

**Statement of Work
For
NASA/MSFC/Engineering Directorate
Engineering Technical Management Office Support**

1.0 Scope

The Contractor shall provide systems engineering support to the Engineering Directorate at Marshall Space Flight Center (MSFC). The Contractor shall provide support for, but not limited to, the development of space and vehicle systems engineering products, tasks and activities.

The Contractor shall provide specialized systems engineering services and expertise for space and vehicle systems elements such as, but not limited to: integrated systems and subsystems technical hardware/software requirements, design, test and verification; vehicle and subsystems development and analyses; systems engineering and integration; identify hardware / software systems requirements, verification and interface issues; systems engineering tools/database support; configuration/data management and data architecture; product lifecycle management/product data management and coordination/support to engineering planning and the technical review processes.

The Contractor shall participate in various technical working group meetings, interface with the systems integration groups, and participate in monthly reviews and/or telecons to collect the required information for supporting these task processes.

2.0 Task Order Management and Reporting

A. Contract Management

The Contractor shall provide the planning, coordination, technical direction, and surveillance of the activities necessary to assure disciplined performance of work and timely application of resources for the accomplishment of all tasks issued under the order. The Contractor shall be responsible for maintaining communication with each supported organization and alerting the Contract Specialist immediately of any problems that shall prevent meeting established milestones.

B. Data Deliverables

The Contractor shall report and document this work and fulfill the requirements of associated Data Requirement Descriptions (DRD's) as outlined in Data Procurement Document (DPD) 1334 (Attachment J-2). The Contractor shall determine the data restriction that applies to each data deliverable and mark or transmit the data restriction in accordance with section 2.3.3 of the Data Procurement Document.

1. The Contractor shall submit a Monthly Progress Report in accordance with DRD 1334MA-003. Any presentation, reports, analyses or technical memorandum that is developed during the execution shall be pre-coordinated with the Task Order Monitor and final copies provided to the Task Order Monitor.

The Contractor shall provide NASA with necessary information on project progress to allow the Government to monitor product assurance, identify significant problems, and implement corrective action as applicable based on the Contractor's performance.

The Contractor shall develop and maintain a Work Breakdown Structure (WBS) defining all task elements contained in this Task Order and in accordance with established contract rates per hours worked.

2. The Contractor shall submit a Badged Employee and Remote IT User Listing in accordance with DRD 1334MA-001.
3. The Contractor shall submit a Contractor Employee Clearance Document in accordance with DRD 1334MA-002.
4. The Contractor shall submit a Position Risk Designation for Non-NASA Employee in accordance with DRD 1334MA-004.
5. The contractor shall establish and implement an industrial safety, occupational health, and environmental program that (1) prevent employee fatalities, (2) reduce the number of incidents, (3) reduce the severity of employee injuries and illnesses, and (4) protect the environment through the ongoing planning, implementation, integration and management control of these programs in accordance with DRD 1334SA-001. The SHE Plan shall address each of the following MSFC SHE core program requirements in detail that are applicable to the contracted effort and include a matrix that identifies where each requirement is addressed:
 - a. Management leadership and employee involvement.
 - b. Worksite analysis.
 - c. Hazard prevention and control.
 - d. Safety, health and environmental training.
6. The contractor shall report mishaps and safety statistics to the MSFC Industrial Safety Branch in accordance with DRD 11334SA-002. The contractor shall submit direct to the NASA Incident Reporting Information System (IRIS) or shall use the forms listed in section 15.4 of DRD 1334SA-002 or electronic equivalent to report mishaps and related information required to produce the safety metrics.

3.0 Technical Requirements

The Contractor shall provide specialized systems engineering services in requirements generation and analyses, systems engineering and integration, verification processes and system performance requirements verification, interface requirements development, test and verification planning, systems engineering tools support and support to the technical review process.

The Contractor shall provide strategic and engineering planning department technical managements. The Contractor shall be responsible for technical inputs to risk management, configuration and data management, review planning, trade study planning and general systems engineering (SE) process definition management and SE functions.

3.1 NASA MSFC Ares Project Vehicle Integration – Closed June 2010

The objective of this subtask is to provide systems engineering services for the support of the following activities. Cradle Engineering Support: The contractor shall review current Constellation (CxP) Cradle database schema and other information to a level of effort to support the MSFC Ares Projects to understand and provide recommendation for resolving issues with the configuration, utilization and data management issues relating to Cradle, the systems engineering and requirements management tool. As part of this effort the contractor shall develop forms/tool requirements for input into the ARES Level 3 data architecture as a means to develop formal data architecture requirements with Constellation Level 2. This effort provides the day to day support and coordination for the Product Management Office, on behalf of the Constellation Ares Project Office.

Information Technology/Knowledge Management Engineering Support: The contractor shall provide expertise and support for the Ares Data Architecture integration activity. The contractor shall support the development, implementation, and maintenance of data systems processes, procedures and tools such as SE&I data management, Product Data Management/Product Lifecycle Management (PDM/PLM), Knowledge Management, IT integration, and data surveillance processes.

Configuration and Data Management Engineering Support: The contractor shall provide expertise and support for the overall Ares Configuration and Data Management (CDM) activity, including: support the development, implementation, and maintenance of CDM processes and tools such as change package management, data management, Data Requirement/Data Project Description (DR/DPD) development and management, Requirements Identification Document (RID) tools & processes for major design reviews, action item management, records management, IT integration, product development, and audits and standards. In addition, the contractor shall support and assist the project and engineering team with: technical and management tasks, milestones and product planning to meet the project overall schedules and planning, facilitate tracking of products in a common approach/process/procedure for the identification, storage, and retrieval of data products, review applicable MSFC/NASA documents that relate to systems engineering and integration activities with configuration data management activities, provide inputs to the

development of and maintenance of common data structure to accommodate collection, storage, retrieval, and archiving of data including, but not limited to, analyses, reports, non-configuration items, etc.

Software Configuration and Data Management Engineering Support: The contractor shall provide the necessary expertise in Software Configuration management (SCM) to support ED10/ED11. The effort shall address programmatic, technical and managerial constructs required to define, plan and institute a comprehensive SCM approach that will support the SCM requirements, planning and execution for the Ares Project.

3.2 NASA MSFC Ares Project Upper Stage SE&I

The objective of this subtask is to provide systems engineering services for the support of the following activities. **Cradle Engineering Support:** The contractor shall review current Constellation (CxP) Cradle database schema and other information to a level of effort to support the MSFC Ares Projects to understand and provide recommendation for resolving issues with the configuration, utilization and data management issues relating to Cradle, the systems engineering and requirements management tool. As part of this effort the contractor shall develop forms/tool requirements for input into the ARES Level 3 data architecture as a means to develop formal data architecture requirements with Constellation Level 2. This effort provides the day to day support and coordination for the Product Management Office, on behalf of the Constellation Ares Upper Stage SE&I Office.

Information Technology/Knowledge Management Engineering Support: The contractor shall provide expertise and support for the Ares Data Architecture integration activity. The contractor shall support the development, implementation, and maintenance of data systems processes, procedures and tools such as SE&I data management, Product Data Management/Product Lifecycle Management (PDM/PLM), Knowledge Management, IT integration, and data surveillance processes.

Configuration and Data Management Engineering Support: The contractor shall provide expertise and support for the overall Ares Configuration and Data Management (CDM) activity, including: support the development, implementation, and maintenance of CDM processes and tools such as change package management, SE&I data management, Data Requirement/Data Project Description (DR/DPD) development and management, Requirements Identification Document (RID) tools & processes for major design reviews, action item management, records management, IT integration, product development, and audits and standards. In addition, the contractor shall support and assist the project and engineering team with: technical and management tasks, milestones and product planning to meet the project overall schedules and planning, facilitate tracking of products in a common approach/process/procedure for the identification, storage, and retrieval of data products, review applicable MSFC/NASA documents that relate to systems engineering and integration activities with configuration data management activities, provide inputs to the development of and maintenance of common data structure to accommodate collection, storage, retrieval, and archiving of data including, but not limited to, analyses, reports, non-configuration items, etc.

3.3 MSFC Science & Engineering Support

The objective of this sub-task is to obtain the services of, to provide impartial assessments of established milestones and product methodologies, technical and management expertise as a Project Engineer, and to coordinate between organizations for the development of a configuration plan, and to be the Project Liaison for the Internal Chief of Operations. Specific task requirements may include:

- The contractor shall assist the project and engineering team, with technical and management tasks, milestones and product planning to meet the project overall schedules and planning.
- The contractor will facilitate tracking of products in a common approach/process/procedure for the identification, storage, and retrieval of data products.
- The contractor shall review applicable MSFC/NASA documents that relate to systems engineering and integration activities with configuration data management activities.
- The contractor shall determine areas of MSFC documents that are unclear and/or need revising to ensure all required activities are achievable.
- The contractor shall provide inputs to the program's integration requirements, and documentation.
- The contractor shall provide inputs to the development of and maintenance of common data structure to accommodate collection, storage, retrieval, and archiving of data including, but not limited to, analyses, reports, non-configuration items, etc.
- The contractor shall support various system engineering and integration technical meetings.

3.4 Ares V Project Coordination

The objective of this sub-task is to obtain the services of, to provide impartial assessments of established milestones and product methodologies, technical and management expertise as an Ares V Project Engineer, and to coordinate between organizations for the development of a configuration plan, and to be the Project Liaison for the Internal Chief of Operations. Specific task requirements may include:

- The contractor shall assist the project and engineering team, with technical and management tasks, milestones and product planning to meet the project overall schedules and planning.
- The contractor will facilitate tracking of products in a common approach/process/procedure for the identification, storage, and retrieval of data products.
- The contractor shall review applicable MSFC/NASA documents that relate to systems engineering and integration activities with configuration data management activities.
- The contractor shall determine areas of MSFC documents that are unclear and/or need revision to ensure all required activities are achievable.

- The contractor shall provide inputs to the program's integration requirements, and documentation.
- The contractor shall provide inputs to the development of and maintenance of common data structure to accommodate collection, storage, retrieval, and archiving of data including, but not limited to, analyses, reports, non-configuration items, etc.
- The contractor shall support various system engineering and integration technical meetings scheduling, notifying, documenting of detailed technical minutes and tracking actions and distribution of minutes for Ares V design analysis teams.

3.5 ECLSS Rack CDM Support

The Contractor shall provide systems engineering support to the Marshall Space Flight Center (MSFC) Engineering Directorate. This shall include, but not limited to, the Engineering Technical Management Division. The Contractor shall provide development support for International Space Station (ISS), Environmental Control Life Support Systems (ECLSS) of National Aeronautics and Space Administration (NASA).

The Contractor shall provide specialized systems engineering services in requirements generation and analyses, systems engineering and integration, verification processes and system performance requirements verification, interface requirements development, test and verification planning, systems engineering tools support and support to the technical review process for ISS for ECLSS Rack data handover.

The Contractor shall provide strategic and engineering planning for ISS elements such as, but not limited to, ECLSS. The Contractor shall be responsible for technical inputs to risk management, configuration and data management, review planning, trade study planning and general systems engineering (SE) process definition management and SE functions.

The Contractor shall participate in Technical Working Group (TWG) meetings, Technical Interface Meetings (TIMs) interface with the System Integration Groups (SIG), and participate in monthly reviews and/or telecons to collect the required information for supporting this task process.

The following task(s) are for ECLSS Configuration and Data Management activities: The contractor shall provide expertise and support for overall ECLSS Configuration and Data Management (CDM) activity. Support the development, implementation, and maintenance of CDM processes and tools such as change package management, program data management, data Requirement/Data Project Description (DR/DPD) development and management, Requirements Identification Document (RID) tools & processes for major design reviews, action item management, records management, IT integration, product development, and audits and standards. Maintain the C&DM Plan per MPR 8040.1. Provide CM support to the ECLSS FCA/PCAs in accordance with MPR 8040.1.

- Support and facilitate Acceptance Reviews and Project Closeouts.
- Compile and review CM-related sections of the ADP.
- Perform final CM evaluation to ensure the readiness of accepting the end items.

Support the development of C&DM IT Tool/System/Automation requirements coordination.

- The objective of this task is to provide lessons learned and inputs to the development of and maintenance of common data structure. This data structure will be used to accommodate collection, storage, retrieval, and archiving of data including, but not limited to, analyses, reports, non-configuration data items, and digitizing and indexing individual page documents.
- IT Access to optimize a multitude of server access to utilize the CM system deliverable.

3.6 PCH Engineering Support (CMO)

Specific task requirements may include:

- Develop and/or require that all handling and moving plans are being addressed and that the PCH Project Engineer is notified of the timeframe for the planned activity.
- Develop one master transportation and handling schedule.
- Coordinate and document the interfaces between contractors and MSFC for handling of PCH and/or oversized hardware when delivered to MSFC.
- Oversee the design and fabrication requirements, insuring that they include the preparation and implementation of detailed handling and moving plans for the hardware.
- Review plans that have details for packaging, handling, and moving PCH for compliance with MSFC MWI6410.1.
- Review and recommend for approval the design of all special loading and handling equipment, test fixtures, special shipping containers, tooling, and support hardware required in the offloading, loading, transporting, and Installation of PCH.
- Assist the Government Technical Manager in the certification of personnel and equipment. The handling/moving and assembly of Program Critical Hardware within the organization's operational perimeters (test stands, test fixtures, buildings, etc.) whenever the move is incidental to the test or work is being performed on the hardware.

3.7 NASA MSFC ED Space and Vehicle Systems Support

(Authorization to proceed with this subtask will be provided by the Contracting Officer in written direction.)

The objective of this subtask is to provide systems engineering services for the support of the following activities. Requirements management tool Engineering Support: The contractor shall review current requirements management tool database schema and other information to a level of effort to support the MSFC space and vehicle systems to understand and provide recommendation for resolving issues with the configuration, utilization and data management issues relating to the systems engineering and requirements

management tool. As part of this effort the contractor shall develop forms/tool requirements for input into the space and vehicle systems data architecture as a means to develop formal data architecture requirements. This effort provides the day to day support and coordination for the Product Management Office, on behalf of space and vehicle systems directives.

Information Technology/Knowledge Management Engineering Support: The contractor shall provide expertise and support for the space and vehicle systems Data Architecture integration activity. The contractor shall support the development, implementation, and maintenance of data systems processes, procedures and tools such as SE&I data management, Product Data Management/Product Lifecycle Management (PDM/PLM), Knowledge Management, IT integration, and data surveillance processes.

Configuration and Data Management Engineering Support: The contractor shall provide expertise and support for the overall space and vehicle systems Configuration and Data Management (CDM) activity, including: support the development, implementation, and maintenance of CDM processes and tools such as change package management, data management, Data Requirement/Data Project Description (DR/DPD) development and management, Requirements Identification Document (RID) tools & processes for major design reviews, action item management, records management, IT integration, product development, and audits and standards. In addition, the contractor shall support and assist the project and engineering team with: technical and management tasks, milestones and product planning to meet the project overall schedules and planning, facilitate tracking of products in a common approach/process/procedure for the identification, storage, and retrieval of data products, review applicable MSFC/NASA documents that relate to systems engineering and integration activities with configuration data management activities, provide inputs to the development of and maintenance of common data structure to accommodate collection, storage, retrieval, and archiving of data including, but not limited to, analyses, reports, non-configuration items, etc.

Software Configuration and Data Management Engineering Support: The contractor shall provide the necessary expertise in Software Configuration management (SCM) to support ED10/ED11. The effort shall address programmatic, technical and managerial constructs required to define, plan and institute a comprehensive SCM approach that will support the SCM requirements, planning and execution for space and vehicle systems.

4.0 Travel

The contractor shall travel as requested to accomplish each technical requirement. Any travel must be approved by the Contractor Officer's Technical Representative (COTR) or task order technical monitor, prior to travel.

The contractor's monthly report shall contain travel detail to include travel destination, dates of travel, number of people who traveled, and purpose of the travel.

5.0 Materials

No materials are currently required for this order. However, this may change based on the customer's requirements as directed by the Contractor Officer's Technical Representative (COTR) or task order technical monitor. Any materials being purchased must be approved by the Contracting Officer prior to purchase.

6.0 Reserved

7.0 Personnel Skill Levels

The Contractor shall provide skills at a level to perform the subtasks in this order.

8.0 Technical Milestones and Deliverables

Specified under Section 2.B of the SOW; any additional deliverables for specific subtasks are specified under Section 3.0.