

Heliophysics 2012 “(mini)
Roadmap”:
Aligning the Decadal Strategy for
Solar and Space Physics
(NASA = Heliophysics)

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NASA HQ

Strategic Planning

- *The Government Performance and Results Act of 1993 requires each Federal agency to produce a strategic plan every three years. NASA Policy Directive (NPD) 1000.0, Strategic Management and Governance Handbook, calls for NASA to issue the NASA Strategic Plan and subordinate documents and for each Mission Directorate to develop an Implementation Plan. The Science Mission Directorate's(SMD) issues its Implementation Plan, or the **NASA Science Plan as** it is typically named, every third year in concert with the NASA Strategic Plan.*
- H.R. 6063, as amended by the Senate [now P. L. 110-702], the National Aeronautics and Space Administration Authorization Act of 2008

TITLE XI. OTHER PROVISIONS

Sec. 1104. National Academies Decadal Surveys. Directs the Administrator to enter into agreements on a periodic basis with the National Academies for independent assessments of the status and opportunities for Earth and space science discipline fields and aeronautics research, to recommend priorities for research and programmatic areas over the next decade, to include whenever possible independent estimates of the costs and technical readiness of missions assessed, and to identify conditions that would warrant reexamination of the priorities established.

Decadal Strategy for Solar and Space Physics (Heliophysics) – NASA, NSF, NOAA

- **The National Research Council Space Studies Board shall establish a Heliophysics Survey Committee to develop comprehensive science and mission strategy for heliophysics research for a 10-year period beginning in approximately 2013.**
 - 1. Provide an overview of the science and a broad survey of the current state of knowledge in the field, including a discussion of the relationship between space- and ground-based science research and its connection to other scientific areas;**
 - 2. Identify the most compelling science challenges that have arisen from recent advances and accomplishments;**
 - 3. Identify—having considered scientific value, urgency, cost category and risk, and technical readiness—the highest priority scientific targets for the interval 2013-2022, recommending science objectives and measurement requirements for each target rather than specific mission or project design/implementation concepts; and**
 - 4. Develop an integrated research strategy that will present means to address these targets.**
- **Addresses primarily the responsibilities of NASA and NSF and will provide recommendations to these two agencies. However, the survey will also address issues of particular interest to NOAA and the DoD, including the current state of capabilities and future directions in space**

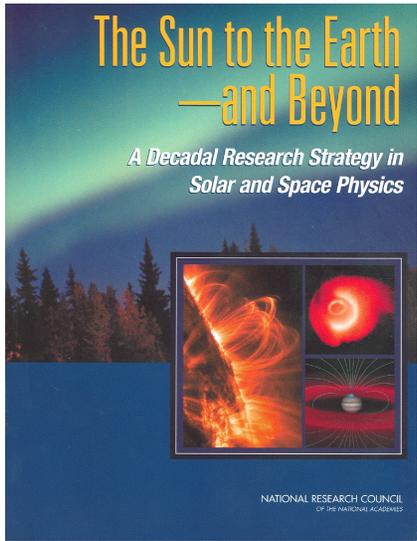
Structure of Strategic Planning

How do all the studies and documents relate?

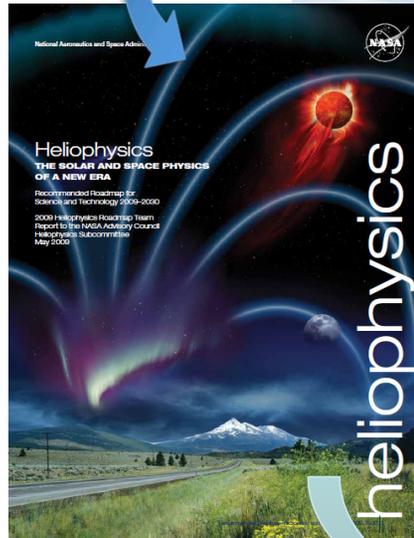
Wide variety of studies, both internal and NASA-sponsored NRC studies



National Academies Decadal Survey



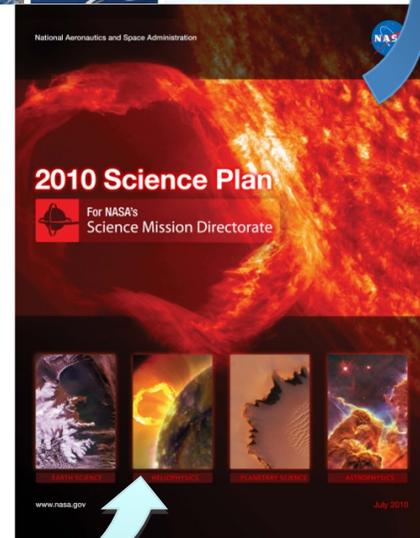
Heliophysics Roadmap



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NASA Strategic Plan



NASA Science Plan

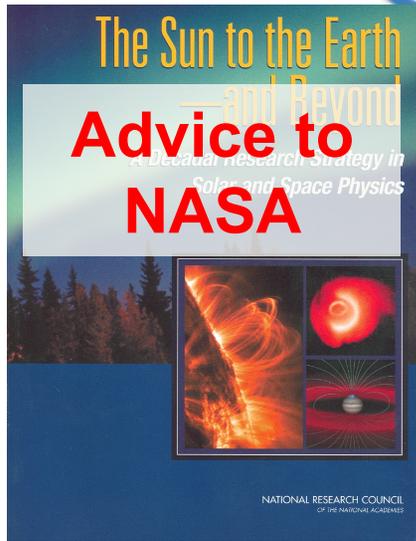
Structure of Strategic Planning

Which are advice and which are official?

Wide variety of studies, both internal and NASA-sponsored NRC studies



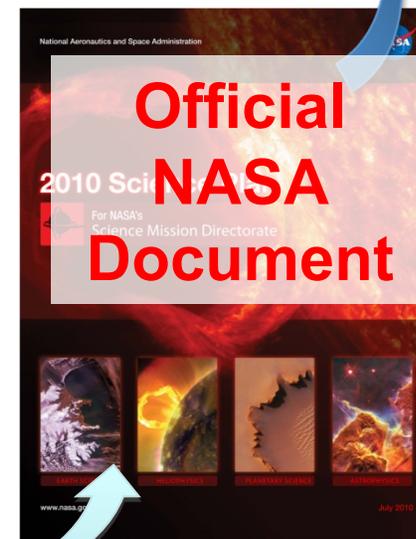
National Academies Decadal Survey



Heliophysics Roadmap



NASA Strategic Plan



NASA Science Plan

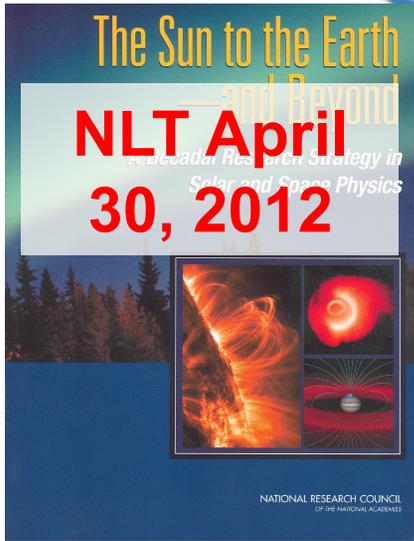
Structure of Strategic Planning

When will the various plans be updated?

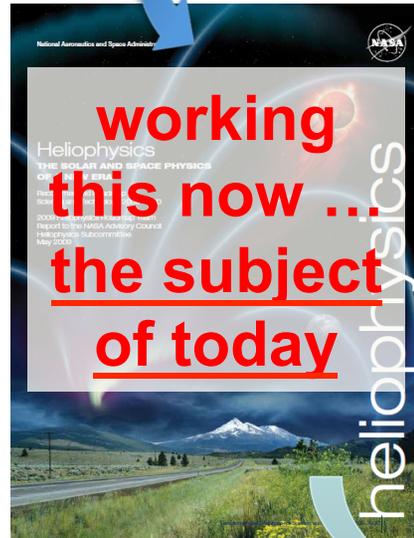
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National Academies Decadal Survey



Heliophysics Roadmap



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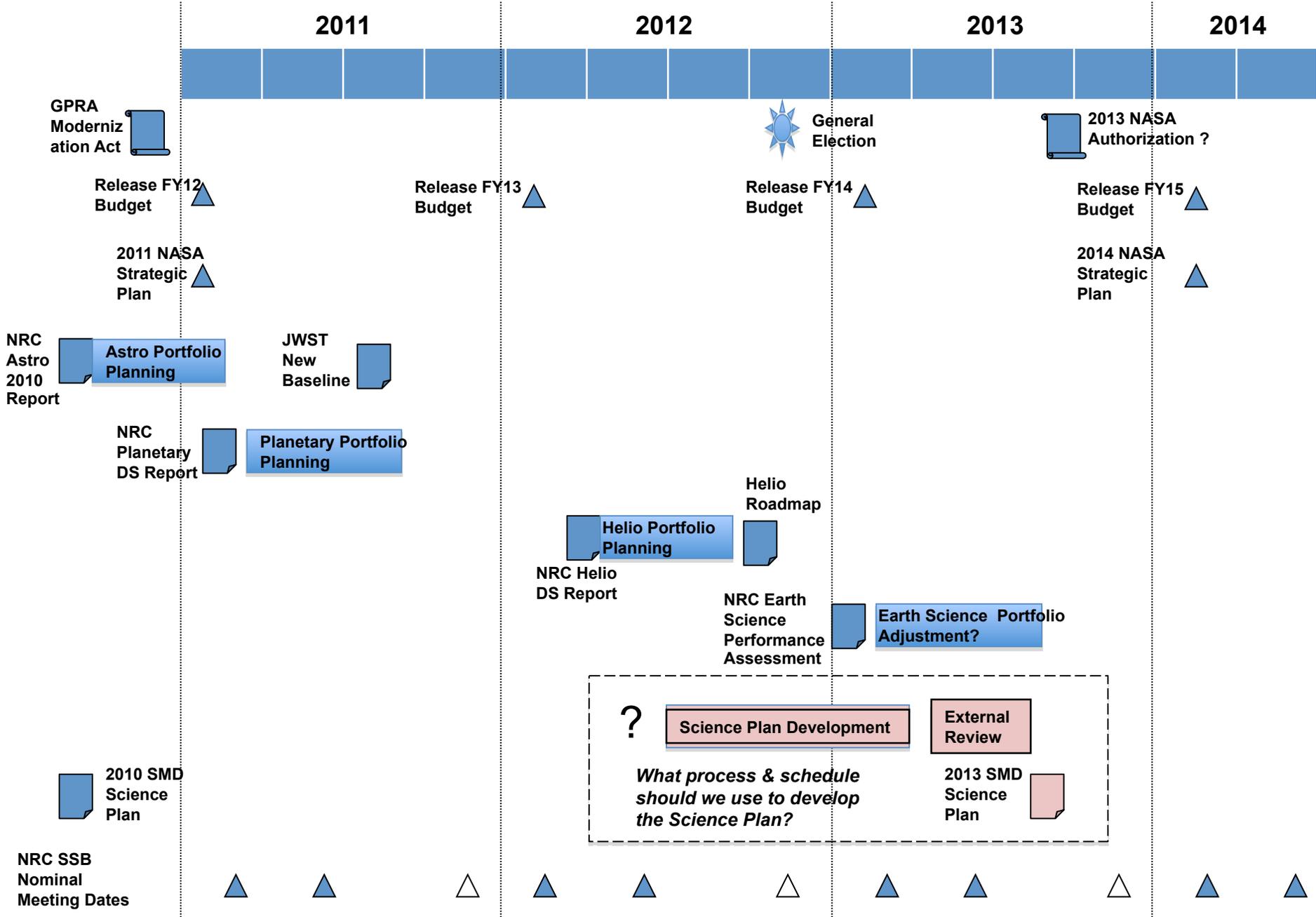
NASA Strategic Plan



NASA Science Plan

SMD Strategic Planning Context & Events

3/18/11



Anatomy of a Roadmap

- **Emphasize national/community input, with NASA guidance**
- **Involve industry, academia, other government agencies**
- **Enlist the aid of the National Academies of Science – Decadal Survey**
- **Broad scientific and exploration objectives, priorities**
- **Possible pathways or decision points**
- **Timeline**
- **Critical sequences and path**
- **Qualitative risk assessments**
- **ROM phased cost plan**
- **Interdependencies**
- **Capabilities, facilities and infrastructure needs**
- **Implementation approaches**
- **High-level mission pipeline - Foundation for mission/program architectures**

Nature of the 2012 (mini) Roadmap

- **Roadmap – Implementation response to Decadal. Report to the HPS. Presents both long-term goals and nearer-term objectives. The Roadmap is the product of, and is periodically revised by, the science community at large.**
- **Decadal will produce a wealth of material – Integrated research strategy covering:**
 - **Science: Challenges, Priorities, Strategies**
 - **Missions: Cost, technical readiness, measurement requirements**
 - **Currently Unknown: Specifics, directions, mission study details, topics**
- **The key for the Roadmap is to focus on:**
 - **Align the science strategy developed by the Decadal with the Heliophysics Program over the next 10 years**
 - **Extend the strategy out to 2033**
 - **Follow the 2009 Roadmap paradigm of presenting a science priority with a flexible mission implementation approach consistent with the current (FY13) budget profile**
 - **Identify needed Technology development**
- **Goal: Roadmap rollout Dec. 2012 (AGU).**

Roadmap Major Topics

- **Scientific Foundation – fundamental questions from Decadal**
- **A Balanced Program - a series of small, medium, and large class missions and their enabling technologies, supported by a vigorous, balanced program of research and analysis, and creative education and public outreach.**
 - **New Missions**
 - **Operating and Developing Missions**
 - **Technology - timely technology development to support cost-capped missions**
 - **Research and Analysis**
 - **SubOrbital Research**
- **Applications – Space Weather**
- **Education and Public Outreach**
- **Programmatic Considerations**

Schedule – Faster than Standard

- **Decadal release: NLT April 30, 2012**
- **Kickoff Telecon**
- **Panel Meeting #1 – expectations, science objectives, RFAs, early opportunities**
- **Panel Meeting #2 – Community workshop, writing assignments, mission queue plan, missing technology**
- **HPS Status review**
- **Panel Meeting #3 – Finish implementation, final writing assignments, identify gaps, figures, traceability matrix,**
- **Draft**
- **Red team**
- **Roadmap rollout Dec. 2012 (AGU)**

Near Term Activities

- **Form Balanced roadmap committee membership: NASA, industry, academia and other government.**
 - External co-chairs are nationally recognized leaders
 - NASA co-chairs
 - HPS members
 - Soliciting Input...
- **Kickoff Telecon(?) – Early April – Early start opportunities:**
 - Operating and Developing Missions
 - Education and Public Outreach
 - Applications – Space Weather
 - Current Program Elements
 - SWOT

Roadmap 2012 Charter (?)

- **Align Decadal Survey science strategy with NASA Heliophysics Program**
- **Craft a sustainable science program that is achievable within our resources and constraints**
- **Construct a useful strategic plan with a notional scheme to guide the implementation of critical science in the HP program**
- **Streamlined Document**
- **High level mission studies, no point designs**

Backup

Roadmap 2009 Charter

- **Craft a sustainable science program that is achievable within our resources and constraints**
- **Construct a useful strategic plan with a notional scheme to guide the implementation of critical science in the HP program**
- **Start from science goals in previous roadmap and update with new results and new insights**
- **Reduce the impact on the community during preparation i.e. smaller team, smaller document**
- **High level mission studies, no point designs**

Things for the Roadmap Committee to Keep In Mind

- **How can we help to optimize the science and engineering partnership and synergism?**
- **Science is the exploration of the unknown: How does ongoing scientific discovery during the process of exploration influence subsequent steps?**
- **It is hard to see into the future, so keep the maximum flexibility possible.**
- **How can we meet design requirement deadlines but maintain maximum flexibility?**
- **What can we learn from the past that can help guide us in the future?**
- **If not, how can they be improved?**
- **We are looking 20 years into the future, so we need to maintain maximum flexibility, and allow maximum capability to incorporate new technological developments that will surely come.**
- **We need to provide broad guidelines, but also guidelines that are sufficiently detailed to be useful in architectural design and operational planning.**
- **We need to keep our eyes on the goal and not be derailed by “excessive” quantification, metrification and traceability.**
- **Exploration is a process of discovery, iteration and adaptation, not a set of boxes that can be checked in advance.**
- **This process is not a “spreadsheet problem”, it is a “systems engineering” problem**