



Lunar Surface Innovation

C O N S O R T I U M

LSIC ISRU Focus Group Monthly

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

<http://lsic-wiki.jhuapl.edu/> (“Confluence” sign-up required)

Sept 22, 2021

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Agenda

- 3:00 – General updates
- 3:10 – Results from the Facilities survey
 - Jodi Berdis.. <https://forms.gle/TxXbvb1LwN4XzQT47>
- 3:25 – Focused talk
 - Emily Costello, Univ. of Hawaii. “Using knowledge of impact gardening to predict the depth-distribution of lunar polar volatiles”
- 3:40 – Showcase talk
 - Hannah Sargeant, Univ. of Central Florida. “ISRU at the 2021 LEAG Annual Meeting”.
- 3:55 - Move to our respective breakout groups (WaterIce Prospecting, O2-Metal Extraction, ValueChain Analysis, Facilities). As before these Zoom rooms for the respective breakout groups will remain open until 430 EDT.
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- ** 35 minutes in a randomly assigned room (you can switch rooms immediately afterwards to your breakout room of choice).
- Networking rooms will be mapped to the themes of the Breakout Groups.
 - Water. Moderator: Karl Hibbitts
 - O2&Metals. Moderator: Michael Nord
 - Value Chain. Moderator: none today
 - Laboratory Facilities. Moderator: Jodi Berdis
- The conversations will be recorded.

Updates

- The LSIC Fall meeting is Nov 3- 4. Robotics and Autonomy. Hybrid. Hosted by Bowie State, Md.
- ASCEND. 15-17 Nov. Session topics include: regolith processing, ISRU economics.
- Break the Ice Challenge: A Request for Information (RFI) seeking information on sites to test working prototypes for lunar excavation and transportation systems for the Break the Ice Lunar Challenge Phase 2 was published. The second phase of the challenge will be released no earlier than January 2022. Please respond with information by Sept 24th. The link is here: <https://sam.gov/opp/f8a9d4947306402d93355574f788043d/view>.
- The location of the VIPER landed site has been selected. Western rim of Nobile crater.
- Remember: “Who’s Who in ISRU” at <https://lsic-wiki.jhuapl.edu/display/ISRU/Who%27s+Who+in+ISRU>

Updates

Break the Ice Challenge RFI details

- Specifically NASA is looking for a location or locations that fit the following criteria:
- 2 – 5 acres in size
- Be available for 4 – 6 weeks between September to November 2023
- Ability to use existing or bring in and remove dirt and/or simulated material to construct a track
- Access to or can bring in heavy machinery and cranes for building of the track and lifting hardware
- Ability to allow judges, teams and public audiences to be on site
- Access to utilities such as electricity, water, bathrooms etc. or the ability to bring such utilities on site
- Easy access from main roads and transportation hubs
- Easy access to Parking
- Ability for NASA to arrange for services such as food, internet, security, etc.
- Please respond with information by Sept 24th. The link is here: <https://sam.gov/opp/f8a9d4947306402d93355574f788043d/view>.

Updates

VIPER landing site: western rim of Nobile Crater (~somewhere around the blue box)

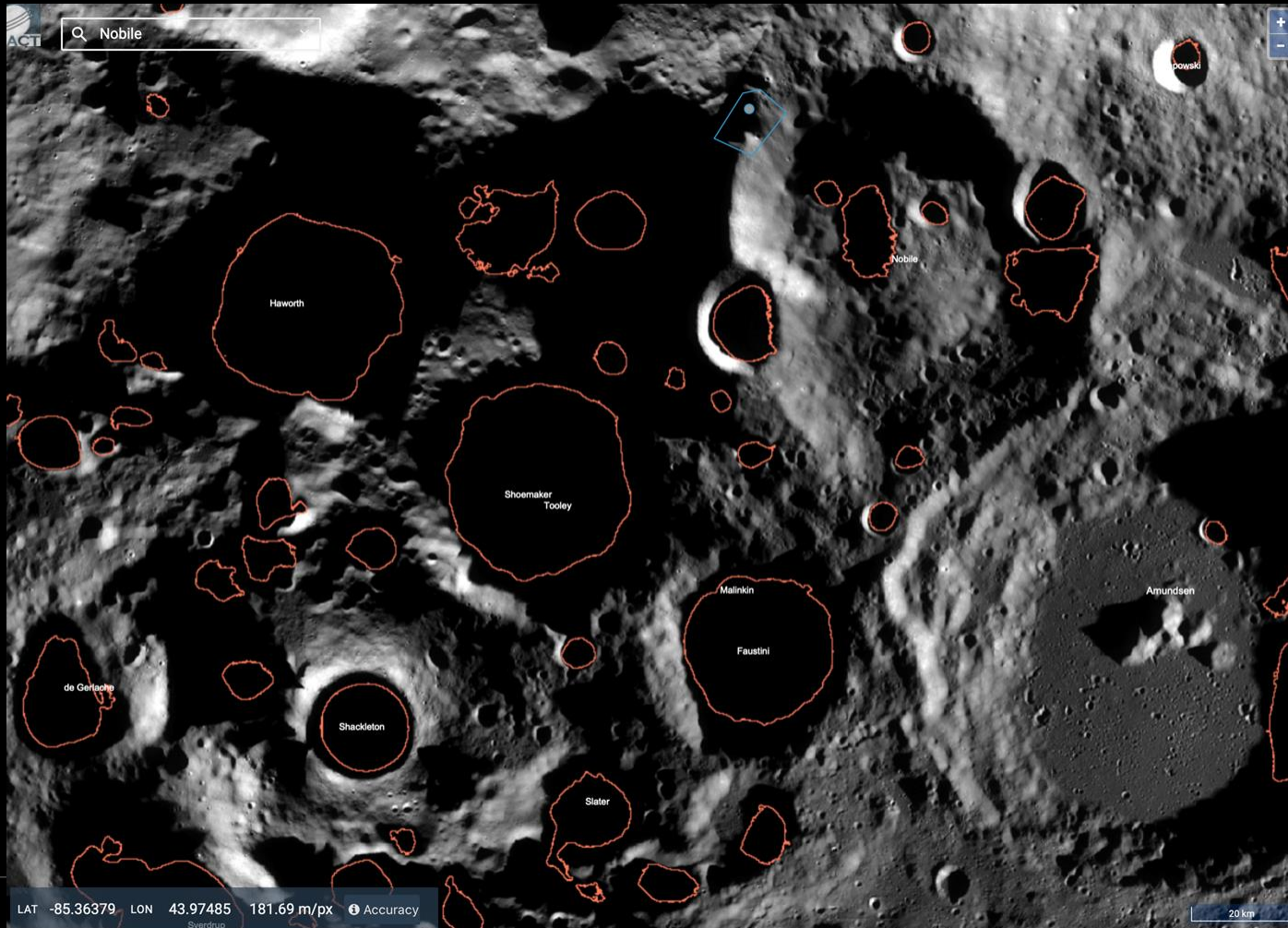


Image Courtesy Kirby Runyon

Focus Group Updates

ISRU

- The ISRU FG monthly invite will be updated so the unintentional forwarded invite you may have received today will no longer occur.
- We have solicited input from the ISRU FG members on NASA announcements of opportunities to obtain information about how NASA can write AO's to better meet the needs of and increase the participation by, the community. You can still provide input at the Confluence site, or email Kirby.runyon@jhuapl.edu.
- The Break-out groups (Water Prospecting, O2&Metals, Facilities, ValueChain) will meet as always in separate zoom links at the conclusion of this main meeting
 - Self organized with the goal of influencing NASA decision making.
 - Theme oriented with specific objectives (to be determined by the participants and the APL facilitator as helpful)
 - Temporary. When Objective is completed; findings will be written up (1page PPT, 1 page Word Doc) and submitted to STMD. And the breakout group will be disbanded.

ISRU Break-out groups

- Water prospecting and mining
 - what we need to understand about the abundance, distribution, and form of ice in PSRs in order to use it as a resource, and what measurements are needed to obtain this information. International Lunar Ice Prospecting Campaign.
- O₂ & metals
 - ensuring we have an effective and holistic system approach to O₂ extraction.
 - What metal (metalloids) result from each process and how can they be used?
- Value Chain Development for ISRU
 - ensuring industry and government efforts are linked to customer (future) needs and the right technologies are being identified for development.
- Laboratory Facilities for ISRU (we are completing this Focus Group in the not too distant future)
 - ensuring we have what is needed and access to it, for testing ISRU technologies.

Focus Group Updates

- **Dust Mitigation:** The Dust FG will have a special meeting on Monday at 1PM EDT to discuss aspects of the PRISM2 call related to the dust environment, which is a topic covered under the generic South Pole lander. I will send more details when available.
- **Excavation and Construction:** The EC FG will have presentations from three of the Break the Ice Challenge winners at their next monthly meeting, this Friday at 3pm. Sign up on Confluence or email Athonu.Chatterjee@jhuapl.edu if you aren't yet a member of the EC Focus Group.
 - Elon Gordon (Redwire Space): Redwire Space, Florida, won the first place for its proposed two-rover system designed for simplicity and robustness.
 - George Sowers (Colorado School of Mines): Colorado School of Mines won the second place for its proposed Lunar Ice Digging System, or LIDS.
 - Curtis Purrington (Austere Engineering): Austere Engineering, Colorado, won the third place for its Grading and Rotating for Water Located in Excavated Regolith (GROWLER) system.

Focus Group Updates

- **Surface Power:** recent brainstorming sessions on modularity and MOSA.

Modularity and Standards

- **Overview and Brainstorming Sessions:**

- September 9th 2021, 11:00am – Noon EDT

<https://jhuapl.zoomgov.com/j/1616303523?pwd=SVVTNU03MWZNCnNLU3I4YlJBQTFpUT09>

- September 14th 2021, 2:00pm – 3:00pm EDT

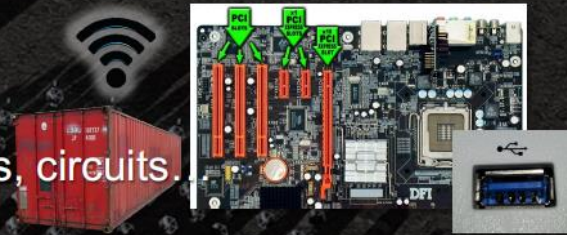
<https://jhuapl.zoomgov.com/j/1600847204?pwd=STZjWi9Oc2Y4WjdjUjZlR1dUcnpWUT09>

- **Objective:**

- Discuss potential benefits of a Modular Open Systems Approach
- Develop a comprehensive list of items that could be standardized or modularized on the lunar surface

- **Examples:**

- Connectors, voltages, communications, data, message sets, controls, circuits.



Facilities Survey Presentation of Results

Jodi Berdis, APL

- To obtain information about your needs for ISRU facilities and to compile and provide that information to NASA in the form of a recommendation.

Focus Talk

“Using knowledge of impact gardening to predict the depth-distribution of lunar polar volatiles”

Emily Costello, University of Hawaii

Showcase Presentation

ISRU at the 2021 LEAG Annual Meeting

Hannah Sargeant, UCF

Wrap-Up and Transition to Breakout Groups

Water. Moderator: Karl Hibbitts

O₂ tech. Moderator: Michael Nord

Value Chain. Moderator: none today

Laboratory Facilities. Moderator: Jodi Berdis



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