NONREIMBURSABLE SPACE ACT AGREEMENT
BETWEEN
THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
AND SPIRIT AEROSYSTEMS, INC.
UNDER THE SPACE TECHNOLOGY
ANNOUNCEMENT OF COMPETITIVE OPPORTUNITY 2019

ARTICLE 1. AUTHORITY AND PARTIES

In accordance with the National Aeronautics and Space Act (51 U.S.C. § 20113(e)), this Agreement is entered into by the National Aeronautics and Space Administration, located at 300 E Street SW, Washington, DC 20546 (hereinafter referred to as "NASA") and Spirit AeroSystems, Inc. located at 3801 S. Oliver St., Wichita, KS (hereinafter referred to as "Partner" or "Spirit"). NASA and Partner may be individually referred to as a "Party" and collectively referred to as the "Parties."

ARTICLE 2. PURPOSE

This Agreement ("Agreement") shall be for the purpose of accelerating the development and testing of critical technologies for emerging space system capabilities. The Parties' specific responsibilities, schedule and milestones are described in one or more Responsibilities and Schedule document completed in coordination with a NASA Center and incorporated fully by reference into this Agreement. This collaboration is intended to advance commercial space-related efforts by facilitating access by Partner to NASA's extensive resources including facilities, technical expertise, hardware, and software. Each Center Responsibilities and Schedule Document will detail the specific purpose of the proposed activity, responsibilities, schedule and milestones, and any personnel, property or facilities proposed to be made available to Partner.

ARTICLE 3. RESPONSIBILITIES

NASA and Partner agree they will use reasonable efforts to fulfill the Responsibilities set forth in any Schedule and Responsibilities Document.

ARTICLE 4. SCHEDULE

NASA and Partner agree they will use reasonable efforts to meet the Schedule set forth in any Schedule and Responsibilities Document.

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 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. LIABILITY AND RISK OF LOSS - PRODUCT LIABILITY

With respect to products or processes resulting from a Party's participation in an SAA, each Party that markets, distributes, or otherwise provides such product, or a product designed or produced by such a process, directly to the public will be solely responsible for the safety of the product or process.

ARTICLE 10. LIABILITY AND RISK OF LOSS - PRODUCT LIABILITY INDEMNIFICATION

In the event the U.S. Government incurs any liability based upon Partner's, or Partner's Related Entity's, use or commercialization of products or processes resulting from a Party's participation under this Agreement, Partner agrees to indemnify and hold the U.S. Government harmless against such liability, including costs and expenses incurred by the U.S. Government in defending against any suit or claim for such liability.

ARTICLE 11. INTELLECTUAL PROPERTY RIGHTS - DATA RIGHTS

A. General

1. Definitions.

    a. "Related Entity" as used in Articles 11 and 12, INTELLECTUAL PROPERTY RIGHTS, 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.

    b. "Data," means recorded information, regardless of form, the media on which it is recorded, or the method of recording.

    c. "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:

        (1) known or available from other sources without restriction;

        (2) known, possessed, or developed independently, and without reference to the Proprietary Data;

(3) made available by the owners to others without restriction; or

(4) required by law or court order to be disclosed.

2. Data exchanged under this Agreement is exchanged without restriction except as otherwise provided in this Agreement.

3. Notwithstanding any restrictions provided in the Terms and Conditions applicable to "Data Rights, the Parties are not restricted in the use, disclosure, or reproduction of Data provided under this Agreement that meets one of the exceptions in the definition of "Proprietary Data" 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.

4. The Parties will not exchange preexisting Proprietary Data under this Agreement unless authorized under this Agreement or in writing by the owner.

5. 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 the Terms and Conditions applicable to "Data Rights" unless otherwise directed in writing by the providing party.

6. The Data rights under this Agreement 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 the Terms and Conditions applicable to "Data Rights."

7. Disclaimer of Liability: NASA is not restricted in, or liable for, the use, disclosure, or reproduction of Data without a restrictive notice, or for Data Partner gives, or is required to give, the U.S. Government without restriction.

8. Partner may use the following or a similar restrictive notice:

   Proprietary Data Notice

The data herein include Proprietary Data and are restricted under the Data Rights provisions of Space Act Agreement [provide applicable identifying information].

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 three 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 under this Agreement).

F. Copyright

Data exchanged with a copyright notice and with 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 F.1. is presumed to be first produced under this Agreement. Except as otherwise provided in paragraph E. of the Terms and Conditions applicable to "Data Rights", and in the Terms and Conditions applicable to "Invention and Patent Rights" 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 the Terms and Conditions applicable to "Data Rights."

3. 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 the Terms and Conditions applicable to "Data Rights." 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.

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.

l. 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 and gives it to NASA within ten (10) calendar days after disclosure.

ARTICLE 12. 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 expressly set forward herein.

2. The invention and patent rights under this Agreement 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 the Terms and Conditions applicable to "Invention and Patent Rights."

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 12.

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 12.

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 12:

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 12 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 paragraph E.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 Agreement, the Receiving Party shall withhold all invention reports or disclosures from public access for a reasonable time (one (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 under this Agreement 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.

NASA technology available for licensing can be located by visiting the following website address – http://technology.nasa.gov.

ARTICLE 13. USE OF NASA NAME AND NASA 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 14. 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. Pursuant to Section 841(d) of the NASA Transition Authorization Act of 2017, Public Law 115-10 (the "NTAA"), NASA is obligated to publicly disclose copies of all agreements conducted pursuant to NASA's 51 U.S.C. §20113(e) authority in a searchable format on the NASA website within 60 days after the agreement is signed by the Parties. The Parties acknowledge that a copy of this Agreement will be disclosed, without redactions, in accordance with the NTAA.

ARTICLE 15. 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 16. 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 17. 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 18. 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 two years from the Effective Date, whichever comes first.

ARTICLE 19. RIGHT TO TERMINATE

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

ARTICLE 20. 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 clauses shall survive such

expiration or termination of this Agreement.

ARTICLE 21. POINTS OF CONTACT

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

Technical Points of Contact

NASA
Justin Littell
Marshall Space Flight Center
MSFC/EM32
Huntsville, AL 35812
256-961-2335
Justin.A.Littell@nasa.gov

Spirit
Federico Gasco
3801 S. Oliver St.
Wichita, KS 67210
316-523-0672
Federico.gasco@spiritaero.com

ARTICLE 22. 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 23. MODIFICATIONS

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

ARTICLE 24. 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 25. 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 26. 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 27. LOAN OF GOVERNMENT PROPERTY

The parties shall enter into a NASA Form 893, Loan of NASA Equipment, for NASA equipment loaned to Partner.

ARTICLE 28. 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	Spirit AeroSystems Inc.
BY: _____	BY: _____
James L. Reuter	Phalguni DuBois
Associate Administrator, STMD	Procurement Agent
DATE: July 29, 2019	DATE: 7/23/19

RESPONSIBILITIES AND SCHEDULE DOCUMENT IS REQUIRED TO BE INCLUDED AS AN ATTACHMENT TO THE CENTER LETTER OF INTENT SUPPORTING THE PROPOSAL.

SUBMISSION OF A CENTER LETTER OF INTENT AND RESPONSIBILITY AND SCHEDULE DOCUMENT IN A FINAL ACO PROPOSAL INDICATES PROPOSER'S ACCEPTANCE OF THE RESPONSIBILITIES AND SCHEDULE DOCUMENT PROPOSED BY THE CENTER IF SELECTED FOR AWARD.

RESPONSIBILTIES AND SCHEDULE
DEVELOPED BY MSFC
TO SUPPORT ACO 2019 PROPOSAL SUBMITTED BY
SPIRIT AERO SYSTEMS COLLABORATIVE R&D

1. RESPONSIBILITIES

A. Marshal Space Flight Center will use reasonable efforts to:

1. Manufacture FSW tools
2. Develop procedures for FSW stiffeners to skin
3. Develop methods to help mitigate FSW distortion in stiffener to skin welds
4. Manufacture flat stiffener to skin panels with pad-ups
5. Develop butt joint FSW procedures
6. Develop methods to help mitigate FSW distortion in skin to skin welds
7. Receive material for full scale panel testing (Spirit Procured)
8. Perform FSW in accordance with developed procedures on full scale panels for both stiffener and panel butt joints.
9. Ship panels to Spirit partner for testing

B. Spirit Aero Systems Collaborative R&D will use reasonable efforts to:

1. Select alloys and design stiffener to skin geometry/configuration
2. Procure raw stiffener and skin material for the FSW development effort
3. Create FSW stiffener to skin trade
4. Perform crippling test
5. Create butt joint FSW trade
6. Evaluate butt joint trades FSW trade
7. Design panel structure with FSW tee joint & panel joint FSW
8. Manufacture skin with chemically milled pockets (4)
9. FSW Panel Testing
10. Redesign of barrel based of panel testing
11. Receive material for barrel production
12. Manufacturing skin with chemically milled pockets (8)
13. Ship skins to NASA for welding

The planned schedule for the activities with PROPOSER as defined in Paragraph 1. RESPONSIBILITIES are as follows:

Responsibility	Task Description	Completion Date
Spirit	Alloy Selection & Design	Dec. 2019
Spirit	Procure Raw Stiffener And Skin Material For The FSW Development Effort	Dec. 2019
NASA	Manufacture FSW Tooling and Tools	Feb. 2020
NASA	Develop Methods To Help Mitigate FSW Distortion In Stiffener To Skin Welds (Tack Weld)	Jun. 2020
NASA	Develop Procedures For FSW Stiffener To Skin	Jun. 2020
Spirit	Create FSW Stiffener To Skin Trade	Jun. 2020
NASA	Manufacture & Weld Flat Stiffener To Skin Panels With Pad-Ups	Oct. 2020
Spirit	Crippling Testing	Dec. 2020
NASA	Develop Butt Joint FSW Procedures	Jul. 2020
NASA	Develop Methods To Help Mitigate FSW Distortion In Butt Welds	Jun. 2020
Spirit	Create Butt Joint FSW Trade	Aug. 2020
Spirit	Butt Joint Trade	Sep. 2020
Spirit	Design Panel Structure With FSW Tee Joint & Panel Joint FSW	Feb. 2021
Spirit	Receive Material For Full Scale Panels	Mar. 2021
Spirit	Manufacture Skin With Chemically Milled Pockets (4)	May. 2021
NASA	Perform FSW In Accordance With Developed Procedures On Full Scale Panels For Both Tee Joint And Panel Joint	Jul. 2021
NASA	Ship To Spirit Partner For Panel Testing	Aug. 2021
Spirit	Partner Panel Testing	Dec. 2021

3. POINTS OF CONTACT

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

NASA George C. Marshall Space Flight Center	Spirit Aero Systems Collaborative R&D
Justin Littell Team Lead: Welding and Manufacturing Mail Suite: EM32 Marshall Space Flight Center, AL 35812 Phone: 256-961-2335 Justin.A.Littell@NASA.gov	Heath Misak Mechanical Engineer Ph.D. Metallurgical Engineer B PO Box 7830008 Wichita , KS 672780008 Phone: 316-523-3321 heath.e.misak@spiritaero.com

4. MODIFICATIONS

Any modification to this Responsibilities and Schedule document set forth herein after award shall be documented in writing, and signed by both the MARSHAL SPACE FLIGHT CENTER and the Spirit Aero Systems Collaborative R&D. Modification of this Responsibilities and Schedule document does not modify the terms of the Space Act Agreement.

5. SIGNATORY AUTHORITY

The signatory to this Responsibilities and Schedule document represents and warrants that he/she has authority to commit MARSHAL SPACE FLIGHT CENTER to support Spirit Aero Systems Collaborative R&D if selected for award.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

MARSHAL SPACE FLIGHT CENTER

BY: Kae Meyer
David M. Burns, Ph.D.
Director
Science and Technology Office

DATE: 5-10-2019