

NNM12ZPS001N - SLS ABEDRR Questions and Answers

Note: Some questions have been edited for clarity. Additionally, not all questions have been addressed at this time.

Question 66: In order to show compliance with the 130mT performance requirement, are guidance algorithms to be incorporated in the trajectory simulations the Offeror provides with their proposal?

Answer 66: No. The guidance algorithm does not have to be incorporated. The Offeror shall describe the flight simulation technique, data, and assumptions used for the ascent trajectory analysis. This should include a description of the vehicle steering methodology as applied to each stage of flight.

Question 67: Reference Appendix A, page 6, figure 2.

Part A.

- The booster envelope appears to be missing 53.4 in. ($810 - 212.8 - 212.8 - 331 = 53.4$ in.) Is this meant to reflect a 26.7 in. ($53.4 / 2 = 26.7$) spacing between each booster and core?
- If not, is there a hard requirement for the spacing between the boosters and core?
- The figure shows that the booster diameter must be less than or equal to 212.8 in. or 17.73 ft. Is this a hard limit or can the booster diameter be larger and the booster to core gap be less than 26.7 in. provided the maximum width does not exceed 810 in. required to fit through the Vehicle Assembly Building (VAB) door?

Part B.

- Does NASA anticipate moving the aft attach point shown in the figure prior to Final NRA release?

Answer 67: Part A. The Final NRA release will be updated to allow a maximum diameter of up to 227.5 inches (18 ft, 11.5 inches) for each Advanced Booster. For this NRA, this will maintain spacing of 12 inches between the core and each Advanced Booster, similar to the Shuttle's external tank to solid rocket motor spacing. This will also maintain a minimum clearance of 12 inches between the reference vehicle and the VAB doors on roll-out (including VAB door dimensions and alignment, crawler-transporter (CT) tracking error, CT leveling error, and VAB wind sway).

Part B. The recent assessment of the SLS configuration has moved the Core Stage to booster aft attachment 240.1 inches (20 ft) further down the vehicle ($X_{SLS} = 4624.5$). The new information will be provided with the Final NRA in Appendix A, Figure 2.

Question 68: Any LO₂/RP2-1 engine program will need new or adapted existing test facilities and other test infrastructure. If an Offeror proposes an engine test as part of risk reduction, we are concerned about potential estimating and funding issues for that facilitization, based on the statement at Industry Day that NASA is not liable for successfully executing any Space Act Agreement (SAA). What does NASA MSFC think about having engine test capability on their test stand and does that research task present any difficulties with Stennis Space Center during the risk reduction phase?

Answer 68: NASA will provide revised guidance on test stand facilitization in the Final NRA. The Offeror will remain solely responsible for the successful execution of their proposed effort. The evaluation criteria will be unbiased with regard to engine test location. The Offeror is referred to the Rocket Propulsion Test Program Manager, Roger Simpson for questions on suitable NASA locations for engine testing. He may be reached at 228-688-1874.

Question 69: What facilities can NASA provide for testing? For example: engine testing, component

level testing.

Answer 69: The Offeror is referred to the Rocket Propulsion Test Program Manager, Roger Simpson for questions on suitable NASA locations for engine testing. He may be reached at 228-688-1874.

Question 70: Reference Draft NRA Appendix A, paragraph 2.1, page 2. “The Advanced Booster will also interface with the Mobile Launcher (ML) at the eight existing mechanical hard points...” Will the eight hard points shown in Figure 4 on page 7 be existing, as they do not appear designed for the initial 5 segment solid rocket boosters?

Answer 70: The notional solid rocket booster was designed to fit the existing mechanical interface attach points. The attach points are based on two 146 inch diameter solid boosters 250.5 inches from the Core Stage (center-to-center), the same as Shuttle. This maintains 12 inches clearance between each booster and the Core Stage. The Offeror may choose to increase the diameter of their Advanced Booster concept and this will mandate a modification to the ML. Per Draft NRA paragraph 4.2.6.1.2, an Advanced Booster concept that requires modification of SLS Program requirements as described in the Draft NRA will be considered if significant affordability gains are documented in the Affordability Plan.

Question 71: Reference Draft NRA Appendix A, paragraph 3.0, page 4. Is the separation trigger of 40,000 lbf net thrust (per booster) applicable to the liquid booster system or is it based solely on propellant depletion?

Answer 71: The 40,000 lbf net thrust separation trigger is an analysis simplification only utilized for the solid booster solution and is not applicable to a liquid or hybrid booster solution. For the liquid or hybrid booster solutions, the simplified assumption is each booster fully expends its respective liquid propellant.

Question 72: Draft NRA page 1, Section 1.2, Bullet 2 states: “The construction of facilities is not an allowed activity under this NRA unless specifically stated.”

Part A. Please consider providing additional guidance in the Final NRA relative to the Offeror’s ability to include facility modification costs in their proposal.

For an RP-based liquid Advanced Booster concept, one of the biggest challenges will be developing/modifying the infrastructure required to develop and test large (>1 M lbf thrust) RP engines. Currently, the only operational, Government-owned RP test stand is at the Stennis Space Center’s E-Complex. This facility is limited in its capabilities to lower thrust levels and relatively short-duration tests. While it may be an option for component testing, it does not have the capability to conduct full-scale development testing or flight acceptance testing. Further, the stand is currently in use for the foreseeable future with other programs (namely AJ26).

While construction of new facilities for the risk reduction phase is not anticipated, it is likely significant modifications to existing test facilities will be required to support planned risk reduction activities which could include major component and engine-level hot-fire testing.

Part B. Please correct the statement to remove “unless specifically stated” as it appears it is stated nowhere else in the Draft NRA that construction of facilities will be allowed.

Answer 72: Part A: NASA will provide revised guidance on test stand facilitization in the Final NRA. The Offeror will remain solely responsible for the successful execution of their proposed effort. The evaluation criteria will be unbiased with regard to engine test location. The Offeror is referred to the Rocket Propulsion Test Program Manager, Roger Simpson for questions on suitable NASA locations for

engine testing. He may be reached at 228-688-1874. Part B: Concur.

Question 73: Draft NRA Section 4.2.6.2.1.3 includes the following: The Offeror shall identify any Government-owned facilities, industrial plant equipment, or special tooling that is proposed for use.

Please consider how NASA could help Industry level the playing field for the RP-based liquid propulsion infrastructure relative to the existing solid propulsion infrastructure.

Over the last 40 years, through the Space Shuttle Program, NASA has invested heavily in the development and the maintenance of the solid propulsion infrastructure of a single company. NASA has not invested similarly in the development and maintenance of the infrastructure required to develop and test large (>1 M lbf thrust) RP engines since the end of the Apollo Program. The test stands developed during Apollo have either been mothballed or converted to other uses, primarily liquid hydrogen propulsion testing.

If NASA intends to create a fair and level playing field for all propulsion concepts to compete for the Advanced Booster, it should give consideration to resurrecting/developing Government-owned RP-based propulsion test capabilities. This would allow Industry to use the capabilities and achieve relative parity with the solid propulsion infrastructure that NASA has funded for the last 40 years.

Answer 73: NASA will provide revised guidance on test stand facilitization in the Final NRA. The Offeror will remain solely responsible for the successful execution of their proposed effort. The evaluation criteria will be unbiased with regard to engine test location. The Offeror is referred to the Rocket Propulsion Test Program Manager, Roger Simpson for questions on suitable NASA locations for engine testing. He may be reached at 228-688-1874.

Question 74: NASA has accomplished a lot of activities lately on Commercial Crew standards and specifications where Industry and commercial documents and standards are acceptable substitutions to achieve affordability. In the Draft Model Contract, Attachment J-3, it states that approval to substitute will be provided by NASA. While approval is not required for the reference documents, standards and specifications chosen in this phase but later not approved by NASA carries significant risk and could have severe consequences to the proposed demonstration and/or risk reduction benefit. How will NASA address this specific balancing of affordability via substitution with technical risk?

Answer 74: Attachment J-3 does not require approval for document substitution. NASA certainly understands that applicable documents can significantly impact the cost of DDT&E, and potentially the benefits of this effort. It is incumbent upon the Offeror to detail ground rules and assumptions related to standards and specifications in their Affordability Plan; specifically, how standards substitution may reduce cost during DDT&E.

Question 75: Reference Draft Model Contract, Section G, Page G-1, Clause G.1. NFS 1852.227-70 is incorporated by reference. Recommend inclusion of Statement of Waiver of Rights to Inventions as in CCIDC Draft RFP. This will clarify parties' understanding with respect to rights to inventions earlier in the process, thereby eliminating uncertainty in the bidding process.

Answer 75: No change will be included in the Final NRA.

Question 76: Part A: Reference Draft Model Contract, Section H, Page H-1, Clause H.2. NASA FAR Supplement (NFS) 1852.223-70 is incorporated. Providing NASA approval authority over any operation NASA considers hazardous and requiring Contractor submittal, for approval, of hazardous operating

procedures and personnel qualification standards is not appropriate for a design and development contract. Recommend deleting paragraph H.2j. **Part B:** Alternatively, replace NFS 1852.223-70, Safety and Health, with NFS 1852.223-72, Safety and Health (short form), and add contractual language that narrows the scope by approving only those operations involving participation of NASA personnel and its support services Contractors.

Answer 76: **Part A:** No change will be included in the Final NRA. **Part B:** No change will be included in the Final NRA. For information purposes, the definition of NASA workforce includes Contractor employees working on NASA contracts.

Question 77: Reference Draft Model Contract, Section H, Page H-9, Clause H.15. A small business subcontracting goal equivalent to 10.5% of the total contract value has been established for this procurement. This is excessive in light of the unique nature of developmental work called for on this project. Recommend reducing the small business subcontracting goal equivalent to 5% of the total contract value.

Answer 77: No change will be included in the Final NRA.

Question 78: Reference Draft Model Contract, Section H, Page H-11, Clause H.17. This clause requires that Contractor travel and allowable expenses comply with the Joint Federal Travel Regulations (JFTR). This is inappropriate in light of the fact that NASA anticipates that awards made through this NRA will be in the form of a firm-fixed-price contract. Recommend deleting Clause H.17.

Answer 78: Clause H.17 will be deleted in the Final NRA; however, the JFTR will be utilized during negotiation if the Offeror is selected for award.

Question 79: Reference Draft Model Contract, Section I, Page I-3, Clause I.1. The inclusion of NFS 1852.215-78 is not required by or consistent with the guidance given in FAR 15.407-2 regarding make or buy programs. Inclusion of make or buy program requirements is particularly inappropriate in this context--a competitive procurement that will result in firm-fixed-price contracts. Recommend deleting reference to NFS 1852.215-78.

Answer 79: NFS 1852.215-78 will be removed from the Final NRA, Attachment 1 – Model Contract.

Question 80: Reference Draft Model Contract, Section I, Page I-5, Clause I.5. The inclusion of standard data rights clause FAR 52.227-14 (as modified by NFS 1852.227-14) does not fairly balance the interests of the parties when it is anticipated that Contractors will share the costs of development. The Government should not receive unlimited rights to data developed in whole or in part with private funds. The CCIDC Draft RFP, which similarly was premised on the Contractor sharing in the cost of development, included a deviation to FAR 52.227-14 (as modified by NFS 1852.227-14) and Alternates I, II, and III, which allocated data rights more fairly than the standard clause. Recommend substituting the data rights clause that NASA incorporated in the CCIDC Draft RFP for the standard data rights clause in I.5.

Answer 80: No change will be included in the Final NRA. NASA cannot evaluate an Offeror's approach at this stage in the process prior to initial proposal submission.

Question 81: Reference Draft Model Contract, Section I, Page I-5, Clause I.5. The inclusion of standard data rights clause FAR 52.227-14 (as modified by NFS 1852.227-14) is not consistent with Clause H.16 of the Draft NRA, which presumes inclusion of Alternates II and III with FAR 52.227-14. Recommend

adding Alternates II and III to FAR 52.227-14 in Clause I.5.

Answer 81: Alternates II and III will be incorporated into Clause I.5 in the Final NRA.

Question 82: Reference Draft Model Contract, Section I, Page I-5, Clause I.5. The definition of "limited rights" in FAR 52.2217-14, Alternate I is more appropriate for the contemplated situation where it is anticipated that Contractors will share the costs of development. Recommend adding Alternate I to FAR 52.227-14 in Clause I.5.

Answer 82: No change will be included in the Final NRA. NASA cannot evaluate an Offeror's approach at this stage in the process prior to initial proposal submission.

Question 83: Reference Draft Model Contract, Attachment J-2, Page J-2-14. DRD No. MA-003 requires the Offeror to provide detailed project scheduling information to NASA on a monthly basis. Can an Offeror propose different timeframes in order to optimize project performance?

Answer 83: Yes. The Offeror is allowed to propose modifications to any aspect of the DPD, especially if value to the Government can be demonstrated.

Question 84: Reference Draft Model Contract, Attachment J-2, Page J-2-14/15. DRD No. MA-003 states: "The program/project schedule shall be created and maintained in management software that supports automated time phasing of tasks, a logic driven critical path, schedule assessment, and trend analysis capabilities." Part A. Is Microsoft Project an example of an approved "management software" product? Part B. If an Offeror uses a different management structure/process than what is referenced in MA-003, what steps must be taken to receive NASA approval to use the existing Offeror process/"management software"?

Answer 84: Part A. Yes, Microsoft Project is an acceptable management software tool. Part B. The Offeror is allowed to propose modifications to any aspect of the DPD, especially if value to the Government can be demonstrated.

Question 85: Reference Draft NRA Appendix E, Page 2, Item 5a. Material states "estimated cost" for a fixed price. Is NASA looking for a proposed price here or is NASA looking for a cost reimbursable proposal for materials? Recommend changing "the estimated cost" to "the proposed price."

Answer 85: The Final NRA Appendix E will be revised to read "the proposed price."

Question 86: Reference Appendix E, Page 2, Item 9. Why is Profit/Fee required for a firm-fixed-price proposal? Recommend adding "(if any)" to Item 9.

Answer 86: The Final NRA Appendix E will be revised to add "if any" to Item 9.

Question 87: Reference Draft NRA Summary, Page 16, Section 4.2.6.4.3. What level of the Work Breakdown Structure (WBS) is a sufficient level? Recommend changing "at a sufficient level" to "to at least level 2."

Answer 87: The Offeror shall determine the depth of the WBS level that is sufficient to communicate a complete understanding of the proposed effort to NASA. No change will be included in the Final NRA.

Question 88: What type of insight model does NASA plan to utilize on this firm-fixed-price effort?

Concerns exist that NASA's insight/oversight model is a large burden that typically adds tremendous cost to NASA projects. Recommend using a very limited insight model that minimizes any Government-directed change to the technical effort.

Answer 88: A very limited insight model has already been implemented in the development of this NRA as evidenced by only requiring monthly reports, quarterly technical interchange meetings, and limited deliverables at the beginning and at the completion of the contract.

Question 89: Previous answer to question #25 stated that NASA trade studies determined the need for a Thrust Vector Control (TVC) on the Advanced Booster. Please provide the trade study or the ground rules and assumptions for such a trade study.

Answer 89: The SLS baseline configuration includes TVC on the boosters. This configuration was based on a series of preliminary analyses rather than a formal trade study. The Offeror is allowed to modify the baseline configuration if significant affordability gains can be shown.

Question 90: Part A: Industry Day presentation, slide 8 states, “*Future Core Stage Engine: Separate contract activity to be held in the future*”. Is this intended to be a JOFOC follow-on for the RS-25, or an open competition? (This is relevant to ABEDRR because changing SLS requirements to support a common engine/propellant across core and boosters may show significant affordability gains. ABEDRR could be used to reduce the risk of this approach.) Part B: Will a proposal based on an Advanced Booster concept that includes a common engine and propellant across elements be rejected outright, or be objectively evaluated?

Answer 90: Part A: No additional information is available on the core stage engine acquisition at this time. Part B: NASA cannot evaluate an Offeror’s approach at this stage in the process prior to initial proposal submission.

Question 91: In the context of the ABEDRR Draft NRA, is “reducing risk” synonymous with advancing the Technical Readiness Level (TRL) and Manufacturing Readiness Levels (MRL) of components, subsystems, or systems in a proposed Advanced Booster concept?

Answer 91: Yes.

Question 92: Does NASA intend to score Affordability subjectively for each proposed Advanced Booster concept/Affordability Plan or by some quantitative means?

Answer 92: The Offeror is referred to Draft NRA Section 4.2.6.1.3, Affordability Plan, and Section 5.0, Application Review Information.

Question 93: If quantifying Affordability of an Advanced Booster concept requires comparing (lifecycle) cost estimates to a baseline funding profile, then please provide a profile (or identify a profile published in one of the SLS planning documents or trade studies as an arbitrary baseline).

Answer 93: SLS PPB&E information will not be included in the SLS Affordability Plan or the Final NRA. The Offeror shall provide pertinent ground rules and assumptions used in their Affordability Plan.

Question 94: At what confidence level will affordability estimates be compared? If not stated, should mean, median, or 70th percentile be used?

Answer 94: Affordability ROMs will be evaluated in accordance with Factor 1 – Relevance to NASA Objectives as contained in the Final NRA.

Question 95: Is it NASA’s intent to allow an Offeror propose limits on the Governments rights to data and intellectual property in order to prevent the Government from sharing with potential competitors?

Answer 95: No. It is not the Government’s intent to prevent sharing of data with potential competitors by limiting the Government’s rights to data and intellectual property.

Question 96: Will an Offeror be penalized in the evaluation of Intrinsic Merit for proposing limits on Government rights to data and Intellectual Property first developed in performance of this contract, but partially supported by the Offeror’s facilities, resources and funding?

Answer 96: Per Draft NRA Section 5.1.3.2, the Government will evaluate the appropriateness of the asserted data rights proposed as unlimited, limited, and/or restricted. NASA cannot evaluate an Offeror’s approach at this stage in the process prior to initial proposal submission.

Question 97: It appears it is NASA’s intent in Clause H.16 to allow an Offeror to propose limits on Governments rights to data and intellectual property (IP) in order to prevent the Government from sharing with potential competitors. (Thereby allowing these limitations to be included in assessments of Intrinsic Merit, and enabling the benefits of free market economics/competition to improve the affordability of Advanced Booster concepts.)

The FAR referenced in the Draft NRA Paragraph 5.1.3.2 and the Model Contract sections Contract H.16 and I.5 currently states, *“The Government shall have unlimited rights in data first produced in the performance of this contract”*. It appears to disallow tailoring of data rights and IP, even if the Offeror provides significant resources to support the ABEDRR effort. A tailored wording to support the intent of the Draft NRA might be, *“The Government shall have unlimited rights in data first produced in the performance of this contract exclusively at Government expense.”*

Answer 97: The only intent of H.16 is to establish a mutual understanding with respect to data rights at the beginning of the contract. No change will be included in the Final NRA.

Question 98: Could NASA clarify the maximum allowable number of tasks to be bid per proposal? “1-5 preferred” may not be prescriptive enough and may complicate NASA’s evaluation process.

Answer 98: There is no “maximum.” The “1-5 preferred” is intended to be a reasonable goal considering page limitations given in the NRA.

Question 99: Does NASA anticipate a final proposal revision (FPR) to allow the Offeror to incorporate Government findings, discussions comments, and/or negotiations agreements?

Answer 99: In accordance with NASA FAR Supplement (NFS) 1835.016-71(d)(4), final proposal revisions shall not be requested. However, as stated in Draft NRA Section 5.2, paragraph 3, “When a proposal is selected for award, negotiation and award will be handled by the procurement office in the funding installation. The proposal is used as the basis for negotiation. The Contracting Officer may request certain business data and may forward a model award instrument and other information pertinent to negotiation.”

Question 100: In case of conflicting statements, which takes precedence, the Draft NRA instructions or

Model Contract?

Answer 100: The Government did not intend for any conflict to exist within the Draft NRA, which includes the Model Contract. The Offeror is expected to identify any conflict found within the Final NRA.

Question 101: In the Draft NRA NASA states “all three evaluation factors are relatively equal in importance.” Would NASA elaborate on what is meant by “relatively equal?”

Answer 101: The evaluation factors are relatively equal in importance in accordance with NFS 1852.235-72(i)(1). Relatively equal means that one evaluation factor is not more important than any other evaluation factor.

Question 102: Is it safe to assume the NASA objectives of affordability, reliability, and performance are listed in the order of importance to NASA?

Answer 102: As stated in Draft NRA Section 5, Factor 1, NASA’s objectives are to enhance affordability, improve reliability, and meet the set of performance requirements. Affordability is more important than reliability or performance. Reliability and performance are considered equal in importance.

Question 103: Is our understanding correct that the “Relevance to NASA Objectives” section is to discuss *what* will be done to meet the NASA objectives and “Intrinsic Merit” section is to discuss *how* the NASA objectives will be met?

Answer 103: The stated understanding follows closely with chart 42 of the ABEDRR Industry Day presentation. The chart states that Volume 1: Relevance to NASA Objectives includes the “Why/What” and Volume 2: Intrinsic Merit includes the “What/How.” This simplification was intended to convey understanding of the relationship between the volumes to a broad audience. The Offeror is referred to Draft NRA Section 4 for detailed instructions on content required and Section 5 for evaluation criteria.

Question 104: The Draft NRA states: “Relevance to NASA Objectives will be given strengths and/or weaknesses for each proposal.” “Intrinsic Merit” will be given strengths and/or weaknesses for each engineering demonstration and/or risk reduction.” Recommend that each statement use engineering demonstration and/or risk reduction.

Answer 104: No change will be included in the Final NRA. Relevance to NASA Objectives will receive strengths and weaknesses leading to a single adjectival rating per proposal. Intrinsic Merit will receive strengths and weaknesses leading to multiple adjectival ratings—one per EDRR.

Question 105: Can the total 43 page count limit for Volume 1 be sub-allocated differently than: the 25 pages for Relevance to NASA Objectives, 3 pages for Executive Summary, and 15 pages for Affordability Plan shown in the Draft NRA?

Answer 105: No. The sub-allocations shall be followed; however, the Final NRA will increase the Relevance to NASA Objectives limit to 35 pages.

Question 106: Draft NRA Section 2.2 states that successor proposals and resubmissions will not be entertained. This seems to conflict with section 4.3.2, which states that proposals or proposal modifications may be submitted after the stated due date but may only be considered if they result in a

significant reduction to cost or have significant technical advantages over the previous submittal. Please provide clarification regarding the submittal of proposal modifications.

Answer 106: The two cited Sections are not in conflict.

Per Section 1.5 of the Guidebook for Proposers Responding to a NASA Research Announcement (NRA) or Cooperative Agreement Notice (CAN) as referenced with the Draft NRA, holders of existing research awards frequently submit follow-on or “successor proposals” to successive NRAs that are issued for continued pursuit of the same NASA program objectives in order to extend an ongoing research activity to its next logical step. As this NRA is unique in its requirements, no successor proposals or resubmissions will be entertained.

Section 4.3.2 “Late Proposals” relates to proposal submissions specific to this acquisition, not an existing basic or applied research effort.

Question 107: FAR Clause 52.223-14, Toxic Chemical Release Reporting, is currently listed as “Removed and Reserved”. Suggest removing this clause in the model contract.

Answer 107: FAR Clause 52.223-14 will be removed from the Final NRA, Attachment 1 – Model Contract.

Question 108: NFS 1852.215-78, Make or Buy Program Requirements, states that a Make-or-Buy Program plan should be submitted in accordance with FAR 15.407-2. Per FAR 15.407-2, the Make-or-Buy plan is not required for R&D efforts, of which a NRA would be considered R&D. Suggest removing this clause from the model contract.

Answer 108: NFS Clause 1852.215-78 will be removed from the Final NRA, Attachment 1 – Model Contract.

Question 109: Draft NRA Section 4.2.6.3.2.5 requires the “Offeror to submit a detailed schedule of all work items to be undertaken”. In accordance with the standalone task pricing requirement, is it NASA’s preference that the Offeror provide standalone schedules for each task instead of an integrated master schedule for all tasks being proposed?

Answer 109: The Offeror has flexibility in its proposal submittal provided the Government has the ability to distinguish between specific EDRRs.

Question 110: The solicitation indicates the vehicle performance requirement is 130 mT. Additionally, a request is made for the Offeror to discuss the margin that should be allocated above this requirement. Without detailed knowledge of the vehicle design, its sub-system maturity, its development plan, etc., it becomes difficult to determine the overall development risk posture of the vehicle and thus its margin needs. Suggest the 130 mT performance requirement be fixed with no discussion on vehicle level margin.

Answer 110: It is early in the concept formulation phase and specific details about vehicle level uncertainties are not available at this time; therefore, there is no firm requirement for payload mass margin. However, NASA has provided fill-in-the-blank locations in Appendix B, sheet “1.5-Performance” to document the Offeror’s results for payload mass margin (see worksheet cells for rows 22 and 23). The Final NRA Appendix A, paragraph 4.1 will be modified to remove the request for discussion of “appropriate” margin.

Question 111: Appendix B Sheet 2 requests detailed design information that appear to be inconsistent with the fidelity of a booster conceptual design. In addition, the NRA may be utilized to perform risk reduction tasks that would ultimately define the parameters requested in Sheet 2. Particularly, the requested descriptions for fabrication and inspection processes of each sub-system seem premature. Suggest Sheet 2 be limited to a general, qualitative description of the concepts major sub-systems and only those parameters necessary to confirm performance results

Answer 111: The level of detail requested shall be sufficient to enable the Government to evaluate the relevant technical risks associated with the Offeror's Advanced Booster concept. Appendix B sheets 2, 3, and 4 request short descriptions of the proposed fabrication and inspection process of the Advanced Booster concept. These descriptions shall enable the Government evaluation of the expected significance and value to each proposed EDRR effort to the Advanced Booster concept, particularly with respect to this NRA's objectives of affordability, performance, and reliability.

Question 112: Does the booster stage dry weight provided in Appendix B Sheet 1.2 represent basic or predicted mass? Is this consistent throughout the other provided masses?

Answer 112: The Offeror shall treat the values as predicted mass. The mass data is addressed consistently throughout the NASA provided information.

Question 113: Draft NRA paragraph 4.2.6.1.2.1 implies a risk assessment is required from the integrated level down to the component level. For a conceptual design, many subassembly & component design solutions are undefined. Is it NASA's desire to have the risk assessment performed down to the level the proposed risk reduction tasks will address or truly down to the component level? Is it correct to assume that TRL, MRL, CRL, PRL type assessments are not required?

Answer 113: The Offeror is to summarize all relevant technical risks commensurate with the level of concept maturity. From this list of total risks, a subset of proposed risk reduction tasks will then be proposed by the Offeror, which can be at any level of assembly. Readiness level type assessments are not required.

Question 114: Draft NRA paragraph 4.2.6.1.2.8 requests reliability features such as verification/acceptance testing, inspection steps, failure mode interactions. At the conceptual design level, many of these features may be undefined at the sub-assembly & component level. Is it NASA's intent to address reliability at the system level or in a more detailed sense down to the component level?

Answer 114: NASA will evaluate the Offeror's reliability input at the level it is proposed. Section 5 will be clarified in the Final NRA.

Question 115:

Topic: Plan Submittal Requirements

- Reference(s):
Summary of Solicitation, Page 15, Section 4.2.6.4 and Attachment J-1
- Problem Statement:
The Draft states: "An Offeror selected for award shall provide an Organizational Conflict of Interest Avoidance Plan and an IT Security Management Plan." However, this statement is followed and preceded by statements of requirements that appear to be due with the original proposal. Attachment J-1 says these plans are "to be provided by Offeror selected for award" but provides no clear definition of the timeframe. The OCI Plan DRD says its initial submission is

due "not later than the final proposal due date," and the SHE Plan DRD says, "to be provided no later than 30 days after award."

○ Resolution / Request:

Please clarify whether the OCI Avoidance Plan and the IT Security Plan are due with the original proposal or only if selected for award. If the latter, please provide a specific timeframe (at ATP, 30 days after ATP, etc.).

Answer 115: The Organizational Conflict of Interest (OCI) Avoidance Plan and an IT Security Management Plan are not required with the proposal submission. In the secure Technical Library, the reference OCI Plan DRD is provided as an aid for the Offeror in preparation of an OCI Avoidance Plan that will be evaluated by the Government if an Offeror is selected for award. Section 5.2 of the Final NRA will be updated to delineate when delivery of the documents will be required.

Question 116:

Topic: Plan Submittal Requirements

○ Reference(s):

Summary of Solicitation, Page 15, Section 4.2.6.4

○ Problem Statement:

The Draft states: "The Offeror shall provide a Safety, Health, and Environmental (SHE) Plan per DRD SA-001." However, this statement is preceded by some statements of requirements that appear to be due with the original proposal and others that appear to be due only if selected for award. Attachment J-1 says this plan is "to be provided by Offeror selected for award no later than 30 days after award" but provides no clear definition of "award" (that is, does "award" mean ATP, notification of selection for negotiation, or other).

○ Resolution / Request:

Please clarify whether the SHE Plan is due with the original proposal or only if selected for award. If the latter, please provide a specific timeframe (at ATP, 30 days after ATP, etc.).

Answer 116: The Offeror is not to submit a Safety, Health, and Environment Plan with their proposal. The final SHE DRD will be tailored after selection to the specific Statement of Work selected. The initial submission of the Offeror's SHE Plan is required no later than 30 days after award. The Final NRA paragraph 4.2.6.4 and Attachment J-2, SHE Plan DRD will be updated for clarification.

Question 117:

Topic: Plan Submittal Requirements

○ Reference(s):

Summary of Solicitation, Page 15, Section 4.2.6.4

○ Problem Statement:

The Draft states: "An Offeror selected for award shall provide an ...IT Security Management Plan." No DRD or other guidance for creating this Plan is provided in this paragraph (unlike the guidance provided for the SHE Plan). Based on past experience, creation of this Plan can be very involved (and costly).

○ Resolution / Request:

Does NASA expect that development of this Plan is to be included in the price of our proposed program? Can NASA provide a DRD and/or other guidance with respect to the creation of the IT Security Management Plan?

Answer 117: Yes. The Offeror shall include development of this plan in the price of their program. NASA does not have a reference DRD for the IT Security Management Plan. Reference Model Contract Section I, Clause I.13.

Question 118:**Topic: DPD Submittal Requirements**

- **Reference(s):**
Summary of Solicitation, Page 16, Section 4.2.6.4.2
- **Problem Statement:**
What DPD documents are due with the original proposal submittal? The DPD appears to state that only the Affordability Plan (MA-004) is due with the proposal. It does not state that a Master Schedule (MA-003) is due with the proposal; however, various parts of the solicitation clearly state that a schedule is required.
- **Resolution / Request:**
Are these two documents to be submitted as separate DPD documents or as integral parts of the proposal? Our interpretation is that Master Schedule is to follow the requirements of MA-003 but is submitted per the proposal instructions (i.e., not as a DPD submittal); and that the Affordability Plan is to follow the requirements of MA-004 but is to be submitted as part of Volume 1 of the proposal rather than as a separate DPD submittal. Are these interpretations correct?

Answer 118: Yes. Interpretations are correct. The Affordability Plan shall be submitted as a part of Relevance to NASA Objectives, has a 15 page limitation, and shall follow the requirements of MA-004. The schedule data shall be submitted as a part of Volume II - Intrinsic Merit and also shall follow its MA-003 requirements. The Final NRA will be revised to reflect this change.

Question 119:**Topic: Property Reporting**

- **Reference(s):**
Model Contract Section G.13
- **Problem Statement / Question:**
We interpret this to mean only capital assets/property purchased with contract funds under this NRA are to be included in the Property Reporting. And we interpret that property that is purchased with Contractor's capital funds—such that the title would remain with the Contractor—is not included in the property reporting. Is this correct?

Answer 119: The interpretation is correct.

Question 120:**Topic: Page Limits**

- **Reference(s):**
Section 4.2.6.7.2, Page 16
- **Problem Statement / Question:**
Can a proposal Compliance Matrix be included as part of the Table of Contents (i.e., as part of the unlimited page count) for each volume?

Answer 120: No. If the Offeror chooses to submit a Compliance Matrix, it must be included in the page count for each volume.

Question 121:**Topic: Production Assumptions**

- **Reference(s):** N/A
- **Problem Statement / Question:**
What are the baseline first flight date, production flight rate, and duration of production campaign we should assume for the SLS Advanced Booster? Does NASA anticipate any test flights for the

advanced booster during DDT&E?

Answer 121: SLS PPB&E information, including but not limited to flight rates, baseline first flight dates and other planning information will not be included in the SLS Affordability Plan or the Final NRA. The Offeror shall provide pertinent ground rules and assumptions used in their Affordability Plan and concept ROMs, cost and schedule.

Question 122:

Topic: Cost ROMs

- Reference(s):
Section 4.2.6.1.3.1
- Problem Statement:
NASA states in section 4.2.6.1.3.1 that "The Offeror shall submit schedule and cost Rough Order of Magnitudes (ROMs) for their Advanced Booster concept for DDT&E, production, and operations using a cost model tool and in-house cost estimates. Costs shall account for affordability strategy, systems integration, contractor fee, program support, contingency/margin, and vehicle integration costs."
- Resolution / Request:
Please provide further definition of "program support." Does that include any estimated US Government oversight/insight costs? Please also provide further definition of "vehicle integration costs." Does that include the costs for integrating the advanced booster and/or does that include the costs for integrating (physically and analytically) with the SLS core stage?

Answer 122: No further definition is available for program support and vehicle integration costs. ROMs shall include all costs associated with the Offeror's Advanced Booster concept. The Offeror shall provide pertinent ground rules and assumptions used in their Affordability Plan and concept ROMs, cost and schedule.

Question 123:

Topic: Milestone Payment Table

- Reference(s):
Model Contract Section B.3
- Problem Statement / Question:
Based on the direction to submit price information for each proposed EDRR task as a "free standing" risk area, should we complete and submit a separate Milestone Payment table for each individual proposed EDRR task? Or should we submit a single table for the entire proposed program?

Answer 123: The milestone payment plan should be based on the Offeror's total proposed firm-fixed-price amount. If the Offeror is selected for a partial award, the milestone payment plan may require an update and be subject to negotiation.

Question 124:

Topic: Key Personnel and Facilities

- Reference(s):
Model Contract Section H.5
- Problem Statement / Question:
Should we provide a separate list of Key Personnel and Facilities for each individual proposed EDRR task or a single list for the entire proposed program?

Answer 124: H.5 will be updated to request a separate listing by EDRR in the Final NRA.

Question 125:

Topic: Contract Hardware Deliverables

- Reference(s):
Model Contract Section F.3
- Problem Statement:
Should we provide a separate list of Contract Hardware Deliverables for each individual proposed EDRR task or a single list for the entire proposed program?

Answer 125: F.3 will be updated to clarify identification by EDRR in the Final NRA.

Question 126:

Topic: Rights in Data

- Reference(s):
Model Contract Section H.16
- Problem Statement / Question:
Should we provide a separate list of proposed data rights for each individual proposed EDRR task or a single list for the entire proposed program?

Answer 126: The proposed data listing should be based on the Offeror's total proposed effort. If the Offeror is selected for a partial award, the proposed data listing may require an update prior to award.

Question 127:

Topic: Space Act Agreements

- Reference(s):
Section 4.2.6.2.1.2.1, page 11; Section 4.2.6.4.4, page 16; Section 4.2.6.7.2, page 17
- Problem Statement:
Space Act Agreements (SAAs) appear to be required under both Volume 2 (Intrinsic Merit) and the Model Contract.
- Resolution / Request:
If applicable, should we submit related documents (e.g., SAAs or Other Government Agreements, Letters of Intent for SAAs or Other Government Agreements, or Signed Teaming Agreements) as attachments to Volume 2 (Intrinsic Merit), within the Model Contract as part of the Subcontracting Plan, or both? Please clarify.

Answer 127: The Final NRA will be revised to only require SAAs or other related documents (if applicable) in the Subcontracting Plan as Attachment J-5 of the Model Contract.

Question 128:

Topic: Major Subcontractor Information

- Reference(s):
Section 4.2.6.2.1.2, Page 10; Appendix D Subcontractor Information in Volume 2; and Draft NRA Q&A Set 2, Answers 48 and 64
- Problem Statement:
Question 48 of Q&A Set 2 asked, "Are the Appendix D Subcontractor Information sheets intended to be included in proposal Volume 2 (Intrinsic Merit), which is limited to 50 pages?" NASA's answer was given as, "The Final NRA page limit will not be increased for Appendix D inputs."

Also, Answer 64 of Q&A Set 2 stated, "The definition of major subcontractors will apply to the

engineering demonstrations and/or risk reductions efforts proposed.” (That is, by task, not by total contract value.)

It is likely that an Offeror could propose a small EDRR task (say, \$5M value) that includes the support of several subcontractors whose work is small, but by the requirement of Answer 64, exceeds the 5% threshold, so the subs must be categorized as major subcontractors. For this size task, subcontractors minimally meet this threshold at a subcontract value of \$250k. If an Offeror proposes several such small tasks (say, up to 5), and it selects several subcontractors to support each task (say, 4 per task) which slightly exceed the 5% threshold, then the Offeror may be required to submit Appendix D Subcontractor Information for up to 20 subcontractors, many of which could have contracts of about \$250k (or less than \$10k per month over the contract). This could add up to many pages of content in Volume 2, severely limiting the page count for Management / Technical Approach.

○ Resolution / Request:

In order to allow an Offeror fair page count for any size EDRR task(s), we recommend that the Appendix D Subcontractor Information form be excluded from the Volume 2 page limits.

Answer 128: NASA encourages the Offeror to utilize small businesses to the maximum extent but does not intend to adjust the location of Appendix D nor increase any page limitation for Appendix D. However, Appendix D is being corrected to comply with format limitations within the Final NRA.

Question 129:

Topic: Aft Attach Point

○ Reference(s):

Appendix A, page 6, Figure 2

○ Problem Statement / Question:

The Advanced Booster aft attach point to the SLS Core Stage shown in Figure 2 appears to reflect the 4-segment SRB aft attach location plus the additional booster length due to the 5th SRB motor segment. It is our understanding that the aft attach is moving aft an additional 240 inches (due to NASA analysis and design). Will this be updated in the Final NRA?

Answer 129: Yes, the intent is to update Appendix A, Figure 2 in the Final NRA. The recent assessment of the SLS configuration has moved the Core Stage to booster aft attachment 240.1 inches (20 ft) further down the vehicle ($X_{SLS} = 4624.5$).

Question 130:

Topic: Guidebook for Proposers

○ Reference(s):

Section 4.2.1.1, page 4

○ Problem Statement / Question:

Are proposers instructed to follow only Appendix B (Instructions for Responding to NRAs) of the Guidebook for Proposers Responding to an NRA or are we to follow the entire guidebook? Are there specific parts of the Guidebook that are to be followed which are not already covered by this NRA solicitation?

Answer 130: The Final NRA takes precedence, but the guidebook is to be used for proposal preparation as necessary.

Question 131:

Topic: Font Size

- Reference(s):
Section 4.2.6.7.2, page 16
- Problem Statement / Question:
Paragraph mentions text should be 12 point or larger, but 8-point font and above may be used in graphics and figures. May we use a font point size less than 12 point in tables (e.g., 10 point font)?

Answer 131: No.

Question 132:

Topic: Proposal Hardcopy Binding and Printing

- Reference(s):
Section 4.2.6.7.2, page 16
- Problem Statement / Questions:
May we use three-ring binders for the hardcopy submission?
Should hardcopies be printed single-sided or double-sided?

Answer 132: Three-ring binders will be allowed where staples are not feasible. Double-sided printing for proposal copies is preferred but not required. Section 4.2.6.7.2 will be clarified in the Final NRA.

Question 133:

Topic: Relationship to Previous or Ongoing Work

- Reference(s):
Section 4.2.6.2.2.2, page 12 and Draft NRA Q&A Set 2, Question 46
- Problem Statements / Questions:
Despite NASA’s response to Question 46, we are still confused about the requirements of Section 4.2.6.2.2.2 “Relationship to Previous or Ongoing Work”. Could NASA further clarify the following:
 - 1) Per the first part: “Relation of the proposed engineering demonstration and/or risk reduction effort to the present state of knowledge”, could NASA provide additional clarification on what information is being requested?
 - 2) Per the second part: “Relation to previous or ongoing work performed for or funded by a Federal agency”, is NASA’s intent for an Offeror to provide information on related experience from prior Government contracts associated with proposed EDRR tasks *and* the Offeror’s Advanced Booster Concept? Or is there another intent?
 - 3) Per the third part: “Any dependency on previous or ongoing efforts in relationship to their proposed efforts for this NRA”, we interpret this to be a description of *only* the areas of proposed EDRRs that are dependent on prior or current work (if any). Is that correct?

Answer 133: The Offeror will remain solely responsible for the successful execution of their proposed effort. NASA is seeking information on the Offeror’s reliance on any US Government funded previous or ongoing work specifically related to the Offeror’s proposal for EDRR tasks.

Part 1: Additional clarification will be provided in the Final NRA.

Part 2: Specifically relative to EDRR tasks proposed.

Part 3: Correct.

Question 134: Reference 4.2.6.3.5 Additional Price Requirements if Selected for Award: Please clarify whether this information is required as part of the Contractor’s initial submittal, or only required after being notified of an award.

Answer 134: The information is not required for the Offeror's initial submission and is only required if the Offeror has been selected for a partial or total award.

Question 135: We understand, per the Executive Summary of the Draft NRA that funds are not currently available for awards under this NRA; however, given that resultant contract(s) will be Firm Fixed Price (FFP) we expect the contract(s) will be fully funded at award. Can you please confirm or provide the details of the Government's plan for funding the contract(s) at award?

Answer 135: Any resulting contract will not be fully funded. The Government anticipates funding per the milestone schedule as proposed by the Offeror.

Question 136: Draft NRA Section 5.1.3.3 Factor 3: Price (page 21) states: "The overall price reasonableness and clarity of the firm fixed price and the extent to which the Offeror complied with the anticipated funding allocation and phasing in the NRA will be evaluated." Is the "anticipated funding allocation and phasing" referred to in 5.1.3.3 that which is noted in the footnote following B.3 (30% in FY2013; 50% in FY2014; and 20% in FY2015)?

Answer 136: Yes.

Question 137: Reference Attachment J-9 Contract Funding: What is the intent of Attachment J-9 (not included in the draft)? When will Attachment J-9 be available/released?

Answer 137: Attachment J-9 will be used to incorporate appropriation data as needed during the contract performance. Attachment J-9 will be released upon contract award and updated as needed.

Question 138: Reference DRD MA-002, Final Management and Technical Report (page J-2-12), and DRD MA-004, Affordability Plan (page J-2-17). Given their relevance to subsequent Advance Booster competitions, would these products be treated by NASA as Contractor proprietary? Public release of the ROM data in particular, would have an adverse impact on future competitions. It is assumed that the ROM data at a minimum, would be considered Contractor proprietary

Answer 138: NASA cannot evaluate an Offeror's approach at this stage in the process prior to initial proposal submission.

Question 139: Reference DRD SA-001, *Off-Site Safety, Health and Environmental (SHE) Plan* (page J-2-19). DRD has the title "*Alternate Safety, Health and Environmental (SHE) Plan* on pages J-2-20 through J-2-26. Which is the correct title? "Alternate or Off-site?"

Answer 139: The correct title is Off-site Safety, Health, and Environmental (SHE) Plan. Attachment J will be updated for clarification.

Question 140: In order to encourage adequate progress towards contract milestones without contributing to additional contract administration and management costs, it is recommended that instead of using the reduction methodology described in Draft Model Contract Attachment J-10, milestone payments in Draft Model Contract Clause B.3 be based upon objective completion criteria including completion or delivery of all contractual requirements during the milestone period with invoicing and invoicing and payment being made only after said completion.

Answer 140: The Offeror is allowed to propose alternative milestone payment schedules and/or performance requirements. No change will be included in the Final NRA.

Question 141: Reference Attachment J-10 (page 1). Attachment J-10 requires reporting of overall cost as part of quarterly technical interchange meetings (TIMs). Is the definition of “overall costs” the summary of completed milestone values or is it incurred Contractor costs on the program? Because reporting of incurred costs is typically not seen as value-added and would be a cost driver for the program, we recommend removal of cost reporting from the TIMs; however, if maintained, we recommend that this reporting represent completed milestone values only.

Answer 141: The Offeror is allowed to propose alternative TIM formats and agendas. No change will be included in the Final NRA.

Question 142: Reference Attachment J-10, (page 2). Section 2.3, Recapture of Reduced Milestone Payments, indicates recapture may occur “solely at the Government’s discretion.” Does this mean that the Contractor needs to ask whether the Government will first consider recapture of reduced milestone payments before attempting efforts to do so?

Answer 142: No. All reductions will be considered for recapture. It will be “solely at the Government’s discretion” with respect to how much is recaptured.

Question 143: Reference Attachment J-10 (page 3). The “Performance Standard” for submission of reports and data are stated as “timely and accurate”. What is the definition of “accurate”?

Answer 143: The definition of accurate pertains to DRD submittals that follow the requirements of Section 15 of the respective DRD.

Question 144: Should the ABEDRR NRA Contractors estimate ground infrastructure upgrades (examples: new umbilical, new pumps, new ground supply tanks, etc at KSC) as part of the Affordability Plan (MA-004) if these are required for the Advanced Booster concept offered in the NRA response, or will NASA address these “non-booster” impacts to the Advanced Booster life cycle cost?

Answer 144: No. The Offeror may exclude ground infrastructure upgrades with the exception of those required as a result of changes to SLS requirements due to affordability gains with the Offeror’s Advanced Booster concept.

Question 145: In Appendix B of the Draft NRA (Tab 1.2 Configuration, Cells (G18-G27), the reference LRB engine vacuum thrust, throttling, vacuum Isp and exit area is defined. Part A: Can NASA provide the reference engine chamber pressure, mixture ratio, length and mass? Part B: If available, can NASA provide the reliability and catastrophic failure fraction?

Answer 145: Part A: NASA does not have a specified engine model at this time. The engine chamber pressure, mixture ratio, length, and mass are not used in the vehicle-level simulation. Thrust was set to maintain 1.2 thrust-to-weight (T/W) at liftoff. Specific impulse (Isp) and nozzle exit area are based on oxygen-rich staged combustion (ORSC) RP engine estimates. Reasonable ranges for the following parameters are listed below:

- Length: 145-200 inches (total gimballed length)
- Mass (dry): 15,000-17,000 lbm
- Mixture ratio (oxidizer/fuel): 2.6-2.75 for ORSC
- Chamber pressure: 2800-3750 psia for ORSC

Part B: Reliability and catastrophic failure fraction allocations have not been determined and are not available at this time.

Question 146: In the Draft Model Contract Attachment J-2 (Data Procurement document “DPD”), specifically with respect to the DPD pertaining to the Affordability Plan, Contractors are asked to submit the Affordability Plan 30 days after completion of the contract. Can a Contractor submit early, i.e. at the end of the contract as the Final Affordability Plan?

Answer 146: Yes. For clarity, the intent of the final Affordability Plan submission is to include the results of the engineering demonstration and/or risk reductions.

Question 147: Are the engineering demonstration and/or risk reduction (EDRR) attributives listed in the Draft NRA (e.g., demonstrated cost reduction > analytical cost reduction) representative of NASA’s initial cut at the “benefit to the government” evaluation criteria for the EDRR?

Answer 147: The EDRR attributives in the Draft NRA are notional. They were developed by MSFC based on collective experiences and studies. The notional attributes were developed and included in the Draft NRA to prompt or stimulate ideas for consideration by the Offeror and was not intended to be the definitive list (or prioritization) of evaluation criteria. All evaluation criteria are provided in Section 5.0 APPLICATION REVIEW INFORMATION of the NRA. Evaluation of proposals will be performed in accordance with that section of the NRA. Therefore, the list is no longer needed and the Final NRA will not contain the notional EDRR attributes.