EVM-3 AO Q&As **As of 3/1/2021**

Q1 : The EVM-3 AO allows investigation teams to propose non-AO-provided launch services where the PI arranges the required launch services for their proposed mission. Will proposed investigations be required to hold cost reserves against the cost of the launch services arranged by the PI?

A1 : Yes. The cost of non-AO-provided launch services is part of the PI-Managed Mission Cost (PIMMC). The PIMMC is subject to the cost reserves requirements in the EVM-3 AO.

Q2 : The EVM-3 AO states "For contracts that exceed $2,000,000, the contractor will be required to provide certified cost and pricing data to support the cost estimate and award of the contract in accordance with FAR 15.403-4.". Does this requirement apply to a commercial subcontract for launch services (see FAR 15.403-1(b)(3).)?

A2 : It all depends on how those procurements are set up and the structure of the contract terms and conditions.

Q3 : In previous AOs, missions choosing non-AO-provided launch services were required to budget for the cost of NASA LSP launch vehicle monitoring and advisory services. The EVM-3 AO is silent on this requirement. Is this requirement NOT applicable for the EVM-3 AO?

A3 : Yes, it is not applicable to the EVM-3 AO. Section 5.10.4.1 of the EVM-3 AO states "since the PI is responsible for the non-AO-provided launch services risk management, insight, and oversight, the PI must ensure that the risks associated with access to space are consistent with the risk classification approved for individual payloads and missions; reference NPD 8610.7D Launch Services Risk Mitigation Policy for NASA-Owned and/or NASA-Sponsored Payloads/Missions and NPD 8610.23C Launch Vehicle Technical Oversight Policy". In addition, Requirement 110 of the EVM-3 AO states "The proposal shall describe the arrangement between the PI and the launch service provider to enable the PI's insight for launch services, consistent with NASA Procedural Document (NPD) 8610.7D and insight and approval consistent with NPD 8610.23C."

Q4 : Attachment 1 of the Commercial FAA-Licensed Launch Services Program Information Summary (found in the EVM-3 Library) states "A representative separation system is assumed, the mass of which is book-kept on the launch vehicle side." Does this also refer to CubeSat Dispensers? Please clarify.

A4 : For all mission and launch services it is assumed that the mass of the separation system is book-kept in the launch vehicle side. This refers to the clamp-band and light band systems that are provided by the launch service. This does not mean that CubeSat Dispenser mass should be book-kept on the launch vehicle side. The CubeSat Dispenser mass should be book-kept on the spacecraft side since the dispenser and CubeSat are considered one unit or the total spacecraft for this purpose.

Q5 : On Attachment 3 of the Commercial FAA-Licensed Launch Services Program Information Summary (found in the EVM-3 Library), by the subtitle "Non-NASA Launch Services", there is an item that reads "Area of concern (__Yes or __No)". Please clarify the purpose of that item.

A5 : Most of the subtitles in this attachment have the item that reads "Area of concern (__Yes or __No)". This is to record whether evaluators have any concerns about any items listed under that subtitle. Please note that this applies to both AO-provided launch services and non-AO-provided launch services.

Q6 : On Attachment 3 of the Commercial FAA-Licensed Launch Services Program Information Summary (found in the EVM-3 Library), under the subtitle "Non-NASA Launch Services", there is an item that reads "Is the proposal clear on the approach that the PI will utilize to ensure the adequacy of the technical work performed by the launch provider and to determine flight worthiness? (__Yes or __No)". Is "to ensure the adequacy of the technical work performed by the launch provider" and "to determine flight worthiness" redundant?

A6 : No. They are distinct in this context.

Q7 : On Attachment 3 of the Commercial FAA-Licensed Launch Services Program Information Summary (found in the EVM-3 Library), under the subtitle "Non-NASA Launch Services", there is an item that reads "Does the proposal address PI's responsibility to obtain NASA Flight Planning Board approval prior to acquisition of the launch service? (__Yes or __No)". Is the PI required to show how they will obtain NASA Flight Planning Board approval on their approach for the acquisition of the launch service?

A7 : Yes.

Q8 : Is there information available on the status of the Launch Vehicle Risk Category certifications for any of the Commercial FAA-Licensed Launch Vehicles?

A8 : Please note that the status of the FAA license for any of the launch vehicles listed in the table below is not included. NASA Launch Services Program (LSP) does not keep track of which vehicles have a license. See the table below for the current certification status of various launch vehicles. Because launch vehicle configurations change, this status may or may not be accurate. Per NASA LSP's definition the Common Launch Vehicle Configuration changes for Category 1 purposes when there is greater than 10% change in either core stage engine thrust, or core stage propellant mass; in that case, a new certification would need to be conducted.

Commercial Company/Vehicle	**Certification Status**
Rocket Lab/Electron	Cat 1*
Virgin Orbit/LauncherOne	Offered**
Astra/Rocket 3.0	Offered**
Firefly/Alpha	Plan Signed†
ABL Space Systems/RS-1	Plan Signed†
Astra/Rocket 4.0	
Relativity/Terran-1	Offered**
Aveum /Raven	
X-Bow/Bolt	Offered**

*Cat 1 – Launch Vehicle has been certified to Risk Category 1.
** Offered – NASA LSP has offered the company the process to certification. A general offer of the process to certification has been made to all companies at conferences related to small launches. The timeline for completion is subject to LSP resources and to the company's ability to provide the required information for review.
†Plan Signed – The plan to achieve Launch Vehicle Risk Category 1 certification has been approved by LSP.

Q9 : If the selected mission proposes to arrange alternative access to space (i.e., Non-AO-Provided Launch Services) through a Commercial FAA-Licensed Launch Service and plans to obtain Risk Category 1 certification (per NPD 8610.7) for the Launch Vehicle, what is the scope of this review and how much should be budgeted for NASA LSP to provide certification?

A9 : The scope of the requirements for Launch Vehicle Risk Category certifications is shown in NPD 8610.7. The two items of most significance and effort for the launch provider and the assessment team are the Hardware Qualification item and the Quality Audit which is normally combined with the Manufacturing Audit. If the selected launch service is not certified, NASA LSP will not be performing the certification for an EVM-3 selected mission utilizing Non-AO-Provided Launch Services; this will be the responsibility of the mission team. Category 1 certification is a risk assessment, not a risk mitigation, that would be done by the mission team.

The mission team will need to work with the launch service provider they are targeting to determine the cost for the required data and to determine the mission team's resources to assess the information for the certification.

Q10 : How will the evaluation of EVM-3 proposed missions be inclusive of the applications requirements listed in the EVM-3 AO (Requirements 12 and 17)?

A10 : The EVM-3 AO evaluation criteria in Factors A-1, A-2, and B-3 has been slightly modified to include the applied science requirements along with the science goals. This will be done to be more consistent with the criteria as listed in the EVM-2 AO.

Q11 : The first paragraph in Section 5 of the 2020 SMD ESPA RUG (located in the EVM-3 Library) states "The DoD STP developed a Rideshare Mission Assurance Do-No-Harm (TOR-2016-02946) guideline document. This document is only releasable to Government and Government contractors and will not be in the program library; the relevant requirements are included in this document." Does the second instance of "this document" refer to the RUG or the TOR-2016-02946?

A 11 : It refers to the 2020 SMD ESPA RUG.

Q 12 : Requirement 103 of the EVM-3 AO states "For investigations proposing to launch on an ESPA, proposals shall clearly demonstrate compliance to the ESPA requirements and enveloping characteristics, as given in the *2020 SMD ESPA RUG* document found in the EVM-3 Library. " There are 50+ additional requirements in the 2020 SMD ESPA RUG. Are proposals required to address every requirement in detail?

A 12 : For investigations that plan to use AO-Provided Rideshare Assess to Space, investigation teams are expected to address requirements in the 2020 SMD ESPA RUG to the extent needed for the proposal to demonstrate that the proposed payload can be accommodated successfully and safely in the ESPA ring.

Q 13 : Part of Requirement B-4 of the EVM-3 AO states "Two extra pages are allotted for each additional separate, non-identical science instrument in the Science Section (Sections D and E); two extra pages are allotted for each additional separate, non-identical flight element (e.g., additional non-identical spacecraft) in the Mission Implementation and Management Sections (Sections F and G) ". Does the "additional separate, non-identical science instrument or flight element" count start from zero or one?

A 13 : The count for "additional separate, non-identical science instrument or flight element" starts from one. For example, a proposed investigation with one "additional separate, non-identical science instrument" would total two separate, non-identical science instruments; two extra pages are allotted for the additional separate, non-identical science instrument in the Science Section (Sections D and E).

Q14 : Section 5.10.3.1 of the EVM-3 AO states that there are two performance categories of Commercial FAA Licensed Launch Services at two different price points. The Commercial FAA-Licensed Launch Services Program Summary in the EVM-3 Library only shows one fairing. How should launch vehicle fairing volume compatibility be assessed for the different performance options?

A 14 : As with the NASA Launch Services (NLS) II summary, we placed the bounding condition for the fairing envelope of the Commercial FAA Licensed Launch Services associated with the EVM-3 AO-Provided Access to Space. NASA LSP does not categorize the levels in terms of performance, but by in terms of low and high risk solutions. If the investigation team proposes to the fairing envelope in the Commercial FAA-Licensed Launch Services Program Summary, there is a greater likelihood that a launch solution will be met. If the proposer deviates from the envelope in the Commercial FAA-Licensed Launch Services Program Summary document, they do so at risk of not having an acceptable launch solution at the time LV procurement.

Q 15 : Can a EVM-3 mission purchase supplies and services from non-U.S. sources using NASA funds?

A 15 : The NASA FAR Supplement (NFS) under 1835.016-70, “Foreign participation under broad agency announcements (BAAs)” item 1835.016-70(a)(3) states “NASA funding may not be used for subcontracted foreign research efforts. The direct purchase of supplies and/or services, which do not constitute research, from non-U.S. sources by U.S. award recipients is permitted.”

Q 16 : Section 3 of the EVM-3 AO states “All proposals, U.S. and non-U.S., must be received by the proposal submittal deadline. For those received after the deadline, the Government reserves the right to consider proposals or modifications thereof received after the date indicated for such purpose, if the Selection Official deems it to offer NASA a significant technical advantage or cost reduction (see NFS 1815.208).” What would be considered a “significant technical advantage or cost reduction”?

A 16 : For the rare occurrence that a proposal is received after the Electronic Proposal Submittal Deadline, the “significant technical advantage or cost reduction” would be considered on a case by case basis. Please note that Section 3 of the EVM-3 AO states, “This solicitation has a single submission deadline.” and “All proposals, U.S. and non-U.S., must be received by the proposal submittal deadline.” In addition, Requirement 1 of the EVM-3 AO states “Proposals submitted in response to this solicitation shall be submitted electronically (see Section 6.2.3) no later than the Electronic Proposal Submittal Deadline.”

Q17 : Section 4.1.4 of the EVM-3 AO states: “SMD had determined that the EVM-3 mission to be selected as a result of this AO to be a Category 3 project (per NPR 7120.5E) with Class D payloads (per NPR 8705.4), with a prime mission life of less than 3 years. Proposers must incorporate appropriate work effort and support in their proposals accordingly.” What is the definition of prime mission life?

A17 : In this context, the prime mission life is defined as the proposed period of Operations (Phase E) to achieve the proposed baseline science requirements with appropriate schedule reserves.

Q18 : Section 5.6.3 “Student Collaboration (SC) (optional)” of the EVM-3 AO states, "An ideal SC provides a hands-on experience for students that focuses on the unique demands of instrument development, flight systems, environments, and operations, and on the opportunity to acquire early knowledge of systems engineering techniques." Is the example, which focuses on system engineering, the only area of interest for student collaboration or could the focus be on other aspects of the mission?

A18 : Section 5.6.3 “Student Collaboration (SC) (optional)” of the EVM-3 AO also states “SCs may involve students in multiple aspects of a mission spanning scientific formulation; mission planning; systems engineering; design and development of flight hardware; qualification, test and integration; and mission operations.”

Q19 : One of the bulletized items that shall be described in response to Requirement 12 of the EVM-3 AO (regarding Applied Science) is, "A budget for implementation of the activities listed in the above bullets." Is it required and expected to appear as a WBS element in Tables B3, and if so, does it go under the Science WBS? Is it a single budget number or should it be broken down by year and/or phase?

A19 : The cost must be bookkept under the "science" WBS 04 (Tables B3a and B3b) and included as appropriate for each year and phase. The Science Panel will evaluate the merit of the Applied Science from the criteria as described in Factors A-1, A-2, and B-3 of the EVM-3 AO and assess the value of the Applied Science return of the proposed activity and whether it is feasible as proposed.

Q20 : Requirement 13 of the EVM-3 AO, regarding the Operational Enhancement Opportunity (OEO), states, "If OEO activities are proposed, the submission shall define and describe the proposed activities and their costs." Items 7 and 8 of the Program Specific Data on NSPIRES ask for information on the "Enhanced PI-Managed Mission Cost". Q&A 10 for of the Draft (not final) AO indicates that the "Enhanced PI-Managed Mission Cost" line in Table B3 is NOT for the OEO, but the Q&A does not address NSPIRES. Please clarify the OEO.

Q20 : In the EVM-3 AO, the OEO has been intentionally described at a high level. It is mostly for NOAA to understand the investigation team plans for the OEO and the proposed cost of the OEO activities. During Phase A, a formal proposal will be solicited from the selected investigation that would be jointly reviewed and negotiated between the investigation team and NOAA/NASA. The nature of that agreement is dependent on NOAA's priorities and the best way to set up the contract. NOAA would receive the appropriate information to understand the costs by phases for the OEO option. The information in the OEO is NOT part of the NASA evaluation!

EVM-3 Community Announcement Q&As

Q1 : The NASA Policy Directive (NPD) 8610.7D "Launch Services Risk Mitigation Policy for NASA-Owned and/or NASA-Sponsored Payloads/Missions - Revalidated w/Change 2 (03/29/2018)" under the section "5. Responsibility" states, "d. Mission Directorates, Center Directors, and the Director of JPL shall ensure that all NASA-owned or NASA-sponsored payloads under their control obtain launch services provided by LSP, are consistent with this policy and are coordinated with HEOMD." Does this statement restrict proposals from NASA centers in any way?

A1: NPD 8610.12H "Orbital Space Transportation Services (Revalidated with change 1)" under the section "5. Responsibility" states that, "(d) Space transportation services for class D (NPR 8705.4 Risk Classification for NASA Payloads) non-primary payloads may be arranged by HEOMD or the payload-sponsoring organization." and that, "(e) On a case-by-case basis, as approved by the FPB, an organization other than HEOMD may provide/arrange space transportation services for a Class D primary payload (e.g., some Small Explorer (SMEX) Announcements of Opportunity). These statements directly apply to the EVM-3 solicitation.

Q2 : The language in the Community Announcement does not convey what is believed to be the intent, which is that missions must adhere to the constraints shown in Figure 1 of the *Venture Class Launch Services Program Information Summary* document found in the EVM-3 Library as 500kg / 500km is merely one point on the curve. The Community Announcement introduces the term "operational orbit" which does not appear in the Draft AO while the Draft AO refers to the "reference orbit". Please clarify.

A2 : A new launch services program information summary document titled *Commercial FAA-Licensed Launch Services Program Information Summary* is now in the EVM-3 Library. In it, you will see two figures (for different orbital inclinations) that designate the range of the lower cost AO-provided Launch Services (now referred to as Commercial Federal Aviation Administration (FAA)-Licensed Launch Services). The final AO will reflect these changes.

Q3 : For Venture Class Launch Services (VCLS) the Draft EVM-3 AO states "launch services for no more than a 150kg to a reference orbit of 500km Sun-Sync (inclusive of any project deployment hardware) per launch ", however the Community Announcement is silent on the sun-sync orbit. Will the restriction to sun-sync orbits be lifted for the final EVM-3 AO?

A3 : For VCLS, and that nomenclature have changed to "Commercial Federal Aviation Administration (FAA)-Licensed Launch Service", any orbit that is appropriate for the mission AND can be appropriately attained by the combination of the launch vehicle and payload mass will be considered compliant with the solicitation. Please refer to the *Commercial FAA-Licensed Launch Service Program Information Summary* document in the EVM-3 Library for more information.

Draft EVM-3 AO Q&As

Q1 : Section 5.10.3.2 of the draft EVM-3 AO states “An EVM-3 investigation (including CubeSat investigations) may be proposed as a Rideshare Payload (RPL) for up to two platforms on an Evolved Expendable Launch Vehicle Secondary Payload Adapter (ESPA) or ESPA Grande offered as AO-provided launch service”. In a different paragraph of this section the draft AO states “Investigations may propose to utilize one or two ESPA ports. Investigations requiring two ports must comply with the requirements for each port.” Are the terms “two platforms” and “two ports” intended to refer to two ports?

A1 : This section will be rewritten in the final EVM-3 AO to reflect that the $25M is for the ESPA ring, where the proposed EVM-3 mission can plan to use any number of the available ports. EVM-3 missions are permitted to propose the use of only one ESPA ring.

Q 2 : Can we specify an ESPA Grande since we would need the larger capacity for our proposed port(s)?

A2 : Proposers can specify an ESPA Grande to accommodate their Flight System(s).

Q3 : Are unencumbered cost reserves required to be budgeted under the PI-Managed Mission Cost (PIMMC) for AO-provided access to space (ELV, VCLS, or RPL) “standard launch services”?

A3 : No. Since NASA will be responsible for the AO-provided access to space “standard launch services”, proposers are not required to budget unencumbered reserves against these costs. This will be clarified in the final AO.

Q4 : Where should the launch service cost be presented in the proposal?

A4 : The AO-provided access to space costs are expected to be presented in the Cost Tables. However, it would not be included in the unencumbered cost reserves calculation (see Q?).

Q5 : Is the cost of the Rideshare Payload (RPL) option $25M per ESPA/ESPA Grande port, or $25M per ESPA/ESPA Grande ring?

A5 : The cost of the RPL option is $25M per ESPA/ESPA Grande ring, where only one ring can be proposed. This will be clarified in the final EVM-3 AO.

Q6 : Section 4.3.3 of the draft EVM-3 AO references a “typical funding profile over a nominal 5-year development period”. Could a quantitative definition of a “typical funding profile” be provided?

A6 : Please note that Section 4.3.3 of the draft EVM-3 AO also states “Proposers should propose a funding profile that is appropriate for their investigation and is consistent with the selection and launch readiness dates in Section 3 of this AO.”

Q7 : Compared with the EVM-2 AO (and the Standard AO), the maximum lines per page (5.5 lines per inch, 49 lines per page) has decreased by ~12% (the limit was 55 lines per page), yet the requirements have actually increased. The D/E page limit was reduced by one page in comparison to the EVM-2 AO without any reduction in requirements. Also, the limit of total number of extra pages (for instruments/flight elements) was reduced from 10 to 9 in comparison to the EVM-2 AO without any reduction in requirements. Can this be rectified for the final EVM-3 AO?

A7 : The new language in the AO is intended to make consistent the font size and the number of lines per page. The old language was inconsistent as there was no way to get 55 lines with the required font. Nevertheless, the number of pages will be increased by six pages. The number of lines per page and font size will remain at 49 and 12 point. This change will be reflected in the final EVM-3 AO. (Updated 06/03/2020)

Q8 : Requirements 12 and 13 of the Draft EVM-3 AO, stating that proposals specify the Level 1 and Level 2 requirements, appears to be premature for a Pre-Phase A proposal. Per NPR 7120.5E, Program-level Requirements (Level 1) and Project-level Requirements (Level 2), together with System Requirements, achieve 'preliminary' maturity by the Pre-Phase A Mission Concept Review (MCR), and 'baseline' maturity by the Phase A System Requirements Review (SRR). We recommend that these two requirements be deleted from the EVM-3 AO, and that overall mission requirements be addressed by the Science Traceability Matrix as part of Requirement B-17.

A8 : This language is now part of the Standard AO template. NASA recognizes that the Level 1 and Level 2 requirements for a Pre-Phase A mission are preliminary relative to the end of Phase A and the proposals will be evaluated accordingly. The final EVM-3 AO language will clarify that these are preliminary requirements.

Q9 : Is it acceptable to propose a NOAA collaborator without a proposed NOAA Operational Enhancement?

A9 : Yes.

Q10 : The table titled "Proposal Structure and Page Limits" on pages B-2 and B-3 of the Draft EVM-3 AO specifies that the NOAA Operational Enhancement (OE) is considered part of the "Total Budget". Please define this term and modify the templates for Tables B3a and B3b to include these values if necessary.

A10 : The NOAA OE information must be uploaded separate from the main body of the proposal. This option will be made available with the upload options for the submissions to NSPIRES. There will be no defined template for these submissions and this cost is not to be included in Tables B3a or B3b. Please note that the NOAA OE option is also due on the EVM-3 proposal submission due date.

Q11 : If the Virgin Orbit LauncherOne and Firefly are certified prior to the AO-specified Launch Readiness Date, will they be available as a Venture Class Launch Services (VCLS) launch option?

A11: With the EVM-3 selected investigation being a Class D mission, the launch can be on the first flight of a new launch vehicle configuration that is not certified at the time of procurement. During the integration of the spacecraft, NASA Launch Services Program (LSP) will perform the certification if required. All NASA-procured launch services are to be consistent with NASA Policy Directive (NPD) 8610.7, *NASA Launch Services Risk Mitigation Policy for NASA-Owned and/or NASA-Sponsored Payloads/Missions*. Commercial launch services acquired by NASA will be managed in accordance with NPD 8610.23, *Launch Vehicle Technical Oversight Policy* per Attachment C.

Q12 : For the Expendable Launch Vehicle (ELV), VCLS, and Rideshare Payload (RPL) AO-provided access to space options, may NASA provide a series of curves of the performance to orbit available across a range of orbit altitudes and inclinations to facilitate the selection of the most applicable launch option for a proposed mission?

A12 : The requested curves for the ELV option are found in the *ELV Launch Services Program Information Summary* document located in the EVM-3 Library. For the RPL, these curves are not available at this time since a mission or launch vehicle has not been selected to support EVM-3 mission requirements. The VCLS/Commercial

Federal Aviation Administration (FAA) section will have an update with additional curves of potential launch vehicles that may be in the market at the time of LV procurement.

Q13 : Section 5.10.3 of the draft EVM-3 AO states, “For this [VCLS] option, utilizing a domestic launch vehicle on its first flight would be permitted; however, prior to launch the vehicle must be certified as Category 1 per NPD 8610.7D, NASA Launch Services Risk Mitigation Policy for NASA-Owned or NASA-Sponsored Payloads/Missions (see EVM-3 Library).” Are Virgin's LauncherOne or Firefly Alpha viable AO-provided access to space options to propose?

A13: Yes, understanding that, depending on the market, these launch vehicles may not be available. However, there may be other launch vehicles that could meet spacecraft launch requirements. Please refer to Requirement 101 of the draft EVM-3 AO.

Q14: Can non-sun synchronous orbits be proposed?

A14: Yes

Q15 : Are the rideshare opportunities listed at https://s3vi.ndc.nasa.gov/launchportal/ the only applicable options for EVM-3 proposed missions? Can NASA provide information about other missions launching to mid-low inclinations in the 2024-2025 timeframe that will accept an RPL/ESPA? Can EVM-3 missions propose a RPL/ESPA even if it is not listed on the website referenced above?

A15: The referenced web site does not necessarily list all potential options for rideshare opportunities. Yes, proposers may propose a rideshare on an unlisted opportunity. Keep in mind that most unlisted opportunities may present programmatic risks of not occurring, which will be considered at the time of selection.

Q16 : Is it permissible to use the inner volume within the ESPA or ESPA Grande ring for payload hardware? If if it is permissible, can NASA specify the constraints and whether this is considered as a “standard launch service”?

A16 : Yes, however the proposer must account for the separation system tip-off to ensure any RPL structure that extends into the internal volume of the ring will exit the volume upon RPL deployment without contacting the port inner diameter. (UPDATED ON 05/12/2020)

Q17 : Can an appendage of an EVM-3 payload assigned to a single ESPA Grande port extend into another port?

A17: Since the cost for an ESPA ring is for the entire ring, EVM-3 missions are free to propose having all the available ports’ volume for use.

Q18 : The COVID-19 pandemic has substantially impacted the operations and resources of many institutions, universities, and government centers. This broad and deep disruption to the industry creates an extremely challenging environment for the development of a responsive proposal that is dependent on intense interpersonal interactions and a substantial investment of resources by proposing and partner institutions. Would NASA consider a delay in the release of the final EVM-3 AO until such time as: (1) the critical interactions necessary to generate a quality and responsive proposal can be undertaken; and (2) institutions can have greater confidence in their operational and fiscal planning?

A18: NASA will take this request under consideration. Possibilities may be an alternate date for the release of the final EVM-3 AO or an alternate period of time for proposal development (i.e., between AO release and proposal due date).

Q19 : Section 5.1.7 "*NOAA Operational Enhancement Opportunity*"of the Draft EVM-3 AO states that a sole source "Request for Proposal (RFP)" may be issued. The term "RFP" implies that this is for industry only. Is it correct to assume that this Operational Enhancement (OE) could be provided by another government organization, with appropriate funding mechanism?

A19 : NOAA will be considering OE opportunities from any organization. The method of procurement, assuming NOAA selects the OE, will be negotiated with the institution of the selected EVM-3 investigation.

Q20 : Is the Launch Readiness Date (LRD) constraint for the first launch or all launches?

A20: The LRD is for the first launch. However, the all payloads shall be ready for integration on the LRD and the proposal shall include a storage plan for the additional payloads. This will be clarified in the final EVM-3 AO.

Q21 : The EVM-3 Draft AO states to use the Inflation Index in the draft AO, which is also available in the EVM-3 Library. However, the index in the Draft AO is different from the index in the EVM-3 Library. The differences are in the Cumulative Inflation Index. Which index should be used on EVM-3 proposals?

A21: Please use the "NASA FY19 Inflation Tables - to be utilized in FY20" in the EVM-3 Library. Table B4 will be updated in the final AO.

Q22 : Section 5.10.3.1 of the Draft EVM-3 AO states "The $25M charge is only applicable to launch services for no more than a 150kg to a reference orbit of 500km Sun-Sync (inclusive of any project deployment hardware) per launch." However, Figure 1 of the *Venture Class Launch Services Program Information Summary* document found in the EVM-3 Library, shows performance constraints that are more complex than simply 150kg to 500km Sun-Sync. Can NASA please clarify this apparent inconsistency?

A22: Proposers should use Figure 1 of the *Venture Class Launch Services Program Information Summary* document . This change will be reflected in the final EVM-3AO.

Q23 : Will NASA consider using the LSP catalog prices for VCLS ($15M vs. $25M per launch)?

A23 : NASA will strongly consider lowering the costs for VCLS to $22M per launch. The final decision will be made before the final EVM-3 AO is released.

Q24 : For multiple launches, the second launch with the same mission requirements would inherently cost less for the items which are only incurred once (eg. trajectory analyses, coupled loads analysis, development of safety data packages, technical interface meetings, mission reviews, etc.). Would NASA consider cost efficiencies for multiple launches?

A24: There is the potential that a cost savings could be provided by the launch Services contractor. However, at this point, not knowing full mission requirements a potential cost reduction for multiple launches cannot be

considered. It is not known if the LV will provide a cost reduction for multiple launches or keep the cost the same for all launches. Hence, no cost efficiencies for multiple launch vehicles will be considered for this EVM-3 AO.

Q25 : Would NASA consider removal of the limitation of two VCLS launches (Section 5.10.3.1), as long as the mission can be implemented within the EVM-3 AO cost constrains?

A25: NASA plans to update the final EVM-3AO to allow for up to three launches through VCLS. Please note that no discount will be applied for multiple VCLS launches.

Q26 : The EVM-3 $25M cost for an ESPA ring is higher than the $20M cost found in the NASA LSP 2020 catalog. Would NASA consider lowering the cost for the EVM-3 ESPA?

A26 : NASA goes not intend to reduce the cost for a full ESPA ring from $25M.

Q27 : Would NASA consider a per-port cost for RPL/ESPA instead of charging for the entire ESPA?

A27: NASA does not intend to allow a per-port rate for the EVM-3 RPL/ESPA.

Q28 Would NASA consider an incentive for missions that are easy to launch (ie. going to common ESPA Rideshare orbits)?

A28 : In practice, there are no missions that are considered "easy" and each proposed mission will offer unique challenges for access to space. It is unlikely that such incentives will be offered.

Q29 : Although the draft EVM-3 AO defines the term "Adjusted AO Cost Cap", it does not define any adjustments. Are the prescribed costs, e.g., AO-provided access to space and environmental review and launch approval cost, meant to be reflected as reductions in the Adjusted AO Cost Cap.?

A29 : Yes. The EVM-3 proposer's choice of AO-Provided Access to Space cost and the cost of environmental review and launch approval are both to be reflected as a reduction in the Adjusted AO Cost Cap. For instance, if a proposer plans on a launch using an ESPA ring, the Adjusted AO Cost Cap would be $164.9M ($190M – ($25M ESPA + $100K for environmental review and launch approval)), i.e. the PIMMC is capped to $164.9M for this mission. Therefore, the "Adjusted AO Cost Cap" is applicable for the EVM-3 AO, however it is not appropriately reflected in the draft EVM-3 AO. This will be rectified for the Final AO.

Q30 : Under the EVM-3 AO-provided access to space ELV option, can a specific NLS launch vehicle that may be procured for $61M or less be proposed?

A30 : Under the NLS section, $61M is the catalog cost for standard launch services and cannot be reduced.

Q31 : Under the EVM-3 AO-provided access to space VCLS option, can access to space via a specific NLS launch vehicle that may be procured for $25M or less be proposed?

A31: NASA, through LSP, will coordinate the procurement of launch vehicle that meets the specifications needed for proposed investigation. The procured launch vehicle may or may not be on the NLS contract at that time. Nevertheless, NASA will strongly consider lowering the costs for VCLS to $22M per launch. The final decision will be made before the final EVM-3 AO is released (see Q&A #23)

Q32 : May the EVM-3 AO or EVM-3 Library documents explicitly indicate the VCLS inclination options for a non-sun-synchronous orbit?

A32 : NASA LSP is in the process of updating the performance and inclination curves for the EVM-3 AO-provided access to space VCLS vehicles. If the inclination that is being proposed is not provided, then the proposer may contact the NASA LSP point of contact identified in the EVM-3 AO for additional information.

Q33 : Would NASA consider allowing up to three launches under the EVM-3 AO-provided access to space VCLS option?

A33 : The final EVM-3 AO will be changed to reflect that a maximum of three VCLS launches will be permitted to be proposed, instead of the currently listed number of two. Each VCLS launch shall have the final determined cost (currently $25M per launch, however it may change, see Q&A #23) to be reflected as a reduction in the Adjusted AO Cost Cap.

Q34 : Would NASA consider that the EVM-3 AO-provided access to space VCLS option be specified as $15M in alignment with page 17 of the 2020 LSP Catalog, 8th Edition?

A34 : While the current costs for VCLS launches are lower than the currently listed EVM-3 AO-provided access to space VCLS option of $25M, NASA does not know what the costs will be at the time of procurement of any VCLS launches. As stated in Q&A 23, NASA is considering lowering the amount currently listed for the EVM-3 AO-provided access to space VCLS option from $25M to $22M.

Q35 : May NASA include all VCLS fairing sizes and launch performance parameters be in the EVM-3 AO or in EVM-3 Library documents?

A35 : The VCLS summary provides a bounding case for fairing size and performance parameters. If the proposed spacecraft is within the bounding conditions currently defined, there is less risk that a launch solution can be achieved. If the proposal goes outside the bounding cases, there is an increasing risk that a launch solution may not be achievable. If this is the case, this will be taken into consideration during the proposal evaluation.

Q36 : Can two different spacecrafts mounted on two different ESPA ports go to different orbital planes and/or altitudes without propulsion? (Updated 5/22/2020)

A36 : This would depend on the amount of launch vehicle performance margin that remains on the primary mission and is there enough to make an appropriate orbit change by starting the second stage. Altitude changes will require less to perform than inclination changes. A change of +/- 15 degrees in inclination will take a sizable amount of Delta-v. It would be best to have the EVM-3 spacecraft requirement in the same RLSP as the primary's which would allow for the Launch Vehicle providers to work the trajectory design during the procurement. EVM-3 mission requirements could drive additional analyses and changes to the primary mission that may be not considered "standard launch services" and therefore the cost would be the responsibility of EVM-3 PI. For specific information contact the NASA LSP point of contact listed in the EVM-3 AO.

Q37 : Are 5-m fairings or other fairings available for the three AO-provided access to space options? Please specify which fairing options are considered "standard launch services" in the *ELV Launch Services Program Information Summary* or the *Venture Class Launch Services Information Summary* and please provide the cost of the ones considered non-standard options.

A37 : The 5-m fairing offering may only be available from some Launch Vehicle providers for an RPL/ESPA launch. For the EVM-3 AO the ELV and VCLS will not have a 5-m option. Although in the future there may be more launch vehicles using 5-m fairings as their standard service, this cannot be offered at this time. For mission specific launch services information contact the NASA LSP point of contact listed in the EVM-3 AO.

Q38 : Can NASA provide the mass margins held by the launch providers for the AO-provided access to space options?

A38: The performance curves provided for ELV and VCLS include the mass margins for the payload. For RPL/ESPA it is not possible to provide mass margins since this is a function of the mass of the primary payload and the Launch Vehicle that is selected.

Q39 : It has been reported that two remaining Pegasus XL rockets are available, see (https://spaceflightnow.com/2019/10/10/rockets-purchased-by-stratolaunch-back-under-northrop-grumman-control/). Can a Pegasus XL launch vehicle be proposed under the ELV AO-provided access to space option?

A39: Yes – the Pegasus launch services is still on the NLS contract. However, Requirement 101 of the draft EVM-3 AO states "Due to the volatility of the launch services market, NASA cannot ensure which launch vehicles will be available at the time of the launch vehicle procurement. Accordingly, proposers are advised to plan for compatibility with vehicle families that provide the necessary performance and are expected to be available through spacecraft Preliminary Design Review (PDR; see the *ELV Launch Services Information Summary or Venture Class Launch Services Program Information Summary* in the EVM-3 Library). It is recommended that payload designs accommodate launch environments for these vehicle families."

Q40 : If an EVM-3 spacecraft is launched as a secondary payload for the RPL/ESPA AO-provided access to space option, is there capability to deliver the secondary payload to a different orbit (altitude/inclination) than the primary payload orbit? If so, can NASA specify the flexibility and limits on this capability?

A40 : This would depend on the amount of launch vehicle performance margin that remains on the primary mission and is there enough to make an appropriate orbit change. Altitude changes will require less to perform than inclination changes. It would be best to have the EVM-3 spacecraft requirement in the same RLSP as the primary's which would allow for the Launch Vehicle providers to work the trajectory design during the procurement. EVM-3 mission requirements could drive additional changes to the primary mission that may be not considered "standard launch services" and therefore the cost would be the responsibility of EVM-3 PI. For mission specific launch services information contact the NASA LSP point of contact listed in the EVM-3 AO.

Q41 : Could NASA please specify the additional costs beyond the "standard launch services" if an investigation proposes launching two or more SmallSats on a single RPL/ESPA or ESPA Grande port.

A41 The cost of the RPL/ESPA will cover the standard launch services for all the ports on the ESPA. For mission specific launch services information contact the NASA LSP point of contact listed in the EVM-3 AO.

Q42 : Would NASA consider allowing the 2020 LSP catalog capabilities for mass to orbit for a potential 2026 launch?

A42 : NASA intends to add additional mass-to-orbit available for some EVM-3 AO-provided access to space. However, NASA also intends to attach a launch-to-orbit risk on those additional mass-to-orbit offerings. For

instance, a 150kg/500km VCLS launch (currently offered in the Draft EVM-3 AO) is considered to have a lower risk than a 300kg/500km VCLS launch.

Q43 : How will an EVM-3 Project compliance with the Space Systems Protection requirements be verified?

A43: The EVM-3 Project should include this compliance as part of their integration and test process. In other words, there should be specific tests included just as there would be for any other requirement on the project.

Q44 : Does the EVM-3 Project solution for the Space Systems Protection requirements need to be independently FIPS certified or just FIPS compliant as verified by the Project?

A44 : FIPS compliant as verified by the project is sufficient. On the other hand, for the project to verify their solution is FIPS compliant, they might point to the FIPS web site listing of compliant systems. Those systems will have been independently certified, so the end result is the same. However, the project does not need to pay for a separate independent certification.

Q45 : May NASA specify which items are included in the "standard launch services" as referenced in Requirement 100? Are unencumbered reserves required to be booked against the cost of launch services beyond the standard launch services offered?

A45 : NASA Launch Services (NLS) standard launch services are listed in the ELV Launch Services Program Information Summary. The Venture Class Launch Services Program Information Summary Attachment #2 will be updated as the one published is for ELV. The standard services will be reduced to reflect what is provided by the Commercial launch provider. For ESPA, cost includes ESPA hardware and standard integration (adapter and LV), minor known mission uniques, integrated services/Payload Processing Facility (PPF) (shared facility, short integration 1-2 weeks), standard telemetry, standard mission analyses, and mass simulators. It does not cover significant vehicle modifications driven by secondary payload requirements (larger fairing), secondary payload-specific mission uniques outside the ESPA RUG, or stand-alone PPF. Yes. Section 5.10.3.1 of the Draft EVM-3 AO states "Proposers are required to include under the PIMMC any cost of launch services beyond the standard launch services offered."

Q46 : What would be the additional costs if an investigation proposes launching two or more SmallSats on a single ELV or VCLS?

A46 : The two spacecrafts will be required to fit within the volume of the fairing of the proposed Launch Vehicle. The available fairing volumes are provided in the ELV Launch Services Program Information Summary and VCLS Program Information Summary located in the EVM-3 Library. For mission specific launch services information contact the NASA LSP point of contact listed in the EVM-3 AO.

Q47 : Can the $25M cost of the ESPA ring be reduced if another payload is assigned to one of the unused ports?

A47 : The $25M is to cover the cost of the ring, and the proposal can propose to use one or more of the available ports. Since it is not possible, at this time, to determine whether another payload could use any unused ports, there can be no assumptions of cost reductions.

Q48 : Can a payload exceed the ESPA or ESPA Grande dimensions specified in the RUG in the Z and/or Y axes? If so, is this exceedance considered a non-standard launch service? Must a proposer negotiate exceedance(s) with the LSP and include a signed letter in Appendix J.2?

A48 : The Proposer will be required to follow the guidance in the RUG for useable volume in the Y and/or Z axes during the AO process. If the Proposer is using multiple ports, they can include these volumes. Once a primary mission is selected, and the usable ESPA/Grande volume increases due to an increase fairing size, the allowable volumes will increase in the X-axis.

Q49 : The EVM-3 Library includes document *2018-09-18-IMAP-ESPA-SIS*, which specifies a lower "Max RPL Mass" than that stated in the *EVM-3 Evolved Expendable Launch Vehicle Secondary Payload Adapter (ESPA) Rideshare User's Guide (RUG).* May NASA reconcile this inconsistency?

A49 : The "Max RPL Mass" for EVM-3 missions is 450 kg for a single ESPA Grande ring.

Q50 : It appears that the EVM-3 AO-Provided Access to Space is extremely limited in orbit options and that it seems to favor constellation missions over single spacecraft missions, particularly if the mission requires a non-standard orbit. Is this the case?

A50 : The currently known/listed orbit options do not mean that those are the only options that will be available to proposers, as not all potential options are known at this time. As an example, LSP is currently coordinating a constellation mission that requires three separate orbit planes. The costs to the PI would likely be higher for such a mission concept, since there may be unique non-standard launch services for the particular mission. A single launch mission would likely be less of a risk, however that would be the case regardless of who does the coordination of the launch services. With the current direction given in the draft EVM-3 AO, all the risk for access to space is on NASA and not the PI. For mission unique launch services information contact the NASA LSP point of contact listed in the EVM-3 AO.

Q 51 :Regarding the EVM-3 AO-Provided Access to Space RPL/ESPA option, is the $25M charge for the entire EPSA ring with its capacity for up to 5 ports, even if only one is used by the proposed mission?

A51 : Yes, this is the policy for the EVM-3 AO.

Q52 : Is the seemingly lower risk posture of only allowing AO-Provided Access to Space for EVM-3 inconsistent with the stated focus of the Earth Venture program – to demonstrate innovative ideas allowing the use of existing moderately higher-risk technologies or approaches?

A52 : The currently available options for access to space offered in the draft EVM-3 AO is allowing a number of higher risk launch vehicles that have not on-ramped onto the NLS II contract and obtained Category 1 certification. NASA LSP will work to identify a launch solution that meets the requirements of the proposed science mission.

Q53 : May NASA reconsider allowing alternative access to space for the final EVM-3 AO, where the PIs would be able to use different alternatives?

A53 : NASA is allowing alternative launch strategies within the EVM-3 AO-Provided Access to Space with the option for Commercial FAA launches, however the arrangements will be made through NASA LSP and not the PI.

If the PI was to procure the launch service, it would need to comply with - prior to launch the vehicle must be certified as Category 1 per NPD 8610.7D, NASA Launch Services Risk Mitigation Policy for NASA-Owned or NASA-Sponsored Payloads/Missions and other launch policies. Instead NASA is taking on that responsibility through LSP to relieve the investigation team from taking on this process that can be very time consuming and suffers of uncertainties in launch vehicle availability and in costs.

Q54: Would NASA consider procuring a Firefly Alpha under the EVM-3 VCLS AO-Provided Access to Space option if it demonstrates a successful flight and achieves Category 1 status?

A54 : Any launch vehicle that complies with NPD 8610.7D Category 1 for Class D Payloads can be procured by NASA LSP.

Q55 : Why is the EVM-3 RPL/ESPA AO-Provided Access to Space option $25M cost to be reflected as a reduction in the Adjusted AO Cost Cap if integration costs are covered by the SMD primary payload sponsoring division, as stated in the SMD Evolved Expendable Launch Vehicle (EELV) Secondary Payload Adapter (ESPA) Secondary Payloads Rideshare policy document (SPD-32)?

A55 : At this time, there is significant uncertainty on what the cost to NASA SMD of the various rideshare options will be. The RPL/ESPA cost to be reflected as a reduction in the Adjusted AO Cost Cap also ensures relatively balanced costs for all AO-Provided Access to Space options relative to the abilities of each option and not positively bias one option relative to the others. The latest version of the SPD-32 is found in the EVM-3 Library.

Q56 : The NOAA Operational Enhancement (OE) Opportunity Section 5.1.7 of the draft EVM-3 AO provides few clues regarding the structure, content, or NOAA priorities beyond the general ones listed. Would the following activities be within the scope of NOAAs OE Opportunity?
(i) use of EVM-3 measurements to validate and improve NOAA's operational weather and climate prediction models and assimilations (especially for coupled model and assimilation);
(ii) test impact of EVM-3 measurements on NOAA's weather forecast through Observing System Sensitivity (OSE) experiments.
(iii) validation field campaign focused on assessing the accuracy of EVM-3 products for Numerical Weather Prediction (NWP).

A56 : The draft EVM-3 AO states that "These activities would allow NOAA to explore or facilitate the use of the EV science investigation to support NOAA's current or future operations. These activities could include but are not limited to: improving mission availability and reliability towards NOAA operational needs; developing operationally-focused data products/algorithms; enhancing calibration, validation, and testing; reducing data latency to NOAA to meet its mission needs; and delivering mission data to a location (such as the Commercial Cloud) where it can be accessed by operational users in support of NOAA's weather, climate, and ocean observations." NOAA would be interested using the EVM-3 mission data for validating and improving Operational models. NOAA is also open to having the OE include Observing System Simulation Experiments (OSSE) work to allow the improvements in the use of the selected EVM-3 mission data as part of the proposed activity. NOAA is not interested in the inclusion of field campaigns as part of the OE.

Q57 : May respondents propose Commercial Ground Station services in place of SCaN provided data services?

A57 : Requirement 30 in Section 5.3.5 of the draft EVM-3 AO states "Proposals shall include mission requirements for telecommunications, tracking, and navigation; proposals shall also include a plan for meeting those requirements. If non-NASA networks are used, a cost plan for the use of services shall also be included in

the PIMMC." Please also note that this section also states "NASA funds may not be used for the construction of new facilities for non-NASA communications services."

Q58 : For proposing purposes, should EVM-3 projects baseline to the Mission Assurance Requirements (MAR) for Geostationary Carbon Cycle Observatory (GeoCarb) Mission document found under the EVM Contract link in the EVM-3 Library or the new Science Mission Directorate Standard Mission Assurance Requirements Payload Classification: D document?

A58 : For proposing purposes, EVM-3 projects should assume that the Mission Assurance Requirements (MAR) for Geostationary Carbon Cycle Observatory (GeoCarb) Mission document will be used for the selected mission. Any tailoring will be determined once the selected investigation is in formulation.

Q59 : To fullfil Requirements 41, 42, and 43 of the draft EVM-3 AO, can proposals use the released 10/29/19 version of NASA Standard 1006, or can the EVM-3 AO more clearly delineate where AO requirements supersede those in NASA Standard 1006?

A59 : The draft EVM-3 AO requirements should be consistent with NASA Standard 1006, as the Standard gives requirements for what should be identified in the proposals and the AO asks that the proposals identify the budget and schedule to implement these requirements. The AO requirements will be reassessed before the release of the final EVM-3 AO.

Q60 : Section 2.3 of the draft EVM-3 AO states "NASA will prioritize consideration of proposals that address questions laid out in the 2017 Decadal Survey and will use the classification of the question being addressed." It further states that observables that were deemed to be considered or Explorer Class… and "Other ESAS 2017 Targeted Observables" will be considered here as there are no assurances that all of these particular observables would be address in the near future. Is there an implied prioritization that proposals that target portions of the DOs (even if the proposed EVM-3 would launch many years prior to DO launch) would be a lower priority because of the existing funding lines?

A60 : NASA SMD will have no general prioritization based on how the Decadal Survey (DS) classified a science question based on how the DS recommended the observable be obtained. The evaluations will be based on the value of the science question as identified in the five science chapters within the Decadal Survey regardless of how the Decadal Survey suggested NASA implement the observable.

Q61 : Regarding Section 5.10.4 of the draft EVM-3 AO, while it is understood that NASA will not agree a priori to options for alternative access to space, would NASA like to see options that proposers may put forward (similar to Earth Venture Instrument solicitations that states you may provide research the proposing team has done)?

A61 : EVM-3 proposals have no constraints, other than page limits, to show how their mission concept design is consistent with various identified platforms for gaining access to space. Please note that when an investigation is selected, NASA LSP may or may not procure the identified platform as they go through their procurement process.

Q62 : The NASA Earth Science Division (ESD) has created strong international partnerships which have benefitted the Earth system science community significantly. Recommendation 4.5 in the DS encourages NASA to pursue expanded and extended international partnerships. While ensuring a preponderance of NASA interest in the mission is certainly important, may NASA consider increasing the hard cutoff of one third (1/3) for the sum of contributions to enable more creative options and partnership opportunities?

A62 : After initial discussion, NASA SMD decided that the sum of contributions is not to exceed one-third (1/3) of the proposed PIMMC. A change is not being considered at this time.

Q63 : Given Requirements 6, 18, and B-24, is a formal “Data Management and Archive Plan ” required for pre-Phase A EVM-3 AO proposals?

A63 : A data management plan with the items descrbed on Requirements 6, 18, and B-24 and the evaluation criteria is required in the body of the proposals. However, a formal plan is not required at this stage of development. The language in the final EVM-3 AO will reflect that.

Q64 : In response to the previous posted Q&A 7, since line spacing (or “leading” in desktop publishing programs) and type font are set independently, it is consistent to have a 12 point font with 55 lines per page. Proposers have been meeting both of these requirements for many years. Lowering the lines per page to 49 results in an effective 12% reduction in the page count for the page limited sections of the main body of the proposal. May NASA consider increasing the page count allocation by six pages in the final EVM-3 AO to offset the lost space?

A64 : Yes. The number of pages will be increased by six pages. The number of lines per page and font size will remain at 49 and 12 point. This change will be reflected in the final EVM-3 AO.