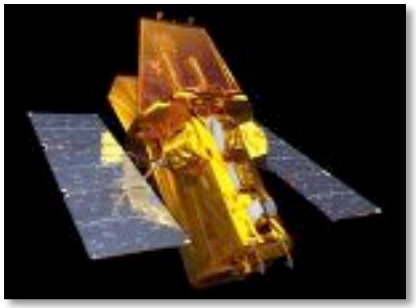
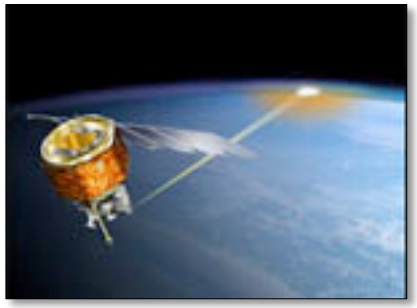
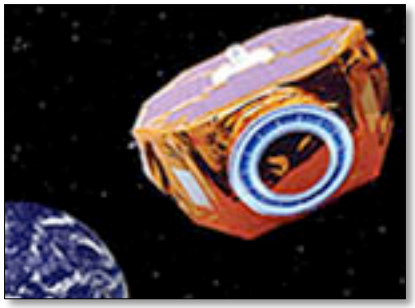



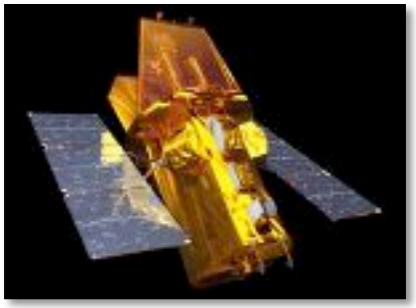
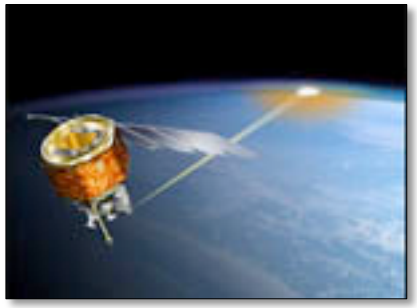


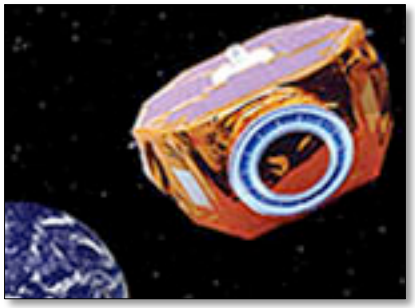
Explorer Mission of Opportunity Science Overview

Barbara Giles

Explorer Program Acquisition Scientist

Science Mission Directorate

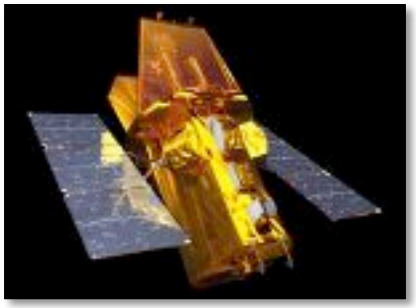
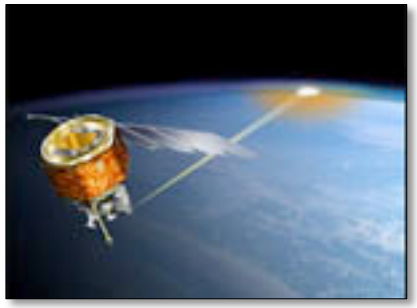



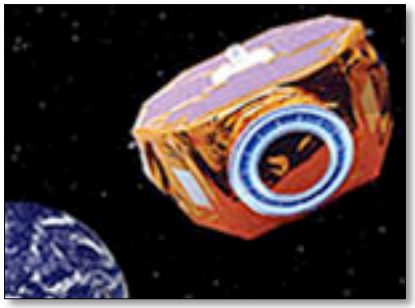


Purpose of this Presentation

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

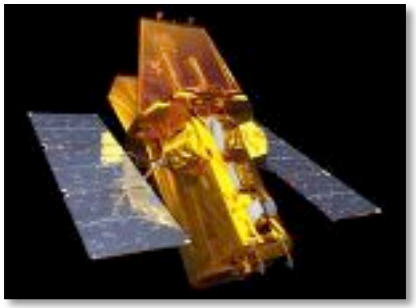
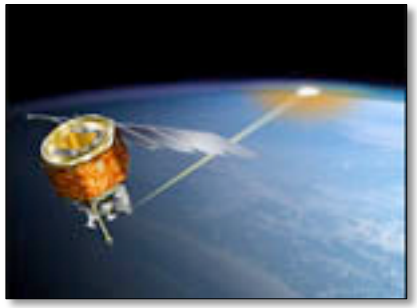
Important Note: This announcement incorporates a large number of changes relative to previous Explorer Program AOs including both policy changes and changes to proposal submission requirements. All proposers must read this PEA and the SALMON AO carefully, and all proposals must comply with the requirements,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

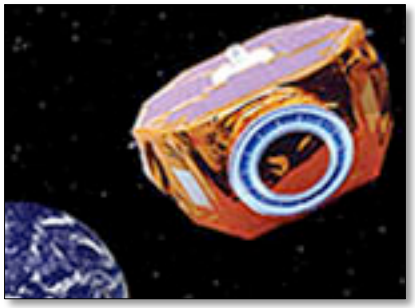





Outline

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



Introduction to the PEA

NASA issues this SALMON Program Element Appendix (PEA) for the purpose of soliciting proposals for Mission of Opportunity (MO) science investigations to be implemented through the Explorer Program.

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

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).

Three MO types may be proposed in response to this PEA:

- **Partner Missions of Opportunity** (PMOs),
- **New Science Missions using Existing Spacecraft**, and
- **Small Complete Missions** (SCMs), including investigations requiring flight on long duration balloons, investigations on the International Space Station (ISS), investigations launched as secondary payloads, or investigations launched as hosted payloads.

See Section 5 of the SALMON AO for complete descriptions of these types of MOs

A fourth MO type, **U.S. Participating Investigators** (USPIs), may be proposed in response to the NASA Research Announcement (NRA) NNH10ZDA001N, Research Opportunities in Space and Earth Sciences (ROSES).

At the same time as the final release of this PEA in SALMON, NASA will release an amendment to ROSES for Explorer USPI proposals.

For **Small Complete Mission MOs**, proposers must specify the launch date in the proposal, which is to be no later than December 31, 2018.

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

For **Partner MOs**, the proposing PI must provide evidence that the sponsoring organization intends to fund the primary host mission and that the NASA commitment for U.S. participation is required by the sponsoring organization prior to December 31, 2013.

The launch date itself for a Partner MO is not constrained.

The PI-managed Mission Cost cap for an Explorer MO, including all mission phases and the cost of accommodation on and/or delivery to the host mission, if applicable, is $55M in Fiscal Year (FY) 2011 dollars.

Proposers should be aware, however, that the Explorer program budget is heavily committed prior to 2014. It may be necessary for NASA to adjust the launch date and definition phasing of selected investigations from that proposed in order to conform to the available Explorer program budget profile; therefore, the degree of launch date flexibility should be indicated in the proposal.

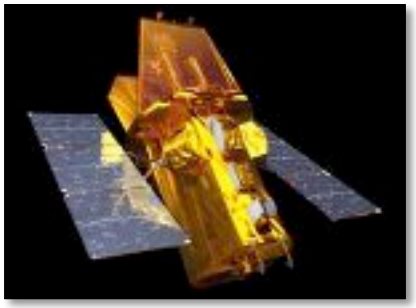
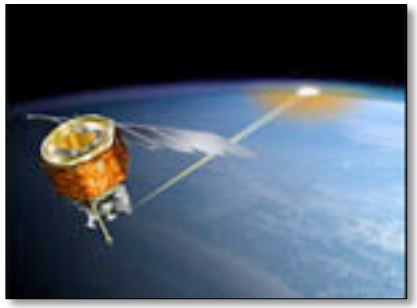
Proposal Opportunity Period and Schedule

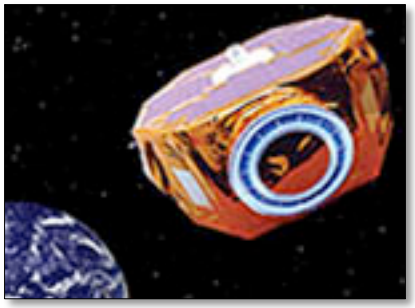
Milestone	Target Date
PEA Release Date (target)	Fall 2010
Preproposal Conference	2-4 weeks after PEA release
Notice of Intent to Propose Deadline	4 weeks after PEA release
Proposal Submittal Deadline at 4:30 p.m. Eastern Time	3 months after PEA release
Letters of Commitment due (w/ proposal)	3 months after PEA release
Step 1 Selections announced (target)	9 months after PEA 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 Small Complete Mission MO	NLT December 31, 2018

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

Investigations to be selected from this AO have been classified as Category 3 payloads.

Investigations must be proposed at an appropriate risk classification per NPR 8705.4, *Risk Classification for NASA Payloads,* and may include a proposed payload designation of Class C or Class D as appropriate.



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.

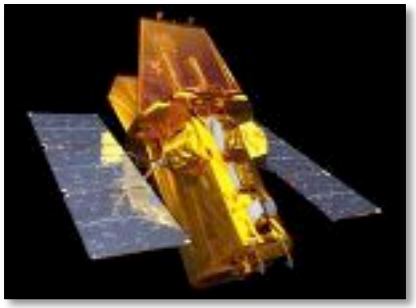
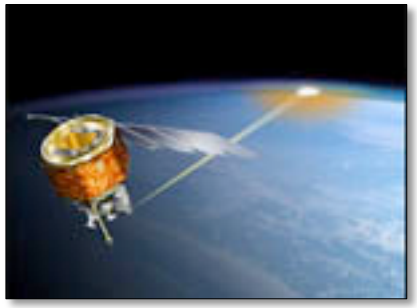
Assuming sufficient Explorer Program budget authority, NASA intends to select and execute a second full Explorer mission or one or more Mission(s) of Opportunity.

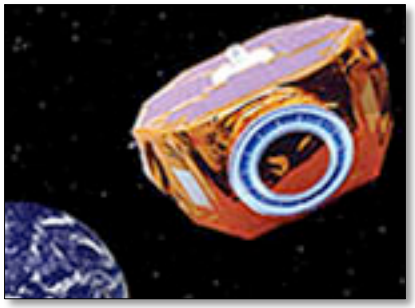
NASA is fully prepared to select only one full mission (either astrophysics or heliophysics) if it receives mission of opportunity proposals that offer outstanding science opportunities.

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.

It is intended that proposed investigations be evaluated and selected through a two-step competitive process (Section 7 of this SALMON AO).

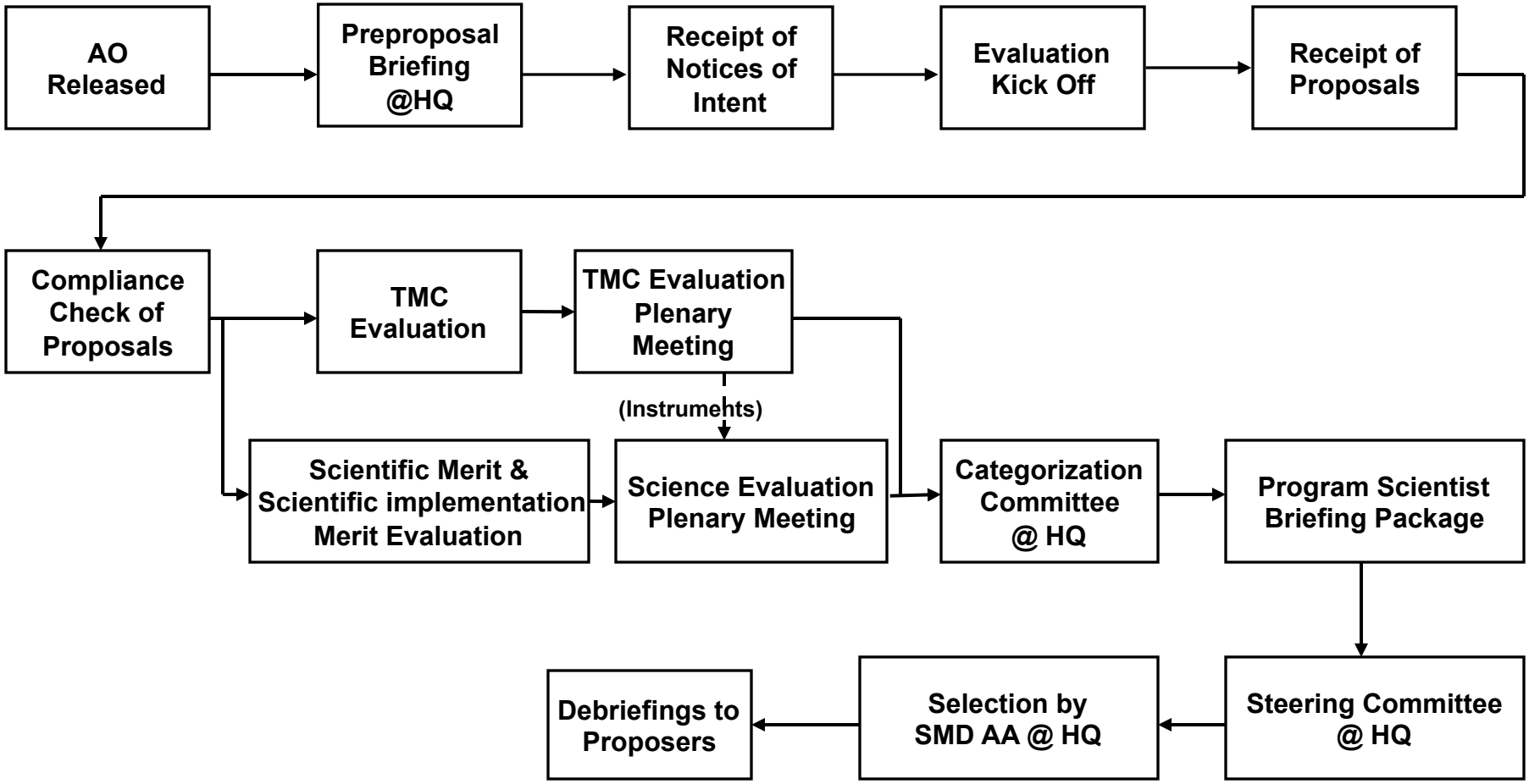
- –Step 1 is the solicitation, submission, evaluation, and selection of proposals prepared in response to this PEA. As the outcome of Step 1, one or more Step 1 proposals may be selected for Phase A study and review if their perceived value to the Explorer Program is significant. NASA will issue awards to the selected proposers to conduct Phase A concept studies.
- –Step 2 is the preparation, submission, evaluation, and continuation decision (downselection) of the Concept Study Reports.
- –As the outcome of Step 2, NASA may continue one or two investigation(s) into the subsequent phases of mission development for flight and operations.

The SALMON AO, Section 7.3, provides that a proposal may be selected for development without first completing a Phase A concept study.

The proposal must make the case that it is not only necessary, but that it is also technically feasible for the project to be selected for development without a competitive Phase A concept study.

The proposer must recognize that NASA would only make such a decision without a Phase A competition if the MO proposal was sufficiently compelling.

Step 1 Evaluation and Selection Overview



Compliant proposals will be evaluated against the criteria specified in Section 7.2 of the SALMON AO 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.

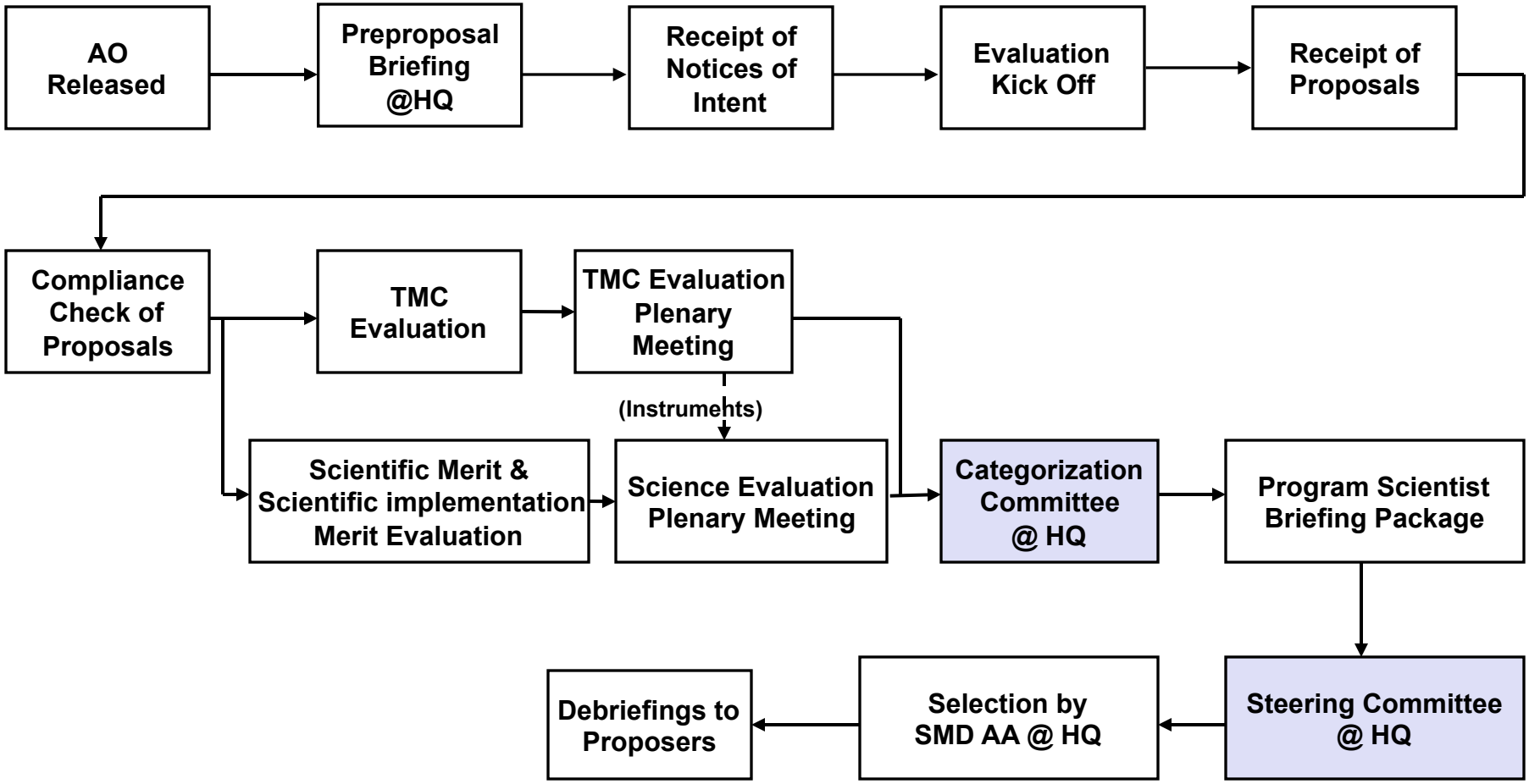
Panel members will be instructed to evaluate every proposal independently without comparison to other proposals.

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 (pending update).

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.

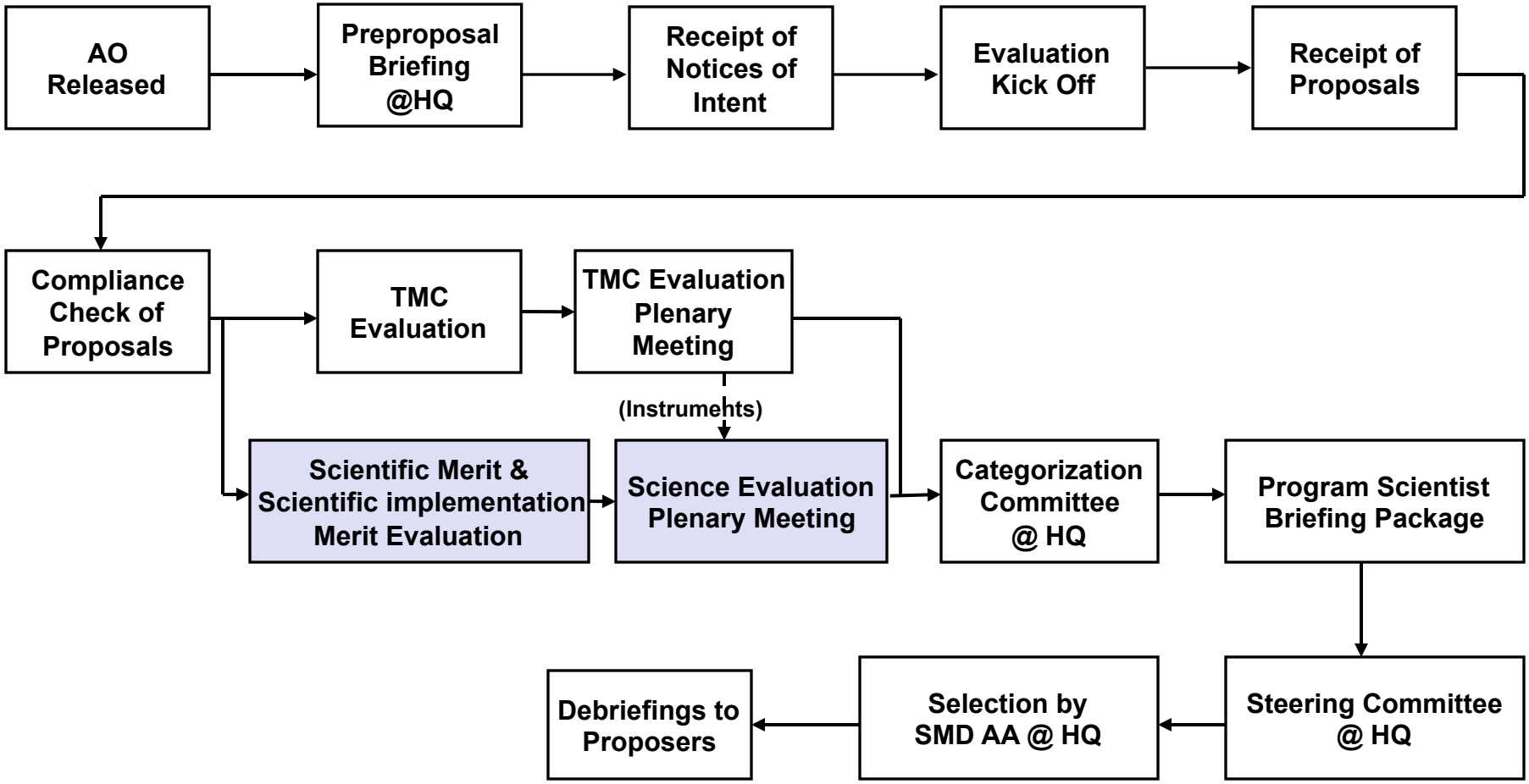
Step 1 Evaluation and Selection Overview

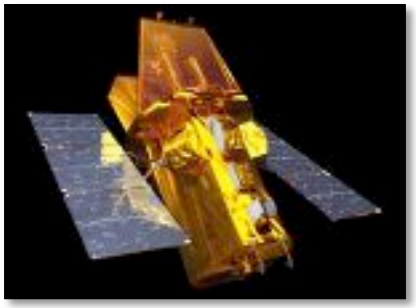
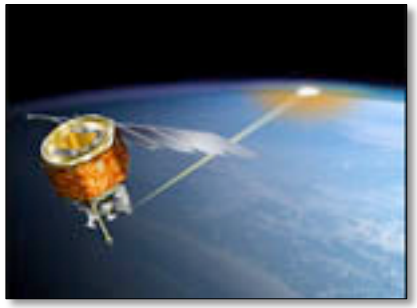


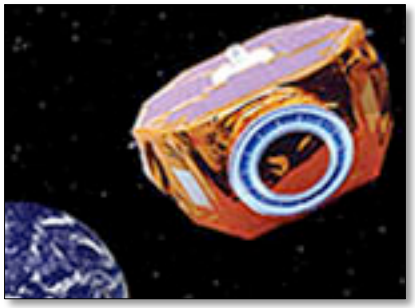
An *ad hoc* **categorization subcommittee**, appointed by the Associate Administrator for the Science Mission Directorate, will convene to **consider the peer review results** and, based on the evaluations, categorize the proposals in accordance with procedures required by NFS 1872.403-1(e).

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 of the PEA),

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

and must be implemented through the provision of complete spaceflight missions.

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 MO PEA Highlights

Proposals must describe a science investigation with goals and objectives that address the program science objectives described in Section 2.

Proposals must 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.

Proposals must 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.

Draft Explorer 2010 MO PEA Highlights

Proposals must 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).

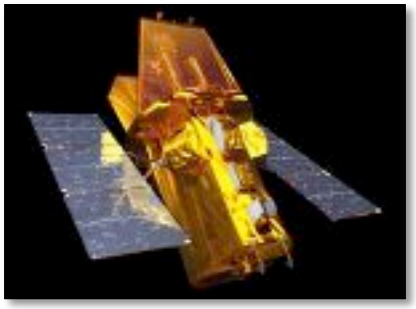
Proposals must describe the proposed instrumentation, including a discussion of each instrument and the rationale for its selection

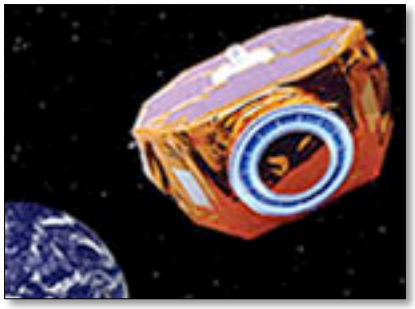
Proposals should specify only one Baseline Science Mission and only one Threshold Science Mission.

Proposals must 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)**.



Science Merit Evaluation Factors

Each proposed investigation will be evaluated for its scientific or technical merit as expressed in terms of specific major and minor strengths and weaknesses.

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

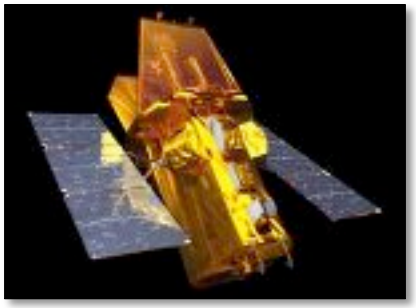
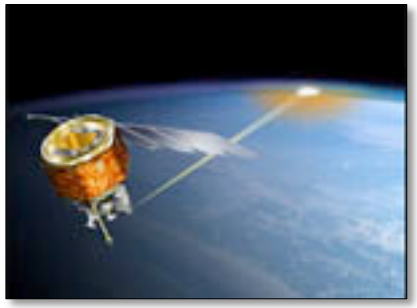
To evaluate intrinsic merit, the goals and objectives of the proposed investigation will be assessed to determine the impact of the investigation on one or more of the science, research, or technology programs identified in the NASA Strategic Plan.

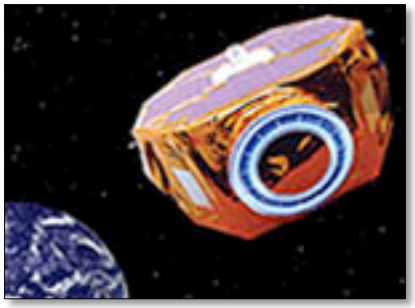
For science investigations, this evaluation will include how well the investigation fills gaps in the understanding of science and thereby provides for progress in one of the NASA science research programs, and/or how well the proposed investigation synergistically supports other ongoing science missions related to these research programs sponsored by NASA or a non-U.S. space agency, and whether or not it provides ancillary benefits to the U.S. science program.

Science Merit Evaluation Factors

A major element in the assessment of scientific or technical merit will be whether the data that are proposed to be gathered will be sufficient to complete the proposed investigation.

Merit will be evaluated for the baseline proposed investigation; science or technical enhancements beyond the baseline investigation will not contribute to the assessment of the merit of the proposed investigation.



Science Implementation Merit Evaluation Factors

Each proposed investigation will be evaluated for its scientific or technical implementation merit, including feasibility, resiliency, and the probability of success as expressed in terms of specific major and minor strengths and weaknesses.

Science Implementation Merit Evaluation Factors

Implementation merit and feasibility will be evaluated by assessing the degree to which the investigation will address the proposed scientific or technical goals and objectives, the degree to which the proposed instrument(s) or technology can be built using the proposed methods, the degree to which the proposed instrument(s) or technology can provide the necessary data, and the degree to which the mission will support the accomplishment of acquisition of the required data.

Areas requiring critical technology development of the instrument for flight readiness will be identified and the plan for completing technology development will be assessed. weakness of the proposal.

Science Implementation Merit Evaluation Factors

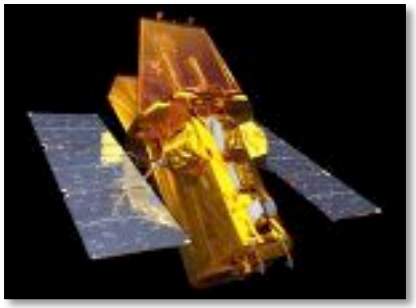
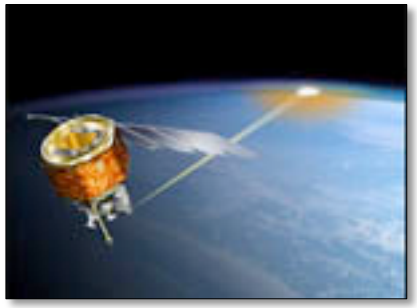
Considerations in the evaluation of the data analysis (i.e., calibration/validation) and archiving plan will include an assessment of planning and budget adequacy and evidence of plans for well documented, high level products and software usable to the entire community, an assessment for adequacy of resources for physical interpretation of data and reporting scientific or technical results in refereed journals, and the proposed plan for the timely release of the data to the public domain.

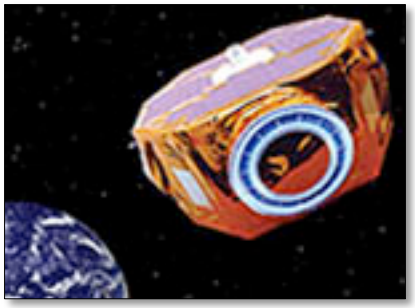
Science Implementation Merit Evaluation Factors

Should a new technology that represents an untested advance in the state of the art be proposed for use, an assessment will be made of the likelihood of its success.

The probability of success will be evaluated by assessing science team roles, experience, expertise, and the organizational structure of the science team and the technical risk associated with the overall mission design and/or instrument set.

The role of each Co-I will be evaluated for necessary contributions to the proposed investigation; the inclusion of Co-Is who do not have a well-defined and necessary role will be considered a weakness of the proposal.



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 activities are optional under this SALMON AO.

If proposed:

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.

Education and Public Outreach

E/PO activities are optional under this SALMON AO.

If proposed:

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.

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