

**Task Order Plan (TOP)**

**Contract Number:** NNM05AB50C  
**TO Title:** *EEE Parts Failure Analysis*  
**TO Number:** 37-040303 **Revision:** 05

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

**MSFC Initiator:** Michael Selby

(b)(4)  


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**Emergency:** No

Revision -05: The purpose of this revision is to extend this task into Contract Year 6 of the NNM05AB50C ESTS contract and add subelement –SC. This revision defines and estimates the work for the period October 2, 2010 through September 30, 2011. The Schedule has been revised to add subelement –SC for shuttle work. Additionally, Performance Plan, and Risk Assessment have been revised to reflect changes in task activities for the new period of performance.

Sub-element -04:

This subelement is closed.

Sub-element –SC: was added to provide EEE Parts Analysis support to Shuttle PSE&I.

Sub-element –CF: was administratively closed on July 3, 2010.

Sub-element -CI: was administratively closed on July 3, 2010.

Sub-element -CV: was administratively closed on July 3, 2010.

Sub-element Mapping and WBS funding:

New Subelement	Previous subelement	WBS	Program
05	05	N/A	
JA	02	401769.06.08.02.04.02	ISS
SA	01	520871.08.01.01.02	Shuttle
SB	03	524238.08.01.01.03	Shuttle
SC	NA	197009.10.01.01.05	Shuttle

The subelements have been renamed to conform to the project/program naming convention that has been established for FY11.

Revision -04: The purpose of this revision is to extend this task into Contract Year 5 of the NNM05AB50C ESTS contract. This revision defines and estimates the 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. Sub-elements -04, -CF, -CI, and -CV are identified on the schedule and in the table for visibility, but no cost was estimated per the customer's direction.

This revision affects the following ARES Program Office sub-elements:

- Ares First Stage (sub-element –CF)
- Ares I-X (sub-element –CI)
- Ares Vehicle Integration (sub-element –CV)

Revision -03: The purpose of this revision is to more accurately reflect the effort required during this period of performance and to add sub-element -CI. The schedule has been revised to include the new sub-element –CI for Ares I-I. The Performance Plan and Risk Assessment have not been revised since there are no expected changes in task activities for this period of performance

Sub-element -01:

Estimated labor was reduced by (b) hours.

Sub-element -CI:

Sub-element –CI is added to this revision to reflect increased work. Estimated labor is (b)(4) hours. The WBS number for sub-element is 136905.10.10.80.50.20.10.

This revision affects the following ARES Program Office sub-elements:

- Ares I-I (sub-element –CI)

Revision -02: The purpose of this revision is to extend this task into Contract Year 4 of 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 period of performance. This revision affects the following ARES Program Office elements, First Stage (subelement –CF) and Vehicle Integration (subelement –CV).

Revision -01: The purpose of this revision is to more accurately reflect the effort required during this period of performance. Labor estimate on Sub-element -01 was reduced by (b)(4) hours with a corresponding reduction in cost of (b)(4) sub-element -03 was reduced by (b)(4) hours with a corresponding reduction in cost of (b)(4) sub-element –CF was reduced by (b)(4) hours with a corresponding reduction in cost of (b)(4), and sub-element –CV was reduced by (b) hours with a corresponding reduction in cost of (b)(4). The Schedule, Performance Plan and Risk Assessment have not been revised since there are no expected changes in task activities for this period of performance. No additional budget is required.

This Task Order (TO) is a continuation of work being performed on TO 31-040203 of the NNM05AB50C ESTS contract. This TO realigns work performed previously in E142, and now supports ES43 within the new ED organizational structure. In addition sub-element -05, to support Miscellaneous Project Tasks has been added in order to provide support to various project offices for small programs. This TO defines and estimates work for the period 1 March 2008 through 26 September 2008. For Subcontracted efforts, this TO authorizes work for the same period. TO 31-040203 will be revised for closure in March with an effective date of 29 February 2008.

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## **1.0 Task Order Description & Objectives**

This Task Order provides failure analysis engineering support to the ES43 EEE Parts, Analysis and Verification Team of the Space Systems (SSD) Department (SSD) in the Engineering Directorate. Support will be provided in the failure analysis and testing of Electrical, Electronic and Electromechanical (EEE) parts to determine failure mechanisms, probable causes and root causes. EEE parts types will be screened to assure a reliable supply of EEE parts for use in space flight and ground support equipment for MSFC, other NASA centers and NASA contractors. Engineering insight and evaluation will be provided on parts screening and parts failure analysis performed by outside sources. Engineering support will be provided advising, consulting and reviewing the failure analysis of EEE parts within electrical/electronic assemblies and systems. Test results will be interpreted and technical reports will be prepared for internal use, project office status, government publications, or relevant scientific publications.

### **Sub-element -04: Failure Analysis Support to SSME/AHMS**

This sub-element is closed as of 10/1/2010.

### **Sub-element -05: Failure Analysis Support to Miscellaneous Jobs**

This sub-element provides failure analysis engineering support described above to ES43 and to project offices for small programs requiring immediate support.

### **Sub-element -CF: Failure Analysis Support for Ares First Stage Program**

This subelement was administratively closed on July 3, 2010.

### **Sub-element -CI: Failure Analysis Support for Ares I-1 Program**

This subelement was administratively closed on July 3, 2010.

### **Sub-element -CV: Failure Analysis Support for Ares Vehicle Integration Program**

This subelement was administratively closed on July 3, 2010.

### **Sub-element -JA: Failure Analysis Support to ECLSS Spares**

This sub-element provides failure analysis engineering support described above to ES43 and the ECLSS Spares project office.

### **Sub-element -SA: Failure Analysis Support to RSRB**

This sub-element provides failure analysis engineering support described above to ES43 and the Reuseable Solid Rocket Booster project office.

### **Sub-element -SB: Failure Analysis Support to External Tank**

This sub-element provides failure analysis engineering support described above to ES43 and the External Tank project office.

### **Sub-element -SC: Failure Analysis Support to PSE&I**

This sub-element provides failure analysis engineering support described above to ES43 and the Propulsion Systems Engineering & Integration (PSE&I) project office including in-house hardware and contractor supplied hardware..

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

The Jacobs ESTS Group will perform the work described above using standard office automation software including Microsoft Project, Excel, Word and PowerPoint. The Internet will be used to obtain NASA and military standards, and contractor documents as appropriate.

The Jacobs ESTS Group will support meetings, teleconferences, Technical Interchange Meetings, (TIMs), etc., as required by the MSFC SSD ES43 EEE Parts, Analysis and Verification Team. The

Jacobs ESTS Group will travel as necessary to support failure analysis concerns and issues to provide the support described in this Task Order.

### **3.0 Discussion of Skills Required**

Personnel providing support to this task must have experience with the following: Scanning Electron Microscopy, Fourier Transform Infrared Spectroscopy, radiography, cross-sectioning, plasma etching, and liquid crystal analysis. A thorough knowledge of chemistry, physics, mathematics, properties of materials and materials processing is required. Knowledge and experience in procedures, specifications, test methods, and safety requirements for EEE part screening, construction analysis, destructive physical analysis and failure analysis is desired.

### **4.0 Special Tools Required**

No special tools identified.

### **5.0 Participating Subcontractors**

None identified.

### **6.0 Milestones & Deliverables**

Activity reports delivered monthly.

All other products, such as test plans, procedures, analyses, etc, will be accomplished in accordance with ES43 customer controlled schedules.

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

Travel is included in subelement 05 to support technical training on new failure analysis equipment and methodologies and technical interchange meetings.

ODC is estimated for sub-element -05 to cover the cost of the registration fee for the industry standard committee meetings

### **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.

<b>TO/Subelement</b>	<b>Description</b>	<b>Due Date</b>	<b>Skill</b>
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### **9.0 Schedule**



# ESTS Contract Task Order Request Performance Plan

Task Order Title: [EEE Parts Failure Analysis](#)

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Category	Weighting Technical %	End of Period Technical Score
<b>Technical Objectives</b>	65%	X 65% = <b>Justification</b>
1) Determine failure mechanisms, probable causes and root causes of failure on EEE components. 2) Perform screening on EEE components in accordance with E142 and project offices. 3) Evaluate screening, FA and DPA performed by outside sources. 4) Prepare and present test plans, test results, test reports, analyses, etc		
<b>Schedule Objectives (Milestones)</b>	Weighting Schedule % 10% (min 10%)	X 10% = <b>Justification</b>
Deliver test plans, procedures, results, analyses, etc per the agreed-to schedule		
<b>Cost (actual vs. negotiated)</b>	Weighting Cost % 25% (min.25%)	X 25% = <b>Justification</b>
	Weighting Total % 100.00%	<b>Total Score</b>

## 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

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**Comments:**

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**Risk Assessment**

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(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			No cost risks have been identified.
Risk C2	Cost			
Risk T1	Technical			No technical risks have been identified.
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.



