

ANNEX NO. 7  
UNDER  
SPACE ACT UMBRELLA AGREEMENT SAA2-403514  
BETWEEN  
THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  
LANGLEY RESEARCH CENTER  
AND  
NORTHROP GRUMMAN CORPORATION  
FOR  
RAMJET INLET DEVELOPMENT

ARTICLE 1. PURPOSE

This Annex shall be for the purpose of evaluation of Inlet performance to support Ramjet Inlet development. The test article will utilize the 4-Foot Supersonic Unitary Plan Wind Tunnel facility. This facility offers advantageous testing capabilities including a large test section, variable density, and continuous supersonic flow. Similar capabilities within the U.S. commercial market do not exist in combination, making UPWT unique for testing within the supersonic testing regime. The tests and its data will be leveraged to serve as risk reduction effort and inform future design decisions.

This effort supports NASA’s 2022 Strategic Goal 3.2 to “Drive Efficient and Sustainable Aviation.”. Additionally, this effort is highly synergistic with Objective Strategy 3.2, which states “through high-risk, high-reward research and technology development, NASA seeks to enable safe and efficient growth in global operations and innovation in commercial supersonic aircraft”.

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. Calibrate the Unitary Tunnel Test Facility at the test condition specified by Partner.
2. Provide support including instrumentation support and model mounting, hardware changes and removal at completion of tests.
3. For NG Inlet Phase I: Provide 64 Run hours of integration and testing at the Unitary Tunnel, in a 2-week period.
4. For NG/RTX Inlet Phase II: Provide 60 run hours of integration and testing at the Unitary Tunnel in a 2- week period
5. Deliver a copy of test data to Northrop Grumman after each test and completion of the final test program.

B. Partner will use reasonable efforts to:

1. Provide the test article and deliver to Langley. Assemble and instrument the test article, install parametric hardware in-between each test and remove and ship to NG Ronkonkoma site at completion of tests.
2. Provide a model stress report meeting the requirements of LPR 1710.15 Rev. J., Wind Tunnel Model Systems Criteria.
3. Provide a Test Plan which outlines test conditions, objectives, instrumentation requirements, and facility requirements.
4. Provide test article and associated hardware and test specifications for NASA LaRC testing.
5. Provide on-site engineering support.

### ARTICLE 3. SCHEDULE AND MILESTONES

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

- |   |   |
|---|---|
| 1. Partner shall finalize and provide hardware test specifications to NASA LaRC.                              | No later than four (4) weeks prior to test start date               |
| 2. Partner shall ship the test article and associated hardware to NASA LaRC.                                  | No later than two (2) weeks prior to test start date                |
| 3. Partner shall provide Test Plan and Model Systems Report to NASA LaRC.                                     | Within six (6) weeks of test start date                             |
| 4. NASA LaRC will conduct tests of wind tunnel testing.   | Dependent on tunnel availability. Expected to be Q2 of 2024.        |
| 5. NASA LaRC will provide quick-look test data to inform decisions of next test.                              | Within 4 hours after completion of each test                        |
| 6. NASA LaRC will provide Partner a copy of all data gathered during wind tunnel testing of the test article. | Within thirty (30) days after completion of the final test program. |

### ARTICLE 4. FINANCIAL OBLIGATIONS

A. Partner agrees to reimburse NASA an estimated cost of \$885,689 for NASA to carry out its responsibilities under this Annex.

Each payment shall be marked with LaRC, SAA2-403514, Annex 7.

Partner will make payments for the testing effort in accordance with this schedule:

<u>NG Inlet Phase I</u>	
Effective Date of this Agreement	\$ 25%
Completion of TRR	\$ 25%
On or before first day of testing	<u>\$ 50%</u>
<b>TOTAL</b>	<b>\$400,625</b>

<u>NG/RMX Inlet Phase II</u>	
Effective Date of this Agreement	\$ 25%
Completion of TRR	\$ 25%
On or before first day of testing	<u>\$ 50%</u>
<b>TOTAL</b>	<b>\$485,064</b>

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 six (6) months 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 January 20, 2025, 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,  
Center Agreements Manager  
Langley Research Center  
Hampton, VA 23681  
Phone: 757-864-5627  
[jennifer.m.hubble@nasa.gov](mailto:jennifer.m.hubble@nasa.gov)

Northrop Grumman Systems Corporation  
Jennifer Gardner  
Staff Supply Chain Subcontract Specialist  
55 Thiokol Road  
Elkton, MD 21921-4755  
Phone: 410-999-7884  
[jennifer.gardner@ngc.com](mailto:jennifer.gardner@ngc.com)

##### Technical Points of Contact

NASA Langley Research Center  
Jose Mondragon Gomez  
Langley Research Center

Northrop Grumman Systems Corporation  
Michael Celentano

Hampton, VA 23681  
Phone: 757-864-3060  
[Jose.mondragongomez@nasa.gov](mailto:Jose.mondragongomez@nasa.gov)

77 Raynor Ave  
Ronkonkoma, NY 11779  
Phone: 631-791-8431  
[Michael.Celentano@ngc.com](mailto:Michael.Celentano@ngc.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  
LANGLEY RESEARCH CENTER

NORTHROP GRUMMAN  
CORPORATION

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

Jennifer  
BY: Gardner  Digitally signed by Jennifer Gardner  
Date: 2023.12.18 16:17:34 -05'00'  
Jennifer Gardner  
Staff Supply Chain Subcontract Specialist

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

DATE: 12/18/2023 \_\_\_\_\_