



**Earth Venture Instrument – 6
Technical, Management, and Cost Evaluation
Pre-Proposal Web Conference**

**Announcement of Opportunity
NNH17ZDA004O-EVI6**

May 6, 2022



Outline

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Introduction

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Purpose of this Presentation

1. Present a short overview of the Technical, Management and Cost (TMC) Evaluation of proposals submitted as a result of the Earth Venture Instrument - 6 (EVI-6) Program Element Appendix (PEA) of the Third Stand Alone Missions of Opportunity Notice (SALMON-3) Announcement of Opportunity (AO).
2. Discuss EVI-6 PEA simplification.
3. Point to reference documents.
4. Answer questions.

Important Note: Proposers must read the SALMON-3 AO and the EVI-6 PEA carefully, and all proposals must comply with the requirements and constraints contained in the AO and the PEA.



EVI-6 PEA Simplification



EVI-6 PEA Simplification

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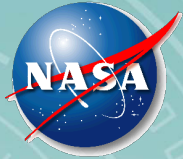
Overall

Proposal page limits reduced by at least 25 pages (EVI-6 PEA Requirement R-38).

Investigation Implementation

EVI-6 PEA Section 5.1.1, Requirements R-39 and R-40.

- Systems Engineering: Requirement for a description of overall systems engineering approach eliminated; only the description of systems engineering aspects unique to the mission, if any, is required (EVI-6 PEA Requirement R-39).
- Schedule: Two schedule foldouts do not count against the page limit instead of three; narrative for the schedule foldout is not required (EVI-6 PEA Requirement R-40).



EVI-6 PEA Simplification

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Management

EVI-6 PEA Section 5.1.2, Requirements R-41 to R-45

- Requires only the management organization chart to be provided and the decision-making authority, and the teaming arrangement and responsibilities to be briefly discussed.
- Only investigation unique roles and responsibilities of the key management team are required. Eliminates explanation of traditional roles for key personnel.
- Eliminates naming Project Manager (PM) and other primary team members.
- Project risk and potential mitigation strategies in the form of a table only.
- Requires waivers to NASA Procedural Requirements (NPRs) only to be listed. Eliminates need for a description.



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Cost and Cost Estimating Methodology

EVI-6 PEA Section 5.1.3, Requirements R-46 to R-47.

- Requires a Basis of Estimate table and a brief description of the methodologies and assumptions used to develop the proposed cost estimate.
- Only requires a brief discussion of cost reserves.
- Only requires a brief discussion of cost risk.
- Eliminates presenting a rationale for the costing methodology.
- Eliminates description/evaluation of any independent cost estimates performed outside the proposing organizations.
- Eliminates description of cost management tools.



EVI-6 PEA Simplification

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Proposal Appendices

EVI-6 PEA Section 5.1.4, Requirements R-48 to R-55.

- Resumes – eliminates requirement for the resume of the PM.
- Eliminates appendix for Summary of Proposed Program Cooperative Contributions.
- International Participation – reduced to one page for a table and brief narrative.
- Eliminates appendix for Discussion of Limiting the Generation of Orbital Debris and End of Mission Spacecraft Disposal Requirements. However, selected investigations will have to fulfill these requirements after selection.
- Heritage – reduced page count from 30 to 15 pages. This reduction also applies to the Classified Appendix Regarding Heritage.

Scientific/Technical Evaluation Factors

Evaluation Criteria – Rewording reflects simplified requirements (EVI-6 PEA Section 6.1).



TMC Evaluation



Evaluation Criteria

Evaluation Criteria (Section 7.2 of the SALMON-3 AO):

1. Intrinsic Science Merit of the Proposed Investigation (Section 7.2.2)
2. Experiment Science Implementation Merit and Feasibility of the Proposed Investigation (Section 7.2.3)
- 3. TMC Feasibility of the Proposed Investigation Implementation (Section 7.2.4)**

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

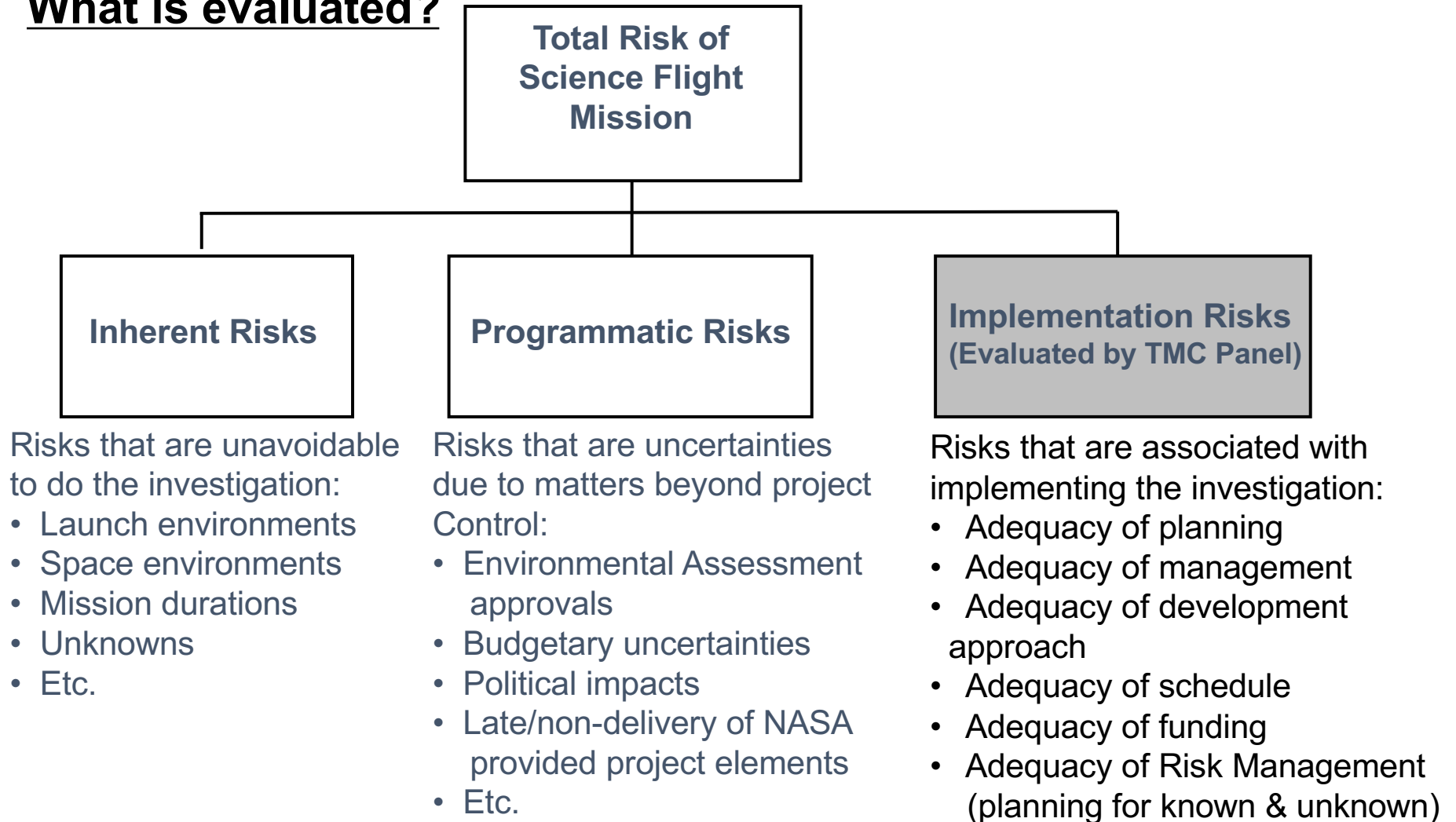
TMC Evaluation: The technical and management approaches of all submitted investigations are evaluated to assess the likelihood that they can be successfully implemented as proposed, including an assessment of the likelihood of their completion within the proposed cost and schedule.



TMC Evaluation

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What is evaluated?





TMC Evaluation

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TMC Evaluation Purpose

TMC evaluation purpose: to assess the likelihood that the submitted investigations' technical and management approaches can be successfully implemented as proposed, including an assessment of the likelihood of their completion within the proposed cost and schedule.

TMC Evaluation Principles

- All proposals are treated fairly and equally, are evaluated to identical standards, and are not compared to other proposals.
- Risk is to be assessed on the basis of the material in the proposal and the clarification process.
- 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 and is not permitted.



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TMC Evaluation Factors

TMC Feasibility of the Proposed Investigation Implementation

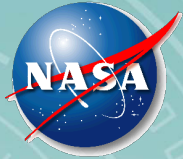
Factor C-1. Adequacy and robustness of the instrument implementation plan.

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 Findings Definitions

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.



TMC Evaluation Cost Analysis

- Initial cost analyses are accomplished on the basis of information provided in the proposals (e.g., consistency, completeness, basis of estimate, contributions, use of full cost accounting, maintenance of reserve levels).
- 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 (refer to the next slide). For Phases A-D, the remaining unencumbered reserves are compared to the minimum required in the AO. The AO does not specify a minimum unencumbered cost reserves for Phases E/F.
- The entire panel participates in Cost deliberations. All information from the entire evaluation process is considered in the final cost assessment.
- Cost findings are documented under the Cost Factor on the Form C.
- The panel is polled for Cost Risk Rating.



TMC Evaluation

TMC Evaluation Cost Analysis: Cost Threat Impact

The *likelihood* and *cost impact*, if any, of each weakness is stated as “This finding represents a cost threat assessed to have an Unlikely/Possible/Likely/Very Likely/Almost Certain likelihood of a Minimal/Limited/ Moderate/Significant/Very Significant cost impact being realized during development and/or operations, which results in a reduction from the proposed unencumbered cost 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 threat.

The cost threat matrix defines the adjectives that describe the *likelihood* and *cost impact*.
Minimum cost threat threshold = \$1M.

TMC Cost Threat Matrix			Cost Impact (CI) % of PI-Managed Mission Cost to complete Phases B/C/D or % of Phase E not including unencumbered cost reserves or contributions				
	Likelihood of Occurrence	Weakness	Minimal	Limited	Moderate	Significant	Very Significant
			2.5% < CI ≤ 5% (\$0M < CI ≤ \$0M) 2.5% < CI ≤ 5% (\$0M < CI ≤ \$0M)	5% < CI ≤ 10% (\$0M < CI ≤ \$0M) 5% < CI ≤ 10% (\$0M < CI ≤ \$0M)	10% < CI ≤ 15% (\$0M < CI ≤ \$0M) 10% < CI ≤ 15% (\$0M < CI ≤ \$0M)	15% < CI ≤ 20% (\$0M < CI ≤ \$0M) 15% < CI ≤ 20% (\$0M < CI ≤ \$0M)	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 “\$0M” is converted to dollars according to the associated percentage depending on the proposed PIMMC.



TMC Evaluation Cost Analysis: Cost Risk Definitions (1 of 4)

The three criteria below are indicators of Cost Risk. Evaluators must consider these criteria and other relevant information (e.g., cost model applicability, uncertainty of the cost models error bars, effect of cost issues that fall below the minimum cost threat threshold, likelihood of cost impacts, mitigating factors such as major strengths, etc.) together with their judgement in determining the appropriate Cost Risk for a particular investigation.

Three criteria are considered for the determination of the Cost Risk for a proposed investigation; 1) The level of unencumbered reserves after any reduction by TMC identified cost threats; 2) The comparison of proposed cost with the TMC Base Independent Cost Estimate considering the appropriate error bars; and 3) The proposed cost, including reserves, supported by material in the proposal.

Appropriate Cost Reserves are defined as the minimum unencumbered reserves required by the AO, or higher as judged by the TMC evaluation panel based on the justification provided by the PI. Unencumbered cost reserves higher than the minimum AO requirement may be necessary for some investigations, such as those requiring specific technology maturation.



TMC Evaluation Cost Analysis: Cost Risk Definitions (2 of 4)

Low Risk

- No cost threats have been identified by the TMC evaluation panel that reduce the proposed unencumbered cost reserves below the Appropriate Cost Reserves.
- The proposed investigation cost and the cost of all modelled lower Work Breakdown Structure (WBS) levels are greater than or equal to the lower bounds of the TMC Base Independent Cost Estimate error bars.
- The proposed investigation cost estimate is very well supported by the information in the proposal.

Low/Medium Risk

- No cost threats have been identified by the TMC evaluation panel that reduce the proposed unencumbered cost reserves below the Appropriate Cost Reserves.
- The proposed investigation cost and the cost of most modelled lower WBS levels are greater than or equal to the lower bounds of the TMC Base Independent Cost Estimate error bars.
- The proposed investigation cost estimate is well supported by the information in the proposal.



TMC Evaluation Cost Analysis: Cost Risk Definitions (3 of 4)

Medium Risk

- Cost threats have been identified by the TMC evaluation panel that reduce the proposed unencumbered cost reserves below the Appropriate Cost Reserves.
- The proposed investigation cost or the cost of most modelled lower WBS levels are greater than or equal to the lower bounds of the TMC Base Independent Cost Estimate error bars.
- The proposed investigation cost estimate is mostly supported by the information in the proposal.

Medium/High Risk

- Cost threats have been identified by the TMC evaluation panel that reduce the proposed unencumbered cost reserves below the Appropriate Cost Reserves.
- The proposed investigation cost or the cost of most modelled lower WBS levels are lower than the lower bounds of the TMC Base Independent Cost Estimate error bars.
- The proposed investigation cost estimate is not well supported by the information in the proposal.



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TMC Evaluation Cost Analysis: Cost Risk Definitions (4 of 4)

High Risk

- Cost threats have been identified by the TMC evaluation panel that reduce the proposed unencumbered cost reserves significantly below the Appropriate Cost Reserves.
- The proposed investigation cost and the cost of most modelled lower WBS levels are significantly lower than the lower bounds of the TMC Base Independent Cost Estimate error bars.
- The proposed investigation cost estimate is not supported by the information in the proposal.



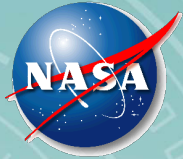
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PMWs Clarification Process

During the evaluation process, NASA will request written clarification on Potential Major Weaknesses (PMWs) associated with the *Intrinsic Science Merit of the Proposed Investigation (A Factors)*, the *Experiment Science Implementation Merit and Feasibility of the Proposed Investigation (B Factors)* and the *TMC Feasibility of the Proposed Investigation Implementation (C Factors)* criteria.

- Proposers will be allowed up to eight combined pages in total (with some restrictions) for clarification of the PMWs associated with the A Factors and the B Factors.
- Proposers will be allowed up to six pages in total (with some restrictions) for clarification of the PMWs associated with the C Factors.
- These clarifications may include text, tables, and figures to address the PMWs and to provide additional information.



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PMWs Clarification Process

Requirement 1: Proposers shall submit only one Clarification Response Document for the A and B factors (combined) and only one Clarification Response Document for the C-factors.

Requirement 2: The Clarification Response Documents shall be a single unlocked (e.g., without digital signatures) searchable Adobe Portable Document Format (PDF) file, composed of the response text, figures, and/or tables. Images (e.g., figures and scans) shall be converted into machine-encoded text using optical character recognition. Animations shall not be included. Links to materials outside of the response are not permitted. Do not insert any comment fields.

Requirement 3: The Clarification Response Documents shall be presented in 8.5 x 11 inch paper (or A4). Text shall not exceed 5.5 lines per vertical inch and page numbers shall be specified. Margins at the top, both sides, and bottom of each page shall be no less than 1 inch if formatted for 8.5 x 11 inch paper; no less than 2.5 cm at the top and both sides, and 4 cm at the bottom if formatted for A4 paper. Type fonts for text, tables, and figure captions shall be no smaller than 12-point (i.e., no more than 15 characters per horizontal inch; six characters per horizontal centimeter). Fonts used within figures shall be no smaller than 8-point.



PMWs Clarification Process

Requirement 4: For the A- and B- factors PMWs combined, the Clarification Response Documents shall not exceed eight pages. For the C-factor PMWs, the Clarification Response Documents shall not exceed six pages. Text, table(s) and figure(s) are permitted; however, all material shall be within the page limits specified above and limitations in Requirements 2, 3 and 9. Response files shall not exceed 10MB.

Requirement 5: The Clarification Response Documents shall not contain International Traffic in Arms Regulations (ITAR), Export Administration Regulations (EAR), or classified material.

Requirement 6: Each PMW shall be addressed, and each clarification response labelled with the PMW number provided. Each PMW clarification response shall only contain information relevant to the PMW. Although your clarification response may point back to references in your proposal, please note that there are already references to locations on your proposal with the PMWs, which indicates that the evaluation team is familiar with and has already evaluated that data, therefore they are not obliged to re-consider them. When making references to the material in your proposal in your clarification responses, refer to the proposal page number on the bottom of the page, as opposed to the electronic PDF file page number.



PMWs Clarification Process

Requirement 7: In the Clarification Response Document, the proposers are free to provide any additional information on any criteria or requirements relevant to the proposed investigation, e.g. for *TMC Feasibility of the Proposed Investigation Implementation*, advances in proposed technologies since proposal submission. However, this response together with the PMW clarification responses shall not exceed the total page limitation per Clarification Response Document.

Requirement 8: In addition to the references in the proposal, in support of each PMW clarification response, proposers may provide up to two references; references are restricted to peer reviewed literature. In support of any additional information response in Requirement 7, proposers may provide up to two additional references; references are restricted to peer reviewed literature. References with a publication or release date after the proposal due date are allowed. Proposers shall not provide URLs with any of the responses.

Requirement 9: Proposers shall append to the page-limited response complete versions of any modified fold-out. All modified fold-outs shall have modifications clearly marked by the use of a different color font or by a colored-bordered box (labeled "PMW Clarification"). Proposers shall provide the description of the updates and changes to the modified fold-out(s) as text in the page limited document. The complete versions of the modified fold-outs will not count against the page limit. Any new fold-outs will count as two pages against the response page limit.



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TMC Risk Ratings

The TMC Evaluation assesses the likelihood that the submitted investigations' technical and management approaches can be successfully implemented as proposed, including an assessment of the likelihood of their completion within the proposed cost and schedule. 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.



Other Considerations



Other Considerations

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TMC Evaluation Panel Other Considerations

The panel evaluating the third evaluation criterion, *TMC Feasibility of the Proposed Investigation Implementation*, will also provide comments to NASA regarding the bulleted items below. While these comments will not be considered in the evaluation, they may be considered during selection.

- The managerial and spaceflight experience of the PI, and whether appropriate mentoring and support tools are in place when necessary.
- The extent to which the proposed investigation provides career development opportunities to train the next generation of engineering and management leaders.
- The extent to which the proposed instrument is compatible with potential satellite platform interfaces and operations or the SmallSat investigation is compatible to potential launch opportunities.
- Any deviations from NPR 7120.5F, NPR 7123.1C, and any other NASA procedural requirements that will need a waiver during formulation associated with Requirement R-45.



Other Considerations

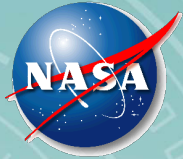
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Accommodation Study

After the evaluation, but prior to the selection decision, NASA will perform an accommodation study of selectable Instrument investigation proposals to assess the extent to which the proposed instrument is compatible with potential satellite platform interfaces and operations. This accommodation study will also consider the accommodations of selectable SmallSat proposals for launch.



EVI-6 Acquisition Homepage



EVI-6 Acquisition Homepage

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EVI-6 Solicitation Information

Proposers are encouraged to periodically check the EVI-6 Acquisition Homepage at <https://essp.larc.nasa.gov/EVI-6/index.html> . This site provides;

- Links to the PEA solicitation including the latest amendments (if any).
- Presentations for the Prospective Bidders Web Conference and the Preproposal Web Conference (when available),
- Pertinent announcements.
- The EVI-6 Library.
- EVI-6 Questions and Answers.
- A link to the SALMON AO Website
- A list of potential teaming partners.
- The EVI-6 Evaluation Plan (when available).

The EVI-6 Library provides additional regulations, policies, and background information related to the solicitation.



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EVI-6 Questions and Answers

All questions regarding the EVI-6 solicitation **MUST** be addressed to:

Hank Margolis, Ph.D.
Earth Venture Instrument - 6 Program Scientist
Earth Science Division
Science Mission Directorate
NASA Headquarters
Washington, DC 20546-0001

Preferably by email at:
hank.a.margolis@nasa.gov
Subject line to read "EVI-6 PEA"



Questions?