NNH08ZDA009O-EXPMO11
Program Element Appendix (PEA) H7:
EXPLORER 2011 SCIENCE MISSIONS OF OPPORTUNITY
Amended through Amendment 8 on December 3, 2010: Sections 5.6, 6.1, 6.2

SALMON Program Element Appendix (PEA) H7: EXPLORER 2011 SCIENCE MISSIONS OF OPPORTUNITY

1 Introduction

1.1 Proposal Opportunity

The National Aeronautics and Space Administration (NASA) issues this SALMON Program Element Appendix (PEA) for the purpose of soliciting proposals for Mission of Opportunity (MO) science investigations to be implemented through its Explorer Program. All investigations proposed in response to this solicitation must support the goals and objectives of the Explorer Program (Section 2.2 of this PEA), must be implemented by Principal Investigator (PI) led investigation teams (Section 4.6.2 of the SALMON AO), and must be implemented through the provision of space investigations (including partner missions of opportunity, investigations on the International Space Station (ISS) and on high altitude scientific balloon platforms, and investigations launched as secondary or hosted payloads).

Three MO types may be proposed in response to this PEA – Partner Missions of Opportunity (PMOs), New Science Missions using Existing Spacecraft, and Small Complete Missions (SCMs), including investigations requiring flight on high altitude scientific balloon platforms, investigations on the International Space Station (ISS), investigations launched as secondary payloads, or investigations launched as hosted payloads. A fourth MO type, U.S. Participating Investigators (USPIs), may be proposed in response to the NASA Research Announcement (NRA) NNH10ZDA001N, Research Opportunities in Space and Earth Sciences (ROSES) (Section 5.1 of this PEA).

1.2 Changes from the Draft Solicitation

Proposers should be aware of the following major changes in this AO from the Draft SALMON PEA for Explorer 2010 Science Missions of Opportunity (NNH10ZDA009J) that was released on June 22, 2010.

- This PEA has been renamed Explorer 2011 Science Missions of Opportunity.
- A ROSES program element appendix soliciting Explorer Program U.S. Participating Investigators is being released as the same time as this AO (Section 2.4 of this PEA)
- Changes in NASA's management of programs and projects since the SALMON AO was released are described in a new section (Section 4 of this PEA).
- Partner MOs may not be proposed for specific potential strategic partnership missions (Section 5.2 of this PEA).
- Partner MOs may be proposed for nonstrategic NASA missions (Section 5.2 of this PEA).
- Phase A funding cap is stated (Section 5.3).
- Requirements for Letters of Acknowledgement from the Space Station Payloads Office and Letters of Feasibility have been added for investigations requiring flight on the ISS (Section 5.4 of this PEA).
- Exceptions to general SALMON requirements have been specified (Section 6.2 of this PEA).
- The evaluation criteria have been spelled out (Section 7.1 of this PEA).
- Revised or clarified tables specific for this solicitation are provided (Section 10 of this PEA).

2 Announcement Objectives

2.1 NASA Strategic Goals

Two of NASA's strategic goals are to (a) "Understand the Sun and its interactions with Earth and the solar system" and (b) "Discover how the universe works, explore how the universe began and developed into its present form, and search for life elsewhere." Further information on NASA's strategic goals may be found in NASA Policy Directive (NPD) 1001.0, *The 2006 NASA Strategic Plan*, available through the Program Library (Appendix D).

The NASA Science Mission Directorate (SMD) addresses these strategic goals by conducting programs of heliophysics and astrophysics science designed to answer the following science research objectives:

For heliophysics research, the strategic objectives are to

- Understand the fundamental physical processes of the space environment from the Sun to Earth, to other planets, and beyond to the interstellar medium;
- Understand how human society, technological systems, and the habitability of planets are affected by solar variability interacting with planetary magnetic fields and atmospheres; and,
- Maximize the safety and productivity of human and robotic explorers by enabling the capability to predict the extreme and dynamic conditions in space.

For astrophysics research, the strategic objectives are to

- Understand the origin and destiny of the universe, and the nature of black holes, dark energy, dark matter, and gravity;
- Understand the many phenomena and processes associated with galaxy, stellar, and planetary system formation and evolution from the earliest epochs to today; and,
- Generate a census of extra-solar planets and measure their properties.

Further information on the goals and objectives of NASA's heliophysics and astrophysics programs may be found in the *2010 Science Plan for NASA's Science Mission Directorate* and the *2009 Heliophysics Roadmap*, available through the Program Library.

It should be noted that while the National Research Council has recently released the 2010 Astronomy and Astrophysics Decadal Survey report, *New Worlds, New Horizons in Astronomy and Astrophysics* (http://www.nap.edu/catalog.php?record_id=12951), NASA has not fully absorbed this report into its program planning. For the purposes of this solicitation, investigations proposing to address the goals and objectives of astrophysics programs will be reviewed in the context of the *2010 Science Plan for NASA's Science Mission Directorate* only.

2.2 Explorer Program Goals and Objectives

The goal of NASA's Explorer Program is to provide frequent flight opportunities for high quality, high value, focused heliophysics and astrophysics science investigations that can be accomplished under a not-to-exceed cost cap and that can be developed relatively quickly, generally in 36 months or less, and executed on-orbit in less than 3 years.

The Explorer Program accomplishes these world-class space science investigations utilizing efficient management approaches to contain mission cost through commitment to, and control of, design, development, and operations costs. The Program also seeks to enhance public awareness of and appreciation for space science by incorporating educational and public outreach activities as integral parts of the investigations.

The Explorer Program provides an effective means of timely achievement of strategic goals. By conducting a rapid series of science investigations, NASA is responsive to new knowledge, technology, and science priorities. Pressing questions in heliophysics and astrophysics science are addressed, permitting a steady improvement in our understanding of space science systems and the processes that affect them. The frequent, steady nature of the investigations ensure a continuing stream of fresh scientific data to the broader science community, thus maintaining the excellence of the U.S. space science program and the inspiration of a new generation of investigators.

The Explorer program science objectives are to:

- Understand the Sun and its interactions with Earth and the solar system, and
- Discover how the universe works, explore how the universe began and developed into its present form, and search for life elsewhere.

The Explorer Program strives to:

- advance scientific knowledge of heliophysics and astrophysics processes and systems;
- add scientific data and other knowledge-based products to data archives for all scientists to access;
- publish scientific progress and results in the peer-reviewed literature to encourage, to the maximum extent possible, the fullest commercial use of the knowledge gained;
- expand the pool of well-qualified Principal Investigators and Program Managers for implementation of future missions in other NASA programs;
- implement technology advancements prepared in related programs; and
- announce scientific progress and results in popular media, scholastic curricula, and materials that can be used to inspire and motivate students to pursue careers in science, technology, engineering, and mathematics.

Investigations may target any heliophysics or astrophysics scientific investigation, in order to advance the objectives outlined in Section 2.1 of this PEA. Investigations that address NASA goals in other areas, such as Earth science or planetary science, are not solicited in this PEA.

2.3 Explorer Program Background

The Explorer Program is the oldest continuous program in NASA. It is comprised of a longstanding series of space science missions that are independent, but share a common funding and NASA oversight/insight management structure. Initiated with the Explorer 1 launch in 1958 and including the Nobel Prize winning Cosmic Background Explorer (COBE) mission, the Explorer program has launched over 90 missions.

Though historically not always this way, the program currently administers only Principal Investigator (PI)-led science investigations for SMD's Heliophysics and Astrophysics Divisions.

Competitive selection ensures that the most current and best strategic science will be accomplished.

Since the early 1990s, the Explorer Program has provided several classes of flight opportunities for the science program areas described in Section 2.1 of this PEA. These mission classes are designed to increase the number of flight opportunities in response to recommendations from the scientific community.

Explorer Missions of Opportunity are investigations generally characterized by being part of a host space mission other than a strategic SMD mission. Missions of Opportunity also include small complete missions and new science investigations utilizing existing spacecraft. NASA generally solicits proposals for MO with each Explorer Program AO issued. For each AO, the budget available for a MO vary, as do the types of investigations that may be proposed.

Explorer Program MOs are now being solicited through this NASA Announcement of Opportunity (NNH08ZDA009O), Stand Alone Missions of Opportunity Notice (SALMON).

2.4 Related Explorer Program Solicitations

NASA has released simultaneously with this PEA a solicitation for Explorer (EX) Missions through the Explorer 2011 AO (NNH11ZDA002O). Mission proposals submitted in response to that solicitation will be reviewed at the same time by the same review panels as proposals submitted in response to this PEA for Explorer Missions of Opportunity. A single selection meeting will select proposals, and all Explorer selections will be funded from the same Explorer future mission budget; there is no separate budget for Explorer MOs (see Section 5.3 of this PEA). The Explorer 2011 AO is available for download at http://nspires.nasaprs.com/.

One class of MO is the U.S. Participating Investigator (USPI) class. NASA has released simultaneously with this PEA a solicitation for Explorer Program U.S. Participating Investigators through the ROSES NRA (NNH10ZDA001N). USPI proposals submitted to that solicitation will be reviewed at the same time by the same science peer review panel as the EX full missions and Explorer MOs. A single selection meeting will select proposals, and all Explorer selections will be funded from the same Explorer future mission budget. There is no separate budget for USPIs. The Explorer USPI program element appendix of the ROSES NRA is available for download at http://nspires.nasaprs.com/.

3 Proposal Opportunity Period

This solicitation has a single submission deadline. The following schedule describes the major milestones for this PEA:

PEA Release Date	November 1, 2010
Preproposal Conference	November 23, 2010
Notice of Intent to Propose Deadline	December 9, 2010
Proposal Submittal Deadline at 4:30 p.m. Eastern Time	February 16, 2011
Letters of Commitment due (with proposal)	February 16, 2011
Step 1 Selections announced (target)	August 2011
Initiate Phase A Concept Studies (target)	September 2011
Phase A Concept Study Reports due (target)	August 2012
Down-selection of investigation(s) for flight (target)	February 2013
Commitment need date for Partner MO	December 31, 2013
Decision date for New Missions Using Existing Spacecraft	December 31, 2013
Launch Readiness Date for Small Complete Mission MO	NLT December 31, 2018

All proposals, U.S. and non-U.S., must be received before the proposal submittal deadline. Those received after the deadline will be treated in accordance with Appendix A, Section VII of the SALMON AO.

4 Policies Applicable to this Announcement

4.1 NASA Flight Program and Project Requirements

Proposals selected in response to this AO will be implemented in accordance with NASA mission management processes. NASA mission management processes, as defined by NASA Interim Directive (NID) NM 7120-81[1], *NASA Space Flight Program and Project Management Requirements,* are Formulation, Approval, Implementation, and Evaluation. The NASA mission management processes are subdivided as follows:

Formulation is divided into:

- Phase A – Concept Study and Technology Development; and
- Phase B – Preliminary Design and Technology Completion.

Approval is the Confirmation process for transitioning into Implementation.

Implementation is divided into:

- Phase C – Final Design and Fabrication;
- Phase D – System Assembly, Integration and Test, and Launch (extending through in-orbit checkout);
- Phase E – Operations and Sustainment; and
- Phase F – Closeout.

[1] NM 7120-81 is the NASA Interim Directive (NID) for NASA Procedural Requirements (NPR) 7120.5D. Effective September 22, 2009, NM 7120-81 is the governing NPR until NPR 7120.5 is formally revised.

Evaluation is the ongoing independent review and assessment of the project's status during both Formulation and Implementation, as described in NM 7120-81, which may be found in the Program Library.

A Key Decision Point (KDP) occurs before the project is approved to begin the next phase of development; KDPs are defined in NM 7120-81. For missions selected as a result of this AO, KDP-A is the selection of a Step-1 proposal for a Phase A concept study, KDP-B is the downselection of a mission to enter Phase B following evaluation of Concept Study Reports, KDP-C is the culmination of the Confirmation process, KDP-D is a transition that occurs after the Systems Integration Review, KDP-E is the handoff from development to operations following in-orbit checkout, and KDP-F is the decision to terminate operations after completion of the mission. Scientific and other analyses may continue under project funding in Phase F. If the decision at downselection is to maintain the selected investigation in an extended Phase A, then a separate KDP-B will be required.

4.2 NASA Program Management

Owing to the significant expenditure of Government funds on these space flight investigations, as well as to their expected complexity, NASA intends to maintain an essential degree of insight into mission development; NASA will exercise essential oversight to ensure that the implementation is responsive to NASA requirements and constraints. NASA requirements and constraints are spelled out in NM 7120-81, in the *Explorer Program Safety, Reliability, and Quality Assurance Requirements* document, and in other NASA requirements documents available in the NASA Online Directives Information System (NODIS, http://nodis.hq.nasa.gov/) and in the Program Library. The Associate Administrator for SMD has established an Explorer Program Office at the NASA Goddard Space Flight Center to be responsible for project oversight. The Explorer Program Manager at the NASA Goddard Space Flight Center reports to the Director of the Heliophysics Division, Science Mission Directorate, at NASA Headquarters.

NM 7120-81 defines project management responsibilities, and it presumes that project management is assigned to a NASA Center or JPL. If an organization other than a NASA Center or JPL is proposed and selected to provide project management for an investigation, then the NASA Center's project management responsibilities under NM 7120-81 will be assigned to the implementing project management organization. That organization must be prepared to carry out these responsibilities. In such cases, the Explorer Program Office at the NASA Goddard Space Flight Center will retain the Technical Authority (TA), as described in NM 7120-81, that would otherwise be invested in an implementing Center or JPL.

The *Explorer Program Safety, Reliability, and Quality Assurance Requirements* document, available through the Program Library, will apply to investigations that are selected for Phase A concept studies. Selected investigations that reside at institutions that have NASA-approved safety and mission assurance (S&MA) programs may utilize their own institutional practices in lieu of the guidelines and requirements in this document. Although this document may impose requirements on selected investigations, it does not impose requirements, either implicitly or explicitly, on Step-1 proposals.

In addition to its role as the site of the Explorer Program Office, the NASA Goddard Space Flight Center is eligible to participate in proposals that are submitted in response to this AO. The

Explorer Program Office will have access to the AO before it is released; this is necessary so that the Explorer Program Office can review the AO and ensure that it correctly describes the postselection project management processes. Other than that, the Explorer Program Office plays no role in the AO process; specifically they play no role in defining the scientific scope of the AO, writing the AO, evaluating proposals, or selecting proposals. The Science Mission Directorate at NASA Headquarters will manage the evaluation and selection process. In order to manage the NASA Goddard Space Flight Center's two roles, SMD has established functional and organizational firewalls between the Explorer Program Office and those parts of Goddard Space Flight Center that might participate in proposals. These firewalls ensure that personnel identified as supporting the Explorer Program Office and the AO process will protect all nonpublic information from all proposers, including those at the NASA Goddard Space Flight Center, and will be free of financial and other conflicts of interest with proposers.

4.3 NASA Center Role in Public Affairs and Outreach

Successful media relations activities require close cooperation between NASA and the selected investigations. NASA Centers and JPL have specific expertise in media relations and/or public affairs, especially as they pertain to Earth and space science missions. All selected investigations will coordinate media relations and/or public affairs with a NASA Center or JPL. If a selected investigation does not include a NASA Center or JPL as part of their investigation team, the investigation will utilize the public affairs guidance and resources of the Explorer Program Office at the NASA Goddard Space Flight Center.

NASA is to be informed in a timely manner of any newsworthy mission event or issue before public release of information. Strategies for using new and social media also will be developed collaboratively to ensure common and consistent messaging will occur in a timely manner. NASA and the selected investigation will establish and maintain a detailed coordination media relations plan and communications process.

Selected investigations also must work with NASA to ensure their mission website follows NASA requirements for incorporating content for the agency's primary public website at http://www.nasa.gov/. NASA, and through NASA the selected investigation, is required under the Information Quality Act (44 U.S.C. 3504(d)(1) and 3516) and associated guidelines to maximize the quality, objectivity, utility, and integrity of information and services provided to the public.

4.4 Eligibility to Participate in this Proposal Opportunity

The NASA Evaluations, Assessments, Studies, Services, and Support (EASSS) contract with Earth Resources Technology Inc. (ERT) for evaluation support under this AO creates an unmitigatable organizational conflict of interest for ERT in the event that any business unit of ERT has a proposed role as prime contractor, subcontractor, or participating organization. Because of this organizational conflict of interest, ERT is precluded from participating in any capacity in support of a respondent under this AO.

As the evaluating organization is not Science Applications International Corporation (SAIC), SAIC is not precluded from participating in response to this solicitation; this supersedes Section 4.1 of the SALMON AO.

The Aerospace Corporation will not be used for evaluation support. There is no limitation on the participation of Aerospace Corporation in any capacity in response to this solicitation.

5 Requirements and Constraints

5.1 Type of Mission of Opportunity

Three MO types may be proposed in response to this PEA – Partner Missions of Opportunity (PMOs), New Science Missions using Existing Spacecraft, and Small Complete Missions (SCMs), including investigations requiring flight on high altitude scientific balloon platforms, investigations on the International Space Station (ISS), investigations launched as secondary payloads, or investigations launched as hosted payloads.

A fourth MO type, U.S. Participating Investigators (USPIs), may be proposed in response to the NASA Research Announcement (NRA) NNH10ZDA001N, Research Opportunities in Space and Earth Sciences (ROSES). At the same time as the release of this PEA in SALMON, NASA will release an amendment to ROSES for Explorer USPI proposals. USPI Notices of Intent (NOIs) to propose and proposals will be submitted in response to the ROSES amendment, will be subject to the proposal guidelines specified in ROSES, will be subject to the constraints (cost, schedule, technical) and requirements specified in ROSES, and will be reviewed and selected using the proposal criteria specified in ROSES.

See Section 5 of the SALMON AO for complete descriptions of these types of MOs.

5.2 Constraints on Proposing to Specific Partner Missions

Investigations intended to be flown on the European Space Agency (ESA) Euclid and PLATO mission candidates are not solicited in this PEA. NASA and ESA are continuing to discuss the potential for a strategic collaboration on the Euclid mission candidate. U.S. science opportunities are offered by NASA to all proposers via a separate solicitation through the ROSES NRA. ESA has requested that NASA not solicit mission of opportunity investigations for the PLATO mission candidate at this time.

Partner MOs may be proposed for participation in nonstrategic NASA missions. A partner MO may be proposed for participation in a PI-led NASA mission from a program other than Explorer (an Explorer MO may not be proposed for an Explorer mission). Such a proposal must satisfy the following requirements: (i) The PI of the host mission provides a Letter of Commitment endorsing the partnership and (ii) the feasibility assessment of the host mission, i.e., the TMC evaluation in Step 1 and Step 2, includes the accommodations for the partner MO instrument.

5.3 Cost and Schedule Constraints

The PI-managed Mission Cost cap for an Explorer MO, including all mission phases and the cost of accommodation on and/or delivery to the host mission, if applicable, is $55M in Fiscal Year (FY) 2011 dollars.

For Partner MOs, the proposing PI must provide evidence that the sponsoring organization intends to fund the primary host mission and that the NASA commitment for U.S. participation

is required by the sponsoring organization prior to December 31, 2013. The launch date itself for a Partner MO is not constrained.

For Small Complete Mission MOs, proposers must specify the launch date in the proposal, which is to be no later than December 31, 2018. Explorer MO investigations with an anticipated launch date requirement later than the end of calendar year 2018 should be proposed in response to a subsequent opportunity.

Proposers should be aware, however, that the Explorer program budget is heavily committed prior to 2014. It may be necessary for NASA to adjust the launch date and definition phasing of selected investigations from that proposed in order to conform to the available Explorer program budget profile and/or NASA's ability to negotiate a launch opportunity to the International Space Station; therefore, the degree of launch date flexibility must be indicated in the proposal.

It is intended that proposed investigations be evaluated and selected through a two-step competitive process (Section 7 of the SALMON AO). Step 1 is the solicitation, submission, evaluation, and selection of proposals prepared in response to this PEA. As the outcome of Step 1, one or more Step 1 proposals may be selected for Phase A study and review if their perceived value to the Explorer Program is significant. 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 (downselection) of the Concept Study Reports. As the outcome of Step 2, NASA may continue one or two investigation(s) into the subsequent phases of mission development for flight and operations.

Proposers selected through this AO will be awarded a contract to conduct a Phase A concept study with a duration of approximately 11 months and capped at $250K Real Year (RY) dollars.

The SALMON AO, Section 7.3, provides that a proposal may be selected for development without first completing a Phase A concept study. The proposal must make the case that it is not only necessary, but that it is also technically feasible for the project to be selected for development without a competitive Phase A concept study. The proposer must recognize that NASA would only make such a decision without a Phase A competition if the MO proposal was especially compelling.

The currently approved Explorer Program planning budget is sufficient to select and execute at least one full Explorer mission to proceed into Phase B and subsequent mission phases. Assuming sufficient Explorer Program budget authority, NASA intends to select and execute a second full Explorer mission or one or more Mission(s) of Opportunity. NASA is fully prepared to select only one full mission (either astrophysics or heliophysics) if it receives mission of opportunity proposals that offer outstanding science opportunities.

The due date for proposals is given in Section 3 of this PEA.

5.4 Technical Requirements and Constraints

In addition to the requirements given in the SALMON AO, all proposed Explorer MO investigations must also provide: (1) a detailed description of the proposed provisions for sharing

of science data, plans that scientific data returned from at least those aspects of the mission in which NASA is involved shall be made available to the U.S. scientific community in a timely way, and the status of the host mission sponsoring agency's commitment to enter into an appropriate agreement with NASA for data sharing; and (2) a detailed explanation of how the U.S. heliophysics or astrophysics science community benefits from the proposed investigation.

In addition to the requirements given in the SALMON AO, all proposed partner MO investigations must also demonstrate: (1) their formal relationship with the sponsoring agency's host mission (e.g., already selected contribution, invited contribution, or proposed contribution); and (2) the status of the host mission within the sponsoring agency (i.e., Pre-Phase A, Phase A, or Phase B), including the level of commitment that the sponsoring agency has made to complete the mission.

In addition to the requirements given in the SALMON AO, all proposed partner MO investigations requiring flight on the ISS must also provide a Letter of Acknowledgement from the NASA Space Station Payload Office. This Letter of Acknowledgement must contain: (1) a description of the formal relationship with the sponsoring agency's host mission for access and accommodation at the space station, (2) identification of known challenges and/or conditional provisions for access or accommodation of the host mission, and (3) a description of the level of technical interchange and negotiation required to mature the host mission's provisions for access and accommodation.

In addition to the requirements given in the SALMON AO, all proposed small complete mission investigations with the exception of investigations requiring flight on the ISS must also provide a Letter of Commitment from the program or agency providing access to space. This Letter of Commitment must contain: (1) a detailed description of the proposed provisions for access to space (e.g., type of high altitude scientific balloon platform, sponsored flight to the ISS, secondary ride on another U.S. sponsored mission, etc.), and (2) the status of those proposed flight provisions within the sponsoring program or agency (i.e., conditional, confirmed, conceptual, etc.) including the level of commitment that the sponsoring program/agency has made to support that flight opportunity.

In addition to the requirements given in the SALMON AO, all small complete mission investigations requiring flight on the ISS must also provide a Letter of Feasibility from the NASA Space Station Payload Office. This Letter of Feasibility must contain: (1) a conceptual description of the feasibility for proposed provisions for access and accommodation at the space station, (2) identification of known challenges and/or conditional provisions for access or accommodation, and (3) a description of the level of technical interchange and negotiation required to mature the proposed provisions for access and accommodation. For any selected investigations, flight commitment to the ISS will be negotiated with NASA's Space Operations Mission Directorate during the Phase A Concept Study time period.

5.5 Launch Vehicle Services and Funding

No launch vehicle will be provided by NASA through this solicitation. In addition, NASA is prohibited by law from purchasing non-U.S. launch vehicles, nor may NASA funds provided to an investigation be used to purchase a launch vehicle from a non-U.S. source.

5.6 Education and Public Outreach

[This section added in its entirety through Amendment 8 on December 3, 2010]

Among NASA's strategic goals is to communicate the results of its efforts to the American public and to enhance the science and technical education of the next generation of Americans. While recognizing the benefits of a robust E/PO program, due to the limited funding envisioned for the Explorer 2011 Science Mission of Opportunities, the SALMON AO and this PEA do not require a core Education and Public Outreach (E/PO) program as outlined in SMD policy (see the *Explanatory Guide to the NASA Science Mission Directorate Educational and Public Outreach Evaluation Factors* document in the Program Library). If an optional E/PO is proposed, the following instructions apply.

The quality of an optional core E/PO plan is not a consideration in the selection of Step 1 proposals for Phase A concept studies. Therefore, E/PO plans are not needed at this time. Proposals shall not designate an E/PO lead and proposals shall not include a plan for an E/PO program.

Plans for an optional core E/PO program will be developed during the Phase A concept study and will be included in the Concept Study Report. The quality of the E/PO plan contained in the Concept Study Report will be evaluated in the downselection for flight following Phase A; see *The Explanatory Guide to the NASA Science Mission Directorate Educational and Public Outreach Evaluation Factors* in the Program Library. The E/PO plan will be compliant with SMD Policy Document SPD-18, *Policy and Requirements for the E/PO Programs of SMD Missions*.

Proposals shall identify the funding set aside for the implementation of the core E/PO program if proposed. There is no minimum or maximum designated cost for the core E/PO program; however, the funding for the core E/PO program must be included in the PI Managed Mission Cost. Core E/PO activities may continue for one year following end-of-prime-mission to allow for the incorporation of the results of the mission investigation into the core E/PO program.

6 Proposal Preparation and Submission

6.1 Proposal Content Requirements

Proposal content must conform to the guidelines set forth in Section 6.2 and Appendix B of the SALMON AO.

[This replacement table added through Amendment 8 on December 3, 2010. Bold indicates changes from the SALMON AO.]

Table B.1 of Appendix B of the SALMON AO is replaced in its entirety by the following restriction and guidance on page count.

TABLE B.1
RESTRICTIONS AND GUIDANCE ON PAGE COUNT

Section	Reference	Page Limits
Graphic Cover Page **Proposal Summary Information** **Export controlled material statement** **Optional Restriction on Use statement**	App. B (III)	**1** **None** **0.5** **0.5**
Fact Sheet	App. B (V)	2
Table of Contents	App. B (VI)	No page limit
Scientific/Technical Investigation	App. B (VII)	**20 + 2 pages for optional SEO**
Investigation Implementation Management and Schedule	App. B (VIII) App. B (IX)	**20**, **schedule foldouts do not count against limit**
Cost and Cost Estimating Methodology Cost Tables B.5 and B.6	App. B (X)	**8, cost tables do not count against limit**
Optional: Master Equipment List (MEL); Work Breakdown Structure (WBS); WBS Dictionary; WBS Cost Table; Basis of Estimate Details	App. B (X)	No page limit
Optional: E/PO Acknowledgement and SC	App. B (XI)	**2**
Appendices - no others permitted: 1. Letter(s) of Commitment 2. Statement(s) of Work (SOW) 3. Resumes 4. Summary of Proposed Program Cooperative Contributions 5. Draft International Participation Plan - Discussion on Compliance with U.S. Export Laws and Regulations 6. Draft Outline of Technical Responsibilities between U.S. and International Participation 7. Orbital Debris Generation Acknowledgement 8. Compliance with Procurement Regulations by NASA PI Proposals 9. Heritage 10. Abbreviations and Acronyms List 11. Reference List (optional)	App. B (XII)	No page limit, but small size encouraged

6.2 Exceptions to General SALMON Requirements

The governing Program and Project Management Requirements document NPR 7120.5 is currently represented by NM 7120-81 (NID for NPR 7120.5D).

Appendix B, Table B.1, Restrictions and Guidance on Page Count is replaced by Table B.1 provided in Section 6.1 of this PEA. [Added through Amendment 8 on December 3, 2010.]

Appendix B, Table B.3, Science Traceability Matrix, is replaced by Table B.3 provided at the end of this PEA.

Appendix B, Table B.4, Mission Traceability Matrix, is replaced by Table B.4 provided at the end of this PEA.

Appendix B, Table B.5, NASA Cost Funding Profile Template, is replaced by Table B.5 provided at the end of this PEA.

Appendix B, Table B.7, NASA New Start Inflation Index, is replaced by Table B.7 provided at the end of this PEA.

This PEA contains no other exceptions to the proposal preparation and submission requirements outlined in this SALMON AO.

6.3 Proposal Submission Requirements

Proposals must be submitted according to the guidelines set forth in Section 6.3 of the SALMON AO and in Section 3 of this PEA with the following exceptions.

The original signed proposal and 65 paper copies, each of which contains an attached, clearly labeled CD-ROM that contains electronic proposal files (see Appendix B) shall be delivered to the following address by the proposal submittal deadline specified in Section 3.

NASA Research and Education Support Services (NRESS)
Suite 500
2345 Crystal Drive
Arlington, VA 22202

Phone for commercial delivery: 202-479-9030

7 Proposal Evaluation, Selection, and Implementation

7.1 Evaluation Process

The evaluation of proposals will be conducted as described in Section 7.1.1 of the SALMON AO with the following modification.

Proposers should be aware that, during the evaluation and selection process, NASA may request clarification of specific points in a proposal; if so, such a request from NASA and the proposer's response must be in writing. In particular, before finalizing the evaluation of the feasibility of the mission implementation (see Section 7.2.3 of this PEA), NASA will request clarification on specific, potential major weaknesses in the feasibility of mission implementation that have been identified in the proposal. NASA will request such clarification uniformly from all proposers. The ability of proposers to provide clarification to NASA is extremely limited, as NASA does not intend to enter into discussions with proposers. A typical limited response is to direct NASA's attention to pertinent parts of the proposal without providing further elaboration.

7.2 Evaluation Factors

The evaluation criteria, which are defined more fully in the following sections and will be used to evaluate proposals, are as follows:

- The scientific merit of the proposed investigation;
- The scientific implementation merit and feasibility of the proposed investigation; and
- The technical, management, and cost (TMC) feasibility of the proposed approach for mission implementation, including cost risk.

The proposal categorizations, discussed in Section 7.1 of the SALMON AO, will be based on these criteria. For categorization, scientific merit is weighted approximately 40%, scientific implementation merit and feasibility is weighted approximately 30%, and TMC feasibility, including cost risk, is weighted approximately 30%.

These criteria are defined more fully in the following sections. Evaluation findings for each evaluation criterion will be documented with narrative text in the form of specific major and minor strengths and weaknesses, as well as an adjectival summary score. The adjectival summary scores for the first two criteria (scientific merit and scientific implementation merit) will be reported as Excellent, Very Good, Good, Fair, or Poor, as defined in the table below.

Summary Evaluation	Basis for Summary Evaluation
Excellent	A comprehensive, thorough, and compelling proposal of exceptional merit that fully responds to the objectives of the AO as documented by numerous and/or significant strengths and having no major weaknesses.
Very Good	A fully competent proposal of very high merit that fully responds to the objectives of the AO, whose strengths fully outbalance any weaknesses.
Good	A competent proposal that represents a credible response to the AO, having neither significant strengths nor weakness and/or whose strengths and weaknesses essentially balance.
Fair	A proposal that provides a nominal response to the AO, but whose weaknesses outweigh any perceived strengths.
Poor	A seriously flawed proposal having one or more major weaknesses (*e.g.*, an inadequate or flawed plan of research or lack of focus on the objectives of the AO).

The third criterion, technical merit and feasibility, including cost risk, will be reported as Low Risk, Medium Risk, or High Risk, as defined in the table below.

Summary Evaluation	Basis for Summary Evaluation
Low Risk	There are no problems evident in the proposal that cannot be normally solved within the time and cost proposed. Problems are not of sufficient magnitude to doubt the Proposer's capability to accomplish the investigation well within the available resources.
Medium Risk	Problems have been identified, but are considered within the proposal team's capabilities to correct within available resources with good management and application of effective engineering resources. Mission design may be complex and resources tight.
High Risk	One or more problems are of sufficient magnitude and complexity as to be deemed unsolvable within the available resources.

7.2.1 Scientific Merit of the Proposed Investigation

The information provided in a proposal will be used to assess the intrinsic scientific merit of the proposed investigation. Scientific merit will be evaluated for the Baseline Science Mission and, if defined, the Minimum (or Threshold) Science Mission; science enhancement options beyond the Baseline Science Mission will not contribute to the assessment of the scientific merit of the proposed investigation. The factors for scientific merit include the following:

- Factor A-1. Compelling nature and scientific priority of the proposed investigation's science goals and objectives. This factor includes the clarity of the goals and objectives; how well the goals and objectives reflect program, Agency, and National priorities; the potential scientific impact of the investigation on program, Agency, and National science objectives; and the potential for fundamental progress, as well as filling gaps in our knowledge relative to the current state of the art.
- Factor A-2. Programmatic value of the proposed investigation. This factor includes the unique value of the investigation to make scientific progress in the context of other ongoing and planned missions; the relationship to the other elements of NASA's science programs; how well the investigation may synergistically support ongoing or planned missions by NASA and other agencies; and the necessity for a space mission to realize the goals and objectives.
- Factor A-3. Likelihood of scientific success. This factor includes how well the anticipated measurements support the goals and objectives; the adequacy of the anticipated data to complete the investigation and meet the goals and objectives; and the appropriateness of the mission requirements for guiding development and ensuring scientific success.
- Factor A-4. Scientific value of the Minimum (or Threshold) Science Mission. If a Minimum (or Threshold) Science Mission is defined, then this factor includes the scientific value of the Minimum (or Threshold) Science Mission using the standards in the first factor of this section and whether that value is sufficient to justify the proposed cost of the mission.

Factors A-1 through A-3 are evaluated for the Baseline Science Mission assuming it is implemented as proposed and achieves technical success. Factor A-4 is similarly evaluated for the Minimum (or Threshold) Science Mission, if defined.

This evaluation will result in narrative text, including specific major and minor strengths and weaknesses, as well as an appropriate adjectival rating for the scientific merit of the investigation.

7.2.2 Scientific Implementation Merit and Feasibility of the Investigation

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

- Factor B-1. Merit of the instruments and mission design for addressing the science goals and objectives. This factor includes the degree to which the proposed mission will address the goals and objectives; the appropriateness of the selected instruments and mission design for addressing the goals and objectives; the degree to which the proposed instruments and mission can provide the necessary data; and the sufficiency of the data gathered to complete the scientific investigation.
- Factor B-2. Probability of technical success. This factor includes the maturity and technical readiness of the instruments; the adequacy of the plan to develop the instruments within the proposed cost and schedule; the robustness of those plans,

including recognition of risks and mitigation plans for retiring those risks; the likelihood of success in developing any new technology that represents an untested advance in the state of the art; the ability of the development team - both institutions and individuals - to successfully implement those plans; and the likelihood of success for both the development and the operation of the instruments within the mission design.

- 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; to result in the publication of science discoveries in the professional literature; and to preserve data and analysis of value to the science community. Considerations in this factor include assessment of planning and budget adequacy and evidence of plans for well-documented, high-level data products and software usable to the entire science community; assessment of adequate resources for physical interpretation of data; reporting scientific results in refereed journals; and assessment of the proposed plan for the timely release of the data to the public domain for enlarging its science impact.
- Factor B-4. Science resiliency. This factor includes both developmental and operational resiliency. Developmental resiliency includes the approach to descoping the Baseline Science Mission to the Minimum (or Threshold) Science Mission in the event that development problems force reductions in scope. Operational resiliency includes the ability to withstand adverse circumstances, the capability to degrade gracefully, and the potential to recover from anomalies in flight.
- Factor B-5. Probability of science team success. This factor will be evaluated by assessing the experience, expertise, and organizational structure of the science team and the mission design in light of any proposed instruments. The role of each Co-Investigator will be evaluated for necessary contributions to the proposed investigation; the inclusion of Co-Is who do not have a well defined and appropriate role may be cause for downgrading of the proposal.
- Factor B-6. Merit of any science/technology enhancement options (STEOs), if proposed. This factor includes assessing the appropriateness of activities selected to enlarge the science impact of the mission; the potential of the selected activities to enlarge the science impact of the mission; and the appropriate costing of the selected activities. The peer review panel will inform NASA whether the evaluation of the proposed STEO(s) impacted the overall rating for scientific implementation merit and feasibility. Lack of an STEO will have no impact on the proposal's overall rating for scientific implementation merit and feasibility.

Student Collaboration proposals, if any, will be evaluated only for the impact they have on science implementation feasibility to the extent that they are not separable; student collaboration proposals will not be penalized in Step 1 for any inherent higher cost, schedule, or technical risk, as long as the student collaboration is shown to be clearly separable from the implementation of the Baseline Science Mission. The intrinsic merit of student collaborations will not be evaluated at this time.

This evaluation will result in narrative text, including specific major and minor strengths and weaknesses, as well as an appropriate adjectival rating for the scientific implementation merit and feasibility of the scientific investigation.

7.2.3 Feasibility of the Mission Implementation, Including Cost Risk

The technical and management approaches of all submitted investigations will be evaluated to assess the likelihood that they can be successfully implemented as proposed, including an assessment of the likelihood of their completion within the proposed cost and schedule. The factors for feasibility of mission implementation include the following:

- Factor C-1. Adequacy and robustness of the instrument implementation plan. The maturity and technical readiness of the instrument complement will be assessed, as will the ability of the instruments to meet mission requirements. This factor includes an assessment of the instrument design, accommodation, interface, heritage, and technology readiness. This factor includes an assessment of the instrument hardware and software designs, heritage, and margins. This factor includes an assessment of the proposer's understanding of the processes, products, and activities required to accomplish development and integration of the instrument complement. This factor also includes adequacy of the plans for instrument systems engineering and for dealing with environmental concerns. This factor includes an assessment of plans for the development and use of new instrument technology and the adequacy of backup plans to mature systems within the proposed cost and schedule when technologies having a TRL less than 6 are proposed.
- Factor C-2. Adequacy and robustness of the mission design and plan for mission operations. This factor includes an assessment of the overall mission design and mission architecture, the spacecraft design and design margins (including margins for launch mass, delta-V, and propellant), the concept for mission operations (including communication, navigation/tracking/trajectory analysis, and ground systems and facilities), and the plans for launch services. This factor includes mission resiliency – the flexibility to recover from problems during both development and operations – including the technical resource reserves and margins, system and subsystem redundancy, and reductions and other changes that can be implemented without impact to the Baseline Science Mission.
- Factor C-3. Adequacy and robustness of the flight systems. This factor includes an assessment of the flight hardware and software designs, heritage, and margins. This factor includes an assessment of the proposer's understanding of the processes, products, and activities required to accomplish development and integration of all elements (flight systems, ground and data systems, etc.). This factor includes an assessment of the adequacy of the plans for spacecraft systems engineering, qualification, verification, mission assurance, launch operations, and entry/descent/landing. This factor includes the plans for the development and use of new technology and the adequacy of backup plans to ensure success of the mission when technologies having a TRL less than six are proposed. The maturity and technical readiness of the spacecraft, subsystems, and operations systems will be assessed. The adequacy of the plan to mature systems within the proposed cost and schedule, the robustness of those plans, including recognition of risks and mitigation plans for retiring those risks, and the likelihood of success in developing any new technologies will be assessed.
- Factor C-4. Adequacy and robustness of the management approach and schedule, including the capability of the management team. This factor includes: the adequacy of

the proposed organizational structure and WBS; the management approach, including project level systems engineering; the roles, qualifications, and experience of the PI, PM, other named key management team members, and implementing organization, mission management team, and known partners; the commitment, spaceflight experience, and relevant performance of the PI, PM, other named key management team members, and implementing organization, mission management team, and known partners against the needs of the investigation; the commitments of partners and contributors; and the team's understanding of the scope of work covering all elements of the mission, including contributions. Also evaluated under this factor is the adequacy of the proposed risk management approach, including any risk mitigation plans for new technologies, any long-lead items, and the adequacy and availability of any required manufacturing, test, or other facilities. The approach to any proposed descoping of mission capabilities will be assessed against the proposed Baseline Science Mission. The plans for managing the risk of contributed critical goods and services will be assessed, including the plans for any international participation, the commitment of partners and contributors, as documented in Letters of Commitment, and the adequacy of contingency plans for coping with the failure of a proposed cooperative arrangement or contribution. This factor also includes assessment of proposal elements, such as the relationship of the work to the project schedule, the project element interdependencies, the associated schedule margins, and an assessment of the likelihood of launching by the proposed launch date. Also evaluated under this factor are the proposed project and schedule management tools to be used on the project, along with the subcontracting plan, including small and small disadvantaged businesses.

- Factor C-5. Adequacy and robustness of the cost plan, including cost feasibility and cost risk. This factor includes proposal elements such as cost, cost risk, cost realism, and cost completeness, including assessment of the basis of estimate, the adequacy of the approach, the methods and rationale used to develop the estimated cost, the discussion of cost risks, the allocation of cost reserves by phase, and the team's understanding of the scope of work (covering all elements of the mission, including contributions). Proposals will be evaluated for the adequacy of the cost reserves and whether proposals with inadequate cost reserves demonstrate a thorough understanding of the cost risks. This factor also includes an assessment of the proposed cost relative to estimates generated using parametric models and analogies. Also evaluated under this factor are the proposed cost management tools to be used on the project.

Student Collaboration proposals, if any, will be evaluated only for the impact they have on overall mission feasibility to the extent that they are not separable; student collaboration proposals will not be penalized in Step 1 for any inherent higher cost, schedule, or technical risk, as long as the student collaboration is shown to be clearly separable from the implementation of the baseline mission. The intrinsic merit of student collaborations will not be evaluated at this time.

This evaluation will result in narrative text, including specific major and minor strengths and weaknesses, as well as an appropriate risk rating for the feasibility of mission implementation.

7.3 Specific Selection Factors

Proposals will be selected according to the guidelines set forth in Section 7.3 of the SALMON AO. In addition to the factors for selection given in Section 7.3 of the SALMON AO, the level of commitment toward host mission accommodation and/or provision for access to space will be a significant consideration during the selection process.

The Selection Official for this PEA is the Associate Administrator for Science Mission Directorate.

NASA reserves the right to make no selection if there are no proposals of appropriate merit or for any other reason.

7.4 Implementation Activities

Proposal selection and award will be implemented according to the guidelines set forth in Section 7.4 of the SALMON AO and Section 5.3 of this PEA. Explorer MO investigations will be implemented by the Explorer Program Office at the NASA Goddard Space Flight Center.

8 Preproposal Activities

8.1 Preproposal Conference

A Preproposal Conference will be held in Washington, D.C., in accordance with the schedule in Section 3 of this PEA. Further information, including logistics, will be available at the Explorer Acquisition Homepage (see Section 8.2 of this PEA) prior to the Preproposal Conference.

All interested parties may attend. All expenses and arrangements for attending this meeting are the responsibility of the attendees. Note that travel and associated costs of attendance are not allowable as direct costs under another Federal Government award, *e.g.*, a contract, grant, or cooperative agreement. Government employees may attend and be authorized travel and associated costs as a matter of official business.

The purpose of this conference will be to address questions about the proposal process for this AO. Questions should be sent to the Explorer Program Acquisition Scientist at the address given 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 Explorer Acquisition Homepage at the address given in Section 8.2 of this PEA approximately 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 3 of this PEA. It is expected that all questions and answers will be posted on the Explorer Acquisition Homepage at the address given in Section 8.2 of this PEA.

8.2 Program Library and Acquisition Home Page

The Explorer Program Library provides additional regulations, policies, and background information on the Explorer Program. The Program Library is accessible at http://explorers.larc.nasa.gov/EX/ex_Library.html.

An Explorer Acquisition Homepage, available at http://explorers.larc.nasa.gov/EX/, will provide updates and any PEA addenda during the Explorer MO solicitation process. It will provide links to the Program Library, information about the preproposal conference, a list of potential proposers and teaming partners, and questions and answers regarding the PEA.

Updates to the PEA and any amendments will be posted on the NSPIRES website. A link will be provided on the Explorer Acquisition Homepage to the NSPIRES index page for the PEA.

9 Summary of Key Information

Explorer MO Cost Cap	$55M (FY 2011$)
Page limit for proposals	See Section 6.1
Sponsoring organization's latest need date for NASA commitment for U.S. participation (Partner MOs only)	December 31, 2013
Decision date required for New Missions Using Existing Spacecraft (New Missions Using Existing Spacecraft MOs only)	December 31, 2013
Latest MO flight date (Small Complete Mission MOs only)	NLT December 31, 2018
Preproposal Conference	See Section 3
Notice of Intent to Propose Deadline	See Section 3
Proposal Submittal Deadline	4:30 p.m. Eastern Time on the date given in Section 3
Submission medium	Hard and electronic copies; see Section 6.3.1 of the SALMON AO
Web site for submission of electronic cover page via NSPIRES	http://nspires.nasaprs.com/ (help desk available at 202-479-9376 or nspires-help@nasaprs.com)
Web site for additional information, updates, and Program Library	http://explorers.larc.nasa.gov/EX/

NASA points of contact concerning this Program Element:	
For science and other questions associated with this Program Element:	Dr. Barbara Giles Explorer Program Acquisition Scientist Mail Stop 3R15 Science Mission Directorate NASA Headquarters Washington, DC 20546-0001 Tel: 202-358-1762 Email: HQ-Explorers@mail.nasa.gov **[email address corrected November 5, 2010]**
For technical questions associated with high altitude scientific balloon missions:	Mr. David Gregory Explorer Balloon Experiment POC NASA Balloon Office Mail Stop 820.0 NASA Wallops Flight Facility 34200 Fulton Street Wallops, VA 23337 Tel: 757-824-2367 Email: david.d.gregory@nasa.gov
For technical questions associated with International Space Station Payloads:	Ms. Marybeth Edeen Explorer ISS Payload POC Space Station Payload Office Mail Stop OZ NASA Johnson Space Center Houston, TX 77058 Tel: 281-483-9122 Email: marybeth.a.edeen@nasa.gov
For technical questions associated with NASA's GEO Quick Ride (GQR) program enabling secondary and hosted payloads:	Mr. Robert Caffrey GEO Quick Ride POC Code 460 NASA Goddard Space Flight Center Greenbelt, MD 20771 Tel: 301-286-0846 Email: robert.t.caffrey@nasa.gov URL: http://gqr.gsfc.nasa.gov/

10 Appendix: Replacement Tables

TABLE B.3: EXAMPLE SCIENCE TRACEABILITY MATRIX

Science Goals	Science Objectives	Scientific Measurement Requirements		Instrument Functional Requirements		Projected Performance	Mission Functional Requirements (Top Level)
		Observables	Physical parameters				
Goal 1		Absorption line	Column density of absorber				Observing strategies: requires yaw and elevation maneuvers
Goal 2		Emission line	Density and temperature of emitter	Alt. Range	XX km	ZZ km	Launch window: to meet nadir and limb overlap requirement. Window applies day to day
Etc.	Objective 1		Size of features	Vert. Resol.	XX km	ZZ km	Need AA seasons to trace evolution of phenomena
		Morphological feature		Horiz. Resol.	XX deg x XX lat x XX long	ZZ deg x ZZ lat x ZZ long	
			Rise time of eruptive phenomenon	Temp. Resol.	XX min	ZZ min.	Need AA months of observation to observe variability of phenomena
				Precision	XX K	ZZ K	
		Rate of change of observable phenomenon		Accuracy	XX K	ZZ K	
	Objective 2 to N			Repeat above categories			

An EXCEL version of this template is available in the Program Library.

TABLE B.4: EXAMPLE MISSION TRACEABILITY MATRIX

Mission Functional Requirements	Mission Design Requirements	Spacecraft Requirements	Ground System Requirements	Operations Requirements
From Table B1	Rocket type Launch date: Mission length Orbit altitude requirement and rationale Geographic coverage and how it drives orbit requirement Orbit local time and rationale for the requirement Type of orbit, e.g. Sun synchronous, precessing, Lagrangian point, other Other	Spinning, stabilized Mass Power Volume: Data Rate Temperature Range for spacecraft systems Pointing Control: Knowledge, Stability, Jitter, Drift , Other Detector radiation shielding requirements and rationale Other	Passes per day and duration Assumed antenna size Data volume per day Real time data transmission requirements Transmit frequency Power available for comm (Watts) Downlink data rate Number of data dumps per day Spacecraft data destination (e.g., mission operations center) Science data destination (e.g., science operations center) Other	General spacecraft maneuver requirements and frequency Special maneuvers requirements Rationale for maneuvers Ephemeris requirements Changes in viewing modes and directions per orbit, per day or over longer time periods. Rationale for these changes Other
Msn Functional Req or Instrument Accommodation (from Table B1)	Mission	Spacecraft	Ground System	Operations
Four different observing strategies: Solar, limb, nadir, zenith; requires yaw and elevation maneuvers		Agility requirements Slew rate = y deg/sec Settle = stability < .001 deg/sec after 30 secs		Target planning on 3 day centers Ephemeris accuracy of x with updates every 2 days
Instrument X precision of 5K		Thermal stability of 1 deg/hr S/C bus stability of .01 deg over 10 secs	Bit error rate < 1e-5 Time correlation to 2 msec over 1 week	Weekly time correlation

An EXCEL version of this template is available in the Program Library.

TABLE B.5: NASA COST FUNDING PROFILE TEMPLATE

Total Mission Cost Funding Profile Template

FY costs in Real Year Dollars (RY$), Totals in Real Year Dollars (RY$) and Fiscal Year 2011 Dollars (FY11$)

WBS#	WBS Element	Phase A			Phase B			Phase C/D			Phase E			RY$	FY11$
		FY2011	FY2012	Total	FY2012	FY2013	Total	FY2013	FY2014	FY2015	Total	FY2015	FY2016	FY2017	Total	Total	Total
01	Project Management																
02	Systems Engineering																
03	Safety & Mission Assurance																
04	Science / Technology																
	Breakout pre-launch science from technology development activities																
05	Payload(s)																
	List each instrument separately																
06	Spacecraft																
	List each major flight system element separately																
07	Mission Operations																
	Breakout separable services, e.g., DSN, etc.																
08	Launch Vehicle / Services																
09	Ground System(s)																
	Breakout non-standard cost, e.g., coordinating ground stations																
10	Systems Integration & Testing																
11	Education and Public Outreach																
	Reserves																
	PI-Managed Mission Cost																
Contributions																	
	Student Collaboration Incentive (if applicable)																
	List by organization and WBS element																
	Total Contributions																
	Total Mission Cost																
Other AO-specific Activities																	
	List by activity and WBS element																
	Enhanced PI-Managed Mission Cost																
	Phase B Bridge Phase Funding (*included above*)																

Label columns with actual fiscal years. Add or remove FY columns as necessary.

An EXCEL version of this template is available in the Program Library.

TABLE B.7:
NASA FY 2010 NEW START INFLATION INDEX
for use in FY 2011

Fiscal Year	2011	2012	2013	2014	2015	2016	2017	2018
Inflation Rate		2.6%	2.7%	2.6%	2.6%	2.6%	2.7%	2.6%
Cumulative Inflation Index	1.000	1.026	1.054	1.081	1.109	1.138	1.169	1.199

Use an inflation rate of 2.6% for years beyond 2018.

Note: Proposers shall use their own forward pricing rates. For organizations that are without forward pricing rates, proposers may use the NASA new start inflation index in Table B.7. This instruction replaces the instruction in Appendix B, Section X of the SALMON AO.

END OF PEA H7