

ANNEX NO. 1  
UNDER  
SPACE ACT UMBRELLA AGREEMENT SAA1-38941  
BETWEEN  
THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  
LANGLEY RESEARCH CENTER  
AND  
SIERRA SPACE CORPORATION  
FOR  
COLLABORATION ON DEVELOPMENT OF CERAMIC MATRIX COMPOSITE  
STRUCTURES FOR REENTRY VEHICLES.

ARTICLE 1. PURPOSE

This Annex shall be for the purpose of NASA Langley Research Center (LaRC) and Sierra Space collaboration on the design and fabrication of ceramic matrix composite (CMC) structural elements and test articles for structural test and finite element validation.

Both LaRC and Sierra Space have a strong interest in reusable reentry vehicles. The application of ceramic matrix composites (CMC) on reentry vehicles is anticipated to withstand the elevated temperatures associated with the hypersonic flight environments, while reducing operational costs due to reusability of the thermal protection systems (TPS) and increased performance through mass savings. Reduced cost and increased performance are key metrics for both LaRC and Sierra Space. Due to a common interest and complementary capabilities, LaRC and Sierra Space will collaborate on the development of ceramic matrix composite (CMC) hot structures for reentry vehicles.

Specifically, Sierra Space has an interest in developing reusable CMC hot structures for future variants of the Dream Chaser Space Plane. LaRC is currently performing applied research in this area, specifically on the development of CMC control surfaces. LaRC and Sierra Space will collaborate on the design and fabrication of CMC structural elements and test articles for structural assessment and testing and finite element validation.

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 LaRC will use reasonable efforts to:

1. Collaborate with Sierra Space for purposes of designing, developing and assessing CMC structural elements applicable to atmospheric reentry vehicles.

2. Provide information on the material pedigree used in construction of relevant design elements.
3. Collaborate with Sierra Space in the development of test plans for structural testing.
4. Provide Sierra Space with test articles for structural test.
5. Collaborate with Sierra Space on data analysis, material assessment and documentation as agreed upon.

B. Partner will use reasonable efforts to:

1. Provide NASA LaRC with design data and concepts for reentry vehicles to assist the assessment of CMC technologies.
2. Collaborate with NASA LaRC for purposes of designing and developing CMC design elements applicable to atmospheric reentry vehicles.
3. Collaborate with NASA LaRC in the development of test plans for structural testing.
4. Execute structural testing of provided design elements and provide real time test data to NASA LaRC for evaluation.
5. Collaborate with NASA LaRC on data analysis, material assessment and documentation as agreed upon.
6. Ship test articles to NASA LaRC upon conclusion of testing.

### ARTICLE 3. SCHEDULE AND MILESTONES

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

NASA LaRC and Sierra Space to collaborate in the design and development of test articles.	Within one month of execution of Agreement
NASA LaRC and Sierra Space to collaborate in the development of test plans for structural testing.	Within two months of Milestone 1
NASA LaRC to provide test articles to Sierra Space for testing.	No less than three weeks prior to testing
Sierra Space to conduct structural testing of NASA LaRC test articles and provide real time data and review concurrent with testing.	By no later than August 1, 2025
Sierra Space to ship test articles to NASA LaRC upon conclusion of testing.	By no later than September 30, 2025
NASA LaRC and Sierra Space to collaborate on data analysis, material assessment and documentation.	As needed throughout the period of performance.

### ARTICLE 4. FINANCIAL OBLIGATIONS

There will be no transfer of funds between the Parties under this Agreement and each Party will fund its own participation. 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 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.
1. Third Party Proprietary Data:  
The Disclosing Party's Third Party Proprietary Data, if any, will be identified in a separate technical document.
2. Controlled Government Data:  
The Disclosing Party's Controlled Government Data, if any, will be identified in a separate technical document.
6. 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 three years 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.

Management Points of Contact

NASA Langley Research Center  
Jennifer Hubble-Viudez  
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Langley Research Center  
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Principal Investigator Points of Contact

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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  
LANGLEY RESEARCH CENTER

SIERRA SPACE CORPORATION

BY: \_\_\_\_\_  
John H. Koelling  
Director, Aeronautics Research  
Directorate

BY: \_\_\_\_\_  
Nick Vera  
Sr. Contracts Manager

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

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