

The National Academies of
SCIENCES • ENGINEERING • MEDICINE

DIVISION ON ENGINEERING AND PHYSICAL SCIENCES
SPACE STUDIES BOARD

**Decadal Survey on Planetary Science and Astrobiology:
Panel on Giant Planet Systems**

**Eighth Meeting
AGENDA**

Friday, 16 2021

(All times are EDT)

OPEN SESSION¹

- | | | |
|------------|--|--|
| 09:00 a.m. | <i>Cryogenic Hydrogen Oxygen Propulsion System (CHOPS)
for Planetary Science Missions</i> | Shuvo Mustafi
NASA GSFC
Lloyd Purves,
NASA GSFC |
| 09:45 a.m. | Panel on Exoplanet Observations
HabEx, Scott Guadi – Ohio State University
LUVOIR, Aki Roberge – NASA GSFC
Origins Space Telescope, Kevin Stevenson – JHU APL | |
| 11:00 a.m. | <i>Open Session Adjourns</i> | |

CLOSED SESSION

- | | | |
|------------|----------------------|-----------|
| 11:00 a.m. | Committee Discussion | Committee |
| 12:00 p.m. | Meeting Adjourns | |

¹ Zoom: <https://nasem.zoom.us/j/91695289182?pwd=a1dpNHFvUGRlbWUycUh0VzdTb0xvdz09>

NOTES

Note to Observers: This meeting is being held to gather information to help the committee conduct its study. This committee will examine the information and material obtained during this, and other public meetings, in an effort to inform its work. Although opinions may be stated and lively discussion may ensue, no conclusions are being drawn at this time and no recommendations will be made. In fact, the committee will deliberate thoroughly before writing its draft report. Moreover, once the draft report is written, it must go through a rigorous review by experts who are anonymous to the committee, and the committee then must respond to this review with appropriate revisions that adequately satisfy the Academy's Report Review committee and the chair of the NRC before it is considered an NRC report. Therefore, observers who draw conclusions about the committee's work based on today's discussions will be doing so prematurely.

Furthermore, individual committee members often engage in discussion and questioning for the specific purpose of probing an issue and sharpening an argument. The comments of any given committee member may not necessarily reflect the position he or she may actually hold on the subject under discussion, to say nothing of that person's future position as it may evolve in the course of the project. Any inference about an individual's position regarding findings or recommendations in the final report are therefore also premature.

Note to Presenters: If your presentation contains unpublished data, ITAR controlled and/or other sensitive information, please be aware that the open sessions at the meeting are being webcast and presentation materials given to the committee may be posted on a publicly accessible website. Please edit your presentations accordingly.

Question and Answers: Given the size of the panel and the limited amount of time available for questions and answers, comments and questions from non-members cannot be accommodated during this meeting.

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

Panel Description:

This panel will discuss the role played by focused studies of Jupiter, Saturn, Uranus, and Neptune (including their magnetospheres, rings, and satellites) in addressing the broader activities described in the decadal survey's statement of task, and will report its findings to the decadal survey's steering group.

Overall Project 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.