

ANNEX  
BETWEEN  
THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION AND  
BLUE ORIGIN, LLC  
UNDER SPACE ACT UMBRELLA AGREEMENT  
NO. 29343, DATED 2/8/2020 (ANNEX NUMBER 19).

ARTICLE 1. PURPOSE

This Annex shall be for the purpose of allowing partner to access NASA White Sands Test Facility's (WSTF) expertise and capabilities for materials, fluids and component testing, goods, services, and analysis in NASA-STD-2007-213740 Guide for Oxygen Compatibility Assessments on Oxygen Components and Systems / NASA-STD-6001 Flammability, Offgassing, and Compatibility Requirements and Test Procedures and related consensus methodology standard testing (such as NASA-STD-6016 or TP-WSTF-629 Navy Submarine Atmosphere Material Control Protocol). WSTF's Oxygen and Standard Testing core capability has evaluated materials for spacecraft safety for more than 30 years maintaining vast hazard evaluation experience. NASA WSTF possesses unique testing facilities, unique custom analysis and interpretation capabilities, as well as unique NASA Materials and Processing (M&P) certification. WSTF is the only oxygen, propellant, and NASA-STD-6001 materials and component test facility and these services are not available in the commercial marketplace.

The legal authority for this Annex, consistent with the Umbrella Agreement, is in accordance with the Space Act, Other Transactions Authority (OTA), 51 U.S.C. § 20113(e).

ARTICLE 2. RESPONSIBILITIES

A. NASA WSTF will use reasonable efforts to:

Standard Testing:

1. Review Partner data package(s) on proposed test articles and concur with shipping the test article(s) to WSTF.
2. When necessary, conduct a pre-test meeting with the Partner Technical Point of Contact to review the Test Request (WSTF Form 514) and obtain Partner approval. Test schedule will not initiate until all requirements are finalized and approved.
3. Perform tests in accordance with NASA-STD-6001B and per environmental conditions and special considerations stipulated in the Test Request (WSTF Form 514). Additional tests may be performed upon Partner's request and provision of additional advance

funding in accordance with Article 5 of the Umbrella and this Annex. Reporting of test data will be spaced at least one (1) week apart. The conditions for each test include:

a. WSTF will notify Partner of any identified issues with the test articles that may affect test results or do not comply with NASA STD-6001B requirements. WSTF will prepare samples upon request by the Partner. Utilization of preparation services may reduce the number of tests allowed under this agreement. Test schedule will not initiate until sample preparation is complete and samples are deemed acceptable by WSTF. If samples are not deemed acceptable by WSTF testing may proceed if approved by the Partner Technical Point of Contact for test. Testing of samples not deemed acceptable may result in non NASA-STD-6001B compliant data.

b. If there is an initial indication of poor performance, NASA WSTF will stop further work and notify the Partner Technical Point of Contact for further direction. Testing will not resume until Partner has provided written authorization (email is acceptable). Delays incurred in obtaining direction will be in addition to the negotiated test schedule. Poor performing examples include, for NASA STD 6001 Test 7, an initial "dirty" assessment and for NASA STD 6001 Test 1, sample failure. In the case of offgas toxicity, testing is estimated for a relatively clean to medium level analysis. In the case that a material or component receives an initial "dirty" assessment WSTF will provide delta estimate for cost of additional involved analysis if the partner wishes to proceed with full interpretation. Complex interpretation associated with materials and components assessed as "dirty" for offgas testing will require an extended schedule.

c. If overtime hours are required to meet the schedule, NASA WSTF will notify Partner and obtain written approval (email is acceptable) prior to initiating work. Utilization of overtime may reduce the number of tests performed under this Annex.

4. If applicable, provide notification of poor performing samples assessment. Provide final test data and report. Upon Partner request, return any remaining test articles upon completion of each test, otherwise dispose of appropriately.

5. Provide monthly status to the Partner Technical Point of Contact during testing activity. Notification will be provided upon completion of each test.

6. Document and confirm via email any verbal requests or approval provided to Partner by NASA. NASA will provide the email to the Partner Technical Point of Contact in a timely fashion.

Particle Impact Testing:

7. Collaborate with Partner to determine testing materials, matrix, and conditions relating to particle impact testing.

8. Execute Particle Impacts on customer supplied materials per agreed matrix and conditions.

9. Provide Partner with video and data files from the Particle Impacts executed under this Annex.

B. Partner will use reasonable efforts to:

Standard Testing:

1. For each requested test series, provide completed Test Request WSTF Form 514 and prepared test articles. The articles will include material identification and Safety Data Sheets (SDS). The quantity of test articles will be sufficient to meet NASA-STD-6001B Table 3 minimum quantities although additional material and or components are always preferred. Partner will coordinate with WSTF for Use-Simulation testing minimum required material quantities.

2. When necessary, support pre-test meetings with NASA WSTF. Test schedule will not initiate until all requirements are finalized and approved on the WSTF Form 514.

3. Provide sample acceptance input. If articles are not deemed acceptable by WSTF, testing may proceed if approved in writing (email is acceptable) by Partner Technical Point of Contact, but may result in non NASA-STD-6001 compliant data.

4. Provide direction on whether or not to proceed with interpretation or additional testing if a poor initial high level assessment has been obtained.

5. Document and confirm via email any verbal requests or approvals given to NASA by Partner. Partner will provide the email to the NASA Technical Point of Contact in a timely fashion.

6. If desired, request return of any remaining samples.

Particle Impact Testing:

7. Submit a request for Particle Impacts and collaborate with NASA to determine testing materials, matrix, and conditions.

8. Receive test video and data from the Particle Impacts executed under this Annex.

### ARTICLE 3. SCHEDULE AND MILESTONES

The planned major milestones for the activities for this Annex defined in the "Responsibilities" Article are as follows:

Partner will deliver Test Request (WSTF Form 514) and SDS for each test and necessary Pre-Test Meeting.	Minimum 3 weeks prior to test start
Partner will deliver acceptable test articles or WSTF sample preparation will be completed.	2 weeks prior to test start
NASA will perform and complete test once established requirements are properly met.	Within 2 weeks of test initiation
If requested by partner, WSTF provides initial high-level performance assessment.	Within 3 weeks of test initiation
WSTF provides final test data report. Reporting of test data will be spaced at least 1 week apart.	Within 4 weeks of test completion
If requested, WSTF provides e-mail / verbal status of testing and reporting	Monthly
If desired, Partner will request and WSTF will return remaining test samples to Partner. Otherwise, samples will be disposed of as appropriate by WSTF.	Within 1 month of final test data report
Partner and WSTF to determine materials, conditions, and test matrix for Particle Impact and Friction testing and components, and components, conditions and test matrix for Pneumatic Impact testing.	Complete at time determined and agreed upon by WSTF and Partner based on size and complexity of test matrix and conditions
WSTF conducts particle impact and friction testing on Partner-specified materials and pneumatic impact on Partner-specified components per agreed testing matrix and conditions.	Complete at time determined and agreed upon by WSTF and Partner based on size and complexity of test matrix and conditions
WSTF Transmittal of Particle Impact, Friction and Pneumatic Impact data to Partner.	(2) two weeks after testing is concluded

#### ARTICLE 4. FINANCIAL OBLIGATIONS

A. Partner agrees to reimburse NASA an estimated cost of \$695,424.77 for NASA to carry out its responsibilities under this Annex.

The Partner agrees to make advance payment to NASA dependent upon the training being requested. Advance payments will be scheduled to ensure that funds are resident with NASA before Federal Obligations are incurred in support of this Agreement.

Each payment shall be marked with JSC, WSTF, SAA-RA-22-29343, Annex 19; RAN 3529.

B. NASA will not provide services or incur costs beyond the current funding. Although NASA has made a good faith effort to accurately estimate its costs, it is understood that NASA provides no assurance that the proposed effort under this Annex will be accomplished for the estimated amount. Should the effort cost more than the estimate, Partner will be advised by NASA as soon as possible. Partner shall pay all costs incurred and have the option of canceling the remaining effort, or providing additional funding in order to continue the proposed effort under the revised estimate. Should this Annex be terminated, or the effort completed at a cost less than the agreed-to estimated cost, NASA shall account for any unspent funds within one year after completion of all effort under this Annex, and promptly thereafter, at Partner's option return any unspent funds to Partner or apply any such unspent funds to other activities under the Umbrella Agreement. Return of unspent funds will be processed via Electronic Funds Transfer (EFT) in accordance with 31 C.F.R. Part 208 and, upon request by NASA, Partner agrees to complete the Automated Clearing House (ACH) Vendor/Miscellaneous Payment Enrollment Form (SF 3881).

#### ARTICLE 5. INTELLECTUAL PROPERTY RIGHTS - DATA RIGHTS

A. Data produced under this Annex which is subject to paragraph C. of the Intellectual Property Rights - Data Rights Article of the Umbrella Agreement will be protected for the period of two years.

B. Under paragraph H. of the Intellectual Property Rights - Data Rights Article of the Umbrella Agreement, 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 provided.

1. Background Data:

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

2. Third Party Proprietary Data:

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

3. Controlled Government Data:

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

4. The following software and related Data will be provided to Partner under a separate Software Usage Agreement:

None

#### ARTICLE 6. TERM OF ANNEX

This Annex becomes effective upon the date of the last signature below ("Effective Date") and shall remain in effect until the completion of all obligations of both Parties hereto, or one year from the Effective Date, whichever comes first, unless such term exceeds the duration of the Umbrella Agreement. The term of this Annex shall not

exceed the term of the Umbrella Agreement. The Annex automatically expires upon the expiration of the Umbrella Agreement.

ARTICLE 7. RIGHT TO TERMINATE

Either Party may unilaterally terminate this Annex by providing thirty (30) calendar days written notice to the other Party.

ARTICLE 8. POINTS OF CONTACT

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

Technical Points of Contact

NASA White Sands Test Facility  
Virginia Ward  
Materials and Processes Engineer  
NASA/White Sands Test Facility  
Materials and Components Laboratories  
Phone: 575-524-5459  
jennie.ward@nasa.gov

BLUE ORIGIN, LLC  
Chris Ramsay  
Senior Manager, Procurement  
21218 76th Avenue S  
Kent , WA 98032-2442  
Phone: 253-437-4451  
cramsay@blueorigin.com

ARTICLE 9. MODIFICATIONS

Any modification to this Annex shall be executed, in writing, and signed by an authorized representative of NASA and the Partner. Modification of an Annex does not modify the terms of the Umbrella Agreement.

ARTICLE 10. SIGNATORY AUTHORITY

The signatories to this Annex covenant and warrant that they have authority to execute this Annex. By signing below, the undersigned agrees to the above terms and conditions.

NATIONAL AERONAUTICS AND  
SPACE ADMINISTRATION  
WHITE SANDS TEST FACILITY

BLUE ORIGIN, LLC

BY: \_\_\_\_\_  
Jason Noble  
Director, White Sands Test Facility

BY: \_\_\_\_\_  
Stephanie Tiburzio                      Jessica Curry  
Supply Chain Manager                  Sr. Manager,

DATE: \_\_\_\_\_

DATE: 10/24/2022  
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