

National Aeronautics and  
Space Administration  
  
**Ames Research Center**  
Moffett Field, CA 94035-0001



Reply to Attn of: JAI: 241-1

DATE: April 18, 2014  
TO: Offerors  
FROM: Contracting Officer, NASA ARC  
SUBJECT: RFQ# NNA14508776Q-AMD  
"Joint Attachment Techniques for HEEET - Phase 1"

Attached is Request for Quotes (RFQ) # NNA14508776Q-AMD for "Joint Attachment Techniques for HEEET (Heatshield for Extreme Entry Environment and Technology) Phase 1". This requirement was summarized in the Synopsis that was publicized by NASA and FedBizopps.gov on April 3, 2014.

The following documents are included for your review to enable your preparation of a quotation to be submitted to NASA Ames Research Center (ARC) in response to this RFQ:

- 1) Solicitation Instructions, Provisions and Clauses
- 2) Statement of Work, April 18, 2014 (**replaces** Draft SOW posted and dated April 3, 2014)

**All contractual and/or technical questions must be submitted in writing (e-mail) by May 5, 2014.** Telephone questions will not be accepted. Please address any comments or questions to: Marianne Shelley, Contracting Officer, NASA Ames Research Center. Email: [Marianne.Shelley@nasa.gov](mailto:Marianne.Shelley@nasa.gov). Any responses to questions submitted will be posted at this website.

Offers for the items described in this RFQ (**quotations**) are due by **1:00 pm Pacific time May 12, 2014 or sooner**, and shall be delivered to Marianne Shelley, by EMAIL to [Marianne.Shelley@nasa.gov](mailto:Marianne.Shelley@nasa.gov). Offers must be in MS Office and/or Adobe pdf. file formats. Offers must include all of the required information as indicated on the following pages.

Cordially,

Contracting Officer  
NASA Ames Research Center

**SOLICITATION TABLE OF CONTENTS**

|           |  |          |
|-----------|--|----------|
| <b>A.</b> | <b>INSTRUCTIONS TO OFFERORS.....</b>   | <b>3</b> |
| 1.        | <i>Cover letter</i> .....  | 3        |
| 2.        | <i>Quotation (Price)</i> .....   | 3        |
| 3.        | <i>Technical Capability Statement</i> .....  | 3        |
| 4.        | <i>Past Experience of the Offeror</i> .....  | 4        |
| 5.        | <i>System for Award Management and Offeror’s Representations and Certifications (Reps &amp; Certs)</i> .....     | 4        |
| <br>      |  |          |
| <b>B.</b> | <b>SOLICITATION PROVISIONS .....</b>   | <b>5</b> |
| 1.        | <i>Protests to NASA (NASA FAR 1852.233-70) (OCT 2002)</i> .....  | 5        |
| 2.        | <i>Evaluation - Other Than Commercial Items (NASA FAR 1852.213-71) (JUN 2002) (Modified APR 2014)</i> .....      | 5        |
| 3.        | <i>Restriction on funding Activity with China – Representation (NFS 1852.225-72)</i> .                           | 6        |
| <br>      |  |          |
| <b>C.</b> | <b>TERMS AND CONDITIONS OF ORDER (GENERAL - OTHER THAN COMMERCIAL ITEMS) .....</b>                               | <b>7</b> |
| 1.        | <i>Clauses Incorporated by Reference (FAR 52.252-2) (FEB 1998)</i> .....   | 7        |
| 2.        | <i>Firm Fixed Price (NFS 1852.216-78) (DEC 1988)</i> .....   | 7        |
| 3.        | <i>Ombudsman (NFS 1852.215-84) (NOV 2011)</i> .....  | 7        |
| 4.        | <i>Phased Acquisition Using Down-Selection Procedures (NFS 1852.217-71) (NOV 2011)</i> .....                     | 8        |
| 5.        | <i>Restriction on Funding Activity with China (NFS 1852.225-71)</i> .....  | 9        |
| 6.        | <i>Designation of New Technology Representative and Patent Representative (NFS 1827.227-72) (JUL 1997)</i> ..... | 9        |
| 7.        | <i>Technical Direction (NFS 1852.242-70) (SEP 1993)</i> .....  | 10       |
| 8.        | <i>Release of Sensitive Information (NFS 1852.237-73) (JUN 2005)</i> .....                                       | 10       |
| 9.        | <i>Advance Notice of Shipment (NFS 1852.247-72) (OCT 1988)</i> .....   | 12       |
| 10.       | <i>Management and Protection of Data (ARC 52.227-93) (JUL 1988)</i> .....  | 12       |
| 11.       | <i>Handling of Data (ARC 52.227-96) (JUN 1989)</i> .....   | 13       |
| 12.       | <i>Subcontracting and Data Rights (ARC 52.227-97) (NOV 2010)</i> .....   | 13       |
| 13.       | <i>Information Incidental to Contract Administration (ARC 52.227-98) (OCT 2004)</i> 14                           |          |
| 14.       | <i>Period of Performance</i> .....   | 14       |

|            |  |           |
|------------|--|-----------|
| <b>15.</b> | <b><i>Place of Performance</i></b> .....   | <b>14</b> |
| <b>16.</b> | <b><i>Delivery and/or Completion Schedule</i></b> .....  | <b>14</b> |
| <b>17.</b> | <b><i>Delivery Instructions</i></b> .....  | <b>14</b> |
| <b>18.</b> | <b><i>Submission of Invoices (ARC 52.232-90) (JUN 2008) (Modified JAN 2012)</i></b> ....                     | <b>15</b> |
| <b>19.</b> | <b><i>Representations, Certification and Other Statements of Offeror (Simplified Acquisitions)</i></b> ..... | <b>15</b> |
| <b>20.</b> | <b><i>Statement of Work</i></b> .....  | <b>15</b> |

**A. INSTRUCTIONS TO OFFERORS**

Each quotation submitted by the offeror in response to this RFQ shall contain the following information:

**1. Cover letter**

Include a cover letter that includes the following information:

- a) A statement of acceptance of the purchase order provisions and clauses, and proposed schedule, or specific exceptions taken to any of the terms and conditions. Include a written acknowledgement of any solicitation amendments, if posted. A statement that your company's proposal is firm for a period of not fewer than 60 days.
- b) Includes the names, telephone numbers, and email addresses of person(s) to be contacted for technical and contractual questions.
- c) A statement that, if selected, your company is willing and capable of performing the anticipated work for all future phases of this acquisition.
- d) Letter shall be signed by an official authorized to contractually bind your company.

**2. Quotation (Price)**

**Provide a firm fixed price for each task your company proposes to perform for NASA.**

Offerors may provide a quotation for any combination or all of the following tasks described in the Statement of Work:

- (1) TASK 1 (Phase I): Manufacturing Demonstration of a NASA-proposed joint enhancement technique: Butt Joint with Angled Stitch.
- (2) TASK 2 (Phase I): Manufacturing Demonstration of a NASA-proposed joint enhancement technique: Angled Joint with Angled or Normal Stitch.
- (3) TASK 3: (Phase I) Manufacturing Demonstration of a NASA-proposed joint enhancement technique: Tufted Butt Joint with Angled Stitch.
- (4) TASK 4 (Phase I): Manufacturing Demonstration of a NASA proposed joint enhancement technique: Tufted Angled Joint with Angled or Normal Stitch.

**3. Technical Capability Statement**

Offerors shall submit a written document that describes the technical capability of the offeror, and how it proposes to successfully perform the work described in the Statement of Work. **\*\*Specifically, address each of the numbered items below, including a negative response. A response that does not address each item will be scored as "not capable" in that numbered item.**

1. Plans, schedule, and approaches for completing each task element as appropriate. Provide some indication of costs and schedules for modifications of current facilities, if required, to accommodate Tasks 1-4.
2. Current capability to stitch or tuft large area substrates. Provide current maximum dimensions for substrate (including thickness) that offeror has worked with.
3. Current capability to stitch or tuft high density weaves. A high fiber volume fraction material that is up to 4" thick may be needed for this application. Is the stitching (or equivalent) process amenable to such thicknesses?
  - a. The Woven TPS system may consist of a high density (50+ volume percent) carbon outer layer with a lower density weave beneath. The outer layer may comprise between ¼ and ½ the total thickness of the part.
4. Current capability to stitch at a non-surface normal angle. Provide maximum off-nominal angle stitched to date and any additional capability information.
5. Current capability information on yarns (provide chemical composition, denier etc. if available) that offeror has stitched with.

6. Provide information on previous efforts to join or stitch representative (woven) substrates. Provide details of approach, seam design, properties of joint if applicable.
7. Provide information on evaluation of woven substrate stitched area for damage as a result of the stitching process (NDE or other).
8. Offeror's ability to stitch material draped over a gentle radius of curvature.
  - a. Stitching at a non-normal angle with respect to the material surface, up to 60 degrees off-normal.
  - b. Stitching along compound curvature shapes
9. If draping is not possible for stitching is there an alternative approach proposed to allow such stitching?

There is no page limitation to this section of the quotation. The information to be submitted for this procurement may be a duplicate of information previously submitted for other NASA or Government solicitations, or in response to Requests for Information (RFIs). Photographs of facilities and stitching work, resumes, and brochures are also acceptable if they communicate the technical capability of the offeror.

#### **4. Past Experience of the Offeror**

Offerors shall submit relevant information that describes the offeror's past experience performing similar stitch work for Government customers. Include a list of 3 relevant contracts which demonstrate the offeror's capabilities to perform this requirement. Include the contract numbers; Government agency or industry placing the contract; Contracting Officer's telephone number and email address; dates of performance, and a brief description of offeror's part of the work and the total dollar value of the offeror's portion. Industry contracts involving subcontracting to another company that may have a prime contract with some area of the government may be included. If no previous Government contract, include a description of work performed for private customers (Customer name, contact information, dates performed).

Describe your company's financial condition, and its capability to perform all phases of the intended work of this acquisition. The Government will use the information submitted in this section to evaluate the offeror's capability to perform the work for not only Phase 1, but also the offeror's capability to perform all future phases of this acquisition (NFS 1817.7301-2).

#### **5. System for Award Management and Offeror's Representations and Certifications (Reps & Certs)**

Offerors shall confirm that their company is currently registered at the System for Award Management ([www.sam.gov](http://www.sam.gov)), that the offeror has completed the annual representations and certifications and all information posted on SAM is current. List the company's CAGE and DUNS number. No award is possible if the offeror is not registered at SAM.

**B. SOLICITATION PROVISIONS**

**1. Protests to NASA (NASA FAR 1852.233-70) (OCT 2002)**

Potential bidders or offerors may submit a protest under 48 CFR Part 33 (FAR Part 33) directly to the Contracting Officer. As an alternative to the Contracting Officer's consideration of a protest, a potential bidder or offeror may submit the protest to the Assistant Administrator for Procurement, who will serve as or designate the official responsible for conducting an independent review. Protests requesting an independent review shall be addressed to Assistant Administrator for Procurement, NASA Code H, Washington, DC 20546-0001.

(End of provision)

**2. Evaluation - Other Than Commercial Items (NASA FAR 1852.213-71) (JUN 2002)  
(Modified APR 2014)**

(a) In accordance with FAR 13.106 (Soliciting competition, evaluation of quotations or offers, award and documentation), the Government will award a contract resulting from this solicitation to the responsible offeror(s) whose offer conforming to the solicitation will be most advantageous to the Government, price and other factors considered. The following factors, listed in descending order of importance, shall be used to evaluate and determine the offers which will provide the best value to the Government:

1) Technical capability of the offeror:

- a. Evaluation of offeror's plans, schedule, and approaches for completing each task element as appropriate. Evaluation of proposed costs and schedules for modifications of current facilities, if required, to accommodate Tasks 1-4.
- b. Evaluation of offeror's current capability to stitch or tuft large area substrates. Evaluation of offeror's current maximum dimensions for substrate (including thickness) that offeror has worked with.
- c. Evaluation of offeror's current capability to stitch or tuft high density weaves, including if the stitching (or equivalent) process is amenable to a high fiber volume fraction material that is up to 4" thicknesses.
- d. Evaluation of offeror's current capability to stitch at a non-surface normal angle, including the maximum off-nominal angle stitched to date and any additional capability information.
- e. Evaluation of offeror's information provided on yarns (chemical composition, denier etc.) that offeror has stitched with.
- f. Evaluation of offeror's previous efforts to join or stitch representative (woven) substrates, including details of approach, seam design, properties of joint if applicable.
- g. Offeror's evaluation of woven substrate stitched area for damage as a result of the stitching process (NDE or other).
- h. Evaluation of offeror's ability to stitch material draped over a gentle radius of curvature, including stitching at a non-normal angle with respect to the material surface, up to 60 degrees off-normal, and stitching along compound curvature shapes.
- i. An evaluation of alternative approaches proposed to allow such stitching if draping is not possible

2) Past performance and contractor capability:

- a. Evaluation of contractor's performance on similar government/NASA contracts, and/or other types of contracts.

- b. Evaluation of the offeror's ability to perform all future phases of the procurement.
- c. Responsibility of the vendor.

3) Price:

- A. Price reasonableness of the quoted price for each proposed task.

(b) As a result of this solicitation, the Government intends to award multiple purchase orders to more than one vendor to perform this requirement. Award will be made to that group of offerors that offer the best value to the Government with consideration given to the offered technical capability, past performance, and total price of the offered items, as well as the offerors' capability to successfully perform the required work not only for this Phase 1, but also, all of the anticipated future phases of this acquisition. That said, any purchase order awarded as a result of this solicitation will be for the instant requirement described in this Statement of Work only.

(End of provision)

**3. Restriction on funding Activity with China – Representation (NFS 1852.225-72)**

(a) Definition - "China" or "Chinese-owned" means the People's Republic of China, any company owned by the People's Republic of China or any company incorporated under the laws of the People's Republic of China.

(b) Public Laws 112-10, Section 1340(a) and 112-55, Section 536, restrict NASA from contracting to participate, collaborate, or coordinate bilaterally in any way with China or a Chinese-owned company with funds appropriated on or after April 25, 2011. Contracts for commercial and non-developmental items are excepted from the prohibition as they constitute purchase of goods or services that would not involve participation, collaboration, or coordination between the parties.

(c) Representation. By submission of its offer, the offeror represents that the offeror is not China or a Chinese-owned company.

(End of provision)

**C. TERMS AND CONDITIONS OF ORDER (GENERAL - OTHER THAN COMMERCIAL ITEMS)**

Open Market Supply or Service: This is an order for a non-commercial item or service subject to the terms and conditions of **FAR 52.213-4, Terms and Conditions - Simplified Acquisitions (Other Than Commercial Items)**, incorporated by reference, and any additional terms and conditions incorporated by reference or included in full text as indicated below.

**1. Clauses Incorporated by Reference (FAR 52.252-2) (FEB 1998)**

This contract incorporates one or more clauses by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. Also, the full text of a clause may be accessed electronically at this/these address(es):

Federal Acquisition Regulation (FAR) clauses:

<http://www.acquisition.gov/far/index.html>

NASA FAR Supplement (NFS) clauses:

<http://www.hq.nasa.gov/office/procurement/regs/nfstoc.htm>

This order incorporates the following FAR and NASA FAR Supplement (NFS) clauses by reference. **See paragraph (c) of FAR 52.213-4.**

|                 |   |          |
|-----------------|---|----------|
| FAR 52.204-7    | System for Award Management   | JUL 2013 |
| FAR 52.227-11   | Patent Rights – Ownership by the Contractor (as modified by NFS 1852.227-11 Patent Rights – Retention by the Contractor (Short Form) <i>(applies to small businesses)</i> ) | DEC 2007 |
| FAR 52.227-14   | Rights in Data - General Alt II (DEC 2007), Alt III (DEC 2007), Alt V (DEC 2007) (As Modified By NFS 1852.227-14, Rights in Data – General)                                 | DEC 2007 |
| FAR 52.247-34   | FOB Destination   | NOV 1991 |
| NFS 1852.223-72 | Safety and Health (Short Form).   | APR 2002 |
| NFS 1852.225-70 | Export Licenses. <i>(Insert: “NASA Ames Research Center” in paragraph (b))</i>  | FEB 2000 |
| NFS 1852.227-70 | New Technology <i>(applies to large businesses)</i>   | May 2002 |

(End of clause)

**2. Firm Fixed Price (NFS 1852.216-78) (DEC 1988)**

The total firm fixed price of this contract is \$ \_\_\_TBD\_\_\_\_\_.

(End of clause)

**3. Ombudsman (NFS 1852.215-84) (NOV 2011)**

(a) An ombudsman has been appointed to hear and facilitate the resolution of concerns from offerors, potential offerors, and contractors during the preaward and postaward phases of this acquisition. When requested, the ombudsman will maintain strict confidentiality as to the source of the concern. The existence of the ombudsman is not to diminish the authority of the contracting officer, the Source Evaluation Board,

or the selection official. Further, the ombudsman does not participate in the evaluation of proposals, the source selection process, or the adjudication of formal contract disputes. Therefore, before consulting with an ombudsman, interested parties must first address their concerns, issues, disagreements, and/or recommendations to the contracting officer for resolution.

(b) If resolution cannot be made by the contracting officer, interested parties may contact the installation ombudsman, whose name, address, telephone number, facsimile number, and e-mail address may be found at: [http://prod.nais.nasa.gov/pub/pub\\_library/Omb.html](http://prod.nais.nasa.gov/pub/pub_library/Omb.html) . Concerns, issues, disagreements, and recommendations which cannot be resolved at the installation may be referred to the Agency ombudsman identified at the above URL. Please do not contact the ombudsman to request copies of the solicitation, verify offer due date, or clarify technical requirements. Such inquiries shall be directed to the Contracting Officer or as specified elsewhere in this document.

(End of clause)

#### **4. Phased Acquisition Using Down-Selection Procedures (NFS 1852.217-71) (NOV 2011)**

(a) This solicitation is for the acquisition of Phase 1 - Joint Attachment Techniques for HEEET (Heatshield for Extreme Entry Environment and Technology). The acquisition will be conducted as a two-phased procurement using a competitive down-selection technique between phases. In this technique, two or more contractors will be selected for Phase 1. It is expected that a single contractor for Phase 2 will be chosen from among these contractors after a competitive down-selection.

(b) Phase 1 is for the manufacturing demonstration of various joint attachment techniques on one-inch or thicker woven carbon fabric using carbon fiber based threads. Phase 2 is for manufacturing scale-up as outlined in the Statement of Work.

(c) The competition for Phase 2 will be based on the results of Phase 1, and the award criteria for Phase 2 will include successful completion of Phase 1 requirements.

(d) NASA will issue a separate, formal solicitation for Phase 2 that will include all information required for preparation of proposals, including the final evaluation factors.

(e) Phase 2 will be synopsisized in the Governmentwide Point of Entry (GPE) in accordance with [FAR 5.201](#) and [5.203](#) unless one of the exceptions in [FAR 5.202](#) applies. Notwithstanding NASA's expectation that only the Phase 1 contractors will be capable of successfully competing for Phase 2, all proposals will be considered. Any other responsible source may indicate its desire to submit a proposal by responding to the Phase 2 synopsis, and NASA will provide that source a solicitation.

(f) To be considered for Phase 2 award, offerors must demonstrate a design maturity equivalent to that of the Phase 1 contractors. This demonstration shall include the following Phase 1 deliverables upon which Phase 2 award will be based:

- (1) TASK 1 (Phase I): Manufacturing Demonstration of a NASA-proposed joint enhancement technique: Butt Joint with Angled Stitch, and/or
- (2) TASK 2 (Phase I): Manufacturing Demonstration of a NASA-proposed joint enhancement technique: Angled Joint with Angled or Normal Stitch, and/or
- (3) TASK 3: (Phase I) Manufacturing Demonstration of a NASA-proposed joint enhancement technique: Tufted Butt Joint with Angled Stitch, and/or
- (4) TASK 4 (Phase I): Manufacturing Demonstration of a NASA proposed joint enhancement technique: Tufted Angled Joint with Angled or Normal Stitch.

Failure to fully and completely demonstrate the appropriate level of design maturity may render the proposal unacceptable with no further consideration for contract award.

(g) The following draft Phase 2 evaluation factors are provided for your information. Please note that these evaluation factors are not final, and NASA reserves the right to change them at any time up to and

including the date upon which Phase 2 proposals are solicited.

- Demonstration of successful completion of Phase 1 requirements
- Price reasonableness of the quoted price for each type design
- Capability of the offeror to perform the remaining phases
- Responsibility of offeror

(h) Although NASA will request Phase 2 proposals from Phase 1 contractors, submission of the Phase 2 proposal is not a requirement of the Phase 1 contract. Accordingly, the costs of preparing these proposals shall not be a direct charge to the Phase 1 contract or any other Government contract.

(i) The anticipated schedule for conducting this phased procurement is provided for your information. These dates are projections only and are not intended to commit NASA to complete a particular action at a given time.

Phase 1 award – June 1, 2014

Phase 2 synopsis – September 1, 2014

Phase 2 proposal requested – September 15, 2014

Phase 2 proposal receipt – October 1, 2014

Phase 2 award – November 1, 2014

(End of clause)

#### 5. **Restriction on Funding Activity with China (NFS 1852.225-71)**

(a) Definition - "China" or "Chinese-owned company" means the People's Republic of China, any company owned by the People's Republic of China or any company incorporated under the laws of the People's Republic of China.

(b) Public Laws 112-10, Section 1340(a) and 112-55, Section 539, restrict NASA from contracting to participate, collaborate, coordinate bilaterally in any way with China or a Chinese-owned company using funds appropriated on or after April 25, 2011. Contracts for commercial and non developmental items are exempted from the prohibition because they constitute purchase of goods or services that would not involve participation, collaboration, or coordination between the parties.

(c) This contract may use restricted funding that was appropriated on or after April 25, 2011. The contractor shall not contract with China or Chinese-owned companies for any effort related to this contract except for acquisition of commercial and non-developmental items. If the contractor anticipates making an award to China or Chinese-owned companies, the contractor must contact the contracting officer to determine if funding on this contract can be used for that purpose.

(d) Subcontracts - The contractor shall include the substance of this clause in all subcontracts made hereunder.

(End of clause)

#### 6. **Designation of New Technology Representative and Patent Representative (NFS 1827.227-72) (JUL 1997)**

(a) For purposes of administration of the clause of this contract entitled "New Technology" or "Patent Rights - Retention by the Contractor (Short Form)(NFS 1852.227-11)," whichever is included, the following named representatives are hereby designated by the Contracting Officer to administer such clause:

|   |  |
|---|--|
| New Technology Representative<br>NASA Ames Research Center<br>c/o Gail.V.Woll<br><a href="mailto:Gail.V.Woll@nasa.gov">Gail.V.Woll@nasa.gov</a><br>M/S 202A-3 (Code VP)<br>Moffett Field, CA 94035-0001 | Patent Representative<br>NASA Ames Research Center<br>M/S 202A-4 (Code DL)<br>Moffett Field, CA 94035-0001 |
|---|--|

(b) Reports of reportable items, and disclosure of subject inventions, interim reports, final reports, utilization reports, and other reports required by the clause, as well as any correspondence with respect to

such matters, should be directed to the New Technology Representative unless transmitted in response to correspondence or request from the Patent Representative. Inquires or requests regarding disposition of rights, election of rights, or related matters should be directed to the Patent Representative. This clause shall be included in any subcontract hereunder requiring a "New Technology" clause or "Patent Rights - Retention by the Contractor (Short Form)" clause, unless otherwise authorized or directed by the Contracting Officer. The respective responsibilities and authorities of the above-named representatives are set forth in 1827.305-370 of the NASA FAR Supplement.

(End of clause)

**7. Technical Direction (NFS 1852.242-70) (SEP 1993)**

(a) Performance of the work under this contract is subject to the written technical direction of the Contracting Officer Technical Representative (COTR or COR), who shall be specifically appointed by the Contracting Officer in writing in accordance with NASA FAR Supplement 1842.270. "Technical direction" means a directive to the Contractor that approves approaches, solutions, designs, or refinements; fills in details or otherwise completes the general description of work or documentation items; shifts emphasis among work areas or tasks; or furnishes similar instruction to the Contractor. Technical direction includes requiring studies and pursuit of certain lines of inquiry regarding matters within the general tasks and requirements in the Statement of Work for this contract.

(b) The COTR does not have the authority to, and shall not, issue any instruction purporting to be technical direction that -

- (1) Constitutes an assignment of additional work outside the statement of work;
- (2) Constitutes a change as defined in the changes clause;
- (3) Constitutes a basis for any increase or decrease in the total estimated contract cost, the fixed fee (if any), or the time required for contract performance;
- (4) Changes any of the expressed terms, conditions, or specifications of the contract; or
- (5) Interferes with the Contractor's rights to perform the terms and conditions of the contract.

(c) All technical direction shall be issued in writing by the COTR.

(d) The Contractor shall proceed promptly with the performance of technical direction duly issued by the COTR in the manner prescribed by this clause and within the COTR's authority. If, in the Contractor's opinion, any instruction or direction by the COTR falls within any of the categories defined in paragraph (b) of this clause, the Contractor shall not proceed but shall notify the Contracting Officer in writing within 5 working days after receiving it and shall request the Contracting Officer to take action as described in this clause. Upon receiving this notification, the Contracting Officer shall either issue an appropriate contract modification within a reasonable time or advise the Contractor in writing within 30 days that the instruction or direction is -

- (1) Rescinded in its entirety; or
- (2) Within the requirements of the contract and does not constitute a change under the changes clause of the contract, and that the Contractor should proceed promptly with its performance.

(e) A failure of the Contractor and contracting officer to agree that the instruction or direction is both within the requirements of the contract and does not constitute a change under the changes clause, or a failure to agree upon the contract action to be taken with respect to the instruction or direction, shall be subject to the Disputes clause of this contract.

(f) Any action(s) taken by the Contractor in response to any direction given by any person other than the Contracting Officer or the COTR shall be at the Contractor's risk.

(End of clause)

**8. Release of Sensitive Information (NFS 1852.237-73) (JUN 2005)**

(a) As used in this clause, "Sensitive information" refers to information, not currently in the public domain, that the Contractor has developed at private expense, that may embody trade secrets or commercial or financial information, and that may be sensitive or privileged.

(b) In accomplishing management activities and administrative functions, NASA relies heavily on the

support of various service providers. To support NASA activities and functions, these service providers, as well as their subcontractors and their individual employees, may need access to sensitive information submitted by the Contractor under this contract. By submitting this proposal or performing this contract, the Contractor agrees that NASA may release to its service providers, their subcontractors, and their individual employees, sensitive information submitted during the course of this procurement, subject to the enumerated protections mandated by the clause at 1852.237-72, Access to Sensitive Information.

(c) (1) The Contractor shall identify any sensitive information submitted in support of this proposal or in performing this contract. For purposes of identifying sensitive information, the Contractor may, in addition to any other notice or legend otherwise required, use a notice similar to the following:

Mark the title page with the following legend:

This proposal or document includes sensitive information that NASA shall not disclose outside the Agency and its service providers that support management activities and administrative functions. To gain access to this sensitive information, a service provider's contract must contain the clause at NFS 1852.237-72, Access to Sensitive Information. Consistent with this clause, the service provider shall not duplicate, use, or disclose the information in whole or in part for any purpose other than to perform the services specified in its contract. This restriction does not limit the Government's right to use this information if it is obtained from another source without restriction. The information subject to this restriction is contained in pages [*insert page numbers or other identification of pages*]. Mark each page of sensitive information the Contractor wishes to restrict with the following legend:

*Use or disclosure of sensitive information contained on this page is subject to the restriction on the title page of this proposal or document.*

(2) The Contracting Officer shall evaluate the facts supporting any claim that particular information is "sensitive." This evaluation shall consider the time and resources necessary to protect the information in accordance with the detailed safeguards mandated by the clause at 1852.237-72, Access to Sensitive Information. However, unless the Contracting Officer decides, with the advice of Center counsel, that reasonable grounds exist to challenge the Contractor's claim that particular information is sensitive, NASA and its service providers and their employees shall comply with all of the safeguards contained in paragraph (d) of this clause.

(d) To receive access to sensitive information needed to assist NASA in accomplishing management activities and administrative functions, the service provider must be operating under a contract that contains the clause at 1852.237-72, Access to Sensitive Information. This clause obligates the service provider to do the following:

(1) Comply with all specified procedures and obligations, including the Organizational Conflicts of Interest Avoidance Plan, which the contract has incorporated as a compliance document.

(2) Utilize any sensitive information coming into its possession only for the purpose of performing the services specified in its contract.

(3) Safeguard sensitive information coming into its possession from unauthorized use and disclosure.

(4) Allow access to sensitive information only to those employees that need it to perform services under its contract.

(5) Preclude access and disclosure of sensitive information to persons and entities outside of the service provider's organization.

(6) Train employees who may require access to sensitive information about their obligations to utilize it only to perform the services specified in its contract and to safeguard it from unauthorized use and

disclosure.

(7) Obtain a written affirmation from each employee that he/she has received and will comply with training on the authorized uses and mandatory protections of sensitive information needed in performing this contract.

(8) Administer a monitoring process to ensure that employees comply with all reasonable security procedures, report any breaches to the Contracting Officer, and implement any necessary corrective actions.

(e) When the service provider will have primary responsibility for operating an information technology system for NASA that contains sensitive information, the service provider's contract shall include the clause at 1852.204-76, Security Requirements for Unclassified Information Technology Resources. The Security Requirements clause requires the service provider to implement an Information Technology Security Plan to protect information processed, stored, or transmitted from unauthorized access, alteration, disclosure, or use. Service provider personnel requiring privileged access or limited privileged access to these information technology systems are subject to screening using the standard National Agency Check (NAC) forms appropriate to the level of risk for adverse impact to NASA missions. The Contracting Officer may allow the service provider to conduct its own screening, provided the service provider employs substantially equivalent screening procedures.

(f) This clause does not affect NASA's responsibilities under the Freedom of Information Act.

(g) The Contractor shall insert this clause, including this paragraph (g), suitably modified to reflect the relationship of the parties, in all subcontracts that may require the furnishing of sensitive information.

(End of clause)

**9. Advance Notice of Shipment (NFS 1852.247-72) (OCT 1988)**

Five (5) work days prior to shipping joint attachment demonstration items to NASA, the Contractor shall furnish the anticipated shipment date, bill of lading number (if applicable), and carrier identity to [TBD] and to the Contracting Officer.

(End of clause)

**10. Management and Protection of Data (ARC 52.227-93) (JUL 1988)**

(a) In the performance of this contract it is anticipated that the Contractor may have access to, be furnished, use, or generate the following types of data (recorded information):

- 1) data submitted to the Government with limited rights or restricted rights notices;
- (2) data of third parties which the Government has agreed to handle under protective arrangements; and
- (3) data generated by or on behalf of the Government which the Government intends to control the use and dissemination thereof.

(b) In order to provide management appropriate for protecting the interests of the Government and other owners of such data, the Contractor agrees with respect to data in category (a)(1) above, and with respect to any data in categories (a)(2) and (a)(3) when so identified by the Contracting Officer, to:

- (1) use and disclose such data only to the extent necessary to perform the work required under this contract, with particular emphasis on restricting disclosure of the data to those persons who have a definite need for the data in order to perform under this contract;
- (2) not reproduce the data unless reproduction of the data is specifically permitted elsewhere in the contract or by the Contracting Officer;
- (3) refrain from disclosing the data to third parties without the written consent of the Contracting Officer; and
- (4) return or deliver the data including all copies thereof to the Contracting Officer or his

designated recipient when requested by the Contracting Officer.

(End of clause)

**11. Handling of Data (ARC 52.227-96) (JUN 1989)**

(a) Paragraph (d)(I) of the “Rights in Data—General” clause of this contract permits the Government to restrict the Contractor's right to use, release to others, reproduce, distribute, or publish any data first produced or specifically used by the Contractor in the performance of the contract provided such restriction is expressly set forth in the contract. Pursuant to this authority, the following restrictions shall apply to such data and shall be included, in substance, in all subcontracts:

(b) Data specifically used.

(1) In the performance of this contract, it is anticipated the Contractor may have access, or be furnished, data (including financial, administrative, cost or pricing, or management information as well as technical data or computer software) of third parties which the Government has agreed to handle under protective arrangements, as well as such Government data for which the Government intends to control the use and dissemination.

(2) In order to protect the interests of the Government and the owners of such data, the Contractor agrees, with respect to such third party or Government data that is either marked with a restrictive legend or specifically identified in this contract or in writing by the Contracting Officer as being subject to this clause, to use and disclose such data only to the extent necessary to perform the work required under this contract, preclude disclosure of such data outside the Contractor's organization, and return or dispose of such data as directed by the Contracting Officer when the data is no longer needed for contract performance.

(3) Notwithstanding (2) above, the Contractor shall not be restricted in the use and disclosure of any data that becomes generally available without breach of this clause by this Contractor, is known to or is developed by the Contractor independently of any disclosure of proprietary, restricted, or confidential data hereunder, or is rightfully received by the Contractor from a third party without restriction.

(c) Data first produced.

Data first produced by the Contractor under this contract may include data for which the Government wants to control the use and dissemination. The Contracting Officer may require, or this contract may presently specify, that the Contractor apply restrictive legends to such identified data prior to delivery to the Government, or to third parties at the Government's direction, that restrict the use and disclosure of the data by any third party recipient. However, such restrictive legends shall in no way affect the Contractor's or the Government's rights to such data as provided in the "Rights in Data--General" clause of this contract.

(End of clause)

**12. Subcontracting and Data Rights (ARC 52.227-97) (NOV 2010)**

(a) The Contractor shall flow down the data rights provisions of this contract to lower tier subcontractors to ensure that it can fulfill its data rights obligations to the Government. See Clause FAR 52.227-14(h), Rights in Data—General. The Contractor shall be held responsible to obtain rights for the Government where it fails to fulfill such obligations.

Pursuant to Clause FAR 52.227-14(c)(2), the Contractor must obtain Contracting Officer approval before incorporating any data not first produced under the Contract into data delivered under the contract. Before delivering such data, the Contractor must identify it and grant the Government, or acquire on its behalf, the broad licenses required by subparagraph (c) of the Rights in Data—General clause.

(End of clause)

**13. Information Incidental to Contract Administration (ARC 52.227-98) (OCT 2004)**

NASA shall have unlimited rights in information incidental to contract administration including administrative and management information created by the Contractor and specified for delivery to NASA in performance of the contract, expressly excluding financial information. Specifically, NASA shall have the right to release such administrative and management information to any third party to satisfy NASA's requirements.

(End of clause)

**14. Period of Performance**

The period of performance of this contract is date of award through \_\_\_\_TBD\_\_\_\_.

(End of clause)

**15. Place of Performance**

The services to be performed under this contact shall be performed at the following location(s): (1) the Contractor's facilities at \_\_\_\_TBD\_\_\_\_, and (2) at such other locations as may be directed by the Contracting Officer.

(End of clause)

**16. Delivery and/or Completion Schedule**

The Contractor shall deliver and/or complete performance of the items required under this contract as follows:

| Due Date | Description                    | Acceptance Criteria  |
|----------|--------------------------------|--|
| TBD      | Task 1 stitching demonstration | Inspection and acceptance by Contracting Officer's Representative (COR) and CO |
| TBD      | Task 2 stitching demonstration | Inspection and acceptance by Contracting Officer's Representative (COR) and CO |
| TBD      | Task 3 stitching demonstration | Inspection and acceptance by Contracting Officer's Representative (COR) and CO |
| TBD      | Task 4 stitching demonstration | Inspection and acceptance by Contracting Officer's Representative (COR) and CO |
| TBD      | TBD                            | TBD  |

(End of clause)

**17. Delivery Instructions**

(a) The Contractor shall ship the items required under this contract to:

NASA Ames Research Center  
Marked for:  
Consignee: [ TBD]  
Contract Number: [ TBD]  
Organization/Office Code: TBD]  
Building No.: [ TBD]

(b) Unless otherwise authorized in advance by the Contracting Officer, deliveries under this contract shall be made between the hours of 8:00 a.m. and 5:00 p.m., Monday through Friday, excluding Federal

holidays.

(c) Additional delivery instructions: None

(d) Additional marking instructions: in accordance with Statement of Work

(End of clause)

**18. Submission of Invoices (ARC 52.232-90) (JUN 2008) (Modified JAN 2012)**

(a) Invoices shall be prepared and submitted to the designated billing and payment office noted below in accordance with FAR 52.232.25 Prompt Payment clause:

NASA Shared Services Center (NSSC)  
Financial Management Division (FMD)—Accounts Payable  
Bldg. 1111, Road C  
Stennis Space Center, MS 39529

Invoices shall include the Contractor's Taxpayer Identification Number (TIN). Electronic submission is preferred, via email [NSSC-AccountsPayable@nasa.gov](mailto:NSSC-AccountsPayable@nasa.gov) or fax 866-209-5415. A copy of the invoice shall be provided to the Contracting Officer.

(b) In the event that amounts are withheld from payment in accordance with the New Technology clause or other provisions of this contract, a separate invoice for the amount withheld shall be required before payment of that amount is made.

(c) This Contract  does  does not provide for partial payments. If applicable, payments will be made in accordance with the following schedule:

|   |
|---|
| Payment will be made for separately priced items which have been received and accepted by NASA, and upon receipt of a payable invoice submitted in accordance with this clause. |
|---|

(End of clause)

**19. Representations, Certification and Other Statements of Offeror (Simplified Acquisitions)**

The completed provision 52.204-8, Annual Representations and Certifications, (posted at System for Award Management) including any amended representation(s) made at paragraph (b) of the provision submitted as part of the quote are hereby incorporated by reference in this resulting order.

(End of clause)

**20. Statement of Work (attached to this RFQ)**

The Contractor shall provide the item or services specified in the Statement of Work (SOW) and contractor's proposal entitled "\_\_\_\_\_", dated \_\_\_\_\_ which is incorporated into this contract by reference as Attachment 1. The following pages of said proposal contain proprietary information, and shall therefore not be released outside of the Government: Page(s)\_\_\_\_\_.

(End of text)

# **Statement of Work**

## **Joint Attachment Techniques for HEEET**

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**Heatshield for Extreme Entry Environment Technology (HEEET) Project**

**April 18, 2014**



National Aeronautics and Space Administration  
Ames Research Center  
Moffett Field, California 94035-0001

## TABLE OF CONTENTS

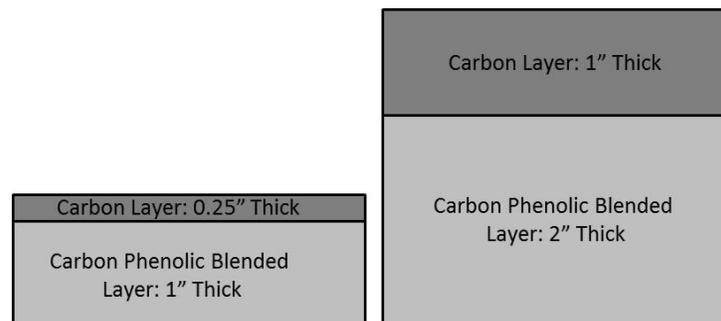
|            |  |          |
|------------|--|----------|
| <b>1.0</b> | <b>INTRODUCTION.....</b>                     | <b>1</b> |
| <b>2.0</b> | <b>SCOPE AND OBJECTIVES .....</b>            | <b>3</b> |
| <b>2.1</b> | <b>DELIVERABLES: .....</b>                   | <b>8</b> |
| <b>3.0</b> | <b>TASK REQUIREMENTS.....</b>                | <b>8</b> |
| <b>3.1</b> | <b>General.....</b>                          | <b>8</b> |
| <b>3.2</b> | <b>Planning and Coordination .....</b>       | <b>9</b> |
| <b>3.3</b> | <b>Site Visits.....</b>                      | <b>9</b> |
| <b>3.4</b> | <b>Process Assessment .....</b>              | <b>9</b> |
| <b>3.5</b> | <b>Materials Delivery Documentation.....</b> | <b>9</b> |

## 1.0 INTRODUCTION

The Heatshield for Extreme Entry Environment and Technology (HEEET) Project, funded by NASA's Space Technology Mission Directorate under the Game Changing Development Program (GCDP) seeks to mature a game changing Woven Thermal Protection System (WTPS) technology to enable in-situ robotic science missions recommended by the NASA Research Council (NRC) Planetary Science Decadal Survey (PSDS) committee. Current state of the art 3D weaving technologies place the various fibers in an optimized 3D configuration. The woven process results in panels approximately 24 inches wide with thicknesses from 1 to 3 inches depending on the mission. A traditional manufacturing and assembly approach would then infuse woven preforms with a resin, machine it to shape, and assemble as a tiled solution with an adhesive to fill the gaps between tiles. Such an adhesively bonded seam approach has significant challenges, not the least of which is the reduction in thermal-mechanical performance compared to that of the acreage woven material. A mechanically enhanced seam inserted into the assembly process either before or after resin infusion would offer many advantages compared to the traditional adhesively bonded approach.

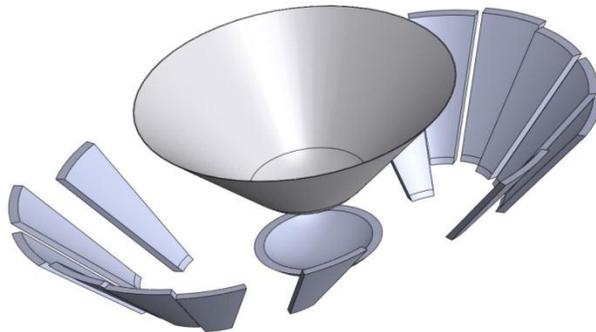
NASA Ames Research Center (ARC) plans to explore all forms of joint enhancement for the woven panels. Joint enhancement techniques such as stitching, tufting, z-pinning, or some alternative mechanical solution are all within scope of this SOW. It is essential that the joint be able to withstand harsh dynamic loading at launch, and temperature extremes while in the vacuum of space and during re-entry, and most importantly not adversely impact the recession and thermal performance of the system. Developing reliable joint enhancement using one of the aforementioned methods would provide a significant contribution for the successful development of woven TPS materials.

The woven goods for joining, at least for the first phase under this effort, are depicted in Figure 1. This architecture consists of a high density carbon layer with a fiber volume fraction of 55 percent, below which is a lower density insulating layer with a fiber volume fraction of 45 percent. This woven architecture is then infused with a resin. A layer to layer weave is utilized in HEEET which mechanically interlocks the different layers together in the thru-the-thickness direction. During flight, the majority of load across the joint is carried in the carbon layer at the outer surface of the vehicle. This is due to the stiffer nature of the weave, and consequently the post infused part. Figure 1 shows the relative thicknesses of material expected to be stitched in 2014 (left) and 2015 after weave scale up, currently in progress, is complete (right).



**Figure 1:** Depiction of the woven TPS material. 2014 thickness (Left) 2015 thickness (Right)

In future missions, woven panels up to 3 inches in thickness may be required in order to withstand the most demanding aerothermal environment such as during a Saturn re-entry. The HEEET project plans to design and manufacture a 1 meter diameter heat shield for a relevant mission as shown in Figure 2. Figure 2 details the spherical nose cap, and conical flanks of the TPS material. Each gore will have three joint interfaces, two at the two gores adjacent on the flank, and one joint with the nose cap. A similar joining technique at both the gore to gore interface, and the gore to nose cap interface is preferable.



**Figure 2: Exploded view of the Saturn heat shield and substructure.**

There are currently two options with which the heat shield will be joined together. The first method will dry bond the molded woven panels onto the carrier structure prior to resin infusion and prior to the joint enhancement technique. The carrier structure will reduce access to one side and will require a tufting or alternate joint enhancement technique. After joining, the heat shield is then infused with resin while bonded to the carrier structure. The second manufacturing methodology will join panels prior to assembly onto the carrier structure, allowing access to both sides of the woven material and a stitched solution.

Various joint design concepts investigated by NASA to date are provided in Figure 3. Elimination of the various options (as determined by NASA) is presented below. Yellow lines represent an elimination from the trade space, blue lines represent a backup design solution. The nature of the woven TPS material results in a high density all carbon surface layer with a lower density blended yarn insulating layer underneath. The stiffness variation between the two layers results in the majority of load transfer across the joint occurring in the carbon surface layer. Therefore, both larger compliance and strength between the carbon layers on either side of the joint is preferable.

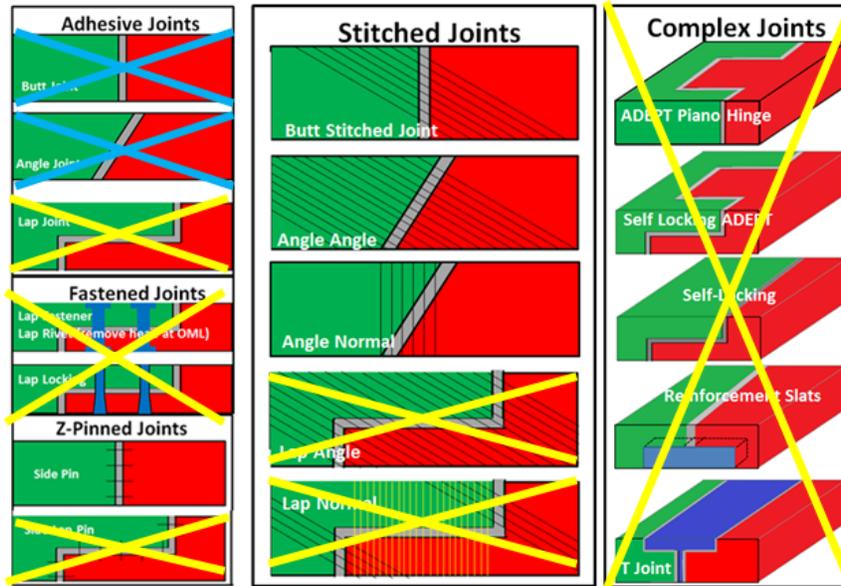


Figure 3: Baseline joint configuration.

The two baseline joint concepts are provided in Figure 4. The top image depicts a butt joint with an angle stitch. The bottom image depicts an angle joint with a normal stitch through the joint. These two joints will be investigated in Tasks 1 and 2, respectively, as described below.

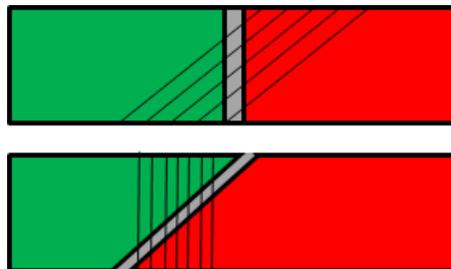


Figure 4: Baseline joint configuration.

**2.0 SCOPE AND OBJECTIVES**

This Statement of Work (SOW) defines the requirements for various seam joining techniques to support the HEEET project and eventual use on an Engineering Test Unit (ETU). This effort is anticipated to be conducted as a phased acquisition with down-selections for subsequent phases in accordance with NASA FAR Subpart 1817.73 Phased Acquisitions. This SOW describes the requirements for the initial Phase I procurement. Competition for subsequent phases will build on the testing results of previous phases. The award criteria for subsequent phases will include demonstrated completion of specified previous phase requirements. The Government expects that only the initial phase contractors will be capable of successfully competing for the subsequent phases, and proposals for the subsequent phases will be requested from these contractors. The Government does intend to issue a separate, formal solicitation for subsequent phases. Notwithstanding the expectation that only the initial phase contractors will be capable of successfully competing for the subsequent phases, proposals from all responsible sources submitted by the specified due date will be considered. In order to contend for subsequent phase

awards, however, such prospective offerors must demonstrate a design maturity equivalent to that of the prior phase contractors. Failure to fully and completely demonstrate the appropriate level of design maturity may render the proposal unacceptable with no further consideration for contract award.

Phase 1 of this Joint Attachment Techniques procurement consists of four Tasks as described below. Offerors are not required to propose to perform all 4 tasks. If an offeror's technical capabilities and expertise are in only one or several stitching capabilities, the offeror may propose to perform only those tasks in the offeror's area(s) of expertise. Therefore, for Phase 1, offerors may propose to perform a minimum of one to a maximum of four of the tasks described below. For Phase 1, NASA intends to award one or more non-commercial purchase orders under the procedures of FAR Part 13, Simplified Acquisitions.

**TASK 1 (Phase 1): Manufacturing Demonstration of a NASA-proposed joint enhancement technique: Butt Joint with Angled Stitch**

This task will investigate the feasibility of joining samples of woven carbon fabric using carbon fiber based threads or alternate joint enhancement options. The design concept for stitching will be the butt joint with an angle stitch. Stitch density shall be as high as possible with a maximum spacing of 1/4". Fiber reinforcement through stitching or tufting will be requested at some non-normal angle. Initially, NASA will deliver four samples of 2.875" x 6" x 1.25" thick to the vendor, and the four pieces will be joined to create two samples about 5.75" x 6" each. The seam will run along the 6-inch sides of the sample. One sample is for vendor practice trial. The second sample is for NASA evaluation purposes and 5-inches of the 6-inch joint width shall be stitched. If particular joining techniques are more amenable to assembly prior to infusion, after a light infusion, or after the full phenolic infusion, all options are viable and samples will be provided as proposed by the vendor. Stitching or attachment techniques utilized shall be extendable to thick samples with compound curvature. The vendor shall provide some insight into how they anticipate their joint enhancement approach would be scaled up for use on the ETU and even larger vehicles. Handling damage during stitching is one of the evaluation criteria. Additional evaluation criteria are listed below.

Task 1 Steps:

1. NASA delivers four samples of 2.875" x 6" x 1.25" thick woven material and an AS4-3k carbon based thread if required
2. Vendor manufactures Butt Joint with Angled Stitch joint concept, one practice sample
3. Vendor manufactures one sample material for NASA evaluation
4. Vendor delivers one sample material to NASA
5. Vendor provides report documenting the stitching technique utilized, including approaches, challenges, suggestions for scale-up approach for use on ETU and larger vehicles
6. NASA infuses, machines and tests Vendor's joint design

NASA evaluation of **Butt Joint with Angled Stitch** manufactured joints will be based on at least some or all of the following criteria:

1. Manufacturability

2. Ease of remaining assembly processes, including resin infusion, bonding, machining, etc
3. Minimization of damage to the pristine woven material
4. Minimization of thickness variation between post-stitched and pre-stitched material
5. Minimization of broken threads and needles during stitching operation
6. Pattern consistency of the automated/semi-automated/hand process proposed
7. Joint strength in tension and bending
8. Aerothermal performance

**TASK 2 (Phase 1): Manufacturing Demonstration of a NASA-proposed joint enhancement technique: Angled Joint with Angled or Normal Stitch**

This task will investigate the feasibility of joining samples of woven carbon fabric using carbon fiber based threads or alternate joint enhancement options. The design concept for stitching will be the angle joint with an angle or normal stitch. Stitch density shall be as high as possible with a maximum spacing of 1/4". Fiber reinforcement through stitching or tufting will be requested at some non-normal angle. Initially, NASA will deliver four samples of 2.875" x 6" x 1.25" thick to the vendor, and the four pieces will be joined to create two samples about 5.75" x 6" each. The seam will run along the 6-inch sides of the sample. One sample is for vendor practice trial. The second sample is for NASA evaluation purposes and 5-inches of the 6-inch joint width shall be stitched. If particular joining techniques are more amenable to assembly prior to infusion, after a light infusion, or after the full phenolic infusion, all options are viable and samples will be provided as proposed by the vendor. Stitching or attachment techniques utilized shall be extendable to thick samples with compound curvature. The vendor shall provide some insight into how they anticipate their joint enhancement approach would be scaled up for use on the ETU and even larger vehicles. Handling damage during stitching is one of the evaluation criteria. Additional evaluation criteria are listed below.

Task 2 Steps:

1. NASA delivers four samples of 2.875" x 6" x 1.25" thick woven material and an AS4-3k carbon based thread if required
2. Vendor manufactures **Angled Joint with Angled or Normal Stitch** joint concept, one practice sample
3. Vendor manufactures one sample material for NASA evaluation
4. Vendor delivers one sample material to NASA
5. Vendor provides report documenting the stitching technique utilized, including approaches, challenges, suggestions for scale-up approach for use on ETU and larger vehicles
6. NASA infuses, machines and tests Vendor's joint design

NASA evaluation of **Angled Joint with Angled or Normal Stitch** manufactured joints will be based on the following criteria:

1. Manufacturability
2. Ease of remaining assembly processes, including resin infusion, bonding, machining, etc
3. Minimization of damage to the pristine woven material
4. Minimization of thickness variation between post-stitched and pre-stitched material

5. Minimization of broken threads and needles during stitching operation
6. Pattern consistency of the automated/semi-automated/hand process proposed
7. Joint strength in tension and bending
8. Aerothermal performance

**TASK 3: (Phase 1) Manufacturing Demonstration of a NASA-proposed joint enhancement technique: Tufted Butt Joint with Angled Stitch**

This task will investigate the feasibility of joining samples of woven carbon fabric using carbon fiber based threads. The design concept for tufting will be the butt joint with an angle stitch. Tuft density shall be as high as possible with a maximum spacing of 1/4". Fiber reinforcement will be requested at some non-normal angle. Initially, NASA will deliver four samples of 2.875" x 6" x 1.25" thick to the vendor, and the four pieces will be joined to create two samples about 5.75" x 6" each. The seam will run along the 6-inch sides of the sample. One sample is for vendor practice trial. The second sample is for NASA evaluation purposes, and 5-inches of the 6-inch joint width shall be tufted. If particular joining techniques are more amenable to assembly prior to infusion, after a light infusion, or after the full phenolic infusion, all options are viable and samples will be provided as proposed by the vendor. Tufting shall be extendable to thick samples with compound curvature. The vendor shall provide some insight into how they anticipate their joint enhancement approach would be scaled up for use on the ETU and even larger vehicles. Handling damage during stitching is one of the evaluation criteria. Additional evaluation criteria are listed below.

Task 3 Steps:

1. NASA delivers four samples of 2.875" x 6" x 1.25" thick woven material and an AS4-3k carbon based thread if required
2. Vendor manufactures **Tufted Butt Joint with Angled Stitch** joint concept, one practice sample
3. Vendor manufactures one sample material for NASA evaluation
4. Vendor delivers one sample material to NASA
5. Vendor provides report documenting the stitching technique utilized, including approaches, challenges, suggestions for scale-up approach for use on ETU and larger vehicles
6. NASA infuses, machines and tests joint design

NASA evaluation of **Tufted Butt Joint with Angled Stitch** manufactured joints will be based on at least some or all of the following criteria:

1. Manufacturability
2. Ease of remaining assembly processes, including resin infusion, bonding, machining, etc
3. Minimization of damage to the pristine woven material
4. Minimization of thickness variation between post-stitched and pre-stitched material
5. Minimization of broken threads and needles during stitching operation
6. Pattern consistency of the automated/semi-automated/hand process proposed
7. Joint strength in tension and bending
8. Aerothermal performance

**TASK 4 (Phase 1): Manufacturing Demonstration of a NASA proposed joint enhancement technique: Tufted Angled Joint with Angled or Normal Stitch**

This task will investigate the feasibility of joining samples of woven carbon fabric using carbon fiber based threads. The design concept for tufting will be the angle joint with an angle or normal stitch. Tuft density shall be as high as possible with a maximum spacing of 1/4". Fiber reinforcement will be requested at some non-normal angle. Initially, NASA will deliver four samples of 2.875" x 6" x 1.25" thick to the vendor, and the four pieces will be joined to create two samples about 5.75" x 6" each. The seam will run along the 6-inch sides of the sample. One sample is for vendor practice. The second sample is for NASA evaluation and 5-inches of the 6-inch joint width shall be tufted. If particular joining techniques are more amenable to assembly prior to infusion, after a light infusion, or after the full phenolic infusion, all options are viable and samples will be provided as requested. Tufting or attachment techniques utilized shall be extendable to thick samples with compound curvature. The vendor shall provide some insight into how they anticipate their joint enhancement approach would be scaled up for use on the ETU and even larger vehicles. Handling damage during tufting is one of the evaluation criteria. Additional evaluation criteria are listed below.

**Task 4 Steps:**

1. NASA delivers four samples of 2.875" x 6" x 1.25" thick woven material and an AS4-3k carbon based thread if required
2. Vendor manufactures **Tufted Angled Joint with Angled or Normal Stitch** joint concept, one practice sample
3. Vendor manufactures one sample material for NASA evaluation
4. Vendor delivers one sample material to NASA
5. Vendor provides report documenting the stitching technique utilized, including approaches, challenges, suggestions for scale-up approach for use on ETU and larger vehicles
6. NASA infuses, machines and tests joint design

NASA evaluation of **Tufted Angled Joint with Angled or Normal Stitch** manufactured joints will be based on the following criteria:

1. Manufacturability
2. Ease of remaining assembly processes, including resin infusion, bonding, machining, etc
3. Minimization of damage to the pristine woven material
4. Minimization of thickness variation between post-stitched and pre-stitched material
5. Minimization of broken threads and needles during stitching operation
6. Pattern consistency of the automated/semi-automated/hand process proposed
7. Joint strength in tension and bending
8. Aerothermal performance

**TASK TBD (Phase 1): Manufacturing demonstrations of additional joint attachment techniques, as required by NASA**

**TASK TBD (Phase 2): (After Down-Selection of Phase I Vendors) Manufacturing Scale Up Beyond Coupon (Joint Attachment) Manufacturing Demonstrations**

After delivery and NASA testing and evaluation of deliverables submitted for the Phase 1 effort, NASA expects to conduct a down-selection to one or more vendors' joint attachment manufacturing demonstration. Work beyond Phase 1 will be performed as Phase 2 of this Phased Acquisition, in accordance with NASA FAR Subpart 1817.73 Phased Acquisitions and clause Phased Acquisition Using Down-Selection Procedures (NASA FAR 1852.217-71). Because of the unknown nature of the exact deliverables at this time for Phase 2, it is possible that NASA will negotiate one or more contracts that are other than firm fixed price. Phase 2 tasks may include but are not limited to:

1. Vendor-provided alternate joint enhancement recommendations
2. Plan for scaling the joining technique up to 3 inch thick material and compound curvature
3. Implementation of upgrade plan
4. Demonstration of joining techniques on 3-inch thick material
5. Demonstration of joining technique on 3-inch thick compound curvature material
6. Manufacturing of specimens for seam testing
7. Manufacturing of various Manufacturing Demonstration Units (MDU's)
8. Manufacturing of the Engineering Test Unit (ETU)

**2.1 DELIVERABLES:**

The timeframe for completion of Phase I, Tasks 1-4 is about 1 month per task from purchase order award. Due to NASA testing schedules, all Phase I stitching demonstration tasks are required to be delivered by August 2014. Material will be provided to vendors for Tasks 1 through 4 within 5 working days of Phase I purchase order award. NASA estimates that the total offered price for each Task will be in the \$2K - \$30K range. It is not expected that any one Phase I purchase order will exceed \$100K.

**3.0 TASK REQUIREMENTS****3.1 GENERAL**

NASA's Contracting Officer Representative (COR) will serve as the primary point of contact between NASA and the contractor for all technical and programmatic issues related to this SOW. The NASA Contracting Officer (CO) will serve as the primary contact for all contractual issues.

- a) The contractor shall provide management of all resources, schedule, procurement, quality control, and documentation control to deliver the services and products required.
- b) The contractor shall designate a single individual who will be given full responsibility and authority to manage and administer all aspects of the work specified in this SOW, and ensure that all objectives are accomplished within schedule and cost constraints.
- c) The contractor shall designate a single individual who shall serve as the point of contact with the COR for all technical and programmatic aspects of the contract.
- d) The contractor shall designate a single individual who shall serve as the point of contact with the CO for all contractual aspects of the contract.

### **3.2 PLANNING AND COORDINATION**

The contractor shall participate in technical interchange meetings or other meetings to discuss technical or programmatic issues as requested by the CO or COR. After contract award, the COR will determine the frequency and the method for progress reporting. Examples of technical interchange meetings expected during this contract are:

- Telecoms as required to discuss schedule
- Telecoms as required to discuss unexpected process issues

### **3.3 SITE VISITS**

- a) The contractor shall support and participate in reviews, audits and site visits as requested by the Government. Specific topics and an agenda will be provided to the contractor at least two weeks prior to the scheduled reviews, audits or site visits.
- b) The contractor shall provide NASA (including Government and non-Government personnel designated by NASA) access to developmental facilities, including subcontractor's facilities, for in-process inspections, audits, meetings and reviews.

### **3.4 PROCESS ASSESSMENT**

The contractor shall assist NASA in establishing acceptance criteria for raw materials, woven products, tracking of defects, development of specifications, etc. as requested by NASA. The Contractor shall identify the process areas that could impact the quality of the delivered product such as manufacturing defects, raw material availability, concerns associated with subcontractors, etc., whose occurrence can cause system failure, hazardous occurrence or otherwise impact the quality of the products to be delivered. The assessment shall be used in developing inspection and/or repair plans and identifying items requiring special handling, testing, or procurement controls. It is expected that this will be a continuous process and shall be updated as required throughout the period of performance of the contract.

### **3.5 MATERIALS DELIVERY DOCUMENTATION**

The Contractor shall provide copies of all inspection records for all materials delivered under this contract.