

ATTACHMENT J-1

MPCV PROGRAM INTEGRATION CONTRACT (MPIC)

STATEMENT OF WORK (SOW)

Note: Draft II provides a re-organization of Element 1.1 PP&C work into three functional areas: Planning (new section 1.1.1.2), Performance Management (new section 1.1.1.3) and Professional Services (new section 1.1.2) with a more direct alignment to DRDs PC-01 through -05.

Requirements for Elements 1.2 through 1.11 have not changed.

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INTRODUCTION AND SCOPE

The requirements defined in this attachment are in support of the Multi-Purpose Crew Vehicle (MPCV) Program Office at NASA Johnson Space Center (JSC) in Houston, Texas. The work includes both products and professional services. The work location is JSC, with travel required to other NASA and Prime Contractor locations.

The contractor provides 1) products and professional services to the Program Planning and Control Office, 2) engineering services to the Vehicle Integration Office, the Crew and Service Module Office, and the Test and Verification function, and 3) product support to the Education and Public Outreach Office. Work includes the integration of MPCV Program Office work performed by JSC and other NASA Centers, and by the MPCV Program's Prime Contractor. The MPIC contractor shall ensure continuous cooperation and coordination with the other Program elements with respect to accomplishing the objectives of this SOW.

MPIC contractor personnel utilize Government provided office space, tools and systems for the performance of the contract tasks.

The MPIC SOW structure follows the organization and numbering scheme of the MPCV Program WBS, as defined in CxP 72106C dated June 23, 2011, MPCV Program Work Breakdown Structure and Data Dictionary. Revised copy is scheduled for release in 4QFY2012.

1.1 PROGRAM MANAGEMENT

Program management includes general contract requirements as well as responsibilities for the NASA MPCV Program Office business and management operations. The contractor shall conduct appropriate management and administrative activities to develop the required contractual product deliverables and to provide the required services.

1.1.1 Management and Administration

1.1.1.1 General

A. Contractor Management and Administration

1. The contractor shall provide an MPIC Management Plan, DRD MPIC-PM-01.
2. The contractor shall provide Management Review Products (MRP) in accordance with DRD MPIC-PM-02.
3. The contractor shall provide a Phase-In Plan in accordance with DRD-MPIC-PM-03.
4. The contractor shall provide Government access to the contractor's plans, procedures, and processes that are used in support of the MPIC contract.
5. The contractor shall provide a Closeout Plan in accordance with DRD MPIC-PR-01.
6. The contractor shall deliver Wage/Salary and Fringe Benefit data in accordance with DRD MPIC-PR-02.
7. The contractor shall provide an Organizational Conflict of Interest Avoidance Plan in accordance with DRD MPIC-PR-03.

Deliverables

The contractor shall deliver and maintain the following documents:

- DRD MPIC-PM-01: MPIC Management Plan
- DRD MPIC-PM-02: Management Review Products
- DRD MPIC-PM-03: Contract Phase-In Plan

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- DRD MPIC-PR-01: Closeout Plan
- DRD MPIC-PR-02: Wage/Salary and Fringe Benefit Data
- DRD MPIC-PR-03: Organizational Conflict of Interest Avoidance Plan

B. Contract Financial Management

1. The contractor shall develop, implement, and maintain a contract financial system to track resources by the MPIC Work Breakdown Structure (WBS), Attachment J-4, and elements of cost such as labor, overhead, other direct cost, (e.g. travel and subcontracts) and indirect costs.
2. The contractor shall provide NF 533 Cost Reporting in accordance with DRD MPIC-BM-01. Reporting shall be to the third level for all WBS areas with the exception of WBS 1.6, which shall be reported at the fourth level.
3. The contractor shall provide MPIC data supporting the Government budget process and other special requests for budget impacts. NASA will specify the format and content of the data.
4. The contractor shall provide Workforce Reports, DRD MPIC-BM-02.

Deliverables

The contractor shall deliver and maintain the following documents:

- DRD MPIC-BM-01: NF 533 Cost Reporting
- DRD MPIC-BM-02: Workforce Reports

B. Safety and Health

1. The contractor shall provide a Safety and Health Plan in accordance with DRD MPIC-SA-01. Upon approval, the Safety and Health Plan shall be incorporated into the contract as Attachment J-9.
2. The contractor shall provide a Safety and Health Program Self-Evaluation in accordance with DRD MPIC-SA-02.

Deliverables

The contractor shall deliver and maintain the following documents:

- DRD MPIC-SA-01: Safety and Health Plan (Submit with Proposal)
- DRD MPIC-SA-02: Safety and Health Program Self-Evaluation

1.1.1.2 Planning

PP&C Planning requirements from the Draft Statement of Work WBS Elements 1.1.1 and 1.1.2 are combined as follows:

- A. The contractor shall develop, operate and maintain the Planning Data Set as the Program repository for Program Baseline; technical, schedule and cost attributes and assumptions; implementation plans; fiscal- and end-year plans; and cost estimates in accordance with DRD MPIC-PC-01, Planning Data Set.
1. The contractor shall obtain the Program Baseline and establish and maintain Program Baseline attributes and store them in the Planning Data Set.
 2. The contractor shall develop a Program Master Schedule.

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3. The contractor shall develop integrated schedules for Control Account Managers and report as a logical network of tasks and dependencies; and identify milestones, critical path, inter-dependencies, and risks.
- B. The contractor shall maintain the MPCV Program Plan, and the WBS Tree and Data Dictionary.
- C. The contractor shall establish and maintain a cost estimating capability consistent with industry and NASA methods and models; and perform and report independent cost assessments for the Program Baseline, trade studies, change proposals, change requests and risk mitigations. All data products shall be stored in a Planning Data Set.
1. The contractor shall develop fiscal and year-end cost estimates including Life Cycle Cost (LCC) and Estimate at Completion (EAC) with Joint Cost and Schedule Confidence Level (JCL).
 2. The contractor shall provide independent cost and schedule assessments for evaluations of trade studies, change request, and risk mitigation, as requested by the Government.
- D. The contractor shall operate MPCV Program Office's implementation of the JSC Quality Management System (QMS), train Program personnel, conduct internal audits of the Program Office, conduct and document management reviews, participate in JSC audits including internal and registrar, and report findings to Government personnel for determination of corrective action.
1. The contractor shall create and maintain records of MPCV implementation of the JSC QMS including as a minimum: training records, audit reports and connective actions, and the minutes of management reviews.
 2. The contractor shall maintain the MPCV Program Office Master List of Work Instructions, processes, and procedures in accordance with the JSC QMS Manual, JPR 1280.2.
 3. The contractor shall maintain an inventory of Program Records including location, and manage records following MPCV Program Office procedure and instructions.
- E. The contractor shall provide cost and schedule input to the annual Program Planning, Budget and Execution (PPB&E) submission.
1. The contractor shall re-baseline Planning Data Set content, as applicable, to accommodate changes resulting from PPB&E.
- F. The contractor shall perform strategic assessments of Program alternatives as requested by the Government.
- G. The contractor shall participate in Integrated Baseline Reviews (IBR) for the Prime contractor and for Non-Prime suppliers.
- H. The contractor shall participate in establishing and maintaining Agreements with NASA participating organizations.
- I. The contractor shall improve the processes used to perform MPCV Planning; incorporate industry standard Best Practices; and obtain 3rd-Party certification for best practices content incorporated.

Deliverables

The contractor shall deliver and maintain the following items:

- DRD MPIC-PC-01: Planning Data Set

1.1.1.3 Performance Management

PP&C Performance Management requirements from the Draft Statement of Work WBS Elements 1.1.1 and 1.1.2 are combined as follows:

- A. The contractor shall develop, operate and maintain the Performance Data Set as the Program repository for Prime Contractor- and Non-Prime-Supplier delivered data reports, and PP&C functional data products and the results of integrated analysis in accordance with DRD MPIC-PC-02, Performance Data Set.
- B. The contractor shall capture performance data reported by the Prime contractor and Non-Prime Suppliers via Data Management and store in the Performance Data Set.
 1. The contractor shall capture and store financial management and workforce functional data products.
 2. The contractor shall capture the Integrated Master Schedule (IMS) reported by the Prime contractor
- C. The contractor shall identify performance information in Prime Contractor and Non-Prime Supplier briefings and presentations, mine identified data, and input extracted information into the Performance Data Set.
- D. The contractor shall use data stored in the Planning and Performance Data Sets to develop technical, schedule and cost functional data products in accordance with DRD MPIC-PC-03, Performance Measures.
 1. The contractor shall capture cost and workforce functional data products from the RMO and store in the Performance Data Set.
 2. The contractor shall identify and report current and forecast schedule variances and discrepancies between reported schedules and planned performance.
 3. The contractor shall track reported flight product development work accomplished per the IMS and identify, assess and report discrepancies and impacts.
 4. The contractor shall evaluate and develop a report of the Prime Earned Value Management (EVM) past performance from reported data, and project future performance.
 5. The contractor shall use Prime Contractor and Non-Prime Supplier risk reports to develop risk functional data products for use in risk boards and in assessing integrated Program performance.
 6. The contractor shall assess the continuing validity of assumptions and document impacts to Program technical, schedule, and cost performance.
- E. The contract shall forecast technical, schedule and cost performance, in accordance with DRD MPIC-PC-03.
- F. The contractor shall obtain independent assessments of current and future performance--including those provided by the Government, in accordance with DRD MPIC-PC-3, Performance Measures.

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- G. The contractor shall prepare integrated analysis of Program performance and document the results as issues and threats for management attention in accordance with DRD MPIC PC-04, Integrated Analysis.
- H. The contractor shall present the results of the integrated analysis and supporting data to Program management at Quarterly, Monthly and Weekly Reviews; obtain feedback from the Program Manager and incorporate feedback received into subsequent integrated analysis products.
- I. The contractor shall provide Data Packages for:
1. Program Life Cycle and Key Decision Point Reviews, including related Standing Review Board, JSC Center Management Council and Agency Program Management Council reviews, as per the Program Master Schedule, and for
 2. Program reviews by NASA organizations (e.g., inspector General, and Aerospace Safety Advisory Panel) and external government agencies (e.g., Government Accountability Office)
- J. The contractor shall improve the processes used to perform MPCV performance management; incorporate industry standard Best Practices; and obtain 3rd-Party certification for best practices content incorporated.

Deliverables

The contractor shall deliver and maintain the following items:

- DRD MPIC-PC-02: Performance Data Set
- DRD MPIC-PC-03: Performance Measures
- DRD MPIC-PC-04: Integrated Analysis

1.1.2 Professional Services

PP&C Professional Services requirements from the Draft Statement of Work WBS Element 1.1.3 are as follows.

1.1.2.1 General

- A. The contractor shall improve the processes used to perform professional services, incorporate industry standard Best Practices where applicable, and obtain 3rd-Party certification for improved processes.
- B. The contractor shall develop and report metrics that characterize volume and quality of services provided to end users.

1.1.2.2 Configuration Management

- A. The contractor shall perform configuration management services for the MPCV Program.
- B. The contractor shall provide Secretarial support and perform planning coordination, and execution of support for MPCV Program meetings, such as MPCV Program Office Control Boards, Panels, designated working groups, major Program reviews, Technical Interchange Meetings, ad hoc management meetings, action item tracking, and Program wide communications. This support includes meeting facilitation, scheduling, room and IT logistical setup, action tracking, maintaining and distributing meeting minutes.

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1.1.2.3 Data Management

- A. The contractor shall provide receipt, tracking, monitoring, reporting, validation, evaluation, distribution, status, and storage of contractor and NASA-supplier items delivered to the MPCV Program Office.
- B. The contractor shall perform Records Management.

1.1.2.4 Risk Management

- A. The contractor shall participate in working groups with the Prime Contractor to conduct probabilistic risk assessment modeling and trade studies.

1.1.2.5 Information Technology Management

- A. The contractor shall use the Johnson Space Center IRD System for all MPCV Program IT needs and complete IT Service Request Forms as needed.
- B. The contractor shall develop, manage and maintain the MPCV Program Office website(s).
- C. The contractor shall provide IT assistance to assess end user issues and to determine appropriate resolutions, such as reporting issues to the appropriate NASA IT contractor, and replacing or repairing user maintained items.
- D. The contractor shall manage and administer the NASA provided software available for employees use at home under NASA licensing agreements.
- E. The contractor shall manage the electronic equipment in MPCV Program Office's conference rooms and other common locations; coordinate repairs with NASA as appropriate; and maintain any organization's unique software.
- F. The contractor shall manage the NASA Equipment Management System for the MPCV Program.
- G. The contractor shall utilize the NASA Integrated Collaborative Environment (ICE) as described in Attachment J-6.
- H. The contractor shall serve as the IT property custodian, maintaining the MPCV Program Office IT inventory, the shared equipment pool, and tracking the shared hardware and software equipment pool.

1.1.2.6 Security Management

- A. The contractor shall provide information technology security in conformity with NPD 1600.1 and NPR 1600.2, NASA Security Policy and Requirements, respectively.
- B. The contractor shall develop, maintain and provide Technology Protection products including plans, requirements, threat assessments, reports, schedules, and security risks.
- C. The contractor shall provide physical security in conformity with NPR 1620.3, Physical Security Requirements for NASA Facilities and Property.
- D. The contractor shall coordinate with Special Agents located at each participating NASA Center and perform a counterintelligence function

1. A security clearance at the Top Secret level is required to perform the counterintelligence function.
- E. The contractor shall implement Export Control by assisting Data Originators and Designating Officials with the assessment of MPCV Program documentation to determine sensitivity and appropriate markings for export, and by interfacing with the JSC Export Services Team to export controlled items.
- F. The contractor shall perform security validation visit annually with the Prime Contractor to ensure adherence to NPR 2810.
- G. The contractor shall serve as the Building Facility Manager or Alternate Facility Manager for the Building 17 Program Office, and coordinate with JSC Center Operations for reporting problems and for responding to emergencies.

1.1.2.7 Supplier Management

- A. The contractor shall capture, analyze, track and report NASA Center participating-organization's (a.k.a. Non-Prime Suppliers) collateral costs for work performed for MPCV.

Deliverables

The contractor shall deliver and maintain the following items:

- DRD MPIC-PC-05: Professional Services

1.1.3 WBS Element 1.1.3, Deleted

1.1.4 WBS Element 1.1.4, Deleted

1.1.5 WBS Element 1.1.5, Deleted

1.1.6 WBS Element 1.1.6, Reserved

1.1.7 WBS Element 1.1.7, Deleted

1.1.8 WBS Element 1.1.8, Reserved

1.2 VEHICLE INTEGRATION

1.2.1 Management and Integration

- A. Vehicle Integration Management
 1. The contractor shall participate in technical reviews, meetings, and integrated assessments for the Program.
 2. The contractor shall participate in technical reviews, meetings and technical assessments for combined MPCV, Space Launch System and 21st Century Ground Operations Program-To-Program work.
 3. The contractor shall participate in technical reviews of Program Change Requests.
 4. The contractor shall develop and document criteria and methodologies for requirements verification.
 5. The contractor shall provide planning, coordination, and review of products for programmatic and engineering reviews, such as Program Technical Review (PTR), Preliminary Design Review (PDR), Critical Design Review (CDR), and Design Certification of hardware and software.

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6. The contractor shall perform planning and coordination for systems engineering and integration efforts (including task agreements) for the MPCV Program Vehicle Integration Office.
7. The contractor shall develop a process and disciplined approach to be used for assessing, documenting and tracing achievability of the emerging set of MPCV Program Office requirements (i.e., the assessment of whether the MPCV Program Office requirements suite can be fully realized in the current spacecraft design, as designs are updated).
8. The contractor shall participate in and perform special studies for Vehicle Integration Management.
9. The contractor shall maintain the MPCV Vehicle Integration Office documentation, such as the Document and Specification Tree, System Engineering Management Plan, Major Review Plans, and Operations Concept.

B. Administration for Vehicle Integration

1. The contractor shall participate in development, process improvement, and documentation of MPCV Program Office systems engineering processes, tools, metrics and training.
2. The contractor shall develop, document, and assist in training on an integrated process for conducting requirements achievability assessments, and ratings or rankings of impacts to an integrated vehicle.
3. The contractor shall provide recommendations for development of MPCV Program Office technical metrics that are uniform, predictive, and objectively measurable.
4. The contractor shall participate with other MPCV Program Office elements (e.g., Crew and Service Module Office, Launch Abort System Office, and Flight Test Office) to ensure coordination and implementation of processes, tools, and metrics.

1.2.2 Requirements Definition and Management

A. MPCV Program Office Vehicle Integration Requirements

1. The contractor shall develop products, reports, plans, and schedules that facilitate coordination of MPCV Program Office requirements analysis effort.
2. The contractor shall participate in development, process improvement, and documentation of MPCV Program Office systems requirements.
3. The contractor shall perform analysis to determine the proper allocation and traceability of MPCV Program Office requirements.
4. The contractor shall review, analyze and report on MPCV Program Office requirements documents to ensure consistency between requirements in lower-level and higher-level requirements documentation.
5. The contractor shall participate with the MPCV Program Office in implementing new requirements through technical analysis of the requirements, developing supporting technical rational, and implementation of requirements.
6. The contractor shall participate in and perform special studies for Vehicle Integration Requirements.

1.2.3 Program Integration and Interfaces Management

A. Program Integration and Interfaces Management

1. The contractor shall analyze, document, and provide process improvement recommendations to Interface Control Documents (ICDs).
2. The contractor shall participate in and perform special studies for Integration and Interface Management.
3. The contractor shall perform Orion interface planning and definition.
4. The contractor shall evaluate design and requirements as they evolve to identify interface issues.

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1.2.4 Systems and Integrated Analysis

A. Vehicle Integration Performance

1. The contractor shall participate in and perform special studies for Vehicle Integration Performance.
2. The contractor shall develop and design analysis tools for the MPCV Program Office and document architecture.
3. The contractor shall participate in Integrated Performance Analysis for the MPCV Program Office. Responsibilities include investigating, analyzing, documenting, and reporting on systems engineering processes and analysis tools.

1.2.5 CSM Crew Cabin and Cockpit Layout Design Requirements

A. Vehicle Integration of the Cabin and Cockpit

1. The contractor shall participate in development, process improvement, and documentation of MPCV Program Office Vehicle Integration processes, plans, products, schedules, and requirements of the Cabin and Cockpit Layout.
2. The contractor shall perform analysis to determine the proper allocation and traceability of MPCV Program Office requirements.
3. The contractor shall review, analyze and report on MPCV Program Office requirements documents to ensure consistency between requirements in lower-level and higher-level requirements documentation.
4. The contractor shall provide recommendations to technical discipline experts to supplement the understanding and implementation of MPCV Program Office requirements.
5. The contractor shall participate in and perform special studies for Vehicle Integration of the Cabin and Cockpit.

1.2.6 WBS Element 1.2.6, Deleted**1.2.7 Flight and Ground Operations Integration**

A. MPCV Program Office and Program Integration

1. The contractor shall perform integration planning, definition, coordination, and documentation for the MPCV Program Office concept of operations processes and procedures.
2. The contractor shall develop processes, plans, system requirements, training, procedures, and work associated with the preparation, launch, flight execution, and recovery functions of the MPCV Program Office in cooperation with the other Programs. Responsibilities include participating in development of a concept of operations, plans for detailed ground operations, flight operations, and operations during design, range safety, training, transition, and payload and cargo integration.
3. The contractor shall perform integration activities in support of MPCV Program Office Flight, Ground, Payload, and Cargo operations.
4. The contractor shall participate in and perform special studies for MPCV Program Integration and Program to Program integration.

1.2.8 Specialty Engineering

A. Specialty Systems Engineering and Integration

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1. The contractor shall perform systems engineering and integration functions for the specialty engineering disciplines of human engineering, materials and processes, electromagnetic compatibility, Electrical, Electronic, and Electromechanical (EEE) parts, natural and induced environments, Micrometeoroid and Orbital Debris (MMOD) analyses, and radiation to the MPCV Program Office System design and integration processes.
2. The contractor shall perform integration planning, definition and documentation of the MPCV Program Office specialty engineering requirements.

1.2.9 WBS Element 1.2.9, Reserved

1.2.10 Assembly, Integration and Production

A. Assembly, Integration and Production Systems Engineering and Integration

1. The contractor shall participate in planning, definition, and documentation of the production of an integrated, verified, and validated Orion vehicle.
2. The contractor shall participate in and perform special studies for Assembly Integration and Production Systems Engineering and Integration.

1.3 WBS ELEMENT 1.3, RESERVED

1.4 WBS ELEMENT 1.4, RESERVED

1.5 WBS ELEMENT 1.5, DELETED

1.6 SPACECRAFT DEVELOPMENT

1.6.1 Crew and Service Module (CSM)

1.6.1.1 CSM Management and Administration

A. CSM Office Management and Administration

1. The contractor shall perform planning and coordination for the CSM Office efforts, including staff meetings, cost/technical/schedule reviews, engineering panels, hardware control panels, and task agreements.
2. The contractor shall participate in and perform special studies for the CSM Office.
3. The contractor shall participate in technical reviews of engineering changes.
4. The contractor shall provide planning, coordination, and review of products for programmatic and engineering reviews, such as PTR, PDR, CDR, and Design Certification of hardware and software, including tracking of discrepancies noted in these reviews.
5. The contractor shall coordinate tasks performed by other MPCV Program Office offices in support of the CSM Office, including resource analysis, scheduling and schedule assessments, baseline and reference data management, web and Windchill expertise, and board and panel administrative support.
6. The contractor shall track and report status on actions for support, development, and review of CSM Office related program changes. Responsibilities include preparing materials and decision packages for program reviews, external reviews, audits, presentations, and technical papers, and performing associated records management.
7. The contractor shall provide support to CSM Office integrated risk management, including maintaining latest status of technical risks, resolution plans, and generating reports necessary to communicate risk status and changes.

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1.6.1.2 CSM Systems Engineering and Integration**A. Integrated CSM Architecture and Engineering**

1. The contractor shall perform tasks for the systems engineering and integration of CSM and subsystem teams across all aspects of the CSM development efforts. Responsibilities include integration of CSM discipline-specific efforts (such as the Landing and Recovery System Functional Integration Team (LRS FIT)), to manage the overall integrated crew module architecture definition and engineering functions
2. The contractor shall perform analysis to determine the proper allocation and traceability of MPCV Program Office requirements within the CSM Office.
3. The contractor shall provide independent assessment and validation of CSM subsystems and components required to meet MPCV Program Office module-level and interface requirements.
4. The contractor shall provide assistance to technical discipline experts in understanding and implementing requirements.

1.6.1.3 WBS Element 1.6.1.3, Reserved**1.6.1.4 CSM Government Furnished Equipment Products****A. Government Furnished Equipment Product Development and Integration**

1. The contractor shall perform tasks required to track GFE and NASA In-Line work activity, including coordinating inputs with technical teams, providing status of current activity being performed, highlighting completed activity, and identifying new items under discussion.
2. The contractor shall provide planning, coordination, data management, web and Windchill expertise master support, and board/panel administrative support for the CSM GFE efforts.

1.6.1.5 WBS Element 1.6.1.5, Reserved**1.6.1.6 CSM Assembly, Integration and Production****A. Assembly, Integration and Production of CSM Flight Test Article(s), Flight Article(s) and CSM Ground Support Equipment**

1. The contractor shall participate in the definition and documentation of the integrated CSM certification and acceptance process. Responsibilities include preparing materials and decision packages for program reviews, external reviews, audits, presentations, and technical papers, and performing associated records management.
2. The contractor shall participate in development and documentation of assembly and integration requirements with requirements owners.
3. The contractor shall analyze, develop, document, and provide implementation recommendations for hardware and software integration and test strategies covering acceptance and sustaining engineering.
4. The contractor shall participate in processing, integration and checkout facility and equipment interface development testing and verification.

1.6.2 WBS Element 1.6.2, Deleted**1.6.3 WBS Element 1.6.3, Deleted****1.6.4 WBS Element 1.6.4, Reserved****1.6.5 Software**

A. MPCV Program Office Software

1. The contractor shall perform planning, definition, and documentation of the systems engineering and integration processes for MPCV Program Office spacecraft software.

1.6.6 WBS Element 1.6.6, Reserved**1.6.7 WBS Element 1.6.7, Reserved****1.7 WBS ELEMENT 1.7, RESERVED****1.8 WBS ELEMENT 1.8, DELETED****1.9 WBS ELEMENT 1,9, RESERVED****1.10 TEST & VERIFICATION (T&V)****1.10.1 T&V Management and Administration****A. T&V Office Development & Management**

1. The contractor shall analyze and assess data in support of the Government's long-range Program planning for the MPCV Program Office's master verification strategy for all flight and ground-interface systems.
2. The contractor shall coordinate with other offices within the MPCV program and other Programs to establish content, schedule, cost, deliverables, and services.
3. The contractor shall perform planning and coordination for the T&V Office efforts (including task agreements).
4. The contractor shall perform planning such as master integration planning and programming design for Programs, taking into account feasibility, cost and economics.
5. The contractor shall track actions for development, and review of T&V related Change Requests (CRs)s. Responsibilities include preparing material and decision packages for Program reviews, external reviews, audits, presentations, and technical papers, and performing associated records management.
6. The contractor shall perform technical reviews and integrated assessments of discipline expert inputs.
7. The contractor shall develop and document criteria and methodologies for T&V requirements verification.
8. The contractor shall provide planning, coordination, and review of products for Programmatic and Engineering Reviews such as PDR, CDR, and Design Certification of hardware and software.
9. The contractor shall participate in the definition and documentation of T&V systems engineering processes.

1.10.2 Integrated Spacecraft Testing and Verification Management**A. Program Requirements Verification Development & Management**

1. The contractor shall coordinate, develop, integrate, maintain, and manage the MPCV Master Verification Plan - CxP 72097, Systems Requirement Document verification requirements, and the Verification Logic Network.
2. The contractor shall participate and coordinate the Verification Closure process. Responsibilities include preparing material and decision packages for program reviews, external reviews, audits,

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presentations, and technical papers, and performing associated records management for the Verification Closure process.

3. The contractor shall participate in the definition and management of the integrated spacecraft certification and acceptance process.
4. The contractor shall provide recommendations and guidance to requirement owners in development of verification requirements.
5. The contractor shall participate in technical reviews of Engineering Change Proposals (ECPs).
6. The contractor shall perform technical reviews and integrated assessments of discipline expert inputs.
7. The contractor shall develop and document criteria and methodologies for requirements verification.

1.10.3 WBS Element 1.10.3, Deleted

1.10.4 Facilities

A. Facilities Development, Management, and Integration

1. The contractor shall assess and report progress on the development (design and construction), management, and maintenance of the Orion Laboratories, Test beds, and other test facilities.
2. The contractor shall perform processing, integration and checkout facility and equipment interface development testing and verification.
3. The contractor shall participate in definition and documentation of interface tooling and test equipment requirements.
4. The contractor shall perform tasks for identification, arrangement and preparation of facilities and associated assets for interface and integration tests.
5. The contractor shall identify and arrange for facilities and associated assets needed for MPCV Program Office flight tests.
6. The contractor shall participate in technical reviews of program and engineering changes.
7. The contractor shall perform technical reviews and integrated assessments of discipline expert inputs.
8. The contractor shall develop and document criteria and methodologies for requirements verification.

1.10.5 WBS Element 1.10.5, Deleted

1.10.6 Flight Test

A. Flight Test Development, Integration, and Management

1. The contractor shall provide test and verification coordination with other Program system engineering and integration as well as test and verification groups to develop an integrated test and verification strategy.
2. The contractor shall participate in preparation and development of flight element integration testing requirements and plans.
3. The contractor shall provide inputs to the definition of final pre-flight checkouts and switch list requirements.
4. The contractor shall develop document, recommend and implement MPCV Program Office test and verification flight testing strategy. Formulate flight testing objectives, requirements and plans in collaboration with MPCV Program Office system integration and verification strategists and participating Program elements.
5. The contractor shall perform planning of MPCV Program Office validation flight tests to confirm that systems being deployed can accomplish the mission elements they intended to satisfy.

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6. The contractor shall plan and document integrated safety and crew survival-function flight testing, such as ascent abort testing and assignment of flight testing requirements to elements.
7. The contractor shall identify and make arrangements for the use of facilities and associated assets needed for MPCV Program Office flight tests.
8. The contractor shall participate in technical reviews of program and engineering changes.
9. The contractor shall provide technical reviews and integrated assessments of discipline expert inputs.
10. The contractor shall develop and document criteria and methodologies for requirements verification.

1.10.7 Special Projects/Studies – T&V

A. Special Studies

1. The contractor shall perform special studies in support of the T&V office.
2. The contractor shall develop and design analysis tools.
3. The contractor shall serve as technical advisor and consultant to the tools, processes and training chief on such matters as overall T&V processes and tools.

1.11 EDUCATION AND PUBLIC OUTREACH

Support to Education and Public Outreach includes the production of program materials with the goal of providing strategic, timely, accurate, coordinated information content across programs and centers.

1. The contractor shall participate in program status meetings to document current and accurate milestone success and status.
2. The contractor shall perform tasks to provide content and timely visual products to facilitate better communications of program accomplishments and technical data.
3. The contractor shall provide public communications products (education and outreach), including videos, animations, printed media, website content, exhibits and broadcast media.
4. The contractor shall provide program content and public communications products to ensure timely update of content for our agency and team partners for use in agency exhibits, including animation/video/photography media, graphics/renderings items, social media, speaker tools, and web content.