ANNEX
BETWEEN
THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION AND
BLUE ORIGIN, LLC
UNDER SPACE ACT UMBRELLA AGREEMENT
NO. SAA-RA-22-36236 (ANNEX NUMBER 1).

ARTICLE 1. PURPOSE

This Annex shall be for the purpose of providing Blue Origin (Partner) training support as requested in the following areas: NASA/WSTF Composite Overwrapped Pressure Vessels (COPV) Damage Detection Course (DDC), Blast and Fragmentation (B&F) Course, NASA Safety Training Center Course 0055, "Hypergol Systems: Design, Build, Operation" and the training course entitled, "Fire Hazards in Oxygen Systems". The COPV DDC and B&F courses will advance Blue Origin's understanding of COPVs and Blast and Fragmentation analysis for future safety and mission assurance of their launch vehicle and support infrastructure.

The "Composite Overwrapped Pressure Vessel (COPV) Damage Detection" (COPV DDC) course is a specialized course approved by NASA Materials & Processes (M&P), NASA Engineering Safety Center (NESC), NASA Safety & Mission Assurance (S&MA), and Range Safety and designed to meet accepted industry standards. The COPV DDC is a unique capability since NASA's White Sands Test Facility (WSTF) developed the data generated for the DDC. WSTF applies state-of-the-art nondestructive evaluation (NDE) and evaluates the results. WSTF designed and built the test facilities used in the production of the data and aids in the evaluation and implications of the results. Students of the DDC learn to detect visual damage on aerospace and commercial COPVs through lecture and hands-on-training. This collection of various flight-rated and commercial COPVs exist only at WSTF. COPV requirements prompting the DDC are levied in AIAA-S-O81 Space Systems – Composite Overwrapped Pressure Vessels (COPVs), KNPR 8715.3 Kennedy NASA Procedural Requirements and AFSPACEMAN 91-710 Range Safety User Requirements Manual Volume 3 –Launch Vehicles, Payloads, and Ground Support Systems. NASA/WSTF provides this training, which is not available in the commercial marketplace

The "Blast and Fragmentation" course is uniquely designed by NASA/WSTF personnel to provide education on how to manage the over-pressurization and fragmentation effects resulting from large amount of storage energy from chemical, cryogenic and/or pressurized systems. All companies that are involved in developing space flight systems with potential catastrophic outcomes require unique material and component selection. The "Blast and Fragmentation" course gives unique emphasis to flight and sensitive/reactive system material and component applications not provided outside of government offerings. Commercial courses covering the general topics of blast and fragmentation may be available; however, there are no commercial courses that cover the effects of over-pressurization and fragmentation on pressure vessels for aerospace applications.

The "Hypergolic Systems: Design, Build, and Operation" course provides specific, in-depth knowledge of hypergol systems with unique emphasis on flight and sensitive/reactive system applications. Safe use of hypergols, identification of hazards associated with hypergols such as toxicity, reactivity, fire, and explosion, risk management to include engineering controls, personal protective equipment, and detectors/monitors are discussed. The goals of the course are to increase safety awareness, provide useful information and references, and enable attendees to identify and evaluate typical hazards of hypergols and hypergol systems. This course was developed by personnel at WSTF and is intended for customers designing, building, operating, and maintaining hypergol systems as well as those professionals involved in monitoring and evaluating the operation of hypergol systems.

The "Fire Hazards in Oxygen Systems" course provides specific knowledge regarding: (1) the fire hazards associated with oxygen; (2) material evaluation and selection for use in oxygen-enriched environments, assessment of ignition mechanisms for oxygen components and oxygen systems; (4) and evaluation of consequences of ignition in oxygen systems. The WSTF team developed oxygen-related training courses for managers, engineers, and technicians that have been taught to NASA engineers, NASA astronauts, international astronauts, other US government, and industrial customers throughout the world. The course provides guidance for safely designing and operating oxygen systems for both space flight and ground applications.

Courses provided by NASA/WSTF cover in-depth material related to the Partner's specific hardware applications with a unique emphasis on both flight and sensitive and reactive systems that is not available through commercially provided courses on general topics. Partners developing or applying hardware to space flight or other sensitive and potentially catastrophic applications require unique flight and ground application, specific training 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

NASA will use reasonable efforts to:

1. Coordinate with Blue Origin to determine the training, dates, schedule, location and method in which classes will be delivered. Class attendance will be limited to 20 students per training session for the COPV DDC, B&F, Hypergol Systems training courses and up to 30 students for the Oxygen Systems training course.
2. Provide instructors to teach the following courses:
a. Blast and Fragmentation
b. Composite Overwrapped Pressure Vessel (COPV) Damage Detection
c. Hypergol Systems: Design, Build, Operation

d. Fire Hazards in Oxygen Systems
e. Any required official travel will be in accordance with Federal Travel Regulations and NASA Travel Policies.
3. Review, update and edit course curriculum.
4. Provide course materials and coordinate shipping of training materials (course books, inspection articles (COPV DDC), etc.) to the training facility.
5. Provide Certificates of Completion for the COPV DDC course to Partner POC for all students who meet the qualifications for course completion after course completion.
6. Enter all names of students who received "Certificates of Completion" for the COPV DDC course into the WSTF COPV DDC database.

BLUE ORIGIN will use reasonable efforts to:

1. Submit a request for training to NASA WSTF.
2. Provide funds no later than 4 weeks before the start of scheduled training date.
3. Coordinate with WSTF to determine the training, dates, schedule and location of the training classes.
4. Identify and secure the training facility
5. Provide training facilities that meet WSTF's requirements to be able to conduct training. This includes tables, chairs and audio/video (A/V) equipment for presentations (in the form of PowerPoint). Adequate visual inspection lighting (50 candle watt (CW)) will also be needed at the training facility/location. The training location will need to be secured one-half day before training dates and for the evening after the last day to allow for course preparation (unpacking and packing) of training material.
6. Training facility shall be secured in such a way that training material may be left unattended after initial set-up and until course material pack-up.
7. Return/ship all inspection articles to WSTF within one week after course completion.
8. Identify and manage attending student(s) for the training.
9. Provide lists of class attendees prior to course beginning, including nationality if non-U.S. citizens. The B&F, Oxygen Systems training and Hypergolic training do not have ITAR approval and will be limited to US citizens only.

ARTICLE 3. SCHEDULE AND MILESTONES

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

WSTF and Blue Origin will coordinate training, schedule date(s)and locations of requested training after NASA WSTF receives a request for training from Blue Origin.	Within 1 month of agreed upon training
WSTF will review and edit course curriculum and ship materials to Partner	Within 1 week of scheduled training
Partner will accept/receive and secure all training materials	Upon receipt of training

	materials and until returned to NASA
Partner will provide secure training facility per WSTF's requirements	1/2 day before and through duration of course
WSTF will provide instructor(s) and, if required, travel to agreed upon training location. WSTF will provide training.	Per scheduled training
Partner will coordinate and ship inspection articles back to WSTF	Within 1 week after training
WSTF will send "Certificates of Completion" to Partner POC and enter appropriate attendees name(s)in WSTF training database (COPV DDC only)	Within 4 weeks of course completion

ARTICLE 4. FINANCIAL OBLIGATIONS

A. Partner agrees to reimburse NASA an estimated cost of $210,691.13 for NASA to carry out its responsibilities under this Annex.

The Partner agrees to reimburse NASA an initial payment of $32,670.78. Subsequent 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-36236, Annex 1; RAN 3520.

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
Stephen Peralta
Flight Systems Test Engineer
Mail Suite: RF111
12600 NASA Road
Las Cruces, NM 88012

BLUE ORIGIN, LLC
Tony Chung
Materials and Process Engineer
21218 76th Avenue S
Kent , WA 98032-2442
Phone: 253-437-9300 x15997

Phone: 575-524-5561 dchung@blueorigin.com
Stephen.f.peralta@nasa.gov

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

BY: JASON NOBLE Digitally signed by JASON NOBLE Date: 2022.06.24 06:17:37 -06'00'
Jason E. Noble
Director, White Sands Test Facility

DATE:

BLUE ORIGIN, LLC

BY: DocuSigned by: Wade Davis 19390BCCEC5D489...
Wade Davis
Senior Commercial Advisor

DATE: 6/21/2022 | 1:41 PM PDT