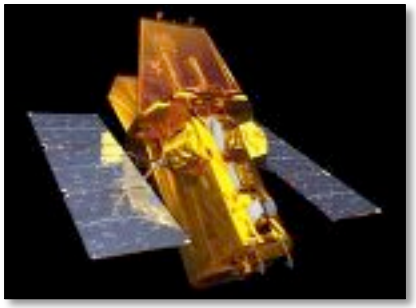
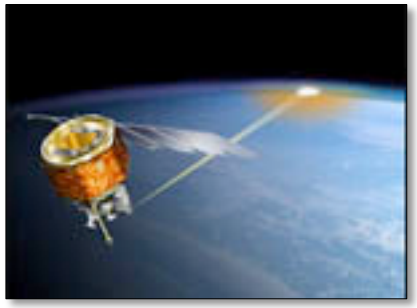
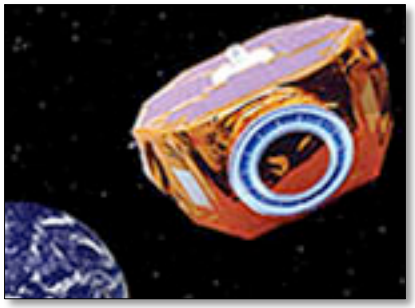



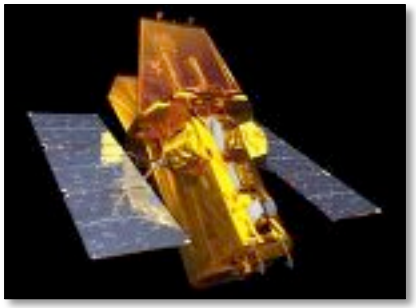
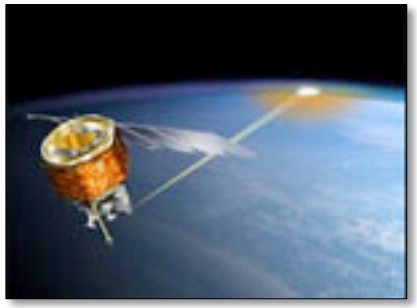


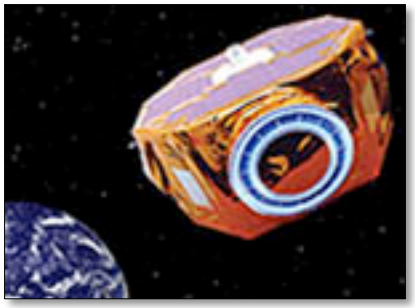
EX AO Science Overview

Barbara Giles

Explorer Program Acquisition Scientist

Science Mission Directorate

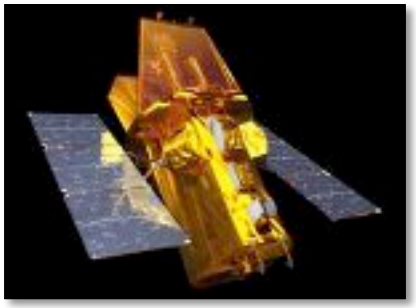
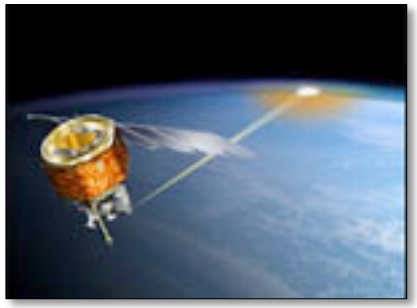



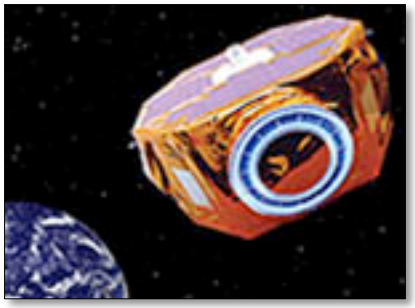


Purpose of this Presentation

- Present to the community Draft Explorer 2010 Announcement of Opportunity (AO) highlights, including the Science Merit and Science Implementation Merit criteria and requirements that are assessed by the Science review panels.
- Solicit comments. Answer questions.

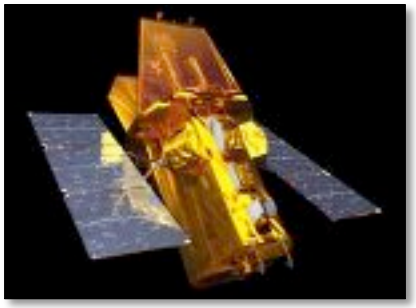
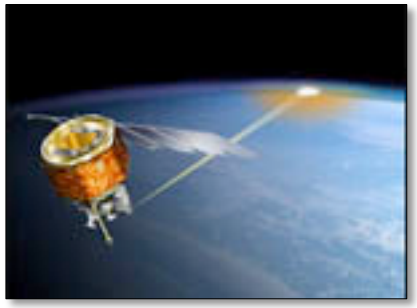
Important Note: This AO incorporates a large number of changes relative to previous Explorer Program AOs including both policy changes and changes to proposal submission requirements. All proposers must read this AO carefully, and all proposals must comply with the requirements, constraints, and guidelines contained within this AO.

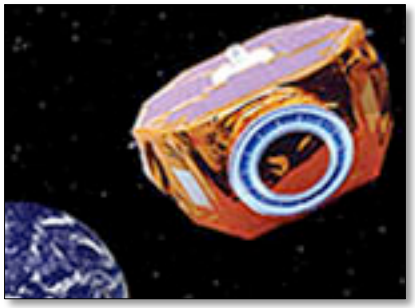





Outline

- Introduction to the AO
- Programmatic Factors
- Solicitation and Evaluation Overview
- Science Requirements
- Science Merit Evaluation Factors
- Science Implementation Merit Evaluation Factors
- Proposal Preparation Requirements



Introduction to the AO

NASA's Science Mission Directorate is releasing this AO to solicit PI-led space science investigations for the Explorer Program.

Explorer (EX) missions are introduced with this 2010 Announcement of Opportunity.

EX missions were conceived in response to the availability of expendable launch vehicles. EX missions fall between the previous Small Explorer (SMEX) and Medium Explorer (MIDEX) classes.

Access to space will utilize one of the several, lower-cost expendable launch vehicles available through NASA's launch services program.

The PI Mission Cost cap for an Explorer (EX) mission is $200M in Fiscal Year (FY) 2011 dollars, not including the cost of the Expendable Launch Vehicle (ELV) or any contributions.

Any selected mission is intended to launch no later than the end of calendar year 2018.

EX investigations with an anticipated launch date requirement later than the end of calendar year 2018 should be proposed in response to a subsequent Explorer Program AO.

Proposal Opportunity Period and Schedule

Milestone	Target Date
AO Release Date (target)	Fall 2010
Preproposal Conference	2-4 weeks after AO release
Notice of Intent to Propose Deadline	4 weeks after AO release
Proposal Submittal Deadline at 4:30 p.m. Eastern Time	3 months after AO release
Letters of Commitment due (w/ proposal)	3 months after AO release
Step 1 Selections announced (target)	9 months after AO release
Initiate Phase A Concept Studies (target)	1 month after selection
Phase A Concept Study Reports due (target)	12 months after selection
Down-selection of investigation(s) for flight (target)	16 months after selection
Launch Readiness Date for proposed mission	NLT December 31, 2018

Proposers should be aware of the following major changes in this AO from previous Explorer Program AOs.

This AO is based on SMD's Standard PI-Led Mission AO; the latest revision of the Standard AO Template may be found at http://sso.larc.nasa.gov/StandardAO/.

Mission of Opportunity investigations are no longer solicited through the Explorer AO. Mission of Opportunity investigations are solicited through the Stand Alone Missions of Opportunity Notice (SALMON) AO (NNH08ZDA009O).

Draft Explorer 2010 AO Highlights

General

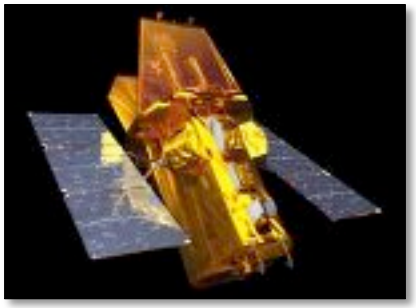
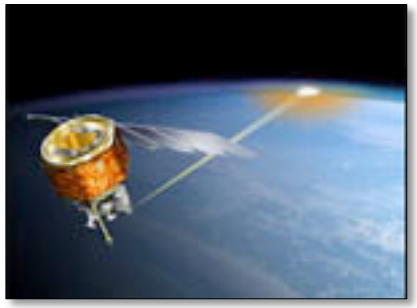
- This Draft Explorer 2010 AO is based on the Standard AO template.
- **Requirements** are identified, numbered, and specific.
  - There are 85 requirements in the Draft Explorer AO
  - When Sections do not levy requirements they do not have numbered requirements.
- **Evaluation Factors** are identified, numbered, and specific.
  - **4 for Science Merit**
  - **6 for Scientific Implementation Merit and Feasibility**
  - 5 for Feasibility of the Mission Implementation, Including Cost Risk
- Appendix B has numbered **requirements on Proposal Preparation**
  - There are 69 specific requirements for the format and content of Step 1 proposals

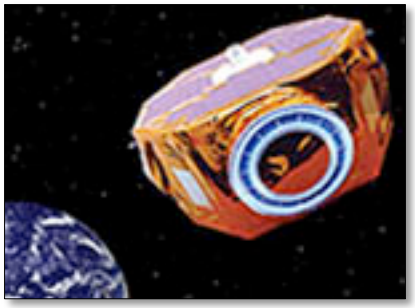
All proposals, U.S. and non-U.S., must be received before the proposal submittal deadline. Those received after the deadline will be treated in accordance with Appendix A, Section VII

Requirement 1: Proposals submitted in response to this solicitation shall be delivered no later than the Proposal Submittal Deadline. Proposals shall be delivered to the Address for Submittal of Proposals given in Section 6.2.3.

Requirement 2: Proposal submission shall be accompanied by electronic submission of proposal summary data no later than the Proposal Submittal Deadline following the instructions for submission of proposal summary data provided in Section 6.2.4.

Requirement 3: Explorer missions selected from this AO have been determined to be **Category 2 missions (per NM 7120-81) with Class C payloads (per NPR 8705.4)**. Proposers shall incorporate appropriate work effort and support in their proposals accordingly.



Programmatic Factors

NASA will clarify the statements on the following three slides when the Explorer AO is released based on the latest available Explorer Program planning budgets.

The currently approved Explorer Program planning budget is sufficient to select and execute at least one full Explorer mission to proceed into Phase B and subsequent mission phases.

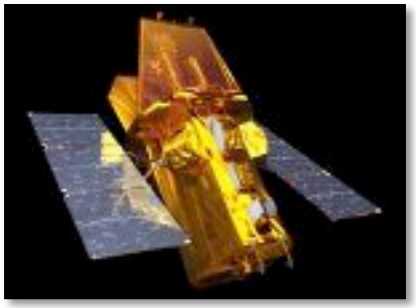
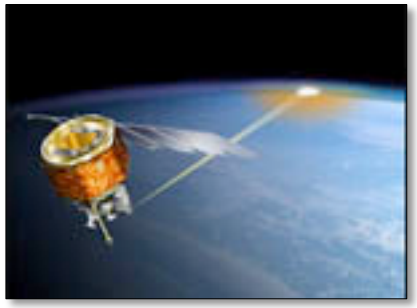
Assuming sufficient Explorer Program budget authority, NASA intends to select and execute a second full Explorer mission or one or more Mission(s) of Opportunity.

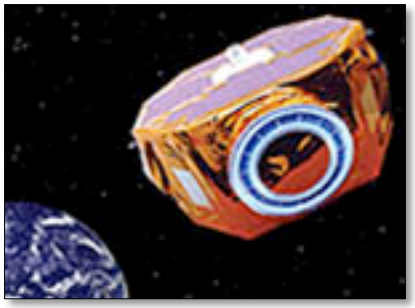
NASA is fully prepared to select only one full mission (either astrophysics or heliophysics) if it receives mission of opportunity proposals that offer outstanding science opportunities.

The decision between these selections options will be based upon the proposals received in response to this AO and to the Explorer MO program element appendix of the SALMON AO (NNH08ZDA009O); the decision will incorporate the most recent budget planning information available at that time.

In addition to the mission selections, NASA has set aside funding sufficient to select up to two Category III proposals for technology development.

Category III. Scientifically or technically sound investigations which require further development. Category III investigations may be funded for development and may be reconsidered at a later time for the same or other opportunities



Solicitation and Evaluation Overview

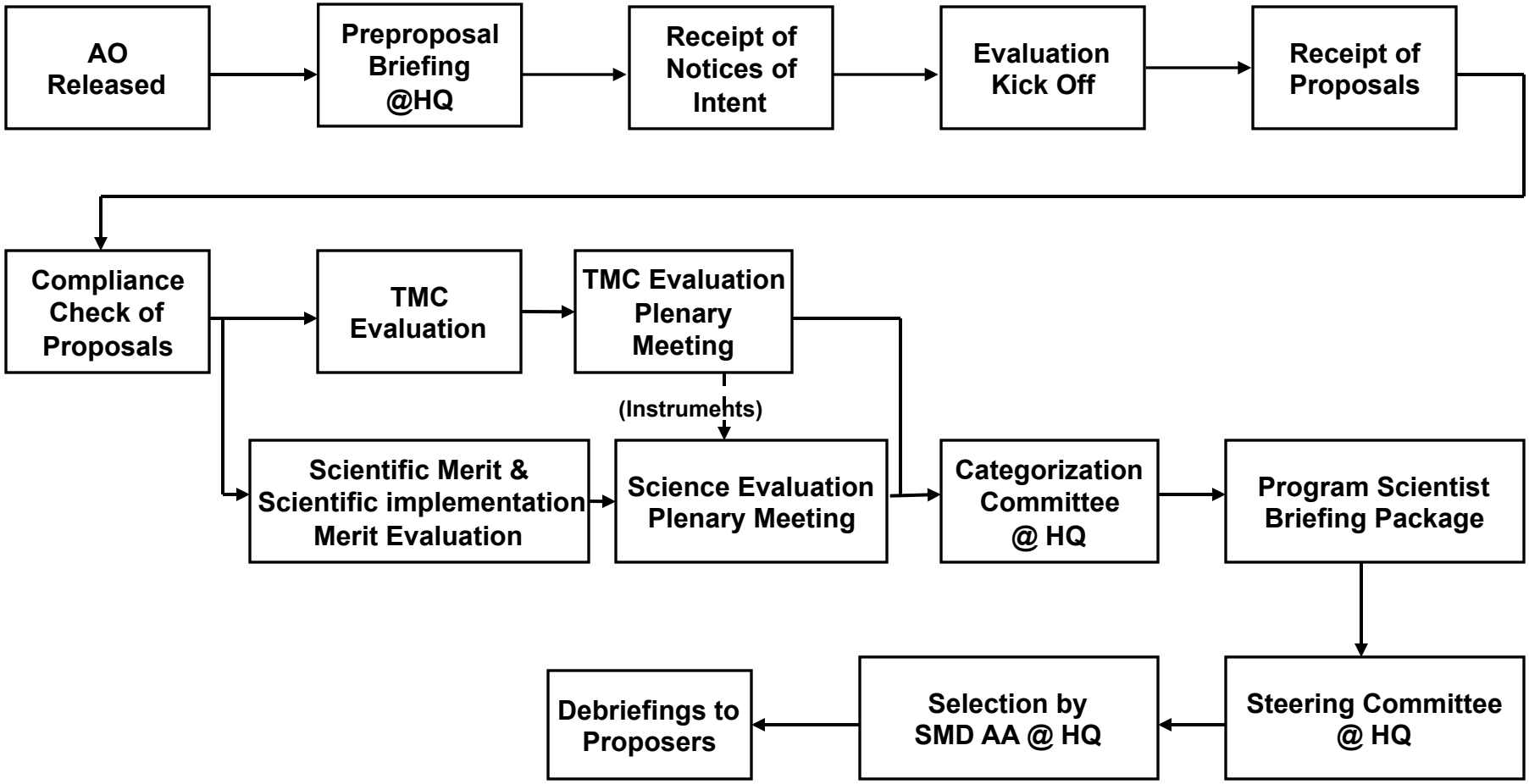
All proposals will be initially screened to determine their compliance to requirements and constraints of this AO.

Proposals that do not comply may be declared noncompliant and returned to the proposer without further review. A submission compliance checklist is provided in Appendix F.

Proposed investigations will be evaluated and selected through a two-step competitive process (Section 7).

- Step 1 is the solicitation, submission, evaluation, and selection of proposals prepared in response to this AO.
- As the outcome of Step 1, NASA intends to select one or more Step 1 proposals and issue awards to the selected proposers to conduct Phase A concept studies and submit Concept Study Reports to NASA.
- Step 2 is the preparation, submission, evaluation, and continuation decision (downselection) of the Concept Study Reports.
- As the outcome of Step 2, NASA intends to continue one or two investigation(s) into the subsequent phases of mission development for flight and operations.

Step 1 Evaluation and Selection Overview



Compliant proposals will be evaluated against the criteria specified in Section 7.2 by panels of individuals who are peers of the proposers.

Proposals will be evaluated by more than one panel (*e.g.*, a science panel and a technical/ management/cost panel); each panel will evaluate proposals against different criteria.

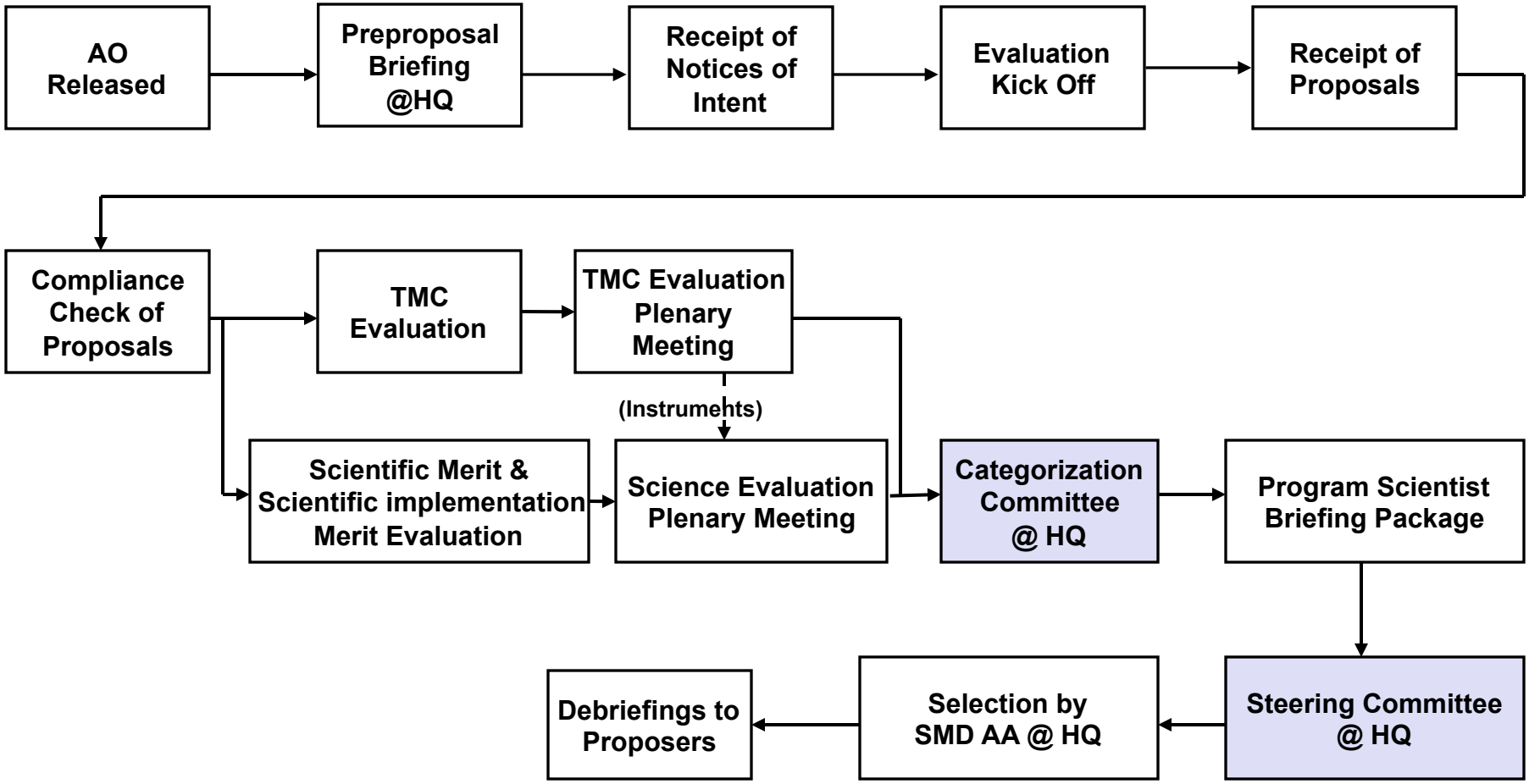
Panel members will be instructed to evaluate every proposal independently without comparison to other proposals.

These panels may be augmented through the solicitation of nonpanel (mail in) reviews, which the panels have the right to accept in whole or in part, or to reject.

Proposers should be aware that, during the evaluation and selection process, NASA may request clarification of specific points in a proposal (Section 7.1.1).

In particular, before finalizing the evaluation of the feasibility of the mission implementation, NASA will request clarification on specific, potential major weaknesses in the feasibility of mission implementation that have been identified in the proposal.

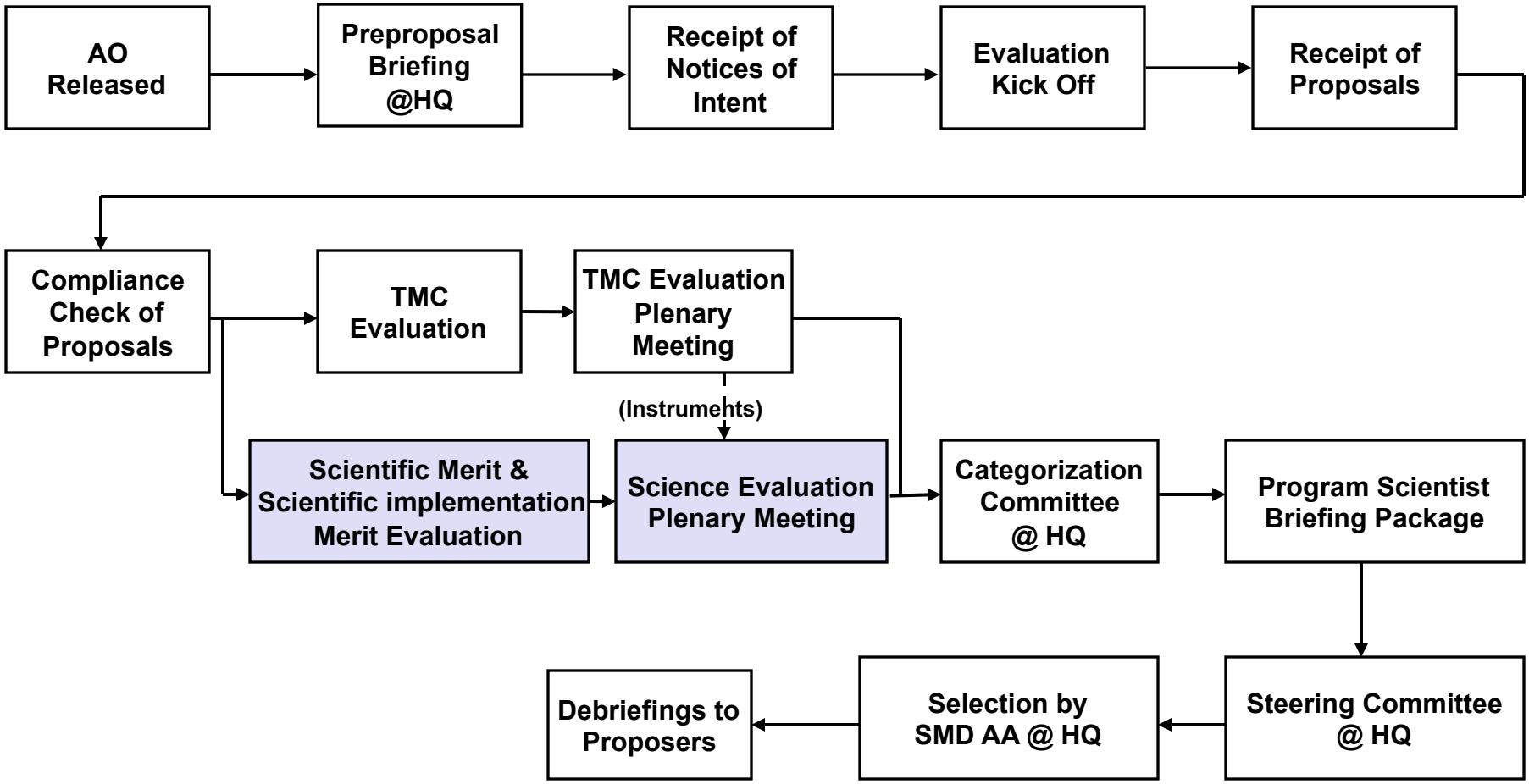
Step 1 Evaluation and Selection Overview

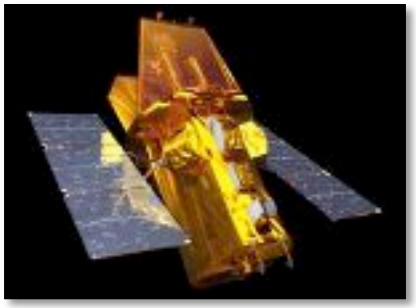
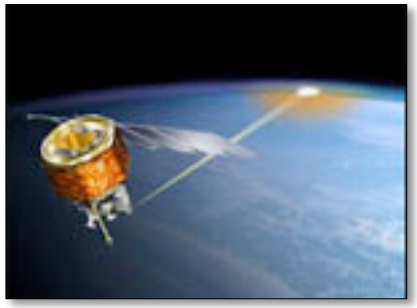


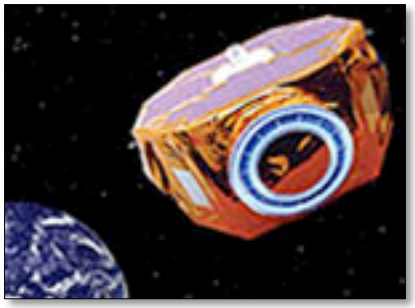
An *ad hoc* **categorization subcommittee**, appointed by the Associate Administrator for the Science Mission Directorate, will convene to **consider the peer review results** and, based on the evaluations, categorize the proposals in accordance with procedures required by NFS 1872.403-1(e).

The **SMD AO Steering Committee** will then review the results of the evaluations and categorizations. The AO Steering Committee **will conduct an independent assessment of the evaluation and categorization processes** regarding their compliance to established policies and practices, as well as the completeness, self-consistency, and adequacy of all supporting materials.

Step 1 Evaluation and Selection Overview





Science Requirements

All investigations proposed in response to this solicitation must support the goals and objectives of the Explorer Program (Section 2),

must be implemented by Principal Investigator (PI) led investigation teams (Section 5.3.1),

and must be implemented through the provision of complete spaceflight missions (Section 5.2.1).

AO Science Objectives:

Two of NASA's strategic goals are to:

(a) "Understand the Sun and its interactions with Earth and the solar system" and

(b) "Discover how the universe works, explore how the universe began and developed into its present form, and search for life elsewhere."

For heliophysics research, the strategic objectives are to:

- Understand the fundamental physical processes of the space environment from the Sun to Earth, to other planets, and beyond to the interstellar medium;
- Understand how human society, technological systems, and the habitability of planets are affected by solar variability interacting with planetary magnetic fields and atmospheres; and,
- Maximize the safety and productivity of human and robotic explorers by enabling the capability to predict the extreme and dynamic conditions in space.

For astrophysics research, the strategic objectives are to:

- Understand the origin and destiny of the universe, and the nature of black holes, dark energy, dark matter, and gravity;
- Understand the many phenomena and processes associated with galaxy, stellar, and planetary system formation and evolution from the earliest epochs to today; and,
- Generate a census of extra-solar planets and measure their properties.

Further information on NASA's strategic goals may be found in NASA Policy Directive (NPD) 1001.0, ***The 2006 NASA Strategic Plan***, available through the Program Library (Appendix D).

Further information on the goals and objectives of NASA's heliophysics and astrophysics programs may be found in ***The Science Plan*** *for NASA's Science Mission Directorate (2007-2016)* and the ***2009 Heliophysics Roadmap***, available through the Program Library.

Draft Explorer 2010 AO Highlights

Requirement 4: Proposals shall describe a science investigation with goals and objectives that address the program science objectives described in Section 2.

Requirement 5: Proposals shall clearly state the relationship between the science objectives, the data to be returned, and the instrument complement to be used in obtaining the required data (see Appendix B, Section D, for additional detail).

Requirement 6: Proposals shall include a plan to calibrate, analyze, publish, and archive the data returned, and shall demonstrate, analytically or otherwise, that sufficient resources have been allocated to carry out that plan within the proposed mission cost. The data plan shall discuss and justify any period of exclusive access to data (see Appendix B, Section E, for additional detail).

Draft Explorer 2010 AO Highlights

Requirement 7: Proposals shall state the specific science objectives and their required measurements at a level of detail sufficient to allow an assessment of the capability of the proposed mission to make those specific measurements and whether the resulting data will permit achievement of these objectives (see Appendix B, Sections D and E, for additional detail).

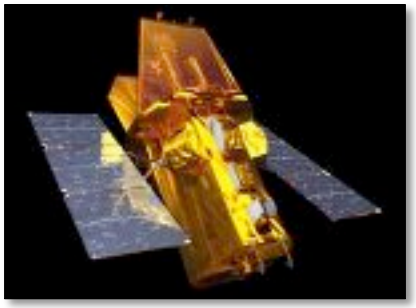
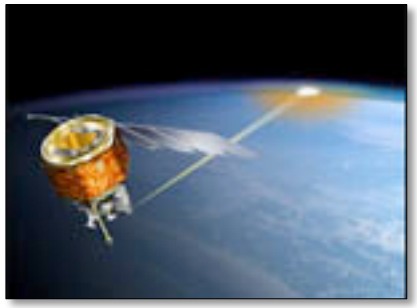
Requirement 8: Proposals shall describe the proposed instrumentation, including a discussion of each instrument and the rationale for its selection

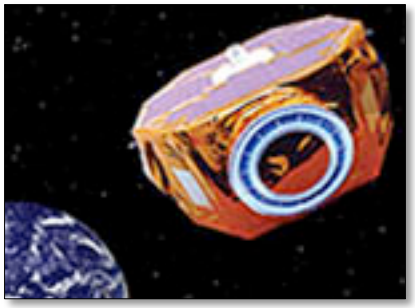
Requirement 9: Proposals shall specify only one Baseline Science Mission and only one Threshold Science Mission.

Requirement 10: Proposals shall not include any descopes or other risk mitigation actions that result in the mission being unable to achieve the Threshold Science Mission objectives.

Science Enhancement Options

Activities such as extended missions, guest investigator programs, general observer programs, participating scientist programs, interdisciplinary scientist programs, and/or archival data analysis programs, where appropriate, have the potential to broaden the scientific impact of investigations. Such optional activities may be proposed as **Science Enhancement Options (SEOs)**.
Section 5.1.5, Requirements 11-13



Science Merit Evaluation Factors

The information provided in a proposal will be used to assess the intrinsic scientific merit of the proposed investigation.

Scientific merit will be evaluated for the Baseline Science Mission and the Threshold Science Mission; science enhancement options beyond the Baseline Science Mission will not contribute to the assessment of the scientific merit of the proposed investigation.

Science Merit Evaluation Factors

The factors for scientific merit include the following:

Factor A-1. Compelling nature and scientific priority of the proposed investigation's science goals and objectives. This factor includes the clarity of the goals and objectives; how well the goals and objectives reflect program, Agency, and National priorities; the potential scientific impact of the investigation on program, Agency, and National science objectives; and the potential for fundamental progress, as well as filling gaps in our knowledge relative to the current state of the art.

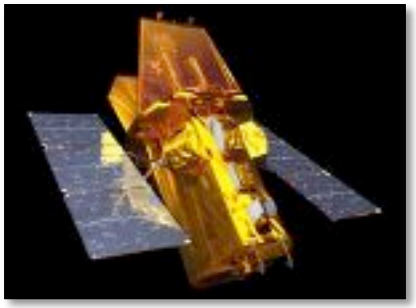
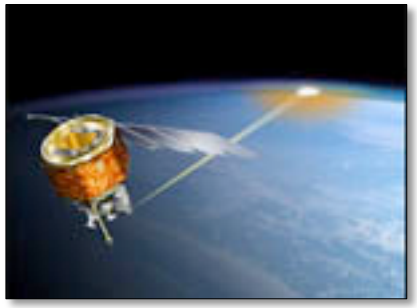
Science Merit Evaluation Factors

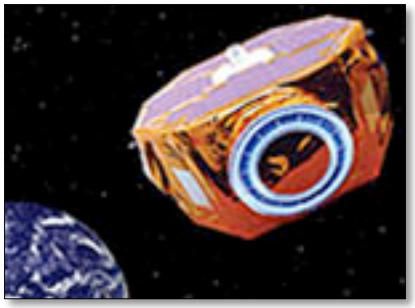
Factor A-2. Programmatic value of the proposed investigation. This factor includes the unique value of the investigation to make scientific progress in the context of other ongoing and planned missions; the relationship to the other elements of NASA's science programs; how well the investigation may synergistically support ongoing or planned missions by NASA and other agencies; and the necessity for a space mission to realize the goals and objectives.

Science Merit Evaluation Factors

Factor A-3. Likelihood of scientific success. This factor includes how well the anticipated measurements support the goals and objectives; the adequacy of the anticipated data to complete the investigation and meet the goals and objectives; and the appropriateness of the mission requirements for guiding development and ensuring scientific success.

Factor A-4. Scientific value of the Threshold Science Mission. This factor includes the scientific value of the Threshold Science Mission using the standards in the first factor of this section and whether that value is sufficient to justify the proposed cost of the mission.



Science Implementation Merit Evaluation Factors

The information provided in a proposal will be used to assess merit of the plan for completing the proposed investigation, including the scientific implementation merit, feasibility, resiliency, and probability of scientific success of the proposed investigation.

Science Implementation Merit Evaluation Factors

The factors for scientific implementation merit and feasibility include the following:

Factor B-1. Merit of the instruments and mission design for addressing the science goals and objectives. This factor includes the degree to which the proposed mission will address the goals and objectives; the appropriateness of the selected instruments and mission design for addressing the goals and objectives; the degree to which the proposed instruments and mission can provide the necessary data; and the sufficiency of the data gathered to complete the scientific investigation.

Science Implementation Merit Evaluation Factors

Factor B-2. Probability of technical success. This factor includes the maturity and technical readiness of the instruments; the adequacy of the plan to develop the instruments within the proposed cost and schedule; the robustness of those plans, including recognition of risks and mitigation plans for retiring those risks; the likelihood of success in developing any new technology that represents an untested advance in the state of the art; the ability of the development team - both institutions and individuals - to successfully implement those plans; and the likelihood of success for both the development and the operation of the instruments within the mission design.

Science Implementation Merit Evaluation Factors

Factor B-3. Merit of the data analysis, data availability, and data archiving plan. This factor includes the merit of plans for data analysis and data archiving to meet the goals and objectives; to result in the publication of science discoveries in the professional literature; and to preserve data and analysis of value to the science community. Considerations in this factor include assessment of planning and budget adequacy and evidence of plans for well-documented, high-level data products and software usable to the entire science community; assessment of adequate resources for physical interpretation of data; reporting scientific results in refereed journals; and assessment of the proposed plan for the timely release of the data to the public domain for enlarging its science impact.

Science Implementation Merit Evaluation Factors

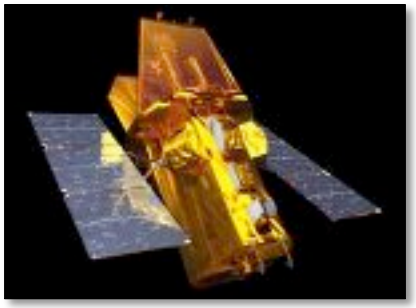
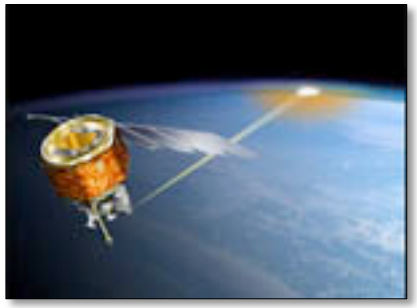
Factor B-4. Science resiliency. This factor includes both developmental and operational resiliency. Developmental resiliency includes the approach to descoping the Baseline Science Mission to the Threshold Science Mission in the event that development problems force reductions in scope. Operational resiliency includes the ability to withstand adverse circumstances, the capability to degrade gracefully, and the potential to recover from anomalies in flight.

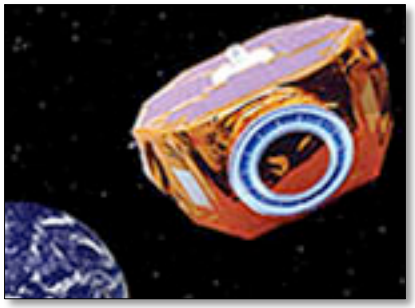
Science Implementation Merit Evaluation Factors

Factor B-5. Probability of science team success. This factor will be evaluated by assessing the experience, expertise, and organizational structure of the science team and the mission design in light of any proposed instruments. The role of each Co-Investigator will be evaluated for necessary contributions to the proposed investigation; the inclusion of Co-Is who do not have a well defined and appropriate role may be cause for downgrading of the proposal.

Science Implementation Merit Evaluation Factors

Factor B-6. Merit of any science enhancement options (SEOs), if proposed. This factor includes assessing the appropriateness of activities selected to enlarge the science impact of the mission; the potential of the selected activities to enlarge the science impact of the mission; and the appropriate costing of the selected activities. The peer review panel will inform NASA whether the evaluation of the proposed SEO(s) impacted the overall rating for scientific implementation merit and feasibility. Lack of an SEO will have no impact on the proposal's overall rating for scientific implementation merit and feasibility.



Proposal Preparation Requirements

NASA's Science Mission Directorate is releasing this AO to solicit PI-led space science investigations for the Explorer Program.

Student Collaborations

Student Collaboration proposals, if any, will be evaluated only for the impact they have on science implementation feasibility to the extent that they are not separable; student collaboration proposals will not be penalized in Step 1 for any inherent higher cost, schedule, or technical risk, as long as the student collaboration is shown to be clearly separable from the implementation of the Baseline Science Mission.

The intrinsic merit of student collaborations will not be evaluated at this time.

See Section 5.5.3, Requirements 48-49

Education and Public Outreach

The quality of E/PO plans is not a consideration in the selection of Step 1 proposals for Phase A concept studies. Therefore, E/PO plans are not needed at this time.

Requirement 45: Proposals shall not designate an E/PO lead and proposals shall not include a plan for a core E/PO program.

Requirement 46: Proposals shall identify the funding set aside …

Requirement 47: Statement of commitment …

A plan for a core E/PO program will be developed during the Phase A concept study and will be included in the Concept Study Report.

Requirements for Proposal Preparation

Appendix B contains the specific requirements for the format and content of Step 1 proposals.

General Requirements (B1-6)
Graphic Cover Page and Proposal Summary Information (B7-12)
Fact Sheet (B-13)
Table of Contents (B-14)
Science Investigation (B-15-18)
Science Implementation (B-19-25)
Missions Implementation (B-26-40)
Management (B-41-45)
Cost and Cost Estimating Methodology (B-46-51)
Small Business Contracting Plan, Acknowledgment of Education and Public Outreach, and Optional Student Collaboration (B-52-54)
Appendices (B-55-69)