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# **Announcement of Opportunity**

**NNH16ZDA008J**

**New Frontiers 4**

**Evaluation Plan**

**December 08, 2016**



# Outline

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# Introduction



# Introduction

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- The New Frontiers 4 Evaluation Plan covers evaluation information from the Announcement of Opportunity (AO) and from the evaluation processes utilized by the Science Panels and the Technical, Management, and Cost (TMC) Panel.
- The AO Cost Cap for a New Frontiers mission is \$850 million in NASA Fiscal Year (FY) 2015 dollars for phases A through D, not including the cost of the Expendable Launch Vehicle (ELV) or any contributions.
- This Evaluation Plan covers step one of a two-step competitive process.
- The approval page for the Evaluation Plan is on page 57.



# New Frontiers 4 Solicitation

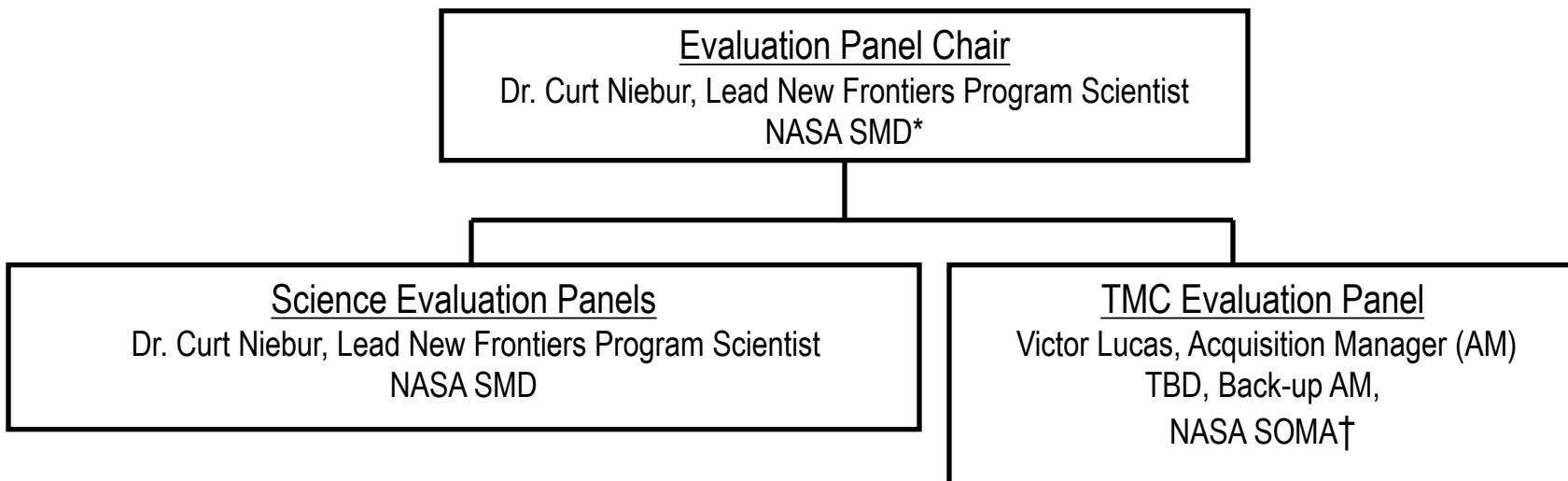
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- All investigations proposed in response to this solicitation must support the goals and objectives of the New Frontiers Program, must be implemented by Principal Investigator (PI) led investigation teams, and must be implemented through the provision of complete spaceflight missions.
- Standard launch services as defined in the AO on an ELV will be provided for New Frontiers missions at no charge against the PI-Managed Mission Cost. Any launch services beyond the standard launch services offered must be funded out of the PI-Managed Mission Cost.
- Launch services may not be arranged by the proposer.
- The Phase A through D portions of the PI Managed Mission Cost, excluding the cost of launch vehicles, is capped at \$850M FY 2015 dollars. Development of ground or flight system software and the development, fabrication, or refurbishment of test-beds, which may occur during Phase E, will be considered deferred Phase D work and will be included under the AO Cost Cap.



# Evaluation Organization

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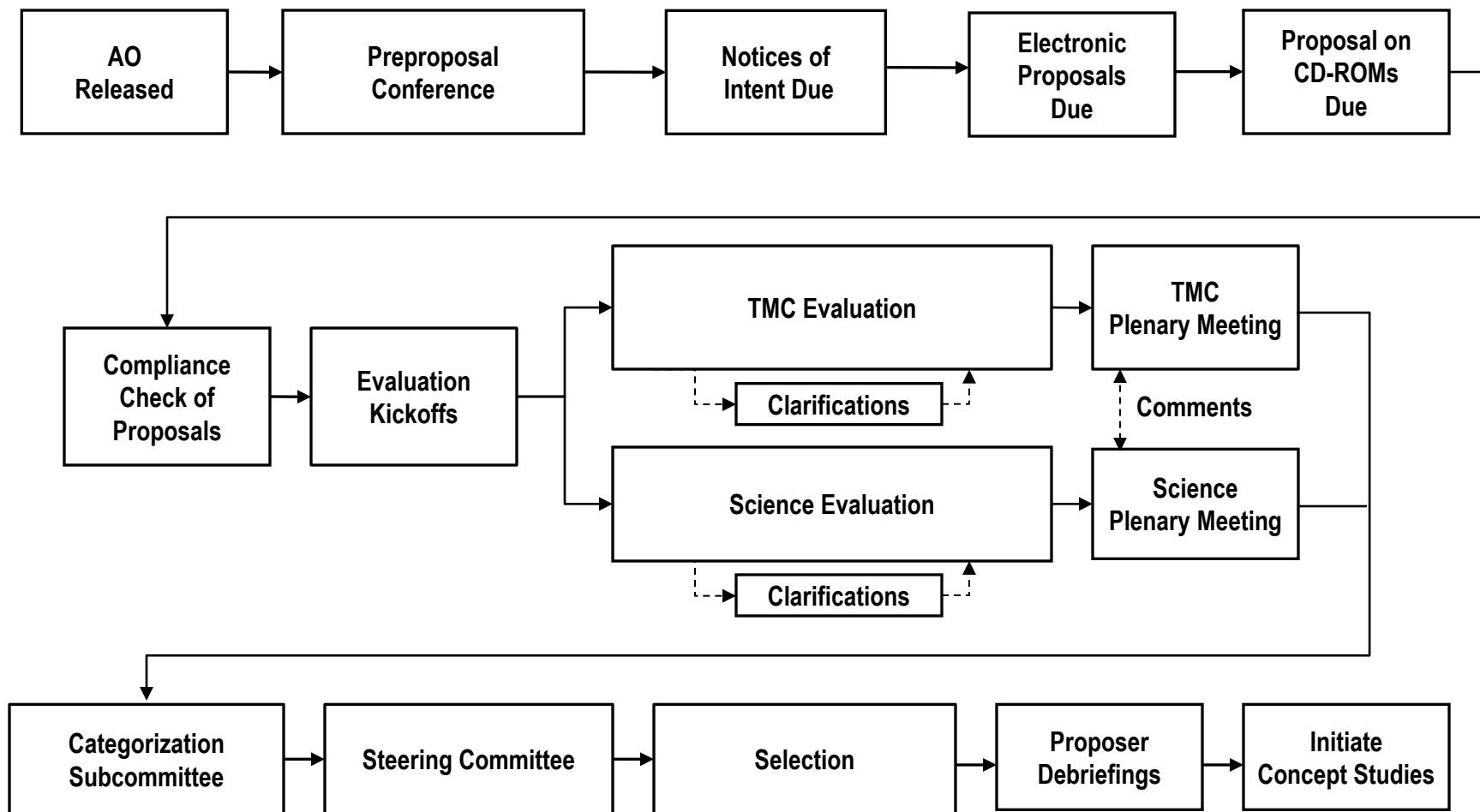


\* Science Mission Directorate

† Science Office for Mission Assessments



# 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 New Frontiers 4 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.



# Conflicts of Interest (COI) Prevention Requirements

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- NRESS will cross-check all 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 contracted TMC Panel members against the lists of personnel and organizations identified in each proposal submitted to determine whether any organizational COI exists.
- Additionally, all contracted 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 and IPA evaluators will self-certify their COI status by reviewing a combined listing of individuals and organizations associated with the proposals. The TMC evaluators must notify the Acquisition Manager in case of a potential conflict that arises during the evaluation. The Science evaluators must notify the Program Scientist in case of a potential conflict that arises during the evaluation.



# 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) must 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) or equivalent 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 documented.
- 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 controlled NASA Solicitation and Proposal Integrated Review and Evaluation System (NSPIRES), *via* the controlled Remote Evaluation System (RES), *via* controlled WebEx, *via* NASA's Large File Transfer capability, or *via* encrypted email, parcel post, fax, or regular mail. Teleconferences among Panel evaluators will be conducted via controlled telephone lines. Proprietary information will not be sent via unencrypted email.
- 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 the New Frontiers 4 AO:
  - Scientific Merit of the Proposed Investigation (Section 7.2.2)
  - Scientific Implementation Merit and Feasibility of the Proposed Investigation (Section 7.2.3); and
  - Technical, Management, and Cost (TMC) Feasibility of the Proposed Mission Implementation, Including Cost Risk (Section 7.2.4).
- Weighting: the first (A) criterion is weighted approximately 40%; the second (B) and third (C) criteria are weighted approximately 30% each.



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# **Compliance Checklist**

## **New Frontiers 4 AO Appendix F**



# Compliance Criteria

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## Administrative:

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





# Compliance Criteria (2)

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## Scientific:

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



# Compliance Criteria (3)

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## Technical:

15. Complete spaceflight mission (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 limits
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 and non-U.S. institutions providing contribution of efforts of anyone on the Proposal Team.



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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 evaluate Scientific Merit of the Proposed Investigation (7.2.2) and Scientific Implementation Merit and Feasibility of the Proposed Investigation (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.
  - The Science Panel and any sub-panels may have one or more Executive Secretaries and Leveler.
  - Any sub-panel will be led by a NASA Civil Servant and may be co-chaired by a member from the scientific community.
- 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 Panel may provide comments and questions to the Science Panel.
- The Science Panels may request Science Merit of the Proposed Investigation (Form A) and 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 Science Panel member will review Proposals as directed by the Program Scientist.
  - If special science expertise is required, the Science Panel 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 or technology specialties.
- Each proposal will be discussed by the reviewers in teleconferences.
  - Findings in the form of Strengths and Weaknesses will provide the basis for initial panel discussions.
  - Each reviewer provides an individual review prior to teleconferences.
  - The proposal and the reviews by the individual reviewers, including non-panel reviewers, will be discussed during the teleconferences.
  - Following the teleconferences, the Lead Reviewer assisted by other reviewers and the Executive Secretary captures/synthesizes individual evaluations, including discussion, and generates the Draft Evaluation including draft findings.
  - The draft findings form the basis for the clarification of draft major weaknesses.
  - There is no overall merit grade assigned prior to receiving the responses to the clarification requests.



# Science Panel Procedures

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- A Science Panel Meeting 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 clarifications provided by the PIs will be considered and the findings will be adjusted if warranted.
  - If warranted, a Panel may reconsider evaluations at the Meetings.
  - Evaluations of all proposals are reviewed during the Science Panel Meeting 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;
    - Based on findings, an adjectival median rating for Scientific Merit Feasibility of the Proposed Investigation, ranging from “Excellent” to “Poor”;
    - Polling distribution for the median rating\*;
    - Summary rationale for the median rating;
    - Narrative findings, identified as major or minor strengths or weaknesses;
    - Comments to PI, comments to NASA\*, and comments to the TMC Panel\*. (optional)
  - Form B
    - Proposal title, PI name, and submitting organization;
    - Based on findings, an adjectival median rating for Scientific Implementation Merit and Feasibility of the Proposed Investigation, ranging from “Excellent” to “Poor”;
    - Polling distribution for the median rating\*;
    - Summary rationale for the median rating;
    - Narrative findings, identified as major or minor strengths or weaknesses;
    - Comments to PI, comments to NASA\*, and comments to the TMC Panel\*. (optional)

\* Note: not provided to proposers



# Science Evaluation Criterion A Factors

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## Criterion A: Scientific Merit of the Proposed Investigation

- Factors from New Frontiers 4 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 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 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 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 Evaluation: Factor A-4

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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.

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



# Science Evaluation Criterion B Factors

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

- Factors from New Frontiers 4 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, data archiving plan, and/or sample analysis plan.
  - Factor B-4. Science resiliency.
  - Factor B-5. Probability of science team success.



# Science 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 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 Evaluation: Factor B-3

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Merit of the data analysis, cartography, data archiving plan, and/or sample analysis plan. This factor includes the merit of plans for data analysis and and/or sample analysis, data archiving, and/or sample curation to meet the goals and objectives of the investigation; to result in the publication of science discoveries in the professional literature; and to preserve data and analysis samples 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; an assessment of the planning and budget adequacy and evidence of plans for the preliminary evaluation and curation of any returned samples; 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.

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## Science 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 Evaluation: Factor B-5

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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 and collaborator will be evaluated for necessary contributions to the proposed investigation; the inclusion of Co-Is and/or collaborators who do not have a well-defined and appropriate role may be cause for downgrading during evaluation.



# 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.

\* Note: Findings that are considered "as expected" are not documented in the Forms A or B.



# 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).

\* Note: half grades are allowed



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# Technical, Management, and Cost (TMC) Evaluation



# TMC Panel Composition and Organization

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- The Acquisition Manager, who is a Civil Servant in the NASA Science Office for 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 non-conflicted contractors, consultants, Civil Servants, and IPAs 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 contribute only to findings; they do not provide ratings.



# TMC Panel Evaluation Factors

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

- Factors from New Frontiers 4 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 and advanced engineering developments as well as 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/trajjectory analysis, and ground systems – hardware and software – 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.

Note: When appropriate, Factor C-2 will include an assessment of proposed planetary protection provisions to avoid potential biological contamination (forward and backward) that may be associated with the mission. An evaluation of the implementation of planetary protection provisions in the preparation or processing of proposed instruments, the development of the flight system, and management of the project will be included in the evaluations of Factors C-1, C-3, C-4, and C-5, as appropriate. The impact to the proposed costs of the proposed implementation of planetary protection provisions will also be evaluated, as appropriate.



# 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, plans for the infusion of NASA-developed technologies, 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. NASA-developed technologies offered in the AO will be included in this factor to the extent described in Table 4.



# 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 potential science impact to the proposed Baseline Science Mission. 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 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.

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# 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 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). The adequacy of the cost reserves will be evaluated; understanding of the cost risks will be assessed. This factor also includes an assessment of the proposed cost relative to estimates generated by the evaluation team 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;
- Based on findings, an adjectival median risk rating of “LOW Risk”, “MEDIUM Risk”, or “HIGH Risk” for TMC Feasibility of the Proposed Mission Implementation, Including Cost Risk;
- Polling distribution for the median risk rating\*;
- Summary rationale for the median risk rating;
- Narrative findings, identified as major or minor strengths or weaknesses;
- Comments to the PI, comments to NASA\*, and comments to the Science Panels\*. (optional)

\* Note: not provided to proposers



# TMC Evaluation Products: 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 Products: 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. Investigation 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.



# 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 of full cost accounting, maintenance of reserve levels, cost management, etc.).
- Cost will be evaluated with at least two cost models.
- Cost threats, risks, and risk mitigations will be analyzed.
- Cost realism is based on models, analogies, heritage, and grass roots information from proposals.
- Draft Cost Evaluation Summaries and Forms Cs will be completed prior to the Plenary.
- During the TMC Plenary meeting, the entire panel will participate in Cost deliberations:
  - All information from the entire evaluation process will be considered in the cost assessment.
  - All significant Cost Findings will be included on the Form C.





# Cost Threat Matrix

- The *likelihood* and *cost impact*, if any, of each weakness is stated as “This finding represents a cost threat assessed to have a Unlikely/Possible/Likely/Very Likely/Almost Certain likelihood of a Very Minimal/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*.
- The *minimum* cost threat threshold is \$1M.

		Cost Impact (CI) % of PI-Managed Mission Cost to complete Phases A/B/C/D or % of Phase E not including unencumbered cost reserves or contributions						
Likelihood of Occurrence		Weakness	Very Minimal 1% < CI ≤ 2.5% (\$0M < CI ≤ \$0M) 1% < CI ≤ 2.5% (\$0M < CI ≤ \$0M)	Minimal 2.5% < CI ≤ 5% (\$0M < CI ≤ \$0M) 2.5% < CI ≤ 5% (\$0M < CI ≤ \$0M)	Limited 5% < CI ≤ 10% (\$0M < CI ≤ \$0M) 5% < CI ≤ 10% (\$0M < CI ≤ \$0M)	Moderate 10% < CI ≤ 15% (\$0M < CI ≤ \$0M) 10% < CI ≤ 15% (\$0M < CI ≤ \$0M)	Significant 15% < CI ≤ 20% (\$0M < CI ≤ \$0M) 15% < CI ≤ 20% (\$0M < CI ≤ \$0M)	Very Significant CI > 20% (CI > \$0M) CI > 20% (CI > \$0M)
Likelihood (L, %)	Almost Certain (L > 80%)							
	Very Likely (60% < L ≤ 80%)							
	Likely (40% < L ≤ 60%)							
	Possible (20% < L ≤ 40%)							
	Unlikely (L ≤ 20%)							

Note: Each instance of “\$0M” in the table above is converted to dollars according to the associated percentage, on a CSR-by-CSR basis. Depending on proposed PI-Managed Mission Cost, some columns may not apply.



# Clarifications

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NASA will request clarification of potential major weaknesses (PMWs) identified during the evaluations of “Scientific Merit of the Proposed Investigation,” “Scientific Implementation Merit and Feasibility of the Proposed Investigation” and “TMC Feasibility of the Proposed Mission Implementation, Including Cost Risk” 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.
  - Acknowledge 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 the PMW is incorrect and identifying a place in the proposal where data supporting a correct analysis can 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 clarification. Any response that does not correspond to any of the options above, or does not conform to guidelines provided with the the request, will be redacted or deleted, and will not be shown to the evaluation panel.



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# Classification



# Categorization

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Upon completion of the evaluations, NASA will convene an ad hoc categorization subcommittee of the SMD AO Steering Committee, composed wholly of Civil Servants and Intergovernmental Personnel Act appointees (some of whom may be from Government agencies other than NASA) and appointed by the Associate Administrator for the Science Mission Directorate.

The categorization subcommittee will consider the science merit and feasibility peer reviews and TMC review results and, based on the evaluations, categorize the proposals in accordance with procedures required by NFS 1872.403-1(e). The categories are defined as follows:

- 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 (2)

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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.



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# Steering and Selection



# Steering Committee

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- SMD AO Steering Committee will review the results of the evaluations, categorizations, and accommodation assessment. 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.



# 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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Dr. Jeffrey Newmark  
SMD Deputy Associate Administrator for  
Research, Science Mission Directorate

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Dr. James Green  
Director, Planetary Science Division, Science  
Mission Directorate

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Cindy Daniels  
Director, Science Office for Mission  
Assessments (SOMA)

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Dr. Curt Niebur  
New Frontiers Program Scientist, Planetary  
Science Division, Science Mission  
Directorate

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Victor Lucas  
Acquisition Manager, SOMA

\* Signed copy on file