

Task Order Plan (TOP)

Contract Number: NNM05AB50C

TO Title: Fluid Dynamics Support for Space Shuttle Main Engine

TO Number: 33-040223 **Revision:** 06

Period of Performance: 10/2/2010 to 3/31/2011

MSFC Initiator: Lisa Griffin

(b)(4)

Emergency: No

Revision 6:

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.

This revision closes Subelement 00 and 01 with the scope of Subelements 00 continuing under new Subelement SA. Estimates and schedule for a period of six months are provided. Specifics of the new Subelement and changes to old subelements are as follows:

Subelement 00 (WBS 522094.08.01.01.01)

This subelement is closed under this revision.

Subelement 01 (WBS 522094.08.01.01.01)

This subelement is closed under this revision.

Subelement SA (WBS 522094.08.01.01.01) Analysis and CFD Support of Shuttle Based Unsteady Fluid Dynamics

Estimated (b)(4) labor hours of an (b)(4) Cost Category, (b)(4) labor hours of an (b)(4) Cost Category and (b)(4) labor hours of an (b)(4) Cost Category. Estimated Subcontractor support at (b)(4)

The total estimate for this Task Order is (b)(4)

Revision 5:

This Revision aligns scope, schedule and resources with current expectations for the remainder of the contract year. Changes by subelement are as follows:

Subelement 00 (WBS 522094.08.01.01.01)

Removes (b)(4) labor hours of an (b)(4) Cost Category due to reprioritization of work by the (b)(4)

Subelement 01 (WBS 522094.08.01.01.01)

Adds (b)(4) labor hours of an (b)(4) Cost Category for preparation and assembly of test articles for water flow testing.

The total estimate for this Task Order is (b)(4)

Revision 4:

This revision modifies scope, schedule and resources to align with expectations for the remainder of the contract year. Changes by subelement are as follows:

Subelement 00 (WBS 522094.08.01.01.01)

Add an estimate for (b)(4) hours of an (b)(4) Cost Category to support determination for why Space Shuttle acoustic levels near the Base Heat Shield are measuring higher than those stated in the Space Shuttle Acoustics Data Book. Item h in Section 1 is added as additional scope and is reflected in the schedule.

The total estimate for this Task Order is (b)(4)

Revision 3:

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.

Changes by subelement are as follows:

Subelement 00 (WBS 522094.08.01.01.01)

Estimates (b)(4) hours of an (b)(4) Cost Category.

Subelement 01 (WBS 522094.08.01.01.01)

Estimates (b)(4) hours of an (b)(4) Cost Category.

The total estimate for this Task Order (b)(4)

Revision 2:

The purposes of this revision are to:

Subelement 00 (WBS 522094.08.01.01.01)

Reduce the labor estimate by (b)(4) hours of an (b)(4) Cost Category because the work will be completed in less hours than originally estimated.

Subelement 01 (WBS 522094.08.01.01.01)

Reduce the labor estimate by (b)(4) hours of an (b)(4) Cost Category because the work will be completed in less hours than originally estimated.

The total estimate for this Task Order is (b)(4) which is a net reduction of (b)(4) from the previous revision.

Revision 1:

The purposes of this revision are to:

Subelement 00 (WBS 522094.08.01.01.01)

Increase the scope to include items listed in section 1 which adds an estimate of (b)(4) hours of an (b)(4) Cost Category.

The total estimate for this Task Order is (b)(4)

1.0 Task Order Description & Objectives

Subelement 00 – Signal Processing Support of Shuttle Based Unsteady Fluid Dynamics (WBS 522094.08.01.01.01)

This subelement is closed under this revision.

Subelement 01 – Test Article Support (WBS 522094.08.01.01.01)

This subelement is closed under this revision.

Subelement SA – Analysis and CFD Support of Shuttle Based Unsteady Fluid Dynamics (WBS 522094.08.01.01.01)

- a) Acquire acoustics and fluid dynamics test/flight data.
- b) Investigate test/flight data using PC Signal or other applicable software.
- c) Document data trending and results.
- d) Attend meetings relating to test/flight data.
- e) Perform data acquisition, reduction analysis, and reporting to provide system and component performance and environment predictions.
- f) Develop analytical tools and models to assist with assessments and understanding of propulsion systems and component environments.
- g) Coordinate and participate in multidisciplinary testing, from planning through reporting of test data.
- h) Analyze Space Shuttle Base Heat Shield acoustic level data and determine cause of these values being higher than those given in the Space Shuttle Acoustics Data Book.
- i) Perform CFD analysis of propulsion components.

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

Subelement 00 – Signal Processing Support of Shuttle Based Unsteady Fluid Dynamics (WBS 522094.08.01.01.01)

This subelement is closed under this revision.

Subelement 01 – Test Article Support (WBS 522094.08.01.01.01)

This subelement is closed under this revision.

Subelement SA – Analysis and CFD Support of Shuttle Based Unsteady Fluid Dynamics (WBS 522094.08.01.01.01)

- a) Acquire acoustics and fluid dynamics test/flight data.
- b) Investigate test/flight data using PC Signal or other applicable software.
- c) Document data trending and results.
- d) Attend meetings relating to test/flight data.
- e) Perform data acquisition, reduction analysis, and reporting to provide system and component performance and environment predictions.
- f) Develop analytical tools and models to assist with assessments and understanding of propulsion systems and component environments.
- g) Coordinate and participate in multidisciplinary testing, from planning through reporting of test data.
- h) Analyze Space Shuttle Base Heat Shield acoustic level data and determine cause of these values being higher than those given in the Space Shuttle Acoustics Data Book.

3.0 Discussion of Skills Required

Engineers supporting this task will have a mechanical engineering background.

4.0 Special Tools Required

There are no special tools associated with this task.

ESTS Contract Task Order Request Performance Plan

Task Order Title: [Fluid Dynamics Support for Space Shuttle Main Engine](#)

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Category	Weighting Technical %	End of Period Technical Score
Technical Objectives	65%	X <u>65%</u> = Justification
Subelement SA – Signal Processing Support of Shuttle Based Unsteady Fluid Dynamics a) Acquire acoustics and fluid dynamics test/flight data. b) Investigate test/flight data using PC Signal or other applicable software. c) Document data trending and results. d) Attend meetings relating to test/flight data. e) Perform data acquisition, reduction analysis, and reporting to provide system and component performance and environment predictions. f) Develop analytical tools and models to assist with assessments and under-standing of propulsion systems and component environments. g) Coordinate and participate in multidisciplinary testing, from planning through reporting of test data.		
Schedule Objectives (Milestones)	Weighting Schedule % <u>10%</u> (min 10%)	Schedule Score X <u>10%</u> = Justification
Subelement SA – Signal Processing Support of Shuttle Based Unsteady Fluid Dynamics Monthly Activity Reports Signal Processing Reports		
Cost (actual vs. negotiated)	Weighting Cost% <u>25%</u>	Cost Score X <u>25%</u> =

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(min.25%)

Justification

**Weighting
Total %**

Total Score

100.00%

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:

Risk Assessment

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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 for this Task Order.
Risk T1	Technical	1	1	No technical risks have been identified for this Task Order.
Risk S1	Schedule	1	1	No schedule risks have been identified for this Task Order.

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



