

Key Non-Polar Destinations Across the Moon to Address Decadal-level Science Objectives with Human Explorers: Panel on Applied Sciences - Hybrid Meeting No. 2

August 12-14, 2025

Hybrid / Virtual Meeting

Location if In Person: Beckman Center, UC Irvine Campus Balboa Room and Board Room

ALL TIMES IN US PACIFIC {STANDARD/DAYLIGHT} TIME (UTC-8:00)

TUESDAY, AUGUST 12, 2025

OPEN SESSION

Livestream: TBD

[CLICK HERE TO JOIN](#)

Presentations

8:55 AM	Welcome	Brent Sherwood, Chair
9:00 AM	Applied Science Investigations for National Security Objectives <i>In Person</i> (45-minute presentation and 15-minute discussion)	Peter Garretson American Foreign Policy Council
10:00 AM	Other Perspectives <i>Virtual</i> (30-minute presentation)	Michael Nayak DARPA
11:00 AM	Lava Tubes/Pits, MoonDiver <i>In Person</i> (45-minute presentation and 15-minute discussion)	Laura Kerber JPL
12:05 PM	Working Lunch for Members, Speakers, and Invited Guests in Dining Room	
1:00 PM	Lunar Resources Panel Discussion (3 15-minute presentations and 45-minute discussion) (3 in person)	Elizabeth Frank, Interlune Evan Jensen, ICON Chris Stott, Lonestar Lunar
2:30	Break	
2:45 PM	Regolith for Radiation Shielding (3 15-minute presentations and 30-minute discussion) (2 in person, 1 virtual)	Lawrence Heilbronn, University of Tennessee Harlan Spence, University New Hampshire Tony Slaba, NASA
4:00 PM	Break	
4:15 PM	Landing Site Impingement Issues <i>In Person</i> (45-minute presentation and 15-minute discussion)	Phil Metzger University of Central Florida
5:15 PM	Meeting Adjourns to Alternate Location	

IMPORTANT NOTES

Presenters:

- Please do not include unpublished data, ITAR-controlled or sensitive information in your presentation.
- A National Academies Board staff member will ask you to sign a form before the meeting allowing us permission to use your likeness and presentation for our livestream video, which will be posted on our Board website after the meeting. Please get in touch with us before the meeting if you have any concerns about this usage.

Members and Presenters:

- Remote access will be provided through Zoom. This will allow you to participate in the meeting even if you can't be physically present.
- Please note that Zoom allows audio and any materials exchanged or viewed during the session to be recorded and shared.
- By participating in this activity, you agree to let your voice, likeness, and any materials you provide be recorded for use and dissemination. This includes any language, format, or media now known or later devised.
- You release the National Academies of Sciences, Engineering, and Medicine from any and all claims, liability, or damages arising from any such use. If you disagree, please do not join the session.

Members of the General Public:

- Remote access will be provided through a live stream on Vimeo. This will also be publicly available and posted on the Board website. You do not need to register.

Thank you all for your cooperation, and we look forward to a successful meeting.

STATEMENT OF TASK

Statement of Task

Panel on Applied Sciences

The Panel on Applied Sciences will gather information and identify and articulate the science objectives related to space technology and engineering and in situ resource utilization that would be most enabled by human explorers on the moon. Using NASA's 2022 Moon to Mars Objectives and other gathered information, the panel will:

- Identify key science objectives of space technology and engineering and in situ resource utilization that can or must be done by human explorers on the lunar surface;
- Specify the key measurements, either in situ or via returned samples, needed to achieve these key science objectives and why human explorers would enable those measurements (as opposed to robotic assets);
- Detail any pre-placed assets (e.g., tools, mobility devices, robotic hardware, and equipment delivered to the lunar surface prior to human landing) that would be either necessary or enabling of these key measurements; and
- Prioritize potential non-polar landing sites or characteristics of landing sites that would be most enabling of these key science objectives and measurements

This panel is one of four operating under the aegis of "Key Non-Polar Destinations Across the Moon to Address Decadal-level Science Objectives with Human Explorers" and its steering committee. The panel will provide the steering committee with its findings and a science traceability matrix outlining each potential non-polar landing site (or characteristics of landing sites) and the science objectives it would enable. The panel will not produce recommendations as part of its input to the project's Steering Committee.

Overall Project Statement of Task

The National Academies of Sciences, Engineering, and Medicine will convene an ad hoc committee to address the topic of “Key Non-Polar Destinations across the Moon to Address Decadal-level Science Objectives with Human Explorers.” To address this topic, the committee will:

- Define a strategy and provide a prioritized list of high-value human sortie destinations for lunar exploration across the Moon (except for the poles), along with any time-ordering constraints, using published documentation, expert testimony, and other input, as appropriate.
 - o A sortie is defined here as two crew members to the surface for 1-4 EVAs, destination-dependent.
 - o Site prioritization might be based on addressing single highest-priority objectives at a single destination.
 - o Discuss whether the number or sequence of destinations explored influences the prioritization, e.g., if exploration at one site would benefit from a preceding mission to another destination.
- For each target destination identified, provide
 - o Key science objectives to be addressed at that location, tied to the National Academies report *Origins, Worlds, and Life: A Decadal Strategy for Planetary Science and Astrobiology 2023-2032* (OWL) and NASA's Moon to Mars Objectives.
 - o Key measurements, made in situ, needed to achieve the identified science objectives.
 - o Key measurements that can or must be enabled via samples collected and returned to terrestrial labs to achieve the identified science objectives
 - o Justification for why these measurements or sample collection efforts would require or would most effectively be enabled by human explorers (as opposed to robotic rovers or sample return)
 - o Discussion of what, if any, pre-placed assets would be necessary or enabling to accomplish these measurements (e.g., tools, mobility devices, robotic hardware, and equipment delivered to the lunar surface prior to human landing)
 - o Key resources available at this destination that might be useful for in-situ resource utilization.
- Produce a report that describes the recommended strategy, that also includes at a minimum:
 - o Science traceability matrices for each target destination.
 - o A visual summary of targeted geographic locations on the Moon and the associated key science objectives addressed.

Project

- [Key Non-Polar Destinations Across the Moon to Address Decadal-level Science Objectives with Human Explorers](#)