Marshall Space Flight Center
Engineering, Science & Technical Services

Task Order Plan (TOP)

Contract Number: *NNM05AB50C*
TO Title: *Constellation Support to Propulsion Systems*
TO Number: *33-000002* **Revision:** *00*

Period of Performance: *10/02/2010* to *09/30/2011*

MSFC Initiator: *Terry Ware (Task Initiator)*

(b)(4)

Emergency: *No*

1.0 Task Order Description & Objectives

This Task Order provides scope, schedule and resource estimates for the period of October 2, 2010 through September 30, 2011 of Contract Year 6. Efforts conducted under this Task Order are a continuation of efforts previously conducted under Task Order 33-000001 of Contract Year 5.

Provide Analysis, Design Services, Systems Engineering, Fabrication, Test, and Data Services support to Propulsion Systems.

Analysis support will include systems, subsystems, components, and detail hardware performance/thermal-fluid, heat transfer, stress, structural, structural dynamic, loads and environments. Maintain, modify, and verify any associated critical math models.

Design Services support will include the development of system, subsystem, component, assembly, and piece part 3 dimensional and 2 dimensional Computer Aided Design models and drawings.

Systems Engineering will include support for the planning, design, development, analysis, review, test, characterization, requirement and verification definition and flow down, evaluation of design features and proposed design changes, development and evaluation of system, element and component level test plans, development and evaluation of system, element and component level specifications, hardware integration, anomaly resolution, trade studies, and insight.

Fabrication support will be provided for non-critical hardware, components, assemblies, subsystems, and systems in support of test activities.

Test support will be provided for test planning and procedures development, test system development, integration and checkout, test conduct, test system maintenance, and post test system disposition.

Data Services support will be provided for the reduction, analysis, interpretation, maintenance, and disposition of analysis, test, and flight data, including the development of data reduction and analysis tools.

Subelement CA – Constellation Liquid Engines Support
Provide Analysis, Systems Engineering, Test and Data Services support to ER21 as defined above and as specifically identified in Section 6 below.

Subelement CB – Constellation Main Propulsion Systems Support
Provide Analysis, Systems Engineering, Test and Data Services support to ER22 as defined above and as specifically identified in Section 6 below.

Subelement CC – Constellation Auxiliary Propulsion Systems Support
Provide Analysis, Systems Engineering, Test and Data Services support to ER23 as defined above and as specified identified in Section 6 below.

Subelement CD – Constellation Turbomachinery Support
Provide Analysis, Systems Engineering, Test and Data Services support to ER31 as defined above and as specifically identified in Section 6 below.

Subelement CE – Constellation Combustion Devices Support
Provide Analysis, Systems Engineering, Test and Data Services support to ER32 as defined above and as specifically identified in Section 6 below.

Subelement CF – Constellation Propulsion Components Support
Provide Analysis, Systems Engineering, Test and Data Services support to ER33 as defined above and as specifically identified in Section 6 below.

Subelement CG – Constellation Propulsion Detail Design Support
Provide Design Services support to ER34 as defined above and as specifically identified in Section 6 below.

Subelement CH – Constellation Thrust Vector Control Systems Support
Provide Analysis, Systems Engineering, Fabrication, Test and Data Services support to ER35 as defined above and as specifically identified in Section 6 below.

Subelement CI – Constellation Propulsion Structural Analysis Support
Provide Analysis, Systems Engineering, and Data Services support to ER41 as defined above and as specifically identified in Section 6 below.

Subelement CJ – Constellation Propulsion Fluid Dynamics Analysis Support
Provide Analysis, Systems Engineering, Fabrication, Test and Data Services support to ER42 as defined above and as specifically identified in Section 6 below.

Subelement CK – Constellation Propulsion Thermal Analysis Support
Provide Analysis and Data Services support to ER43 as defined above and as specifically identified in Section 6 below.

Subelement CL – Constellation Large Solid Propulsion System Support
Provide Analysis, Systems Engineering, Fabrication, Test and Data Services support to ER51 as defined above and as specifically identified in Section 6 below.

Subelement CM – Constellation Small Solid Propulsion System Support
Provide Systems Engineering support to ER52 as defined above and as specifically identified in Section 6 below.

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

Specific technical approaches for each support activity will be as identified and coordinated on a case-by-case between the MSFC Task Initiator and (b)(4) Shown below are generic technical approaches for applicable categories of ESTS products:

Analysis:

1. Attend technical interchange, project planning, design review and other appropriate meetings to maintain a current knowledge base of design, requirements, issues, action items, and resolution activities. Identify issues, pursue resolutions, and provide supporting analyses.
2. Identify customer objective and requirements for analyses.
3. Collect inputs: hardware/software configurations, propellant characteristics, launch / test conditions, launch / test telemetry, thermal fluids properties, and other boundary conditions, etc.
4. Identify analysis methodology, develop tools as needed, create and/or modify modeling algorithms as appropriate.
5. Generate model and model inputs.
6. Perform analyses.
7. Compare results to requirements, historical experience, statistical analyses, and results of other analyses.
8. Update databases as appropriate.
9. Document and deliver results with recommendations.

Design Services:

1. Attend technical interchange, project planning, design review and other appropriate meetings to maintain a current knowledge base of design, requirements, issues, action items, and resolution activities. Identify issues, pursue resolutions, and provide supporting analyses.
2. Assist in the development and/or review of system or component design requirements and objectives.
3. Prepare preliminary schematics, sketches, and descriptive documentation.
4. Perform or review analyses, studies, and evaluations as required for maturing the design concepts.
5. Interface with other disciplines to verify compliance with design requirements and component interfaces and evaluate the designs compliance with thermal, stress, materials, fluid flow, and other design related aspects.
6. Evaluate component specifications and recommend component selection alternatives.
7. Develop detailed models and design drawings using Pro-E CAD.
8. Develop integrated layout drawings and detailed design drawings using Pro-E CAD.
9. Document and deliver results with recommendations.

Systems Engineering

1. Attend technical interchange, project planning, design review and other appropriate meetings to maintain a current knowledge base of design, requirements, issues, action items, and resolution activities. Identify issues, pursue resolutions, and provide supporting analyses. Complete assigned action items. Develop requirements and implement risk management processes.
2. Translate higher level requirements into lower level functional requirements and design options. Conduct trade studies/assessments to determine the optimal design solutions.
3. Collect data and perform assessments on the system to continually assess compliance against requirements.
4. Support relevant testing, including design, fabrication, documentation, analysis and assessments of test plans, test procedures, and test reports. Identify and pursue resolution of issues.
5. Support relevant anomaly investigations and failure investigation teams. Identify and pursue resolution of issues.
6. Identify and document customer objectives and product requirements.
7. Collect required inputs.
8. Develop draft product per customer requirements.
9. Conduct stakeholder review.
10. Modify/update draft product based on stakeholder reviews.
11. Document and deliver results with recommendations.

Fabrication:

1. Receive and review CAD drawing, shop traveler, or customer electronic work, etc., in order to fully understand requirements (including traceability requirements if necessary) and verify that

quantity of item requested and product requirements are clearly and completely defined and item is producible.
2. Acquire necessary suitable materials for fabrication.
3. Fabricate the item.
4. Perform initial inspection checking functional characteristics versus requirements.
5. Release item to end user for use.

Test:
1. Attend technical interchange, project planning, design review and other appropriate meetings to maintain a current knowledge base of design, requirements, issues, action items, and resolution activities. Identify issues, pursue resolutions, and provide supporting analyses.
2. Support component and/or system level test planning, post test data reviews and evaluation of anomalous test events as required. This includes performing post test data reviews, specialized analysis/evaluation of unique or out of family test conditions and test request presentations.
3. Support test and flight hardware acquisition, tracking, and integration.
4. Provide integration insight, evaluation and review for test article and facility interfacing.
5. Provide real time and post test/flight data evaluation using WinPlot or other MSFC provided software.
6. Document and deliver results with recommendations.

Data Services:
1. Attend technical interchange, project planning, design review and other appropriate meetings to maintain a current knowledge base of design, requirements, issues, action items, and resolution activities. Identify issues, pursue resolutions, and provide supporting analyses.
2. Support/Provide data reduction, analysis, and presentation of data.
3. Identify anomalies and support/provide resolution.
4. Follow-up with the resolution of and recommendations for any outstanding issues and present the findings to obtain closure.
5. Develop and maintain WinPlot scripts as needed. Participate in the development and implementation of new data analysis and database tools.
6. Provide real time and post test/flight data evaluation using WinPlot or other MSFC provided graphical software.
7. Document and deliver results with recommendations.

3.0 Discussion of Skills Required

Subelement CA – Constellation Liquid Engines Support

Junior, Journeyman and Senior Engineers with knowledge of propulsion system design, analysis, engine integration and development/verification testing.

Subelement CB – Constellation Main Propulsion Systems Support

Junior, Journeyman and Senior Engineers with knowledge of propulsion system design, analysis, engine integration and development/verification testing.

Subelement CC – Constellation Auxiliary Propulsion Systems Support

Senior and Junior Engineers with experience in APS design, development, and test are required. Previous experience with small thruster systems Design Development Test and Evaluation and dynamic modeling are desired.

Senior and Junior Technicians with electrical and/or mechanical experience in fluid systems design, development, and test are required. Previous experience with Easy5 analysis software is desired.

Subelement CD – Constellation Turbomachinery Support

Senior Engineer 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.

Subelement CE – Constellation Combustion Devices Support
Junior and Senior Engineers with general knowledge of fluid mechanics and test operations of gas and liquid propellant rocket engines. Detailed knowledge of combustion chemistry, fluid mechanics, and methods of design analysis is required.

Subelement CF – Constellation Propulsion Components Support
Senior Engineers with experience in fluid systems design and development and/or test are required. Experience with pressurant and propellant delivery systems, specifically Reaction Control Systems design is desired.

Junior Engineers with fluid systems design experience are required. Experience with Pro E modeling and fundamental working knowledge of propellant fluid systems is desired.

Subelement CG – Constellation Propulsion Detail Design Support
Senior engineers with general knowledge of engineering mechanics, materials, fluid mechanics and propulsion system design and Pro-E CAD experience and CAD Technicians with Pro-E CAD experience to generate the CAD models and drawings.

Subelement CH – Constellation Thrust Vector Control Systems Support
Senior and Junior Engineers with experience in fluid systems design, development, and test are required. Previous experience with the Solid Rocket Booster (SRB) Thrust Vector Control (TVC) System, TVC hydraulic systems design and dynamic modeling is desired.

Senior and Junior Technicians with electrical and/or mechanical experience in fluid systems design, development, and test are required. Previous experience with the SRB TVC System, TVC hydraulic systems design and dynamic modeling is desired.

Subelement CI – Constellation Propulsion Structural Analysis Support
Senior and Junior Engineers with experience in structural dynamics analysis, stress analysis, and test are required. Previous experience with the structural analysis of solid rocket motors, liquid rocket engines, and turbomachinery is desired.

Subelement CJ – Constellation Propulsion Fluid Dynamics Analysis Support
Junior, Journeyman, and Senior Engineers with background in mechanical engineering or aerospace engineering and a strong background in acoustics, CFD, or fluid dynamics.

Subelement CK – Constellation Propulsion Thermal Analysis Support
Junior, Journeyman, and Senior Engineers with background in mechanical engineering or aerospace engineering and thermal/fluids analysis.

Subelement CL – Constellation Large Solid Propulsion System Support
Senior Engineers with knowledge of solid rocket motor systems engineering. Engineer with specific knowledge of solid rocket motor case, joints and seals. Entry level (1-5 years) engineer with solid rocket motor systems engineering and requirement development experience. Previous experience with RSRM and SRB components and systems is desired.

Subelement CM – Constellation Small Solid Propulsion System Support
Senior Engineer with knowledge of solid rocket motor systems engineering, solid propellant performance characteristics, and/or pyrotechnic devices.

4.0 Special Tools Required
All computer hardware and software will be provided by NASA MSFC.

5.0 Participating Subcontractors
(b)(4)

Subelement CI – (b)(4) [redacted]
(b)(4) [redacted]

Subelement CJ – (b)(4) [redacted]
(b)(4) [redacted]

6.0 Milestones & Deliverables

Work is primarily driven by milestones that are set by the respective project customers, and are not within the control of the Task. Deliverables will be formatted as presentations, reports, and letters documenting findings, issues, meetings, trips, etc., as scheduled on a case by case basis. Reports documenting significant tasks will be provided as they are completed. Progress of efforts and significant issues will be formally documented in Monthly Activity Reports provided in the (b)(4) [redacted]
(b)(4) [redacted]

Milestones for technical assessments and evaluations as specified above, will be coordinated between NASA and technical personnel to perform the efforts, and negotiated with Task Lead and Task Initiator on a case-by-case basis.

The currently agreed Milestones and Deliverables are reflected in the schedule in Section 9.

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

Subelement CA – Constellation Liquid Engines Support
Materials= (b)(4) [redacted]
Travel= (b)(4) [redacted]

Subelement CB – Constellation Main Propulsion Systems Support
None.

Subelement CC – Constellation Auxiliary Propulsion Systems Support
Travel= (b)(4) [redacted]

Subelement CD – Constellation Turbomachinery Support
Travel= (b)(4) [redacted]

Subelement CE – Constellation Combustion Devices Support
Travel= (b)(4) [redacted]

Subelement CF – Constellation Propulsion Components Support
Travel= (b)(4) [redacted]

Subelement CG – Constellation Propulsion Detail Design Support
None.

Subelement CH – Constellation Thrust Vector Control Systems Support
Materials= (b)(4) [redacted]
Subcontract= (b)(4) [redacted]
Travel= (b)(4) [redacted]

Subelement CI – Constellation Propulsion Structural Analysis Support
Subcontract (b)(4) [redacted]
Travel= (b)(4) [redacted]

Subelement CJ – Constellation Propulsion Fluid Dynamics Analysis Support
Subcontract= (b)(4) [redacted]
Travel= (b)(4) [redacted]

Subelement CK – Constellation Propulsion Thermal Analysis Support
Travel= (b)(4)

Subelement CL – Constellation Large Solid Propulsion System Support
Travel= (b)(4)

Subelement CM – Constellation Small Solid Propulsion System Support
Travel= (b)(4)

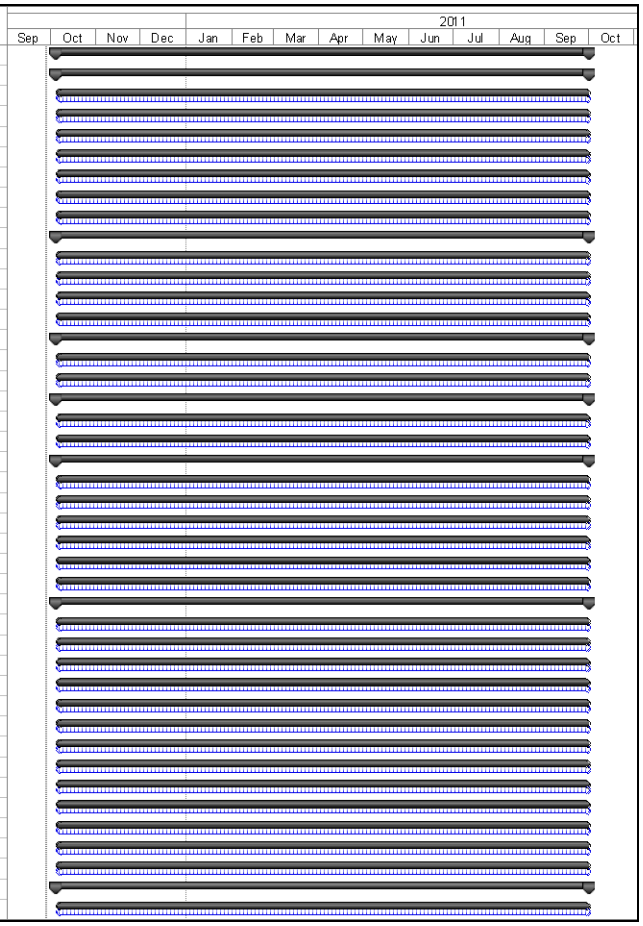
8.0 Work Shelf

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.

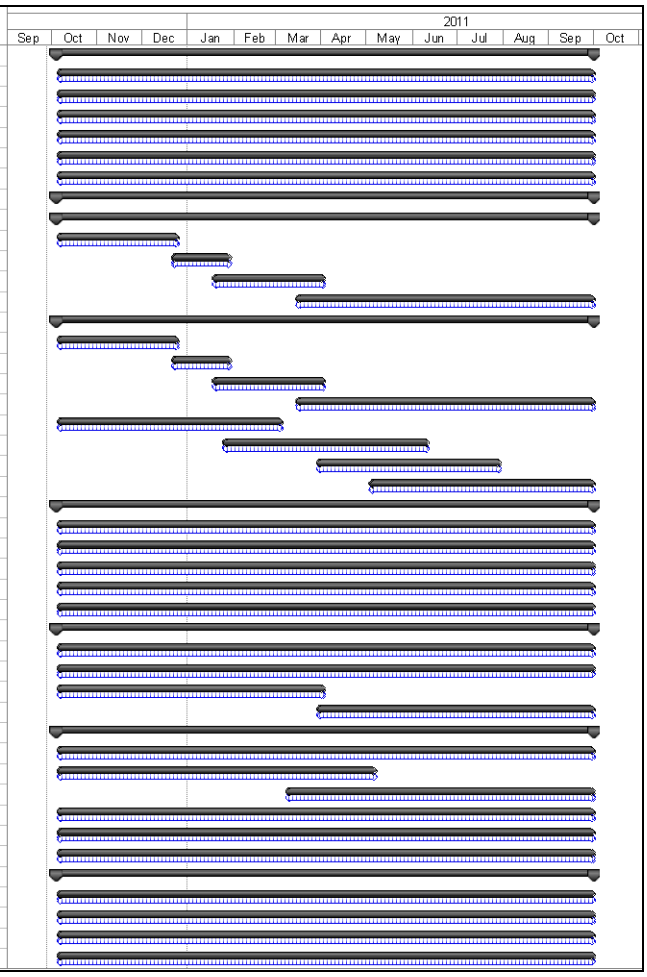
TO/Subelement	Description	Due Date	Skill

9.0 Schedule

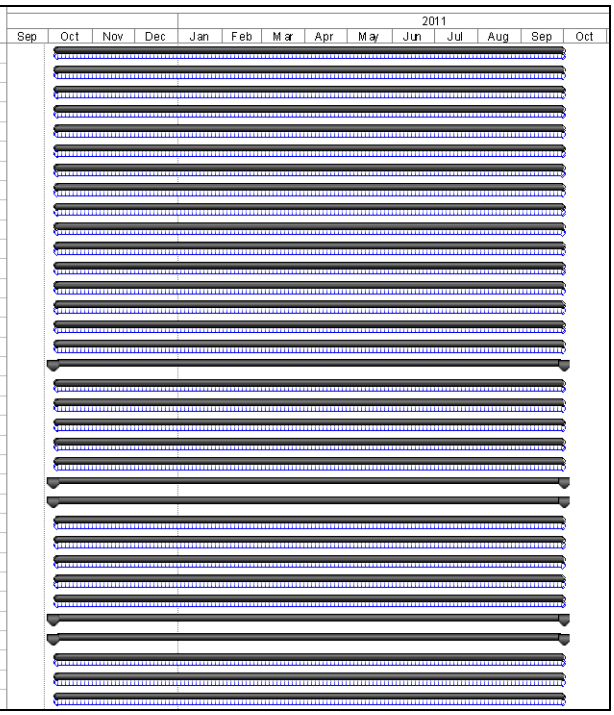
ID	Task Number	S/E	Task Name
1	**33-000002**	--	**Cx Propulsion Systems Support**
2	**33-000002**	**CA**	**Cx Liquid Engines Support**
3	33-000002	CA	Ares I USE SE&I Leadership / Coordination
4	33-000002	CA	Ares I USE Performance Modeling
5	33-000002	CA	Ares I USE Engine Systems / Facility Requirements Development
6	33-000002	CA	Ares I USE Systems DB Development
7	33-000002	CA	Ares I USE Test Planning & Data Review
8	33-000002	CA	Ares I USE Hardware Buildup Coordination
9	33-000002	CA	Ares I USE Diagnostics Modeling
10	**33-000002**	**CB**	**Cx Main Propulsion Systems Support**
11	33-000002	CB	Ares I US MPS Requirements Development
12	33-000002	CB	Ares I US MPS Helium Injection Testing Support
13	33-000002	CB	Ares I US MPS LO2 Damper Design and Development
14	33-000002	CB	Ares I US MPS Ground Operations Planning and Support
15	**33-000002**	**CC**	**Cx Auxiliary Propulsion Systems Support**
16	33-000002	CC	Ares I US ReCS Requirements Development
17	33-000002	CC	Ares I US ReCS Specification Development
18	**33-000002**	**CD**	**Cx Turbomachinery Support**
19	33-000002	CD	Ares I USE Power Pack Assembly Support
20	33-000002	CD	Ares I USE Engine 10001 Assembly Support
21	**33-000002**	**CE**	**Cx Combustion Devices Support**
22	33-000002	CE	Ares I USE ASI Test Preparation
23	33-000002	CE	Ares I USE ASI Fabrication Review
24	33-000002	CE	Ares I USE Work Horse GG Testing
25	33-000002	CE	Ares I USE Main Injector Fabrication Review
26	33-000002	CE	Ares I USE MCC Fabrication Review
27	33-000002	CE	Ares I USE PPA / Engine Assembly Test Support
28	**33-000002**	**CF**	**Cx Propulsion Components Support**
29	33-000002	CF	Ares I US MPS LO2 Tank Internal Vent/Relief Duct Specification
30	33-000002	CF	Ares I US MPS Revise LH2 Tank Vent/Relief Duct Specification
31	33-000002	CF	Ares I US MPS LO2 External Vent/Relief Duct Specification
32	33-000002	CF	Ares I US MPS LH2/LO2 Feed Line Specification
33	33-000002	CF	Ares I US MPS Snorkle Design
34	33-000002	CF	Ares I US Service Valves Detailed Design Specification
35	33-000002	CF	Ares I US Service Valve Life Cycle Test Report
36	33-000002	CF	Ares I US Flexline Detailed Design Specification
37	33-000002	CF	Ares I US Thruster Conrol Valve Kickoff Trip Report
38	33-000002	CF	Ares I US Thruster Control Valve Life Cycle Test Report
39	33-000002	CF	Ares I US Thruster Control Valve Shuttle Time Test Report
40	33-000002	CF	Ares I US Flow Limiter Data Analysis and Test Report
41	33-000002	CF	Ares I US Lines Flexibility Analysis and Report
42	**33-000002**	**CG**	**Cx Propulsion Detail Design Support**
43	33-000002	CG	Ares I US ReCS Detailed Design



ID	Task Number	S/E	Task Name
44	**33-000002**	**CH**	**Cx Thrust Vector Control Systems Support**
45	33-000002	CH	TVC Actuator Lab Capabilities Development Testing
46	33-000002	CH	TVC/Avionics Lab Interface Test Development
47	33-000002	CH	TVC LAB Operating System Schematics/Procedures/ Test Plan Development
48	33-000002	CH	High Pressure Hydraulics Power Station Installation and Validation
49	33-000002	CH	High Pressure Hydraulics power Station Operators Manual
50	33-000002	CH	TVC Lab DAS Operators Manual Development
51	**33-000002**	**CI**	**Cx Propulsion Structural Analysis Support**
52	**33-000002**	**CI**	**Ares I USE Dynamics Analysis**
53	33-000002	CI	J-2X Pre-Delivery Analysis Support
54	33-000002	CI	J-2X Test Stand Integration Support
55	33-000002	CI	J-2X Test Support
56	33-000002	CI	J-2X Post-Test Data Review/Analysis
57	**33-000002**	**CI**	**Ares I USE Stress Analysis**
58	33-000002	CI	J-2X Pre-Delivery Analysis Support
59	33-000002	CI	J-2X Test Stand Integration Support
60	33-000002	CI	J-2X Test Support
61	33-000002	CI	J-2X Post-Test Data Review/Analysis
62	33-000002	CI	FTP 1st Stage Damper HCF Analysis
63	33-000002	CI	OTP Volute Housing HCF LCF Analysis
64	33-000002	CI	Summarize the OTP and FTP 2D Stack Models
65	33-000002	CI	OTP Inducer Analysis
66	**33-000002**	**CI**	**Ares I US MPS Stress Analysis**
67	33-000002	CI	Stress Analysis Support for LOX Damper / Support Structure
68	33-000002	CI	Structural Analysis Support for Other MPS Components
69	33-000002	CI	Review of Component Vendor Milestones/Deliverables
70	33-000002	CI	Development of MPS Analysis Methods
71	33-000002	CI	Coordinate Work of Non-ESTS MPS Analysts
72	**33-000002**	**CI**	**Ares I VI Loads & Dynamics Analysis**
73	33-000002	CI	Support Development and Validation of Response Matching Technique
74	33-000002	CI	Comparison of Vibroacoustic Response of Heavy Components
75	33-000002	CI	Updated Upper Stage System Model w/ New LH2 Tank
76	33-000002	CI	Vibroacoustic Response of Aft Skirt
77	**33-000002**	**CI**	**RSRMV Stress Analysis**
78	33-000002	CI	Review CDR Analyses, Compliance Reports, Verification Reports
79	33-000002		Support for DM-3 Test
80	33-000002		Support for QM-3 Test
81	33-000002	CI	Failure methodology for viscous-elastic materials.
82	33-000002	CI	New constitutive model for nozzle structural analysis.
83	33-000002	CI	Develop damage tolerance methodology for propellant, liner and insulation.
84	**33-000002**	**CJ**	**Cx Propulsion Fluid Dynamics Analysis Support**
85	33-000002	CJ	Ares I Lift-off and IOP Model Development
86	33-000002	CJ	Ares I FITO Fluid Dynamic Analysis
87	33-000002	CJ	Ares I FS Fluid Dynamics Support
88	33-000002	CJ	Ares I FS Acoustics Support



ID	Task Number	S/E	Task Name
89	33-000002	CJ	Ares I FS Thrust Oscillation Analysis
90	33-000002	CJ	Ares I FS DM 1 Acoustics Data Analysis / Review
91	33-000002	CJ	Ares I US Propellant Damping Analysis
92	33-000002	CJ	Ares I US POGO Fluid Dynamic Analysis
93	33-000002	CJ	Ares I US LO2 Damper Model Development
94	33-000002	CJ	Ares I US Lateral Slosh Testing Support
95	33-000002	CJ	Ares I USE Turbopump Fluid Dynamics Support
96	33-000002	CJ	Ares I USE Facility Fluid Dynamics Support
97	33-000002	CJ	Ares I USE Valve Fluid Dynamics Support
98	33-000002	CJ	Ares I USE GG Fluid Dynamics Support
99	33-000002	CJ	Ares I USE Turbopump Water Flow Fluid Dynamics Support
100	33-000002	CJ	Ares I USE Turbine Drive / Injectors Fluid Dynamics Support
101	33-000002	CJ	SRTMV IOP Analysis
102	33-000002	CJ	Small Motors Acoustics Support
103	33-000002	CJ	Update Acoustics Analysis Databook
104	33-000002	CJ	ASMAT Preparation / Build-up
105	**33-000002**	**CK**	**Cx Propulsion Thermal Analysis Support**
106	33-000002	CK	Ares I USE ECU / Components Thermal Analysis
107	33-000002	CK	Ares I US Ullage Settling Motor Thermal Analysis
108	33-000002	CK	Ares I ReCS / RoCS Thermal Analysis
109	33-000002	CK	Ares I US MPS Thermal Analysis
110	33-000002	CK	RSRM Thermal Analysis
111	**33-000002**	**CL**	**Cx Large Solid Propulsion Systems Support**
112	**33-000002**	**CL**	**Systems Engineering**
113	33-000002	CL	Design/Specification Reviews / TIMs
114	33-000002	CL	IPT, Project, and Program Meetings
115	33-000002	CL	Requirements and Verification Support
116	33-000002	CL	RSRMV Critical Design TIMs
117	33-000002	CL	Development Motor 2 Status Test Support
118	**33-000002**	**CM**	**Cx Small Solid Propulsion Systems Support**
119	**33-000002**	**CM**	**Systems Engineering**
120	33-000002	CM	Design/Specification Reviews / TIMs
121	33-000002	CM	IPT, Project, and Program Meetings
122	33-000002	CM	Requirements and Verification Support



ESTS Contract Task Order Request Performance Plan

Task Order Title: Constellation Support to Propulsion Systems

Task Order Number: 33-000002 Revision: 00

Category	Weighting Technical %	End of Period Technical Score
Technical Objectives	65%	X 65% =
		Justification
1. Demonstrate initiative in taking independent actions when required. 2. Communicate ideas for improvement of current efforts. 3. Demonstrate ability to discover “gaps” in work products, training, and capabilities. Develop and communicate plans to close gaps. 4. Work is accurate for intended use. 5. Level of detail is appropriate for intended use. 6. Tools and methodologies applied are appropriate for intended use. 7. Work is of appropriate quality. 8. Resources assigned exemplify appropriate technical knowledge. 9. Progress and results are appropriately documented. 10. Results, issues, actions items, etc., are appropriately communicated and exemplify appropriate knowledge. 11. Demonstrate continuous improvement. 12. Level of technical oversight required is appropriate for resources and work assigned.		

	Weighting Schedule %	Schedule Score
Schedule Objectives (Milestones)	10% *(min 10%)*	X 10% =
		Justification
1. Work progression is appropriate for action assigned. 2. Resource loading commensurate with task schedule. 3. Products completed on time to support other areas. 4. Exemplify ability/willingness to adjust changing priorities. 5. Response to action items are timely.		

	Weighting Cost%	Cost Score

ESTS Contract Task Order Request Performance Plan

Task Order Title: Constellation Support to Propulsion Systems

Task Order Number: 33-000002 Revision: 00

Cost (actual vs. negotiated)	25% *(min.25%)*	X 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

Task Order Number: Constellation Support to Propulsion Systems

Task Order Number: 33-000002 Revision: 00

Comments:

Marshall Space Flight Center
Engineering, Science & Technical Services

JACOBS
ESTS Group

Risk Assessment

Contract Number: *NNM05AB50C*
TO Title: *Constellation Support to Propulsion Systems*
TO Number: *33-000002* **Revision:** *00*

Period of Performance: *10/02/2010* to *09/30/2011*

MSFC Initiator: *Terry Ware (Task Initiator)*

(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	Staffing commensurate with funding. Negative programmatic cost risk impacts are avoided through reviews. Only positive programmatic cost impacts are expected.
Risk T1	Technical	1	1	Technical knowledge of personnel assigned appropriate for work assigned.
Risk S1	Schedule	1	1	Task schedule is driven almost exclusively by programmatic schedules. Negative programmatic schedule risk impacts are avoided through status reviews. Only positive programmatic schedule impacts are expected.

*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