Marshall Space Flight Center
Engineering, Science & Technical Services

Task Order Plan (TOP)

Contract Number: *NNM05AB50C*
TO Title: *Fluid Dynamics Support of Shuttle PSE&I*
TO Number: *33-040222* **Revision:** *14*

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

MSFC Initiator: *Lisa Griffin*

(b)(4) [redacted]

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.

This revision closes Space Shuttle Subelement 02, 04 and 05 with the scope of Subelements 02 and 04 continuing under new Subelements SA and SB, respectively. Estimates and schedules for a period of six months and scopes for Space Shuttle Subelements SA and SB are provided. Specifics of the new Subelements and changes to old subelement are as follows:

Subelement 02 (WBS 197009.10.02.01.02)

This subelement is closed under this revision.

Subelement 04 (WBS 197009.10.01.01.12)

This subelement is closed under this revision.

Subelement 05 (WBS 197009.10.01.01.12)

This subelement is closed under this revision.

Subelement SA (WBS 197009.10.02.01.02) Debris Transport Modeling and Analysis of Launch Vehicles

Estimated (b)(4) [redacted] Cost Category and (b)(4) [redacted] of an (b)(4) Cost Category. Estimated 3 trips to support Space Shuttle launches and other technical activities at (b)(4) [redacted] and estimated Subcontractor support at (b)(4) [redacted]

Subelement SB (WBS 197009.10.01.01.12) Fluid Dynamics Support for MPS Elements

Estimated (b)(4) [redacted] of an (b)(4) Cost Category and estimated 2 trips at (b)(4) [redacted] to support technical meetings.

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

Revision 13:

The purpose of this revision is to augment the scope of Subelement 02 to include Computational Fluid Dynamics capabilities development for Lift-off debris analysis of launch vehicles. The title of the Sub-element is also changed to reflect this change. The total estimate for this Task Order is (b)(4) The net change from the previous revision is (b)(

Revision 12:

The purpose of this revision is to augment and align scope, schedule, and resources with current expectations. Augmentation and alignment of resources is required to complete specific work required for Shuttle Propulsion System Engineering and Integration tasks with regard to Lift-off Debris Impact modeling, Propellant Tank fill and drain predictions, and Flow Control Valve efforts and for Computational Fluid Dynamics (CFD) code enhancements. Changes by subelement are as follows:

Subelement 02 (WBS 197009.10.02.01.02)

Reduced (b)(4) of an (b)(4) Cost Category due to reprioritization of work by the (b)(4) removed one not needed trip, and estimated Subcontractor support at (b)(4) The latter is an augmentation of (b)(4) to support increased scope with Shuttle Lift-off debris modeling effort.

Subelement 04 (WBS 197009.10.01.01.12)

Increased (b)(4) Cost Category labor hours to support Flow Control Valve and Main Propulsion System elements modeling, and added Subcontractor support at (b)(4) to support Propellant Tank Fill and Drain modeling and Enhancement and Verification of LOCI-Chem CFD code with particle tracking analysis.

Subelement 05 (WBS 197009.10.01.01.12)

Revised labor estimates by decreasing (b)(labor hours of (b)(4) Cost Category and (b)(labor hours of (b)(4) Cost Category due to reprioritization of work related to Shuttle propulsion system testing and estimated one trip to support Water Flow component testing at a cost estimate of (b)(4)
The total estimate for this Task Order is (b)(4) The net change from the previous revision is (b)(4)

Revision 11:

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. This revision also increases the scope of the task to include subelement 05, "Test Support of Shuttle Propulsion System Engineering and Integration (PSE&I)" for providing cold flow test support for Shuttle propulsion elements while subelement 03 "Computational Fluid Dynamics Support for the Reusable Solid Rocket Motor" is closed. 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 Space Shuttle Subelements 02, 03, 04, and 05. Changes by subelement are as follows:

Changes to subelement is as follows:

Subelement 02 (WBS 197009.10.02.01.02)

Estimated (b)(4) of an (b)(4) Cost Category and (b)(4) labor hours of an (b)(4) Cost Category. Estimated 5 trips to support Space Shuttle launches and estimated Subcontractor support at (b)(4)

Subelement 03 (WBS 520871.08.01.01.02)

This subelement is closed under this revision.

Subelement 04 (WBS 197009.10.01.01.12)

Estimated (b)(4) labor hours of an (b)(4) Cost Category.

Subelement 05 (WBS 197009.10.01.01.12)

Estimated (b)(4) labor hours of an (b)(4) Cost Category and (b)(4) labor hours of an (b)(4) Cost Category.

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

Revision 10:
Changes to subelement is as follows:
Subelement 02 (WBS 197009.10.02.01.02)
Estimated (b)(4) labor hours of an (b)(4) Cost Category to provide needed additional support for Space Shuttle launches for a total cost estimate of (b)(4)

The total estimate for this Task Order is $(b)(4) The net change from the previous revision is $ (b)(4)

Revision 9:
Changes by subelement are as follows:
Subelement 02 (WBS 197009.10.02.01.02)
Estimated (b)(4) labor hours of an (b)(4) Cost Category to provide needed additional support for Space Shuttle launches. Estimated one trip to support testing/launches, and estimated Subcontractor support at (b)(4) for current Shuttle Computational Fluid Dynamics Analysis for a total cost estimate of $ (b)(4)

Subelement 04 (WBS 197009.10.01.01.12)
Estimated an additional (b)(4 labor hours of an (b)(4) Cost Category to support Shuttle Flow Control Valve Computational Fluid Dynamics analysis for a total cost estimate of (b)(4)

The total estimate for this Task Order is (b)(4) The net change from the previous revision is $ (b)(4)

Revision 8:
Changes by subelement are as follows:
Subelement 04 (WBS 197009.10.01.01.12)
Estimated an additional (b)(4) labor hours of an (b)(4) Cost Category to support Shuttle Flow Control Valve Computational Fluid Dynamics analysis.
The total estimate for this Task Order is (b)(4) The net change from the previous revision is (b)(4)

Revision 7:
Changes by subelement are as follows:
Subelement 04 (WBS 197009.10.01.01.12)
Estimated (b)(4) labor hours of an (b)(4) Cost Category to support Shuttle Flow Control Valve Computational Fluid Dynamics analysis.

The total estimate for this Task Order is (b)(4) The net change from the previous revision is (b)(4)

Revision 6:
The purpose of this revision is to increase the scope of the task to add an additional (b)(4) Subcontractor hours to support Shuttle Flow Control Valve Computational Fluid Dynamics analysis. Additionally, the Schedule, Performance Plan and Risk Assessment have been revised to reflect changes in task activities. Changes by subelement are as follows:
Subelement 02 (WBS 197009.10.02.01.02)
Estimated (b)(4) subcontractor hours to support Shuttle Flow Control Valve Computational Fluid Dynamics analysis. The increased in cost estimate is (b)(4)

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

Revision 5:

The purposes of this revision are to increase the scope of the task to include subelement 03, "Computational Fluid Dynamic Support for the Reusable Solid Rocket Motor" and to add (b)(4) hours of an (b)(4) Cost Category labor estimate to support Shuttle Flow Control Valve Computational Fluid Dynamics analysis. Additionally, the Schedule, Performance Plan and Risk Assessment have been revised to reflect changes in task activities. Changes by subelement are as follows:

Subelement 02 (WBS 197009.10.02.01.02)

Estimated (b)(4) labor hours of an (b)(4) Cost Category to support Shuttle Flow Control Valve Computational Fluid Dynamics analysis.

Subelement 03 (WBS 520871.08.01.01.02)

Estimated (b)(4) labor hours of an (b)(4) Cost Category and estimated Subcontractor support at (b)(4) for a total subelement cost estimate of (b)(4)

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

Revision 4:

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. Subelements 00 and 01 were closed under revision 4. Changes by subelement are as follows:

Subelement 00 (WBS 197009.10.01.01.11)

This subelement is closed.

Subelement 01 (WBS 522094.08.01.01.01)

This subelement is closed.

Subelement 02 (WBS 197009.10.02.01.02)

Estimated (b)(4) labor hours of an (b)(4) Cost Category, estimated (b)(4) labor hours of an (b)(4) Cost Category, four trips to support testing/launches, and estimated Subcontractor support at (b)(4) for a total cost estimate of (b)(4)

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

Revision 03: The purpose of this Task Order (TO) revision, -03, is to increase the hourly estimate by (b)(4) hours for a (b)(4) cost category. Increased resources were required to extend the current work through September. Funding has already been applied to the task to support the increase in estimate of (b)(4)

Revision 02: This Revision (02) aligns scope, schedule and resources with current expectations for the remainder of the contract year. In particular scope and resources are added for new Subelement 01, "Signal Processing Support of Shuttle Based Unsteady Fluid Dynamics". Additionally, the performance and risk plans are updated. Total cost impact for additional resources to support this effort is $ (b)(4)

The purpose of this revision is to increase the estimate for materials from (b)(4) for the purchase of an actuator. Originally 30% of this estimate (b)(4) was to be billed in FY07 on Task Order 33-040201-00 at the time the purchase was placed and the remaining 70% of the estimate (b)(4) was to be billed in FY08 on Task Order 33-040222-00 upon delivery of the actuator. The vendor billed the entire amount in FY08.

1.0 Task Order Description & Objectives

Subelement 00 – Fluid Dynamics Support of Shuttle Propulsion System Engineering and Integration

This Subelement was closed under revision 4.

Subelement 01 – Signal Processing Support of Shuttle Based Unsteady Fluid Dynamics

This Subelement was closed under revision 4.

Subelement 02 – Debris Transport Modeling and Analysis of Launch Vehicles
This Subelement is closed under revision 14.
Subelement 03 – Computational Fluid Dynamics Support for the Reusable Solid Rocket Motor
This Subelement was closed under revision 11.
Subelement 04 – Fluid Dynamics Support for MPS Elements
This Subelement is closed under revision 14.
Subelement 05 – Test Support of Shuttle Propulsion System Engineering and Integration (PSE&I)
This Subelement is closed under revision 14.

Subelement SA – Debris Transport Modeling and Analysis of Launch Vehicles

a) Support Shuttle PSE&I and Shuttle elements with computational debris transport analysis.
b) Conceptualize, construct, analyze, and document Groundrules and Assumptions (G&A) for Shuttle debris items. Execute debris transport analysis based on G&A. Apply debris transport analysis toolsets and related pre- and post-processing utilities.
c) Present G&A, analysis, findings and conclusions for technical review. Deliver simulation results and data to vehicle elements for debris damage assessment. Document analysis in technical report format.
d) Construct and improve unstructured computational models of SSLV and launch facility for debris transport analysis applications; includes CAD based surface geometry generation, grid generation, and execution of CFD flowfield simulations for Shuttle Liftoff modeling. Perform CFD simulation setup and analysis utilizing ER42 grid generation and CFD tools (SolidMesh, AFLR3, Loci-Chem, Loci-Stream, and others).
e) Develop, maintain, improve and apply debris transport analysis tools, including unstructured 3-DOF and 6-DOF debris tracking, debris impact and rebound models. Generate debris objects aerodynamic databases for application in database-driven 6-DOF analysis.
f) Perform verification and validation and uncertainty quantification for all aspects of LODTA analysis process including CFD flow field simulations, debris object aerodynamic database generation, debris 3-DOF and 6-DOF modeling, debris impact and rebound modeling.
g) Participate, as required, in Shuttle PSE&I Liftoff Debris Assessment Team HOSC day-of-launch activities, KSC post-launch imagery review, pre- and post-launch launch facility debris assessment.
h) Support related ER42 engineering and analysis activities in areas of fluid, thermal, and combustion.
i) Perform an evaluation of the Loci code(s) and report simulation readiness level.
j) Develop CFD capabilities for Lift-off Debris analysis of Launch vehicles. Verify and validate the developed tools for launch scenarios.

Subelement SB – Fluid Dynamics Support for MPS Elements

a) Perform computational fluid dynamics investigations to support acoustics, environments, and loads.
b) Interrogate CFD solutions for steady and unsteady environments and loads.
c) Support code and analysis verification activities.
d) Attend and participate in team technical meetings, integrated product team meetings, and project reviews.
e) Perform CFD analysis of the Flow Control Valve.

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

Subelement 00 – Fluid Dynamics Support of Shuttle Propulsion System Engineering and Integration

This Subelement was closed under revision 4.

Subelement 01 – Signal Processing Support of Shuttle Based Unsteady Fluid Dynamics

This Subelement was closed under revision 4.

Subelement 02 – Debris Transport Modeling and Analysis of Launch Vehicles

This Subelement is closed under revision 14.

Subelement 03 – Computational Fluid Dynamics Support for the Reusable Solid Rocket Motor

This Subelement was closed under revision 11.

Subelement 04 – Fluid Dynamics Support for MPS Elements

This Subelement is closed under revision 14.

Subelement 05 – Test Support of Shuttle Propulsion System Engineering and Integration (PSE&I)

This Subelement is closed under revision 14.

Subelement SA – Debris Transport Modeling and Analysis of Launch Vehicles

a) Support Shuttle PSE&I and Shuttle elements with computational debris transport analysis.
b) Conceptualize, construct, analyze, and document Groundrules and Assumptions (G&A) for Shuttle debris items. Execute debris transport analysis based on G&A. Apply debris transport analysis toolsets and related pre- and post-processing utilities.
c) Present G&A, analysis, findings and conclusions for technical review. Deliver simulation results and data to vehicle elements for debris damage assessment. Document analysis in technical report format.
d) Construct and improve unstructured computational models of SSLV and launch facility for debris transport analysis applications; includes CAD based surface geometry generation, grid generation, and execution of CFD flowfield simulations for Shuttle Liftoff modeling. Perform CFD simulation setup and analysis utilizing ER42 grid generation and CFD tools (SolidMesh, AFLR3, Loci-Chem, Loci-Stream, and others).
e) Develop, maintain, improve and apply debris transport analysis tools, including unstructured 3-DOF and 6-DOF debris tracking, debris impact and rebound models. Generate debris objects aerodynamic databases for application in database-driven 6-DOF analysis.
f) Perform verification and validation and uncertainty quantification for all aspects of LODTA analysis process including CFD flow field simulations, debris object aerodynamic database generation, debris 3-DOF and 6-DOF modeling, debris impact and rebound modeling.
g) Participate, as required, in Shuttle PSE&I Liftoff Debris Assessment Team HOSC day-of-launch activities, KSC post-launch imagery review, pre- and post-launch launch facility debris assessment.
h) Support related ER42 engineering and analysis activities in areas of fluid, thermal, and combustion.
i) Perform an evaluation of the Loci code(s) and report simulation readiness level.
j) Develop CFD capabilities for Lift-off Debris analysis of Launch vehicles. Verify and validate the developed tools for launch scenarios.

Subelement SB – Fluid Dynamics Support for MPS Elements

a) Perform computational fluid dynamics investigations to support acoustics, environments, and loads.
b) Interrogate CFD solutions for steady and unsteady environments and loads.
c) Support code and analysis verification activities.
d) Attend and participate in team technical meetings, integrated product team meetings, and project reviews.
e) Perform CFD analysis of the Flow Control Valve.

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.

5.0 Participating Subcontractors

Subelement SA – Debris Transport Modeling and Analysis of Launch Vehicles

(b)(4)

Subelement SB – Fluid Dynamics Support for MPS Elements

There are no subcontractors associated with this subelement.

6.0 Milestones & Deliverables

Subelement 00 – Fluid Dynamics Support of Shuttle Propulsion System Engineering and Integration

This Subelement was closed under revision 4.

Subelement 01 – Signal Processing Support of Shuttle Based Unsteady Fluid Dynamics

This Subelement was closed under revision 4.

Subelement 02 – Debris Transport Modeling and Analysis of Launch Vehicles This This Subelement is closed under revision 14.

Subelement 03 – Computational Fluid Dynamics Support for the Reusable Solid Rocket Motor

This Subelement was closed under revision 11.

Subelement 04 – Fluid Dynamics Support for MPS Elements

This Subelement is closed under revision 14.

Subelement 05 – Test Support of Shuttle Propulsion System Engineering and Integration (PSE&I)

This Subelement is closed under revision 14.

Subelement SA – Debris Transport Modeling and Analysis of Launch Vehicles Monthly Activity Reports
CFD Reports

Subelement SB – Fluid Dynamics Support for MPS Elements

Monthly Activity Reports
CFD Reports

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

Subelement 00 – Fluid Dynamics Support of Shuttle Propulsion System Engineering and Integration
None.

Subelement 01 – Signal Processing Support of Shuttle Based Unsteady Fluid Dynamics
This Subelement was closed under revision 4.

Subelement 02 – Debris Transport Modeling and Analysis of Launch Vehicles
This Subelement is closed under revision 14.

Subelement 03 – Computational Fluid Dynamics Support for the Reusable Solid Rocket Motor
This Subelement was closed under revision 11.

Subelement 04 – Fluid Dynamics Support for MPS Elements
This Subelement is closed under revision 14.

Subelement 05 – Test Support of Shuttle Propulsion System Engineering and Integration (PSE&I)
This Subelement is closed under revision 14.

Subelement SA – Debris Transport Modeling and Analysis of Launch Vehicles
Three trips will be needed to support testing/launches. The travel estimate is (b)(4)

Subelement SB – Fluid Dynamics Support for MPS Elements
Two trips will be needed to support attendance of technical meetings. The travel estimate (b)(4)

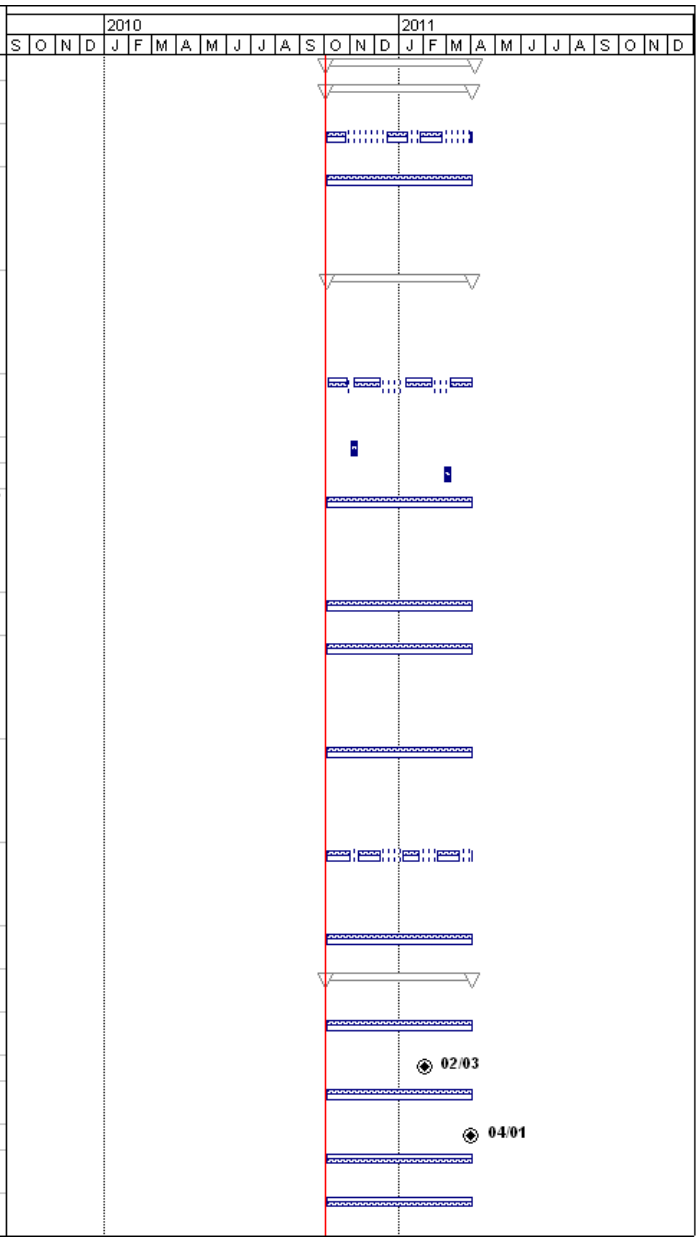
8.0 Work Shelf

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.

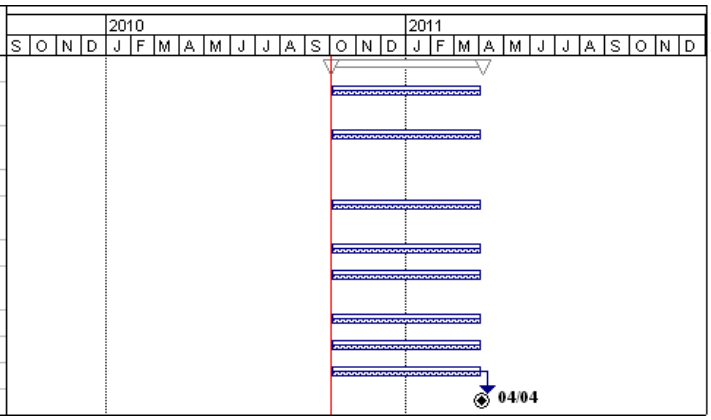
TO/Subelement	Description	Due Date	Skill

9.0 Schedule

Task Order	SubE	Task Work Element
33-040222	**SA**	**Fluid Dynamics Support of Shuttle PSE&I**
33-040222	**SA**	**Debris Transport Modeling and Analysis of Launch Vehicles**
33-040222	SA	Support Shuttle PSE&I and Shuttle elements with computational debris transport analysis.
33-040222	SA	Conceptualize, construct, analyze, and document Groundrules and Assumptions (G&A) for Shuttle debris items. Execute debris transport analysis based on G&A. Apply debris transport analysis toolsets and related pre- and post-processing utilities.
33-040222	**SA**	**Present G&A, analysis, findings and conclusions for technical review. Deliver simulation results and data to vehicle elements for debris damage assessment. Document analysis in technical report format.**
33-040222	SA	Present G&A, analysis, findings and conclusions for technical review. Deliver simulation results and data to vehicle elements for debris damage assessment.
33-040222	SA	Support STS launch
33-040222	SA	Support STS launch
33-040222	SA	Construct and improve unstructured CFD models of SSLV and launch facility for debris transport analysis applications; includes CAD based surface geometry generation, grid generation, and execution of CFD flowfield simulations for Shuttle Lift-off.
33-040222	SA	Perform CFD simulation setup and analysis utilizing ER43 grid generation and CFD tools.
33-040222	SA	Develop, maintain, improve and apply DTA tools, including unstructured 3-DOF and 6-DOF debris tracking, debris impact and rebound models. Generate debris objects aerodynamic databases for application in database-driven 6-DOF analysis.
33-040222	SA	Perform verification and validation and uncertainty quantification for all aspects of LODTA analysis including CFD flow field simulations, debris object aerodynamic database generation, debris 3-DOF/6-DOF modeling, debris impact and rebound models.
33-040222	SA	Participate in Shuttle PSE&I Liftoff Debris Assessment Team HOSC day-of-launch activities, KSC post-launch imagery review, pre- and post-launch launch facility debris assessment.
33-040222	SA	Support related ER42 engineering and analysis activities in areas of fluid, thermal, and combustion.
33-040222	**SA**	**Evaluation of the Loci code(s) and report simulation readiness level.**
33-040222	SA	Perform an evaluation of the Loci code(s) and report simulation readiness level.
33-040222	SA	Document analysis in technical report format.
33-040222	SA	Loci-Chem code enhancement and verification
33-040222	SA	Document analysis in technical report format.
33-040222	SA	Perform CFD analysis for the Shuttle Flow Control Valve. As required.
	SA	Develop CFD capabilities for Lift-off Debris analysis of Launch vehicles



Task Order	SubE	Task Work Element
33-040222	**SB**	**Fluid Dynamics Support for MPS Elements**
33-040222	SB	Perform computational fluid dynamics investigations to support acoustics, environments, and loads.
33-040222	SB	Interrogate CFD solutions for steady and unsteady environments and loads.
33-040222	SB	Interrogate CFD solutions for steady and unsteady environments and loads.
33-040222	SB	Support code and analysis verification activities.
33-040222	SB	Attend and participate in team technical meetings, integrated product team meetings, and project reviews.
33-040222	SB	Modeling and documentation of Flow Control Valve
33-040222	SB	Consolidate report
33-040222	SB	Shuttle tank fill and drain analysis
33-040222	SB	Document analysis in technical report format.



ESTS Contract Task Order Request Performance Plan

Task Order Title: Fluid Dynamics Support of Shuttle PSE&I

Task Order Number: 33-040222 Revision: 14

Category	Weighting Technical %	End of Period Technical Score
Technical Objectives	65%	X 65% = **Justification**
Subelement SA – Shuttle Debris Transport Modeling and Analysis a) Support Shuttle PSE&I and Shuttle elements with computational debris transport analysis. b) Conceptualize, construct, analyze, and document Groundrules and Assumptions (G&A) for Shuttle debris items. Execute debris transport analysis based on G&A. Apply debris transport analysis toolsets and related pre- and post-processing utilities. c) Present G&A, analysis, findings and conclusions for technical review. Deliver simulation results and data to vehicle elements for debris damage assessment. Document analysis in technical report format. d) Construct and improve unstructured computational models of SSLV and launch facility for debris transport analysis applications; includes CAD based surface geometry generation, grid generation, and execution of CFD flowfield simulations for Shuttle Liftoff modeling. Perform CFD simulation setup and analysis utilizing ER42 grid generation and CFD tools (SolidMesh, AFLR3, Loci-Chem, Loci-Stream, and others). e) Develop, maintain, improve and apply debris transport analysis tools, including unstructured 3-DOF and 6-DOF debris tracking, debris impact and rebound models. Generate debris objects aerodynamic databases for application in data-base-driven 6-DOF analysis. f) Perform verification and validation and uncertainty quantification for all aspects of LODTA analysis process including CFD flow field simulations,		

debris object aerodynamic database generation, debris 3-DOF and 6-DOF modeling, debris impact and rebound modeling. g) Participate, as required, in Shuttle PSE&I Liftoff Debris Assessment Team HOSC day-of-launch activities, KSC post-launch imagery review, pre- and post-launch launch facility debris assessment. h) Support related ER42 engineering and analysis activities in areas of fluid, ther-mal, and combustion. i) Perform an evaluation of the Loci code(s) and report simulation readiness level. j) j) Develop CFD capabilities for Lift-off Debris analysis of Launch vehicles. Verify and validate the developed tools for launch scenarios. Subelement SB – Fluid Dynamics Support for MPS Elements a) Perform computational fluid dynamics investigations to support acoustics, envi-ronments, and loads. b) Interrogate CFD solutions for steady and unsteady environments and loads. c) Support code and analysis verification activities. d) Attend and participate in team technical meetings, integrated product team meet-ings, and project reviews. e) Perform CFD analysis of the Flow Control Valve.		
Schedule Objectives (Milestones)	**Weighting Schedule %** 10% *(min 10%)*	**Schedule Score** X 10% = **Justification**

ESTS Contract Task Order Request Performance Plan

Task Order Title: Fluid Dynamics Support of Shuttle PSE&I

Task Order Number: 33-040222 Revision: 14

Subelement SA – Shuttle Debris Transport Modeling and Analysis Monthly Activity Reports CFD Reports Subelement SB – Fluid Dynamics Support for MPS Elements Monthly Activity Reports CFD Reports		
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: Fluid Dynamics Support of Shuttle PSE&I

Task Order Number: 33-040222 Revision: 14

Comments:

Marshall Space Flight Center
Engineering, Science & Technical Services

JACOBS
ESTS Group

Risk Assessment

Contract Number: *NNM05AB50C*
TO Title: *Fluid Dynamics Support of Shuttle PSE&I*
TO Number: *33-040222* **Revision:** *11*

Period of Performance: *10/2/2010 to 3/31/2011*
MSFC Initiator: *Lisa Griffin*

(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 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.

Task Order Risk Matrix

		1 Minimal Impact	2 Minor Impact	3 Medium Impact	4 Major Impact
Inevitable Occurrence (>95% Probability)	4	Y	Y	R	R
High Probability of Occurrence (>60% but <95% Probability)	3	G	Y	Y	R
Medium Probability of Occurrence (>25% but <60% Probability)	2	G	Y	Y	Y
Low Probability of Occurrence (<25% Probability)	1	G	G	Y	Y

Legend

- R — **Primary Risk Driver:** Requires Risk Mitigation Plan
- Y — **Caution:** Requires status updates and general plan for risk reduction as determined necessary by Team Lead and Initiator
- G — **Watch:** No Action required

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