

2016 Small Explorer (SMEX) Announcement of Opportunity and Mission of Opportunity (MO)

Heliophysics Explorer Program Q&A

Change Log		
Rev.	Date	Description of Changes
01	10/8/15	Added Q&As 1 and 2
02	10/22/15	Added Q&A 3
03	3/11/16	Added Q&A 4
04	4/14/16	Added Q&As 5 and 6
05	4/20/16	Revised Q&As 1 and 2, Added Q&As 7 - 27
06	4/21/16	Revised Q&A 25
07	4/22/16	Revised Q&A 25, Added Q&As 28 - 31
08	4/27/16	Added Q&As 32 - 34
09	5/2/16	Added Q&As 35, 36
10	5/13/16	Added Q&As 37 - 39
11	6/9/16	Added Q&A 40
12	7/8/16	Added Q&As 41 - 45
13	7/13/16	Update Q&A 17
14	7/21/16	Added Q&A 46
15	7/26/16	Added Q&A 47
16	7/29/16	Added Q&A 48
17	8/8/16	Added Q&As 49 - 53
18	8/9/16	Added Q&As 54 and 55
19	8/10/16	Added Q&As 56 and 57
20	8/23/16	Added Q&As 58 - 71
21	8/25/16	Revised Q&As 62 and 57, Added Q&As 72 - 76
22	8/31/16	Revised Q&A 47, Added Q&As 77 - 81
20	8/23/16	Added Q&As 58 - 71
21	8/25/16	Revised Q&As 62 and 57, Added Q&As 72 - 76
22	8/31/16	Revised Q&A 47, Added Q&As 77 - 81
23	9/9/16	Added Q&A 82
24	9/23/16	Added Q&A 83

Q-1 Recent similar AOs (such as the Astrophysics SMEX AO) included the option of proposing a mission with the launch vehicle provided by the proposer but with an increased cost cap. Is it anticipated that there will be a similar option for the Heliophysics Explorer AO?

Please see the Community Announcement Update at http://explorers.larc.nasa.gov/HPSMEX/pdf_files/update-comm-announcement.pdf on the SOMA webpage at <http://explorers.larc.nasa.gov/HPSMEX/index.html> and FAQ Q-5 below.

Q-2 Is there any chance of talking or meeting with you on this project?

All correspondence and communication concerning this Community Announcement can be sent to hq-explorers@nasa.gov.

Q-3 Are proposals requesting flight on the first NASA Exploration Mission (EM-1) allowed for this opportunity?

Proposals requiring a flight on the first NASA Exploration Mission (EM-1) are not applicable for the Heliophysics 2016 SMEX or MO opportunities.

Q-4 Please clarify if the AO Cost Cap for a Heliophysics Small Explorer mission of \$115 million in NASA Fiscal Year (FY) 2017 dollars includes access to space as described in the Forward.

There is a typographical error in the Draft Heliophysics SMEX AO. The AO Cap of \$115M does NOT include the cost for access to space.

Q-5 Will NASA consider changing the Heliophysics SMEX AO to allow for co-manifested, rideshare or secondary launch opportunities?

On March 11, 2016, the National Aeronautics and Space Administration (NASA) Science Mission Directorate (SMD) released a draft solicitation for community review and comment: the Draft 2016 Heliophysics Small Explorer (SMEX) Announcement of Opportunity (AO) NNH16ZDA003J. A large number of questions and comments were received from the scientific community. SMD is now issuing information on an anticipated major change between the Draft and Final AOs based, in part, on these comments. Proposers should read the Final Heliophysics SMEX 2016 AO carefully when it is released.

In order to expand the range of options for access to space, The Heliophysics SMEX AO will be revised to allow co-manifested, rideshare, or secondary launch opportunities. Although NASA-provided launch services will be offered and may be proposed, proposers may also propose alternative access to space. While the

specific requirements are still being developed, it is anticipated the Final AO will be similar, but not identical, to the 2015 Earth Venture Mission-2 AO (NNH15ZDA0110) and/or the 2014 Astrophysics Small Explorer AO (NNH14ZDA0130). Clarifications regarding Principal Investigator (PI)-Managed Mission Cost requirements and the AO Cost Cap are pending and will be incorporated into the Final SMEX AO.

Q-6 Per the *Space Communications and Navigation (SCaN) Mission Operations and Communications Service (MOCS) and Realignment of Funding Responsibilities for Space Communications and Navigation* documents, should DSN aperture feeds, per minute SN fees and NEN per pass fees be included within the PI managed cost cap, or not?

All costs listed in the *Space Communications and Navigation (SCaN) Mission Operations and Communications Service (MOCS)* are required and should be included in the PI managed cost cap. It is a generic document approach to estimating both cost and **value** associated with using the SCaN networks. The *Realignment of Funding Responsibilities for Space Communications and Navigation* document was generated between the SMD and HEOMD/SCaN. The intent of this document was to highlight internal NASA costs.

Q-7 Can you clarify the technology readiness level requirements in Section 5.2.4 of the SMEX AO?

As discussed in requirement 24, additional detail is listed in Appendix B, Section F, requirement B-36. Additionally, as written in Appendix I, additional clarification will be given in the final AO release. The TRL requirements do not mandate system level testing for maturing technologies to TRL 6 by PDR. Requirement B-36 calls for demonstration in a relevant environment and not necessarily a system level test. Please see the "System Level TRL 6 example" document in the program library for additional information.

Q-8 Requirements 27 and 28, and Sections 4.3.1, 5.2.7, and 5.6.6, discuss the need to account explicitly for NASA-provided telecommunications costs within the PI-managed Mission Cost. Please clarify how this should be accounted for.

NASA-provided telecommunications costs must be explicitly accounted for within the PI-managed cost. Cost information can be found in the *Space Communications and Navigation (SCaN) Mission Operations and Communications Services (MOCS)* as provided in the Document Library.

Q-9 Section 5.2.7 and Requirement 30 state that “Proposals shall consider the use of Ka band...”. What level of detail is required in the consideration?

As discussed in Section 5.2.7, proposals shall include the mission requirements for telecommunications. Please see SFCG documentation for guidelines. All proposers who contemplate using Ka-band for data transmission should contact Network Integration Management Office (NIMO) prior to submitting their proposal, to confirm Ka-band availability for their particular mission.

Q-10 Is the Pegasus HAPS system (or comparable auxiliary/precision orbital injection system) a “standard launch service”?

No, this is a non-standard launch service and must be costed as part of the PI-managed cost. Please contact NASA Launch Services Program for additional details on non-standard launch services.

Q-11 Do “standard launch services” include timed release of more than one satellite from a single mission-provided deployer, on a time scale of a few minutes, once the desired orbit has been achieved by the LV?

No, this is a non-standard launch service and must be costed as part of the PI-managed cost. Please contact NASA Launch Services Program for additional details on non-standard launch services.

Q-12 Can you please confirm that Phase A costs are to be included in the PI managed cost cap as stated by requirement 55 of the draft Heliophysics SMEX AO?

Yes, Phase A costs are included in the PI-managed cost.

Q-13 The scheduling for B-D is very short compared to analogous AO's in recent times. The draft AO calls out 36 months for Phase B-D schedule. Is it possible to propose to lengthen this by anywhere up to 12 months?

The Phase B-D schedule in the Final AO will remain the same as the Draft.

Q-14 What inflation factor should we use to inflate current year \$ (2016) into FY17\$? The inflation index in the AO right now assumes that we are in 2017 developing the cost estimate.

Please use Inflation tables found in the AO document library.

Q-15 Requirement B-52 currently explicitly lists which parametric cost modeling tools may be used to conduct the parametric cost analysis (SEER-H and PRICE TruePlanning). We request that this be reworded to require “one of the CAD sponsored parametric modeling tools” rather than explicitly require a specific tool.

Requirement B-52 will be deleted in the Final AO.

Q-16 Cubesats may use the ISS as a launching facility, using the NanoRacks system in the JEM module. Do SCM investigations that use these sort of services need to comply with requirement Q-18, ISS letter of feasibility?

CSLI provided launches do not require an ISS Letter of Feasibility.

Q-17 Given the complexity of developing a Mission of Opportunity relative to that of a full Small Explorer mission, is there any consideration to raising the funding level for Phase A?

The Phase A study will now be awarded for **\$400K**.

Q-18 Can 6Us have mass above the “6 x 1.33 kg” guidance in the AO?

The mass limitation is dependent on the launch and dispenser used. The 1.33kg/U is the most constraining limit and good for any scenario. The most constraining scenario is for a CubeSat secondary launch opportunity on a launch with a NASA science primary, in which case the 1.33kg per one U would apply. However, for CubeSats on a VCLS class mission or other government launch, CSLI is accepting CubeSat masses that exceed 1.33kg/U mass limit. For a 6U CubeSat, 12kg is a good limit to use that will satisfy any dispenser we have on contract.

Q-19 Are rides available to GEO or GEO Graveyard?

Although NASA does not send many spacecraft to GEO, we do have partnerships set up with the DoD who do utilize the GEO destination. However, DoD missions are not planned out as far as the 2022 timeframe (at least our knowledge of them), so we can't commit. We are also working on the capability to manifest with a commercial “broker” who could provide secondary opportunities on commercial missions such as commsats. GEO missions also place additional burdens for a mission to meet the orbital debris mitigation requirements to limit orbital lifetime after EOM to 25 years or enter an appropriate storage or disposal orbit and for collision avoidance.

Q-20 Can CSLI provide a ride for multiple CubeSats going to the same orbit?

As secondary payloads, it will be more difficult to get multiple CubeSats on the same launch/same orbit. However, we currently have 3 emerging small launch providers on contract to provide demonstration launches in the 2017/18 timeframe. If at least one of them is successful, we may have a potential for essentially dedicated launches of multi-CubeSat missions to a single destination.

Q-21 Can CSLI ensure, with a letter of commitment, we will have a ride in the 2022 timeframe?

If you are requesting a CSLI launch, CSLI will manifest the selected Cubesats. However, a letter of commitment stating a specific launch date is not possible. As a secondary payload, CSLI will work within your requested constraints and primary launch vehicle opportunities, to manifest the mission in a timely fashion. We have discussed this with the AO developers. Proposers are expected to meet Launch Readiness Date requirements as specified in the AO.

Q-22 Will there be an AO process to get selected for a ride?

For CubeSats selected from a NASA AO that propose to use CSLI services, we do automatically select them out of the CSLI AO process. We ask for at least a copy of the proposal submitted for the science AO to be submitted to the CSLI AO for purposes of prioritization. The CSLI calls have been annual, opening in the August timeframe and have advertised for launches 1-4 years out from the announcement. So the 2018 call will probably advertise for launches in the 2019-2022 timeframe.

Q-23 Is the \$17M charge the same for one launch or two launches?

The \$17M (note, this cost is being re-evaluated for the Final AO may increase to \$20M) is for only one launch of 100kg of payload. This charge is built off the scenario of a dedicated launch of multiple CubeSats. In the draft AO the last sentence in the paragraph that addresses this is in error and will be corrected in the final.

Q-24 What altitudes and inclinations are available?

As a secondary payload, its altitude and inclination would depend on the primary mission. The project can specify the orbit desired, but the more flexibility provided, the easier to manifest. Thus far, CubeSats have been deployed or are manifested for deployment into the following target orbits:

102 deg inclination; 420km X 810km
40.5 deg inclination; 500km circular
51.6 deg inclination; 400km circular (this is the ISS orbit, although altitude may be slightly higher or lower based on when in the reboost cycle the CubeSats are deployed)

97 deg inclination; 450km circular
98.2 deg inclination; 440km X 670km
90 deg inclination; 500km circular
85 deg inclination; 500km circular
55 deg inclination; 375km circular

In addition, we currently have 3 emerging small launch providers on contract (VCLS contracts mentioned above) to provide demonstration launches in the 2017/18 timeframe. If at least one of them is successful, we may have a potential for essentially a dedicated launch of a small payload that would be able to select the orbital parameters (generally LEO for these nano-launchers) needed to meet their science requirement.

Q-25 What are the predicted launch dispersions in altitude and inclination?

Launch vehicles orbit insertion accuracies are dispersions within **±50km in altitude and ±1.0°** in inclination, however they are very dependent on specific launch vehicle and target orbit. The VCLS launch vehicles may have larger tolerances as they are still developmental and we would be flying Class D type payloads. If tight tolerances on the destination orbit are important to your objectives, then state that and we will do our best to meet your desires. Just be advised that flexibility enhances our ability to find an appropriate launch. For specifics on each type

Athena; semi-major axis +/- 20 km, inclination +/-0.30 deg.

Pegasus; https://www.orbitalatk.com/flight-systems/space-launch-vehicles/pegasus/docs/Pegasus_UsersGuide.pdf

Delta; http://www.ulalaunch.com/uploads/docs/Launch_Vehicles/Delta_IV_Users_Guide_June_2013.pdf

Atlas V; <http://www.ulalaunch.com/uploads/docs/AtlasVUsersGuide2010.pdf>

Falcon9;

http://www.spacex.com/sites/spacex/files/falcon_9_users_guide_rev_2.0.pdf

Q-26 Do the limits on mass per cube (1.33 kg per cube) mentioned for the CubeSat Launch Initiative apply to this service?

The mass limitation is dependent on the launch and dispenser used. The 1.33kg/U is the most constraining limit and good for any scenario. The most constraining scenario is for a CubeSat secondary launch opportunity on a launch with a NASA science primary, in which case the 1.33kg per one U would apply. However, for CubeSats on a VCLS class mission or other government launch, CSLI is accepting CubeSat masses that exceed 1.33kg/U mass limit. For a

6U CubeSat, 12kg is a good limit to use that will satisfy any dispenser we have on contract.

Q-27 Please confirm that Phase E costs are or are not included in the \$115M cost cap.

Phase E costs are included within the PI-managed cost cap.

Q-28 Due to the uncertainty in launch dates for Cubesat up to 6 years in the future can you clarify the wording for Requirement Q-9?

Yes, Requirement Q-9. In the final SALMON-2, PEA Q will be modified to: "Proposals shall include a detailed development schedule (including integration plans) and an associated cost that for a SCM *with a launch readiness date no later than June 2022*, or for PMOs is consistent with the documented launch and operations schedule of the primary host mission."

Q-29 Can Requirement Q-17 be modified so that that launch services available from commercial entities are recognized?

Yes, the final Mission of Opportunity, PEA Q and will read, "Requirement Q-17. In addition to the requirements given in the SALMON-2 AO, all proposed SCM investigations, with the exception of investigations requiring flight on the ISS or suborbital-class missions, *or launch services purchased directly by the investigation*, must also provide a Letter of Commitment from the program or agency providing access to space. This Letter of Commitment must contain: ...".

Q-30 Can it be made clearer that all of the requirements in section 4.5.3.3 apply only to investigations that take advantage of the KSC CubeSat Launch Initiative (CSLI) and not to other Cubesat investigations?

Yes, Section 4.5.3.3 and requirement Q-21 of the final Mission of Opportunity, PEA Q will be modified to explicitly state these are relevant for NASA CSLI launches.

Q-31 Do Cubesat proposals need to address Requirement Q-24 of the SALMON-2 PEA Q?

Yes, Cubesat proposals need to address Requirement Q-24 and Requirement 39 in the SALMON-2 AO. Requirement Q-24 of the final Mission of Opportunity, PEA Q will be modified to explicitly state this.

Q-32 Will NASA allow a lower technical and cost risk for plans whereby within

the proposed effort an inexpensive initial pathfinder unit is launched and tested, with NASA not committed to funding the follow-ons until both technical and cost success has been proven in space with the pathfinder?

The general Technology Readiness Level requirement is to demonstrate a there is a plan to achieve TRL 6 by PDR. For CubeSat proposals that wish to demonstrate that technology by a full flight, it is more appropriate to propose the technology demonstrator to the Research Opportunities in Space and Earth Sciences (ROSES) Solicitation for Heliophysics Technology and Instrument Development for Science (HTIDeS).

Q-33 Will the two AOs be updated to cite “EXP-RQMT-0003, Small EXplorers (SMEX) Mission Assurance Requirements (MAR) Mission Risk Classification – NPR 7120.5 Class D” as the mission assurance requirements document for this acquisition?

Yes, this change will be made.

Q-34 What requirements, if any, are levied on NASA missions proposed for bandwidth restriction in the S- and X-band regardless of ground system provider?

Please review the *Spectrum Data Space Communications Bands* document and the *S-Band Overview* document located in the Program Library.

Q-35 Requirement Q-33 replaces requirement B-23, Q-34 replaces B-24, and Q-35 replaces B-27. Requirements B-23, B-24, and B-27 are in Version A of the requirements section F, which does not apply to Small Complete Missions. Does this mean that Q-33, Q-34, and Q-35 only apply to Partner Mission of Opportunity investigations??

SALMON-2 PEA Q Requirements Q-33, Q-34, and Q-35 apply to SCMs as well as PMOs. For SCMs, Requirements Q-33 and Q-34 apply in *addition* to Requirements B-31 to B-44 in Version B of SALMON-2 Section F. However, the following from Requirement B-31 should be noted:

In some areas (e.g., instruments), the data requested may have already been presented in another section of the proposal (e.g., the Experiment Implementation section). In such a case, a proposal may provide a reference to that section and need not repeat the data in this section.

For SCMs, Requirement Q-35 supersedes Requirement B-41. These clarifications will be documented in the Final SALMON-2 PEA Q.

Q-36 To allow a proper development cycle for balloon missions from Antarctica, can NASA extend the flight readiness date to December 2022?

For Small Complete Mission (SCM) MOs, proposers must specify the launch readiness date in the proposal, which is to be no later than June 2022. However, for balloon missions planned for launch from Antarctica during the December 2022 - January 2023 campaign, "launch readiness" per this requirement is considered to be one and the same as being at CSBF and ready to complete pre-deployment integration and testing with the CSBF support systems. June is the normal month for pre-deployment integration and testing at CSBF for Antarctic balloon missions, which in the case of this AO, must be no later than June 2022.

Q-37 If a proposal is for a constellation of satellites consisting of identical spacecraft buses, with some carrying instrument A and some carrying instrument B, does the proposal warrant two additional pages for an additional instrument? Also, if flight segment is defined as spacecraft bus plus payload, does this scenario constitute two flight segments based on two different flight configurations, thus warranting an additional two pages for the additional flight segment?

Assuming the instruments are not differentiated by science operations only, instrument B warrants two additional pages. But because the flight segments are only differentiated by something that has already been credited with additional pages, no additional pages would be warranted for the additional flight segment. If accommodation of instruments A and B imposed different requirements, resulting in significantly different spacecraft bus designs, two additional pages would be warranted for the additional flight segment.

Q-38 What cost information is allowed in the Heritage Appendix?

As stated in the Draft Heliophysics SMEX AO, Appendix B, Section J.10 Heritage, Requirement B-68 of the Draft Helio SMEX AO allows only specific types of cost information to be provided which is "a comparison of the cost of the heritage items to the proposed cost" only on "proposed elements with substantial design heritage". Requirement B-68 limits the discussion to "each element of any heritage from which the proposed investigation derives substantial benefit, including heritage from spacecraft subsystems, instruments, ground systems, flight and ground software, test set ups, simulations, analyses, etc."

Any cost information found in the Heritage appendix which is outside of the limited scope allowed by Requirement B-68 will not be considered in the evaluation of the proposal.

All other proposal cost information, as described in Appendix B, Section H. COST AND COST ESTIMATING METHODOLOGY of the Draft Helio SMEX AO, must be included in the page-limited Cost Section of the proposal. Please also note that Appendix B, Section J. PROPOSAL APPENDICES, Requirement B-54 of the Draft Helio SMEX AO states "...The proposer shall not include in these

Appendices material required in the page-limited sections in the body of the proposal. Any additional information not specifically within scope of an appendix will not be considered by the evaluation panel and may result in reduced ratings during the evaluation process or, in some cases, could lead to rejection of the proposal without review.”

The final PEA Q will include the same requirement that will supercede the SALMON-2 Requirement B-57.

Q-39 Please clarify Section 1.1. of the EXP-RQMT-003 document that states, “The developer shall prepare, document, and implement a Mission Assurance Implementation Plan (MAIP). Developer MAIP and Compliance Matrix drafts are due with AO response.”

The document EXP-RQMT-003 will be updated with new language, with the required information delayed to Step 2. The first paragraph in Section 1.1 will now read: “The developer shall prepare, document, and implement a Mission Assurance Implementation Plan (MAIP). Developer MAIP and Compliance Matrix drafts are due with the Concept Study Report.”

Q-40 How will NASA access risk for a proposal that includes a co-manifested or secondary payload pertaining to launch services, cost, and schedule?

Alternative access to space may include the provision of non-NASA launch services as primary, secondary, or co-manifested payloads on a U.S.- or foreign-manufactured launch vehicle. Proposals that include non-NASA launch services (purchased or contributed) obtained from a U.S. or non-U.S. partner shall meet the following requirements:

- When flying as a co-manifested or secondary payload, the proposer must demonstrate a commitment from the proposed co-manifested or primary mission organization(s) to accommodate the proposed payload or demonstrate that the launch services provider has an appropriate process to provide specific launch services; these commitments must be documented in a Letter from the appropriate organization(s).
- The proposal must identify the launch opportunity and must provide evidence in the proposal that the launch service provider agrees to manifest the mission should the proposal be selected and confirmed for flight by NASA. This evidence must include a Letter from the launch services provider containing, at a minimum, the following information:
 - Evidence that the launch services provider will provide the services described in the proposal under the conditions (cost, schedule) described in the proposal;
 - A description of the opportunity (or opportunities, if more than one under consideration) that the launch service provider can offer for consideration by the PI; and
 - A description of the process that the launch service provider will use in order to commit to the PI to provide specific launch services for the

proposed investigation, should NASA select the proposed investigation; this process description must include a notional schedule for identifying the specific launch opportunity and definitizing the cost.

- The proposal must describe the launch services, demonstrate compatibility with the proposed launch vehicle, and show how the provider will fulfill the mission requirements.
- The proposal must describe the arrangement between the PI and the non-NASA launch service provider to enable the PI's insight for launch services, consistent with NASA Procedural Documents (NPD) 8610.7 and 8610.23. Note that these NPDs allow unique arrangements for payloads able to tolerate more risk. NASA will develop an advisory approach based on the insight the PI is provided from the non-NASA launch service provider. The proposal budget must include \$2.0M for the NASA launch vehicle monitoring functions and advisory services that would enable NASA to review and advise the PI on launch vehicle information from the non-NASA launch service provider.
- For proposed secondary or co-manifested missions, or for missions proposed as hosted payloads, the PI assumes all risk for any delays in the implementation of the parent mission and shall, therefore, propose appropriate reserves for such schedule contingencies. Proposal shall include a minimum 9 months funded schedule reserve for this risk. Proposal shall provide justification for the schedule risk.

Alternative access to space options involves several complex issues at this stage of project maturity. It is in the proposer's best interest to clearly support the maturity of their plan and access to space possibilities. The minimum expectations for access to space arrangements must be included in the proposal to the level of detail outlined above. Any additional evidence of maturity or commitment provided will be used to support risk posture.

Q-41 Section 5.9.2 of the draft AO indicates that a launch vehicle will be provided as GFE, and that "Standard launch services ... will be provided". Should this be construed to mean that standard launch services will be provided at no direct charge to the project, i.e. outside the PI-Managed Mission Cost?

Section 5.9.2 of the draft AO regarding PI Managed Mission Cost and launch services has been superseded with the information provided in Community Announcement #2 (http://explorers.larc.nasa.gov/HPSMEX/pdf_files/CA2-05112016.pdf) dated April 14, 2016. Note that unencumbered cost reserves are not required for NASA provided launch services.

Q-42 Where is the ELV Launch Services Information Summary document?

The latest "ELV Launch Services Information Summary" document, dated 05/02/2016, is located in the SMEX program library at http://explorers.larc.nasa.gov/HPSMEX/SMEX/pdf_files/SMEX-

Q-43 What is the 2016 Heliophysics SMEX AO Cost Cap ?

The AO Cost Cap for a Heliophysics Explorer mission will be increased to \$165M in Fiscal Year (FY) 2017 dollars, including access to space, but not including any contributions. This supersedes the Cost Caps stated above in Q-4 and Q-27 in this this document.

Q-44 For a 2016 Heliophysics MO, are costs associated with NASA provided access to space or suborbital access outside the PI-Managed Mission Cost?

For a 2016 Heliophysics MO, costs associated with NASA provided access to space as a secondary payload for CubeSats that use CubeSat Launch Initiative (CSLI), suborbital-class missions, and investigations requiring flight to the ISS, will be outside the PI-Managed Mission Cost.

Q-45 The 2016 Small Explorer (SMEX) Announcement of Opportunity (AO) Heliophysics Explorer Program Q&A, Q-40 requires 9 months minimum funded schedule reserve for secondary/co-manifested launch schedule risk mitigation. Can any (or all) of the launch schedule reserve occur after the launch readiness date?

The baseline mission launch readiness date is specified in the AO, but potential delays in implementation of the parent mission may extend beyond this. The proposal and justification of reserves for associated schedule contingencies must include an assessment of likelihood of delay. In cases where the delay is expected to exceed 9 months, the cost of the duration in excess of 9 months may be adjusted according to the assessed likelihood of occurrence. In cases where the delay is expected to be less than 9 months, 9 months of fully-funded schedule reserve must be provided.

Q-46 The 2016 SMEX AO cites NPR 8715.6B, while the Program Library cites NPR 8715.6A. Since 8715.6A was still in effect upon AO release, should it be used instead of NPR 8715.6B?

Yes, but clarification is necessary. Earth-orbiting spacecraft with a perigee height of less than 2000 km in altitude or within 200 km of GEO are *not* required to be maneuverable, but these spacecraft *will be* required to have conjunction assessments performed for them. Also note, the requirement to budget for conjunction assessment risk analysis has been deferred to Step 2.

For further detailed information please contact: Ms. Lauri Newman (Telephone: 301-286-3155; E-mail: lauri.k.newman@nasa.gov).

Q-47 The 2016 Heliophysics SMEX AO Requirement B-4 and SALMON-2 PEA Q Requirement Q-41 both state “Proposals shall conform to the page limits specified in the *Proposal Structure and Page Limits* table”, but the respective tables do not provide for extra pages for additional separate, nonidentical science instruments (PEA) or flight elements (both). Given the inconsistency, do the Requirements or the tables govern the page limits?

2016 Heliophysics SMEX AO Requirement B-4 and SALMON-2 PEA Q Requirement Q-41 govern the page limits in the case of inconsistency. Furthermore, for both the AO and PEA, any extra pages may be distributed between Sections D-G as desired. Extra pages are not allocated for the first instance of either instrument or flight element. For example, an investigation involving spaceflight of 5 different science instruments would be considered to have 4 *additional* instruments (one of the instruments being the first instance of an instrument in the proposal). Such an investigation would be allowed up to $2 \times 4 = 8$ *additional* pages in the proposal to achieve adequate description of these instruments. Note that Q&A #37 provides an example of the page allowance for *additional* flight elements.

Q-48 Where is the final COMPLIANCE CHECKLIST (APPENDIX F on page F-1) for the Heliophysics Explorers Program 2016 Small Explorer (2016 Helio SMEX) Announcement of Opportunity?

The final version of the COMPLIANCE CHECKLIST (APPENDIX F on page F-1) is available in the corrected AO posted on July 29, 2016 on NSPIRES at: <https://nspires.nasaprs.com/external/solicitations/summary.do?method=init&objectId={A0C496AC-9B9D-8F7D-A506-B1695BF9BDE8}&path=init>
The previous Appendix F.1 on page F.1 (dated July 20, 2016) has been updated to remove the watermark that implied the table was a draft. The watermark has been removed. No other changes were made; the table as released was the final version.

Q-49 Does the “cost to complete” in AO Requirement 58 refer to mission Phases A-D, or Phases A-F?

Per AO Requirement 59, there are no minimum unencumbered cost reserve requirements for Phases E and F. The “cost to complete” in Requirement 58 is that through Phases A/B/C/D.

Q-50 Is collaborator funding considered a contribution to the Project? What are the associated Institutional Letter of Commitment requirements?

AO Requirement 48 states that: “Proposals shall identify the funding source for each collaborator; the costs shall be included in the Total Mission Cost.” Collaborator funding is considered a contribution to the Total Mission Cost (see AO Section 4.3.2). Institutional Letters of Commitment are required for individuals in the Step-1 proposal, provided that the individual’s effort is contributed and the individual is part of the Proposal Team (see AO Section 5.8.1.3).

PEA-Q Requirement Q-7 states that: “Proposals shall identify the funding source for each collaborator; the costs shall be included in the Total Mission Cost.” Collaborator funding is considered a contribution to the Total Mission Cost (see SALMON-2 AO Sections 4.3.2 and 5.8). However, the SALMON-2 AO (Section 5.10.1) does *not* require an associated Institutional Letter of Commitment: “Letters of Commitment signed by an institutional official must be provided from (i) all organizations offering contributions of goods and/or services (both U.S. and non-U.S., but excluding Co-I and collaborator services) on a no-exchange-of-funds basis ...”.

Q-51 Is there a page limit on a classified heritage appendix?

A classified heritage appendix, if provided, is limited to 30 pages. Per Section 5.8.3, “The requirements on content and format of the classified appendix regarding heritage are the same as those for the unclassified appendix regarding heritage (see Appendix B, Section J.10, for further details) ...”. Appendix B, Section J.10 states that “[t]his section is limited to 30 pages”, where “this section” refers to the unclassified heritage appendix.

Q-52 In what way are the Science Enhancement Options (Section 5.1.5) and the Data Management Plan (Requirement B-23) being deferred?

Per AO Requirements 12-14, if SEO activities are proposed, the proposal shall define and describe the proposed activities, which shall be clearly separable from the Baseline Science Mission and Threshold Science Mission investigations. If an extended mission SEO is proposed, it shall conform to the guidelines provided in the *SMD Mission Extension Paradigm* document. However, the requirement to estimate the cost of any SEO effort has been deferred until Step 2. In addition, NASA assumes that one or more activities specified will be proposed, even after downselection, so they need only to be described in proposals and/or concept study reports if they are atypical.

Per AO Requirement B-23, the end-to-end data processing from downlink of the data through archiving shall be described in the proposed investigation. In addition, the science and data products, and the appropriate NASA data archive and the formats and standards to be used, shall be identified. An estimate of the raw data volume shall be provided. The data latency by product for the

submission to the data archive of raw and reduced data in physical units accessible to the science community shall be defined. However, a schedule-based end-to-end data management plan is deferred until Step 2.

Q-53 Is the use of Ka-band required for science data return for the proposed investigations?

Per AO Requirement 29, the use of Ka-band is required for science data return, unless it is inappropriate for the proposed investigation. If the use of Ka-band for science data return is inappropriate for the proposed investigation, then proposal of an alternative communications approach shall be justified in the proposal. Justifications that may be acceptable include subsystem/component heritage, link availability, and power constraints.

Q-54 Regarding Q-39 above, Has a revised EXP-RQMT-003 document been issued? Please clarify Section 1.1 regarding when the Mission Assurance Implementation Plan (MAIP) and Compliance Matrix drafts are required.

Revision A of the EXP-RQMT-003 document was issued on 03 August 2016, and is posted in the Program Library. Section 1.1 now reads, "The developer shall prepare, document, and implement a Mission Assurance Implementation Plan (MAIP). Developer MAIP and Compliance Matrix drafts are due with the Concept Study Report."

Q-55 Can the bridge phase funding line at the bottom of Table B3b be deferred?

Proposed bridge phase funding requests are important considerations in Heliophysics Division budget planning, so the requirement for their provision will not be deferred.

Q-56 Is there a limit to the contribution fraction for a PEA MO?

No.

Q-57 Are contributions for Heliophysics SMEX proposals limited to each individual phase, or to the total project?

The Heliophysics SMEX contribution limit of 1/3 of the PI-Managed Mission Cost is applied over the entire project. There is no limit for any single phase or WBS element.

Q-58 For the Helio PEA Q, do CubeSat missions get lumped with the "suborbital

class” and therefore have a cost cap of \$35M, or does a CubeSat based mission have a cost cap of \$55M?

CubeSat missions are capped at \$55M. Balloons and sRLVs are the only missions with cost caps of \$35M.

Q-59 For both Helio SMEX AO and PEA Q, are all Fiscal Year costs to be in the Government Fiscal Year?

Yes, all Fiscal Year costs are to be expressed according to the Government Fiscal Year, October to September.

Q-60 How much advance notice will PIs be given as to when the no less than 24-hour window for Clarifications will be?

Several weeks before the potential major weaknesses are sent out to proposers, the Program Scientist will send an email out to each Principal Investigator stating the date proposers will receive potential major weaknesses and the due date and time for providing clarification responses. An update to this Q&A with a target period for Clarifications will be issued after the receipt of proposals.

Q-61 Can SEOs be proposed in the Step 1 proposals?

Yes, SEOs can be proposed in the Step 1 proposals. The final Helio SMEX AO (Section 5.1.5) and SALMON-2 AO (Section 5.2.5) both state: “NASA considers any proposed SEO activities as optional.” If included in a proposal, however, cost information is not required. Cost will be required for any SEOs included in the concept study reports of selected missions.

Q-62 For TMC evaluations, do multiple minor strengths/weaknesses combine to rise to the level of affecting the risk rating?

The TMC evaluation panel will determine the major and minor findings based on the definitions of major and minor strengths and weaknesses. TMC risk ratings are based only on major weaknesses and major strengths. Multiple related minor weaknesses or strengths could be combined into a major if the TMC evaluation panel deems it appropriate.

Q-63 What should we assume for the time period between end of Phase A and start of Phase B? Is this the 4-month (PEA) or 5-month (AO) "bridge"?

There is effectively no gap between the end of Phase A at downselection and the start of Phase B. The Bridge Phase represents the first 4 or 5 months of Phase B.

Q-64 Requirement 90 of the Helio SMEX AO and Requirement Q-23 of the Helio PEA Q specify \$2.0M NASA monitoring of non-NASA launches. How should we allocate this (one lump vs spread over time); what should be the timing of this cost in our cost breakout?

While there is no specific requirement regarding allocation of the NASA monitoring charge, our recommendation is to distribute it uniformly over mission Phases C and D. Also, note that the charge in PEA Q is not applicable to hosted payloads, in line with the SMEX AO.

Q-65 Section 5.6.6 of the Helio SMEX AO and Section 4.5.4 of the Helio PEA Q discuss how to include costs related to NASA services, and specifically indicate not to include NASA Headquarters overhead. Should the proposal include costs related to the GSFC Explorers Program Office activities to manage the project? If yes, how do we work with GSFC to estimate these costs, and are they included in the PI-Managed Mission Cost, or the Total Mission Cost?

No, projects are not responsible for Explorers Program Office personnel. The cited Sections of the Helio SMEX AO and PEA Q apply to NASA Civil Servants who are members of the proposal team.

Q-66 For the Helio SMEX AO (Requirement 89) and the Helio PEA Q (Requirement Q-22), should the cost of the 9-month funded schedule reserve be considered part of the 25% unencumbered cost reserve?

25% unencumbered cost reserves must be held against the cost of the 9-month funded schedule reserves. Per Helio SMEX AO Section 5.6.3, and SALMON-2 AO Section 5.5.2, funded schedule reserve must be included in the denominator of the unencumbered cost reserves calculation.

Q-67 For the Helio SMEX AO Requirement 58 and PEA Q Requirement Q-15, the text for the 25% unencumbered reserve requirement, indicates this should be against “cost to complete”. Should the “cost to complete” be the PI-Managed Mission Cost, or the Total Mission Cost? Should the reserve be taken against a total that itself has reserves in it (see prior question about funded schedule reserve), or only against planned costs?

The Helio SMEX AO Requirement 58 and Helio PEA Q Requirement Q-15 refer to the unencumbered cost reserves on the PI-Managed Mission Cost to complete mission development Phases A/B/C/D. The unencumbered cost reserves are the ratio of: 1) the amount of development unencumbered cost reserves for Phases A/B/C/D, not including funded schedule reserve, and 2) the PI-Managed Mission

Cost to complete development Phases A/B/C/D, including the cost of technical design margin, including funded schedule reserve, not including cost reserve or NASA-provided launch and monitoring/advisory service costs as applicable. See Helio SMEX AO Section 5.6.3 and SALMON-2 AO Section 5.5.2.

Q-68 In the SALMON-2 AO, Requirement B-33 refers to “Requirement B-46 thru Requirement B-44”. Is this a typo? What are the correct requirements?
Requirement B-33 in the SALMON-2 AO is in error. The first sentence of the correct Requirement B-33 reads: “NASA recognizes that the full depth of information requested in Requirement B-34 through Requirement B-44 may not be available for some aspects of mission implementation at this stage of mission design.”

Q-69 The Helio SMEX AO Section 7.4.4 and PEA Q Section 6.3.3 indicate that NASA may request site visits to review concept study results. Should Phase A funds be allocated to support such a site visit after the CSR has been submitted? Should the Phase A study period of performance extend beyond the nominal 11 month concept study period in order to allow proposers to support a site visit?

Adequate funding and schedule should be allocated in Phase A to support site visits. The draft *Guidelines and Criteria for the Phase A Concept Study* document in the Program Libraries states, in part:

“The concept study for each selected investigation will constitute the investigation’s Concept and Technology Development Phase (Phase A) of the Formulation process as outlined in NPR 7120.5E.” (Page 1)

“The product of a concept study is a Concept Study Report (CSR)...” (Page 1)

“Investigation teams are responsible for the content and quality of their CSRs, site visit presentations, and responses to weaknesses and questions...” (Page 2)

“The evaluation process will include visits by the evaluation team to each investigation team’s chosen site, to hear oral briefings and, if needed, to receive updates and clarification of material in the CSRs. These briefings will be conducted approximately two months following submission of the CSRs... NASA may identify weaknesses and questions and ask that the investigation team respond to these either prior to or at the site visit. (Page 3)

“Any additional information provided to NASA by the investigation team at the site visit, in response to the NASA-identified weaknesses and questions, or in response to NASA requests for additional information, will be treated as updates and clarifications to the CSR.” (Page 3)

Q-70 Is the Mission Unique Adapter cost a cost to develop a MUA, or to support a PI-provided MUA?

A “standard” payload adapter is included in the NASA-provided Launch Service. Standard adapters are described in launch vehicle-specific payload user guides. The Mission Unique Adapter cost includes the design and manufacturing of a custom adapter, if one is required. If the standard adaptor provided by the launch vehicle is suitable, the cost is already included in the \$50M charge; otherwise, the cost must be included in the PI Managed Mission Cost (PIMMC).

3 options for Payload Adapters:

- 1- Existing Launch Vehicle standard adapter: no additional charge (included in \$50M)
- 2- Mission unique adapter from NASA launch service: cost included in PIMMC
- 3- PI-provided adapter: cost included in PIMMC

Q-71 Please clarify whether or not NeN access costs or other non-NeN SCA N costs are to be held within the PI-Managed Mission Cost.

Q-6 in the posted Q&As is correct: “All costs listed in the Space Communications and Navigation (SCaN) Mission Operations and Communications Service (MOCS) are required and should be included in the PI managed cost cap.” See Helio SMEX AO Section 5.2.5 and SALMON-2 AO Section 5.3.6 for more details.

Q-72 If a commercial launch service provider will only commit to a 6-month launch window at this time (depends on finding a prime to out orbit), would it be acceptable for the launch readiness date (NLT August 2022) to be the start of that 6-month window?

Yes, assuming that you are ready to launch NLT August 2022, and have budgeted enough funds for the potential 6 month delay.

Q-73 For the Helio SMEX AO and PEA Q, do International Space Station payloads require inclusion of 9 months funded schedule reserve for launch delays?

The 9 months funded schedule reserve only applies to secondary or co-manifested missions, or for missions proposed as hosted payloads. If NASA launch services to ISS are used, then 9 months of funded schedule reserve are not required.

Q-74 For the Helio SMEX AO and PEA Q, does use of International Space Station (ISS) communications for health, status and instrument suite commanding, or transmittal of collected experiment data from the ISS, constitute “NASA network services” and is there a PI-Managed Mission Cost (PIMMC) associated with this?

For the SMEX AO and PEA Q ISS investigations, no NASA network service charges are required in the PIMMC.

Q-75 Section 6.1.2 of the SALMON-2 AO states “those who submit NOIs will receive any updates or AO amendments that may occur, up to the time of the proposal submittal deadline.” However, the Helio SMEX AO does not have that same statement. How will proposing teams (SMEX AO and PEA Q) be notified of updates and/or amendments?

The above statement from the SALMON-2 AO is in error. Any amendments will be announced by email to all subscribers to the SMD general information list in NSPIRES. For other updates, including clarifications and FAQs, proposing teams should check the solicitation pages and Q&As periodically.

Q-76 For the Helio SMEX AO, are unencumbered reserves to be included in the PI-Managed Mission Cost (PIMMC) for either the \$50M NASA-provided launch services (Section 5.9.2) or the \$50M NASA provided accommodations on and transportation to the ISS (Section 5.9.3)? For the Helio PEA Q, are unencumbered reserves to be included in the PIMMC for the \$20M NASA-provided launch services for CubeSat investigations (Section 4.6.4.3)? For both the SMEX AO (Section 5.9.4) and PEA Q (Section 4.6.2), are unencumbered reserves to be included in the PIMMC for the \$2M NASA launch vehicle monitoring functions and advisory services required for non-NASA launches?

Cost reserves are not required on any of these NASA-provided services. As stated in the Helio SMEX AO, Section 5.9.2: “The cost risk for NASA provided launch services is not included in the PIMMC. Therefore, cost reserves are not required for NASA-provided launch services.” Similarly, cost reserves are not required for the SMEX AO ISS investigations. Although not specifically stated in the PEA Q, for consistency with the SMEX AO, cost reserves are not required for the \$20M NASA-provided launch services for CubeSat primary launches. Also, although not specifically stated in the SMEX AO or PEA Q, no reserves are required on the \$2M NASA launch vehicle monitoring functions and advisory services.

Q-77 Section 2.2 of PEA Q indicates that programs are to be completed fairly quickly, generally in 36 months or less. How is this reflected in the requirements?

As indicated in Question 13 above, the 36-month interval generally describes the interval between the start of Phase B (following down-select) and the “end” of Phase D. For the purposes of this discussion, the end of Phase D is the launch readiness date (LDR). The LRD specified in Requirement Q-16 states, “Proposals shall include a detailed development schedule (including

integration plans) and an associated cost that for a SCM with a launch readiness date (LRD) no later than August 2022, or for PMOs is consistent with the documented launch and operations schedule of the primary host mission.” Note that the 9-month interval for schedule reserve for the cases specified in Requirement Q-22 occurs after the LRD.

Q-78 Regarding Earned Value Management (EVM), the 2016 Heliophysics SMEX AO and SALMON-2 AO refer entities receiving contracts to the NASA Far Supplement (NFS) for requirements. It is not clear whether an Earned Value Management System (EVMS) needs to be certified by the cognizant Federal agency in a timely fashion. What is the intent?

Note that Procurement Class Deviation PCD 15-05 (<http://www.hq.nasa.gov/office/procurement/regs/pcd15-05.htm>), issued on November 10, 2015, increased the threshold for EVMS compliance reviews from \$50 million to \$100 million. As a consequence, per Policy specified in the associated NFS 1834.201, “for cost or fixed-price incentive contracts and subcontracts valued at ~~\$50 Million~~ **[100 million]** or more the contractor shall have an EVMS that has been determined by the cognizant Federal agency to be in compliance with the guidelines in the American National Standards Institute/Electronic Industries Alliance Standard 748, Earned Value Management Systems (ANSI/EIA-748).” Also, “for cost or fixed-price incentive contracts and subcontracts valued at ~~\$20 M~~ **[100 million]** or more but less than ~~\$50 Million~~ **[100 million]**, the contractor shall have an EVMS that complies with the guidelines in ANSI/EIA-748, as determined by the cognizant Contracting Officer.” Compliance/validation are addressed in the associated NFS 1852.234-2, which is tailored with ALTERNATE I for contracts valued at less than \$100 million.

Q-79 The SALMON-2 AO Section 7.4.2 states "Proposals are not required to include SOWs and cost and pricing data for formulation and subsequent phases. These will be required only for investigations that are selected at the outcome of the competition." However, Appendix A Section VI states : "Submission of cost or pricing data, as defined in FAR 15.401, is required if the proposal exceeds \$650,000." Given that proposals responding to the PEA Q will be higher than \$650,000, please clarify the proposal requirement for cost and pricing data.

The SALMON-2 is inconsistent on this topic, and Section 7.4.2 is correct. Following selection and during negotiations leading to a definitive contract, the institution may be required to resubmit cost information in accordance with FAR 15.403-5. Submission of certified cost or pricing data, as defined in FAR 15.403-4, will be required if the Phase A cost, or the combined Phase A and Bridge Phase costs, exceed the current threshold of \$750,000. Certified cost or pricing data will also be required for proposals for subsequent mission phases.

Q-80 Page 15 of the Launch Services Presentation presented at the Preproposal Conference implies that Minotaur-C mass performance (800kg to 600km sun-synch) is available to proposers. If a proposer has a 550 kg spacecraft that is intended to be launched into a 600 km sun synch orbit and the spacecraft fits in the launch envelope shown on Page 18 of the proposal, is this acceptable?

Proposers are to design to the limiting/enveloping case of the potentially available launch vehicles (fairing size, performance, environments). The max spacecraft separation mass to a 600km sun synch orbit would be approximately 235kg per the limiting performance curves. Refer to Attachment 1 in the updated *ELV Launch Services Information Summary, Rev A*, in the Program Library.

Q-81 Is the Mission Unique Adapter cost a cost to develop a MUA, or to support a PI-provided MUA?

A “standard” payload adapter is included in the NASA-provided Launch Service. Standard adapters are described in launch vehicle-specific payload user guides. The Mission Unique Adapter cost includes the design and manufacturing of a custom adapter, if one is required. If the standard adaptor provided by the launch vehicle is suitable, the cost is already included in the \$50M charge; otherwise, the cost must be included in the PI Managed Mission Cost (PIMMC).

Three options for Payload Adapters:

- 1- Existing Launch Vehicle standard adapter: no additional charge (included in \$50M)
- 2- Mission unique adapter from NASA launch service: cost to be included in PIMMC
- 3- PI-provided adapter: cost to be included in PIMMC

Q-82 For the Helio SMEX AO proposals, what material is allowed on the Science Enhancement Options (SEO) pages?

As stated in the Helio SMEX AO Requirement B-4, two extra pages are allotted for all science enhancement options (SEOs) combined in the Science Implementation Section (Section E). These additional pages may be used to define and describe the proposed SEO activities as described in Section 5.1.5.

Q-83 Would CSLI support the launch of up to 6 CubeSats with a 6U configuration and onboard propulsion into a high inclination (>60 deg) LEO (~500km) from a single launch vehicle ? If so, would CSLI send prospective PIs a letter

to that effect?

It is possible for CSLI to support the launch described above. However, the potential requirement to launch this mission as a primary payload will be a consideration at selection. In addition, Q&A #20 states “As secondary payloads, it will be more difficult to get multiple CubeSats on the same launch/same orbit”, and Q&A #24 states “As a secondary payload, its altitude and inclination would depend on the primary mission. The project can specify the orbit desired, but the more flexibility provided, the easier to manifest”. Proposals using CSLI access to space are not required to include CSLI letters of commitment (see Q&A #21) and do not incur any additional access to space costs for multiple CubeSats (see Q&A #44). For launches under CSLI, a CubeSat with propulsion may require a waiver to the requirements in the Helio MO Program Library document *Launch Services Program, Program Level Dispenser and CubeSat Requirements Document* (LSP-Req-317.01), depending on the launch opportunities available. Note that the propulsive component may constrain the manifest options.