

# Status Report on Planning for the Planetary Science Decadal Survey

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National Academies of Sciences, Engineering and Medicine

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# **Space Science Decadal Surveys: Origin, Organizations and Outcomes**

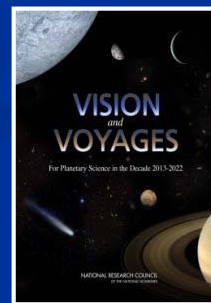
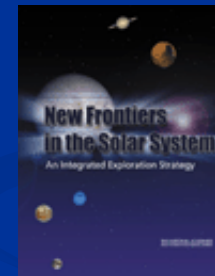
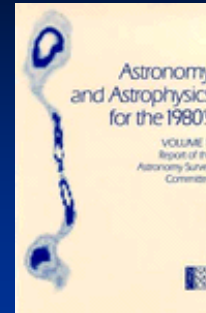
# National Academy of Sciences



The National Academy of Sciences was signed into being by President Abraham Lincoln on March 3, 1863, at the height of the U.S. Civil War. It is a private, self-perpetuating, society of distinguished scientists. But, its Act of Incorporation, mandates it to "investigate, examine, experiment, and report upon any subject of science or art" when asked to do so by any department of the government.

# 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?

- Assess the current status of an entire scientific discipline
- Defines and prioritizes the key scientific questions that could potentially be addressed in the next decade
- Defines and prioritizes the most important initiatives that might be undertaken to address the most important questions
- Are conducted independently of sponsoring agencies and organizations by the National Academies
- NASA is required by language in Authorization Acts of 2005 and 2008 to engage with the National Academies and conduct decadal surveys in all major space science disciplines
- Sponsoring Agencies and Congress views 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

# How is a Survey Conducted?

- A large group of experts selected and appointed by the National Academies—typically a steering group in overall charge and a series of supporting panels
- Specific actions taken to engage the community — an effort to achieve diverse inputs via a host of outreach mechanisms
- Supporting studies of promising mission concepts identified by NASA and, independently, by the Survey Committee
- An independent assessment of the technical, fiscal, and schedule realism of ground- and space-based facilities recommended
- A rigorous review conducted by outside experts selected by the National Academies

# Typical Survey's Goals

- The decadal survey process is aimed at articulating a program for the coming decade that represents as fully as possible the consensus view of the relevant US space science community.
- The distinguishing features of the decadal survey process are inclusiveness and transparency
- In contrast to past decadal surveys, post-2009 surveys place a very strong emphasis on cost and technical realism
- Community participation in all aspects of the decadal survey was strongly encouraged

# Past Ground Rules

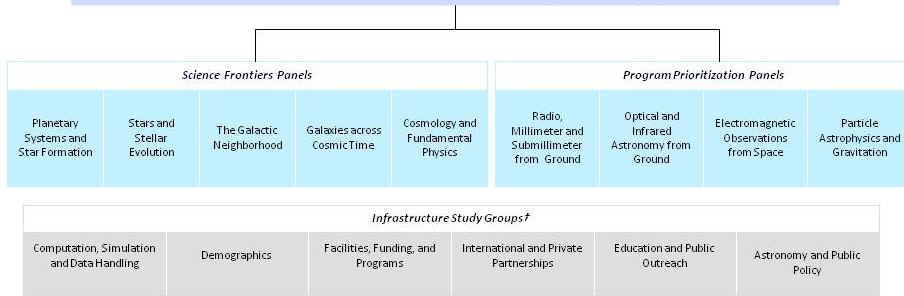
- Only missions that had a formal budgetary line were assumed *a priori* to be part of the decadal plan (i.e., not reprioritized), everything else was within scope for prioritization
- Surveys have not, in general, prioritized small missions (e.g., Discovery-class or smaller) or R&A-type activities
- Missions that had been extensively discussed and studied but had not entered Phase A (e.g., EJSM, TSSM, Venus Flagship) were “on the table”

# Typical Elements of a Survey Report

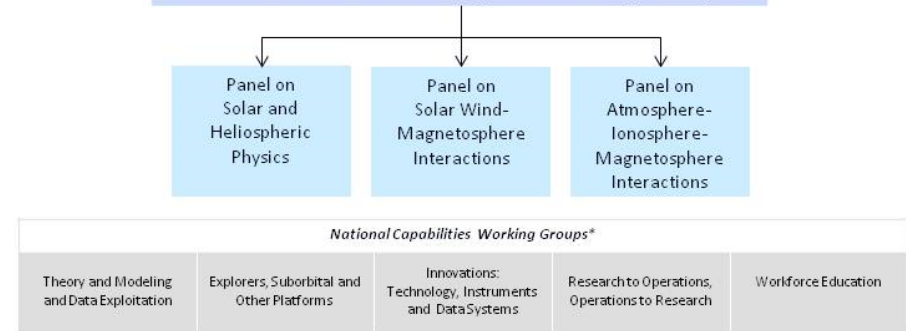
- Overview of relevant discipline
- Broad survey of the current state of knowledge
- Inventory of the top-level science questions
- Recommendations on optimum balance between target bodies, large/medium/small missions, ground versus space, etc.
- Assessment of infrastructure
- Discussion of strategic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

# No Two Surveys Are the Same

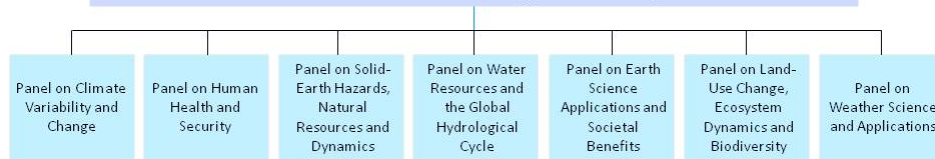
## Committee for a Decadal Survey of Astronomy and Astrophysics\*



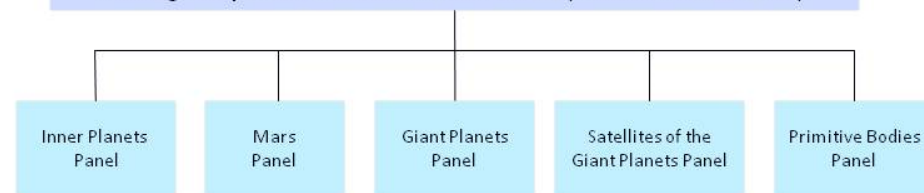
## Committee on a Decadal Strategy for Solar and Space Physics



## Committee on Earth Science and Applications from Space



## Steering Group of the Committee on the Planetary Science Decadal Survey



# Outcomes

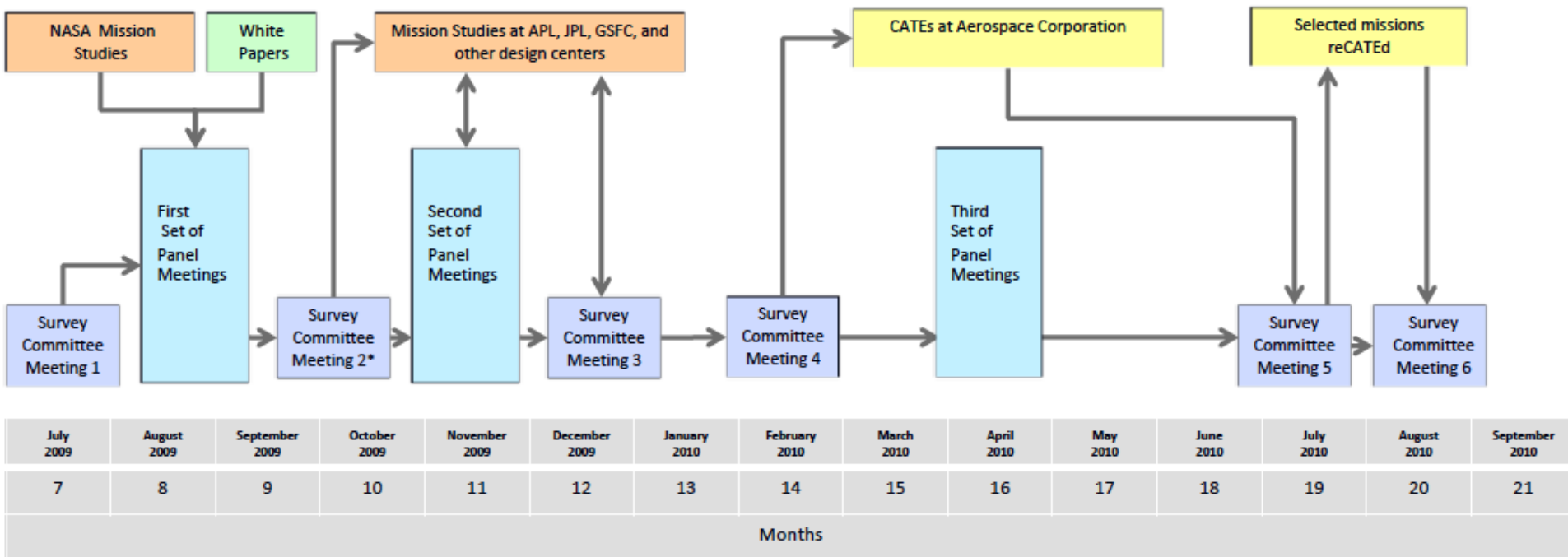


# Status of Planning and Notional Schedule

# Notional Schedule for Third PSDS

Last week	Organizing meeting for 3 <sup>rd</sup> planetary science decadal survey
~1/2020	Statement of task finalized, proposal submitted and funded
~2/2020	White paper submission website opens
~3/2020	Chair selected and announced at LPSC
~5/2020	Deadline for submission of white papers
~6/2020	Survey committee and panel meetings begin
~10/2021	First complete draft of survey report assembled
~3/2022	Survey report released at LPSC

# Timeline for Second PSDs



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.

# Studies Relevant to PSDS I

- Decadal Surveys: Lessons Learned and Best Practices (2015)
- Achieving Science Goals with CubeSats (2016)
- NASA Science Mission Extensions: (2016)
- Review of SMD/PSD Reorganized R&A Programs (2017)
- Large Strategic NASA Science Missions (2017)
- CAPS Short Report: Getting Ready for the Next Planetary Decadal (2017)

# Studies Relevant to PSDS II

- Planetary Protection Policy Development Process Review (2018)
- CAPS Short Report: Review of the Planetary Science Aspects of the Administration's Lunar Science and Exploration Initiative (2018)
- Planetary Science Decadal Midterm Review (2018)
- Exoplanet Exploration Strategy (2018)
- Astrobiology Strategy for the Search for Life in the Universe (2018)
- Review of Extraterrestrial Sample Analysis Facilities (2018)
- CAPS Short Report: The Role of Commercial Ventures in Addressing Lunar Science and Exploration Objectives (2018)
- Martian Moons Planetary Protection (2019)

# Thank You

Additional information about the Space Studies Board's  
Decadal Surveys can be found at:

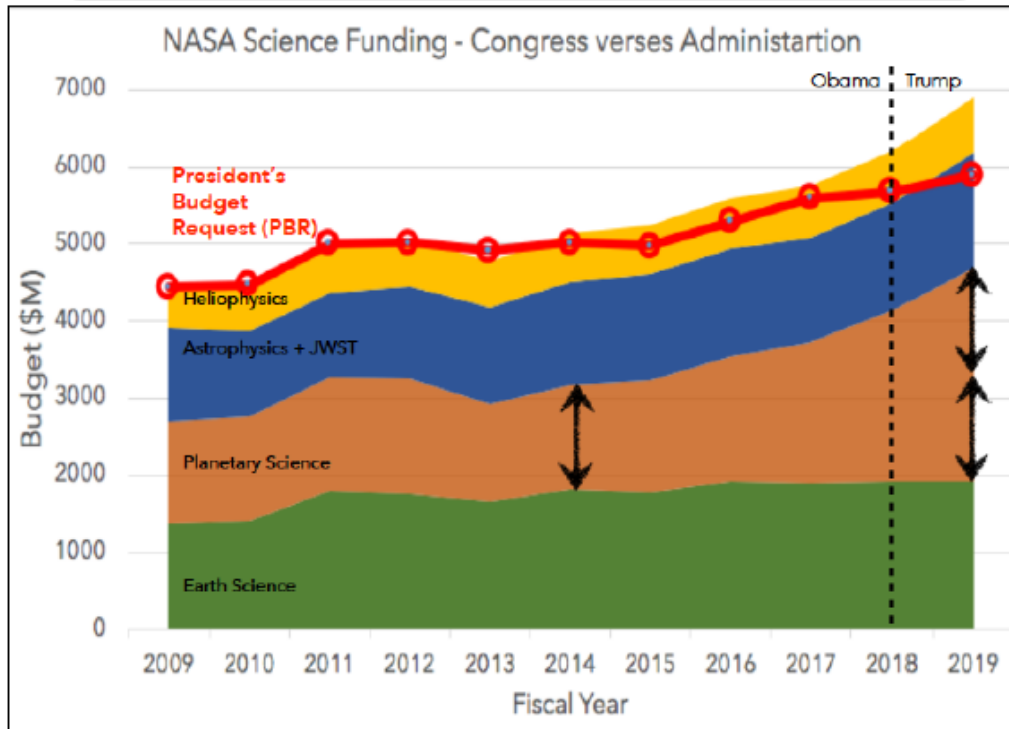
[http://sites.nationalacademies.org/SSB/SSB\\_052297](http://sites.nationalacademies.org/SSB/SSB_052297)

Additional information about the Space Studies Board can be found at:

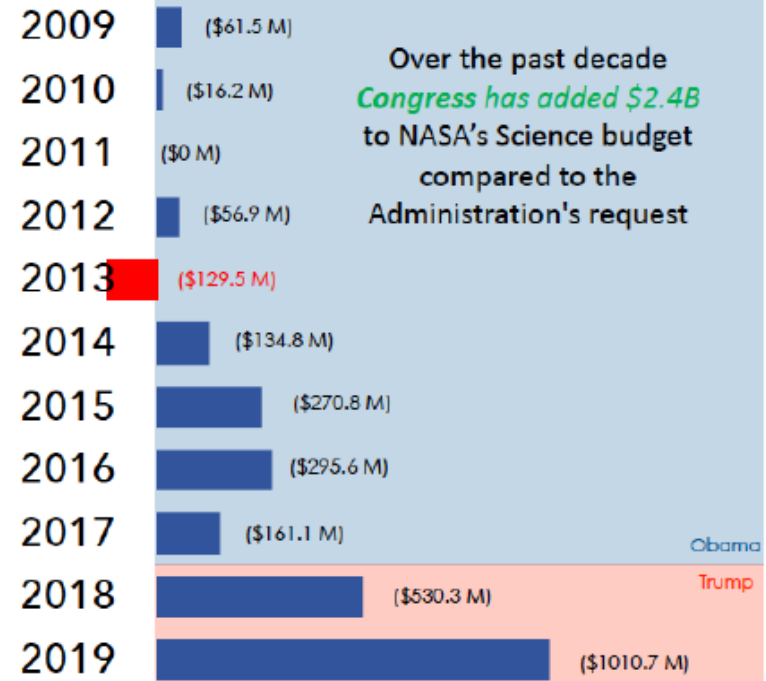
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# Remember Who Funds NASA's PSD

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



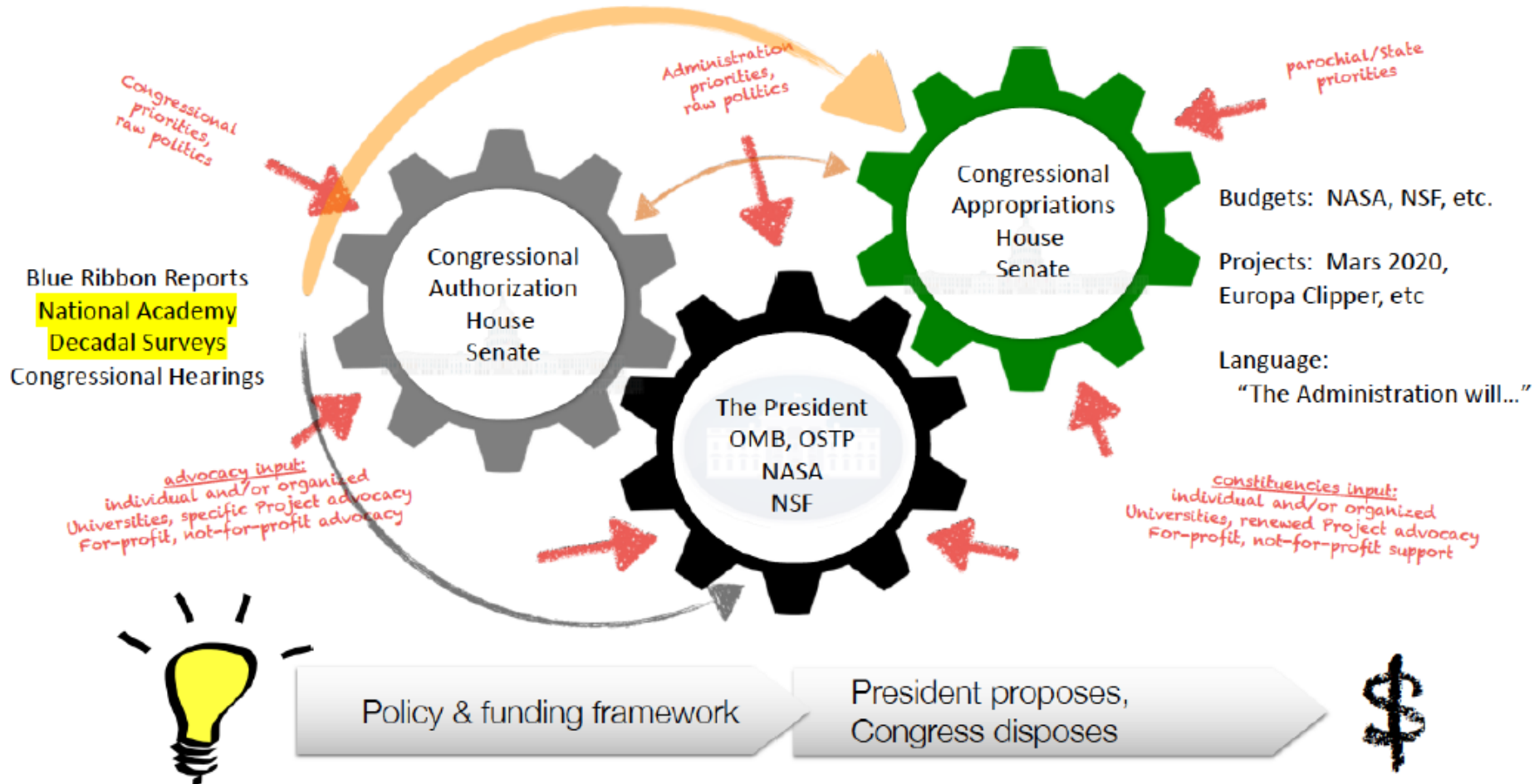
Annual Congressional funding levels for NASA Science (SMD) by Division

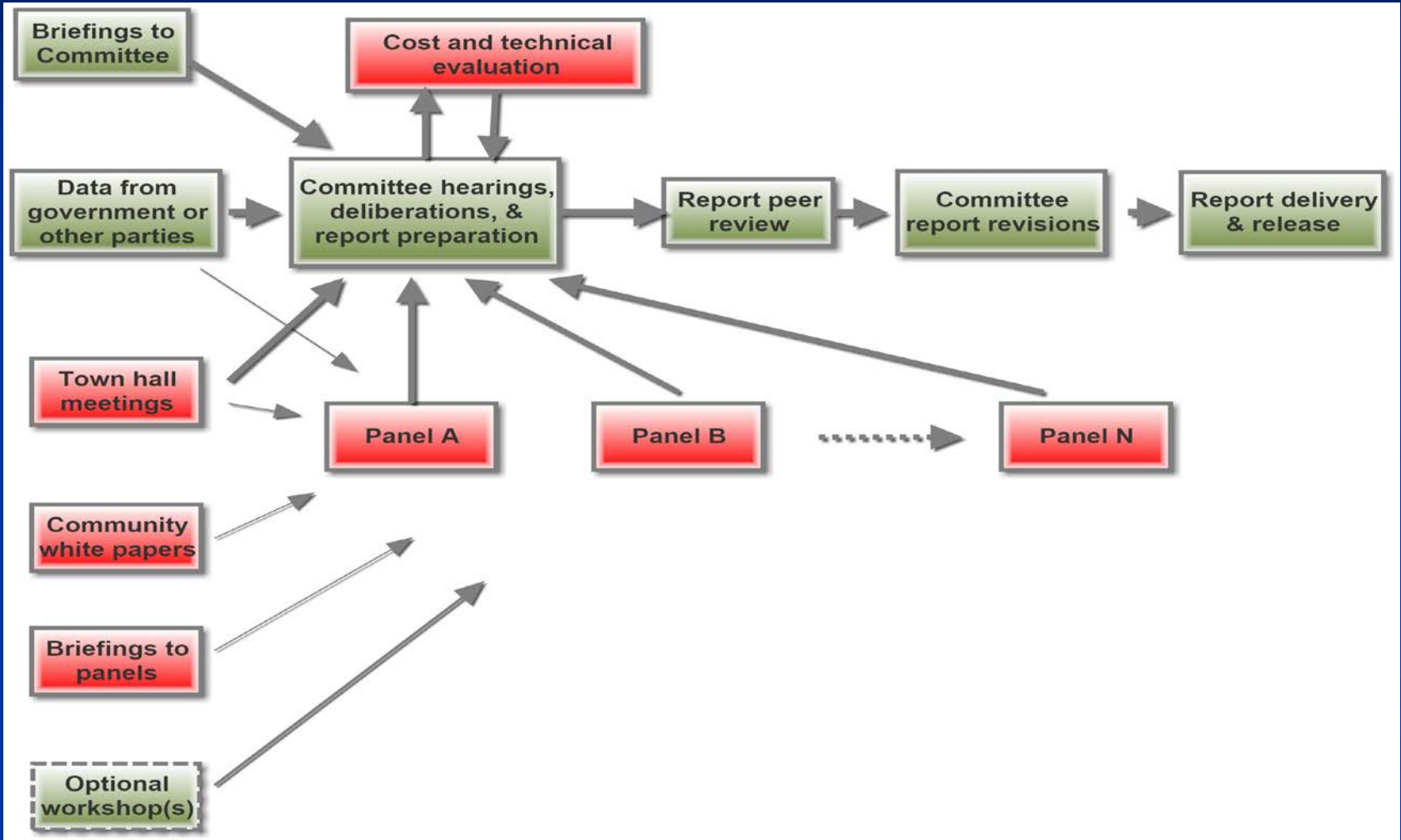


Comparison of annual outcome – enacted versus PBR for NASA's SMD budget

# Federal Budget Process

basic assumption: *no one constituency has a monopoly on wisdom*





# Steps in a Typical Survey

