

AMENDMENT NO. 1 TO
NONREIMBURSABLE SPACE ACT AGREEMENT
BETWEEN
THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
AND FINAL FRONTIER DESIGN
FOR COMMERCIAL SPACE CAPABILITIES COLLABORATION

PURPOSE OF AMENDMENT AND AGENCY COMMITMENT

The purpose of this Amendment No. 1 to Space Act Agreement No. SAA-QA-14-18882 between the National Aeronautics and Space Administration (“NASA”) and FINAL FRONTIER DESIGN (“Partner” or “FFD”), effective December 18, 2014 (the “Agreement”), is to (1) adjust milestones to reflect the Partner’s revised program content and schedule, (2) clarify NASA and FFD responsibilities, (3) clarify NASA furnishing of information and services, (4) update the NASA point of contact, and (5) extend the period of performance under the Agreement.

Now therefore, in consideration of the mutual undertakings in this Amendment, the Agreement is amended in accordance with Article 21 of the Agreement as follows:

I. Amendment to ARTICLE 2. PURPOSE

The following modifications are made to Article 2:

- A. In the first sentence “IVA” is modified to read “Inter Vehicular Activity (IVA)”
- B. The sentence “The scope of the activity and alignment with NASA’s strategy for human space exploration is as described in the Executive Summary in Appendix 1.” is deleted and replaced with “The Parties are working in collaboration to perform certain tasks, including tasks identified in Appendix 2, and additional work identified in this Agreement. Partner’s activity, as identified in Article 4, is related to this Agreement but is not a Partner responsibility under this Agreement, except where described elsewhere in this Agreement. This collaboration is aligned with NASA’s strategy for human space exploration as described in the Executive Summary in Appendix 1.”

II. Amendment to ARTICLE 3. RESPONSIBILITIES

- A. Article 3.A.2 is deleted entirely and replaced with:

Provide access to requested NASA technical data, lessons learned, expertise support, services, facilities, and NASA-developed technologies, on a non-interference basis as

resources permit. NASA furnished services, facilities, and technologies that may be provided are identified in Appendix 2.

B. The following modification is made to Article 3.A.5:

“Within” is deleted and replaced with “If requested by FFD, and within”.

C. Article 3.B is deleted entirely and replaced with:


Partner will use reasonable efforts to:







1. Provide NASA with data regarding its progress towards the milestones identified in Article 4.
2. Conduct a quarterly meeting with NASA regarding the past quarter’s milestones, demonstrating that the success criteria have been met, and discuss upcoming activities.
3. Fulfill its obligations in Appendix 2.




III. Amendment to ARTICLE 4. SCHEDULE AND MILESTONES

Article 4 shall be replaced in its entirety with the following:

The Milestones below are intended to provide a measure of Partner’s overall progress, but are not a Partner responsibility under this Agreement, except where described elsewhere in this Agreement:

<p>Milestone 1: Project Management Plan Review Subsequent to the Space Act Agreement, FFD shall host a kickoff meeting to describe the plan for program implementation, which includes management planning for Design, Development, Testing and Evaluation, integrated scheduling, supplier engagement, risks and anticipated mitigations.</p> <p>FFD shall provide a briefing of the program implementation plan, along with a hard copy of the presentation materials, and responses to any questions that the NASA might have concerning FFD's Plan.</p> <p>Success Criteria: Successful review of the project management plan review as described above. Baselining FFD Project Control Plan and Safety and Mission Assurance Plan.</p>	
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<p>Milestone 2: Systems Requirements Review FFD shall conduct a System Requirements Review (SRR) in accordance with the FFD Project Control Plan.</p> <p>Success Criteria: Successful completion of the SRR</p>	
<p>Milestone 3: Testing and Incorporation of an Automatic Pressure Regulator FFD shall develop, build, test, and incorporate an automatic pressure regulator capable of maintaining an adequate internal suit pressure during an emergency without user intervention.</p> <p>Success criteria: Integration of the automatic pressure regulator into the IVA suit</p>	
<p>Milestone 4: System Definition Review (SDR) FFD shall conduct a System Definition Review (SDR) in accordance with the FFD Project Control Plan.</p> <p>Success criteria: Successful completion of the SDR</p>	
<p>Milestone 5: Materials Characterization FFD shall test and verify that primary materials used in their suit are acceptable for required environments.</p> <p>Success criteria: Toxicity testing, oxygen compatibility, and fracture control reviews of relevant materials are approved. Results may be entered in Materials And Processes Technical Information System (MAPTIS).</p>	
<p>Milestone 6: Preliminary Design Review (PDR) FFD shall conduct a Preliminary Design Review (PDR) in accordance with the FFD Project Control Plan.</p> <p>Success criteria: Successful completion of the PDR</p>	
<p>Milestone 7: Spacesuit Assembly (SSA) Fabrication Complete FFD shall complete assembly of an SSA in accordance with the FFD Project Control Plan for use in testing.</p> <p>Success Criteria: Successful completion, and confirmed pressurization of SSA.</p>	

<p>Milestone 8: Testing Plan and Protocols Defined FFD shall define testing criteria and protocols and shall submit plans for Institutional Review Board (IRB) review for human testing, as needed.</p> <p>Success Criteria: IRB approval of testing plan, documents of defined testing protocols</p>	
<p>Milestone 9: Ground Testing in Relevant Environments FFD shall conduct SSA testing in accordance with defined testing protocols and IRB approved testing plan.</p> <p>Success Criteria: Results and data analysis from SSA testing that demonstrate functional criteria were met.</p>	
<p>Milestone 10 :Critical Design Review (CDR) FFD shall conduct a System Critical Design Review (CDR) in accordance with the FFD Project Control Plan.</p> <p>Success Criteria: Successful completion of the CDR</p>	

IV. Amendment to ARTICLE 8. LIABILITY AND RISK OF LOSS

Article 8 is deleted entirely and replaced with:

A. Each Party hereby waives any claim against the other Party, employees of the other Party, the other Party’s Related Entities (including but not limited to contractors and subcontractors at any tier, grantees, investigators, customers, users, and their contractors or subcontractor at any tier), or employees of the other Party’s Related Entities for any injury to, or death of, the waiving Party’s employees or the employees of its Related Entities, or for damage to, or loss of, the waiving Party’s property or the property of its Related Entities arising from or related to activities conducted under this Agreement, whether such injury, death, damage, or loss arises through negligence or otherwise, except in the case of willful misconduct.

B. Each Party further agrees to extend this cross-waiver to its Related Entities by requiring them, by contract or otherwise, to waive all claims against the other Party, Related Entities of the other Party, and employees of the other Party or of its Related Entities for injury, death, damage, or loss arising from or related to activities conducted under this Agreement. Additionally, each Party shall require that their Related Entities extend this cross-waiver to their Related Entities by requiring them, by contract or otherwise, to waive all claims against the other Party, Related Entities of the other Party, and employees of the other Party or of its Related Entities for injury, death, damage, or loss arising from or related to activities conducted under this Agreement.

V. Amendment to ARTICLE 9. INTELLECTUAL PROPERTY RIGHTS - DATA RIGHTS

- A. Article 9.A.6 is deleted and replaced with “RESERVED.”
- B. The following modification is made to Article 9.A.10:
 - a. The word “under” is deleted and replaced with “for restricted data as described in”.
 - b. The italicized words “*Appendix 3, Business Plan*” are deleted and replaced with “*provide applicable identifying information*”.
- C. The following modification is made to Article 9.B:
In the second sentence “The” is deleted and replaced with “Such”.
- D. The following modification is made to Article 9.C:
Delete the words “3 years after its development” and replace with “five (5) years after its development unless specified otherwise in Appendix 2.”
- E. The following modification is made to Article 9.H.3:
 - a. In subparagraph a., “None” shall be replaced with “As marked”
 - b. In subparagraph b., “None” shall be replaced with “As marked”
 - c. In subparagraph c., “None” shall be replaced with “As marked”

VI. Amendment to ARTICLE 10. INTELLECTUAL PROPERTY RIGHTS - INVENTION AND PATENT RIGHTS

In Article 10.G.2 delete “therefore” and replace with “therefor”.

VII. Amendment to ARTICLE 16. TERM OF AGREEMENT

Article 16 is deleted entirely and replaced with:

This Agreement becomes effective upon the date of the last signature below (“Effective Date”) and shall remain in effect until March 31, 2019.

VIII. Amendment to ARTICLE 18. CONTINUING OBLIGATIONS

The word “clauses” shall be inserted after the word “related.”

IX. Amendment to ARTICLE 19. POINTS OF CONTACT

The points of contact in Article 19 are deleted entirely and replaced with:

<p><u>NASA</u> Philip R. McAlister Director, Commercial Spaceflight Development Division, NASA Headquarters philip.mcalister@nasa.gov Telephone: 202-358-0712 300 E Street, SW Washington, DC 20546</p>	<p><u>Final Frontier Design</u> Theodore Southern President, Final Frontier Design ██ Telephone: ██ Brooklyn Navy Yard 63 Flushing Ave, Unit 163 Building 280, Suite 522 Brooklyn, NY 11205</p>
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X. Addition of New ARTICLE 25. NASA FURNISHED INFORMATION AND SERVICES

The following shall be added to the Agreement as new Article 25:

ARTICLE 25. NASA FURNISHED INFORMATION AND SERVICES

A. NASA may, at its sole discretion and on terms to be negotiated between the Parties, provide Partner additional NASA services, technical expertise, or Government Property. Access to NASA-developed technologies may require a separate license agreement. Access to NASA software may require a separate software usage agreement. NASA equipment used at Partner facilities will be in accordance with a separate NF-893 Loan Agreement. Additional NASA services, technical expertise, or Government Property may be provided on a non-reimbursable basis. Specific services and Government Property will be identified in Appendix 2 to this Agreement. Partner shall remain solely responsible for completion of its milestones under this Agreement regardless of the availability or use of such optional NASA services, technical expertise, or Government Property.

B. There is no Government Furnished Property or Services furnished under this Agreement except for those that may be provided in Article 25.A. However, Partner has the ability to enter into separate reimbursable Space Act agreements with NASA Centers to use NASA resources in performance of this Agreement. The terms and conditions of other Space Act agreements will govern the use of NASA resources not being provided under this Agreement.

XI. Renumbering of ARTICLE 25. SIGNATORY AUTHORITY

Article 25 shall be renumbered to Article 26.

XII. Amendment to APPENDIX 1 – EXECUTIVE SUMMARY

- A. Delete the text “+3 PSIG, Illustrating a 14” vertical adjustment range” from the Figure 1 title.
- B. The Figure 1 image is deleted and replaced with this one:



- C. The 3rd paragraph “FFD’s team ...our IVA technology.” is modified to read as follows:

FFD’s team draws from diverse and deep technical experience. Our lead designer, Nikolay Moiseev, is a US permanent resident who worked in Russia for almost 20 years at Zvezda; his IVA and EVA suit designs have flown on MIR, Buran, Soyuz, and ISS missions. Our president, Ted Southern, has served as Principal Investigator for multiple FFD SBIR and

other contracts related to space suits for NASA’s JSC, since 2010. Ted and Nik together won a cash prize from NASA in 2009 for their advanced pressure garment glove designs in the Astronaut Glove Challenge. Our unique lab in the Brooklyn Navy Yard includes a laser cutter and several heavy duty sewing machines, a fabric welding station, CNC milling and lathe capabilities, a vacuum chamber glove box, and extensive pressurization equipment necessary to prototype and construct advanced space garments. FFD has built 5 IVA space suit assembly prototypes since 2010, each with increasing strength, functionality, precision, and fidelity. We have applied significant direct investment and in kind development of our IVA technology.

D. The 5th paragraph “FFD plans ...and MAPTIS.” is modified to read as follows:

FFD plans to test and document their IVA space suit design to achieve flight standards and safety approval from both the FAA and NASA over the next 2.5 years. Space flight is our long term goal, and will require considerable definitions, testing, validation, and cooperation between FFD and NASA. Engineering documentation and analysis, component testing, unmanned and manned high fidelity tests, and processes, closely adhere to NASA standards, especially the NPR 8705.2B, STD 6016, STD 3001, and NPR-7120.5, as reflected in our FFD Project Control Plan document.

E. At the end of the 6th paragraph the text “or proposed” is deleted.

XIII. Addition of APPENDIX 2 – NASA FURNISHED SERVICES, FACILITIES, AND TECHNOLOGIES

The following Appendix 2 shall be added after Appendix 1:

Appendix 2 – NASA Furnished Services, Facilities, and Technologies

In accordance with Article 9 Intellectual Property Rights – Data Rights, any Data First Produced by NASA under this Agreement which does not have a period of time specified in this Appendix 2 will be protected for a period of five (5) years after its development. All other time periods specified herein for the protection of data also commence after its development.

<u>NASA Furnished Services, Facilities, and Technologies</u>	<u>Corresponding Partner Obligations</u>	<u>Data Rights</u>

APPROVALS

The signatories to this Amendment covenant and warrant that they have authority to execute this Amendment No. 1 and agree to the above terms and conditions.

NATIONAL AERONAUTICS AND
SPACE ADMINISTRATION

FINAL FRONTIER DESIGN

BY: Philip McAlister

Philip R. McAlister
Director, Commercial Spaceflight
Development Division

Date: March 3, 2017

BY: Theodore Southern

Theodore Southern
President

Date: March 1, 2017