Marshall Space Flight Center
Engineering, Science & Technical Services

JACOBS
ESTS Group

Task Order Plan (TOP)

Contract Number: *NNM05AB50C*
TO Title: *Constellation Support to Ares Projects Office*
TO Number: *45-000003* **Revision:** *02*

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

MSFC Initiator: *Melanie Aldridge (Task Initiator)*

(b)(4) [redacted]

Emergency: *No*

Revision 02 (WBS136905.01.01.08.11)

The purpose of this revision is to clarify the scope of the task order to reflect support of Exploration Space Launch vehicles and associated technology architecture and systems engineering studies.

- Verbiage and/or titles in Section 1.0 for Subelements BD, BF, BK, CA, CB, CC, CD, CE, CF, CG, CH, CI, and CJ were revised to capture this intent.
- Verbiage and/or titles in Section 2.0 for Subelements CA, CB, CC, CD, CE, CG, CH, CI, and CJ were revised to capture this intent.
- Titles in Section 3.0 for Subelements CH and CI were revised to capture this intent.

This revision reduces the estimated cost for three (3) subelements (BG, CC, and CE) due to a reduction in work scope. This revision also adds estimated travel and (b)(4) [redacted] (b)(4) [redacted] The total cost decrease associated with this revision is (b)(4) [redacted]

The following is a summary of specific estimated cost changes:

Subelement BG: The labor estimate was reduced by (b)(4) [redacted] because less Upper Stage (US) project planning and integration effort is required. The total estimated reduction in labor cost for this Subelement is (b)(4) [redacted]

Subelement CC: The labor estimate was reduced by (b)(4) [redacted] because less Avionics Integration and Vehicle Systems Test (AIVST) systems engineering effort is required. The total estimated reduction in labor cost for this Subelement is (b)(4) [redacted]

Subelement CE: The labor estimate was reduced by (b)(4) [redacted] because less Vehicle Integration (VI) systems engineering and requirement traceability effort is required. The total estimated reduction in labor cost for this Subelement is (b)(4) [redacted]

Subelement CI: The travel estimate was increased by (b)(4) [redacted] to cover (b)(4) [redacted] (b)(4) [redacted] (b)(4) [redacted] The total estimated increase in cost for this Subelement is (b)(4) [redacted]

No changes were made to the performance plan or risk assessment.

Revision 01 (WBS136905.01.01.08.11)

The purpose of this revision is to add new scope to this Task Order as defined in Subelement CM. The Schedule, Performance Plan, and Risk Assessment were evaluated for possible impacts as a result of the addition of the new scope to this Task Order.

Subelement - CM: This subelement adds strategic planning for MSFC's future space exploration activities to this Task Order. The total cost associated with the addition of this new support is (b)(4)

Revision 00 (WBS136905.01.01.08.11)

This FY11 task order is a continuation of effort provided under FY10 Task Order 45-000001, *Ares Projects Office Ares I Support.* It defines and estimates work for the period of October 2, 2010 through September 30, 2011. The Schedule, Performance Plan, and Risk Assessment reflect the task activities for the new period of performance. This Task Order affects the Constellation Ares Projects Office and is funded via WBS # 136905.01.01.08.11. The total estimate for the task order is (b)(4)

1.0 Task Order Description & Objectives

1.1 Subelement BA – First Stage (FS) Project Management (PM) Technical Coordination

Provide PM technical coordination support, including development of presentations, routing, tracking and coordinating closure of action items, management of information flow internal and external to the First Stage Element (FSE) Office, and overall coordination of the element's activities internal/external to the element. Provide meeting supplies and support for major FS project reviews.

1.2 Subelement BB – First Stage (FS) Operations and Ground Test

Serve as the lead for the SE&I ground operations and test activities associated with the FSE to include prime contractor (PC) facilities and the launch site. Provide oversight for PC activities to include data deliverables.

1.3 Subelement BC – First Stage (FS) Parachute Subject Matter Expert (SME)

Provide SME support to perform analysis of the aerodynamics and flight mechanics of the FS to assist in the design, development, planning, and testing of the FS parachute system.

1.4 Subelement BD – First Stage (FS) Thrust Vector Control (TVC) Avionics

Provide TVC and Avionics support to the FS Avionics and Control Team (ACT) and Space Launch System architectures.

1.5 Subelement BE – First Stage (FS) Planning / Earned Value Management (EVM)

(This technical effort did not continue from 45-000001, Rev. 01.)

1.6 Subelement BF – First Stage (FS) Integration Subject Matter Expert (SME)

Assist with FS project planning and scheduling, requirement definition and development, including planning for ground and flight tests associated with critical functions of the Ares I vehicle and Space Launch System architectures drawing on past Apollo, Saturn and Shuttle experience.

1.7 Subelement BG – Upper Stage (US) Project Planning / Integration

Provide US Project Office (PO) project planning, coordination, integration, and technical communications.

1.8 Subelement BH – Upper Stage (US) Project Engineering

Provide SE&I project engineering, integration, analysis support, and project review and reporting.

1.9 Subelement BI – Upper Stage (US) Integrated Operations and Logistics

Provide project engineering, SE, and technical support to the US Element Logistics Manager.

1.10 Subelement BJ – Upper Stage Engine (USEng) Project Engineering

Provide project and SE, project coordination, risk management (RM) and integration support to the USEng Element Office of the APO. Activities will include test planning, data management (DM), RM, project reporting, contractor data integration, and contractor process integration, as well as overall project coordination. Project engineering support will include technical/programmatic reviews and evaluations necessary to ensure the successful planning, control, and execution of the USEng Element Office.

1.11 Subelement BK – Upper Stage Engine (USEng) Integrated Master Schedule (IMS)

Provide schedule development, maintenance, analysis, integration, and Earned Value Management (EVM) for the USEng Element schedules as well as integration into the Ares Vehicle Integration Office (VIO) schedules and the Vehicle Integration (VI) IMS and providing support to the Space Launch System architecture development.

1.12 Subelement BL – Upper Stage Engine (USEng) Nozzle Subject Matter Expert (SME)

Provide technical direction and advice pertinent to the current nozzle extension (NE) design and development activities.

1.13 Subelement BM – Upper Stage Engine (USEng) Program Planning and Control (PP&C)

(This technical effort did not continue from 45-000001, Rev. 01.)

1.14 Subelement CA – Program Planning and Control (PP&C) Upper Stage (US) Schedule

Provide schedule development, maintenance, analysis and EVM for the US Element Office and launch vehicle study teams.

1.15 Subelement CB –Program Planning and Control (PP&C) Flight and Integrated Test Office (FITO) Integrated Schedule

Provide Integrated Master Schedule (IMS), Integrated Vehicle Ground Vibration Test (IVGVT), test schedule support to the FITO, and analytical planning evaluations of space launch vehicle architectures and studies.

1.16 Subelement CC – Vehicle Integration (VI) Avionics Integration and Vehicle Systems Test (AIVST) Project Engineering

Provide project and systems engineering and integration (SE&I) support to the AIVST subelement of the APO. Activities will include avionics and software design analysis, project engineering support for technical/programmatic reviews, and evaluations necessary to ensure the successful planning, control, and execution of the AIVST subelement of the APO.

Provide schedule development, maintenance, analysis, and EVM for the AIVST as well as VI schedules. Review and analyze resource loaded schedules and the associated network logic for completeness, reasonableness, functionality, and accuracy. Ensure that network logic is complete and that the critical path and other schedule analysis reports and any performance concerns are provided to project management for timely decision making. Assist AIVST/VI Project Managers with “what-if” scenario analysis and work-around planning by utilizing project network logic drive schedules.

Provide project and systems engineering support as well as project planning support in support of avionics and software design and performance evaluations of space launch vehicle architectures and studies.

1.17 Subelement CD – Vehicle Integration (VI) Avionics Integration and Vehicle Systems Test (AIVST) Integration and Systems Integration Laboratory (SIL)

Provide consultation to support software requirement definition and development, avionics integration, and SIL for APO and the APO Elements. Tasks effort is expected to include:

- Provide hardware and test environment review and analysis support to the Ares I avionics integration effort.
- Assist in the development of avionics and hardware architecture requirements.
- Provide SIL planning and support to project and project elements of Ares and space launch vehicle architectures.

1.18 Subelement CE– Vehicle Integration (VI) Systems Engineering (SE) and Requirements Traceability

- Provide system engineering and integration (SE&I) and project support to the APO Vehicle Integration Office. Activities will include support for the development, analysis, and management of requirements, interfaces, and verifications.
- Track and manage the requirements and verification of the Ares VIO.
- Provide requirement assessment support to space launch vehicle architectures and studies.

1.19 Subelement CF – Vehicle Integration (VI) Systems Management and Project Analysis

Support the VI Systems Management team by:

- Analyzing Systems Management products and processes, and providing recommendations for improved implementations and efficiencies.
- Developing data and tool usage analyses and performing strategic planning and implementation for the VI Systems Management products.
- Providing guidance and support in the definition of Systems Management plans and processes including the identification of the tools, resources, roles and responsibilities, task descriptions, and products necessary to achieve project goals and objectives.
- Providing specialized software integration support for the Integrated Collaborative Environment (ICE) Windchill™ application.
- Monitoring products and projects from initiation through delivery and interfacing frequently with the customer on technical matters.
    - VI Systems Management products support Ares and space launch vehicle studies and architectures.

Track and manage the ESTS support to the Systems Management WBS. Activities will include development of MARs, preparation of scope, cost and schedule estimates, and variance analyses for cost and schedule.

1.20 Subelement CG – Vehicle Integration (VI) Data and Information Management

Provide SE and specialized software integration support to the VI Systems Management team by:

- Managing NASA's ICE Windchill™ Web application program.
- Managing MSFC's Integrated Engineering Capability (IEC) Design and Data Management System (DDMS) Web application program.
- Developing Wikis.
- Monitoring products and projects from initiation through delivery, interfacing frequently with the customer on systemic and technical matters.
- Providing guidance and support in the definition of Data Systems Mapping (DSM) plans and processes.

- Providing recommendations for improved implementations and efficiencies.
- Data and Information Management products support Ares as well as space launch vehicle studies and architectures.

1.21 Subelement CH –Ground Vibration Test (GVT) for Vehicle Systems and Integrated Vehicle Development

- Provide SE support by generating and/or reviewing test requirements, test plans, and test procedures. Coordinate system integration activities, document results, and present findings.
- Provide programmatic support by preparing, reviewing, and/or evaluating the planning documents such as project plans, element-to-element agreement, integration plans, risk management (RM) plans, property plans, organization charts, and schedules. Programmatic support also includes preparing summary charts, presenting data and information, as well as preparing and/or evaluating project and/or test activity metrics.
- Provide document development support including writing and reviewing documentation as described, schedule tracking, and serving as a (b)(4) Review associated element documents to assess the potential effects on ground vibration test activities and provide technical reviews of element and vehicle integration options from a test perspective.
- Capture and document lessons learned.

1.22 Subelement CI – Vehicle Test, Technology, and Integration Systems Engineering

- Provide SE support by generating and/or reviewing test objectives and requirements, technology options, test procedures, test plans, test reports, and verification plans. Also, analyze test data, assess test options, identify test gaps and risks, participate design reviews, test readiness reviews, Technical Interchange Meetings (TIMs), and test planning meetings. Prepare summary charts and present findings.
- Provide programmatic and SE support by preparing, reviewing, and/or evaluating planning documents such as systems engineering management plans, project plans, RM plans, logistics plans, organization charts, flight evaluation reports, and schedules. Programmatic support also includes preparing summary charts, progress reports, newsletters, and presenting findings.
- Provide knowledge management and lessons learned documentation including gathering information, data entry, and analysis of the data. Knowledge management also includes organizing and conducting knowledge capture activities, interactions with external entities, and reporting. Lessons learned also includes the application of lessons learned from previous test activities such as Ares I-X and Ares I 5% Scale Model Acoustics Test (ASMAT) to support the development of new flight tests and interpretation of data as it is applied to vehicle integration and development and architecture studies.
- Perform systems analysis/operations research and requirements analysis. Participate in the identification of options, the assessment of the options, and the preparation of recommendations. Subject Matter Experts (SMEs) will verify and ensure that key technical products are accurate and meet the intent and scope of the task.
- Prepare technical papers to capture lessons learned from tests and test planning activities.
- Provide requirement and performance evaluation support to space launch vehicle architectures and studies.

1.23 Subelement CJ – Dynamic Test Planning

Provide subject matter expertise to support dynamic testing from test planning to the evaluation of test results. The primary task is to perform systems analysis of dynamic test options. This includes identification and definition of dynamic test risks and issues, derivation of alternatives, research and assessment of the alternatives, and preparation of recommendations. Other associated tasks include mapping of system requirements to the test objectives, evaluation of

capabilities such as resources to perform the testing, and knowledge capture of the test data. Also, support vehicle dynamic testing and analysis, development of approaches for testing, evaluation of simulations, support or participation in validations, and review of related documentation. Products include the following:

- Documentation of systems analysis and architecture study results.
- Written comments and/or redlines of documentation.
- Test plans, procedures, and white papers.
- Summary reports (e.g., Microsoft (MS) PowerPoint presentations).
- Provide SME support to Exploration architectures and studies.

Tasks will be performed via participation in test and working groups, documentation of results and comments, presentation of relevant material, and coordination of task activities with other participants.

1.24 Subelement CK – Vehicle Integration (VI) Chief Architecture

Provide support to the VI Chief Architect in the areas of launch vehicle (LV) SE, technical integration, and concept analysis. Provide the necessary vehicle technical integration activities including support for integrated vehicle systems analysis, performance analysis, requirements validation, configuration research, and performance documentation for integrated launch vehicles. Support will include LV architecture design analysis, configuration analysis, systems analysis, trade study support, and project engineering support for technical/programmatic reviews. Personnel may provide real-time expert design and analysis recommendations through participations in JP and ED technical/programmatic forums. Task personnel will be expected to lead and perform systems analysis and project engineering tasks and studies as applicable.

Specific expertise required to fulfill these objectives include ascent flight SE&I and integrated performance analysis of human-rated LVs, as well as the unique skills specified below:

- Provide technical management and leadership expertise to coordinate and conduct special studies at all levels of engineering design and management review. Apply technical literature experience in researching and preparing management level documentation regarding LV configuration options and performance. Provide real-time spacecraft mission operations and orbital dynamics expertise as applicable.
- Provide Subject Matter Expertise in flight mechanics, induced environments, aerodynamics, solid rocket motors (SRMs), solid propulsion, and historical LV research.
- Provide Subject Matter Expertise in liquid stages, liquid propulsion, rocket engines, and historical LV research.

1.25 Subelement CM– APO Strategic Planning

Provide Subject Matter Expertise to research Constellation Program successes and identify specific technologies for potential incorporation into MSFC's future strategic planning.

- Assess the identified successes and technologies to pinpoint specific ones for further investigation.
- Translate the specific program/project successes and technologies descriptions into non-engineering driven verbiage.
- Develop framing statements for the identified successes and technology areas that will resonate with NASA stakeholders.

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

2.1 Subelement BA – FS Project Management (PM) Technical Coordination

Support the customer in the development of technical and programmatic presentations by:

- Utilizing data from existing presentations.
- Obtaining data as required from research, FSE team members, and PC.

- Coordinating with the graphics support personnel.
- Coordinating and reviewing presentations with the FSE Office.

Facilitate the closure of actions received by FSE Office from the PO, MSFC, HQ, and other sources by:

- Routing actions to the appropriate FSE actionee.
- Tracking all FSE actions to maintain status and ensure on-time closure.
- Resolving issues that are delaying the closure of actions.

Facilitate and manage the flow of information internal and external to the FSE Office by:

- Providing weekly notes to the Crew Launch Vehicle (CLV) PO from the FSE Office, gathering information from the appropriate FSE team members.
- Coordinating submission of the monthly Program Management Council (PMC) charts to the CLV PO.
- Handling other communication flow as required.

Provide overall coordination of the element's activities internal and external to the element by:

- Organizing special on-site and offsite meetings as required.
- Ensuring the appropriate facilities and equipment is available.
- Developing and communicating agendas with internal and external attendees to ensure proper level of preparedness for successful meetings.
- Representing the PO in support of the FS ACT.

Perform other coordination functions for the customer as needed in order to successfully conduct daily business.

2.2 Subelement BB – FS Operations and Ground Test

Support the FSE Office SE&I team including coordination and interfacing with the CLV PO, Engineering, contractors, CLV Elements, CLV VIO, and other NASA centers as required to ensure the FSE successfully meets the Critical Design Review (CDR), test, and mission objectives. Efforts may include the following:

- Providing input to the CLV Operations Concept.
- Formulating requirements.
- Coordinating review of contractor deliverables.
- Supporting testing activities as required.
- Developing element schedules.
- Coordinating meetings.
- Tracking element tasks to completion.
- Assessing test schedules and mission objectives.
- Participating in major milestone reviews.
- Assisting in the generation of an assortment of engineering and element reports for internal and external dissemination.
- Interacting with multiple engineering disciplines, processes, and integrated product teams (IPTs).

2.3 Subelement BC – FS Parachute SME

- Perform analyses of the aerodynamics and flight mechanics CLV FS to support the design, development, planning, and testing of the FS parachute system for the CLV.
- Participate in program reviews, prepare comments and recommendations on technical approaches, and participate in the selection and implementation of design and technical approaches to meet baseline architectures and plans.
- Review technical reports, requirements documents, and engineering memorandums for technical adequacy and content as well as prepare and deliver technical and programmatic briefings as requested.

Provide expertise in the following specific areas:

- FS Separation System Development.
- FS Recovery System Development.
- FS Aerodynamics Analysis.
- Analysis of the Flight Mechanics of the FS Parachute System.

2.4 Subelement BD – FS TVC Avionics

Support the FSE Office ACT by:

- Coordinating and interfacing with Ares I PO, Engineering, contractors, Ares I Elements, Ares I VIO, and other NASA centers to ensure that FSE successfully meets the CDR, test, and mission objectives.
- Participating in program reviews, preparing comments and recommendations on technical approaches, and participating in the selection and implementation of design and technical approaches to meet baseline architectures and plans.
- Reviewing technical reports, requirements documents, and engineering memorandums for technical adequacy and content as well as prepare and deliver technical and programmatic briefings as requested.

Provide technical TVC support and expertise in the following specific areas:

- Detailed expertise and knowledge resulting from experience from the development of the Space Shuttle Solid Rocket Booster TVC systems for the SRM.
- Support all phases of design, development, and test activities of the Ares I FS TVC system.
- Provide expertise of the TVC system to identify and determine potential integration issues.
- Identify technical and programmatic risks/issues while recommending mitigation solutions as well as verification and validation approaches.

2.5 Subelement BE – FS Planning / EVM

(This technical effort did not continue from 45-000001, Rev. 01.)

2.6 Subelement BF – FS Integration SME

Provide Project Planning and Scheduling Support including:

- Attending program reviews, preparing comments and recommendations on technical approaches, and participating in the selection and implementation of design and technical approaches to meet baseline architectures and plans.
- Reviewing technical reports, requirements documents and engineering memorandums for technical adequacy and content.
- Preparing and delivering technical and programmatic briefings as required.

Provide expertise in the following specific areas:

- FS Requirements Development.
- Mission Planning and Implementation.
- Stage Interface Integration and Verification.
- Flight and Test Execution.
- Ground Testing and Execution.

2.7 Subelement BG – US Project Planning / Integration

<u>Project Planning, Coordination, and Integration</u>:

Support of this task includes planning, coordinating, tracking, and reporting of project/element tasks and actions.

- Organize project/element team meetings by maintaining team distribution lists for e-mail notifications of meetings, scheduling conference rooms, reserving equipment and resources, verifying attendee credentials and attendee list, controlling access to secure meetings, minute taking and preparation, action item logging and tracking, and distribution and control of meeting data.

- Maintain project/element calendars.
- Interface with project/element management and personnel to support integration activities such as, but not limited to: schedule management, action item tracking; tracking government products and deliverables.
- Interface with project/element management and personnel to identify areas of required support, such as but not limited to, participation in management meetings, participation in evaluation teams, and development of presentations (i.e. Project/Element Overviews and Monthly/Quarterly Performance Reports).
- Assist project/element office personnel in securing computer support, supplies, and other necessary items in the performance of the task/project daily activities.
- Coordinate and facilitate project/element team building exercises and activities.
- Distribute and communicate project/element reports, HQ reports, status reports, meeting items, management/lead feedback, rosters, and other communications as deemed appropriate by management/leads ensuring correct security protocol is followed.
- Develop and provide practical coordination guidelines in reporting, rosters, calendars, and informal project/TO actions.
- Facilitate communication flow across project/element interfaces as deemed appropriate.
- Develop and distribute desktop operating procedures in support of project/element office. These procedures provide step-by-step directions for use of common processes. This also includes the tracking of multimedia needs, as well as ensuring all members supporting the US are issued required multimedia resources to efficiently support the customer.
- Identify areas for improved project/element office efficiency and propose processes/ products to achieve desired outcome. Implement as directed.
- Provide project/element office database administration including verifying security permissions, loading data, setting up and organizing folders/files for efficient and logical data storage, data retrieval and archiving, as well as assisting project/element office personnel needing access and location of information.

Technical Communications:

Support activities include the development and review of CLV US project/element office documents, review of CLV US subsystem level documents, review of CLV level documents, and communication between project/element, subsystem leads, and the CLV personnel. The technical approach for this area of support is described by the following:

- Draft, collaborate, and assist in the development of reports/documents and in acquiring inputs from identified resources and in the distribution of data reports including proper DM repository.
- Develop, review, and edit documentation to support project/element office as needed to support project/element milestones.
- Provide data research and documentation.
- Perform quality checks of reports and presentations.
- Prepare and maintain data books as necessary.

2.8 Subelement BH – US Project Engineering

Project & Systems Engineering, Integration and Analysis:

- Provide technical oversight and products/documentation development for the project/element office including the production and maintenance of project/element level Technical Program Metrics (TPMs) and Technical Readiness Levels (TRLs).
- Execute technical tasks and actions such as but not limited to support of reviews, panels, trade studies, kaizen studies, and data requirement assessments.
- Work with project/element management to provide broad-based strategic planning and problem solving on a variety of technical and programmatic topics.
- Provide guidance and support in definition of project/element requirements, plans and processes including the identification of the tools, resources, work breakdown, organization,

roles and responsibilities, task descriptions, and products necessary to achieve project/element goals and objectives.

- Participate in SE process development which flow down requirements and ensure that requirements are valid, traceable, properly assessed, and allocated at major reviews.
- Provide project integration support between US and VIO as well as US and ED to ensure deliverables, milestones, etc. are tracked and statused properly which includes serving as an US representative at the VIO schedule meetings.

Project/Element Review and Reporting:

Perform systems engineering functions and coordination to include reporting, database administration, and integration.

- Provide assistance to the SE&I Subsystem Lead in the development of technical review plans (i.e. SRR, PDR, etc.)
- Develop data review comment sheets (i.e. Review Item Discrepancies (RIDs), issues, etc.) in support of project/element technical and programmatic reviews.

Data Analysis and DM:

Perform data analysis and DM to included review of project and contractor data, data package review coordination, and document tree development oversight.

- Serve as a point of contact (POC) for US data collection, collaboration, and information gathering.
- Develop and document the US DM plans and processes for the handling of NASA produced as well as contractor supplied products.
- Develop and make recommendations of information management processes, including data organization, identification, and maintenance procedures.
- Serve as the US archive manager by capturing relevant documentation and communications to be kept electronically in a central location for the element office.

Project Management:

- Provide PM support, team leadership, and SE expertise to the US SE Manager.
- Create proper documentation and records to support design review activities. Organize, integrate, and expedite engineering efforts between the US, Engineering Product Teams, and production contractors.
- Serve as a member of Design Architecture Teams to ensure drawing and modeling database tools are compatible with existing systems.
- Lead efforts to effectively plan and design processes/procedures to effectively manage the delivery of an integrated US vehicle.

2.9 Subelement BI – US Integrated Operations and Logistics

Provide project engineering, SE, and technical support to the CLV US Element Logistics Manager. Provide project engineering in direct support of projects and/or TO directives to include reporting, integration, activity support, facilitation, and communication. Perform an integration and coordination function for the Logistics Manager as needed to develop products and conduct daily business.

This task support will include following:

- Collection, interpretation, and preparation of information for presentation to internal and external customers to meet element goals.
- Provide SE support associated with the ILS planning, development, and evaluation of programmatic processes and documentation, configuration and DM, requirements development and evaluation, RM, work package coordination, trade studies, and other SE functions.
- Provide support for the facilities and CoF management processes.

2.10 Subelement BJ – USEng Project Engineering

Provide PM/Engineering, Integration and Test support by:

- Assisting the customer by coordinating and prioritizing tasks.
- Coordinating the support activities to ensure that manpower resources are assigned efficiently to the highest priority task.
- Creating a support structure around the customer that allows the customer's office to function effectively without direct guidance/supervision from the customer.
- Facilitating the flow of project data through the effective use of the ICE including the integration of the hardware contractor into ICE, developing an effect methodology for using ICE that addresses items such as the creation and maintenance of master and detailed schedules, task management, reporting, preparing and maintaining documentation, data archiving, and others as the need arises.
- Supporting the office management including meeting participation and coordination, supporting management briefings, developing presentations and project documentations, as well as supporting other related programmatic activities.
- Performing integration functions.

Provide SE support by:

- Performing SE activities including development of programmatic documentation.
- Performing integration function with provided organization contacts to coordinate and obtaining the necessary information to produce documents that meet the Project's requirements. Assisting in the negotiation and approvals of documents.
- Performing necessary initial release and approval coordination as well as the necessary revisions throughout the period of performance.
- Supporting the development and execution of the Project's processes and procedures and related to SE.

Provide Project Coordination support by:

- Facilitating meetings:
  - Schedule all meetings for members of the customer's office.
  - Set up and host teleconferences, videoconferences, and WebEx sessions as needed for the meeting.
  - Provide notification to all necessary meeting parties.
  - Taking meeting minutes, distributing meeting information, providing any follow-on information needed.
  - Coordinating any outside resources that are deemed necessary for meeting success.
- Creating and maintaining group calendars, email lists, contact lists, resource and property lists, and other group assets as needed.
- Performing other coordination functions as needed to ensure customer success.

Provide RM support by:

- Performing RM activities including development and maintenance of any risk related project documentation.
- Maintaining the Project's risk database and assuring that it and the risk data contained within are in compliance with all applicable processes and guidelines.
- Holding periodic risk meetings to ensure that identified risk and corresponding mitigation plans are accurate and up to date.
- Providing oversight of the hardware contractor risk processes for the Project's management and technical leads.

2.11 Subelement BK – USEng IMS

- Develop and maintain the resource loaded USEng schedules and ensure that network logic is complete.
- Ensure the critical path and other schedule analysis reports and any performance concerns are provided to USEng PM for timely decision making.
- Review and analyze resource loaded schedules and the associated network logic for completeness, reasonableness, functionality, and accuracy.
- Provide assistance to USEng Project Managers with “what-if” scenario analysis and work-around planning by utilizing project network logic drive schedules.
- Participate and assist with special MSFC and Ares teams assigned to perform project analyses and integrated project reviews.
- Participate in special independent program assessment teams for the purpose of determining the feasibility of a program/project achieving the approved cost, schedule, and technical requirements.

2.12 Subelement BL – USEng Nozzle SME

Provide specific support in the area of NE design and development.

2.13 Subelement BM – USEng PP&C

(This technical effort did not continue from 45-000001, Rev. 01.)

2.14 Subelement CA – PP&C US Schedule

- Provide schedule development, maintenance, analysis, integration and EVM for the US Element and subsystem schedules as well as integration into the Ares VIO schedules and the VI IMS schedule. Review and analyze resource loaded schedules and the associated network logic for completeness, reasonableness, functionality, and accuracy.
- Develop and maintain the resource loaded US schedules and ensure that network logic is complete. Ensure the critical path and other schedule analysis reports and any performance concerns are provided to US PM for timely decision making. Assistance will be provided to US Project Managers with “what-if” scenario analysis and work-around planning by utilizing project network logic drive schedules.
- Participate and assist with special MSFC, Ares, and launch vehicle study teams assigned to perform project analyses and integrated project reviews, when needed. Participate in special independent program assessment teams for the purpose of determining the feasibility of a program/project achieving the approved cost, schedule, and technical requirements.

2.15 Subelement CB – PP&C FITO Integrated Schedule

- Support schedule development, maintenance, analysis, integration, and EVM as well as integration into other Ares I schedules. Review and analyze resource loaded schedules and the associated network logic for completeness, reasonableness, functionality, and accuracy.
- Develop and maintain the resource loaded FITO schedules and ensure that network logic is complete. Ensure the critical path and other schedule analysis reports and any performance concerns are provided to FITO Manager for timely decision-making. Assist the FITO Manager with “what-if” scenario analysis and work-around planning by utilizing project network logic drive schedules.
- Participate and assist with special MSFC, Ares, and launch vehicle study teams assigned to perform project analyses and integrated project reviews, when needed. Participate in special independent program assessment teams for determining the feasibility of a program/project achieving the approved cost, schedule, and technical requirements.

2.16 Subelement CC – VI AIVST Project Engineering

Provide Project Engineering, Systems Engineering, and Schedule support to AIVST by:

- Developing and maintaining project plans that address risk.
- Identifying, tracking, and supporting resolution of action items.

- Supporting project planning and control activities for Ares and launch vehicle study teams.
- Preparing, maintaining, and providing status reports, calendars, contact lists, and project data.
- Supporting theoretical avionics and software studies and strategic planning to develop concepts and prove approaches for Ares and launch vehicle teams.
- Performing assessments of avionics and software feasibility, capability, design, performance, and resource requirements via trade studies and analysis.
- Performing schedule development, maintenance, analysis, integration and EVM for the avionics and software schedules for Ares, VI, and launch vehicle teams.

2.17 Subelement CD – VI AIVST Integration and SIL

Provide software requirement definition and development, avionics integration, and SIL by:

- Providing hardware and test environment review and analysis support to the Ares I Avionics integration effort.
- Assisting in the development of avionics and hardware architecture requirements.
- Providing SIL planning and support to Ares I Project, Project elements, and launch vehicle teams.

2.18 Subelement CE – VI Systems Engineering and Requirements Traceability

- Support the development, maintenance, and management of requirements, verification items, and interfaces.
- Identify, track, and support resolution of action items.
- Support project planning and control activities.
- Prepare, maintain, and provide status reports and project data.
- Perform requirement assessments in support of launch vehicle architectures and studies.

2.19 Subelement CF – VI Systems Management and Project Analysis

- Identify, track, and support resolution of action items.
- Support and monitor all VI Systems Management activities.
- Prepare and format documents to established customer standards and reporting.
- Analyze technical and project review processes and provide recommendations for both.
- Support technical review efforts.

Personnel will collect, interpret, and prepare information for presentation to internal and external customers to meet program/project goals.

2.20 Subelement CG – VI Data and Information Management

- Work within assigned customer areas to provide specialized software integration support.
- Support assignments which may include multiple assignments to NASA customer requests and/or projects.
- Provide support for all program/project areas as assigned to efficiently and effectively meet project and Exploration Systems Mission Directorate (ESMD) needs.
- Work directly to perform scoped tasks in a timely manner with minimal direction by the Jacobs Technical Manager.
- Provide data collection and modeling for DSM.
- Collaborate with tool developers and end-users to integrate a seamless data architecture across NASA directorates and centers.
- Perform software integration support for VI and launch vehicle studies and architectures.
- Perform activities that support the efficient application of software packages to facilitate large project reviews of technical and programmatic data.
- Work to integrate processes with software tools such that task objectives can be met and the efficiency of the tool will be maximized to support project objectives.

- Use the provided NASA's ICE Windchill™ and/or the MSFC Integrated Engineering Capability (IEC) DDMS Web application programs and shall integrate the required specialty software program(s) with these environments in order to implement the required processes and policies of the assigned project.
- Provide suggestions, comments, presentations, educational materials, etc. that are required to facilitate the most efficient use of software products to achieve the customer objectives.
- Utilize off-the-shelf or government provided software packages and shall refrain from the development of a unique software capability unless the joint approval to do is given.

2.21 Subelement CH – GVT for Vehicle Systems and Integrated Vehicle Development

- Support strategic and test planning activities by providing SME inputs and recommendations. Also, report summary of meetings and findings.
- Generate and review test documentation.
- Support review of requirements and system test design using SE best practices, tools, techniques, methods, and processes. Use the NASA SE Handbook, SP 6105, as guidelines in performance of task.
- Participate in technical reviews and TIMs by providing critical assessments and detail comments.
- Support RM and schedule analysis activities using approved tools and processes.
- Develop white papers as necessary to document key findings. Submit white papers for publication if consistent with task initiator objectives.
- All research will be performed with the full rigor of a systems analysis requiring clear problem identification, evaluation of alternatives, analytical assessments as necessary to evaluate alternatives, and report findings.

2.22 Subelement CI – Vehicle Test, Technology, and Integration Systems Engineering

- Support strategic and test planning for launch vehicle activities by providing SME inputs and recommendations. Also, report summary of meetings and findings.
- Generate and review test documentation.
- Support review of requirements and system test design using SE best practices, tools, techniques, methods, and processes. Use the NASA SE Handbook, SP 6105, as guidelines in performance of task.
- Participate in technical reviews and TIMs by providing critical assessments and detail comments.
- Support RM and schedule analysis activities using approved tools and processes.
- Develop white papers as necessary to document key findings. Submit white papers for publication if consistent with task initiator objectives.
- All research will be performed with the full rigor of a systems analysis requiring clear problem identification, evaluation of alternatives, analytical assessments as necessary to evaluate alternatives, and report findings.

2.23 Subelement CJ – Dynamic Test Planning

- Support strategic and test planning activities for launch vehicles by providing SME inputs and recommendations.
- Generate and review test documentation.
- Support review of requirements and system test design using SE best practices, tools, techniques, methods, and processes. Use the NASA SE Handbook, SP 6105, as guidelines in performance of task.
- Participate in technical reviews and TIMs by providing critical assessments and detail comments.
- Support RM and schedule analysis activities using approved tools and processes.
- Develop white papers as necessary to document key findings.

- All research will be performed with the full rigor of a systems analysis requiring clear problem identification, evaluation of alternatives, analytical assessments as necessary to evaluate alternatives, and report findings.

2.24 Subelement CK – VI Chief Architecture

Provide support to the VI Chief Architect by:

- Representing VI at engineering level and management level meetings.
- Evaluating integrated LV performance estimating and control processes.
- Presenting integrated LV analyses.
- Configuring analyses in support of trade studies.
- Supporting architecture studies and strategic planning to develop concepts and prove approaches.
- Performing assessments of LV architecture feasibility, capability, design, performance, risks, and resource requirements via trade studies and analysis.

Work will be performed using standard office automation software including MS Project, Access, Excel, PowerPoint, and Word as well as appropriate SE tools and modeling software. The products delivered will be provided in formats defined by VI. Project schedule inputs will be provided to the ESTS Group by VI and the various Program/Project/Element Offices.

2.25 Subelement CM – APO Strategic Planning

Provide strategic planning support to APO by:

- Research Constellation Program and Ares Project materials and conduct interviews with Project Managers to identify successes and key technologies related to the program/project.
- Compile and analyze the identified Constellation successes and key technologies for potential relevance to key stakeholders using a recently developed set of stakeholder values.
- Develop a platform of matched values and then recommend the creation of messaging that will resonate with key stakeholders.
- Provide recommendations for future strategic planning and perspectives to refine communication strategies for MSFC's future space exploration activities.

3.0 Discussion of Skills Required

3.1 Subelement BA – FS PM Technical Coordination

This task requires excellent writing, communication, and analytical skills. Personnel should have extensive engineering knowledge of system requirements development, and integration. Personnel shall also be experienced in database management, project planning, and PM. Personnel shall have access to and experience with tools accessible on the ICE portal. Personnel should possess a proficiency in MS Office tools (Project, Word, Excel, PowerPoint, Project, Access and Filemaker Pro); and a working knowledge of NASA documentation (NPR 7120.5, etc.).

3.2 Subelement BB – FS Operations and Ground Test

The Project Engineering Operations and Ground Test personnel supporting this task need to have (b)(4) (b)(4) The task personnel should also have excellent knowledge of NASA and/or DoD processes and procedures.

3.3 Subelement BC – FS Parachute SME

This task requires a (b)(4) (b)(4) Subcontractor shall provide personnel who are experienced and highly qualified in the development and testing of parachute systems as well as the separation and recovery of flight hardware.

3.4 Subelement BD – FS TVC Avionics

(b)(4) [redacted]

3.5 Subelement BE – FS Planning / EVM

(This technical effort did not continue from 45-000001, Rev. 01.)

3.6 Subelement BF – FS Integration SME

Contractor personnel shall have (b)(4) [redacted] (b)(4) [redacted] (b)(4) [redacted] Personnel shall also be experienced and highly qualified in LV design, requirements definition, ground and system testing, interface verification, system integration, and test and checkout.

3.7 Subelement BG – US Project Planning / Integration

This task requires excellent writing, communication, and analytical skills.

- Experience Level: Personnel shall have (b)(4) [redacted] (b)(4) [redacted] Experience with risk analysis and RM is desirable. Personnel shall have experience with tools accessible on the ICE portal. Personnel should possess a proficiency in MS Office tools (Project, Word, Excel, PowerPoint, Project, Access and Filemaker Pro), and a working knowledge of NASA documentation. Education Level: (b)(4) [redacted]
- Experience Level: The Technical Coordination/Data Specialist personnel supporting this task need to have (b)(4) [redacted] (b)(4) [redacted] Technical Coordination/Data Specialist personnel should also have excellent knowledge of NASA and/or DoD processes and procedures. Education Level: (b)(4) [redacted]
- Experience Level: The Contract Officer Technical Representative support requires skills utilizing MS Office and familiarity with PC based software systems. Must have an analytical and problem solving skill set and be adept at comprehension of detailed technical documentation. Education Level: College course work in pursuit of a degree in business or engineering with an emphasis on procurement operations and contract management is preferred.

3.8 Subelement BH – US Project Engineering

This task requires PM expertise, analytical capabilities as well as creative skills, especially in the area of discerning technical issues and communicating them to upper level management. This task requires excellent writing, communication, integration, and analytical skills.

- Experience Level: (b)(4) [redacted] (b)(4) [redacted] (b)(4) [redacted] Proved experience in SE, Team Leadership and PM is required. Experience with NASA and DoD is highly desired. Excellent technical writing skills and the ability to deliver high impact technical presentations are required. Experience in participation and leadership of design reviews, strategic planning, project scheduling, and engineering planning is desired. Training and/or certification in PM and EVM is desired.
- Experience Level: (b)(4) [redacted] (b)(4) [redacted] (b)(4) [redacted] Personnel must possess a proficiency in MS Office tools (Project, Word, Excel, PowerPoint, Project, Access and Filemaker Pro) and a working knowledge of NASA documentation (NPR 7120.5, etc.). Experience with meeting

coordination and facilitation, schedule input coordination and integration, and risk analysis and RM is desirable. Personnel shall have experience with tools accessible on the ICE portal. Education Level: (b)(4) [redacted]

3.9 Subelement BI – US Integrated Operations and Logistics

- Experience Level: (b)(4) [redacted] (b)(4) [redacted] (b)(4) [redacted] Proven experience in Team Leadership and PM is required. Experience with NASA and DoD is highly desired. Excellent technical writing skills and the ability to deliver high impact technical presentations are required. Experience in participation and leadership of design reviews, strategic planning, project scheduling and engineering planning is desired. Training and/or certification in PM and EVM is desired.

3.10 Subelement BJ – USEng Project Engineering

- PM Technical Coordination Support: This task requires excellent writing, communication, and analytical skills. Personnel should have extensive engineering knowledge of system requirements development, and integration. Personnel shall also be experienced in database management, project planning, and PM. Personnel shall have access to and experience with tools accessible on the ICE portal. Personnel should possess a proficiency in MS Office tools (Project, Word, Excel, PowerPoint, Project, Access and Filemaker Pro); and a working knowledge of NASA documentation (NPR 7120.5, etc.).
- Project / SE**:** The Project Engineering personnel supporting this task should have excellent knowledge of NASA and/or DoD processes and procedures in the areas of RM, SE, liquid engine propulsion systems, and component and systems level testing. Personnel shall have access to and experience with tools accessible on the ICE portal. Personnel should possess a proficiency in MS Office tools (Project, Word, Excel, PowerPoint, Project, Access and Filemaker Pro); and a working knowledge of NASA documentation (NPR 7120.5, etc.). (b)(4) [redacted]

3.11 Subelement BK – USEng IMS

IMS Support: The senior personnel supporting this task shall (b)(4) [redacted] (b)(4) [redacted] (b)(4) [redacted] Personnel shall have a thorough comprehension of planning and scheduling of NASA projects as well as an understanding of the application of CPM scheduling principles, concepts, and techniques. Experience in cost & schedule integration through resource loading and leveling of schedules and the use of EVM techniques to perform schedule performance assessments is required. Expertise in the development of project-level as well as subsystem-level schedules is required. Personnel are required to be self motivated team players familiar with working in a dynamic work environment.

3.12 Subelement BL – USEng Nozzle SME

NE Support: This task requires at least one person with (b)(4) [redacted] (b)(4) [redacted] Subcontractor shall provide personnel who are experienced and highly qualified in NE design and development.

3.13 Subelement BM – USEng PP&C

(This technical effort did not continue from 45-000001, Rev. 01.)

3.14 Subelement CA – PP&C US Schedule

Senior personnel (b)(4) [redacted] Personnel shall have a thorough comprehension of planning and scheduling of NASA projects as well as an understanding of the application of Critical Path Method (CPM) scheduling principles, concepts, and techniques. Experience in cost & schedule integration through resource loading and leveling of schedules and the use of EVM techniques to perform schedule performance assessments is required. Expertise in the development of project-level as well as subsystem-level schedules is required. Personnel are required to be self-motivated team players familiar with working in a dynamic work environment.

3.15 Subelement CB – PP&C FITO Integrated Schedule

Senior personnel (b)(4) [redacted] Personnel shall have a thorough comprehension of planning and scheduling of NASA projects as well as an understanding of the application of CPM scheduling principles, concepts, and techniques. Experience in cost & schedule integration through resource loading and leveling of schedules and the use of EVM techniques to perform schedule performance assessments is required. Experience with flight test programs is desired. Personnel are required to be self-motivated team players familiar with working in a dynamic work environment.

3.16 Subelement CC – VI AIVST Project Engineering

Personnel providing avionics and software engineering support (b)(4) [redacted] These personnel shall also have a background in avionics and software system planning, design analysis, SE, requirement assessment, feasibility studies, experience working in a PO environment as well as knowledge of relevant NASA programs, capabilities, and culture. The (b)(4) [redacted]

All task personnel shall possess excellent written, communication, and analytical skills as well as a proficiency in MS Office tools (Project, Word, Excel, PowerPoint, Project, and Access) and a working knowledge of NASA documentation. Skills and experience with tools accessible on the ICE portal are highly desired.

3.17 Subelement CD – VI AIVST Integration and SIL

Personnel shall have a (b)(4) [redacted] Excellent written and verbal communication skills are required. Personnel are required to be self-motivated team players familiar with working in a dynamic work environment.

3.18 Subelement CE – VI Systems Engineering and Requirements Traceability

Required skills/experience:

- Ability to work independently or as part of a team to support SE tasks.
- Excellent oral and written communication skills.
- Proficiency in MS Office tools (Project, Word, Excel, PowerPoint).
- Proficiency with the Cradle requirements database.
- Familiarity with relevant NASA programs.
- Technical positions: (b)(4) [redacted]

3.19 Subelement CF – VI Systems Management and Project Analysis

Personnel shall have (b)(4) (b)(4)

Required skills/experience:

- Thorough knowledge of project planning, process development, and information and DM tools.
- Coordinating and facilitating the resolution of technical and programmatic issues/actions.
- Proficiency using MS Office tools (Word, Excel, PowerPoint, and Project) to develop and analyze management status reports and prepare/present project level presentations.
- Understanding of schedule integration, meeting facilitation, and risk analysis.
- Excellent interpersonal, written, and communication skills.
- Experience collaborating with multiple functional groups.

Desired skills/knowledge:

- Familiarity with ICE portal tools.
- Working knowledge of documentation maintenance processes.
- Familiarity with access control processes/procedures.
- Strong analytical and organizational skills.
- Understanding of Product Lifecycle Management (PLM) techniques.

Personnel should have relevant experience working within an integrated LV project office and a versatile knowledge of a PM office environment. Personnel must possess the ability to make rational decisions and exercise good judgment, and must be able to take initiative and work independently with minimal supervision.

3.20 Subelement CG – VI Data and Information Management

Junior personnel shall have a minimum (b)(4) (b)(4)

Experience with NASA software systems, familiarity with Data Management systems, and knowledge of product, document, and information sharing is expected. Personnel shall have broad experience in providing IT support (i.e. knowledge of databases and programming languages) and shall possess excellent organizational and analytical skills.

Personnel shall have proven experience in the support of major NASA or other government and industry system management and project development efforts. Personnel shall provide the proper balance of experienced analysts and information technologists with necessary programming capabilities to support the needs of the assigned project teams.

Experience with management research, design, and implementation of best practices is highly desired. Excellent written and verbal communication skills are required. Personnel are required to be self-motivated team players familiar with working in a dynamic work environment.

3.21 Subelement CH – GVT for Vehicle Systems and Integrated Vehicle Development

To accomplish the tasks identified herein requires an educated, experienced, and trained team with the skills, experience, and education noted below:

- Ability to work independently and in a team environment. This includes working with multiple NASA centers and participating contractors.
- Oral and written communication skills capable of presenting subject matter to all size audiences.

- Proficiency in MS Office tools (Word, Excel, PowerPoint, Project, and Access) and Adobe Acrobat.
- Ability to use e-tools such a Windchill™ and WebEx to communicate over the Internet.
- Familiarity with NASA programmatic and SE policies (i.e. – NPR 7120.5D, Program and PM, and NPR 7123.1A, SE Processes)
- All tasks will require expertise by senior and principle systems engineers.

(b)(4)

3.22 Subelement CI – Vehicle Test, Technology, and Integration Systems Engineering

To accomplish the tasks identified herein requires an educated, experienced, and trained team with the skills, experience, and education noted below:

- Ability to work independently and in a team environment. This includes working with multiple NASA centers and participating contractors.
- Oral and written communication skills capable of presenting subject matter to all size audiences.
- Proficiency in MS Office tools (Word, Excel, PowerPoint, Project, and Access) and Adobe Acrobat.
- Ability to use e-tools such a Windchill and WebEx to communicate over the Internet.
- Familiarity with NASA programmatic and SE policies (i.e. – NPR 7120.5D, Program and PM, and NPR 7123.1A, SE Processes).

(b)(4)

3.23 Subelement CJ – Dynamic Test Planning

To accomplish the tasks identified herein requires an educated, experienced, and trained team with the skills, experience, and education noted below:

- Ability to work independently and in a team environment. This includes working with multiple NASA centers and participating contractors.
- Oral and written communication skills capable of presenting subject matter to all size audiences.
- Proficiency in MS Office tools (Word, Excel, PowerPoint, Project, and Access) and Adobe Acrobat.
- Ability to use e-tools such a Windchill™ and WebEx to communicate over the Internet.
- Familiarity with NASA programmatic and SE policies (i.e. – NPR 7120.5D, Program and PM, and NPR 7123.1A, SE Processes)
- All tasks will require expertise by senior and principle systems engineers.

(b)(4)

3.24 Subelement CK – VI Chief Architecture

Task personnel will include senior level degreed engineers as well as senior level degreed SMEs with experience working within a design team and with leadership experience in a dynamic, controls, SE, and analysis environment.

Personnel will provide support, which includes advising, mentoring in concept and requirements definitions, SE, program cost and schedule projections, and availability and application of advanced technologies. This effort will include attending program meetings and reviews, preparing comments and recommendations on technical approaches, and participating in the selection and implementation of design and technical approaches to meet baseline architectures and plans for LVs. This includes serving on Independent Assessment teams and working specific actions from senior managers. Personnel will interface, as requested, with other contractor and community leaders to provide information to advocate the exploration program approaches. Excellent written and verbal communication skills are critical. Personnel are required to be self-motivated team players familiar with working in a high-profile and dynamic work environment.

- (b)(4)

  (b)(4) Expertise in the area of real-time spacecraft mission operations, writing and researching technical documents. Previous leadership and technical management experience is required.
- (b)(4)

  Expertise in the area of ascent flight SE integration, flight mechanics, induced environments, aerodynamics, SRMs, solid propulsion, and integrated performance analysis of human-rated LVs is required. Personnel will be expected to deliver consultations and recommendations based on historical LV data and previous experience.
- (b)(4)

  Expertise in the area of ascent flight SE integration, liquid stages, liquid propulsion, rocket

engines, and integrated performance analysis of human-rated LVs is required. Personnel will be expected to deliver consultations and recommendations based on historical LV data and previous experience.

3.25 Subelement CM – APO Strategic Planning

(b)(4)

(b)(4) Excellent written and verbal communication skills are required. Personnel are required to be self-motivated team players familiar with working in a dynamic work environment.

4.0 Special Tools Required

4.1 Subelement BA / BB / BC / BD / BF / BG / BH / BI / BJ / BK / BL / CA / CB / CC / CD / CE / CF / CG / CH / CI / CJ / CK / CM

None.

5.0 Participating Subcontractors

(b)(4)

(b)(4)

[redacted]

6.0 Milestones & Deliverables

6.1 Subelement BA / BB / BC / BD / BF

- MARs.
- Project / Element products (presentations, reports, plans, etc.).

6.2 Subelement BG / BH / BI

- MARs.
- Project / Element products (presentations, reports, plans, etc.).
- PM assessments, as needed.

6.3 Subelement BJ / BK / BL

- MARs / J-2X Schedule and Critical Path Assessment Report.
- Others as negotiated with customer.

6.4 Subelement CA /CB

- MARs.
- Schedule updates, analyses, schedule health checks performance audits, and IMS & schedule reports.
- Project / Element products (presentations, reports, plans, etc.).

6.5 Subelement CC / CD

- MARs.
- Schedule updates, analyses, schedule health checks performance audits, and IMS & schedule reports.
- Project / Element products (presentations, reports, plans, etc.).
- Others as negotiated with customer.

6.6 Subelement CE

- MARs.

- Project products (system requirements development and analysis etc.).
- PM Assessments.

6.7 Subelement CF / CG

- MARs.
- Project products (presentations, reports, plans, recommendations, assessments, white papers, summary documentation etc.).
- Others as negotiated with customer.

6.8 Subelement CH / CI / CJ

- Prepare white papers.
- Generate test documentation.

6.9 Subelement CK

- Analyses and reports as needed to meet project and program milestone reviews.
- Monthly reports of activity and accomplishments are required.

6.10 Subelement CM

- Compilation of identified successes and key technologies
- Categorization and ranking of the identified successes and key technologies.
- Translation of the specific program/project successes and technologies descriptions into non-engineering driven verbiage.
- Proposed messaging for the identified successes and key technologies that will resonate with key stakeholders.
- Recommendations for future strategic planning and perspectives to refine communication strategies for MSFC's future space exploration activities.

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

7.1 Subelement BA

Travel: Estimated cost is to support major milestone reviews, TIMs, and offsite meetings as required by the customer.

7.2 Subelement BB

Travel: Estimated cost is to support major milestone reviews, TIMs, Ops reviews, and offsite meetings as required by the customer.

7.3 Subelement BC / BD / BF

Not applicable.

7.4 Subelement BG

Travel: Estimated cost is to support major milestone reviews, TIMs, and offsite meetings as required by the customer.

7.5 Subelement BH

Travel: Estimated cost is to support major milestone reviews, TIMs, and offsite meetings as required by the customer.

7.6 Subelement BI

Travel: Estimated cost is to support major milestone reviews, TIMs, and offsite meetings as required by the customer.

7.7 Subelement BJ

Travel: Estimated costs are required to support TIMs, testing, milestone reviews, and face-to-face meetings at Stennis Space Center (SSC), KSC, and vendors, as well as trips to and from the PC sites.

7.8 Subelement BK / BL

Not applicable.

7.9 Subelement CA

Not applicable.

7.10 Subelement CB

Travel: Estimated cost is to support major milestone reviews, TIMs, and offsite meetings as required by the customer.

7.11 Subelement CC

Travel: Estimated cost is to support major milestone reviews, TIMs, and offsite meetings as required by the customer.

ODC: Estimated costs are included for registration fees associated with training and/or conference attendance.

7.12 Subelement CD

Not applicable.

7.13 Subelement CE

Travel: Estimated cost is to support major milestone reviews, TIMs, and offsite meetings as required by the customer.

ODC: Estimated costs are included for registration fees associated with training and/or conference attendance.

7.14 Subelement CF / CG / CH

Not applicable

7.15 Subelement CI

Travel: Estimated cost is to the JANNAF conference and other offsite meetings as required by the customer.

ODC: Estimated costs are included for registration fees associated with training and/or conference attendance

7.16 Subelement CJ / CK / CM

Not applicable.

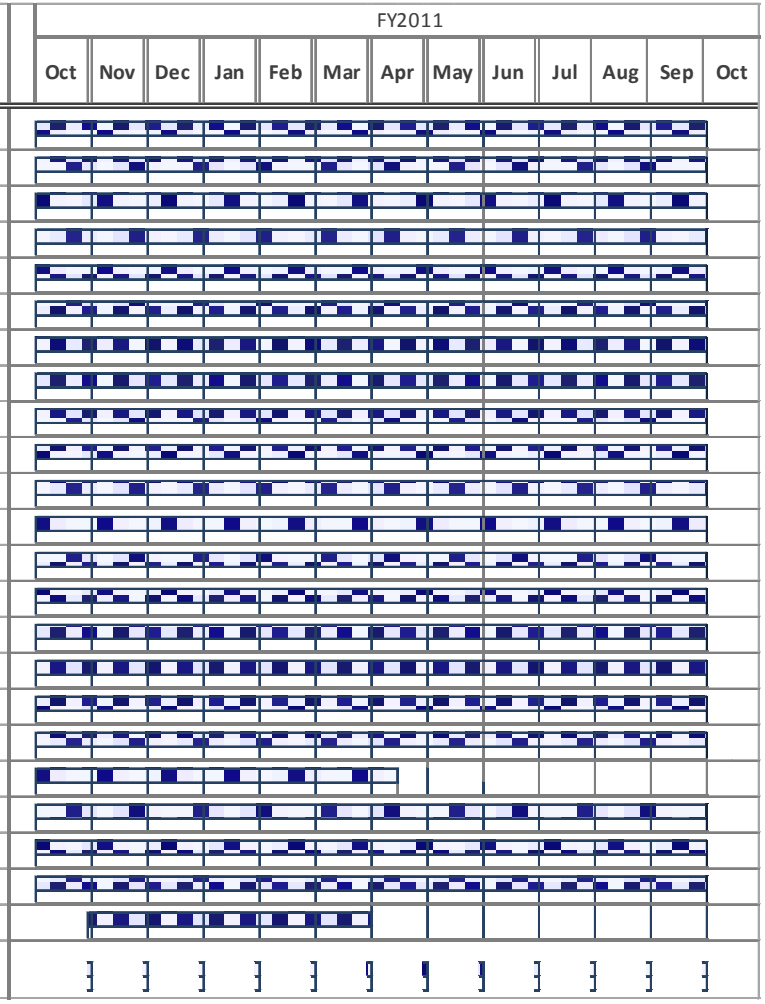
8.0 Work Shelf

The following activities could be accomplished as part of the TO 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 #	Sub-element	Task Work Element
45-000003	BA	FS Project Management Technical Coordination
	BB	FS Operations and Ground Test
	BC	FS Parachute SME
	BD	FS TVC Avionics
	BF	FS Integration SME
	BG	US Project Planning / Integration
	BH	US Project Engineering
	BI	US Integrated Operations and Logistics
	BJ	USEng Project Engineering
	BK	USEng IMS
	BL	USEng Nozzle SME
	CA	PP&C US Schedule
	CB	PP&C FITO Integrated Schedule
	CC	VI AIVST Project Engineering
	CD	VI AIVST Integration and SIL
	CE	VI Systems Engineering and Requirements Traceability
	CF	VI Systems Management and Project Analysis
	CG	VI Data and Information Management
	CH	GVT for Vehicle Systems and Integrated Vehicle
	CI	Vehicle Test, Technology, and Integration Systems
	CJ	Dynamic Test Planning
	CK	VI Chief Architecture
	CM	APO Strategic Planning
	-	Monthly Activity Reports (MARs)



ESTS Contract Task Order Request Performance Plan

Task Order Title: Constellation Support to Ares Projects Office

Task Order Number: 45-000003 Revision: 02

Category	Weighting Technical %	End of Period Technical Score
Technical Objectives	60%	X 60% = 0.00
		Justification
1) Provide project management, project engineering, and systems engineering support to the APO Manager's Office and the individual APO elements of the Ares I Project.		
Schedule Objectives (Milestones)	**Weighting Schedule %** 15% *(min 10%)*	**Schedule Score** X 15% = 0.00
		Justification
1) Monthly Activity Reports 2) Program/Project documentation (presentations, reports, plans, white papers, schedules, etc.) developed to meet schedules for APO Manager's Office and the individual APO elements of the Ares I Project.		
Cost (actual vs. negotiated)	**Weighting Cost%** 25% *(min.25%)*	**Cost Score** X 25% = 0.00
		Justification
	Weighting Total % 100.00%	**Total Score** **0.00**

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 Ares Projects Office

Task Order Number: 45-000003 Revision: 02

Comments:

Marshall Space Flight Center
Engineering, Science & Technical Services

JACOBS ESTS Group

Risk Assessment

Contract Number: *NNM05AB50C*
TO Title: *Constellation Support to Ares Projects Office*
TO Number: *45-000003* **Revision:** *02*

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

MSFC Initiator: *Melanie Aldridge (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			None Identified
Risk C2	Cost			
Risk T1	Technical			None Identified
Risk T2	Technical			
Risk S1	Schedule			None Identified
Risk S2	Schedule			

*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