

**Task Order Plan (TOP)**

**Contract Number:** NNM05AB50C  
**TO Title:** Turbomachinery Design and Development Branch  
**TO Number:** 33-030101 **Revision:** 14

**Period of Performance:** 10/02/2010 to 03/31/2011

**MSFC Initiator:** Randall Thornton

(b)(4)

**Emergency:** No

**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 March 31, 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 -01 is closed and continued under subelement –SA. Total cost of the Task Order Estimate (b)(4) Details by subelement are shown below.

Subelement Revision Summary			
Subelement	WBS	Change(s)	Reason(s)
-SA, SSME Turbomachinery Design and Development Engineering Support	522094.08.01.01.03.01	1. (b)(4) and one trip for FY11.	1. New contract year.  Total change in cost = (b)(4)
			Total change in cost of this task order = (b)(4)

**1.0 Task Order Description & Objectives**

**1.1 Subelement SA: Space Shuttle Main Engine Turbomachinery Design and Development Engineering Support**

Under this subelement, the ESTS Group will provide general engineering support in development of turbomachinery for the Space Shuttle Main Engine (SSME). Activities will include support of program definition and requirements development; the design, fabrication, and testing of hardware; development of program documentation; hardware management; component testing activities; development and testing of unique or specialized devices and diagnostics and pre- and post- test data reduction and analysis. The ESTS Group will provide technical integration and leadership as required and interact with other MSFC organizations to achieve project/program goals.

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

**2.1 Subelement SA: Space Shuttle Main Engine Turbomachinery Design and Development Engineering Support**

1. Help identify technological needs in turbomachinery and assist in technology development planning.
2. Coordinate/oversee the design, analysis, and fabrication of Turbomachinery components.
3. Support program reviews and interchange meetings.
4. Provide technical input to documents, designs, tests, and program/project reviews.
5. Perform qualitative and quantitative analysis, as required, to support design of turbomachinery, test operations, evaluation of performance, and evaluation of turbine and pump stability.
6. Generate procedures for test hardware checkout and verification.
7. Set up, operate, and maintain diagnostic and/or visualization systems to measure flow characteristic parameters in rocket engine turbomachinery flows.
8. Support test operations from procedure generation through post-test data reduction and analysis.

**3.0 Discussion of Skills Required**

**3.1 Subelement SA: Space Shuttle Main Engine Turbomachinery Design and Development Engineering Support**

This subelement requires a journeyman engineer(s) with general knowledge of turbomachinery, fluid mechanics and test operations for liquid propellant rocket engines. Detailed knowledge of fluid flow mechanics, materials, manufacturing techniques, and methods of design and design analysis is required.

**4.0 Special Tools Required**

All computer hardware and software will be provided by NASA MSFC.

**5.0 Participating Subcontractors**

None.

**6.0 Milestones & Deliverables**

1. Each subelement will provide inputs to Monthly Activity Report that is compiled and delivered at the task order level.
2. Deliverables are to be submitted at designated milestones as negotiated between the Task Initiator, Task Lead, and technical personnel performing the efforts on a case-by-case basis.

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

**7.1 Subelement SA: Space Shuttle Main Engine Turbomachinery Design and Development Engineering Support**

One trip to contractor site is estimated at a total cost of (b)(4)

**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	2011							
			Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
33-030101	00	<b>Turbomachinery Design and Development</b>								
33-030101	SA	<b>SSME Turbomachinery Design and Development Engineering Support</b>								
33-030101	SA	ST S-133 Preparation, Launch, Data Analysis								
33-030101	SA	ST S-133 Preparation, Launch, Data Analysis								
33-030101	SA	Refine HPFTP and HPOTP Internal Flow Models								

# ESTS Contract Task Order Request Performance Plan

Task Order Title: [Turbomachinery Design and Development Branch](#)

Task Order Number: [33-030101](#) Revision: 14

Category	Weighting Technical %	End of Period Technical Score
<b>Technical Objectives</b>	65%	X <u>65%</u> = <b>Justification</b>
<ol style="list-style-type: none"> <li>1. All products / services delivered meet negotiated scope and objectives.</li> <li>2. All products / services delivered demonstrate quality in both content and presentation.</li> <li>3. All tools and methodologies utilized are sufficient for intended use.</li> <li>4. All resources assigned exemplify appropriate technical knowledge.</li> <li>5. Results, issues, actions items, etc., are appropriately communicated and documented.</li> <li>6. Personnel demonstrate continuous improvement.</li> </ol>		
<b>Schedule Objectives (Milestones)</b>	<b>Weighting Schedule %</b> <u>10%</u> <i>(min 10%)</i>	<b>Schedule Score</b> X <u>10%</u> = <b>Justification</b>
<ol style="list-style-type: none"> <li>1. Schedule milestones are met.</li> <li>2. Work progression is appropriate for resources assigned.</li> <li>3. Responses to action items are timely.</li> <li>4. Exemplify ability/willingness to adjust to changing priorities.</li> </ol>		
<b><u>Cost (actual vs. negotiated)</u></b>	<b>Weighting Cost%</b> <u>25%</u> <i>(min.25%)</i>	<b>Cost Score</b> X <u>25%</u> = <b>Justification</b>
	<b>Weighting Total %</b> 100.00%	<b>Total Score</b>

## ESTS Contract Task Order Request Performance Plan

Task Order Title: [Turbomachinery Design and Development Branch](#)

Task Order Number: [33-030101](#)      Revision: [14](#)

---

### 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: [Turbomachinery Design and Development Branch](#)

Task Order Number: [33-030101](#)      Revision: [14](#)

---

**Comments:**

---

**Risk Assessment**

**Contract Number:** NNM05AB50C  
**TO Title:** Turbomachinery Design and Development Branch  
**TO Number:** 33-030101 **Revision:** 14

**Period of Performance:** 10/02/2010 to 03/31/2011

**MSFC Initiator:** Randall Thornton

(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 for this Task Order.
Risk C2	Cost			
Risk T1	Technical			No technical risks have been identified for this Task Order.
Risk T2	Technical			
Risk S1	Schedule	1	2	If required input data is not available on schedule, it may cause delays in associated deliverables.
Risk S2	Schedule			

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



