

THIRD STAND ALONE MISSIONS OF OPPORTUNITY NOTICE (SALMON-3)  
NNH17ZDA004O-HPTDMO  
PROGRAM ELEMENT APPENDIX (PEA) L  
2018 HELIOPHYSICS TECHNOLOGY DEMONSTRATION MISSION OF OPPORTUNITY

**NOTICE: Amended September 26, 2018. This amendment makes the following changes to this PEA: in Sections 6.1.2 and 6.2.2, it is noted that restrictions on changing team membership after the notification proposal has been submitted have been modified. New text is in bold and deleted text is struck through.**

**NOTICE: Amended August 28, 2018. This amendment makes the following changes to this PEA: in Section 9 it is noted that the dates for Notification Proposal, Final PEA Full Proposal Due (NSPIRES), and Final PEA Full Proposal Due (CD ROMs) have been changed. New text is in bold and deleted text is struck through.**

**NOTICE: August 6, 2018. The National Aeronautics and Space Administration (NASA) Science Mission Directorate (SMD) is releasing this FINAL version of 2018 Heliophysics Technology Demonstration Mission of Opportunity Program Element Appendix (PEA) L for the Third Stand Alone Missions of Opportunity Notice (SALMON-3) AO. The period for questions will close two weeks before the proposal due date. Questions regarding this final text should be sent to [hq-techdemo@mail.nasa.gov](mailto:hq-techdemo@mail.nasa.gov). A draft version of this PEA was made available earlier in 2018 for community comment as [NNH18ZDA009J](#). The list of significant changes made from draft to final versions of this PEA will be found in a change log posted in the Program Library at <https://soma.larc.nasa.gov/stp/tdmo/tdmo-library.html>.**

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## 1 BACKGROUND

### 1.1 Programmatic Overview

The National Aeronautics and Space Administration (NASA) issues this Program Element Appendix (PEA) to the Third Stand Alone Missions of Opportunity Notice (SALMON-3) for the purpose of soliciting proposals for Heliophysics Technology Demonstration (TechDemo) Mission of Opportunity (MO) investigations.

This PEA solicits Small Complete Mission (SCM) proposals for spaceflight demonstration of innovative medium Technology Readiness Level (mid-TRL) technologies that enable significant advances in NASA's Heliophysics Science Objectives and Goals (see Section 2.1 of this PEA). The sole access to space for investigations solicited by this PEA will be in the form of a secondary payload opportunity on the Evolved Expendable Launch Vehicle (EELV) planned for NASA's Heliophysics Solar Terrestrial Probes #5 (STP-5) mission—Interstellar Mapping and Acceleration Probe (IMAP). Accommodation on the EELV Secondary Payload Adapter (ESPA) Grande will be provided at no cost to proposers.

Proposal merit will be determined by the magnitude of heliophysics science advancements enabled by the proposed TechDemo investigation. Initiation of a future mission achieving the science advancements enabled by the TechDemo investigation must be technically and scientifically feasible within the next 15 years (see Factors A-1 and A-2). The TechDemo investigation might inform the mission recommendations of the next heliophysics decadal study by raising the TRL of a key technology to the point it is no longer considered a defining risk to those missions. However, significant science advancement is also possible within the TechDemo investigation itself. 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.

This opportunity is open to high risk, high reward investigations. The PEA specifically enables this by superseding SALMON-3 with a lower TRL requirement at PDR, a waiver of technology development backup plans, and an allowance of higher expenditure of costs prior to the Preliminary Design Review (PDR). The evaluation process for the TMC Feasibility of the Proposed Investigation Implementation criterion itself will not change. Instead, 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.

Missions of Opportunity are solicited through the SALMON-3 Announcement of Opportunity (AO) NNH17ZDA0040 by amendments that add new specific PEAs. This solicitation for the 2018 Heliophysics Technology Demonstration Mission of Opportunity is one such PEA. Both PEA and SALMON-3 documents provide requirements and guidelines for proposers. In the case of conflicting or ambiguous requirements, the PEA document takes precedence.

## 1.2 Technology Demonstration Background

The Heliophysics Technology and Instrument Development for Science (H-TIDeS) program (Appendix B.3, <http://solicitation.nasaprs.com/ROSES2018table3> for the ROSES 2018 opportunity) is the primary tool for technology development and demonstration within the NASA Heliophysics Division (HPD) technology and research activity. However, the scale of investigations that can be conducted under H-TIDeS is limited by flight opportunities (primarily suborbital or CubeSats) or available scope (total cost and duration). This PEA opportunity expands both aspects of heliophysics technology innovation beyond H-TIDeS to past near-earth space and to the scope of a Mission of Opportunity. The sole purpose of the HPD technology and research activity is to enable the most compelling new advances in achieving the NASA Heliophysics Science Objectives and Goals, whether these scientific advances are ultimately achieved during a particular investigation, a follow-on Explorers investigation, or a strategic mission in this or the next decade.

Access to space for the solicited TechDemo investigations will be provided by NASA in the form of a secondary payload opportunity on one or two ports of the EELV Secondary Payload Adapter (ESPA) Grande that is planned for the IMAP mission. Investigations requiring access to space other than the IMAP launch are not solicited.

## 1.3 Overview of this Program Element Appendix

The SALMON-3 AO is an omnibus solicitation that provides the overall structure, guidelines and requirements for several types of MO solicitations. Each new opportunity is announced through a PEA that details the solicitation and may include additional guidelines and requirements. This document is one such PEA. The SALMON-3 AO (NNH17ZDA0040) can be found by searching open solicitations in the NASA Solicitation and Proposal Integrated Review and Evaluation System (NSPIRES) at <http://nspires.nasaprs.com/>.

NASA issues this PEA of the SALMON-3 AO for the purpose of soliciting proposals for 2018 Heliophysics TechDemo MO investigations to be managed under the NASA Solar Terrestrial Probes (STP) Program. All investigations proposed in response to this solicitation must demonstrate support of NASA's Heliophysics Science Objectives and Goals (Section 2.1 of this PEA) and the Heliophysics Technology Demonstration Objectives and Goals (Section 2.2 of this PEA), and must be implemented by Principal Investigator (PI)-led investigation teams (Sections 4.2.4 and 5.4.1 of the SALMON-3 AO) via complete space investigations (Section 5.3.2 of the SALMON-3 AO).

Proposals submitted in response to this PEA will be selected for flight through a two-step competitive process. Proposals submitted in response to this PEA will undergo the first step evaluation. As the outcome of the first step evaluation, NASA expects to fund two or more MO

investigations to proceed to a nine-month Phase A concept study. In the second step, NASA will conduct an evaluation of the Phase A Concept Study Reports. From this evaluation, NASA expects to down-select one or two MOs to proceed into Phase B and subsequent mission phases.

The SALMON-3 AO and this PEA present the requirements and constraints that apply to proposals that are to be submitted. Appendix B of the SALMON-3 AO contains additional requirements on the format and content of the proposals. Documents available through the TechDemo MO Program Library at <https://soma.larc.nasa.gov/stp/tdmo/tdmo-library.html> (hereafter referred to as the Program Library) are intended to provide guidance for investigations selected. Unless otherwise indicated in this PEA, the documents in the Program Library are not intended to impose requirements on proposals.

## 2 SCIENCE AND PROGRAM OBJECTIVES

### 2.1 NASA Heliophysics Science Objectives and Goals

The NASA Strategic Objective for Heliophysics Research is to understand the Sun, Earth, Solar System, and Universe. Further information on NASA's Strategic Goals and Objectives may be found in NASA Policy Directive (NPD) 1001.0C, *NASA 2018 Strategic Plan*, available through the Program Library.

The NASA Science Mission Directorate (SMD) is addressing this Strategic Objective by conducting heliophysics investigations designed to address the following science goals:

- Explore the physical processes in the space environment from the Sun to the Earth and throughout the solar system;
- Advance our understanding of the connections that link the Sun, the Earth, planetary space environments, and the outer reaches of our solar system; and
- Develop the knowledge and capability to detect and predict extreme conditions in space to protect life and society and to safeguard human and robotic explorers beyond Earth.

Further information on the objectives and goals of NASA's Heliophysics Program may be found in the *2014 Science Plan* and *Our Dynamic Space Environment: Heliophysics Science and Technology Roadmap for 2014-2033* documents available through the Program Library.

### 2.2 Heliophysics Technology Demonstration Objectives and Goals

The goal of the Heliophysics Technology Demonstration PEA is to demonstrate and mature – through spaceflight – technologies that enable new heliophysics science investigations or enhance the ability of heliophysics science investigations to be executed with fewer resources, with a lower risk, and/or with a significantly higher scientific return. Future missions achieving the science advancements enabled by the TechDemo investigation must be expected technically and scientifically during the next 15 years. Technologies solicited in the PEA include flight hardware (e.g., sensors and detectors, platform technologies, systems, and components), flight software, or any combination thereof. Technologies proposed may have a TRL of less than 5 when proposed, but any such technologies must be accompanied by a plan for advancement of the system that includes the technology reaching TRL 5 by Preliminary Design Review (PDR).

Back-up plans for the technologies are not required. The goal is to mature technologies that would enable and enhance future science investigations.

### 3 PROPOSAL OPPORTUNITY PERIOD AND SCHEDULE

The following activities apply to this PEA, and the associated schedule is provided in Section 9 of this PEA:

- A Preproposal teleconference/Webex will take place in association with this solicitation (See Section 6.1.1 of this PEA).
- A Notification Proposal replaces the Notice of Intent (NOI) and is required. Section 6.1.2 of this PEA provides information on electronic Notification Proposal submission through NSPIRES. The Notification Proposal is a prerequisite for submission of a Full Proposal (Step-1), but it does not commit the offerors to submit a Full Proposal later. Due dates for the Notification Proposal and Full Proposals are in Section 9 of this PEA.
- Full Proposals must be submitted electronically through NSPIRES; in addition, two identical CD-ROMs containing all proposal materials must be received at the address specified in Section 6.2.3 of the SALMON-3 AO by the date given in Section 9 of this PEA. Proposal submission requirements are outlined in Section 6.2 of this PEA.
- Evaluation, selection for concept studies, and down-selection for flight will be done using a two-step selection process.
- Investigation teams selected following Step-1 will be funded by NASA to conduct Phase A concept study activities.
- NASA funding for selected proposals will begin as soon as appropriate funding vehicles (e.g., contracts) can be put in place, as set forth in Section 7.3.1 of this PEA. Efforts will be made to establish an “Advance Agreement on Pre-Contract Costs” within one month of the proposal selection announcement to allow Phase A concept study work to begin prior to finalizing the funding vehicle agreement. This approach is taken to facilitate meeting the schedule established for Phase A concept studies, the down-selection, and ultimately the implementation phase. The term “pre-contract costs” is defined in FAR 31.205-32. Costs incurred before the effective date of the contract will be allowable to the extent that they would have been allowed if incurred after the effective date of the contract, subject to conditions specified in the “Advance Agreement on Pre-Contract Costs” letter.

### 4 POLICIES

#### 4.1 NASA Management of the Technology Demonstration Program

The down-selected investigation(s) will be managed by the STP Program Office. The Associate Administrator for SMD has established the STP Program Office at the NASA Goddard Space Flight Center (GSFC) to be responsible for project oversight. The STP Program Manager at NASA GSFC reports to the Heliophysics Division Director at NASA Headquarters. Additional details about the program office staffing, structure, and goals can be found in the *STP Program Plan*, available through the Program Library. There are appropriate protective firewalls between the STP Program Office and the rest of NASA GSFC, allowing investigators from GSFC to propose in response to this PEA. The STP Program Office will manage the Heliophysics TechDemo MO investigations under the requirements of NPR 7120.5E, *NASA Space Flight*

*Program and Project Management Requirements* (available in the Program Library), as described in Section 4.1.2 of the SALMON-3 AO and as modified by the *NASA Science Mission Directorate (SMD) Class-D Tailoring/Streamlining Decision Memorandum* (issued Dec. 7, 2017) (available in the Program Library). Safety, reliability, and mission assurance requirements for Heliophysics TechDemo MO investigations will be consistent with the EHPD-RQMT-0003, *Explorers and Heliophysics Projects Division (EHPD) Mission Assurance Requirements (MAR) Mission Risk Classification – NPR 7120.5 Class D* (available in the Program Library), as applicable.

#### 4.2 Eligibility to Participate in this PEA

Refer to Section 4.2 of the SALMON-3 AO for general rules on participation policies. For this particular PEA, NASA will place full or partial limitations (as described in the SALMON-3 AO) on organizations that will be involved in the evaluation process. Cornell Technical Services LLC (CTS) and Arctic Slope Regional Corporation (ASRC) and affiliates are subject to the “Full Limitation” as described in Section 4.2.1 of the SALMON-3 AO. No other organizations have been identified to provide evaluation services for this PEA. As stated in Section 4.2.2 of the SALMON-3 AO, proposals must not include bilateral participation, collaboration, or coordination with China or any Chinese-owned company or entity, whether funded or performed under a no-exchange-of-funds arrangement.

#### 4.3 Data Policies and Requirements

Sections 4.3 and 4.4 of this PEA supersede Section 4.4 of the SALMON-3 AO.

##### 4.3.1 Data Analysis

The PI will be responsible for analysis of the investigation data necessary to complete the proposed investigation objectives and for timely publication of initial results in refereed journals, as part of their mission operations (Phase E) and/or post-mission (Phase F) activities. Data analysis may be continued during Phase F.

Requirement L-1. A Data Analysis Plan including approaches for data retrieval, validation, and preliminary analysis shall be described. The technology and any science products (e.g., flight data, ancillary or calibration data, theoretical calculations, higher order analytical or data products, laboratory data, etc.) shall be identified, including a list of the specific data products and the individual team members responsible for the data products. This requirement, in conjunction with Requirement L-2 of this PEA, supersedes Requirement B-23 in Appendix B of the SALMON-3 AO.

##### 4.3.2 Increasing Access to the Results of Federally Funded Research

As a Federal agency, NASA requires prompt public disclosure of the results of its sponsored research to generate knowledge that benefits the Nation. To this end, contracts arising from this PEA will include the clause FAR 52.227-14, Rights in Data—General, and accordingly, Alternate IV to this clause, permitting the automatic assertion of copyright in any data produced under the contract by a contractor, will not be applicable. Thus, it is NASA’s intent that all

knowledge developed under awards resulting from this solicitation be shared broadly. In keeping with the *NASA Plan for Increasing Access to the Results of Scientific Research* (available in the Program Library), new terms and conditions about making manuscripts and data publicly accessible may be attached to awards that derive from this PEA. Proposals are required to include a Data Management Plan (DMP) in accordance with the requirements and guidelines in the *NASA Plan for Increasing Access to the Results of Scientific Research* or to justify that one is not necessary given the nature of the work proposed (see Requirement L-6). The kind of data that requires a DMP is described in the *NASA Plan for Increasing Access to the Results of Scientific Research*.

SMD anticipates that awards deriving from this PEA will include terms and conditions requiring that as-accepted manuscript versions of peer-reviewed publications (hereinafter "manuscripts") resulting from PEA awards be uploaded into NASA's part of the PubMed Central (PMC) repository called NASA PubSpace at <https://www.ncbi.nlm.nih.gov/pmc/funder/nasa/>. This applies only to peer reviewed publications. Patents and publications that contain material governed by personal privacy, export control, proprietary restrictions, or national security law or regulations will not be covered by this requirement. The manuscript will appear in PMC for free public access following a maximum 12-month embargo period after the publication date. PMC will release the manuscript when the embargo has ended. For more details on public access to scientific publications and digital scientific data resulting from NASA-funded research, please see: <https://www.nasa.gov/open/researchaccess>. DMPs must describe how data sharing and preservation will enable validation of published results or how such results could be validated if data are not shared or preserved. Furthermore, DMPs must provide a plan for making science data that underlie the results and findings in peer-reviewed publications digitally accessible *at the time of publication or within a reasonable time period after publication*.

#### 4.3.3 Delivery of Data to Archive

The investigation team will make mission data fully available to the public through a NASA-approved data archive ([Solar Data Analysis Center](#), [Space Physics Data Facility](#), [TechPort](#)), in readily usable form, in the minimum time necessary, but barring exceptional circumstances, within six months following its collection. The PI will be responsible for collecting the scientific, engineering, and ancillary information necessary to validate and calibrate the data prior to delivery to the archive.

Archival data products will include low-level (raw) data, high-level (processed) data, and derived data products including, but not limited to, maps, ancillary data, calibration data (ground and in-flight, and intercalibration as needed), documentation, and related software and/or other tools or parameters that are necessary to interpret the data. The PI will be responsible for generating data products that are documented, validated, and calibrated in physical units that are usable by the scientific community at large. For information about metadata, the relevant heliophysics data standard is the SPASE Data Model (see <http://www.spase-group.org>) which is used to populate a 'git' registry whose main public face is the Heliophysics Data Portal (<https://heliophysicsdata.gsfc.nasa.gov>). The required elements of the Data Model are the 'header' information that includes the Resource Type, Measurement Type, people, access URL(s), duration information and the like.

NASA data archives have budgets to support core activities, including the basic ingestion and review of new data. Proposed mission data archiving plans and budgets must be consistent with the policies and practices of the appropriate NASA data archive. Proposers should contact the archive directly to obtain information regarding the appropriate policies and practices. Proposals may include funding for up to one year after end-of-operations for the generation and archiving of derived data products. This funding will be included in the PI-Managed Mission Cost (PIMMC).

Requirement L-2. A Data Management and Archive Plan, including approaches for the release of peer-reviewed publications, the release of the research data that underlie the results and findings in peer-reviewed publications, and the archiving of all technology and any science products shall be described. The technology and any science products (e.g., flight data, ancillary or calibration data, theoretical calculations, higher order analytical or data products, laboratory data, etc.) shall be identified, including a list of the specific data products and the individual team members responsible for the data products. The Data Management and Archive Plan shall be in compliance with requirements and the guidelines in the *NASA Plan for Increasing Access to the Results of Scientific Research* (available through the Program Library) or a justification shall be provided that this is not necessary given the nature of the work proposed (see Section 4.4.1 of the SALMON-3 AO). The Data Management and Archive Plan shall identify the appropriate NASA data archive and the formats and standards to be used. It shall include an estimate of the raw data volume and the data latency by product for submission of raw and reduced data, to the data archive, in physical units accessible to the science community. This requirement, in conjunction with Requirement L-1 of this PEA, supersedes Requirement B-23 in Appendix B of the SALMON-3 AO.

#### 4.4 Intellectual Property Rights

Sections 4.3 and 4.4 of this PEA supersede Section 4.4 of the SALMON-3 AO.

##### *4.4.1 Invention Rights*

Recipients that are Small Businesses or nonprofit organizations may elect to retain title to any inventions made under a funding agreement pursuant to the Bayh-Dole Act (35 U.S.C. § 202). Large business recipients are subject to section 20135 of the National Aeronautics and Space Act (51 U.S.C. § 20135) relating to property rights in inventions. Title to inventions made under an agreement by a large business recipient initially vests with NASA. However, these recipients may request a waiver to obtain title to inventions made under the agreement. Such a request may be made in advance of the agreement or within 30 days thereafter. Even if a waiver request is not made, or denied, a large business recipient may request a waiver on individual inventions made during the course of the agreement.

##### *4.4.2 Data Rights*

All technology and science data returned from investigations led by NASA-funded PIs will be made available to the public as rapidly as possible. Following a short latency period, all data will be made available to the user community, to the extent consistent with the approved Data Management Plan and the data rights clause incorporated into the award instrument. No period

of exclusive access is permitted. The PI proposes and justifies any data product latency period for standard data products listed in the proposal, based primarily on the time required to produce, quality check, and validate the products. Barring exceptional circumstances, data product latency may not exceed six months.

In addition, sensitive Government information is defined as information the Government has generated that qualifies for an exception to the Freedom of Information Act, which is not currently in the public domain, may embody trade secrets or commercial or financial information, and may be sensitive or privileged. If performing any contract resulting from this opportunity entails access to such sensitive Government information, then the Contractor: must limit utilization of the information to performing the services specified in said contract; must not utilize the information to improve its own competitive position in another procurement; must safeguard the information from unauthorized use and disclosure, allowing access only to those employees that need it to perform services under the contract; and must preclude access and disclosure of the information to persons and entities outside of the Contractor's organization. A Contractor's Organizational Conflicts of Interest Avoidance Plan is a procedures and obligations compliance document that will be required for contract award.

#### 4.4.3 Trademark

The National Aeronautics and Space Act directs NASA to "provide for the widest practicable dissemination of the information concerning its activities and the results thereof." 51 USC 20 112(a) (3). NASA's mission supports broad public engagement, enhanced educational opportunities, and open scientific inquiry. Accordingly, selected or down-selected missions may not assert trademark or other ownership rights in the mission name, mission logos, mission graphics, or any other program identifier.

## 5 REQUIREMENTS AND CONSTRAINTS

### 5.1 Types of Mission of Opportunity

Only Small Complete Missions (SCMs) are solicited by this MO PEA. Access to space for all SCMs proposed in response to this PEA will be provided as a secondary payload on the IMAP mission. Payload accommodations on the ESPA Grande accompanying IMAP will be provided by NASA.

### 5.2 Investigation Requirements

As stated in Section 2.2 of this PEA, the goal of the Heliophysics TechDemo MO is to demonstrate, via spaceflight, technologies that enable new heliophysics science investigations or enhance the ability for heliophysics science missions to be executed with fewer resources, with lower risk, and/or, especially, with significantly higher scientific return. A technology to be demonstrated may be flight hardware (e.g., sensors and detectors, platform technologies, systems, and components), flight software, or any combination thereof. Initiation of a future mission achieving the science advancements enabled by the TechDemo investigation must be technically and scientifically feasible within the next 15 years.

Proposals must clearly define the science investigations that the proposed technology would enable or enhance, the value of the science, and their traceability to the NASA Heliophysics Science Objectives and Goals (see Requirement L-3 and Requirement L-5). Proposals do not need to solve or answer a science question within the scope of the TechDemo investigation itself—although this may be achieved in some investigations. However, all responsive proposals must demonstrate technology maturation during the investigation that will enable mission advancement as described above.

### *5.2.1 Scope of Proposed Investigation*

Requirement L-3. Proposals shall clearly identify the Heliophysics Science Objectives and Goals, described in Section 2.1 of this PEA, that the technology would address and the Heliophysics Science investigations that the technology would enable or enhance.

Requirement L-4. Proposals shall clearly show how the scope of the investigation is necessary for the proposed technology demonstration.

### *5.2.2 Traceability of Proposed Investigation*

Investigations must demonstrate technologies that would enable investigations to achieve Heliophysics Science Goals and Objectives. The proposed objectives of a TechDemo MO investigation must be shown to flow from the NASA Heliophysics Science Objectives and Goals.

Requirement L-5. Proposals shall clearly state the high-level science requirements that flow from the Heliophysics Science Objectives and Goals to be addressed, show how those science requirements map into the technology requirements, and how the technology would fulfill those requirements. This requirement supersedes Requirement 16 of the SALMON-3 AO.

Requirement L-6. Proposals shall include Data Plans to calibrate (both preflight and in-flight), analyze, publish, and archive the data returned, and shall demonstrate, analytically or otherwise, that sufficient resources have been allocated to carry out the Data Plans within the proposed investigation cost. This requirement, in combination with Requirement L-2, supersedes Requirement 17 of the SALMON-3 AO.

### *5.2.3 Baseline and Threshold Investigations*

Baseline and Threshold Investigations are defined in Section 5.2.4 of the SALMON-3 AO. The following requirement is a related, additional requirement for this PEA.

Requirement L-7. Proposals shall clearly state the mission requirements, including lifetime, to achieve the Baseline and Threshold Investigations.

### *5.2.4 Science Enhancement Options*

There are no additional requirements regarding Science Enhancement Options (SEOs) beyond those in Section 5.2.5 of the SALMON-3 AO.

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. These activities will include science that is not directly related to or necessary for the demonstration of the proposed technology(ies) and/or required measurements that extend past the end of the Baseline Investigation. Examples of further scientific return from a mission not necessary to validate the enabling capacity of the proposed technology include extended mission operations to achieve new science results or the use of data obtained from the technology demonstration to advance science objectives outside of those motivating the technology demonstration.

Note that validation of the enabling capacity of proposed technology(ies) will be interpreted broadly and may, for example, include evaluation of a new observable as well as the development of novel mission operations unique to the proposed technology(ies).

### 5.3 Technical Requirements

#### *5.3.1 Two-Step Evaluation and Selection Process*

For this PEA, it is intended that proposed investigations be evaluated and selected through a two-step competitive process. Step-1 is the solicitation, submission, evaluation, and selection of proposals prepared in response to this PEA. The Step-1 evaluation and selection process is described in Section 7 of the SALMON-3 AO. NASA expects to select two or more Step-1 proposals for Phase A study and evaluation. NASA will issue awards (provide funding to NASA Centers and the Jet Propulsion Laboratory (JPL), award contracts to non-NASA institutions, or utilize other funding mechanisms, as applicable) to the selected proposers to conduct Phase A concept studies and submit Concept Study Reports to NASA. Step-2 is the preparation, submission, evaluation, and continuation decision (down-selection) of the Concept Study Reports. As the outcome of Step-2, NASA may continue one or two investigations into the subsequent phases of mission development for flight and operations.

Step-1 proposers selected through this AO will be awarded a contract to conduct a Phase A concept study with duration of approximately nine months and capped at \$400,000 Fiscal Year (FY) 2019 dollars.

#### *5.3.2 Complete Investigations*

Section 5.3.2 of the SALMON-3 AO states that the PEA may broaden the allowable platforms beyond spaceflight. This PEA specifies that suborbital class investigations are not allowed.

Requirement L-8. Proposals shall be for complete spaceflight investigations including Phases A–F.

Each observation from space has natural synergies with other observations. Some proposed observations may either require or desire additional observations in order to better address the technology questions as proposed for the investigation. Some of these observations may be planned either from other NASA missions or from missions by other U.S. or non-U.S. agencies. Proposers are expected to clearly state any dependencies on other data sets, what assumptions are

made on the likelihood that these observations will exist during potential time frames for operation of their proposed investigations, and the implications if those observations do not exist.

NASA expects each proposal to fully describe the requirements for calibration and validation of the technology to be demonstrated, the instruments, and the data returned. Other data policies and requirements are given in Section 4.3 of this PEA.

Requirement L-9. Proposals shall fully describe the requirements for calibration and validation of the technology to be demonstrated, the instruments and systems, and the data returned. This requirement supersedes SALMON-3 Requirement 30.

### 5.3.3 Mission Category and Payload Risk Classification

The following requirements are in addition to those given in Section 5.3.4 of the SALMON-3 AO.

This PEA solicits proposals for technology investigations requiring the development and operation of space-based investigations. The projects are designated as Category 3 as defined in NPR 7120.5E, *NASA Space Flight Program and Project Management Requirements*. Payloads are designated as Streamlined Class D (Risk Classes are defined in NPR 8705.4, available in the Program Library).

NASA's Science Mission Directorate has defined a new approach to managing Class-D investigations that are less than \$150M, not including launch services. The *NASA Science Mission Directorate (SMD) Class-D Tailoring/Streamlining Decision Memorandum* describes the approach that has been approved by SMD leadership to guide the implementation of Streamlined Class D investigations. This Memorandum, along with other Class-D policy and guideline documents, are in the Program Library. All TechDemo investigations solicited by this PEA will be considered to be Streamlined Class-D investigations and thus must use the principles, guidelines, and approaches described in the documents.

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.

Requirement L-10. Proposals shall identify any requirements not specifically identified as already being tailored that are proposed for adjustment, include the rationale for the adjustment,

and describe the cost, schedule, and/or other benefits that would be realized should one or more of the adjustments be accepted by NASA.

The following Class D and Streamlined Class D related documents are available in the Program Library:

- *Technical, Management, and Cost Panel Expectations on SMA-Related Program Requirements for NASA Class C and Class D Payloads*
- *Guidance and Expectations for Small Category 3, Risk Classification D (Cat3/ClassD) Space Flight Projects with Life-Cycle Cost Under \$150M*
- *NASA SMD Class-D Tailoring/Streamlining Decision Memorandum* (issued Dec. 7, 2017)
- *Science Mission Directorate Class D Town Hall Presentation*
- TROPICS Project Plan
- Earned Value Management 101

#### 5.3.4 *New Technologies/Advanced Engineering Developments*

New Technologies/Advanced Engineering Developments are described in Section 5.3.5 of the SALMON-3 AO. For this solicitation, each system that includes a technology to be demonstrated needs to be matured to TRL 5 by PDR; this requirement supersedes the requirement for all systems to be matured to TRL 6 by PDR given in Section 5.3.5 of the SALMON-3 AO. All systems that do not include a technology demonstration must be matured to TRL 6 by PDR, as required in Requirement 35 of the SALMON-3 AO.

Requirement L-11. Investigations that propose to demonstrate technologies that are below TRL 5 at time of proposal submission shall include a plan for the maturation of the systems containing the technologies to TRL 5 by no later than PDR. For the purposes of this PEA, no back-up plan is needed. Systems that do not include a technology demonstration shall adhere to Requirement 35 of the SALMON-3 AO.

Note that Section 5.3.5 of the SALMON-3 AO references NASA/SP-2007-6105 Rev 1, *NASA Systems Engineering Handbook* and NASA/SP-2010-3404 *NASA Work Breakdown Structure (WBS) Handbook*. The latest versions of these documents, NASA/SP-2016-6105 Rev 2 and NASA/SP-2016-3404/REV1, however, should be used instead, and are available in the Program Library. The *NASA Work Breakdown Structure (WBS) Handbook* figure referenced in SALMON 5.3.5 is now Figure 3-9 in the current version.

The SALMON-3 Requirement B-46 refers to the PEA library for TRL examples regarding demonstrations of system level TRL in a relevant environment. This document, *System Level TRL 6 Examples*, along with the two additional documents *An Example for Demonstrating Systems Level TRL* and *Assessment of TRL in AO-Based Evaluations and Common Causes of Major TRL Weaknesses* can be found in the Program Library. Note these documents are geared towards providing guidance for the TRL 6 system level requirement, but should be beneficial as well for the TRL 5 by PDR system level requirement.

### 5.3.5 *Technology Demonstration and Infusion Opportunities*

This PEA does not solicit Technology Demonstration Opportunities (TDOs), as described in Section 5.3.6 of the SALMON-3 AO.

This PEA also does not solicit investigations for Technology Infusion Opportunities, as described in Section 5.3.7 of the SALMON-3 AO.

### 5.3.6 *PEA-Provided Access to Space*

The TechDemo PEA-provided access to space is in the form of a secondary payload, termed Rideshare Payload (RPL), on the IMAP ESPA Grande. Information regarding the ESPA Grande can be found in the *NASA's Mission Specific Evolved Expendable Launch Vehicle Secondary Payload Adapter (ESPA) System Interface Specification (SIS) For Heliophysics Missions of Opportunity* document (hereafter referred to as the *ESPA SIS*), found in the Program Library. RPL accommodations are described in the *Evolved Expendable Launch Vehicle Rideshare User's Guide* (May 2016), which can be found in the Program Library. Rideshare Mission Assurance (RMA) is a process to control and mitigate the risks to the primary mission and other RPLs. Guidelines for this process are discussed in the *ESPA SIS* document found in the Program Library.

Requirement L-12. For investigations to launch on the IMAP ESPA Grande, proposals shall clearly demonstrate compliance to the ESPA Grande requirements and enveloping characteristics, as given in the *ESPA SIS* document found in the Program Library.

Requirement L-13. For investigations launching on the IMAP ESPA Grande, proposals shall utilize one or two ESPA Grande ports. Investigations requiring two ports shall comply with the *ESPA SIS* for *each* port.

Requirement L-14. Proposals shall define applicable Rideshare Mission assurance processes and describe implementation.

The IMAP ESPA Grande provides a standard interface for the TechDemo investigations. This ESPA Grande will not provide propulsion, power, or other spacecraft support beyond the standard ESPA Grande deployment process, which will not occur until the IMAP mission has been deployed. Specific details of the ESPA Grande interface can be found in the *ESPA SIS* document found in the Program Library.

Questions concerning rideshare may be addressed to:

Garrett L. Skrobot  
Launch and Flight Operations  
NASA Kennedy Space Center  
KSC, Florida 32899  
Telephone: 321.867.5365  
Email: [garrett.l.skrobot@nasa.gov](mailto:garrett.l.skrobot@nasa.gov)

## 5.4 Management Requirements

### 5.4.1 Schedule

Proposers for rideshare opportunities provided as part of this PEA must base their schedules on the standard rideshare integration schedule, which will require flight-ready rideshare payloads to be delivered to the integration facility ahead of the primary mission's launch readiness date. Additional schedule and delivery requirements are specified by the *ESPA SIS* document available in the Program Library.

Requirement L-15. Proposals shall include a detailed development schedule (including rideshare integration plans).

#### 5.4.1.1 Schedule for the IMAP Rideshare Opportunity

The rideshare integration schedule identifies milestones that must be met to ensure no impact to IMAP's mission integration schedule. These include a final RPL delivery date as well as the delivery of the RPL test-verified finite element model. Rideshare scheduling information can be found in the *ESPA SIS* document available in the Program Library.

Requirement L-16. For investigations to launch on the IMAP launch vehicle, proposed development and integration schedules shall include delivery of the flight-ready RPL to the integration facility.

Requirement L-17. For investigations to launch on the IMAP launch vehicle, proposed schedules shall include delivery of the RPL test-verified finite element model no later than the date specified in Section 9 of this PEA.

Requirement L-18. For investigations to launch on the IMAP launch vehicle, proposed schedules shall include an RPL delivery date of no later than the date specified in Section 9 of this PEA.

## 5.5 Education Program Plan, Communications and Outreach Program Plan, and Student Collaborations

### 5.5.1 *Education Program Plan and Communications and Outreach Program Plan*

No Education Plan is required by this PEA, nor will it be reviewed if provided.

No information on a Communications and Outreach Program Plan is required for the Step-1 proposal. A Communications and Outreach program (previously referred to as Public Outreach) is required for this solicitation; the communications plan must be developed during Phase B of the mission. The plan must include topline messaging, target audiences, and media processes linked to reaching target audiences. All associated detailed budgets, milestones, metrics and timelines, and reporting requirements must be included in the plan. Mission-related communications are funded directly through a NASA Center or JPL (see Section 4.1.3 of the SALMON-3 AO) and are not within the PIMMC.

### 5.5.2 *Student Collaborations*

No information on a Student Collaboration (SC) is required for the Step-1 proposal. An SC will be mandatory for the Step-2 Concept Study Report, and plans and costs for proposed SC activities must be defined in the Concept Study Report.

Student Collaborations are discussed in further detail in Section 5.6.2 of the SALMON-3 AO; however, the following supersedes the fourth paragraph of the section:

The objective of an SC is enhancement of student research experience through collaborative work associated with a specific NASA spaceflight mission. This is not to be confused with a Scholarship or Fellowship, where the sole objective is the training/development of a particular student. This flight mission SC is not one of the specific opportunities for NASA Scholarships and Fellowships. OMB Uniform Guidance, 2 CFR Part 200.466: Scholarships and student aid, clarifies the difference between a Scholarship or Fellowship and the allowable compensation of a student research assistant employed under an SC.

## 5.6 Cost Requirements

### 5.6.1 *PEA Cost Cap and Cost Constraints*

The PIMMC, Total Mission Cost, and Enhanced PIMMC are defined in Section 4.3 of the SALMON-3 AO.

A TechDemo investigation proposed PIMMC is expected to range from \$25M–\$65M in Fiscal Year (FY) 2019 dollars for Phases A through F. Multiple missions may be down-selected if the sum of the cost of all of these missions remains below the overall PEA Cost Cap of \$65M in FY 2019 dollars.

Requirement L-19. The proposed PIMMC for the Heliophysics TechDemo MO shall be no more than \$65 million in FY 2019 dollars.

Requirement L-20. Proposals shall include detailed plans and budgets for Phases A–F for costs that are within the PIMMC.

Each down-selected investigation is PI-managed, and the PI will be responsible for defining and controlling the costs within the proposed budget for each phase of the investigation. As NASA

expects investigations proposed to this solicitation to require more development than non-technology demonstration solicitations, proposals may spend up to 30% of the PIMMC prior to KDP-C; this supersedes Requirement 75 of the SALMON-3 AO that limits investigation expenditures to no more than 25% of the PIMMC before KDP-C.

Requirement L-21. Proposals shall budget no more than 30% of the PIMMC prior to KDP-C.

Access to space via a rideshare on the IMAP launch vehicle will be provided by NASA; integration costs to the IMAP ESPA Grande will be funded by NASA and do not need to be included within the PIMMC.

The Phase A concept study is capped at \$400,000 Fiscal Year (FY) 2019 dollars, with a duration of approximately nine months, for the selected missions.

Final funding profiles (Phases A–F) for all down-selected investigations will be negotiated between the STP Program Office and the down-selected investigation teams. The inability of NASA to accommodate the requested funding profile may be a reason to not select a proposal or down-select a concept.

#### *5.6.2 Cost Reserve Management*

The required minimum Phases A/B/C/D unencumbered cost reserves percentage measured against the Phases A/B/C/D cost is 30%. The required minimum Phases E and F unencumbered cost reserves percentage measured against the Phases E and F cost is 20% (see SALMON-3 Section 5.7.2).

#### *5.6.3 Full Cost Accounting for NASA Facilities and Personnel*

Full cost accounting for NASA facilities and personnel is described fully in Section 5.7.5 of the SALMON-3 AO. For this PEA, per HQ policy guidance signed in June 2010 by the Associate Administrator, Mission Support Directorate and by the Agency Chief Financial Officer, all Centers must use an identical Center Management and Operations (CM&O) burden rate of \$47,000 (FY 2019) per “equivalent head”. Although not required for proposals, for years after FY 2019, this number must be inflated.

#### *5.6.4 Contributions*

This PEA is sponsored by SMD and it does not permit contributions or funding from SMD programs other than the funding offered through this PEA. Allowable contributions are subject to the following exceptions and limitations: (i) contributions of non-U.S. nuclear power sources are prohibited; and (ii) in order to ensure a preponderance of NASA interest in the mission, as well as to ensure that missions of roughly comparable scope are proposed for purposes of equitable competition, the sum of contributions of any kind to the entirety of the investigation is not to exceed one-third (1/3) of the proposed PIMMC (see SALMON-3 Section 5.7.6).

## 5.7 Non-US Participation Requirements

For this PEA, no exemptions are made to the SALMON-3 Requirement 92 that proposed non-U.S. contributions essential to the success of the proposed investigation must be described at the same level of detail as those of U.S. partners.

## 5.8 Classified Materials

This section supersedes Section 5.9.4 of the SALMON-3 AO.

Requirement L-22. Proposals submitted in response to this solicitation, as well as the proposed investigations and all proposed technologies, shall be unclassified. The proposal shall be complete including an unclassified appendix regarding heritage (see Appendix B, Section J.9, of the SALMON-3 AO, for further details).

In order to increase the capabilities of investigations proposed in response to this solicitation, while minimizing the development and operations risks within the PIMMC, proposers may choose to leverage technology with classified heritage that was developed by other institutions and agencies, as well as by NASA and NASA-funded partners.

If a proposer chooses to submit a classified appendix regarding heritage, the requirements on content, format, and length are the same as, but independent from, those for the unclassified appendix regarding heritage included in the proposal (see Appendix B, Section J.9, of the SALMON-3 AO, for further details) with the exceptions that Letters of Validation and cost bases of estimate may be included in the classified appendix regarding heritage.

The entire proposal including the unclassified appendix regarding heritage will be read and evaluated by the entire evaluation panel. The evaluation panel will *not* have access to the classified appendix regarding heritage, however. Proposers are strongly encouraged to provide as much information and detail as possible on their technology heritage in the unclassified appendix regarding heritage.

NASA allows three options for proposers to support heritage claims from classified programs: 1) delivery to NASA of a classified appendix regarding heritage, 2) “delivery in place” of a classified appendix regarding heritage, and subject to possible restriction 3) sponsor verification of the heritage claims derived from classified programs. Each option is explained in a subsection below.

### 5.8.1 Delivery to NASA

Proposers may provide NASA access to a classified proposal appendix for validation of classified heritage claims. The classified appendix regarding heritage may include Letters of Validation for classified heritage claims from technology development sponsors and classified cost bases of estimate. The proposer is responsible for determining what information is classified and what information is unclassified; any classified information provided to NASA must be handled appropriately to include marking and declassification information and must comply with the applicable Security Classification Guide (SCG) or similar document. The proposer is

responsible for obtaining any “need to know” permission for at least one reviewer with appropriate clearance and relevant expertise to evaluate the classified appendix regarding heritage.

The delivery to NASA option of a classified appendix regarding heritage requires delivery to NASA Headquarters (HQ) separately from the proposal. A single copy of the classified appendix regarding heritage must be submitted along with a cover letter referencing the submitted proposal by name, PI, and proposing organization. The “need to know” permission for the reviewer should be discussed in a cover letter. The proposer assumes all responsibility for determining the appropriate security clearance and method of delivery to NASA HQ of the classified appendix regarding heritage. The classified appendix regarding heritage must be handled and delivered to NASA HQ in compliance with NPR 1600.1A, *NASA Security Program Procedural Requirements*.

Requirement L-23. Proposers that choose to deliver to NASA a classified appendix regarding heritage shall submit the appendix and a cover letter to NASA HQ no later than the deadline for receipt for the CD-ROM in Section 9 of this PEA. The proposer shall determine the appropriate security classification for the classified appendix, the proposer shall obtain any permission required for a reviewer to read the classified appendix, and the proposer shall ensure that all appropriate security requirements are followed in delivering the classified appendix to NASA HQ.

Requirement L-24. The point-of-contact (POC) for the solicitation (Section 9 of this PEA) shall be notified of the intent to submit a classified appendix regarding heritage and its level of classification to ensure sufficient evaluator clearance. The PEA POC notification shall include whether the sender is considering delivery to NASA via a classified email system in lieu of physical delivery. The unclassified appendix regarding heritage shall also indicate that a classified appendix is being submitted.

The address for delivery of the package containing the classified appendix regarding heritage is: Mr. Paul Raudenbush, Chief, NASA Headquarters Security Office, Suite 1M40, 300 E Street SW, Washington, DC 20546. The package containing the classified appendix regarding heritage should be sent to NASA HQ by an appropriate means (e.g., courier, U.S. Registered Mail, etc.) with coordination in advance with the receiving facility.

Should a proposer choose to deliver a classified appendix regarding heritage to NASA in addition to a complete proposal, the evaluation process (see Section 7.1.1 of the SALMON-3 AO) will be supplemented. At least one NASA-selected evaluator with appropriate clearance and relevant expertise will review the classified appendix regarding heritage; this evaluator may be a member of the evaluation panel or this evaluator may be a specialist reviewer. All findings generated during the review of the classified appendix regarding heritage will be unclassified, and these findings will be provided as input for assessing the TMC Feasibility of the Proposed Investigation Implementation. Clarifications may be requested concerning findings from evaluation of the classified appendix regarding heritage.

### 5.8.2 “Delivery in Place”

Proposers may choose to utilize the option for “delivery in place” of the classified appendix regarding heritage, where the classified material is not delivered to NASA but is kept at the point of origin. The complete, unclassified proposal must state that a classified appendix regarding heritage has been delivered in place and provide the classification level of the material, the location of the material, and the POC to be contacted to access the material.

Should a proposer choose to submit a classified appendix regarding heritage to NASA in addition to a complete proposal using the “delivery in place” mechanism, the evaluation process (see Section 7.1.1 of the SALMON-3 AO) will be supplemented. At least one NASA-selected evaluator with appropriate clearance and relevant expertise will travel to the delivery location and review the classified appendix regarding heritage; this evaluator may be a member of the evaluation panel or this evaluator may be a specialist reviewer. All findings generated during the review of the classified appendix regarding heritage will be unclassified, and these findings will be provided as input for assessing the TMC Feasibility of the Proposed Investigation Implementation. Clarifications may be requested concerning findings from evaluation of the classified appendix regarding heritage.

Requirement L-25. Proposers that choose the option of “delivery in place” of a classified appendix regarding heritage shall develop—and deliver to a designated POC/custodian—the appendix by the deadline for electronic proposal submission in Section 9 of this PEA, with a cover page record of the last date that the document was edited. The POC/custodian of the classified appendix shall certify the date of receipt of the document and its unchanged status, each time the classified appendix is viewed by a reviewer. The proposer shall determine the appropriate security classification for the classified appendix, the proposer shall obtain any permission required for a reviewer to read the classified appendix at the proposer’s designated facilities, and the proposer shall ensure that all appropriate security requirements are followed in the handling of the classified appendix.

Requirement L-26. The POC for the solicitation (Section 9 of this PEA) shall be notified of the intent to utilize the “delivery in place” option for a classified appendix regarding heritage, the level of classification to ensure sufficient evaluator clearance, and the POC/custodian contact information.

### 5.8.3 Sponsor Verification

Proposals that include technologies with classified heritage may utilize sponsor verification. This option is only available if the sponsor organization is not a proposed partner. Such proposals would only *reference* classified materials, including associated cost bases of estimate; the materials would not be provided to NASA in any format. In lieu of a direct review of the classified materials, the evaluation panel will compile a list of questions regarding claims made in the proposal that need substantiation by the classified material. The list would be sent to the sponsor of the classified programs who must verify that the claims are supported.

Requirement L-27. Proposers that choose the option of sponsor verification of classified materials shall provide an enumeration of claims related to the classified materials, in the body of the proposal.

Requirement L-28. The POC for the solicitation (Section 9 of this PEA) shall be notified of the intent to utilize the sponsor verification option and the POC to whom associated questions would be sent.

## 6 PROPOSAL PREPARATION AND SUBMISSION

### 6.1 Preproposal Activities

#### *6.1.1 Preproposal Conference*

A Preproposal Conference will take place in association with this solicitation on the date indicated in Section 9 of this PEA. The purpose of this Conference will be to address questions about the proposal process for this PEA. Questions should be sent to the NASA POC identified in Section 9 of this PEA. NASA personnel will address all questions that have been received no later than five working days prior to the Conference. Questions submitted after this date may be addressed at the Conference as time permits and as appropriate answers can be generated. Anonymity of the authors of all questions will be preserved. Presentations made at the Preproposal Conference, including answers to all questions addressed at the Conference, will be posted on the 2018 Heliophysics TechDemo MO PEA Acquisition Homepage no later than two weeks after this event. Additional questions and answers subsequent to the Conference will also appear in this location, if necessary. Questions may be submitted until 14 days before the proposal due date given in Section 9 of this PEA. Answers will be provided no later than 10 days before the proposal due date.

Further information will be available at the Heliophysics TechDemo MO Acquisition Website (<http://soma.larc.nasa.gov/stp/tdmo/>) prior to the Preproposal teleconference/Webex.

#### *6.1.2 Required Notification Proposal*

To facilitate planning of the proposal evaluation, in particular to avoid conflicts in the peer review process, and to inform prospective proposers of any changes to this AO, NASA *requires* all prospective proposers to submit a Notification Proposal through the Authorized Organizational Representative (AOR) of the PI institution. The Notification Proposal replaces the Notice of Intent for this AO.

A Notification Proposal is submitted electronically at <http://nspires.nasaprs.com/>. The Notification Proposal submission requires the confirmation in NSPIRES of all identified team members. All identified team members and the proposing organization must register on the NSPIRES website in order for the proposer to submit the Notification Proposal. Proposers who experience difficulty in using the NSPIRES site should contact the Help Desk by e-mail at [nspires-help@nasaprs.com](mailto:nspires-help@nasaprs.com) for assistance.

Full (Step-1) Proposals will not be accepted without prior submission of a Notification Proposal. Invitations will be provided to those satisfying NSPIRES requirements. This is not the outcome of an evaluation. Submission of a Notification Proposal does not commit the team to submitting a Full Proposal. Notification Proposals are due no later than 11:59 p.m. Eastern Time on the date given in Section 9 of this PEA. Material in a Notification Proposal is deemed confidential and will be used for NASA planning purposes only.

The following information is required content for the Notification Proposal:

- (a) Name, address, telephone number, email address, and institutional association(s) of the PI, Project Manager, and Project System Engineer (if named).
- (b) Full names and institutional associations of each additional Proposal Team member, and their role such as Co-Investigator or Collaborator. If any Proposal Team members are from non-U.S. institutions, the vehicle by which they will be funded should be identified in the Notification Proposal.
- (c) Answers to PEA-specific questions.
- (d) A brief statement (4000 characters or fewer) covering the following:
  1. technology objectives of the proposed mission;
  2. general design or architecture of the mission;
  3. identification of the technology to be demonstrated as part of the mission; and
  4. identification of other instrumentation and systems that may be employed as part of the mission.
- (e) The name of the organizational lead from each organization (industrial, academic, nonprofit, and/or Federal) included in the proposing team, and the organization's role in the proposed investigation.

Budget data will not be requested as part of the Notification Proposal.

The technology objectives of the proposed mission and the PI, ~~Co-I~~, and institutions cannot be changed between submissions of the Notification and the Full Proposals. **Requests for changes to Co-Investigators after the Notification Proposal submission must be approved by NASA before this is allowed; these requests for changes must be submitted to the PEA POC through the email address [hq-techdemo@mail.nasa.gov](mailto:hq-techdemo@mail.nasa.gov) as soon as possible, but no later than 2 weeks before the due date for Full Proposals. [amended September 26, 2018]**

Requirement L-29. Proposers shall submit electronically through NSPIRES a Notification Proposal that names the organizational lead from each organization and the organization's role; identifies all investigators, the proposed technology objectives, general mission architecture, new technologies to be demonstrated, and a list of other instruments and systems; and answers PEA-specific questions. The technology objectives of the proposed investigation and the PI, ~~Co-I~~, and institutions cannot be changed between submissions of the Notification Proposal and the Full (Step-1) Proposals. **Requests for changes to Co-Investigators after the Notification Proposal submission must be approved by NASA before this is allowed; these requests for changes must be submitted to the PEA POC through the email address**

[hq-techdemo@mail.nasa.gov](mailto:hq-techdemo@mail.nasa.gov) as soon as possible, but no later than 2 weeks before the due date for Full Proposals. [amended September 26, 2018]

### *6.1.3 Point of Contact for Further Information*

Questions concerning any portion of this PEA should be addressed to the Point of Contact (POC) given in Section 9 of this PEA.

In order to make sure that all proposers receive the same information, all questions concerning the content provided in this PEA, or in the documents available through the Program Library, should be sent to the email address for the point of contact that is listed in Section 9 of this PEA. Responses to proposers will be posted on the website also listed in Section 9 of this PEA. Anonymity of the authors of all questions will be preserved.

## 6.2 Proposal Preparation and Submission

### *6.2.1 Structure and Content of Proposals*

Requirement L-30. Proposal content shall conform to the guidelines set forth in Appendix B of the SALMON-3 AO.

The program specific data associated with the electronic submission of proposals (see Section 6.2 of the SALMON-3 AO) includes questions indicating whether or not a proposal contains export-controlled information (see Section 5.9.3 of the SALMON-3 AO).

Requirement L-31. All proposers shall answer the program specific data questions, regarding the presence of export-controlled information in the proposal, either YES or NO when completing the electronic submission; these questions shall not be left unanswered.

All proposals must further identify any export-controlled material in the proposal as instructed in Section 5.9.3 of the SALMON-3 AO. To the extent possible, International Traffic in Arms Regulations (ITAR) or Export Administration Regulations (EAR) sensitive material should be organized into separate clearly marked sections.

Requirement L-32. All proposals shall identify any export-controlled material in the proposal as instructed in Section 5.9.3 of the SALMON-3 AO; in addition, the export-controlled material shall be printed in a red font or enclosed in a red box as described in the required statement in Requirement 99 of the SALMON-3 AO.

The following Requirement and table supersede Requirement B-4 of the SALMON-3 AO and clarifies the information requested on page limits. (Deletions from the SALMON-3 table are shown with strike throughs and additions are bold and italicized.)

<b>Proposal Structure and Page Limits</b>		
<b>Section</b>	<b>Contents</b>	<b>Page Limits</b>
A	Graphic Cover Page	1
	Export Controlled Material statement (Section 5.9.3)	0.5
	Optional Restriction on Use statement (see Appendix A, Section V)	0.5
	PI Commitment (Section 5.3.1)	1
B	Fact Sheet	2
C	Table of Contents	None
D	<del>Science, Exploration, or</del> Technology Investigation	20 + 2 pages for SEO (if applicable) + 3 pages for
E	Experiment Implementation, including optional SEO and/or TDO	<del>TDO (if applicable) + 2 pages / additional, non-identical technology</del> (see Requirement L-33)
F	Investigation or Mission Implementation	15 + 2 pages /
G	Schedule Foldout (s) Management	<i>additional, non-identical flight element</i> (3 Schedule Foldouts do not count against limit) (see Requirement L-33)
H	Cost and Cost Estimating Methodology Cost Table B3	8 (Cost Table Foldout(s) do(es) not count against limit)
I	<del>Optional Student Collaboration Plan</del>	<del>2</del>
J	Proposal Appendices (no others permitted):	
J.1	Table of Proposal Participants	None
J.2	Letters of Commitment	None
J.3	Resumes	None
J.4	Summary of Proposed Program Cooperative Contributions	None
J.5	Draft International Participation Plan	None
	Discussion on Compliance with U.S. Export Laws and Regulations	
J.6	Compliance with Procurement Regulations by NASA PI Proposals	None
J.7	<del>Discussion of End-of-Mission Spacecraft Disposal Requirements</del>	<del>None</del>
J.8	Master Equipment List (MEL)	None
J.9	Heritage	30
J.10	List of Abbreviations and Acronyms	None
J.11	List of References (optional)	None
J.12	<del>Infusion Plan for TIO (if applicable)</del>	<del>5</del>

Requirement L-33. Proposals shall conform to the page limits specified in the *Proposal Structure and Page Limits* table above. Two extra pages are allotted for each additional separate, non-identical to-be-demonstrated technology in the Technology Sections (D and E). Two extra pages are allotted for each additional separate, non-identical flight element (e.g., additional spacecraft are allotted two extra pages, but only non-identical spacecraft) in the Investigation Implementation and Management Sections (F and G). The two extra pages allocated in the *Proposal Structure and Page Limits* table for proposed Science Enhancement Options (SEOs) in the Technology Sections (D and E) are for all SEOs *combined*. Different to-be-demonstrated technologies on identical spacecraft will only be allotted extra pages for additional non-identical to-be-demonstrated technologies; no extra pages will be allotted for the resulting additional non-identical flight elements. *The total number of such extra pages in Sections D-G shall not exceed a maximum of ten extra pages regardless of the number of to-be-demonstrated technologies and flight elements.* Every page upon which printing appears will count against the page limits, and unless specifically exempted (e.g., Requirement B-49 and Requirement B-58 of the SALMON-3 AO), each foldout page will count as two pages against the page limits as appropriate for its area (e.g., a fold-out with the total area of two standard pages counts as two pages, etc.).

### 6.2.2 Submission of Full Proposals

Proposal submission instructions and requirements are provided in Section 6.2 of the SALMON-3 AO, and further clarified and expanded upon in Appendix B.

Requirement L-34. Proposals shall be submitted electronically through NSPIRES no later than the time deadline on the proposal due date given in Section 9 of this PEA. Proposal CD-ROMs shall be delivered to the address given in Section 6.2.3 of the SALMON-3 AO no later than the CD-ROM due date given in Section 9 of this PEA.

Requirement L-35. Full (Step-1) Proposals shall have the same technology demonstration objectives, PI, ~~Co-I,~~ and institutions as the Notification Proposal. **Requests for changes to Co-Investigators after the Notification Proposal submission must be approved by NASA before this is allowed; these requests for changes must be submitted to the PEA POC through the email address [hq-techdemo@mail.nasa.gov](mailto:hq-techdemo@mail.nasa.gov) as soon as possible, but no later than 2 weeks before the due date for Full Proposals. [amended September 26, 2018]**

## 7 PROPOSAL EVALUATION, SELECTION, AND IMPLEMENTATION

### 7.1 Scientific/Technical Evaluation Factors

As described in Section 1.1 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.

The evaluation process will be as described in Section 7 of the SALMON-3 AO. The evaluation criteria, which are grouped into Forms and are described more fully in the sections below, are as follows:

- A: Intrinsic Technology Merit of the Proposed Investigation
- B: Experiment Technology Implementation Merit and Feasibility of the Proposed Investigation
- C: TMC Feasibility of the Proposed Investigation Implementation

The evaluation of these criteria will result in narrative text, including specific major and minor strengths and weaknesses, as well as an appropriate rating for Forms A, B, and C.

As part of that process, NASA will request clarifications from proposers on potential major weaknesses on the Intrinsic Technology Merit of the Proposed Investigation, Experiment Technology Implementation Merit and Feasibility of the Proposed Investigation, and TMC Feasibility of the Proposed Investigation Implementation criteria.

Proposals will be evaluated according to the evaluation criteria set forth in Sections 7.1.1-7.1.3 of this PEA, which supersede the criteria given in Section 7.2 of the SALMON-3 AO. Half-step ratings will not be used for the Criteria A and B adjectival ratings.

#### *7.1.1 Intrinsic Technology Merit of the Proposed Investigation*

The information provided in a proposal will be used to assess the intrinsic merit of the proposed technology investigation. Merit will be evaluated for the Baseline Investigation and the Threshold Investigation. The factors for intrinsic merit include the following:

- Factor A-1. Compelling nature, priority, and value of the proposed investigation's 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 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 and technology progress in the context of other planned missions; the relationship to the other elements of NASA's programs; how well the investigation may support 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.
- Factor A-3. Likelihood of 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. 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 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.

### *7.1.2 Experiment Technology Implementation Merit and Feasibility of the Proposed Investigation*

The information provided in a proposal will be used to assess the merit of the plan for completing the proposed investigation, including the experiment implementation merit, feasibility, resiliency, and probability of technology success of the proposed investigation. The factors for experiment implementation merit and feasibility include the following, as applicable for the investigation being proposed:

- Factor B-1. Merit of the investigation design for addressing the 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 technology and investigation design for addressing the goals and objectives; the degree to which the proposed investigation can provide the necessary data; and the sufficiency of the data gathered to complete the 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 technology to be demonstrated or demonstration of a clear path to achieve necessary maturity; the adequacy of the plan to develop the 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 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 technology within the investigation design.
- Factor B-3. Merit of the data analysis, data availability, and data archiving plan. This factor includes the merit of plans for data analysis and data archiving to meet the goals and objectives of the investigation; to result in the publication of discoveries in the professional literature; and to preserve data 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; reporting science 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. Technology resiliency. This factor includes both developmental and operational resiliency. Developmental resiliency includes the approach to descopeing 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.

- 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 proposed 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 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.

### 7.1.3 TMC Feasibility of the Proposed Investigation Implementation

This PEA uses the evaluation criterion TMC Feasibility of the Proposed Investigation Implementation as described in Section 7.2.4 of the SALMON-3 AO, with the following amendments:

- 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 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.

## 7.2 Selection Process

After the review by the AO Categorization and Steering Committees, the final evaluation results will be presented to the Associate Administrator for SMD, who will make the final selection(s). As the Selection Official, the SMD Associate Administrator may consult with senior members of SMD and the Agency, including the Director of the Heliophysics Division, concerning the selections.

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).

As was described in Section 1.1 of this 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.

### 7.3 Implementation Activities

Proposal selection and award will be implemented according to the guidelines set forth in Section 7.4 of the SALMON-3 AO and Section 7 of this PEA with the following amendments.

A PI-led Team Masters Forum is not planned for investigations selected under this PEA.

#### *7.3.1 Award Administration and Funding of Investigations*

Oversight management responsibilities have been assigned to the STP Program Office at the Goddard Space Flight Center. The responsibilities of the Program Office will include oversight of investigation implementation; coordination of Government-furnished services, equipment and facilities; and contract management for selected investigations.

It is anticipated that the Program Office will provide funding to each selected investigation. This award to perform a Phase A concept study is to be initiated as soon as possible after notification of selection. NASA Centers will receive funding via intra-agency funding mechanisms. Statements of Work (SOWs), certified cost and pricing data (as applicable), and small business subcontracting plans (as applicable) will be required in order to put awards in place for the Phase A concept studies.

Proposals are *not* required to include SOWs, cost and pricing data for Phase A concept studies and subsequent phases, or small business subcontracting plans. These will be required *only* for investigations that are selected at the outcome of the Step-1 competition. If more than one contractual arrangement between NASA and the proposing team is required, a separate SOW will be required for each organization.

For those investigations that are selected, it will be in the best interest of their PI-led mission management teams to provide SOWs, certified cost and pricing data (as applicable), and small business subcontracting plans (as applicable) in as timely a manner as possible. The process of awarding contracts cannot begin until SOWs, certified cost and pricing data (as applicable), and small business subcontracting plans (as applicable) have been received, and funds cannot be provided to the implementing organizations until this process has been completed.

SOWs will be required for selected investigations regardless of whether a proposing organization is Governmental or non-Governmental. SOWs will include the requirement for a Phase A Concept Study Report as described in the *Guidelines and Criteria for the Phase A Concept Study* document available in the Program Library, as well as general task statements for Phases B through F. SOWs will include the following as a minimum: Scope of Work, Deliverables

(including science and/or engineering data), and Government responsibilities (as applicable). SOWs need not be more than a few pages in length.

Each Phase A contract will be modified to include a priced option for a Bridge Phase, to be exercised upon investigation down-selection to proceed into Phase B. The Bridge Phase option will allow work to be continued uninterrupted under the contract after a Step-2 down-selection decision is made. The Bridge Phase is intended to cover a four-month period of Phase B effort to provide program continuity while negotiations are completed to modify the contract to include Phases B, C/D, and E/F. The Bridge Phase Option will be exercised only on the contract for the investigation(s) that is chosen during the Step-2 down-selection process to continue beyond the Phase A concept study. The Bridge Phase option will allow the Government to continue work under the contract after a Step-2 down-selection decision is made. The four-month Bridge Phase period will be used to begin the negotiation of the remaining phases of the contract with the successful PI(s) down-selected during Step 2.

For contracts that exceed the dollar threshold stated in FAR 15.403-4 (\$750,000), the contractor will be required to provide certified cost and pricing data to support the cost estimate, in the format specified in the *STP Budget Summary, Exhibit A* document posted in the Program Library accessible at <https://soma.larc.nasa.gov/stp/tdmo/tdmo-library.html>, and to execute a Certificate of Current Cost or Pricing Data in accordance with FAR 15.406-2.

Proposers are advised that, by law, NASA prime contracts resulting from this solicitation which offer subcontracting possibilities, in excess of \$700,000, with organizations other than small business concerns, are subject to FAR 52.219-9. Accordingly, proposers awarded contracts that exceed \$700,000 will be required to submit small business subcontracting plans consistent with the FAR unless they adequately demonstrate that subcontracting opportunities are not reasonably available in the performance of these concept studies. Failure to do so will make the proposer ineligible for award. These plans should be submitted for negotiation after selection in conjunction with contract execution.

### 7.3.2 *Conduct of the Phase A Concept Study*

The concept studies are intended to provide NASA with more definitive information regarding the cost, risk, and feasibility of the investigations, as well as a detailed plan for the Student Collaboration, before down-selection for implementation. The product of the concept studies is a Phase A Concept Study Report to be delivered by each selected investigation team nine months following Phase A kickoff. The content and format of the study reports are specified in the *Guidelines and Criteria for the Phase A Concept Study* document in the Program Library.

The PI will provide in the Phase A Concept Study Report a proposed set of Level 1 requirements, including the criteria for full investigation success satisfying the Baseline Technology Investigation and the criteria for minimum investigation success satisfying the Threshold Technology Investigation. The PI will also provide in the Phase A Concept Study Report the allocation of the proposed cost reserves among the appropriate WBS elements. The PIMMC must not increase by more than 20% from that in the Step-1 proposal to that in the Phase A Concept Study Report, and, in any case, must not exceed the PEA Cost Cap. The NASA review of the

completed Concept Study Report will include all investigation facets. Risk reduction that has been accomplished during Phase A will be closely reviewed. NASA may request presentations and/or site visits to review the final concept study results with the investigators. Each investigation's Concept Study Report must conclude with a commitment by the PI for the cost, schedule, and scientific performance of the investigation. For each Phase B down-selection, and unless otherwise stated in the selection letter, the down-selected investigation's cost will be set at the Concept Study Report's proposed cost.

NASA cannot guarantee that the proposed funding profile can be accommodated within the Heliophysics Technology Demonstration Program's budget. A funding profile for the down-selected investigation will be negotiated during Phase B.

### 7.3.3 *Down-selection of Investigations*

The SMD Associate Administrator will make down-selection decisions based on the evaluation of the Phase A Concept Study Reports and on programmatic considerations. The criteria for evaluating the concept study are as follows:

1. Intrinsic Technology Merit of the Proposed Investigation;
2. Experiment Technology Implementation Merit and Feasibility of the Proposed Investigation;
3. TMC Feasibility of the Proposed Investigation Implementation; and
4. Quality of Plans for Small Business Subcontracting and Student Collaboration.

The evaluation criteria and down-selection factors are described in the *Guidelines and Criteria for the Phase A Concept Study* document that will be available in the Program Library. Any substantial changes to the investigation's objectives contained in the Phase A Concept Study Report will result in the re-evaluation of the intrinsic merit of the proposed investigation: if no substantial changes are found to have been made to the investigation's objectives, the Step-1 evaluation of the first criterion will be maintained.

Proposers may be asked for specific information at the time of selection for a competitive Phase A. This requested information will need to be included in the Phase A Concept Study Report and will be considered at the time of down-selection for flight.

At the conclusion of Phase A, it is anticipated that the Selection Official will continue at least one investigation into the subsequent phases of mission development for flight and operation. The target date for this continuation decision (i.e., "down-selection") is given in Section 9 of this PEA.

An investigation may be down-selected to enter Phase B or may be down-selected for a funded Extended Phase A so that the PI can retire one or more risks before the investigation is allowed to proceed to Phase B. There is no guarantee that an investigation down-selected for an Extended Phase A will be approved to enter Phase B, even if all risks have been retired during the Extended Phase A.

Upon a continuation decision, NASA will execute the Bridge Phase option and begin to provide additional funding for the project that is continued beyond the Phase A concept study. During the Bridge Phase, NASA and the continued project will negotiate and sign a contract modification necessary for the remaining portion of mission phases. Deliverables will be negotiated during the Bridge Phase, on the basis of information provided in the Concept Study Report.

In no case is NASA required to exercise any option. NASA will not exercise any contract option nor continue funding those investigations not down-selected to proceed. For those investigations that are not continued, the contracts will be allowed to terminate without further expense to NASA. Every investigation team will be offered a debriefing of the evaluations of its Concept Study Report.

As stated in Section 5.8 of the SALMON-3 AO, should a non-U.S. mission or a U.S. mission with non-U.S. participation be down-selected, NASA's Office of International and Interagency Relations, Science Division, will arrange with the non-U.S. sponsoring agency for the proposed participation on a no-exchange-of-funds basis, in which NASA and the non-U.S. sponsoring agency will each bear the cost of discharging their respective responsibilities. These arrangements will be documented and affirmed in a legally binding agreement between NASA and the non-U.S. sponsoring agency.

## 8 SALMON-3 SPECIFICATIONS AND EXCEPTIONS

### 8.1 SALMON-3 Specifications for PEA

The SALMON-3 AO states that the PEAs will provide certain information for the solicitation. For this PEA, the following table lists these topics and the location of each in this PEA.

SALMON-3 Section(s)	Required Specifications for PEA	PEA Section(s)
2.4, 5.2.1, 5.3.5	Investigation type (technology, science or exploration); goals and objectives that address program research objectives	1.1, 2
2.5, 5.3.1	Two-Step Selection	1.3, 3, 5.3.1
3, 6.2.3	Electronic proposal and CD-ROM submission due dates	9
3, 5.1	Type of MO	1.1, 5.1
4.1.2	Assigned Program Office and associated NASA Center	4.1
4.1.2	Applicable safety, reliability, and quality assurance requirements document	4.1
4.2.1, 6.1	NASA/PEA Point of Contact	9
4.2.1, 4.2.2	Limitations on CTS and other organization participation	4.2
4.3	Costs included in the PIMMC, Total Mission Cost, and Enhanced PIMMIC	5.6.1
5.1.3	For SCMs, launch date timetable	5.4.1
5.1.3, 5.3.8	NASA provided launch services	5.3.6
5.1.3, 5.3.8	Non-NASA provided launch services	5.3.6
5.2.5	Science Enhancement Options	5.2.4

5.3.2	Broadening of allowable platforms	1.1, 5.3.2
5.3.4	Mission category and payload risk classification	5.3.3
5.3.6	Technology Demonstration Opportunities	5.3.5
5.3.6	Technology Infusion Opportunities	5.3.5
5.4.5	Schedule requirements	5.4.1
5.6.1	Education Program / Communications and Outreach Plan	5.5.1
5.6.2	Student Collaboration Plan	5.5.2
5.7.1	Cost Cap and cost constraints	5.6.1
5.7.2	Unencumbered cost reserves	5.6.2
5.7.5	CM&O burden rate	5.6.3
5.7.6	Contribution sources and limits	5.6.4
5.8	Arrangements with non-U.S. participants	7.3.3
5.8.2	Exemptions on contribution descriptions	5.7
6.1.1	Preproposal Conference	3, 6.1.1, 9
6.1.5	PEA-specific Acquisition Homepage and Library	6.1.1
6.2.1	Amendments to Appendix A and B	8.2
7.1.1, 7.2.1	Evaluation criteria: clarifications and half-step ratings	7.1
7.4.2	PI-led Team Master Forum	7.3

## 8.2 Exceptions to General SALMON-3 Requirements

This PEA makes no amendments to Appendix A of the SALMON-3 AO. This PEA contains the following exceptions to the SALMON-3 AO requirements.

SALMON-3 Section(s)	Exceptions to SALMON-3 Requirements	PEA Section(s)
4.4.2, 4.4.3, 4.4.4.2, App B E.4	Sections 4.3 and 4.4 supersede SALMON-3 AO Section 4.4 on data policies and intellectual property; Requirement L-1 and Requirement L-2 supersede SALMON-3 AO Requirement B-23 on data plan	4.3, 4.4
5.2.2	Requirement L-5 supersedes SALMON-3 Requirement 16 on traceability	5.2.2
5.2.2	Requirement L-6 supersedes SALMON-3 Requirement 17 on data plans	5.2.2
5.3.2	Requirement L-9 supersedes SALMON-3 Requirement 30 on calibration and validation requirements	5.3.2
5.3.5	Requirement L-15 supersedes SALMON-3 Requirement 35 on TRL system maturation	5.3.4
5.3.5, App B F.4	NASA/SP-2016-6105 Rev 2, <i>NASA Systems Engineering Handbook</i> replaces earlier version	5.3.4
5.3.5	NASA/SP-2016-3404/REV1, <i>NASA Work Breakdown Structure (WBS) Handbook</i> replaces earlier version	5.3.4
5.6.2	2 <sup>nd</sup> paragraph of PEA section supersedes SALMON-3 AO 4 <sup>th</sup> paragraph on SC objective	5.5.2

5.7.1	Requirement L-21 supersedes SALMON-3 Requirement 75 on budget limits prior to KDP-C	5.6.1
5.9.4	Section 5.8 supersedes SALMON-3 Section 5.9.4 on classified materials	5.8
6.1.2	Notification Proposal supersedes the Notice of Intent	6.1.2
App B	Requirement L-33 supersedes SALMON-3 AO Requirement B-4 on page limits	6.2.1
7.2	Sections 7.1.1,7.1.2, 7.1.3 supersede SALMON-3 AO Section 7.2 on evaluation criteria	7.1.1,7.1.2, 7.1.3
4.5.1	SALMON-3 AO Independent Verification and Validation is deferred for this Step One of the Two-Step process	NA
4.5.4	SALMON-3 AO Conjunction Assessment Risk Analysis is deferred for this Step One of the Two-Step evaluation process	NA
Appendix B	SALMON-3 AO Requirements B-13 and B-58 to B-60 for costs in real year dollars (RY\$) are deferred for this Step One of the Two-Step process; SALMON-3 AO Requirement B-65 is amended to specify costs in FY 2019 terms	NA
5.3.13, App B J-7	SALMON-3 AO Requirement 53 and Requirements B-73 through B-76 on orbital debris and disposal are deferred for this Step One of the Two-Step evaluation process	NA
4.5.4, 5.3.13, App B J-7	NPR 8715.6B, <i>NASA Procedural Requirements for Limiting Orbital Debris and Evaluating the Meteoroid and Orbital Debris Environments</i> replaces earlier version	NA
5.3.13, App B J-7	NASA-STD-8719.14A, <i>NASA Process for Limiting Orbital Debris</i> replaces earlier version	NA

## 9 SUMMARY OF KEY INFORMATION

Funding available	See Section 5.6.1 of this PEA
Date for Preproposal Conference	August 24, 2018, via Webex; see the TechDemo MO PEA Acquisition Homepage <a href="https://soma.larc.nasa.gov/stp/tdmo/">https://soma.larc.nasa.gov/stp/tdmo/</a> for schedule updates, agenda, and logistical information
Due Date for Notification Proposal	11:59 p.m. Eastern Time on <del>September 10</del> , <b>October 1, 2018 [amended August 28, 2018]</b>
Due Date for Receipt of Electronic Full Proposals in NSPIRES	11:59 p.m. Eastern Time on <del>November 5</del> , <b>November 30, 2018 [amended August 28, 2018]</b>
Due Date for Receipt of Full Proposal CD-ROMs	<del>November 9</del> , <b>December 6, 2018</b> at 4:30 p.m. Eastern Time <b>[amended August 28, 2018]</b>
Target Selection Date for Competitive Phase A Studies	July 3, 2019

Target Concept Study Reports Due	May 4, 2020
Target Down-Selection Date	November 2, 2020
Acquisition Homepage for the Heliophysics TechDemo MO PEA	<a href="https://soma.larc.nasa.gov/stp/tdmo/">https://soma.larc.nasa.gov/stp/tdmo/</a>
Program Library for the Heliophysics TechDemo MO PEA	<a href="https://soma.larc.nasa.gov/stp/tdmo/tdmo-library.html">https://soma.larc.nasa.gov/stp/tdmo/tdmo-library.html</a>
Proposal Submission Medium	Electronic copies and CD-ROM submission required; see Section 6.2.2 of this PEA
Web site for submission of electronic proposal via NSPIRES	<a href="http://nspires.nasaprs.com/">http://nspires.nasaprs.com/</a> (help desk available at 202-479-9376 or <a href="mailto:nspires-help@nasaprs.com">nspires-help@nasaprs.com</a> )
Due date for delivery of mass simulator to integrator	IMAP Launch Readiness Date (October 1, 2024) - 24 months
Due date for delivery of the RPL test-verified finite element model	IMAP Launch Readiness Date (October 1, 2024) - 12 months
Due date for RPL delivery to integration facility	IMAP Launch Readiness Date (October 1, 2024) - 4 months
NASA point of contact	Dr. Roshanak Hakimzadeh Heliophysics Division Science Mission Directorate NASA Headquarters Washington, DC 20546-0001 Email: <a href="mailto:hq-techdemo@mail.nasa.gov">hq-techdemo@mail.nasa.gov</a>

END OF PEA L