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STATEMENT OF WORK
FOR

Flex hose, Titanium, Engineering Development Units for NITROGEN TETROXIDE

Date: June 19, 2012

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1.0 PURPOSE AND SCOPE

1.1 Purpose

A Titanium flex hose is needed for engineering development and testing purposes. The flex hose will be tested pm ground simulating operating conditions for a planned use to transfer Nitrogen Tetroxide and Gaseous Helium to a spacecraft in geosynchronous orbit.

1.2 Scope

This statement of work (SOW) defines the effort for the design, fabrication, testing, and delivery of six (6) Engineering Development Unit (EDU) flex hoses per Specification K0000113725-SPC Flex hose, Titanium, Nitrogen Tetroxide Service.

The Contractor shall provide all resources and materials necessary to design, fabricate, test and deliver the items below in accordance with the contract that includes this SOW and the K0000113725-SPC specifications. This SOW does not replace the requirements noted on the specification K0000113725-SPC.

2.0 Requirements

The Contractor shall meet the following requirements contained in this SOW and the NASA technical procurement specifications for the performance of this procurement.

The contractor shall manufacture, verify and deliver to NASA KSC six (6) EDU Titanium Flex hoses and one (1) bellows test specimen per this contract. The requirements for performance, interfaces, design and construction, quality assurance, and acceptance testing are provided in procurement specification K0000113725-SPC. These specifications call on other compliance and reference specifications for their various requirements.

One (1) EDU Flex hose (Vendor test article), shall be identified with serial number TFH-EDU-C-001, and shall be utilized by the Contractor as a first article test unit to verify the design, construction processes, and to perform the vendor tests as defined in Table 1, Acceptance Test Matrix in Specification K0000113725-SPC. Upon completion of the testing, the EDU will be delivered to NASA. This unit will not be used in service or test program by NASA.

Five (5) EDU Flex hoses, (NASA test articles) shall be identified with serial number TFH-EDU-N-002 through TFH-EDU-N-006 and shall be manufactured and delivered to NASA upon the completion of the NASA Tests article defined in Table 1, Acceptance Test Matrix in Specification K0000113725-SPC and upon completion of the contractor EDU acceptance test.

One bellows test specimen, 8 to 10 inches in length (cut from bellows convolution peak to peak) to define the bellows spring rate and required for the flow induced vibration analysis to be performed by NASA. This unit will be delivered prior to the start of fabrication assembly of the contractor's EDU flex hoses for NASA delivery.

All documentation test results defined in the Acceptance Data Package 9.2 shall become the intellectual property of NASA.

All test fixtures specifically built for the work performed to meet the requirements of this SOW or related specification shall be delivered to NASA upon completion of the contract. This includes any test articles that may fail initial acceptance tests, such that NASA may perform additional malfunction inspection / analysis of the failed unit.

The detailed requirements are specified in the following paragraphs of this Statement of Work (SOW).

2.1 Applicable Documents

The following documents are applicable to this SOW:

Specification Number	Description
K0000113725-SPC *	Procurement Specification – Flex hose EDU – Nitrogen Tetroxide, Service
ANSI/ISO/ASQ 9001-2000	American National Standard Quality Management Systems Requirements
ANSI/ISO/ASQ Q10012	Measurement Management Systems - Requirements for Measurement Processes and Measuring Equipment - First Edition

* The specification specific revision levels, amendments, and approval dates and/or revision levels are defined in Appendix C.

2.2 Precedence

If any of the documents invoked herein are changed during the period of performance of the Contract/Purchase Order, the Contractor shall not use the later issue without prior written approval of the Contracting Officer.

2.3 Request for Quote (RFQ) Response

In addition to the RFQ Response, the following is also required.

2.3.1 Alternative Weld Inspection

If welds for non-category A type joints cannot be radiographically inspected as required in Specification K0000113725-SPC, provide a proposed alternative/equivalent weld inspection methodology with the RFQ response. All welds on pressure containing parts must be 100% Non-Destructive Evaluation (NDE) volumetric inspected or equivalent methods ensuring similar quality such as automated recorded parameter processes and alternative high precision NDE.

2.4 General

The contractor shall provide signed/stamped certified P.E. drawings and engineering analysis as required by specification K0000113725-SPC.

The contractor shall provide the fabrication and assembly documentation for each EDU to NASA for review and concurrence prior to start of fabrication.

If a component was previously qualified / test certified for another government agency and meets or exceeds the requirements enveloped in specification K0000113725-SPC, the contractor shall provide the specific component information (analysis or testing) to the NASA Contracting Officer in detail for review when providing the bid for this contract.

The contractor shall fabricate and perform Non Destructive Evaluation (NDE), acceptance tests, cleaning, certification, shipment preparation, packaging and delivery of the Hardware item to KSC as defined in Specification K0000113725-SPC.

NASA reserves the right to witness and inspect any part during the construction, fabrication, assembly and test period at the Contractor or Contractor's suppliers / subcontractor's site on a non-interference basis.

The contractor shall provide the NASA Contracting Officer/ Contracting Officer Technical Representative any technical requirements and specifications for a ten (10) work day review prior to providing it for release for fabrication to any specialty Subcontractor (such as a convoluted bellows manufacturer, braid or sub-assemblies manufacturer).

3.0 Data Management

All data deliverables shall be delivered electronically in common computer formats such as Word, Excel, Acrobat, etc. unless otherwise specified. All engineering records - drawings, reports, calculations, etc shall be provided to the government in root file format as well as an image file such as Adobe PDF (portable document format) and two clean hard copies. All Contractor detail proprietary documents such as shop practices/procedures shall be appropriately marked per individual sheet.

NASA shall own the rights to all final as-built fabrication drawing to repair or solicit remanufacturer internally or by others of such items (including but not limited to) as geometric data, material types, bill of materials used in construction, convolute shape/ spacing, braid tension, etc) and any post receipt test results by NASA . The vendor / fabricators proprietary detail shop practices and processes for manufacture and assembly of the items may be marked "proprietary" and will be protected accordingly.. Therefore, drawings submitted for review must be appropriately subdivided into these two sets of data and only unique vendor shop practices and processes for manufacturer may be marked proprietary.

All documents provided to the Contractor that contain an Export Control Determination, or similar information sensitivity marking, shall have that marking maintained with that document & information at all times. Contractor created drawings created based on such documents must carry-over that information sensitivity marking as that determination belongs to the information and not the document.

4.0 Monthly Status and Final Reports

The Contractor shall provide a monthly status report. Contractor format is acceptable. The first report shall be delivered thirty (30) days after contractor Notice to Proceed. The contractor shall prepare an agenda and send to the government three (3) work days prior to the meeting. The following reports should be delivered on the second Friday of each month following the first report through to the end of the contract. Monthly project status reports shall be delivered every ten (10) work days following the end of each month. These reports shall provide data for the assessment of monthly cost, technical and schedule progress. The monthly status report shall include:

A. Agenda, project schedule and changes.

B. Work accomplished for current reporting period, including a report of overall cost, technical and schedule performance including photos / videos, standard cell phone / digital camera quality, of major item progress.

C. Work planned for next reporting period.

D. Current problems which impede performance or impact program schedule or cost, and proposed corrective action.

E. Other information that assists NASA in evaluating the Contractor's cost, technical and schedule performance.

F. A thirty (30) minute telecom review shall be held after report is submitted for follow-up NASA questions and/or clarification.

5.0 Project Schedule

The Contractor shall develop, maintain, and track a project schedule. The program schedule shall illustrate the schedule that the Contractor intends to follow over the period of performance and shall be delivered to the NASA Contracting Officer ten (10) days after Contract award.

6.0 Meetings

The Contractor shall provide manpower, facilities, and data to support the meetings and reviews defined in this SOW, and will document and provide NASA the meeting minutes for review, within two (2) working days after the meeting. Meetings defined below shall include as a minimum:

A. Technical Kickoff Review
B. Monthly Status (as defined in Section 4.0)
C. Prefabrication Start Design Review
D. Acceptance Review

6.1 Technical Kickoff Review

The Contractor shall conduct a Technical Kickoff Review not later than ten (10) work days after contract award at the NASA Kennedy Space Center with at least one technical lead representative from the vendor present (other support parties may be tied in via telecom / WEBEX, if desired). At a minimum this review should cover proposed basic high level concepts, and initial schedule for design and acceptance testing. This meeting will also serve as first technical exchange of Contractor engineering and NASA engineering for clarification of any specification technical items.

6.2 Design Reviews

6.2.1 Contractor Responsibilities

6.2.1.1 Agenda

The agenda shall specify the time and place for the scheduled review at contractor or nearby fabrication plant facilities, specific review items, supporting documentation, and key participants and shall submit the agenda for review three (3) days prior to the meeting. Submit approved copies at the review.

6.2.1.2 Review materials

All design drawings, analysis, inspect / test plans, etc must be saved in a common viewable electronic format (along with root file format) to NASA Contracting Officer ten (10) work days prior to start of review period.

6.2.1.3 Minutes

The minutes shall contain a description of the review with sufficient detail to enable the review decisions and comment disposition to be made a matter of record. The minutes shall include any presentation charts, a listing of disposition to comments, action items with actionee and suspense (closure) date. Minutes shall be provided to each attendee within two (2) work days after review meeting and an electronic copy shall be available.

6.2.1.4 Design Comment (DC) Disposition

The Contractor shall perform all work necessary to prepare recommended technical options, solutions and dispositions to close each DC that is within scope of the contract. Initial disposition shall be within five (5) work days after closure of comment period. No

review milestone shall be considered completed until all DC's deemed critical by the NASA Contracting Officer are closed.

6.2.2 NASA Responsibilities

6.2.2.1 Meeting Support

NASA will co-chair the formal reviews required within this scope of work.

6.2.2.2 Design Comments (DC) Tracking

NASA Contracting Officer Technical Representative shall track final closure of Design Comments (DC) associated with the design reviews.

6.2.2.3 Design Comment Closure

Formal DC closure requires NASA Contracting Officer Technical Representative concurrence.

6.3 Pre-Fabrication Start Design Review

The Contractor shall conduct a pre-fabrication start Design meeting with NASA. The meeting shall be held at or nearby contractor fabrication / assembly facilities. The pre-fabrication Start Design is chaired by the NASA Contracting Officer (or designated representative). The pre-fabrication start Design maturity shall mean the design/analysis is complete and that drawings / test procedures are ready to issue for use for fabrication start as deemed by the manufacturer ready for NASA review / concurrence.

The pre-fabrication start Design shall include review of the following items, at a minimum and shall be provided to the Contracting Officer ten (10) work days prior to the design review:

A. Component description – A written narrative description of the flex hose functional capabilities

B. Design / Shop fabrication drawings including but not limited to such items as dimensional details, convolute shape and spacing, weld symbols, materials / parts list, thicknesses, convolute weld transition details to end fittings and convolute section to convolute section if applicable, and key interface details.

C. Procurement specifications for any procured major specialty subcontract items

D. Acceptance Test Procedures for each deliverable EDU

E. Verification plan– Identify verification approach to tech specification requirements and auditable methods of analysis, test, demo, or inspection

F. Handling requirements/design

G. Any design analysis performed

H. Materials Identification and Usage List

I. Development and Production Plan with Long Lead time parts/components identified

J. Final Shop production process procedures for such items but not limited to weld procedures records, NDE processes / individual certifications, cleaning processes / procedures, etc. These items may be marked "proprietary" and will be protected accordingly.

K. Packaging, protection, and transportation plans to KSC of EDU's

L. A detailed fabrication and test schedule

M. After successful completion of this review and disposition of comments incorporated to final fabrication test drawings and specifications work may proceed to start fabrication of test articles

6.4 Acceptance Review (AR)

The Contractor shall conduct an Acceptance Review via telecom / WEBEX based on the contents of the Acceptance Data package (ADP) send to NASA. This final review data shall be issued for review no later than ten (10) work days post final successful acceptance testing completion. A certification of compliance to the SOW and procurement specification shall be submitted. The AR will be co-chaired by the NASA Contracting Officer (or designated representative) and with the Contractor supplying all documentation needed to establish acceptability of hardware for its intended use. This review is conducted after as-built design drawings are complete and acceptance and certification testing and associated reports are complete. All data may be submitted in Contractor format.

The Acceptance Data Package for each flex hose unit shall include data described in the SOW Paragraph 9.2 (Acceptance Data Package).

7.0 Document Control

The Contractor shall implement a Document Control as defined by their process meeting ANSI/ISO/ASQ 9001 requirements.

All documents and records - Drawings, reports, calculations, etc shall be provided to the government in an electronic format, root file format as well as an image file such as PDF and

two clean hard copies. All Contractor detail Proprietary documents shall be appropriately marked per individual sheet.

7.1 Request for Information (RFI)

After contract award, the successful Contractor shall, when contract information or clarification is required by the Contractor, prepare and submit KSC Form 8-268, "Request for Information (RFI)/Clarification." The form shall be submitted to the Contracting Officer and will be processed by the Government. The RFI will be returned to the contractor with the appropriate information/response within no greater than five (5) work days. The Contractor shall indicate on the RFI if when the concern / question have an effect on schedule or cost. The form will be provided to the successful contractor at the post award pre-work meeting.

7.2 Request for Change or Deviation/Waiver

All Contractor requests to deviate from the technical requirements in Specification K0000113725-SPC or this SOW, shall present rationale for requested deviation and the impact of the deviation with respect to achieving the component's specification performance (along with cost adjustment - either additional or reduced price).

No changes to the pre-fabrication design review approved flex hose design drawings, material composition, inspection, or processes are authorized without the written direction from the NASA Contracting Officer or NASA Contracting Officer Technical Representative.

7.3 Change Management

The Contractor change process shall ensure that all design changes that affect development, fabrication, assembly, inspection, or testing shall go through a controlled process to ensure that the quality of the component and associated documents are not compromised. Any changes that impact approved documents from pre-fabrication review will require NASA approval.

7.4 Engineering Release

The Contractor shall establish an engineering release system in accordance with internal company procedures, to issue configuration documentation to functional activities and to authorize the use of configuration documentation associated with an approved configuration.

8.0 Quality Assurance

8.1 Quality System

The contractor's quality system shall be compliant to ANSI/ISO/ASQ 9001. The contractor can satisfy this requirement by current registration by a recognized registrar. If NASA has accepted Contractor's ANSI/ISO/ASQ 9001 registration and Contractor subsequently changes registrars, loses its registration status, or is put on notice of losing its registration status, it shall notify the NASA's Contracting Officer within three (3) work days of receiving such notice from its registrar.

8.2 Pre or Post-Award Survey

Prior to starting work on this order and at the discretion of NASA Quality Assurance Representative, a pre or post award survey of the supplier may be conducted by customer representatives consisting of representatives from Engineering, Procurement, and Quality Assurance. This survey will be conducted at a time mutually agreeable to by all parties on a non-interference basis.

8.3 Inspection Control Point Outline

Special inspections, called mandatory inspection points (MIP), will be designated by the Government during the performance of this contract. Prior to the start of work, the Contractor shall provide the NASA KSC Technical and Quality Assurance Representative (QAR) a schedule and Inspection Control Point Outline (ICPO) which shows the work sequence(s) to be employed during the performance of this Purchase Order. The contractor's schedule/ICPO must indicate what types of contractor inspections will be performed and where in the contract's sequence of events they will be accomplished. The contractor shall notify The NASA KSC QAR at least five (5) work days prior to the occurrence of a scheduled, designated MIPS. Designation of MIPS does not relieve the contractor of the obligation to perform and provide record certification of all contractually required inspections.

Reference the attached Mandatory Inspection Points table in Appendix B.

8.4 Contamination Control

The Contractor shall develop and implement a Cleaning Procedure that meets the requirements in Specification K0000113725-SPC. The Procedure shall be provided to the NASA Contracting Officer or Contracting Officer Technical Representative ten (10) work days prior to the Pre-fabrication Design Review start. The procedure shall address as a minimum the following:

A. Materials Selection - Materials shall be selected to preclude generating contaminants during operation.

B. Cleaning and Surface Cleanliness - All materials shall be cleaned and verified clean to meet specification K0000113725-SPC requirements for the end item use. The cleaning methods for cleaning and verification / sampling shall include required solvents and method and shall also be forwarded to the NASA Contracting Officer or Contracting Officer Technical Representative for review and approval.

8.5 Calibration System

The Contractor shall have a documented calibration system that meets the requirements of ANSI/ISO/ASQ Q10012 Measurement Management Systems - Requirements for Measurement Processes and Measuring Equipment - First Edition, or equivalent standards.

9.0 SUBMITTAL DOCUMENTS

The Contractor shall provide all of the data listed in Appendix A of this Statement of Work entitled "Contract Data Requirements List (CDRL)". All Contract data requirements shall be submitted to NASA Contracting Officer as identified in the purchase contract unless otherwise specified. All CDRL's shall be subject to the unilateral approval of the NASA Contracting Officer. In the event of disapproval, the Contractor shall initiate immediate corrective action and shall resubmit to the NASA Contracting Officer for approval within five (5) work days.

The Contractor shall submit all data deliverables electronically along with a signed hardcopy. All documents shall be submitted in an electronic format that is searchable (e.g., PDF). For documents that were scanned, the Contractor shall run "paper capture" or optical character recognition to convert the file to a searchable format before submittal.

9.1 Certificates of Compliance

Manufacturer Certificates of Compliance (COC) to Technical Specification K0000113725-SPC shall be provided in the acceptance data package (ADP) per each end item flex hose assembly delivered when all ADP requirements are met for that unique serial number item.

9.2 Acceptance Data Package (ADP)

The Contractor shall develop, maintain and deliver, for each flex hose end item assembly, an Acceptance Data Package. Delivery of data package to NASA Contracting Officer must be ten (10) work days prior to Acceptance review and ten (10) work days before shipment of units via electronic scanned / PDF file. Two (2) signed hard copies shall be delivered to NASA, one to Contracting Officer, and one to Contracting Officer Technical Representative, before or with shipment of unit to KSC. Any units shipped without ADP will not be considered acceptable for receipt at customer site. The Acceptance Package shall include the following as a minimum:

A. Test history log, including post manufacturing checkout and final verification tests of the flex hose, with the following data (may refer to the Component Data Log for details):

    1. Actual measurements identified to specified tests.
    2. Brief test summary.
    3. List of actual and recommended retest.
    4. Special test instructions, investigations, warnings, and problems encountered during test.
    5. Failure and corrective actions data for all failures during all testing.

B. Each flex hose will have a data log which shall include the following:
    1. Weld Related Data:
        a. Inspection records for all NDE inspections traceable to a unique joint, such as for radiograph and dye penetrant, including weld traceable maps of welder and procedure number at each joint
        b. Welder and Weld inspector certifications
        c. Weld procedures

2. Records for all metallic materials and shall include:
    a. Material Listing – (Supplier certificate acceptable, specific mil certs are not required for EDU)
    b. Testing certificates – (Supplier, Vendor or Contractor certificate acceptable)
3. Acceptance Test Data:
    a. Final Test Plan & Procedure
    b. Test Reports
4. Contamination:
    a. Finalized cleaning procedure
    b. Results / Verification
5. Dimensional check that includes measurements of the outside interface dimensions to check conformity with drawings
6. Records showing any identified defects during inspection / testing with correction data. – Applicable to all the above tests and inspections
7. Analysis of acceptance test data
8. Manufacturing processes and assembly "travelers"
9. Photographs and video of sample acceptance testing for first unit shall be provided to NASA (digital quality)

C. All analysis performed per specification K0000113725-SPC to include stress analysis and flex hose torsion analysis.

D. Complete copies of drawings reflecting AS-BUILT configuration to the level required to permit repair, remanufacture, maintenance and operation of the component.

10.0 Design and Development

The Contractor shall design and develop the flex hose such that it meets all requirements detailed in the component specification K0000113725-SPC and this SOW. Acceptance testing shall be performed as part of the design/development phase to assure compliance with the above specification. Data deliverables and analyses to be performed include the following:

10.1 Component Specifications

A detail technical specification for any subcontract piece part of the flex hose fabrication is required for NASA review at Pre-fabrication design review. All associated data deliverables are due ten (10) work days prior to the Pre-fabrication design review and with final acceptance data package following acceptance testing of EDU units.

10.2 Drawings and Associated Lists

The Contractor shall provide four (4) hard copies of the as-built assembly cross section drawing of each component / assembly in a part breakdown format, part information, part breakdown list with part numbers and shall be provided ten (10) work days prior to Pre-fabrication design review. Two (2) each electronic version of each of these documents shall be provided on a disc or other transferable electronic media: one (1) in PDF and one (1) in native format with native source program specified.

11.0 Acceptance Test Planning, Procedures, and Reporting

The Acceptance Test data shall be documented by the Contractor in separate documents for each EDU traceable to unique serial number end item and shall be provided ten (10) work days prior to prefabrication design review and per the following:

11.1 Test planning information shall include the following as a minimum:

A. Complete description of article under evaluation, including the description of the interface requirements between the article and the test facility (or apparatus).

B. The overall philosophy, approach, and objective for each item, including any special tailoring or interpretation of design and testing requirements.

C. Detail descriptions of all test activities (i.e., tests, analyses, inspections) to be performed based on the identified requirements. Identify any prerequisites, constraints, and objectives for all the test activities.

D. Description and planned usage of the support equipment, software, facilities, and tooling necessary to execute the test activities, and required tools, test beds, etc.

E. The contractor shall notify the NASA Contracting Officer and Contracting Officer Technical Representative at least ten (10) work days prior to the occurrence of a scheduled test, which is listed as a Mandatory Inspection Point (MIP).

11.2 Test procedures shall contain the following as a minimum:

A. Identification of item/article being subjected to test, inspection, or demonstration.

B. Identification of objectives established for the particular test, inspection, or demonstration.

C. Description of steps and operations, in sequence, to be taken.

D. Identification of measuring and recording equipment to be used, specifying range, accuracy, and type and any special instructions for operating such equipment.

E. Layouts, schematics, or diagrams showing identification, location, and interconnection of item/article, support equipment, and measuring equipment.

F. Environmental and/or other conditions to be maintained with tolerances.

G. Constraints on test, inspection, or demonstration.

H. Pass-fail criteria for evaluating results.

I. Instructions for handling non-conformances and anomalous occurrences during activity.

J. Confirmation that required support equipment has been calibrated and certification of the calibration is still valid.

K. Identify requirements verification points (NASA, Contractor)

11.3 Test Reports shall include the following as a minimum:

A. Conclusions and recommendations relative to success of the test activity.

B. Description of deviations from nominal results, failures, approved corrective actions and procedures, and retest.

C. Traceability back to the requirement.

D. Copy of as-run procedure (as appropriate).

E. Identification of test configuration.

F. Specific results of each procedure including automated test segments and associated analyses.

G. The contractor shall provide test report data no later than five (5) work days upon completion of testing.

12.0 Fabrication and Assembly

The Contractor shall be responsible for maintaining and conducting all fabrication and assembly activities (equipment, processes, and procedures) in a manner which is consistent with and supports the requirements of this SOW and specification K0000113725-SPC. Hardware shall be fabricated and finished so appearance, fit and specific tolerances per approved fabrication drawings are observed. Any item failing the acceptance criteria shall be reworked or replaced and re-examined by the same acceptance criteria as required for the original item.

13.0 Interchangeability

Hardware assemblies, components, and parts with the same part number shall be physically and functionally interchangeable.

14.0 Security

The vendor shall be responsible for information and Information Technology (IT) security when information systems are used to store, generate, process or exchange information with NASA. At the completion of the contract, the Vendor shall return all NASA information provided to the vendor during the performance of the contract and certify that all ITAR information has been purged from vendor-owned systems used in the performance of this procurement.

15.0 Advance Shipping Notice

An Advanced Shipping Notice is a courtesy letter, e-mail or fax which provides advance shipping information to the NASA Contracting Officer/Contracting Officer Technical Representative (COTR) to coordinate the receipt of the shipped items with the NASA receiving, transportation, and management personnel. Complete shipping plan due ten (10) work days prior to each shipment. The Contractor shall furnish the following written information to the NASA COTR or his authorized designated representative five (5) work days prior to each shipment:

- Date of Shipment
- Method of Shipment
- Complete or Partial Shipment
- Number of Cartons
- Total Weight
- Dimensions

16.0 Transportation

The Contractor is responsible for all protective shipping fixtures, tie-downs and supports (Reference section 6 of K0000113725-SPC) and any applicable permits required for shipping.

The Point of Acceptance will be Kennedy Space Center. Unless otherwise directed, the Contractor will ship all parts to:

Transportation Officer, NASA
ISC Warehouse Building, M6-744
Kennedy Space Center, FL 32899

Appendix A – Submittals / Contract Data Requirement List (CDRL)

CDRL NO.	Section	Deliverables	Delivery Date
C1	1.2	Flex hose Bid	Proposal
C2	2.4	Component Qualification information from previous government qualification	Proposal, if applicable
C3	2.4	Subcontractor Technical Specifications / Requirements	Ten (10) work days prior to providing to Subcontractor & ADP
C4	4.0	Monthly Status Report	Ten (10) work days after the end of the Month & ADP
C5	5.0	Project Schedule	Ten (10) work days after Contract Award and monthly updates
C6	6.0	Meeting Minutes	Two (2) work days after the meeting & ADP
C7	6.1	Technical Kickoff Review	Ten (10) work days after Contract Award
C8	6.2.1.1	Design Review Agenda	Three (3) work days prior to review
C9	6.2.1.2	Design Review Materials	Ten (10) work days prior to review & ADP
C10	6.2.1.3	Design Review Minutes	Two (2) work days after review
C11	6.2.1.4	Design Review Comment Disposition	Five (5) work days after closure of comment period & ADP
C12	6.3	Pre-fabrication Design Review	Per the approved Project Schedule
C13	6.3	Data for Pre-fabrication Design Review	Ten (10) work days prior to Pre-fabrication Design Review
C14	6.4	Acceptance Review	Ten (10) work days post final successful Acceptance Test
C15	7.1	Request for Information	As needed and full set with ADP
C16	7.2	Deviation & Waiver Request	As needed; Approved Deviation/Waivers with ADP
C17	8.3	Inspection Control Point Outline and Record	With Fabrication drawings and with ADP
C18	8.4	Contamination Control	Ten (10) work days prior to Pre-fabrication Design Review

CDRL NO.	Section	Deliverables	Delivery Date
C19	9.1	Certificate of Conformance	With ADP
C20	9.2	Acceptance Data Package	Ten (10) work days prior to Acceptance Review (AR), and fourteen (14) days before component is delivered.
C21	10.1	Component Specifications	Ten (10) work days prior to Pre-fabrication Design Review & ADP
C22	10.2	Drawings and Associated Lists	Ten (10) work days prior to Pre-fabrication Design Review & with ADP
C23	11.0	Acceptance Test Plans & Procedures	Ten (10) work days prior to Pre-fabrication Design Review & ADP
C24	11.1	Acceptance Test Notification	Ten (10) work days prior to test and with ADP
C25	11.3	Acceptance Test Reports	Five (5) work days upon test completion & ADP
C26	13.0	Advance Shipping Notice	Complete plan due five (5) days prior to each shipment

Note – Days are defined as Calendar days.

Appendix B – Inspection Control Point Outline / Mandatory Inspection Points

Inspection Control Point Outline (ICPO)			
1. Contractor Name:	TBD		
2. Contractor Address:	TBD	3. City/State:	TBD
4. Point of Contact:	TBD	5. POC Phone:	TBD
6. POC Email:	TBD		
7. Description of Procurement (including Contract number and Delivery Order number):			
Reference Specification K0000113725-SPC Table 1 - Acceptance Test Matrix			

8. INSPECTIONS

Line	Description of Inspection [Reference to Specification]	Planned Date of Performance	Performance Date	Contractor Stamp and Date	NASA Stamp and Date
1.	Quality and Contracting Officer's Technical Representative (COTR) shall be notified when all welding and associated weld inspection (NDE) is complete (each EDUs)				
2.	Quality and COTR shall be notified prior to proof/leak test , Section 4.5 (Vendor EDUs)				
3.	Quality and COTR shall be notified and witness the spool cycle test, Section 4.6.2 (Vendor EDU)				
4.	Quality and COTR shall be notified 5 days prior to torque test, Section 4.8 (Vendor EDU)				
5.	Quality and COTR shall be notified prior to the burst test, Section 4.9 (Vendor EDU)				
6.	Quality and COTR shall be notified when assembly is ready for Final Inspection (each EDUs)				

Appendix C – Specification Revisions

Specification #	Revision	Title
NASA NPR 6000.1	H	Requirements for Packaging, Handling and Transportation for Aeronautical and Space Systems, Equipment, and Associated Components
MIL-PRF-26539	F	Propellant Pressurization Agent, Nitrogen Tetroxide
MIL-PRF-27407	C	Helium (Type I Grade A)
MIL-P-27401	F	Nitrogen (Type I/II Grade B)
MIL-T-81556	A	Titanium and Titanium Alloys, Extruded Bars and Shapes Aircraft Quality
AWS G2.4/G2.4M	2007	Guide for the Fusion Welding of Titanium and Titanium Alloy
AWS D17.1/D17.1M	2010	Specification for Fusion Welding for Aerospace Application
AWS B1.10M/B1.10	2009	Guide for the Nondestructive Examination of Welds
ASME BPVC Section V Appendix IV	2011	Nondestructive Evaluation
ASNT-TC-1A	2011	Recommended Practice for Personal Qualification and Certification in Non-destructive Testing
ASTM B265	2011	Standard Specification for Titanium and Titanium Alloy Strip, Sheet and Plate
ASTM B348	2011	Standard Specification for Titanium and Titanium Alloys Bars and Billets
ASTM B863	2010	Standard Specification for Titanium and Titanium Alloy Wire
ASTM E1742/E1742M	2011	Standard Practice for Radiographic Examination
ASTM E1417/E1417M	2011	Standard Practice for Liquid Penetrant Examination
ASTM D1193	2011	De-mineralized Reagent Water, Type H
ASTM G93-03	2011	Materials and Equipment used in Oxygen-Enriched Environments
EJMA	2009	Standards of the Expansion Joint Manufacturers Association, Inc
SAE AMS 4928	S	Standard Specification for Titanium Bar
SAE AS4330	2005	37 Degree Flare (Material Titanium)
SAE AS4327	2007	Sleeve (Stainless Steel)
SAE AS4326	2007	Nut, Coupling (Stainless Steel)
AIA NAS 410	2008	NAS Certification & Qualification of Nondestructive Test Personnel
ISO 10380	2003	Pipework – Corrugated Metal Hoses and Hose Assemblies
ANSI/ISO/ASQ 9001	2000	Quality Management Systems
ANSI/ISO/ASQ Q10012	2003	Measuring Management Systems – Requirements for Measurement Processes and Measuring Equipment
K0000113725-SPC	BASIC	Procurement Specification – Flex hose, Titanium, Nitrogen Tetroxide, Service