

Task Order Plan (TOP)

Contract Number: NNM05AB50C

TO Title: Constellation Support to Materials and Processes Laboratory

TO Number: 34-000002 **Revision:** 01

Period of Performance: 10/02/2010 to 09/30/2011

MSFC Initiator: Regina Moore (Task Initiator)

(b)(4)

Emergency: No

Revision 01:

The purpose of this revision is to add estimates to reflect customer directed increases in scope and to reflect changes in available resources to support existing effort. Specific details on the changes to each subelement are provided below. The total task order estimate increased by (b)(4). The Schedule and Performance Plan were updated, but the Risk Assessment was not revised since it was not impacted by the changes reflected in this revision.

- Added scope to subelement CA to support integrated manufacturing and assembly (IM&A) efforts at MSFC and other locations as needed for this subelement. This change in scope can be accomplished within the existing estimate.
- Changed the distribution of labor supporting subelement BC to match available resources to the required scope, which resulted in a decrease in estimated cost for this subelement.
- Changed the distribution of labor supporting subelement CC to match available resources to the required scope, which resulted in a slight decrease in estimated cost for this subelement.
- Increased the amount of direct labor, but reduced the subcontract effort supporting subelement CD to reflect available resources, which resulted in a decrease in estimated cost for this subelement.
- Added (b)(4) and (b)(4) estimate to subelement CE to support new scope for manufacturing planning and coordination efforts.
- Added new scope to subelement CH to include next generation program and 4765 building manager support. This change in scope can be accomplished within the existing estimate.
- Added materials estimate to subelement CJ to cover laboratory coat rental expenses.
- Added subelement CV and associated labor estimate to support new scope providing transitional coverage from Constellation to the follow-on program.
- Changed the distribution of labor and subcontract personnel supporting subelement DD to match available resources to the required scope, which resulted in a slight increase in estimated cost for this subelement.
- Changed the distribution of labor and subcontract personnel supporting subelement ED to match available resources to the required scope, which resulted in a slight decrease in estimated cost for this subelement.

1.0 Task Order Description & Objectives

This Task Order Plan (revision -00) defines and estimates work for the period October 2, 2010 through September 30, 2011, Contract Year 6 of the NNM05AB50C ESTS contract. This task is a continuation of work previously performed under Task 34-000001 during Contract Year 5.

This task estimates activity for the MSFC Materials and Processes Lab in support of the Constellation Program (WBS 136905, 604746, and 644423). The Schedule, Performance Plan and Risk Assessment reflect the task activities for the new period of performance. This activity includes support for materials mechanical testing at the Materials Mechanical Test Facility (MMTF) and Hydrogen Test Facility (HTF), damage tolerance analysis, nondestructive evaluation (NDE), materials engineering, materials processes development, composites fabrication, digital manufacturing, rapid prototyping, contamination control, foreign object/debris control, and environmental effects testing. Specific support activities are listed in separate subelements below:

Subelement #	Subelement Title	Old Subelement Number	Subelement Lead
AL	EM60 Ares V Support	34-000301-AC	(b)(4)
BC	EM10 MMTF 1st Stage Support	34-000001-BC	(b)(4)
BF	EM41 Nonmetallic Materials 1st Stage Support	34-000001-BF	(b)(4)
CA	EM03 Upper Stage Manufacturing Support	34-000001-CA	(b)(4)
CB	EM10 HTF Upper Stage Support	34-000001-CB	(b)(4)
CC	EM10 MMTF Upper Stage Support	34-000001-CC	(b)(4)
CD	EM20 Upper Stage Support	34-000001-CD	(b)(4)
CE	EM30 Upper Stage Support	34-000001-CE	(b)(4)
CH	EM41 Polymeric Materials Upper Stage Support	34-000001-CH	(b)(4)
CJ	EM42 Composites Manufacturing Upper Stage Support	34-000001-CI	(b)(4)
CK	EM50 Upper Stage Support	34-000001-CK	(b)(4)
CL	EM60 Upper Stage Support	34-000001-CA	(b)(4)
CV	Program Transition Support	34-000002-CV	(b)(4)
DD	EM20 J2X Support	34-000001-DD	(b)(4)
DK	EM50 J2X Support	34-000001-DK	(b)(4)
ED	EM20 LAS Support	34-020002-EA	(b)(4)

2.0 Technical Approach (Including required input, guidelines & assumptions)

Subelement AL: EM60 Ares V Support

- Participate in all Ares V Core Stage architecture and design study team meetings and provide manufacturing & assembly expertise. Participation may be in-person or by teleconference/Webex.
- Modify / mature Ares V Core Stage manufacturing plans and flow charts.

Subelement BC: EM10 MMTF First Stage Support

- Prepare test samples and test fixtures.
- Coordinate machining activities.
- Provide purchasing services.
- Perform mechanical property testing.
- Perform an engineering review and quality check of the data.
- Perform statistical analysis.
- Prepare reports and data packages from data per customer requirements.

Subelement BF: EM41 Nonmetallic Materials 1st Stage Support

- Provide engineering and technical support in the area of adhesive and nonmetallic materials and processes used in the Ares I First Stage systems.
- Review element contractor engineering test plans for technical content and engineering rigor.
- Support the review of flight hardware engineering designs and updates involving adhesives and non-metallic materials.
- Provide engineering support for the post fire evaluation of Ares I First Stage hardware in the areas of adhesives and nonmetallic materials..
- Provide testing guidance and analytical support of the development of statistically significant design mechanical properties for nonmetallic systems used in structural applications.
- Provide materials engineering analysis of data from laboratory and subscale testing of adhesively bonded rocket motor components, structures and nonmetallic materials.
- Provide limited on site materials and processes support at the First Stage contractor's facility.
- Publish Engineering Test Plans and Engineering Test Reports for the nonmetals lab to perform characteristic testing of First Stage materials. Provide engineering oversight to performance of the test plans by MSFC contractors.

Subelement CA: EM03 Upper Stage Manufacturing Support

- Develop requirements for manufacturing and assembly facilities at MAF, MSFC and other locations as needed.
- Coordinate schedule milestones between the US Manufacturing & Assembly Subsystem, the US Logistics Subsystem, and the US Production Contractor.
- Monitor progress of MAF, MSFC and other facility modifications and construction, acquisition and installation of manufacturing and assembly tooling, and facility readiness reviews.
- Participate in facility and tooling design and construction reviews.
- Coordinate Construction of Facilities inputs for the US Manufacturing and Assembly subsystem.
- Report status and issues to the US Manufacturing and Assembly Product Team management.
- Support facility related meetings and US Manufacturing and Assembly team meetings.

Subelement CB: EM10 HTF Upper Stage Support

- Work with customer (EM10) to develop detailed understanding of test requirements.
- Develop detailed estimate and plan to meet new customer requirements.
- Perform normal, routine maintenance and repair of test equipment.
- Machine test fixtures to support testing.
- Produce CAD drawings as needed to support testing.
- Calibrate test equipment as needed to ensure testing accuracy.
- Perform tests per plan and provide engineering review and quality check of the data, and prepare data packages from the test data per customer requirements.

Subelement CC: EM10 MMTF Upper Stage Support

- Prepare facility and manufacturing plans.
- Produce CAD drawings as needed to support testing.
- Prepare test samples and test fixtures.
- Coordinate machining activities.
- Provide purchasing services.
- Develop and execute design of experiment studies.
- Calibrate test equipment as needed to ensure testing accuracy.
- Perform mechanical property testing.
- Perform an engineering review and quality check of the data.
- Perform statistical analysis.
- Prepare reports and data packages from data per customer requirements.

Subelement CD: EM20 Upper Stage Support

- Provide NDE support including, but not limited to, shearography, ultrasound, eddy current, radiography and fluorescent penetrant inspections for:
 - Planned weld development activities
 - Planned secondary composite structural activities
 - Analyze data and report results for these activities

Subelement CE: EM30 Metals Engineering & Processes Upper Stage Support

Provide engineering and technical support to EM30 and EM31 in buildings 4612, 4618, 4711 and 4205.

EM30 is divided into two Branches consisting of four teams. The EM31 Failure Analysis and Metallurgy Branch is divided into the Metallurgical Engineering Team and the Materials Diagnostics Team. The EM32 Metal Joining and Processes Branch is divided into the Processes and Corrosion Team and the Welding and Manufacturing Team. Members of the different teams work closely together across team boundaries within EM30, with members of other divisions and branches within the Materials and Processes Laboratory, and with members of other MSFC, NASA and contractor organizations to support EM30 objectives/assignments. The members of the ESTS Group Metals Engineering Division Support Task are expected to perform their technical work equally seamlessly across these same boundaries while functioning administratively within the ESTS Group management system. In other words, the administrative management of the task and its members is controlled by the ESTS Group Performance Management System and the technical work is controlled by the EM30 ISO/AS9100 systems. Within those bounds, team members can and will give/accept technical direction to/from customer personnel and/or other contractor personnel to achieve EM30 objectives/assignments. Much of this work will be performed in conjunction with other NASA groups and companies such as equipment vendors and the Ares production contractors.

Some of the team's work will be collaborative - gathering and sharing technical knowledge from/at meetings, telecoms, e-mails and site visits. This collaborative process may also involve providing input into and review of EM30 technical reports. Very little of the work will be broken down into specific, stand-alone tasks assigned to ESTS personnel and returned to the customer in the form of a formal deliverable. Inputs into the aforementioned collaborative processes will be the norm. In cases where specific, stand-alone tasks are performed, the work product will be returned to the customer in the form of an ESTS Group memo.

- Support operation of the Robotic Weld Tool (RWT), Vertical Weld Tool (VWT).
- Support plug welding development.
- Support completion of both conventional and self reacting friction stir welding.
- CAD and machining support.
- Support Production Development System (PDS) weld development.
- Data analysis supporting weld development.
- Generation of Ares I Upper Stage project technical reports and data archival for future use.
 - Support the archival and capture of technical and engineering data from the Ares I Upper Stage project. Data captured shall include but not be limited to failure analysis and diagnostics analyses, weld process development, cleaning and corrosion studies, property data, lesson learned, component process data, tooling development data, and weld fixture data.
- Monitor progress of MAF, MSFC and other manufacturing facility modifications and construction, acquisition and installation of manufacturing and assembly tooling, and facility readiness reviews.
- Participate in facility and tooling design and construction reviews.
- Coordinate Construction of Facilities inputs for the US Manufacturing and Assembly subsystem.

Subelement CH: EM41 Polymeric Materials Upper Stage Support

- Provide coordination of TPS transporter and tooling design, manufacturing, and testing for Building 4739 and 4765 TPS Development Facilities.

- An independent team of engineering and technician support will be provided for development of an independent TPS processing capability to support Constellation and next generation Program activities.
- MSFC Buildings 4739 and 4765 TPS Development Facilities will be utilized to conduct NASA-directed tasks associated with TPS formulation, automatic, and manual SOFI application, and manual pour foam application, automatic primer application, foam trimming, and adhesive evaluations.
- Work closely with Ares I US, Ares V Core Stage, and Ares V Earth Departure Stage production contractors when they become available to provide MSFC onsite support. The Independent team will be active participants in TPS processing during all of these activities with the primary goal of carrying forward lessons learned and processing experience between the different prime contractors that may be selected for each program element.
- Duties include: generating Work Orders, Shop Travelers and Inventory (Material Usage Reports), generating specimens for testing, spraying materials, bonding, maintaining the equipment, control and monitor calibrated equipment, TPS test plans, and develop and present technical presentations.
- Perform test data analysis and statistics reporting.
- Support development of TPS processing options from a critical process, hazard analysis, safety, and potential failure mode (fault tree) perspective.
- Conduct review of Constellation Program related documents and requirements to ensure compliance.
- Provide building manager support for MSFC Building 4765 Thermal Protection Development Facility.

Subelement CJ: EM42 Composite Manufacturing Upper Stage Support

- Support fabrication of the Common Bulkhead Manufacturing Demonstration Article
- Coordinate machining activities.
- Coordinate bonding activities.
- Prepare test samples and test fixtures.
- Implement composite manufacturing process improvements.
- Establish proper form, fit, function and relevant details for composite tooling/design.
- Support CBMDA core repair development.
- Support scanning, metrology and machining processes.

Subelement CK: EM50 Upper Stage Support

- Review modular tooling related documentation and provide constructive comments back to the originator.
- More specific tasks will include insight and oversight of monitoring techniques, cleaning processes, cleanliness verification and Foreign Object Debris (FOD) program administration and assessment.
- Support of surface inspection instrument development and testing efforts is required as well as participation in process and hardware production facility audits.
- Perform tasks as a FOD Focal Point in accordance with Marshall Interim Directive MID 5340.1, Foreign Object Damage/Foreign Object Debris (FOD) Prevention Operations.
- Support documentation review, document revision/conversion, identification and assessment of development needs, cost/schedule estimates for technical approach activities, and input for safety/risk assessments.
- Support MAF activation, facilities requirements definition, process development, MSFOC planning and controls for shared facilities.
- Support additional engineering related tasks related to testing capabilities planning and operations as required within EM50.

Subelement CL: EM60 Upper Stage Support

- Assist with insight and oversight of Source Controlled Items (SCI) and Component End Items (CEI) to insure that the proper materials and processes are utilized during the manufacturing and assembly operations
- Represent M&A in reviewing SCI and CEI designs to insure the resulting design can be manufactured in the most timely, cost effective manner.

Subelement CV: Program Transition Support

- Materials mechanical testing support:
 - Prepare test samples and test fixtures.
 - Coordinate machining activities.
 - Calibrate test equipment as needed to ensure testing accuracy.
 - Perform mechanical property testing.
 - Perform an engineering review and quality check of the data.
 - Perform statistical analysis.
 - Prepare reports and data packages from data per customer requirements.
- Weld development support:
 - Support operation of the Robotic Weld Tool (RWT), Vertical Weld Tool (VWT).
 - Support plug welding development.
 - Support completion of both conventional and self reacting friction stir welding.
 - CAD and machining support.
 - Support Production Development System (PDS) weld development.
 - Data analysis supporting weld development.
 - Generation of Ares I Upper Stage project technical reports and data archival for future use.
 - Support the archival and capture of technical and engineering data from the Ares I Upper Stage project. Data captured shall include but not be limited to failure analysis and diagnostics analyses, weld process development, cleaning and corrosion studies, property data, lesson learned, component process data, tooling development data, and weld fixture data.
- Composites and Digital Manufacturing
 - Support fabrication of manufacturing demonstration articles
 - Coordinate machining activities.
 - Coordinate bonding activities.
 - Prepare test samples and test fixtures.
 - Implement composite manufacturing process improvements.
 - Establish proper form, fit, function and relevant details for composite tooling/design.
 - Support scanning, metrology and machining processes.

Subelement DD: EM20 J2X Support

- Implement fracture control requirements.
- Provide analytical details support.
- Perform engineering review and quality check of the data.
- Prepare reports and data packages from data per customer requirements.
- Provide NDE support including, but not limited to, shearography, ultrasound, eddy current, radiography and fluorescent penetrant inspections, analyze data and report results for these activities.

Subelement DK: EM50 J2X Support

- Electrostatic Levitator (ESL) - building 4708:
 - A. Operate, maintain and modify the equipment.
 - B. Develop new technology and equipment designs including fabrication, integration, and field testing.
 - C. Maintain the laboratory.
- Ultra HiTEMS Emissometer - building 4708:
 - A. Operate, maintain and modify the equipment.

- B. Develop new technology and equipment designs including fabrication, integration, and field testing.
- C. Maintain the laboratory.

Subelement ED: EM20 LAS Support

- Implement fracture control requirements.
- Provide analytical details support.
- Perform engineering review and quality check of the data.
- Prepare reports and data packages from data per customer requirements.

3.0 Discussion of Skills Required

Subelement AL: EM60 Ares V Support

Personnel supporting this task must have a minimum education of a Bachelor of Science in Mechanical, Aerospace, Industrial, or other Engineering with experience in manufacturing. Familiarity with software such as MS Visio and Sharepoint is desired.

Subelement BC: EM10 MMTF First Stage Support

Personnel supporting this task must have experience in mechanical properties testing of materials. Selected personnel supporting the Task must be experienced in materials diagnostics activities such as, but not limited to machining operations; operation and maintenance of MMTF test equipment and facilities; numerical and analytical modeling.

Subelement BF: EM41 Nonmetallic Materials 1st Stage Support

Personnel supporting this task must have experience in design and manufacture of nonmetallic materials. The personnel selected should have experience with adhesives, bonding systems, foams, sealants and the characterization of nonmetallic materials and systems.

Subelement CA: EM03 Upper Stage Manufacturing Support

The Manufacturing Support engineer requires a minimum education of a Bachelor of Science in Mechanical, Aerospace, Industrial, or other Engineering with experience in facility planning/construction/expansion/upgrading and manufacturing.

Subelement CB: EM10 HTF Upper Stage Support

Personnel supporting this task must have experience testing materials in cryogenic and gaseous hydrogen. Selected personnel supporting the task must be experienced in support activities such as, but not limited to, machining operations and maintenance of HTF test equipment and facilities.

Subelement CC: EM10 MMTF Upper Stage Support

Personnel supporting this task must have experience in mechanical properties testing of materials. Selected personnel supporting the task must be experienced in activities such as, but not limited to machining operations; operation and maintenance of MMTF test equipment and facilities; numerical and analytical modeling.

Subelement CD: EM20 Upper Stage Support

To support the damage tolerance assessment aspect of this task, personnel must have experience in fatigue and fracture assessments, fracture control requirements, and numerical and analytical modeling. Engineering expertise in metals and composites materials evaluation and testing is required.

To support nondestructive evaluation activities aspects of this task, selected personnel must be experienced in the operation of NDE equipment. NASA NDE Level II skills certification is required to perform NDE on flight hardware.

Certain training identified by the NASA customer or resulting from annual SHE assessments are required.

Subelement CE: EM30 Upper Stage Support

Personnel supporting this task must have experience in metallurgical and/or materials engineering, materials processes such as forging, brake forming, extrusions, corrosion, surface treatment, heat treatment, etc., welding and/or metal joining, failure analysis, and/or diagnostics.

(b)(4)



Subelement CJ: EM42 Composite Manufacturing Upper Stage Support

Personnel supporting this task must have experience in design and fabrication of composite and non-metallic materials. Selected personnel supporting the task must be experienced in manual and automatic composite lay-up techniques, machining, design of composite components.

Subelement CK: EM50 Upper Stage Support

Contamination Control support requires an engineer familiar with general contamination control philosophy including requirements definition/implementation, process and facilities controls. Duties include development and review of program/project/customer test plans and procedures, Program/Project level documentation, and support program/project/customer meetings as appropriate. The generation of design requirements, operations control plans, test plans, test reports, training and awareness materials, Standard Operating Procedures, and technical articles are considered integral to this position.

Subelement CL: EM60 Upper Stage Support

Personnel supporting this task must have a minimum education of a Bachelor of Science in Materials Engineering or equivalent engineering with detail knowledge of materials selection and control according to NASA requirements. Skills should include expertise in processing and manufacturing.

Subelement CV: Program Transition Support

Personnel supporting this task must have experience in metallurgical and/or materials engineering, materials processes such as welding and/or metal joining, failure analysis, and/or diagnostics. One person shall have experience with manufacturing planning and installation of large machining centers. One person shall have experience with materials mechanical testing.

Subelement DD: EM20 J2X Support

Personnel must have experience in fatigue and fracture assessments, fracture control requirements, and numerical and analytical modeling. Engineering expertise in metals and composites materials evaluation and testing is required.

To support nondestructive evaluation activities aspects of this task, selected personnel must be experienced in the operation of NDE equipment. NASA NDE Level II skills certification is required to perform NDE on flight hardware.

Subelement DK: EM50 J2X Support

Space Environmental Effects and J-2X Combustion Devices-Nozzle support requires paraprofessionals with experience in the levitation of a variety of materials including metals and alloys, along with an understanding of optical diagnostic equipment, pyrometers, high-resolution videography, a working knowledge of vacuum systems, and high-voltage laboratory systems. Additionally the paraprofessionals must possess a general knowledge of laboratory equipment as well as fabrication

methods and techniques required for developing enhancements to the Electrostatic Levitator equipment/facility, the Ultra HiTEMS Emissometer, the Exploding Wire Gun apparatus, the Space Environmental Effects Facility and the Lunar Environment Test System.

Subelement ED: EM20 LAS Support

Personnel must have experience in fatigue and fracture assessments, fracture control requirements, and numerical and analytical modeling. Engineering expertise in metals and composites materials evaluation and testing is required.

4.0 Special Tools Required

- Microsoft Visio 2007 Professional and Project 2007 Standard are needed for the MAF facility requirements effort.
- Personal protective equipment (PPE) appropriate to the performance of the various operations (machining, welding, testing, NDE, etc.) accomplished by task personnel.
- Environmentally Controlled Spray Booths, Spray Robots, Foam and Primer Delivery Systems, TPS Tooling and Transporter, Specialized Molds, In-Process Test Equipment, Foam Reactivity Test Equipment, Thin Film Thickness Measuring Equipment, Laboratory Scales, Hoods, Microscope, and Hand tools.
- Access to the M&P data products server and Materials and Processes Technical Information System (MAPTIS).
- Access to the project Integrated Collaborative Environment (ICE)/data documents server and the SharePoint Manufacturing and Assembly web portal.
- Matlab is used to develop engineering tools to support fracture and damage tolerance analyses and to support materials testing activities.

5.0 Participating Subcontractors

- (b)(4) [Redacted]
- (b)(4) [Redacted]

6.0 Milestones & Deliverables

- Biweekly notes via e-mail.
- Formal monthly activity reports.
- Test plans and test reports documenting results of test programs in accordance with project requirements.
- Specimen and fixture design.
- Test specimens and fixtures.
- Technical reports, technical presentations, documents inputs, and review item discrepancies (RIDs).
- E-mail and verbal communications
- Support of product development meetings.
- NDE process development and inspection test reports.
- Fracture and damage tolerance analysis methodologies, fracture assessments and analysis software.
- Data Requirement Documents, training and awareness materials, document review inputs, and draft document revisions.
- Shop Travelers
- Schedules
- Material usage report
- Response to customer requests – Verbal inputs
- Document Inputs and RIDs: editorial
- Hazard Analysis

- Organizational Work Instructions (OWI)
- Spray booth and related documentation
- Quality records for the EM10 database must be provided within 10 calendar days from the date of completion of the actual testing.
- Task schedule slips due to uncontrollable circumstances (examples: reprioritization of testing by customer; etc.) will not be factored negatively in assessing schedule objectives.

7.0 Special Considerations (Recruiting, Special Equipment / Material, Safety, etc.)

Subelement BF: EM41 Nonmetallic Materials 1st Stage Support

Travel: 14 trips for technical interchange, vendor visits and problem resolution meetings.

Subelement CA: EM03 Upper Stage Manufacturing Support

Travel: Four trips to MAF for manufacturing facility review meetings.

Subelement CC: EM10 MMTF Upper Stage Support

Materials: Test support equipment like extensometers and servo valves.

Travel: Two trips to support technical interchange meetings.

Subelement CD: EM20 Upper Stage Support

Materials: Cleaning and rental services for laboratory coats.

Subelement CE: EM30 Upper Stage Support

Travel: Five trips to MAF to support weld tooling development and installation.

Subelement CH: EM41 Polymeric Materials Upper Stage Support

Materials: Raw materials, tooling and supplies to support foam spray facility operations.

Other: Machining services to support foam spray facility operations.

Travel: Two trips to offsite test facilities to witness Reaction Control System (RCS) TPS materials testing, two trips to the Michoud Assembly Facility and/or Kennedy Space Center to support Ares Upper Stage materials and processes development and two trips to participate in materials manufacturing reviews.

Subelement CJ: EM42 Composite Manufacturing Upper Stage Support

Materials: Cleaning and rental services for laboratory coats.

Subelement CK: EM50 Upper Stage Support

Other: Conference fees and training costs.

Travel: Three trips to MAF to support FOD control activities, two trips to FOD/ASTM conferences and meetings, and one trip for attendance of a FOD awareness training course.

8.0 Work Shelf

The following activities could be accomplished as part of the Task Order performance by personnel that are temporarily available due to program or funding delays on other Tasks. Specific assignments will be coordinated with the Task Initiator to ensure appropriate skills and experience.

TO/Subelement	Description	Due Date	Skill
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ESTS Contract Task Order Request Performance Plan

Task Order Title: [Constellation Support to Materials and Processes Labora](#)

Task Order Number: [34-000002](#) Revision: 01

Category	Weighting Technical %	End of Period Technical Score
Technical Objectives	65%	X <u>65%</u> = Justification
<p>Support Ares V Core Stage architecture and design studies.</p> <p>Operate and maintain the Hydrogen Test Facility to support materials mechanical testing in hydrogen environments for Ares I Upper Stage and J2X.</p> <p>Operate and maintain the Materials Mechanical Test Facility to support materials mechanical testing for Ares I Upper Stage, Ares I First Stage and J2X.</p> <p>Provide materials development and qualification support for Ares First Stage motor (insulation, liner, propellant, seals, nozzle, and BDM/BTM IPTs), structural and TPS systems (M&P IPT)</p> <p>Support the development of manufacturing and assembly facilities at MSFC and MAF.</p> <p>Provide nondestructive evaluation support including, but not limited to, shearography, ultrasound, eddy current, radiography, and fluorescent penetrant inspections in support of Ares I Upper Stage and J2X.</p> <p>Support manufacturing and weld development activities at MSFC and MAF (as appropriate) for Ares I Upper Stage.</p> <p>Enable MSFC Buildings 4739 and 4765 TPS Development Facility to be utilized as facilities to conduct NASA- directed tasks associated with TPS formulation, automatic, and manual SOFI application, and manual pour foam application.</p> <p>Support composites fabrication</p>		

ESTS Contract Task Order Request Performance Plan

Task Order Title: [Constellation Support to Materials and Processes Labora](#)

Task Order Number: [34-000002](#) Revision: 01

<p>efforts for the Common Bulkhead Manufacturing Demonstration Article including core repair development.</p> <p>Provide technical support to the Contamination Control Team in support of Ares I Integrated Manufacturing and Assembly technical objectives with insight and oversight of monitoring techniques, cleaning processes, cleanliness verification and Foreign Object Debris (FOD) program administration and assessment.</p> <p>Assist with insight and oversight of Source Controlled Items (SCI) and Component End Items (CEI) in support of Ares I Upper Stage.</p> <p>Provide engineering and technical support to the Damage Tolerance Assessment Branch. Perform advanced fracture analyses using appropriate fracture modeling applications in support of J2X and Launch Abort System.</p> <p>Maintain and operate the Electrostatic Levitator and Ultra HiTEMS Emissometer and help develop new technology and equipment designs in support of J2X.</p> <p>Support the transition from Constellation to the follow-on program.</p>	
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Schedule Objectives (Milestones)

Weighting
Schedule %
10%
(min 10%)

Schedule Score

X 10% =

Justification

ESTS Contract Task Order Request Performance Plan

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<p>A majority of the work performed is real time support and is negotiated at the time of receipt. Provide deliverables on or before the negotiated date, which may need to be renegotiated due to changing priorities or scope of work.</p>		
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	Weighting Cost% <u>25%</u> <i>(min.25%)</i>	Cost Score X <u>25%</u> =	
<u>Cost (actual vs. negotiated)</u>			Justification
	Weighting Total % <u>100.00%</u>	Total Score	

Technical, Schedule, and Cost Grading Scale

Score	Description
9.0-10.0	Exceeded TO Performance Plan objectives resulting in major benefit(s)
8.0-8.9	Exceeded TO Performance Plan objectives resulting in modest benefit(s)
7.0-7.9	Met TO Performance Plan objectives
3.0-6.9	Did not meet all TO Performance Plan objectives resulting in minimal impact or requiring additional agency funds
0.0-2.9	Did not meet TO Performance Plan objectives resulting in substantial impact and/or requiring additional agency funds

ESTS Contract Task Order Request Performance Plan

Task Order Number: [Constellation Support to Materials and Processes Labora](#)

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Comments:

Risk Assessment

Contract Number: NNM05AB50C

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Period of Performance: 10/02/2010 to 09/30/2011

MSFC Initiator: Regina Moore (Task Initiator)

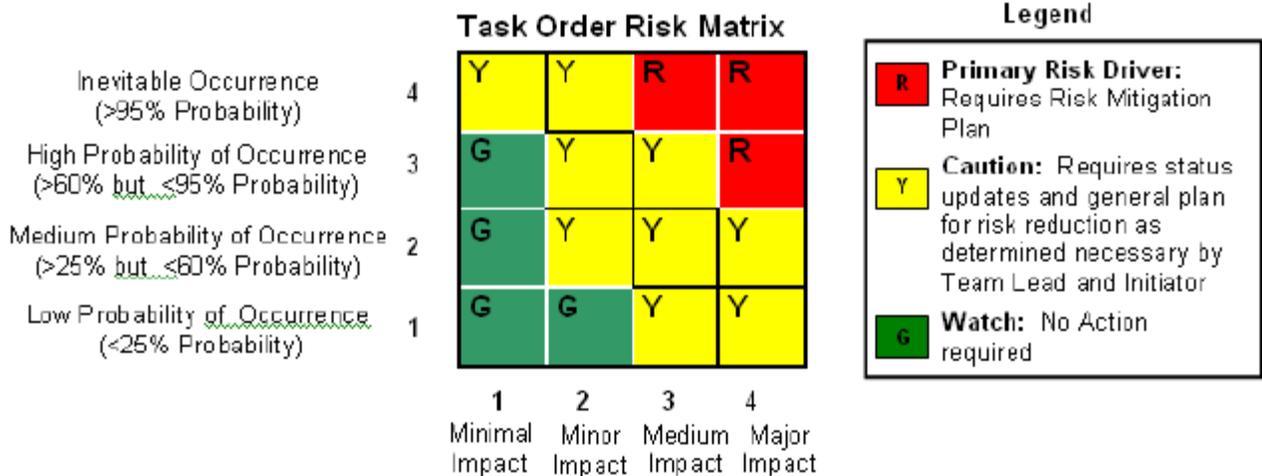
(b)(4)
[Redacted]
[Redacted]
[Redacted]

Task Order Risk Assessment to Cost, Technical, and Schedule

List identified risk associated with Task Order performance as related to task cost, technical, and schedule. Classify the risk(s) according to probability of occurrence and impact as defined below and enter the risk into risk matrix.

Risk	Risk Type	Probability (1-4)	Impact (1-4)	Risk Description
Risk C1	Cost	3	2	Higher proportional overhead costs due to reduction of overall contract workforce level and associated RIF liabilities may cause actual labor rates to be higher than estimated rates. As a result, lower hours may be delivered than estimated to stay within cost constraints.
Risk C2	Cost			
Risk T1	Technical	1	2	Loss of experienced personnel and resulting detail knowledge may impact quality/technical maturity of task products.
Risk T2	Technical			
Risk S1	Schedule			No schedule risks have been identified.
Risk S2	Schedule			

*Note: See page 2 for risk mitigation plan for those risks which are Primary Risk Drivers.



Impact Level	Cost Impact Definition	Technical Impact Definition	Schedule Impact Definition
(1) Minimal Impact	No significant cost impact	No significant technical impact	No significant schedule impact
(2) Minor Impact	Potential to recover cost	Potential to gain required technology without impact	Minor delay in deliverables but no impact to customer
(3) Medium Impact	>0 but <10% subtask cost overrun	Some technical impact but potential to recover	Delay in subtask deliverables but work arounds available and acceptable to customer
(4) Major Impact	>10% subtask cost overrun	Unable to meet technical requirements to perform subtask	Delay in subtask deliverables with impact to customer

Risk Mitigation Plan

Complete the following chart for those risks identified on page 1 as "Primary Risk Drivers". The following chart will serve as the Risk Mitigation Plan.

Risk No.:		
Risk Description:		
Mitigation Step No.	Planned Completion Date	Mitigation Step Description