The National Academies of
SCIENCES • ENGINEERING • MEDICINE

DIVISION ON ENGINEERING AND PHYSICAL SCIENCES
SPACE STUDIES BOARD

Decadal Survey on Planetary Science and Astrobiology: Steering Group Meeting on behalf of the R & A Working Group

AGENDA

Thursday, 15 July 2021

(All times are EDT, UTC -4 hours)

OPEN SESSION[1]

05:45 p.m.	*The audio and video connection will go live*	
06:00 p.m.	Welcome and Agenda Review	David Smith NAS
06:05 p.m.	Virtual Astrobiology Institutes	Mary Voytek, NASA Interdisciplinary Consortia for Astrobiology Research (ICAR) Penelope Boston, NASA Astrobiology Institute (NAI)
06:35 p.m.	Q and A Session	All
06:50 p.m.	Updates from NASA R & A Program	Stephen Rinehart NASA Headquarters
7:35 p.m.	Q&A Session	
08:00 p.m.	*Open Session Adjourns*	

CLOSED SESSION

08:00 p.m.	Committee will be in closed session	Committee
08:30 p.m.	*Meeting Adjourns*	

[1]Zoom: https://nasem.zoom.us/j/91041739702?pwd=THVMOHROUEYxZkphYXREZGZ3OExkUT09
Password: 135019

STATEMENT OF TASK AND RELATED DOCUMENTS

The guiding document for the decadal survey is the Statement of Task. The Scope, Considerations, Approach, and Products outlined below are additional counsel for the committee and its staff while they carry out their work.

STATEMENT OF TASK

The Space Studies Board shall establish a survey committee (the "committee") to develop a comprehensive science and mission strategy for planetary science that updates and extends the Board's current solar system exploration decadal survey, Vision and Voyages for Planetary Science in the Decade 2013-2022 (2011).

The new decadal survey shall broadly canvas the field of space- and ground-based planetary science to determine the current state of knowledge and to identify the most important scientific questions to be addressed during the interval 2023-2032.

For the first time, this decadal survey will also study aspects of planetary defense, now that this activity is fully incorporated as an element of NASA's planetary science endeavors. The survey will also take into account planned human space exploration activities.

In addition, the survey and report shall address relevant programmatic and implementation issues of interest to NASA and the National Science Foundation (NSF). Since the content and structure of the program portfolios of the two agencies are distinct from one another, implementation and investment recommendations specific to each agency should be elaborated in separate sections of the final report. This will ensure that the report's investment guidance will be clearly addressed to the appropriate agency.

It is critically important that the recommendations of the Committee be achievable within the boundaries of anticipated funding. NASA and NSF will provide an up-to-date understanding of these limitations to the committee at the time of survey initiation.

The report should provide a clear exposition of the following:

1. An overview of planetary science, astrobiology, and planetary defense—what they are, why they are compelling undertakings, and the relationship between space- and ground-based research;
2. A broad survey of the current state of knowledge of the solar system;
3. The most compelling science questions, goals and challenges which should motivate future strategy in planetary science, astrobiology, and planetary defense;
4. A coherent and consistent traceability of recommended research and missions to objectives and goals;
5. A comprehensive research strategy to advance the frontiers of planetary science, astrobiology and planetary defense during the period 2023-2032 that will include identifying, recommending, and ranking the highest priority research activities (research activities include any project, facility, experiment, mission, or research program of sufficient scope to be identified separately in the final report). For each activity, consideration should be given to the scientific case, international and private landscape, timing, cost category and cost risk, as well as technical

readiness, technical risk, lifetime, and opportunities for partnerships. The strategy should be balanced, by considering large, medium, and small research activities for both ground and space;

6. Recommendations for decision rules, where appropriate, for the comprehensive research strategy that can accommodate significant but reasonable deviations in the projected budget or changes in urgency precipitated by new discoveries or technological developments;

7. An awareness of the science and space mission plans and priorities of NASA human space exploration programs and potential foreign and U.S. agency partners reflected in the comprehensive research strategy and identification of opportunities for cooperation, as appropriate;

8. The opportunities for collaborative research that are relevant to science priorities between SMD's four science divisions (for example, comparative planetology approaches to exoplanet or astrobiology research); between NASA SMD and the other NASA mission directorates; between NASA and the NSF; between NASA and other US government entities; between NASA and private sector organizations; between NASA and its international partners; and

9. The state of the profession including issues of diversity, inclusion, equity, and accessibility, the creation of safe workspaces, and recommended policies and practices to improve the state of the profession. Where possible, provide specific, actionable and practical recommendations to the agencies and community to address these areas.

SCOPE

In order to ensure the committee provides actionable advice and to ensure consistency with other advice developed by the National Academies, guidelines for the scientific scope of the survey are as follows:

1. The report should address and be organized according to the significant, overarching questions in planetary science, astrobiology, and planetary defense.

2. Basic or supporting ground- and space-based, laboratory, field, and theoretical research in astrobiology is within scope. Any findings and recommendations in the area of astrobiology should take into consideration the National Academies' report *An Astrobiology Strategy for the Search for Life in the Universe* (2018);

3. Interactions between solar and heliospheric phenomena and the atmospheres, magnetospheres, and surfaces of solar system bodies are within scope. Reassessment of recommendations treated in the National Academies' *Solar and Space Physics: A Science for a Technological Society* (2012) is out of scope;

4. Excluding analog studies, focused study of the Earth system, including its atmosphere, magnetosphere, surface, and interior, is out of scope (these topics are treated in the National Academies' *Thriving on our Changing Planet: A Decadal Strategy for Earth Observation from Space* (2017);

5. Studies of meteorites and other extraterrestrial materials in terrestrial laboratories that further planetary science goals are in scope but findings and recommendations in this area should take into consideration the National Academies' report *Strategic Investments in Instruments and Facilities for Extraterrestrial Sample Curation and Analysis* (2018).

6. Recommendations for ground- and space-based investigations to detect exoplanets are out of scope (these topics are being addressed by "ASTRO2020: Decadal Survey on Astronomy and Astrophysics" currently in progress). However, the identification of scientific issues and questions related to the study of exoplanets, including the comparative planetology and potential habitability of solar and extrasolar planets, is in scope.

7. Scientific investigations of near-Earth objects, both for the impact hazard presented to Earth and the future exploration and resource opportunities, are within scope. Findings and recommendations in this area should take into consideration the National Academies' report *Defending Planet Earth: Near-Earth-Object Surveys and Hazard Mitigation Strategies* (2010) as well as more recent National Academies' and community studies related to this area such as the *Near-Earth Object Observations in the Infrared and Visible Wavelengths* (2018)

8. Findings and recommendations concerning planetary protection policies are out of scope. But, the identification of planetary protection considerations for recommended missions–as recommended in the National Academies' *Review and Assessment of the Planetary Protection Policy Development Processes* (2018)–and research or technology development to mitigate concerns about biological contamination are in scope.

9. Recommendations regarding new construction of major new ground-based observatories are out of scope (these are addressed within the scope of the ASTRO2020 decadal survey currently in progress). The role that current and contemplated new ground-based facilities can play in advancing planetary science is in scope. How the facilities under consideration in the ASTRO2020 survey (when available) could benefit planetary science is within scope.

10. The scientific identification and initial validation of technosignatures is in scope but the application of such signatures in survey studies is out of scope. Recommendations in this area should take into account the summary of the Technosignatures Workshop found in the meeting report *NASA and the Search for Technosignatures* (2018) as well as the National Academies' reports *An Astrobiology Strategy for the Search for Life in the Universe (2018) and Exoplanet Science Strategy* (2018).