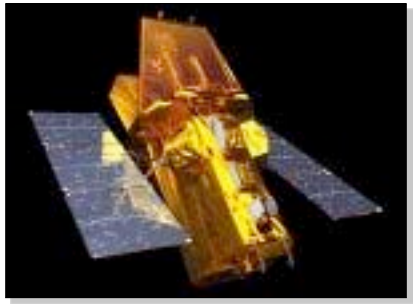
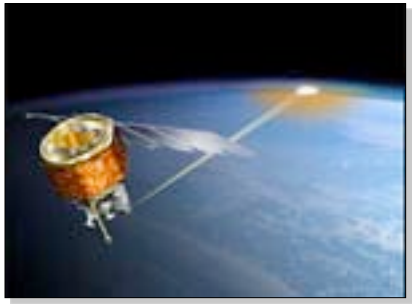
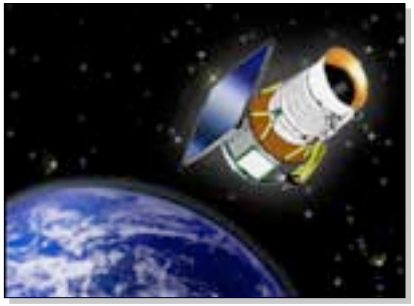
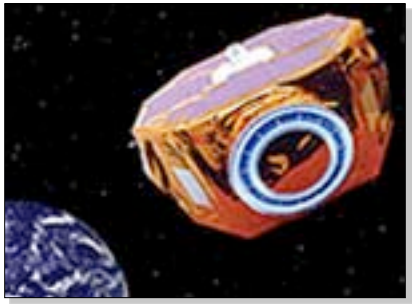
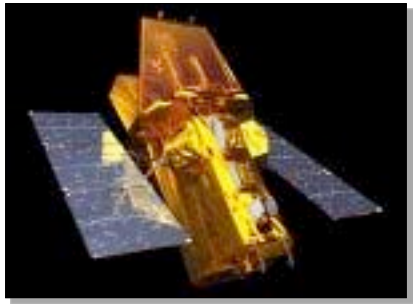
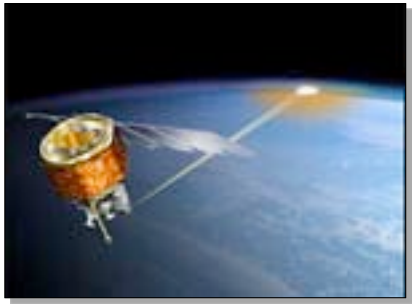
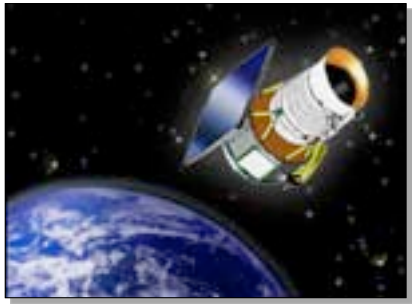
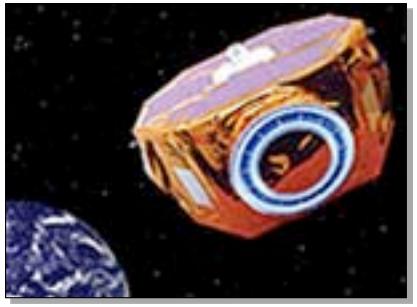





Explorer 2011
Science Evaluation Overview

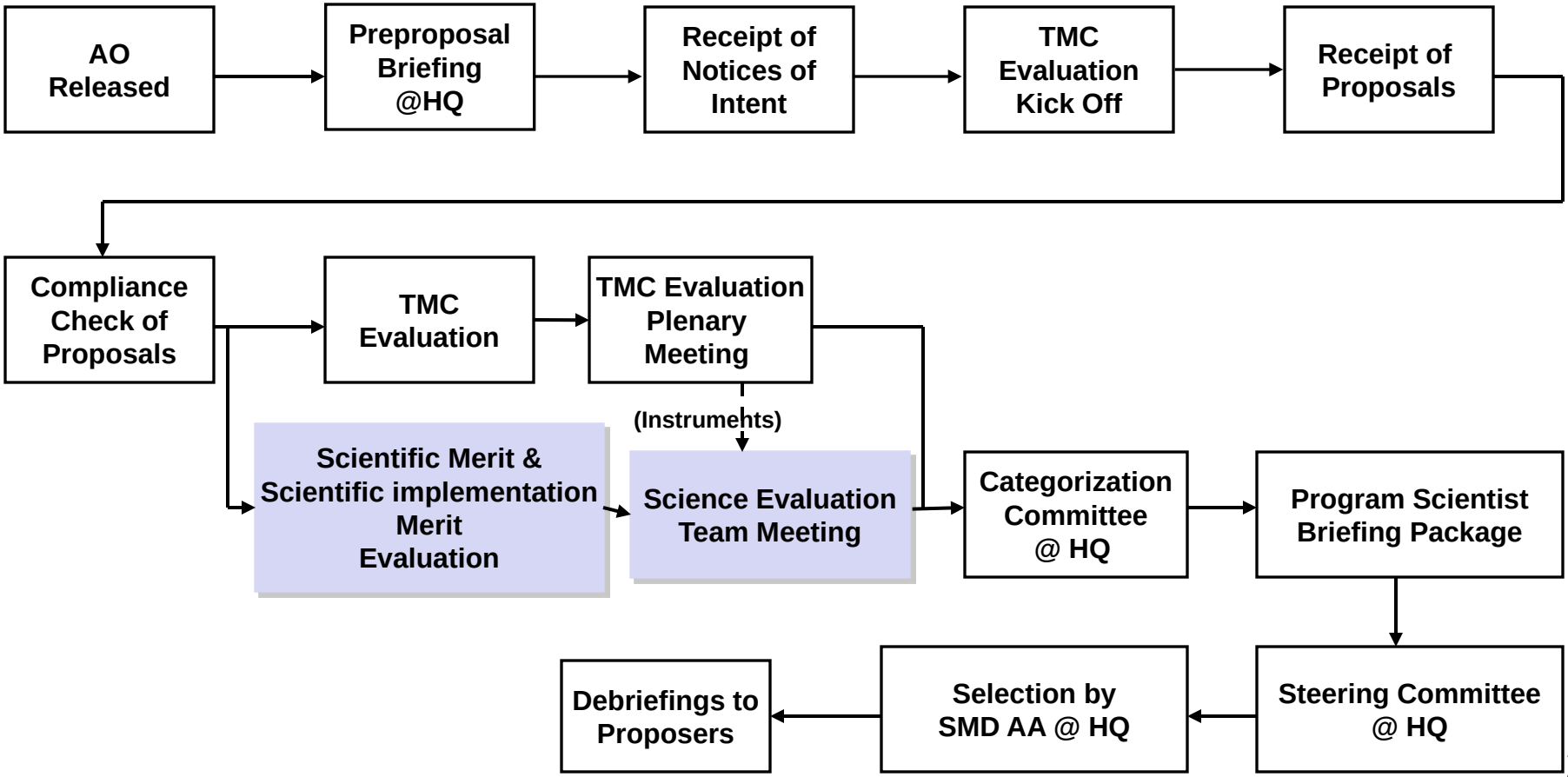
Dr. Barbara Giles

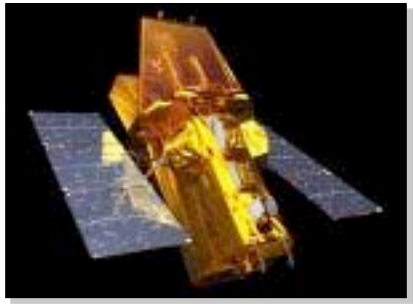
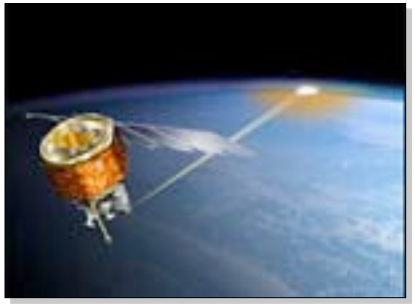
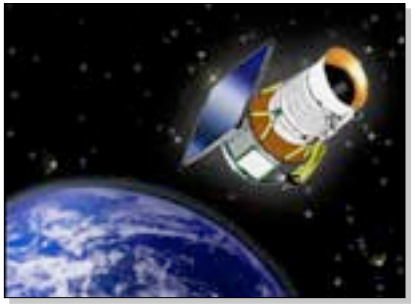
Explorer Program Acquisition Scientist

Science Mission Directorate

Science Evaluation Process




Science Requirements

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

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

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 Explorer Program Library.

Further information on the goals and objectives of NASA's heliophysics and astrophysics programs may be found in ***2010 Science Plan for NASA's Science Mission Directorate*** and the ***2009 Heliophysics Roadmap***, available through the Program Library.

Explorer 2011 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).

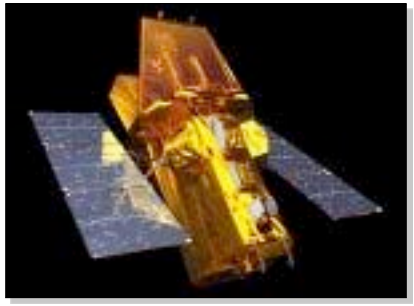
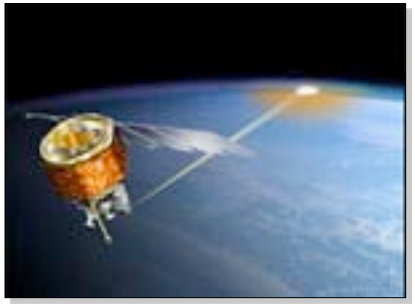
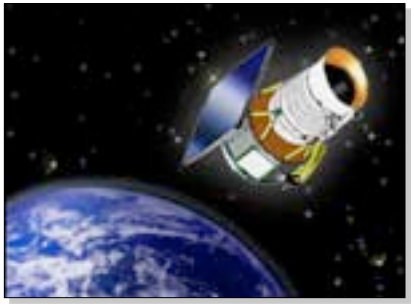
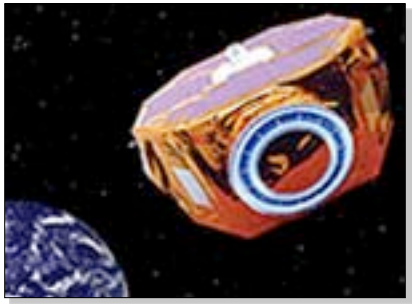
Explorer 2011 AO Highlights

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 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

The factors for scientific merit include the following:

<u>Factor A-1</u>. 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

<u>Factor A-2</u>. 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;

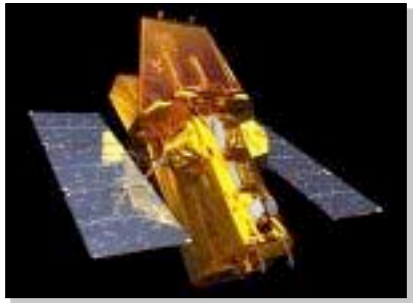
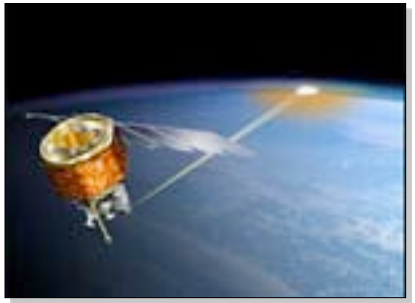
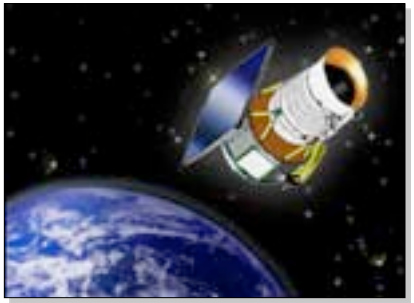
and the necessity for a space mission to realize the goals and objectives.

Science Merit Evaluation

<u>Factor A-3</u>. 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.

<u>Factor A-4</u>. 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.

[not applicable to EX2011 USPI]


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

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

<u>Factor B-1</u>. 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

<u>Factor B-2</u>. 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.

[not applicable to EX2011 USPI]

Science Implementation Merit

<u>Factor B-3</u>. 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.

continued …

Science Implementation Merit

<u>Factor B-3</u>. Merit of the data analysis, data availability, and data archiving plan.

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

<u>Factor B-4</u>. 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.

[not applicable to EX2011 USPI]

Science Implementation Merit

<u>Factor B-5</u>. 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

<u>Factor B-6</u>. 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;

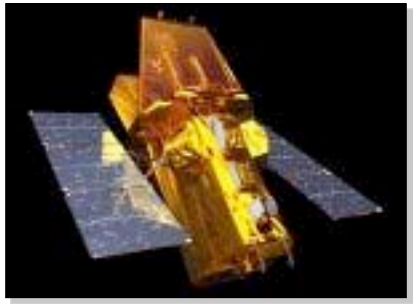
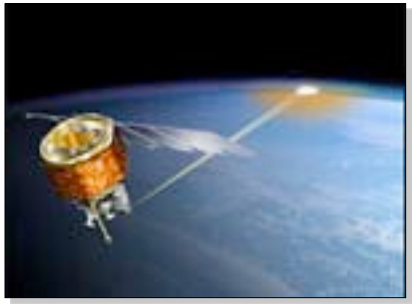
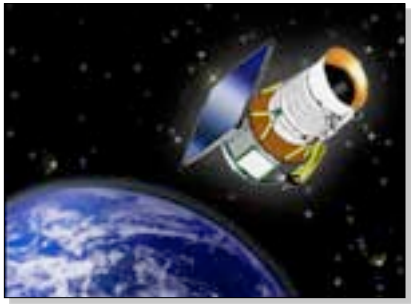
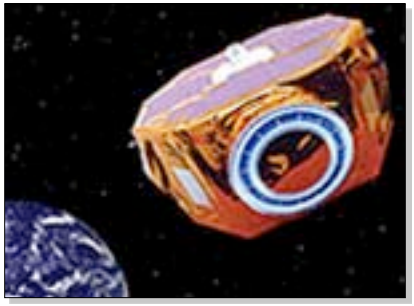
the potential of the selected activities to enlarge the science impact of the mission;

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.

[not applicable to EX2011 USPI]

Questions?