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Releasable Public Version

April 26, 2021

[redacted]

GAO PROTECTIVE ORDER REQUESTED

IMMEDIATE AGENCY NOTIFICATION REQUESTED

Via GAO Electronic Bid Protest Filing System (EPDS)

Office of the General Counsel
Procurement Law Control Group
United States Government Accountability Office
441 G Street, N.W.
Washington, D.C. 20548

Re: Protest of Blue Origin Federation, LLC against National Aeronautics And Space Administration award of Option A contract for Human Landing System under Broad Agency Announcement NNH19ZCQ001K_APPENDIX-H-HLS.

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Attorneys for Blue Origin Federation, LLC

Attachments

cc: Mr. Tyler Cochran, Contracting Officer

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Re: Protest of Blue Origin Federation, LLC against National Aeronautics And Space Administration award of Option A contract for Human Landing System under Broad Agency Announcement NNH19ZCQ001K_APPENDIX-H-HLS.

Dear Sir or Madam:

Blue Origin Federation, LLC (Blue Origin),[1] through undersigned counsel, files this protest challenging the award of an Option A contract for the Human Landing System (HLS) under Broad Agency Announcement (BAA) NNH19ZCQ001K_APPENDIX-H-HLS. The National Aeronautics and Space Administration (NASA or Agency) selected Space Exploration Technologies Corp. (SpaceX) for an HLS Option A contract award in the amount of $2.89 billion. *See* NASA Press Release. During the proposal

[1] Blue Origin has offices located at 21218 76th Ave., South Kent, Washington, 98032-2242. Its telephone number is (253) 275-1727. However, please provide all further communications concerning this protest to undersigned counsel at this email address: scott.pickens@btlaw.com. For facsimiles, please use the following dedicated and protected fax line: (202) 912-8409. Throughout this document, emphasis in quotes has been added unless noted otherwise.

preparation and submission process, NASA had indicated an overriding intention to make two awards, but due to perceived shortfalls in currently available and anticipated future budget appropriations, it made only the award to SpaceX, eliminating HLS competition, and effectively locking down immediate and future lunar landing system development and launch and lunar landing opportunities. However, as explained below, the Agency's evaluation process and award decision fails to comply with Federal procurement statutes and regulations and should be set aside.

As discussed more fully below, the Agency's award decision is flawed for the following reasons: a) the Agency evaluation and award decision failed to allow offerors to meaningfully compete for an award when the Agency's requirements changed due to its undisclosed, perceived shortfall of funding for the multi-year program lifecycle; (b) the Agency performed a flawed competitive acquisition in contravention of BAA rules and requirements; (c) the Agency's evaluation of Blue Origin's HLS proposal was flawed and unreasonable and conflicted with BAA evaluation provisions; (d) the Agency improperly and disparately evaluated SpaceX's Option A proposal; and (e) the Agency's evaluation changed the weight accorded to evaluation factors to make price (cost to the Government) the most important factor because of perceived funding limitations. For the reasons discussed below, the protest should be sustained.

Blue Origin respectfully requests that the Government Accountability Office (GAO) immediately give formal notice to the Agency and the Contracting Officer of the filing of this protest with GAO and the imposition of the automatic stay pursuant to 4 C.F.R. § 21.3(a). The Contracting Officer's contact information is set forth below (at § II.B).

I. INTRODUCTION AND BACKGROUND

Blue Origin Is Committed To Lunar Landing and Exploration

Blue Origin independently began design and development of the Blue Moon lunar lander in 2016 prior to NASA deciding on a policy to return humans to the Moon. In early 2017, Blue Origin sought a public-private partnership with NASA to develop Blue Moon and on March 2, 2017, submitted an unsolicited proposal for a demonstration landing on the lunar surface that included a substantial corporate investment.[2] Blue Origin founder Jeff Bezos stated at the time: "It is time for America to return to the Moon – this time to stay. A permanently inhabited lunar settlement is a difficult and worthy objective [and can] only be done in partnership with NASA. Our liquid hydrogen expertise and experience with precision vertical landing offer the fastest path to a lunar lander mission. I'm excited about this and am ready to invest my own money alongside NASA to make it happen." Over the next several years, Blue Origin internally funded design and development of Blue Moon over more than five Design Analysis Cycles (DACs) before receiving its first NASA lander funding under the NEXTStep-2 Appendix E program in May 2019.

Additionally, Blue Origin has so far spent more than [redacted] of private investment developing a new 10,000 lb. thrust class liquid oxygen/liquid hydrogen rocket engine called the BE-7 that can be used by a variety of commercial applications including the Blue Moon cargo lander or crewed landers. Blue Origin independently started this engine program in the summer of 2017, signed an agreement with NASA Marshall Space Flight Center (MSFC) and Johnson Space Center (JSC) that included hotfire testing of

[2] *See* Christian Davenport, *An exclusive look at Jeff Bezos's plan to set up Amazon-like delivery for 'future human settlement' of the moon*, Washington Post (March 2, 2017), URL: https://www.washingtonpost.com/news/the-switch/wp/2017/03/02/an-exclusive-look-at-jeff-bezos-plan-to-set-up-amazon-like-delivery-for-future-human-settlement-of-the-moon/.

[redacted]

additively manufactured pathfinder thrust chambers in 2018, and BE-7 hardware testing at NASA MSFC in June 2019. Blue Origin now has more than 25 minutes of cumulative run time on the BE-7 thrust chamber, has had more than [redacted] full-time equivalent persons working on the program, signed more than [redacted] of reimbursable Space Act agreements with NASA MSFC, and has signed an additional set of agreements worth about [redacted] with the U.S. Air Force to upgrade an existing vacuum test facility for use through 2034. Blue Origin's substantial commercial investment in the BE-7 engine program is direct evidence of its corporate commitment in lunar exploration.

Blue Origin is committed to implementing U.S. space priorities by building a robust and resilient launch capability and by developing various space vehicles including lunar landers. By incorporating highly reliable engines and propulsion systems designed and manufactured in the United States, in a variety of launch and space vehicles and actively participating in a long-term domestic competitive environment, assured U.S. access to space will be achieved. So too will the ability to develop new operational concepts and capabilities in space. Blue Origin has invested over $2.5 billion of its own funds to develop the New Glenn launch system, including over $1 billion developing manufacturing and launch facilities in the U.S. Blue Origin seeks the opportunity to compete to provide launch services and a variety of space vehicles at consistent, predictable, and sustainable commercial prices for the Agency and to drive innovation in the market for launch and space systems.

Blue Origin established the National Team for the Human Landing System bringing together industry partners with its considerable space heritage including Lockheed Martin Corporation leveraging the Orion program, Northrop Grumman Corporation for Cygnus, and Draper Laboratory. Blue Origin seeks the opportunity to compete to provide launch services and a variety of space vehicles at consistent, predictable, and sustainable commercial prices for the Agency and to drive innovation in the market for launch and space systems. NASA's early commitment to selecting two HLS suppliers and preserving competition was the right decision. NASA arbitrarily decided to only engage in discussions with one bidder, contrary to long established federal procurement principles. In failing to maintain two sources for HLS Option A, NASA's selection decision creates a number of issues for the HLS program and puts all of NASA's eggs in one basket. This decision directly introduces technical and schedule risk into NASA's flagship program by betting on a singular solution the Source Selection Statement itself deems complex and high-risk, without a fallback plan; chooses a "closed" architecture that is intrinsically incompatible with any other NASA launch system and potentially obviates the need for multiple programs that NASA has been developing over many years. It selects a provider that is almost fully vertically integrated, thereby precluding participation in the HLS program by the nationwide aerospace supply base that NASA and national security programs have built up over many decades to sustain the nation's superiority in space.

NASA's HLS Program and Option A Procurement

Space Policy Directive-1 instructed NASA to "[l]ead an innovative and sustainable program of exploration with commercial and international partners to enable human expansion across the Solar System and to bring back to Earth new knowledge and opportunities. Beginning with missions beyond low-Earth orbit, the United States will lead the return of humans to the Moon for long-term exploration and utilization, followed by human missions to Mars and other destinations." Subsequently, on March 26, 2019, Vice President Pence announced, "[i]t is the stated policy of this administration and the United States of America to return American astronauts to the Moon within the next five years."

To achieve these goals, NASA created the Human Landing System (HLS) program within its

Human Exploration and Operations Mission Directorate (HEOMD).[3] The HLS program is for development and demonstration of a human-rated lunar landing system to deliver "the first woman and next man" to the lunar surface, initially originally by 2028, later adjusted to 2024 as noted above. The Next Space Technologies for Exploration Partnerships-2 (NextSTEP-2) Omnibus Broad Agency Announcement (BAA) was initially issued on April 19, 2016, BAA number NNH19ZCQ001K. The NexSTEP-2 BAA was issued as part of NASA's strategy to stimulate the commercial space industry while leveraging those same commercial capabilities through future contracts and public-private partnerships to deliver mission capabilities.

NASA used the NextSTEP-2 BAA under two specific appendices to mature initial designs and then development of demonstration of a crewed lunar landing system referred to as the Human Landing System (HLS) that would be part of its overall Artemis lunar exploration program. This started with Appendix E which was focused on commercially-led six month system studies and risk reductions. The Appendix E final solicitation was released on Feb. 7, 2019.[4] On May 19, 2019, NASA announced that 11 companies were awarded Appendix E contracts including Blue Origin, Lockheed Martin, and Northrop Grumman (each awarded separate contracts).[5] Blue Origin received perfect scores on the NASA Contractor Performance Assessment Reports System (CPARS) report for its work on Appendix E. Lockheed Martin and Northrop Grumman also executed Appendix E contracts for NASA, leading to Blue Origin's creation of the National Team (see below) for the subsequent competition for full-scale development and operation of an actual mission.

NASA then proceeded to Appendix H, whose final solicitation was released on Oct. 25, 2019, and was focused on "development and demonstration of a Human Landing System (HLS) to deliver humans to the lunar surface by 2024."[6] Appendix H was formulated into two phases to achieve the first crewed lander demonstration. The first phase was a 10-month Base Period to advance design and development of the initial lander, advance the design of a sustainable lander design, and order Long Lead Items for the 2024 crewed landing mission. NASA then included in Appendix H a follow-on Option A Period to focus on Design, Development, Test, and Evaluation (DDT&E) and to conduct the actual crewed landing mission. NASA publicly announced on April 30. 2020 that the Blue Origin led National Team (which included Lockheed Martin, Northrop Grumman, and Draper) was awarded a 10-month NextSTEP-2 Appendix H Base Period contract.[7]

HLS Base Period Awards

On September 30, 2019, NASA released a Solicitation under the NextSTEP-2 Broad Agency Announcement (BAA) Appendix H, Solicitation Number NNH19ZCQ001K_APPENDIX-H-HLS, for this program. This Solicitation requested a firm-fixed price for the first ten months of development (the "Base Period"), as well as for the option period (Option A) – effectively a firm-fixed-price to return NASA astronauts to the Moon for the first time in a half century. There were minor amendments released on October 2, October 16, and October 25, 2019, and two question and answer logs released on October 16, 2019, and October 25, 2019.

NASA awarded three Base Period contracts under Appendix H, to jointly explore concepts for

[3] Background information is located here: https://www.nasa.gov/nextstep/humanlander2
[4] https://www.nasa.gov/nextstep/humanlander
[5] https://www.nasa.gov/press-release/nasa-taps-11-american-companies-to-advance-human-lunar-landers
[6] *See* https://www.nasa.gov/nextstep/humanlander2
[7] https://www.nasa.gov/press-release/nasa-names-companies-to-develop-human-landers-for-artemis-moon-missions

[redacted]

achieving human landing on the Moon for the first time in a half century. NASA selected Blue Origin and its partners (*i.e.*, the National Team, consisting of Blue Origin as prime contractor, with partners Lockheed Martin, Northrop Grumman, and Draper), Dynetics, Inc. ("Dynetics") and SpaceX, for these Base Period awards. Blue Origin received an award of $579 million, Dynetics an award of $253 million, and SpaceX an award of $135 million. Those selected would have the opportunity to re-price the Option A period based on increased knowledge and requirements definition gained over the course of the base period. These three Base Period contractors are currently performing research and development in support of their respective human landing systems.

One significant task of the Base Period contract was for NASA and Blue Origin to adjudicate and reach final agreement on all design and construction, safety, and health and medical standards that would be used during the performance of Option A and execution of the Artemis III mission. This standards adjudication process culminated in the Certification Baseline Review (CBR) which was led by the NASA HLS Chief Engineer and NASA HLS Program Management. The CBR, held on August 24, 2020, examined the functional and performance requirements defined for the system and verified that Blue Origin's HLS system concept met the requirements, would satisfy the mission, and could be certified by NASA to carry its astronauts and complete its demonstration mission in 2024.

HLS Option A Procurement

The HLS Option A procurement builds upon NASA's HLS Base Period contracts to develop and demonstrate landing systems to deliver humans to the Moon's surface. During the Base Period contract, Blue Origin developed detailed engineering concepts, technology development plans, and mission performance data aligned with the Agency's reference three-element HLS architecture. This contract task developed the technical baseline Blue Origin used to compete for the next stage of the program, Appendix H (see below).

NASA's procurement documents and public statements repeatedly recognized that it was NASA's intent to award two HLS Option A awards. For example, the HLS Option A Source Selection Official stated "by making three HLS base period contract awards that preceded the present Option A source selection, it was NASA's preference (as stated in the Option A BAA) to then down-select from among these contractors to two Option A awardees." *See* Source Selection Statement (SSS) (**Attachment 2**) at 7. Similarly, the Source Selection Statement expressly recognizes that one of NASA's HLS objectives as set forth in the Solicitation was "making two Option A contract awards" which reflected "NASA's longstanding Option A acquisition strategy." SSS at 7. *See also* https://spacenews.com/nasa-says-maintaining-competition-a-priority-for-lunar-lander-procurement/.

As explained above, NASA utilized a BAA to solicit firm-fixed-price proposals for both the HLS Base Period and for the Option A period. Although BAAs are not Federal Acquisition Register (FAR) Part 15 negotiated procurements conducted on the basis of competitive proposals, they are competitive procedures which can fulfill the requirements for full and open competition, so long as they are used for research, and "that part of development not related to development of a specific system or hardware procurement." FAR 6.102(d)(2). BAA procedures and evaluation criteria are specified in FAR 35.016 (primary bases for selecting BAA proposals shall be technical, importance to agency programs, and funds availability). Offerors must be treated fairly and equally, with an understanding of the Government's actual requirements, and rationally evaluated against disclosed evaluation factors in accordance with the Solicitation. *Spaltudaq Corp.*, B-400650; B-400650.2, Jan. 6, 2009 (in using BAAs, "agencies may not conduct themselves in an arbitrary manner, and they must negotiate in good faith and in a manner

consistent with the BAA.").

The Agency released the HLS Option A Solicitation, consisting of the NextSTEP-2 Appendix H Option A BAA to the three HLS contractors on October 30, 2020, with an amendment issued on November 16, 2020, (**Attachment 1**) and Solicitation Attachments A-Q. The Solicitation required that fixed price proposals be submitted in four volumes: Technical (I); Price (II); Management (III); and Attachments (IV) – the latter consisting of 44 distinct proposal attachments. The period of performance for Option A will be up to six years. Solicitation (**Attachment 1**), Section 6.2.

Proposals were due by 3:00 PM CT on December 8, 2020. Blue Origin timely submitted a responsive and compliant proposal, supported by members of the Human Landing System National Team (Lockheed Martin Corporation, Northrop Grumman Corporation, and The Charles Stark Draper Laboratory).

The Solicitation established three factors for evaluation: Technical (Factor 1), Price (Factor 2), and Management (Factor 3). The Solicitation specified these factors were in descending order of importance to NASA: Factor 1 was more important than Factor 2, and Factor 2 was more important than Factor 3. Factors 1 and 3, when combined, were significantly more important than Factor 2.

Within Factors 1 and 3, the Solicitation established specific "focus" areas for evaluation. For each offeror, findings (e.g., strengths, weaknesses) created for the areas of focus were to be considered in totality by the Source Evaluation Panel (SEP) to arrive at a single adjectival rating for each factor. Areas of focus were not to receive their own adjectival ratings. In determining adjectival ratings for Factors 1 and 3, all areas of focus were to be considered as approximately of equal importance within their respective factor. Table 1 below contains the evaluation factors and areas of focus.

Evaluation Factor	Area of Focus
Factor 1: Technical Approach	Technical Design Concept
	Development, Schedule, and Risk
	Verification, Validation, and Certification
	Insight
	Launch and Mission Operations
	Sustainability
	Approach to Early System Demonstrations
Factor 2: Total Evaluated Price	No focus areas
Factor 3: Management Approach	Organization and Management
	Schedule Management
	Risk Reduction
	Commercial Approach
	Base Period Performance
	Small Business Subcontracting Plan
	Data Rights

Table 1: Option A Evaluation Factors and Areas of Focus

For evaluation of Factors 1 and 3, the SEP identified strengths and weaknesses as defined below. Elements of an offeror's proposal that merely met the Agency's requirements were ineligible for a finding

of either a strength or a weakness. In such case, the SEP did not create findings.

Finding	Definition
Significant Strength	An aspect of the proposal that greatly enhances the potential for successful contract performance and/or thatappreciably exceeds specified performance or capability requirements in a way that will be advantageous to the Government during contract performance.
Strength	An aspect of the proposal that will have some positive impact on the successful performance of the contract and/or that exceeds specified performance or capabilityrequirements in a way that will be advantageous to the Government during contract performance.
Weakness	A flaw in the proposal that increases the risk of unsuccessful contract performance.
Significant Weakness	A flaw in the proposal that appreciably increases the risk of unsuccessful contract performance.
Deficiency	A material failure of a proposal to meet a Government requirement or a combination of significant weaknesses in a proposal that increases the risk of unsuccessful contract performance to an unacceptable level.

Table 2: Option A Findings Definitions

Adjectival ratings definitions as applicable to Factors 1 and 3 were as follows:

Adjectival Rating	Definition
Outstanding	A thorough and compelling proposal of exceptional merit thatfully responds to the objectives of the BAA. Proposal contains strengths that far outweigh any weaknesses.
Very Good	A competent proposal of high merit that fully responds to the objectives of the BAA. Proposal contains strengths which outweigh any weaknesses.
Acceptable	A competent proposal of moderate merit that represents a credible response to the BAA. Strengths and weaknesses areoffsetting or will have little or no impact on contract performance.
Marginal	A proposal of little merit. Proposal does not clearly demonstrate an adequate approach to and understanding of the BAA objectives. Weaknesses outweigh strengths.
Unacceptable	A seriously flawed proposal that is not responsive to the objectives of the BAA. The proposal has one or more deficiencies, or multiple significant weaknesses that either demonstrate a lack of overall competence or would require amajor proposal revision to correct. The proposal is unawardable.

[redacted]

Table 3: Option A Adjectival Ratings Definitions

For one of the Areas of Focus within Factor 3, Base Period Performance, the SEP performed its evaluation in accordance with a special procedure established in the Option A solicitation. This procedure involved evaluation of NASA's Base Period Performance Record (BPP-R) for each offeror, documenting its performance from the beginning of base period contract performance until October 2020, as well as evaluationof the Base Period Performance Narrative (BPP-N) submitted by each offeror with its Option A proposal. For this Area of Focus, offerors were eligible to receive one of four base period performance ratings enumerated and defined within the Option A solicitation.

The SEP's price evaluation consisted of four components: (1) A calculation of each offeror's Total Evaluated Price (evaluation Factor 2); (2) an evaluation of each offeror's price reasonableness; (3) an evaluation of each offeror's balanced pricing; and (4) an evaluation of whether the offeror's proposal contained advance payments. The evaluation of offerors' prices did not result in the assignment of any adjectival rating norany strengths or weaknesses. The SEP calculated each offeror's Total Evaluated Price bysumming the offeror's proposed firm fixed price amounts for CLINs 005, 009, and 010; the value of certain Government contributions to the proposed effort, including Optional Government Furnished Equipment or Property and the value of any Government Task Agreements; and the minimum indefinite delivery/indefinite quantity (IDIQ) obligations as provided in theOption A solicitation.

Although NASA stated that the Option A period would start in March 2021, upon the conclusion of the Base Period at the end of February, the Agency issued a two-month no-cost extension of the Base Period to all HLS contractors. This extended the Base Period through the end of April 2021, with no additional funds or scope, to accommodate delays in the Option A selection. The Option A period then continues through the 2024 crewed flight demonstration.

HLS Option A Procurement Evaluation

The Option A technical and management adjectival ratings as assessed by the SEP for the three offerors are shown below:

	Technical Rating (Factor 1)	Management Rating (Factor 3)
Blue Origin	Acceptable	Very Good
Dynetics	Marginal	Very Good
SpaceX	Acceptable	Outstanding

Table 4: Option A Technical and Management Adjectival Ratings

As determined by the Agency Blue Origin's evaluated price was $5.99 billion, Source Evaluation Panel Report (SEPR) at 45,[8] and SpaceX's evaluated price was $2.91 billion (SSS at 8).[9]

[8] The Source Evaluation Panel Report was dated April 1, 2021. Blue Origin identified an erroneous reference to SpaceX's Starship vehicle in the SEPR. The Agency asserted that this reference was a typographic error, and reissued a corrected SEPR on April 19, 2021 removing that reference. The corrected SEPR is included at **Attachment 3**.

[9] Source Selection Statement, Appendix H: Human Landing System, Option A, Next Space Technologies for Exploration Partnerships-2 (NextSTEP-2) NNH19ZCQ001K_APPENDIX-H-HLS, April 16, 2021, URL:

The Agency's Source Selection decision recognized NASA's longstanding Option A acquisition strategy of making two Option A contract awards. *See* Source Selection Statement (**Attachment 2**) at 3, 7. Although the Agency purportedly desired "to preserve a competitive environment at this stage of the HLS Program, at the initial prices and milestone payment phasing proposed by each of the Option A offerors," NASA's current fiscal year budget at the time of proposal review and evaluation "did not support even a single Option A award." *Id.* Accordingly, on April 2, 2021, the Source Selection Official (SSO) determined to make an initial, "conditional" selection of SpaceX to enable the Contracting Officer (CO) to engage in post-selection price negotiations with that company. *Id.* The SSO therefore determined to open price negotiations only with SpaceX, the offeror that had "by a wide margin, the lowest initially-proposed price."

HLS Option A Award

After review of the price negotiations with SpaceX, which did not result in a lower price but did change some milestone payments, the SSO determined to award Option A to SpaceX. Accordingly, on April 16, 2021, NASA selected SpaceX for the HLS Option A award, at an evaluated price of $2.91 billion and a total award value of $2.89 billion, despite its stated intention to down-select to two providers to maintain competition. SSS at 8.[10] NASA made this selection based on price, as the Source Selection Statement indicates that "NASA's current fiscal year budget did not support even a single Option A award. The SSO stated: "My selection determination for SpaceX's proposal is based upon the results of its evaluation considered in light of the Agency's currently available and anticipated future funding for the Option A effort." SSS (**Attachment 2**) at 24.

Impact of Flawed Option A Award to Single Awardee SpaceX On Competition and Commercial Industry Development

Even though Congress appropriated nearly $1.5 billion for HLS in just two fiscal years, including $850 million in FY21, NASA's source selection rationale improperly justifies the selection of a lone provider as a result of "anticipated future funding for the HLS Program." Unfortunately, this justification lacks precedent and is not substantiated by the facts. The total cost of selecting both the National Team and SpaceX for firm-fixed price, milestone-based contracts is less than $9 billion – roughly half of what NASA requested in its September 2020 Artemis Plan budget and only 10% of the total Artemis cost as reported by the NASA Office of the Inspector General on April 19, 2021.[11] Furthermore, this total cost is similar to the $8.3 billion total cost of the Commercial Crew Program. Under the Commercial Crew Program, the Agency made two awards with less available funding and less out-year funding certainty.

The Agency made repeated statements prior to selection of its desire for two Option A providers and also made explicit statements publicly about its budgets to do so. NASA's Artemis Plan, released in September 2020, shows the agency planned $16.2B for HLS Option A through FY2025 for two providers with the first landing on the Moon in 2024 and a second landing in 2026.[12] NASA's plan as stated publicly was to "keep two going to the moon . . . the first one in 2024 and the next one in 2026."[13]

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https://www.nasa.gov/sites/default/files/atoms/files/option-a-source-selection-statement-final.pdf

[10] "As Artemis Moves Forward, NASA Picks SpaceX to Land Next Americans on Moon," NASA Press Release, April 16, 2021, URL: https://www.nasa.gov/press-release/as-artemis-moves-forward-nasa-picks-spacex-to-land-next-americans-on-moon

[11] NASA Office of the Inspector General, *Artemis Status Update*, April 19, 2021, URL: https://oig.nasa.gov/docs/IG-21-018.pdf

[12] *Artemis Plan: NASA's Lunar Exploration Program Overview*, September 2020, URL: https://www.nasa.gov/sites/default/files/atoms/files/artemis_plan-20200921.pdf

[13] Lisa Watson-Morgan, HLS program manager at NASA's Marshall Space Flight Center in Huntsville." (Claire Aiello, *Huntsville*

The Artemis Plan further states that the actual landing dates will be dependent on appropriations rather than reducing the number of providers. Regarding the acceleration of the first landing from 2028 to 2024, NASA's Artemis Plan states: "While the funding requirements are accelerated and near-term amounts have comparatively increased, overall funding requirements for the 2024 Phase 1 [Base Period and Option A] effort are not higher." In addition, NASA publicly said that it would delay the Artemis III landing beyond 2024 if the agency received less funding than requested.[14]

NASA's selection of only a single provider based on the Source Selection Statement claim that "NASA's current fiscal year budget did not support even a single Option A award" is inconsistent with NASA's documented acquisition strategy and public statements.

Additionally, with only a single HLS provider, NASA risks the Nation's return to the Moon entirely on SpaceX's ability to deliver its proposed solution – Starship and the new Super Heavy booster – despite the "immense complexity" and "high risk" NASA itself documented in the source selection rationale. In fact, NASA's own International Space Station (ISS) lessons learned warn against the risk of a single provider, definitively stating that "future exploration programs must be structured with alternative transport vehicles, so there is no particular system that becomes a single-point-of-failure."[15] Moreover, the April 19, 2021, NASA's Office of Inspector General finding states that NASA officials themselves "expressed concern that selecting a single contractor would result in a lack of redundancy and potentially higher, less sustainable future HLS costs due to a lack of competition."[16]

NASA's multiple provider approach for Commercial Cargo and Crew already laid a successful roadmap for future agency procurements: this approach insulated both programs from delays in system development (including significant vehicle anomalies at different providers), financing, and budgets. In spite of this, NASA chose one provider for HLS, its most visible flagship program. The selection of SpaceX effectively makes deep space exploration a closed system that ultimately calls into question even SLS, Orion, and Gateway. With launch vehicles, crew systems, transfer, and surface access all provided by one company, NASA would be wholly dependent on SpaceX's Starship, Super Heavy booster, and Crew Dragon for all foreseeable future deep space exploration.

This single award endangers domestic supply chains for space and negatively impacts jobs across the country, by placing NASA space exploration in the hands of one vertically integrated enterprise that manufactures virtually all its own components and obviates a broad-based nationwide supplier network. Such supplier consolidation cuts most of the space industrial base out of NASA exploration, impacting national security, jobs, the economy, and NASA's own future options. Exacerbating this situation is the fact that SpaceX's Starship uses the Super Heavy booster. Starship is incompatible with other U.S. commercial launch vehicles, further restricting NASA's alternatives and entrenching SpaceX's monopolistic control of NASA deep space exploration.

As discussed below, NASA's source selection process treated each bidder differently and disparately.

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companies fine-tune Human Landing Systems as NASA decision nears, Huntsville Chamber of Commerce, October 1, 2020). URL: https://hsvchamber.org/huntsville-companies-fine-tune-human-landing-systems-as-nasa-decision-nears/

[14] NASA Administrator Jim Bridenstine remarks before the Senate Commerce, Justice, Science, and Related Agencies Appropriations Subcommittee, September 23, 2020, URL: https://spacenews.com/bridenstine-asks-senate-appropriators-for-full-funding-for-artemis/

[15] https://www.nasa.gov/pdf/511133main_ISS_Lessons_Learned_7-22-09_complete.pdf

[16] https://oig.nasa.gov/docs/IG-21-018.pdf

For example, mid-selection, SpaceX was offered the opportunity to re-price its offer based on new budget information that NASA provided only to SpaceX. Unfortunately, Blue Origin was not given a similar opportunity to discuss or negotiate price for a 2024 landing date, or re-phase milestones and costs for a landing date after 2024. This was in spite of the National Team repeatedly demonstrating in the Base Period its ability to reduce its price to meet a NASA budget constraint, adjust milestones to meet NASA's funding profile, apply corporate resources including funding to innovative approaches to preserve schedule when NASA removed elements like Long Lead Item funding from the Base Period, and despite the solicitation implying that a second landing "eighteen months later" would be part of the program. *See* **Attachment 4** (Declaration of Brent Sherwood). In addition, SpaceX was lauded for its "deep bench of personnel and expertise, its prior program management experience, and lessons learned from those experiences . . . on other, similar programs." NASA's evaluation chose not to credit the broad and deep human spaceflight experience of the National Team partners.

II. PRELIMINARY MATTERS

A. Interested Party Status, Timeliness, and Imposition of Stay

Blue Origin is an actual bidder in this procurement with a direct economic interest in the Agency's failure to award it a contract under the Option A Solicitation. Blue Origin has timely submitted a compliant[17] proposal pursuant to the Option A solicitation which the Agency favorably evaluated (even with the inherent evaluation flaws and errors involved). But for the procurement evaluation errors described in this protest, Blue Origin would have received an award, or at a minimum had a substantial chance for award in a properly conducted re-evaluation. Blue Origin is therefore an interested party within the meaning of 4 C.F.R. § 21.0(a) and FAR 33.101.

Blue Origin learned of its nonselection and grounds for this protest on April 16, 2021, when NASA informed it of NASA's decision to select SpaceX for award and provided some evaluation documents. Blue Origin timely files this protest because it is filed within 10 days of when Blue Origin knew of its potential protest grounds. 4 C.F.R. § 21.2 (a)(1).

Upon timely notice of this protest as requested above, the Competition in Contracting Act (CICA) requires NASA to refrain from making any Option A contract award or permitting HLS Option A performance, pending GAO's resolution of this protest unless authorized in accordance with applicable statutory and regulatory procurement procedures. 31 U.S.C. § 3553(c)(1) and (2) and FAR § 33.104(b)(l).

B. Contracting Officer Notification

Pursuant to 4 C.F.R. § 21.1(e), and FAR 52.233-2 *Service of Protest,* Blue Origin is also providing by e-mail a complete copy of this protest and attachments to the Contracting Officer within one day after this protest is filed at GAO, as follows:

Mr. Tyler Cochran, Contracting Officer
Human Landing System

[17] As discussed below, the Agency erroneously and improperly asserted that Blue Origin was ineligible for award because Blue Origin purportedly proposed Advance Payments contrary to the HLS Solicitation. That assertion is factually wrong and improper. Blue Origin's proposal complied with all HLS Option A Solicitation requirements and did not propose Advance Payments.

NASA Marshall Space Flight Center
MSFC, AL 35812
E-mail: tyler.c.cochran@nasa.gov

C. Protester Contact Information

Blue Origin has offices located at 21218 76th Ave. South, Kent, Washington, 98032-2242. Its telephone number is (253) 437-9300. However, please provide all further communications concerning this protest to undersigned counsel at this email address: scott.pickens@btlaw.com.

D. Request for Protective Order

This Protest contains Blue Origin's confidential commercial, financial, business, and proprietary information, the release of which would result in a competitive disadvantage and damage to Blue Origin. Blue Origin has therefore included protective legends on this Protest and identified confidential and competitive sensitive information with gray highlighting ( ). Blue Origin also expects that the disposition of this Protest will require the exchange of additional confidential commercial, financial, and business information, as well as Agency source selection material. Accordingly, pursuant to 4 C.F.R. § 21.4(a), Blue Origin requests that GAO issue a Protective Order limiting the release of this Protest and such other protectable information. In the interim, Blue Origin requests that GAO and the Agency treat this Protest as protected from disclosure.

E. Request for a Hearing

Blue Origin reserves its right to request a hearing in the future if one becomes necessary to resolve this Protest. *See* 4 C.F.R. § 21.1(d)(3). Blue Origin anticipates that a hearing will be necessary in this protest.

III. ARGUMENT

The Agency planned and confirmed throughout the HLS procurement that, based on its requirements and needs, it intended to award two HLS Option A awards. However, due to perceived funding constraints known to NASA, but not disclosed to offerors in a manner that would have allowed timely analysis and revision of Option A proposals, NASA determined that it could make only one HLS award. As a consequence, price/cost to the Agency became the most important and determinative evaluation factor, but that crucial change was not disclosed to all offerors and instead NASA conducted discussions on price with only one offeror which was arbitrary and not consistent with full and open competition principles.

Additionally, the evaluation and award decision as disclosed by the Agency departed from the specified evaluation criteria, and necessarily resulted in an arbitrary and unreasonable selection decision. More specifically, the Agency's evaluation and award decision contained significant errors detailed below, including (a) engineering errors and negative evaluation of technical features already approved in NASA's Certification Baseline Review many months earlier, on contract in the Base Period; (b) uneven and disparate treatment of technical features between the Blue Origin and SpaceX solutions, resulting in heightened scrutiny for Blue Origin yet overlooking or under-emphasizing analogous features for SpaceX; (c) application of an erroneous and overreaching standard for claiming Government Purpose Rights, while deviating from the definition already accepted and

[redacted]

implemented by NASA for the Base Period contract; and, (d) erroneous assertion that valid Milestone Payments were advance payments despite abundant evidence in the proposal of the rationale and need for rapid expenditures for Long Lead procurements through Milestone Payments at the start of Option A, to implement the proposed program plan to meet NASA's 2024 landing goal. These errors, individually and in the aggregate, tainted the bases for the Source Selection Official's decision by creating a material negative impact on the adjectival scores given to Blue Origin. These scores directly facilitated the Source Selection Official's decision to award to SpaceX. In addition, the identification and relative valuation of strengths and weaknesses in the SEP Report, and their relative valuation by the Source Selection Official, was disparate and unequal between SpaceX and Blue Origin. Finally, the Source Selection Official valued implicit requirements using unstated evaluation factors that were not identified by the Solicitation. As explained in more detail below, these errors require that Blue Origin's protest be sustained.

A. The Agency Improperly Failed to Amend the Solicitation to Allow Offerors to Revise Their Proposals When the Government's Requirements Changed Due to a Perception of Significantly Reduced Funding.

1. Offerors Were Deprived of A Full and Fair Opportunity To Compete With An Accurate Understanding of the Agency's True Requirements.

It is a fundamental principle of government procurement that competition must be conducted on an equal basis; that is, offerors must be treated equally and provided with a common basis for the preparation of their proposals. *Systems Mgmt., Inc.; Qualimetrics, Inc.*, B-287032.3, B-287032.4, Apr. 16, 2001, 2001 CPD ¶ 85 at 8. This fundamental principle fully applies to BAA procurements. *Spaltudaq Corp.*, B-400650; B-400650.2, Jan. 6, 2009 (in using BAAs, "agencies may not conduct themselves in an arbitrary manner, and they must negotiate in good faith and in a manner consistent with the BAA."). When, either before or after receipt of proposals, the government changes or relaxes its requirements, it must issue an amendment to notify all offerors of the changed requirements and give them an opportunity to respond. *Diebold, Inc.*, B-404823, June 2, 2011, 2011 CPD ¶ 117 at 4; *Systems Mgmt., Inc.; Qualimetrics, Inc.*, *supra; see Cardkey Sys.*, B-220660, Feb. 11, 1986, 86-1 CPD ¶ 154 at 2 (If it becomes apparent that the contract being negotiated differs significantly from the requirements stated in the RFP, the contracting agency must amend the RFP or, at the least, advise offerors of the change during discussions and seek new offers). GAO will sustain a protest where an agency, without issuing a written amendment, materially alters the solicitation's requirements to the protester's prejudice. *See Systems Mgmt., Inc.*; *Qualimetrics, Inc., supra*.

It is axiomatic and a fundamental procurement principle that when, either before or after receipt of proposals, the Government's requirements change, the Government shall amend the solicitation and allow offerors to submit revised proposals based on the Government's true needs. FAR 15.206(a)("When, either before or after receipt of proposals, the Government changes its requirements or terms and conditions, the contracting officer shall amend the solicitation."). *See Murray-Benjamin Elec. Co., L.P.*, B-400255, Aug. 7, 2008, 2008 CPD ¶ 155 at 3-4 (Where an agency's requirements change in a material way after a solicitation has been issued, the agency must generally issue an amendment and afford all offerors an opportunity to compete for its changed requirements.); *Symetrics Indus., Inc.*, B-274246.3 *et al.*, Aug. 20, 1997, 97-2 CPD ¶ 59 at 6 (where an agency's estimate for the amount of work to be ordered under an ID/IQ contract changes significantly, prior to award, the agency must amend the solicitation and provide offerors an opportunity to submit revised proposals.).

In *Symetrics*, GAO concluded that the agency should have amended a solicitation for an ID/IQ contract because the scope of work contemplated by the agency changed prior to award (the solicitation initially estimated the agency would require 3,755 sequencers, but the agency subsequently learned--prior to award--that the agency no longer had a requirement for 3,219 of the sequencers.). *Id.* Similarly, in *Northrop Grumman Info. Tech., Inc., et al.*, B-295526 *et al.*, Mar. 16, 2005, 2005 CPD ¶ 45 at 13, GAO sustained a protest where the Government knew that the scope and extent of work changed, making it less likely that work specified in the solicitation would be required. Here the reduced funding translated to a reduced scope of work or reduced technical features which represents a material departure from the assumptions contained in the Solicitation. *Global Computer Enterprises, Inc.; Savantage Financial Services, Inc.*, B-404597; B-404597.2; B-404597.3, March 9, 2011 (the selection decision relied on the agency's evaluation of the offerors proposed prices and technical solutions that were based on solicitation assumptions which were no longer valid at the time of award; GAO determined that the agency's award to CACI was improper.).

Similarly, *CGI Federal Inc.*, B-410330.2: Dec 10, 2014, shows the Agency's failure to disclose its change of plans here was irrational. In *CGI Federal*, the agency failed to disclose to offerors that the basis for its price evaluation was no longer accurate because the agency's ordering plans changed. As GAO stated there, "where the disconnect between the terms of the solicitation and the agency's order needs became apparent prior to award, it was incumbent on the agency to instead amend the solicitation to correct the flaw in the solicitation."

Here, the Agency's actions were improper. The Agency's Solicitation and evaluation did not allow offerors to understand that so little funding was available to the Agency that it could not make even a single Option A award. The significant change in the Agency's ability to make an HLS Option A award should have been disclosed to offerors, so they could make informed revisions to their proposals in view of these new requirements and information. *See M.K. Taylor, Jr. Contractors, Inc.*, B-291730.2, April 23, 2003. In *M.K. Taylor*, the record showed that the agency's funding philosophy had changed prior to issuance of the RFP, and that it was aware after issuance of the RFP that, if funding could be obtained, it would order the work under the contract awarded under the RFP. Under these circumstances, GAO determined that the scope of work changes due to funding should have been communicated to all offerors through an RFP amendment. There, the protester, a competing offeror, should have been made aware of the potential change of work scope, so that it would have had the same opportunity that a competing offeror had to factor this risk into its prices. *M.K. Taylor, Jr. Contractors, Inc.*, *supra*.

The amount of funding available for Option A awards correlates directly to the amount of work that can be performed and plainly affected offerors' ability to propose outstanding and highly rated technical solutions, and management proposals. Blue Origin was plainly prejudiced by the Agency's failure to communicate this change in requirements. As demonstrated in the attached Declaration of Brent Sherwood (**Attachment 4**), Blue Origin could have and would have taken several actions to revise its proposed approach, reduce its price to more closely align with funding available to the Agency, and/or propose schedule alternatives commensurate with the Agency's perceived available budget and program framework had it been provided the opportunity to revise its proposal through discussions or negotiations. The Agency's actions here improperly affected Blue Origin's opportunity for receiving an award. While competitive prejudice is an essential element of a viable protest, GAO resolves any doubts regarding prejudice in favor of a protester since a reasonable possibility of prejudice is a sufficient basis to sustain a protest. *Intelsat General Corp.*, B-412097, B-412097.2, Dec. 23, 2015, 2016 CPD ¶ 30 at 19-20. As shown in **Attachment 4**, on the record here, GAO should find a reasonable probability that Blue Origin was prejudiced by the Agency's failure to update its requirements under the solicitation and should sustain the protest.

[redacted]

It is fundamental that a solicitation must disclose the Government's requirements in a manner that enables offerors to intelligently prepare their proposals so that offerors may compete on a common basis and with an accurate understanding of the Government's needs. *See, e.g., Raymond Express Int'l*, B-409872.2, Nov. 6, 2014, 2014 CPD ¶ 317 at 9 (sustaining the protest where the RFP provisions did not unambiguously communicate the Agency's intended price evaluation methodology); *IBM Global Business Servs*., B-404498, B-404498.2, Feb. 23, 2011, 2012 CPD ¶ 36 at 8 (finding that it was fundamentally unfair for the Government to not have provided offerors information about the quantities and proportions of service desk users it intended to usefor evaluation purposes, particularly when one offeror may have had insight to the agency's actual requirements); *Meridian Mgmt. Corp*., B-285127, July 19, 2000, 2000 CPD ¶ 121 at 6 (recommending that the agency amend the RFP to make clear to offerors that they are responsible for operating, maintaining, and repairing specialized equipment in the laboratories). Where, as here, there is a significant change in the government's requirements, the appropriate course of action is for the agency to apprise the offerors of its revised requirements, and afford them an opportunity to submit proposals responsive to those revised requirements, even where a source selection decision has been made. *United Telephone Co. of the Northwest*, B-246977, Apr. 20, 1992, 92-1 CPD ¶ 374 at 7-10, a*ff'd. Dept. of Energy--Recon.; Westinghouse Hanford Co.—Recon.; United Telephone Co. of the Northwest*, B-246977.2, et al. July 14, 1992, 92-2 CPD ¶ 20. Alternatively, the Agency should, at a minimum, have initiated discussions with Blue Origin, as it did with SpaceX.

Agencies may not properly award a contract on a basis that is fundamentally different from the basis upon which the competition for the requirement was conducted. Here, the Agency applied undue weight to price due to funding constraints and deviated from Solicitation's evaluation framework and weightings. In fact, price was actually the predominant and predeterminant factor (because only the lowest priced offeror could realistically even be considered).[18]

B. The Agency's Evaluation of Blue Origin Is Unreasonable and Improper.

1. The Agency's Evaluation Erroneously Determined That Blue Origin Proposed Advance Payments.

Blue Origin protests that the Source Evaluation Panel (SEP), and consequently, the Source Selection Official (SSO), erroneously and unreasonably determined that Blue Origin proposed what "**appeared to be**" advance payments. The SEP Report and SSO provide merely conclusory statements with no factual basis for the assertion. In reality, the payments were proper, calculated consistent with the HLS Base Period contract and Option A requirements, and included an approach to Milestone Payments for previously accepted but deferred long-lead payments previously approved by NASA. The Milestone Payments included significant amounts for Long Lead Item commitments, as discussed below, and the costing was consistent with the NASA-approved approach under the Base Period performance under similar requirements, and should have been determined acceptable. *See* Declaration of Susan Knapp (**Attachment 5**). For reasons that follow, this protest ground should be sustained.

Under the Solicitation's section 5.2.5, the price evaluation was to include an evaluation of each

[18] The Agency's award decision effectively improperly transformed the HLS Option A procurement into a Lowest Price Technically Acceptable (LPTA) procurement. *See Patriot Solutions, LLC*, B-413779, December 22, 2016 (GAO determined that the agency improperly converted the solicitation's best-value tradeoff competition into a LPTA competition). *See also Technical Support Services, Inc.*, B-279665, B-279665.2, July 8, 1998, 98-2 CPD ¶ 26 (protest sustained where agency disregarded RFP's evaluation scheme and awarded to offeror on LPTA basis).

offeror's advance payments (if any). Section 5.2.5 stated the following with regard to advance payments:

> The Government will not make advance payments; proposals containing an advance payment are ineligible for contract award. This advance payment prohibition applies to proposed CLIN payment amounts and, separately, to proposed milestone payment amounts within those CLINs.

The Source Evaluation Panel (SEP) Report stated (page 10) "[t]he evaluation of advance payments was conducted in accordance with FAR 52.232-28, Invitation to Propose Performance-based Payments, which directs offerors to FAR 32.1004 for appropriate criteria for establishing performance bases and performance-based finance payment amounts." The SEP determined that there were two instances of Advance Payments. The SEP stated:

> The offeror proposed two Kickoff Meeting milestones at the outset of its Option A contract (under CLIN 5 ([redacted]) & CLIN 10 ([redacted])) which were determined to be not commensurate with performance and **appear to be** advanced payments.

SEP Report at 50. Although the SEP determined Blue Origin's proposal to be reasonable and balanced in accordance with section 5.2.5, it concluded that Blue Origin was ineligible for award without negotiations or additional justification of the allegedly proposed advanced payments referenced above. SEP Report at p. 50.

The Source Selection Official concurred with the Source Evaluation Panel's findings, as follows (SSS at 18).

> However, the SEP did identify two instances of proposed advance payments within Blue Origin's proposal. Pursuant to section 5.2.5 of the BAA, proposals containing any advance payments are ineligible for a contract award. The solicitation's advance payment prohibition applies to proposed CLIN payment amounts and, separately, to proposed milestone payment amounts within those CLINs. Blue Origin's proposal is not compliant with the latter of those two requirements. Specifically, Blue Origin proposed milestones at the outset of its Option A performance that the SEP determined were not commensurate with performance. I concur with the SEP's assessment that these kickoff meeting-related payments are counter to the solicitation's instructions and render Blue Origin's proposal ineligible for award without the Government engaging in discussions or negotiations with Blue Origin, either of which would provide an opportunity for it to submit a compliant revised proposal.

See also SSS p. 20, n. 1, where the SSO noted: "While it is also the case that Blue Origin's proposal is not awardable as-is in light of its aforementioned advance payments, this is an issue I would endeavor to allow Blue to correct through negotiations or discussions if I otherwise concluded that its proposal presents a good value to the Government. This, however, is not my conclusion."

The SEP's evaluation and report concluded that two CLIN payments related to Kick Off milestones "appear to be" advance payments. The SSO's further step of eliding "**appear to be**" and concluding instead that the two CLIN payments **were indeed** advance payments is factually incorrect, and therefore unreasonable. The SSO's conclusion that advance payments made Blue Origin ineligible for award relied

on that factually incorrect assertion and was therefore also tainted by error.

The SEP's concern appears to be that the amounts for Kick Off meetings appeared too large, though no factual basis was explicitly provided for the statement. However, the Blue Origin Option A proposal was built from bottom up basis of estimates by Blue Origin technical experts, subcontractor estimates, and National Team Partner proposals that resulted in Q1 2021 expenditures of [redacted] in the month of March. The initial milestone payments only include [redacted] of CLIN 005 & CLIN 010 milestones for Kick Off Meeting Support. This results in milestone payments less than milestone expenditures for Q1 2021 as noted in the SEP Report's Customer assessment graph named 'Blue Origin Milestone Payment vs Expenditure Commensurate Analysis' in the SEP Report, page 49. As noted there, NASA's own evaluation (SEP Report (**Attachment 2**) at page 49), determined that Blue Origin's financial investment is compliant with expectation: "NASA determined that contractor investment (contractor expenditures minus NASA payments) and risk-sharing are not unreasonably low or negative during performance **(Commensurate Payment Analysis)**." *See* Declaration of Susan Knapp **(Attachment 5).**

The following table illustrates the expenditure summary as described above.

[redacted]

The Agency was aware from the outset of the Appendix H solicitation in early 2019 that Long Lead Item procurements would be needed to meet a 2024 landing date. NASA in its Appendix E BAA released on February 7, 2019, stated that contractors, as part of their Appendix E deliverables, would have to "Identify post-Phase-A [reference to the Appendix E period of performance] long lead items remaining."[19]

[19] (**Attachment 6**) Next Space Technologies for Exploration Partnerships -2 (NextSTEP-2) Appendix E: Human Landing System

[redacted]

Subsequently, NASA in its Appendix H BAA included a specific CLIN 0003 in its Base Period solicitation entitled "CLIN 003 – Base: Indefinite Delivery/Indefinite Quantity (IDIQ) for 2024 Long Lead Items".[20] The Agency also had already been provided knowledge of Blue Origin's Long Lead Item procurement needs through multiple venues including Blue Origin's original Base Period proposal (and revisions of it), multiple interactions during the Base Period, multiple references in the Technical Volume (Vol. 1) of the Blue Origin HLS Option A proposal, and multiple references in Blue Origin's Option A proposal attachments including the following:

- Blue Origin Option A Proposal Attachment 19 – Integrated Master Schedule (IMS)
- Blue Origin Option A Proposal Attachment 33 - Risk Reports – Initial Demo

The original NextSTEP-2 Appendix H proposal submitted to NASA in November 5, 2019, supplied a CLIN 0003 for long lead procurement (a NASA required CLIN) of over [redacted]. In its subsequent April 19, 2020, proposal revision made at NASA's request to lower total payments in the Base Period, Blue Origin accepted risk by reducing cost for critical Long Lead Item to only [redacted] in the Base Period. However, the final signed contract with NASA on May 11, 2020, only included one dollar for Long Lead Item procurements, with NASA deferring Long Lead Item procurements to later in the Base Period. NASA's definition of these Base Period Long Lead Items for a 2024 landing was: "Long lead items are defined as flight hardware with a value of over $100,000 required to be procured during the Base period to enable a 2024 flight demonstration. Proposed long lead purchases are only allowed beginning one month after Authority to Proceed (ATP)."[21] *See* Declaration of Susan Knapp **Attachment 5**.

As Blue Origin was working with NASA during the Base Period to authorize these Long Lead Item procurements, the Agency notified Blue Origin on August 31, 2020 (a few months after ATP) that no Long Lead Item procurements would be authorized across all competitors at that time for the Base Period. For the remainder of the Base Period, Blue Origin continued incurring cost for nonrecurring work to develop the Long Lead Item requirements and associated suppliers' statements of work to allow Blue Origin to quickly authorize these deferred critical Long Lead Item procurements immediately following the award of Option A. Since the start of the Appendix H solicitation, NASA has consistently emphasized the importance of the goal for a 2024 landing. In support of this urgency with the understanding of NASA's inability to fund Long Lead Items in the Base Period CLIN 0003, Blue Origin provided limited funding to the National Team to start Long Lead Item procurements in the Base Period, but this was a very small set of what was initially proposed in the base period CLIN 0003.[22]

Blue Origin continued to calculate the subcontract requirements for such Long Lead Items would need to start such purchases at the beginning of Option A. Although NASA descoped Long Lead Item funding from the Base Period (CLIN 0003), it never added a Long Lead Item funding CLIN for the Option A award. Accordingly, Blue Origin captured in its Option A proposal these Long Lead Item obligations and the associated expediting fees necessary to meet NASA's 2024 landing goal. This required the placing of a majority of the purchase orders for Long Lead Item into the Option A CLIN 5.

These Long Lead Item procurement costs include not only Blue Origin's supply chain but also the

Studies, Risk Reduction, Development, and Demonstration, Broad Agency Announcement NNH19ZCQ001K_APP-E, Originally Issued: February 7, 2019, URL: https://www.nasa.gov/nextstep/humanlander, at p. 19.

[20] Next Space Technologies for Exploration Partnerships -2 (NextSTEP-2), Appendix H: Human Landing System, Broad Agency Announcement, NNH19ZCQ001K_APPENDIX-H-HLS, Solicitation for Option A, Amendment 1, Issued: 16 November 2020.

[21] (**Attachment 7**) NASA Contract Number: 80MSFC20C0020. HLS Appendix H Contract to Blue Origin Federation Final Signed Contract, May 11, 2020, p. 2.

[22] (**Attachment 8**) Blue Origin Option A Proposal, Volume I Technical, page 31, December 8, 2020.

[redacted]

subcontracting commitments of Lockheed Martin and Northrop Grumman, which relied upon their extensive, mature, and established Orion and Cygnus program supply chains. The criticality of starting these procurements early in Option A was documented in risk HLS-15 titled "Low schedule margin for 2024 mission."[23] The risk context notes the need for "timely authority to proceed on long-lead procurements" and thus the mitigation of that risk is early authority and funding of the procurements. Also, as contained in Blue Origin's Option A proposal Attachment 19 Integrated Master Schedule, specifically the file MLCD-07233_Attachment1_FULL_IMS, there are over 200 IMS line items of Long Lead Item procurements that were planned to be started in the first month of the contract.[24] Therefore, the first Milestone Payment covers a significant amount of early cost obligations for long lead hardware, castings and Electrical, Electronic and Electromechanical (EEE) parts. Importantly, that Milestone Payment is still [redacted] million under Blue Origin's expenditures, as shown in the Expenditure Profile attached to Blue Origin's proposal. Contrary to the SEP evaluation determination, these costs for Long Lead Items were commensurate with contract performance and entirely appropriate for inclusion in Milestone Payments.

Nothing in the SEP Report's stated evaluation standard of FAR 52.232-28, *Invitation to Propose Performance-based Payments*, or the referenced FAR 32.1004 precludes the Milestone Payments proposed by Blue Origin. Blue Origin's proposed Milestones Payments conform to the requirements in FAR 32.1004, including paragraph (b) which provides direction for establishing performance-based payments amounts. Specifically, FAR 32.1004(b)(3)(ii) states "Performance-based payment amounts are commensurate with the value of the performance event or performance criterion and are not expected to result in an unreasonably low or negative level of contractor investment in the contract. To confirm sufficient investment, the contracting officer may request expenditure profile information from offerors . . .." As demonstrated by the Expenditure Profile included with Blue Origin's proposal these performance-based payments do not result in an unreasonably low or negative level of contractor investment, a conclusion that NASA came to as documented in the SEP Report (**Attachment 2**) on p. 49. Instead, as explained above, Blue Origin's payments are fully consistent with those FAR provisions, and based on actual cost and milestones of performance.

Blue Origin's approach here is similar to and consistent with the proposing approach found acceptable by NASA under the awarded Base Period contract. The Base Period solicitation had a similar restriction on proposing advance payments. NASA had a similar finding in Blue Origin's Base Period proposal which included payments at contract signature. Blue Origin modified its Base Period proposal which moved the first payment milestones to the kickoff meeting which resolved NASA's finding, was approved by NASA, and was incorporated into the resulting Base Period contract. Blue Origin's Milestone Payment approach in Option A is within the precedent established in the NASA awarded and executed Base Period payment milestones.

Blue Origin developed its assessment of its Option A proposed initial payment milestones against what was accepted and awarded for the Base Period contract as a compliant precedent for compliance with the Option A solicitation. The Agency's determination to the contrary that the milestones "appeared" to include advance payments without any additional justification is erroneous and unreasonable.

This protest ground should be sustained.

[23] (**Attachment 9**) Att. 33, Risk Reports, MLRE-15911, HLS Risk Report, December 7, 2020.
[24] (**Attachment 10**) Att. 19, Integrated Master Schedule, MLCD-07233, December 7, 2020.

[redacted]

2. The Agency's Evaluation of Blue Origin's Technical Proposal Was Unreasonable and Blue Origin Should Have Received a "Very Good" Rating for Factor 1.

The Agency assessed Blue Origin with an "Acceptable" technical factor rating, assigning 13 strengths, 14 weaknesses, and two significant weaknesses. Blue Origin objects to eight of the weaknesses and both significant weaknesses. Moreover, one of the strengths should have been considered a "significant strength." The Agency's assessments of these weaknesses and significant weakness were arbitrary, unreasonable, and utilized unstated evaluation criteria; these improper ratings prejudiced Blue Origin, because without these weaknesses and significant weakness Blue Origin would have received a "Very Good" rating for the technical factor, the most important evaluation factor in the selection process.

GAO has consistently held that an agency's evaluation must be consistent with the solicitation criteria, documented, and reasonably based. *Coburn Contractors, LLC*, B-408279.2, Sep 30, 2013 (sustaining a protest where the Agency assigned a weakness to the protester for failure to submit a subcontractor list that was not required in the RFP). GAO will question an agency's evaluation conclusions where they are unreasonable or undocumented. *OSI Collection Servs., Inc*., B-286597, B-286597.2, Jan. 17, 2001, 2001 CPD ¶ 18 at 6. The critical question is whether the agency conducted the evaluation fairly, reasonably, and in accordance with the solicitation's evaluation scheme. *Al Raha Grp. for Tech. Servs., Inc*.; *Logistics Mgmt. Int'l, Inc*., B-411015.2, B-411015.3, Apr. 22, 2015, 2015 CPD ¶ 134 at 5 (evaluation with respect to past performance was unreasonable, inconsistent with the terms of the RFP, and not adequately documented and GAO sustained these protest arguments).

Moreover, it is a fundamental principle of federal procurement law that a contracting agency must treat all vendors equally and evaluate their quotations evenhandedly against the solicitation's requirements and evaluation criteria. *SRA Int'l, Inc*., B-408624, B-408624.2, Nov. 25, 2013, 2013 CPD ¶ 275 at 10. Where an agency treats vendors unequally by, for example, reading some vendors' quotations in an expansive manner and resolving doubt in their favor, while reading other vendors' quotations narrowly and applying a more exacting standard to those quotations, GAO has found such evaluations involve disparate treatment. *See Arctic Slope Mission Servs*., LLC, B-410992.5, B-410992.6, Jan. 8, 2016, 2016 CPD ¶ 39 at 7-9. Accordingly, where an agency treats vendors unequally, it must provide a reasonable explanation for doing so. *See SRA Int'l, Inc., supra*; *360 IT Integrated Solutions*, B-414650.7, B-414650.12, May 18, 2108, 2018 CPD ¶ 188 at 7-8 (sustaining protest where the agency failed to provide a reasonable explanation for its unequal evaluation of quotations).

In the case of two offerors, GAO precedent is clear that an agency may not disparately evaluate the offerors' proposals where the difference in the evaluation scores cannot be attributed to differences in the proposals. *See Connected Global Solutions, LLC*, B-418266.4, B-4182166.7, October 21, 2020, __ CPD __ (Protest sustained where the agency disparately evaluated technical capability proposals and differences in the assignment of strengths could not be attributed to differences in the proposals). This should be no different for one offeror's proposal evaluated at two separate times against the same requirements. If the substance of the offeror's option period proposal is materially the same as its Base Period proposal, and the requirements from the Base Period to the option period have not changed – then the evaluation ratings should be the same, particularly where the agency fails to provide any rationale for the disparate ratings.

Agencies are also required to evaluate proposals based solely on the factors identified in the solicitation, and must adequately document the bases for their evaluation conclusions. *Intercon Assocs., Inc*., B-298282, B-298282.2, Aug. 10, 2006, 2006 CPD ¶ 121 at 5. While agencies properly may apply

evaluation considerations that are not expressly outlined in the RFP if those considerations are reasonably and logically encompassed within the stated criteria, an agency may not give importance to specific factors, subfactors, or criteria beyond that which would reasonably be expected by offerors. *See Risk Analysis and Mitigation Partners*, B-409687, B-409687.2, July 15, 2014, 2014 CPD ¶ 214 at 6-13; *Raytheon Co*., B-404998, July 25, 2011, 2011 CPD ¶ 232 at 15-16. To be reasonably and logically encompassed within the stated evaluation criteria, there must be a clear nexus between the stated criteria and the unstated considerations. *DRS ICAS, LLC*, B-401852.4, B-401852.5, Sept. 8, 2010, 2010 CPD ¶ 261 at 10-11 (holding that an agency applied unstated evaluation criteria when it assessed a technical weakness based on a protester's failure to identify and address specific threats and technologies for future systems upgrades, and offerors would not reasonably realize that they should submit such information, where RFP only required offerors to address how the "architecture" of their proposed systems would accommodate upgrades and systems growth); *Global Analytic Info. Tech. Servs., Inc.*, B-298840.2, Feb. 6, 2007, 2007 CPD ¶ 57 at 4.

In several areas of the Option A Technical evaluation, the Agency downgrades Blue Origin's proposal for purported flaws in Blue Origin's technical approach or design which the Agency itself has previously reviewed, approved, and accepted during the certification baseline review of the Base Period contract. The Agency provides no rationale or explanation for why its assessment of these areas contradicts its own previous adjudication of whether these designs/approaches met the same requirements. Given its failure to document or otherwise provide a rationale for contradicting its earlier analyses, the Agency's assessment of weaknesses for these technical areas is arbitrary and unreasonable. As explained below, the Agency's evaluation of Blue Origin's technical proposal was unreasonable, lacked justification or bases for disparate treatment, and applied unstated evaluation criteria.

The Agency Unreasonably Assigned Blue Origin a Weakness for Its Description of Transfer Element (TE) Disposal and Planetary Protection Approach.

The Agency unreasonably assessed a weakness where there were none in Blue Origin's description of disposal and planetary protection approach, alleging that Blue Origin did not adequately describe how the anticipated disposal of its Transfer Element (TE) would adhere to two requirements set forth in the requirements document, HLS-Blue Federation-SMA-0029: (1) "The HLS Blue Federation system and associated hardware including launch vehicle stages shall be disposed at the end of life in such a way as to not create a credible risk of collision with current orbital assets, celestial objects, or sensitive areas on the lunar surface"; and (2) the offeror is required "to design a mission post-deployment trajectory "to avoid unplanned impacts/planned disposal impacts within 2km of sensitive areas [of the lunar surface] at the 1x10-2 probability level to prevent contamination." Blue Origin properly addressed both of these issues, although the Agency further applied an unstated evaluation criterion, as discussed below.

Blue Origin stated in multiple sections of its proposal – the Concept of Operations[25] and the Mission Design and Navigation Databook[26] – that disposal of the Transfer Element will be a ballistic impact on the lunar surface approximately 15-20 km uprange of the primary landing site. Specific citations include:

- "The TE [Transfer Element] is tracked all the way to lunar impact to ensure successful disposal. The DDL [Deorbit, Descent, and Landing] trajectory is designed so TE impacts > 20 km up-range from the landing site. The ILV [Integrated Lander Vehicle which consists of the AE, DE, and TE] braking burn has a cross-track bias relative to the landing site to avoid risk of TE recontact with the

[25] (**Attachment 11**)Att. 23a, MLPL-15833_HLS Mission Plan Vol 1, Sec 4.1.3, p. 23; and Sec 4.1.7, p. 27. For TE Impact Location, see Proposal Attachment 38, MLRE-15908, Section 6.9.1, p. 61
[26] (**Attachment 12**) Att. 38, MLRE-15908. Sec 6.9, p. 61

CLV [Crewed Lander Vehicle which consists of the AE + DE](after CLV ignition) and risks from TE lunar impact ejecta."[27]

- After separating from the CLV, the TE will follow a ballistic trajectory until it reaches its end-of-life point on the surface of the moon. For the Site 2 Malapert [this is one of the reference landing sites NASA provided] trajectory, this is currently uptrack by 15.7 km from the target landing site and occurs about 5 minutes before the overflight by the CLV on its way to Site 2...In future trajectory design, the NRHO departure burn design will be updated such that the arrival plane at the moon will be offset by a small cross-track angle, targeting a TE disposal site further away from the desired landing location. Following TE separation, the CLV will perform the cross-track maneuver to do final alignment with the correct landing location, while the TE will continue its ballistic descent.[28]

However, the Agency then unreasonably claimed Blue Origin's proposal did not include a description of how its TE disposal trajectory planning would avoid sensitive areas, such as permanently shadowed regions (PSRs). Blue Origin's proposed impact site is 15-20 km uprange of the primary referenced landing site, which is far outside of any permanently shadowed regions on the lunar surface or other known sensitive areas (e.g. Apollo heritage sites).

Further, NASA stated it "will provide the Contractor with documented locations of these sensitive areas on the lunar surface and maintain this data, in order to assist the Contractor with documenting their disposal method and trajectory."[29] The documented sensitive locations were never provided to Blue Origin. The only examples provided of sensitive areas were "permanently shadowed regions as well as sites of previous or on-going national or international landed lunar missions" - areas mentioned in NASA's planetary protection interim directives.[30] Blue Origin's proposed TE disposal trajectory is outside of any known sensitive areas. The Agency's assessment is unreasonable and not based on factors identified in the Solicitation and should be set aside. *See Intercon Assocs., Inc*., B-298282, B-298282.2, Aug. 10, 2006, 2006 CPD ¶ 121.

Further, the Agency applied an unstated evaluation criteria in stating that Blue Origin "did not sufficiently address TE design accommodations such as delta-V, power, etc., which may allow for a controlled disposal trajectory." (SEPR at 20). The Solicitation does not require offerors to propose additional "TE design accommodations" to allow for controlled or powered disposal trajectory. To the contrary, a "free drift" trajectory that avoids impact to any sensitive areas is not only permitted by the solicitation requirements, it is an elegant and more efficient disposal design that should have garnered a strength rather than a weakness. The Agency's use of an unstated evaluation criterion is improper and unreasonable. *See DRS ICAS, LLC*, B-401852.4, B-401852.5, Sept. 8, 2010, 2010 CPD ¶ 261.

The Agency also incorrectly claimed that Blue Origin's "supporting analysis documentation does not adequately address how it will utilize its transfer element capabilities during its proposed ballistic disposal trajectory to effectively avoid environmental contamination [of sensitive areas]." (SEPR (**Attachment 2**) at 20). The Agency's assessment is incorrect and unreasonable for the same reasons described above. Blue Origin's proposed TE disposal trajectory cannot impact a sensitive area; therefore, Blue Origin's proposed trajectory effectively avoids the risk of environmental contamination of sensitive areas. The Agency's incorrect claim should be set aside.

[27] **(Attachment 11)** Att. 23a, MLPL-15833_HLS Mission Plan Vol 1, Sec 4.1.3, p. 23
[28] **(Attachment 12)** Att. 38, MLRE-15908. Sec 6.9, p. 61
[29] **(Attachment 13)** HUMAN LANDING SYSTEM (HLS) PARTNER SRD (PaSRD) ANNEX Technical Authority (TA) Agreements – Blue Federation, HLS-RQMT-002-ANX-03, Rev-EFFECTIVE DATE: November 12, 2020, p. 39 note 2.
[30] *Id*.

The Agency's Evaluation of Blue Origin's Guidance, Navigation, and Control System Development Risk Is Unreasonable and Utilizes Unstated Evaluation Criteria.

The Agency assigned Blue Origin a weakness for development risk to its guidance, navigation, and control system. Specifically, the Agency alleged that two of Blue Origin's design features require "substantial additional development efforts that the offeror has not sufficiently accounted for in its proposal and may constrain the offeror's ability to land in certain areas." (SEPR at 22). The Agency's assessment is unfounded and factually incorrect.

Regarding Blue Origin's use of a two [redacted],[31] the Agency states that "[t]his capability has never been implemented in human spaceflight applications and will require significant development to increase necessary technology readiness levels necessary to achieve the requisite reliability of this capability." (SEPR at 22). The Agency is incorrect. Blue Origin's software is derived directly from the Orion Crew Vehicle, which will transport astronauts to lunar orbit. [redacted] The software on the Blue Origin's AE is derived directly from Orion. This capability is inherent in the Orion software for Artemis 2 and has already been tested and will be inherited directly from Orion for use on the AE. In addition, an earlier version of this software was flown on the Orion Exploration Flight Test 1 flight test in 2014. Blue Origin's proposal, and specifically the Ascent Element leverage extensive Orion hardware/ software to take advantage of such technical development.[32] Therefore, this approach is not a new capability that requires unprecedented software development or program risk, and it is compliant with the single failure tolerance requirement.

Second, the Agency argues that Blue Origin's Passive Terrain Relative Navigation (TRN) system integrated with its Crew Landing Vehicle (CLV) Light Detection and Ranging (LiDAR) system constrains the offeror's ability to land in darkness/low light. The Agency's assessment of a weakness is erroneous, because this feature is not a requirement. While several requirements specify landing accuracy (HLS-R-0021), location (HLS-R-0306), and continuous daylight operations (HLS-R-0070), no requirements specify landing in darkness or low light. Blue Origin is therefore fully compliant with requirements.[33] The Agency use of this unstated evaluation criterion is improper and unreasonable. *See DRS ICAS, LLC*, B-401852.4, B-401852.5, Sept. 8, 2010, 2010 CPD ¶ 261.

Furthermore, the only specific and determinate landing site requirements were those provided as part of the BAA solicitation package.[34] In the requirements attachment to the solicitation, NASA stated the surface access site requirement HLS-R-0306 for the initial (2024) mission to be as follows: "The HLS shall provide crew transfers to and from NRHO and a lunar landing site between 84°S and 90°S." The Agency

[31] [redacted]

[32] **(Attachment 8)** Blue Origin Human Landing System Option A Proposal, Volume I Technical, p. 4, December 8, 2020.

[33] **(Attachment 14)** See Att. 29, MLSP-15870-A, p. 75-75, December 7, 2020; see also HLS Option A Solicitation, Attachment F, HUMAN LANDING SYSTEM (HLS) PARTNER SYSTEM REQUIREMENTS DOCUMENT (PaSRD), HLS-RQMT-002, Rev - EFFECTIVE DATE: November 16, 2020. p. 20, 25, 26, 36.

[34] **(Attachment 15)** HLS Option A Solicitation, Attachment F, HUMAN LANDING SYSTEM (HLS) PARTNER SYSTEM REQUIREMENTS DOCUMENT (PaSRD), HLS-RQMT-002, Rev - EFFECTIVE DATE: November 16, 2020, p. 22.

[redacted]

never provided any landing site requirement more specific than this statement. To the contrary, the Agency stated that the reference landing sites it was reviewing during the Base Period, and provided to Blue Origin on September 29, 2020 had not been considered relative to landing in darkness or low light (e.g. sun location).[35]

Specifically, in the Base Period, as part of interactions with all three contractors, NASA provided only two reference landing sites and specifically stated "the landing sites provided are realistic landing sites that HLS may go to, but are not necessarily THE landing sites for the 2024 missions or beyond" and even stated that "sun location on the descent not considered [by NASA] in the selection of the landing sites... the landing sites were selected to be within the *broader* HLS requirements [HLS-R-306]."[36] Blue Origin provided analysis to verify required landing accuracy to these referenced landing sites in Section 8.2.15 of its Option A Proposal in Attachment 38.[37, 38]

The Agency assessment of a weakness for these approaches is both surprising and arbitrary because both of these features of Blue Origin's guidance, navigation, and control system were previously reviewed and specifically approved by NASA during the Certification Baseline Review on August 24, 2020 base period review.[39] As discussed above, the Agency's assignment of a weakness to a proposed approach which had previously been approved, is arbitrary and unreasonable, particularly where the Agency failed to provide and document a reasonable explanation for the disparity in treatment.

The Agency's Analysis of Blue Origin's Radio Frequency Communication Links is Inaccurate and Contradicts the Agency's Own Prior Analysis.

The Agency assigned Blue Origin a significant weakness because it argues that four of six communication links proposed by Blue Origin "do not close,"[40] and "a fifth link may potentially close, but with a very low positive margin." (SEPR at 30). In its analysis of Blue Origin's communications link information, the Agency postulates Blue Origin's "proposed link budgets appear to insufficiently account for the significant degradations of multipath and thermal noise losses associated with lunar communications." The Agency's evaluation is incorrect. Blue Origin's proposal appropriately accounted for the multipath degradations and thermal noise loss associated with lunar communications, a fact that was independently corroborated by the Agency's own review of Blue Origin's links through the Certification Baseline Review (CBR) and through an audit of the communication link budgets through a Government Task Agreement (GTA).[41]

The Blue Origin Option A proposal (Attachment 38 – Document MLRE-15896) shows link budgets

[35] **(Attachment 16)** Craig, Scott, Price, Greg, and Laura Burke., "HLS Design Reference Mission," Provided by NASA to Blue Origin during HLS Base Period, September 29, 2020, p. 4.
[36] *Id*.
[37] **(Attachment 17)** Att. 38, Integrated Systems Performance Analysis - Initial Demo, MLRE-15906, ISPA Vol 15: DE ISPA, December 7, 2020, Section 8.2.15, p. 104,
[38] **(Attachment 18)** Att. 38, Integrated Systems Performance Analysis - Initial Demo, MLRE-15897, ISPA Vol 6: Integrated Lander GN&C Analysis report, Section 4.5.1.1.1, December 7, 2020. p. 56-57.
[39] **(Attachment 19)** Davey Jones, HLS Certification Baseline Review (CBR) Board for Blue Federation - Board Kickoff and Review Summary, p. 6, August 24, 2020.
[40] To "not close" means a communication cannot be sustained at the required data rates over that link.
[41] **(Attachment 19)** Davey Jones, HLS Certification Baseline Review (CBR) Board for Blue Federation - Board Kickoff and Review Summary, p. 6, August 24, 2020.

that include all loss contributors, including lunar surface multipath effects and lunar noise.[42] Each required link in Table 3-1 from Proposal attachment 38 shows positive margin. These exact budgets provided in Blue Origin's proposal were also provided to the NASA HLS program in response to Request for Action (RFA)-237 which was assigned at the August 2020 Certification Baseline Review (CBR) on "Communication Architecture."[43] This RFA specifically requested "information relative to RF Comm System Design & Performance (coverage analysis & link parameters), in-situ patterns, expected losses [including multipath], co-site analyses (RF interference), Antenna Types / Placement," so that NASA can assess "compliance against HLS requirements" "for Link Speeds and Margin parameters, as well as details on the Comm System Architecture and test plans." To close this RFA, Blue Origin held a joint Communications Technical Interchange Meeting (TIM) with NASA where the details of the communications architecture, analysis assumptions, and link budgets were reviewed. In response to this TIM, and the materials provided, NASA formally concurred with the Blue Origin architecture and analysis approach and the RFA was successfully closed in the HLS Systems Engineering Review Forum (SERF) on December 1, 2020. In other words, the Agency previously received, during the CBR, the same information and data on Blue Origin's radio frequency communication architecture as what Blue Origin submitted in its Option A and, in its previous assessment, the Agency found that Blue Origin's RF communications links closed. The Agency provides no explanation for why its conclusion is different during this Option A evaluation.

Moreover, Blue Origin's communications analysis was also independently validated by a new NASA Space Communications and Navigation (SCaN) study released on January 26, 2021, substantiating Blue Origin's analysis and the results in its Option A proposal.[44] The table in the attached document compares the links analyzed by Blue Origin its HLS Option A proposal with NASA's SCaN report.[45]

The outputs of this report compare the links analyzed by Blue Origin in its Option A proposal with NASA's SCaN assessment.[46] The SCaN outputs confirm that all required communication links show positive margin. One link - the DE-1 DTE (Direct to Earth) link - was evaluated at a data rate 2x the expected data rate required to support the NASA surface mission while the crew is on EVA. Reducing the data rate under evaluation to the required data rate results in the DE-1 DTE link meeting or exceeding the requirements with margin.

Because Blue Origin has shown its analysis does not contain the errors suggested by the Agency and, in fact, the Agency's own independent analysis verifies Blue Origin's results and proposal submission, the Agency's assessment of a weakness is unreasonable, unsupported, and should be set aside. NASA reviewed Blue Origin's approach for communications as part of the Base Period CBR milestone and formally accepted Blue Origin's technical approach. Moreover, because Blue Origin elements have redundant communication systems all with documented adequate margins, this should not have been a weakness but rather a strength or significant strength, as it improves crew safety and the likelihood of successful mission execution.

[42] **(Attachment 20)** Att. 38, Integrated Systems Performance Analysis - Initial Demo, MLRE-15896, ISPA Vol 5: Integrated Lander Communication Analysis Report, December 7, 2020, p. 9. 10, 11.
[43] **(Attachment 21)** Request for Action (RFA) 237, Certification Baseline Review (SBR), Blue Origin Base Period Document, September 15, 2020.
[44] **(Attachment 22)** NASA SCaN Study, January 26, 2021.
[45] *Id*.
[46] **(Attachment 20)** Att. 38, Integrated Systems Performance Analysis - Initial Demo, MLRE-15896, ISPA Vol 5: Integrated Lander Communication Analysis Report, December 7, 2020.

The Agency Inappropriately Applied Redundancy Requirements on the Manual Control System for Blue Origin's Ascent Element Leading to a Flawed Evaluation.

The HLS Option A requirement HLS-R-0108 mandates that each offeror's HLS must be capable of manual control by the crew and requirement HLS-R-0004 states that each offeror's system must have single fault tolerance to catastrophic hazards.[47] The Agency assigned Blue Origin a weakness because its manual control system ". . . is not compliant with HLS-R-0004, which requires that the offeror's approach to manual control must have single fault tolerance." (SEPR at 23). Specifically, the Agency alleges Blue Origin's manual control system has "a single rotational hand controller, a single translational hand controller, and a single power data unit. A single failure of any one of these components during landing operations could result in at least a loss of mission (abort), and will significantly increase the risk of loss of crew." *Id*. The Agency's assessment is unreasonable, incorrectly applies HLS-R-0004, and is inconsistent with the adjudication and approval of the manual control architecture as part of the Certification Baseline Review (CBR).

First, the hand controllers themselves are internally redundant, so multiple hand controllers are not required to achieve substantive fault tolerance. Fault tolerance is achieved through this internal redundancy, so a single failure within the hand controller does not lead to mission failure.[48] Further, even if Blue Origin's design did not have these built-in redundancies, the Agency erred when it also stated there would be an increased risk of loss of crew. The system architecture does not require the use of manual controls to prevent a catastrophic hazard, because the automated control system prevents catastrophic hazard by requirement, including after a single failure. Thus the need for fault tolerance in manual control is to prevent loss of mission, not loss of crew.

Second, Blue Origin's single controller architecture was explicitly reviewed as part of the CBR for compliance with NASA certification requirements, including HLS-R-0004, and thus the Agency's statement that "[t]his aspect of the offeror's proposal fails to meet an important mission-related requirement" is incorrect and inconsistent with NASA's own evaluation. Specifically, NASA evaluated and approved the architecture against success criteria SC10."[49] In addition to the CBR review, Blue Origin engaged with the NASA team in a series of manual control Technical Interchange Meetings (TIMs) to address Request for Action (RFA) 127 – which incorporates manual control through all phases of crewed flight. Specifically, the Concept of Operations (CONOPS) and design were reviewed and approved as part of RFA-127 closure at the NASA HLS System Engineering Review Forum (SERF) with Blue Origin on December 1, 2020.[50] In order to pass the CBR, the Agency had to and did find Blue Origin's architecture compliant with the requirements.

As discussed previously, the Agency's assignment of a weakness to a proposed approach which had previously been approved, is arbitrary and unreasonable, particularly where the Agency failed to provide and document a reasonable explanation for the disparity.

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[47] **(Attachment 1)** Next Space Technologies for Exploration Partnerships -2 (NextSTEP-2), Appendix H: Human Landing System, Broad Agency Announcement, NNH19ZCQ001K_APPENDIX-H-HLS, Solicitation for Option A, Amendment 1, Issued: 16 November 2020.

[48] **(Attachment 23)** Att. 37, Design Data Book - Initial Demo, MLDD-15882 FMSA Design Databook p. 99. "The signals from the 3PST switch sets for CSS, BFC Engage, Abort, and transducers have three RS422 channels each, which are evaluated using voting logic."

[49] **(Attachment 19)** Davey Jones, HLS Certification Baseline Review (CBR) Board for Blue Federation - Board Kickoff and Review Summary, p. 6, August 24, 2020.

[50] **(Attachment 24)** Request for Action (RFA) 127, Updated ConOps Mission Timeline Jettison EVA, Certification Baseline Review (SBR), Blue Origin Base Period Document, September 15, 2020; see also Att. 37, Design Data Book - Initial Demo, MLDD-15882 HLS DDB Vol 14: Ascent Element), December 7, 2020.

The Agency Misunderstood Blue Origin's Plan to Evolve from Initial Design to Sustainable Architecture. and Applied Unstated Evaluation Criteria to Evaluate It.

Blue Origin's proposal was assessed a weakness because the proposed evolution from the initial 2024 Option A mission to the 2027 sustainable mission architecture will require "significant re-engineering and recertifying of each element." (SEPR at 44). The Agency further alleges the Blue Origin proposal "lacks clarity and may be both impractical and not cost-effective." The Agency's evaluation is factually inaccurate, assumes worst-case scenarios which are unsupported, and misunderstands aspects of Blue Origin's proposal.

Section 4.4.3.6 of the Solicitation requires offerors to propose the approach for how they will evolve the initial 2024 lander design to achieve "sustaining" capabilities for 2027 Option B, including sustaining capabilities such as operations and survival in periods of darkness (e.g., eclipse periods), longer duration EVAs, and increased cargo transportation mass to and from the Gateway. Importantly, the Solicitation does not require offerors to incorporate "sustaining" design elements into the initial 2024 lander design. To the contrary, if sustainable features are included in the 2024 design, the solicitation specifies that "[a]ny [sustainable] aspect of a proposal that . . . may harm the likelihood of success for a 2024 mission, whether from a technical, schedule, or other perspective, may be evaluated more negatively overall." Solicitation (**Attachment 1**) at 31.

Blue Origin's Option A proposal addresses and satisfies all the Solicitation requirements. Its approach accurately describes how it will achieve the sustaining capabilities by 2027, including how Blue Origin's design will support long-term affordability. Blue Origin agrees that this evolution will require changes to its initial design because its initial lander design has been developed to accomplish the 2024 HLS Option A objectives. The Agency here appears to penalize Blue Origin because Blue Origin's 2024 lander design will meet 2024 requirements rather than 2027 sustaining requirements. Blue Origin acknowledges that it will need to upgrade certain elements of its design to meet the 2027 objectives, but strongly disagrees that it will be "impractical" or of greater difficulty to upgrade these elements over a three-year 2024-2027 time period than it will be to develop the 2024 version of many of these elements over the three-year 2021-2024 time period.

Further, NASA incorrectly states Blue Origin "is not able to leverage its existing design and minor modifications . . . to evolve its initial capability into a sustainable capability." (SEPR at 44). Blue Origin's mission architecture, system architecture, propulsion system, guidance system, avionics system, and more, are identical or require only minor updates from the proposed 2024 design to the proposed 2027 design.[51] Blue Origin purposely chose for this very reason a three element architecture so that the elements could be independently updated, without perturbing the inter-element interfaces. The architecture was purposely selected to allow upgrades to meet longer term sustaining requirements and to prepare the pathway for more reusable systems as options if desired (such as the AE and DE) for Artemis V, VI, and beyond.

The Agency's evaluation applies an unstated evaluation criteria in applying an unspecified and unclear factor of sustainability. NASA provided specific sustainability requirements in BAA requirements [52] and then an undefined requirement of "long-term affordability" (from the final BAA, p.11). Blue Origin's

[51] **(Attachment 23)** Att. 23b, HLS Proposed CONOPS-Sustaining, MLSP-18435, HLS Mission Plan Vol. 10 - Sustaining Mission Plan, December 7, 2020.
[52] **(Attachment 15)** HUMAN LANDING SYSTEM (HLS)PARTNER SYSTEM REQUIREMENTS DOCUMENT (PaSRD), HLS-RQMT-002, Rev-EFFECTIVE DATE: November 16, 2020.

sustaining HLS architecture meets or exceeds all the specific requirements from HLS-RSMT-002. NASA also criticizes Blue Origin's approach as not "cost effective" but did not ask for any price information for the sustainability missions so it cannot have information to judge "long term affordability" or "cost-effectiveness." Moreover, the Agency did not request a price for the sustainability phase or an estimate of corporate contributions that Blue Origin might provide to achieve the sustainable architecture. Blue Origin's National Team has repeatedly demonstrated it is willing to provide substantial corporate contributions to compensate for NASA's budget limitations. NASA also confuses and misapplies approaches to reduce long term affordability with those approaches to meet the specific HLS-RQMT-002 requirements. For instance, in its sustainability architecture Blue Origin proposes to reuse elements (such as the AE), but that is only to meet the long-term affordability targets and is not specifically needed to meet the explicit HLS-RSMT-002 requirements. For these reasons, the Agency's assessment of this weakness is unreasonable and unsupported.

The Agency Unreasonably Evaluated Blue Origin's Mission Timeline.

The Agency argues Blue Origin's proposed mission timeline results in "either limitations on mission availability and trajectory design or over-scheduling of the crew, resulting in unrealistic crew timelines." (SEPR at 42). Further, the Agency alleges "the offeror's proposed ILOPS duration reduces the number of viable mission dates." The Agency misunderstands Blue Origin's jettison EVA approach and did not provide sufficient information for Blue Origin to further tailor its ILOPS approach to the Agency's priorities.

The Blue Origin Initial Lunar Operations (ILOPS) Phase duration of approximately 3.5 days aligns with the government reference timeline provided in the Joint NASA Mission Design Working Group on July 19, 2020. This includes approximately 2.75 days of time not driven by Blue Origin architecture requirements (e.g. crew sleep periods and xEVA suit checkouts). The remaining 0.75 day intentionally contains significant margin beyond the time strictly necessary to complete activities.

While the HLS Program Concept of Operations discusses minimizing the duration of the ILOPS segment, it also mentions the need for sufficient time for open hatch preparation time. This implies a balance between the two priorities. Importantly, viable Orion launch dates as a function of ILOPS Phase duration were not provided to Offerors until after proposal submittal (presented at the Joint NASA Mission Design Working Group on February 22, 2021). Therefore, Blue Origin had no quantitative information regarding how phase duration may impact available mission dates and reasonably relied on the NASA-provided reference timeline. Had NASA provided that information earlier, the ILOPS phase could have been shortened in a trade of margin versus available mission dates.

The finding that "the proposed mission profile requires a jettison EVA to reduce Ascent Element mass prior to liftoff" is inaccurate. As described in Blue Origin's HLS Option Proposal Attachment 38 (Document MLRE-15908), a jettison EVA is not required for nominal ascent (Section 6.7.1.2) or early mission termination (Section 6.7.2.2).[53] The jettison EVA is only required for combinations of off-nominal scenarios, such as worst-case early mission termination with an engine-out ascent (Section 6.7.1.4).

As part of the Certification Baseline Review (RFA 149), NASA identified and resolved concerns with the jettison EVA.[54] This included reviewing various combinations of off-nominal scenarios and

[53] **(Attachment 12)** Att. 38, Integrated Systems Performance Analysis - Initial Demo MLRE-15908: Mission Design and Navigation Data Book, Section 6.7.1.2, p. 55, December 7, 2020.
[54] **(Attachment 26)** Request for Action (RFA) 149, Updated ConOps Mission Timeline Jettison EVA, Certification Baseline Review (SBR), Blue Origin Base Period Document, September 15, 2020.

discussing timeline impacts. The NASA HLS System Engineering Review Forum (SERF) concurred with the closure and implementation on September 28, 2020.

Blue Origin met all solicitation requirements and the Agency's assessment of this weakness is unreasonable in light of the information provided in the Solicitation.

Blue Origin's Proposal Appropriately Addressed How It Would Utilize and Mitigate Risks of Using Heritage Hardware with the Proposed Cabin Atmosphere, Which the Agency's Evaluation Overlooked.

The Agency improperly assessed Blue Origin's proposal with a weakness for failing to explain how use of Orion-heritage components is safe in a more oxygen rich cabin atmosphere than the components were originally designed for. Specifically the Agency states the "proposal does not contain an assessment that addresses using the Orion-heritage crew compartment components in the planned HLS cabin atmosphere." The Agency weakness rating is unreasonable because Blue Origin's proposal described and addressed this risk in its HLS Option A Proposal (Proposal Attachment 33 – Risk Report, Document MLRE-15911).[55]

Because Blue Origin proposes to use the Orion-heritage hardware in a lower-PSIA, higher oxygen environment, Blue Origin addressed the risk of flammability in its proposal.[56] Specifically, in its Option A proposal Blue Origin states: "In accordance with the program's M&P Control plan, the flammability, toxic off-gassing and materials compatibility analyses will be performed per material and/or part on any materials/parts that do not meet the applicable requirements of HLS-PN-0008 for flammability, toxic off-gassing."[57] Further in Proposal Attachment 33 (Document MLRE-15911, rows 87-90 of the HLS Risk report, SCR023) AE Material Flammability is reported and submitted as part of the proposal to NASA which addresses this concern. This Risk Report identifies four risk mitigation steps:[58]

1. Look at materials in cabin to identify which materials need flammability testing
2. Review bill of materials (BOM) for Orion components in AE cabin
3. Testing of materials for flammability
4. Off ramp to return to 10.2 psi cabin pressure

Thus in fact Blue Origin's Option A proposal included a mitigation plan that included "testing materials for flammability" as well as a plan at the start of Option A to improve and increase flexibility to surface operations to reduce pre-breath time if needed\desired.[59] As additional evidence of Blue Origin's work to asses this issue, Blue Origin's HLS Option A proposal itself included a recommendation for a trade study AE should be certified to 36% O2 concentration at 8.2 psia to align with Government Furnished Equipment (GFE) qualification for surface operations.[60]

As such, the Agency's evaluation is factually incorrect where it claims Blue Origin's proposal "does not otherwise appear to contain any proposed forward work analysis or testing to support the viability of the proposed use of Orion-heritage components" and where it states that its proposed design creates a "risk that the Orion-heritage hardware will not be safe to operate in more oxygen-rich cabin atmospheres." Contrary

[55] **(Attachment 9)** Att. 33 - Risk Reports, MLRE-15911, HLS Risk Report, AE risk Tab, rows 87 through 90 , December 7, 2020.
[56] *Id*.
[57] **(Attachment 27)** Att. 38, Integrated Systems Performance Analysis - Initial Demo, MLRE-15905 ISPA Vol 14: Ascent Element Analysis Report, section 2.21, December 7, 2020.
[58] **(Attachment 9)** Att. 33 - Risk Reports, MLRE-15911, HLS Risk Report, AE risk Tab, rows 87 through 90 , December 7, 2020.
[59] *Id*.
[60] **(Attachment 23)** Att. 37, Design Data Book - Initial Demo (MLRE-15882 HSL DDB: Ascent element, section 15.2, p 405), December 7, 2020.

to the erroneous Agency findings, Blue Origin addressed these risks and provided mitigation steps.

The Agency improperly assigned a weakness because it appears to have failed to review or overlooked this section of Blue Origin's proposal. The Agency's evaluation is unreasonable and not in accordance with the Solicitation requirements.

The Agency Improperly Assessed Blue Origin a Weakness Because It Mistakenly Believed Blue Origin and the Agency Had Fully Adjudicated HMTA Requirements, Methods, and Statements.

For verification purposes, the Solicitation requires offerors to use the standards listed in NextSTEP-2 Appendix H BAA Attachment F. and in particular, Appendix C of HLS-RQMT-002-ANX-03 contains the offeror's Health and Medical Technical Authority (HMTA) requirements and accompanying verification methodologies and statements that were tailored for each specific offeror, adjudicated, and agreed to during the Base Period of performance.[61] Regarding Blue Origin's Integrated Lander System Specification and the HLS Requirements Traceability Report, the Agency claims Blue Origin did not use the proper verification statement or criteria, which are purportedly those found in HLS-RQMT-002-ANX-03 Appendix C for the HMTA adjudicated requirements. Blue Origin did not use the HTMA verification statement or criteria because they had not been fully adjudicated.

The Appendix C HMTA requirements were adjudicated via several formal adjudication meetings with NASA. Detailed Verification Objectives (DVOs), however, were not. At Certification Baseline Review (CBR), each of these adjudicated requirements were included in their entirety in the deliveries of the applicable requirements specifications and trace reports. Because adjudication had not taken place for DVOs, no Verification Methods or Verification Expectations were provided, and no Request for Action (RFA) was issued.

Between CBR and Continuation Review (CR), occasional drafts of the NASA-proposed DVOs were intermittently exchanged between NASA and Blue Origin via email for feedback, with the latest exchange coming mere days before the onset of the blackout period during the Base Period. In an email exchange on September 29, 2020, there was joint agreement with the HMTA NASA counterpart that the updates to the HMTA DVOs would be worked a later date. On October 1. 2020, the parties agreed that Blue Origin would submit verification information based on system-specific requirements decomposition. Thus there was a joint expectation with NASA and the National Team that Option A would be the opportunity to review the proposed DVOs from both sides and conduct the final adjudication process.

At CR, Blue Origin again provided each of the adjudicated requirements in their entirety in the deliveries of the applicable requirements specifications and trace report. In lieu of DVOs formal adjudication, the National Team did not copy and paste independently-developed NASA BAA verification language (much of which contained significant errors and typos, and did not appropriately reflect the HLS architecture) and instead provided detailed and accurate proposed verification language for NASA to review that was fully responsive to the NASA Appendix C requirements, while also relevant to the National Team system, element, and subsystem CONOPs and lower-level requirements decomposition.

The Agency erred where it unreasonably assigned Blue Origin a weakness for failing to utilize verification methods and statements that had not been fully agreed to or adjudicated.

[61] **(Attachment 13)** HUMAN LANDING SYSTEM (HLS) PARTNER SRD (PaSRD) ANNEX Technical Authority (TA) Agreements – Blue Federation, HLS-RQMT-002-ANX-03, Rev-EFFECTIVE DATE: November 12, 2020.

The Risk in Blue Origin's Propulsion System Development Schedule Has Been Substantially Mitigated and Does Not Warrant a Significant Weakness.

The Agency unreasonably assessed a significant weakness, instead of a weakness, for Blue Origin's propulsion system developments. The Agency claims Blue Origin's "three main HLS elements (Ascent, Descent, and Transfer) consist of major subsystems that have low Technology Readiness Levels (TRLs), are immature for the offeror's current phase of development, and create significant development and schedule risks, many of which are inadequately addressed in the proposal." (SEPR at 28).

In its proposal, Blue Origin acknowledged the inherent risks the Agency's 2024 goal placed on the development of both the individual propulsion system components as well as the integration of these components. To reduce these risks, Blue Origin's proposal included robust mitigation plans, which together address each of the Agency's concerns identified in the proposal evaluation. These risk mitigation plans were not appropriately considered by the Agency. Furthermore, the identified concerns do not represent a finding against the technical design, but instead against the development schedule, and thus more appropriately belong in Area of Focus 2.

Regarding the DE Integrated Reaction Control System (IRCS) the Agency found Blue Origin "fails to assess the IRCS holistically relative to TRL and its associated development risk." This is incorrect. As explicitly documented in Table I-10 from Blue Origin's HLS Option A Proposal Volume I Technical and Proposal Attachment 33 (risk DE-557).[62] Blue Origin recognized the risk of the integrated RCS development and took specific steps to mitigate this risk. This mitigation plan included tests that were performed in the Base Period that raised the TRL to level 5/6 and gained confidence on the holistic design.

These tests directly addressed the concerns raised by NASA in this finding, specifically the design of a "fluid pressurization and gasification subsystem to supply high pressure gaseous propellants from the main propellant tanks to high pressure storage bottles." The results of these tests were included in the proposal submission and presented at the Continuation Review. This testing demonstrated the viability of the integrated RCS design, as well as Blue Origin's performance executing its risk mitigation process to address new engineering developments. Thus the Agency's statement that integrated RCS system inclusive of the gasification and pressurization subsystem has a low TRL that was not identified and therefore calls into the question the systems proposed development approach" is unfounded. It appears that the Agency objects only to the language Blue Origin used in declaring the Integrated RCS an engineering development rather than a new technology development. The proposal clearly establishes a holistic look at the development risk.

The Agency's evaluation correctly observed that the first DE integrated propulsion test would be performed less than nine months before the operational system is proposed to land the uncrewed Demo mission in 2023, and included the correct reference to the risk DE-557 where Blue Origin identifies this risk and lays out a mitigation plan; however, the Agency incorrectly states that "evidence of this testing could not be adequately substantiated elsewhere in the proposal." (SEPR (**Attachment 2**) at 27, 29). In fact Blue Origin's Descent Element (DE) hot fire test at NASA's Armstrong Test Facility was clearly documented in Blue Origin's proposal.[63]

[62] **(Attachment 8)** Blue Origin HLS Option A Proposal, Vol. 1 Technical, page 36, December 8, 2020; and, **(Attachment 9)** Att. 33, Risk Reports, December 7, 2020.
[63] **(Attachment 28)** Att. 31, DE Assembly, Integration, and Test Plan MLPL-15935 Sec. 6.3, p. 42 and Appendix E.9, p. 153, Dec. 7, 2020.

The Agency also notes the Ascent Element's engine may lag behind development of the integrated system, stating "[t]his increases the likelihood that functional or performance issues found during engine development testing may impact other, more mature AE subsystems, causing additional schedule delays." However, the functional interfaces of Blue Origin's AE engine are well understood from previous XLR-132 testing done for the Air Force Research Lab (AFRL). Thus, it is unlikely there would be impacts to the design of the propulsion system. The likelihood of engine-level performance issue impacts to the integrated system (Isp, thrust, etc.) are planned to be significantly reduced with the first development engine. Furthermore, Blue Origin recognized the risk of the XLR-132 development schedule, and implemented a robust mitigation plan under risk HLS-9 to address the implication of late engine delivery. This risk mitigation plan established steps completed in the Base Period including an early focus on interfaces, specifically maturing "the interfaces between the XLR-132 engine specific to the ascent element application," as well as steps to establish "an engine simulator and required supplemental tooling to enable late integration of engines during [I&T] flow." Together these risk mitigations isolate the XLR-132 development from the development of the integrated system. These mitigation steps were not appropriately evaluated by the Agency.

The Agency faults Blue Origin's proposal because "several of the required integrated propulsion systems will not be flight tested until the 2024 crewed mission, including the XLR-132 engines, AE Reaction Control System, the dual BE-7 configured DE, and the integrated TE propulsion system." In regard to the integrated propulsion systems not being flight tested until the 2024 crewed mission, specifically the dual BE-7 configured DE, the only aspect of the DE integrated propulsion solution that would not fly until 2024 is the 2-engine configuration. This configuration being identified as a high risk of unsuccessful contract performance is again factually erroneous. Flight data will have been gathered on the 2023 single-engine uncrewed demo on the engine performance and TVC, as well as integrated propulsion system performance applicable to the DE and TE. The DE hot fire test at Armstrong Test Facility with the 2-engine configuration further mitigates the risk of the configuration differences. Thus, the crewed, 2-engine flight configuration will have been tested across the full mission profile prior to the 2024 flight, and the Agency's finding did not appropriately consider the applicability of the flight tests or the mitigations implemented in the hot fire test campaign.

The Source Selection Official's statement in relation to this weakness that "[w]aiting until the crewed mission to flight test these systems for the first time is dangerous" is factually incorrect, and inappropriately characterizes the propulsion system test program as a risk to crew safety. (SSS at 15). The Blue Origin architecture intentionally includes in-flight use of the propulsion systems on all elements during transit of the elements to NRHO. This includes use of all main propulsion systems, including the BE-7, the XLR-132 engines, and the integrated RCS system on the DE. Given that the actual flight units will be fully characterized and exercised in actual flight environments prior to the launch of the crew, this approach minimizes the risk to the crew over a separate flight test with test units.

Blue Origin believes the risks noted by the Agency were sufficiently mitigated and explained in the proposal. As such, Blue Origin should have received a weakness rather than a significant weakness for this issue.

Overall Rating – When the Agency's Evaluation Errors are Corrected, Blue Origin Should Have Received a "Very Good" Rating for Factor 1 Technical.

Blue Origin received an overall "Acceptable" rating for Factor 1 Technical, with thirteen strengths,

fourteen weaknesses, and two significant weaknesses. Blue Origin objects to eight of the weaknesses and both significant weaknesses, and asserts it should have been assessed an additional strength (as discussed below). As such, Blue Origin should have had at least fourteen strengths and only six weaknesses, with no significant weaknesses. Absent the weaknesses and significant weaknesses above, Blue Origin should have and would likely have received a "Very Good" rating for its Technical Factor. Had Blue Origin received a higher technical rating than SpaceX, Blue Origin would have been substantially more likely to receive award. As such, the Agency's error in evaluating Blue Origin's technical proposal is prejudicial and material, and this protest should be sustained.

3. The Agency's Evaluation of the Management Factor Was Unreasonable.

The Agency assessed Blue Origin with an overall "Very Good" management factor rating, assigning one significant strength, two strengths, and six weaknesses to Blue Origin's Management proposal. Blue Origin objects to all six weaknesses as erroneously assessed. The Agency failed to reasonably and fairly evaluate Blue Origin's management proposal. The Agency applied unstated or non-mandatory evaluation criteria and failed to assess Blue Origin's proposal consistent with the terms of the Solicitation. Without these weaknesses, Blue Origin would likely have received an "Outstanding" rating for the management factor. The Agency's assessment of Blue Origin's Management proposal was unreasonable and prejudicial.

In reviewing a protest of an agency's evaluation of proposals, the GAO will examine the record to determine whether the agency's judgment was reasonable and consistent with the stated evaluation criteria and applicable procurement statutes and regulations. *Shumaker Trucking & Excavating Contractors, Inc*., B-290732, Sept. 25, 2002, 2002 CPD ¶ 169 at 3. While the GAO will not substitute its judgment for that of the agency, the GAO will sustain a protest where the agency's conclusions are inconsistent with the solicitation's evaluation criteria, undocumented, or not reasonably based. *DRS ICAS, LLC*, B-401852.4, B-401852.5, Sept. 8, 2010, 2010 CPD ¶ 261 at 4-5.

Furthermore, it is a fundamental principle of government procurement that agencies must treat vendors equally, which means, among other things, that they must evaluate quotations in an even-handed manner. See *SRA Int'l, Inc.,* B-408624, B-408624.2, Nov. 25, 2013, 2013 CPD ¶ 275 at 10. Accordingly, where an agency treats vendors unequally, it must provide a reasonable explanation for doing so. *See id*.

The Agency's Previously Accepted Both the Form and Substance of Data Rights Assertions It Now Claims Lack Required Specificity and Explanation.

For Management Area of Focus 7, the Agency alleged that many of Blue Origin's data rights assertions listed in its proposal lack the specificity required by the Solicitation and are non-compliant with the Solicitation's requirements. (SEPR at 67-68). The Agency inconsistently and arbitrarily evaluated Blue Origin's proposal. As Blue Origin demonstrates below, (1) the identical data rights assertion requirement is present in both the Base Period solicitation and the Option A solicitation; (2) the Agency previously adjudicated Blue Origin's Base Period proposal including its data rights assertions as "fully compliant with the solicitation's terms and conditions" and, upon that basis, awarded Blue Origin a base period contract; and, (3) Blue Origin submitted many of the same data rights assertions in its Option A proposal that were fully adjudicated and awarded during the base period competition.

The identical data rights assertion requirement is present in both the NextSTEP-2 Appendix H HLS

Base Period BAA solicitation (Section 4.4.5.7)[64] and the Option A BAA solicitation (Section 4.4.5.7):[65]

> If the Offeror provides assertions pertaining to delivery of any TD/CS/CSD with less than GPR in its *Assertion Notice*, the Offeror shall furnish a written explanation with its proposal separate from and in addition to the *Assertion Notice* for any restriction asserted by the Contractor or its subcontractors on the right of the United States or others to use that TD/CS/CSD and the detailed basis for that right. Offeror shall also provide a reasonable amount of initial evidence to support any such assertion with submission of its proposal.'

During the Base Period competition, the Agency sent Blue Origin a request seeking changes to Blue Origin's data rights Assertion Notice, stating "if your firm is selected for contract award, the Government, at time of contract award, will only incorporate into the contract those specific entries in your Assertion Notice that the Government has adjudicated are fully compliant with the solicitation's terms and conditions."[66, 67] Blue Origin submitted a data rights Assertion Notice, which was reviewed, adjudicated, and accepted as fully compliant with the terms of the Base Period solicitation.[68, 69, 70] Because Blue Origin's assertions of limited rights were based on the data being developed entirely at private expense, Blue Origin never submitted any separate written explanation or initial evidence.

The Option A proposal submission was for a modification to an existing contract (80MSFC20C0020). The updated Assertion Notice was to be included in the modification, but much of the Assertion Notice would remain unchanged from the Base Period. This was not a new Assertion Notice, merely a partial alteration with many items continuing between the two phases of the same contract.

In Blue Origin's Option A proposal submission, Blue Origin submitted a similar data rights Assertion Notice, without any separate written explanation or initial evidence for the limited rights assertions.[71] Many of the assertions were identical to the previous Assertion Notice, as this was merely an update of the existing Assertion Notice, and all but one of the items identified in the weakness were verbatim entries from the current Assertion Notice, already accepted by the Agency. The same Agency which previously adjudicated Blue Origin's submission as fully compliant with the terms of the base period solicitation, now assessed Blue Origin with a weakness for the same requirement in the Option A Solicitation. Because the relevant aspects of Blue Origin's data rights assertion submission did not change, and the solicitation requirements did not change, the Agency's disparate evaluation is arbitrary and unreasonable. The Agency's assessment of this weakness is arbitrary, unreasonable, and inconsistent with its previous evaluation.

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[64] (**Attachment 44**) Next Space Technologies for Exploration Partnerships -2 (NextSTEP-2), Appendix H: Human Landing System, Broad Agency Announcement, NNH19ZCQ001K_APPENDIX-H-HLS, Amendment 3, 25 October 2019.
[65] (**Attachment 1**) Next Space Technologies for Exploration Partnerships -2 (NextSTEP-2), Appendix H: Human Landing System, Broad Agency Announcement, NNH19ZCQ001K_APPENDIX-H-HLS, Solicitation for Option A, Amendment 1, Issued: 16 November 2020.
[66] **(Attachment 29)** Base Period Proposal, Att. 16, Data Rights Assertion Notice, November 5, 2019.
[67] **(Attachment 30)** Solicitation NNH19ZCQ001K-APPENDIX-H-HLS, NextSTEP-2 Appendix H: Human Landing System, Discussions Transmission No. 2, Enclosure 6 Blue Origin – Proposal Issues for which the Government is Requesting Proposal Updates, February 10, 2020.
[68] **(Attachment 31)** Option A Proposal, Att. 16, Data Rights Assertion Notice, December 8, 2020.
[69] **(Attachment 32)** Option A Proposal, Att. 16, Revised Data Rights Assertion Notice, February 23, 2021.
[70] **(Attachment 7)** NASA Contract Number: 80MSFC20C0020 - HLS Appendix H Contract to Blue Origin Federation Final Signed Contract May 11, 2020, p. 2.
[71] *Id*.

The Agency Erroneously Faults Blue Origin for Not Providing GPR in Data Developed at Private Expense.

The Agency assessed Blue Origin with a weakness because Blue Origin allegedly proposed to deliver certain sets of technical data, computer software, and/or computer software documentation (TD/CS/CSD) with less than Government Purpose Rights (GPR), despite the fact that such items were or will be created with input and resources from the Government. (SEPR at 68-74). The Agency incorrectly assumes that for any item where government resources were used to any extent, the Government automatically has full government purpose rights for each item, including all of those listed in the evaluation from page 69-74. For most, if not all, of these items listed by the Agency, the Government was not provided the data rights it claims in the evaluation.

There are four major errors with the Agency's assessment of this issue, including:

- Failing to Acknowledge Data Rights Assertions in the Base Period Contract: NASA accepted the data rights assertions from Blue Origin in our final contract for many of the technologies it listed in this weakness. Thus, it is inconsistent for NASA to claim a weakness in the data rights they get when they agreed to such data rights in the Base Period contract, indicating that it was not a weakness. Again, **the Option A contract is a modification to the already agreed to Base Period contract, not an entirely new contract**.
- Misreading of the Collaboration Plan and GTAs: The SEP report stated, "When technical data or computer software is created, in part or in whole, using Government resources as provided under a GTA or a Collaboration Plan, the Government is contractually entitled to receive at least GPR in that data or software." Many examples in the SEP report cited Collaboration Plan and GTA references, which reflect a misunderstanding of the data rights approach and justification. Data rights are reflected not in the Collaboration Plan and GTAs, but in the data rights assertions in the actual contract between Blue Origin and NASA.[72] [73] The Agency is inappropriately using the mere existence of collaboration plan and GTAs as evidence that the particular items are not developed exclusively at private expense.
- Incorrectly using the existence of hardware testing GTAs/Collaboration resources as a basis for GPR on all hardware: Many of the Blue Origin GTAs/Collaboration resources were for testing and not hardware development. This included multiple technologies including fuel cells, solar arrays, thermal vacuum testing of cryogenic tanks, rendezvous and docking tests of element subsystem hardware, thermal vacuum testing of the Descent Element and Transfer Element that included BE-7 engines on each element, and DE cryogenic tank testing. Bringing privately developed hardware to a NASA center for testing does not give NASA GPR to that private hardware.
- Misreading Procedural Assumption: The SEP report stated, "In addition, the negotiations that will be necessary on contract to sort out the parties' proper rights in data runs a high risk of slowing down contract execution and places a contractual burden on the HLS program for some items as described above pertaining to interfaces and identifying those items asserted at less than GPR that should be delivered at GPR due to collaboration and GTAs." The award decision was made based on NASA's assumption that a data rights discussion would have put

[72] **(Attachment 33)** Att. 5, Collaboration Plan, December 8, 2020.
[73] **(Attachment 34)** Att. 6, Government Task Agreement(s) (GTAs) and/or Optional GFE/GFP Agreement(s) (OGFPAs), December 8, 2020.

the Option A schedule at risk. This assumption was unfounded, given that virtually all of these data rights assertions are clear and consistent with the current Base Period agreement. In addition, as shown in the examples below, Blue Origin has frequently and quickly negotiated data rights with NASA in the past.

Below, we highlight several examples of technical data rights areas that are illustrative of these misinterpretations from the Agency.

Fuel Cells:

The fuel cell hardware and non-recurring engineering (NRE) for hardware development was funded under corporate contribution during the Base Period by Blue Origin. Blue Origin incorporated some aspects of fuel cell stack technology previously developed under NASA-funded programs, but the Descent Element Fuel Cell System (FCEPG) is a Blue Origin corporate contribution-funded internal design from the HLS Base Period, during which Blue Origin revised the fuel cell stack and subsequently developed the FCEPG technology. The Base Period fuel cell collaboration assumptions stated "Blue Origin responsible for final designs," which the NASA HLS Program Office accepted and agreed to on August 19, 2020.

NASA misread the Collaboration Plan applicable to this technical data area. The collaboration scope included technology transfer from NASA programs and applying Space Shuttle crew rating processes. Similarly, the relevant GTAs were for testing resources and facilities only to mature TRL; there was no design or hardware development scope. The initial Base Period proposal (November 5, 2019) asserted limited data rights for "Fuel Cell Long Lead Development." On February 10, 2020, NASA requested a proposal revision that updated assertions for the lowest segregable levels. On February 23, 2020, as part of Blue Origin's revised proposal, Blue Origin included, "Fuel Cell design, including PEM, metering & instrumentation, thermal management interface, enclosure, and DC/DC" which NASA accepted into the Base Period contract. That assertion remained unchanged for the Option A proposal.

BE-7:

Blue Origin, LLC is privately funding the development of BE-7 as a commercial propulsion system with numerous applications. BE-7 is not unique to HLS. To that end, NASA did not provide funding for the BE-7 development during the Base Period, which is why Blue Origin asserted Limited rights for BE-7 interfaces and internal engine requirements and BE-7 engine data.

Blue Origin privately funded Reimbursable Space Act Agreements (RSAA) to test Blue Origin-designed hardware at NASA MSFC, for which Blue Origin was responsible for all costs related to NASA MSFC testing services.[74] Since 2019, Blue Origin entered into six (6) RSAAs, valued at approximately [redacted] and has paid [redacted] to date for BE-7 testing (not unique to HLS). Over the life of the program, Blue Origin estimates spending at least [redacted] The RSAAs enable GPR for only test data covered by the RSAAs. The RSAAs were generated with coordination from the NASA HLS Program Office and were signed before the Option A proposal submittal. Yet, the SEP report omitted the following sentence from the RSAA Annex: "This requirement shall not apply to any Proprietary Background Data provided by Blue Origin to NASA MSFC that has the appropriate marking and is not meaningfully transformed by either party during the performance of this Annex."

[74] **(Attachment 35)** Reimbursable Space Act Agreements (RSAAs) between Marshall Space Flight Center and Blue Origin LLC under Space Act Umbrella Agreement No. SAA8-1725986; Annexes 1725986.13, .15, .19, .25, .28, .29; SAA8-1726580.19.

[redacted]

Blue Origin provided NASA insight into the BE-7 according to its insight plan (and handling of data rights) or BE-7 interfaces and internal engine requirements. According to the accepted plan from NASA Insight Plan for BE-7 engine data and receive GPR under the RSAAs only for BE-7 test data covered by the RSAAs.

NASA misread the Collaboration Plan applicable to the BE-7. There is no inconsistency because Blue Origin did not propose collaboration activities with NASA on BE-7. As for the Thermal Vacuum Testing of the Descent Element and Transfer Element GTA, the data generated is shared according to the terms of the GTA (GPR for test data).[75]

***ACFM Controllers and Interfaces**:*

NASA misread the Collaboration Plan applicable to ACFM Controllers and Interfaces. There is no inconsistency because Blue Origin did not propose collaboration activities. [redacted] No work was done on this effort, and no NASA funds or resources were spent on their development; subsequently, no collaboration work was proposed for Option A.

***Cryocooler Systems, CFD Models**:*

These items asserted Limited rights, [redacted], for which there was not any Collaboration Plan scope or GTAs. [redacted]

NASA's claim of GPR for design data based only on hardware testing being conducted in NASA facilities, contributing to Management Weakness 6, was identically erroneous in the same way for three additional major components :

- Composite cryogenic tanks – GTAs were for tank testing[76]
- Solar Arrays – Collaboration was for solar array testing
- Thermal Protection Systems – GTAs were for thermal vacuum testing

The Agency Unreasonably Concluded Blue Origin's Commercial Approach was Unsubstantiated.

The Agency claims Blue Origin's proposed commercial approach is incomplete and lacks sufficient detail to substantiate the commercial approach. The Agency's claims are unsupported and contradicted by information in Blue Origin's proposal and in the Agency's own evaluation.

Section 4.4.5.4 of the Solicitation requires offerors to leverage the HLS effort to:

(1) enable future commercial uses of HLS capabilities or technologies
(2) maintain compatibility with NASA's objectives;

[75] **(Attachment 36)** Blue Origin HLS Option A Proposal Government Task Agreement (GTA), Thermal Vacuum Testing of DE and TE Qualification Propulsion Systems, GRC-U-4, November 24, 2020.
[76] **(Attachment 37)** Blue Origin HLS Option A Proposal Government Task Agreement (GTA), Dual 6ft Dia LOX/LN2 Passive cooling testing, MSFC-U-3B, November 27, 2020.

[redacted]

(3) facilitate sustainable and cost-effective recurring lunar transportation services for NASA and other stakeholders; and,
(4) stimulate the growth of a viable commercial marketplace in these areas.

Further, "the Offeror should explain how any proposed corporate contribution is tied to its commercial approach," and "how its commercial approach will benefit NASA's future human and robotic exploration missions, including how such an approach could enable sustained, continuing, or lower-cost access to the lunar surface."

A primary reason the Agency assessed this weakness is because Blue Origin's proposal allegedly "lacks evidence on how [Blue Origin's] commercial approach will result in lower costs to NASA." Inconsistent with this allegation, the Agency separately states "the offeror proposed a sizeable corporate contribution involving internal research and development that is . . . valuable to NASA insofar as it reduces the immediate contract price (and consequential immediate cost to the Government)."

NASA errs because Blue Origin's proposal describes in detail how it will use a significant space flight vehicle developed under the HLS program – the Descent Element – to provide a future payload service to commercial customers, which has already garnered substantial commercial interest. Blue Origin also identifies other commercial endeavors such as the possible development and use of HLS technologies. The core future commercial business to be enabled by HLS-developed technology is affordable, regular, and larger cargo delivery via Blue Origin's Descent Element. A substantial element of Blue Origin's corporate contributions to HLS directly relate to these future commercial approaches. Furthermore, Blue Origin has already demonstrated a commitment to this commercial approach as evidenced by the Blue Moon cargo lander public marketing and inclusion in NASA's own Commercial Lunar Payload (CLPS) catalog, as mentioned in the Option A proposal Management Volume page 21, a validation by NASA itself of the commercial potential of the Descent Element-based cargo lander service. This commercial approach is compatible with NASA future objectives and will lower future costs of lunar missions.

Additionally, Blue Origin also provided evidence in its HLS Option A Proposal Technical Volume (Vol. I, p. 56) of its intent to host commercial payloads Even more, during the Base Period, Blue Origin also provided a specific presentation on October 28, 2020 on various payload conversations that Blue Origin had been engaged with multiple organizations around the world and presented that information to HLS program leadership (PM, Deputy PM, senior leaders).[77] In the presentation Blue Origin stated that its uncrewed demonstration mission (referred to as the Descent Element or DE Demo Mission) was synergistic with commercial cargo lander missions. "This included discussion of a [redacted] that was listed in the Blue Origin HLS Option A proposal Management Volume (Vol. III, p. 11). In the October 29, 2020 meeting Blue Origin stated its desire to have these lander payloads enable commercial and sustainability plans. [redacted]" This information was both evidence of Blue Origin's external payload conversations and its interest in long term sustainability [redacted]

In NASA's evaluation of Blue Origin's original Base Period proposal from November 2019, the Source Evaluation Panel (SEP) scored Blue Origin's Commercial Approach (Management Focus 4) as a "Significant Strength".[78] Specifically NASA commented: "the offeror's execution on its commercialization

[77] **(Attachment 38)** Blue Origin HLS Option A Proposal, Volume III Management, p. 11 and 21, December 8, 2020.
[78] **(Attachment 39)** Blue Origin: Final, Consensus Findings as Evaluated by the SEP, HLS Base Period Proposal, April 30,

strategy and corporate contributions will be highly advantageous for the Government and therefore represent a significant strength."[79] It is unclear how this significant strength at the start of the Base Period became a weakness by the end, when all that changed in the interim was that the lander's design was matured. The commercial approach in Blue Origin's final Option A proposal built on the Significant Strength assessed for the Base Period Proposal, and had substantiation.

The Agency unreasonably concluded the commercial approach was unsubstantiated, errantly evaluated this factor, and otherwise lacked a basis for its assessment of a weakness to Blue Origin for its proposed commercial approach.

Overall Rating – Blue Origin Should Have Received an Outstanding for Factor 3 Management

Blue Origin received a Very Good rating, in part because of "its excellent overall approach to management and its thoughtful organizational structure that is well-suited to its specific HLS architecture." (Source Selection Statement at 18). Without receiving weaknesses for the above three management factor criteria discussed above, Blue Origin would have received an Outstanding Management score based on its strengths far outweighing any weakness. See Table 3, above. Absent the three weaknesses discussed above, the remaining weaknesses are far less significant, easily remedied, and would be outweighed by the substantive strengths.

Blue Origin acknowledges Management weaknesses assessed for (1) Incomplete Project Management Plan, (2) Inadequate Approach to Schedule Management, and (3) Payment Milestones Missing from IMS; however, Blue Origin believes these weaknesses are much less significant because these weaknesses are predicated on easily correctable items, such as internal company corporate practices that were referenced but not explicitly included in the proposal for Weakness 1. Weakness 2 is based on the failure to fully to explain our schedule margin and how it helps to achieve the proposed schedule, while for Weakness 3, only certain payment milestones were listed in the IMS (although all the payment milestones were correctly included as a wholly separate proposal attachment to the proposal, Attachment 13 – Milestone Acceptance Criteria and Payment Schedule). Given that these weaknesses were assigned for a failure to fully explain or include information in our proposal, and not based on a substantive flaw in our Management or Schedule approach, these errors were significantly less consequential and would be far outweighed by our strengths.

Without the erroneous weaknesses, Blue Origin would have received an "Outstanding" rating for the Management Factor. The Agency's assessment of Blue Origin's Management proposal was unreasonable and prejudicial.

C. The Agency Treated Offerors' Proposals Unequally and Disparately.

The Agency's evaluation of SpaceX was flawed and shows that the Agency disparately evaluated offerors' proposals. The Agency assessed SpaceX with an "Acceptable" Factor 1: Technical and an "Outstanding" for Factor 3: Management. Although SpaceX's proposal received the highest ratings, the Agency acknowledged the proposal was highly complex and high-risk. In the Agency's assessment, SpaceX's proposal merited the highest ratings even though it (1) requires development of an entirely new super heavy, *fully reusable*, launch vehicle (which has never been done before); (2) requires this launch

2020.

[79] **(Attachment 40)** Blue Origin: Final, Consensus Findings as Evaluated by the SEP, HLS Base Period Proposal, April 30, 2020.

vehicle and accompanying systems to be developed at an extraordinarily rapid pace, (3) requires this launch vehicle to be launched successfully and be reusable an unprecedented number of times over a short time frame; and (4) requires never-before-tested on-orbit refueling, using 100-plus ton vehicles. All of these events must occur within a short timeframe, with little margin for error, in order for SpaceX to successfully perform this Option A contract. In contrast, Blue Origin's proposal is compatible with existing launch vehicles, utilizes only 3 launches, and employs heritage systems that have been flight tested. Had the Agency evaluated all offerors consistently against the Solicitation criteria, SpaceX would have had a lower Technical and Management score, and Blue Origin's proposal would have had a higher technical and management score.

As discussed above, an agency's evaluation must be consistent with the solicitation criteria, documented, and reasonably based. *Coburn Contractors, LLC*, B-408279.2, Sep 30, 2013. The agency must treat all vendors equally and evaluate their quotations evenhandedly against the solicitation's requirements and evaluation criteria. *SRA Int'l, Inc*., B-408624, B-408624.2, Nov. 25, 2013, 2013 CPD ¶ 275 at 10. An Agency may not treat vendors disparately by, for example, reading some vendors' quotations in an expansive manner and resolving doubt in their favor, while reading other vendors' quotations narrowly and applying a more exacting standard to those quotations. *See Arctic Slope Mission Servs*., LLC, B-410992.5, B-410992.6, Jan. 8, 2016, 2016 CPD ¶ 39 at 7-9. Accordingly, where an agency treats vendors unequally, it must provide a reasonable explanation for doing so. *See SRA Int'l, Inc., supra*; *360 IT Integrated Solutions*, B-414650.7, B-414650.12, May 18, 2108, 2018 CPD ¶ 188 at 7-8.

The Agency unreasonably favored SpaceX's evaluation by minimizing significant risks in SpaceX's design and schedule, while maximizing the same or similar risks in Blue Origin's proposal. Such an evaluation is unreasonable and prejudiced Blue Origin.

Disparate Treatment of Cryogenic Fluid Management Development and Verification Approach

The Agency treated offerors disparately where it cited Cryogenic Fluid Management (CFM) as a weakness for both Blue Origin and Dynetics, but did not cite CFM as a weakness for SpaceX, even though SpaceX also relies upon advanced CFM technologies. (See generally Source Selection Statement).

In the SEPR section "Weakness: Challenging Cryogenic Fluid Management Development and Verification Approach," the Agency stated with regard to Blue Origin:

- *The proposed implementation of cryogenic propellants includes the use of several critical advanced cryogenic fluid management (CFM) technologies which are both low in maturity and have not been demonstrated in space*. (SEPR at 33)
- [redacted]
- [redacted] *leverages a Lockheed Martin design, insufficient detail is provided to assess the credibility of the design, and the planned completion of maturation relies on flight demonstration in late 2023 through a separate "Tipping Point" contract that, while selected, has not yet been awarded and thus is at risk of delay*. (SEPR at 34).

The disparate treatment regarding CFM is particularly blatant because nearly all of the above

[redacted]

critiques equally apply to SpaceX. The Agency noted that SpaceX's technical approach involves "immense complexity and heightened risk" and requires "numerous in-space cryogenic propellant transfer events" prior to the time-critical HLS Starship launch. (Source Selection Statement at 11). Such in-space cryogenic propellant transfers require advanced CFM technologies from SpaceX that are both "low in maturity and have not been demonstrated in space." The low technology readiness level (TRL) for SpaceX's CFM system is illustrated by SpaceX's October 2020 selection for a Tipping Point award. SpaceX was selected for a "[l]arge-scale flight demonstration to transfer 10 metric tons of cryogenic propellant, specifically liquid oxygen, between tanks on a Starship vehicle." (See NASA Tipping Point Selections). Given that SpaceX has never demonstrated this technology in space, and certainly not on the operational scale its solution requires, its CFM system must have a low technology readiness level. The evaluation rating by the Agency was irrational and disparate.

Moreover, the Agency downgraded Blue Origin for a possible delay in the award of Lockheed Martin's Tipping Point contract, which is the same Tipping Point selection for which SpaceX was also chosen. It is patently a disparate treatment to downgrade the National Team for a possible delay in a Lockheed Martin Tipping Point contract award while simultaneously assessing SpaceX's risk as lower for their use of the same Tipping Point contract vehicle. Again, the Agency treated offers disparately: Given that SpaceX has yet to develop a mature cryogenic propellant transfer system, much less demonstrate it in space, its proposal should have been assessed a weakness.

The Agency Utilizes and Unstated Evaluation Criteria Regarding Risk from Height of Vehicle Presents Risk to EVA Operations (Area of Focus 1)

The Agency inexplicably and unreasonably determined the 33.5 feet height of the egress/ingress points of Blue Origin's lander vehicle merited a weakness, while SpaceX's lander vehicle with an egress/ingress point at *100 feet tall*, merited a significant strength.

In Blue Origin's evaluation, the Agency stated:

"*The offeror's proposed vehicle design includes an EVA egress and ingress point located 10.2 meters (33.5 feet) above the surface, introducing complexity to both nominal and contingency operations.*
. . .
Overall, the height of the CLV's egress/ingress point adds risk to successful contract performance by impacting operational timelines, increasing risks to EVA crew safety, and has a potential negative impact on overall readiness and ability to conduct science on the Moon's surface."

In contrast, the Agency found that SpaceX's vehicle – which is *three times as tall* as Blue Origin's vehicle – apparently did not contain these same or greater risks, as it was awarded a *significant strength*. The Agency's evaluation is disparate and unequal, and for that reason should be set aside.

Further, the Agency also applies an unstated evaluation criteria. There is no Solicitation requirement that defines a height limitation, preference or otherwise, of the lunar lander vehicle. Crew safety concerns related to crew ingress/egress are addressed by compliance with EVASC.0113, EVA-EXP-0070 Human Landing System EVA Compatibility IRD. This requirement has a 10-minute minimum threshold and a 5-minute goal for emergency ingress of crew. Blue Origin's proposed response is 8 minutes, as documented in Proposal Attachment 38, MLRE-19900 - ISPA Appendix: Design and Performance Metrics, Technical Perf Metric Tab, cell E10 (proposed) and cell I10 (requirement). Moreover, in relation to crew safety, Blue Origin's design includes two alternative methods of ingress/egress – a powered ascender-lift system and a

passive ladder.[80] SpaceX's design, by contrast, contains only one method of ingress and egress – a powered lift.

Blue Origin further disagrees with the SEP's comment evaluation assessment concerning the ascender:[81] "In addition, transporting heavy science samples from the surface to the CLV will require use of the ascender, which places the critical ascender in a position of needing fault tolerant design." Contrary to the Agency's evaluation finding, failure to return science payloads is not a Catastrophic Hazard and therefore is not required to be failure tolerant per HLS-R-0004. The requirement of HLS-R-0356, Scientific Payload Delivery from NRHO also does not specify return requirements other than mass and volume. As a result, the proposed design is compliant with the Option A BAA requirement.[82]

The Source Selection Official charitably overlooked the risks associated with SpaceX's 100-feet high design and assigned SpaceX a significant strength, while impermissibly applying stricter scrutiny to Blue Origin's substantially safer design and assessing Blue Origin a weakness. Had evaluation standards been consistently applied, SpaceX should have received a significant weakness or weakness for the lander height.

The Agency's applied an unstated evaluation criteria, and did so in an unequal fashion, prejudicing Blue Origin's proposal. The Agency's evaluation should be set aside.

Blue Origin Should Be Assessed a "Significant Strength" for Its Comprehensive Abort Strategy and Effective Capability, While SpaceX Likely Should Have Been Evaluated with a Weakness.

SpaceX and Blue Origin were both awarded a "strength" under Technical Area of Focus 1 for abort approach, even though the Blue Origin approach was superior in terms of providing a dissimilar abort at any time throughout the mission using a separable element with storable propellants.

The Source Selection Authority praised SpaceX's abort approach design, stating –

> "I particularly find SpaceX's strength under Technical Area of Focus 1 for its robust approach to aborts and contingencies to be compelling. This approach contains several key features, including: the application of its excess propellant margin to expedite ascent to lunar orbit in the event of an emergency early return; a comprehensive engine-out redundancy capability; and two airlocks providing redundant ingress/egress capability, each with independent environmental control and life support capabilities that can provide a safe haven for crew. Additionally, SpaceX's design allows for the sourcing of excess propellant, which will provide crew with a large reserve supply of life support consumables in the event of a contingency event."

However, only one of the attributes highlighted by the selection statement directly apply to the abort capability – the propellant margin for early return. Engine out capability is required per the solicitation to provide failure tolerance to catastrophic hazards (BAA Requirement HLS-R-004 - Failure Tolerance to

[80] **(Attachment 41)** Att. 38, MLRE-19900, ISPA Appendix: Design and performance Metrics, December 7, 2020.
[81] The ascender is the primary method of reaching the AE from the lunar surface, the backup method is the ladder documented in **(Attachment 42)** Att. 37, MLDD-15879 – HSL DDB Vol 9: Crew Systems, Section 4.2.3 Ingress/Egress System Interface.
[82] **(Attachment 15)** HUMAN LANDING SYSTEM (HLS) PARTNER SYSTEM REQUIREMENTS DOCUMENT (PaSRD), HLS-RQMT-002, Rev-EFFECTIVE DATE: November 16, 2020.

Catastrophic Events).[83] The above statement in the source selection rationale regarding a lack of impact to crew safety from landing a 30 meter tall vehicle with no independent abort system does not provide additional detail to support it. The SpaceX abort approach, which relies on the same systems for landing and return, introduces risks identified as far back as the Apollo program, yet not identified by the SEP. These risks include:

- Risk of engine damage on landing on lunar surface as experienced on Apollo 15.
- Risk of engine plume damage on critical systems as experienced on Apollo 16, and descent plume debris erosion as observed on Surveyor III from the Apollo 12 landing.

In contrast, the robust Abort approach provided by Blue Origin should have been identified as a significant strength, rather than simply a strength. Blue Origin offers complete coverage of abort and early mission termination throughout the entire duration of the lunar sortie.

In particular, the multi-element architecture allows for propulsive redundancy during several phases of flight. As described in Blue Origin's HLS Option A proposal, the TE, DE, or AE each have enough capability to rapidly (within 2-8 hours) return to Orion prior to insertion into low lunar orbit.[84] After insertion, the DE or AE maintain similar capability. During deorbit, descent, and landing, three abort modes (AE independent, DE assisted, and abort to surface) cover the full envelope of the trajectory down to the surface. Even the low-altitude portion near the surface – where abort is most challenging – is protected by DE assisted aborts and mechanical factors of safety. Such abort capability redundancy greatly enhances crew safety. A failure in one element does not result in loss of crew, as in all situations other elements can compensate.

Once on the surface, the AE is able to ascend to return to Orion at any time. The AE delta-v budget covers as provided in the Blue Origin Option A proposal assumes a worst-case orbital alignment.[85] This allows the crew to return to Orion at any point, rather than be forced to "shelter in place" while waiting for appropriate launch windows. The delta-v budget also covers engine-out scenarios. That is, even though the AE has three main engines, only two are required to successfully complete the mission. This results in greater crew safety, as an engine failure does not impact the crew's ability to return to Orion. Therefore, Blue Origin provides abort capability to the Crewed Staging Vehicle for the full duration of the mission.

Blue Origin's Crewed Lander Vehicle (CLV), which consists of the DE and AE, additionally provides significant robustness for the capability to execute an abort. Since the AE is a completely separate Element from the DE and TE with different avionics, software, GNC, and propulsion systems, the possibility of a common mode failure that would prevent the timely detection of an Abort Condition or the safe execution of an Abort is eliminated. The system is already designed to be single fault tolerant to the need to initiate an Abort (per requirement HLS-R-0004)[86], however, for most faults the system is also at least single fault tolerant to the capability of executing the Abort once initiated, which exceeds requirements. The DE and TE provide the GNC and propulsion during the Descent Phase and all Elements constantly monitor for faults that would indicate an Abort Condition. If sufficient faults occur that exceed the planned fault tolerance (i.e., complete failure of a DE or TE function) this would be detected by the DE/TE and/or the AE.

[83] *Id*.
[84] **(Attachment 43)** Att. 23a, HLS Proposed CONOPS-Initial, MLPL-15836, HLS Mission Plan Vol. 4 - Descent Phase, December 7, 2020.
[85] **(Attachment 12)** Att. 38, Integrated Systems Performance Analysis - Initial Demo (MLRE-15908: Mission Design and Navigation Data Book), Section 6.7.1.2, p. 55, December 7, 2020.
[86] **(Attachment 15)** HUMAN LANDING SYSTEM (HLS)PARTNER SYSTEM REQUIREMENTS DOCUMENT (PaSRD), HLS-RQMT-002, Rev-EFFECTIVE DATE: November 16, 2020.

[redacted]

The AE would then initiate the Abort and retain the internal fault tolerance within the AE to execute the Abort. This includes maintaining an engine out capability on the AE as well as the Backup Flight System (BFS), should a common cause software failure disrupt the primary AE control software.[87] In addition, an unexpectedly high load landing or a boulder that exceeds the maximum expected height would not damage the Ascent engines as they are protected by the structure of the DE. This multi-level dissimilar redundancy provides increased robustness beyond requirements to maximize Crew safety.

With consistent application of evaluation criteria, Blue Origin and SpaceX should not have received the same rating for Abort approach. Blue Origin's design, which features many redundancies, was thoughtfully and strenuously designed to prioritize the safety of the astronauts. While the Agency acknowledged Blue Origin's design when assigning a strength, the Agency demonstrated the inconsistency in its evaluation when it also awarded SpaceX a strength, recognizing several of SpaceX's capabilities, only one of which directly relates to abort design. The Agency's evaluation of abort design was unreasonable and treated offerors unequally.

Improper Evaluation and Disparate Treatment in Evaluation of SpaceX Launch Vehicle development

SpaceX proposed to develop an entirely new launch vehicle (the Starship and Super Heavy Booster) for the HLS program. SpaceX's price, schedule, and performance depends on successfully developing the Starship as a fully reusable launch vehicle; no fully reusable upper stage vehicle has ever been developed, nor has a fully reusable super heavy booster rocket. Moreover, the Starship has no flight heritage or validation of performance, and launch vehicle development is notoriously difficult and takes much longer than anticipated.[88]

Despite these risks, the Agency assigned SpaceX a significant strength for its technical design. The Agency unreasonably accepted SpaceX's claims, or at least minimized the significant technical and schedule risks of developing an unprecedented, highly complex launch vehicle in a short amount of time. In contrast, the Agency's evaluation minimized the substantial technical and programmatic benefits to NASA of Blue Origin's design being compatible with existing launch vehicles. Blue Origin developed a design that could utilize existing launch vehicles because Blue Origin understood this would significantly mitigate schedule and development risk. The Agency did not take this into account in assigning Blue Origin a significant weakness for development schedule and a weakness for inadequate approach to schedule management. Yet SpaceX schedule was not similarly assessed, despite the utter novelty of its major launch vehicle development proposal and its past history of announcing schedules that it could not meet for prior, smaller, and simpler launch vehicles.

The Agency failed to evaluate offerors in a consistent manner by minimizing the benefits of Blue Origin's proposal while overlooking significant risks in SpaceX's proposal. The Agency disparately and unreasonably evaluated the offerors' proposals.

D. The Agency's Erroneous Award Decision for HLS Option A Fails To Obtain Full And

[87] **(Attachment 23)** Att. 37, Design Data Book - Initial Demo (MLRE-15882 HSL DDB: Ascent element, section 15.2, p 405), December 7, 2020.

[88] SpaceX's Falcon Heavy, which should have been easier because it was developed using the heritage Falcon 9 rocket boosters, was originally supposed to launch in 2013 but did not launch until 2018. See Kenneth Chang, *SpaceX's Big Rocket, the Falcon Heavy, Finally Reaches the Launchpad*, New York Times, January 22, 2018 (https://www.nytimes.com/2018/01/22/science/falcon-heavy-spacex-elon-musk.html).

Open Competition and Contravenes Federal Law And Congressional Intent

The long-term economic competitiveness and continued technological and scientific pre-eminence of the United States are intrinsically linked to the continued evolution of space technologies and the advancement of space exploration. In addition, broad development of these capabilities is crucial to STEM educational programs and workforce development, and to the national security of the United States, particularly in areas central to competition between the United States and China.

NASA developed the Artemis program next generation crewed lunar lander to land United States astronauts, including the first woman and the next man, on the Moon and to collaborate with commercial and international partners to establish sustainable lunar exploration by 2028. In addition, the Artemis program will mitigate threats and minimize challenges to the nation's superiority in space technology including lunar infrastructure and lander capabilities.

From the program's inception, NASA had correctly planned to select two distinct providers for the next generation crewed lunar lander, building on the success of the Commercial Cargo and Commercial Crew Programs. Even though Congress appropriated nearly $1.5 billion for HLS in just two fiscal years, including $850 million in FY21, NASA's source selection rationale improperly justifies the selection of a lone provider as a result of "anticipated future funding for the HLS Program." Unfortunately, this justification lacks precedence. The total cost of selecting both the National Team and SpaceX for firm-fixed price, milestone-based contracts is less than $9 billion – roughly half of what NASA requested in its September 2020 Artemis Plan budget. This total is similar to the $8.3 billion cost of the Commercial Crew Program for which the agency made two awards with less available funding and less out year funding certainty.

NASA's single award decision was inconsistent with NASA's acquisition strategy and stated intent to promote competition (safety and reliability) by making two HLS Option A awards. Contracting officials have a duty to promote competition and to obtain the most advantageous contract for the Government. *Precision Logistics, Inc.*, B-271429, July 18, 1996, 96-2 CPD ¶ 24 at 5; *National Aerospace Group, Inc.*, B-282843, Aug. 30, 1999, 99-2 CPD ¶ 43; *XTec, Inc.*, B-410778.3, Oct. 1, 2015, 2015 CPD ¶ 292, at 11. The statutory and regulatory requirements to use "competitive procedures" to obtain full and open competition, and to take other appropriate actions "to the maximum extent practicable" are material limitations on agency discretion. *See, e.g., SMS Data Products Grp., Inc. v. United States*, 853 F.2d 1547, 1553-54 (Fed. Cir. 1988) (interpreting "shall," "to the maximum extent practicable" obtain competition when reprocuring following a default termination to mean that "the contracting officer did not have unbridled discretion in conducting the reprocurement, but was required to conduct the reprocurement in the most competitive manner feasible"); *Palantir USG, Inc. v. United States*, 129 Fed. Cl. 218, 269 (2016) ("The word 'maximum' in the phrase 'to the maximum extent practicable,' therefore, should not be ignored and read out of the statute. Given the congressional choice of the word 'maximum,' even when coupled with words like 'practicable' and 'appropriate,' agencies cannot ignore or superficially comply with the requirement "), *aff'd*, 904 F.3d 980 (Fed. Cir. 2018). For the reasons set forth above, the Agency has improperly defaulted to a single HLS Option A award.

A broad industrial development of technologies that enable human exploration of the lunar surface and other celestial bodies is critical to the nation's space industrial base, including hundreds of suppliers, including small and disadvantaged businesses. The National Team members have made significant investment and progress toward the development of human-class lunar landers and related technologies and systems.

[redacted]

In failing to maintain two sources for HLS Option A, the selection decision creates a number of issues for the HLS program. That decision: 1) directly introduces technical and schedule risk into NASA's flagship program by betting on a singular solution the Source Selection Statement itself deems complex and high-risk, without a fallback plan; 2) creates a potential monopoly for all future NASA exploration missions because there would not be continuing programs for lunar access other than the SpaceX solution and this could preclude an alternative solution in the future, however it might appear in the marketplace to be able to be competitively attractive to the Agency; 3) chooses a solution that is purpose-designed for future, unscheduled Mars missions , rather than the specific lunar missions sought by the solicitation; 4) chooses a "closed" architecture that is intrinsically incompatible with any other launch system and potentially obviates the need for multiple programs that NASA has been developing over many years; and 5) selects a provider that is almost fully vertically integrated, thereby precluding participation in the HLS program by the nationwide aerospace supply base that NASA and national security programs have built up over many decades to sustain the nation's superiority in space.

IV. BLUE ORIGIN IS PREJUDICED BY THE DEFECTIVE SOLICITATION

Competitive prejudice is an essential element of a viable protest. Here, Blue Origin is plainly prejudiced by the Agency's flawed evaluation. Blue Origin is prejudiced for the additional reasons set forth above. In any event, GAO will resolve doubts regarding prejudice in favorof the protester and a reasonable possibility of prejudice is sufficient to sustain a protest. *See Alutiiq- Banner Joint Venture*, B-412952 *et al.*, July 15, 2016, 2016 CPD ¶ 205 at 11. That test is met and, therefore, Blue Origin has met its burden of showing a reasonable possibility of prejudice.

V. CONCLUSION

GAO should sustain this protest. The improper and flawed evaluation of Blue Origin's and SpaceX's proposals submitted against outdated funding tainted the selection decision and did not provide offerors with an even playing field and prejudiced Blue Origin, as well as other competitors. As such, this protest should be sustained.

VI. REQUEST FOR PRODUCTION OF DOCUMENTS

Pursuant to GAO's bid protest regulations, 4 C.F.R. § 21.1(d)(2), Blue Origin requests that as part of or in addition to the documents required by 4 C.F.R. § 21.3(d) and FAR 33.104(a)(3)(i), the Agency produce the following documents (as defined below) as soon as possible, but not later than the specified due date for the Agency Report.

The term "document" is used in its broadest sense, and includes, without limitation, information contained in electronic storage, electronic mail, internal memoranda, notes, and all non-identical copies, including drafts, of all requested documents.

Pursuant to 4 C.F.R. § 21.3(c), at least five days prior to filing of the Agency Report, the Agency is required to identify all requested documents that it intends to produce or withhold and, for each requested document that it intends to withhold, to provide a specific explanation as to why it is not required to produce such requested document.

Please produce the following:

[redacted]

1. The Acquisition Strategy or Acquisition Plan for HLS Option A procurement, including documents resulting in the Option A BAA's suggestion of a second provider on a schedule eighteen months later than a first provider.

2. The HLS Option A Solicitation and all attachments and amendments thereto.

3. All documents that relate in any way to the Agency's plans at any time for evaluating the proposals, including but not limited to, any guidance, standards, evaluation plans or similar documents provided to, or utilized in any way by, the evaluators.

4. The HLS Option A proposals submitted by Blue Origin and SpaceX, including all modifications and clarifications thereto.

5. All documents relating to the Agency decision referenced in the SSS at page 3 relating to the determination by the SSO that it would be in the Agency's best interests to make an initial, conditional selection of SpaceX.

6. All documents comprising or relating to the April 2, 2021 SSO determination referenced in the SSS at page 3.

7. The SpaceX revised proposal submitted by April 7, 2021, as referenced in the SSS at page 3.

8. All documents referring or relating to the price negotiations with SpaceX referenced in the SSS at page 3.

9. All documents relating to the availability of funding to the Agency to make an award for HLS Option A, including analysis by Fiscal Year of NASA HLS budgets.

10. All documents related to an all day review conducted on Friday, April 9, 2021 (or therein) by the Agency, and specifically by its HLS program, regarding their budgetary predictions.

11. All documents related to the Agency's analysis of cost and budget savings by delaying expenditure of long lead items in the Base Period.

12. All documents relating to the Agency's decision to limit award under the HLS Option A Solicitation to only one offeror.

13. All Agency independent cost estimates of the HLS Option A architectures.

14. All documents reflecting in any way any communications between the Agency and SpaceX under the Solicitation up to the date of this protest, including, but not limited to, communications, exchanges, clarifications, and discussions.

15. All evaluation documents of whatever nature relevant to the evaluation of the Blue Origin and SpaceX HLS Option A proposals. This includes documents relating to the initial evaluation of proposals and any and all subsequent evaluations of the proposals. It also includes, but is not limited to, individual evaluator documents, consensus evaluation documents, and related correspondence.

[redacted]

16. All documents relating to the Agency's Source Selection Statement and any documents relied upon by the source selection authority in making the award to SpaceX and deciding not to award to Blue Origin.

17. Names of all members of the source evaluation panels for all three proposals.

18. All documents relating to the Agency's comparison of SpaceX's Option A proposal to Blue Origin's Option A proposal.

19. All documents relating to the Agency's decision not to conduct price discussions or negotiations with Blue Origin.

20. All documents memorializing communications, including exchanges, discussions or oral or written formal or informal provision of information between the NASA and SpaceX concerning SpaceX's HLS Option A proposal between April 2, 2021 and April 7, 2021.

21. All documents memorializing communications, including exchanges, discussions or oral or written formal or informal provision of information between NASA and its personnel with SpaceX concerning SpaceX's HLS Option A proposal.

22. All documents that the Agency intends to refer to or rely upon if a hearing is held in this protest.

23. List and description of specifically requested responsive documents withheld by the Agency on the grounds of privilege or any other ground.

24. List and description of all weaknesses and strengths of any type for SpaceX's HLS Option A proposal.

25. Expenditure profile by calendar quarter for SpaceX's HLS Option A proposal..

26. The HLS Option A contract awarded under the Solicitation and all modifications to that contract.

The above requested documents are relevant because Blue Origin has challenged the Agency's evaluation of Blue Origin's HLS Option A proposal, and SpaceX's HLS Option A proposal.

VII. RELIEF REQUESTED

For all the reasons set forth above, Blue Origin requests the following ruling by the Comptroller General on this Protest. Blue Origin respectfully requests that GAO:

(1) Sustain each and every ground of this Protest.

(2) Recommend the Agency rescind the HLS Option A award to SpaceX, resolicit offers against a revised statement of available funds, and conduct discussions with all eligible offerors under the revised requirements.

(3) Re-perform the evaluation of offers after receipt of revised offers, correcting the evaluation

defects identified above.

Blue Origin also requests that GAO recommend that Blue Origin be reimbursed the reasonable costs of filing and pursuing the protest, including attorneys' fees. Blue Origin further requests that GAO recommend all such further relief as GAO deems appropriate under the circumstances. Bid Protest Regulations, 4 C.F.R. § 21.8(d)(1).

[redacted]

CERTIFICATION AS TO ACCURACY OF FACTUAL STATEMENTS
PURSUANT TO 28 U.S.C. 1746

I declare under penalty of perjury under the laws of the United States of America that the factual statements made in this document by Blue Origin Federation, LLC in support of this protest are true and correct to the best of my knowledge and belief.

Executed on April 26, 2021

s//: Bob Smith
Robert Smith, Chief Executive Officer,
Blue Origin Federation

Respectfully submitted;

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Attachments (attachments also contain Blue Origin confidential, proprietary and competition sensitive information not to be disclosed outside the Government):

cc (via email, with attachments):

Mr. Tyler Cochran, Contracting Officer
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NASA Marshall Space Flight Center
MSFC, AL 35812
E-mail: tyler.c.cochran@nasa.gov

[redacted]

Blue Origin Protest Attachment Index

Attachment	Description
1	Option A RFP FINAL*
2	HLS Option A Source Evaluation Panel Report – Blue Origin*
3	Option A Source Selection Statement
4	Declaration of Brent Sherwood with Exhibit A*
5	Declaration of Susan Knapp*
6	NextSTEP-2 Appendix E BAA NNH19ZCQ001K_APP-E, February 7, 2019
7	NASA Contract Number: 80MSFC20C0020. HLS Appendix H Contract to Blue Origin Federation Final Signed Contract, May 11, 2020*
8	Blue Origin HLS Option A Proposal, Volume I Technical, page 31, December 8, 2020*
9	Att. 33, Risk Reports, MLRE-15911, HLS Risk Report, December 7, 2020*
10	Att. 19, Integrated Master Schedule, MLCD-07233, December 7, 2020*
11	Att. 23a, MLPL-15833_HLS Mission Plan Vol 1, December 7, 2020*
12	Att. 38, Integrated Systems Performance Analysis - Initial Demo, MLRE-15908, December 7, 2020*
13	HUMAN LANDING SYSTEM (HLS) PARTNER SRD (PaSRD) ANNEX Technical Authority (TA) Agreements – Blue Federation, HLS-RQMT-002-ANX-03, Rev-EFFECTIVE DATE: November 12, 2020*
14	Att. 29, MLSP-15870-A, December 7, 2020*
15	HLS Option A Solicitation, Attachment F, HUMAN LANDING SYSTEM (HLS) PARTNER SYSTEM REQUIREMENTS DOCUMENT (PaSRD), HLS-RQMT-002, Rev - EFFECTIVE DATE: November 16, 2020*
16	Craig, Scott, Price, Greg, and Laura Burke, "HLS Design Reference Mission," Provided by NASA to Blue Origin during HLS Base Period, September 29, 2020*
17	Att. 38, Integrated Systems Performance Analysis - Initial Demo, MLRE-15906, ISPA Vol 15: DE ISPA, Section 8.2.15, p.104, December 7, 2020*
18	Att. 38, Integrated Systems Performance Analysis - Initial Demo, MLRE-15897, ISPA Vol 6: Integrated Lander GN&C Analysis report, December 7, 2020*
19	Davey Jones, HLS Certification Baseline Review (CBR) Board for Blue Federation - Board Kickoff and Review Summary, August 24, 2020*
20	Att. 38, Integrated Systems Performance Analysis - Initial Demo, MLRE-15896, ISPA Vol 5: Integrated Lander Communication Analysis Report, December 7, 2020*
21	Request for Action (RFA) 237, Certification Baseline Review (SBR), Blue Origin Base Period Document, September 15, 2020*
22	NASA SCaN Study, January 26, 2021*
23	Att. 37, Design Data Book - Initial Demo, MLDD-15882 HLS DDB Vol 14: Ascent Element), December 7, 2020*
24	Request for Action (RFA) 127, Updated ConOps Mission Timeline Jettison EVA, Certification Baseline Review (SBR), Blue Origin Base Period Document, September 15, 2020*

***Contains Confidential Blue Origin Information Subject to Protective Order Request and Not to Be Publicly Disclosed**

25	Att. 23b, HLS Proposed CONOPS-Sustaining, MLSP-18435, HLS Mission Plan Vol. 10 - Sustaining Mission Plan, December 7, 2020*
26	Request for Action (RFA) 149, Updated ConOps Mission Timeline Jettison EVA, Certification Baseline Review (SBR), Blue Origin Base Period Document, September 15, 2020*
27	Att. 38, Integrated Systems Performance Analysis - Initial Demo, MLRE-15905 ISPA Vol 14: Ascent Element Analysis Report, section 2.21, December 7, 2020*
28	Att. 31, DE Assembly, Integration, and Test Plan, MLPL-15935 Section 6.3, December 7, 2020*
29	Base Period Proposal, Att. 16, Data Rights Assertion Notice, November 5, 2019*
30	Solicitation NNH19ZCQ001K-APPENDIX-H-HLS, NextSTEP-2 Appendix H: Human Landing System, Discussions Transmission No. 2, Enclosure 6 Blue Origin – Proposal Issues for which the Government is Requesting Proposal Updates, February 10, 2020*
31	Option A Proposal, Att. 16, Data Rights Assertion Notice, December 8, 2020*
32	Option A Proposal, Att. 16, Revised Data Rights Assertion Notice, February 23, 2020*
33	Att. 5, Collaboration Plan, December 8, 2020*
34	Att. 6, Government Task Agreement(s) (GTAs) and/or Optional GFE/GFP Agreement(s) (OGFPAs), December 8, 2020*
35	Reimbursable Space Act Agreements (RSAAs) between Marshall Space Flight Center and Blue Origin LLC under Space Act Umbrella Agreement No. SAA8-1725986; Annexes 1725986.13, .15, .19, .25, .28, .29; SAA8-1726580.19*
36	Blue Origin HLS Option A Proposal Government Task Agreement (GTA), Thermal Vacuum Testing of DE and TE Qualification Propulsion Systems, GRC-U-4, November 24, 2020*
37	Blue Origin HLS Option A Proposal Government Task Agreement (GTA), Dual 6ft Dia LOX/LN2 Passive cooling testing, MSFC-U-3B, November 27, 2020*
38	Blue Origin HLS Option A Proposal, Volume III Management, December 8, 2020*
39	Charania, A.C., and Steve Squyres, Descent Element (DE) Demo Payload Overview, Rev 5, October 28, 2020*
40	Blue Origin: Final, Consensus Findings as Evaluated by the SEP, HLS Base Period Proposal, April 30, 2020*
41	Att. 38, MLRE-19900, ISPA Appendix: Design and performance Metrics, December 7, 2020*
42	Att. 37, MLDD-15879 – HSL DDB Vol 9: Crew Systems, Section 4.2.3 Ingress/Egress System Interface, December 7, 2020*
43	Att. 23a, HLS Proposed CONOPS-Initial, MLPL-15836, HLS Mission Plan Vol. 4 - Descent Phase, December 7, 2020*
44	Next Space Technologies for Exploration Partnerships -2 (NextSTEP-2), Appendix H: Human Landing System, Broad Agency Announcement, NNH19ZCQ001K_APPENDIX-H-HLS, Amendment 3, 25 October 2019

***Contains Confidential Blue Origin Information Subject to Protective Order Request and Not to Be Publicly Disclosed**

ATTACHMENTS

ATTACHMENT 1

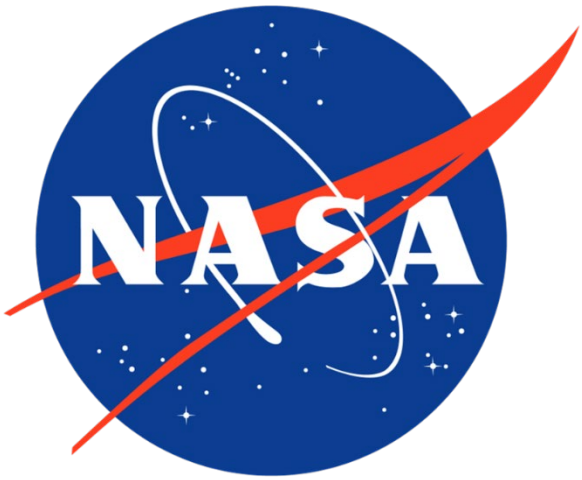
DOCUMENT
Redacted in Its Entirety

ATTACHMENT 2

DOCUMENT
Redacted in Its Entirety

ATTACHMENT 3

Source Selection Statement



Appendix H: Human Landing System, Option A
Next Space Technologies for Exploration Partnerships-2 (NextSTEP-2)
NNH19ZCQ001K_APPENDIX-H-HLS

National Aeronautics and Space Administration

April 16, 2021

Introduction

In my role as the Source Selection Authority (SSA) for the National Aeronautics and Space Administration (NASA or Agency) Human Landing System (HLS) Option A procurement, for the reasons set forth below, I have selected Space Exploration Technologies Corp. (SpaceX) for an HLS Option A contract award. This selection statement documents my independent analysis and judgment as the SSA and constitutes my final determination on this matter.

Procurement Description

Building off of the success of NASA's HLS base period contracts, the purpose of the HLS Option A procurement is to further facilitate the rapid development and demonstration of one or more landing systems that will deliver the first woman and first person of color to the Moon. Culminating in a crewed lunar surface landing demonstration mission near the South Pole, the Option A contract scope of work also encompasses demonstration of the aggregation of HLS elements, docking, transfer of crew to HLS in lunar orbit, lunar surface extra-vehicular activity (EVA), and the return of crew and materials from the surface. While the requirements and operations concept for the HLS are specified and managed by NASA, the HLS design, development, test, and evaluation (DDT&E) will be led by the Option A contractor. As part of this public-private partnership, NASA will provide significant support and expertise to the contractor, including the use of specialized NASA facilities, hardware, and personnel. NASA invited offerors to demonstrate their commitment to the public-private partnership by providing a corporate contribution; these corporate contributions not only have the effect of significantly lowering offerors' proposed firm fixed prices, but also show how each offeror intends to leverage its corporate contribution to enable its approach for commercializing HLS capabilities.

It is NASA's vision that the HLS capability demonstrated in the first mission to the lunar surface will evolve into a sustainable commercial transportation system that will enable frequent access to the lunar surface for NASA and other customers. NASA further intends for public and private investments in lunar exploration capabilities to eventually expand to include elements necessary to support prolonged human exploration in order to accomplish increasingly advanced exploration goals, including a human mission to Mars.

Procedural History

There are currently three base period contractors performing research and development in support of their respective human landing systems: Blue Origin Federation, LLC (Blue Origin or Blue), Dynetics, Inc. (Dynetics), and SpaceX. The HLS Option A solicitation (as amended) was released to these contractors on November 16, 2020, consisting of the NextSTEP-2 Appendix H Option A Broad Agency Announcement (BAA) and solicitation attachments A-Q. The solicitation required that proposals be

submitted in four volumes: Technical (I); Price (II); Management (III); and Attachments (IV), the latter consisting of 44 distinct proposal attachments. Proposals were due by 3:00 PM CT on December 8, 2020. All three firms submitted timely proposals.

After receipt of proposals, the Source Evaluation Panel (SEP) that I appointed to evaluate Option A proposals, comprised of three sub-panels (one each for Technical, Price, and Management), began its evaluation. The SEP evaluated proposals in accordance with the evaluation procedures established in the HLS Option A solicitation. To fully document its work, the SEP produced a report for each offeror containing all of the SEP's findings, ratings, and other evaluative content. The SEP has provided these reports to me, along with a comprehensive briefing summarizing its evaluation work and conclusions. This briefing provided an opportunity for the SEP to fully explain its final assessment of each of the proposals, and for me and other senior NASA leaders to ask questions and receive answers directly from the Agency experts that comprised the SEP. During this briefing, I asked questions of the SEP in order to ensure I fully apprehended the evaluation results and had a sufficiently in-depth understanding of each offeror's proposal to support making informed selection decisions. I also solicited and considered the viewpoints of other senior advisors in attendance.

On April 2, 2021, I made a determination that it would be in the Agency's best interests to make an initial, conditional selection of SpaceX to enable the Contracting Officer (CO) to engage in post-selection price negotiations with this offeror. This decision was based on NASA's longstanding Option A acquisition strategy of making two Option A contract awards. While it remains the Agency's desire to preserve a competitive environment at this stage of the HLS Program, at the initial prices and milestone payment phasing proposed by each of the Option A offerors, NASA's current fiscal year budget did not support even a single Option A award. Working in close coordination with the CO, it was therefore my determination that NASA should, as a first step, open price negotiations with the Option A offeror that is both very highly rated from a technical and management perspective and that also had, by a wide margin, the lowest initially-proposed price—SpaceX.

The CO thus opened price negotiations with SpaceX on April 2, 2021. As contemplated by the solicitation, the Government instructed SpaceX that it was permitted to change certain price and milestone-related aspects of its proposal (e.g., the Government requested a best and final price, as well as updated milestone payment phasing to align with NASA's budget constraints), but was prohibited from changing content within its technical and management proposals or otherwise de-scoping its proposal in any capacity. SpaceX submitted a compliant and timely revised proposal by the due date of April 7, 2021. Although SpaceX's revised proposal contained updated milestone payment phasing that fits within NASA's current budget, SpaceX did not propose an overall price reduction. After I reviewed this revised proposal and consulted with the SEP Chairperson and CO, it was evident to me that it would not be in the Agency's best interests to select one or more of the remaining offerors for the purpose of engaging with them in price negotiations. Following a final review of the offerors' SEP reports and

SpaceX's revised pricing proposal, I made final Option A selection and award determinations, as documented herein.

Proposal Evaluation Methodology

For this procurement, NASA utilized a BAA to solicit for firm fixed price proposals. BAAs are not negotiated procurements conducted on the basis of competitive proposals. As such, NASA did not conduct a comparative analysis and trade-off amongst proposals. Rather, each proposal was evaluated on its own individual merits.

Generally, the SEP evaluated each offeror's proposal as a measure of its understanding of and approach to meeting all of the requirements and goals of the Option A solicitation. The SEP evaluated the degree to which the proposal demonstrated the offerors' in-depth knowledge of the required engineering processes, procedures, and tools to successfully perform the tasks on schedule, and a clear understanding of current NASA requirements, goals, policies, and procedures affecting such tasks. For all of the enumerated evaluation criteria, the SEP evaluated the credibility, feasibility, effectiveness, comprehensiveness, suitability, risk, completeness, adequacy, and consistency of each offeror's unique proposed approach, as well as its ability to successfully meet the technical, management, schedule, and all other requirements and goals of the Option A solicitation.

The solicitation established three factors for evaluation: Technical (Factor 1), Price (Factor 2), and Management (Factor 3). These factors are in descending order of importance to NASA: Factor 1 is more important than Factor 2, and Factor 2 is more important than Factor 3. Factors 1 and 3, when combined, are significantly more important than Factor 2.

Within Factors 1 and 3, the solicitation established specific areas of focus for evaluation. For each offeror, findings (e.g., strengths, weaknesses) created for the areas of focus were considered in totality by the SEP to arrive at a single adjectival rating for each factor. Areas of focus did not receive their own adjectival ratings. In determining adjectival ratings for Factors 1 and 3, all areas of focus were considered as approximately of equal importance within their respective factor. Table 1 contains the evaluation factors and areas of focus.

Evaluation Factor	Area of Focus
Factor 1: Technical Approach	Technical Design Concept
	Development, Schedule, and Risk
	Verification, Validation, and Certification
	Insight
	Launch and Mission Operations
	Sustainability
	Approach to Early System Demonstrations
Factor 2: Total Evaluated Price	No focus areas
Factor 3: Management Approach	Organization and Management
	Schedule Management
	Risk Reduction
	Commercial Approach
	Base Period Performance
	Small Business Subcontracting Plan
	Data Rights

Table 1: Option A Evaluation Factors and Areas of Focus

For evaluation of Factors 1 and 3, the SEP identified strengths and weaknesses as defined below. Elements of an offeror's proposal that merely met the Government's requirements were ineligible for a finding of either a strength or a weakness. In such cases, the SEP did not create findings.

Finding	Definition
Significant Strength	An aspect of the proposal that greatly enhances the potential for successful contract performance and/or that appreciably exceeds specified performance or capability requirements in a way that will be advantageous to the Government during contract performance.
Strength	An aspect of the proposal that will have some positive impact on the successful performance of the contract and/or that exceeds specified performance or capability requirements in a way that will be advantageous to the Government during contract performance.
Weakness	A flaw in the proposal that increases the risk of unsuccessful contract performance.
Significant Weakness	A flaw in the proposal that appreciably increases the risk of unsuccessful contract performance.
Deficiency	A material failure of a proposal to meet a Government requirement or a combination of significant weaknesses in a proposal that increases the risk of unsuccessful contract performance to an unacceptable level.

Table 2: Option A Findings Definitions

Adjectival ratings definitions as applicable to Factors 1 and 3 were as follows:

Adjectival Rating	Definition
Outstanding	A thorough and compelling proposal of exceptional merit that fully responds to the objectives of the BAA. Proposal contains strengths that far outweigh any weaknesses.
Very Good	A competent proposal of high merit that fully responds to the objectives of the BAA. Proposal contains strengths which outweigh any weaknesses.
Acceptable	A competent proposal of moderate merit that represents a credible response to the BAA. Strengths and weaknesses are offsetting or will have little or no impact on contract performance.
Marginal	A proposal of little merit. Proposal does not clearly demonstrate an adequate approach to and understanding of the BAA objectives. Weaknesses outweigh strengths.
Unacceptable	A seriously flawed proposal that is not responsive to the objectives of the BAA. The proposal has one or more deficiencies, or multiple significant weaknesses that either demonstrate a lack of overall competence or would require a major proposal revision to correct. The proposal is unawardable.

Table 3: Option A Adjectival Ratings Definitions

For one of the Areas of Focus within Factor 3, Base Period Performance, the SEP performed its evaluation in accordance with a special procedure established in the Option A solicitation. This procedure involved evaluation of NASA's Base Period Performance Record (BPP-R) for each offeror, documenting its performance from the beginning of base period contract performance until October 2020, as well as evaluation of the Base Period Performance Narrative (BPP-N) submitted by each offeror with its Option A proposal. For this Area of Focus, offerors were eligible to receive one of four base period performance ratings enumerated and defined within the Option A solicitation.

The SEP's price evaluation consisted of four components: (1) A calculation of each offeror's Total Evaluated Price (evaluation Factor 2); (2) an evaluation of each offeror's price reasonableness; (3) an evaluation of each offeror's balanced pricing; and (4) an evaluation of whether the offeror's proposal contained advance payments. The evaluation of offerors' prices did not result in the assignment of any adjectival rating nor any strengths or weaknesses. The SEP calculated each offeror's Total Evaluated Price by summing the offeror's proposed firm fixed price amounts for CLINs 005, 009, and 010; the value of certain Government contributions to the proposed effort, including Optional Government Furnished Equipment or Property and the value of any

Government Task Agreements; and the minimum IDIQ obligations as provided in the Option A solicitation.

Source Selection Determinations

Introduction

I have thoroughly reviewed the evaluation report for each offeror prepared by the SEP. It is my determination that the evaluation results documented therein, including the findings, adjectival ratings, narrative bases for each adjectival rating, and the Total Evaluated Prices were created in accordance with the evaluation criteria and methodology set forth in the Option A solicitation. Further, it is my determination that this evaluation record has a rational basis, is thoroughly documented, and provides me with information regarding the qualitative merits and drawbacks of each offeror's proposal that is sufficient to support my selection decisions. As such, I fully concur with and adopt the SEP's evaluation record. This record is the basis for all decisions made herein, and such decisions represent my independent judgement as the Agency official solely responsible for selections in this procurement.

In accordance with the Option A solicitation, the SSA is not, as a general matter, tasked with conducting a comparative analysis or trade-off amongst proposals. Rather, as the SSA, I am charged with considering each proposal on its own individual merits and selecting for award one or more proposals that individually each present value to the Government and that optimize NASA's ability to meet its objectives as set forth in the solicitation. As discussed above, one such objective is making two Option A contract awards. NASA's HLS acquisition strategy has been to maintain a competitive environment through the initial crewed lunar demonstrations and beyond, thereby creating performance and pricing incentives for contractors at all stages of the HLS Program. By making three HLS base period contract awards that preceded the present Option A source selection, it was NASA's preference (as stated in the Option A BAA) to then down-select from among these contractors to two Option A awardees.

However, when considered in conjunction with the Total Evaluated Prices for each Option A offeror, NASA's fiscal year 2021 appropriations and appropriations indications for future fiscal years that span the Option A period of performance are incongruent with NASA's Option A acquisition strategy. Thus, while not NASA's optimal outcome in this matter, in accordance with section 6.1 of the BAA, NASA is permitted to select for award multiple, one, or none of the Option A proposals. Perhaps most critically, the solicitation provides that "[t]he overall number of awards will be dependent upon funding availability and evaluation results." My selection decisions set forth below are based upon these dual considerations.

Summary of Evaluation Results

The Option A technical and management adjectival ratings as assessed by the SEP are as follows:

	Technical Rating (Factor 1)	Management Rating (Factor 3)
Blue Origin	Acceptable	Very Good
Dynetics	Marginal	Very Good
SpaceX	Acceptable	Outstanding

Table 4: Option A Technical and Management Adjectival Ratings

For Factor 2, SpaceX's Total Evaluated Price of $2,941,394,557 was the lowest among the offerors by a wide margin. Blue Origin's Total Evaluated Price was significantly higher than this, followed by Dynetics' Total Evaluated Price, which was significantly higher than Blue Origin's.

In light of these results, and the funds presently available to the Agency for Option A contract(s), my selection analysis must first consider the merits of making a contract award to the offeror that is most highly rated and has the lowest price—SpaceX—followed by the second most highly rated offeror, Blue Origin, and finally, Dynetics. Below are my analyses for each of these offerors and the accompanying bases for their selection or non-selection for award. For each offeror, I have identified those aspects of its proposal and the SEP's evaluation thereof that I find to be particularly compelling and noteworthy. Note that this selection statement does not identify or describe SEP findings for each offeror with which I concur but that did not represent significant considerations in my analysis or ultimate determinations.

Analysis

SpaceX

Technical Approach

The SEP evaluated SpaceX's proposal as Acceptable for Factor 1: Technical Approach. I agree with this assessment.

Within Technical Area of Focus 1, Technical Design Concept, I agree with the SEP's assignment of a significant strength for SpaceX's proposed capability to substantially exceed NASA's threshold values or meet NASA's goal values for numerous initial performance requirements. I also note the SEP's independent analysis and verification of these attributes, which lends credence to the feasibility of SpaceX's approach to meeting NASA's performance requirements. I find this suite of augmented capabilities

and SpaceX's approach to achieving them in a manner that will not comprise its ability to meet NASA's other requirements to be a particularly noteworthy attribute of SpaceX's design with abundant potential benefit for NASA. In particular, SpaceX's quiescent lunar orbit operations capability will allow it to loiter for 100 days prior to rendezvous with the crew vehicle. This capability exceeds NASA's stated goal period of 90 days, which allows for additional flexibility for crew launch in the event unexpected circumstances arise that could delay the commencement of Artemis missions.

Additionally, the scale of SpaceX's lander architecture presents numerous benefits to NASA. First, I find SpaceX's capability to deliver and return a significant amount of downmass/upmass cargo noteworthy, as well as its related capability regarding its mass and volumetric allocations for scientific payloads, both of which far exceed NASA's initial requirements. I also note SpaceX's ability to even further augment these capabilities with its mass margin flexibility. While I recognize that return of cargo and scientific payloads may be limited by Orion's current capabilities, SpaceX's ability to deliver a host of substantial scientific and exploration-related assets to the lunar surface along with the crew is immensely valuable to NASA in the form of enhanced operational flexibility and mission performance. For example, SpaceX's capability will support the delivery of a significant amount of additional hardware, including bulky and awkwardly-shaped equipment, for emplacement on the lunar surface. This has the potential to greatly improve scientific operations and EVA capabilities. The value of this capability is even more apparent when considered with SpaceX's ability to support a number of EVAs per mission that surpasses NASA's goal value and EVA excursion durations that surpass NASA's thresholds. Together, this combination of capabilities dramatically increases the return on investment in terms of the science and exploration activities enabled. And, while I agree with the SEP that the scale of SpaceX's lander also presents challenges, such as risks associated with an EVA hatch and windows located greater than 30 meters above the lunar surface, I find the positive attributes created by this aspect of SpaceX's lander design to outweigh these and other shortcomings as identified by the SEP.

I note that the SEP also assigned SpaceX an additional, separate strength within Technical Area of Focus 1 specifically concerning its science payload delivery and return allocations. It is my assessment that SpaceX received some credit for these augmented capabilities and the flexibilities they create for NASA in the above-discussed significant strength. However, this separate strength focused on SpaceX's unique design attributes that enable the creative use of available space, including its combination of unpressurized and pressurized cargo areas and its stowage plan, which will make efficient use of available space for science payloads and streamline their deployment and sample returns. Thus, I find this specific strength to be noteworthy of its own accord, and I agree with the SEP that the assignment of this standalone strength was appropriate.

In addition, I appreciate that although SpaceX's design has substantially augmented capabilities, these do not come at the expense of heightened risk to mission execution or crew safety. I particularly find SpaceX's strength under Technical Area of Focus 1 for its robust approach to aborts and contingencies to be compelling. This approach contains

several key features, including: the application of its excess propellant margin to expedite ascent to lunar orbit in the event of an emergency early return; a comprehensive engine-out redundancy capability; and two airlocks providing redundant ingress/egress capability, each with independent environmental control and life support capabilities that can provide a safe haven for crew. Additionally, SpaceX's design allows for the sourcing of excess propellant, which will provide crew with a large reserve supply of life support consumables in the event of a contingency event. I thus agree with the SEP that SpaceX's design incorporates a variety of capabilities that enable the execution of vital and time-critical contingency and abort operations which provide the crew with flexibilities should such scenarios arise. Collectively, these capabilities mitigate risks and increase the likelihood of crew safety during multiple phases of the mission.

Dovetailing with SpaceX's significant strength under Technical Area of Focus 1 for its exceedance of NASA's performance requirements is SpaceX's corollary significant strength within Technical Area of Focus 6 (Sustainability) for its meaningful commitment to, and a robust yet feasible approach for achieving, a sustainable capability through its initial design. Here, I note that the SEP closely analyzed SpaceX's proposal and was able to independently substantiate its claimed performance capabilities. Thus, I agree with the SEP's assignment of a significant strength in this area and concur with the SEP's basis for this finding. It is of particular interest to me that, for its initial lander design, SpaceX has proposed to meet or exceed NASA's sustaining phase requirements, including a habitation capability to support four crewmembers without the need for additional pre-emplaced assets such as habitat structures. SpaceX's initial capability also supports more EVAs per mission than required in the sustaining phase, along with an ability to utilize two airlocks and other logistics capabilities to enhance EVA operations while on the surface. And, as previously mentioned, SpaceX's cabin volume and cargo capability enable a myriad of endeavors that will ensure a more sustainable human presence on the lunar surface. Moreover, I note that SpaceX's capability contemplates reusable hardware, leverages common infrastructure and production facilities, and builds from a heritage design with commonality in sub-systems and components across its different variants. The collective effect of these attributes is that SpaceX's initial lander design will largely obviate the need for additional re-design and development work (and appurtenant Government funding) in order to evolve this initial capability into a more sustainable capability. While I acknowledge that some development and technical risk necessarily accompany SpaceX's innovative approach to designing a capability that is sustainable from the outset, I find that SpaceX has provided a feasible path to executing on this capability. Accordingly, I conclude that the significantly enhanced operational flexibility and mission performance that SpaceX offers, and complementary potential for resultant long-term affordability, present immense value for NASA for lunar and deep space exploration activities.

Finally, within Technical Area of Focus 7, Approach to Early Systems Demonstrations, I agree with the SEP's assignment of a significant strength for SpaceX's robust early system demonstration ground and flight system campaign, which focuses on the highest risk aspects of its proposed architecture. This will allow SpaceX to isolate and address performance and operational issues early in its development cycle, which will

meaningfully inform the maturation of its capability and increase overall confidence in its performance abilities.

While I find the positive aspects of SpaceX's technical approach to be notably thoughtful and meritorious, these aspects are, however, tempered by its complexity and relatively high-risk nature. Of concern here is the SEP's assignment of a significant weakness within SpaceX's proposal under Technical Area of Focus 5, Launch and Mission Operations, due to SpaceX's complicated concept of operations. SpaceX's mission depends upon an operations approach of unprecedented pace, scale, and synchronized movement of the vehicles in its architecture. This includes a significant number of vehicle launches in rapid succession, the refurbishment and reuse of those vehicles, and numerous in-space cryogenic propellant transfer events. I acknowledge the immense complexity and heightened risk associated with the very high number of events necessary to execute the front end of SpaceX's mission, and this complexity largely translates into increased risk of operational schedule delays. However, these concerns are tempered because they entail operational risks in Earth orbit that can be overcome more easily than in lunar orbit, where an unexpected event would create a much higher risk to loss of mission.

Indeed, despite SpaceX's concept of operations relying on a high number of launches, there is some flexibility in the timing of its required propellant tanker launches prior to the time-critical HLS Starship. This flexibility will allow NASA to time its crewed mission only after SpaceX has successfully achieved its complex propellant transfer activities and is ready to commence launch of its lunar lander. It is this flexibility that allays my concerns with regard to the admittedly riskier aspects of the first phase of SpaceX's concept of operations. And, I further acknowledge that bounding more of the risk associated with these activities within the first phase of SpaceX's mission actually enables the use of a single-element lander for the crewed portion of its mission. By decoupling the launch of propellant from the launch of the lander, SpaceX was able to design a larger lander which will not require any on-orbit aggregation or integration activities (an attribute for which the SEP assigned a strength under Technical Area of Focus 1). Moreover, I note that SpaceX's complex rendezvous, proximity operations, docking, and propellant transfer activities will occur in Earth orbit rather than at a more distant point in lunar orbit. In my opinion, the closer location of these complex operations mitigates risk to some degree; as noted above, issues that occur in Earth orbit are more easily overcome or corrected compared to those that occur in lunar orbit. Finally, I note that SpaceX has built in some margins for delay, and that its capability allows for some delay in propellant delivery without the need for a complete mission restart. Thus, while I concur with the SEP that numerous attributes of SpaceX's launch campaign create a significant risk to execution, enduring these operational risks on the front end of the mission is, in my opinion, a more palatable level of risk that has commensurate potential benefits.

Additionally, I note the SEP's evaluated weakness within Area of Focus 2, Development, Schedule, and Risk regarding the development and schedule risk accompanying SpaceX's highly integrated, complex propulsion system. Several sub-systems that comprise SpaceX's propulsion system are currently at a state of design that will require

substantial maturation. The complexity of this system, coupled with the level of development and testing activities that must occur with relatively little margin available in SpaceX's proposed schedule, introduces risk. Yet SpaceX's proposal acknowledges this risk and, more importantly, provides a thorough proposed approach to achieving this development. Thus, I concur with the SEP's conclusion that this risk constitutes a weakness, but not a significant weakness, within SpaceX's proposal.

In light of my assessment above, and in consideration of SpaceX's remaining evaluation record pertaining to this factor, I concur with the SEP that while SpaceX's technical proposal is of moderate merit, and represents a credible response to the BAA objectives, the qualitative attributes of SpaceX's aggregated strengths and its aggregated weaknesses are offsetting and that commensurate risk accompanies the meritorious aspects of SpaceX's technical approach. In particular, SpaceX's proposal has several attractive technical attributes, including a suite of augmented capabilities, a feasible approach for a sustainable design for its initial system, and an aggressive testing plan that will buy down risk. Yet SpaceX's technical approach has countervailing weaknesses, including its complex concept of operations and the development risk associated with its propulsion system. Therefore, I find that the SEP properly rated SpaceX's technical proposal as Acceptable.

Price

I reviewed the SEP's calculation of SpaceX's Total Evaluated Price and conclude that it is accurate. Based on the SEP's utilization of multiple price analysis techniques set forth in FAR 15.404-1(b) and (g), I have similarly high confidence in its conclusions that SpaceX's price is fair, reasonable, balanced, and that SpaceX's proposal contains no advance payments. Finally, the SEP compared SpaceX's proposed milestone payments to monthly expenditures and concluded that contractor investment and risk-sharing were not unreasonably low or negative during performance. I concur with each of these conclusions. As previously discussed, the Contracting Officer engaged in limited price negotiations with SpaceX that resulted in some revisions to SpaceX's proposal, but SpaceX's revised proposal did not alter the price evaluation results summarized above.

Management Approach

The SEP evaluated SpaceX's proposal as Outstanding for Factor 3: Management Approach. I agree with this assessment.

The positive attribute of SpaceX's management proposal that I found to be the most compelling is its exceedingly thorough and thoughtful management approach and organizational structure within Area of Focus 1, Organization and Management. I concur with the SEP that this represents a significant strength in SpaceX's management approach. In particular, I acknowledge SpaceX's approach to leveraging its deep bench of personnel and expertise, its prior program management experience, and lessons learned from those experiences that SpaceX will bring to bear in its management of the HLS effort. Similarly, I find attractive SpaceX's proposal to replicate and utilize management processes, toolsets, and software that have been effectively employed on other, similar programs and will ensure effective traceability and tracking of progress on

the HLS contract. I concur with the SEP that together, these attributes will help reduce SpaceX's schedule risk and allow for more effective management of its contractual progress.

The SEP also assigned SpaceX a strength within Management Area of Focus 1, Organization and Management, for its effective organizational and management approach to facilitating contract insight in a manner that follows its broader Starship development effort and operational activities. This approach, which does not draw illusory distinctions between HLS activities and other efforts utilizing the common Starship architecture, is critical because SpaceX's HLS effort and its development of commercial spaceflight capabilities are inextricably intertwined. I find that this aspect of SpaceX's proposal will effectuate immediate and meaningful insight into SpaceX's vehicles, systems, facilities, operations, and organizational practices, and will also permit NASA insight to evolve as SpaceX's Starship effort evolves.

Within Management Area of Focus 4, Commercial Approach, I found SpaceX's significant strength for its comprehensive plan to leverage its HLS contract performance to advance a multi-faceted approach to commercializing its underlying Starship capability to be a highlight of its management proposal. SpaceX's plans to self-fund and assume financial risk for over half of the development and test activities as an investment in its architecture, which it plans to utilize for numerous commercial applications, presents outstanding benefits to NASA. This contribution not only significantly reduces the cost to the Government (which is reflected in SpaceX's lower price), but it also demonstrates a substantial commitment to the success of HLS public-private partnership commercial model and SpaceX's commitment to commercializing technologies and abilities developed under the Option A contract.

In light of my assessment above, and in consideration of SpaceX's remaining evaluation record pertaining to this factor, I concur with the SEP that SpaceX's management approach is of exceptional merit and fully responsive to the objectives of the solicitation. Like the SEP, I find that the qualitative attributes of SpaceX's aggregated strengths, including its rating of High for its Base Period Performance, far outweigh the qualitative attributes of its evaluated weaknesses, which were relatively minor. Therefore, I agree that SpaceX's proposal was properly rated as Outstanding under Management Approach.

Selection Rationale

My selection determination for SpaceX's proposal is based upon the results of its evaluation considered in light of the Agency's currently available and anticipated future funding for the Option A effort. In making my selection, I examine the totality of the SEP's evaluation of SpaceX's proposal across the Option A solicitation's evaluation criteria, as well as the relative weighting of those criteria as stated therein. This analysis leads me to the conclusion that SpaceX's proposal is meritorious and advantageous to the Agency, and that it aligns with the objectives as set forth in this solicitation. Specifically, I conclude that SpaceX's acceptable technical approach coupled with its outstanding management approach provide abundant value for NASA at its Total

Evaluated Price. Moreover, as a result of the price negotiations discussed above, the Agency's budget now permits the award of a contract to SpaceX. Therefore, I select SpaceX's proposal for an Option A contract award.

Blue Origin

Technical Approach

The SEP evaluated Blue Origin's proposal as Acceptable for Factor 1: Technical Approach. I agree with this assessment.

As an initial matter, I note that the SEP did not identify any significant strengths within Blue Origin's technical proposal. Nonetheless, Blue Origin's proposal has several attractive technical attributes. Within Technical Area of Focus 1, Technical Design Concept, the SEP evaluated Blue Origin's proposal as having two strengths and two significant weaknesses that I find to be particularly notable. First, the SEP assigned Blue Origin a strength for exceeding certain functional and performance requirements for its initial demonstration mission. Some of these include a landed cargo capacity of 850 kg, meeting NASA's goal for this requirement and thereby offering flexibility for manifesting equipment to support science and EVA operations; having an increased loiter capability in near-rectilinear halo orbit, enabling additional flexibility for SLS and/or Orion launches; exceeding the threshold number of EVAs, allowing for additional flexibility when planning for surface exploration activities and science return; and meeting the goal value for vertical orientation, which will enhance internal operations and improve safety and quality of life for the crew during the surface stay. I agree with the SEP that these proposed capabilities not only exceed NASA's stated requirements, but do so in a manner that would be materially advantageous to NASA in numerous ways during Blue Origin's performance of its demonstration mission.

Blue Origin's second Technical Design Concept strength that I find to be particularly meaningful is its comprehensive approach to aborts and contingencies. This places a priority on crew safety throughout all mission phases. Here, Blue Origin proposes to utilize a combination of off-nominal trajectory planning, reliance on dissimilar elements, and a multi-engine Ascent Element. Blue Origin's concept of operations identifies two types of contingencies (abort and early mission termination) that would apply during critical mission activities, and describes the contingency operations associated with each event. These operations leverage Blue Origin's multi-element architecture to effectuate such operations, particularly during powered descent. Blue Origin's Ascent Element also has a number of abort-related features that are beneficial, including the fact that it is capable of separation, which could provide a safe alternative in the event of failure of its Descent Element. And while the Ascent Element utilizes three engines, it can operate with only two of those engines, providing a one engine-out capability throughout the descent phase. I further appreciate the Ascent Element's use of hypergolic propellants, which helps to ensure engine ignition and rapid initiation of ascent to orbit, thus bolstering the reliability of this critical element of Blue Origin's architecture in the event of an off-nominal event. Finally, Blue Origin proposes a robust surface abort strategy by basing its delta-v budget on a suite of ascent trajectories that

vary with surface stay time. I concur with the SEP's conclusion that, collectively, these aspects of Blue Origin's overall approach to aborts and specific abort capabilities will increase safety for the crew throughout all phases of the mission.

But despite these and other strengths of Blue Origin's technical design, I find that it suffers from a number of weaknesses, including two significant weaknesses with which I agree. The first of these is that Blue Origin's propulsion systems for all three of its main HLS elements (Ascent, Descent, and Transfer) create significant development and schedule risks, many of which are inadequately addressed in Blue Origin's proposal. These propulsion systems consist of complex major subsystems that have low Technology Readiness Levels (TRLs) and are immature for Blue Origin's current phase of development. Additionally, Blue Origin's proposal evidences that its Ascent Element's engine preliminary design reviews and integrated engine testing occur well after its lander element critical design reviews, indicating a substantial lag in development behind its integrated system in which the engine will operate. This increases the likelihood that functional or performance issues found during engine development testing may impact other, more mature Ascent Element subsystems, causing additional schedule delays.

Further compounding these issues is significant uncertainty within the supplier section of Blue Origin's proposal concerning multiple key propulsion system components for the engine proposed for its Descent and Transfer Elements. The proposal identifies certain components as long lead procurements and identifies them in a list of items tied to significant risks in Blue Origin's schedule. Yet despite acknowledging that the procurement of these components introduces these risks, Blue Origin's proposal also states that these components will be purchased from a third party supplier, which suggests that little progress has been made to address or mitigate this risk. At Blue Origin's current maturity level, component level suppliers for all critical hardware should be established to inform schedule and Verification, Validation, and Certification approaches, and major subsystems should be on track to support the scheduled element critical design review later this year. Nevertheless, these attributes are largely absent from Blue Origin's technical approach.

Finally, numerous mission-critical integrated propulsion systems will not be flight tested until Blue Origin's scheduled 2024 crewed mission. Waiting until the crewed mission to flight test these systems for the first time is dangerous, and creates a high risk of unsuccessful contract performance and loss of mission if any one of these untested systems does not operate as planned. In summary, I concur with the SEP that the current TRL levels of these major subsystems, combined with their proposed development approach and test schedule, creates serious doubt as to the realism of Blue Origin's proposed development schedule and appreciably increases its risk of unsuccessful contract performance.

Blue Origin's second notable significant weakness within the Technical Design Concept area of focus is the SEP's finding that four of its six proposed communications links, including critical links such as that between HLS and Orion, as well as Direct-to-Earth communications, will not close as currently designed. Moreover, it is questionable

whether Blue Origin's fifth link will close. These problematic links result in Blue Origin's proposal failing to meet key HLS requirements during the surface operations phase of the mission. This is significant, because as proposed, Blue Origin's communications link errors would result in an overall lack of ability to engage in critical communications between HLS and Orion or Earth during lunar surface operations. I am troubled by the risks this aspect of Blue Origin's proposal creates to the crew and to the mission overall.

Within Technical Area of Focus 2, Development, Schedule, and Risk, the SEP identified a weakness pertaining to Blue Origin's cryogenic fluid management (CFM) development and verification approach that is of heightened interest to me. I concur with the SEP that this aspect of Blue Origin's proposal creates considerable development and schedule risk. In particular, Blue Origin's choice of cryogenic propellant for the majority of its mission needs will require the use of several critical advanced CFM technologies that are both low in maturity and have not been demonstrated in space. Blue Origin's propellant choice also presents challenges in terms of storage temperature, which only increases the difficulty of maturing the necessary CFM technologies. I fully concur with the SEP's finding that these and other CFM-related proposal attributes increase the probability that schedule delays to redesign and recover from technical performance issues uncovered both in component maturation tests and in system level tests will delay Blue Origin's overall mission and could result in unsuccessful contract performance.

Similarly, several segments of Blue Origin's proposed nominal mission timeline result in either limitations on mission availability and trajectory design and/or over-scheduling of the crew, resulting in unrealistic crew timelines. I agree with the SEP that this represents a weakness within Blue Origin's proposal within the Launch and Mission Operations Area of Focus (Technical Area of Focus 5). Specifically, Blue Origin's proposed Initial Lunar Operations phase duration reduces the number of viable mission dates. Additionally, its proposed descent timeline requires a longer crew day to complete all required tasks. This long descent day is required to enable an EVA after the crew's first sleep period on the Moon. As proposed, Blue Origin's ascent day suffers from similar challenges. In particular, the proposed mission profile requires a jettison EVA to reduce the Ascent Element mass prior to liftoff, but the series of activities required to perform this jettison EVA extend the duration of crew operations for ascent day. Therefore, both descent and ascent days will require the crew to work more hours than are typically scheduled. I share the SEP's concern that this is likely to be very taxing on the crew, which could increase safety risks.

Counterbalancing these mission operations risks are a number of strengths within this area of Blue Origin's proposal, including one that I find to be particularly appealing, which is that Blue Origin proposes to use a launch approach that provides flexibility and minimizes risk. Blue Origin's initial HLS mission requires only three commercial launches. This very low number of required launches lowers the risk of mission failure due to launch anomalies. This risk is further reduced by the fact that Blue's HLS elements are capable of interfacing with multiple commercial launch vehicles (CLVs), leaving Blue Origin with near-term options regarding choice of launch vehicle. Finally, Blue Origin's proposal demonstrates that its architecture closes with an existing CLV. This gives the Government greater confidence in Blue Origin's approach to launch and

mission operations. I find that overall, these attributes of Blue Origin's approach meaningfully reduce launch-related risks and therefore increase its likelihood of successful contract performance.

Finally, within Technical Area of Focus 6, Sustainability, the SEP again found that various aspects of Blue Origin's proposal effectively provided a counterbalance when weighed against one another. I agree with this assessment. Here, although the design of Blue Origin's sustainable architecture represents a strength within its proposal, I am particularly concerned with the offsetting weakness for Blue's plan to evolve its initial lander into this sustainable design. While the solicitation does not require sustainable features for the offeror's initial approach, it did require the offeror to propose a clear, well-reasoned, and cost-effective approach to achieving a sustainable capability. Blue Origin proposed a notional plan to do so, but this plan requires considerable re-engineering and recertifying of each element, which calls into question the plan's feasibility, practicality, and cost-effectiveness. Blue Origin's two architectures are substantially different from one another. For example, the changes required for evolving Blue's Ascent Element include resizing the cabin structure to accommodate four crew, thermal control system upgrades, bigger fans, and propellant refueling interfaces. And to accommodate the additional mass of the Ascent Element and to reach non-polar locations, Blue Origin's Descent Element requires a complete structural redesign, larger tanks using a new manufacturing technique, a refueling interface, radiator upgrades, and a performance enhancement to its main engine. The SEP observed that this "from the ground-up" plan is likely to require additional time, considerable effort, and significant additional cost to design and develop new technologies and capabilities, and to undertake re-engineering and re-certification efforts for Blue Origin's sustainable lander elements utilizing new heavier lift launch vehicles and modified operations. I share this concern. When viewed cumulatively, the breadth and depth of the effort that will be required of Blue Origin over its proposed three-year period calls into question Blue's ability to realistically execute on its evolution plan and to do so in a cost-effective manner.

In light of my assessment above, and in consideration of Blue Origin's remaining evaluation record pertaining to this factor, I concur with the SEP that while Blue Origin's technical proposal is competent, of moderate merit, and represents a credible response to the BAA objectives, the qualitative attributes of its aggregated strengths are offset by the countervailing qualitative attributes of its aggregated weaknesses. In particular, Blue Origin's proposal has several attractive technical attributes, including an architecture that closes in three launches and has the flexibility to launch on multiple vehicles from multiple providers, including currently existing launch vehicles. Yet, Blue Origin's technical approach has countervailing weaknesses, including risks to timely development of its complex propulsion and cryo-fluid management systems and a failure to close its communications links. Therefore, I find that the SEP properly rated Blue Origin's technical proposal as Acceptable.

Price

I reviewed the SEP's calculation of Blue Origin's Total Evaluated Price and conclude that it is accurate. Based on the SEP's utilization of multiple price analysis techniques set forth in FAR 15.404-1(b) and (g), I have similarly high confidence in its conclusion that Blue Origin's price is fair, reasonable, and balanced. Finally, the SEP compared Blue Origin's proposed milestone payment amounts to its monthly expenditures and concluded that the contractor's investment was not unreasonably low or negative during performance, and that Blue Origin is thus assuming a fair sharing of risk throughout contract performance. I agree with these conclusions.

However, the SEP did identify two instances of proposed advance payments within Blue Origin's proposal. Pursuant to section 5.2.5 of the BAA, proposals containing any advance payments are ineligible for a contract award. The solicitation's advance payment prohibition applies to proposed CLIN payment amounts and, separately, to proposed milestone payment amounts within those CLINs. Blue Origin's proposal is not compliant with the latter of those two requirements. Specifically, Blue Origin proposed milestones at the outset of its Option A performance that the SEP determined were not commensurate with performance. I concur with the SEP's assessment that these kickoff meeting-related payments are counter to the solicitation's instructions and render Blue Origin's proposal ineligible for award without the Government engaging in discussions or negotiations with Blue Origin, either of which would provide an opportunity for it to submit a compliant revised proposal.

Management Approach

The SEP evaluated Blue Origin's proposal as Very Good for Factor 3: Management Approach. I agree with this assessment.

The positive attribute of Blue Origin's management proposal that I found to be the most compelling is its excellent overall approach to management and its thoughtful organizational structure that is well-suited to its specific HLS architecture. I concur with the SEP that this represents a significant strength in Blue Origin's management approach within Management Area of Focus 1. Notably, Blue Origin proposes a considered approach to parallel management of its vehicle development by assigning an individual organization to each of its three primary systems. In this regard, Blue Origin maximizes the value of teaming with experienced organizations. By making each organization accountable for a major element and empowering those teams to execute rapidly using their own processes and experienced workforce, Blue Origin's approach has the potential to maximize the benefits inherent to having multiple major subcontractors. This parallel management and development of its three primary HLS elements will allow Blue Origin to stay focused on achieving schedule.

In addition, Blue Origin's approach recognizes some of the potential pitfalls that three parallel development efforts by three different organizations can cause, and thoughtfully addresses these types of risks by building in comprehensive cross-organization management tools and teams. For example, Blue Origin proposes cross-program, "badgeless" teams staffed by all partners and led by Blue Origin that will own the

technical baseline, integrate individual element systems engineering teams, and define and manage margins across the system. These types of badgeless environments constitute a true organizational partnership across Blue Origin and its major subcontractors, ensuring strong integration and employing best practices for large-scale system development synthesized from the partners' combined experience.

I have concerns, however, with Blue Origin's commercial approach. Here, I agree with the SEP that, in response to Management Area of Focus 4, Blue Origin's proposed approach was incomplete and provided insufficient details to substantiate its claims. The proposal lacks evidence supporting how Blue's commercial approach will result in lower costs to NASA and how it will apply to immediate or future applications for existing or emerging markets beyond just HLS contract performance itself. For example, while Blue Origin proposes a significant corporate contribution for the Option A effort, it does not provide a fulsome explanation of how this contribution is tied to or will otherwise advance its commercial approach for achieving long-term affordability or increasing performance. Similarly, while the second tenant of Blue's commercial approach is related to rapid evolution to sustainable and increasingly affordable services, the proposal lacks detail explaining how this evolution furthers or enables its commercial approach, or how its approach will benefit NASA's future human and robotic exploration missions, including how such an approach could enable sustained, continuing, or lower-cost access to the lunar surface. Moreover, aside from several high level ideas that it would consider pursuing, Blue Origin's proposal did not adequately address how it would leverage contract performance and development efforts accomplished thereunder to stimulate the growth of a viable commercial deep space marketplace. Rather, Blue Origin merely states that HLS-funded technological advances will hasten opportunities for commercial applications and growth, including anticipated marketing and licensing of its innovations, but does not describe specific plans for how it will pursue or lead opportunities to integrate the HLS capabilities into future systems or stimulate the growth of the commercial marketplace. Collectively, these proposal attributes do not constitute a thorough and well-reasoned approach by Blue Origin to utilize its HLS efforts to stimulate the growth of a viable commercial marketplace.

Finally, I note that within Management Area of Focus 7, Data Rights, the SEP identified two weaknesses within Blue's proposal with which I concur and find to be noteworthy. In both cases, Blue's approach to data rights is likely to result in protracted intellectual property (IP) disputes during contract performance and generally creates a high risk that the Government will obtain lower IP licensing rights than it is otherwise entitled to under the contract. First, the SEP observed that Blue's Assertion Notice lacks the specificity required by the solicitation, and further, it fails to make assertions at the lowest practicable and segregable level. The first of these errors leaves the Government unable to verify the validity of some of Blue Origin's assertions, meaning that Blue Origin has proposed to deliver certain data sets with a limited or restricted rights license but has failed to adequately substantiate its basis for doing so. The latter error has a similar result in that Blue Origin proposes to deliver what appear to be overly broad sets of data and software to the Government with limited or restricted rights. By not breaking these sets down to the required level and segregating out only those portions that are truly appropriate to deliver with less than a Government Purpose Rights (GPR)

license, this aspect of Blue's proposal is non-compliant with the solicitation's instructions. Blue's proposal further impugns the Government's potential rights in data by proposing to deliver data created in conjunction with NASA with less than a GPR license; this is prohibited by the solicitation. I thus agree with the SEP's finding that multiple conflicting components within Blue Origin's proposal create a situation in which the parties will likely need to engage in protracted negotiations while on contract to ensure that the Government is obtaining all of the IP rights to which it is contractually entitled. It is to the advantage of both parties to begin contract performance with as much clarity and agreement as to each party's rights in data as is reasonably possible, but it is my assessment that Blue Origin's proposal is not particularly helpful in achieving this goal and leaves me with concerns about NASA being able to obtain proper rights in data once on contract.

Nonetheless, in light of my assessment above, and in consideration of Blue Origin's remaining management evaluation record, I concur with the SEP that Blue Origin's management approach is of high merit and fully responsive to the objectives of the solicitation. Like the SEP, I find that the qualitative attributes of Blue Origin's aggregated management strengths, including its rating of High for its Base Period Performance, far outweigh the qualitative attributes of its aggregated management weaknesses. Therefore, I agree that Blue Origin's proposal was properly rated as Very Good under Management Approach.

Selection Rationale

My selection determination with regard to Blue Origin's proposal is based upon the results of its evaluation considered in light of the Agency's currently available and anticipated future funding for the HLS Program. Blue Origin's proposal has merit and is largely in alignment with the technical and management objectives set forth in the solicitation. Nonetheless, I am not selecting Blue Origin for an Option A contract award because I find that its proposal does not present sufficient value to the Government when analyzed pursuant to the solicitation's evaluation criteria and methodology.

In reaching this conclusion, I considered whether it may be in the Government's best interests to engage in price negotiations to seek a lower best and final price from Blue Origin. However, given NASA's current and projected HLS budgets, it is my assessment that such negotiations with Blue Origin, if opened, would not be in good faith. After accounting for a contract award to SpaceX, the amount of remaining available funding is so insubstantial that, in my opinion, NASA cannot reasonably ask Blue Origin to lower its price for the scope of work it has proposed to a figure that would potentially enable NASA to afford making a contract award to Blue Origin. As specified in section 6.1 of the BAA, the overall number of Option A awards is dependent upon funding availability; I do not have enough funding available to even attempt to negotiate a price from Blue Origin that could potentially enable a contract award. For these reasons, I do not select Blue Origin's proposal for an Option A contract award.[1]

[1] While it is also the case that Blue Origin's proposal is not awardable as-is in light of its aforementioned advance payments, this is an issue I would endeavor to allow Blue to correct through negotiations or

Dynetics

Technical Approach

The SEP evaluated Dynetics' proposal as Marginal for Factor 1: Technical Approach. I agree with this assessment.

As an initial matter, I note that while the SEP evaluated several positive attributes for Dynetics' technical approach under this factor, none of them resulted in the assignment of a significant strength. However, Dynetics' proposal does contain several attractive characteristics. Within Technical Area of Focus 1, Technical Design Concept, the SEP evaluated Dynetics' proposal as having two strengths that I find to be particularly notable. First, Dynetics' proposed single stage integrated Descent Ascent Element (DAE) lander design requires no in-space integration of lander elements or staging/separation events. This pre-integrated design will also allow for terrestrial testing of the entire system, which will increase the fidelity of testing data generated. I concur with the SEP's conclusion that this design greatly simplifies Dynetics' proposed architecture and its ability to execute. Further, Dynetics' design incorporates several features that are uniquely responsive to NASA's requirements and that will facilitate crew and surface operations. Specifically, Dynetics' low-slung DAE will enable easy access to the lunar surface and will minimize risk of sustaining injuries during ingress and egress operations, particularly while handling scientific samples. This design feature also facilitates the crew's ability to attend to incapacitated crew potentialities with a short translation path from the surface to the crew module. Finally, Dynetics' design includes two crew stations, providing redundancy during operations, as well as large windows that will maximize field of view during approach and landing. I agree that collectively, these design aspects will enhance operational effectiveness and reduce risk to the crew.

However, notwithstanding these aforementioned positive attributes, I find that Dynetics' technical approach suffered from a number of serious drawbacks, and I concur with the SEP's conclusion that these drawbacks meaningfully increase the risk to Dynetics' successful performance of this contract. Of particular concern is the significant weakness within Dynetics' proposal under Technical Area of Focus 1, Technical Design Concept, due to the SEP's finding that Dynetics' current mass estimate for its DAE far exceeds its current mass allocation; plainly stated, Dynetics' proposal evidences a substantial negative mass allocation. This negative value, as opposed to positive reserves that could protect against mass increases at this phase of Dynetics' development cycle, is disconcerting insofar as it calls into question the feasibility of Dynetics' mission architecture and its ability to successfully close its mission as proposed. While Dynetics recognizes and has been actively addressing this issue during its base period performance, its proposal does not provide sufficient details regarding its plan for executing on and achieving significant mass opportunities, especially when in the same breath, the proposal also identifies material additional mass threats. I concur with the SEP that collectively, Dynetics' mass margin deficit at this juncture, coupled with

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discussions if I otherwise concluded that its proposal presents a good value to the Government. This, however, is not my conclusion.

insufficient substantiation as to precisely how Dynetics will address this issue, creates a potent risk to successful contract performance.

The SEP also evaluated several other weaknesses within Dynetics' proposal under Technical Area of Focus 1, including two that are of a similar nature and that I consider to be noteworthy. First, Dynetics' proposal did not provide sufficient substantiation regarding the design maturity and performance capabilities of its tanker support spacecraft, which is a cornerstone of its mission architecture and is critical to successful completion of its demonstration mission. Similarly, critical technical details regarding the Mission Unique Logistics Element (MULE) are absent across numerous areas of Dynetics' proposal. In both cases, this dearth of information complicates NASA's ability to verify and validate the feasibility of Dynetics' approach or its ability to close its mission as proposed.

Additionally, the SEP assigned three significant weaknesses to Dynetics' proposal within Technical Area of Focus 2 that are critical to me. First, Dynetics' proposal contained insufficient and inconsistent design and analysis details regarding its proposed cryogenic fluid management (CFM) system and the long-term characteristics for its propellant storage capabilities. Once again, Dynetics' proposal lacked material details as to development testing and analysis of this system to support its maturation, which decreases confidence in its ability to develop this capability according to its proposed schedule. Next, I note that Dynetics' proposed mission sequencing and the significant overlap between its uncrewed landing test and its crewed demonstration mission are inconsistent with and noncompliant with the solicitation's requirements. Therefore, as proposed, Dynetics' uncrewed landing provides limited value, insofar as it will not be able to apply lessons learned from this activity to meaningfully reduce risk to its crewed demonstration. Finally, I note that Dynetics' development schedule is unrealistic overall due to multiple mission-critical subsystems and systems which are at a relatively low level of maturity without sufficient accompanying margin to address inevitable issues as maturation continues as proposed. I concur with the SEP's assessment of these significant flaws which, together, call into question the credibility of Dynetics' proposed approach.

Within Technical Area of Focus 2, the SEP also assigned Dynetics a weakness regarding development risk and relative maturity of its proposed complex propellant transfer capability. This weakness is of heightened interest to me because Dynetics' ability to transfer propellant in this manner is considered to be a key attribute to enable its proposed mission approach. For one, Dynetics' proposal envisages a much more optimistic and mature level of technical readiness for its in-space cryogenic fluid transfer. Moreover, Dynetics' proposal lacks detail concerning operational specifics of this capability and is unclear about key component design attributes. This lack of detail raises questions about Dynetics' ability to address these admittedly significant development challenges and to develop a viable propellant transfer capability on a schedule that aligns with its proposed demonstration mission.

In light of my assessment above, and in consideration of Dynetics' remaining evaluation record pertaining to the Technical Approach factor, I agree with the SEP's overall

conclusion that on balance, the nature of multiple problematic significant weaknesses, in tandem with other notable weaknesses, meaningfully outweigh the evaluated meritorious attributes of Dynetics' proposal. In particular, I agree that Dynetics' mass closure issue has substantial ramifications for the feasibility of its proposed architecture. I also acknowledge that Dynetics' proposal contains inconsistencies and lacks key substantiating details in numerous areas, resulting in several thematic weaknesses which cast considerable doubt in my mind as to the proposal's overall credibility. Therefore, I find that the SEP properly rated Dynetics' technical proposal as Marginal.

Price

I reviewed the SEP's calculation of Dynetics' Total Evaluated Price and conclude that it is accurate. Based on the SEP's utilization of multiple price analysis techniques set forth in FAR 15.404-1(b) and (g), I have similarly high confidence in its conclusion that Dynetics' price is fair, reasonable, and balanced. The SEP also reviewed Dynetics' pricing for advance payments and concluded that it did not propose any. Finally, the SEP compared Dynetics' proposed milestone payment amounts to its monthly expenditures and concluded that the contractor's investment was not unreasonably low or negative during performance, and that Dynetics is thus assuming a fair sharing of risk throughout contract performance. I concur with these conclusions.

Management Approach

The SEP evaluated Dynetics' proposal as Very Good for Factor 3: Management Approach. I agree with this assessment.

Within Management Area of Focus 4, Commercial Approach, I note and agree with the SEP's assignment of a significant strength for Dynetics' thoughtful, thorough, and compelling proposal for commercializing its HLS capabilities and capitalizing on the technologies and systems developed under this effort. This includes a plan for leveraging its autonomous logistics platform as a cargo delivery system, establishment of a communications and navigation network, and the active exploration of a commercial lunar payload market. In concert, these attributes of Dynetics' plan, along with its aspirations for the establishment of a propellant depot, will foster a more sustainable presence on the lunar surface and will enable long-term affordability for NASA and other customers of the lunar economy.

Within Management Area of Focus 6, I acknowledge and concur with the SEP's assignment of a significant strength for Dynetics' meaningful commitment to small business utilization. Its plan intends to exceed the solicitation's stated goals (and the Government's expectations), particularly, in the area of high technology areas.

However, I note that the SEP assigned Dynetics' management approach a weakness within Management Area of Focus 1, Schedule Management, due to an evaluated lack of sufficient description regarding its schedule risk analysis plan process, methodology, and application for schedule management purposes, including the creation and utilization of schedule margin. This issue concerned me considering the development schedule issues identified in the SEP's evaluation of Dynetics' technical proposal.

In light of my assessment above, and in consideration of Dynetics' remaining evaluation record pertaining to this factor, I concur with the SEP that Dynetics' management approach is of high merit and fully responsive to the objectives of the solicitation. Like the SEP, I find that the qualitative attributes of Dynetics' aggregated management strengths, including its rating of High for its Base Period Performance, outweigh the qualitative attributes of its aggregated management weaknesses. Therefore, I agree that Dynetics' proposal was properly rated as Very Good under Management Approach.

Selection Rationale

My selection determination for Dynetics' proposal is based upon the results of its evaluation considered in light of the Agency's currently available and anticipated future funding for the Option A effort. In making my selection, I examine the totality of the SEP's evaluation record of Dynetics' proposal across the Option A solicitation's evaluation criteria, as well as the relative weighting of those criteria as stated therein. This leads me to the conclusion that while Dynetics' proposal does have some meritorious technical and management attributes, it is overall of limited merit and is only somewhat in alignment with the objectives as set forth in this solicitation. Specifically, I conclude that Dynetics' marginal technical approach, coupled with its very good management approach, does not provide sufficient value to the Government at its Total Evaluated Price and when considered in light of the Agency's available budget. Therefore, I do not select Dynetics' proposal for an Option A contract award.

Conclusion

In light of the three HLS Option A offerors' evaluation results and in consideration of NASA's available funding, it is my determination that the award of a single Option A contract is in the best interests of the Agency. This contract award is the catalyst for developing a critical element needed for the initial Artemis missions—a human lander—to return astronauts to the Moon, including the first woman to touch the lunar surface. This Option A selection represents a critical step, but is by no means the last step, in NASA's investment in and facilitation of lunar transportation service providers. With this award and NASA's forward efforts for the acquisition of long-term recurring human lunar landing services, NASA is leading a sustainable return to the Moon, and we are doing it with our commercial and international partners to lead innovation and expand our knowledge for future lunar missions, looking towards Mars.

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Kathryn L. Lueders
Source Selection Authority

ATTACHMENT 4

BEFORE THE UNITED STATES GOVERNMENT ACCOUNTABILITY OFFICE

Protest of Blue Origin Federation, LLC	)	Protest Filed April 26, 2021

DECLARATION OF BRENT SHERWOOD

I, Brent Sherwood, declare pursuant to 28 U.S.C. § 1746, as follows:

1. My name is Brent Sherwood. I am employed by Blue Origin as Senior Vice President, Advanced Development Programs. The following statements are based on my personal knowledge and/or my appropriate investigation within Blue Origin of the statements made herein, and they are accurate.

2. Blue Origin's [redacted] Base Period award (initially valued at $579 million) funded the National Team to develop baseline requirements, certification standards, and preliminary designs for its proposed Human Landing System solution in close collaboration with NASA.

3. The Base Period progress therefore significantly reduced technical uncertainties underpinning the Firm Fixed Price bid required by the HLS Option A Solicitation, and significantly increased clarity and specificity of NASA requirements. As a consequence, Blue Origin's original December 2019 Option A bid ($[redacted] billion) submitted with the Base Period proposal decreased to $[redacted] billion for the revised Option A submittal due on December 8, 2020. Over and above this proposed NASA funding, the proposal committed $[redacted] of corporate contribution by the Blue Origin team plus the privately-funded development of the commercial BE-7 rocket engine integral to the system offering. This

demonstrates Blue Origin's commitment to the "public-private partnership" model sought by NASA in the HLS solicitation.

4. The first and only response from NASA to Blue Origin's submitted Option A proposal was on April 16, 2021. NASA informed Blue Origin that it was not selected for an Option A award. The Source Selection Statement, provided to Blue Origin later that day and immediately released publicly, states that two weeks earlier, on April 2, 2021, NASA had engaged SpaceX in negotiations toward the Option A award, with the opportunity provided to SpaceX to revise its proposal. The same Statement states that, having chosen SpaceX, the Source Selection Authority concluded that "After accounting for a contract award to SpaceX, the amount of remaining available funding is so insubstantial that, in my opinion, NASA cannot reasonably ask Blue Origin to lower its price for the scope of work it has proposed to a figure that would potentially enable NASA to afford making a contract award to Blue Origin." Source Selection Statement at 20.

5. The Source Selection Authority's opinion did not afford Blue Origin, a well-funded private space company backed by Jeff Bezos, any opportunity to submit a revised business position in light of the "available funding" (which was never communicated to Blue Origin) even as it was already affording that opportunity to SpaceX.

6. Exhibit A to this declaration (Blue Origin HLS Option A Att 26 Exhibit 4 Statement of Financial Capability) was provided to the Agency in Blue Origin's Option A proposal as part of the required Responsibility Determination Information to demonstrate to NASA's satisfaction the financial wherewithal of Blue Origin. Exhibit A addresses Blue Origin's and its founder's financial ability. The Exhibit very clearly points to the fact that Blue Origin could afford a very sizeable contribution to HLS Option A, if NASA had opened

discussions or negotiations with Blue Origin and sought adjustments to Blue Origin's option price or funding profile.

7. NASA requested and Blue Origin submitted Exhibit A to demonstrate to NASA's satisfaction the financial wherewithal of Blue Origin. Nevertheless, the Source Selection Official assumed that Blue Origin would not or could not amend its proposal price to make its otherwise selectable proposal – having Technical score equal to SpaceX and Management score of "very good" – a "good value" to the Government despite the Government's oft-claimed preference to select two Option A contractors for award to maintain competition and reduce program risk.

8. The Source Selection Official's assumption was in error. If NASA had notified Blue Origin that the Source Selection Official's assessment of available out-year budget would preclude an award absent a repriced Blue Origin proposal, Blue Origin would have welcomed the opportunity to offer specific adjustments in a revised proposal. Blue Origin would have considered specific adjustments (*e.g.*, "eighteen month later" second landing, as suggested by the BAA and as publicly stated by NASA officials multiple times in 2020; increased corporate contribution; revised milestone payments, and associated expenditure profile; etc.) in a revised offering.

9. More specifically, Blue Origin's proposal was built around a 2024 date for the first crewed demonstration landing as prescribed by the Option A Solicitation and reinforced throughout the Base Period by our customer for that work, the HLS Program Office at NASA Marshall Space Flight Center. The Option A Solicitation requested an "accelerated schedule" that nonetheless would have to be "credible." In response to repeated questions for clarification, NASA would only say that 2024 "remains very important." Yet the Solicitation also referred in multiple places to the award of a second demonstration landing

for a second provider "eighteen months later." Had NASA invited a revised proposal to meet such a schedule, we would have eliminated multiple programmatic and technical risks including vendor long-lead procurement penalties, resulting in a reduced total evaluated price and a different funding profile, including a revised funding profile in Government fiscal years 2021 and 2022.

10. Blue Origin and the National Team had the financial potential to increase its corporate contribution and private investment above the almost [redacted] dollars proposed. *See* Exhibit A. The Source Selection Official's assumption that Blue Origin and our National Team members would not or could not self-fund a greater share of the total cost was erroneous and unfounded.

11. Additionally, Blue Origin has a history of offering and making proactive investments and corporate contributions to government proposals to enable lunar exploration. Mr. Bezos, Blue Origin's founder, has made clear that the company has a strong corporate commitment to develop a lunar landing system and a basis to make such investments. *See* https://www.washingtonpost.com/technology/2019/05/09/trump-wants-return-moon-jeff-bezos-is-among-those-vying-help/ and https://www.blueorigin.com/blue-moon/. On March 1, 2017, Blue Origin submitted an unsolicited proposal to NASA offering a public-private partnership for a lunar cargo lander. In this proposal, Blue Origin offered its own corporate funds for development of the main engine for such a mission.

12. Subsequently, in Blue Origin's NextSTEP-2 Appendix E proposal submitted to NASA on March 25, 2019, we also included an unsolicited and complete Funded Space Act Agreement stating that Blue Origin would contribute [redacted] toward development of a first demonstration mission using the Blue Moon Descent Element.

13. The original Blue Origin NextSTEP-2 Appendix H proposal submitted to NASA on November 5, 2019, committed [redacted] of corporate contribution for the Base and Option A Periods, plus full self-funding to develop the commercial BE-7 engine, worth [redacted] over and above the [redacted] corporate contribution.

14. For the Appendix H HLS Option A proposal submitted on December 8, 2020, Blue Origin proposed [redacted] of corporate contribution in the Option A period (plus the significant private investment to develop the commercial BE-7 engine in Option A). Blue Origin has spent [redacted] of its own funds to date for commercial development of its BE-7 engine that can be used for its HLS architecture, not even including reimbursable Space Act Agreements to fund test activities with NASA Marshall Space Flight Center that total [redacted] and plans for up to [redacted] of test site improvements at Air Force Research Lab engine test facilities at Edwards Air Force Base.

15. In addition to the above areas of Blue Origin funding to support HLS in our proposals, NASA sought price adjustments in order to make the Base Period award. Specifically, Blue Origin and the National team were asked to re-propose to specific pricing detailed by NASA without changing schedule or technical content. NASA's pricing detail revision requests were significantly below the amount of Blue Origin's National Team proposal, yet within a matter of days Blue Origin submitted a revised proposal that was aligned to NASA's funding constraints, significantly lowering our Base Period proposal price without relaxing schedule, and therefore requiring additional National Team funds.

16. More specifically for example, during the HLS Base Period evaluation and award activity, when asked by NASA, Blue Origin reduced its original 2019 Base Period proposal price [redacted] despite sustaining the major Base Period milestones and maintaining a 2024 landing date.

17. Similarly, when again asked for final contract adjustments, Blue Origin made significant reductions to accommodate NASA's request. Blue Origin proposed [redacted] of long-lead procurements in its original proposal. It then removed [redacted] for the final contract while maintaining major NASA milestones in the Base Period and a 2024 landing date. After that adjustment, NASA never exercised the remaining [redacted] on the contract for long-lead procurements under CLIN 3, yet Blue Origin still maintained the 2024 landing date.

18. The financial ability of Blue Origin and our National Team partners to fund necessary development of HLS technology, our repeated willingness to contract on these terms in both unsolicited proposals and responses to Requests for Proposals, and our demonstrated ability and willingness to reduce cost while maintaining schedule during the Base Period shows the willingness, viability and credibility of Blue Origin to respond to NASA's requests in the event of budgetary shortfalls. Yet for Option A, Blue Origin was not even asked or afforded an opportunity to discuss or propose funding adjustments.

19. Blue Origin was unreasonably deprived of the ability to make the type of credible adjustments described above to its Option A proposal through discussions or negotiations.

20. Based on the foregoing, Blue Origin was plainly prejudicially disadvantaged by not being afforded the same opportunity as SpaceX to revise its proposal and adjust its pricing.

I declare under penalty of perjury under the laws of the United States of America that the statements made in this declaration are true and correct.

April 25, 2021

Brent Sherwood

EXHIBIT A

DOCUMENT
Redacted in Its Entirety

ATTACHMENT 5

DOCUMENT
Redacted in Its Entirety

ATTACHMENT 6

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ATTACHMENT 7

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ATTACHMENT 14

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ATTACHMENT 44

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