



DIVISION ON ENGINEERING AND PHYSICAL SCIENCES

Decadal Survey on Biological and Physical Sciences Research in Space 2023-2032

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**Aeronautics and Space Engineering Board
The National Academies of Sciences, Engineering,
and Medicine**

How the Academies Works

Charter signed by President Lincoln, 1863

The Academies has many different activities underway every day (now virtual).

Over 500 expert committees are active at any given time.



1863

1st Study

The feasibility of
achieving "uniformity
of weights, measures,
and coins."

The Secretary of the Treasury requests a report

Treasury Department.

Apr. 24, 1863

My dear Sir,

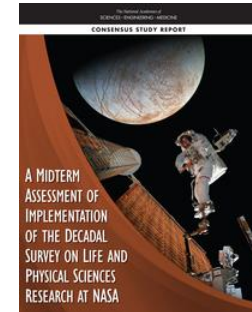
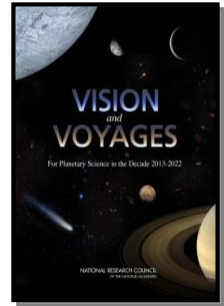
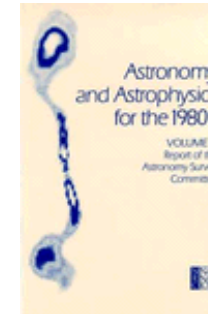
While you are in attendance
in the meeting of the National Academy
of Sciences, will you have the goodness
to invite the attention of the Academy
to a subject on which, as you are
aware, I take deep interest. I
mean the subject of uniformity of weights,
measures, and coins, considered in relation
to domestic and international commerce.

It seems of the greatest importance to
carry the decimal system thoroughly
into all measures of extent, quantity,
value, and if possible to obtain some
agreement or harmonization of these measures.



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, (2023, underway now!)



What is a Decadal Survey?



Assesses an entire scientific space science discipline



Prioritizes key scientific questions



Prioritizes associated missions, research, engineering, & facilities



Performed entirely independently of sponsoring organizations



Decadal Survey Goals

- **The Decadal Survey report presents a compelling program for the coming decade that represents the prioritized activities for the relevant U.S. space science community.**
- **Community participation is strongly encouraged and all fact-gathering meetings are open to the public.**
- **Deliberations are held in closed session in order to ensure independence from external influence.**
- **The distinguishing features of the process are: inclusiveness through white papers, independence from external influence, and transparency wherever possible.**

Who Charters a Decadal Survey?

- **Agencies such as NASA negotiate the Statement of Task with the National Academy.**

Who Uses a Decadal Survey?

- **Congress, the science community, and federal agencies rely on Decadal Surveys for guidance on prioritizations.**
- **Agencies and Congress consider Decadal Surveys the formal prioritization document from the relevant community, and have repeatedly stated their intent to give the highest priority to the missions or objectives ranked in a Decadal Survey.**

Why do we care about the decadal surveys?

They are both **swords and shields**.

They are **swords** for a highly ranked new program by providing a manager with arguments supporting a new activity.

They are **shields** because they protect highly ranked programs.

The changing environment over a decade is inherently difficult to map, but **decision rules** can allow for more relevant advice with changing budgets, mission costs, and unanticipated technology breakthroughs.

Let's go through the basic parts of a Decadal Survey used by the Steering Committee

Selection of Decadal Survey Participants

- An open call to all sources seeks nominations, including self-nominations, so as not to overlook any excellent candidates.
 - Community response was extensive. Also, we consulted widely.
- Composition intended to cover the range of expertise.
- Diversity is emphasized across multiple axes.
- Choice of co-chairs
 - Experienced, strong committee leader, familiar with the NASEM process and not perceived to be conflicted on critical decisions.
- Choice of panel members
 - Scientifically respected, broad view of the field, perceived as fair and unbiased.

A Decadal Survey member is charged with representing the interests of BPS, not of their institution or subfield.

Panels

- **Panels of experts are assembled by the National Academies covering the breadth of biological and physical sciences in space.**
- **Panels gather data and information, performing analyses, and develop input in their assigned area.**
- **Panels receive direction and feedback from the Steering Committee.**

Community Outreach

- **The National Academies arranges Town Hall meetings with the Decadal Survey Chairs and members, requests white papers from the community at large, and events to engage scientists who will see the fruition of this Decadal Survey and play key roles in its implementation.**
- **The scientific community white papers contribute immensely to the process. Every white paper is read by at least one member of the Decadal Survey.**

Science Prioritization

- **Each panel selects, refines, and applies criteria to identify research needs in its thematic area.**
- **Input from the panels is analyzed by the Steering Committee and synthesized into a common set of criteria for considering the highest priority recommendations.**

Technical, Risk and Cost Evaluation

- **The Steering Committee provides direction to contractor to utilize the Technical Risk and Cost Evaluation (TRACE) process on large recommended spaceflight projects (those costing more than \$100M) and on any other projects selected by the committee.**

The Decadal Survey Report

- **A Decadal Survey is a consensus document, with the co-chairs leading the conversation of the steering committee into general consensus on findings and recommendations.**
- **Once the draft is complete, a rigorous review is conducted by outside experts selected by the Academies.**

Typical Elements of a Survey Report

- Overview of relevant discipline.
- Broad survey of the current state of knowledge.
- Inventory of the top-level science questions and the impact of addressing them.
- Recommendations on optimum balance between fields, large/medium/small projects, ground versus space, etc.
- Consideration of infrastructure.
- Discussion of strategic capability needs and the requirements for a healthy community.
- Strategy for accomplishing recommended research objectives, programs, and supporting capability development.

BPS Decadal Survey Milestones

- Aug 2021 Committee Appointed
- Aug 16-17, 2021 Committee 1st Meeting
- Fall 2021 Panels Appointed & Committee 2nd Meeting
- Oct 31, 2021 Topical White Papers Due
- Dec 23, 2021 Research Campaign White Papers Due
- 2022 Series of Committee & Panel Meetings
- Jan 2023 Report to Review
- May 2023 Report Sign Off
- Summer 2023 Report Release Activities

Thank You!

Please Participate!

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Putting it all together

A Steering Committee of experts assembled by the National Academy is responsible for the overall conduct of the decadal survey –

- **Collecting input from panels;**
- **Requesting and analyzing input from the Technical, Risk, and Cost Analysis (TRACE) contractor;**
- **Drafting a report of top-level conclusions and recommendations;**
- **Responding to comments collected from the NASEM extensive report review analysis and modifying the draft report, as appropriate;**
- **After NASEM releases the Decadal Survey Report, the co-chairs will lead community briefings of the report with Steering Committee help over the coming decade!**

For a description of the entire study process, go to:

<https://www.nationalacademies.org/about/our-study-process>