

ANNEX
BETWEEN
THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
GEORGE C. MARSHALL SPACE FLIGHT CENTER
AND
NANORACKS, LLC
UNDER
SPACE ACT UMBRELLA AGREEMENT
NO. SAA8-2338534, DATED 5/16/2023 SAA8-2338534.4

ARTICLE 1. PURPOSE

This Annex shall be for the purpose of the Nanoracks Mousetrap project including Guidance, Navigation and Mission Analysis of Centaur upper stage spin characteristics and stability, hot/cold case upper stage/Mousetrap analysis, orbital insertion analysis for Mousetrap payload deployment, and on call support of Mousetrap CDR.

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 MSFC will use reasonable efforts to:

1. Attend tag up meetings with Nanoracks as required.
2. Provide preliminary analysis of Centaur Upper Stage passive spin-stabilized dynamics for at least 3 rotation rates prior to Part One CDR.
3. Provide updated analysis of Centaur Upper Stage passive spin-stabilized dynamics based on feedback from Nanoracks prior to Part One CDR.
4. Provide updated analysis of Centaur Upper Stage passive spin-stabilized dynamics for based on feedback from Nanoracks and results of Part One CDR prior to Part Two CDR.
5. Provide hot case lighting analysis (highest radiation) for reference orbit and attitude of Centaur Upper Stage/Mousetrap.
6. Provide cold case lighting analysis (lowest radiation) for reference orbit and attitude of Centaur Upper Stage/Mousetrap.
7. Provide final orbits of payloads deployed from Mousetrap incorporating a range of roll rates and satellite masses, with a minimum of three roll rates and three masses.
8. Support the Part One Critical Design Review (CDR) for Mousetrap on an on-call basis as requested.
9. Support the Part Two CDR for Mousetrap on an on-call basis as requested.
10. Provide Subject Matter Expert (SME) support post-Part Two CDR as agreed to.

Nanoracks will use reasonable efforts to:

1. Provide NASA MSFC three rotation rates required for Centaur Upper Stage spin dynamics analysis.
2. Provide NASA MSFC with reference orbit and attitude for Centaur Upper Stage/Mousetrap.
3. Provide three or more masses for payload to be deployed from Mousetrap.
4. Provide magnitude and direction of impulse provided by deployer mechanism to payload deployed from Mousetrap.
5. Provide other configuration data for Mousetrap and Centaur Upper Stage as needed.
6. Provide dial-in information for any required tag-ups.
7. Provide dial-in information and identify required Subject Matter Experts (SMEs) for CDR.

ARTICLE 3. SCHEDULE AND MILESTONES

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

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| 1. Nanoracks will provide NASA MSFC three rotation rates for Centaur Upper stage spin dynamics analysis | Effective Date |
| 2. Nanoracks will provide NASA MSFC with reference attitude and orbit for Centaur Upper Stage/Mousetrap | Effective Date |
| 3. Nanoracks will provide three or more payload masses to be deployed from Mousetrap | Effective Date |
| 4. Nanoracks will provide magnitude and direction of impulse provided by deployer mechanism to payload deployed from Mousetrap | Effective Date |
| 5. Nanoracks will provide other configuration data for Centaur Upper Stage and Mousetrap as needed | Effective Date |
| 6. Nanoracks will provide Virtual Meeting dial-in information for any required tag-ups | Effective Date |
| 7. NASA MSFC will attend tag-up meetings with Nanoracks as required | Milestone 6 + 1 day |
| 8. NASA MSFC will provide agreed to updated analysis to Nanoracks prior to Part Two CDR | Milestone 7 + 14 days |
| 9. NASA MSFC will provide updated analysis of Centaur Upper Stage passive spin-stabilized dynamics prior to Part One CDR | Milestone 8 + 21 days |
| 10. NASA MSFC will provide hot case lighting analysis (highest radiation) for reference orbit and attitude of Centaur | Milestone 8 + 21 Days |

Upper Stage/Mousetrap

- | | |
|---|------------------------|
| 11. NASA MSFC will provide cold case lighting analysis (lowest radiation) for reference orbit and attitude of Centaur Upper Stage/Mousetrap | Milestone 8 + 21 days |
| 12. NASA MSFC will provide final orbits of payloads deployed from Mousetrap incorporating a range of roll rates and satellite masses, with a minimum of three roll rates and three masses | Milestone 8 + 21 days |
| 13. Nanoracks will identify level of Subject Matter Expert (SME) support required of NASA MSFC for Part One CDR | Milestone 12 + 1 day |
| 14. NASA MSFC will provide agreed to updated analysis to Nanoracks prior to Part Two CDR | Milestone 13 + 49 days |
| 15. Nanoracks will provide dial-in information and identify required Subject Matter Experts (SMEs) for Part Two CDR | Milestone 14 + 7 days |
| 16. NASA will provide Subject Matter Expert (SME) support post-CDR as required | Milestone 7 + 360 days |

ARTICLE 4. FINANCIAL OBLIGATIONS

A. Partner agrees to reimburse NASA an estimated cost of \$31,961 for NASA to carry out its responsibilities under this Annex. Each payment shall be marked with NASA MSFC and SAA8-2338534.4.

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. LIABILITY

For the responsibilities and activities conducted under this Annex, and any claims arising thereunder, the following sentence shall be added to the end of Paragraph C, Article 8 (titled "Liability") of the Umbrella Agreement:

Prior to issuing such direction, NASA will consider input from Partner and other factors such as the extent to which damage was attributable to the activity and the respective responsibilities of each Party as described in the Agreement.

ARTICLE 6. 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 one year.

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:

None

2. Third Party Proprietary Data:

None

3. Controlled Government Data:

None

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

none

ARTICLE 7. 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 1 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 8. RIGHT TO TERMINATE

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

ARTICLE 9. 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 George C. Marshall Space Flight Center
Andrew Heaton
Guidance, Navigation and Mission Analysis Branch Chief
Marshall Space Flight Center, AL 35812
Phone: 256-932-4650
andrew.f.heaton@nasa.gov

NANORACKS, LLC
Charlotte Houser
Project Manager
503 Forge River Road
Webster, TX 77598-4357
Phone: 256-244-1263
chouser@nanoracks.com

ARTICLE 10. 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 11. 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
GEORGE C. MARSHALL SPACE FLIGHT CENTER

NANORACKS, LLC

BY: _____
Donald W. Holder
Director Engineering Directorate

BY: _____
Christopher Cummins
Chief of Staff

DATE: _____

DATE: _____