

Report from Excavation & Construction Monthly Meeting

July 2020

Notes From Discussion

Concern About PSRs as Lunar Destination

- Concerns expressed about going directly for icy regolith in PSRs b/c of investment required for tech development
- NASA response that PSRs are definitely the intended location

Payload Deliveries to the Lunar Surface

- Geotechnical characteristics of regolith at poles is gap NASA wants to address
- Several CLPS landers carrying missions to investigate that
 - Prime 1 is prequel to Viper
 - Viper has a mobile drill, will get data from those results from several months on the South Pole surface, also looking for icy volatiles
 - Add'l CLPS payloads looking to infer geotechnical specs as a subsidiary goal
 - Cameras going to get grain size morphology info
- 2024 is NASA goal for an excavation prototype
- 2026-28, NASA looking at demo missions for excavation & horizontal construction
- 2028 when charter aims to become sustainable, seeing serious technology appearing in manifest
- 2028-30 is earliest potential for vertical construction
- Extracting resources from the regolith is another critical need

Inquiry About Inclusion of Construction Technologies OTHER Than 3D Printing

- Ways to get access to various challenges / opportunities for construction techs:
 - Identifying NASA centers / technologists with specialties in applicable areas to get direction for continued development
 - Annual solicitations (contact a center and write a joint proposal / tipping point solution)
 - SBIR / SDTR
 - Centennial Challenge
- Rob Mueller stated that 3d printing is not the only technology NASA needs, said there is plenty of use for things horizontal construction methods (landing pads, roads, dust control)
- John Vickers said direction from LSIC E&C group to NASA could encourage additional opportunities for construction / non-3d centered opps for the industry

Notes From Chat

Question about where meeting slide decks are located - <http://lsic.jhuapl.edu/Focus-Areas/Excavation-and-Construction.php>

Dennis Wingo shared opinion that going for icy recovery in PSRs is an overreach, and that he was looking for a formal statement regarding PSR ice mining.

Michael Fiske answered that part of Centennial Challenge is pushing the state of the art

Dennis Wingo asked why things had to be fully autonomous, with a comm delay of only 2.5 seconds from Earth

Jeff Plate responded that surface comms into a PSR expected at 10 mins per 24 hrs

Michael Fiske agreed, and stated there would be multiple external interfaces

Brad Blair added that teleoperation should work fine, based on example of Dr. Greg Baiden and robotic underground mine in Sudbury, Ontario

Leslie Gertsch added that complicated equipment is more difficult to repair

Dennis Wingo added that teleoperation is standard in mining and oil drilling industry

Leslie Gertsch added that the key to mine automation is that it isn't total, people need to be available to fix issues / make substitutions

Jim Kervalá said that OffWorld is deploying in underground mines in 2020, also developing construction / processing robots as part of swarm infrastructure

Request from Angeliki Kapoglou to talk more about infrastructure building on the moon

Jeff Plate added that communications are also important for infrastructure

Angeliki Kapoglou pointed out that ESA has an open call for lunar comms / navigation systems available here:

https://www.esa.int/Applications/Telecommunications_Integrated_Applications/Who_s_ready_to_serve_the_lunar_missions

Dennis Wingo suggested hydrogen reduction as an established tech to stretch