Marshall Space Flight Center
Engineering, Science & Technical Services

JACOBS ESTS Group

Task Order Plan (TOP)

Contract Number: *NNM05AB50C*
TO Title: *Pyrotechnic Design Support*
TO Number: *32-030209* **Revision:** *14*

Period of Performance: *10/02/2010* to *02/28/2011*

MSFC Initiator: *Sid Rowe*

(b)(4)

Emergency: *No*

WBS # 522632.08.01.01 Subelement SA
WBS # 522632.08.01.01.02 Subelement SB

Revision 14
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 February 28, 2011. Additionally, the Schedule, Performance Plan and Risk Assessment have been revised to reflect changes in task activities for the new period of performance.

Revision 13
The purpose of this revision is to extend this 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, Performance Plan and Risk Assessment have been revised to reflect changes in task activities for the new period of performance.

Revision 12
The purpose of this revision is to more accurately reflect the effort required during this period of performance.

Subelement 00
Labor estimate was reduced by (b)(4) with a corresponding reduction in cost of (b)(4) Fewer resources were required to accomplish the work than were originally estimated. Travel estimate was reduced by 1 trip with a corresponding reduction in cost of (b)(4) The planned trip was removed because the hardware delivery was delayed.

Subelement 02
No change in plan.

Revision 11
The purpose of this revision is to more accurately reflect the effort required during this period of performance. Labor estimate on Subelement -00 was reduced by (b)(4) hours with a corresponding reduction in cost of (b)(4) Fewer resources were required to accomplish the work than were originally estimated. Travel estimate on Subelement -00 was reduced by 1 trip with a corresponding reduction in

cost of (b)(4) The planned trip was removed because the hardware delivery was delayed. ODC estimate on Subelement -00 was reduced by (b)(4) The relocation costs reached the maximum amount allowed. Labor estimate on Subelement -02 was reduced by (b)(4) with a corresponding reduction in cost of (b)(4) Fewer resources were required to accomplish the work than were originally estimated. Travel estimate on Subelement -02 was reduced by 2 trips with a corresponding reduction in cost of (b)(4) The planned trips were removed because the hardware delivery was delayed.

Revision 10
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. No resources are anticipated to be required for subelement -01. Additionally, the Schedule, Performance Plan and Risk Assessment have been revised to reflect changes in task activities for the new period of performance.

Revision -09
The purpose of this revision is to more accurately reflect the effort required during this period of performance. Labor estimate on Subelement -00 was reduced by (b)(4) with a corresponding reduction in cost of (b)(4) Fewer resources were required to accomplish the work than were originally estimated. Travel estimate on Subelement -00 was reduced by 1 trip with a corresponding reduction in cost of (b)(4) The planned trip was removed because the hardware delivery was delayed. Labor estimate on Subelement -01 was reduced by (b)(4) with a corresponding reduction in cost of (b)(4) Fewer resources were required to accomplish the work than were originally estimated. Labor estimate on Subelement -02 was reduced by (b)(4) with a corresponding reduction in cost of (b)(4). Fewer resources were required to accomplish the work than were originally estimated.

Revision -08
This Task Order (TO) revision is required to make adjustments, due to personnel changes, for Subelements -00, -01, and -02 to modify the estimates for materials, labor, travel and ODC.

Subelement -00	Removed (b)(4) from (b)(4) position.
	Removed (b)(4) from materials.
	Added (b)(4) to ODC for relocation expense.
Subelement -01	Removed (b)(4) from materials.
Subelement -02	Removed (b)(4) from (b)(4) position.
	Removed (b)(4) from travel.

Revision -07
The purpose of revision 07 is to add additional scope to the Subelement -00 task which will be to support the Reuseable Solid Rocket Booster (RSRB) Chief Engineer's Review Board (CERB).

Subelement -00	Added (b)(4) to cover expanded scope.

Revision -06
The purpose of revision 06 is to add an additional Subelement -02 for RSRM pyrotechnic engineering design support.

Subelement -00	Removed (b)(4) from (b)(4) position.

Revision -05
The purpose of revision 05 is 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 any changes in task activities for the new period of performance.

Revision -04
This Task Order (TO) revision is required to make adjustments for Subelements -00 and -01 to modify the estimates for materials, labor, travel and ODC.

Subelement -00 Removed (b)(4) from (b)(4) position.
Removed (b)(4) form (b)(4) position.
Removed (b)(4) from materials.
Removed (b)(4) from travel.
Subelement -01 Removed (b)(4) from (b)(4) position.

Revision -03
This Task Order (TO) revision is required to make adjustments for Subelements -00 and -01 to modify the estimates for, materials, labor and ODC.
Subelement -00 Add (b)(4) to cover new person to task.
Add (b)(4) to cover relocation costs (ODC).
Add (b)(4) for Personal Safety Equipment.
Subelement -01 Ad (b)(4) for materials purchases.

Revision -02
The purpose of this revision 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.

Revision -01
This Task Order (TO) revision is required to make adjustments for Subelements -00 and -01 to modify the estimates for travel, materials and labor.
Subelement -00 Reduce (b)(4) due to the delay in hiring a new employee
Remove (b)(4) from travel
Add (b)(4) to cover relocation costs for new employee
Subelement -01 Added (b)(4) to cover the purchase of signal conditioning equipment required for testing.
Additionally, the Schedule, Performance Plan and Risk Assessment have been revised to reflect changes in task activities for this fiscal year.

1.0 Task Order Description & Objectives

Subelement -SA
Provide pyrotechnic engineering design support and provide insight into the design of components for the Solid Rocket Booster (SRB) Sustaining Engineering Program. Specific assignments include serving on technical review committees, particularly when reviewing design of structure and associated hardware with SRB pyrotechnics. This includes serving on investigative teams charged with analyzing/verifying the as built hardware. Detailed reviews of all pertinent assemblies are required as well as thorough reviews of SRB components. It may be required to provide the ability to procure materials, hardware, services and documentation (not otherwise provided by the Government) in order to provide the necessary support to accomplish pyrotechnic design support. In addition, review engineering change packages, discrepancy reports, problem reports, ect., from a structural/mechanical design perspective in support of the Reuseable Solid Rocket Booster (RSRB) Chief Engineer's Review Board (CERB). Evaluation sheets will be submitted to the CERB secretary and/or change package engineer for consolidation with other evaluator comments for consideration by the CERB. Will also be responsible for working technical issues with the change package engineer or other appropriate personnel who have been identified. Briefings will be provided to the structural/mechanical CERB member of the status of the items on each agenda.

Subelement -SB
Provide pyrotechnic engineering design support and provide insight into the design of components for the Reusable Solid Rocket Motor (RSRM) Sustaining Engineering Program. Specific assignments include serving on technical review committees, particularly when reviewing design of structure and associated hardware with RSRM pyrotechnics. This includes serving on investigative teams charged with analyzing/verifying the as built hardware. Detailed reviews of all pertinent assemblies are required as

well as thorough reviews of RSRM components. It may be required to provide the ability to procure materials, hardware, services and documentation (not otherwise provided by the Government) in order to provide the necessary support to accomplish pyrotechnic design support.

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

Subelement -SA

Required inputs for these designs will be developed as a collaborative effort with other members of the project team. It is assumed that the requirements and design inputs being developed by other members of the project will be available in a timely manner. Access of contractor generated design drawings and models to team members is required. Use design drawings and models to compare contractor fabricated parts and assemblies to as-designed versus as-built. Other office automation software will be utilized as appropriate to create the associated design documentation and reports. This software will include, but not be limited to, Microsoft Office (Word, Excel, PowerPoint) and MathCAD. It is assumed that the NASA project office will schedule design and safety reviews. Participation in these design and safety reviews may include the review of design data and the development of Review Item Discrepancies (RIDs). Each RID written by the design team will be coordinated with the NASA Project Team Lead. Engineering data will be delivered in electronic and/or paper media format as appropriate. It will be the responsibility of the NASA Project Team Lead to create the final report and to provide document control over the deliverables provided by this subtask.

Subelement -SB

Required inputs for these designs will be developed as a collaborative effort with other members of the project team. It is assumed that the requirements and design inputs being developed by other members of the project will be available in a timely manner. Access of contractor generated design drawings and models to team members is required. Use design drawings and models to compare contractor fabricated parts and assemblies to as-designed versus as-built. Other office automation software will be utilized as appropriate to create the associated design documentation and reports. This software will include, but not be limited to, Microsoft Office (Word, Excel, PowerPoint) and MathCAD. It is assumed that the NASA project office will schedule design and safety reviews. Participation in these design and safety reviews may include the review of design data and the development of Review Item Discrepancies (RIDs). Each RID written by the design team will be coordinated with the NASA Project Team Lead. Engineering data will be delivered in electronic and/or paper media format as appropriate. It will be the responsibility of the NASA Project Team Lead to create the final report and to provide document control over the deliverables provided by this subtask.

3.0 Discussion of Skills Required

Subelement -SA

Personnel performing this task must have experience in mechanical design and must have knowledge of subsystem interfaces and mechanical and structural design. Skills should also include proficiency in ability to import and export model files to and from other NASA entities and contractors, and interfacing with other analytical disciplines (i.e. stress, dynamics, performance, mass properties, thermal, avionics). Knowledge of pyrotechnics and flight hardware from design through fabrication is required. Team members will be knowledgeable of standard engineering practices (MSFC-STD-555) and will be proficient in the use of ProE and Microsoft Office.

Subelement -SB

Personnel performing this task must have experience in mechanical design and must have knowledge of subsystem interfaces and mechanical and structural design. Skills should also include proficiency in ability to import and export model files to and from other NASA entities and contractors, and interfacing with other analytical disciplines (i.e. stress, dynamics, performance, mass properties, thermal, avionics). Knowledge of pyrotechnics and flight hardware from design through fabrication is required. Team members will be knowledgeable of standard engineering practices (MSFC-STD-555) and will be proficient in the use of ProE and Microsoft Office.

4.0 Special Tools Required

None.

5.0 Participating Subcontractors

None.

6.0 Milestones & Deliverables

Subelement -SA

Deliverables will consist of a Monthly Activity Report (MAR) which will be submitted through the (b)(4) (b)(4) A final oral presentation will be given to brief management on accomplishments throughout the year.

Subelement-SB

Deliverables will consist of a Monthly Activity Report (MAR) which will be submitted through the (b)(4) (b)(4) A final oral presentation will be given to brief management on accomplishments throughout the year.

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

Subelement-SA

There are two trips planned for flight hardware acceptance at the vendors.

Subelement-SB

There are no trips planned for flight hardware acceptance at the vendors.

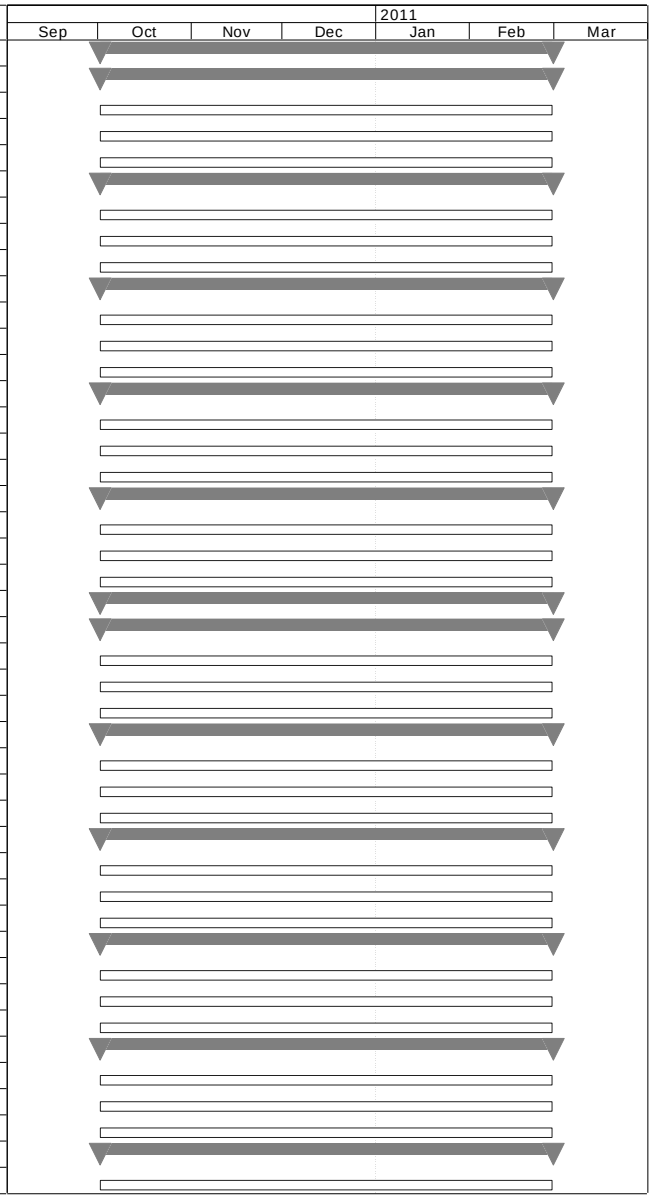
8.0 Work Shelf

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 #	SubE	Task Work Element
32-030209	**SA**	**SRB Pyrotechnic Design Support**
32-030209	**SA**	**Engineering Change Package (ECP)**
32-030209	SA	Receive ECP from MSFC Initiator
32-030209	SA	Review ECP
32-030209	SA	Deliver Review Results Monthly*
32-030209	**SA**	**Vendor ECP**
32-030209	SA	Receive ECP from MSFC Initiator
32-030209	SA	Review ECP
32-030209	SA	Deliver Review Results Monthly*
32-030209	**SA**	**Support Flight Hardware Acceptance Reviews**
32-030209	SA	Review Manufacturing and Test Data
32-030209	SA	Perform Inspection of Hardware
32-030209	SA	Deliver Review Results Monthly*
32-030209	**SA**	**Material Review Board (MRB)**
32-030209	SA	Receive MRB from MSFC Initiator
32-030209	SA	Review MRB
32-030209	SA	Deliver Review Results Monthly*
32-030209	**SA**	**Design Studies of Other Contractors**
32-030209	SA	Receive Documents & Drawings
32-030209	SA	Review Documents & Drawings
32-030209	SA	Deliver Review Results Monthly*
32-030209	**SB**	**RSRM Pyrotechnic Design Support**
32-030209	**SB**	**Engineering Change Package (ECP)**
32-030209	SB	Receive ECP from MSFC Initiator
32-030209	SB	Review ECP
32-030209	SB	Deliver Review Results Monthly*
32-030209	**SB**	**Vendor ECP**
32-030209	SB	Receive ECP from MSFC Initiator
32-030209	SB	Review ECP
32-030209	SB	Deliver Review Results Monthly*
32-030209	**SB**	**Support Flight Hardware Acceptance Reviews**
32-030209	SB	Review Manufacturing and Test Data
32-030209	SB	Perform Inspection of Hardware
32-030209	SB	Deliver Review Results Monthly*
32-030209	**SB**	**Material Review Board (MRB)**
32-030209	SB	Receive MRB from MSFC Initiator
32-030209	SB	Review MRB
32-030209	SB	Deliver Review Results Monthly*
32-030209	**SB**	**Design Studies of Other Contractors**
32-030209	SB	Receive Documents & Drawings
32-030209	SB	Review Documents & Drawings
32-030209	SB	Deliver Review Results Monthly*
32-030209	**SA**	**MARs**
	SA	*See MAR for exact deliverables for each month



ESTS Contract Task Order Request Performance Plan

Task Order Title: Pyrotechnic Design Support

Task Order Number: 32-030209 Revision: 14

Category	Weighting Technical %	End of Period Technical Score
Technical Objectives	65%	X 65% =
Review Engineering Change Packages,review Material Review Board (MRB)documents, support preproduction and hardware reviews, perform design studies and provide coordination of technical issues with NASA and contractor support.		**Justification**
Schedule Objectives (Milestones)	**Weighting Schedule %** 10% *(min 10%)*	**Schedule Score** X 10% = **Justification**
Submit all change evaluations by the date requested by project office and provide support in a timely manner to meet pyrotechnic component hardware schedules.		
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: Pyrotechnic Design Support

Task Order Number: 32-030209 Revision: 14

Comments:

Marshall Space Flight Center
Engineering, Science & Technical Services

JACOBS ESTS Group

Risk Assessment

Contract Number: *NNM05AB50C*
TO Title: *Pyrotechnic Design Support*
TO Number: *32-030209* **Revision:** *14*

Period of Performance: *10/02/2010* to *02/28/2011*

MSFC Initiator: *Sid Rowe*

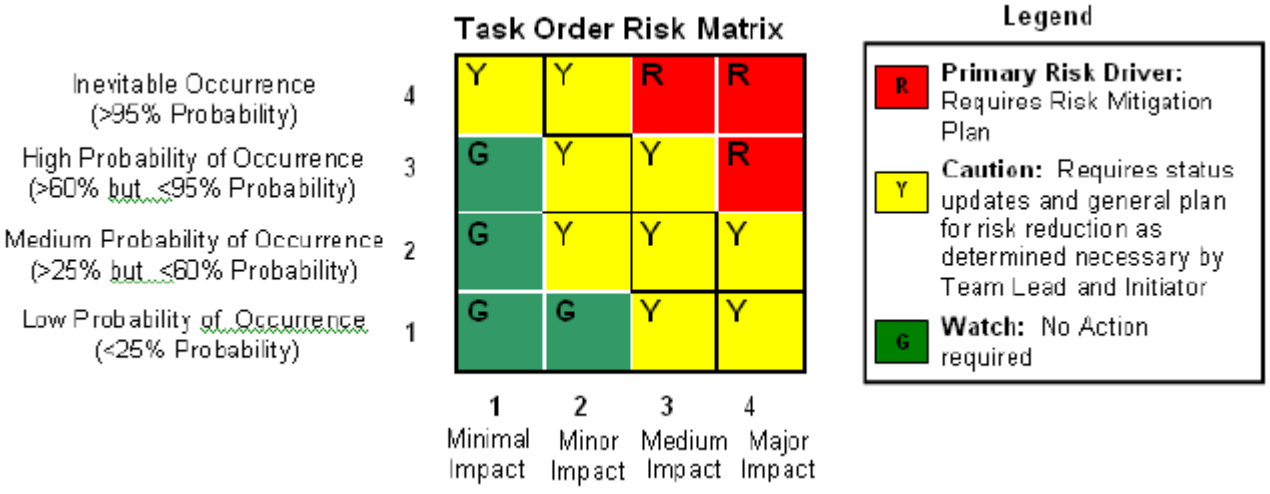
(b)(4)

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	No cost risks have been identified with this TO.
Risk C2	Cost			
Risk T1	Technical	1	1	No technical risks have been identified with this TO.
Risk T2	Technical			
Risk S1	Schedule	1	1	No schedule risks have been identified with this TO.
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