their report.

hbarnaby : I just want to make sure I am on your list to get the Google form. Hugh Barnaby ASU - hbarnaby@asu.edu

Paul Van Susante : will a calendar invite be sent for any future meetings?

Andrea Harman : @Hugh, are you on the EE listserv?

hbarnaby : I think so, but what to double check.

Chuck Lauer : not just 2024 but 2021 too

Paul Van Susante : Long term effects become more relevant as well. need long term testing

Longform Discussion Notes

Additional environments to explore:
Cheol Park: low gravity
Larry Thomsen: Secondary radiation environment
KT Ramesh: Impact risk (is part of other external hazards per Ben)
Michael Poston: Swirls
Jim Keravala: Constrained environments
Further explanation from Jim: Constrained environments meaning regolith rock under high compression. A lot of activities are looking at surface regolith extraction but there's a high value proposition for building underground facilities and caverns. So hard rock excavation tools will also be a different formulation of equipment. We're then looking at both mineral acquisition and excavation for habitation and utility. So you've got a non-electrostatically charged environment, different than what we're spending a lot of attention on.

Nickname idea – Jim Keravala: LunExtreme

Question from Chuck Lauer re: directory
Ben – One will be developed

Craig Peterson: It occurred to me, should've brought this up at overall intro meeting for LSIC, is there any kind of established relationship with the current Lunar Exploration Advisory Group? Been doing work on related topics for several decades. Just wanted to make sure everyone was aware there may be info to use as a stepping stone as to where we want to get so we don't recreate the wheel.

Ben – we are aware of LEAG, a number of people in LSIC participate in LEAG. I know Rachel is online, anything you'd like to say specifically about what our interactions will be?

Rachel – we will be working, we haven't ironed out exactly how we will coordinate, but we will likely have a LEAG member on EC so we're not duplicating efforts A lot of what we're going to do is make sure we link to centralized resources and build on them. We don't want to reproduce or redo work they've already done, just want to build forward towards the surface sustainability and tech side of things. We will def be coordinating with them throughout the whole process and will probably make sure that both our EC and theirs have direct interaction either by representation on each of them respectively or will coordinate offline if that's not the case. But we will probably have someone on each of the boards.

Ben – LEAG, the focus of LEAG being primarily HEOMD and SMD are on a different stage of tech of LSIC, which is more initial development and identifying tech for sustainable architecture. It will differ by focus group. EE are extreme not just to advanced tech in 2030, just extreme to things in 2024. There are resources / work that's been done in the community that we want to use. The product we make we want to be of value to LEAG.

Craig. Also posted to the chat the last extreme enviro roadmap that came out of SMD.

Ben – that was generally applicable not just to lunar but all enviros.

Craig – but moon was in there as part of roadmap. Might as well make sure what ground has already been paved over.

Chuck Lauer pointed out value for not just 2024 but 2021 too(missions)

Ben – Especially as technology is needed not just to land and execute a full day mission on the near side, but missions to the far side, surviving lunar night and midday, going into these pits, PSRs, all these other places which are completely different than what we've explored.

Paul Van Susante: Long term effects become more relevant as well. Need long term testing.

Ben – not sure what environment you're referring to here but almost every environment's effects are different from short-duration to long exposure. A high radiation dose over a short period of time is different than a low dose over a long period of time.