

**Statement of Work (SOW)
For
Ares Projects Office (APO) Integration and Senior Engineering Support**

1.0 OBJECTIVE:

1.1 As part of the Vision for Space Exploration (VSE), NASA is developing the Ares I with a first human launch no later than 2014. Marshall Space Flight Center (MSFC) provides overall management for the design, development, test, evaluation, and integration of the Ares I launch vehicle.

1.2 The Ares Projects Office (APO) is responsible for the space launch architecture within the NASA Constellation Program. A key element of this effort is early capability development of design, focused on definition, and the development of the Ares I with some initial design analysis for the Ares V and Earth Departure Stage.

1.3 The objective of this statement of work (SOW) is for the contractor to work directly with each of the Ares Project Element Offices (Vehicle Integration Office, First Stage Office, Upper Stage Office, Core Stage Office, Upper Stage Engine Office, and Flight Integration Test Office) by providing the necessary support for the following four tasks: Program Integration Support, Organization Development Support, Senior Engineering and Management Support, and Modification and use of the Technology Readiness Level (TRL) tool. Additionally, the contractor may provide support to matrixed organizations at MSFC that support the Ares Projects Office, including the MSFC Engineering Directorate, and the MSFC Safety and Mission Assurance (S&MA) directorate. The matrix support will be provided under the Senior Engineering and Management Support task in section 2.3 below.

1.4 The Contractor shall handle Sensitive but Unclassified (SBU) data generated by the Government in support of the APO. The SBU data may include, but is not limited to, Government information such as plans, policies, drawing, reports, studies, financial plans, electronic devices (disks and/or CDs), or data that has not been made public (Government Information). The Contractor may also handle SBU data (technical, not financial) generated by another contractor, but shall not access any financial database or other electronic media that contains financial SBU data generated by another contractor. If for any reason the Contractor is requested to handle/access financial SBU data generated by another contractor, the Contractor shall notify the requestor that it is not authorized to handle such data and shall immediately notify the Contracting Officer.

1.5 The contractor shall implement a broad-based, balanced IT security program that utilizes a risk-based process for selecting the security controls for providing security commensurate with risk that includes both the likelihood and magnitude of harm resulting from the loss, misuse, or unauthorized access to or modification of information.

1.6 The contractor shall implement and ensure information and information technology security (1) when information is generated, processed, stored or exchanged with NASA or on behalf of NASA regardless of whether the information resides on a contractor/subcontractor or NASA information system and (2) when contractor/subcontractor is required to obtain physical or electronic access to NASA's computer systems or applications.

2.0 TASK DESCRIPTION:

2.1 Program Integration Support

2.1.1 The contractor shall provide support, both on-site and off-site, in the integration and management of the various elements of the APO. The contractor shall be responsible for providing formal control which includes documentation, planning and tracking of project milestones, project performance measurement and assessment, developing and maintaining project/program documents, and other supporting products.

2.1.2 The contractor shall schedule forums and venues for: staff meetings, project and element control boards, safety meetings, independent project assessment activities, and periodic prime contractor visits and reviews.

2.1.3 The contractor shall support the coordination of meetings, technical off-sites and symposiums providing services to include but not limited to documenting issues, ensuring computer network connections, tracking action items, reporting status, presentation package preparation, security (attendee's badges) and coordinate events to include physical plant assessments.

2.1.4 The contractor shall manage the APO compliance and response to technical and administrative actions assigned by the MSFC Director, their direct reports, and outside entities. The contractor shall provide an appropriate initial response for consideration by the APO, and provide a final disposition of the actions to the Center's action item tracking system (CAITS). Also, the contractor shall identify an approach to track and manage the APO action items and provide recommendation for increased capability. All enhancement recommendations must be reviewed and approved by the Contracting Officer Technical Representative (COTR) prior to implementation.

2.1.5 The contractor shall be responsible for using the administrative systems used by project control such as the Centerwide Action Item Tracking System (CAITS), Baseline Performance Review (BPR) Systems, State of the Agency (SOA), Directives Control Board (DCB) review system. The contractor shall provide recommendations for APO process enhancements which provide cost savings or increased capability. Also, the contractor shall identify potential solutions for using existing applications to maintain an APO an electronic shared calendar. All enhancements recommendations must be reviewed and approved by the COTR prior to implementation.

2.2 Organization Development Support

2.2.1 The contractor shall provide organizational development services to APO and associated elements to assure the organization continuously improves in areas of communication and interoperability between offices through implementing internal and external lessons learned.

2.2.2 The contractor shall plan and facilitate quarterly organizational development and improvement sessions with APO Management. The Contractor shall identify organizational issues, conflicts, develop potential resolution plans and assess the progress toward the resolutions and provide updates to the plans as required. The Contractor shall assess communication paths and overall organizational effectiveness related to APO goals and objectives. All documentation of the session results and assessments shall be a quarterly submission to the APO.

2.2.3 Using the Government Furnished Organizational Survey, the contractor shall administer the survey (as requested, up to once a year) to participants identified by the COTR and provide data and trend analysis for results by comparing the results to historical data from past surveys. The contractor shall submit to the APO for review and concurrence.

2.2.4 The contractor shall assess, evaluate, and document the interactions from a variety of team activities such as project all-hands meetings, leadership retreats, and various workshops as requested by the COTR. All evaluated session results shall be submitted in the form of an informal, contractor formatted monthly report to the APO.

2.2.5 The contractor shall conduct APO coaching on leadership styles, organization needs, organizational change, and big picture change needed to shift the existing culture toward the goals outlined in the Mission of the APO organization. The contractor shall submit an outline of the concept and approach to APO for review and concurrence to ensure that the goals and missions of the APO are captured. The contractor shall submit the outline concept to the APO 30 days prior to the presentation.

2.3 Senior Engineering and Management Support

2.3.1 The APO requires knowledge of NASA's history, the Agency's vision for space exploration, and/or technologies of specific interest to APO. APO also requires senior engineering and management support to participate in project planning, project review, special studies and scheduling support during the design, development, and test phases of the Ares I and Ares V.

2.3.2 The contractor shall provide engineering and management support to include but not limited to, the review of project documentation, engineering design trades and analyses, scheduling support, contractor management and contractor attendance at planning meetings. The contractor shall assess capabilities or processes being applied to the project in Engineering Management and Design, Test and Development Engineering to identify gaps or deficiencies and develop recommendations to correct the cited deficiencies. The contractor shall be responsible for special studies as initiated by the COTR which include the support of element reviews such as Vehicle Integration Delta Preliminary Design Review (Delta-PDR), Vehicle Test Readiness Reviews (TRRs), Ares I-X Critical Design Review (CDR) and Flight Readiness Review (FRR), and APO elements CDRs. The contractor shall review technical reports, requirements documents, and engineering memorandums for technical adequacy and content. The contractor shall prepare and deliver technical and programmatic briefings and reports as requested by the government.

2.3.3 Under special studies in 2.3.1 and 2.3.2 above (initiated by the COTR or CO), the contractor shall be responsible for the assessment of capabilities or processes being applied to the project in management and engineering, to identify gaps or deficiencies and develop recommendations to correct the cited deficiencies. This assessment process is especially critical to support the SE&I engineering and Vehicle Integration areas of the Project. The assessment may directly support APO activities, or interface and support matrixed activities, performed by other MSFC organizations, such as the Engineering or S&MA directorates.

2.3.4 The contractor shall provide mentoring and coaching on engineering issues to organizations and their leadership at MSFC implementing or supporting the APO. The contractor shall evaluate organization design and effectiveness of APO supplier organizations, such as the MSFC

Engineering and Safety and Mission Assurance (S&MA) directorates, and maintain a dialog with and provide feedback to the appropriate management officials at the Center. At management's request, the contractor shall support the understanding of and options for resolution of particular issues of interest.

2.4 Modification and use of the Technology Readiness Level (TRL) Tool

2.4.1 The contractor shall use basic systems engineering principles and processes to modify and maintain a Technology Readiness Level (TRL) assessment tool. Using the Government Furnished TRL assessment tool, the contractor shall modify the tool from its current Excel based platform to a web based platform and conduct an assessment for each Element of the Ares I Project. The contractor shall structure the updated tool to allow TRL assessments of project elements, based on the Ares Work Breakdown Structure (WBS). The Contractor shall ensure that any web based platform complies with Section 508 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794d). The Contractor shall ensure that the all contractor developed applications will follow MPR 2800.4, Marshall Operational Readiness Review (MORR) for Center Applications and Web Sites, prior to deployment.

2.4.2 The assessment shall be conducted for each Element of the APO using the modified Technology Readiness Level (TRL) assessment tool. Any modification will remain property of the Government. The contractor shall perform both hardware and software assessments for technology readiness level.

2.4.3 The contractor shall coordinate with the elements of the APO to perform the following technology assessment prior to the Ares Critical Design Review (CDR):

- WBS 136905.02: Vehicle Integration (VI)
 - Guidance, Navigation, and Control (GN&C).
 - Failure Detection, Diagnosis, and Response (FDDR) and Abort.
 - Separation.
 - Flight Software.
- WBS 136905.08.01: First Stage (FS)
 - Forward Structure.
 - Parachutes.
 - Pyrotechnics and Separation Subsystems.
 - Aft Skirt.
 - Thrust Vector Control (TVC).
 - Avionics.
 - Five-Segment Reusable Solid Rocket Motor (RSRMV).
 - Nozzle.
- WBS 136905.08.04: Upper Stage Engine (USE)
 - Engine Integration and Assembly.
 - Control Valves and Instrumentation.
 - Turbopumps.
 - Combustion Devices.
- WBS 136905.08.05: Upper Stage (US)
 - Structures and Thermal (S&T).

- Main Propulsion System (MPS).
- Upper Stage Reaction Control System (ReCS).
- First Stage Roll Control System (RoCS).
- Thrust Vector Control (TVC).
- Avionics.
- Logistics Support Infrastructure (Ground Support Equipment (GSE)).
- Manufacturing and Assembly.
- Small Solids.

2.4.4 The technology assessments, along with the associated roadmaps and identification of any critical technologies, shall be integrated into the Technology Readiness Assessment Report (TRAR) and published at major design reviews (e.g., CDR, DCR, etc).

2.4.5 The contractor shall update and benchmark test the tool to assure the accuracy of results. The contractor shall be responsible for maintenance of the configuration of the TRL assessment tool.

3.0 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) 1291 (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.

The contractor shall prepare and deliver Badged Employee and Remote IT User Listings in accordance with DRD 1291MA-001.

The contractor shall prepare and deliver Contractor Employee Clearance Documents in accordance with DRD 1291MA-002.

The contractor shall prepare and deliver Position Risk Designation for Non-NASA Employee in accordance with DRD 1291MA-004.

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) protects the environment through the ongoing planning, implementation, integration and management control of these programs in accordance with DRD 1291SA-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. System and worksite analysis.
- c. Hazard prevention and control.
- d. Safety, health and environmental training

The contractor shall report mishaps and safety statistics to the MSFC Industrial Safety Branch in

accordance with DRD 1291SA-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 1291SA-002 or electronic equivalent to report mishaps and related information required to produce the safety metrics.

3.1 Weekly:

3.1.1 The contractor shall update schedules and review technical data provided by each of the Ares I Project Element Offices. The contractor shall perform verification and validation of data to ensure horizontal and vertical integration of all Ares I Project Office Element data. The contractor shall analyze the data, develop trends, forecasts, and impacts to develop briefings from the analysis for the Ares I Project Office and associated elements.

3.1.2 The contractor shall support the coordination of meetings between Ares I Project Office and associated elements, providing services which include but is not limited to documenting issues, tracking action items, and reporting status.

3.2 Monthly:

3.2.1 The contractor shall prepare and deliver a Monthly Status Reports summarizing the work accomplished for all task areas during each reporting period throughout contract performance in accordance with DRD 1291MA-003. Reports shall be in narrative form, brief and in contractor format. The reports shall include (1) a description of overall progress, (2) an indication of any current problems which may impede performance and proposed corrective action, and (3) a discussion of the work to be performed during the next month.

3.2.2 The contractor shall support the coordination of meetings between the APO and associated elements which includes, but is not limited to, documenting issues, tracking action items, and reporting status.

3.2.3 The contractor shall provide documentation of organizational development sessions and team assessments to the COTR within 30 days of each session.

3.2.4 The contractor shall provide special study/analysis briefing and/or report findings for each special study and analysis to the APO and/or project element management within 30 days of completion.

3.3 Quarterly:

3.3.1 Organizational survey: The contractor shall conduct a Survey approximately 9-12 months after previous APO survey and deliver assessment of results 90 days after completion.

3.3.2 The contractor shall deliver modified TRL tool and associated assessments to APO by 1 February 2010, and also deliver the Technology Readiness Assessment Report (TRAR) 30 days prior to Ares I Critical Design Review scheduled for 15 January 2011. In addition the benchmarking report will be delivered 60 prior to the start of the Ares I CDR.

4.0 TRAVEL ESTIMATE:

- Six 3-day trips (2 people per trip) per year to Johnson Space Center in Houston, TX to support technical interchange meetings with the Constellation Program and Projects.
- Six 3 day trips (two people per trip) per year to Washington DC to support technical and program management meetings at NASA HQ.
- Two 3 day trips (two people per trip) per year to Los Angeles, CA to support technical interchange meetings.
- Three 3 day trips (two people per trip) per year to Hampton, VA to support technical interchange meetings.

5.0 GOVERNMENT FURNISHED ITEMS:

5.1 The APO will provide access to the application server and a Microsoft Office Excel spreadsheet containing the TRL assessment tool. The APO will provide access as well as any associated software licensing required. NASA will provide the coordination and sponsorships for interfacing with the NASA Information Technology department.

5.2 The APO will provide access to the application server and a SQL Server database server hosting the PCS II software, as well as associated licensing.

5.3 The APO will make available all documentation that is currently available in support of this SOW to ensure that the information developed by the contractor is based on the most current NASA assessments available to date.

6.0 PERFORMANCE REQUIREMENTS SUMMARY (PRS):

6.1 The following columnar section defines the PRS for the tasks detailed above. Not all efforts under this order are included in the PRS. Lack of inclusion in the PRS in no way relieves the contractor of the obligation to perform all delineated tasks.

6.2 Level of Acceptable Performance: The Level of Acceptable Performance is the measure used by the Government to evaluate the contractor's quality control on a monthly basis. Performance below this level indicates the contractor's quality control is unsatisfactory. The Level of Acceptable Performance for each work environment is specified in the PRS below.

6.3 Deduction Methodology: The deduction taken for unsatisfactory performance of individual tasks is measured per incident. Each incident shall reduce the value of the invoice associated with the evaluation period in which the incident was observed by the Government. The amounts to be deducted per incident are shown in the PRS below:

PERFORMANCE REQUIREMENTS SUMMARY

REQUIRED SERVICE/ SUPPORT	PERFORMANCE STANDARD	LEVEL OF ACCEPTABLE PERFORMANCE	METHOD OF SURVEILLANCE
Submission of Reports and Data	The contractor shall assure the timely and accurate submission of required reports and deliverables	<p align="center">0 Incidents</p> <p align="center">Incidents are limited to each late submission of reports required and each error discovered in reports</p> <p align="center">Dollar deduct for Incident</p> <p align="center">Per incident=\$100</p>	Review of delivered data
Provision of Qualified Personnel	Adherence to Quoted and Accepted Staffing Approach	<p align="center">0 Incidents</p> <p align="center">Incidents are limited to any lack of adherence to quoted and accepted Staffing Approach.</p> <p align="center">Dollar deduct for Incident</p> <p align="center">Per incident=\$1,000</p>	Quarterly (more frequently is required) review of staffing issues that are identified by either the contractor or customer.