Marshall Space Flight Center
Engineering, Science & Technical Services

JACOBS ESTS Group

Task Order Plan (TOP)

Contract Number: *NNM05AB50C*
TO Title: *Nonmetallic Materials Team Support*
TO Number: *34-040001* **Revision:** *21*

Period of Performance: *10/02/2010* to *9/30/2011*

MSFC Initiator: *Jeffery Sparks*

(b)(4)

Emergency: *No*

REVISION 21:

The purpose of this revision is to modify the labor to match the available funding. The overall estimate has been decreased from (b)(4) The scope of work on subelements SB, SE and SM has been reduced in accordance with customer directions to match the available funding. There will be a reduced level of support pertaining to sections 2.1, 2.2, 2.4 through 2.6, and 2.8 through 2.10 since the level of effort is expected to be minimal, but could increase as a result of in-flight anomalies. Additionally, travel estimates for subelements SB and SM have been deleted as travel will not be supported for this revision. Efforts will focus primarily on post flight support (section 2.3), materials obsolescence resolution (section 2.7), and flight hardware reviews (2.11) for the remaining space shuttle launches. Support for all subelements will focus on launch readiness reviews, problem resolution and post launch hardware evaluations.

Subelement -SB: Shuttle SRB

Labor:
The labor estimate for -SB is reduced by (b)(4) hours, corresponding to a decrease in cost of (b)(4) This change is due to reductions in the available funding in accordance with customer directions.

Travel:
Travel estimates for –SB are reduced by (b)(4) since travel will not be supported for this revision.

The net impact to this subelement is a decrease in the cost estimate of (b)(4)

Subelement –SE: Shuttle SSME

Labor:
The labor estimate for -SE is reduced by (b)(4) hours, corresponding to a decrease in cost of (b)(4) This change is due to reductions in the available funding in accordance with customer directions.

Subelement -SM: Shuttle RSRM

Labor:

The labor estimate for -SM is reduced by (b)(4) hours, corresponding to a decrease in cost of (b)(4) This change is due to reductions in the available funding in accordance with customer directions.

Travel:
Travel estimates for –SM are reduced by (b)(4) since travel will not be supported for this revision.

The net impact to this subelement is a decrease in the cost estimate of (b)(4)

REVISION 20:
The purpose of this revision is to extend this task into Contract Year 6 of the NNM05AB50C ESTS contract. This revision defines and estimates work for the period October 2, 2010 through September 30, 2011. Additionally, the Schedule, Performance Plan and Risk Assessment have been revised to reflect changes in task activities for the new period of performance. Subelement -EA has been closed since support is no longer required for this effort. Subelements -01 and -07 have been closed and replaced with Shuttle SRB (-SB) and Shuttle RSRM (-SM) respectively. An additional subelement has been opened for Shuttle SSME (-SE) for this performance period. Subelement -20 (the Solar Probe project) will close due to a reduction in support required for CY6. Subelement -99 will remain open and active for support of miscellaneous projects such as the SBIR project # NNX10CF19P.

REVISION 19:
The purpose of this revision is to modify the task descriptions and subelements to reflect the change in scope of this task order. Subelements -CA and -CP will be administratively closed and support activity in these areas will cease due to a reduction in scope. Subelement CE will be administratively closed and the work corresponding to this subelement will be continued under the new TO # 34-000001 Subelement BF. The Orion subelement –EA will remain open and active, while subelement -20 will continue to provide support for the Ceramic Solar Grid Development effort. In addition, the MSFC Initiator has been changed to Jeffery Sparks. The Schedule, Risk Assessement and Performance Plan have been updated to reflect the changes in scope, subelemets and task descriptions.

Subelement 01: Nonmetals Engineering Branch SRB/RSRM Support (Closed)

Labor:
This subelement has been closed due to reductions in support requirements for Shuttle STS activities and post-flight analysis. The net labor estimate for FY2010 is decreased by (b)(4) hours corresponding to (b)(4)

Subelement 07 – Shuttle RSRM Booster Separation Motor (BSM) Project Support (Revised):
WBS# 520871.08.01.01.02

Subcontract:
The subcontractor estimate was increased by (b)(4) to account for final billing and close-out of the effort to be provided for the remainder of the year. This subelement will close at the end of FY2010.

Subelement 20 – Solar Probe Ceramic Grid Development (Revised):
WBS# 432938.09.01.08.10.09

Labor:
The labor estimate has been reduced by (b)(4 hours corresponding to a decrease of (b)(4) This decrease is due to a reduction in the level of support required for product development and technical interchange meetings for the remainder of FY 2010. This effort will close at the end of FY2010.

Subelement 99 – Short Term Support (Closed):
WBS# 953033.04.08.01 & 698671.04.08

Labor:
The labor estimate has been reduced by (b)(4) hours corresponding to a decrease of (b)(4) due to to a decrease in the support required for this effort for the remainer of FY 2010.

Subelement EA – Orion Launch Abort System (LAS) Project Support (Revised):
WBS# 644423.06.34.03.10.08

Labor:
The labor estimate for -EA is reduced by (b)(4) hours, corresponding to a decrease in cost of (b)(4) This change is due primarily to reductions in the required level of support for technical interchange meetings and (b)(4) support.

Travel:
This revision decreases travel expectations by (b)(4) as a result of reduced requirements for visits to subcontrators and vendors and for technical interchange meetings.

The net impact to this subelement is a decrease in the cost estimate of (b)(4)

REVISION 18:
The purpose of this revision is to (a) change the TO Title to reflect reorganization of the Materials & Processes Laboratory, (b) revise subelement titles and verbiage within the appropriate narrative descriptions to reflect reorganization of the Materials & Processes Laboratory (c) re-allocate resources in order to more accurately reflect the effort required during this period of performance for the EM41 High Temperature Materials Team and (d) open subelement -CP which will provide high temperarure materials engineering support for the Ares I Ullage Settling Motor effort. The total task order estimate is decreased from (b)(4) The Schedule, Risk Assessement and Performance Plan have been updated to reflect the changes in scope and TO Title.

Subelement 01: Nonmetals Engineering Branch SRB/RSRM Support (Closed)

Labor:
This subelement has been closed due to reductions in support requirements for Shuttle STS activities and post-flight analysis. The net labor estimate for FY2010 is decreased by (b)(4) hours corresponding to (b)(4)

Subelement 07 – Shuttle RSRM Booster Separation Motor (BSM) Project Support (Revised):
WBS# 520871.08.01.01.02

Labor:
The labor estimate for -07 is reduced by (b)(4) hours corresponding to a reduction of (b)(4) and is due to a decrease in support required for document reviews and materials characterization.

Subelement 20 – Solar Probe Ceramic Grid Development (Revised):
WBS# 432938.09.01.08.10.09

Labor:
The labor estimate for subelement was increased by (b)(4) hours corresponding to an increase of (b)(4) due to additional requirements for prototype grid manufacturing development and materials characterization.

Subelement 99 – Short Term Support (Revised):
WBS# 953033.04.08.01 & 698671.04.08

Labor:

This revision raises the labor estimate by (b)(4) hours corresponding to an increase of (b)(4) due to a heighten level of anticipated support for SBIR's and non-Ares related projects.

Subelement CA – Upper Stage Project Fracture Control Board Support (Revised):
WBS# 136905.08.05.12.01.08

Labor:
The labor estimate is reduced by (b)(4) hours, corresponding to a decrease in cost of (b)(4) This decrease is primarily due to a reduction in required support for technical interchange meetings and document reviews.

Subelement CE – Ares I First Stage Five Segment Reusable Solid Rocket Motor (RSRMV) Support (Revised):
WBS# 136905.08.01.11

Labor:
The labor estimate for –CE is reduced by (b)(4) hours, corresponding to a decrease in cost of (b)(4) This reduction in labor is due primarily to reduced requirements for document reviews , technical interchange meetings and visits to contractor sites.

Travel:
Travel estimates are decreased by (b)(4) due to reduced requirements for visits to contractor sites for post-fire analysis and technical interchange meetings.

The net impact to this subelement is a decrease in the cost estimate of (b)(4)

Subelement CP – Ares I Ullage Settling Motor Project Support (New):
WBS# 13905.08.05.13.02.01.08

Labor:
This revision adds a new subelement with an estimate of (b)(4) hours (b)(4) to support high temperature nonmetallic material issues for the Ares I Ullage Settling Motor and nozzle sections.

Travel:
An estimate of (b)(4) is provided for possible travel to vendors, subcontractors and/or technical interchange meetings related to design reviews, material changes and/or process deviations.

The net impact for this subelement results in an estimate of (b)(4)

Subelement EA – Orion Launch Abort System (LAS) Project Support (Revised):
WBS# 644423.06.34.03.10.08

Labor:
The labor estimate for –EA is reduced by (b)(4) hours, corresponding to a decrease in cost of (b)(4) This change is due primarily to reductions in the required level of support for technical interchange meetings and on-site post-fire evaluations.

Travel:
This revision decreases travel expectations by (b)(4) resulting from reduced requirements for visits to subcontrators and vendors and technical interchange meetings.

The net impact to this subelement is a decrease in the cost estimate of (b)(4)

REVISION 17:

The purpose of this revision is to open subelement -20 which will provide support for the Solar Probe Ceramic Grid Development project. The total task order estimate is increased from (b)(4) to (b)(4) The Performance Plan and the Risk Assessment have not been revised since they are not impacted by the changes reflected in this revision.

Subelement 20 – Solar Probe Ceramic Grid Development (New):
WBS# 432938.09.01.08.10.09

Labor:
This revision adds a new subelement with an estimate of (b)(4) hours (b)(4) to support efforts for the Solar Probe Ceramic Grid Development project.

Ares subelements are not affected by this revision.

REVISION 16:
The purpose of Revision 16 is to extend the task into Contract Year 5 of the NNM05AB50C ESTS contract. This revision defines and estimates work for the period October 3, 2009 through October 14, 2010. Additionally, the Schedule has been revised to reflect changes in the task activities for the new period of performance while the Performance Plan and Risk Assessment are not affected by the changes in this revision. This revision affects the following APO elements:

- Ares I Upper Stage Upper Stage Fracture Control Board (subelement CA), WBS# 136905.08.05.12.01.08
- Ares I First Stage Support (subelement CE), WBS# 136905.08.01.11
- Orion Nonmetals Engineering Support (subelement EA), WBS# 644423.06.34.03.10.08

REVISION 15:
The purpose of this revision is to more accurately reflect the effort required during this period of performance. Specific details on the changes to each subelement are provided below. The total task order estimate is increased from (b)(4) The Performance Plan and the Risk Assessment have not been revised since they are not impacted by the changes reflected in this revision.

Subelement 07 – Shuttle RSRM Booster Separation Motor (BSM) Support (Revised):
WBS# 520871.08.01.01.02

Labor:
This revision reduces the labor estimate by (b)(4) hours corresponding to a reduction of (b)(4) due to a decrease in required support for this effort. This provides additional support for the resolution of manufacturing and design issues associated with Ares I First Stage and Orion Nonmetals Engineering.

Subcontract:
This revision reduces the subcontracting estimate by (b)(4) due to a change in travel requirements for the subcontractor which reduces the original travel expenses accordingly.

Subelement 10 – Shuttle Reinforced Carbon-Carbon (RCC) Support (Revised):
WBS# 197009.10.01.01.10

Labor:
This revision increases the labor estimate by (b)(4) hours corresponding to a cost increase of (b)(4) in order to provide additional efforts toward resolution of the RCC spallation issue.

Subelement CA – Upper Stage Fracture Control Board Nonmetals Support (Revised):
WBS# 136905.08.05.12.01.08

Labor:
In order to more accurately reflect the expected efforts, this revision reduces the labor estimate by (b)(4 hours, corresponding to a decrease in cost of (b)(4) and shifts additional support towards Orion Nonmetals Engineering efforts.

Subelement CE – Ares I First Stage Support (Revised):
WBS# 136905.08.01.11

Labor:
This revision makes minor adjustments in the overall distribution of existing labor contributions in this area which provides additional support for Orion Nonmetals Engineering efforts. The result is a net labor decrease of (b)(hours, corresponding to a net labor cost decrease of (b)(4)

Travel:
This revision decreases travel expectations by (b)(4) to more accurately reflect the anticipated travel requirements for the next few months.

The net impact to this subelement is a decrease in the cost estimate of (b)(4)

Subelement EA – Orion Nonmetals Engineering Support (Revised):
WBS# 644423.06.34.03.10.08

Labor:
This revision provides additional support for Orion Nonmetals Engineering activities with emphasis in the resolution of design and manufacturing issues. The result is a net labor increase of (b)(4) hours, corresponding to a net labor cost increase of (b)(4)

REVISION 14:
The purpose of this revision is to (1) add a new subelement (CA) to provide engineering support for the Upper Stage Fracture Control Board, (2) redefine the scope and level of support for the RSRM Booster Separation Motor, and (3) redistribute the overall labor to more accurately reflect the effort required. Specific details on the changes to each subelement are provided below. The total task order estimate is increased from (b)(4) The Performance Plan has been revised to better reflect the anticipated technical objectives. Risk Assessment has not been revised since it is not impacted by the changes reflected in this revision.

(b)(4)

Subelement 07 – Shuttle RSRM Booster Separation Motor (BSM) Support (Revised):
WBS# 520871.08.01.01.02

Labor:
This revision adds (b)(4) hours of (b)(4) per month beginning in May for a total increase of (b)(4)

Subcontract:
This revision reduces the subcontracting estimate by (b)(4) to more accurately reflect the expected level of subcontract support.

Subelement 10 – Shuttle Reinforced Carbon-Carbon (RCC) Support (Revised):
WBS# 197009.10.01.01.10

Labor:
This revision increases the labor estimate by (b)(4) to extend the support out through September 2009.

Subelement 99 – Short Term Support (Revised):
WBS# 953033.04.08.01 & 698671.04.08

Labor:
This revision reduces the labor estimate by (b)(4) to more accurately reflect the effort required during this period of performance.

Subelement CA – Upper Stage Fracture Control Board Nonmetals Support (New):
WBS# 136905.08.05.12.01.08

Labor:
This revision adds a new subelement with an estimate of (b)(4) to support efforts for the Upper Stage Fracture Control Board.

Subelement CD – Ares I Upper Stage J-2X Engine Support (Revised):
WBS# 136905.08.04.01.08.11

Labor:
This revision reduces the labor estimate by (b)(4) to more accurately reflect the effort required during this period of performance.

Subelement CE – Ares I First Stage Support (Revised):
WBS# 136905.08.01.11

Labor:
This revision redistributes labor to more accurately reflect the effort required during this period of performance. (b)(4) estimates were increased while (b)(4) estimates were decreased resulting in an overall labor estimate increase of (b)(4) hours and a net increase in labor cost of (b)(4)

Travel:
This revision adds (b)(4) of travel estimate to support (1) manufacturing activities at the prime contractor facility (Promontory, UT) and (2) processing efforts at one of the subcontract manufacturers.

The net impact to this subelement is an increase in estimate of (b)(4)

Subelement EA – Orion Nonmetals Engineering Support (Revised):
WBS# 644423.06.34.03.10.08

Labor:
This revision redistributes and reduces the overall labor estimate by (b)(4) to more accurately reflect the effort required during this period of performance.

Travel:
This revision adds (b)(4) of travel estimate to support a technical interchange meeting and process review at a subcontractor facility.

The net impact to this subelement is a decrease in estimate of (b)(4)

REVISION 13:
The purpose of this revision is to more accurately reflect the effort required during this period of performance. Specific details on the changes to each subelement are provided below. The total task or-

der estimate is increased from (b)(4) The Performance Plan has been revised to better reflect the anticipated technical objectives. Risk Assessment has not been revised since it is not impacted by the changes reflected in this revision.

(b)(4)

Subelement 10 – Shuttle Reinforced Carbon-Carbon (RCC) Support (Revised):
WBS# 197009.10.01.01.10

Labor:
This revision reduces the labor estimate by (b)(4) to more accurately reflect the effort required during this period of performance.

Subelement CC – Ares I Upper Stage TPS Support (Closed):
WBS# 136905.08.05.12.07.08

Labor:
This revision reduces the labor estimate by (b)(4) to reflect that this effort is closed and no additional work will be performed against this subelement.

Subelement CE – Ares I First Stage Support (Revised):
WBS# 136905.08.01.11

Labor:
This revision redistributes labor to more accurately reflect the effort required during this period of performance. (b)(4) estimates were increased while (b)(4) estimates were decreased resulting in an overall labor estimate decrease of (b)(4) hours and a net reduction in labor cost of (b)(4)

Subelement EA – Orion Nonmetals Engineering Support (Revised):
WBS# 644423.06.34.03.10.08

Labor:
This revision increases the labor estimate by (b)(4) to more accurately reflect the effort required during this period of performance. (b)(4) estimate was decreased and (b)(4) estimate increased to reflect that a (b)(4) was hired at (b)(4) rather than the originally estimated (b)(4)

Other Direct Charges (ODC):
This revision decreases the ODC estimate by (b)(4) to reflect actual recruitment costs for new (b)(4) (b)(4)

The net impact to this subelement is an increase in estimate of (b)(4)

REVISION 12:
The purpose of this revision is to extend this task into Contract Year 4 of the NNM05AB50C ESTS contract. This revision defines and estimates work for the period September 27, 2008 through October 2, 2009. Additionally, the Schedule, Performance Plan and Risk Assessment have been revised to reflect changes in task activities for the new period of performance. This revision affects the following APO elements:

- Ares I Upper Stage (subelement CC), WBS# 136905.08.05.12.07.08
- Ares I Upper Stage J-2X Engine (subelement CD), WBS# 136905.08.04.01.08.11
- Ares I First Stage (subelement CE), WBS# 136905.08.01.11
- Orion launch-abort system (subelement EA), WBS# 644423.06.03.10.08

REVISION 11:

The purpose of this revision is to more accurately reflect the effort required during this period of performance. Specific details on the changes to each subelement are provided below. The total task order estimate is decreased from (b)(4) No additional budget is required for any of the subelements. The Performance Plan and Risk Assessment have not been revised since they are not impacted by the changes reflected in this revision.

(b)(4)

Subelement 07 – Shuttle RSRM Booster Separation Motor (BSM) Support (Revised):
WBS# 520871.08.01.01.02

Subcontract:
This revision reduces the subcontracting estimate by (b)(4) to more accurately reflect the expected level of subcontract support.

Subelement 10 – Shuttle Reinforced Carbon-Carbon (RCC) Support (Revised):
WBS# 197009.10.01.01.10

Labor:
This revision reduces the labor estimate by (b)(4) to more accurately reflect the effort required during this period of performance.

Subelement 19 – Tape Wrapper Upgrades (Closed):
This revision closes this subelement.

Labor:
This revision reduces the labor estimate by (b)(4) to reflect that this effort is closed and no additional work will be performed against this subelement.

Subelement 99 – Short Term Support (Revised):
WBS# 953033.04.08.01 & 698671.04.08

Labor:
This revision reduces the labor estimate by (b)(4) to more accurately reflect the effort required during this period of performance.

Subelement CC – Ares I Upper Stage TPS Support (Revised):
WBS# 136905.08.05.12.07.08

Travel:
This revision deletes (b)(4) of travel estimate. Travel is no longer expected to be required to support this effort during this period of performance.

Subelement CD – Ares I Upper Stage J-2X Engine Support (Revised):
WBS# 136905.08.04.01.08.11

Labor:
This revision reduces the labor estimate by (b)(4) to more accurately reflect the effort required during this period of performance.

Subelement CE – Ares I First Stage Support (Revised):
WBS# 136905.08.01.11

Labor:
This revision redistributes labor to more accurately reflect the effort required during this period of performance. (b)(4) estimate was reduced while (b)(4) estimates were increased resulting in an

overall labor estimate increase of (b)(4) hours but a reduction in labor cost of (b)(4) due to the shift from higher to lower cost labor categories.

Other Direct Charges (ODC):
This revision reduces the ODC estimate by (b)(4) to reflect relocation costs that were lower than originally estimated.

Subcontract:
This revision reduces the subcontracting estimate by (b)(4) to reflect that (b)(4) is no longer providing task management support.

Travel:
This revision adds (b)(4) of travel estimate to support a technical interchange meeting, a working group meeting and a materials focus team meeting.

The net impact to this subelement is a reduction in estimate of (b)(4)

Subelement EA – Orion Nonmetals Engineering Support (Revised):
WBS# 644423.06.34.03.10.08

Labor:
This revision reduces the labor estimate by (b)(4) to more accurately reflect the effort required during this period of performance.

Other Direct Charges (ODC):
This revision increases the ODC estimate by (b)(4) to cover relocation costs for an engineer.

Travel:
This revision adds (b)(4) of travel estimate to support a working group meeting.

The net impact to this subelement is a reduction in estimate of (b)(4)

Revision 10 is written to add travel to the Orion launch abort systems (LAS) subelement –EA. In addition, (b)(4) effort has been shifted to subelement –EA.

Revision 09 is written to add engineering support for the Launch Abort System (subelement –EA) and to better define and focus the task order to the needs of the Ceramics and Ablatives Engineering Team. The principal change will be the moving of (b)(4) from the Shuttle and External Tank Debris subelements (Task Order 34-040006, subelements -01 and -02) to cover Launch Abort System. In addition, relocation and interviewing costs have been included in this task order's subelement -EA. Estimate has been added to allow (b)(4) to attend a ceramics symposium. A subelement -10 has been added for support of shuttle leading edge reinforced carbon-carbon (RCC) work. Estimate for six trips are included in subelement -10 to cover anticipated travel. The travel estimate has been increased somewhat for subelement –CE due to higher travel requirements than originally identified. Some effort has been moved to a new subelement -99 which will be used for short term consultations and document reviews. The task order title is changed to better reflect the work being done. Subelement -19 defining the engineering coordination support to upgrade the nozzle tape wrapper located in building 4707 has been added. Subelement –CD has been reopened to define J2X engine nozzle extension work. This subelement is being covered by a shifting of staffing effort at this time, with no additional resources required.

Revision 08 is being written to extend this task into Contract Year 3 of the NNM05AB50C ESTS contract. This revision defines and estimates work for the period 29 September 2007 through 26 September 2008. Additionally, the Schedule, Performance Plan, and Risk Assessment have been revised to reflect changes in task activities for the new period of performance. Acceptance testing of graphite

material will be continued, and the subcontract to support this has been inserted for this contract year. The effort and financial management for subelements -R1 and -09 is being moved to task order 34-040006. The –CE subelement (Ares I, 1st stage) description has been clarified. Subelement –CC has been reinserted to allow for support of upperstage small solid motor work. A nominal estimate has been inserted for travel. Support of the installation of the arc induction furnace, the SRB auxiliary power unit effort, and evaluation of the crack repair efforts have been completed, and these subelements have been removed (-02, -05, -08).

Revision 07 is written to move some of the debris characterization effort from subelement R1 to a new subelement, 09, where external tank-related efforts will be tracked, separately. In addition, the upperstage cryogenic foam efforts are being moved from this task order (b)(4) in subelement –CC) to Subelement 34-040003-CC, effective July 1, 2007 (this move facilitates the tracking of the usage of funds and work done by the task initiator of subelement 34-040003-CC). Estimate was increased in the amount of (b)(4) to allow for relocation of (b)(4)

The purpose of this revision (06) is to close Subelement R3; modify the support effort due to reallocation and change of resources; extend support for Subelements 05, R6, and 07; add Subelement 08 for Shuttle SRB TVC APU fuel pump bearing anomaly investigation subcontractor support; and add Subelement CE for Ares I First Stage nozzle development support. (b)(4) positions are being added for Subelement CE. The Schedule, Performance Plan and Risk Assessment have been revised to reflect these changes in task order activities.

The purpose of this revision (05) is to add Subelement CC to provide the additional scope to support NASA's Ares I Upper Stage activities. This revision defines and estimates the required support. The revision also reduces support required for sub-elements –R3 and –R6 due to those project activities working towards closure/completion. This revision also adds support under Subelement 02 for consultant support and evaluation/assessment of MSFC arc heater test facility to perform future programs materials testing. Additionally, the Schedule, Performance Plan and Risk Assessment have been revised to reflect changes in task order activities.

The purpose of this revision (04) is to extend this task into Contract Year 2 of the NNM05AB50C ESTS Contract. This revision defines and estimates work for the period 30 September 2006 through 28 September 2007. Additionally, the Schedule, Performance Plan and Risk Assessment have been revised to reflect changes in task activities for the new period of performance.

The purpose of revision -03 is to reflect changes in required support, including subcontractors, for August and September, 2006. Estimates were changed to reflect the reduced support and reduced travel. The scope of testing for subelement R6 was reduced, along with corresponding test support.

The purpose of revision -02 is to add subelement –07 and associated scope. The revision also revises the support and travel for the remaining subelements due to priority changes by the customer. Subelement –07 will provide materials engineering consultant support to M&P and the space shuttle reusable solid rocket motor project office. It is specifically to support the Booster Separation Motor (BSM) team and material replacement and qualification efforts.

The purpose of revision -01 is to add subelement -R6 and associated scope. Subelement -R6 will provide materials engineering development and properties testing support. Test development and property testing support will be primarily through the use of a subcontract with an industry expert. Additionally, the schedule, Performance Plan and Risk Assessment have been revised to reflect changes in subtask activities associated with the new work scope of subelement –R6.

1.0 Task Order Description & Objectives

The objective of this task order is to provide support to the Nonmetallic Materials Engineering Team relative to the following tasks:

1. Provide periodic project review, oversight support of projects, and intermittent institutional activities support to the Nonmetallic Materials Team, in support of special projects, studies, reviews, and independent assessments as defined by the team leader.
2. Provide materials engineering support for booster separation motor (BSM) material replacement and qualification for the Shuttle Reusable Solid Rocket Booster (RSRB) Project Office. BSM support activities will be provided by direct labor as well as a subcontract utilizing an industry expert with BSM Shuttle experience (closed with rev 20)
3. Provide technical support for failure analysis, materials charcterization and flight anomalies associated with the Space Shuttle's leading edge Reinforced Carbon-Carbon (RCC) (closed with rev 16).
4. Provide materials and processes engineering support for re-design and upgrades to the Accurate Machine Tool Company nozzle tape wrapping machine (closed with rev 12).
5. Provide materials and development support for high temperature components to be used in the MSFC Technology Investment Project (TIP), "High Temperature Grid for the Solar Probe Plus Mission" (closed with rev 20).
6. Provide engineering support for the Upper Stage Fracture Control Board as an alternate to EM41's primary representative covering issues related to design, analysis and materials (closed with rev 19).
7. Provide materials development and qualification support for TPS issues associated with the Ares I Upper Stage insulation and ablator materials (closed with rev 12).
8. Provide materials development and qualification support for Ares Upper Stage J-2X Engine, relative to the nozzle extension (closed with rev 12).
9. Provide materials development and qualification support for the Ares First Stage five-segment reusable solid rocket motor (RSRMV) nozzle, external thermal protection system (TPS), the booster deceleration motor (BDM), and the booster tumbling motor (BTM) (closed with rev20).
10. Provide materials development and qualification support for Ares Upper Stage, relative to the ullage settling motor (USM) (closed with rev 19).
11. Provide materials development and qualification support for Orion, including the service module (SM) engine nozzle extension (if applicable), the launch abort system (LAS) motor nozzles, and TPS (as required) for the SM, crew module (CM), and LAS (closed with rev 20).

With rev 20, the Jacobs-ESTS Group Nonmetals Engineering Team will provide engineering and technical support for the MSFC EM41-Nonmetals Engineering Branch for the following material classes

1. Adhesives and Bonding processes
2. Polymeric and Elastomeric materials and associated manufacturing processes
3. Protective finishes (paints and ablative seal coats) and application processes
4. High temperature Phenolic based composite and ablative materials and associated manufacturing processes
5. Ablative, ceramic, and fabric thermal protection materials and associated fabrication and manufacturing processes
6. Solvents and cleaning processes
7. Nonmetallic materials (other materials like fabrics used in parachutes) and processes

Each of the above noted objectives is provided in the following subelement descriptions.

Subelement 01: Nonmetals Engineering Branch SRB/RSRM Support (Closed)
Provide non-metallic high temperature materials engineering support for design, structures and manufacturing activities associated with SRB and RSRM related issues.

Subelement 07: Shuttle RSRM Booster Separation Motor (BSM) Project Support (Closed)
Support duties assigned to EM41's High Temperature Materials Team relative to the BSM such as material replacement and qualification efforts. Primary responsibility is to provide BSM engineering consultant support for review of material properties, design and analysis allowables, as well as material

replacement processes performance verification and qualification. Most of this effort will be supported through a consulting services agreement utilizing (b)(4) while partial support covering a broader range of BSM issues will be supported by (b)(4)

Subelement 10: Shuttle Reinforced Carbon-Carbon (RCC) Support (Closed)
Provide high temperature materials engineering support as it relates to the Shuttle's leading edge RCC panels and RCC Tiger Team efforts. This will include investigations of RCC defects such as spallations, delaminations and any RCC fight-critical issues brought forth by the team.

Subelement 19: Tape Wrapper Upgrades (Closed)
Provide support pertaining to the upgrade of the Accurate Machine Tool Company nozzle tape wrapping machine. The effort will include engineering oversight for redesign and upgrading of the tape wrapper. Redesign and upgrading will be provided by subcontractor through the NASA customer.

Subelement 20: Solar Probe Ceramic Grid Development (Closed)
Provide support for research and development of the MSFC Technology Investment Project (TIP), "High Temperature Grid for the Solar Probe Plus Mission", particularly in the areas requiring design, fabrication and analysis of high temperature nonmetallic components.

Subelement 99: Short Term Support
This subelement is included to cover short term engineering analysis and coordination of manufacturing, analysis, testing, research and development. Limited to small efforts not requiring special tracking.

Subelement CA: Upper Stage Project Fracture Control Board Support (WBS# 136905.08.05.12.01.08) (Closed)
Provide materials engineering support as an alternate to EM41's principal representative to the Upper Stage Fracture Control Board effort with emphasis in the areas of design and analysis.

Subelement CC: Ares I Upper Stage TPS Support (WBS# 136905.08.05.12.07.08) (Closed)
Provide materials development and qualification support for TPS issues associated with the Ares I Upper Stage insulation and ablator materials.

Subelement CD: Ares I Upper Stage J-2X Engine Support (WBS# 136905.08.04.01.08.11) (Closed)
Provide Ares Upper Stage J-2X engine-related materials development and qualification support to EM41's High Temperature Materials Team, relative to the J-2X engine nozzle extension.

Subelement CE: Ares I First Stage Five-Segment Reusable Solid Rocket Motor (RSRMV) Support (WBS# 136905.08.01.11) (Closed)
Provide Ares First Stage high temperature materials design, development, manufacturing and qualification support concerning the RSRMV nozzle section and associated RSRMV demonstration motors and test articles, including the throat, nosecap, exit cone and supporting TPS structures. May also include issues associated with the booster deceleration motor (BDM), and the booster tumbling motor (BTM).

Subelement CP: Ares I Ullage Settling Motor Project Support (WBS# 13905.08.05.13.02.01.08) (Closed)
Provide high temperature materials engineering support to the MSFC EM41 branch for USM design and manufacturing development with particular emphasis on nonmetalic nozzle materials.

Subelement EA: Orion Launch Abort System (LAS) Project Support (WBS# 644423.06.03.10.08) (Closed)
Provide high temperature materials design, development, manufacturing and qualification support for the Orion LAS and interrelated systems including the attitude control motor (ACM), abort motor (AM), jettison motor (JM) and associated structures, fairing assembly, adapter cone, nose cone, canards, and interstage.

Subelements SB, SE and SM: Nonmetallic Engineering Support for the Space Shuttle
Provide nonmetallic materials engineering support for operations, flight readiness reviews (FFR) and post-flight analysis pertaining to the Space Shuttle Solid Rocket Boosters (SRB), Reuseable Solid Rocket Motors (RSRM) and Space Shuttle Main Engines (SSME).

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

Subelement 01: Nonmetals Engineering Branch SRB/RSRM (Closed)

2.1 Provide engineering support in the area of adhesive and nonmetallic materials and processes used in the Space Shuttle Solid Rocket Booster (SRB) and Reusable Solid Rocket Motor (RSRM) systems.
2.2 Review element contractor engineering test plans for technical content and engineering rigor.
2.3 Support the review of flight hardware engineering changes and updates involving adhesives and non-metallic materials used on Space Shuttle Solid Rocket Booster and Reusable Solid Rocket Motor.
2.4 Provide engineering support for the post flight/fire evaluation of SRB and RSRM hardware in the areas of adhesives and nonmetallic materials.
2.5 Provide testing guidance and analytical support of the development of statistically significant design mechanical properties for nonmetallic systems used in structural applications.
2.6 Provide materials engineering analysis of data from laboratory and subscale testing of adhesively bonded rocket motor components, structures and nonmetallic materials.

Subelement 07: Shuttle RSRM Booster Separation Motor (BSM) Project Support (Closed)

2.1 Provide technical consultation, materials engineering and testing support for the evaluation of high temperarture materials and BSM replacement materials.
2.2 Provide BSM team support for materials properties evaluations and allowables assessments. Efforts will be provided by direct labor and through the use of an industry expert with Shuttle BSM experience.
2.3 Provide subcontract monitoring and oversight to ensure timely, adequate and technically-sound materials test development and materials properties testing.

Subelement 10: Shuttle Reinforced Carbon-Carbon (RCC) Support (Closed)

2.1 Provide technical consultation and engineering evaluations related to RCC issues that arise and and associated materials testing activities.
2.2 Particiapte in Tiger Team meetings to evaluate RCC flight-related issues.
2.3 Provide monitoring and oversight functions to ensure timely, adequate, and technically-sound materials test development and properties testing.

Subelement 19: Tape Wrapper Upgrades (Closed)

2.1 Provide technical consultation to define required activities.
2.2 Provide engineering oversight and coordination for the upgrade of this machine.

Subelement 20: Solar Probe Ceramic Grid Development (Closed)

2.1 Provide R&D support for production of silicon carbide (SiC) ceramic grids which will be used as critical components in the assembly of the Solar Probe Nadir-Viewing Faraday Cup (NFC) in support of the Solar Probe Plus Mission.
2.2 Provide technical support for other high temperature materials identified as potential candidates for the NFC device.
2.2 Collaborate with project investigators from other NASA branches, scientific institutions and major universities in the processing, machining and characterization of high temperature articles for the NFC device. Such materials may include ceramics and various carbon forms.
2.3 Identify equipment and process requirements for production of prototype grids and components via chemical vapor deposition (CVD), photolithography and chemical etching.

2.4 Participate in the testing and characterization of NFC first articles. Coordinate with the EM50 Environmental Effects Branch and the simulated Solar Wind Test Facility.

Subelement 99: Short Term Support

2.1 Provide technical consultation for support activities that arise.
2.2 Provide support for materials properties evaluations and allowables assessments.
2.3 Provide monitoring and oversight to ensure timely, adequate, and technically-sound materials test development and properties testing.

Subelement CA: Upper Stage Project Fracture Control Board Support (Closed)

2.1 Provide technical consultation for materials issues that arise.
2.2 Provide support for materials evaluations.
2.3 Provide monitoring and oversight to ensure timely, adequate, and technically-sound materials test development and properties testing.

Subelement CC: Ares I Upper Stage TPS Support (Closed)

2.1 Provide support to the Materials & Processes Laboratory Nonmetallic Materials and Processes Branch for the Ares I Project. Primary responsibility is supporting the NASA MSFC Ares I Upper Stage (US) Team in all aspects of M&P and TPS design, development, test, evaluation and integration of a variety of small solid motors.
2.2 This includes TPS materials (primarily ablatives) along with seals and insulation/blankets for engine(s) integration.
2.3 Duties will also include providing assessments of project products, schedule inputs/performance, and in other TPS areas as they relate to meeting technical objectives.
2.4 Other TPS duties include the following: the review of M&P TPS and related specifications, Project/IPT coordination/support, risk management/assessment support, inspection/assessment of TPS manufacturing and installation development and processes,
2.5 Participate in scheduled program/project/IPT reviews and technical interchange meetings (TIM) as requested. Interact on a day-to-day basis with NASA TPS and Project personnel, especially those involved in US TPS M&P efforts. Interact with personnel at other NASA Centers (such as ARC, GRC, LaRC, JSC, and KSC) and most likely with other government facilities (such as Redstone Arsenal) as directed to support DDT&E efforts.
2.6 Support small solid motor development for the ullage settling motor.

Subelement CD: Ares I Upper Stage J-2X Engine Support (Closed)

2.1 Coordinate with Ares I J2X team.
2.2 Review current status of design, development, and test programs for Ares I J2X nozzle extension.
2.3 Establish contacts at MSFC, other NASA Centers, and other government facilities, as directed to accomplish task objectives.
2.4 Review J2X nozzle extension materials and processing related specifications. Review verification plans, test plans, and engineering change packages for J2X nozzle extension designs and assembly/installations.
2.5 Assess J2X nozzle extension development.
2.6 Develop tests and support test execution, review and integration into project DDT&E.
2.7 Evaluate/assemble test data from other sources. Prepare any test plans and test reports required.
2.8 Conduct visits/travel as requested by technical lead to J2X facilities, other NASA Centers, and other government facilities to inspect and assess capabilities/support for J2X nozzle. Results/findings will be documented in written memos/reports.

Subelement CE: Ares I First Stage Five-Segment Reusable Solid Rocket Motor (RSRMV) Support (Closed)

2.1 Coordinate with Ares I First Stage team.
2.2 Review current status of design, development, and test programs for Ares I First Stage nozzle, BDM, BTM, and TPS.

2.3 Establish contacts at MSFC, other NASA Centers, and other government facilities, as directed to accomplish task objectives.
2.4 Review First Stage M&P related specifications. Review verification plans, test plans, and engineering change packages for nozzle and small solid motor designs and assembly/installations.
2.5 Assess nozzle and small solid motor materials development.
2.6 Develop tests and support test execution, review and integration into project DDT&E.
2.7 Evaluate/assemble test data from other sources. Prepare any test plans and test reports required.
2.8 Conduct visits/travel as requested by technical lead to First Stage facilities, other NASA Centers, and other government facilities to inspect and assess capabilities/support for First Stage. Results/findings will be documented in written memos/reports.
2.9 Participate in meetings, teleconferences, program design reviews, and TIMs as directed to maintain intimate knowledge and understanding of Ares I First Stage nozzle progress. Results/findings of major reviews and TIMs will be documented in written memos/reports.
2.10 Make recommendations to MSFC Ares I First Stage Team regarding acceptability of program and interfacing IPT's technical direction and accomplishments through written and oral reviews.
2.11 Provide technical support to the Ares I First Stage Team related activities for schedule, planning, reviews and risk management/assessment.

Subelement CP: Ullage Settling Motor (USM) Project Support (Closed)

2.1 Coordinate with USM team and conduct reviews regarding current status of design, development, and test programs for nozzle ablator/insulator materials used in the USM.
2.2 Assess nozzle and small solid motor materials development.
2.3 Evaluate and assemble test data from other sources. Prepare test plans and reports required.
2.4 Conduct visits, as requested by the technical lead, to small vendors, contractor sites, other NASA Centers, and other government facilities to inspect and assess capabilities and support for USM small motors. Results/findings will be documented in written memos/reports.
2.5 Participate in meetings, teleconferences, program design reviews, and TIMs as directed to maintain intimate knowledge and understanding of USM nozzle materials development and motor progress. Results/findings of major reviews and TIMs will be documented in written memos/reports.
2.6 Make recommendations regarding acceptability of program and interfacing IPT's technical direction and accomplishments through written and oral reviews.
2.7 Provide technical support to the Ares I First Stage Team related activities for schedule, planning, reviews and risk management/assessment.

Subelement EA: Orion Launch Abort System (LAS) Project Support (Closed)

2.1 Coordinate with the Orion small solid rocket motor teams: service module, command module, and launch-abort system (LAS), as directed.
2.2 Review current status of design, development, and test programs for service module, command module, and LAS small solid motors, as directed.
2.3 Establish contacts at MSFC, other NASA Centers, and other government facilities, as directed to accomplish task objectives.
2.4 Review Orion M&P related specifications, as appropriate, and review verification plans, test plans, and engineering change packages for nozzle extension and small solid motor designs and assembly/installations.
2.5 Assess nozzle and small solid motor materials development.
2.6 Develop tests and support test execution, review and integration into project DDT&E.
2.7 Evaluate/assemble test data from other sources. Prepare any test plans and test reports required.
2.8 Conduct visits/travel as requested by technical lead to small solid motor facilities, other NASA Centers, and other government facilities to inspect and assess capabilities/support for Orion small solid motors. Results/findings will be documented in written memos/reports.
2.9 Participate in meetings, teleconferences, program design reviews, and TIMs as directed to maintain intimate knowledge and understanding of Orion nozzle extension and small solid mo-

tor progress. Results/findings of major reviews and TIMs will be documented in written memos/reports.

2.10 Make recommendations to the MSFC Orion Team regarding acceptability of program and interfacing IPT's technical direction and accomplishments through written and oral reviews.

2.11 Provide technical support to the Ares I First Stage Team related activities for schedule, planning, reviews and risk management/assessment.

Subelements SB, SE and SM: Nonmetallic Engineering Support for the Space Shuttle

2.1 Review element contractor engineering test plans, test reports and problem resolution recommendations

2.2 Review of new and revised flight hardware engineering designs, processes and materials.

2.3 Post-fire and flight evaluation and disassembly oversight of full and subscale propulsion test and flight hardware

2.4 Testing guidance and analytical support of the development of statistically significant design mechanical properties for nonmetallic systems used in structural applications.

2.5 Materials engineering analysis of data from laboratory and subscale testing of adhesively bonded rocket motor components, structures and nonmetallic materials.

2.6 Oversight/expertise at the contractor facility.

2.7 Materials obsolescence issue resolution

2.8 Vehicle integration and processes development

2.9 Develop test plans and perform testing or provide oversight for internal (MSFC M&P) test programs for nonmetallic materials. Generate test reports to document results.

2.10 Observe the production and refurbishment of related hardware as appropriate.

2.11 Support the review of flight hardware engineering designs and updates

3.0 Discussion of Skills Required

Subelement 01: The minimum educational requirement is a Bachelor of Science in Materials Science, Materials Engineering, Chemistry, Physics or equivalent science/engineering degree. Subelement personnel should have experience working with high temperature nonmetallic materials including ceramics, advanced composites, graphite/carbon materials, high temperature polymers and adhesives.

Subelement 07: The person selected to support this subelement should have extensive industry experience in evaluation and development of booster separation motor material properties, particularly carbon and graphite, and assessing performance of the existing Shuttle Booster Separation Motor system. Support will be provided by a (b)(4)

Subelement 10: The minimum educational requirement is a Bachelor of Science in Materials Engineering, or equivalent engineering, or Materials Science. It is essential that the subelement personnel have experience working with some form of high temperature ceramic and/or carbon materials.

Subelement 19: The minimum educational requirement is a Bachelor of Science in Materials Engineering, or equivalent engineering, or Materials Science. The person working this subelement should have good organizational skills and computer office suite skills. Additional skills in inspection and coordination methods used in manufacturing equipment upgrades and maintenance may be required to ensure the effectiveness of the upgrade.

Subelement 20: The minimum educational requirement is a Bachelor of Science in Materials Science, Materials Engineering, Chemistry, Physics or equivalent science/engineering degree. Subelement personnel should have experience working with high temperature nonmetallic materials, particularly silicon carbide (SiC).

Subelement CA: The minimum educational requirement is a Bachelor of Science in Materials Engineering, or equivalent engineering, or Materials Science. It is essential that the subelement personnel have experience working with some form of high temperature ceramic and/or carbon materials.

Subelement CC: The minimum educational requirement is a Bachelor of Science in Materials Engineering, or equivalent engineering, or materials science degree with knowledge of high temperature materials. It is highly desired that the personnel supporting this subelement have experience working with ablative TPS materials. The person(s) should have design and integration experience of TPS materials to the structural, thermal control, and propulsion systems of launch vehicles, with preference to NASA manned space flight program/project experience.

Subelement CD: The minimum educational requirement is a Bachelor of Science in Materials Engineering, or equivalent engineering, or Materials Science. It is essential that the subelement personnel have experience working with some form of high temperature ceramic and/or silicon-carbon materials, even if they are monolithic materials. The selected person(s) should have some experience working with the test methods and techniques applicable to characterizing and testing both coupons and components fabricated from such types of high temperature materials.

Subelement CE: The minimum educational requirement is a Bachelor of Science in Materials Engineering, or equivalent engineering, or Materials Science. It is essential that the subelement personnel have experience working with some form of high temperature ceramic and/or carbon materials, even if they are monolithic materials. The selected person(s) should have some experience working with the test methods and techniques applicable to characterizing and testing both coupons and components fabricated from such types of high temperature materials.

Subelement CP: The minimum educational requirement is a Bachelor of Science in Materials Engineering, or equivalent engineering, or Materials Science. It is essential that the subelement personnel have experience working with some form of high temperature ceramic and/or silicon-carbon materials, even if they are monolithic materials. The selected person(s) should have some experience working with the test methods and techniques applicable to characterizing and testing both coupons and components fabricated from such types of high temperature materials.

Subelement EA: The minimum educational requirement is a Bachelor of Science in Materials Engineering, or equivalent engineering, or Materials Science. It is essential that the subelement personnel have experience working with some form of high temperature ceramic and/or carbon materials, even if they are monolithic materials. The selected person(s) should have some experience working with the test methods and techniques applicable to characterizing and testing both coupons and components fabricated from such types of high temperature materials.

Subelements SB, SE and SM: The minimum educational requirement is a Bachelor of Science in Materials Science/Engineering or equivalent science/engineering degree with knowledge of nonmetallic materials used in aerospace and space transportation systems such as adhesives, coatings, ceramics, ablatives and/or advanced composites. Experience in ablative thermal protection materials (TPS) is highly desirable, including the design and integration of TPS materials for thermal control to primary aerospace structures and the propulsion systems of launch vehicles. Preference will be given to experiences involving NASA manned space flight programs and projects.

4.0 Special Tools Required

All projects/subelements require access to the M&P data products server and Materials and Processes Technical Information System (MAPTIS). Additional access may include the project Integrated Collaborative Environment (ICE) data documents server and the SharePoint Manufacturing and Assembly web portal.

5.0 Participating Subcontractors

None

6.0 Milestones & Deliverables

6.1 Monthly Activity Reports.
6.2 Informal weekly or bi-weekly notes as requested by the customer.
6.3 Written and oral reviews of the contractors', and their subcontractor's, performance as requested.
6.4 Written memos/reports for the various major reviews, TIM, inspections and workshops attended.
6.5 Analyzed data sets ready for inclusion in MAPTIS database.

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

Subelement 99:
Travel – to support development of NASA specifications standard for protective coatings and finishes.

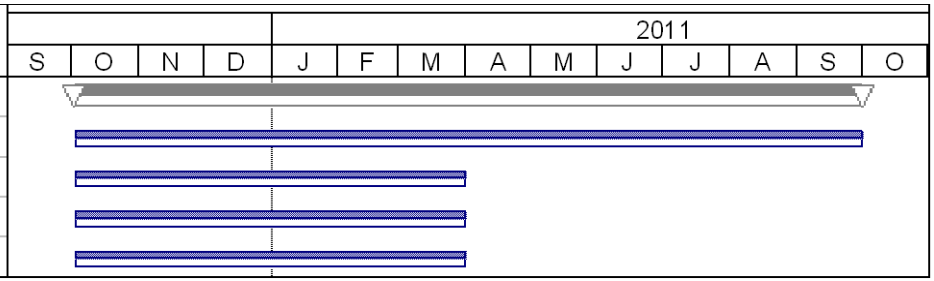
8.0 Work Shelf

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

9.0 Schedule

Task Order #	Subelement	Task Work Element
34-040001	**00**	**NonMetallics Engineering Branch Support**
34-040001	99	Short Term Support
34-040001	SB	Shuttle SRB
34-040001	SE	Shuttle SSME
34-040001	SM	Shuttle RSRM



ESTS Contract Task Order Request Performance Plan

Task Order Title: Temperature Materials Team Support

Task Order Number: 34-040001 Revision: 21

Category	Weighting Technical %	End of Period Technical Score
	65%	X 65% =
Technical Objectives		**Justification**
Provide nonmetallic materials engineering support for operations, flight readiness reviews (FFR) and post-flight analysis pertaining to the Space Shuttle Solid Rocket Boosters (SRB). Provide nonmetallic materials engineering support for operations, flight readiness reviews (FFR) and post-flight analysis pertaining to the Space Shuttle Reuseable Solid Rocket Boosters (RSRM). Provide nonmetallic materials engineering support for operations, flight readiness reviews (FFR) and post-flight analysis pertaining to the Space Shuttle Main Engines (SSME). Provide periodic project reviews, project oversight support and intermittent institutional activities support to the Nonmetallic Materials Engineering Team in support of special projects, studies, reviews, and independent assessments as defined by the team leader. Provide support for Space Shuttle activities as needed, including analysis, materials development and problem resolution for external thermal protection systems (TPS), RSRM, SRB and nozzle related components. Provide support for research and development of the MSFC Small Business Innovative Research (SBIR) contract NNX10CF19P. This effort will faciliate manufacturing development and characterization of ceramic/carbon-carbon honeycomb composite prototype structures for next generation space		

ESTS Contract Task Order Request Performance Plan

Task Order Title: Temperature Materials Team Support

Task Order Number: 34-040001 Revision: 21

telescope systems.		
Schedule Objectives (Milestones)	**Weighting Schedule %** 10% *(min 10%)*	**Schedule Score** X 10% = **Justification**
Frequent oral and written communications of activities are required. Formal monthly and informal weekly activity reports should be typical with sufficient documentation of activities. Written and oral reviews will be provided covering the performance of any contractors (and their subcontractors) regarding activites associated with Shuttle hardware and any special M&P Projects.		
Cost (actual vs. negotiated)	**Weighting Cost%** 25% *(min.25%)*	**Cost Score** X 25% = **Justification**
	Weighting Total % 100.00%	**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: Temperature Materials Team Support

Task Order Number: 34-040001 Revision: 21

Comments:

Marshall Space Flight Center
Engineering, Science & Technical Services

JACOBS ESTS Group

Risk Assessment

Contract Number: *NNM05AB50C*
TO Title: *Nonmetallic Materials Team Support*
TO Number: *34-040001* **Revision:** *21*

Period of Performance: *10/02/2010 to 9/30/2011*

MSFC Initiator: *Jeffery Sparks*

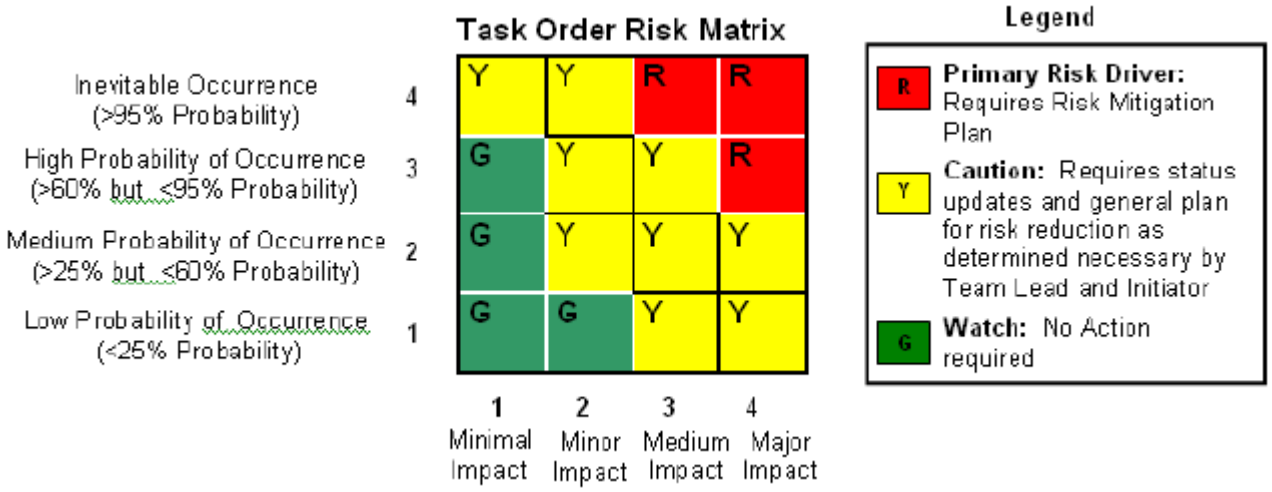
(b)(4)

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	1	1	Inadequate estimation may result in cost increases
Risk T1	Technical	1	1	Inadequate review of documentation
Risk T2	Technical	1	2	Inappropriate assessment of TPS materials performance
Risk T3	Technical	1	2	Inappropriate assessment of TPS requirements, documentation and integration
Risk T4	Technical	1	2	Review fails to detect flawed data or analysis
Risk T5	Technical	1	2	Inadequate technical definition and testing anomalies of material tests may result in invalid data/results
Risk S1	Schedule	1	2	Unable to complete tests or analysis by due date
Risk S2	Schedule	1	2	Limited resource allocations may cause slippage of tasks completion and schedule delay
Risk S3	Schedule	2	2	Testing anomalies may cause slippage of the completion of tasks/tests

*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.: T5 Risk Description: Inadequate technical definition and testing anomalies of material tests may result in invalid data/results		
Mitigation Step No.	Planned Completion Date	Mitigation Step Description
1	Monthly	Perform monthly tracking/status of tasks and costs associated for completion
2	Weekly	Hold weekly telecons to monitor progress to SOW and test matrix
3	Weekly	Review test results and compare to known data and testing procedures

Risk No.: S3 Risk Description: Testing anomalies may cause slippage of tasks/tests completion		
Mitigation Step No.	Planned Completion Date	Mitigation Step Description
1	Monthly	Perform monthly tracking/status of tasks and milestones associated for completion

Risk No.: S3 Risk Description: Testing anomalies may cause slippage of tasks/tests completion		
2	Weekly	Hold weekly telecons to monitor progress to SOW, test matrix and schedule