

SAA3-1723

ANNEX
BETWEEN
THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
GLENN RESEARCH CENTER
AND RELATIVITY SPACE, INC.
UNDER SPACE ACT UMBRELLA AGREEMENT
NO. SAA3-1723, DATED _____ (ANNEX NUMBER 01).

ARTICLE 1. PURPOSE

This Annex (the “Annex” or “Annex No. 01”) to Umbrella Agreement No. SAA3-1723 (hereinafter referred to as the "Agreement" or "Umbrella Agreement") shall be for the purpose of the National Aeronautics and Space Administration Glenn Research Center (“NASA GRC” or “NASA”) and Relativity Space, Inc. (“Relativity” or “Partner”) collaborating towards the development of Alumina strengthened copper alloys for use space propulsion. NASA GRC will produce alumina coated feedstocks of Copper (Cu) metal powder. Relativity will print the coated feedstock. Relativity and NASA will then perform mechanical and microstructural analysis of the Additively Manufactured (AM) oxide dispersion strengthened (ODS) Cu specimens. Lastly, Relativity will perform thermal conductivity tests to determine if the new alloys perform better than conventional Cu alloys such as GRCop42.

ARTICLE 2. RESPONSIBILITIES

A. NASA will use reasonable efforts to:

- 1.) Determine optimal coating parameters for the base Cu-alloy feedstock.
- 2.) Provide enough coated Cu powder for AM trial builds at both NASA and Relativity.
- 3.) Perform in-house prints on the EOS-M100 printer.
- 4.) Perform microstructural analysis on AM Cu-ODS samples to help determine best print parameters.

B. Relativity will use reasonable efforts to:

- 1.) Print coated Cu-powder provided by NASA.
- 2.) Determine optimal print parameters.
- 3.) Perform mechanical tests on Cu-ODS samples.
- 4.) Perform thermal conductivity tests on Cu-ODS samples.

ARTICLE 3. SCHEDULE AND MILESTONES

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The planned major milestones for the activities defined in the "Responsibilities" Article are identified below. The current circumstances related to the COVID-19 pandemic may significantly impact the schedule and milestones of this Annex and dates are therefore subject to a considerable degree of variability. The Parties may utilize a separate document labeled as "Appendix A: Schedule Coordination Matrix" ("Appendix A") to coordinate possible changes to the Annex schedule. The Appendix is utilized only for Annex performance planning purposes and the terms and conditions of this Agreement control. Any change to schedule identified in the Appendix must be signed or approved by the applicable Management Points of Contact or Technical Points of Contact for the respective Parties, as appropriate. The dates included in the aforementioned Appendix are the best approximation at the time this Annex was created and may be amended.

1. NASA will determine the optimal mixing parameters to coat the Cu feedstock. SEE APPENDIX A.
2. NASA will provide 20 Kilograms (Kgs) of alumina coated Cu powder to Relativity. SEE APPENDIX A.
3. NASA and Relativity will determine the optimal print parameters for the coated powder. SEE APPENDIX A.
4. Relativity will finish analyzing the mechanical properties of the AM Cu-ODS alloy. SEE APPENDIX A.
5. Relativity will complete the thermal conductivity tests on the Cu-ODS material and compare it to GRCop42. SEE APPENDIX A.
6. NASA and Relativity will determine final Cu alloy and ceramic down select based on Annex No. 01 results. SEE APPENDIX A.

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 (2) 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.

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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 two (2) 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

Timothy D. Smith
Chief, Space Technology Project Ofc
21000 Brookpark Road
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RELATIVITY SPACE, INC.

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dotsu@relativityspace.com

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Technical Points of Contact

NASA
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Materials Research Engineer
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timothy.m.smith@nasa.gov

RELATIVITY SPACE, INC.
Bishop Wright
Materials Engineer
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Long Beach, CA 90815-1730
Phone: 424-393-4309
bwright@relativityspace.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
GLENN RESEARCH CENTER

RELATIVITY SPACE, INC.

BY: _____
Michael J. Barrett, Ph.D.
Director, Space Flight Systems

BY:  _____
David Otsu
Lead Materials and Processes Engineer

DATE: _____

DATE: 11/16/2022 _____