

National Aeronautics and  
Space Administration



# EXPLORESCIENCE

**Ground- and Space-Based Coordination**

*Decadal Survey, Integrating Ground- and Space-based  
Observations Working Group, Request for Information*

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# Introduction

This input to the Decadal Survey presents information regarding a topic that arose during the Decadal Survey process. This response addresses the topic as discussed by the Decadal Survey Committee and Panels and/or the science community.


These slides address NASA and ground-based observations. Additionally, the slides provide as an example one way the Decadal Survey Committee might make project recommendations to NASA that fits into the individual mandates of the separate sponsor agencies.

## Decadal Survey Statement of Task

*Recommendations regarding operational space weather activities and/or projects shall be directed to only NOAA. **Recommendations regarding establishing new or supporting established ground-based observatories shall be directed to only NOAA and NSF, as appropriate.** Recommendations regarding spaceflight projects shall be directed to only NOAA and NASA.*

# Overview

- Heliophysics Division's activities are governed by laws, regulations, and White House direction that:
  - ...assign roles and responsibilities to NASA.
  - ...place restrictions on *how* NASA pays *whom* for *what*.
  - ...rarely prohibit NASA from exceeding its mandate in support of its scope of work (but Government agencies avoid infringing on each other's mandates).
- The Decadal Survey Statement of Task includes the agreement between the agencies and the National Academy of Sciences that the Decadal Survey will target recommendations to the appropriate agency.
  - “Recommendations regarding establishing new or supporting established ground-based observatories shall be directed to only NOAA and NSF, as appropriate.”  
[Statement of Task]

The background of the slide is a cosmic scene. The top half features a dark blue and black space with a prominent blue nebula on the right side and several bright, multi-pointed stars. The bottom half transitions into a warmer color palette of orange, yellow, and green, with a large, diffuse green nebula and numerous smaller stars scattered throughout.

# Agency Roles, Responsibilities



# Agency Mandates [Defining Statutes]

- ***National Aeronautics and Space Administration (NASA)***
  - ***National Aeronautics and Space Act of 1958 (Public Law 85–568): To conduct aeronautical and space activities.***
    - ***For the purpose of expansion of human knowledge; improvement of aeronautical and space vehicles; development of vehicles capable of carrying instruments and humans through space; preservation of the role of the United States as a leader in space science and technology.***
- National Science Foundation (NSF)
  - National Science Foundation Act of 1950 (Public Law 81-507): To promote the progress of science.
    - For the purpose of advancing the national health, prosperity, and welfare; securing the national defense.
- National Oceanic and Atmospheric Administration (NOAA)
  - Omnibus Trade and Competitiveness Act of 1988 (Public Law 100-418)
    - To conduct research on all telecommunications sciences [...]; preparation and issuance of predictions of electromagnetic wave propagation conditions and warnings of disturbances in such conditions; research and analysis in the general field of telecommunications sciences in support of other Federal agencies

# Agency Mandates [PROSWIFT Act]

## 51 U.S.C. §60601. Space Weather

### (a) Findings -

(1) Space weather. Congress makes the following findings with respect to space weather:

[...]

(C) Space-based and ground-based observations provide crucial data necessary to understand, forecast, and prepare for space weather phenomena.

(D) Clear roles and accountability of Federal departments and agencies are critical for efficient and effective response to threats posed by space weather.

[...]

(2) Role of federal agencies. Congress makes the following findings with respect to the role of Federal agencies on space weather:

(A) The **National Oceanic and Atmospheric Administration** [...] maintains **ground-based and space-based assets to provide observations** needed for space weather forecasting, prediction, and warnings...

[...]

(C) The **National Aeronautics and Space Administration** provides increased understanding of the fundamental physics of the Sun-Earth system through [...] **space-based** observations and modeling, developing new **space-based** technologies and missions...

(D) The **National Science Foundation** provides increased understanding of the Sun-Earth system through **ground-based measurements**...

[...]

The background of the slide is a composite of two astronomical images. The top half features a dark blue and black space filled with numerous small stars and a prominent, bright blue nebula on the right side. The bottom half shows a similar starry field but with a warm, golden-yellow and greenish glow, suggesting a different spectral filter or a different region of space. The text 'Decadal Survey Charge' is centered in a white, sans-serif font across the middle of the image.

# Decadal Survey Charge



# Decadal Survey Statement of Task [1]

- The Statement of Task captures both:
  - The agencies' defining statutory mandates, and
  - The clear roles and responsibilities Congress identified in the PROSWIFT Act.
- The Statement of Task package makes three strong statements to help the Decadal Survey incorporate these roles and responsibilities in its recommendations.
  - It called for specific science objectives that could be *completed* as part of addressing a goal.
    - Goals are also referred to as “science questions” within the science community.
  - It called for recommendations to NASA for space-based investigations that would complete science objectives.
  - It requested input on where (distinct) ground-based and space-based investigations combined would be able to better address the high-level science goals than either could alone.





# Decadal Survey Statement of Task [2]

## *Statement of Task*

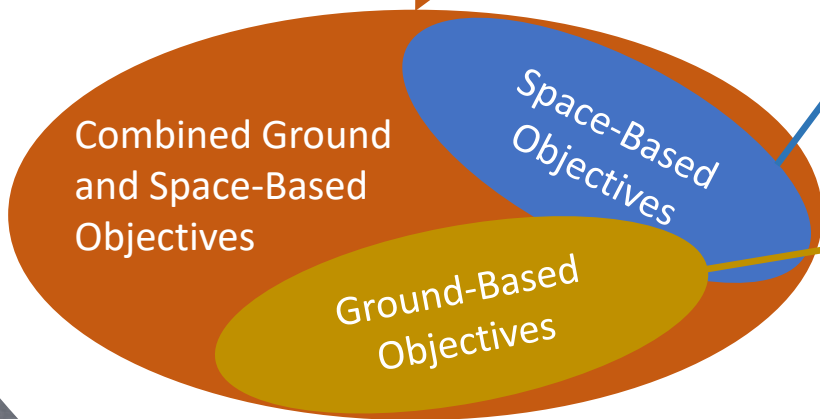
2. Describe the highest priority science goals to be addressed in the period of the survey. In doing so:
    - a. Identify the focused parts of those goals where measurable progress can be made, where frontiers can be expanded, and that improve possibilities for scientific growth in the future; and
    - b. Note where an interdisciplinary or system science approach is needed.
  3. Develop a comprehensive ranked research strategy that provides an ambitious, but realistic, approach to address these science goals. The strategy will include consideration of:
    - a. The combination of ground- and space-based investigations to enhance progress on the prioritized science goals.
- [...]

## *Study Approach (NASA-specific guidelines)*

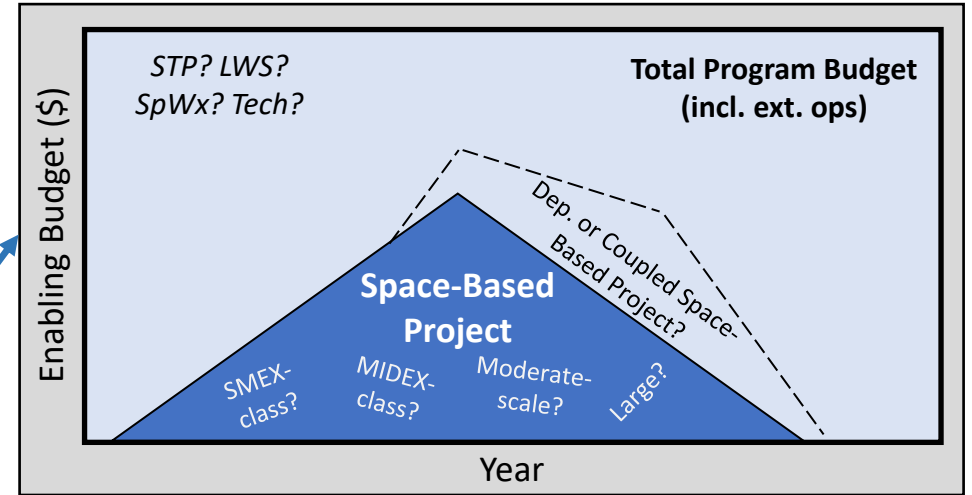
All recommendations for Living With a Star, Solar Terrestrial Probes, and Space Weather Science Application should be made as prioritization of goals and objectives to be addressed (where an objective is a narrow aspect of broader science goals that can be completed by a single spaceflight investigation). In those programs, the report should recommend major investments that would be capable of completing identified objectives. The recommended major investments should not specify mission implementations (including instrument-specific details), but should use notional mission concepts as a tool for assessing the technical readiness and budget feasibility.

# Decadal Survey, Charge

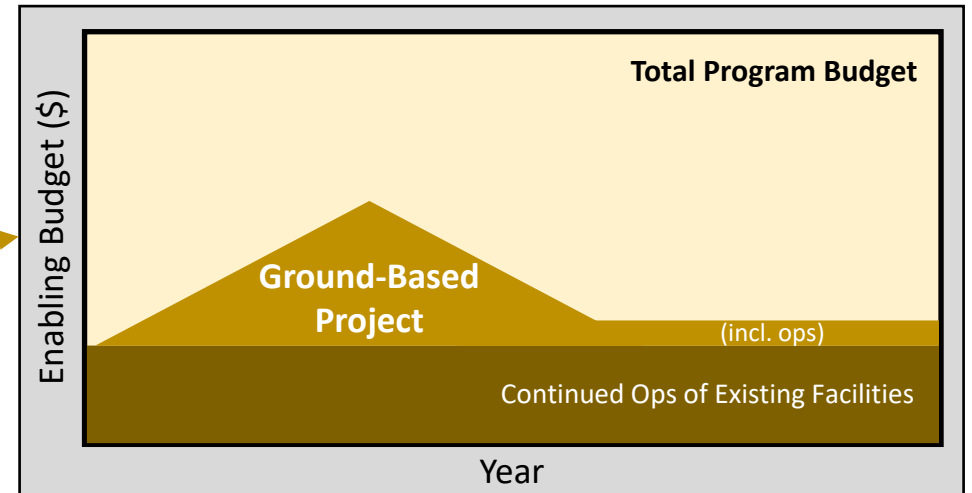
## Prioritized Science Goal



## NASA

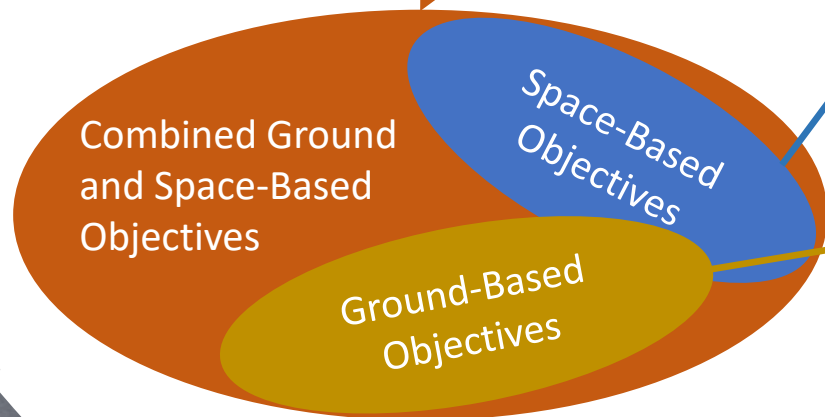


## NASA Partner



# Decadal Survey, Charge [Investigation]

## Prioritized Science Goal



The Decadal Survey has been charged with prioritizing the science goals for the next decade, and recommending *completable* science objectives that would make progress on those goals.

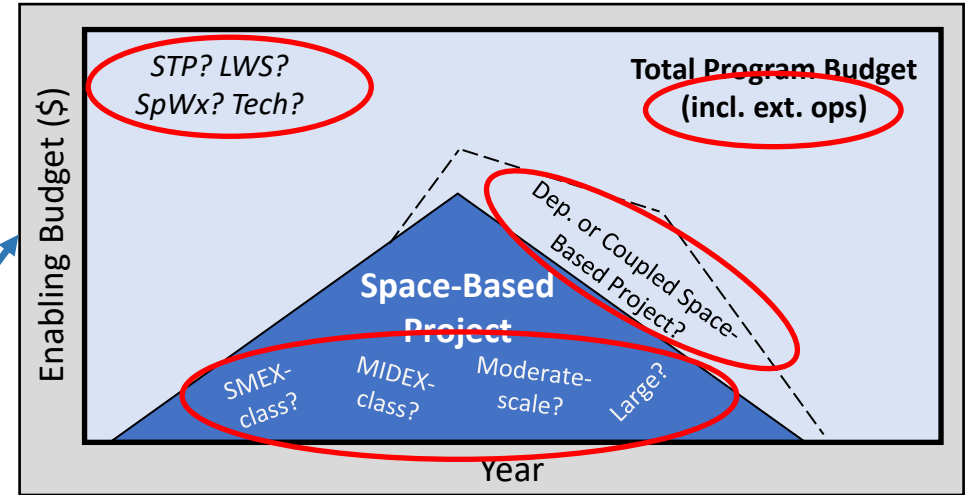
The Statement of Task called out the value of combining ground- and space-based investigations to enhance progress on those goals, and required those investigations be directed to the appropriate sponsor.

# Decadal Survey, Charge [NASA Rec.]

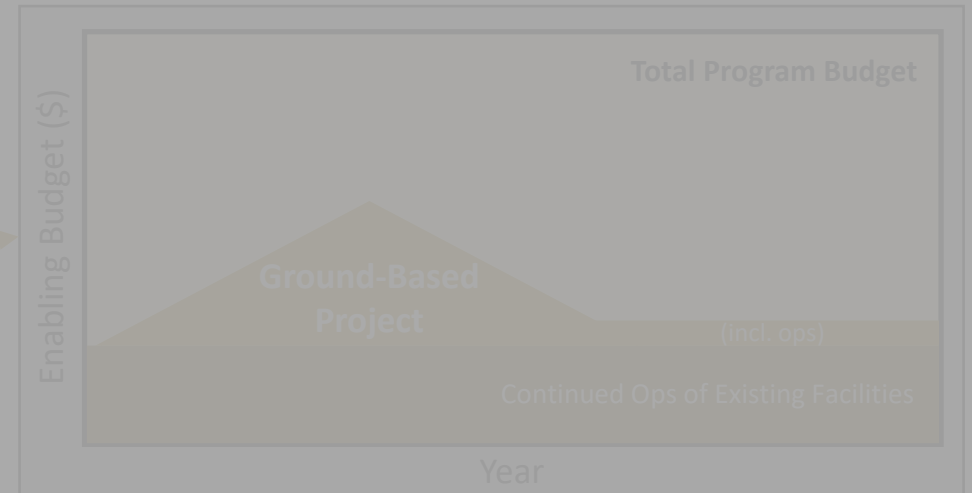
## Prioritized Science Goal

NASA has requested the Decadal Survey address and include specific aspects of program and project activities. References to further information are on a later slide.

## NASA



## NASA Partner



Combined Space- and Ground-Based Objectives

Space-Based Objectives

Ground-Based Objectives

# Requested Recs [Partner Rec.]

## Prioritized Science Goal

Completable Objectives for Progress on Science Goal



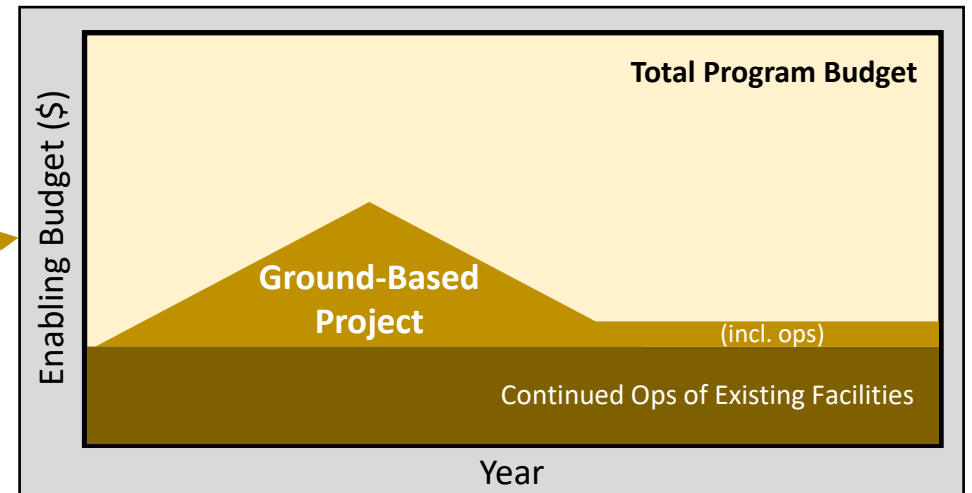
This information would show NASA what is recommended for partner agency's implementation, but may not be sufficient for the partner agency.

Combined Space- and Ground-Based Objectives

Space-Based Objectives

Ground-Based Objectives

## NASA Partner



# Decadal Survey, NASA Program/Projects

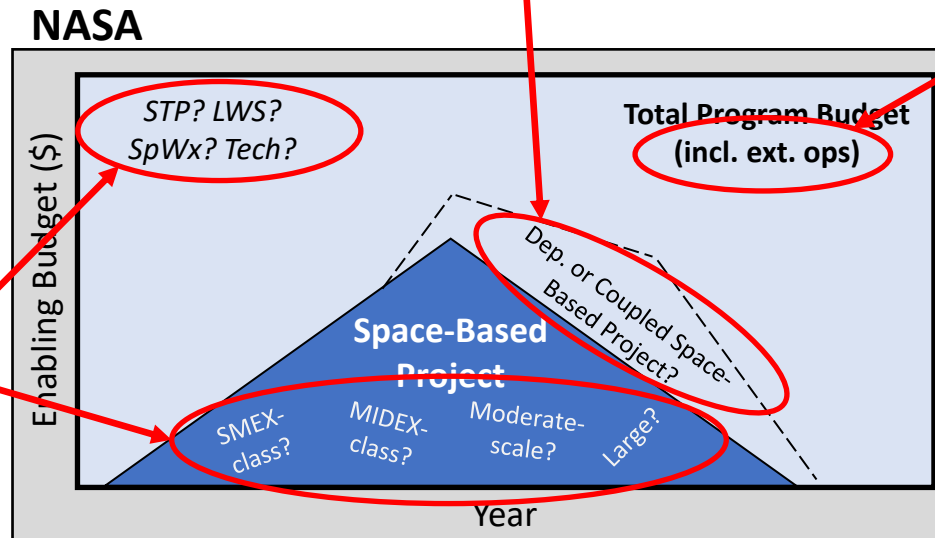
Each recommendation for a particular program/project activity must have certain components defined.

Decadal Survey  
Kick-off Presentation  
(Slide 17)

*Formulation of NASA Space  
Flight Investigations*

Decadal Survey Kick-off  
Presentation  
(Slide 18)

Statement of Task Package  
(Study Approach, NASA)



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# Discussion on Integration



# IGSO WG Considerations

*"This working group will consider the feasibility of an integrated approach to organizing, supporting, and operating ground- and space-based observations."*

- What is definition of "integrated approach"?
- How does the working group define "organize," "support," and "operate" ?
- What are Decadal Survey's concerns about formulating a compelling science strategy without these lower-level implementation details?
  - Decadal Survey recommends high-priority science goals and a strategy to address them. Implementation details are the responsibility of the agencies.

*"...the group will consider whether and how ground- and space-based observatories and data can be integrated into one or more "systems" to achieve/enable discovery science."*

- All Federal agencies follow open data guidance. NASA's approach is outlined in Agency and Division policy documents.



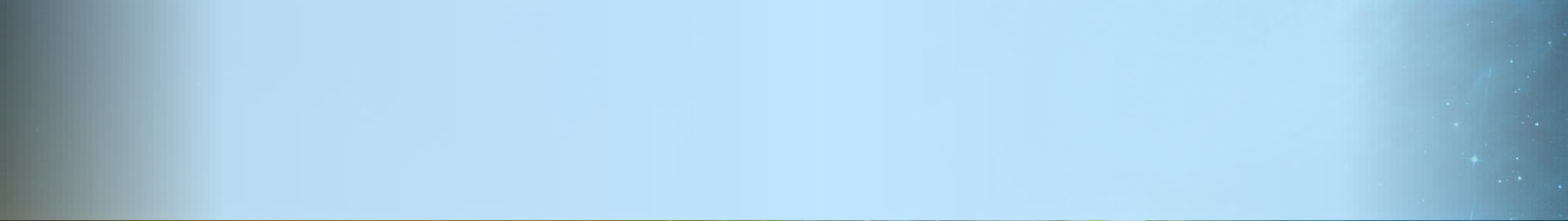


# IGSO WG Discussion Topics

- *What are the real or perceived barriers to such integration?*
- *What policies or actions could mitigate or eliminate such barriers?*
  - Agency commitments must ensure clear lines of authority/responsibility and minimize programmatic risk (including unplanned costs).
  - NASA, NOAA, and NSF currently coordinate within established agency mandates on topics of mutual interest (e.g., Space Weather).
- *What are specific areas where agencies could coordinate and collaborate, e.g., Data management, funding (construction, O&M), community review.*
  - Agencies can have appropriate coordination and collaboration.
  - Agencies do not infringe on another agency's mandates.
  - Agencies do not fund another agency's activities; cross-agency requirements and review are by agreement only.
- *What are potential impacts on mission or facility design and operations planning in moving towards integration?*
  - Better understanding of envisioned "integration" is required.

The background of the slide is a cosmic scene. The top half features a dark blue and black space filled with numerous small stars and a prominent, bright blue nebula on the right side. The bottom half transitions into a warmer color palette, with a golden-yellow and greenish glow, also containing stars and nebulae. A horizontal light blue band runs across the middle of the slide, containing the text.

Questions?





# Elements of an AO-proposed Project

- Contributed
  - Contributions can be from a Government agency, international partner, or other organization
  - Contribution is part of proposal, no pre-proposal NASA “matchmaking”
  - Agreement with NASA on no-exchange-of-funds basis (no NASA funding)
- Project-managed (and –funded)
  - Part of the proposal, project manages/funds within PIMMC
- Government Furnished Equipment (GFE)
  - GFE is offered by NASA in the AO
    - AO may adjust PIMMC
  - NASA responsible for funding
- [Not managed by NASA program/project, no official title]
  - Proposal identifies and justifies capabilities without established relationship/commitment (i.e., not part of AO or proposal)
  - Project budgets costs as necessary
- NASA considerations include risks to proposed science objectives, schedule, budget