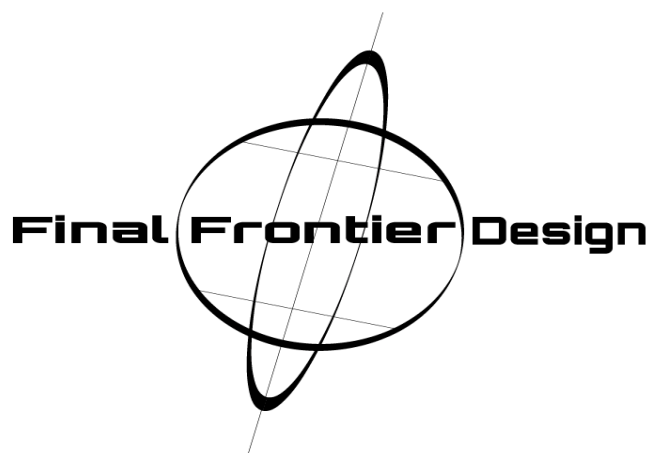




# **Collaborations for Commercial Space Capabilities**

**Space Act Agreement  
SAA-QA-14-18882**

**Effective Date: December 18, 2014**



**AMENDMENTS AND HISTORY LOG**

<b>Status</b>	<b>Amend No.</b>	<b>Effective Date</b>	<b>DESCRIPTION</b>
Baseline	N/A	12/18/14	Baseline Space Act Agreement

NONREIMBURSABLE SPACE ACT AGREEMENT  
BETWEEN  
THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  
AND FINAL FRONTIER DESIGN  
FOR COMMERCIAL SPACE CAPABILITIES COLLABORATION

ARTICLE 1. AUTHORITY AND PARTIES

In accordance with the National Aeronautics and Space Act (51 U.S.C. § 20113), this Agreement is entered into by the National Aeronautics and Space Administration (hereinafter referred to as "NASA") and Final Frontier Design located at Brooklyn Navy Yard, 63 Flushing Avenue, Unit 163, Building 280, Suite 522 (hereinafter referred to as "Partner" or *FFD*) NASA and Partner may be individually referred to as a "Party" and collectively referred to as the "Parties."

ARTICLE 2. PURPOSE

The purpose of this Agreement is to facilitate FFD's anticipated development of an IVA space suit for high altitude and space flight. The scope of the activity and alignment with NASA's strategy for human space exploration is described in the Executive Summary in Appendix 1. NASA is committed to advance commercial space-related efforts by facilitating access to NASA's vast spaceflight resources including technical expertise, assessments, lessons learned, and data. Accordingly the agency's Commercial Space Capabilities Office is partnering with FFD, through this agreement, to provide insight and assistance to FFD in its attempt to develop this capability.

ARTICLE 3. RESPONSIBILITIES

A. NASA will use reasonable efforts to:

1. Provide a point of contact for FFD within the Commercial Space Capabilities Office within 30 days after the effective date of this Agreement.
2. Provide access to requested NASA technical data, lessons learned, and expertise support as resources permit.
3. Review data provided by FFD.
4. Attend quarterly meetings with FFD regarding the past quarter's milestones and upcoming activities.
5. Within 30 days of each quarterly meeting, provide FFD a written acknowledgement of milestone completion if NASA ascertains that the milestones of the previous quarter have been accomplished. Nothing in the acknowledgement of milestone completion shall be construed to imply that NASA endorses or sponsors any FFD product or service resulting from activities conducted under this Agreement. NASA's acknowledgement shall not be construed to imply approval or endorsement of the safety, reliability or appropriateness of any FFD design, system, architecture or testing methodology.

6. Attend and observe FFD milestones, at its discretion and after coordination with FFD.

B. FFD will use reasonable efforts to:

1. Conduct its development program according to the milestones identified in Article 4 of this Agreement.
2. Provide NASA with data regarding its progress towards the milestones.
3. Conduct a quarterly meeting with NASA regarding the past quarter's milestones, demonstrating that the success criteria have been met, and discuss upcoming activities.

#### ARTICLE 4. SCHEDULE AND MILESTONES

The planned major milestones for the activities defined in the "Responsibilities" Article are as follows. Full detail of success criteria are included in Appendix 4 of this document:

<p><b>Milestone 1: Project Management Plan Review</b>          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.</p>	<p>Oct 2014</p>
<p><b>Milestone 2: Systems Requirements Review</b>          FFD shall conduct a System Requirements Review (SRR) in accordance with the SRR definition in Appendix 4 below.</p> <p>Success Criteria:          Successful completion of the SRR</p>	<p>Jan 2015</p>
<p><b>Milestone 3: Materials and Processes Information Readiness</b>          FFD shall begin supporting documents, with a focus on Materials and Processes Technical Information System (MAPTIS) research, for a System Definition Review (SDR) in accordance with the SDR definition in Appendix 4.</p> <p>Success criteria:          MAPTIS information acquired for major system materials and processes</p>	<p>Apr 2015</p>

<p><b>Milestone 4: System Definition Review (SDR)</b> FFD shall conduct a System Definition Review (SDR) in accordance with the SDR definition in Appendix 4.</p> <p>Success criteria: Successful completion of the SDR</p>	Jul 2015
<p><b>Milestone 5: Engineering Draft Documents Complete</b> FFD shall complete draft engineering drawings in accordance with the detailed SDR plan for use in PDR definition in Appendix 4.</p> <p>Success criteria: Successful completion of draft engineering drawings</p>	Oct 2015
<p><b>Milestone 6: Preliminary Design Review (PDR)</b> FFD shall conduct a Preliminary Design Review (PDR) in accordance with the PDR definition in Appendix 4.</p> <p>Success criteria: Successful completion of the PDR</p>	Jan 2016
<p><b>Milestone 7: Spacesuit Assembly (SSA) Fabrication Complete</b> FFD shall complete assembly of an SSA in accordance with the detailed PDR plan for use in testing.</p> <p>Success Criteria: Successful completion, and confirmed pressurization of SSA.</p>	Apr 2016
<p><b>Milestone 8: Testing Plan and Protocols Defined</b> 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>	Jul 2016
<p><b>Milestone 9: Ground Testing in Relevant Environments</b> 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>	Oct 2016
<p><b>Milestone 10 :Critical Design Review (CDR)</b> FFD shall conduct a System Critical Design Review (CDR) in accordance with the CDR definition in Appendix 4.</p> <p>Success Criteria: Successful completion of the CDR</p>	Jan 2017

## ARTICLE 5. 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 6. PRIORITY OF USE

Any schedule or milestone in this Agreement is estimated based upon the Parties' current understanding of the projected availability of NASA goods, services, facilities, or equipment. In the event that NASA's projected availability changes, Partner shall be given reasonable notice of that change, so that the schedule and milestones may be adjusted accordingly. The Parties agree that NASA's use of the goods, services, facilities, or equipment shall have priority over the use planned in this Agreement. Should a conflict arise, NASA in its sole discretion shall determine whether to exercise that priority. Likewise, should a conflict arise as between two or more non-NASA Partners, NASA, in its sole discretion, shall determine the priority as between those Partners. This Agreement does not obligate NASA to seek alternative government property or services under the jurisdiction of NASA at other locations.

## ARTICLE 7. NONEXCLUSIVITY

This Agreement is not exclusive; accordingly, NASA may enter into similar agreements for the same or similar purpose with other private or public entities.

## ARTICLE 8. LIABILITY AND RISK OF LOSS

A. Partner hereby waives any claims against NASA, its employees, its related entities, (including, but not limited to, contractors and subcontractors at any tier, grantees, investigators, customers, users, and their contractors and subcontractors, at any tier) and employees of NASA's related entities for any injury to, or death of, Partner employees or the employees of Partner's related entities, or for damage to, or loss of, Partner'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. Partner further agrees to extend this unilateral waiver to its related entities by requiring them, by contract or otherwise, to waive all claims against NASA, its related entities, and employees of

NASA and employees of NASA's related entities for injury, death, damage, or loss arising from or related to activities conducted under this Agreement.

## ARTICLE 9. INTELLECTUAL PROPERTY RIGHTS - DATA RIGHTS

### A. General

1. "Related Entity" as used in this Data Rights Article means a contractor, subcontractor, grantee, or other entity having a legal relationship with NASA or Partner that is assigned, tasked, or contracted to perform activities under this Agreement.
2. "Data" means recorded information, regardless of form, the media on which it is recorded, or the method of recording.
3. "Proprietary Data" means Data embodying trade secrets developed at private expense or commercial or financial information that is privileged or confidential, and that includes a restrictive notice, unless the Data is:
  - a. known or available from other sources without restriction;
  - b. known, possessed, or developed independently, and without reference to the Proprietary Data;
  - c. made available by the owners to others without restriction; or
  - d. required by law or court order to be disclosed.
4. Data exchanged under this Agreement is exchanged without restriction except as otherwise provided herein.
5. Notwithstanding any restrictions provided in this Article, the Parties are not restricted in the use, disclosure, or reproduction of Data provided under this Agreement that meets one of the exceptions in 3., above. If a Party believes that any exceptions apply, it shall notify the other Party before any unrestricted use, disclosure, or reproduction of the Data.
6. The Parties will not exchange preexisting Proprietary Data under this Agreement unless authorized herein or in writing by the owner.
7. If the Parties exchange Data having a notice that the Receiving Party deems is ambiguous or unauthorized, the Receiving Party shall tell the Providing Party. If the notice indicates a restriction, the Receiving Party shall protect the Data under this Article unless otherwise directed in writing by the Providing Party.
8. The Data rights herein apply to the employees and Related Entities of Partner. Partner shall ensure that its employees and Related Entity employees know about and are bound by the obligations under this Article.
9. Disclaimer of Liability: NASA is not restricted in, or liable for, the use, disclosure, or reproduction of Data without a restrictive notice under paragraphs A.3., B. or H. of this Article or for Data Partner gives, or is required to give, the U.S. Government without restriction.
10. Partner may use the following or a similar restrictive notice under paragraphs A.3., B. and H. of this Article.

#### **Proprietary Data Notice**

The data herein include Proprietary Data and are restricted under the Data Rights provisions of Space Act Agreement [*Appendix 3, Business Plan*].

Partner should also mark each page containing Proprietary Data with the following or a similar legend: “**Proprietary Data – Use And Disclose Only Under the Notice on the Title or Cover Page.**”

B. Data First Produced by Partner Under this Agreement

If Data first produced by Partner or its Related Entities under this Agreement is given to NASA, and the Data is Proprietary Data, and it includes a restrictive notice, NASA will use reasonable efforts to protect it. The Data will be disclosed and used (under suitable protective conditions) only for U.S. Government purposes.

C. Data First Produced by NASA Under this Agreement

If Partner requests that Data first produced by NASA or its Related Entities under this Agreement be protected, and NASA determines it would be Proprietary Data if obtained from Partner, NASA will mark it with a restrictive notice and use reasonable efforts to protect it for 3 years after its development. During this restricted period the Data may be disclosed and used (under suitable protective conditions) for U.S. Government purposes only, and thereafter for any purpose. Partner must not disclose the Data without NASA’s written approval during the restricted period. The restrictions placed on NASA do not apply to Data disclosing a NASA owned invention for which patent protection is being considered.

D. Publication of Results

The National Aeronautics and Space Act (51 U.S.C. § 20112) requires NASA to provide for the widest practicable and appropriate dissemination of information concerning its activities and the results thereof. As such, NASA may publish unclassified and non-Proprietary Data resulting from work performed under this Agreement. The Parties will coordinate publication of results allowing a reasonable time to review and comment.

E. Data Disclosing an Invention

If the Parties exchange Data disclosing an invention for which patent protection is being considered, and the furnishing Party identifies the Data as such when providing it to the Receiving Party, the Receiving Party shall withhold it from public disclosure for a reasonable time (one (1) year unless otherwise agreed or the Data is restricted for a longer period herein).

F. Copyright

Data exchanged with a copyright notice and no indication of restriction under paragraphs A.3., B, C, or H of this Article (*i.e.*, Data has no restrictive notice) is presumed to be published. The following royalty-free licenses apply.

1. If indicated on the Data that it was produced outside of this Agreement, it may be reproduced, distributed, and used to prepare derivative works only for carrying out the Receiving Party’s responsibilities under this Agreement.



2. Data without the indication of 1. is presumed to be first produced under this Agreement. Except as otherwise provided in paragraph E. of this Article, and in the *Invention and Patent Rights* Article of this Agreement for protection of reported inventions, the Data may be reproduced, distributed, and used to prepare derivative works for any purpose.

#### G. Data Subject to Export Control

Whether or not marked, technical data subject to the export laws and regulations of the United States provided to Partner under this Agreement must not be given to foreign persons or transmitted outside the United States without proper U.S. Government authorization.

#### H. Handling of Background, Third Party Proprietary, and Controlled Government Data

1. NASA or Partner (as Disclosing Party) may provide the other Party or its Related Entities (as Receiving Party):
  - a. Proprietary Data developed at Disclosing Party's expense outside of this Agreement (referred to as Background Data);
  - b. Proprietary Data of third parties that Disclosing Party has agreed to protect or is required to protect under the Trade Secrets Act (18 U.S.C. § 1905) (referred to as Third Party Proprietary Data); and
  - c. U.S. Government Data, including software and related Data, Disclosing Party intends to control (referred to as Controlled Government Data).
2. All Background, Third Party Proprietary and Controlled Government Data provided by Disclosing Party to Receiving Party shall be marked by Disclosing Party with a restrictive notice and protected by Receiving Party in accordance with this Article.
3. 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.
  - a. Background Data:  
None
  - b. Third Party Proprietary Data:  
None
  - c. Controlled Government Data:  
None
  - d. NASA software and related Data will be provided to Partner under a separate Software Usage Agreement (SUA). Partner shall use and protect the related Data in accordance with this Article. Unless the SUA authorizes retention, or Partner enters into a license under 37 C.F.R. Part 404, the related Data shall be disposed of as NASA directs:  
None
4. For Data with a restrictive notice and Data identified in this Agreement, Receiving Party shall:
  - a. Use, disclose, or reproduce the Data only as necessary under this Agreement;
  - b. Safeguard the Data from unauthorized use and disclosure;

- c. Allow access to the Data only to its employees and any Related Entity requiring access under this Agreement;
- d. Except as otherwise indicated in 4.c., preclude disclosure outside Receiving Party's organization;
- e. Notify its employees with access about their obligations under this Article and ensure their compliance, and notify any Related Entity with access about their obligations under this Article; and
- f. Dispose of the Data as Disclosing Party directs.

#### I. Oral and visual information

If Partner discloses Proprietary Data orally or visually, NASA will have no duty to restrict, or liability for disclosure or use, unless Partner:

- 1. Orally informs NASA before initial disclosure that the Data is Proprietary Data, and
- 2. Reduces the Data to tangible form with a restrictive notice as required by paragraphs A.3., B, and H of this Article, and gives it to NASA within ten (10) calendar days after disclosure.

### ARTICLE 10. INTELLECTUAL PROPERTY RIGHTS - INVENTION AND PATENT RIGHTS

#### A. General

- 1. NASA has determined that 51 U.S.C. § 20135(b) does not apply to this Agreement. Therefore, title to inventions made (conceived or first actually reduced to practice) under this Agreement remain with the respective inventing party(ies). No invention or patent rights are exchanged or granted under this Agreement, except as provided herein.
- 2. "Related Entity" as used in this Invention and Patent Rights Article means a contractor, subcontractor, grantee, or other entity having a legal relationship with NASA or Partner assigned, tasked, or contracted with to perform activities under this Agreement.
- 3. The invention and patent rights herein apply to employees and Related Entities of Partner. Partner shall ensure that its employees and Related Entity employees know about and are bound by the obligations under this Article.

#### B. NASA Inventions

NASA will use reasonable efforts to report inventions made under this Agreement by its employees. Upon request, NASA will use reasonable efforts to grant Partner, under 37 C.F.R. Part 404, a negotiated license to any NASA invention made under this Agreement. This license is subject to paragraph E.1. of this Article.

#### C. NASA Related Entity Inventions

NASA will use reasonable efforts to report inventions made under this Agreement by its Related Entity employees, or jointly between NASA and Related Entity employees, where NASA has the

right to acquire title. Upon request, NASA will use reasonable efforts to grant Partner, under 37 C.F.R. Part 404, a negotiated license to any of these inventions where NASA has acquired title. This license is subject to paragraph E.2. of this Article.

#### D. Joint Inventions With Partner

The Parties will use reasonable efforts to report, and cooperate in obtaining patent protection on, inventions made jointly between NASA employees, Partner employees, and employees of either Party's Related Entities. Upon timely request, NASA may, at its sole discretion and subject to paragraph E. of this Article:

1. refrain from exercising its undivided interest inconsistently with Partner's commercial business; or
2. use reasonable efforts to grant Partner, under 37 C.F.R. Part 404, an exclusive or partially exclusive negotiated license.

#### E. Rights to be Reserved in Partner's License

Any license granted Partner under paragraphs B., C., or D. of this Article is subject to the following:

1. For inventions made solely or jointly by NASA employees, NASA reserves the irrevocable, royalty-free right of the U.S. Government to practice the invention or have it practiced on behalf of the United States or on behalf of any foreign government or international organization pursuant to any existing or future treaty or agreement with the United States.
2. For inventions made solely or jointly by employees of a NASA Related Entity, NASA reserves the rights in 1. above, and a revocable, nonexclusive, royalty-free license retained by the Related Entity under 14 C.F.R. § 1245.108 or 37 C.F.R. § 401.14 (e).

#### F. Protection of Reported Inventions

For inventions reported under this Article, the Receiving Party shall withhold all invention reports or disclosures from public access for a reasonable time (1 year unless otherwise agreed or unless restricted longer herein) to facilitate establishment of patent rights.

#### G. Patent Filing Responsibilities and Costs

1. The invention and patent rights herein apply to any patent application or patents covering an invention made under this Agreement. Each Party is responsible for its own costs of obtaining and maintaining patents covering sole inventions of its employees. The Parties may agree otherwise, upon the reporting of any invention (sole or joint) or in any license granted.
2. Partner shall include the following in patent applications for an invention made jointly between NASA employees, its Related Entity employees and Partner employees:

The invention described herein may be manufactured and used by or for the U.S. Government for U.S. Government purposes without the payment of royalties thereon or therefore.

#### ARTICLE 11. RELEASE OF GENERAL INFORMATION TO THE PUBLIC AND MEDIA

NASA or Partner may, consistent with Federal law and this Agreement, release general information regarding its own participation in this Agreement as desired.

#### ARTICLE 12. USE OF NASA NAME AND EMBLEMS

##### A. NASA Name and Initials

Partner shall not use "National Aeronautics and Space Administration" or "NASA" in a way that creates the impression that a product or service has the authorization, support, sponsorship, or endorsement of NASA, which does not, in fact, exist. Except for releases under the "Release of General Information to the Public and Media" Article, Partner must submit any proposed public use of the NASA name or initials (including press releases and all promotional and advertising use) to the NASA Associate Administrator for the Office of Communications or designee ("NASA Communications") for review and approval. Approval by NASA Office of Communications shall be based on applicable law and policy governing the use of the NASA name and initials.

##### B. NASA Emblems

Use of NASA emblems (i.e., NASA Seal, NASA Insignia, NASA logotype, NASA Program Identifiers, and the NASA Flag) is governed by 14 C.F.R. Part 1221. Partner must submit any proposed use of the emblems to NASA Communications for review and approval.

#### ARTICLE 13. DISCLAIMER OF WARRANTY

Goods, services, facilities, or equipment provided by NASA under this Agreement are provided "as is." NASA makes no express or implied warranty as to the condition of any such goods, services, facilities, or equipment, or as to the condition of any research or information generated under this Agreement, or as to any products made or developed under or as a result of this Agreement including as a result of the use of information generated hereunder, or as to the merchantability or fitness for a particular purpose of such research, information, or resulting product, or that the goods, services, facilities or equipment provided will accomplish the intended results or are safe for any purpose including the intended purpose, or that any of the above will not interfere with privately-owned rights of others. Neither the government nor its contractors shall be liable for special, consequential or incidental damages attributed to such equipment, facilities, technical information, or services provided under this Agreement or such research, information, or resulting products made or developed under or as a result of this Agreement.

## ARTICLE 14. DISCLAIMER OF ENDORSEMENT

NASA does not endorse or sponsor any commercial product, service, or activity. NASA's participation in this Agreement or provision of goods, services, facilities or equipment under this Agreement does not constitute endorsement by NASA. Partner agrees that nothing in this Agreement will be construed to imply that NASA authorizes, supports, endorses, or sponsors any product or service of Partner resulting from activities conducted under this Agreement, regardless of the fact that such product or service may employ NASA-developed technology.

## ARTICLE 15. COMPLIANCE WITH LAWS AND REGULATIONS

A. The Parties shall comply with all applicable laws and regulations including, but not limited to, safety; security; export control; environmental; and suspension and debarment laws and regulations. Access by a Partner to NASA facilities or property, or to a NASA Information Technology (IT) system or application, is contingent upon compliance with NASA security and safety policies and guidelines including, but not limited to, standards on badging, credentials, and facility and IT system/application access.

B. With respect to any export control requirements:

1. The Parties will comply with all U.S. export control laws and regulations, including the International Traffic in Arms Regulations (ITAR), 22 C.F.R. Parts 120 through 130, and the Export Administration Regulations (EAR), 15 C.F.R. Parts 730 through 799, in performing work under this Agreement or any Annex to this Agreement. In the absence of available license exemptions or exceptions, the Partner shall be responsible for obtaining the appropriate licenses or other approvals, if required, for exports of hardware, technical data and software, or for the provision of technical assistance.

2. The Partner shall be responsible for obtaining export licenses, if required, before utilizing foreign persons in the performance of work under this Agreement or any Annex under this Agreement, including instances where the work is to be performed on-site at NASA and where the foreign person will have access to export-controlled technical data or software.

3. The Partner will be responsible for all regulatory record-keeping requirements associated with the use of licenses and license exemptions or exceptions.

4. The Partner will be responsible for ensuring that the provisions of this Article apply to its Related Entities.

C. With respect to suspension and debarment requirements:

1. The Partner hereby certifies, to the best of its knowledge and belief, that it has complied, and shall comply, with 2 C.F.R. Part 180, Subpart C, as supplemented by 2 C.F.R. Part 1880, Subpart C.

2. The Partner shall include language and requirements equivalent to those set forth in subparagraph C.1., above, in any lower-tier covered transaction entered into under this Agreement.

ARTICLE 16. TERM OF AGREEMENT

This Agreement 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 through March 31, 2017, whichever comes first.

ARTICLE 17. RIGHT TO TERMINATE

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

ARTICLE 18. CONTINUING OBLIGATIONS

The rights and obligations of the Parties that, by their nature, would continue beyond the expiration or termination of this Agreement, e.g., "Liability and Risk of Loss" and "Intellectual Property Rights" related shall survive such expiration or termination of this Agreement.

ARTICLE 19. POINTS OF CONTACT

The following personnel are designated as the Points of Contact between the Parties in the performance of this Agreement.

NASA

Alan Lindenmoyer  
Manager, Commercial Space Capabilities  
Office  
alan.j.lindenmoyer@nasa.gov  
Telephone: 281-244-7064  
Cell: 281-630-4841  
Fax: 281-483-5970  
NASA Johnson Space Center  
2101 NASA Parkway  
Code QA  
Houston, Texas 77058

Partner

Theodore Southern  
President, Final Frontier Design  
[REDACTED]  
Telephone: [REDACTED]  
Brooklyn Navy Yard  
63 Flushing Ave, Unit 163  
Building 280, Suite 522  
Brooklyn, NY 11205

ARTICLE 20. DISPUTE RESOLUTION

Except as otherwise provided in the Article entitled "Priority of Use," the Article entitled "Intellectual Property Rights – Invention and Patent Rights" (for those activities governed by 37 C.F.R. Part 404), and those situations where a pre-existing statutory or regulatory system exists (e.g., under the Freedom of Information Act, 5 U.S.C. § 552), all disputes concerning questions

of fact or law arising under this Agreement shall be referred by the claimant in writing to the appropriate person identified in this Agreement as the "Points of Contact." The persons identified as the "Points of Contact" for NASA and the Partner will consult and attempt to resolve all issues arising from the implementation of this Agreement. If they are unable to come to agreement on any issue, the dispute will be referred to the signatories to this Agreement, or their designees, for joint resolution. If the Parties remain unable to resolve the dispute, then the NASA signatory or that person's designee, as applicable, will issue a written decision that will be the final agency decision for the purpose of judicial review. Nothing in this Article limits or prevents either Party from pursuing any other right or remedy available by law upon the issuance of the final agency decision.

#### ARTICLE 21. MODIFICATIONS

Any modification to this Agreement shall be executed, in writing, and signed by an authorized representative of NASA and the Partner.

#### ARTICLE 22. ASSIGNMENT

Neither this Agreement nor any interest arising under it will be assigned by the Partner or NASA without the express written consent of the officials executing, or successors, or higher- level officials possessing original or delegated authority to execute this Agreement.

#### ARTICLE 23. APPLICABLE LAW

U.S. Federal law governs this Agreement for all purposes, including, but not limited to, determining the validity of the Agreement, the meaning of its provisions, and the rights, obligations and remedies of the Parties.

#### ARTICLE 24. INDEPENDENT RELATIONSHIP

This Agreement is not intended to constitute, create, give effect to or otherwise recognize a joint venture, partnership, or formal business organization, or agency agreement of any kind, and the rights and obligations of the Parties shall be only those expressly set forth herein.

ARTICLE 25. SIGNATORY AUTHORITY

The signatories to this Agreement covenant and warrant that they have authority to execute this Agreement. By signing below, the undersigned agrees to the above terms and conditions.

NATIONAL AERONAUTICS AND SPACE  
ADMINISTRATION

FINAL FRONTIER DESIGN

BY: Philip R. McAlister  
Philip R. McAlister  
Director, Commercial Spaceflight  
Development Division

BY: Theodore Southern  
Theodore Southern  
President

DATE: 12/17/2014

DATE: 9/5/14



## Appendix 1 Executive Summary

### Space Act Agreement for IVA Space Suit

Final Frontier Design, LLC, (FFD) was founded in 2010 with the goal of designing and manufacturing high quality, advanced space safety garments for the commercial space industry. Our focus since the outset has been new technology and materials solutions for pressure garments and space suits, for high altitude, suborbital, and orbital applications. New commercial demands of comfort, aesthetics, cost, weight, and adjustability inform our design decisions, while we strive to meet the stringent engineering standards of NASA's historical safety garments. Further, FFD is developing a series of spin offs aimed towards broader markets on Earth.

FFD knows there is a significant market need for a new generation, lighter weight, inexpensive, and reliable IVA space suit, for both NASA and private entities alike. Competition in the space safety garment market will drive down costs for manned space flight considerably; the current market options are very limited, relying mostly on heritage gear from military applications dating back to the 1960's. Development of advanced space safety gear fits squarely in NASA's long term strategic goals.



Figure 1. FFD's IVA Space Suit, +3 PSIG, Illustrating a 14" vertical adjustment range

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 3 FFD SBIR 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. Kari Love, our lead pattern maker, has developed garments for technical theater and movies for more than a decade and has worked with space garments for FFD for nearly 2 years. 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 spent nearly \$400,000 in direct investment and in kind development of our IVA technology.

Our current 3<sup>rd</sup> Generation suit has a nominal operating pressure of 3.5-5 PSI and includes both a pressure garment and a nomex outer garment. FFD's 3G suit weighs under 18 pounds with a nomex outer garment, is highly adjustable, has been component pressure cycled over 10,000 times, survived a proof pressure of 9 PSI, and offers significant Range of Motion and Torque advantages compared to current NASA IVA technology. All parts are built in house or sourced from within the US. Flight certification is the major barrier standing between FFD and space access. We have validated our proof of concept.

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, and unmanned and manned high fidelity tests are required according to NASA standards, especially the NPR 8705.2B, STD 6016, STD 3001, and MAPTIS.

FFD proposes to enter into a Space Act Agreement with NASA via the CCSC for Base Support partnership, with attendance, and observation of milestone achievements in advancement of human rating certification of their IVA space suit. This support should include a technical point of contact within NASA, some witnessing of significant testing and design reviews of the suit, review of provided data, and access to data, lessons, and support where ever possible from NASA. No funds shall exchange hands in this agreement, and no use of NASA facilities are required or proposed.