



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)

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Agenda

- 3:00 – General updates
- 3:05 – 3:10 – Updated on Regolith to Rebar joint workshop with Excavation & Construction.
- 3:10 –3:15 - LSSW on Lunar Resource Prospecting Campaign. Clive Neal, Notre Dame.
- 3:15 –3:30 - Rotary Drum Extraction for water ice. Curtis Purrington.
- 3:30 –3:45 - BECA. Ann Parsons, NASA GSFC
- 3:45 - Update on Breakout Groups including Interoperability
- 3:55 – Breakout Groups
 - Water-Ice Prospecting
 - O₂-Metal Extraction
 - Value Chain Analysis
 - Interoperability/Standards/Maintenance

Updates

Some upcoming IRSU related meetings you might not be aware of

- COSPAR. 16-24 July. Athens, Greece. ISRU session B0.2. *There is growing interest in the use of the resource base of the Solar System to facilitate space exploration and enable the development of a space economy. Such activities might also supplement the economic resources of our own planet. This event will address the extent to which lunar, asteroid, and martian resources may contribute to these objectives. Papers are invited on all aspects of the science and engineering of space resource utilisation, including the development of synergies among techniques developed to access resources on different Solar System objects, and the scientific investigations that support them.*
- “Who’s Who in ISRU” at <https://lsic-wiki.jhuapl.edu/display/ISRU/Who%27s+Who+in+ISRU>
- Survey on how the ISRU FG is meeting your needs.

Regolith to Rebar: LSIC E&C – ISRU Joint Workshop (virtual only)

February 23. ~ 11 am to 530 pm EST

Website for registration and current speakers. <https://lsic.jhuapl.edu/Events/Agenda/index.php?id=177>

Our over-arching goal is to develop a common and realistic mutual understanding of what is possible for metal ISRU in the near-term (next 5-10 years)

Bring together lunar (ISRU) developers to represent the supply side and (E&C) participants to represent the demand side

Link the in-situ production, the processing and the use/consumption of metals and metal-like by-products (that may result from O₂ production technologies).

Lay the foundation for the development of an eco-system in this nascent field of lunar ISRU metals and to strengthen public-private partnerships.

Some issues to be addressed include:

- Discuss infrastructural needs for the use of metals. What kinds, how much, and in what shape and form?
- Discuss the ‘low hanging fruit’ for metal extraction. The products, their usefulness, and need for modest post-processing.
- Discuss feasibility of metal-specific manufacturing processes on lunar surface.
- Discuss economic feasibility of metallic yields and any associated processing, including areas ripe for improvement.
- Develop concepts for how to integrate the metal supply side with the construction side, identifying possible roles for NASA.
- Identify gaps and challenges in metal production and construction on lunar surface.

Lunar Surface Science Workshop Proposal

International Lunar Prospecting Campaign

Clive Neal

Notre Dame

Topical Discussion

Rotary Extraction Drum for waterice

Curtis Purrington

Colorado School of Mines

Topical Discussion

Bulk Element Compositional Analyzer (BECA)

Ann Parsons

NASA GSFC

LSIC | ISRU Modularity/Interoperability Subgroup

- **Approach**

- Self-organized within the breakout group. Leader/enabler/organizer needed to implement this.
- Pursue inter-focus group collaborations. Leverage and synergize with similar efforts in other Focus Groups (this is after-all intrinsically a system engineering challenge and thus intrinsically not confined to any specific FG).
- Have clear goals/objectives/tasks. Pick your battles/challenges.
- Be passionate and enabling. This is a collaboration for accomplishing a broad and cross-cutting challenge.

LSIC | ISRU Modularity/Interoperability Subgroup

- **Modularity/Interoperability subgroup**
 - Dedicated to exploring *modularity, interoperability, open-systems architectures, and maintenance/repair* related to lunar ISRU.
- **Cross-focus group applicability**
 - Leverages existing Power Focus Group MOSA (Modular Open-Systems Architecture) subgroup.
 - The Excavation & Construction focus group is developing subgroups to align with findings from their maintenance & repair workshop.
- **Goals of the ISRU Mod/Interoperability subgroup:**
 - Identify modularity, interoperability, and maintenance/repair needs and approaches for ISRU technology including use of open architecture. – your charge is to make these more specific.
 - We will provide recommendations to NASA based on these findings.
 - Serve as a bridge with the Power MOSA subgroup and the E&C maintenance subgroup to help ensure system-wide standards are established.

Wrap-Up and Transition to Breakout Groups

WaterIce Prospecting. Moderator: Karl Hibbitts

O₂ tech. Moderator: Michael Nord

Value Chain. Moderator: Kirby Runyon

Interoperability/Modularity/Open Architecture. Moderator: Jodi Berdis



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