



Solar Probe Plus (SPP) Investigations AO Pre-Proposal Conference

Solar Probe Plus AO Science Evaluation

Dr. Lika Guhathakurta
Solar Probe Plus Program Scientist

Science Mission Directorate
NASA Headquarters

January 7, 2010



Solar Probe Plus AO Instrument Investigations

- Proposals shall be for either an:
 - SPP instrument investigation(s) or an
 - SPP Observatory Scientist investigation
- All SPP instrument investigations must:
 - Support the goals and objectives of the SPP
 - Implemented by a Principal Investigator (PI)-led investigation teams
 - Implemented through the provision of complete instrument investigations (the term “complete” encompasses all appropriate mission phases – section 5.2.1)
 - Individual instruments or suites of instruments may be proposed.



Solar Probe Plus AO Science

- SPP Mission Goals and Objectives
 - Determine the structure and dynamics of the magnetic fields at the sources of the fast and slow solar wind
 - Trace the flow of energy that heats the solar corona and accelerates the solar wind
 - Explore mechanisms that accelerate and transport energetic particles
 - Explore dusty plasma phenomena in the near-Sun environment and their influence on the solar wind and energetic particle formation



Observatory Scientist Investigation – Section 5.5

- Carry out a science investigation that will focus on the goals and objectives of the SPP mission.
- Serve on the SPP SWG and provide independent input to the SWG and SPP project and contribute to the following tasks:
 - (i) work with the SPP project during formulation and development of the SPP observatory in order to optimize the SPP science program within programmatic constraints;
 - (ii) provide an independent assessment of the scientific performance of the SPP mission as formulated and developed;
 - (iii) understand the SPP end-to-end system engineering effort and assist with key decisions and trades during the formulation and development of the SPP observatory in order to support the SPP SWG and the SPP project in optimizing the science productivity of the SPP mission;
 - (iv) act as a community advocate for the SPP mission science goals and objectives,
 - (v) serve as a scientific advisor to the LWS Program, and the SPP project.

The Observatory Scientist is expected to be a part time effort.



Observatory Scientist Investigation

- Proposals for SPP Observatory Scientist investigation, where the PI is proposed as a team member of an instrument science investigation, shall clearly state that the PI will forgo the opportunity to be a team member on the instrument science investigation in order to serve as SPP Observatory Scientist. (Requirement 51)

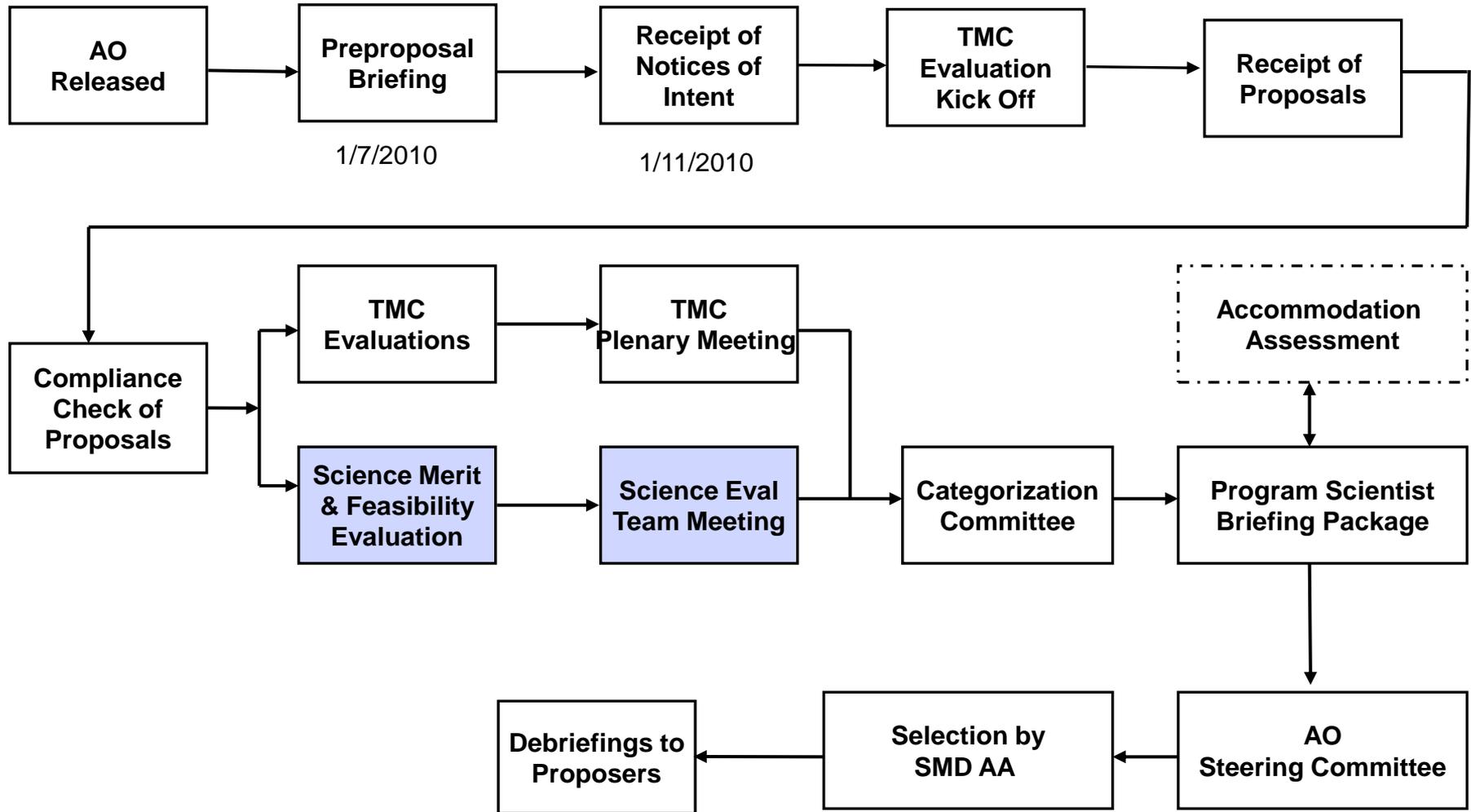


SPP Science Working Group

- The SPP Science Working Group (SWG) will provide scientific input for the SPP mission. The SPP SWG will work with the LWS Program and SPP Project offices during the formulation and development phases to maximize the effectiveness of engineering trades and to ensure that the proposed science investigations remain feasible. The SPP SWG will contribute to the development of the Level I science requirements for the SPP project. The SPP SWG will be chaired by the SPP Project Scientist, and the membership will include the SPP Observatory Scientist, the PIs of the selected SPP instrument science investigations, and any other scientists that NASA may appoint. (Section 2.5.3)



Solar Probe Plus Investigations Proposal Evaluation & Selection Process





Scientific Merit of the Proposed Investigation – Section 7.2.2 (Applies to Instrument and Observatory Scientist Proposals)

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 and the Threshold Science. 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 address the science objectives in Section 2 of this AO; and the potential for fundamental progress, as well as filling gaps in our knowledge relative to the current state of the art.

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.



Scientific Merit of the Proposed Investigation – Section 7.2.2 (Applies to Instrument and Observatory Scientist Proposals)

Factors continued

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 investigation requirements for guiding development and ensuring scientific success.

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

Factors A-1 through A-3 are evaluated for the Baseline Science, assuming it is implemented as proposed and achieves technical success. Factor A-4 is similarly evaluated for the Threshold Science.



Baseline and Threshold Science – Section 5.1.4

The “Baseline Science Investigation” is the investigation that, if fully implemented, would achieve the full science objectives proposed for the investigation.

The “Threshold Science Investigation” is the investigation that would accomplish the minimum subset of Baseline Science Investigation science objectives sufficient to justify the proposed cost of the investigation. The threshold science requirements set the science floor for the proposed investigation.



Baseline and Threshold Science – Section 5.1.4 continued

The differences between the Baseline Science Investigation and the Threshold Science Investigation provide resiliency to potential cost and schedule growth in the proposed development and implementation plan. A descope is any alteration of an investigation that renders it unable to accomplish one or more of the Baseline Science Investigation science objectives, but allows accomplishment of all Threshold Science Investigation science objectives.

NASA recognizes that, in some circumstances, the Threshold Science Investigation may be identical to the Baseline Science Investigation.



Scientific Implementation Merit and Feasibility – Section 7.2.3 (Applies to Instrument proposals)

The information provided in a instrument science investigation 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. 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 investigation 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.

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.



Scientific Implementation Merit and Feasibility – Section 7.2.3 (Applies to Instrument proposals)

Factors continued

Factor B-3. Merit of the data analysis 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 of value to the science community. Considerations in this factor include an 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, and 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.

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.



Scientific Implementation Merit and Feasibility – Section 7.2.3 (Applies to Instrument proposals)

Factors continued

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 role may be cause for downgrading of the proposal.



Scientific Implementation Merit and Feasibility of the Proposed Plans for Providing Independent Input to the SWG – Section 7.2.5 (Applies to Observatory Scientist proposals)

The information provided in an Observatory Scientist investigation proposal will be used to assess the scientific implementation merit and feasibility of the proposed plans for providing independent input to the SWG. The factors for scientific implementation merit and feasibility of the proposed plans for providing independent input to the SWG include the following:

Factor D-1. Merit and feasibility of the proposed strategy for carrying out the tasks of the Observatory Scientist. This factor will be evaluated by assessing the strategy for optimizing the science program within programmatic constraints, assessing the scientific performance of the mission, assisting in making key decisions and trades during formulation and development, and advocating for the mission science goals. This factor will be evaluated by assessing the strategy for other contributions that can be made to the SPP SWG and SPP project.



Suitability of the Proposer for the Observatory Scientist Position – Section 7.2.6 (Applies to Observatory Scientist proposals)

The information provided in an Observatory Scientist proposal will be used to assess the suitability of the PI for the Observatory Scientist position. The factors for suitability of the PI for the Observatory Scientist position include the following:

Factor E-1. Demonstrated experience and expertise in the area of solar and heliospheric research as evidenced by a relevant publication record and by any relevant activity in the heliophysics field.

Factor E-2. Demonstrated leadership qualities. The ability, competence, commitment, and performance of the PI in leading similar efforts will be evaluated to assess her/his skills and stature among scientific peers, as a gauge of her/his effectiveness in organization, management, and negotiations.

Factor E-3. Demonstrated organizational abilities. This factor will be evaluated by assessing the PI's prior organizational responsibilities. This factor includes an assessment of the PI's probability of success in executing the tasks assigned to the Observatory Scientist.



Summary of Criteria for each Proposal Type

Criteria	AO Section	Form	Applicable to Instrument(s) proposal	Applicable to Observatory Scientist
Scientific Merit	7.2.2	Form A	Yes	Yes
Scientific Implementation Merit and Feasibility	7.2.3	Form B	Yes	No
Feasibility of the Instrument Investigation Implementation, Including Cost Risk	7.2.4	Form C	Yes	No
Scientific Implementation Merit and Feasibility of the Proposed Plans for Providing Independent Input to the SWG	7.2.5	Form D	No	Yes
Suitability of the Proposer for the Observatory Scientist Position	7.2.6	Form E	No	Yes



Science Panel Composition and Organization

- The Science Panel will be led by the SPP Program Scientist
- Science evaluators are typically, but not exclusively, recruited from the academic, governmental, and industrial research communities.
- The Science Panel evaluates Science Merit (7.2.2), Scientific Implementation Merit and Feasibility (7.2.3), Scientific Implementation Merit and Feasibility of the Proposed Plans for Providing Independent Input to the SWG (7.2.5), and Suitability of the Proposer for the Observatory Scientist Position (7.2.6).
- The science evaluation will be implemented *via* one Science Panel, but sub-panels may be employed, depending on the number and variety of proposed investigations.
- The TMC Panel may provide comments and questions to the Science Panel.



Science Panel Evaluation Process – Instrument and Observatory Scientist Proposals

- For each Instrument Investigation proposal, the process results in
 - A Scientific Merit (7.2.2) adjectival rating.
 - For each instrument proposed
 - For the suite if more than one instrument is proposed
 - A Scientific Implementation Merit and Feasibility of the Proposed Investigation (7.2.3) adjectival rating
 - For each instrument
 - For the suite if more than one instrument is proposed
 - Supporting documentation for these results is also provided.
- For each Observatory Scientist Proposal
 - A Scientific Merit (7.2.2) adjectival rating.
 - A Scientific Implementation Merit and Feasibility of the Proposed Plans for Providing Independent Input to the SWG (7.2.5) adjectival rating.
 - A Suitability of the Proposer for the Observatory Scientist Position (7.2.6) adjectival rating.
 - Supporting documentation for these results is also provided.



Science Panel Evaluation Process

- Proprietary Information
 - All proposal material will be considered Proprietary, and this material will be handled and stored according to NASA policies and procedures for the treatment of Proprietary information.
 - Only those with a need to know will be allowed to view Proposal materials.
 - SMD Conflict of Interest (CoI) policies will be followed.