National Aeronautics and Space Administration

Commercial Destinations - Free Flyer

Space Act Agreement
SAA-UA-22-35807

Effective Date: December 1, 2021

BLUE ORIGIN

AMENDMENTS AND HISTORY LOG

Status	Amend No.	Effective Date	DESCRIPTION
Baseline	N/A	12/1/21	Baseline Space Act Agreement

FUNDED SPACE ACT
AGREEMENT BETWEEN
NATIONAL AERONAUTICS AND SPACE
ADMINISTRATION AND
BLUE ORIGIN, LLC
FOR
COMMERCIAL DESTINATIONS-FREE FLYER PHASE 1

BACKGROUND

A. The National Aeronautics and Space Administration (NASA) has established the Commercial Low Earth Orbit (LEO) Development Program at the Johnson Space Center as part of the Space Operations Mission Directorate. The objectives of the Program are to:

- Develop a robust commercial space economy in LEO, including supporting the development of commercially owned and operated LEO destinations from which various customers, including private entities, public institutions, NASA, and foreign governments, can purchase services; and

- Stimulate the growth of commercial activities in LEO.

B. To achieve the Commercial LEO Development Program's overall goals, NASA developed and is implementing a five-point plan. The plan, entitled NASA's Plan for Commercial LEO Development, addresses how NASA participates with industry to develop commercial LEO destinations, stimulates demand for new and emerging markets in LEO, and takes near-term steps to achieve a robust economy in LEO. The third point in this plan is to initiate the process for commercial development of LEO destinations. In order to cost-effectively meet U.S. long-term research and technology development needs in low-Earth orbit (LEO), a robust commercial human spaceflight economy must be established including commercial destinations and new markets such that NASA can be one of many customers of a broad portfolio of commercial products and services. Development and operation of a commercial destination to provide those services will require significant private investment over many years and significant non-NASA demand to ensure long-term financial viability.

C. This SAA represents Blue Origin's and NASA's commitment to Blue Origin's concept maturation and initial development phase of a project to develop the vehicles, systems, and operations needed to deploy and operate free-flying LEO destinations that meet potential future needs of various customers including the U.S. Government.

ARTICLE 1. AUTHORITY AND PARTIES

In accordance with the National Aeronautics and Space Act (51 U.S.C. § 20113(e)), this Agreement is entered into by the National Aeronautics and Space Administration, located at 4th and E Streets, SW, Washington, D.C. (hereinafter referred to as "NASA" or

Government), and Blue Origin, LLC, located at 21218 76th Ave S, Kent, WA 98032 (hereinafter referred to as "Blue Origin" or "Partner"). NASA and Partner may be individually referred to as a "Party" and collectively referred to as the "Parties." This agreement will be implemented by NASA at the Lyndon B. Johnson Space Center in Houston, Texas.

ARTICLE 2. PURPOSE

The purpose of this Agreement is to facilitate the Partner's concept maturation and initial development phase (Phase 1) of its Commercial Destinations-Free Flyer (CDFF) capabilities.

For purposes of this Agreement, CDFF refers to an independent, free-flying facility operating in an orbit selected by the Partner. The Partner's CDFF System is described in Appendix 1. As part of the work in this Agreement, the Parties may work in collaboration in some areas as may be mutually agreed during implementation of this Agreement and documented in a Technical Implementation Plan (TIP). The Parties anticipate that this may be an evolvable architecture that could include the following general types of capabilities:

a) Transportation – services provided by four transportation elements, including Dream Chaser for crew/cargo, Starliner for crew, New Glenn reusable launch vehicle, and Blue Ring space tug
b) Destination – six destination elements, including Blue Origin Energy Mast and Core module, Sierra Space LIFE module and Node, Boeing Research module and Genesis Single Person Spacecraft
c) Ground/Operations – manufacturing, launch, landing, mission control, Amazon ground station, and data processing facilities with turnkey customer payload planning, processing, and operations

ARTICLE 3. RESPONSIBILITIES

A. NASA shall use reasonable efforts to:

1. Provide a point of contact for Partner within the Commercial LEO Development Program within thirty (30) days after the effective date of this Agreement.
2. Participate in quarterly status reviews.
3. Appoint a NASA representative to participate in each review board described in Appendix 2.
4. Review data provided by Partner.
5. Attend and observe Partner milestones, at NASA's discretion and after coordination with Partner.
6. Provide milestone payments to Partner upon successful completion of each milestone, subject to limitations noted below;

7. If requested by Partner, and within 30 days of each quarterly meeting, provide Partner a written acknowledgement of milestone completion if NASA ascertains that the milestones of the previous quarter have been accomplished. Nothing in the acknowledgement of milestone completion shall be construed to imply that NASA endorses or sponsors any Partner product or service resulting from activities conducted under this Agreement. NASA's acknowledgement shall not be construed to imply approval or endorsement of the safety, reliability or appropriateness of any Partner design, system, architecture or testing methodology.
8. Provide equipment and/or services as identified and described in a Technical Implementation Plan (TIP) to be developed by the Parties as needed.
9. Provide access to requested NASA technical data, lessons learned, and expertise support, services, facilities, and NASA-developed technologies, on a non-interference basis as resources permit. NASA furnished services, facilities, and technologies that may be provided are identified in the TIP.

B. Blue Origin shall use reasonable efforts to:

1. Conduct concept maturation and initial development of Blue Origin's CDFF System according to the milestones identified in Appendix 2 (Partner Milestones) and provide NASA with data to demonstrate that Milestone entrance and success criteria have been successfully completed.
2. Conduct quarterly status reviews.
3. Designate at least one seat for a NASA representative on each review board for major milestones identified in Appendix 2.
4. Provide equipment as identified and described in the TIP. All equipment provided by Partner to NASA shall include documentation stating build, revision, and traceability information.
5. Fulfill its obligations in the TIP.

ARTICLE 4. SCHEDULE AND MILESTONES

The planned major milestones for the activities defined in the "Responsibilities" Article, including acceptance criteria and payments for each milestone in furtherance of CDFF Phase 1 activities are identified in Appendix 2 to this Agreement.

ARTICLE 5. FINANCIAL OBLIGATIONS

A. Obligation

1. The Government's liability to make payments to Partner is limited to only those funds obligated annually under this Agreement or by amendment to the Agreement. NASA may obligate funds to the Agreement incrementally.

B. Acceptance and Payment for Milestones

1. Partner shall notify the NASA Points of Contact, listed in Article 18, at least 30 calendar days prior to the completion of any milestone to arrange for the NASA Technical Contact or designee to witness the event or accept delivery of documents. NASA shall have 30 calendar days to determine whether the milestone event meets its corresponding acceptance criteria as described in Appendix 2 of this Agreement and shall notify Partner of NASA's acceptance or non-acceptance. NASA shall have 5 calendar days to determine whether Milestone 1 meets its corresponding acceptance criteria as described in Appendix 2 of this Agreement and shall notify Partner of NASA's acceptance or non-acceptance. Any disagreement between NASA and Partner about the successful accomplishment of a milestone shall be deemed a Dispute and resolved in accordance with Article 19 of this Agreement.

2. Partner shall submit a written invoice requesting payment from NASA upon notification of acceptance by NASA of each milestone, as identified and described in Appendix 2 of this Agreement. Partner shall submit all invoices utilizing Treasury's Invoice Processing Platform (IPP). For instructions on submitting invoices through IPP reference: https://www.nssc.nasa.gov/vendorpayment. After receipt and review of the invoice, the NASA Administrative Contact will prepare a written determination of milestone completion and authorize payment.

3. The following information shall be included on each Partner invoice to NASA:
   (a). Agreement Number;
   (b). Invoice Number;
   (c). A description of milestone event;
   (d). Terms of Payment;
   (e). Payment Office; and
   (f). Amount of the fixed contribution claimed.

4. Financial Records and Reports: Except as otherwise provided in this Agreement, Partner's relevant financial records associated with this Agreement shall not be subject to examination or audit by NASA.

5. Comptroller General Access to Records: The Comptroller General, at its discretion and pursuant to applicable regulations and policies, shall have access to and the right to examine records of any Party to the Agreement or any entity that participates in the performance of this Agreement that directly pertain to and involve transactions relating to the Agreement for a period of three (3) years after the Government makes the final milestone payment under this Agreement. This paragraph only applies to any record that is created or maintained in the ordinary course of business or pursuant to a provision of law. The terms of this paragraph shall be included in any subcontracts or other arrangements valued in excess of $5,000,000.00 that Partner has or may enter into related to the execution of the milestone events in this Agreement.

6. Notwithstanding any other provision of this Agreement, all activities under or pursuant to this Agreement are subject to the availability of funds, and no provision of this Agreement shall be interpreted to require obligation or payment of funds in violation of the Anti-Deficiency Act, (31 U.S.C. § 1341).

ARTICLE 6. PRIORITY OF USE

Any schedule or milestone in this Agreement is estimated based upon the Parties' current understanding of the projected availability of NASA goods, services, facilities, or equipment. In the event that NASA's projected availability changes, Partner shall be given reasonable notice of that change, so that the schedule and milestones may be adjusted accordingly. The Parties agree that NASA's use of the goods, services, facilities, or equipment shall have priority over the use planned in this Agreement. Should a conflict arise, NASA in its sole discretion shall determine whether to exercise that priority. Likewise, should a conflict arise as between two or more non-NASA Partners, NASA, in its sole discretion, shall determine the priority as between those Partners. This Agreement does not obligate NASA to seek alternative government property or services under the jurisdiction of NASA at other locations.

ARTICLE 7. NONEXCLUSIVITY

This Agreement is not exclusive; accordingly, NASA may enter into similar agreements for the same or similar purpose with other U.S. private or public entities.

ARTICLE 8. LIABILITY AND RISK OF LOSS

A. The objective of this Article is to establish a cross-waiver of liability in the interest of encouraging participation in the exploration, exploitation, and use of outer space. The Parties intend that the cross-waiver of liability be broadly construed to achieve this objective.

B. For purposes of this Article:

1. The term "Damage" means:
   a. Bodily injury to, or other impairment of health of, or death of, any person;
   b. Damage to, loss of, or loss of use of any property;
   c. Loss of revenue or profits; or
   d. Other direct, indirect, or consequential Damage.

2. The term "Launch Vehicle" means an object, or any part thereof, intended for launch, launched from Earth, or returning to Earth which carries Payloads, persons,

or both.

3. The term "Payload" means all property to be flown or used on or in a Launch Vehicle.

4. The term "Protected Space Operations" means all Launch Vehicle or Transfer Vehicle activities and Payload activities on Earth, in outer space, or in transit between Earth and outer space in implementation of an agreement for launch services. Protected Space Operations begins at the signature of this Agreement and ends when all activities done in implementation of this Agreement are completed. It includes, but is not limited to:

   a. Research, design, development, test, manufacture, assembly, integration, operation, or use of Launch Vehicles or Transfer Vehicles, Payloads, or instruments, as well as related support equipment and facilities and services; and

   b. All activities related to ground support, test, training, simulation, or guidance and control equipment and related facilities or services.

   "Protected Space Operations" excludes activities on Earth that are conducted on return from space to develop further a Payload's product or process for use other than for the activities within the scope of an agreement for launch services.

5. The term "Related Entity" means:

   a. A contractor or subcontractor of a Party at any tier;

   b. A user or customer of a Party at any tier; or

   c. A contractor or subcontractor of a user or customer of a Party at any tier. The terms "contractor" and "subcontractor" include suppliers of any kind.

   The term "Related Entity" may also apply to a State, or an agency or institution of a State, having the same relationship to a Party as described in paragraphs B.5.a. through B.5.c. of this Article, or otherwise engaged in the implementation of Protected Space Operations as defined in paragraph B.4. above.

6. The term "Transfer Vehicle" means any vehicle that operates in space and transfers Payloads or persons or both between two different space objects, between two different locations on the same space object, or between a space object and the surface of a celestial body. A Transfer Vehicle also includes a vehicle that departs from and returns to the same location on a space object.

C. Cross-waiver of liability:

1. Each Party agrees to a cross-waiver of liability pursuant to which each Party waives all claims against any of the entities or persons listed in paragraphs C.1.a. through C.1.d. of this Article based on Damage arising out of Protected Space Operations. This cross- waiver shall apply only if the person, entity, or property causing the Damage is involved in Protected Space Operations and the person, entity, or property damaged is damaged by virtue of its involvement in Protected Space Operations. The cross-waiver shall apply to any claims for Damage, whatever the legal basis for such claims, against:

a. The other Party;

b. A party to another NASA agreement that includes flight on the same Launch Vehicle;

c. A Related Entity of any entity identified in paragraphs C.1.a. or C.1.b. of this Article; or

d. The employees of any of the entities identified in paragraphs C.1.a. through C.1.c. of this Article.

2. In addition, each Party shall extend the cross-waiver of liability, as set forth in paragraph C.1. of this Article, to its own Related Entities by requiring them, by contract or otherwise, to:

a. Waive all claims against the entities or persons identified in paragraphs C.1.a. through C.1.d. of this Article; and

b. Require that their Related Entities waive all claims against the entities or persons identified in paragraphs C.1.a. through C.1.d. of this Article.

3. For avoidance of doubt, this cross-waiver of liability includes a cross-waiver of claims arising from the Convention on International Liability for Damage Caused by Space Objects, which entered into force on September 1, 1972, where the person, entity, or property causing the Damage is involved in Protected Space Operations and the person, entity, or property damaged is damaged by virtue of its involvement in Protected Space Operations.

4. Notwithstanding the other provisions of this Article, this cross-waiver of liability shall not be applicable to:

a. Claims between a Party and its own Related Entity or between its own Related Entities;

b. Claims made by a natural person, his/her estate, survivors, or subrogees (except when a subrogee is a Party to this Agreement or is otherwise bound by the terms of this cross-waiver) for bodily injury to, or other impairment of health of, or death of, such person;

c. Claims for Damage caused by willful misconduct;

d. Intellectual property claims;

e. Claims for Damage resulting from a failure of a Party to extend the cross-waiver of liability to its Related Entities, pursuant to paragraph C.2. of this Article; or

f. Claims by a Party arising out of or relating to another Party's failure to perform its obligations under this Agreement.

5. Nothing in this Article shall be construed to create the basis for a claim or suit where none would otherwise exist.

D. To the extent that activities under this Agreement are not within the definition of "Protected Space Operations," defined above, the following unilateral waiver of claims applies to activities under this Agreement.

1. Partner hereby waives any claims against NASA, its employees, its related entities, (including, but not limited to, contractors and subcontractors at any tier, grantees, investigators, customers, users, and their contractors and subcontractors, at any tier) and employees of NASA's related entities for any injury to, or death of, Partner employees or the employees of Partner's related entities, or for damage to, or loss of, Partner's property or the property of its related entities arising from or related to activities conducted under this Agreement, whether such injury, death, damage, or loss arises through negligence or otherwise, except in the case of willful misconduct.
2. Partner further agrees to extend this unilateral waiver to its related entities by requiring them, by contract or otherwise, to waive all claims against NASA, its related entities, and employees of NASA and employees of NASA's related entities for injury, death, damage, or loss arising from or related to activities conducted under this Agreement.

E. Partner Provided Property

For all property provided by Partner to NASA under this Agreement, the following provisions apply:

1. NASA hereby waives any claims against Partner, its officers, its directors, its employees, its related entities, and its contractors, and subcontractors, and third parties using Partner property, and their employees for any injury to, or death of, NASA employees or the employees of NASA's related entities or contractors generally, or for damage to, or loss of, NASA property or the property of its related entities or contractors or subcontractors arising from or related to the use of any property provided by Partner under this Agreement, whether such injury, death, damage, or loss arises through negligence or otherwise, except in the case of willful misconduct.

2. NASA further agrees to extend this unilateral waiver to its related entities or contractors or subcontractors or third parties using Partner property provided under this Agreement by requiring them, by contract or otherwise, to waive all claims against Partner, its employees, its related entities, and contractors and subcontractors, and their employees for injury, death, damage, or loss arising from or related to the use of any property provided by Partner under this Agreement.

ARTICLE 9. INTELLECTUAL PROPERTY RIGHTS - DATA RIGHTS

A. General

1. "Related Entity" as used in this Data Rights Article, means a contractor, subcontractor, grantee, or other entity having a legal relationship with NASA or Partner that is assigned, tasked, or contracted with to perform activities under this Agreement.

2. “Data” means recorded information, regardless of form, the media on which it is recorded, or the method of recording.
3. “Proprietary Data” means Data embodying trade secrets or commercial or financial information that is privileged or confidential, and that includes a restrictive notice, unless the Data is:
    a. known or available from other sources without restriction;
    b. known, possessed, or developed independently, and without reference to the Proprietary Data;
    c. made available by the owners to others without restriction; or
    d. required by law or court order to be disclosed.
4. “Practical Application,” as used in this Data Rights Article, means to:
    a. manufacture, in the case of a composition or product;
    b. practice, in the case of a process or method; or
    c. operate, in case of a machine or system;

and, in each case, under conditions establishing the invention, hardware, software, or service is being used, and its benefits are publicly available on reasonable terms, as permitted by law.

5. Data exchanged between NASA and Partner under this Agreement will be exchanged without restriction except as otherwise provided herein.
6. Notwithstanding any restrictions provided in this Article, the Parties are not restricted in the use, disclosure, or reproduction of Data provided under this Agreement that meets one of the exceptions in 3., above. If a Party believes that any exceptions apply, it shall notify the other Party before any unrestricted use, disclosure, or reproduction of the Data.
7. The Parties will not exchange preexisting Proprietary Data under this Agreement unless authorized herein or in writing by the owner.
8. If the Parties exchange Data having a notice that the Receiving Party deems is ambiguous or unauthorized, the Receiving Party shall tell the Providing Party. If the notice indicates a restriction, the Receiving Party shall protect the Data under this Article unless otherwise directed in writing by the Providing Party.
9. The Data rights herein apply to the employees and Related Entities of Partner. Partner shall ensure that its employees and Related Entity employees know about and are bound by the obligations under this Article.
10. Disclaimer of Liability: NASA is not restricted in, nor liable for, the use, disclosure, or reproduction of Data without a restrictive notice, or for Data Partner gives, or is required to give, the U.S. Government without restriction.
11. Partner may use the following or a similar restrictive notice:

Proprietary Data Notice

The data herein include Proprietary Data and are restricted under the Data Rights provisions of Space Act Agreement [provide applicable identifying information].

Partner should also mark each page containing Proprietary Data with the following or a similar legend: "Proprietary Data – Use And Disclose Only Under the Notice on the Title or Cover Page."

B. Data First Produced by Partner under this Agreement

1. If Data first produced by Partner or its Related Entities under this Agreement is given to NASA, and the Data is Proprietary Data, and it includes a restrictive notice, NASA will use reasonable efforts to protect it. Partner shall furnish such Data to NASA upon request and NASA may disclose and use such Data (under suitable protective conditions) only for evaluating Partner's performance of its milestones and validating the objectives of CDFF.

2. Upon a successful completion by Partner of all milestones under this Agreement, NASA shall not assert rights in Data first produced by Partner under this Agreement or use such Data for any purpose except that NASA shall retain the right to: (1) maintain a copy of such Data for archival purposes; (2) use or disclose such archived data within the Government for continued validating and updating of the objectives of CDFF; and (3) use or disclose such archived Data by or on behalf of NASA for Government purposes in the event the NASA determines that:

   a. Such action is necessary because Partner, its assignee, or other successor has not taken, or is not expected to take within a reasonable time, effective steps to achieve practical application of inventions, hardware, software, or service related to such Data;

   b. Such action is necessary because Partner, its assignee, or other successor, having achieved practical application of inventions, hardware, software, or service related to such Data, has failed to maintain practical application;

   c. Such action is necessary because Partner, its assignee, or other successor has discontinued making the benefits of inventions, hardware, software, or service related to such Data available to the public or to the Federal Government;

   d. Such action is necessary to alleviate health or safety needs which are not reasonably satisfied by Partner, its assignee, or other successor; or

   e. Such action is necessary to meet requirements for public use specified by Federal regulations and such requirements are not reasonably satisfied by Partner, its assignee, or successor.

   In the event NASA determines that one of the circumstances listed in subparagraphs (a)-(e) above exists, NASA shall provide written notification to the Partner's Administrative Point of Contact. Upon mailing of such determination, Partner shall

have thirty (30) days to respond by providing its objection to the determination as a dispute under the Article entitled "Dispute Resolution" of this Agreement. In the event that Partner does not respond in writing to NASA's determination, then such determination shall serve as a final agency decision for all purposes including judicial review.

3. In the event NASA terminates this Agreement in accordance with Article 16.B, Termination for Failure to Perform, NASA shall have the right to use, reproduce, prepare derivative works, distribute to the public, perform publicly, display publicly, or disclose Data first produced by Partner in carrying out Partner's responsibilities under this Agreement by or on behalf of NASA for Government purposes. The parties will negotiate rights in Data in the event of termination for any other reason.

C. Data First Produced by NASA under this Agreement

1. As to Data first produced by NASA in carrying out NASA responsibilities under this Agreement that would be Proprietary Data if it had been obtained from Partner, such Data will be appropriately marked with a restrictive notice and NASA will use reasonable efforts to maintain it in confidence for five years after its development, with the express understanding that during the aforesaid restricted period such marked Data may be disclosed and used by NASA and any Related Entity of NASA (under suitable protective conditions) only for carrying out NASA's responsibilities under this Agreement, and thereafter for any purpose. Partner will use reasonable efforts not to disclose the Data without NASA's written approval during the restricted period. The restrictions placed on NASA do not apply to Data disclosing a NASA-owned invention for which patent protection is being considered.

2. Upon a successful completion by Partner of all milestones under this Agreement, NASA shall not assert rights in Data first produced by NASA under this Agreement or use such Data for any purpose except that NASA shall retain the right to: (1) maintain a copy of such Data for archival purposes; (2) use or disclose such archived Data within the Government for continued validating and updating of the objectives of CDFF; and (3) use or disclose such archived Data by or on behalf of NASA for Government purposes in the event the NASA determines that:

   a. Such action is necessary because Partner, its assignee, or other successor has not taken, or is not expected to take within a reasonable time, effective steps to achieve practical application of inventions, hardware, software, or service related to such Data;
   b. Such action is necessary because Partner, its assignee, or other successor, having achieved practical application of inventions, hardware, software, or service related to such Data, has failed to maintain practical application;
   c. Such action is necessary because Partner, its assignee, or other successor has discontinued making the benefits of inventions, hardware, software, or service related to such Data available to the public or to the Federal Government;
   d. Such action is necessary to alleviate health or safety needs which are not

reasonably satisfied by Partner, its assignee, or other successor; or

e. Such action is necessary to meet requirements for public use specified by Federal regulations and such requirements are not reasonably satisfied by Partner, its assignee, or successor.

In the event NASA determines that one of the circumstances listed in subparagraphs (a)-(e) above exists, NASA shall provide written notification to the Partner's Administrative Point of Contact. Upon mailing of such determination, Partner shall have thirty (30) days to respond by providing its objection to the determination as a dispute under the Article entitled "Dispute Resolution" of this Agreement. In the event that Partner does not respond in writing to NASA's determination, then such determination shall serve as a final agency decision for all purposes including judicial review.

3. In the event NASA terminates this Agreement in accordance with Article 16.B, Termination for Failure to Perform, NASA shall have the right to use, reproduce, prepare derivative works, distribute to the public, perform publicly, display publicly, or disclose Data first produced by NASA in carrying out NASA's responsibilities under this Agreement by or on behalf of NASA for Government purposes. The parties will negotiate rights in Data in the event of termination for any other reason.

D. Publication of Results

The National Aeronautics and Space Act (51 U.S.C. § 20112) requires NASA to provide for the widest practicable and appropriate dissemination of information concerning its activities and the results thereof. As such, NASA may publish unclassified and non-Proprietary Data resulting from work performed under this Agreement. The Parties will coordinate publication of results allowing a reasonable time to review and comment.

E. Data Disclosing an Invention

If the Parties exchange Data disclosing an invention for which patent protection is being considered, and the furnishing Party identifies the Data as such when providing it to the Receiving Party, the Receiving Party shall withhold it from public disclosure for a reasonable time (one (1) year unless otherwise agreed or the Data is restricted for a longer period herein).

F. Copyright

Data exchanged with a copyright notice and with no restrictive notice is presumed to be published. The following royalty-free licenses apply.

1. If indicated on the Data that it was produced outside of this Agreement, it may be reproduced, distributed, and used to prepare derivative works only for carrying out the Receiving Party's responsibilities under this Agreement.
2. Data without the indication of F.1. is presumed to be first produced under this Agreement. Except as otherwise provided in paragraph E. of this Article, and in the

Invention and Patent Rights Article of this Agreement for protection of reported inventions, the Data may be reproduced, distributed, and used to prepare derivative works for any purpose.

G. Data Subject to Export Control

Whether or not marked, technical data subject to the export laws and regulations of the United States provided to Partner under this Agreement must not be given to foreign persons or transmitted outside the United States without proper U.S. Government authorization.

H. Handling of Background, Third Party Proprietary, and Controlled Government Data

1. NASA or Partner (as Disclosing Party) may provide the other Party or its Related Entities (as Receiving Party):
   a. Proprietary Data developed at Disclosing Party's expense outside of this Agreement (referred to as Background Data);
   b. Proprietary Data of third parties that Disclosing Party has agreed to protect, or is required to protect under the Trade Secrets Act (18 U.S.C. § 1905) (referred to as Third Party Proprietary Data); and
   c. U.S. Government Data, including software and related Data, Disclosing Party intends to control (referred to as Controlled Government Data).
2. All Background, Third Party Proprietary and Controlled Government Data provided by Disclosing Party to Receiving Party shall be marked by Disclosing Party with a restrictive notice and protected by Receiving Party in accordance with this Article.
3. Disclosing Party provides the following Data to Receiving Party. The lists below may not be comprehensive, are subject to change, and do not supersede any restrictive notice on the Data.
   a. Background Data:

      The Disclosing Party's Background Data, if any, will be identified in a separate document.

   b. Third Party Proprietary Data:

      The Disclosing Party's Third Party Proprietary Data, if any, will be identified in a separate document.

   c. Controlled Government Data:

      The Disclosing Party's Controlled Government Data, if any, will be identified in a separate document.

   d. Notwithstanding H.4., NASA software and related Data will be provided to Partner under a separate Software Usage Agreement (SUA). Partner shall use and protect the related Data in accordance with this Article. Unless the SUA authorizes retention, or Partner enters into a license under 37 C.F.R. Part 404, the related

Data shall be disposed of as NASA directs:

[Insert name and NASA Case # of the software; if none, insert "None."]

4. For such Data identified with a restrictive notice pursuant to H.2., Receiving Party shall:
   a. Use, disclose, or reproduce such Data only as necessary under this Agreement;
   b. Safeguard such Data from unauthorized use and disclosure;
   c. Allow access to such Data only to its employees and any Related Entity requiring access under this Agreement;
   d. Except as otherwise indicated in 4.c., preclude disclosure outside Receiving Party's organization;
   e. Notify its employees with access about their obligations under this Article and ensure their compliance, and notify any Related Entity with access about their obligations under this Article; and
   f. Dispose of such Data as Disclosing Party directs.

I. Oral and visual information

If Partner discloses Proprietary Data orally or visually, NASA will have no duty to restrict, or liability for disclosure or use, unless Partner:

1. Orally informs NASA before initial disclosure that the Data is Proprietary Data, and
2. Reduces the Data to tangible form with a restrictive notice and gives it to NASA within ten (10) calendar days after disclosure.

ARTICLE 10. INTELLECTUAL PROPERTY RIGHTS - INVENTION AND PATENT RIGHTS

A. Definitions

1. "Administrator," means the Administrator of the National Aeronautics and Space Administration (NASA) or duly authorized representative.

2. "Patent Representative" means the NASA Johnson Space Center Patent Counsel. Correspondence with the Patent Representative under this clause will be sent to:

   Patent Counsel
   NASA Johnson Space
   Center Mail Code AL
   2101 NASA Parkway
   Houston, TX 77058
   E-mail: JSCLegal@nasa.gov

3. "Invention," means any invention or discovery that is or may be patentable or

otherwise protectable under title 35 of the U.S.C.

4. "Made," in relation to any invention, means the conception or first actual reduction to practice.

5. "Practical Application," means to:

   a. manufacture, in the case of a composition or product;

   b. practice, in the case of a process or method; or

   c. operate, in case of a machine or system;

and, in each case, under conditions establishing the invention is being used, and its benefits are publicly available on reasonable terms, as permitted by law.

6. "Related Entity" as used in this Invention and Patent Rights Article, means a contractor, subcontractor, grantee, or other entity having a legal relationship with NASA or Partner assigned, tasked, or contracted with to perform activities under this Agreement.

7. "Manufactured substantially in the United States" means over fifty percent (50%) of a product's components are manufactured in the United States. This requirement is met if the cost to Partner of the components mined, produced, or manufactured in the United States exceeds fifty percent (50%) percent of the cost of all components (considering only the product and its components). This includes transportation costs to the place of incorporation into the product and any applicable duty (whether or not a duty-free entry certificate is issued). Components of foreign origin of the same class or kind for which determinations under Federal Acquisition Regulation 25.103(a) and (b) exist, are treated as domestic. Scrap generated, collected, and prepared for processing in the United States is considered domestic.

B. Allocation of principal rights

1. *Presumption of NASA title in Partner inventions*

   a. Partner inventions under this Agreement are presumed made as specified in subparagraphs (A) or (B) of 51 U.S.C. § 20135(b)(1). The above presumption is conclusive unless Partner's invention disclosure to the Patent Representative includes a written statement with supporting details, demonstrating that the invention was not made as specified above.

   b. Regardless of whether title to such an invention is subject to an advance waiver or a petition for individual waiver, Partner may still file the statement in B.1.a. The Administrator (or Administrator's designee) will review the information from Partner and any other related information and will notify Partner of his or her determination.

2. *NASA Property rights in Partner inventions* Inventions made under this Agreement where the presumption of paragraph B.1.a. of this Article is conclusive

or when a determination exists that it was made under subparagraphs (A) or (B) of 51 U.S.C. § 20135(b)(1) are the exclusive property of the United States as represented by NASA. The Administrator may waive all or any part of the United States' rights to Partner, as provided in paragraph B.3. of this Article.

3. *Waiver of property rights by NASA*

   a. NASA Patent Waiver Regulations, 14 C.F.R. Part 1245, Subpart 1, use Presidential Memorandum on Government Patent Policy of February 18, 1983 as guidance in processing petitions for waiver of rights under 51 U.S.C. § 20135(g) for any invention or class of inventions made or that may be made under subparagraphs (A) or (B) of 51 U.S.C. § 20135(b)(1).

   b. NASA has determined that to stimulate and support the capability of United States Commercial LEO Destination services to the public and the Federal Government, the interest of the United States would be served by waiving to Partner, in accordance with 51 U.S.C. § 20135(g) and the provisions of 14 C.F.R. Part 1245, Subpart 1, rights to any inventions or class of inventions made by Partner in the performance of work under this Agreement. Therefore, as provided in 14 C.F.R. Part 1245, Subpart 1, Partner may petition, prior to execution of the Agreement or within thirty (30) days after execution, for advance waiver of any inventions Partner may make under this Agreement. If no petition is submitted, or if petition is denied, Partner (or an employee inventor of Partner) may still petition for waiver of rights to an identified subject invention within eight (8) months after disclosure under paragraph E.2. of this Article, or within such longer period if authorized under 14 C.F.R.§ 1245.105. See paragraph J. of this Article for procedures.

4. *NASA inventions*

   a. No invention or patent rights in NASA or its Related Entity's inventions are exchanged or granted under this Agreement except as provided herein.

   b. Upon request, NASA will use reasonable efforts to grant Partner a negotiated license, under 37 C.F.R. Part 404, to any NASA invention made under this Agreement.

   c. Upon request, NASA will use reasonable efforts to grant Partner a negotiated license, under 37 C.F.R. Part 404, to any invention made under this Agreement by employees of a NASA Related Entity, or jointly between NASA and NASA Related Entity employees, where NASA has title.

C. <u>Minimum rights reserved by the Government</u>

1. For Partner inventions subject to a NASA waiver of rights under 14 C.F.R. Part 1245, Subpart 1, the Government reserves:

   a. an irrevocable, royalty-free license to practice the invention throughout the world by or on behalf of the United States or any foreign government under any treaty or agreement with the United States; and

b. other rights as stated in 14 C.F.R. § 1245.107.

2. Nothing in this paragraph grants to the Government any rights in inventions not made under this Agreement.

3. Upon a successful completion by Partner of all milestones under this Agreement, NASA will refrain from exercising its Government Purpose License reserved in paragraph C.l.a. above for a period of five years following the expiration of this Agreement.

4. Nothing contained in this paragraph shall be considered to grant to the Government any rights with respect to any invention other than an invention made under this Agreement.

D. Minimum rights to Partner

1. Partner is granted a revocable, nonexclusive, royalty-free license in each patent application or patent in any country on an invention made by Partner under this Agreement where the Government has title, unless Partner fails to disclose the invention within the time limits in paragraph E.2. of this Article. Partner's license extends to its domestic subsidiaries and affiliates within its corporate structure. It includes the right to grant sublicenses of the same scope if Partner was legally obligated to do so at the time of this Agreement. The license is transferable only with approval of the Administrator except to a successor of that part of Partner's business to which the invention pertains.

2. Partner's domestic license may be revoked or modified by the Administrator but only if necessary to achieve expeditious practical application of the invention where a third party applies for an exclusive license under 37 C.F.R. Part 404. The license will not be revoked in any field of use or geographic area where Partner has achieved practical application and continues to make the benefits of the invention reasonably accessible to the public. A license in any foreign country may be revoked or modified at the discretion of the Administrator if Partner, its licensees, or its domestic subsidiaries or affiliates fail to achieve practical application in that country.

3. Before revocation or modification, Partner will receive written notice of the Administrator's intentions. Partner has thirty (30) days (or such other time as authorized by the Administrator) to show cause why the license should not be revoked or modified. Partner may appeal under 14 C.F.R. § 1245.112.

E. Invention disclosures and reports

1. Partner shall establish procedures assuring that inventions made under this Agreement are internally reported within six (6) months of conception or first actual reduction to practice, whichever occurs first. These procedures shall include the maintenance of laboratory notebooks or equivalent records, other records reasonably necessary to document the conception or the first actual reduction to practice of inventions, and records showing that the procedures were followed. Upon request, Partner shall give

the Patent Representative a description of such procedures for evaluation.

2. Partner shall disclose an invention to the Patent Representative within two (2) months after the inventor discloses it in writing internally or, if earlier, within six (6) months after Partner becomes aware of the invention. In any event, disclosure must be before any sale, or public use, or publication known to Partner. Partner shall use the NASA New Technology Reporting system at http://ntr.ndc.nasa.gov/. Invention disclosures shall identify this Agreement and be sufficiently complete in technical detail to convey a clear understanding of the nature, purpose, operation, and physical, chemical, biological, or electrical characteristics of the invention. The disclosure shall also identify any publication, or sale, or public use of the invention, and whether a manuscript describing the invention was submitted or accepted for publication. After disclosure, Partner shall promptly notify NASA of the acceptance for publication of any manuscript describing an invention, or of any sale or public use planned by Partner.

3. Partner shall give NASA Patent Representative:

   a. Interim reports every twelve (12) months (or longer period if specified by Patent Representative) from the date of this Agreement, listing inventions made under this Agreement during that period, and certifying that all inventions were disclosed (or there were no such inventions) and that the procedures of paragraph E.1. of this Article were followed.

   b. A final report, within three (3) months after completion of this Agreement, listing all inventions made or certifying there were none, and listing all subcontracts or other agreements with a Related Entity containing a Patent and Invention Rights Article (as required under paragraph G of this Article) or certifying there were none.

   c. Interim and final reports shall be submitted at http://ntr.ndc.nasa.gov/.

4. Partner shall provide available additional technical and other information to the NASA Patent Representative for the preparation and prosecution of a patent application on any invention made under this Agreement where the Government retains title. Partner shall execute all papers necessary to file patent applications and establish the Government's rights.

5. Protection of reported inventions. NASA will withhold disclosures under this Article from public access for a reasonable time (1 year unless otherwise agreed or unless restricted longer herein) to facilitate establishment of patent rights.

6. The contact information for the NASA Patent Representatives is provided at http://prod.nais.nasa.gov/portals/pl/new_tech_pocs.html.

F. Examination of records relating to inventions

1. The Patent Representative or designee may examine any books (including laboratory notebooks), records, and documents of Partner relating to the conception or first actual reduction to practice of inventions in the same field of technology as

the work under this Agreement to determine whether:

a. Any inventions were made under this Agreement;

b. Partner established the procedures in paragraph E.1. of this Article; and

c. Partner and its inventors complied with the procedures.

2. If the Patent Representative learns of an unreported Partner invention he or she believes was made under this Agreement, he or she may require disclosure to determine ownership rights.

3. Examinations under this paragraph are subject to appropriate conditions to protect the confidentiality of information.

G. Subcontracts or Other Agreements

1. a. Unless otherwise directed by Patent Representative, Partner shall include this Invention and Patent Rights Article (modified to identify the parties) in any subcontract or other agreement with a Related Entity (regardless of tier) for the performance of experimental, developmental, or research work.

b. For subcontracts or other agreements at any tier, NASA, the Related Entity, and Partner agree that the mutual obligations created herein constitute privity of contract between the Related Entity and NASA with respect to matters covered by this Article.

2. If a prospective Related Entity refuses to accept the Article, Partner:

a. shall promptly notify Patent Representative in writing of the prospective Related Entity's reasons for refusal and other information supporting disposition of the matter; and

b. shall not proceed without Patent Representative's written authorization.

3. Partner shall promptly notify Patent Representative in writing of any subcontract or other agreement with a Related Entity (at any tier) containing an Invention and Patent Rights Article. The notice shall identify:

a. the Related Entity;

b. the applicable Invention and Patent Rights Article;

c. the work to be performed; and

d. the dates of award and estimated completion.

Upon request, Partner shall give a copy of the subcontract or other agreement to Patent Representative.

4. In any subcontract or other agreement with Partner, a Related Entity retains the same rights provided Partner in this Article. Partner shall not require any Related Entity to assign its rights in inventions made under this Agreement to Partner as consideration for awarding a subcontract or other agreement.

5. Notwithstanding paragraph G.4., in recognition of Partner's substantial contribution of funds, facilities or equipment under this Agreement, Partner may, subject to the

NASA's rights in this Article:

a. acquire by negotiation rights to inventions made under this Agreement by a Related Entity that Partner deems necessary to obtaining and maintaining private support; and

b. if unable to reach agreement under paragraph G.5.a. of this Article, request from Patent Representative that NASA provide Partner such rights as an additional reservation in any waiver NASA grants the Related Entity under NASA Patent Waiver Regulations, 14 C.F.R. Part 1245, Subpart 1. Partner should advise the Related Entity that unless it requests a waiver, NASA acquires title to all inventions made under this Agreement. If a waiver is not requested, or is not granted, Partner may then request a license from NASA under 37 C.F.R. Part 404. A Related Entity requesting waiver must follow the procedures in paragraph J. of this Article.

H. Preference for United States manufacture

Products embodying inventions made under this Agreement or produced using the inventions shall be manufactured substantially in the United States. Patent Representative may waive this requirement if domestic manufacture is not commercially feasible.

I. March-in rights

For inventions made under this Agreement where Partner has acquired title, NASA has the right under 37 C.F.R. § 401.6, to require Partner, or an assignee or exclusive licensee of the invention, to grant a nonexclusive, partially exclusive, or exclusive license in any field of use to responsible applicant(s), upon reasonable terms. If Partner, assignee or exclusive licensee refuses, NASA may grant the license itself, if necessary:

1. because Partner, assignee, or exclusive licensee has not, or is not expected within a reasonable time, to achieve practical application in the field of use;
2. to alleviate health or safety needs not being reasonably satisfied by Partner, assignee, or exclusive licensee;
3. to meet requirements for public use specified by Federal regulations being not reasonably satisfied by Partner, assignee, or exclusive licensee; or
4. because the requirement in paragraph H of this Article was not waived, and Partner, assignee, or exclusive licensee of the invention in the United States is in breach of the requirement.

J. Requests for Waiver of Rights

1. Under NASA Patent Waiver Regulations, 14 C.F.R. Part 1245, Subpart 1, an advance waiver may be requested prior to execution of this Agreement, or within thirty (30) days afterwards. Waiver of an identified invention made and reported under this Agreement may still be requested, even if a request for an advance waiver was not made or was not granted.

2. Each request for waiver is by petition to the Administrator and shall include:
   a. an identification of the petitioner, its place of business and address;
   b. if petitioner is represented by counsel, the name, address, and telephone number of counsel;
   c. the signature of the petitioner or authorized representative; and
   d. the date of signature.
3. No specific form is required, but the petition should also contain:
   a. a statement that waiver of rights is requested under the NASA Patent Waiver Regulations;
   b. a clear indication of whether the petition is an advance waiver or a waiver of an individual identified invention;
   c. whether foreign rights are also requested and for which countries;
   d. a citation of the specific section(s) of the regulations under which are requested;
   e. whether the petitioner is an entity of or under the control of a foreign government; and
   f. the name, address, and telephone number of the petitioner's point-of-contact.
4. Submit petitions for waiver to the Patent Representative for forwarding to the Inventions and Contributions Board. If the Board makes findings to support the waiver, it recommends to the Administrator that waiver be granted. The Board also informs Patent Representative if there is insufficient time or information to process a petition for an advance waiver without unduly delaying the execution of the Agreement. Patent Representative will notify petitioner of this information. Once a petition is acted on, the Board notifies petitioner. If waiver is granted, any conditions, reservations, and obligations are included in the Instrument of Waiver. Petitioner may request reconsideration of Board recommendations adverse to its request.

ARTICLE 11. USE OF NASA NAME AND EMBLEMS

A. NASA Name and Initials

Partner shall not use "National Aeronautics and Space Administration" or "NASA" in a way that creates the impression that a product or service has the authorization, support, sponsorship, or endorsement of NASA, which does not, in fact, exist. Except for releases under the "Release of General Information to the Public and Media" Article, Partner must submit any proposed public use of the NASA name or initials (including press releases and all promotional and advertising use) to the NASA Associate Administrator for the Office of Communications or designee ("NASA Communications") for review and approval. Approval by NASA Office of Communications shall be based on applicable law and policy governing the use of the NASA name and initials.

B. NASA Emblems

Use of NASA emblems (i.e., NASA Seal, NASA Insignia, NASA logotype, NASA Program Identifiers, and the NASA Flag) is governed by 14 C.F.R. Part 1221. Partner must submit any proposed use of the emblems to NASA Communications for review and approval.

ARTICLE 12. RELEASE OF GENERAL INFORMATION TO THE PUBLIC AND MEDIA

NASA or Partner may, consistent with Federal law and this Agreement, release general information regarding its own participation in this Agreement as desired.

Pursuant to Section 841(d) of the NASA Transition Authorization Act of 2017, Public Law 115-10 (the "NTAA"), NASA is obligated to publicly disclose copies of all agreements conducted pursuant to NASA's 51 U.S.C. §20113(e) authority in a searchable format on the NASA website within 60 days after the agreement is signed by the Parties. The Parties acknowledge that a copy of this Agreement will be disclosed, without redactions, in accordance with the NTAA.

ARTICLE 13. DISCLAIMERS

A. Disclaimer of Warranty

Goods, services, facilities, or equipment provided by NASA under this Agreement are provided "as is." NASA makes no express or implied warranty as to the condition of any such goods, services, facilities, or equipment, or as to the condition of any research or information generated under this Agreement, or as to any products made or developed under or as a result of this Agreement including as a result of the use of information generated hereunder, or as to the merchantability or fitness for a particular purpose of such research, information, or resulting product, or that the goods, services, facilities or equipment provided will accomplish the intended results or are safe for any purpose including the intended purpose, or that any of the above will not interfere with privately-owned rights of others. Neither the government nor its contractors shall be liable for special, consequential or incidental damages attributed to such equipment, facilities, technical information, or services provided under this Agreement or such research, information, or resulting products made or developed under or as a result of this Agreement.

B. Disclaimer of Endorsement

NASA does not endorse or sponsor any commercial product, service, or activity. NASA's participation in this Agreement or provision of goods, services, facilities or equipment under this Agreement does not constitute endorsement by NASA. Partner agrees that nothing in this

Agreement will be construed to imply that NASA authorizes, supports, endorses, or sponsors any product or service of Partner resulting from activities conducted under this Agreement, regardless of the fact that such product or service may employ NASA-developed technology.

ARTICLE 14. COMPLIANCE WITH LAWS AND REGULATIONS

A. The Parties shall comply with all applicable laws and regulations including, but not limited to, safety; security; export control; environmental; suspension and debarment laws and regulations; and establishing an Interconnection Security Agreement when applicable. Access by a Partner to NASA facilities or property, or to a NASA Information Technology (IT) system or application, is contingent upon compliance with NASA security and safety policies and guidelines including, but not limited to, standards on badging, credentials, and facility and IT system/application access.

B. With respect to any export control requirements:

1. The Parties will comply with all U.S. export control laws and regulations, including the International Traffic in Arms Regulations (ITAR), 22 C.F.R. Parts 120 through 130, and the Export Administration Regulations (EAR), 15 C.F.R. Parts 730 through 799, in performing work under this Agreement. In the absence of available license exemptions or exceptions, the Partner shall be responsible for obtaining the appropriate licenses or other approvals, if required, for exports of hardware, technical data and software, or for the provision of technical assistance.

2. The Partner shall be responsible for obtaining export licenses, if required, before utilizing foreign persons in the performance of work under this Agreement, including instances where the work is to be performed on-site at NASA and where the foreign person will have access to export-controlled technical data or software.

3. The Partner will be responsible for all regulatory record-keeping requirements associated with the use of licenses and license exemptions or exceptions.

4. The Partner will be responsible for ensuring that the provisions of this Article apply to its Related Entities.

C. With respect to suspension and debarment requirements:

1. The Partner hereby certifies, to the best of its knowledge and belief, that it has complied, and shall comply, with 2 C.F.R. Part 180, Subpart C, as supplemented by 2 C.F.R. Part 1880, Subpart C.

2. The Partner shall include language and requirements equivalent to those set forth in subparagraph C.1., above, in any lower-tier covered transaction entered into under this Agreement.

D. Partner shall annually certify the following to the NASA Administrative Contact to this Agreement:

1. Neither Partner nor any of its subcontractors nor partners are presently debarred, suspended, proposed for debarment, or otherwise declared ineligible for award of funding by any Federal agency;

2. Neither Partner nor any of its subcontractors nor partners have been convicted or had a civil judgment rendered against them within the last three (3) years for fraud in obtaining, attempting to obtain, or performing a Government contract;

3. Partner and any of its subcontractors or partners receiving $100,000 or more in NASA funding for work performed under this Agreement have not used any appropriated funds for lobbying purposes prohibited by 31 U.S.C. § 1352; and

4. Partner is an eligible Partner as defined as follows:
An entity organized under the laws of the United States or of a State, which is:

   A. More than 50 percent owned by United States nationals; or

   B. A subsidiary of a foreign company and the Secretary of Transportation finds that –

      (i) Such subsidiary has in the past evidenced a substantial commitment to the United States market through –

         a. Investments in the United States in long-term research, development, and manufacturing (including the manufacture of major components and subassemblies); and

         b. Significant contributions to employment in the United States; and

      (ii) The country or countries in which such foreign company is incorporated or organized, and, if appropriate, in which it principally conducts its business, affords reciprocal treatment to companies described in subparagraph A comparable to that afforded to such foreign company's subsidiary in the United States, as evidenced by –

         a. Providing comparable opportunities for companies described in subparagraph A. to participate in Government sponsored research and development similar to that authorized under Title 51 U.S.C. Chapter 501 (Space Commerce);

         b. Providing no barriers, to companies described in subparagraph A. with respect to local investment opportunities, that are not provided to foreign companies in the United States; and

c. Providing adequate and effective protection for the intellectual property rights of companies described in subparagraph A.

E. Pursuant to The Department of Defense and Full-Year Appropriation Act, Public Law 112-10, Section 1340(a); The Consolidated and Further Continuing Appropriation Act of 2012, Public Law 112-55, Section 539; and future-year appropriations (hereinafter, "the Acts"), NASA is restricted from using funds appropriated in the Acts to enter into or fund any agreement of any kind to participate, collaborate, or coordinate bilaterally with China or any Chinese-owned company, at the prime recipient level or at any subrecipient level, whether the bilateral involvement is funded or performed under a no-exchange of funds arrangement. Partner hereby certifies that it is not China or a Chinese-owned company, and that the Partner will not participate, collaborate, or coordinate bilaterally with China or any Chinese-owned company, at the prime recipient level or at any subrecipient level, whether the bilateral involvement is funded or performed under a no-exchange of funds arrangement.

(a) Definition: "China or Chinese-owned Company" means the People's Republic of China, any company owned by the People's Republic of China, or any company incorporated under the laws of the People's Republic of China.
(b) The restrictions in the Acts do not apply to commercial items of supply needed to perform this agreement. However, Partner shall disclose to NASA if it anticipates making any award, including those for the procurement of commercial items, to China or a Chinese-owned entity.
(c) Subawards – The Partner shall include the substance of this provision in all subawards made hereunder.

In addition to the above certification, Partner shall immediately disclose to the NASA Administrative Contact, for any individual involved in this NASA-funded activity, any current or pending professional and educational affiliations or commitments to China or a Chinese-owned company, including Chinese universities.

F. Regarding INKSNA requirements, Partner shall disclose to NASA if it intends to rely upon Russian entities for development of its CDFF system. Partner shall not subcontract to Russian entities without first receiving written approval from NASA.

(a) Definitions: In this provision:

(1) The term “Russian entities” means:

(A) Russian persons, or

(B) Entities created under Russian law or owned, in whole or in part, by Russian persons or companies including, but not limited to, the following:

(i) The Russian Federal Space Agency (Roscosmos),

(ii) Any organization or entity under the jurisdiction or control of Roscosmos, or

(iii) Any other organization, entity or element of the Government of the Russian Federation.

(2) The term "extraordinary payments" means payments in cash or in kind made or to be made by the United States Government prior to December 31, 2025, for work to be performed or services to be rendered prior to that date necessary to meet United States obligations under the Agreement Concerning Cooperation on the Civil International Space Station, with annex, signed at Washington January 29, 1998, and entered into force March 27, 2001, or any protocol, agreement, memorandum of understanding, or contract related thereto.

(b) This clause implements the reporting requirement in section 6(i) of the Iran, North Korea, and Syria Nonproliferation Act. The provisions of this clause are without prejudice to the question of whether the Partner or its subcontractor(s) are making extraordinary payments under section 6(a) or fall within the exceptions in section 7(1)(B) of the Act. NASA has applied the restrictions in the Act to include funding of Russian entities via U.S. Contractors (Awardees).

(c) (1) The Partner shall not subcontract with Russian entities without first receiving written approval from the NASA Administrative Contact. In order to obtain this written approval to subcontract with any Russian entity as defined in paragraphs (a), the Partner shall provide the NASA Administrative Contact with the following information related to each planned new subcontract and any change to an existing subcontract with entities that fit the description in paragraph (a):

(A) A detailed description of the subcontracting entity, including its name, address, and a point of contact, as well as a detailed description of the proposed subcontract including the specific purpose of payments that will made under the subcontract.

(B) The Partner shall provide certification that the subcontracting entity is not, at the date of the subcontract approval request, on any of the lists of proscribed denied parties, specially designated nationals and entities of concern found at:

BIS's Listing of Entities of Concern (see http://www.bis.doc.gov/index.php/policy-guidance/lists-of-parties-of- concern/entity-list)

BIS's List of Denied Parties (see http://www.bis.doc.gov/index.php/policy- guidance/lists-of-parties-of-concern/denied-persons-list)

OFAC's List of Specially Designated Nationals (see http://www.treasury.gov/resource-center/sanctions/SDN- List/Pages/default.aspx)

List of Unverified Persons in Foreign Countries (see http://www.bis.doc.gov/index.php/policy-guidance/lists-of-parties-of- concern/unverified-list)

State Department's List of Parties Statutorily Debarred for Arms Export Control Act Convictions (see http://pmddtc.state.gov/compliance/debar_intro.html)

State Department's Lists of Proliferating Entities (see http://www.state.gov/t/isn/c15231.htm)

(2) Unless relief is granted by the NASA Administrative Contact, the information necessary to obtain approval to subcontract shall be provided to the NASA Administrative Contact 30 business days prior to executing any planned subcontract with entities defined in paragraph (a).

(d) After receiving approval to subcontract, the Partner shall provide the NASA Administrative Contact with a report every six months that documents the individual payments made to an entity in paragraph (a). The reports are due on July 15th and January 15th. The July 15th report shall document all of the individual payments made from the previous January through June. The January 15th report shall document all of the individual payments made from the previous July through December. The content of the report shall provide the following information for each time a payment is made to an entity in paragraph (a):

(1) The name of the entity

(2) The subcontract number

(3) The amount of the payment

(4) The date of the payment

(e) The NASA Administrative Contact may direct the Partner to provide additional information for any other prospective or existing subcontract at any tier. The NASA Administrative Contact may direct the Partner to terminate for the convenience of the Government any subcontract at any tier with an entity described in paragraph (a), subject to an equitable adjustment.

(f) Notwithstanding FAR 52.216-7, "Allowable Cost and Payments," on or after December 31, 2025, the Partner shall be responsible to make payments to entities defined in paragraph (a) of this provision. Any subcontract with entities defined in paragraph (a), therefore, shall be completed in sufficient time to permit the U.S. Government to make extraordinary payments on subcontracts with Russian entities on or before December 31, 2025.

(g) The Partner shall include the substance of this clause in all its subcontracts, and shall require such inclusion in all other subcontracts of any tier. The Partner shall be responsible to obtain written approval from the NASA Administrative Contact to

enter into any tier subcontract that involves entities defined in paragraph (a).

G. During Agreement performance, Partner shall identify any "covered telecommunications equipment or services" as defined in Section 889(f)(3) of the National Defense Authorization Act of 2019, used as a substantial or essential component of any system, or as critical technology as part of any system, or if Partner is notified of such by a subcontractor at any tier or by any other source, the Partner shall report this in writing to the NASA Administrative Contact in the Agreement, within one business day from the date of such identification or notification.

ARTICLE 15. TERM OF AGREEMENT

This Agreement becomes effective upon the date of the last signature below ("Effective Date") and shall remain in effect for five years from the Effective Date.

ARTICLE 16. RIGHT TO TERMINATE

A. Termination by Mutual Consent

This Agreement may be terminated at any time upon mutual written consent of both Parties.

B. Termination for Failure to Perform

1. At its discretion, NASA may terminate this Agreement 30 days after issuance of a written notification that Partner has failed to perform under this Agreement by failing to meet a scheduled milestone, as identified and described in Appendix 2. Before making such notification, NASA shall consult with Partner to ascertain the cause of the failure and determine whether additional efforts are in the best interest of the Parties. Upon such a notification and determination, NASA will take all rights identified in Articles 9 and 10 of this Agreement.

2. Partner shall not be entitled to any additional payments from the Government due to a termination for failure to meet a milestone. NASA and Partner will negotiate in good faith any other outstanding issues between the Parties. Failure of the Parties to agree will be resolved pursuant to Article 19, Dispute Resolution. Partner shall retain without liability or obligation of repayment all NASA payments made and received as of the date of termination.

C. Unilateral Termination by NASA

1. NASA may unilaterally terminate this Agreement upon written notice in the following circumstances: (a) upon a declaration of war by the Congress of the United States; or (b) upon a declaration of a national emergency by the President of the United States; or (c) upon a NASA determination, in writing, that NASA is required to terminate for

reasons beyond its control. For purposes of this Article, reasons beyond NASA's control include, but are not limited to, acts of God or of the public enemy, acts of the U.S. Government other than NASA, in either its sovereign or contractual capacity (to include failure of Congress to appropriate sufficient funding), fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, or unusually severe weather.

2. Upon receipt of written notification that the Government is unilaterally terminating this Agreement, Partner shall immediately stop work under this Agreement and shall immediately cause any and all of its partners and suppliers to cease work, except to the extent that Partner wishes to pursue this development, or similar projects, exclusively using its own funding. Upon such a termination, NASA and Partner agree to negotiate in good faith a final settlement payment to be made by NASA. However, in no instance shall NASA's liability for termination exceed the total amount due under the next milestone of this Agreement and is subject to the provisions of Article 5. Partner shall retain without liability or obligation of repayment all NASA payments made and received as of the date of termination. Failure of the parties to agree will be resolved pursuant to Article 19, Dispute Resolution.

D. Limitation on Damages

In the event of any termination by NASA, neither NASA nor Partner shall be liable for any loss of profits, revenue, or any indirect or consequential damages incurred by the other Party, its contractors, subcontractors, or customers as a result of any termination of this Agreement. A Party's liability for any damages under this Agreement is limited solely to direct damages, incurred by the other Party, as a result of any termination of this Agreement subject to mitigation of such damages by the complaining party. However, in no instance shall NASA's liability for termination exceed the total amount due under the next milestone under this Agreement.

E. Rights in Property

Partner will have title to property acquired or developed by Partner and its contractors/partners with government funding, in whole or in part to conduct the work specified under this Agreement. In the event of termination of this Agreement for Failure to Perform, NASA may purchase such property as provided in Article 26 below.

ARTICLE 17. CONTINUING OBLIGATIONS

The rights and obligations of the Parties that, by their nature, would continue beyond the expiration or termination of this Agreement, e.g., "Liability and Risk of Loss", "Intellectual Property Rights" related clauses, and "Financial Obligations" shall survive such expiration or termination of this Agreement.

ARTICLE 18. POINTS OF CONTACT

The following personnel are designated as the Points of Contact between the Parties in the performance of this Agreement.

Administrative Points of Contact:

NASA	Partner
Kelly L. Rubio	Alexander McNamee
Contracting Officer	Sr. Contract Administrator
kelly.l.rubio@nasa.gov	amcnamee@blueorigin.com
281-244-7890	(253) 275-1727
NASA JSC, Mail Code BG	Blue Origin
2101 NASA Parkway	21218 76th Ave S
Houston, TX 77058	Kent, WA 98032

Technical Points of Contact:

NASA	Partner
Dennis Stone	Randolph Lillard
Project Executive	Program Manager
dennis.a.stone@nasa.gov	rlillard@blueorigin.com
281-792-5570	(253) 437-9300 x17888
NASA JSC, Mail Code UA	Blue Origin
2101 NASA Parkway	21218 76th Ave S
Houston, TX 77058	Kent, WA 98032

ARTICLE 19. DISPUTE RESOLUTION

Except as otherwise provided in the Article entitled "Intellectual Property Rights – Invention and Patent Rights" (for those activities governed by 37 C.F.R. Part 404), and those situations where a pre-existing statutory or regulatory system exists (e.g., under the Freedom of Information Act, 5 U.S.C. § 552), all disputes concerning questions of fact or law arising under this Agreement shall be referred by the claimant in writing to the appropriate person identified in this Agreement as the "Points of Contact." The persons identified as the "Points of Contact" for NASA and the Partner will consult and attempt to resolve all issues arising from the implementation of this Agreement. If they are unable to come to agreement on any issue, the dispute will be referred to the signatories to this Agreement, or their designees, for joint resolution. If the Parties remain unable to resolve the dispute, then the NASA signatory or that person's designee, as applicable, will issue a written decision that will be the final agency decision for the purpose of judicial review. Nothing in this Article limits or prevents either Party from pursuing any other right or remedy available by law upon the issuance of the final agency decision.

ARTICLE 20. INVESTIGATIONS OF MISHAPS AND CLOSE CALLS

In the case of a close call, mishap or mission failure under this Agreement, the Parties agree to provide assistance to each other in the conduct of any investigation. For all NASA mishaps or close calls, Partner agrees to comply with NPR 8621.1, "NASA Procedural Requirements for Mishap and Close Call Reporting, Investigating, and Recordkeeping" and JPR 8621.1, “Johnson Space Center Mishap Response Plan.”

ARTICLE 21. MODIFICATIONS

Any modification to this Agreement shall be executed, in writing, and signed by an authorized representative of NASA and the Partner.

ARTICLE 22. ASSIGNMENT

Neither this Agreement nor any interest arising under it will be assigned by either Party without the express written consent of the officials executing, or successors, or higher-level officials possessing original or delegated authority to execute this Agreement.

ARTICLE 23. APPLICABLE LAW

U.S. Federal law governs this Agreement for all purposes, including, but not limited to, determining the validity of this Agreement, the meaning of its provisions, and the rights, obligations and remedies of the Parties.

ARTICLE 24. INDEPENDENT RELATIONSHIP

This Agreement is not intended to constitute, create, give effect to or otherwise recognize a joint venture, partnership, or formal business organization, or agency agreement of any kind, and the rights and obligations of the Parties shall be only those expressly set forth herein.

ARTICLE 25. LOAN OF GOVERNMENT PROPERTY

The parties shall enter into a NASA Form 893, *Loan of NASA Equipment*, for NASA equipment loaned to Partner.

ARTICLE 26. TITLE AND RIGHTS IN REAL AND PERSONAL PROPERTY

Partner will have title to property acquired or developed by Partner under this Agreement,

including acquired or developed by Partner for the CDFF effort. In the event of Termination for Failure to Perform under Article 16.B, NASA will have the right to purchase any such property. The Parties will negotiate in good faith purchase prices for specific items of property. The negotiated prices will be based on Partner's actual costs for purchase or development of the specific item(s), or fair market value, whichever is less. This price will then be discounted by a percentage that reflects the ratio of government funding provided under the Agreement versus the amount of Partner funding used to develop the specific item(s) of property. However, NASA shall have no rights in property acquired or purchased by Partner that does not directly derive from NASA funding under this Agreement.

ARTICLE 27. NASA FURNISHED INFORMATION AND SERVICES

A. NASA may, at its sole discretion and on terms to be negotiated between the Parties, provide Partner additional NASA services, technical expertise, or Government Property. Low-level requests, such as for a document, telecon, or Technical Interchange Meeting (TIM) of one day or less duration, may be fulfilled during performance of the SAA. Additional NASA services, technical expertise, or Government Property may be provided on a fully reimbursable basis. Specific services and property will be identified in modifications to this Agreement. Unless NASA specifically requires Partner to use NASA furnished services, technical expertise or Government Property to fulfill its obligations under this Agreement, any decision by Partner to use NASA furnished services, technical expertise or Government Property shall be at Partner's option and sole discretion. Partner shall remain solely responsible for completion of its milestones under this Agreement regardless of the availability or use of such optional NASA services, technical expertise, or Government Property.

B. There is no Government Furnished Property or Services furnished under this Agreement except for those that may be provided in Article 27.A. However, Partner has the ability to enter into separate Space Act agreements with NASA Centers to use NASA resources in performance of this Agreement. The terms and conditions of other Space Act agreements will govern the use of NASA resources not being provided under this Agreement. With each of its subcontractors or partners, including NASA Centers, Partner will be responsible for ensuring timely, accurate work, and replacing such subcontractors or partners, where necessary and appropriate and at the discretion of Partner, in order to meet milestones.

ARTICLE 28. OPTIONS TO EXERCISE ADDITIONAL MATURATION EFFORT

Appendix 2, Milestones and Success Criteria, may include optional milestones regarding Blue Origin's further maturing of its CDFF System. These milestones would be included only as a priced Option to this Agreement and create no obligation for either Party to perform unless NASA decides to extend an offer to exercise the Option and the Parties mutually agree. Should NASA decide to extend such offer, it will provide to Blue Origin written notification of such an intention from the Associate Administrator of Space Operations Mission Directorate (SOMD) or his/her designee no later than 60 days prior to the end of this

Agreement.

ARTICLE 29. SIGNATORY AUTHORITY

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

BY: Kathryn Lueders

Kathryn Lueders
Associate Administrator
Space Operations Mission Directorate

DATE: 12/1/2021

BLUE ORIGIN

BY: Alexander McNamee:A01098000000167C8C7729D000051A1 Digitally signed by Alexander McNamee:A01098000000167C8C7729D000051A1 Date: 2021.11.19 13:49:09 -08'00'

Alexander McNamee
Sr. Contract Administrator

DATE: 19 November 2021

APPENDIX 1:
Executive Summary

For NASA's Commercial LEO Destinations opportunity, the Orbital Reef team will invest in, design, develop, operate, and support an end-to-end, free-flying commercial destination to provide turnkey services for global markets in research, commerce, and human space flight. The Orbital Reef strategic partners are Blue Origin and Sierra Space. Teammates are Boeing, Redwire Space, Amazon, Arizona State University, and Genesis Engineering. Our open architecture contains six destination elements (in development) and four transportation elements (entering operations 2022 – 2026), providing redundant solutions for all essential functions. Our plan emphasizes speed to market, with private backing that attracts capital, focus on emergent customer needs, lean commercial practices, and ISS lessons learned.

Our six destination elements provide zoned utilization, generous volumes, large hatchways, unobstructed Earth views, highly automated operations, extensive functional redundancy, and assembly without spacewalks. Initially, NASA and its partners are the primary customers for research. The Baseline Configuration includes payload accommodations equivalent to 488 Mid-Deck Lockers, stowage equivalent to 950 Cargo Transfer Bags, a modern microgravity research laboratory, experiment airlock, exposed payload locations, external robots, and two methods of conducting extravehicular activity. Orbital Reef supports closed-hatch operations to facilitate NASA exploration simulations of any duration in large volumes with four or more crew and can support co-orbiting systems, including human-scale artificial gravity experiments.

New markets hold significant upside potential, and Orbital Reef is designed to accommodate them. We are leveraging our relationships with dozens of companies, universities, governments, and agencies for research, manufacturing, Earth observation, mission operations support, entertainment, adventure travel, and offworld living. We are cultivating these new markets to flow more resources into the orbital ecosystem. We have the foresight, capacity, and patience to build the modular infrastructure that can catalyze and scale to support growth.

APPENDIX 2:
Participant Milestones

This appendix describes the Orbital Reef program's major milestones. A NASA representative is invited to participate in these events to confirm that each milestone is successfully completed according to its defined criteria. NASA input/feedback to milestone products is welcome and encouraged as part of each milestone.

Milestone 1: Kickoff Meeting The Orbital Reef Program Kickoff Meeting serves to introduce all key program partners and team members. The meeting lays out how the program plans to operate and discusses weaknesses/concerns with the proposed baseline. The meeting is anticipated to last approximately 0.5 days. Meeting materials will be distributed approximately two weeks prior to the meeting. All feedback will be adjudicated by Orbital Reef personnel. **Entrance:** 1. A preliminary agenda and success criteria have been agreed to by the technical leads and the program manager prior to the Kickoff Meeting. 2. Key meeting materials have been distributed prior to the meeting, including summaries/excerpts of Program Management Plan, Systems Engineering Management Plan, Risk Management Plan, Safety & Mission Assurance Plan, and Configuration and Data Management Plan. 3. Program partners and key team members have been selected. **Success:** 1. Program partners and key team members have been introduced and their roles have been defined. 2. The preliminary plans for managing the program effort are reasonable and sound based on the scope of effort. 3. Proposal weaknesses and similar concerns have been openly discussed and are being considered as the program moves forward.	Amount: $1M Date: January 2022
Milestone 2: System Requirements Review (SRR) The SRR evaluates whether the Orbital Reef scope is clearly defined so as to ensure the preliminary project plan/requirements will satisfy the mission. Key products will be distributed for formal feedback around four weeks prior to SRR, with a minimum of two weeks allocated for review of major products. The SRR will summarize each major product and the results of each review. Within three business days after conclusion of the review, the review board will summarize review findings and determine and document any review item discrepancies (RID) or requests for action (RFA). RIDs will require disposition and closeout as approved by the review board. RFAs will be treated as suggestions by the review board that may or may not be reacted to by the program.	Amount: $5M Date: March 2022

Entrance:

1. A preliminary Program SRR agenda, success criteria, and instructions to the review board have been agreed to by the technical leads, the program manager, and the review chair prior to the Program SRR.
2. Top program risks have been identified along with corresponding mitigation strategies.
3. An approach for verifying compliance with program requirements has been defined.
4. A process for controlling changes to program requirements has been defined.
5. Failure tolerance and single point failure philosophy has been established.
6. Technical artifacts at system definition stage of development:
    a. Functional definition, allocation, and decomposition across all segments and all space station elements
    b. Preliminary program requirements (enterprise level), with preliminary verification methods
    c. Preliminary functional definition of external interfaces
    d. Preliminary program technical metrics defined
    e. Baseline requirements specification tree
    f. Preliminary trade study plans
7. Technical products iteratively developed concurrent to system level requirements:
    a. Baseline Concept of Operations, including RF concept of operation
    b. Systems Engineering Management Plan incl. Model Based Systems Engineering Plan and Requirements Management Plan
    c. Baseline Safety & Mission Assurance Plan, including Quality Assurance Plan and methodology for hardware criticality identification
    d. Preliminary Specialty Engineering implementation plans
    e. Preliminary Human Rating Certification Plan (may be included in S&MA Plan)
    f. Baseline Risk Management Plan
    g. Baseline Configuration Management Plan
    h. Preliminary IT System Security Plan
    i. Preliminary Physical Security Plan
    j. Preliminary Human Systems Integration Plan
    k. Preliminary Software Management Plan
    l. Preliminary Logistics and Maintenance Plan
    m. Updated Technology Maturation Plan

Success:

1. Concept of Operations, program requirements, and functional interfaces define the system at sufficient detail to allow traceability and decomposition for SDR.
2. The project utilizes a sound process for the allocation and control of requirements throughout all levels, and a plan has been defined to complete the requirements definition at lower levels within schedule constraints.

3. Identified RF concept of operation can be supported by available spectrum in the US Table of Frequency Allocation. 4. A preliminary approach to verification management has been established. 5. Top risks have been identified with timely mitigation plans in place. 6. TBD and TBR items are clearly identified. 7. Plans define reasonable tailored approaches to move forward with next phase of development. 8. Significant technical and development activities have been defined in preparation for SDR. 9. A RID closure plan has been developed and approved by the review board to adequately address all RIDs.	
Milestone 3: System Definition Review (SDR) The SDR evaluates the credibility and responsiveness of the Orbital Reef architecture against the requirements and the maturity of the system definition. Key products will be distributed for formal feedback around four weeks prior to SDR, with a minimum of two weeks allocated for review of major products. The SDR will summarize each major product and the results of each review. Within three business days after conclusion of the review, the review board will summarize review findings and determine and document any review item discrepancies (RID) or requests for action (RFA). RIDs will require disposition and closeout as approved by the review board. RFAs will be treated as suggestions by the review board that may or may not be reacted to by the program. **Entrance:** 1. All remaining RIDs from SRR have been resolved or are executing to a closure plan that does not impact progress of development for SDR. 2. A preliminary SDR agenda, success criteria, and instructions to the review board have been agreed to by the technical leads, program manager, and review chair prior to the SDR. 3. Top program risks have been identified along with corresponding mitigation strategies, including significant status updates since SRR. 4. Technical artifacts at system review stage of development: a. Updated Functional decomposition to Element level b. Baseline Enterprise level and Segment level requirements, including preliminary verification methods c. Baseline Space Station Element level requirements, including preliminary verification methods d. Baseline Enterprise architecture e. Status of major trade studies f. Preliminary Enterprise level interface definitions, including interfaces with external systems g. Baseline program technical metrics defined with status reported h. Preliminary system safety analysis i. Preliminary system analyses, including RF analysis and technical resource utilization analysis	Amount: $6M Date: July 2022

5. Technical products iteratively developed concurrent to design artifacts at system level: a. Updated Concept of Operations b. Baseline Specialty Engineering implementation plans c. Updated Human Rating Certification Plan (may be included in S&MA Plan) d. Baseline Human Systems Integration Plan e. Preliminary Verification, Validation, and Certification (VV&C) Plan f. Preliminary On-Orbit Assembly Plan g. Preliminary Subcontracts Management Plan, including supply chain risk management strategy h. Preliminary NEPA Compliance Documentation, if necessary i. Baseline IT System Security Plan j. Baseline Physical Security Plan k. Baseline Facilities Plan l. Preliminary International Trade Compliance Plan m. Baseline interface document tree n. Baseline Margin Management Plan o. Baseline Software Management Plan p. RF spectrum needs assessment and plan for analysis and regulatory compliance q. Updated SRR products, as necessary **Success:** 6. The system architecture meets program requirements (including fault tolerances) and falls within required constraints. 7. Technical requirements are allocated to Element level. 8. Program products are at milestone planned maturity. 9. Architecture trade studies are completed for system level, or have an acceptable path forward plan. 10. Architecture supports the single point failure and failure tolerance requirements. 11. Program and technical risks identified with timely mitigation plans in place. 12. TBD and TBR items are clearly identified. 13. Technical work to date meets identified program and industry standards identified in program plans. 14. Strategy and plan for subcontracts management aligns with the technical development schedule. 15. Confirmed guidance on the RF regulatory approval process required for uses of identified spectrum from the regulatory approval authority. 16. Plan for RF analysis and regulatory compliance adheres to regulatory authority guidance and program schedule. 17. Significant technical and development activities have been defined in preparation for PDR. 18. A RID closure plan has been developed and approved by the review board to adequately address all RIDs.	
Milestone 4: Delta System Requirements Review	Amount: $5M

The Delta SRR incorporates new requirements and evaluates whether the updated Orbital Reef requirements are clearly defined so as to assure the preliminary project plan will satisfy the mission. Key products will be distributed for formal feedback around four weeks prior to Delta SRR, with a minimum of two weeks allocated for major product revisions. The Delta SRR will summarize changes to each major product and the results of each product review. Within three business days after conclusion of the review, the review board will summarize review findings and determine and document any review item discrepancies (RID) or requests for action (RFA). RIDs will require disposition and closeout as approved by the review board. RFAs will be treated as suggestions by the review board that may or may not be reacted to by the program. **Entrance:** 1. A preliminary Program Delta SRR agenda, success criteria, and instructions to the review board have been agreed to by the technical leads, the program manager, and the review chair prior to the Program Delta SRR. 2. Top program risks, as impacted by new requirements, have been identified along with corresponding mitigation strategies. 3. Updated approach for verifying compliance with program requirements, if changes required. 4. Updated process for controlling changes to program requirements, if changes required. 5. Updated technical artifacts at system definition stage of development, if impacted by new requirements: a. Updated functional decomposition to Element level b. Updated Enterprise, Segment, and Element level requirements, including preliminary verification methods c. Updated preliminary Enterprise level interface definitions, including interfaces with external systems d. Updated status of program technical metrics e. Updated trade study plans f. Updated preliminary failure tolerance assessment 6. Technical products iteratively developed concurrent to system level requirements, if impacted by new requirements: a. Updated Concept of Operations b. Updated requirements specification tree and interface document tree c. Updates to other SRR products, as necessary **Success:** 1. Concept of Operations, program requirements, and enterprise interfaces define the system at sufficient detail to enable preliminary design activities. 2. Impacts to top risks have been identified with timely mitigation plans in place. 3. TBD and TBR items are clearly identified. 4. Architecture trade studies have an acceptable path forward plan that	Date: September 2022

meets the program design schedule. 5. Program products are at milestone planned maturity. 6. Significant technical and development activities have been defined in preparation for preliminary design activities. 7. A RID closure plan has been developed and approved by the review board to adequately address all RIDs.	
Milestone 5: Creep Test Creep testing is comprised of three sub-scale, integrated-article, critical path tests in order to complete the soft goods certification program for the LIFE module: one short, one medium and one long term test. This milestone marks completion of the medium duration creep test. **Entrance:** 1. Initial short duration subscale creep test completed and successful 2. Test plans and procedures reviewed by test engineering, manufacturing engineering and chief engineer and released in PLM system 3. Test Readiness Review complete 4. Test article passed proof and leak tests 5. Digital image measurement implemented and verified by expert personnel 6. Test article integrated in test setup at test facility with pre-checks complete **Success:** 1. Successful test plan execution determined by type and amount of data collected per test plan. 2. Test data reviewed and compiled by the test team. 3. Incorporated test results into certification plan / database.	Amount: $2M Date: November 2022
Milestone 6: Orbital Reef Financial Report #1 The Orbital Reef Financial Report documents progress on financing, market development, and financial projections. **Entrance:** 1. Internal financial report showing funding commitments through 2023 and plan for program funding through 2024. 2. Updated market projections. 3. Updated pro forma financials. 4. Current orders, revenue recognition, and sales projections. **Success:** 1. Internal financial documents show sufficient funding commitments through 2023 target milestones. 2. Financing Plan that shows funding timeline and approach to fully funding the program through 2024.	Amount: $5M Date: January 2023
Milestone 7: Core Structural Test The Core structural test verifies that the design, manufacturing, and assembly of the Core element primary structure meets requirements with adequate	Amount: $9M Date: March 2023

margin. The core structural test supports validation of the structural models and analytical tools used for the core element structural design. **Entrance:** 1. Analysis performed with applicable FoS per selected design standard and results showing positive margin for all structural design requirements. 2. Peer review of models and analytical tools complete. 3. Test plans and test procedures reviewed and released. 4. Safety review completed. 5. TRR completed and approved by the appropriate stakeholders. **Success:** 1. Successful execution of test plan and procedures and structural test requirements and objectives. 2. Non-destructive evaluation of the Core primary structure post-test to verify structural integrity remained intact. 3. Test Data reviewed and released.	
Milestone 8: Full-Scale Burst Test Full-scale burst tests are critical steps for the soft goods certification of the LIFE module. The tests are required in order to complete the soft goods certification program for the LIFE module structure. The milestone marks completion of the second and final full scale burst test. **Entrance:** 1. Sub-scale burst test complete with demonstrated factor of safety as required per selected design standard 2. Full scale burst GSE acceptance test complete 3. Test plans and procedures reviewed and released 4. Full-scale test article Test Readiness Review complete 5. Both full scale test articles passed proof and leak tests 6. Digital image measurement implemented and verified for each article 7. Test article integrated into test setup for each of two separate tests **Success:** 1. Successful test plan execution determined by type and amount of data collected per test plan. 2. Test data reviewed and compiled by the test team. 3. Incorporated test results into certification plan / database. 4. Test demonstrates design validation.	Amount: $12M Date: September 2023
Milestone 9: Preliminary Design Review (PDR) The PDR demonstrates that the preliminary design meets Orbital Reef requirements with acceptable cost, schedule, and risk. Key products will be distributed for formal feedback around four weeks prior to PDR, with a minimum of two weeks allocated for review of major products. The PDR will summarize each major product and the results of each review. Within three business days after conclusion of the review, the review board will summarize review findings and determine and document any review item	Amount: $20M Date: October 2023

discrepancies (RID) or requests for action (RFA). RIDs will require disposition and closeout as approved by the review board. RFAs will be treated as suggestions by the review board that may or may not be reacted to by the program.

Entrance:

1. All remaining RIDs from SDR and Delta SRR have been resolved or are executing to a closure plan that does not impact progress of development for PDR.
2. A preliminary PDR agenda, success criteria, and instructions to the review board have been agreed to by the technical leads, program manager, and review chair prior to the PDR.
3. All planned lower-level PDRs have been successfully conducted, and all significant findings have been adjudicated and do not impact success criteria of system-level PDR.
4. The Orbital Reef Safety Review Board has reviewed all Phase 1 Hazard Reports.
5. Top program risks have been identified along with corresponding mitigation strategies, including significant status updates since SDR.
6. Technical artifacts at preliminary design stage of development:
    a. Baseline technical requirements, including preliminary verification methods and criteria
    b. Preliminary system and interface design
    c. Status of major trade studies
    d. Status of program technical metrics
    e. Failure Modes Effects and Analysis / Critical Items List
    f. System Reliability Predictions
    g. Software Architecture / Software Design
    h. Preliminary enterprise design analyses, including RF analysis and technical resource utilization analyses
    i. Hardware quality control (nonconformance) data analytics
    j. Prototyping plans established and incorporated into design decisions for risk reduction
    k. Summary of significant Segment, Element, and Subsystem PDR results, including requirement compliance and design status supported by preliminary analyses
7. Technical products iteratively developed concurrent to technical artifacts:
    a. Baseline program design standards
    b. Baseline specialty engineering plans
    c. Updated Concept of Operations
    d. Updated Quality Assurance Plan (may be included within S&MA Plan)
    e. Baseline Payload Safety Process (may be included within S&MA Plan)
    f. Updated Technology Maturation Plan
    g. Updated Human Systems Integration Plan
    h. Preliminary engineering drawing tree
    i. Preliminary Visiting Vehicle Integration Plan
    j. Baseline Visiting Vehicle IRD
    k. Baseline Payload Integration Plan

l. Baseline Payload Test & Verification Process m. Baseline Payload interface documentation n. Updated Human Rating Certification Plan (may be included in S&MA Plan) o. Baseline Verification, Validation, and Certification (VV&C) Plan p. Baseline Model Validation & Accreditation Plan q. Preliminary Orbital Reef (Enterprise level) Test & Integration Plan r. Preliminary Element level transportation plans s. Updated Preliminary On-Orbit Assembly Plan t. Preliminary Operations Training Plan u. Preliminary Flight Operations Plan v. Preliminary Collision Avoidance Plan w. Preliminary Software Test Plan x. Status of NEPA Compliance Documentation y. Updated IT System Security Plan z. Updated Physical Security Plan aa. Baseline Logistics and Maintenance Plan bb. Baseline International Trade Compliance Plan cc. Preliminary regulatory analyses and documentation dd. Preliminary Disposal and Decommissioning Plan ee. Preliminary Range Safety Documentation ff. Preliminary Element level launch site processing plans gg. Updated SDR products, as necessary **Success:** 1. Preliminary design, supported by preliminary analyses, is expected to comply with all technical requirements with adequate margin, or a plan exists to resolve compliance concerns. 2. Requirements trace analysis shows there are no orphan requirements, and all childless requirements contain acceptable childless rationale. 3. Program and technical risks are identified with timely mitigation plans in place, and at acceptable level to proceed to detailed design. 4. The operational concept is technically sound and meets the needs of planned human interactions. 5. Software components meet the success criteria defined by the Software Management Plan standards. 6. The program has demonstrated compliance with applicable requirements, standards, processes, and plans. 7. Safety & Mission Assurance approval that preliminary design is on track to meet system safety and human certification requirements. All significant actions have an agreed-to closure plan that allows the program development to proceed through PDR into detailed design. 8. Technical trade studies are mostly complete, remaining trade studies are identified, plans exist for their closure, and potential impacts are understood. 9. Required new technology has been developed to an adequate state of readiness, or backup options exist and are supposed to make them viable alternatives. 10. Program plans incorporate design for manufacturability into the	

design process. 11. Program products are at milestone planned maturity. 12. TBD and TBR items are clearly identified, with acceptable plans and schedule for closure. 13. Technical work to date meets identified program and industry standards identified in program plans. 14. Plans have been finalized for regulatory licensing documentation. 15. Strategy and plan for subcontracts management aligns with the technical development schedule. 16. Program is executable and ready to continue to detailed design with adequate processes, metrics and controls. The forward work plan establishes the road to CDR. 17. A RID closure plan has been developed and approved by the review board to adequately address all RIDs.	
Milestone 10: Window Demo The Core Window Demonstration verifies that the design, manufacturing, and assembly of the Core element windows meets requirements with adequate margin. The Core window demonstration will be further used to validate the structural models and analytical tools used for window design and fabrication. **Entrance:** 1. Analysis performed with applicable FoS per selected design standard and results showing positive margin. 2. Peer review of models and analytical tools complete. 3. Test plans and test procedures reviewed and released. 4. Safety review completed. 5. TRR completed and approved by the appropriate stakeholders. **Success:** 1. Successful execution of test requirements and objectives. 2. Non-destructive evaluation of the structure post-test to verify structural integrity and window functionality remained intact. 3. Test Data reviewed and released.	Amount: $5M Date: March 2024
Milestone 11: Medium Fidelity Human-in-the-Loop Test Human-in-the-loop testing (HITL) is a critical component of iterative human centric design (HCD) testing that prioritizes crew involvement early and often throughout the design life cycle to assist with pivotal design trade decisions. Iterative HITL testing mitigates risks to crew safety, mission success, cost and schedule due to late design changes. The Medium Fidelity (MedFi) HITL test will employ a mockup containing non-operational prototypes of most major components and volumetric representatives for components not yet prototyped. The MedFi Mockup will be iteratively improved as the fidelity of components and subsystems mature, utilizing pre-CDR components and representation from all crew types as test subjects. Key areas of focus include user preferences for accomplishment of task procedures, usability assessments, workload assessments, and human error assessments. The MedFi HITL Test Results Outbrief will occur approximately four weeks after completion of the test.	Amount: $15M Date: June 2024

Entrance: 1. HSI User acceptance of MedFi Mockup for fidelity and future HITL testing 2. Pre-CDR human-related station-level requirements identified 3. Pre-CDR human-related risks identified 4. MedFi HITL test stakeholders identified 5. Pre-CDR updated HSI Plan 6. MedFi HITL Test Plan complete and distributed to stakeholders 7. MedFi HITL TRR complete 8. Pre-CDR element interior layout complete 9. Pre-CDR station configuration complete 10. Test subjects representative of various crew types identified according to verification plan 11. Pre-CDR user task analysis complete **Success:** 1. MedFi HITL Test Plan has been executed. 2. MedFi HITL recommendations document distributed to design stakeholders. 3. Human-related requirement verification issues identified with acceptable timely mitigation plans identified. 4. MedFi HITL test results outbrief executed.	
Milestone 12: Critical Design Review (CDR) The CDR demonstrates that the detailed design meets Orbital Reef requirements with acceptable cost, schedule, and risk. The program is ready to fabricate, manufacture, code, or otherwise realize the hardware and software. Key products will be distributed for formal feedback around four weeks prior to CDR, with a minimum of two weeks allocated for review of major products. The CDR will summarize each major product and the results of each review. Within three business days after conclusion of the review, the review board will summarize review findings and determine and document any review item discrepancies (RID) or requests for action (RFA). RIDs will require disposition and closeout as approved by the review board. RFAs will be treated as suggestions by the review board that may or may not be reacted to by the program. **Entrance:** 1. All remaining RIDs from PDR have been resolved or are executing to a closure plan that does not impact progress of development for CDR. 2. A preliminary CDR agenda, success criteria, and instructions to the review board have been agreed to by the technical leads, program manager, and review chair prior to the CDR. 3. All planned lower-level CDRs have been successfully conducted, and all significant findings have been adjudicated and do not impact success criteria of system-level CDR. 4. The Orbital Reef Safety Review Board has reviewed all Phase 2 Hazard Reports. 5. Summary status of Enterprise, Segment, and Element verification	Amount: $25M Date: October 2024

activities.

6. Top program risks have been identified along with corresponding mitigation strategies, including significant status updates since PDR.
7. Technical artifacts at detailed design stage of development:
    a. Technical design complies with all requirements, or has documented waivers
    b. Baseline enterprise and interface design documentation, including schematics
    c. Status of major trade studies
    d. Status of program technical metrics
    e. Updated Failure Modes Effects and Analysis / Critical Items List
    f. Updated System Reliability Predictions
    g. Updated Software Architecture / Software Design
    h. Baseline Enterprise design analyses, including RF analysis and technical resource utilization analyses
    i. Hardware quality control (nonconformance) data analytics
    j. Summary of significant Segment, Element, and Subsystem CDR results, including requirement compliance and design status supported by baseline analyses
    k. Status summary of Element Assembly, Integration, and Test (AI&T) activities and plans.
8. Technical products iteratively developed concurrent to technical artifacts:
    a. Updated Concept of Operations
    b. Updated Technology Maturation Plan
    c. Updated Human Systems Integration Plan
    d. Baseline engineering drawing tree
    e. Baseline Visiting Vehicle Integration Plan
    f. Updated Visiting Vehicle IRD
    g. Updated Payload Integration Plan
    h. Updated Payload Test & Verification Process
    i. Updated Payload interface documentation
    j. Updated Human Rating Certification Plan (may be included in S&MA Plan)
    k. Updated Verification, Validation, and Certification (VV&C) Plan
    l. Baseline Orbital Reef (Enterprise level) Test & Integration Plan
    m. Baseline Element level transportation plans
    n. Preliminary Enterprise level and Segment level integrated test plans, per development schedule
    o. Baseline On-Orbit Assembly Plan
    p. Baseline Operations Training Plan
    q. Baseline Flight Operations Plan
    r. Preliminary Flight Operations document list
    s. Preliminary Flight Operations constraints list
    t. Baseline Collision Avoidance Plan
    u. Preliminary command and telemetry list
    v. Baseline Software Test Plan
    w. Status of NEPA Compliance Documentation

x. Updated Logistics and Maintenance Plan, including sparing plan y. Baseline regulatory analyses and documentation, including FCC licenses z. Baseline Range Safety Documentation aa. Updated preliminary Disposal and Decommissioning Plan bb. Baseline Element level launch site processing plans cc. Updated PDR products, as necessary **Success:** 9. Detailed design, supported by baseline analyses, complies with all technical requirements with adequate margin, or a plan exists to resolve compliance concerns or waivers have been approved. 10. Interface documentation is sufficiently mature to proceed toward SIR. 11. Verification, validation, and certification details and plans are complete, or any remaining open items have timely mitigation plans in place. 12. Integration plans are sufficiently mature to proceed beyond CDR. 13. Program and technical risks are identified with timely mitigation plans in place, and at acceptable level to proceed to detailed design. 14. The operational concept reflects the mature design and includes test planning concepts. 15. Software components meet the success criteria defined by the Software Management Plan standards. 16. The program has demonstrated compliance with applicable requirements, standards, processes, and plans. 17. Safety & Mission Assurance approval that detailed design meets system safety and human certification requirements. All significant actions have an agreed-to closure plan that allows the program to proceed through CDR. 18. Program plans incorporate design for manufacturability into the design process. 19. Program products are at milestone planned maturity. 20. Required new technology has been developed to an adequate state of readiness, or backup options exist and are supposed to make them viable alternatives. 21. TBD and TBR items are clearly identified, with acceptable plans and schedule for closure. 22. Technical work to date meets identified program and industry standards identified in program plans. 23. Regulatory approvals are on schedule or have mitigations plans in plan that meet program schedule. 24. Program is executable and ready to continue to detailed design with adequate processes, metrics and controls. The forward work plan establishes the road to SIR. 25. A RID closure plan has been developed and approved by the review board to adequately address all RIDs.	
Milestone 13: Orbital Reef Financial Report #2 The Orbital Reef Financial Report documents progress on financing, market development, and financial projections.	Amount: $5M Date: January 2025

Entrance: 1. Internal financial report showing funding commitments through the full Base Period. 2. Updated market projections. 3. Updated pro forma financials. 4. Current orders, revenue recognition, and sales projections. **Success:** 1. Internal financial documents show sufficient funding commitments through end of Base Period.	
Milestone 14: System Integration Review The SIR demonstrates that the Orbital Reef integration plans and activities will result in a successfully integrated enterprise. Key products will be distributed for formal feedback around four weeks prior to SIR, with a minimum of two weeks allocated for review of major products. The SIR will summarize each major product and the results of each review. Within three business days after conclusion of the review, the review board will summarize review findings and determine and document any review item discrepancies (RID) or requests for action (RFA). RIDs will require disposition and closeout as approved by the review board. RFAs will be treated as suggestions by the review board that may or may not be reacted to by the program. **Entrance:** 1. All remaining RIDs from CDR have been resolved or are executing to a closure plan that does not impact progress of development for SIR. 2. A preliminary SIR agenda, success criteria, and instructions to the review board have been agreed to by the technical leads, program manager, and review chair prior to the SIR. 3. Summary status of enterprise, segment, and element assembly, integration, and test (AI&T) activities. 4. Summary status of enterprise, segment, and element verification activities. 5. Top program risks have been identified along with corresponding mitigation strategies, including significant status updates since CDR. 6. Summary of Failure Review Board metrics and major issues. 7. Summary of significant Element level MRR results. 8. Status summary of Orbital Reef (Enterprise level) test & integration activities. 9. Status summary of visiting vehicle integration activities. 10. Status summary of payload integration activities. 11. Technical artifacts at final design stage of development: a. Status of verification activities b. Status of installation drawing development c. Status of program technical metrics d. Updated System Reliability Predictions e. Updated Hardware quality control (nonconformance) data	Amount: $15M Date: September 2025

analytics 12. Technical products iteratively developed concurrent to technical artifacts: a. Updated engineering drawing tree b. Updated Human Rating Certification Plan (may be included in S&MA Plan) c. Updated Verification, Validation, and Certification (VV&C) Plan d. Updated Orbital Reef (Enterprise level) Test & Integration Plan e. Updated Element level transportation plans f. Baseline Enterprise level and Segment level integrated test plans, per development schedule g. Test Procedures, per development schedule h. Updated On-Orbit Assembly Plan i. Updated Operations Training Plan j. Updated Flight Operations Plan k. Preliminary Operations products l. Baseline command and telemetry list m. Updated Software Test Plan n. Status of NEPA Compliance Documentation o. Updated Logistics and Maintenance Plan p. Updated regulatory analyses and documentation, as required q. Updated preliminary Disposal and Decommissioning Plan r. Updated Element level launch site processing plans s. Updated CDR products, as necessary **Success:** 1. Final design, supported by final analyses, is expected to comply with all technical requirements with adequate margin, or a plan exists to resolve compliance concerns or waivers have been approved. 2. Integration plans provide a reasonable approach to assuring successful integration of the enterprise. 3. Program and technical risks are identified with timely mitigation plans in place, and at acceptable level to proceed to detailed design. 4. The operational concept is technically sound. All operational procedures, flight rules, and other operational products have been identified in preparation for the next program milestone review. 5. Software components meet the success criteria defined by the Software Management Plan standards. 6. The program has demonstrated compliance with applicable requirements, standards, processes, and plans. 7. Program products are at milestone planned maturity. 8. TBD and TBR items are clearly identified, with acceptable plans and schedule for closure. 9. Regulatory licensing activities are progressing as planned. 10. Training requirements are baselined. 11. Program is executable and ready to continue to enter integration, verification, and validation of the flight system with adequate processes, metrics and controls. The forward work plan establishes the road to the next program milestone review.	

12. A RID closure plan has been developed and approved by the review board to adequately address all RIDs.	