Update on Planning
for the
National Academies' Decadal Survey
in
Planetary Science and Astrobiology

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Lunar and Planetary Science Conference
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The National Academies' Space Science Decadal Surveys

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Director

Space Studies Board and

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National Academy of Sciences

On March 3, 1863 at the height of the US Civil War, President Abraham Lincoln signed an Act of Congress to create the National Academy of Sciences.

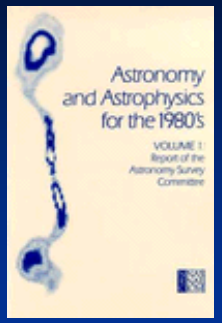
NAS and Astrobiology/Planetary Science

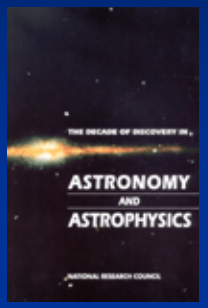
"… the primary scientific goals of this program are immense: a better understanding of the origins of the solar system & the universe, the investigation of the existence of life on other planets, & potentially, an understanding of the origin of life itself."

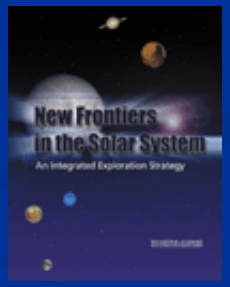
1961 letter from the SSB to NASA Administrator James Webb,

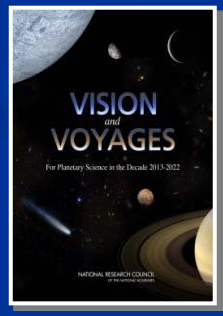
Space Science Decadal Surveys

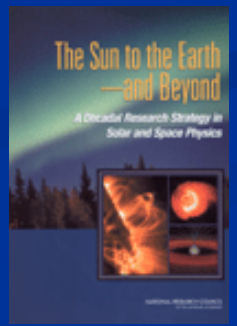
- Astronomy and Astrophysics
  1963, 1973, 1982, 1991, 2001, 2010, (2020)
- Planetary Science
  2003, 2011, (2022)
- Solar and Space Physics
  2003, 2012, (2024)
- Earth Science and Applications from Space
  2007, 2018, (2029)
- Biological and Physical Research in Space
  2011, (2022)











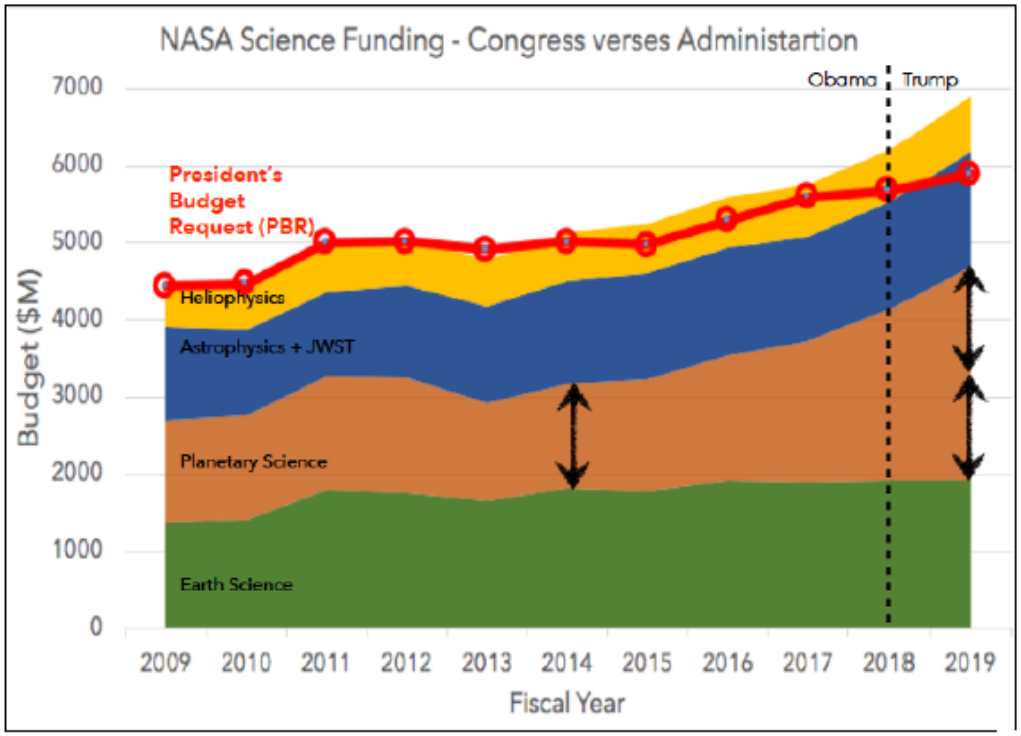
What is a Decadal Survey?

- Assesses the current status of an entire scientific discipline
- Defines and prioritizes the key scientific questions that could potentially be addressed in the next decade
- Prioritizes the most important initiatives that might be undertaken to address the most important questions
- Conducted by the National Academies, independently of sponsoring agencies and organizations
- Fulfills mandate of NASA Authorization Acts of 2005, 2008 to engage with the Academies to conduct decadal surveys in all major space science disciplines, including an independent risk evaluation of missions, when possible

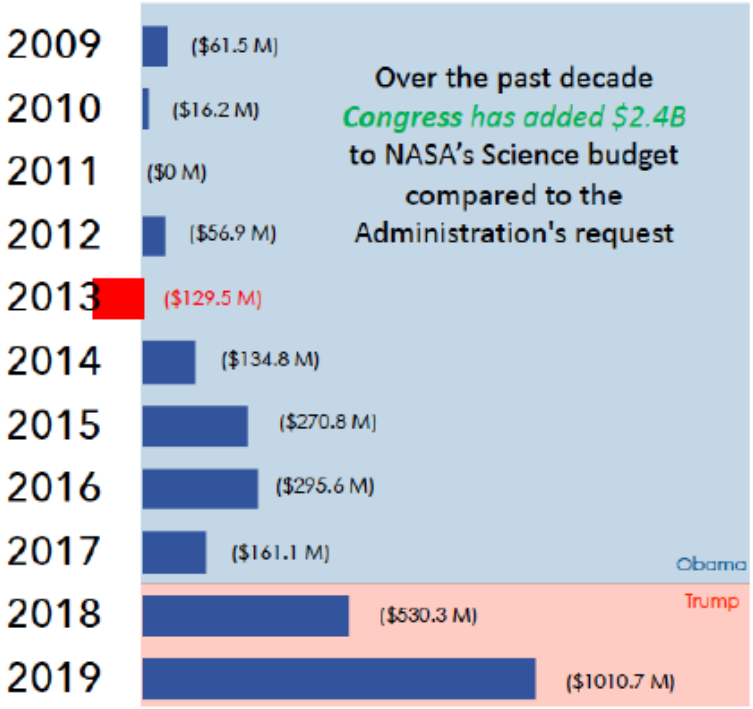
Sponsoring agencies and Congress view~~s~~ surveys as the formal statement of priority by the US space science community, and have repeatedly stated their intent to give highest priority to the missions identified in the survey.

PSD's Budget Doubled Since 2014

NASA's *Planetary Science Division budget* has been ***doubled*** in just 5 years (since FY14)



Annual Congressional funding levels for NASA Science (SMD) by Division

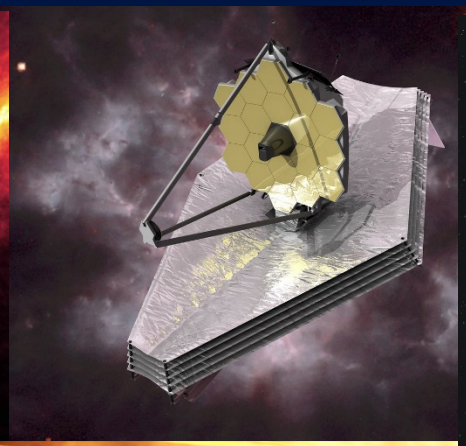


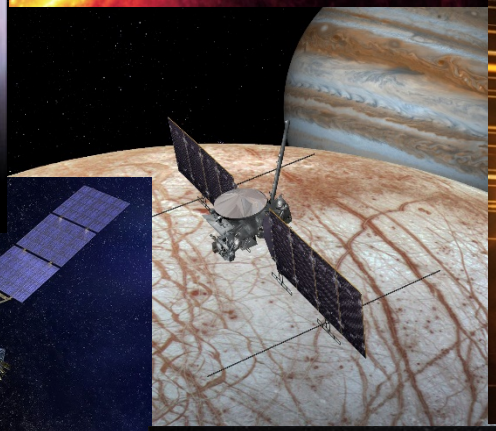
Comparison of annual outcome – enacted versus PBR for NASA's SMD budget

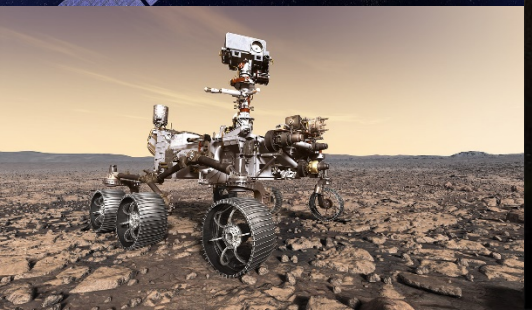
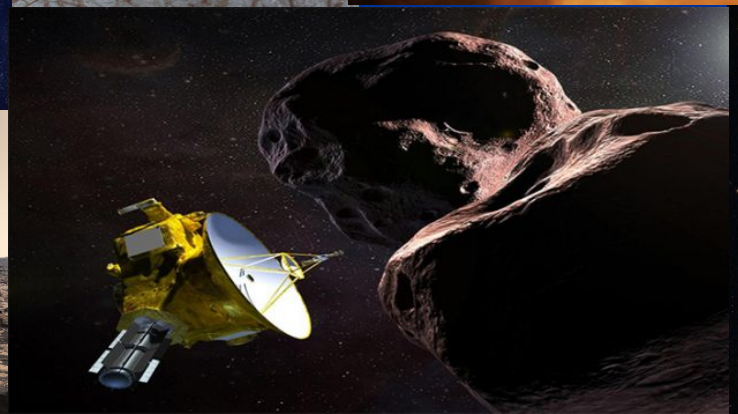
Courtesy Heidi Hammel

Outcomes are Fantastic!








Statement of Task

Lori Glaze
Director,
Planetary Science Division
NASA Science Mission Directorate

What is the Statement of Task?

- The statement of task can be found at this website: https://sites.nationalacademies.org/SSB/SSB_198165
- It is the guiding document for the survey
- It outlines exactly what the sponsors—NASA and NSF—and the National Academies want the survey committee to do
- The National Academies requires its committees to do no more or no less than what is specified in the statement of task
- The above website contains additional information—i.e., scope, considerations, and approach—in the form of suggestions to make the survey most useful to NASA and NSF but they are not binding on the survey committee

What is the Same?

- Overview of relevant disciplines
- Broad survey of the current state of knowledge
- Inventory of top-level science questions and research activities
- Recommendations on optimum balance between target bodies, large/medium/small missions, ground versus space, etc.
- Assessment of infrastructure
- Discussion of strategic technology development needs
- Ranking large/medium space missions (with cost and technical evaluation), ground-based facilities, supporting research

What is New?

- A higher profile for astrobiology and planetary defense
- Recommended activities clearly traceable to goals/objectives
- Decision rules to accommodate significant deviations in budget, new discoveries, or technological development
- Awareness of human exploration activities undertaken by NASA and international partners
- Discussion of opportunities for collaboration with other SMD divisions, NASA directorates, federal agencies, international partners and the private sector
- Consideration of issues related to the state of the profession

Nominations, Schedule, and Early Career Opportunities

David H. Smith
Study Director
Space Studies Board
National Academies

Nominations

Nominations and self nominations are encouraged. We are looking for individuals with the following characteristics:

- Scientific and technical expertise and objectivity;
- Broad thinking, open-minded, and not an active proponent of a specific project;
- Experience in the management of a project, organization, or equivalent enterprise, is advantageous; and
- Willing to participate in-person in survey committee activities

A nominations website is being established

Nominations Caveat

Prospective members of Academy committee have their financial relationships reviewed to prevent actual or perceived conflicts of interest. Additionally, the Academies evaluates whether each prospective member is a strong, publicly known advocate for a specific project. Therefore, we have special considerations for the authors of white papers and mission studies:

- All authors of science-focused whitepapers are eligible to be considered;
- First authors of mission-focused whitepapers cannot serve on the steering group or on any panel considering their mission; and
- PIs of the NASA-funded, pre-decadal mission-concept studies cannot serve on the steering committee or on any panel considering their mission.

Early-Career Opportunities

- ***Early-career Events***—the 15 March event is being rescheduled, plus there will be more in the coming months. Stay tuned at www.nas.edu/planetarydecadal
- ***White Papers***—any and all can author and submit a white paper on any topic relevant to the statement of task
- ***Full-time Job***—The SSB has a job vacancy (PhD preferred). For details see https://www.nationalacademies.org/humanresources/
- ***Note Takers***—recruiting graduate students to take notes at meetings will begin once meeting dates are set
- ***Lloyd V. Berkner Internships***—Available at SSB for undergraduates (summer and autumn) and graduate students (autumn only)—https://sites.nationalacademies.org/SSB/index.htm
- ***Christine Mirzayan Fellowship***—Offered annually by Academies for graduate student and <5 years of completing a graduate degree—https://sites.nationalacademies.org/pga/policyfellows/

Notional Schedule for Decadal Survey

2019	
September	Organizing meeting and town hall at EPSC-DPS
October	Draft statement of task received from NASA
November	LPI launches white paper proposal web site
December	Town hall at AGU meeting
2020	
January	National Academies posts Statement of Task
February	Funding proposal to NASA, NSF
March	Early-career event and town hall at LPSC
April	Receive funding from NASA/NSF: Survey formally begins
Spring	White paper submission begin, chair announced
Summer	White paper deadline and meetings begin
2021	
Autumn	Complete draft of survey report assembled
2022	
Spring	Survey report released, dissemination starts
2023	End of dissemination/NASA contract

Thank You

Additional information about:
the Space Studies Board's Decadal Surveys
http://sites.nationalacademies.org/SSB/SSB_052297

The Space Studies Board
http://sites.nationalacademies.org/SSB/index.htm

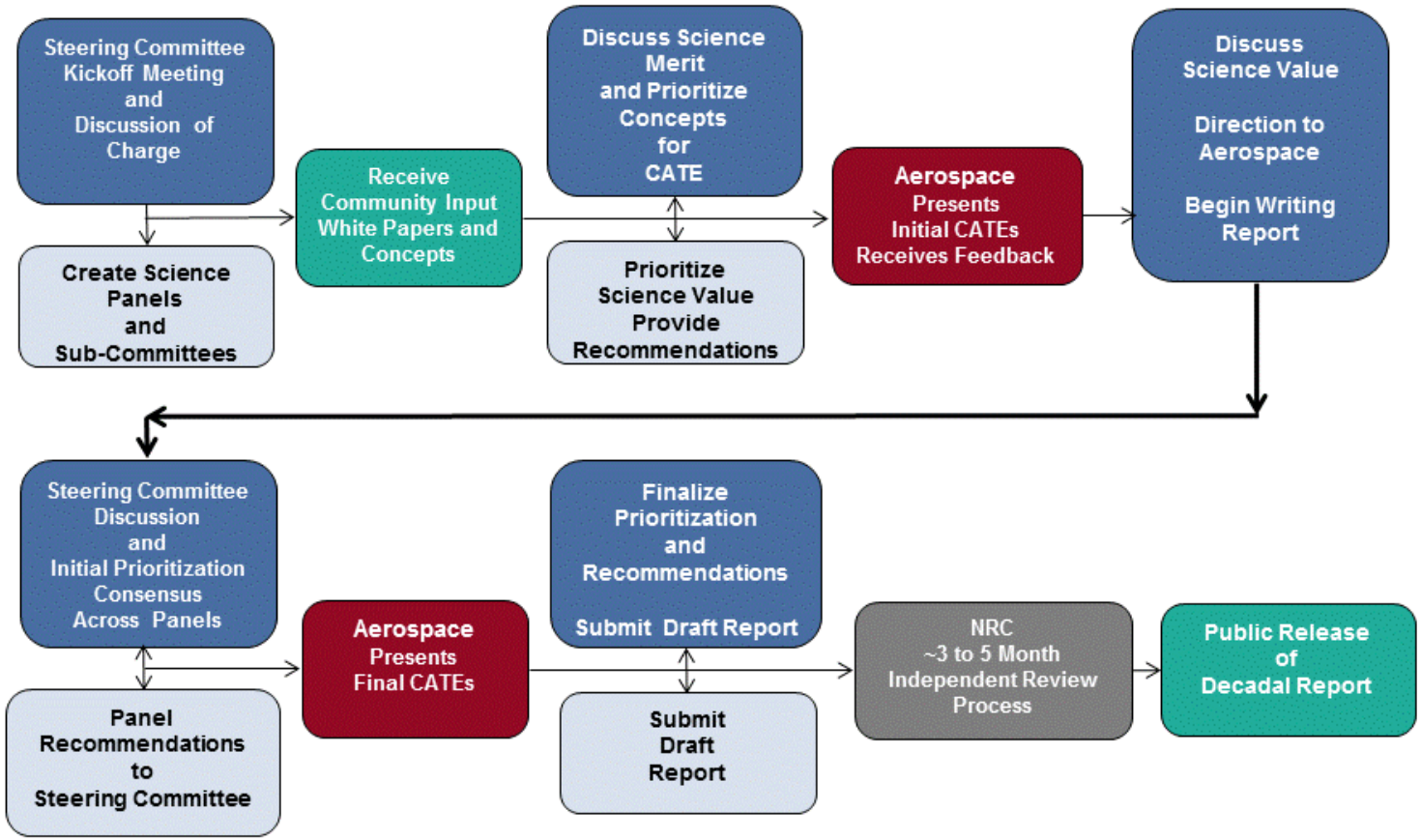
LPI white paper proposal site
https://www.lpi.usra.edu/decadal_whitepaper_proposals/

BACKUP

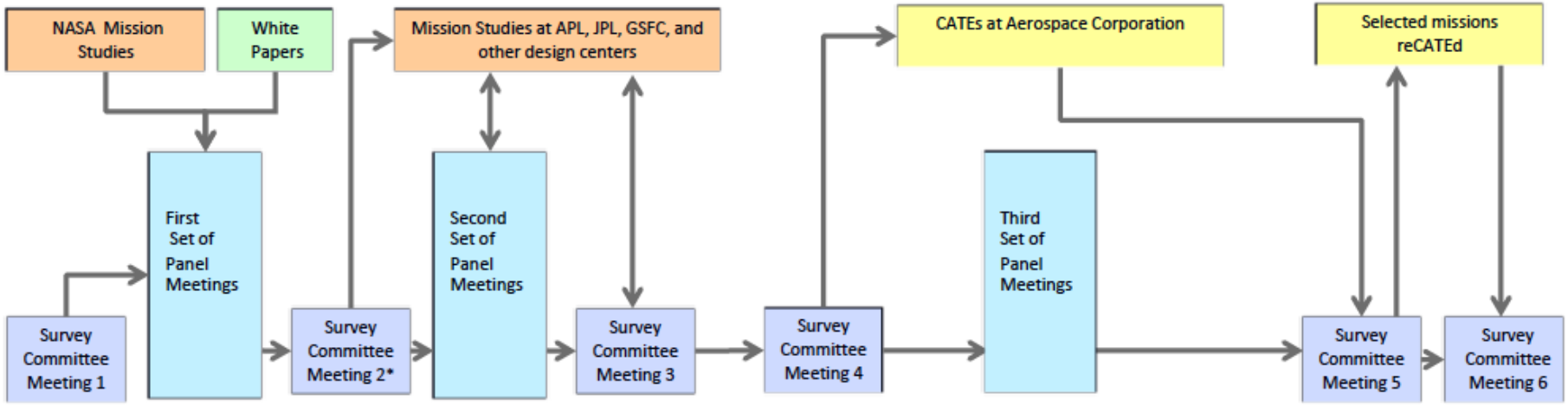
The Statement of Task

- 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;
- A broad survey of the current state of knowledge of the solar system;
- The most compelling science questions, goals and challenges which should motivate future strategy in planetary science, astrobiology, and planetary defense;
- A coherent and consistent traceability of recommended research and missions to objectives and goals;
- 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;
- 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;
- 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;
- 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
- 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.

Steps in a Typical Survey



Timeline for Second PSDS



July 2009	August 2009	September 2009	October 2009	November 2009	December 2009	January 2010	February 2010	March 2010	April 2010	May 2010	June 2010	July 2010	August 2010	September 2010
7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Months														

Panels formulate science goals and begin to define potential mission concepts based on prior NASA-planning activities and community white papers. Advocates for key mission concepts and other activities are invited to make presentations at panel meetings.

Panels nominate most promising mission concepts for technical studies at design centers. Panel-appointed "science champions " work with their design team to ensure fidelity to the science goals of each mission concept. In some cases, rapid mission architecture studies are followed by more detailed point-design studies.

Mission design reports inform panels as to the technical realism and likely cost of the initial list of priority mission concepts. Panels down-select missions and report back to survey committee.

Panel-nominated mission concepts are assessed by the survey committee, and most, if not all, were forwarded to Aerospace Corporation for independent cost and technical evaluation (CATE). When in doubt, the survey committee deferred to the panels as to the relative priorities within the respective panels areas of responsibility.

Results of Aerospace Corporation's CATEs are briefed to the survey committee, and the CATE reports are forwarded to their respective nominating panels. In two cases, CATEd missions were descoped by their nominating panel and re-CATEd. The survey committee determined the relative priorities between the panel-nominated missions.

Elements of a Survey Report

- Broad survey of the current state of knowledge
- Inventory of the top-level science questions
- Recommendations on optimum balance between target bodies, large/medium/small missions, ground versus space, etc.
- Assessment of infrastructure
- Discussion of strategic technology development needs
- Prioritized list of recommended strategic space missions, ground-based facilities, and supporting research

Organizing Meeting

Organized by CAPS and held at the Caltech on 10-12 September, 2019. Goal of meeting was to provide input to NASA, NSF and National Academies on organization and scope of the decadal survey. Items discussed:

- Perspectives from NASA and NSF
- Input from LEAG, MAPSIT, MEPAG, OPAG, SBAG and VEXAG
- Lessons learned from previous decadal surveys
- Survey organization, including discussion of panels structured by destinations, scientific themes or both?
- Community outreach and inclusion
- White papers, including timing, scope and format