



Terms of Reference for the Artemis Science Definition Team

1. Scope of Science Definition Team (SDT)

The SDT will define compelling and executable science objectives for the Artemis III mission, the first human mission to the surface of the Moon in the 21st century. The SDT will assess objectives for the mission to achieve the science goals articulated by NASA including investigation approaches, key surface science activities, and potential inputs into the concept of operations.

At the end of its work, the SDT will submit a final report to the Planetary Science Division that contains prioritized science objectives for all aspects of the Artemis III mission, including sampling strategies and science goals and priorities of deployable instrument packages.

1.1. Topics Within Scope of the SDT's Consideration

The SDT shall include the following elements in their discussions and final report:

1. Science goals, objectives, and investigations to be addressed by the Artemis III mission, based upon recommendations from the LEAG United States Lunar Exploration Roadmap, the 2007 NRC Scientific Context for the Exploration of the Moon report, the LEAG Advancing Science of the Moon report, and solicited public white papers, required in order to initiate execution of the Artemis Science Plan. These goals will also consider Decadal Survey-recommended goals and objectives, but refined and focused in light of scientific advances since the Decadal Survey's publication and in order to ensure that Artemis science is compelling and executable.
2. Science traceability matrix, based upon the Artemis III reference mission architecture, to develop objectives and identify investigations that address those science goals.
3. Set of criteria to rank the relative priority of surface investigations and apply it to the investigations recommended.
4. Science requirements to address each investigation, including landing site characteristics, amount of crew interaction, measurement precision, spatial density, whether subsurface access is required, whether samples are required, longevity/duration for deployed experiments, etc.

5. Potential scientific synergy between Artemis III surface science and other planned or currently operating missions and deliveries (both NASA and non-NASA).

1.2. Topics Not Within Scope of SDT's Consideration

A number of elements will be excluded from the SDT's consideration. These topics will be redacted from any public input to the SDT and should not be discussed by the SDT. The SDT report shall not include advocacy, either for or against, or recommendations about any of the following topics. Due to the dynamic nature of the SDT process, NASA may modify this list as appropriate.

1. Particular instrument types, instrument builds, non-spacecraft capabilities (e.g., models, ground-based observatories). While some measurement requirements have generally been met by particular instruments, the SDT shall not recommend those particular instruments to the exclusion of other instruments (or combinations thereof) that could meet the requirement of measuring particular physical parameters.
2. The method, structure, content, or target of any mission formulation activity. This includes the direction, competition (e.g., AO, RFP), or invited contribution (i.e., from international partners) of mission components (e.g., spacecraft, instruments, inter-mission collaboration).
3. Any procurement activity in support of mission formulation activity. In instances where a need or opportunity outside of the committee's mandate is recognized, the SDT shall identify it for NASA to address separately.
4. Mission development costs or mission budget targets, either projected or recommended. All needed budgetary constraints will be provided by NASA.
5. Any specific Human Landing System or strategy.
6. Any potential NASA collaborations with specific US or non-US organizations.

Additionally, science goals, investigations, and requirements that are reviewed and determined by the SDT, as defined in 1.1., will be explicitly separated from mission requirements. Final mission plans will involve iterative meetings between SMD and HEOMD, taking the outcomes of this SDT into account.

2. Membership and Roles

The SDT consists of subject matter experts from the Civil Service and consultants from the scientific community occupying community leadership roles who have demonstrated significant and unique domain expertise and knowledge in lunar science and exploration. SDT members and consultants were selected by the Associate Administrator of the Science Mission Directorate, with the concurrence of the Director, Planetary Science division.

Co-chairs:

Renee Weber, NASA MSFC
Barbara Cohen, NASA GSFC
Sam Lawrence, NASA JSC

Civil Servant Members:

Jeremy Boyce, NASA JSC
Michael Collier, NASA GSFC
Caleb Fassett, NASA MSFC
Lisa Gaddis, USGS Astrogeology
John Gruener, NASA JSC
Jennifer Heldmann, NASA ARC
Noah Petro, NASA GSFC
Kelsey Young, NASA GSFC

Consultants:

Amy Fagan, LEAG Chair
Carlé Pieters, SSERVI Chief Scientist
Juliane Gross, CAPTEM Lunar Sample Subcommittee Chair

Amanda Nahm, SMD PSD, will serve as the Executive Secretary for the SDT.

The following civil servants will serve as ex officio members, in an observing capacity:

Sarah Noble, SMD Planetary Science Division
Debra Needham, SMD Exploration Science Strategy and Integration Office
James Spann, SMD Heliophysics division
Jake Bleacher, HEOMD
Julie Mitchell/Francis McCubbin, JSC curation
David Draper, NASA Office of the Chief Scientist

3. Organizational and Preparatory Pre-work

The SDT shall engage in organizational and preparatory pre-work ahead of the virtual in-person meetings as needed to successfully complete its work.

4. SDT Schedule

MEETING	DATE	PARTICIPANTS
Science Goals/Objectives Meeting 1	Week of 07 Sep	Civil Servants Only
Science Goals/Objectives Meeting 2	Week of 14 Sep	All
Traceability/Surface Investigations Meeting 1	Week of 21 Sep	All
Traceability/Surface Investigations Meeting 2	Week of 28 Sep	Civil Servants Only
Traceability/Surface Investigations Meeting 3	Week of 05 Oct	All
Traceability/Surface Investigations Meeting 4	Week of 12 Oct	Civil Servants Only
Science Requirements Meeting 1	Week of 19 Oct	All
Science Requirements Meeting 2	Week of 26 Oct	Civil Servants Only
Science Requirements Meeting 3	Week of 02 Nov	All
Final Report to PSD	06 November	All

Consultants will attend Science Goals/Objectives Meeting 2 in order to provide community perspectives on the white papers submitted. They will attend Traceability/Surface Investigations Meetings 1 and 3 to provide input on their specific areas of expertise and will organize short reports from other community members to fill in holes in expertise not covered by the remaining committee membership. They will also attend Science Requirements Meetings 1 and 3 to ensure that the viewpoints from their respective communities are represented in the requirements definition and final report.

5. Input to and Comments for the SDT

The SDT will rely heavily on existing community-generated documents as the basis of their deliberations. Further, NASA invites input to the SDT process through the submission of short white papers, and has provided a public Artemis SDT webpage to receive those papers (<https://www.lpi.usra.edu/announcements/artemis/>). In addition, to provide opportunity for public comment two town halls will be held, the first in conjunction with the September LEAG meeting, the second once a draft report is released.

6. SDT Reports

The SDT will deliver a final report to the Planetary Science Division upon completion of team activities, anticipated by 30 Oct. 2020. PSD will make the report publicly available upon acceptance and work with HEOMD to integrate it into the Artemis Science Plan. The report is anticipated to contain a summary of submitted white papers, a science traceability matrix, a prioritized list of surface experiments, and requirements for each measurement, including (but not limited to: landing site characteristics, amount of crew interaction, measurement precision, spatial density, whether subsurface access is required, whether samples are required, longevity/duration for deployed experiments, etc.

Two weeks prior to submission of the report, a public comment period will open on the draft report. Public commentary will also be summarized in the report.

In addition to any other location, approved reports and public commentary will be made available on the Artemis SDT webpage.

CONCURRENCE:

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Planetary Science Division

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Lori S. Glaze, Ph.D.
Director, Planetary Science Division

**DAVID
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David Burns
Acting Deputy Associate Administrator for Exploration,
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APPROVAL:

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Thomas H. Zurbuchen, Ph.D.
Associate Administrator,
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