

Earth Venture Instrument-6 SALMON-3 AO Program Element Appendix Prospective Bidders Web Conference

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- 1. Present an overview of the *Earth Venture Instrument-6* (EVI-6) PEA of the *SALMON-3 AO*.
- 2. Discuss differences between EVI-6 and EVI-5.
- 3. Answer questions from you.

Earth Venture and the EVI-6 PEA

SALMON-3 PEA Solicitations

- EVI-6 is solicited through a *Program Element Appendix* (PEA).
- The EVI-6 PEA is an Appendix of the Third Stand Alone Missions of Opportunity Notice (SALMON-3) Announcement of Opportunity (AO).
- All proposers must read both the EVI-6 PEA and the SALMON-3 AO carefully and must comply with the requirements and constraints contained within the two documents.
- The EVI-6 PEA complements and clarifies specific information in the SALMON-3 AO. Not all of the information required to propose is contained in the PEA and therefore both documents must be carefully reviewed.

Venture Class – ESD Objectives

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A sustained, successful Venture-class element is a priority from both the 2007 and the 2017 Earth Decadal Surveys.

- Advances science/applications and promotes community involvement through frequent, regular proposal opportunities;
- Ensures overall program scientific flexibility and responsiveness through constrained development schedules.

ESD Venture-class characteristics:

- Science-driven, involving sustained (> seasonal) data acquisition;
- Technology developments/demonstrations are not solicited;
- Frequent, regular solicitations:
 - 4-year frequency for EVS (Suborbital) & EVM (Mission);
 - Nominal 36-month for EVC (Continuity investigations);
 - Nominal 36-month frequency for EVI (Instruments and CubeSat investigations);
- Competitively selected, PI-led.
- Cost Capped and Schedule Constrained.
 - Explicit cost caps per investigation defined in each solicitation;
 - 4- to 5-year development time-to-launch for space missions or delivery to platform for EVI. Science requirements must be achieved within 1-3 years of operations.

Scope and Parameters

Science Scope

• EVI-6 solicitation will be an open call to address science from any of the thirty-five 2017 Decadal Survey science questions.

Evaluation Criteria

- Evaluation criteria in the SALMON-3 and PEA will be used to evaluate proposals
 - (a) Intrinsic Science Merit of the Proposed Investigation 40%,
 - (b) Experiment Science Implementation Merit and Feasibility of the Proposed Investigation 30%, and
 - (c) Technical, Management, and Cost (TMC) Feasibility of the Proposed Investigation Implementation 30%.

Partnerships

• Enabling partnerships are encouraged, however programmatic merit and risk of any proposed partnerships will be considered in the selection process.

<u>Complete investigations</u> using the proposed instrument or CubeSat(s) shall be proposed.

Access to Space

- Access to space for all EVI solicitations is provided by NASA.
- Proposals are required to clearly state the desired and acceptable orbits and operational constraints (e.g., duty cycle or observational cadence) and describe the relative scientific merits of each possible orbit.
- A "Template for EVI-6 Accommodation Worksheet" is provided on the EVI-6 Library for proposers to provide Instrument accommodation requirements to be levied on the NASA provided platform. It does not count against the page limit.
- Proposals may choose to provide information about their assessment of appropriate spacecraft and launch options. It is not required.
- The access to space budget is outside the PI managed mission cost cap and is not cost constrained. This is separately managed by NASA.
- ISS is a possible hosting option for this solicitation.
- JPSS is not a hosting option at this time.

Previous EVI Selections

- EVI-1 Selected November 2012. TEMPO Geo-Hosted Payload.
- EVI-2 Selected July 2014. Two ISS Payloads: (1) ECOSTRESS (Class D) and (2) GEDI (Class C).
- EVI-3 Selected March 2016. (1) MAIA Class C LEO Hosted Payload and (2) TROPICS CubeSat constellation.
- EVI-4 Selected February 2018. (1) EMIT Class C ISS Payload and (2) PREFIRE – Class D CubeSat Pair.
- EVI-5 Selected August 2019. GLIMR Class C Geo-Hosted Payload.

Total of 8 EVI selections since 2012.

2 Geo, 1 LEO, 3 ISS, 2 CubeSat.

Earth Science at NASA

One of NASA's strategic objectives is to "Understand the Sun, Earth, Solar System, and Universe". Further information on NASA's Themes, Strategic Goals, and Strategic Objectives may be found in NASA Policy Directive (NPD) 1001.0C, *NASA Strategic Plan 2018*, available through the EVI-6 Library.

The NASA Science Mission Directorate (SMD) mission is to "Discover the secrets of the universe. Search for life elsewhere. Protect and improve life on Earth." Further information on NASA SMD's vision, mission, core values, priorities and strategies of may be found in *Science 2020-2024: A Vision for Scientific Excellence* available through the EVM-3 Library.

NASA's Earth Science Division is addressing this strategic objective by pursuing a better understanding of Earth. The foundational document that guides NASA's overall approach to the Earth science program is the National Research Council (NRC) 2017 Earth Science Decadal Survey (DS) (*Thriving on Our Changing Planet: A Decadal Strategy for Earth Observation from Space* [The National Academies Press, 2018]) which follows the initial Earth Science Decadal Survey released in 2007 (both documents are available through the EVI-6 Library).

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Thriving on Our Changing Planet

A Decadal Strategy for Earth Observation from Space

#EarthDecadal

The National Academies of SCIENCES ENGINEERING MEDICINE

2017 Earth Decadal Survey

Prioritization Criteria

35 »	<i>103</i>	Most Important	24
Questions	Objectives	Very Important	25
See Table 3.3	U U	Important	54
AREA	DESCRIPTION		
Science Questions	Science objectives that contribute to answering the most important basic and applied scientific questions in Earth System science. These questions may span the entire space of scientific inquiry, from discovery to closing gaps in knowledge to monitoring change.		
Applications & Policy	Science objectives contributing directly to addressing societal benefits achievable through use of Earth System science.		
Interdisciplinary Uses	Science objectives with benefit to multiple scientific disciplines, thematic areas, or applications.		
Long-Term Science and/or Applications	Objectives that can support scientific questions and societal needs that may arise in the future, even if they are not known or recognized today.		
Value to Related Objectives	Science objectives that complement other objectives, either enhancing them or providing needed redundancy.		
Readiness	Are we in a position to make meaningful progress to advance the objective, regardless of measurement?		
Timeliness	Is now the time to invest in pursuing this objective? Examples include recently occurring phenomena that require focused near-term attention and the existence of complementary observing assets that may not be available in the future.		

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Solicits **Class D** Instrument and CubeSat Investigations

Single-Step Evaluation & Selection Process

PI-Managed NASA Costs

- The proposed PI-Managed Mission Cost (PIMMC) shall be no more than \$37M for Class D instrument or CubeSat based investigations in FY 2024 dollars. Also, a \$5.3M Science Enhancement Option for Class D Instruments / CubeSats is offered.
- The PIMMC <u>excludes</u> the integration of the instrument to the selected platform or the integration of the CubeSat(s) to the selected launch vehicle but includes proposed science activities in all Phases A-F.
- The PIMMC also excludes any gap between the instrument delivery and it's integration to the selected platform or the CubeSat(s) delivery and integration to the selected launch vehicle.

Life Cycle Schedule

- Delivery of Class D Instrument (end of Phase C) by ~ Q4 FY27 or ~ Q1 FY28.
- Delivery of CubeSat(s) (within Phase D) by ~ Q4 FY27 or ~ Q1 FY28.

EVI-6 PEA: Overview 2 of 3

Standard NASA Earth Science Data Policy for Missions, no period of exclusive use.

Education and Communications Programs

 Education Program Plan and/or a Communications and Outreach Program Plan are not required with the proposal. A Communication Program may be required after selection, however those costs will be mostly outside the PIMMC.

Contributions

- Contributions to the investigation (part of hardware and/or investigators) on a no-exchange-of-funds basis is permitted.
- The sum of US or non-US contributions of any kind to the proposed investigation is not to exceed one third of the proposed PIMMC.
- Enabling partnerships are encouraged, however programmatic merit and risk of any proposed partnerships will be considered in the selection process.

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Complementary Data

Each proposal shall clearly outline which additional ongoing or planned observations, instrumentation, or platforms, if any, are required for the proposed investigation to achieve its baseline investigation. The proposal shall describe how the high-level science requirements will be impacted if such observations do not exist when the proposed investigation is in operation (Requirement 29 of the SALMON-3 AO).

Risk Classification •Payload Class D.

PIMMC

What is included in the PI-Managed Mission Cost?

- Cost of the Instrument (Phases A-C) and/or CubeSat(s) (Phases A-C and part of Phase D).
- Science Team support, Algorithm Development, Calibration & Validation.
- Key management and engineering staff during Phase D (Project Manager, Instrument Manager, Systems Engineer, etc.) assuming a 2-year Phase D.
- Post-launch instrument commissioning activity (within Phase D).
- Phase E & F e.g., Operation & Ground Processing, Data Analysis & proposed data product generation.
- Any Student Collaboration cost above 1% of the PIMMC.

What is not part of PIMMC, yet required in proposal?

- Investigation Costs during a potential gap between completion of instrument or CubeSat(s) and start of integration (planning budget up to 4 years, on a per-year basis for Instruments and planning budget up to 2 years, on a per-year basis for CubeSat(s))
- Integration and test to selected platform (within Phase D) (planning budget nominally 2 years for Instruments and 1 year for CubeSats).

Evaluation Process Clarifications

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 specified in Section 7.2.1 of the SALMON-3 AO and in this PEA.

- 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 clarifications of the C Factors evaluation criteria.
- These clarifications may include text, tables, and figures to address the PMWs and to provide additional information.

EVI-6 Nominal Schedule

EVI-6 Draft PEA Released

October 26, 2021

Comment Period Closes

EVI-6 PEA Release (target)

December 1, 2021

~ February, 2022

EVI-6 Pre-Proposal Web Conference* ~ 2-3 Weeks After PEA Release *via WebEx; date, agenda, and logistical information found in the EVI-6 Acquisition Homepage at <u>http://essp.larc.nasa.gov/EVI-6/</u>

EVI-6 Notices of Intent Due* ~ 5 Weeks After PEA Release
*<u>Required</u> and must include all PI, Co-Is and collaborators to facilitate planning for evaluation process.

EVI-6 Q&A Period Closes

EVI-6 Proposals Due

~ 2 Weeks Before Proposals Due



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Major Changes from EVI-5

Major Changes from EVI-5 (1 of 2) EVI - 6 Prospective Bidders Conference

- Earth Venture Instrument 6 (EVI-6) solicits investigations proposing Class D Instruments and/or CubeSats. Class C Instruments are not solicited.
- PI-Managed Mission Cost capped at \$37M with an optional Science Enhancement Option (SEO) of \$5.3M in Fiscal Year 2024 dollars.
- International Space Station (ISS) is permitted as a possible platform.
- CubeSats up to 12U are permitted when these are packaged for flight on an Evolved Expendable Launch Vehicle (EELV) Secondary Payload Adapter (ESPA) or ESPA Grande. For Earth Venture Instrument – 5 (EVI-5), 6U was the maximum size allowable.
- Added an optional NOAA Operational Enhancement Opportunity (OEO
- An applications component has been added to the evaluation criteria (A1, A2, and B3).
- NPR 7120.5F instead of NPR 7120.5E is the applicable procedural requirements document.

Major Changes from EVI-5 (2 of 2) EVI - 6 Prospective Bidders Conference

- Added requirement to follow the NASA Earth Science Division (ESD) Open Source Science Policy.
- Added a section describing and requiring a Project Protection Plan.
- Allows PI's to respond to Potential Major Weaknesses using text, tables and figures with some restrictions.
- Added a section to the PEA on Diversity and Inclusion and added a requirement for a Diversity and Inclusion Plan (two-page maximum) to be evaluated within Factor B-5 (*Probability of investigation team* success).
- Augmented Submission via the Box service for cost tables, table of proposal participants, Master Equipment List, Microsoft Project file for the schedule, and the 2-page OEO (if applicable). See section 5.2.1 of the Draft PEA.
- Simplified EVI-6 proposal requirements to reduce the workload on proposers. Please refer to following slides.

EVI-6 Simplification

EVI-6 PEA Simplification (1 of 4)

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- Overall: Proposal page limits reduced by at least 25 pages (PEA Requirement TBD-37).
- 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 (PEA Requirement TBD-38).
- Schedule: Two schedule foldouts do not count against the page limit instead of three; narrative for the schedule foldout is not required (PEA requirement TBD-39).

EVI-6 PEA Simplification (2 of 4)

- Management Approach : (PEA Section 5.1.2, Requirements TBD-40 to 44).
 - Requires only the management organization chart and a brief discussion of decision-making authority and the teaming arrangement and responsibilities.
 - 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 only to be listed. Eliminates need for a description.

EVI-6 PEA Simplification (3 of 4)

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- Cost and Cost Estimating Methodology: (PEA Section 5.1.3).
 - 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 <u>brief</u> discussion of cost risk.
 - Eliminates presenting a rationale for the costing methodology.
 - Eliminates description/evaluation of any proposer's validation methods.
 - Eliminates description of cost management tools.

EVI-6 PEA Simplification (4 of 4)

- Proposal Appendixes: Eliminates two required appendices and simplifies three.
 - Eliminates appendix for Summary of Proposed Program Cooperative Contributions.
 - 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.
 - Resumes eliminates requirement for the resume of the PM.
 - International Participation reduced to one page for a table and brief narrative.
 - Heritage reduced page count from 30 to 15 pages.
- Evaluation Criteria Rewording reflects simplified requirements (PEA Section 6.1).

EVI-6 Acquisition Homepage

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

Questions???

All questions pertaining to the EVI-6 PEA MUST be addressed to:

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

Preferably by email at: Hank.A.Margolis@nasa.gov Subject line to read "EVI-6 PEA"