



# **2018 Heliophysics Technology Demonstration Mission of Opportunity Evaluation Plan**

**Third Stand Alone Missions of Opportunity Notice (SALMON-3)  
Announcement of Opportunity NNH17ZDA004O  
Program Element Appendix (PEA) L**

**Cleared for Public Release  
October, 2018**

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# Outline

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## Introduction

### SALMON-3 AO NASA SMD Evaluation Plan

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- Science Evaluation
- TMC Evaluation
- Categorization
- Selection
- Approval

2018 Heliophysics Technology Demonstration (TechDemo)  
Mission of Opportunity (MO) PEA L Evaluation Plan

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# Introduction

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This package includes the Third Stand Alone Mission of Opportunity Notice (SALMON-3) Announcement of Opportunity (AO) NASA Science Mission Directorate (SMD) Evaluation Plan and the 2018 Heliophysics Technology Demonstration (TechDemo) Mission of Opportunity (MO) PEA L Evaluation Plan.

The SALMON-3 AO is an omnibus solicitation for Principal Investigator (PI)-led Missions of Opportunity (MOs) that is updated by PEAs. The SALMON-3 AO NASA SMD Evaluation Plan covers the evaluation information from the SALMON-3 AO and from the NASA SMD evaluation processes conducted by the Science Evaluation Panel and Technical Management and Cost (TMC) Evaluation Panel. The “SALMON-3 AO Evaluation Plan” designation in the top right hand corner of a slide indicates that the information refers to the SALMON-3 AO NASA SMD Evaluation Plan.

The 2018 Heliophysics TechDemo MO PEA L Evaluation Plan covers any updates to the evaluation information from the SALMON-3 AO and from the NASA SMD evaluation processes that will be conducted by the Science Evaluation Panel and TMC Evaluation Panel. The “Helio TechDemo Evaluation Plan” designation in the top right hand corner of a slide indicates that the information refers to the 2018 Heliophysics TechDemo MO PEA L updates.

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# **Third Stand Alone Missions of Opportunity Notice Announcement of Opportunity NNH17ZDA0040**

## **NASA Science Mission Directorate Evaluation Plan**

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# Outline

Introduction

SALMON-3 AO Compliance Checklist: Appendix F

SALMON-3 AO NASA SMD Evaluations: General

Science Evaluation

TMC Evaluation

Categorization

Selection

Approval



# Introduction

The Third Stand Alone Missions of Opportunity Notice (SALMON-3) Announcement of Opportunity (AO) NASA Science Mission Directorate (SMD) Evaluation Plan covers the evaluation information from the SALMON-3 AO, which is the omnibus solicitation that is updated by each Program Element Appendix (PEA), and from the NASA SMD evaluation processes conducted by the Science Evaluation Panel and Technical, Management, and Cost (TMC) Evaluation Panel.

The Evaluation Plan for a specific PEA is found in the PEA-specific Acquisition Homepage.



# **SALMON-3 AO Compliance Checklist: Appendix F**



# Compliance Checklist

Checklist with the list of items that NASA checks for compliance before releasing a proposal for evaluation. All other requirements are checked during evaluation.

## Administrative:

1. Electronic proposal received on time
2. Proposal on CD\_ROMs received on time
3. Original signatures 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, 1 inch margins)
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. Complied with restrictions Involving China

## Science, Exploration, or Technology :

11. Addresses solicited science, exploration, or technology programs
12. Requirements traceable from objectives to mission
13. Plan to calibrate, analyze, publish, and archive the data returned
14. Baseline Investigation and Threshold Investigation defined



# Compliance Checklist

## Technical :

15. Complete spaceflight mission (Phases A-F) proposed
16. Team led by a single PI (Principal Investigator)
17. PI-Managed Mission Cost within the PEA-specific Cost Cap (if a PEA-specific Cost Cap is stated in the applicable PEA)
18. Contributions within contribution limit (if PEA specifies a contribution limit)
19. Co-Investigator costs in budget
20. Launch/Commitment date prior to launch deadline (if PEA specifies a deadline)
21. Includes table describing non-U.S. participation
22. Includes letters of commitment from funding agencies for non-U.S participating institutions
23. Includes letters of commitment from all U.S. organizations offering contributions
24. Includes letters of commitment from all major partners and non-U.S. institutions providing contribution of efforts of anyone on the Proposal Team.

Note: SALMON-3 Section 5.9.1.2 states “Major partners are the organizations, other than the proposing organization, responsible for providing research leadership, project management, system engineering, major hardware elements, science instruments, integration and test, mission operations, and other major products or services as defined by the proposer.”

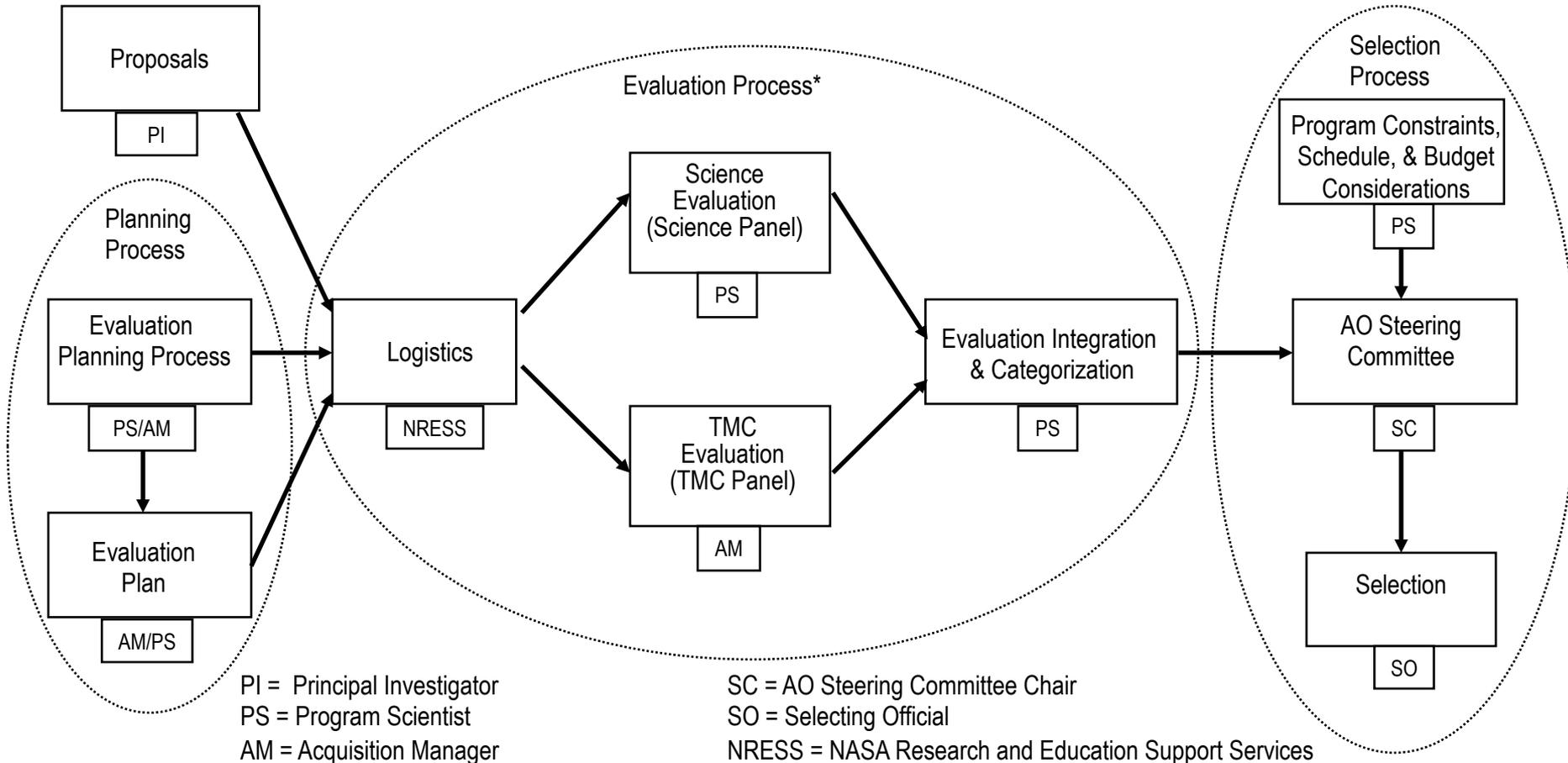


# **SALMON-3 AO NASA SMD Evaluations: General**



# SALMON-3 AO Evaluations

## NASA SMD Processes and Responsibilities



\* The Evaluation Process is addressed in this document.



## Conflict of Interest Prevention Requirements

- NASA Research and Education Support Services (NRESS) cross-checks 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.
- The NASA Science Office for Mission Assessments (SOMA) support contractor cross-checks all TMC Panel members against the lists of personnel and organizations identified in each proposal submitted to determine whether any organizational COI exists.
- All evaluators must divulge any other financial, professional, or potential personal COI, and whether they work for a profit-making company that directly competes with any profit-making proposing organization.
- All Civil Service evaluators must self certify confirming that no COI exists.
- The TMC evaluators must notify the NASA SOMA Acquisition Manager, in case there is a potential COI. The Science evaluators must notify the Program Scientist, in case of a potential COI.



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## **Conflict of Interest Prevention Requirements**

- 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 NASA 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 COI 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

- All proposal and evaluation materials are considered proprietary.
- Viewing of proposal materials are only on a need-to-know basis.
- Each evaluator signs 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, FedEx, fax, or regular mail. Weekly Web conferences among TMC Panel evaluators will be conducted *via* secure 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 SOMA vault.



## Principles for Evaluation

- All proposals are to be treated fairly and equally.
- Merit is to be assessed on the basis of material in the proposal and clarification process (if applicable).
- Evaluation Ratings 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

- All proposals are evaluated to uniform standards established in the solicitation, and without comparison to other proposals.
- All evaluators are experts in the areas that they evaluate.
- Non-panel/mail-in evaluators (to provide special science expertise to the Science Panel) and specialist evaluators (to provide special technical expertise to the TMC Panel) may be utilized, respectively, based on need for expertise in a specific science or technology/engineering area that is proposed.



## Evaluation Criteria and Selection Factors

Evaluation Criteria from Section 7.2 of the SALMON-3 AO:

1. Intrinsic Science, Exploration, or Technology Merit of the Proposed Investigation (Evaluated by the Science Panel);
2. Experiment Science, Exploration, or Technology Implementation Merit and Feasibility of the Proposed Investigation (Evaluated by the Science Panel);
3. TMC Feasibility of the Proposed Investigation Implementation (Evaluated by the TMC Panel).

Weighting: the first criterion is weighted approximately 40%; the second and third criteria are weighted approximately 30% each.

Other Selection Factors from Section 7.3 of the SALMON-3 AO:

- Programmatic factors
- PI-Managed Mission Cost



# Science Evaluation



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## **Science Panel Composition and Organization**

- 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 the Intrinsic Science Merit of the Proposed Investigation and the Experiment Science Implementation Merit and the Feasibility of the Proposed Investigation.
- The science evaluation is conducted *via* one Science Panel, however sub-panels may be employed, depending on the number and variety of proposed investigations.
  - Any sub-panel is 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 is evaluated by assigned panel members.
  - The Lead Evaluator for each proposal leads the discussion.
  - The Lead Evaluator may assign another Evaluator to take notes on the discussion.
- The TMC Panel may provide comments and questions to the Science Panel.



## Science Panel Procedures

Each Science Panel member evaluates proposals as directed by the Chair.

- If special science expertise is required, the Science Panel may utilize non-panel/mail-in evaluators to assist with one or more proposals.
- Non-panel/mail-in evaluators evaluates only those parts of proposals pertinent to their scientific specialties.

Each proposal may be discussed by the evaluators in teleconferences.

- Findings in the form of Strengths and Weaknesses form the basis for initial panel discussions.
- Each panel member provides an individual evaluation prior to the teleconference.
- During the teleconference, proposals and the individual evaluations including non-panel/mail-in evaluations are discussed.
- Following the teleconference, the Lead Evaluator captures/synthesizes individual evaluations including discussions and generates the Draft Evaluation Forms including draft findings.



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## Science Panel Procedures

A Science Panel Meeting is held to refine and finalize the science evaluation forms.

- The Science Panel compiles all of the findings for each proposal.
- For each proposal, the Chair or designated Lead Evaluator leads the discussion, summarizes the proposed investigation, and documents the results.
- If warranted, the Panel may reconsider evaluations at the Meeting.
- 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 Evaluator synthesizes and documents Panel evaluations.



## **Science Panel Evaluation Factors**

Factors A-1 to A-6. Intrinsic Science, Exploration, or Technology Merit of the Proposed Investigation: Please refer to Section 7.2.2 of the SALMON-3 AO for details.

- Factor A-1. Compelling nature and priority of the proposed investigation’s science, exploration, or technology goals and objectives.
- Factor A-2. Programmatic value of the proposed investigation.
- Factor A-3. Likelihood of science, exploration, or technology success.
- Factor A-4. Science, exploration, or technology value of the Threshold Investigation.
- Factor A-5. Merit of any Science-Exploration-Technology Enhancement Options (SEOs), if proposed.
- Factor A-6. Merit of any PI-developed Technology Demonstration Opportunities (TDOs), if proposed.



## Science Panel Evaluation Factors

Factors B-1 to B7. Experiment Science, Exploration, or Technology Implementation Merit and Feasibility of the Proposed Investigation: Please refer to Section 7.2.3 of the SALMON-3 AO for details.

- Factor B-1. Merit of the instruments and investigation design for addressing the science, exploration, or technology goals and objectives.
- Factor B-2. Probability of technical success.
- Factor B-3. Merit of the data analysis, data availability, and data archiving plan and/or sample analysis plan.
- Factor B-4. Science, exploration, or technology resiliency.
- Factor B-5. Probability of investigation team success.
- Factor B-6. Merit of any Science-Exploration-Technology Enhancement Options (SEOs), if proposed.
- Factor B-7. Merit of PI-developed Technology Demonstration Opportunities (TDOs), if proposed.



## Science Evaluation Findings

- **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.



## Factors A and B Rating Definitions

- **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 weakness 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: Only Major Findings are considered in the rating.



# Science Evaluation

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## **Science Panel Products: Form A**

For each proposal, the Science evaluation will result in two forms, Forms A and B:

### Form A

- Proposal title, PI name, and submitting organization;
- Proposal summary;
- The Intrinsic Science Merit of the Proposed Investigation adjectival ratings from each evaluator, ranging from “Excellent” to “Poor”;
- Summary rationale for the median rating;
- Narrative findings supporting the adjectival rating in the form of specific major or minor strengths or weaknesses;
- Comments to PI, Comments to NASA (optional)



# Science Evaluation

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## **Science Panel Products: Form B**

For each proposal, the Science evaluation will result in two forms, Forms A and B:

### Form B

- Proposal title, PI name, and submitting organization;
- The Experiment Science Implementation Merit and Feasibility of the Proposed Investigation adjectival ratings from each evaluator, ranging from “Excellent” to “Poor”;
- Summary rationale for the median rating;
- Narrative findings supporting the adjectival rating in the form of specific major or minor strengths or weaknesses;
- Comments to PI, Comments to NASA (optional)



# TMC Evaluation



# TMC Evaluation

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## TMC Panel Composition and Organization

The Acquisition Manager, who is a Civil Servant from 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 Panel 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 the findings.

Specialist evaluators may be called upon when technical expertise is needed that is not represented in the panel. They evaluate only those parts of a proposal that are specific to their particular expertise.



# TMC Evaluation

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## TMC Panel Evaluation Factors

Factors C1 – C5: TMC Feasibility of the Proposed Investigation Implementation: Please refer to Section 7.2.4 of the SALMON-3 AO for details. These factors are evaluated as applicable for each proposed investigation.

- Factor C-1. Adequacy and robustness of the instrument implementation plan.
- Factor C-2. Adequacy and robustness of the investigation design and plan for 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

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## **TMC Cost Analysis: Step 1 of a Single Step Competitive Process**

- Initial cost analyses are 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, cost management, etc.).
- One or more cost models are utilized to validate the proposed cost.
- Implementation threats are identified.
- Cost threat impacts to the proposed unencumbered reserves are assessed (see Cost Threat Matrix slide 32). The remaining unencumbered reserves are compared to the minimum required in the PEA.
- The entire panel participates in Cost deliberations. All information from the entire evaluation process is considered in the final cost assessment.
- Cost Risk is reported as an adjectival rating, ranging from “LOW Risk” to “HIGH Risk” on a five-point scale.
- Significant findings are documented in the Cost Factor on Form C and considered in the TMC Risk Rating.



# TMC Evaluation

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## **TMC Cost Analysis: Step 1 of a Two-Step Competitive Process**

- Initial cost analyses are 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, cost management, etc.).
- One or more cost models are utilized to validate the proposed cost.
- Implementation threats are identified.
- Cost threat impacts to the proposed unencumbered reserves are assessed (see Cost Threat Matrix slide 32). The remaining unencumbered reserves are compared to the minimum required in the PEA.
- The entire panel participates in Cost deliberations. All information from the entire evaluation process is considered in the final cost assessment.
- Significant findings are documented in the Cost Factor on Form C and considered in the TMC Risk Rating.



# TMC Evaluation

## TMC Cost Analysis: 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 an 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 for Phases A/B/C/D and Phase E will be set at a X% or a \$Y as stated in the applicable PEA.

		Cost Impact (CI, % of PI-Managed Mission cost to complete Phases A/B/C/D or % of Phase E not including unencumbered cost reserves)					
		Very Minimal (1% < CI ≤ 2.5%)	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.



# TMC Evaluation

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## TMC Panel Evaluation Findings Definitions

- **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.

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# TMC Evaluation

## TMC Risk Ratings

Based on the narrative findings, each proposal is 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 the 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 Evaluation

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## TMC Panel Product: Form C

For each proposal, the TMC evaluation results in a Form C that contains:

- Proposal title, PI name, and submitting organization;
- The TMC Feasibility of the Proposed Investigation Implementation adjectival risk rating from each evaluator of “LOW Risk”, “MEDIUM Risk” or “HIGH Risk”;
- Summary rationale for the median risk rating;
- Narrative findings supporting the adjectival risk rating in the form of specific major or minor strengths or weaknesses;
- Comments to the PI, Comments to the Selection Official (optional)



# Classification



# Categorization

## Categorization Process and Proposal Categories

Upon completion of the evaluations, the results are presented to the Categorization 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(s) for the appropriate Mission Directorate(s).

The Categorization Committee considers the evaluation 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:

- 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

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## Categorization Process and Proposal Categories

- 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 that are recommended for rejection for the particular opportunity under consideration, whatever the reason.



# Categorization

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## Evaluation Conclusion and AO Steering Committee

- Once Categorization has been completed, the Evaluation is considered complete unless any issue is questioned by a subsequent AO 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.



# Selection



# Selection

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## **Selection Factors**

The results of the proposal evaluations based on the criteria described in the SALMON-3 AO and the applicable PEA and the categorizations will be considered in the selection process.

The Selection Official(s) may take into account a wide range of programmatic factors in deciding whether or not to select any proposals and in selecting among top-rated 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). While NASA develops and evaluates its program strategy in close consultation with the NASA community through a wide variety of advisory groups, NASA programs are evolving activities that ultimately depend upon the most current Administration policies and budgets, as well as programs' objectives and priorities that can change quickly based on, among other things, new discoveries from ongoing missions.



# Approval

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Cindy L. Daniels  
Director  
NASA Science Office for Mission Assessments

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Dr. Jeffrey Newmark  
Deputy Associate Administrator for Research  
NASA Science Mission Directorate

Signed copy on file

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# **2018 Heliophysics Technology Demonstration Mission of Opportunity Program Element Appendix L**

## **Evaluation Plan**

**Cleared for Public Release  
October, 2018**

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# Outline

Introduction

Evaluation

Selection

Approval



# Introduction

This Evaluation Plan together with the SALMON-3 AO NASA SMD Evaluation Plan is a general guide to the evaluation of proposals submitted as a result of the 2018 Heliophysics Technology Demonstration (TechDemo) Mission of Opportunity (MO) PEA L solicitation. This Evaluation Plan is the companion to the overall SALMON-3 AO NASA SMD Evaluation Plan, covers evaluation information directly from the PEA L, and points out areas where there are differences between the SALMON-3 AO and PEA L. These differences may include proposal requirements and evaluation criteria.

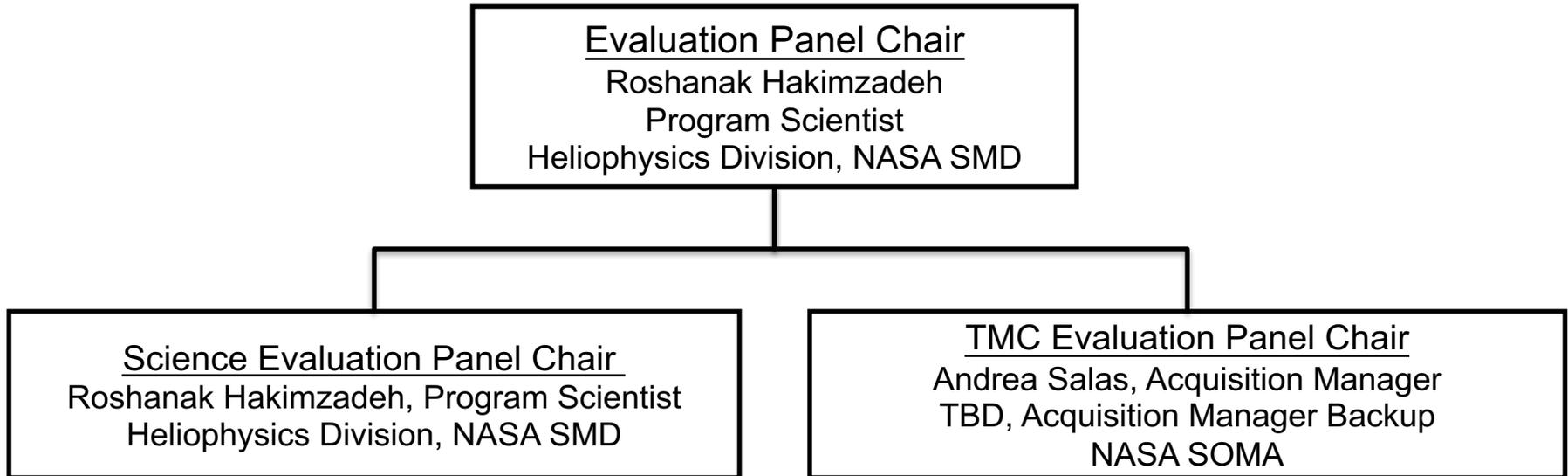
In the case of differences between the SALMON-3 AO and the TechDemo MO PEA L, and their respective evaluation plans, the TechDemo MO PEA L language takes precedence.

The “Helio TechDemo Evaluation Plan” label in the top right hand corner indicates that the page addresses the 2018 Heliophysics TechDemo MO PEA L Evaluation Plan.



# Introduction

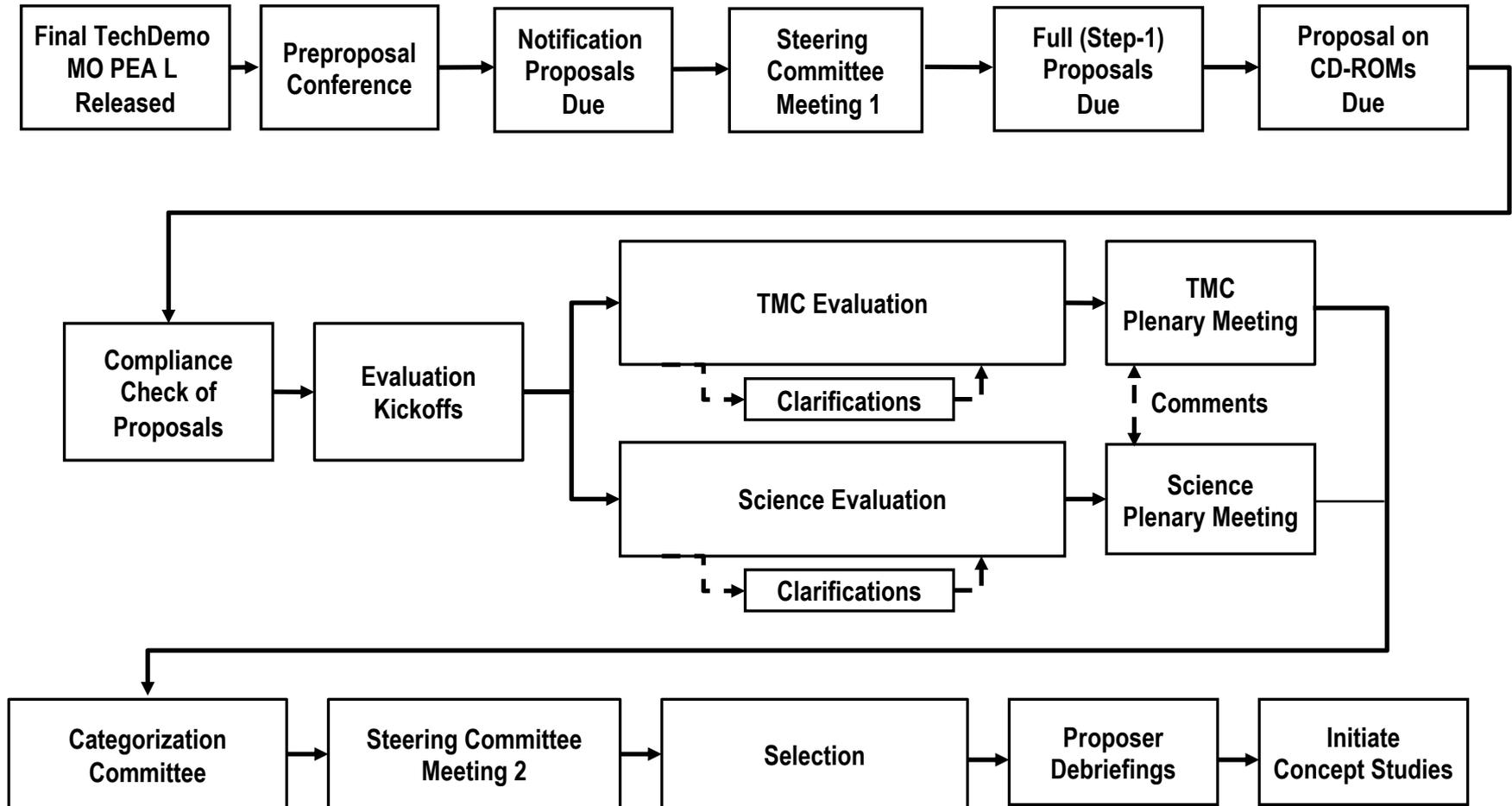
## Evaluation Panel Organization





# Introduction

## TechDemo MO PEA L Solicitation, Evaluation and Selection Flow





# Evaluation

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## Scientific/Technical Evaluation

- The evaluation process will be as described in Section 7.1.1 of the SALMON-3 AO and this Evaluation Plan.
- Proposals will be evaluated according to the evaluation criteria set forth in Sections 7.1.1, 7.1.2, and 7.1.3 of the PEA, which supersede the criteria given in Section 7.2 of the SALMON-3 AO. These changes are described in slides 58-62 and 65.
- Half-step ratings will not be used for the Criteria A and B adjectival ratings (see exception on Slide 66).



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## **Scientific/Technical Evaluation (cont'd)**

- Proposal Merit
  - As described in Section 7.1 of the PEA, proposal merit will be determined by the magnitude of heliophysics science advancements enabled by the proposed TechDemo investigation. Whether the targeted science advancement is achieved during the TechDemo investigation, or during some future mission within the specified timeframe, will not be a factor in the evaluation criteria. Scientifically useful data collected in the course of demonstration of the enabling capability of proposed technology(ies), as well as subsequent analysis and interpretation of any such data, will be considered in the evaluation of proposed Baseline and Threshold Investigations to the extent that they specifically facilitate the demonstration.
- Investigations Targeting Further Scientific Return
  - From PEA Section 5.2.4: “Any investigation targeting further scientific return from a mission—beyond that needed to validate the enabling capacity of the proposed technology(ies)—should propose the associated activities as an SEO.”



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## **Scientific/Technical Evaluation (cont'd)**

- Streamlined Class D - Additional Tailoring
  - From PEA Section 5.3.3: Streamlined Class-D Investigations must identify those requirements not specifically identified as already being tailored in the *NASA Science Mission Directorate (SMD) Class-D Tailoring/Streamlining Decision Memorandum* and described in NPR 7120.5E that are proposed for adjustment, provide a rationale for each adjustment, and describe any cost, schedule, and/or other benefits that would be realized should one or more of the adjustments be accepted by NASA. Note that these adjustments reflect potential modifications to the baseline investigation, to be addressed after down-selection. The panel evaluating the third evaluation criterion, “Technical, Management, and Cost” (TMC) Feasibility of the Proposed Investigation Implementation, will provide comments to the Selection Official on the proposed adjustments and their justifications. These comments will not be considered for the TMC Feasibility of the Proposed Investigation Implementation risk rating but may be considered in the selection decision.



## Potential Major Weaknesses Clarification Process

NASA will request clarifications of Potential Major Weaknesses (PMWs) identified by the Science Evaluation panel in the first two criteria: Intrinsic Technology Merit of the Proposed Investigation, Experiment Technology Implementation Merit and Feasibility of the Proposed Investigation. NASA will request clarifications of PMWs identified by the TMC panel in the third criteria: TMC Feasibility of the Proposed Investigation Implementation. NASA will request such clarification uniformly from all proposers.

- All requests for clarification from NASA and the proposers' responses are 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 are informed that no PMWs have been identified at that time.
- 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 the 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 the proposal.

The PIs are given at least 24 hours to respond to the request for PMW clarification. Any response that goes beyond the five forms of clarification stated above will be deleted and not shown to the evaluation panel.



# Cost Evaluation

- The TechDemo MO evaluation is Step 1 of a Two-Step competitive process; this slide is in addition to the TMC cost analysis information presented in slide 31.
- All information from the entire evaluation process will be considered in the final cost assessment.
- The proposed cost for Phases A-D will be assessed using estimates generated by two independent cost models.
- The evaluation will assess the cost risk, cost realism, and cost completeness, including 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.
- The likelihood and cost impact of significant weaknesses and cost analysis findings will be assessed.
- Cost threat impacts to the proposed unencumbered reserves will be assessed (see Cost Threat Matrix, slide 53; note this Cost Threat Matrix replaces that shown on slide 32).
- The adequacy of the remaining unencumbered reserves will be assessed.
- Draft Forms C and Cost Evaluation Summaries (CESs) will be completed on all proposals prior to the Form C Plenary.
- During the Form C Plenary, the entire panel will participate in Cost deliberations.
- All significant Cost Findings will be included on the Form C and considered in the TMC Risk Rating.



# 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 an 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, which results in a reduction from the proposed unencumbered reserves.”
- 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 \$250K

		Cost Impact (CI)				
		% of PI-managed mission cost to complete Phases B/C/D or Phase E not including unencumbered cost reserves or contributions				
		Minimal (2.5% < CI ≤ 5%) <i>(2.5% &lt; CI ≤ 5%)</i>	Limited (5% < CI ≤ 10%) <i>(5% &lt; CI ≤ 10%)</i>	Moderate (10% < CI ≤ 15%) <i>(10% &lt; CI ≤ 15%)</i>	Significant (15% < CI ≤ 20%) <i>(15% &lt; CI ≤ 20%)</i>	Very Significant (CI > 20%) <i>(CI &gt; 20%)</i>
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.



# Exceptions to SALMON-3

- The following slides in the SALMON-3 Section are being modified for the TechDemo MO evaluation. Additions are highlighted in ***italicized bold*** text and deletions are highlighted by cross-throughs.
  - » Slide # 8 is being replaced by Slide # 55 (Compliance Checklist)
  - » Slide # 18 is being replaced by Slide # 56 (Science Evaluation)
  - » Slide # 20 is being replaced by Slide # 57 (Science Evaluation)
  - » Slide # 21 is being replaced by Slides # 58 and 59 (Science Evaluation)
  - » Slide # 22 is being replaced by Slide # 60, 61, and 62 (Science Evaluation)
  - » Slide # 25 is being replaced by Slide # 63 (Science Evaluation)
  - » Slide # 26 is being replaced by Slide # 64 (Science Evaluation)
  - » Slide # 29 is being replaced by Slide # 65 (TMC Evaluation)
- Slide # 32 is being replaced by Slide # 53 (TMC Evaluation)



# Exception to SALMON-3 Compliance Checklist (Replaces Slide # 8)

Checklist with the list of items that NASA checks for compliance before releasing a proposal for evaluation. ***The Evaluation Panel Chair makes a decision whether a proposal deficient in one or more of these areas will proceed to evaluation depending on the severity of checklist violation.*** All other requirements are checked during evaluation.

## Administrative:

1. Electronic proposal received on time
2. Proposal on CD\_ROMs received on time
3. Original signatures 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, 1 inch margins)
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. Complied with restrictions Involving China

## Science, Exploration, or Technology :

11. Addresses solicited science, exploration, or technology programs
12. Requirements traceable from objectives to mission
13. Plan to calibrate, analyze, publish, and archive the data returned
14. Baseline Investigation and Threshold Investigation defined



# Exception to SALMON-3 Science Evaluation (Replaces Chart # 18)

## Science Panel Composition and Organization

- 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 the Intrinsic Science **Technology** Merit of the Proposed Investigation and the Experiment Science **Technology** Implementation Merit and the Feasibility of the Proposed Investigation.
- The science evaluation is conducted *via* one Science Panel, however sub-panels may be employed, depending on the number and variety of proposed investigations.
  - Any sub-panel is led by **or co-chaired by** a NASA Civil Servant ~~and may be co-chaired by a~~ **or an unconflicted** member from the scientific community.
  - Sub-panels may have an Executive Secretary.
- Each proposal is evaluated by assigned panel members.
  - The Lead Evaluator for each proposal leads the discussion.
  - The Lead Evaluator may assign another Evaluator to take notes on the discussion.
- The TMC Panel may provide comments and questions to the Science Panel.



# Exception to SALMON-3 Science Evaluation (Replaces Chart # 20)

## Science Panel Procedures

A Science Panel Meeting is held to refine and finalize the science evaluation forms.

- The Science Panel compiles all of the findings for each proposal.
- ***Panelists may be grouped into sub-panels for review discussions. Each sub-panel will include a person who serves as a consistency lead who will take notes about the assessment of the sub-factors within Factors A and B. The consistency leads and sub-panel chiefs will meet periodically to ensure consistent scoring across the sub-panels.***
- For each proposal, the Chair or designated Lead Evaluator leads the discussion, summarizes the proposed investigation, and documents the results.
- If warranted, the Panel may reconsider evaluations at the Meeting.
- 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 Evaluator synthesizes and documents Panel evaluations.



# Exception to SALMON-3 Science Evaluation (Replaces Chart # 21)

## Science Panel Evaluation Factors

Factors A-1 to A-6. Intrinsic Science, ~~Exploration, or~~ Technology Merit of the Proposed Investigation: Please refer to Section ~~7.2.2 of the SALMON-3 AO~~ **7.1.1 of the TechDemo MO PEA L** for details.

- Factor A-1. Compelling nature, ~~and~~ priority, **and value** of the proposed investigation's ~~science, exploration, or~~ technology goals and objectives. This factor includes the clarity of the goals and objectives; how well the goals and objectives reflect the program, Agency, and national priorities; the potential impact of the investigation on program, Agency, and national ~~science, exploration, or~~ technology objectives; and the potential for fundamental progress, as well as filling gaps in our knowledge relative to the current state of the art. **Specifically, the value of the technology goals are determined with respect to the heliophysics science missions these goals enable.**
- Factor A-2. Programmatic value of the proposed investigation. This factor includes the unique value of the investigation to make ~~science, exploration, or~~ **and** technology progress in the context of other ~~ongoing and~~ planned missions; the relationship to the other elements of NASA's programs; how well the investigation may ~~synergistically~~ support ~~ongoing or planned~~ **and proposed** missions by NASA and other agencies **within the next 15 years**; and the necessity for a space mission to realize the goals and objectives.



# Exception to SALMON-3 Science Evaluation (Replaces Slide # 21)

## Science Panel Evaluation Factors

### Factors A (continued)

- Factor A-3. Likelihood of ~~science, exploration, or~~ technology 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 success.
- Factor A-4. ~~Science, exploration, or~~ Technology value of the Threshold Investigation. This factor includes the intrinsic value of the Threshold Investigation using the standards in the first factor of this section and whether that value is sufficient to justify the proposed cost of the investigation.
- Factor A-5. Merit of any ~~Science-Exploration-Technology~~ Enhancement Options (SEOs), if proposed. This factor includes assessing the potential of the selected activities to enlarge the impact of the investigation. Although evaluated by the same panel as the balance of Intrinsic Merit factors, this factor will not be considered in the overall criterion rating.
- ~~Factor A-6. Merit of any PI-developed Technology Demonstration Opportunities (TDOs), if proposed.~~



# Exception to SALMON-3 Science Evaluation (Replaces Chart # 22)

Helio TechDemo  
Evaluation Plan

## Science Panel Evaluation Factors

Factors B-1 to B7. Experiment ~~Science, Exploration, or~~ Technology Implementation Merit and Feasibility of the Proposed Investigation: Please refer to Section 7.2.3 of the ~~SALMON-3 AO~~ **7.1.2 of the TechDemo MO PEA L** for details.

- Factor B-1. Merit of the ~~instruments and~~ investigation design for addressing the ~~science, exploration, or~~ technology goals and objectives. This factor includes the degree to which the proposed investigation will address the goals and objectives; the appropriateness of the selected ~~instruments~~ **technology** and investigation design for addressing the goals and objectives; the degree to which the proposed ~~instruments and~~ investigation can provide the necessary data; and the sufficiency of the data gathered to complete the ~~science, exploration, or~~ technology investigation **and meet its goals and objectives**.
- Factor B-2. Probability of technical success. This factor includes the maturity and technical readiness of the ~~instruments~~ **technology to be demonstrated** or demonstration of a clear path to achieve necessary maturity; the adequacy of the plan to develop the ~~instruments~~ **technology to be demonstrated** 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 development of new technology to be demonstrated**; 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~~ **technology** within the investigation design.



# Exception to SALMON-3 Science Evaluation (Replaces Chart # 22)

## Science Panel Evaluation Factors

### Factors B (continued)

- Factor B-3. Merit of the data analysis, data availability, and data archiving plan ~~and/or sample analysis plan~~. This factor includes the merit of plans for data ~~and/or sample analysis~~, **and** data archiving, ~~and/or sample curation~~ to meet the goals and objectives of the investigation; to result in the publication of discoveries in the professional literature; and to preserve data ~~and samples~~ of value to the research and development 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 research and development 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 science, ~~exploration~~, or technology 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 impact.
- Factor B-4. ~~Science, exploration, or~~ Technology resiliency. This factor includes both developmental and operational resiliency. Developmental resiliency includes the approach to descoping the Baseline Investigation to the Threshold Investigation 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.



# Exception to SALMON-3 Science Evaluation (Replaces Chart # 22)

## Science Panel Evaluation Factors

### Factors B (continued)

- Factor B-5. Probability of investigation team success. This factor will be evaluated by assessing the experience, expertise, and organizational structure of the investigation team and the experiment design in light of any proposed instruments **technology. *The scientific expertise of the PI will be evaluated but not his/her experience with NASA missions.*** The role of each Co-Investigator and collaborator will be evaluated for necessary contributions to the proposed investigation; the inclusion of Co-Is or collaborators who do not have a well-defined and appropriate role may be cause for downgrading of the proposal during the evaluation. ***Comments about the managerial experience of the PI, and whether appropriate mentoring and support tools are in place, will be made to the Selection Official but these comments shall not impact the “Experiment Implementation Merit” rating.***
- Factor B-6. Merit of any ~~Science-Exploration-Technology~~ Enhancement Options (SEOs), if proposed. This factor includes assessing the appropriateness of the selected activities to enlarge the impact of the mission and the costing of the selected activities. Although evaluated by the same panel as the balance of Implementation Merit factors, this factor will not be considered in the overall criterion rating.
- ~~Factor B-7. Merit of PI-developed Technology Demonstration Opportunities (TDOs), if proposed.~~



# Exception to SALMON-3 Science Evaluation (Replaces Chart # 25)

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## Science Panel Products: Form A

For each proposal, the Science evaluation will result in two forms, Forms A and B:

### Form A

- Proposal title, PI name, and submitting organization;
- Proposal summary;
- The Intrinsic **Science *Technology*** Merit of the Proposed Investigation adjectival ratings from each evaluator, ranging from “Excellent” to “Poor”;
- Summary rationale for the median rating;
- Narrative findings supporting the adjectival rating in the form of specific major or minor strengths or weaknesses;
- Comments to PI, Comments to NASA (optional)



# Exception to SALMON-3 Science Evaluation (Replaces Chart # 26)

## Science Panel Products: Form B

For each proposal, the Science evaluation will result in two forms, Forms A and B:

### Form B

- Proposal title, PI name, and submitting organization;
- The Experiment **Science *Technology*** Implementation Merit and Feasibility of the Proposed Investigation adjectival ratings from each evaluator, ranging from “Excellent” to “Poor”;
- Summary rationale for the median rating;
- Narrative findings supporting the adjectival rating in the form of specific major or minor strengths or weaknesses;
- Comments to PI, Comments to NASA (optional)



# Exception to SALMON-3 TMC Evaluation (Replaces Slide # 29)

## TMC Panel Evaluation Factors

Factors C1 – C5: TMC Feasibility of the Proposed Investigation Implementation: Please refer to Section 7.2.4 of the SALMON-3 AO **7.1.3 of the Techdemo PEA L** for details. ~~These factors are evaluated as applicable for each proposed investigation.~~

- Factor C-1. Adequacy and robustness of the instrument implementation plan.
- Factor C-2. Adequacy and robustness of the investigation design and plan for 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.

***Factors C-1 and C-3 are amended so that plans for the maturation of systems that contain the proposed technologies result in TRL 5 by PDR (see PEA Requirement L-11.)***

***Factor C-4 is amended to delete evaluation of the PI's spaceflight experience. The capability of the management team will be evaluated as a whole, as opposed to assessing the capabilities of each of the Key Team Members independently. Comments about the managerial experience of the PI, and whether appropriate mentoring and support tools are in place, will be made to the Selection Official but these comments shall not impact the "Technical, Management, and Cost Feasibility" rating.***



# Forms A, B & C Grades

- **Forms A & B Grades:** Polling will be held twice on the Form A and B grades. The individual grades from the final polling are recorded and reported. (Individual grades will not use half-step ratings; see slide 48.) The final grade is set equal to median of the final polling. A median score that falls between two grades will be stated as a mid-point between the two grades (e.g. Very good/Good). If there is a divergence of opinion, there may be additional rounds of discussion and polling.
- **Form C Grade:** Form C will be reviewed three times. Polling will be held twice on the Form C risk rating. The final polling is recorded and reported. For the final polling, the individual grades are recorded and the median is calculated. The final Form C Risk rating will be recorded as the median of the polling. A median score that falls between two risk ratings will be “rounded” to the higher risk rating. If there is a divergence of opinion, there may be additional rounds of discussion and polling.



# Selection

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## Selection Factors

As stated in Section 7.3 of the SALMON-3 AO, the Selection Official may take into account a wide range of programmatic factors, 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).

Also, as described in Section 7.2 of the PEA, this opportunity is uniquely open to high risk, high reward investigations. Therefore, for this PEA, recommendations to the Selection Official will more heavily weigh the return from investigations over risk ratings than has historically been the case for SMD science investigations.



# Approval

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Andrea Salas  
Acquisition Manager  
NASA SOMA

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Cindy Daniels  
Director  
NASA SOMA

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Program Scientist,  
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Alan Zide  
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Deputy Associate Administrator for Research  
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Signed copy on file