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# **Announcement of Opportunity NNH14ZDA0130**

## **2014 Astrophysics Small Explorer (SMEX) Full Missions Evaluation Plan**

**January 14, 2015**



# Outline

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	<u>Page</u>
<b>Introduction</b>	<b>3</b>
<b>General Evaluation Requirements and Compliance</b>	<b>7</b>
<b>Compliance Checklist, 2014 Astrophysics SMEX AO Appendix F</b>	<b>15</b>
<b>Science Evaluation</b>	<b>19</b>
<b>Technical, Management, and Cost (TMC) Evaluation Requirements</b>	<b>38</b>
<b>Categorization</b>	<b>58</b>
<b>Approval</b>	<b>63</b>



# Introduction

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## **Purpose of this Evaluation Plan**

The 2014 Astrophysics SMEX Evaluation Plan covers evaluation information directly from the Announcement of Opportunity (AO) and from the evaluation processes conducted by the Science Panels and the Technical Management and Cost (TMC) Panels.



# Introduction

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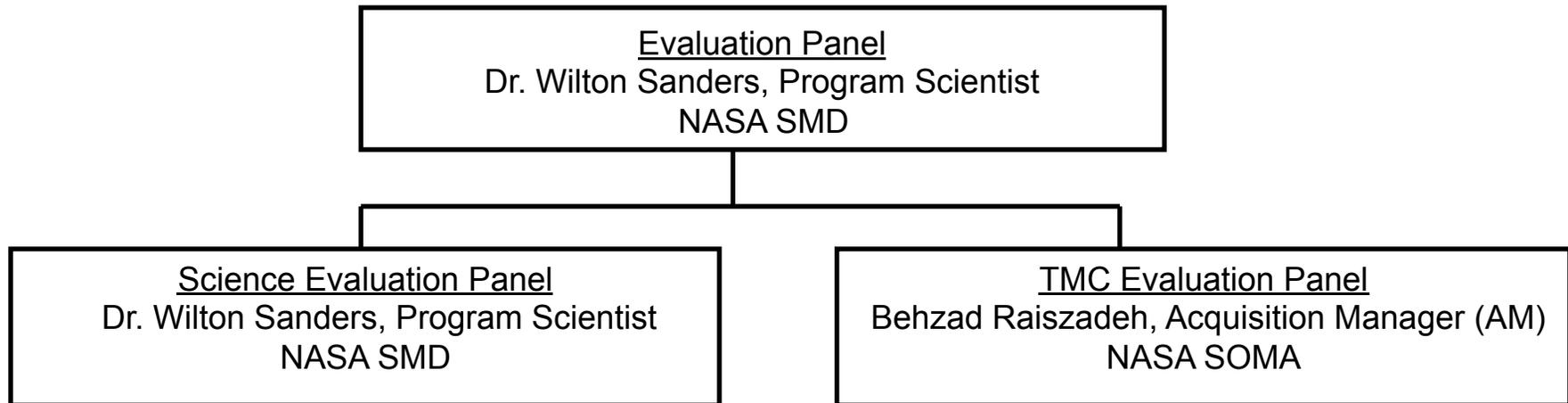
## **2014 Astrophysics SMEX Solicitation**

- All investigations proposed in response to this solicitation must support the goals and objectives of the Explorer Program, must be implemented by Principal Investigator (PI) led investigation teams, and must be implemented through the provision of complete spaceflight missions.
- This is a two-step selection process.
- The PI-Managed Mission cost cap for an Astrophysics Explorer mission is \$175 million in Fiscal Year (FY) 2015 dollars, including access to space but not including any contributions. NASA provided launch services may be proposed at a charge of \$50 million in FY 2015 dollars against the PI-Managed Mission Cost. Proposers may propose alternative access to space, including contributed launch services. A charge to the PI cost cap of \$2.0 million will be levied for the expected NASA launch vehicle monitoring functions and advisory services. NASA will provide accommodations on the ISS, as well as transportation to the ISS, at a charge of \$50 million in FY 2015 dollars against the PI-Managed Mission Cost.



# Introduction

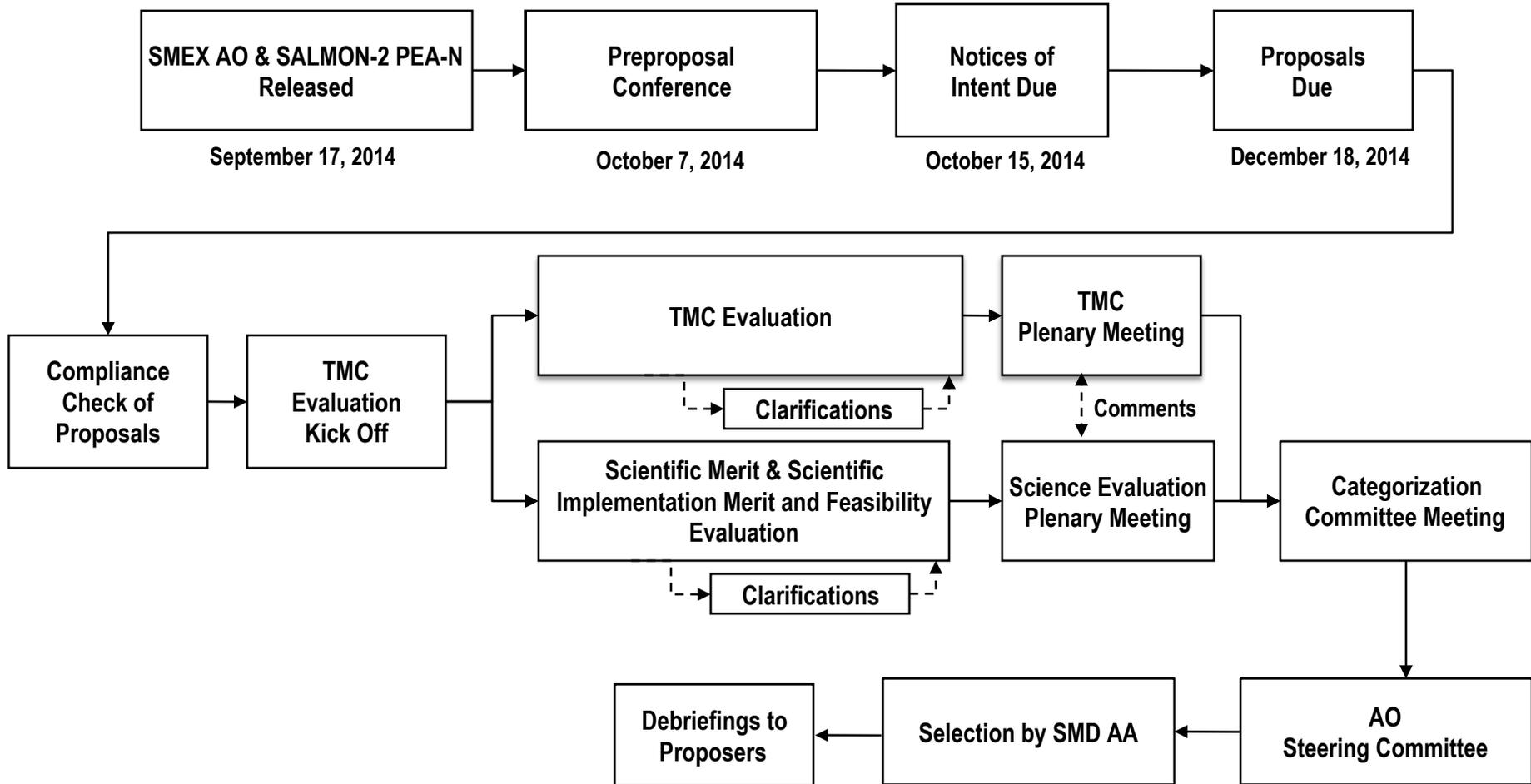
## Evaluation Organization

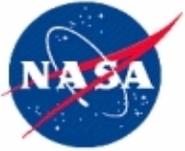




# Introduction

## Proposal Evaluation Flow





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# General Evaluation Requirements and Compliance



# Principles for Evaluation

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- All proposals are to be treated fairly and equally.
- Merit and Risk are to be assessed on the basis of the material in the proposal and the clarification process.
- Ratings shall reflect the written strengths and weaknesses.
- Everyone involved in the evaluation process is expected to act in an unbiased objective manner; advocacy for particular proposals is not appropriate.



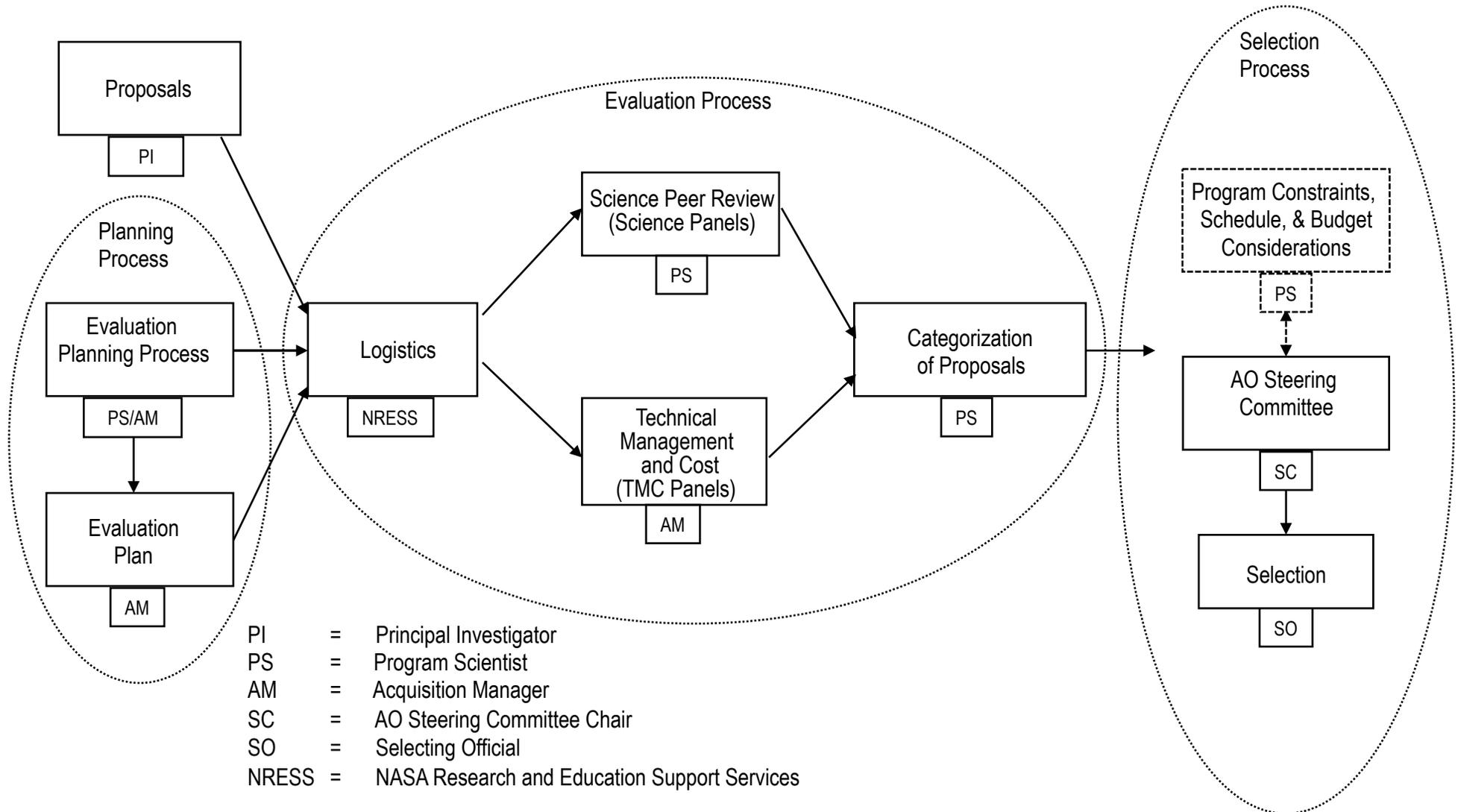
# General Evaluation Ground Rules

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- All proposals will be evaluated to uniform standards established in the 2014 Astrophysics SMEX AO, and without comparison to other proposals.
- All evaluators will be experts in the areas that they evaluate.
- Specialist Evaluators (to provide special technical expertise to the TMC Panel) and non-panel/mail-in Reviewers (to provide special science expertise to the Science Panels) may be utilized, respectively, based on need for expertise in a specific technology or science that is proposed.



# Evaluation Responsibilities





# Conflicts of Interest (COI) Prevention Requirements

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- NRESS will cross-check all the Science Panel members against the lists of personnel and organizations identified in each proposal submitted to determine whether any organizational Conflict of Interest (COI) exists.
- Cornell Technical Services (CTS) will cross-check all TMC Panel members against the lists of personnel and organizations identified in each proposal submitted to determine whether any organizational COI exists.
- Additionally, all evaluators must divulge any other financial, professional, or potential personal conflicts of interest, and whether they work for a profit-making company that directly competes with any profit-making proposing organization.
- All Civil Service evaluators will self-certify their COI status by reviewing a combined listing of individuals and organizations associated with the SMEX proposals. The TMC evaluators must notify the SOMA Acquisition Manager, Behzad Raiszadeh, in case there is a potential conflict. The Science evaluators must notify the Science Panel evaluation manager, Dr. Wilton Sanders, in case of a potential conflict.



# Conflicts of Interest (COI) Prevention Requirements

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- All known conflict of interest issues are documented and a COI Mitigation Plan is developed to minimize the likelihood that an issue will arise in the evaluation process. Any potential COI issue is discussed with the Program Scientist and the SMD Deputy Associate Administrator for Research and documented in the COI Mitigation Plan. All determinations regarding possible COIs that arise will be logged as an appendix to the COI Mitigation Plan.
- If any previously unknown potential conflict of interest arises during the evaluation, the conflicted member(s) will be notified to stop evaluating proposals immediately, and the Panel Chair will be notified immediately. If a COI is confirmed, the conflicted member(s) will be immediately removed from the evaluation process, and steps will be taken expeditiously, to remove, mitigate, or accept any actual or potential bias imposed by the conflicted member(s). The steps will be documented in the COI Mitigation Plan.
- Members of the Science and TMC panels are prohibited from contacting anyone outside their panel for scientific/technical input, or consultation, without the prior approval of the Program Scientist.



# Proprietary Data Protection Requirements

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- All proposal and evaluation materials are considered proprietary.
- Viewing of proposal materials will be only on a need-to-know basis.
- Each evaluator will sign a Non-Disclosure Agreement (NDA) that must be on file at NRESS prior to any proposals being distributed to that evaluator.
- The proposal materials that each evaluator has access to is recorded.
- Evaluators are not permitted to discuss proposals with anyone outside their Science or TMC Panel.
- All proprietary information that must be exchanged between evaluators will be exchanged *via* the secure NASA Solicitation and Proposal Integrated Review and Evaluation System (NSPIRES), *via* the secure Remote Evaluation System (RES), secure WebEx or *via* encrypted email, parcel post, fax, or regular mail. Weekly teleconferences among TMC Panel evaluators will be conducted *via* secure telephone lines.
- Evaluators' electronic and paper evaluation materials will be deleted/destroyed when the evaluation process is complete. Archival copies will be maintained in the NASA Science Office for Mission Assessments (SOMA) vault.



# Investigation Evaluation Criteria

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- Evaluation Criteria from 2014 Astrophysics SMEX AO:
  1. Scientific Merit of the Proposed Investigation (Section 7.2.2)
  2. Scientific Implementation Merit and Feasibility of the Proposed Investigation (Section 7.2.3); and
  3. TMC Feasibility of the Proposed Mission Implementation, including Cost Risk (Section 7.2.4).
- Weighting: the first criterion is weighted approximately 40%; the second and third criteria are weighted approximately 30% each.
- Other Selection Factors (section 7.3):
  - Programmatic factors
  - PI-Managed Mission Cost



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# **Compliance Checklist, 2014 Astrophysics SMEX AO Appendix F**



# Compliance Criteria

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## Administrative:

1. Electronic proposal submitted through NSPIRES on time
2. Proposal on CD-ROM received on time
3. Original signature of authorizing official included
4. Meets page limits
5. Meets general requirements for format and completeness (single searchable PDF no larger than 40 MB, maximum 55 lines text/page, maximum 15 characters/inch, no smaller than 12-point font)
6. Required appendices included; no additional appendices
7. Budgets are submitted in the required formats
8. All individual team members that are named on the cover page indicate commitment through NSPIRES
9. All export controlled information has been identified
10. Restrictions involving China acknowledged on Electronic Cover Page

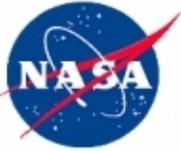


# Compliance Criteria

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## Scientific or Exploration Technology:

11. Addresses solicited science research programs
12. Requirements traceable from science objectives to measurements to instruments to mission
13. Appropriate data archiving plan
14. Baseline science mission and threshold science mission defined



# Compliance Criteria

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## Technical:

15. Complete spaceflight investigation (Phases A-F) proposed
16. Team led by a single PI
17. PI-Managed Mission Cost within AO cost cap
18. Phase A costs within Phase A cost limit
19. Contributions within contribution limit
20. Co-investigator costs in budget
21. Launch date prior to launch deadline
22. Includes table describing non-U.S. participation
23. Includes letters of commitment from funding agencies for non-U.S. participating institutions
24. Includes letters of commitment from all U.S. organizations offering contributions
25. Includes letters of commitment from all major partners



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# Science Evaluation



# Science Panel Composition and Organization

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- The Program Scientist leads the Science Panel
- 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) and Scientific Implementation Merit and Feasibility (7.2.3).
- The science evaluation will be conducted via one separate Science Panel, and sub-panels may be employed, depending on the number and variety of proposed investigations.
  - Any sub-panel will be led by a NASA Civil Servant and may be co-chaired by a member from the scientific community.
  - Sub-panels may have an Executive Secretary.
- Each proposal will be reviewed by assigned panel members.
  - The Lead Reviewer for each proposal will lead the discussion.
  - At the request of the Lead Reviewer, a Supporting Reviewer will take notes on the discussion.
- The TMC Panels may provide comments and questions to the Science Panel.
- The Science Panels may request Science Implementation Merit and Investigation Feasibility (Form B) clarifications from proposers on Potential Major Weaknesses (PMWs) identified during the evaluation process.



# Science Panel Procedures

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- Each member of the Science Panels will review Proposals as directed by the Chair.
  - If special science expertise is required, the Science Panels may utilize non-panel/mail-in reviewers to assist with one or more proposals.
  - Non-panel/mail-in evaluators will evaluate only those parts of proposals pertinent to their scientific specialties.
- Each proposal will be discussed by the evaluators in a teleconference.
  - Findings in the form of Strengths and Weaknesses form the basis for initial panel discussions.
  - Each reviewer will provide an individual review prior to the teleconference.
  - The teleconference discusses the proposal and the reviews by the individual reviewers including non-panel reviewers.
  - Following the teleconference, the Lead Reviewer captures/synthesizes individual evaluations including discussion and will generate the Draft Evaluation including draft findings.
  - The draft findings will include PMWs sent to the proposers for clarification.
  - There is no overall merit grade assigned prior to receiving the responses to the PMWs clarification requests.



# Science Panel Procedures

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- Science evaluation team meetings will be held upon completion of Science Evaluation for all proposals.
  - The Science Panel will compile all of the findings for each proposal.
  - For each proposal, the Chair or designated Lead Reviewer will lead the discussion, summarize the proposed investigation, and document the results.
  - The PMWs clarifications provided by the PIs will be considered and the findings will be adjusted if warranted.
  - If warranted, the Panel may reconsider evaluations at the Meetings.
  - Evaluations of all proposals are reviewed during the Science Panel meetings to ensure that standards have been applied uniformly and in an appropriate and fair manner.
  - The Lead Reviewers synthesize and document Panel evaluations.



# Typical Science Panel Products

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- For each proposal, the process results in:
  - Form A
    - Proposal title, PI name, and submitting organization;
    - Proposal summary;
    - Based on findings, intrinsic Science Merit adjectival ratings from each evaluator, ranging from “Excellent” to “Poor”;
    - Summary rationale for the median rating;
    - Narrative findings, identified as major or minor strengths or weaknesses;
    - Comments to PI, comments to NASA. (optional)
  - Form B
    - Proposal title, PI name, and submitting organization;
    - Based on findings, Science Implementation Merit and Feasibility of the Investigation adjectival ratings from each evaluator, ranging from “Excellent” to “Poor”;
    - Summary rationale for the median rating;
    - Narrative findings, identified as major or minor strengths or weaknesses;
    - Comments to PI, comments to NASA. (optional)



# Science Panel Evaluation Factors

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Criterion A: Intrinsic Science Merit of the proposed investigation

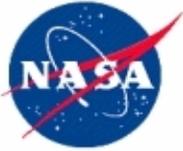
- Factors from 2014 Astrophysics SMEX AO section 7.2.2
  - Factor A-1. Compelling nature and scientific priority of the proposed investigation's science goals and objectives.
  - Factor A-2. Programmatic value of the proposed investigation.
  - Factor A-3. Likelihood of scientific success.
  - Factor A-4. Scientific value of the Threshold Science Mission.



# Science Panel Evaluation: Factor A-1

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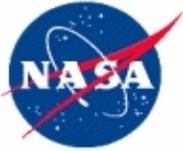
Compelling nature and scientific priority of the proposed investigation's science goals and objectives. This factor includes the clarity of the goals and objectives; how well the goals and objectives reflect program, Agency, and National priorities; the potential scientific impact of the investigation 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 Panel Evaluation: Factor A-2

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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 Panel Evaluation: Factor A-3

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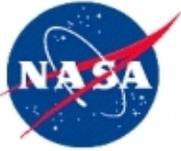
Likelihood of scientific success. This factor includes how well the anticipated measurements support the goals and objectives; the adequacy of the anticipated data to complete the investigation and meet the goals and objectives; and the appropriateness of the mission requirements for guiding development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



# Science Panel Evaluation: Factor A-4

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Science 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.

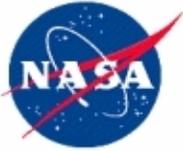


# Science Panel Evaluation Factors

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## Criterion B: Scientific Implementation Merit and Feasibility of the Proposed Investigation

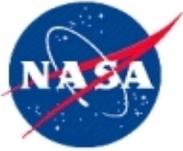
- Factors from 2014 Astrophysics SMEX AO section 7.2.3
  - Factor B-1. Merit of the instruments and mission design for addressing the science goals and objectives.
  - Factor B-2. Probability of technical success.
  - Factor B-3. Merit of the data analysis, data availability, and data archiving plan.
  - Factor B-4. Science resiliency.
  - Factor B-5. Probability of science team success.
  - Factor B-6. Merit of any science enhancement options (SEOs), if proposed.



# Science Panel Evaluation: Factor B-1

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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 Panel Evaluation: Factor B-2

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Probability of technical success. This factor includes the maturity and technical readiness of the instruments or demonstration of a clear path to achieve necessary maturity; 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 Panel Evaluation: Factor B-3

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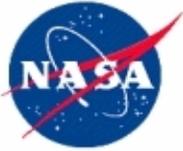
Merit of the data analysis, data availability, and data archiving plan. This factor includes the merit of plans for data analysis and data archiving to meet the goals and objectives; to result in the publication of science discoveries in the professional literature; and to preserve data and analysis 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 the professional literature (*e.g.*, 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 Panel Evaluation: Factor B-4

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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 Panel Evaluation: Factor B-5

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Probability of investigation 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 Panel Evaluation: Factor B-6

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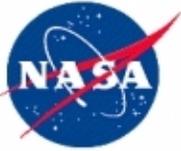
Merit of any science enhancement options (SEOs), if proposed. This factor includes assessing the appropriateness of activities selected to enlarge the science impact of the mission; the potential of the selected activities to enlarge the science impact of the mission; and the appropriate costing of the 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.



# Science Evaluation Products: Findings

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- **Major Strength:** A facet of the implementation response that is judged to be of superior merit and can substantially contribute to the ability of the project to meet its scientific objectives.
- **Major Weakness:** A deficiency or set of deficiencies taken together that are judged to substantially weaken the project's ability to meet its scientific objectives.
- **Minor Strength:** A strength that is worthy of note and can be brought to the attention of proposers during debriefings, but is not a discriminator in the assessment of merit.
- **Minor Weakness:** A weakness that is sufficiently worrisome to note and can be brought to the attention of proposers during debriefings, but is not a discriminator in the assessment of merit.



# Form A and B Grade Definitions

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- **Excellent:** A comprehensive, thorough, and compelling proposal of exceptional merit that fully responds to the objectives of the AO as documented by numerous and/or significant strengths and having no major weaknesses.
- **Very Good:** A fully competent proposal of very high merit that fully responds to the objectives of the AO, whose strengths fully outbalance any weaknesses.
- **Good:** A competent proposal that represents a credible response to the AO, having neither significant strengths nor weaknesses and/or whose strengths and weaknesses essentially balance.
- **Fair:** A proposal that provides a nominal response to the AO but whose weaknesses outweigh any perceived strengths.
- **Poor:** A seriously flawed proposal having one or more major weaknesses (e.g., an inadequate or flawed plan of research or lack of focus on the objectives of the AO).



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# TMC Evaluation Requirements



# TMC Panel Composition and Organization

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- The Acquisition Manager, who is a Civil Servant in the NASA Science Office of Mission Assessments (SOMA) at NASA Langley Research Center (LaRC), leads the TMC panel.
  - NASA SOMA works directly for NASA Headquarters and is firewalled from the rest of NASA LaRC.
- TMC evaluators are a mix of the best non-conflicted contractors, consultants, and Civil Servants who are experts in their respective fields.
  - Evaluators read their assigned proposals.
  - Evaluators provide findings on their assigned proposals.
  - Evaluators provide ratings of proposals that reflect findings.
- Additionally, specialist evaluators may be called upon in cases where technical expertise that is not represented on the panel is needed.
  - Specialist Evaluators evaluate only those parts of a proposal that are specific to their particular expertise.
  - Specialist Evaluators provide only findings; they do not provide ratings.



# TMC Panel Evaluation Factors

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## Criterion C: TMC Feasibility of the Investigation Implementation, Including Cost Risk

- Factors from 2014 Astrophysics SMEX AO section 7.2.4
  - Factor C-1. Adequacy and robustness of the instrument implementation plan .
  - Factor C-2. Adequacy and robustness of the mission design and plan for mission operations.
  - Factor C-3. Adequacy and robustness of the flight systems.
  - Factor C-4. Adequacy and robustness of the management approach and schedule, including the capability of the management team .
  - Factor C-5. Adequacy and robustness of the cost plan, including cost feasibility and cost risk.



# TMC Evaluation Factor C-1

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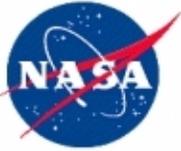
Adequacy and robustness of the instrument implementation plan. The maturity and technical readiness of the instrument complement will be assessed, as will the ability of the instruments to meet mission requirements. This factor includes an assessment of the instrument design, accommodation, interface, heritage, and technology readiness. This factor includes an assessment of the instrument hardware and software designs, heritage, and margins. This factor includes an assessment of the proposer's understanding of the processes, products, and activities required to accomplish development and integration of the instrument complement. This factor also includes adequacy of the plans for instrument systems engineering and for dealing with environmental concerns. This factor includes an assessment of plans for the development and use of new instrument technology, plans for advanced engineering developments, and the adequacy of backup plans to mature systems within the proposed cost and schedule when systems having a TRL less than 6 are proposed.



## TMC Evaluation Factor C-2

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Adequacy and robustness of the mission design and plan for mission operations. This factor includes an assessment of the overall mission design and mission architecture, the spacecraft design and design margins (including margins for launch mass, delta-V, and propellant), the concept for mission operations (including communication, navigation/tracking/trajectory analysis, and ground systems and facilities), and the plans for launch services. This factor includes mission resiliency – the flexibility to recover from problems during both development and operations – including the technical resource reserves and margins, system and subsystem redundancy, and reductions and other changes that can be implemented without impact to the Baseline Science Mission.



## TMC Evaluation Factor C-3

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Adequacy and robustness of the flight systems. This factor includes an assessment of the flight hardware and software designs, heritage, and margins. This factor includes an assessment of the proposer's understanding of the processes, products, and activities required to accomplish development and integration of all elements (flight systems, ground and data systems, etc.). This factor includes an assessment of the adequacy of the plans for spacecraft systems engineering, qualification, verification, mission assurance, launch operations, and entry/descent/landing. This factor includes the plans for the development and use of new technology, plans for advanced engineering developments, and the adequacy of backup plans to ensure success of the mission when systems having a TRL less than 6 are proposed. The maturity and technical readiness of the spacecraft, subsystems, and operations systems will be assessed. The adequacy of the plan to mature systems within the proposed cost and schedule, the robustness of those plans, including recognition of risks and mitigation plans for retiring those risks, and the likelihood of success in developing any new technologies will be assessed.



## TMC Evaluation Factor C-4

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Adequacy and robustness of the management approach and schedule, including the capability of the management team. This factor includes: the adequacy of the proposed organizational structure and WBS; the management approach including project level systems engineering; the roles, qualifications, and experience of the PI, PM, other named Key Management Team members, and implementing organization, mission management team, and known partners; the commitment, spaceflight experience, and relevant performance of the PI, PM, other named Key Management Team members, and implementing organization, mission management team, and known partners against the needs of the investigation; the commitments of partners and contributors; and the team's understanding of the scope of work covering all elements of the mission, including contributions. Also evaluated under this factor is the adequacy of the proposed risk management approach, including any risk mitigation plans for new technologies, any long-lead items, and the adequacy and availability of any required manufacturing, test, or other facilities. The approach to any proposed descoping of mission capabilities will be assessed against the proposed Baseline Science Mission.



## TMC Evaluation Factor C-4 - continued

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The plans for managing the risk of contributed critical goods and services will be assessed, including the plans for any international participation, the commitment of partners and contributors, as documented in Letters of Commitment, and the technical adequacy of contingency plans, where they exist, for coping with the failure of a proposed cooperative arrangement or contribution. This factor also includes assessment of proposal elements such as the relationship of the work to the project schedule, the project element interdependencies, the associated schedule margins, and an assessment of the likelihood of launching by the proposed launch date. Also evaluated under this factor are the proposed project and schedule management tools to be used on the project.



## TMC Evaluation Factor C-5

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Adequacy and robustness of the cost plan, including cost feasibility and cost risk. This factor includes proposal elements such as cost, cost risk, cost realism, and cost completeness including assessment of the basis of estimate, the adequacy of the approach, the methods and rationale used to develop the estimated cost, the discussion of cost risks, the allocation of cost reserves by phase, and the team's understanding of the scope of work (covering all elements of the mission, including contributions). Proposals will be evaluated for the adequacy of the cost reserves and whether proposals with inadequate cost reserves demonstrate a thorough understanding of the cost risks. This factor also includes an assessment of the proposed cost relative to estimates generated using parametric models and analogies. Also evaluated under this factor are the proposed cost management tools to be used on the project.



# TMC Panel Product: Form C

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For each proposal, the TMC Evaluation will result in a Form C that contains:

- Proposal title, PI name, and submitting organization;
- An adjectival risk rating from each evaluator of “LOW Risk”, “MEDIUM Risk” or “HIGH Risk” for the TMC Feasibility of the Investigation Implementation, Including Cost Risk that is derived based on the findings;
- Summary rationale for the median risk rating;
- Narrative findings, identified as major or minor strengths or weaknesses;
- Comments to the PI, comments to the Selection Official, comments to the Science Panel. (optional)



# TMC Evaluation Product: Findings

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Major and minor strengths and weaknesses are defined as follows:

- **Major Strength:** A facet of the implementation response that is judged to be well above expectations and can substantially contribute to the ability of the project to meet its technical requirements on schedule and within cost.
- **Minor Strength:** A strength that is worthy of note and can be brought to the attention of proposers during debriefings, but is not a discriminator in the assessment of risk.
- **Major Weakness:** A deficiency or set of deficiencies taken together that are judged to substantially weaken the project's ability to meet its technical objectives on schedule and within cost.
- **Minor Weakness:** A weakness that is sufficiently worrisome to note and can be brought to the attention of proposers during debriefings, but is not a discriminator in the assessment of risk.

\*Note: Findings that are considered “as expected” are not documented in the Form C.



# TMC Evaluation Product: Risk Ratings

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Based on the narrative findings, each proposal will be assigned one of three risk ratings, defined as follows:

- **LOW Risk:** There are no problems evident in the proposal that cannot be normally solved within the time and cost proposed. Problems are not of sufficient magnitude to doubt the Proposer's capability to accomplish the investigation well within available resources.
- **MEDIUM Risk:** Problems have been identified, but are considered within the proposal team's capabilities to correct within available resources with good management and application of effective engineering resources. Mission design may be complex and resources tight.
- **HIGH Risk:** One or more problems are of sufficient magnitude and complexity as to be deemed unsolvable within the available resources.

\*Note: Only Major Findings are considered in the risk rating.



# Evaluation: Clarification from Proposers

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NASA will request clarification of potential major weaknesses (PMWs) identified in the “TMC Feasibility of the Investigation Implementation, Including Cost Risk” and the “Experiment Science Implementation Merit and Feasibility of the Investigation” evaluation panels.

- NASA will request such clarification uniformly, from all proposers.
- All requests for clarification from NASA, and the proposer’s response, will be in writing.
- The ability of proposers to provide clarification to NASA is extremely limited, as NASA does not intend to enter into discussions with proposers.
- PIs whose proposals have no PMWs will receive an email informing them.
- The form of the clarifications is strictly limited to a few types of responses:
  - Identification of the locations in the proposal (page(s), section(s), line(s)) where the PMW is addressed.
  - Noting that the PMW is not addressed in the proposal.
  - Stating that the PMW is invalidated by information that is common knowledge and is therefore not included in the proposal.
  - Stating that the analysis leading to this PMW is incorrect and identifying a place in the proposal where data supporting a correct analysis may be found.
  - Stating that a typographical error appears in the proposal and that the correct data is available elsewhere inside or outside of the proposal.
- The PI will be given at least 24 hours to respond to the request for PMWs clarifications. Any response that goes beyond a clarification will be deleted and will not be shown to the evaluation panel.



# TMC Cost Analysis

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- Initial cost analyses will be accomplished on the basis of information provided in the proposals (consistency, completeness, proposed basis of estimate, contributions, use full cost accounting, maintenance of reserve levels, and cost management, etc.).
- Cost will be evaluated with one or more models.
- Cost threats, risks, and risk mitigations will be analyzed.
- Cost realism (a.k.a. “cost risk”) is based on models, analogies, heritage, and grass roots information from proposals.
- Draft Cost Evaluation Summaries and Form Cs will be completed prior to the Plenary.
- During the TMC Plenary, the entire panel will participate in Cost deliberations:
  - All information from the entire evaluation process will be considered in the final cost assessment.
- Significant findings from the Cost Evaluation Summaries will be documented in the Cost Factor on Form C.





# TMC Cost Evaluation Process

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A guiding principle for the TMC evaluation process is that individual reviews will occur first and individual evaluation comments will be entered into the Remote Evaluation System (RES) prior to multi evaluator discussions to the extent that this is feasible. This principle is being implemented as described below for cost related comments and products on the evaluation.

1. Individual Review. Each cost evaluator reads the assigned proposal. The cost evaluator generates a set of cost findings and configures a model. The cost evaluator uploads individual findings to the RES. No Independent Cost Estimate (ICE) will be generated from the model at this point.
2. Fat Matrix Telecon (FMT). The cost evaluator and all other TMC Panel evaluators participate in the FMT. At this telecon, evaluators discuss all individual findings entered in the RES for all evaluation TMC Factors.
3. Generate ICE. After the FMT, each cost evaluator generates an ICE independently based only on the assumptions and discussion from the FMT. The ICE WBS elements are rounded to the nearest \$100K. The ICE totals are rounded to the nearest \$1M. The cost evaluator uploads the ICE to the RES.



# TMC Cost Evaluation Process

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4. First Draft Form C Telecon. The cost evaluators and all other TMC Panel evaluators participate in the First Draft Form C Telecon. The evaluators discuss all major and minor strengths and weaknesses. The cost evaluator presents the ICE for each proposal and discusses model assumptions. The evaluators discuss the likelihood and cost impact, if any, of each weakness. The evaluators also discuss the Instrument Level of Difficulty Index (LDI); the LDI is not correlated to cost. The cost evaluator does not make any changes to the ICE until after listening to discussions with all evaluators at this telecon.
5. Generate Cost Threat Matrix (CTM). Subsequent to the First Draft Form C Telecon, the cost evaluator develops a CTM for each proposal that reflects the discussion of the likelihood and impact of weaknesses. The cost evaluator posts the CTM to the RES.
6. Update ICE. Each cost evaluator updates the ICE to reflect the first Draft Form C discussions and the CTM uploaded to the RES. If multiple cost models are used, the average of each WBS element is calculated. Cost threats with a likelihood > 80% are included in the ICE. The expected value of cost threats not included in the ICE is calculated and placed as a note at the bottom of the CTM. The expected value of cost threats is calculated by multiplying each cost threat's mean likelihood by its mean cost impact and summing these products. The cost evaluator posts the ICE to the RES.



# TMC Cost Evaluation Process

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7. Second Draft Form C Telecon. Evaluators review the entire Form C, LDI, CTM and ICE(s) for each proposal.
8. Update ICE, CTM. Based on the 2<sup>nd</sup> Draft Form C review, the cost evaluators update the CTM and ICEs for each proposal and upload them to the RES.
9. Clarifications Request. Based on the 2<sup>nd</sup> Draft Form C review, the Potential Major Weaknesses (PMWs) and statements describing significant cost findings based on the ICE will be sent to the proposer in order to provide the proposer an opportunity to clarify any misunderstanding.
  - PMWs may include findings based on the cost evaluation factor C-5.
  - Statements which represent the CTM will be included in the PMWs.
  - For any proposal top level WBS element estimate that is outside the model error range of the average ICE for that element, the proposer will be sent a statement that the proposer's estimate for that WBS element could not be validated.



# TMC Cost Evaluation Process

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10. Clarification Review. Evaluators drawn from the TMC Panel participate in the review of clarification responses.
11. Generate Cost Evaluation Summary (CES). Before Round 1 of the Plenary, the cost evaluator develops the CES Report for each proposal, which includes any updates to the CTM and ICE.
12. Plenary Round 1. In Round 1, each proposal's CES Report is reviewed. The CES Reports are updated to reflect the Round 1 discussions.
13. Plenary Round 2. In Round 2, each proposal's CES Report is reviewed, with a focus on any Round 1 based updates. The CES Reports are updated to reflect the Round 2 discussions.



# TMC Threat Matrix

- The *likelihood* and *cost impact*, if any, of each weakness is stated as “This finding represents a cost threat assessed to have an Unlikely/Possible/Likely/Very Likely/Almost Certain likelihood of a Minimal/Limited/Moderate/Significant/Very Significant cost impact being realized during development and/or operations.”
- The *likelihood* is the probability range that the *cost impact* will materialize.
- The *cost impact* is the current best estimate of the range of costs to mitigate the realized threat.
- The cost threat matrix below defines the adjectives used to describe the *likelihood* and *cost impact*.

		Cost Impact (CI, % of PI-Managed Investigation cost to complete Phases A/B/C/D)					How cost threat was included in the ICE
		Minimal (2.5% < CI ≤ 5%)	Limited (5% < CI ≤ 10%)	Moderate (10% < CI ≤ 15%)	Significant (15% < CI ≤ 20%)	Very Significant (CI > 20%)	
Likelihood (L, %)	Almost Certain (L > 80%)						
	Very Likely (60% < L ≤ 80%)						
	Likely (40% < L ≤ 60%)						
	Possible (20% < L ≤ 40%)						
	Unlikely (L ≤ 20%)						

Note: For each proposal the percentages in the above table will be converted to dollars by the cost estimator.



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# Classification



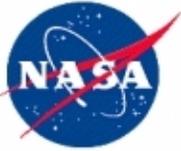
# Categorization

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Upon completion of the evaluations, the results will be presented to the Categorization Committee, an *ad hoc* subcommittee of the SMD AO Steering Committee composed solely of Civil Servants and appointed by the SMD Deputy Associate Administrator.

This committee will consider the peer review results and, based on the evaluations, will categorize each proposal according to procedures required by NFS 1872.403-1(e). The categories are defined as:

- Category I. Well-conceived and scientifically and technically sound investigations pertinent to the goals of the program and the AO's objectives and offered by a competent investigator from an institution capable of supplying the necessary support to ensure that any essential flight hardware or other support can be delivered on time and data that can be properly reduced, analyzed, interpreted, and published in a reasonable time. Investigations in Category I are recommended for acceptance and normally will be displaced only by other Category I investigations.



# Categorization (continued)

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- Category II. Well-conceived and scientifically or technically sound investigations which are recommended for acceptance, but at a lower priority than Category I.
- 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.
- Category IV. Proposed investigations which are recommended for rejection for the particular opportunity under consideration, whatever the reason.



# Evaluation Process Conclusion

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- Once Categorization has been completed, the Evaluation is considered complete unless questioned by a subsequent Steering Committee review.
- 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.
- After selection is announced, a Transition Briefing will be provided by a subset of the TMC Panel to Civil Servants in the Program Office and at Headquarters who have implementation responsibilities.



# Selection Factors

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- As stated in Section 7.3 of the AO, the Selection Official may take into account a wide range of programmatic factors in deciding whether or not to select any proposals and in selecting among selectable proposals, including, but not limited to, planning and policy considerations, available funding, programmatic merit and risk of any proposed partnerships, and maintaining a programmatic balance across the mission directorate(s).



# Approval

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Astrophysics Division, SMD

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Dr. Marc Allen  
SMD Deputy Associate Administrator for  
Research

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Cindy L. Daniels  
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Behzad Raiszadeh  
Acquisition Manager, SOMA

Signed copy on file

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