

# **DRAFT SOW SECTION C**

## **DESCRIPTION/ SPECIFICATION/ WORK STATEMENT**

**FOR**

**JOINT LIGHT TACTICAL VEHICLES**

**21 SEPTEMBER 2011**

## **1 GENERAL**

### **1.1 Introduction**

This Statement of Work (SOW) encompasses the Engineering, Manufacturing, and Development (EMD) phase of the Joint Light Tactical Vehicle (JLTV) acquisition program. All references to meetings, conferences, and reviews, as well as documentation, shall pertain only to the EMD phase unless specifically stated otherwise.

### **1.2 Scope**

The JLTV is comprised of a companion trailer (JLTV-T) and six total vehicle configurations consisting of three base platforms:

- Utility (JLTV-UTL), two seat
- Close Combat Weapons Carrier (JLTV-CCWC), four seat
- General Purpose (JLTV-GP), four seat

And three mission package configurations.

To achieve the mission package configurations below, the Contractor shall use the JLTV-GP and the Mission Packages defined in Annex K of the JLTV Purchase Description (Attachment 1).

- Special Purpose (JLTV-SP)
- Heavy Guns Carrier (JLTV-HGC)
- Command and Control on the Move (JLTV-C2OTM)

In this SOW, the term configurations will be used to refer to all six vehicle configurations defined above. The term JLTV will refer to the entire JLTV defined above.

The JLTV requirements are fully described in the JLTV Purchase Description (Attachment 1). The JLTV shall be developed, designed, modeled, simulated, fabricated, tested, and delivered in both Left Hand Operation (LHO) and Right Hand Operation (RHO) JLTV versions as specified in this SOW. All CDRLs shall cover both LHO and RHO designs by specifically addressing any RHO unique differences in any CDRL submittal that is affected by the Contractor's RHO design.

### **1.3 Affordability**

The Contractor shall minimize cost while achieving maximum performance assuming a Production and Deployment phase **average** base vehicle unit cost target of \$250K (without armor). The Contractor shall track and control costs and shall perform cost-performance analyses. The JLTV Purchase Description (Attachment 1) uses tiers to define priority: 1 is the most important, 10 is the least important.

### **1.4 Commonality**

The Contractor shall maximize commonality in the JLTV design as a key means of reducing the life cycle cost and the operational logistics footprint. The Contractor shall consider commonality within the JLTV (JLTV configurations) as well as interchangeability with other DOD tactical vehicles, commercial sector processes and hardware and allied forces (NATO). Commonality shall include interchangeability of components, Line Replaceable Units (LRUs), Line Replaceable Modules (LRMs), consumables. Commonality shall also consider the interrelationships between systems' major sub-systems, sub-systems, assemblies, and sub-assemblies as they relate to operator and maintenance tasks, training requirements, use of support equipment. The Contractor shall specifically identify commonality-driven design decisions at the Design Understanding Review (DUR).

## **2 PROGRAM STRUCTURE & MANAGEMENT**

The Contractor shall define and ensure Key Roles (e.g. PM and IPT leads) are staffed with personnel with commensurate education, training, work experience, and technical training necessary to effectively and efficiently perform required tasks. The Contractor shall present their organizational Key Roles at the SOWM and shall discuss the plan for communicating and transitioning personnel changes. When the Contractor intends to change the personnel working in Key Roles, the Contractor shall provide 14 days notice to the COR prior to the personnel transition. In addition, the Contractor shall be responsible to conduct a transition meeting with the Government within seven (7) days of the anticipated transition date to discuss all key issues related to such a transition. The Contractor shall provide Minutes, reference CDRL Data Item A002, NLT 2 days after the transition meeting, reporting on any Government concerns or issues discussed in the transition meeting, and providing analysis of actions that the Contractor will take to ensure a seamless transition.

### **2.1 Integrated Product Teams (IPTs)**

For purposes of this Contract, any joint deliberative or task-focused body, regardless of its formal or informal title, (e.g., "Working Group," "Integrated Design Team", etc.) shall be considered an Integrated Product (or Process) Team, or "IPT". IPTs shall be established to serve as the primary management tool and key method of communication for this contract.

The first IPT meetings shall be held concurrently with the Start of Work Meeting (SOWM). Subsequent IPT meetings shall be held weekly or as mutually agreed between the Government and Contractor.

The Contractor shall be responsible for developing all IPT agenda and meeting minutes. The IPT meeting minutes shall be made available to the Government and discussed at subsequent IPT meetings.

The Contractor shall allow physical and dial-in access to the Government for all Contractor IPT meetings and any Contractor design reviews following the SOWM event, in order to allow mutual understanding, maintain the program direction, and appropriately assist meeting the contractual requirements.

#### **2.1.1 IPT Structure**

At a minimum, the IPT structure shall include the following teams: Program Management, Business Management, Acquisition, Systems Engineering, Supportability & Logistics, and Product Assurance Test & Evaluation.

System Engineering IPT shall incorporate the following sub-IPTs: Mechanical, Systems, & Electrical.

Systems IPT shall incorporate the following disciplines: Environmental, Safety, and Occupational Health (ESOH); Survivability; Human Systems Integration (HSI)/Manpower and Personnel Integration (MANPRINT); Manufacturing & Quality; Reliability, Availability, Maintainability (RAM); Risk; and Modeling & Simulation (M&S).

Mechanical Engineering IPT shall incorporate the following disciplines: Force Protection, Mobility, Weapons, Suspension/Steering/Brakes, Transportability, Trailer/Exterior Attachments

Electrical Engineering IPT shall incorporate the following disciplines: Vetrionics (with Electronic Architecture), C4ISR, Software, Power Management, Integration, and Information Assurance.

IPT Leaders and Co-Leaders shall be identified no later than the SOWM. The Contractor may propose changes to the number, composition, functionality, and responsibilities of IPTs at the SOWM. Proposed changes will be jointly determined thereafter. Throughout the life of this contract, both Contractor and Government IPT members have the responsibility to propose new or modified IPTs when needed to focus efforts or improve effectiveness.

### **2.2 Integrated Subject Matter Experts (SMEs)**

The Contractor shall permit Government SMEs to co-locate with Contractor design, analysis, manufacturing, and/or test personnel full-time at the Contractor facility in order to facilitate communication and resolution of questions. The Contractor shall provide desks, phones, and external internet connections for two (2) people at a maximum of three (3) mutually agreed upon sites. The Contractor and Government will agree on the final details at SOWM.

### **2.3 Integrated Master Plan (IMP)**

The Contractor shall manage the JLTV EMD program in accordance with the IMP (Attachment 0002 IMP) and Integrated Master Schedule (IMS) (reference CDRL Data Item A012). The IMP outlines Significant Accomplishments and Exit Criteria for the program's key events that shall be satisfied to accomplish the work under this contract. The Contractor shall report on program progress at each program management review, at selected meetings/reviews/conferences in accordance with the IMP, and at other times at the Government's request. The Contractor shall utilize the IMP and contract deliverable dates to develop their IMS baseline.

### **2.4 Internet-Based Collaboration**

Internet-based collaboration tools (defined below) shall be used to facilitate information sharing and collaboration within a secure Government server environment that provides controlled, distributed access to JLTV program information, both released and in-work. Types of information that shall be processed and maintained using these internet-based collaboration tools will include JLTV program documents, reports, program management data, meeting-related information, modeling and simulation/analysis data, product data supporting design reviews, pertinent manufacturing information, and test data, consistent with the JLTV Security Classification Guide. The internet-based collaboration tools shall be used for tracking issues, decisions, and approvals, as well as for submitting, processing, and acknowledging acceptance of designated CDRL items.

The Contractor shall notify appropriate Government personnel via e-mail when new or updated documents are posted to a collaboration environment. The notification email shall include a hyperlink to the location of the posted content. Correspondence to the Contracting Officer shall not be submitted via an internet-based collaboration tool without prior authorization.

Internet-based collaboration tools: The Contractor shall use the Government Advanced Collaborative Environment (ACE) and/or SharePoint to facilitate unclassified, secure internet-based information sharing between JLTV program participants. The Contractor shall conduct Contractor-Government internet conferencing (web meetings) using Government approved systems such as the Defense Connect Online (DCO) conferencing tool. The Contractor shall use VDLS [VISION (Versatile Information Systems Integrated On-Line Nationwide) Digital Library System] to access unclassified data from Government testing, and Secret VDLS for classified test data. Details on the specific tools, requirements for access, and approach for use will be discussed at the SOWM.

The Government will sponsor Army Knowledge Online (AKO)/ACE/DCO/VDLS/SVDLS, and other required accounts. Details will be provided at the SOWM. The Government can only sponsor accounts for U.S. Citizens. The Contractor shall provide names, contact information, level of access (upload or download), and training required for personnel requiring access to these tools NLT SOWM meeting, for all systems except VDLS. The list of Contractor personnel requiring VDLS access shall be provided to the Government 60 days prior to the Test Readiness Review (TRR). The Government will provide ACE training if requested; reference Attachment 0003 for additional detail regarding ACE.

In order to access these systems, the Contractor shall have or obtain External Certification Authority (ECA) Certificates and/or DoD Common Access Cards (CAC) for appropriate personnel. The Contractor shall designate an Information Assurance (IA) Officer to work with PM JLTV and the Government IA Manager in order to obtain and implement usage of the ECA and/or CAC program in compliance with DoD Directive 8190.3 Smart Card Technology, and DoD Instruction 8520.2, Public Key Infrastructure (PKI) and Public Key (PK) Enabling.

### **3 MEETINGS/CONFERENCES/REVIEWS**

#### **3.1 Participation/Administration**

The Contractor shall participate in the meetings, conferences and reviews required in this scope of work. Where possible, face to face meetings shall be scheduled in tandem, or groups, to minimize personnel resources and travel expenses. Unless otherwise specified in the paragraphs below, all program and technical meetings, conferences, and reviews shall be hosted (i.e. providing facility, sending invitations, media resources, security, minutes, hard copy materials) by the Contractor. The Contractor's hosting duties and responsibilities shall include all functions related to the preparation and execution of the meetings, conferences, and reviews. Government participants will be identified by PM JLTV. The Contractor shall send invitations for all meetings called out in this section not less than 14 days prior to the event. Location of face to face meetings shall be approximately 50% at or near Contractor CONUS site and 50% at or near Government Project Manager Office.

##### **3.1.1 Agenda and Read-Ahead Packages**

The Contractor shall submit an agenda and read-ahead package in Contractor format for Program Management level IPT Meetings, as well as all meetings, conferences, and reviews in this section. Each agenda shall include presentation of all items identified in the IMP for that specific event. The IMP will be used as Exit Criteria for each event. The Government will propose any changes to the agenda (or details in the content) no later than seven (7) days prior to the meeting, conference, or review. (CDRL Data Item A001)

The Contractor shall present cost & IMS information at meetings, conferences, and reviews IAW the IMP. This presentation shall include discussion of contract progress and issues (performance goals, exit criteria, schedule progress, risks and mitigation, and cost impact).

##### **3.1.2 Minutes**

The Contractor shall record and provide meeting minutes for Program Management level IPT Meetings, as well as all meetings, conferences and reviews called out in this section. The Contractor's recorder shall be identified at the beginning of each meeting. Meeting minutes shall be provided in a format mutually agreed upon between Government and Contractor for each event. (CDRL Data Item A002)

#### **3.2 Start of Work Meeting (SOWM) / System Requirements Review (SRR)**

The Contractor shall participate in a Start Of Work Meeting / System Requirements Review at or near the Government Product Manager site within 7 to 30 days after Contract Award, as scheduled by the Government. This meeting will introduce and align the Government and Contractor teams, review this Scope of Work, and review JLTV system requirements and compliance. The agenda topics for the SOWM / SRR are provided by the Government in Attachment 0004 SOWM Agenda. For this meeting, the Contractor shall provide the agenda and read-ahead package NLT two (2) days prior to the event and shall be submitted to the COR via email. For planning purposes, this meeting is anticipated to be a five (5) day event.

#### **3.3 Design Understanding Review (DUR)**

The Contractor shall host and conduct a Design Understanding Review at or near the Contractor site within 30 to 120 days after Contract Award as proposed by the Contractor at the SOWM. The Contractor shall present their detailed JLTV design. The Review shall be at a level of detail similar to a Critical Design Review (CDR), include M&S results, and demonstrate compliance to the JLTV Purchase Description (Attachment 1). The Contractor shall display and manipulate 3D CAD models for meeting participants. For planning purposes, this meeting is anticipated to be a five (5) day event.

#### **3.4 Integrated Baseline Reviews (IBR)**

For planning purposes, the IBR is anticipated to be held in conjunction with the SOWM. At Government discretion the IBR may be held as a separate event. If determined to be a separate event, The Contractor shall host the IBR at or near the Contractor site NLT 60 days after contract award. Refer to Section C.4.3.1.2 for detailed IBR requirements and allowance for additional IBRs.

#### **3.5 Program Management Reviews (PMR)**

The Contractor shall conduct quarterly PMRs, beginning with the first quarter after contract award. The PMRs shall include Contractor senior-level program management personnel. The Contractor shall present cost, schedule, performance, and risk status at each PMR and be prepared for detailed discussion with the Government. Technical issues shall be presented in terms of performance goals, exit criteria, schedule progress, risks and mitigation, and cost impact.

### **3.6 Government Conducted Technology Readiness Assessment (TRA) Reviews**

The Contractor shall participate in Government-led TRA Reviews as a portion of the TRR and PRR. The Contractor shall evaluate and present system technology maturity based on the Work Breakdown Structure (WBS), the score of the level of technological maturity, and demonstrate achievement of Technology Readiness Level (TRL) 7 as defined in the DAG Section 10.5.2, "Technology Maturity and Technology Readiness Assessments". If TRL 7 has not been achieved for any component at TRR, the Contractor shall present a technology maturation plan at the event, detailing how TRL 7 will be achieved by PRR.

### **3.7 Test Readiness Reviews (TRR)**

#### **3.7.1 Contractor Conducted Pre-Test Readiness Reviews (pre-TRRs)**

The Contractor shall conduct a Pre-TRR to present to the Government the readiness of the vehicles to enter into test. The Contractor may propose a single Pre-TRR to review the JLTV, or two Pre-TRRs to separately review the two seat and four seat vehicles. The Pre-TRR(s) shall be held at or near the Contractor build site, at least seven (7) days prior to the Government TRRs. The Contractor's presentation shall address the items in the IMP and a Government provided JLTV Test Readiness Review (TRR) Letter Of Instruction (LOI) detailing test entrance criteria. The Government will provide the LOI 90 days prior to the Pre-TRR.

#### **3.7.2 Government Conducted Test Readiness Reviews (TRRs)**

The Contractor shall support the Government TRR(s) (one (1) or two (2) based on the number of Pre-TRRs), conducted at a Government specified location. The TRRs will be held no more than seven (7) days prior to vehicle acceptance and will assess both the Contractor's and the Government's test readiness. The Contractor shall support the TRR as directed in the JLTV TRR LOI (reference C.3.7.1).

### **3.8 Manufacturing Readiness Assessment (MRA)**

The Contractor shall conduct an MRA at or near the Contractor site NLT 90 days after TRR. The purpose of this meeting will be to evaluate manufacturing readiness in preparation Milestone C. The Government will use, as a guide, the definitions, criteria, and processes defined in the DoD MRL Desk book (30 July 2010). For planning purposes, the MRA is anticipated to be a two (2) day event. MRA content, at a minimum, shall address the items in the IMP.

### **3.9 Functional Configuration Audit (FCA)**

The Contractor shall conduct a Functional Configuration Audit at or near the Contractor site. The FCA shall follow the guidance of Section 4.3.3.4.6 of the DAG. This assessment shall be the formal examination of the "as-tested" characteristics of the JLTV and will verify that actual performance complies with the design and interface requirements in the functional baseline. The FCA shall validate that each subsystem performs the functions assigned to it in the Allocated Baseline. The FCA shall review the JLTV test and analysis data, including component, subsystem, and software unit test results, to validate that the intended function or performance stated in the JLTV Purchase Description (Attachment 1) and Contractor Allocated Baseline is met.

The FCA content, at a minimum, shall address the items in the IMP. The FCA shall be conducted prior to the Production Readiness Review (PRR).

### **3.10 System Verification Review (SVR) / Production Readiness Review (PRR)**

The Contractor shall conduct a System Verification Review concurrently with a Production Readiness Review (PRR), at or near the Contractor site, at least 30 days prior to the End of Contract. The SVR, a multi-disciplined product and process assessment, shall follow the guidance of Section 4.3.3.4.5 of the DAG. The Contractor shall demonstrate, at SVR, that their JLTV design is ready to proceed into Low-Rate Initial Production (LRIP) and Full-Rate Production (FRP) within cost, schedule, risk, and other system constraints.

The Contractor shall demonstrate at PRR that their JLTV design is ready for production and the manufacturing process is ready to produce the design. The Contractor and their major Subcontractors shall demonstrate how they will accomplish adequate production planning to reduce and eliminate unacceptable risks that would breach thresholds of schedule, performance, or cost. The PRR shall examine the readiness of the manufacturing processes, the quality management system, and the production planning (e.g., facilities, tooling and test equipment capacity, personnel development and certification, process documentation, inventory management, supplier management). The SVR/PRR content, at a minimum, shall address the items in the IMP.

### **3.11 Milestone C Preparation Meetings & Support**

The Contractor shall provide support to and/or attend program meetings (~2-3 events) to review and/or clarify methodologies utilized to produce technical and/or cost data contributing to JLTV Milestone (MS) C documentation and preparation efforts. The meetings will be conducted during the contract period of performance to clarify data supporting MS C documentation. The meetings will support data calls and requests for information from various levels of echelon within the Office of the Secretary of Defense (OSD), the Department of the Army (DA)/Department of the Navy (DoN), and/or international partners.

### **3.12 Business Management Reviews**

#### **3.12.1 Cost and IMS CDRL Data Reviews**

The Contractor shall conduct monthly reviews of the IMS and Funds and Man-Hours Expenditure Report at least two (2) days prior to each CDRL submittal date. These reviews shall be supported by the appropriate Contractor Program/Project Management, Business Management, and Technical personnel.

#### **3.12.2 Contractor Manufacturing Cost Estimate Reviews**

The Contractor shall host manufacturing cost estimate meetings with Government Business Management and Cost Team representatives to review the Contractor's manufacturing cost estimates, methodologies and source data, two (2) weeks prior to each Manufacturing Cost Estimate Report submittal (Reference CDRL Data Item A003).

#### **3.12.3 CSDR Readiness Review**

Prior to the OSD/DCARC Post Contract Award Meeting (Reference C.3.12.4) and NLT three (4) weeks after contract award, the Contractor shall conduct a CSDR readiness review.

The Contractor shall present their plan for implementation of CSDR requirements. The plan shall demonstrate the intended rationale, methodology, & source data for the segregation of costs by WBS element per CSDR Contract Plan (Attachment 0005, CSDR Plan, DD Form 2794), by functional category, and by recurring v. non-recurring.

This meeting may be held concurrently with, or influenced by, the scheduling of the SOWM.

#### **3.12.4 OSD/DCARC - Post Contract Award Meeting**

The Contractor shall support the OSD/DCARC Post Contract Award Meeting. At this meeting the Contractor shall present the methodologies used for mapping internal cost accounts to the agreed upon WBS, specifically showing how individual WBS elements will be populated with both recurring and non-recurring information. For elements where either a 1921-1 or 1921-2 report is required, the Contractor shall present the methodologies used for mapping internal cost accounts to functional breakout areas.

## **4 BUSINESS MANAGEMENT**

The Contractor shall collect and analyze data by Work Breakdown Structure (WBS) and CLIN.

At the SOWM, the Contractor shall present their accounting calendar encompassing the duration of the contract. In addition the Contractor shall present scheduled dates of all recurring Business Management CDRL submissions to ACE and the Defense Cost and Resource Center (DCARC) repository. The Contractor shall notify the Government when there are any changes to this accounting calendar.

### **4.1 Contractor Manufacturing Cost Estimates**

The Contractor shall provide a Manufacturing Cost Report that demonstrates auditable estimates for expected Production & Deployment (P&D) phase manufacturing costs based on the JLTV concept and the Contractor's delivered designs.

The Manufacturing Cost Report shall include:

Auditable P&D Phase Estimates in the provided format (Attachment 0006, Manufacturing Cost Estimate Template) Methodology and Documentation

The first submission of this CDRL shall be based on the ground rules and assumptions for vehicle, trailer and auxiliary equipment/kit production schedules and quantities to be provided at the Start of Work meeting (SOWM).

Subsequent submission(s) shall be based upon the most current ground rules and assumptions provided by the Government. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A003).

### **4.2 Cost and Software Data Reports (CSDR)**

The Contractor shall prepare and submit a CSDR IAW CDRL Data Items A004 thru A009, for CSDR Contract Plan (Attachment 0005, CSDR Plan DD Form 2794).

Prime Contractors are responsible for flowing down these CSDR requirements to all subcontractors meeting the reporting thresholds. This responsibility includes requiring subcontractors to electronically report directly to the DCARC.

#### **4.2.1 Bill of Materials (BOM)**

The Contractor shall deliver a Bill of Material (BOM) for each JLTV configuration and trailer. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A010)

#### **4.2.2 Work Breakdown Structure (WBS)**

The Contract WBS is defined by the CSDR Contract Plan (ref. Attachment 0005, CSDR Plan DD Form 2794).

All WBS oriented reporting will be, at a minimum, in compliance with MIL-HDBK-881 definitions and the lowest WBS level(s) identified by the CSDR Contract Plan (Attachment 0005, CSDR Plan DD Form 2794). At the discretion of the Government, specific WBS elements may require lower levels of reporting.

The Contractor shall maintain and update the WBS and Dictionary during contract execution. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A011)

### **4.3 Contractor Integrated Performance Management**

The Contractor shall establish, maintain, and use an integrated performance management system in the performance of this contract.

The integrated performance management system shall link the Contractor's management processes and systems to include the Integrated Master Schedule (IMS), WBS, change management, material management, procurement, cost estimating, and accounting. The Contractor shall integrate these systems and processes to provide early indication of cost or schedule problems, and their relation to technical achievement.

The Contractor shall maintain a schedule and analysis system that includes a critical path feature. Use of a Commercial Off The Shelf (COTS) application is preferred.

#### **4.3.1 Integrated Master Schedule (IMS)**

The Contractor shall use the Defense Contracting Management Agency's (DCMA) Fourteen Point Schedule Assessment as guidance to develop and maintain an Integrated Master Schedule (IMS). The IMS shall contain logically networked, detailed program activities encompassing; the contract milestones, events, decision points, critical subcontract task/hand-offs, external dependencies, Government Furnished Equipment, Government Furnished Information, exit criteria, discrete tasks and activities (including planning packages where applicable) from contract award through delivery and acceptance of all test assets and the initial System Support Package (SSP).

The IMS shall be vertically and horizontally traceable. The IMS shall include reference to the IMP, WBS, and IPT. Additionally, it shall include fields and data that enable the Government to assess the information by product, process, and organizational lines or any combination.

The IMS shall be capable of displaying summary, intermediate, and detailed schedules. Additionally, it shall generate schedule analyses of progress to date. Government approval is required for all program milestone or program event changes.

The Contractor shall provide an IMS capable of producing a critical path analysis for any program milestone defined by the IMP. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A012).

#### **4.3.2 Integrated Baseline Review (IBR) Process**

The Contractor shall engage jointly with the Government program manager in Integrated Baseline Reviews (IBRs) to evaluate the risks inherent in the contract performance.

The IBR will verify the Contractor's use of a reliable performance baseline that includes the pertinent contract scope of work, consistent with contract schedule requirements.

IBRs (both prime and subcontracted) shall be scheduled, coordinated, and hosted at the Contractor or subcontractor's facility based upon acquisition and delivery schedules of the JLTV and major subcontracted materials.

##### **4.3.2.1 Initial IBR**

The Initial IBR will be conducted within time frame defined in Section C.3.4. The Contractor shall provide a read-ahead package NLT 2 business days prior to the IBR containing documents and data pertinent to the upcoming review. At a minimum, the initial IBR read-ahead package shall include:

- 1) A draft agenda (reference CDRL Data Item A001, Agendas and Read-Ahead Packages) including interview schedule, locations, and participants (w/title)
- 2) Program and Functional organizations, including names and titles of responsible individuals
- 3) Time phased staffing plan
- 4) Critical Path Analysis
- 5) Risk Register
- 6) Additional read-ahead requirements may be requested prior to the start of the IBR

In the event the IBR is not held in conjunction with the SOWM, an update to the IMS shall also be submitted.

The Contractor shall plan Government-led interviews for the IPT Leads, Program/Project Manager, Business Manager, and Project Controls Manager. The Government may adjust the interview schedule. PM-JLTV will provide the Government participants names after receipt of the agenda.

The Contractor shall be responsible for providing a Government only conference room with internet and phone service.

#### **4.3.2.2 Follow-up, Subsequent, and Subcontractor IBRs**

The Contractor shall support Follow-up, Subsequent, and Subcontractor IBRs as warranted by the program conditions listed below. Contractor IBR requirements for timing, planning, facilitating, and read ahead data are as previously stated (Section C.4.3.2.1).

##### **4.3.2.2.1 Follow-up IBRs**

Follow-up IBRs will be at the Government's request, when there are significant findings or risks identified through:

- a. reviews,
- b. reports,
- c. surveillance,
- d. significant action items remain open or when
- e. significant schedule re-planning occurs.

##### **4.3.2.2.2 Subsequent IBRs**

Subsequent IBRs may be required at the Government's request, when:

- a. significant contract options are exercised
- b. upon completion of program milestones
- c. with the incorporation of major contract modifications

##### **4.3.2.2.3 Subcontractor IBRs**

At the discretion of the Government, IBRs for subcontracted effort(s) shall be conducted at the subcontractor's facility and scheduled, coordinated, and hosted by the Contractor based on the acquisition and delivery schedules of the JLTV.

#### **4.3.3 Integrated Performance Management Reporting**

##### **4.3.3.1 Funds and Man-Hours Expenditure Report**

The Contractor shall deliver a Funds and Man-Power Report for each non-FFP CLIN. This report shall provide data for each SOW item as defined by Attachment 0007 Funds and Man-Hours Expenditure Report. Contract changes or modifications may include a revised version of Attachment 0007 Funds and Man-Hours Expenditure Report. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A013)

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## **5 SYSTEMS ENGINEERING (SE)**

### **5.1 System Level Design Document (SLDD)**

The Contractor shall develop a System Level Design Document (SLDD) that encompasses the JLTV top-level designs and subsystem designs. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A014)

### **5.2 Technology Readiness Level (TRL) Assessments**

The Contractor shall track and assess the TRL of the technologies included in the delivered configurations per the WBS elements (reference Attachment 0008 WBS). This assessment shall include at a minimum a description of the technology, the function it performs and how it relates to other parts of the system. This assessment shall also include a description of the environment in which the technology has been demonstrated and an analysis of the similarities between the demonstrated environment and the intended operational environment. This assessment shall include the TRL assigned to each technology. Reference DoD Deskbook 5000.2-R for Technology Readiness Level definitions. This information shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP.

### **5.3 Key Subsystems and Design Margins**

The Government has identified Key Subsystems based on the impact of a failure to the EMD program schedule, as identified in Attachment 0009 Key Vehicle Subsystems. The Key Subsystems are broken into three categories; Level 1, Level 2, and level 3 depending on impact on program schedule and timing. The Contractor shall review Key Subsystem Design Failure Mode Effects and Analysis (DFMEAs) and Process Failure Mode Effects and Analysis (PFMEAs) as a part of the Manufacturing & Quality IPT.

The Contractor shall define design margins for use in the design of Key Subsystems (per Attachment 0009). This information shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP.

### **5.4 System Requirements Compliance**

#### **5.4.1 Requirements Compliance Review Sessions**

The Contractor shall conduct specific line-by-line Requirements compliance review sessions in conjunction with meetings and reviews per the IMP. In these sessions, the Contractor shall be prepared to discuss and take actions to provide additional information explaining compliance for each line of the JLTV Purchase Description (Attachment 1). The SRR shall set the baseline for these discussions, and subsequent meetings shall focus on changes and updates based on the Contractor's design.

#### **5.4.2 Requirements Verification Matrix**

The Contractor shall develop a Requirements Verification Matrix that tracks achievement of all JLTV Purchase Description (Attachment 1) requirements. The Contractor shall detail their assessment methods and make evidence available to the Government when the matrix is updated to show verification of a requirement. The matrix shall be completed in accordance with the template provided as Attachment 0010. This Contractor verification is informational only and does not in any way supersede the verification requirements detailed in the JLTV Purchase Description (Attachment 1). The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A015)

#### **5.4.3 Requirements Non-Compliance Reports**

The Contractor's design is expected to achieve all the requirements in the JLTV Purchase Description (Attachment 1). The Contractor shall provide a Purchase Description Non-Compliance Report to the Government in the event of any requirements non-compliance. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A016)

## **5.5 Weight Control and Reporting**

The Contractor shall develop and implement a weight control program for the design, development, and fabrication of the JLTV. The Contractor may develop their processes using the Society of Allied Weight Engineers, Inc.'s "Recommended Practices 5- Mass Properties Control System for Wheeled and Tracked Vehicles" (26 May 2007) as a guide. The Contractor shall use a margin policy that reflects the level of confidence in the weight estimates and is applied individually to each entry in the weight reports. The Contractor shall verify scale calibration prior to weighing any components. The Contractor shall execute formal weight reduction initiatives through the configuration management processes (ref Section C.11).

### **5.5.1 Weight Estimating and Reporting**

The Contractor shall prepare and update weight estimates throughout design, fabrication, and test. The Contractor shall validate weight estimates by using tracking and monitoring activities during design and production of the first deliverable vehicle for each configuration. Weight estimates shall be under configuration control consistent with design configuration management requirements (ref Section 11). The Contractor shall update and maintain the weight estimates throughout the duration of this contract.

The Contractor shall organize and format weight estimates in accordance with the BOM and WBS. Weight estimates may include additional vehicle configurations or unique subsystem configurations as deemed necessary by the Contractor. Weight estimates shall provide the center of gravity location for all configurations as defined in the PD and compare it against the limits developed by the Contractor for compliance to performance requirements.

Weight estimates shall include the following: Curb Weight, Curb+B1-Kit, Curb+B2-Kit, Curb+EFK Kit, Gross Vehicle Weight (GVW), and Gross Combined Vehicle Weight (GCVW). Estimates shall be consistent with PDFOV-7608, axle weights for C-130. Estimates shall be consistent with the Load Plan (ref. CDRL Data Item A070) and ensure that weights are carried in the respective locations on and in the vehicles.

All vehicle weights shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP.

#### **5.5.1.1 Baseline Weight Estimate (BWE)**

The Contractor shall maintain a BWE detailing the weight and center of gravity of the vehicle during detail design. The Contractor shall add a new baseline estimate to the BWE at the conclusion of the SRR, DUR, and any major design changes after DUR. The BWE shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP.

#### **5.5.1.2 Preliminary Product Weight Estimate (p-PWE)**

The Contractor shall maintain a preliminary Product Weight Estimate (p-PWE), based on the BWE, to record and report differences or changes between the BWE and the actual weights, as materials are procured, weighed, and the first of each JLTV configuration is fabricated. A rationale shall be prepared in the event any component weight is more than +/- 2% from the estimate for the component. The p-PWE shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP.

#### **5.5.1.3 Product Weight Estimate (PWE)**

When all margins have been eliminated from the p-PWE for each vehicle configuration, it shall become the Product Weight Estimate (PWE), and correlate with the expected Curb Weight for that configuration. The PWE shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP.

#### **5.5.1.4 Weight Estimate Report**

The Contractor shall provide a Weight Estimate Report containing the BWE, p-PWE, and PWE as procurement and builds proceed during the initial vehicle fabrication for each configuration. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A017)

#### **5.5.2 Scale Weighing Completed Vehicles**

The Contractor shall ensure scale(s) used for the following measurements have been certified within a year of use and have an accuracy of 0.1%.

##### **5.5.2.1 Product Weight Baseline (PWB)**

After scale weighing the first vehicle fabricated for each JLTV configuration at Curb Weight, Curb Weight+B1-Kit, and Curb Weight+B2-Kit, the Contractor shall provide a PWB that sets the baseline of each configuration weight and explains any discrepancies between the PWE and the actual scale weights. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A018)

##### **5.5.2.2 Weighing of All Deliverable Vehicles**

Prior to delivery, the Contractor shall weigh each complete deliverable JLTV in its defined Curb Weight, Curb Weight+B1-Kit, and Curb Weight+B2-Kit configurations with no ship short items allowed. Each JLTV vehicle shall meet the weight requirements in the JLTV Purchase Description (Attachment 1) and shall be no greater than +/- 2% from the Curb Weight, Curb Weight+B1-Kit, and Curb Weight+B2-Kit defined in the PWB (ref. CDRL Data Item A018). Any corrective adjustments to the documented weights or vehicle operational limits shall be made in accordance with the Configuration Management procedures per Section C.11. This information shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP.

### **5.6 Corrosion Prevention and Control**

#### **5.6.1 Corrosion Prevention and Control Plan (CPCP)**

The Contractor shall provide and implement a Corrosion Prevention Control Plan (CPCP). The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A019)

#### **5.6.2 Finish Specification Report**

The Contractor shall provide a Finish Specification Report. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A020)

#### **5.7 Systems Interoperability**

The Contractor shall be responsible for systems interoperability. Systems interoperability shall, at a minimum, include interoperability of all hardware, software, and logistics systems included in the JLTV. Integration of GFE shall not degrade demonstrated performance of or interoperability between GFE components.

The Contractor shall show systems interoperability of vehicle systems with GFE through demonstrations, first in the System Integration Lab, then on the actual vehicle, in accordance with the Government IMP and Section C.7.7 - Systems Integration Lab (SIL).

#### **5.8 User Review Event Requirements**

The Contractor shall conduct a User Review Event between 30-60 days after Contract Award. The Event shall include evaluation of the Right Hand Operation versions of the JLTV design either as a part of review or as a separate event. The Contractor shall propose the schedule for the Event at the SOWM. The User Review Event may be executed using a vehicle or using virtual design review tools (e.g. the TARDEC Cave Automatic Virtual Environment (CAVE)) and the Contractor SIL(s), and shall be supplemented by the use of pictures, presentations, animations, interactive demonstrations, vehicle mockups, and/or vehicles, as appropriate. All representations shall accurately depict the current design.

Soldiers (U.S. and Australian) and Marines equipped with Personal Protective Equipment (PPE), MOPP IV, and extreme cold weather gear, will be made available to the Contractor for up to two weeks total for the review. Timing of the User Review Event shall be subject to Government Approval. GFE shall be used whenever possible and all GFE shall be used for the required post-build User Review Event. The Contractor shall allow the Government access to the Contractor data collection and provide the ability for the Government to collect its own data at these events.

#### **5.8.1 User Review Plan**

The Contractor shall provide a detailed User Review Plan including dates of the events and a detailed plan for executing the User Review Events. The Plan shall detail if or how each Review will include the evaluations suggested in Attachment 0011 User Review Events. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A021)

#### **5.8.2 User Review Reports**

The Contractor shall provide User Review Reports documenting the events, Contractor assessments, resulting actions, and how user feedback was implemented into the designs. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A022)

#### **5.9 Signature Management Goals**

The Contractor shall use the guidelines in the following paragraphs along with engineering judgment and best practices to establish vehicle level Signature Management Goals for visual, acoustic, and thermal detect ability (other than those specifically required in the PD), and then incorporate these goals during Contractor design. The Contractor shall present their Signature Management Goals at the DUR. All developed assumptions, conducted analysis, and test data shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP.

##### **5.9.1 Visual Signature Goal Development**

Each established visual signature goal should be met under all assumed vehicle operating and environmental conditions. Vehicle profiles, caused by the addition of mounted crew weapon systems, antennas and other equipment, should be minimized and/or treated by shaping, size variation or other engineering methods to limit the creation of unnecessary signature cues. Vehicle surfaces that are likely to produce solar glints should be treated, tilted towards the ground or minimized.

##### **5.9.2 Acoustic Signature Goal Development**

Each established acoustic signature goal should be met under all assumed vehicle operating and environmental conditions, including stationary at idle and operating transversely at low speeds. Major noise sources should be addressed in order to meet any useful acoustic signature metric (See MIL-STD 1474, Level 1). Examples of major noise sources include engine exhaust, vehicle cooling, engine intake, and other mechanical noise. The Contractor shall also consider cost, weight, and efficiency impacts of any developing Noise, Vibration, and Harshness (NVH) methods.

##### **5.9.3 Thermal Signature Goal Development**

Each established thermal signature goal should be met under all assumed vehicle operating and environmental conditions, including idle, tactical idle and fully exercised vehicle running at full load. Best engineering practices include obstructing the view of hot components in the vehicle, use of insulation and radiation barriers, and consideration of heat rejection as part of the component selection process.

### **5.10 Engine Emissions Analysis Report**

The Contractor shall provide a diesel engine emissions analysis report conducted by a third party under transient and steady state test cycles using DF2 diesel fuel. This analysis and report shall be done using the engine(s) selected by the Contractor and presented at the DUR. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A023)

### **5.11 Growth Margin**

Throughout the period of performance of this contract, the Contractor shall track the amount of growth margin in each of the following categories as a percentage of the total design: Payload, armor, weight, computing, networks, data buses, memory and towing capacity. These growth margins shall be within the constraints of the Transportability requirements as defined in the JLTV Purchase Description (Attachment 1). This information shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP.

### **5.12 Vehicle Specifications Sheet**

The Contractor shall deliver two vehicle specification sheets for each JLTV configuration, IAW Attachment 0012, Vehicle Spec Sheet. One sheet shall be in metric units and one sheet shall be in U.S English units. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A024)

### **5.13 Design for Maintainability Assessment**

The Contractor shall demonstrate how the JLTV is designed for ease of maintenance and repair. At a minimum this activity shall address the Key Subsystems (per Attachment 0009). The demonstration of the design process shall incorporate the use of CAD to simulate repair and maintenance processes using digital mockup assembly (DMA) methods (including clearances for tooling, personnel, and part removal) to determine the design has ample maintenance clearances, tolerances, and spatial constraints based on section 1.5 of Attachment 0029, CAD Models. The Contractor shall perform an assessment of Design for Maintainability that includes results of these DMA reviews. This information shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP.

### **5.14 Transportability Report**

The Contractor shall complete and submit a Transportability Report. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A025)

### **5.15 Mobility Estimates**

The Contractor shall calculate, track and provide the Vehicle Cone Index (VCI), the "minimum soil strength rating a particular vehicle can traverse before immobilization", for each JLTV configuration throughout execution of this contract. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A026)

### **5.16 Routing Diagrams - Cabling, Wiring Harnesses, and Plumbing**

The Contractor shall provide detailed logical wiring diagrams, schematics, and physical routing diagrams (harnesses, cables, and plumbing) of all electrical, fluid, and air lines in the JLTV. These diagrams shall include the C4ISR/EW and Vetronics architecture, as well as fuel, pneumatic, hydraulic, cooling, and lubrication systems. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A027)

### **5.17 Special Characteristics**

Special Characteristics (SC) are defined as product or process properties (e.g. dimensions, performance tests, part characteristics, or process parameters) that can impact safe product function (as defined by the ESOH Program, Section C.13.1) or induce non-conformance with Government regulations.

The Contractor shall identify all Special Characteristics (SC) in the JLTV design. The Contractor shall select their own marking schema for Special Characteristics as described in ISO 9001: TS 16949:2008 Section 7.3.2.3 (e.g. the inverted delta symbol). The Contractor shall use this schema to identify and mark any characteristic or parameter that, when not executed according to the appropriate tolerances or specifications, can impact safe product function or induce non-conformance with Government regulations. The schema shall be traceable throughout the supply chain.

The Contractor shall use best practices in order to include Special Characteristics in their CAD and solid modeling (e.g. use of layers to manage components, fasteners, and other classes of material).

This information shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP.

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## **6 MODELING AND SIMULATION (M&S)**

### **6.1 Contractor M&S**

At the DUR, the Contractor shall provide an in-depth presentation of the Modeling and Simulation (M&S) that was used to optimize the JLTV design. The M&S presentation shall include key performance characteristics for Mobility (NRMM, Propulsion, Suspension, and Ride Dynamics), Thermal (Engine, HVAC, Electronics), Structure, Signature Management, Survivability (Vulnerability and Criticality), Transportability, Crash Worthiness, Fire Extinguishing, Reliability, Availability and Maintainability (RAM). Additional topics may be added by the Contractor.

The Contractor shall allow Government SME(s) access to observe and discuss the M&S process for the duration of the contract, in order to ensure an understanding of the tools, processes, constraints, and assumptions used during Contractor and any subcontracted M&S to include: specific details such as Finite Element Analysis (FEA) and Computer Aided Design (CAD) modeling processes, default tolerance settings, Finite Element (FE) quality, material and structural properties, loading conditions, and nodes density assignment throughout the material depending on the anticipated stress level of a particular area. Expected cadence of these discussions shall be mutually determined at the SOWM. This requirement also applies to the creation and submission of the CAD & CAE models in Section C.12.

All M&S outputs, interim results, and data used to create the models shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP.

### **6.2 M&S Data Submissions**

The information used to create the CDRLs in the following paragraphs shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP.

#### **6.2.2 Vehicle Propulsion Data Sheets**

The Contractor shall submit fully completed Vehicle Propulsion Data Sheets (per Attachment 0014, Vehicle Propulsion Data Sheets) for each JLTV configuration. (CDRL Data Item A028)

#### **6.2.3 Vehicle Mobility and Dynamics Data Sheets**

The Contractor shall submit fully completed Vehicle Mobility and Dynamics data sheets (per Attachment 0015, Mobility Data Sheets and Attachment 0016, Vehicle Dynamics Data Sheets) for each JLTV configuration. (CDRL Data Item A029)

#### **6.2.4 Thermal Management Data Sheets**

The Contractor shall submit a fully completed Thermal Management Data Sheet (Attachment 0017) for each JLTV configuration. (CDRL Data Item A030)

#### **6.2.5 Acoustic Data Sheet**

The Contractor shall submit a fully completed Noise and Vibration Performance Data Sheet (Attachment 0018) for each JLTV configuration. (CDRL Data Item A031)

### **6.3 Vulnerability and Criticality Analysis**

#### **6.3.1 Criticality Assessment**

The Contractor shall perform a Criticality Assessment of the JLTV at all protection levels using a fault tree analysis and identify the subsystems that, if damaged or destroyed, would cause a C-kill, an M-kill, an F-kill, or a K-kill, as defined in Attachment 0019, Criticality Assessment Definitions.

#### **6.3.2 Vulnerability Analysis Data Package**

The Contractor shall provide a Vulnerability Analysis Data Package that includes: the results of the Criticality Assessment described in Section C.6.3.1, the data described in "Attachment 0020, Vulnerability Data Sheet", a completed "Cab Design Data Sheet, Attachment 0021", and detailed performance descriptions of the JLTV structure and armor. Refer to C.18.1.1.4 for additional guidance. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A032)

### **6.4 Underbody Blast Analysis**

The Contractor shall perform underbody blast analyses against all threshold and objective underbody threats defined in Annex E of the JLTV Purchase Description (Attachment 1), for each JLTV configuration at all armor protection levels. All vehicle simulations shall include the finalized vehicle designs, including all subsystems, payloads, components (including GFE), and occupants.

#### **6.4.1 Underbody Blast Analysis Package**

The Contractor shall provide an Underbody Blast Analysis Package which includes the results of the above analysis and fully completed Blast Protection Data Sheets (Attachment 0022). The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A033)

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## **7 VEHICLE ELECTRONICS (VETRONICS) AND COMMAND, CONTROL, COMMUNICATIONS, COMPUTERS, INTELLIGENCE, SURVEILLANCE, RECONNAISSANCE, AND ELECTRONIC WARFARE(CISR/EW) SUB-SYSTEMS**

### **7.1 C4ISR/EW Electronics A-Kit and B-Kit**

The Contractor shall examine contract GFE C4ISR/EW system components, installation kits and system functions and perform an analysis in order to develop and provide a C4ISR/EW Electronics A-Kit and B-Kit Report. The Electronic A-Kit shall be based on the Government Electronics A-Kit in the JLTV Purchase Description (Attachment 1). The JLTV Electronics B-Kit components shall be capable of installation by field level maintainers. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A035)

### **7.2 Environmental Survivability and Reliability**

#### **7.2.1 Electromagnetic Environmental Effects (E3)**

The Contractor shall perform analyses, studies, inspections, and tests to verify that the JLTV is designed to comply with the applicable E3 standards identified in the JLTV Purchase Description (Attachment 1). The analyses, studies, inspections, and tests shall also be sufficient to characterize the E3 performance of the integrated system including spectrum-dependent subsystems.

##### **7.2.1.1 Electromagnetic Environmental Effects (E3) Performance Report**

The Contractor shall provide an E3 Performance Report that details the E3 performance described above. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A036)

#### **7.2.2 Co-site Interference and Antenna Optimization**

The Contractor shall analyze potential interference patterns (co-site interferences) and optimize placement of all vehicle antennas (including Electronic Warfare) for each vehicle configuration. The Contractor shall work directly with the Government for final placement of all antennas. Specifically for the JLTV-CCWC configuration, the analysis shall include how each antenna is protected from the effects of missile exhaust. This data, including antenna placement diagrams and Radio Frequency (RF) characteristics shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP.

#### **7.2.3 MIL Grade Connector Waivers**

The Contractor shall submit waiver requests for non-MIL grade connectors (reference PDFOV-7660) using the process defined in Attachment 0023, MIL Grade Connector Waiver Process, and shall include technical justification (qualification standards) for the use of the alternate connector. All non-MIL grade connector waivers shall be submitted at SOWM and all waivers will be dispositioned (approved/rejected) by the Government by DUR. This information shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP.

### **7.3 Cross Domain Design**

The Contractor's Cross Domain Design shall use validated products on the Unified Cross Domain Management Offices Baseline list (<http://www.ucdm.gov/faqs.html>), or shall be required to present rationale at the DUR that details why the currently validated products are not suitable for the Contractor's Cross Domain Design solution and provides a path and schedule to obtain certification not later than 9 months prior to the end of contract.

### **7.4 Vehicle Network Configuration Package**

The Contractor shall provide a Vehicle Network Configuration package including the Internet Protocol (IP) Addressing schema, IPv6 report, Controller Area Network (CAN) database, and configuration files of the vehicle networks. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW with the Government provided IMP. (CDRL Data Item A037)

### **7.5 Security and Information Assurance (IA)**

The Contractor shall designate an IA Expert to support the JLTV certification and accreditation effort throughout the period of performance of this contract.

### **7.5.1 IA Strategy**

The Contractor shall develop an IA Strategy which includes tracking the status of IA Product certifications, system security requirements derived from the JLTV Purchase Description (Attachment 1), design system security architecture, detailed system security design; security test strategy, and risks based on the proposed architecture. The Contractor shall track if the IA or IA enabled products used within the architecture are on the DoD Unified Capabilities (UC) Approved Products List. For any products not on the List, the Contractor shall describe the path to obtain certification. This information shall be available to the Government and discussed at IPT meetings as well as major reviews IAW with the Government provided IMP.

### **7.5.2 IA Accreditation Artifact Package**

The Contractor shall provide an IA Accreditation Artifact Package. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A038)

### **7.5.3 IA Scans**

The Contractor shall provide the Government access to the Systems Integration Laboratory (SIL) (Reference C7.7) for Information Assurance Scans described in this section. Access shall be provided for a period of up to five (5) days for each scan in order to allow the Government to conduct IA Scans on the Contractor C4ISR/EW and Vetronics architectures to determine if there are any vulnerabilities or nonconformance in the system.

#### **7.5.3.1 Baseline IA Scan**

The Contractor shall provide the Government access to the SIL for the Baseline IA Scan. The Baseline Scan shall be held NLT 180 days after Contract Award.

#### **7.5.3.2 Final IA Scan**

The Contractor shall provide the Government access to the SIL and a complete, fully integrated vehicle, for the Final IA Scan. The Contractor and Government shall jointly agree on the vehicle to be used for the scan. The Final Scan shall be held NLT 30 days prior to delivery of the first JLTV-C2OTM vehicle.

#### **7.5.3.4 Software Assurance Scans**

The Contractor shall provide the Government access to the software source code repositories for all JLTV software (excluding Commercial Off The Shelf (COTS)), for two Software Assurance scans: Baseline and Final. The Software Assurance scans will be performed prior to, or in conjunction with, the correlating IA Scans. Access shall be provided for a period of up to five days for each scan in order to allow the Government to conduct Software Assurance scans on the Contractor's C4ISR/EW and Vetronics software to determine if there are any vulnerabilities in the system. The Contractor shall ensure each source code repository can accept the Government's 'Fortify Source Code Analyzer' scanning software tool.

## **7.6 Electrical Architecture Metrics**

The Contractor shall track a set of metrics for the JLTV electrical architecture for the following aspects of the vehicle command and control systems (not including GFE hardware):

- a. Computing resources. These metrics shall include peak processor throughput & utilization (per processor) and volatile & nonvolatile memory usage (per board level or processor application) for the Enhanced Modular Computing Unit (EMCU), Driver's Smart Display Unit (DSDU), Commander's Smart Display Unit (CSDU) and Auxiliary Smart Display Unit (ASDU).
- b. Functionality operation. This metric shall include start-up time for DSDU; time shall commence from vehicle ignition-on to when full functionality of the display is available. This metric shall also apply to the EMCU, CSDU, and ASDU; time shall commence from power on to when full functionality of the EMCU, CSDU, and ASDU is available through the display.

These metrics shall initially be tracked as estimates and shall be updated with actual values as the development progresses. These metrics will be reviewed by the Government initially at DUR and monthly through the end of contract. This information shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP.

### **7.6.1 Data Bus Metrics**

The Contractor shall track data bus resource metrics for the entire JTLV electrical architecture. These metrics shall measure throughput & utilization for all Vehicle Sensor Data Buses and the C4ISR/EW Data Bus. The metrics shall initially be tracked as estimates and updated with actual values as the development progresses. These metrics shall be reviewed initially at DUR and monthly through the end of contract. This information shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP.

### **7.6.2 Power Budget Accounting**

The Contractor shall track hotel, on-board, and export power loads for each JTLV configuration using a power budget breakdown. The loads shall initially be tracked as estimates and updated with actual values as vehicles are built and tested by measuring actual currents and voltages. Included in the breakdown, the Contractor shall list the total load draw of each configuration when integrated per Annex K of the JTLV Purchase Description (Attachment 1). This information shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP.

#### **7.6.2.1 Power Generation Growth Analysis**

The Contractor shall conduct an analysis to determine how each configuration could be upgraded to supply power to future on-board systems including how additional power distribution would be connected to the existing architecture. The analysis shall include planning for future increased electrical power generation. The Contractor shall identify technology candidates, design modifications, retrofit compatibility, and supporting theoretical calculations. This information shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP.

### **7.7 Systems Integration Lab (SIL)**

The Contractor shall develop and use a SIL or SILs to integrate and test the JTLV system electronics, Line Replaceable Units (LRUs), and Configuration Items (CIs) prior to full vehicle integration. The SIL(s) shall contain all JTLV production-intent electrical and electronic components (modules, displays, controls, clusters, cabling and harnesses) and GFE electronic hardware and software to enable the replication of fully integrated vehicles. The SIL(s) shall be able to demonstrate actual hardware for both four (4) seat and two (2) seat vehicles.

The SIL(s) shall be functional prior to the Baseline IA Scan and at this time the Contractor shall provide a SIL Demonstration of the SIL layout and capabilities using the Contractor operating procedures provided in CDRL Data Item A039. The Contractor shall also provide demonstrations prior to the Final IA scan. After delivery of the vehicles, the SIL(s) shall remain fully functional. Proposed corrective actions shall be validated in the SIL(s) prior to implementation on the vehicles. The SIL(s) shall be kept current using the Change Management process defined in section C.11 for configuration changes developed by the Contractor in order to reflect the current state of the vehicles until the end of the contract.

#### **7.7.1 SIL Demonstration Procedures**

The Contractor shall develop and provide recommended operating procedures for the execution of the scenarios identified in SIL Demonstration Operating Procedures (Attachment 0024). The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A039)

### **7.8 Health Management System (HMS)**

#### **7.8.1 HMS Report**

The Contractor shall provide a HMS Report to include their Diagnostic Fault Data Table, Sensor Strategy, the Fault Notification Strategy, and the Data Strategy. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A040)

#### **7.8.2 Diagnostic Maturation Strategy**

The Contractor shall perform analysis of vehicle Condition Based Maintenance (CBM) data when failures occur on subsystems and components with diagnostic capability during Contractor and Government testing. During Government testing, the Government will identify specific failures and provide CBM data to the Contractor to support these activities. The Contractor shall use their internal Software Change Management process to evaluate and propose diagnostics enhancements to improve and mature the HMS. This information shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP.

### **7.9 Other Analyses**

For all of the analyses listed in this section, the information shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP

#### **7.9.1 Electrical Bus Fault Handling Analysis**

The Contractor shall conduct analysis to demonstrate the following:

- 1) How the electrical distribution system prevents or protects against voltage reversals (including the limits of the reverse voltage tested or verified).
- 2) How the electrical distribution system is protected from short circuits.
- 3) How the system reacts and is protected against arcing. If any arc detection techniques are used, the analysis shall discuss these techniques.
- 4) Electrical items which should be checked for proper operation prior to initial Fording Tests.

#### **7.9.2 Cascading Electrical Failure Analysis**

The Contractor shall demonstrate through analysis the fault detection strategies employed on the vehicle that relate to the power management, generation, and distribution system will not cause a cascade of failures or have any adverse affects on other equipment on the bus. If a fault is severe enough to cause other effects, the Contractor shall identify and discuss these effects.

#### **7.9.3 Battery Charging Strategy Analysis**

The Contractor shall perform analysis and create curves or charts that demonstrate the correct charging rate for the battery at any State of Charge (SOC) and bus voltage level.

#### **7.9.4 Energy Storage Device Degradation Analysis**

The Contractor shall perform analysis that demonstrates that the energy storage device does not degrade below the level to perform its stated vehicular functions in the JLTV Purchase Description (Attachment 1) in less than 3 years.

#### **7.9.5 Data Bus Communication Failure Default Mode Analysis**

The Contractor shall perform analysis that demonstrates that when data bus communication required to control or configure components fails, the controlled or configured component will operate in a default state that provides for failsafe operation (Reference Attachment 1 - JLTV Purchase Description - PDFOV-1883)

### **7.10 VICTORY Participation**

The Contractor shall evaluate design compliance to the VICTORY Standards Specification 1.0 (29 July 2011, <https://sp.kc.us.army.mil/sites/VICTORY/default.aspx>) and present a comparison of fully including VICTORY as a part of their design versus not including VICTORY, including expected cost differences, expected design advantages or burdens, compliance to the VICTORY Standards, and rationale for areas that are not compliant to the VICTORY standard. This presentation shall be given to the Government, including VICTORY personnel, NLT 60 days after Contract Award.

## **8 SOFTWARE**

The Contractor shall deliver all Non-Developmental Item (NDI), Commercial Off The Shelf (COTS), and Government Furnished Equipment (GFE) software in each delivered vehicle with appropriate licenses and without restrictions for usage in its intended vehicle application.

### **8.1 Software Architecture Design Description (SADD)**

The Contractor shall present a SADD at the DUR, describing the collection of software components utilized to meet JLTV requirements. The SADD shall describe the collection of software components utilized to meet JLTV requirements including descriptions of the interfaces and dependencies between components in the architecture. The SADD shall also include an explanation of each software component with its function, origin (e.g. COTS, CFE development item, GFE), size & computer resource constraints, interfaces, and contract/derived requirement(s) satisfied by the component. At a minimum, the following functional areas shall be examined: On-board C4ISR computing systems (including controls & displays), vehicle electronics (including embedded software), and power management. This information shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP.

### **8.2 Software Build Process (SBP)**

The Contractor shall provide a SBP document which details the process of compiling complete software executables for all JLTV configurations. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A041)

### **8.3 Source Code and Executables**

The Contractor shall deliver a copy of all software images, executables, parameter files, configuration files, and source code utilized on the JLTV and developed by the Contractor and all subcontractors, including C4ISR and Vetronics software and firmware. The software images, executables, parameter files, configuration files, and source code shall be delivered separately from the vehicles. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A042)

### **8.4 Software License Package**

The Contractor shall develop a Software License Package to identify and deliver all commercial software licenses utilized on the delivered vehicles. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A043)

### **8.5 Software Version Description (SVD)**

The Contractor shall develop a SVD document to describe each software version release. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A044)

### **8.6 Capabilities Certification**

The Contractor shall have and maintain at least a Capability Maturity Model Integration (CMMI) Level III Software Engineering Institute (SEI) certification for all business units and subcontractors performing software development work.

### **8.7 Software Metrics**

The Contractor shall track progress against the following software metrics. Tracking shall begin with estimates at SOWM and shall be updated monthly with actual values as available through the end of contract. The software metric information shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. The software metrics shall address the following areas for the complete JLTV:

#### **8.7.1 Software Integration and Test Metric**

This metric shall track the number of successfully completed integration and test procedures for each Software Configuration Item. Actual procedures shall be tracked against the initial estimates, to provide indicator of progress versus plan.

#### **8.7.2 Problem Reporting Metric**

The Contractor shall use a closed loop problem tracking system to capture, track, and correct software problems. The Contractor shall keep a set of metrics to track the number, type, and severity of open software problem reports against the total number of closed reports. The metrics shall be cumulative to show trends of problem report openings and closures over time.

### **8.8 Vehicle Software Updates**

If necessary, the Contractor may update software and calibrations associated with specific automotive systems within 120 days after initial vehicle delivery. Software acceptable for these updates are those systems which require extensive testing on fully functioning, complete vehicles that cannot be accurately modeled, simulated, or developed using an alternative method, including:

- a. Electronic Stability Control Including Traction Control and Anti-Lock Brakes)
- b. Active Suspension Systems (Active Damping, Height Adjustment, and Leveling)
- c. Active Drive train Systems (Active Transfer Case and/or Differentials)
- d. Active Safety Systems (Crash Avoidance, and Crash Preparation)

All software updates shall be presented to the Corrective Action Review Team (CART) and performed during a Corrective Action Period (CAP), unless otherwise authorized by the CART. The Contractor shall schedule these updates with the Government, install any software updates in test assets at all test sites, and maintain configuration management.

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## **9 RELIABILITY, AVAILABILITY, AND MAINTAINABILITY (RAM) PROGRAM**

### **9.1 RAM Program**

The Contractor shall develop, implement, and maintain a comprehensive RAM Management Program. The management program shall establish a process to achieve all of the JLTV Purchase Description (Attachment 1) RAM requirements. The program shall include all aspects of reliability, availability, and maintainability. The Contractor shall develop engineering processes to ensure a reliable design reflected in a corresponding reliability model. American National Standards Institute document GEIA-STD-0009-2008, including the Checklist for Evaluating Reliability Program Plans, shall be used as guidance for reliability program development. The Contractor shall make available all RAM data for all subcontractor supplied component or subsystem. This information shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP.

### **9.2 Reliability Model**

The Contractor shall develop and utilize a reliability model for each configuration and trailer within the JLTV. The reliability model shall be complete with reliability predictions, developed with appropriate design tools and processes such as: Fault Tree Analysis (FTA), Failure Modes and Effects Analysis (FMEA), Reliability Centered Maintenance (RCM) concepts, Accelerated Life Cycle Testing (ALT), and continual improvement. Throughout the period of contract performance, the Contractor shall update the reliability model whenever new failure modes are identified or when reliability predictions are impacted by design or manufacturing changes. The Contractor shall consider their reliability growth tracking status when prioritizing correction actions.

The Contractor shall utilize the reliability model to:

1. Generate and update the reliability predictions from the system level down to lower indenture levels
2. Aggregate system-level reliability based on reliability predictions from lower indenture levels up to the system level
3. Manage the reliability predictions, design predictions, current demonstrated reliability, and proposed design change results from engineering analysis as well as component and system test results
4. Identify single points of failure
5. Enable the application of proactive tools such as Reliability-Centered Maintenance (RCM) and Condition Based Maintenance Plus (CBM+) (as directed in DODI 4151.22), to optimize system design and respective reliability, availability, and maintainability performance.

This information shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP.

#### **9.2.1 RAM Predictions**

The Contractor shall develop and provide Reliability and Maintainability (R&M) predictions that correlate with the Contractor Reliability Model. R&M predictions shall include reliability design predictions for Mean Miles Between Hardware Mission Failure (MMBHMf) and maintainability design predictions for Maintenance ratio (MR), Mean time to repair (MTTR) and Max Time to Repair (MaxTTR). R&M predictions shall include predictions at the LRU level for the JLTV design in A-kit configuration as well as B-kit configuration. R&M predictions shall include failure rates for each LRU and shall further identify whether the individual failure rates are estimated (E), calculated (C), or measured (M). R&M predictions shall be rolled up to the system level. The Contractor shall analyze and update the R&M predictions whenever a design change or manufacturing change occurs. The Contractor shall include R&M predictions in the reliability model. The Contractor shall document any assumptions, boundary conditions and any test or modeling inputs used in developing R&M predictions.

If possible, the Contractor shall generate the R&M predictions by utilizing actual component and subsystem test-generated data with test inputs at least equivalently demanding as the JLTV Operational Mode Summary (OMS) / Mission Profile (MP) (JLTV Purchase Description (Attachment 1), Annex H). The Contractor may also use previously generated data for COTS items to generate R&M predictions, provided that the testing represented the OMS/MP environment. The Contractor shall not base their R&M predictions solely on models, on Non-Electronic Parts Reliability Data (NPRD), or on MIL-HDBK-217 data. If inputs used to generate R&M predictions are not representative of the OMS/MP, then the Contractor shall use an adjustment factor to account for differences between OMS/MP and actual inputs used. The Contractor shall provide rationale in this CDRL for any adjustment factors. The information used to create this CDRL shall be available to the

Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP.  
(CDRL Data Item A045)

### **9.3 Reliability Growth**

#### **9.3.1 Reliability Growth Plan**

The Contractor shall develop and deliver a reliability growth plan IAW the AMSAA Projection Maturity Model (PM2) software tool that describes planned reliability growth throughout system design and Government testing (to include Contractor performed and Government performed, reference section C.17.3). The reliability growth plan shall describe how the Contractor will achieve the JLTV reliability requirements in the JLTV Purchase Description (Attachment 1) and comply with the ASA ALT Reliability Threshold (Attachment 0025). Refer to Attachment 0042, CAP Execution Plan for more guidance. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW with the Government provided IMP. (CDRL Data Item A046)

#### **9.3.2 Reliability Growth Tracking**

The Contractor shall track reliability growth using the AMSAA Maturity Projection Model (AMPM) software tool. The Contractor shall develop and deliver reliability growth tracking curves once system level Reliability Growth testing begins, IAW the AMSAA Reliability Growth Guide (Technical Report No. TR-652, Broemm, Ellner, and Woodworth) (Attachment 0026). The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP.  
(CDRL Data Item A047)

## **10 RISK MANAGEMENT**

Risk management shall be an integral part of all technical reviews, risk review board meetings, periodic program management reviews, meetings, and IPTs. The Contractor shall invite Government representative(s) to participate in monthly Contractor Risk meetings.

### **10.1 Risk Tracking Reports**

The Contractor shall develop and deliver Risk Tracking Reports. The Contractor shall systematically identify and analyze all risks, and shall develop mitigation plans for all red and yellow risks as defined in "Attachment 0027, JLTV Risk Scoring Criteria". The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP.  
(CDRL Data Item A048)

## **11 CONFIGURATION MANAGEMENT (CM)**

The Contractor shall maintain a CM process to control all hardware and software configurations including documentation, media, and parts representing or comprising the JLTV. ANSI/EIA-649A, IEEE 828, and MIL-HDBK-61A shall be used as guidance. The Contractor shall maintain configuration management responsibility throughout the period of performance of this contract.

As part of CM, the Contractor shall utilize a part numbering system that includes an alpha-numeric prefix to identify subsystem and configuration version level in the subsystem and component part number.

As part of the Contractor's configuration management process, the Contractor shall review and update the level of repair analysis required by CDRL SOWC-553 (Level of Repair (LOR) Program Report).

This information shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP.

### **11.1 Baseline Description Documents**

The Contractor shall deliver the Allocated and Initial Product Baselines in separate Baseline Description Documents. Reference the DAG Section 4.2.3.1.6.2. - Establishment of Configuration Baselines as a guide for defining the Allocated and Product Baselines. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP.  
(CDRL Data Item A049)

### **11.2 Change Reporting**

The Contractor shall use the following classifications for all changes made to the baselines:

Class I: A change to Contractor approved configuration documentation, and:

- 1) affects any physical or functional requirement in Contractor approved ALLOCATED configuration documentation, OR
- 2) affects Contractor approved PRODUCT configuration documentation AND one or more of the following:
  - a. Government furnished equipment (GFE),
  - b. safety,
  - c. compatibility, interoperability, or logistic support,
  - d. Contract schedule delay,
  - e. will require retrofit of delivered units,
  - f. interchangeability, substitutability, or replaceability of any item down to non-repairable subassemblies,
  - g. sources on a source control drawing,
  - h. skills, manning, training, biomedical factors or human engineering design.
  - i. Configuration item cost increase.

Class II: All other changes are Class II changes.

### **11.2.1 Change Log**

The Contractor shall maintain a change log to track changes and status of each change implementation. The change log shall include: description of changes, parts affected, reason for change, classification of change, status of change (New, In Design, In Validation, Approved, Implemented, Verified), date opened, date closed, deficiencies corrected, associated problems related. This information shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP.

### **11.2.2 Baseline Change Notification (BCN)**

The Contractor shall provide the Government access to attend the Contractor's change control board. Submittal of a BCN does not relieve the Contractor from the requirement to meet all PD requirements.

After the DUR, the Contractor shall submit a BCN to the Government for notification prior to all changes that affect the Allocated Baseline and all Class I changes to the Product Baseline. The Contractor shall maintain configuration authority of the Product Baseline. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A050)

After delivery of the vehicles, the Contractor shall develop an implementation plan for all design changes. The implementation plan shall include a vehicle version naming convention to delineate configurations. Each vehicles' configuration level shall be discernable (e.g. label, marking) on the vehicle and updated when new changes are implemented. If the changes impact the SSP, the SSPCL shall be updated (reference section C.17.6.5.1). The Contractor shall maintain a database after TRR that tracks configuration versions and details each configuration change and rationale for that change. This information shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP.

## **12 LIFECYCLE PRODUCT DATA MANAGEMENT**

The Contractor shall possess and utilize a product lifecycle management system to manage the design and manufacturing development including a quality management system (Ref. Section E.2.1 - Quality Management System) to organize and maintain best practices throughout the organization.

### **12.1 Data Management System**

The Contractor shall possess and utilize a product data management system to store, manage access, and track multiple versions and iterations of JLTV designs and related data.

The system shall manage digital representations of development product (part and software) items, associated product structures (bill of materials), product definition (e.g. engineering drawings, solid models, specifications and standards, software documentation, schematics), computer-aided engineering(CAE) analysis models, testing and simulation results, and other related documentation.

The Contractor shall conduct solid model data geometric validation properties (GVP) checks on CAD and CAE solid models to identify part, assembly, and installation shape and fit (geometry and topology) problems that will affect downstream activities, such as analysis, modeling and simulation, rapid prototype, and data exchange.

### **12.2 Technical Data Package (TDP) Cost Estimate**

The Contractor shall deliver a cost estimate for Government to obtain unlimited rights (or another appropriate level of rights) to a Production Level Technical Data Package consisting of 3D models with associated 2D drawings, for the JLTV. The Contractor shall use MIL-STD-31000 for guidance and definitions. As part of the cost estimate, the Contractor shall break out as separate line items, spare parts, subsystems, and all components that could be procured separately for sustainment functions. The cost estimate shall include a description of the methods and processes used to calculate the cost. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A051)

### **12.3 CAD/CAE Technical Data Deliveries**

The Contractor shall work with the Government to establish and mutually agree upon a delivery method for CAD/CAE data deliverables within sixty (60) days of contract award. The Contractor shall deliver CAD/CAE data in PTC Pro/Engineer format. The 3D CAD/CAE models shall be in global body position.

#### **12.3.1 Simulation-based Design Model Data**

The Contractor shall deliver Simulation-based design Computer Aided Engineering (CAE) model data for each JLTV vehicle configuration IAW Attachment 0028, M&S CAE Models. Prior to submission, the Contractor shall verify that the Top Level Assembly opens without errors. The Contractor shall provide a validation check report for each part and assembly solid model. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A052)

#### **12.3.2 Developmental Design Technical CAD Data**

The Contractor shall deliver Developmental Design Technical CAD Data for each JLTV vehicle configuration IAW "Attachment 0029, CAD Models". Prior to submission, the Contractor shall verify that the Top Level Assembly opens without errors. The Contractor shall provide a validation check report for each part and assembly solid model. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A053)

## **13 ENVIRONMENTAL, SAFETY AND OCCUPATIONAL HEALTH (ESOH)**

### **13.1 ESOH Program**

The Contractor shall develop, implement, and maintain an ESOH program in accordance with MIL-STD-882D. The ESOH program shall include the following areas: system safety, occupational health, environmental impact, and hazardous materials management.

### **13.2 ESOH Working Group (WG)**

The Contractor shall participate in the JLTV ESOH WG which is comprised of subject matter experts from the Contractor and Government communities whose primary focus is to ensure all ESOH issues and hazards are identified and addressed. The Contractor shall attend quarterly face to face WG meetings at mutually agreed upon locations and dates. During ESOH WG meetings the Contractor shall present ESOH program status and updates, Hazard Tracking Log (HTL) status and updates, Hazardous Materials usage status and updates, and other ESOH data.

### **13.3 Hazard Tracking Log (HTL)**

The Contractor shall prepare a HTL IAW "Attachment 0030, Hazard Tracking Log Content Requirements". The Government will provide final disposition for all hazards. Closed out hazards shall remain on the HTL. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A054)

### **13.4 Safety Engineering and Health Hazards**

#### **13.4.1 Safety Assessment Report (SAR)**

The Contractor shall provide a SAR which documents the results of system safety and health hazard analyses, hazard evaluations, and any independent testing. The SAR shall address each configuration and trailer within the JLTV. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A055)

### **13.5 Environmental Compliance**

The Contractor shall ensure that all aspects of the contract execution are in compliance with United States Federal, State, and Local environmental regulations and requirements; including activities associated with design, prototype build, test, storage, and disposal. The Contractor shall immediately notify the Contracting Officer if the Government gives any direction that may result in violation of law or regulation.

### **13.6 Hazardous Materials Management**

For the purposes of this contract, hazardous materials are defined by FED-STD-313, Section 3.2. Specific Prohibited Hazardous materials for the JLTV are identified in PD3574 of the JLTV Purchase Description (Attachment 1). Hazardous materials prohibitions shall apply to all components, parts, and materials provided under this contract, including items purchased through a subcontractor or supplier, COTS components, OEM parts, and manufactured parts.

#### **13.6.1 Exceptions to Hazardous Materials Requirements**

Waivers from the hazardous materials requirements shall not be permissible except where a suitable alternative does not exist. The Contractor shall present at the SOWM a list of anticipated waivers for any prohibited materials. The Contractor shall submit formal waiver requests to the Government no later than DUR, using Attachment 0031, Request for Use of Prohibited Materials. Waiver requests shall also include detailed technical justification for the use of prohibited hazardous materials. The Government will make the final determination on whether sufficient justification has been provided to support approval of any waiver requests. The Contractor shall not order any items containing prohibited materials until the Government approves the waiver.

Beryllium-Copper (in electrical connectors), lead-acid batteries, and lead solder may be used without requesting a waiver from the Government.

#### **13.6.2 Hazardous Materials Management Report (HMMR)**

The Contractor shall prepare a HMMR in accordance with National Aerospace Standard 411, section 4.4. with NAS 411, Section 4.4.1 modified to include Hazardous materials used in the system manufacture and assembly, in addition to those delivered on the vehicle and required for operation and support. The Contractor shall discuss status, changes or issues with the HMMR as part of DUR and each program management review. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A056)

## **14 HUMAN SYSTEMS INTEGRATION (HSI) / MANPOWER & PERSONNEL INTEGRATION (MANPRINT)**

The Contractor shall conduct a HSI/MANPRINT program in the areas of human factors engineering, manpower, personnel, training, health hazards, safety, and Soldier survivability in accordance with DoDI 5000.02 and AR 602-2.

The Contractor shall participate in the Joint HSI/MANPRINT Working Group (JMWG). The Contractor shall attend quarterly face to face JMWG meetings at mutually agreed upon locations, dates, and monthly VTCs. During the JMWG meetings, the Contractor shall present HSI/MANPRINT program status and updates, design data, planned HSI/MANPRINT events, and event findings.

### **14.1 Human Factors Engineering Analysis (HFEA)**

For HFE requirements not specifically defined in the PD, the Contractor shall use the design standards contained in MIL-STD-1472, MIL-STD-1474, and MIL-HDBK-759 as a guide for application of human factors engineering practices during the design of the JLTV and applicable components.

The Contractor shall perform and deliver a HFEA IAW "Attachment 0032, Human Factors Engineering Analysis". The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A057)

### **14.2 Warfighter Workspace Analysis**

The Contractor shall perform and provide a three-dimensional Jack Soldier Workspace Analysis IAW "Attachment 0033, Warfighter Workspace Analysis". The analysis shall include diagrams, illustrations, drawings with measurements and files used to perform three-dimensional Jack Soldier Workspace Analysis using the 2015 Central 90% Computer Aided Design (CAD) Seven Boundary Condition ARL JACK (TM) Human Figure Manikins (Provided as GFI). The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A058)

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## **15 SUPPORTABILITY/INTEGRATED LOGISTICS SUPPORT (ILS)**

The Contractor shall plan and implement an ILS program addressing all elements of Integrated Product Support (12):

1. Product Support Management
2. Design Interface
3. Sustaining Engineering
4. Supply Support
5. Maintenance Planning & Management
6. Packaging Handling Storage & Transportation
7. Technical Data
8. Support Equipment
9. Training & Training Support
10. Manpower & Personnel
11. Facilities and Infrastructure
12. Computer Resources.

The Contractor shall conduct the ILS effort as an integral part of the design, development and integration process to define the range and depth of the required support, and address all applicable and related elements of logistics.

The Contractor shall maximize commonality at the component, Line Replaceable Units (LRU), Line Replaceable Modules (LRM) level between variants as well as commonality (See Attachment 0034, ILS Definitions) with DOD and commercial sectors through the use of subsystems, components, LRUs, or LRMs already in the DOD system or commercially available to the maximum extent practical in terms of cost, schedule and performance goals.

The Contractor shall use the following reference documents for the ILS EMD areas of support:

- a. Logistics Supportability Planning and Procedures in Army Acquisition, DA PAM 700-56, dtd. April 2006,
- b. Logistics Assessment Guidebook, dtd July 2011
- c. Integrated Logistics Support, AR 700-127, dtd 29 April 2009.

### **15.1 Maintenance Plan, Analysis, and Reports**

#### **15.1.1 Level of Repair (LOR) Program Plan and Analysis**

The Contractor shall provide a LOR Program Plan detailing the methodology and include all system-level repairs, and all subsystem, assembly, and subassembly level candidates for analysis (e.g. designated configuration items (CI)). The Contractor shall examine the Service Components Maintenance Philosophies and respective Military Occupational Specialty (MOS) skill set(s) and conduct an economic and non-economic analysis. The Contractor's examination and analyses shall determine the system, subsystems, assemblies, and subassemblies level of repair and determine if discard is warranted using the latest version of the Computerized Optimization Model for Predicting and Analyzing Support Structures (COMPASS) Model. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A059)

##### **15.1.1.1 Level of Repair Analysis (LORA) Report**

The Contractor shall provide a LORA report, to include all COMPASS input and output data files used in the assessment. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A060)

##### **15.1.2 Reliability Centered Maintenance (RCM) Analysis**

The Contractor shall perform RCM Analysis to identify and document system Operator and Maintainer service tasks based on scheduled and on-condition preventive maintenance requirements. The Contractor shall use the procedures outlined in Society of Automotive Engineers (SAE) JA 1011 and SAE JA 1012 to execute RCM Analysis predicated on the Army and Marines maintenance concepts. The Analysis shall be conducted with the assistance of the Government Subject Matter Experts (SMEs) in the areas of operations and maintenance.

The Contractor shall conduct RCM analyses to the fifth level of allocation if it is part of the Contractor's design.

#### **15.1.2.1 RCM Report**

The Contractor shall provide a validated final report that will summarize the findings of the RCM analysis and include:

- a) Fully described functions supported by the system under analysis
- b) Subsystems of the System under Analysis
- c) Appropriate and cost effective maintenance policies for the subsystems analyzed
- d) Shortcomings and recommended design changes for subsystems analyzed, if discovered
- e) Realized RCM output data that may be used as input for decision support tools that allow for electronic maintenance diagnosis

The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A061)

#### **15.2 Job Task Analysis**

The Contractor shall identify, evaluate, and document the mission essential, critical operation, and maintenance tasks of the JLTV system and provide the Job Task Analyses (JTA) identified below:

a. Mission Task Analysis. The Contractor shall identify and document mission, collective, and individual tasks. The Contractor shall identify and document mission essential tasks as a part of the system analysis, and evaluate the appropriateness and feasibility of system functions and roles allocated to operators and maintainers. The Contractor shall describe the system functions which must be performed to meet the system objectives within the mission context. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A062)

b. Workload Analysis. The Contractor shall conduct Workload Analyses to validate the suitability of the projected number of personnel and the team composition to perform required missions, maintain systems and equipment, and provide necessary technical, engineering, material, logistics, and administrative support. The Workload Analysis may include IMPRINT, spreadsheet, and paper-based modeling. The Contractor shall evaluate the workload execution of representative scenario(s) placed on the planned operators, maintainers, and support personnel. The reports shall summarize the workload analysis methodology, assumptions, data sources, results, and recommendations for human tasks vital to the operation and maintenance of the system. The Contractor shall conduct this analysis in coordination with Manpower analysis and estimations. The Contractor shall conduct workload analysis during various human test opportunities to verify performance and validate previous workload models. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A063)

c. Skills Analysis. The Contractor shall conduct a Skills Analysis to document the knowledge, skills, and attitudes necessary for the operators, maintainers, and support personnel to execute all anticipated missions and tasks. The Contractor shall conduct the analysis to validate the suitability of the number of personnel and the various combinations of knowledge, skills, and attitudes required. Within the Skills Analysis, the Contractor shall define the training process and capabilities required to ensure the knowledge, skills, and abilities can be developed and maintained. The Contractor shall coordinate the Skills Analysis results with training material, approaches, and methods. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A064)

### **15.3 Operator Manuals**

The Contractor shall provide commercial Operator Manuals (OMs) that support the planned evaluation events.

The OMs shall represent:

- 1) Operations (to include driving restrictions) and Operator/Crew Maintenance necessary to support the configuration of the vehicle being tested.
- 2) Preventative Maintenance Checks and Services (PMCS); the Contractor shall develop and prepare operator PMCS for each variant that ensures safe vehicle operation and preclude avoidable vehicle wear or damage. The sequence of the PMCS shall be ordered to complete the process with one pass around the vehicle.
- 3) Vehicle Commander Interfaces and operations of the Vehicle Commander's Smart Display Unit (CSDU).

The OMs shall be in Government work package format and shall be provided in hard copy and in electronic format (PDF File) (reference MIL-PRF-32216). Four hardcopies shall be provided to the Government and four hardcopies to each Test Center(s) concurrent with vehicle delivery to the test site. An Operators Manual shall be over packed with each vehicle delivered under this contract.

The Government may request the OMs be updated as necessary to incorporate all changes, corrections, modifications. All changes shall be sequenced numbered in the same style and format as the delivered OMs.

The Contractor shall submit a Validation Certificate with the final delivery of the OMs. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews. (CDRL Data Item A065)

### **15.4 Copyright Release**

The Contractor shall identify copyrighted material. The Contractor shall furnish an appropriate copyright release giving the Government permission to reproduce and use copyrighted information. When the Contractor uses commercial data which covers a subcontractor's components or portions thereof, and the subcontractor's data contains copyright material, the Contractor shall be responsible for obtaining a copyright release from the subcontractor and furnishing such release to the Government. The Contractor shall provide a copyright release letter. The letter shall be on company letterhead, dated and signed by an authorized company representative. The letter shall certify that the Government has full copyrights from Contractor and subcontractors. Copyright letter shall state all OMs developed are free from copyright restrictions and the Government can edit, reprint and distribute information in the manual as required. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A066)

### **15.5 Packaging Data**

The Contractor shall develop packaging data in accordance with (IAW) MIL-STD-2073-1D (1) (hereafter shown as MS2073), DoD Standard Practice for Military Packaging, and all appendices for the End Item and all repairable components. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews. (CDRL Data Item A067)

#### **15.5.1 Special Packaging Assessment**

The Contractor shall conduct an assessment to determine if new or existing commercially available reusable container designs are suitable for JLTV subassemblies and components. The Contractor shall assess form, fit, and function. The Contractor shall compare costs to modify existing designs or alternate new designs. The Contractor shall develop and submit a proposed container approach if a new or modified commercially available reusable container is required. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews. (CDRL Data Item A068)

### **15.6 Source Data for Forecasting Diminishing Manufacturing Sources and Material Shortages (DMSMS)**

The Contractor shall develop, and deliver to the Government, a DMSMS Management Plan for managing the loss, or impending loss of manufacturers or suppliers of parts and/or materials IAW DoD 4140.1 R, Section C 3.6 and DoD DMSMS Guidebook (SD-22) November 2006. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A069)

### **15.7 Supply Support Strategy**

The Contractor shall be authorized to use Government Sources of Supply (SOS) under the terms of this contract. For items managed by Defense Logistics Agency (DLA), the Contractor shall be authorized to purchase class IX parts directly from DLA, via use of a Contractor Furnished Materiel (CFM) Department of Defense Activity Address Code (DODAAC). Use of DLA as a SOS, or any other Government SOS, does not relieve the Contractor of any performance metric, as stated in the contract. Contractors utilizing DLA as SOS shall also be authorized to leverage other DLA supply chain services, such as, distribution and stock positioning, via individual partnering arrangements directly with DLA.

### **15.8 Data Plates**

The Contractor shall mark the items below; with a data plate that contains the Unique Identification (IUID) data matrix as defined in MIL-STD-130 (latest version) and DFARS clause 252.211-7003. Whenever practicable, the location of the marking on the item shall ensure its readability during normal operational use.

Principal End Item

The Following Subassemblies, if installed:

Engine  
Transmission  
Integrated Starter Generator (ISG) or similar  
Transfer Case  
Steering Gear Box  
Differential Assembly  
Axles

#### **15.8.1 Principal End Item Data Plate**

The Contractor shall permanently affix all data plates. The Contractor shall mark data plates with a two-dimensional IUID data matrix defined in MIL-STD-130 and use Figure 1 as a guide. The Contractor shall include human and machine-readable bar coding for all data plate information. The Contractor shall present a marked data plate at the DUR for verification and validation of proper Syntax. The Contractor shall use a two-dimensional laser engraved UII Tag. The Contractor shall insert vehicle identification tracking numbers or letters in the data plate space marked serial number: (VIN). Tracking identification numbers and/or letters will be provided by the Government. The IUID data matrix shall be no less than one centimeter (1cm) wide and no less than forty percent (40%) in contrast.

##### **15.8.1.1 Principal Data Plate Information**

The minimum human readable data plate information is listed below:

Nomenclature:

USMC or Army Vehicle Registration Number:

NSN: (leave blank)

Design Activity: (MFR ID Cage Code)

Serial Number: (VIN)

Government Ownership Designation: US PROPERTY

Contract Number:

### **15.8.2 Subassembly Data Plates**

At a minimum, subassembly data plates shall have human and machine-readable bar code and IUID data matrix information. For the above subassembly items that do not currently utilize a data plate, the Contractor shall refer to MIL-STD-130 to develop best business practices for display of the below data elements. All applications shall be permanently affixed, as well as, human and machine-readable.

#### **15.8.2.1 Subassembly Data Plate Information**

The minimum data plate information for subassemblies is listed below:

Part number

Serial number

Manufacturer cage code

Two-dimensional UID data matrix

NSN (if available)

### **15.9 Load Plan**

The Contractor shall develop and deliver a load plan schematic that details optimum vehicle locations for all payload items in the JLTV Purchase Description (Attachment 1), for each JLTV configuration and weight state (Curb, ECC, GVW, GCVW). The Load Plan schematic shall be developed using computer aided engineering software tools. The Contractor shall ensure that the load plan is a realistic stowage of items while maintaining functional usage of vehicle. Items shall be stowed as not to interfere with normal operation of vehicle including ingress and egress. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A070)

### **15.10 Tools, Test, and Support Equipment**

The Contractor shall use items currently in the DoD inventory, to the maximum extent practical for support equipment. Listings of support equipment resident in the DoD inventory are available from the Government upon the Contractor's written request.

### **15.11 Commonality Matrix**

The Contractor shall submit a completed Commonality Matrix (per Attachment 0035, Commonality Matrix) for each JLTV configuration, to identify the commonality of the JLTV within the JLTV and DoD tactical vehicles. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A071)



## **16 GOVERNMENT FURNISHED EQUIPMENT (GFE) INTEGRATION AND GOVERNMENT FURNISHED INFORMATION (GFI)**

### **16.1 GFE Integration**

The Contractor shall integrate all applicable Government Furnished Equipment and Government Furnished Information provided IAW the GFE/GFI List (Attachment 0036). Integration shall include software and hardware, providing space, power, weight allocation, heat rejection, cabling & cableways, through hull connections, and all other hardware & software interfaces necessary to meet the requirements as stated in the JLTV Purchase Description (Attachment 1). The Contractor shall integrate the current version of Software GFE/GFI as of the first SIL Demonstration (Section C.7.7). Throughout contract performance, the Contractor shall integrate updated versions of Software GFE/GFI, in the SIL and on all vehicles, for critical fixes or significant functionality improvements, when provided by the Government.

### **16.2 GFE/GFI Delivery**

The Government will provide the GFE/GFI IAW the schedule outlined in the GFE/GFI List (Attachment 0036). At the SOWM, the Government will provide the technical integration data or required Points of Contact (POCs) to receive proprietary information and data related to the GFE/GFI.

### **16.3 External Agreements**

The Contractor shall establish Non-Disclosure Agreements (NDAs) and/or Memorandum of Agreements (MOAs) with non-PM JLTV organizations (both Government and Commercial), as required to receive data and integrate GFE/GFI. At the SOWM the Government will provide, at a minimum, the list of organizations with which the NDA's may need to be arranged. These agreements will allow the Contractor to receive controlled technical integration data and facilitate direct technical collaboration in order to integrate GFE/GFI into the JLTV as identified in the JLTV Purchase Description (Attachment 1). Progress of NDAs shall be discussed at the PMRs.

## **17 VERIFICATION AND VALIDATION ACTIVITIES**

### **17.1 Contractor System-Level Verification Testing**

Prior to Government acceptance, the Contractor shall perform System-Level Verification Testing consisting of Break-in Testing, Shakedown Testing (SDT), and Purchase Description Conformance Demonstration as detailed below and IAW Attachment 0037, Vehicle Configuration and Allocation Matrix). The Contractor shall provide 14 day advance notice and an invitation to the Government PMO to witness any Contractor System-Level testing. The Contractor shall confirm the event schedule three (3) business days prior to event. The Contractor shall successfully complete the Contractor System-Level Verification Testing prior to entrance into pre-TRR and prior to vehicle acceptance.

System-Level Verification Testing failures are defined in the Failure Description and Scoring Criteria (FDSC), Attachment 0038. In the event of a failure, the Government may require the Contractor to repeat some or all portions (specific tests, miles) of the System-Level Verification Testing, if the Government determines that failure warrants additional testing.

The Government will consider any deficiencies found as a result of System-Level Verification Testing as evidence that all JLTV variants or trailers are similarly deficient, unless evidence to the contrary is furnished by the Contractor and such evidence is acceptable to the Government.

#### **17.1.1 Break-In Testing**

The Contractor shall define break-in test procedures and conduct Break-In Testing on every deliverable vehicle and trailer to address all wear-in activities and procedures required before normal vehicle operation. Break-In Testing shall include a minimum of 500 miles per vehicle and 200 miles per trailer, over primary road surfaces IAW Attachment 0039, Operational Mode Summary/Mission Profile (OMS/MP). Break-In Testing shall be sufficient in scope so that no additional wear activities are required prior to Government acceptance. Break-in activities shall cover all component, subsystem, and system level break-in such as: low speed operation, limited load operations, torque adjustments, brake burnishment, suspension calibration, ESC calibration and any other checks or actions to ensure full vehicle serviceability at vehicle delivery.

### **17.1.2 Shakedown Testing**

The Contractor shall perform Shakedown Testing (SDT) to ensure workmanship and infant-mortality issues are surfaced and addressed prior to Government Acceptance. The Contractor shall perform SDT at a Government-approved test site, as approved IAW the Contractor System-Level Verification Test Plan (ref. CDRL Data Item A072). SDT shall be conducted following Break-in Testing and prior to delivery, on each vehicle and trailer designated by the Government for SDT IAW Attachment 0037, Vehicle Configuration and Allocation Matrix. SDT shall consist of 1000 miles on each vehicle and trailer, consisting of 500 miles over secondary terrain and 500 miles over cross-country terrain IAW with the OMS/MP (Attachment 0039). SDT shall be conducted with the vehicles and trailers at GVW.

The Contractor shall equip the SDT vehicles with the CFE/GFE equipment IAW Attachment 0037 and shall cycle all designated items per Section 4 of Attachment 0040, RAM Duty Cycles.

### **17.1.3 PD Conformance Demonstrations**

The Contractor shall conduct PD Conformance Demonstrations IAW vehicles identified in Attachment 0037 for the following PD items:

- PDFOV-878 (Curb Weight)
- PDFOV-8208 (Payload)
- PDFOV-8208 (Turning Radius)

Note: Demonstrations are not required to be fully instrumented tests like those to be performed in Government testing.

For all requirements requiring performance over the OMS/MP terrain, the Contractor shall conduct PD Conformance Demonstrations over the Government-approved test course referenced in Section C.17.1.2. If the PD line item does not contain an OMS/MP element, the Contractor does not need to conduct the Conformance

### **17.1.4 System-Level Verification Test Plan**

The Contractor shall develop a test plan that addresses all system-level verification testing described in Section C.17.1. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A072).

### **17.1.5 System-Level Verification Test Findings**

The Contractor shall conduct root cause analysis and define corrective actions for all deficiencies identified during System-Level Verification Testing that result in any JLTV test asset not meeting contractual requirements. The Contractor shall record and classify each finding as informational, minor, major, or critical (as defined in AR 73-1), and record the failure level IAW the Failure Description and Scoring Criteria (FDSC), Attachment 0038.

During System-Level Verification Testing, the Contractor shall conduct weekly meetings with the Government to review any major or critical level test deficiencies. The Contractor shall determine and execute applicable corrective actions, initiating their appropriate change management processes (e.g. engineering, material, manufacturing) to implement and validate the corrective action(s) and update FMEAs as required.

### **17.1.6 System-Level Verification Test Refurbishment**

At the conclusion of the System-Level Verification Testing but prior to Government Acceptance, the Contractor shall inspect and refurbish all deliverable vehicles and trailers. The refurbish process shall consist of the following:

- a. The Contractor shall replace all Petroleum, Oil, and Lubricants (POL), all filters, and any other wear component with less than 50% life remaining.
- b. The Contractor shall replace all tires on all RAM vehicles, regardless of remaining tire life, and the removed tires shall be included as a part of the System Support Package (SSP), Section C.17.5.5.2
- c. The Contractor shall make all changes, modifications, and repairs to the JLTV test assets necessary to correct deficiencies identified during testing.
- d. The Contractor shall repair and repaint major scratches, scrapes, or dents.
- e. Any desired exceptions to a. - d. above shall be discussed with the Government on a case by case basis.

The Contractor shall make this information available for review by the Government during the weekly meetings that will occur throughout the System-Level Verification testing.

### **17.1.7 System-Level Verification Test Report**

The Contractor shall provide a System-Level Verification Test Report. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A073)

### **17.2 Requirements Verification for Certification or Analysis Requirements**

The Contractor shall provide copies of Certifications for all specified "Certification" requirements IAW Section 4 of the Purchase Description (Attachment 1). The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A074)

The Contractor shall provide separate a data submission to support Government Analysis for each specified "Analysis" requirement IAW Section 4 of the Purchase Description (Attachment 1). The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well at major reviews IAW the Government provided IMP. (CDRL Data Item A075)

### **17.3 Government Testing**

Government Testing, referenced in the below sections, will be conducted at Government designated test sites to validate Contractor compliance in accordance with Section 4 of the Purchase Description.

Attachment 0041, Test Site Detail, describes the intended locations, schedule, and types of tests that will require Contactor support. These test details are subject to change at the Government's discretion.

#### **17.3.1 Contractor-Performed Testing**

The Contractor shall perform Performance and RAM testing as specified below, IAW the test vehicle configuration and test timing described in Attachment 0037. The assets for this testing will be considered GFE after Government Acceptance. With the exception of the Facility Vehicle described in Section C.21, all GFE vehicles shall be returned to the Government at the conclusion of this Contractor performed Government testing. The Contractor shall ensure that all test support needs (e.g. SSP, operator training) are addressed for this testing.

The Contractor shall develop and provide a test plan for this effort. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A076)

During this testing, the Contractor shall document and provide records of all test events and deficiencies IAW AR-73-1. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A077)

### **17.3.1.1 Performance Testing**

The Contractor shall test the requirements listed below IAW Section 4 of the JLTV Purchase Description (Attachment 1).

#### Environmental Testing (Hot and Cold)

Cold/Hot Start:

- a. PDFOV-902
- b. PDFOV-903
- c. PDFOV-3942
- d. PDFOV-3529

Heater Performance:

- a. PDFOV-916
- b. PDFOV-8146
- c. PDFOV-8147
- d. PDFOV-8148

Air Conditioning Performance:

- a. PDFOV-928
- b. PDFOV-6987
- c. PDFOV-8150

Defroster Performance:

- a. PDFOV-924

Runflat Testing

- a. PDFOV-1142
- b. PDFOV-8041
- c. PDFOV-6901
- d. PDFOV-kit installation time (no PD no. as of SEP7)

Power Generation Testing

- a. PDFOV-1224
- b. PDFOV-1226
- c. PDFOV-7848

### **17.3.1.2 RAM Testing**

The Contractor shall conduct three months of RAM Testing with a minimum of 4,000 miles, a goal of 8,000 miles, over the OMS/MP. (Attachment 0039) at a Government-approved test site (ref. CDRL in Section C.17.3.1).

#### **17.3.2 Government-Performed Testing**

##### **17.3.2.1 Corrective Action Period (CAP)**

CAPs are pre-defined blocks of time during Government testing to allow for Contractor implementation of design updates (e.g. engineering changes, part replacements, software updates) across RAM and Performance test vehicles. The Contractor shall utilize CAPs to implement design updates previously reviewed with the Corrective Action Review Team (CART) as described in Section C.19. CAP duration and timing are defined in the CAP Execution Plan (Attachment 0042). Each update may only be implemented if all vehicles and trailers can be completed during the allotted CAP period.

##### **17.3.2.2 Limited User Testing (LUT)**

The Contractor shall be responsible for conducting all maintenance beyond Operator/Crew during the LUT. The LUT will be conducted using performance vehicles at a location determined by the Operational Test Agency (OTA), and performed within the constraints specified by the U.S. Army Developmental Test Command (DTC) Safety Release and USMC PEO-LS. The duration of the LUT is defined in Attachment 0037.

#### **17.4 Contractor Support Facilities at Test Sites**

Government will provide the Contractor office space at:

- Yuma Test Center, Yuma, AZ, USA;
- Aberdeen Test Center, Aberdeen, MD, USA;
- Monegeetta Proving Grounds, Victoria, Australia;
- One or more of the following locations to support C4ISR interoperability testing: Electronic Proving Grounds (EPG) Fort Huachuca, Arizona; White Sands Missile Range (WSMR), New Mexico; Yuma Test Center (YTC), Yuma Proving Grounds (YPG), Arizona);
- Other Test Sites if required (threshold will be 30 or more test days at a particular test site during EMD test phase)

The Government will provide these office facilities seven (7) days prior to vehicle delivery and will be used through the end of testing.

Office space will be furnished with two (2) desks, two (2) phone lines, and storage area for Connex boxes as required.

The Contractor shall configure Connex boxes to maximize space through use of shelving, binning, or other organizational methods to facilitate quick location of parts and Contractor equipment required to maintain and repair test assets. If space for additional Connex containers is required, beyond the number initially provided, the Contractor shall negotiate directly with Test Centers. The Contractor shall turn over all Connex containers to the Government at the end of testing.

#### **17.5 Contractor Support for Government Testing**

##### **17.5.1 Training**

The Contractor shall provide a single point of contact for all training requirements.

##### **17.5.1.1 Training Program Structure Document (Curriculum Outline of Instruction)**

The Contractor shall develop a Training Program Structure Document (Curriculum Outline of Instruction (COI)) to address the key training events outlined in Section C.17.5.1.4. The COI shall identify the training schedule of events and include a breakdown of individual topics showing the purpose, learning objectives, time allotted for each session, academic hours by type of instruction, instructional materials required, facility and instructor requirements, media and training support equipment, reference materials, type of instruction (practical exercise, demonstration, lecture), and tools and Test, Measurement and Diagnostic Equipment (TMDE) required for each period of instruction. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A078)

##### **17.5.1.2 Training Test Package**

The Contractor shall develop a Training Test Package, which shall include written and performance tests for the examination of an individual's knowledge, skills, attitudes, and achievement of terminal. Written test items shall consist of multiple choice, matching, and fill-in-the-blank questions. The test questions shall be written to evaluate the student's comprehension of knowledge-based learning objectives, and the Test Packages shall include a minimum of three (3) test questions for each learning objective. The Contractor developed performance tests shall evaluate the student's ability to perform specific operator/crew tasks and be presented in checklist format. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A079)

##### **17.5.1.3 Training Support Packages (TSPs)**

The Contractor shall develop all training materials and ensure Training Support Packages support all phases of Operator/Crew training for JLTV. The Contractor shall use the following as guidance: MIL-HDBK-29612-2, Instructional Systems Development/Systems Approach to Training and Education and TRADOC Regulation 350-70 Systems Approach to Training (SAT) Management, Processes, and Products. The Contractor shall emphasize hands-on instruction and use of the actual equipment for the conduct of training and to assess student performance. The Contractor shall develop one comprehensive TSP for Operator/Crew training to support the conduct of all training events. The Operator/Crew training and related TSP shall also address the commander's roles and responsibilities. The Contractor shall ensure each TSP consists of multiple lessons plans with supporting Trainee Guides and Visual Aids (described in 17.5.1.3.2x and 17.5.1.3.3 below) as determined by the selection of tasks to be trained and as identified in the Curriculum Outline of Instruction (reference C.17.5.1.1). The Contractor shall utilize the comprehensive Operator/Crew TSP and tailor each to support the training events. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP (CDRL Data Item A080).

#### **17.5.1.3.1 Lesson Plans**

The Contractor shall develop and provide Lesson Plans to trainees during training events. Lesson plans shall be sequenced and contain information relevant to each period of instruction, including the following:

- a. Administrative data, (tasks to be trained, academic hours, methods/media, student-instructor ratios, references and resources required),
- b. Training objectives,
- c. Instructions for the safe delivery of training,
- d. Media cues,
- e. Application of training visual aids,
- f. Conduct of demonstration
- g. Practical application exercises.

#### **17.5.1.3.2 Trainee Guides**

The Contractor shall develop and provide Trainee Guides to trainees during training events. The Trainee Guides shall contain information that enhances the student's mastery of tasks, and shall provide information and summaries relevant to each period of instruction to include training objectives and technical references.

#### **17.5.1.3.3 Visual Aids**

The Contractor shall develop visual aids, such as slides and graphic media, to be used by instructors in the conduct of training and that enhance the transfer of knowledge to the students and their mastery of tasks. Visual aids shall provide information relevant to each period of instruction to include training objectives and technical references.

#### **17.5.1.4 Conduct of Training**

The Contractor shall conduct training courses by employing standard techniques of military instruction. The Contractor shall use TRADOC Regulation 350-70 Systems Approach to Training (SAT) Management, Processes, and Products as a guide. Training courses shall employ various instructional methods (i.e., lectures, demonstrations, and practical applications). Each course shall emphasize practical application hands-on training. The student-to-instructor ratio shall not exceed 25:1 for lectures with a maximum of 50 students for each period of instruction, and shall not exceed 5:1 for hands-on training, practical exercises, and practical application. All training courses shall make maximum usage of the Technical Manuals (TMs) and actual equipment. Training related to operation of integrated GFE shall focus only on aspects of the integration of the equipment into the platform and not on the operation and maintenance of that GFE. Government personnel selected to receive training will have the prerequisite knowledge and skills necessary to operate GFE.

Training locations are defined in attachment 0041, Test Site Detail. Training shall be conducted on weekdays (Monday through Friday), unless otherwise required and mutually agreed between the Government and the Contractor. Individual course length shall be determined by the number and complexity of the tasks to be trained with a goal not to exceed 40 hours for Operator/Crew training unless otherwise specified in the test

event in this section. The length of each training day shall not exceed eight (8) hours of instruction.

The Government will provide classroom space, training equipment support, computing resources, required common tools, and TMDE. The Government will confirm training dates at least thirty (30) days in advance for Continental United States (CONUS) training, and at least one-hundred twenty (120) days in advance for outside-CONUS training, and will include instructions, dates, and locations.

#### **17.5.1.4.1 Tester Training - Operator/Crew**

The Contractor shall conduct Operator/Crew Tester Training courses in support of test events IAW attachment 0041, Test Site Detail. The course shall include tasks associated with proficient and safe operation of the JLTV during test and evaluation.

#### **17.5.1.4.2 Limited User Testing (LUT) - Operator/Crew**

The Contractor shall conduct Operator/Crew training courses in support of Limited User Testing (LUT) IAW attachment 0041, Test Site Detail. The Government will provide classroom space, training equipment support, computing resources, required common tools, and TMDE necessary for the conduct of training. The Government will notify the Contractor at least 30 days in advance for Continental United States (CONUS) training.

LUT Operator/Crew training shall cover the JLTV system's capabilities, functions, limitations, interfaces, and operation of the JLTV in a tactical environment. Training shall also cover the daily operator/crew level preventive maintenance and operator/crew-level repair of the JLTV system, components and JLTV unique ancillary equipment per the Government maintenance concept for all three services. Upon completion, the hands-on instruction shall enable the student to:

- 1) operate the system, subsystem, and equipment controls
- 2) demonstrate knowledge of general equipment functions and operations
- 3) perform system checks and verification procedures
- 4) operate the integrated GFE

The course shall ensure the students receive the necessary hands-on instruction and driving time needed to enable proficient and safe operation of the JLTV during test and evaluation.

#### **17.5.2 Field Service Representative (FSR)**

The Contractor shall provide FSR support at all test sites (concurrently) for the purpose of maintaining and repairing test assets throughout the Government EMD test period. The Contractor shall provide dedicated FSR support for each shift at test sites working multiple shifts. Refer to attachment 0041, Test Site Detail for anticipated duration and for information on test locations that are anticipated to require FSR support.

The Contractor shall be responsible to ensure vehicle repair and maintenance is promptly performed to ensure maximum operational availability. Maintenance shall be performed within the operating hours as defined below. However, when critical safety or catastrophic failure occurs, the Contractor can request from the Government additional test site facilities and personnel (data collectors and drivers at a minimum) to support additional hours of maintenance outside the base work day in order to facilitate more rapid repairs.

All requests must be made as soon as practical to the PMO, but due to time and resource constraints, may not always be able to be granted by the Government.

The FSR shall be knowledgeable in the fabrication, assembly, and operation of the vehicle in order to minimize down time.

FSRs shall have sufficient knowledge of vehicle to provide technical support for the following:

Vehicle Displays,  
Computers,  
C4ISR,  
Electrical Systems, and  
Mechanical Systems.

The test workday for FSRs shall consist of the following base schedules:

Performance Testing will be conducted for one shift of ten (10) hours per day, five (5) days per week. At the Government's discretion, an additional sixth (6th) day of ten (10) hours may be needed due to schedule and time constraints.

RAM Testing will be conducted for two (2) shifts of ten (10) hours each per day, five (5) days per week. At the Government's discretion, an addition of a sixth (6th) day, 2 shifts of ten (10) hours each, may be needed due to schedule and time constraints.

### **17.5.3 Subject Matter Expert (SME)**

In addition to the FSR support requirements outlined above, the Contractor shall provide on-site SME(s) knowledgeable in the following disciplines:

- Mechanical systems
- Electrical systems, including power generation, power distribution, and on-board computing (hardware and software)

The Contractor shall provide SMEs to assist in the initial integration of Government instrumentation and test equipment. In addition, SMEs shall be present for the first 30 days of active RAM and Performance testing (after vehicle characterization) and for all CAP periods (see Attachment 0042) to analyze, troubleshoot and implement necessary corrective actions. The Contractor shall provide this concurrent SME coverage at multiple test sites, reference Attachment 0041, Test Site Detail, for test schedule.

In addition to initial test support described above, the Contractor shall provide appropriate SMEs to Government Test Sites within 24 hours for CONUS test sites, and within 72 hours for OCONUS test sites, as requested by the JLTV Program Office. Typical situations that would require the Contractor to provide an SME within the timeframes specified above include, but are not limited to, the following:

- Individual vehicle issues that cannot be diagnosed and resolved by Contractor FSRs within 2 test shifts
- Test incidents relating to JLTV safety concerns that cannot be diagnosed and resolved by Contractor FSRs within 1 test shift resulting in downtime for multiple vehicles
- Specialized test support for complex vehicle systems (e.g. C4ISR systems, active suspension systems, power management systems)

### **17.5.4 FSR and SME Support for Ballistic Testing**

The FSR support requirements indicated in section C.17.5.2 and SME support requirements as indicated in C.17.5.3 shall also apply to ballistic testing. In addition, FSRs and SMEs supporting Ballistic testing need to be knowledgeable about vehicle ballistic/blast protection systems and shall be available throughout the test execution phase. FSR and SMEs shall provide technical assistance, resolve test asset configuration issues, and provide vehicle repair support between ballistic/blast test events (only in the event that further shots are being performed on subject vehicle). The Contractor shall repair vehicles to a condition that allows for realistic assessment of accelerative load inputs to crew during blast events. In addition, vehicle armor shall be replaced or repaired to such an extent that no damage remains in areas on and around ballistic threat area for any upcoming events. SMEs shall be present at the blast test setup.

### **17.5.5 System Support Package (SSP) Management Strategy**

The Contractor shall develop and conduct an SSP management strategy. The Contractor's SSP strategy shall minimize contract cost associated with excess SSP at the end of testing and storage costs, while at the same time minimizing test down time. Methods which can be considered may include central management storage of SSP components, in particular high cost or long lead time spares such as major components. This information shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP.

#### **17.5.5.1 System Support Package Component List (SSPCL)**

The Contractor shall provide a master System Support Package Component Item List (SSPCL). The Contractor shall provide a SSPCL for each test site based on the master SSPCL. The Contractor shall ensure each SSPCL is reflective of the vehicle locations and quantities identified in Section F.2.1 (Vehicle Configuration and Allocation Matrix, Attachment 0037), the type of testing outlined in Attachment 0041, Test Site Detail information, duration of testing to be performed, associated failure rates and required quantities determined by the Contractor's engineering analysis, usage trends, reliability engineering analysis, predicted failure rates, item lead times, and item criticality. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A081)

#### **17.5.5.2 Initial System Support Package (SSP)**

Based on each test site SSPCL, the Contractor shall deliver an initial System Support Packages (SSP) IAW Section F.2.4.3. The Contractor shall include an SSP packing list to identify all components in initial SSP delivery for tracking purposes.

#### **17.5.5.3 SSP Replenishment**

The Contractor shall manage and maintain SSP at each test site. The Contractor shall be responsible for maintaining SSP quantities to assure availability of SSP components throughout Government testing. The Contractor shall manage the SSP inventory with a goal of minimizing the SSP item quantities that remain at end of test, while simultaneously minimizing vehicle down time.

##### **17.5.5.3.1 CONUS SSP Replenishment**

The Contractor shall provide replacement parts for failures resulting in an Operational Mission Failure (OMF) or safety deadline to the test site within 48 hours after the identified and confirmed test need.

##### **17.5.5.3.2 OCONUS SSP Replenishment**

The Contractor shall have replacement parts available at their facility for pickup by PMO. For failures resulting in an OMF or safety deadline the Contractor shall have replacement parts available within 48 hours after the identified and confirmed test need.

#### **17.5.5.4 SSP Storage**

The Contractor shall provide CONEX container(s) for storage of SSP at all CONUS test sites. They shall remain Government property throughout, and at conclusion of, testing. Storage at OCONUS test sites will be provided by the PMO.

#### **17.5.5.5 SSP Management and Reporting**

The Contractor shall designate an individual (per test site) to manage the on-site SSP and accurately account for parts usage and changes to the stock lists as they occur. The Contractor shall provide a SSP Usage and Inventory Report for each location. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A082)

#### **17.5.6 Outrigger Designs for Performance Testing**

The Contractor shall develop and provide outrigger designs and interfaces for all vehicle configurations. The Contractor shall collaborate with the JLTV Program Office concerning the requirements and design of each outrigger set. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A086)

#### **17.5.7 Armor Recipes**

For each JLTV configuration, the Contractor shall provide descriptions of the unique armor recipes for each vehicle surface (e.g. sides, top, front, rear, underbody, EFP). For each armor recipe, the Contractor shall specify the material and thickness of each armor layer (including air spaces), from outside to inside, plus the areal density of the overall recipe (reference CDRL Data Item A032 Vulnerability Data Analysis).

#### **17.5.8 Armor and Vehicle Schematics**

For each JLTV configuration, the Contractor shall provide Armor and Vehicle Schematics of each vehicle aspect view (e.g. overhead, sides, front, rear, underbody) which identify locations of each individual armor recipe and shows the vertical obliquity angles (layback angles) and horizontal obliquity angles (angles which would be seen if looking directly top-down or bottom-up) of all surfaces. The Schematics shall include illustrations of the armor seams and attachment points on each surface of the vehicle. The Schematics shall also depict the details of the B-kit armor overlap designs and B-kit armor attachment methods. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as

well as major reviews IAW the Government provided IMP. (CDRL Data Item A083)

#### **17.5.9 Armor Ballistic Test Data**

The Contractor shall provide all available ballistic test data for their proposed armor solutions. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A084)

#### **17.6 NATO Engine Testing - 400 Hour**

The Government will conduct a modified 400 hour NATO Engine Test (Attachment 0048, AEP-5-diesel) with a Contractor engine (ref. Section C.18.3.3) operating on JP-8 fuel and in desert like operating conditions (DOC). DOC is defined as 120 degree F ambient, a fuel supply temperature determined by the Government based on the engine's fuel system and any vehicle level fuel cooling, and a Charge Air Cooler (CAC) outlet temperature determined by the Government based on the vehicle installation capacity of the CAC. The Government will meet with the Contractor to discuss the test protocol and engine set-up.

##### **17.6.1 Engine Test Support**

###### **17.6.1 Engine Test Support Package (TSP):**

The Contractor shall provide an Engine TSP List for the supplied engine. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A101)

###### **17.6.2 Engine Test Support FSR**

The Contractor shall provide FSR test support (7 days a week, 2 eight hour shifts) for the 400 hour NATO Engine Test. Testing will begin upon delivery of the engine, and is expected to continue for 4 months. Engine TSP Items used shall be replenished by the Contractor within forty-eight (48) hours of usage.

###### **17.6.2.1 Tools and Test Equipment**

The Contractor test support personnel shall utilize existing Government tools and test equipment to the maximum extent feasible throughout Government testing.

###### **17.6.3 Detailed Engine Information Package**

The Contractor shall provide a Detailed Engine Information Package per Attachment 0013. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A034)



## **18 TEST ASSET REQUIREMENTS**

### **18.1 JLTV Test Assets**

#### **18.1.1 LHO**

The Contractor shall fabricate the JLTV in LHO, as defined in the JLTV Purchase Description (Attachment 1). The Contractor shall fabricate, test, and deliver all LHO JLTV configurations identified in the Vehicle Configuration and Allocation Matrix, Attachment 0037.

#### **18.1.2 RHO**

The Contractor shall fabricate the JLTV in RHO, as defined in the JLTV Purchase Description (Attachment 1). The Contractor shall fabricate, test, and deliver JLTV configurations identified in the Vehicle Configuration and Allocation Matrix, Attachment 0037.

#### **18.1.3 Trailer**

The Contractor shall fabricate the JLTV-T, as defined in the JLTV Purchase Description (Attachment 1). The Contractor shall fabricate, test, and deliver the JLTV-T in the quantities defined in Section F.2.1.

### **18.2 Armor Test Assets**

#### **18.2.1 Armor Coupon Sets**

The Contractor shall provide the Government an armor coupon set for each transparent and opaque armor recipe required to satisfy the protection levels defined in the JLTV Purchase Description (Attachment 1). Each recipe constitutes a unique set, such as different frontal, flank, rear, underbody, and roof armor recipes, according to the Contractor's design. The Contractor shall include a diagram of the vehicle with the coupon delivery that identifies the correlating location of each armor recipe. The Contractor shall label each coupon with the Contractor's name, vehicle configuration, location of solution on the vehicle (e.g. frontal, flank, underbody), and the attack/strike side. Based on a review of the armor recipes, the Contractor may not be required to deliver full coupon sets (per Section F.2.2), for solutions that have been determined by the Government to provide the required JLTV level of protection (e.g. previous qualification through Government testing, similarity to other proven recipe designs from the same Contractor, or for other reasons determined by the Government).

##### **18.2.1.1 Transparent Armor (TA)**

The Contractor shall provide transparent armor coupons in the quantities indicated in Section F.2.2. Each TA coupon shall be 400mm by 400mm in size, with a +/- 5mm tolerance on each linear dimension.

If the actual component design is smaller than the prescribed minimum dimensions, coupons shall be delivered in the actual dimensions and include the designed window frame.

##### **18.2.1.2 Opaque Armor (OA)**

The Contractor shall provide OA coupons in the quantities indicated in Section F.2.2 and in the sizes specified below, depending on the type of material (e.g. metallic, ceramic, composite) and level of protection (e.g. B-kit, A-structure, EFP).

The Contractor shall deliver B-kit solutions bolted to the appropriate A structure coupons near each corner. Each bolt center shall be located at least 1-1/4" from each edge (at corner) in order to allow testers adequate space to affix clamps to secure the target coupon to the test fixture. The Contractor shall provide torque specification for these bolts with the coupon delivery, in order to allow the testers to disassemble and reassemble the coupons.

###### **18.2.1.2.1 Opaque Armor - Metallic Armor Solutions**

For opaque armor solutions which contain only metallic layers, the Contractor shall deliver coupons which are 610mm by 610mm in size, with a +/- 5mm tolerance on each linear dimension.

###### **18.2.1.2.2 Opaque Armor - Ceramic/Composite Armor Solutions**

The Contractor shall deliver coupons for recipes containing ceramic and composite materials in the following sizes, with tolerances of +/- 5mm for each linear dimension:

- 1) For armor solution which contain ceramics but no composite layers, the coupons shall be 610mm by 610mm in size.
- 2) For armor solutions that have a composite backing, the composite backing shall be 610mm by 610mm in size, and centered on a 762mm by 762mm coupon.
- 3) For armor where multiple layers of composites are used, all composite layers which follow the last metallic element in the coupon shall be 610mm by 610mm and all elements prior to this shall be 762mm by 762mm in size.

#### **18.2.1.3 Explosively Formed Penetrator (EFP) Coupons**

If the Contractor proposes a non-Government provided EFP protection kit solution, the Contractor shall provide EFP protection kit solutions in the quantities indicated in Section F.2.2. Each EFP protection kit coupon shall be no smaller than 460mm by 460mm in size. All required mounting hardware shall be provided by the Contractor. EFP coupons do not need to be assembled and bolted together, but they shall be delivered with the armor layers in the proper order (e.g. taped, bonded). If the coupons are bolted, the Government testers reserve the right to remove the bolts prior to testing (otherwise, twisted/bent bolts may make it difficult to disassemble targets after shots to assess damage).

### **18.2.2 Ballistic Armor Structures**

The Contractor shall provide the ballistic armor structures in the quantities indicated in Section F.2.3 and described in the following paragraphs.

#### **18.2.2.1 A-Structure Ballistic Cab**

The ballistic cab in the A-structure armor level of protection shall be configured without the wheels, suspension, drivetrain, or any interior components unless they are designed to provide ballistic protection (e.g. spall protection partitions or curtains).

The Contractor shall also deliver a test stand which attaches to the cab and supports it so that the bottom is at the Contractor designed operational ride height but does not block access to the cab sides or underbody. The four (4) legs of the test stand shall be located where the vehicle tires would normally be.

#### **18.2.2.2 Armored Rolling Chassis**

Both armored rolling chassis' shall include all occupant seats and restraints, but shall not include any other interior components unless they are designed to provide ballistic protection (e.g. spall protection partitions or curtains). Each armored rolling chassis shall incorporate wheels, suspensions, and the necessary drivetrain components to allow the chassis to roll (e.g. pushed or pulled), and shall be configured to the Contractor designed operational ride height. Each structure shall also include any components below the cab (e.g. driveshaft, transfer case, transmission), that would be located under the crew compartment floor or otherwise within the footprint of the crew space. The Contractor is not required to use fully functional components as long as the proper masses and materials are in the appropriate locations defined by the Contractor design. The Contractor shall add surrogate weights to each armored rolling chassis to represent the weight of the engine and other missing components, so that each deliverable has the correct system Gross Vehicle Weight (GVW) and Center of Gravity (CG) location. The Contractor shall not place any artificial weights on the floor of the cab.

### **18.3 Additional Test Assets**

#### **18.3.1 Harnesses for Power Management Testing**

The Contractor shall deliver a power generation test harness with each delivered vehicle that allows the Government to connect load banks to all locations in the vehicle where power can be drawn from the 28VDC On-board Vehicle Power (OBVP) system. The harness shall be capable of carrying the maximum current each attachment point is designed to provide. If the sum of the power that can be drawn from the connection points (e.g. outlets, terminal blocks) required by the JLTV Purchase Description (Attachment 1) is less than 15kW, the Contractor shall specify additional connection point(s) and supply an additional test harness (with each vehicle) designed to draw the remaining load in order to achieve the full 15 kW. No later than 90 days prior to pre-TRR, the Government will provide the required length and harness interfaces necessary to connect to the Government load banks for testing. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A085)

### **18.3.2 Additional Batteries for Ballistics and Abuse Testing**

If the Contractor's design integrates anything other than lead acid type batteries, the contractor shall deliver extra JLTV batteries to support ballistic, destructive, and cold requirements testing.

### **18.3.3 NATO 400 Hour Test Engine Delivery**

The Contractor shall deliver one (1) JLTV engine as specified in Section F.

The following items shall be included with the engine:

- a. One (1) each Engine Control Unit (ECU) and wiring set (If the engine uses an ECU); all wiring harnesses and labeled connections from the ECU to interface with the Government data acquisition and control system. All interface leads must be a minimum of 25 feet long.
- b. All filtration systems (Air, Oil, Fuel, Coolant (if applicable)).
- c. All maintenance items (belts, filters) required for 500 hours of operation excluding Petroleum, Oil, and Lubricant (POL).
- d. One (1) each water heat exchanger (if the engine uses an air-to-air charge air cooler).
- e. One (1) each exhaust outlet flange.
- f. Two (2) each spare exhaust manifold gaskets sets.
- g. One (1) each dyno engine vibration mounts.
- h. One (1) each engine flywheel with ring feeder and starter, dyno shaft and damping coupling.
- i. Three (3) each Engine Test Support Packages as specified in C.17.6.1.

## **19 TEST DEFICIENCIES/FAILURES**

This section outlines the process and procedures to address test deficiencies and failures identified during Government testing.

### **19.1 VISION Digital Library System (VDLS) Utilization**

The Contractor shall be responsible for accessing VDLS (<https://vdlc.atc.army.mil>) for all Test Incident Reports (TIRs) released during Government-required testing (reference CDRL Data Item A087 FACAR). The Contractor shall access System VDLS for the handling of classified TIRs. Receipt of a TIR is defined as the TIR Release Date.

### **19.2 Failure Analysis & Corrective Actions**

The Contractor shall implement a closed-loop failure reporting system (Failure Reporting, Analysis, and Corrective Action System (FRACAS)) to track test deficiencies identified during Government testing. The Contractor shall adhere to Configuration Management Section C.11 for any changes to vehicle configuration as a result of any corrective actions.

The Contractor shall provide Failure Analysis and Corrective Action reports (FACARs) in response to all Critical and Major TIRs. The Contractor shall provide FACARs to Minor and Informational TIRs at the request of the Government. FACARs are not required for TIRs that are generated as a result of the following: crew, personnel, or Government Furnished Equipment (GFE - hardware and software) not attributed to the vehicle.

The Contractor shall analyze and classify each FACAR with one of the failure mode identification codes (A, BC, BD) defined in the AMSAA Reliability Growth Guide (reference Attachment 0026). The Contractor shall conduct root cause analysis and corrective action for all FACARs classified as BC and BD. The Contractor shall utilize root cause analysis technical tools that are appropriate to the issue (e.g. utilize finite element analysis for a structural failure), such as:

- 1) Material Analysis
- 2) Finite Element Analysis (FEA)
- 3) Physics of Failure (PoF)
- 4) Dynamic and Static design modeling and simulation
- 5) Environmental Stress Screening (ESS)
- 6) Thermal and Vibration Analysis

The Contractor shall analyze and assign a Fix Effectiveness Factor (FEF) to each BC and BD classified FACAR to assess the redesign impact. The FEF analysis shall include a comparison of the allocated reliability value to the predicted reliability value and to the demonstrated reliability value. The FACAR shall address root cause determination, corrective action development and implementation, process control improvements, and test results. The FACAR shall also include schedule of repair, time to repair, and availability of parts.

For all Critical and Major TIRs, FACARs shall include subsystem testing as substantiating evidence.

All FACARs shall include a functional block diagram.

The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A087)

### **19.3 TIR Response Time**

The Contractor shall respond to TIRs that require a FACAR within the following time frames below:

#### **19.3.1 Critical TIR**

The Contractor shall provide an update via telephone to the Government PMO within twenty-four (24) hours of Government notification of a Critical TIR. The Initial FACAR shall be submitted within three (3) calendar days of TIR Release Date. Final FACAR submitted within seven (7) calendar days of TIR Release Date, unless an extension is requested by the Contractor in writing, and approved by the Government.

### **19.3.2 Major TIR**

For Major TIRs, the Contractor shall submit the initial FACAR to the Government within seven (7) calendar days of TIR Release Date. The Contractor shall submit the final FACAR within fourteen (14) calendar days of TIR release date, unless an extension is requested by the Contractor in writing, and approved by the Government.

### **19.3.3 Minor/Informational TIRs**

If requested by the Government, the Contractor shall submit a FACAR within (24) calendar days of date of request.

### **19.4 Identification of Failed Test Assets**

The Contractor shall mark, tag, and control each failed test exhibit received from the Government test site as it corresponds to its respective Test Incident Report (TIR).

The Contractor shall ensure that all identification markings and tagging placed on a failed test exhibit by the Government are legible.

The Contractor shall handle each failed test exhibit supporting the Failure Analysis and Corrective Action Report (FACAR) in a manner that does not damage the failed test exhibit.

The Contractor shall be fully responsible for the storage of each failed test exhibit (no matter where the storage facility is located) and the item(s) shall remain stored pending disposition of the failure analysis and Government notification and approval.

For Government testing performed at OCONUS locations, the Government will organize export licenses and return failed parts to Contractor CONUS locations for analysis or repair as required.

## **19.5 Scoring Conferences, Assessment Conferences, & CART Meetings**

### **19.5.1 Scoring Conferences**

The Contractor shall support Government Scoring Conference meetings by presenting information, evidence, or opinions that the Government will consider when scoring test incidents. The Contractor shall document information, evidence, or opinions and deliver to Government. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A088)

### **19.5.2 Assessment Conferences**

The Contractor shall support all Government Assessment Conferences, which will occur during Government testing. The Government will provide Contractor notification of the Assessment Conference at least 10 business days prior to the event. Prior to each Assessment Conference, the Contractor shall prepare and provide an Assessment Conference Package. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A089)

### **19.5.3 Corrective Action Review Team (CART) Meetings**

The Contractor shall support the Corrective Action Review Team (CART) which is the Government group responsible for reviewing the Contractor's FACARs, including root cause analysis and proposed fixes. The CART will provide feedback to the Contractor regarding appropriateness of their root cause analysis methodology and impacts which may invalidate completed testing. The JLTVM PMO will chair the CART meetings. The JLTVM PMO will provide official notification on all CART Meeting schedules at the inception of each test project. The Contractor's corrective action team membership shall directly correlate with the Government CART members, as applicable, to reflect all relevant CART functions (i.e. Quality, RAM, Logistics, Maintenance, Systems Engineering, Safety, Transportability and MANPRINT/Human Factors.)

### **19.5.4 CART Meeting Agenda and Minutes Preparation**

CART meeting agendas will be established by the Government. Meeting agendas will include a list of all TIRs numbers to be discussed by category. The Contractor shall provide official CART meeting minutes (reference C.3.1.2, CDRL Data Item A002).

## **20 FASTENING AND JOINT MANAGEMENT**

The Contractor and their subcontractors shall utilize the processes and procedures identified below to manage the joint configurations (e.g. weldments, threaded fasteners, and bonded joints) in the Joint Light Tactical Vehicle. The Contractor shall maintain a summary of joint configurations that includes the results of torque studies, weld procedures, life cycle testing, and serviceability testing; procedures for the detection of joint degradation and appropriate remediation steps. This information shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP.

### **20.1 Joint Interfaces, Materials, and Coatings**

The Contractor shall provide developmental joint design drawings depicting part interfaces, materials of construction, fasteners, coatings, and torque values. The Contractor shall include a list of wear items that are exempt from the vehicle corrosion service life. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A090)

### **20.2 Threaded Joints**

The Contractor shall evaluate all threaded joints and specify the required torque, hole size, associated tolerances, and other parameters that impact joint quality for all serviceable threaded fasteners used in the assembly of the JLTV (which includes suppliers and sub-suppliers information). The Contractor shall include this information in any applicable documentation required by this contract (e.g. engineering drawings, digital representations, assembly diagrams, build books, service manuals, and operator manuals). This information shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP.

#### **20.2.1 Threaded Joint Testing**

The Contractor shall conduct studies of torque and clamp load on threaded joints associated with Special Characteristics, consistent with their application, assembly process, and expected duty cycle. The Contractor shall conduct environmental testing (temperature, humidity, or other parameters) to determine threaded joint performance at extremes of the vehicle operating ranges defined in the JLTV Purchase Description (Attachment 1). The Contractor shall test potential corrosion of threaded joints via salt spray or other Contractor environmental test procedures. The Contractor shall present a summary of all testing results at the DUR.

### **20.3 Non-Threaded Joints (Excluding Welds)**

The Contractor shall evaluate all non-threaded joints and specify the hole size, associated tolerances, and other parameters that impact joint quality for all non-threaded fasteners used in the assembly of the JLTV (which includes suppliers and sub-suppliers information). The Contractor shall include this information in any applicable documentation required by this contract (e.g. engineering drawings, digital representations, assembly diagrams, build books, service manuals, and operator manuals). This information shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP.

### **20.4 Welds**

#### **20.4.1 Weld Standards**

The Contractor shall perform all welding IAW the documents listed in Welding Requirements Table 1 (Attachment 0043). For each document specified in Attachment 0043, the Contractor shall use the most current version available at the time of the contract solicitation release date. If new materials are to be used that do not follow the guidelines in the applicable code book in Table 1 then the Contractor shall demonstrate the correct code book to the Government for approval.

#### **20.4.2 Welding Procedures**

Prior to vehicle welding, the Contractor shall provide Procedure Qualification Records (PQRs) (CDRL Data Item A091) and Welding Procedure Specifications (WPS) (CDRL Data Item A092) and prepare weld samples and test the weld procedure for qualification in accordance with Welding Requirements Table 1 (Attachment 0043).

Previously Qualified Procedures may be used in lieu of preparing weld samples and test, if procedures are from another Department of Defense (DOD) contract, there was no break in production for more than six months at the facility where the procedures were used and no negative weld quality history on the previous contract where the procedures were used.

Changes to the PQR or weld repair procedures will require requalification.

The use of pre-qualified weld joints as specified in American Welding Society (AWS) D1.1 does not preclude submittal of WPS. Welding procedures provided by the Contractor shall contain both standard welding procedures as well as welding repair procedures.

The information used to create these CDRLs shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A091 and A092)

### **20.4.3 Welding Equipment**

The Contractor shall ensure that all welding equipment (gauges and meters), including subcontractors' welding equipment, used in the performance of this contract has been certified and calibrated annually in accordance with Attachment 0043. Upon Government request, the Contractor shall make available equipment calibration documentation.

### **20.4.4 Welding Fixtures**

The Contractor shall design and utilize weld fixtures with Contractor identified critical dimensions IAW ASME Y14.43 for all Special Characteristics components (as defined in section C.5.17). Geometric Dimension and Tolerance (GD&T) should be applied to achieve dimensions within tolerances of drawings.

Non Special Characteristics components shall be held together by means that will insure secure and true positioning. The fixtures or frames shall minimize distortion of the parts being welded and certified.

### **20.4.5 Welding Inspectors**

The Contractor shall use qualified inspectors trained to perform inspection functions for the verification of weld quality. The Contractor shall notify the Government of the selected individual and their qualifications. A qualified inspector shall meet at least one of the following conditions:

- a. Current Certification in accordance with American Welding Society (AWS), Certified Welding Inspector (CWI), qualified and certified in accordance with provisions of AWS QC1, Standard for AWS Certified Welding Inspector
- b. Current certified Welding inspectors qualified by the Canadian Welding Bureau (CWB) to Level II or the Level III requirements of the Canadian Standards Association Standard W 178.2 Certification of Welding Inspectors
- c. A Contractor identified individual who is experienced in the use of weld inspection techniques and equipment, on the basis of formal training, experience, or both, in metals fabrication, inspection, and testing.

### **20.4.6 Weld Design**

#### **20.4.6.1 Structural Welding Design**

The Contractor shall ensure Non-armor and structural welding design for all weldments meet the requirements in the American Welding Society (AWS) standard for the applicable material referenced in "Attachment 0043, Weld Requirements Table 1".

#### **20.4.7 Alternate Weld Standards**

The Contractor may utilize alternate standards or codes that meet or exceeds the standards listed in "Attachment 0043, Weld Requirements Table 1". The Contractor shall provide verification of such equivalence to the Government prior to fabrication of any weldment.

#### **20.4.8 Non-Destructive Testing (NDT)**

The Contractor shall identify all critical joints that require NDT beyond visual inspection.

When NDT is required for armor, the procedures and acceptance criteria shall be IAW TACOM Ground Combat Vehicle Welding Code drawing number 19207-12479550 steel and AWS D1.2 for aluminum.

When NDT is required for non-armor and structural material(s), the acceptance criteria shall be as stated in the applicable welding code. The Contractor shall determine what joints are critical load bearing members and identify these weldments for NDT inspection. In the case of critical structures, the acceptance criteria for cyclic loads will be used as stated in AWS D1.1 and Class II structures for Aluminum welds IAW AWS D1.2.

When NDT is required, the inspectors shall be qualified IAW the American Society for Nondestructive Testing Recommended Practice No. SNT-TC-1A. Only individuals qualified for NDT Level I and working under the NDT Level II or individuals qualified for NDT Level II may perform nondestructive testing except visual examination. The NDT personnel need not be an AWS Certified Weld Inspector (CWI).

NDT Procedures shall be made available upon request by the Government.

#### **20.4.9 Armor Steel Heat Affect Zone (HAZ) Hardness Requirements**

When steel conforming to MIL-DTL-46100 is utilized on the vehicle, the following requirement shall apply: on any ballistic surface 5/8 inch (15.9mm) from the toe of the weld, at any location of weldment, the Brinell hardness shall not be lower than that permitted minimum hardness requirements by MIL-DTL-46100.

#### **20.5 Joint Integrity During Vehicle Repair and Maintenance**

The Contractor shall evaluate the special characteristic joints that must be disassembled and serviced. The Contractor shall estimate these joints to be serviced 7 times in the life of the vehicle and appropriate physical testing shall be conducted to ensure no degradation of joint integrity occurs. If a special characteristic joint's functionality is impaired by service and repair procedures, the Contractor shall create a procedure to detect loss of integrity and identify remedial actions that may be taken to restore full compliance. If a fastener must be replaced as a result of removal for servicing, this shall be stated in all appropriate documentation. This information shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP.

#### **21 FACILITY VEHICLE**

The Contractor shall maintain one JLTV-GP vehicle at Contractor's facility. Following Government acceptance of this vehicles, the vehicle will undergo Contractor led EMD testing (reference section C.17).

Following Contractor led testing, this vehicle will remain at the Contractors facility and serve the following functions:

- 1) For validation of proposed Engineering Changes. The Contractor shall maintain this vehicle and store it on The Contractors premises. These vehicles shall include GFE (reference section C.16).
- 2) When not being used for validation of Engineering Changes, this vehicle shall serve as the configuration baseline for JLTV platform. This vehicle shall contain the latest engineering changes and will function as the master baseline for vehicle configuration.
- 3) The Facility Vehicle shall be maintained throughout the contract period of performance, according to Contractors maintenance procedures that are in place for all EMD test vehicles.

## **22 MANUFACTURING AND PRODUCTION READINESS**

The Contractor shall create and utilize a Manufacturing Development Strategy. The strategy shall include; manufacturing processes and procedures used under this contract, changes to the manufacturing processes and procedures required to conduct Low Rate Initial Production (LRIP), and changes to the manufacturing processes and procedures required to conduct Full Rate Production (FRP). The Strategy shall include evidence required to meet Manufacturing Readiness Level (MRL) 8 by PRR and MRL 9 following LRIP. The Contractor shall utilize the criteria and processes defined in MIL-HDBK-896 Manufacturing and Quality Program dated 8 Aug 2008 and DoD MRL Deskbook dated 30 July 2010 as guides for this effort, including definitions and measurement of MRLs. The information used to develop this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A093)

### **22.1 Design for Manufacturability (DFM)**

The Contractor shall perform assessments of DFM that include Digital Mockup Assembly (DMA) reviews, feasibility studies, and predicted assembly times for the Key Subsystems (per Attachment 0009). The Contractor shall provide a report that shows how the JLTV has been designed for full rate production manufacturability per the Manufacturing Development Strategy (reference CDRL Data Item A093). The report shall include the methods used to simulate full rate production manufacturing processes (e.g. DMA methods, including clearances and tolerances for tooling, personnel, and part installation). The information used to develop this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A094)

### **22.2 Manufacturing Environment**

The Contractor shall manufacture the JLTV for this contract in an environment that is as representative of a production process as is practical, including tooling, facilities, documentation, and personnel. The Contractor shall monitor MRLs and provide status to the Government at all program reviews IAW the IMP for in-house and supplier MRLs, and shall re-assess MRLs in areas for which design, process, source of supply, or facility location changes have occurred that could impact the manufacturing readiness.

### **22.3 Process Failure Modes and Effects Analysis (PFMEA)**

The Contractor and their suppliers shall use the Automotive Industry Action Group (AIAG) FMEA manual (latest edition) as a guide to create all PFMEAs. The PFMEA's shall be traceable to process changes and shall be included in the configuration management change process. This information shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP.

The Contractor shall provide all Key Subsystem (reference Attachment 0009) PFMEA's necessary to build the JLTV. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A095).

### **22.4 Control Plans**

The Contractor shall develop and implement Control Plans for each manufacturing process IAW latest AIAG Advanced Product Quality Planning and Control Plan (APQP) format and content. The Contractor shall document any temporary or interim off-standard operation (those that will not be used in FRP). The Contractor shall maintain and update the Control Plan to reflect all changes to the manufacturing process through the execution of this contract.

This information shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP.

### **22.5 Manufacturing Consistency**

The Contractor shall ensure that parts are manufactured in a consistent and repeatable manner, by using calibrated gages and Measurement System Analyses (MSA) where appropriate. The Contractor shall use the AIAG MSA manual and the requirements of TS-16949, 7.6.1, and 7.6.2 as guides for Gage Repeatability & Reproducibility (R&R). This information shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP.

## **23 INTERNATIONAL**

### **23.1 Australian Industry Capability (AIC) Plan**

The Contractor shall deliver an AIC Plan that outlines how the Contractor could investigate opportunities for Australian (AUS) Industry to compete on a best value basis for work in future production and sustainment phases of the JLTV program. As the data to be delivered as all or part of the AIC Plan is not likely to be "technical data" as defined in DFARS 252.227-7013, the government is not expecting that this data will need to be listed as part of an Assertion of Restrictions listing (reference DFARS 252.227-7017). This CDRL is not to imply or create any actual requirement for the Contractor to utilize Australian Industry in the performance of this contract or any potential future production or sustainment requirements for JLTV. The Contractor shall identify and describe a plan to investigate, but shall not perform or implement any of the investigation or tasks outlined in its AIC Plan deliverable in the performance of this contract. The content of this AIC Plan will be used solely by the Australian Government to examine possible utilization of Australian industry in the JLTV program. The information used to develop this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A102)

#### **23.1.1 AIC Plan Compliance**

The Contractor shall ensure that the AIC Plan does not propose to investigate or strategize activities that create a conflict with any U.S. laws, regulations, policies, or RFP/contract requirements including, but not limited to, the following; Arms Export Control Act ( 22 U.S.C. Sec. 2751, et seq.), the International Traffic In Arms Regulations (22 C.F.R. Sec. 120.1, et seq.), the Export Administration Act of 1979 (as amended, 50, U.S.C. Sec. 2401, et seq., and as continued by Executive Order), the Export Administration Regulations (15 C.F.R. Sec. 710.1 et seq.), the U.S. Small Business Act (15 U.S.C. Sec. 631), and domestic source restrictions (Berry Amendment and Restrictions on Specialty metals under 10 U.S.C. Sec. 2533b, Buy American Act under 41 U.S.C. Sec. 10a-10d, Trade Agreements Act under 19 U.S.C. Sec. 2501 (as applicable) and any other source restrictions asserted in this contract).

## **24 SECURITY**

### **24.1 Requirements**

The Contractor shall comply with the security requirements imparted by the DD Form 254 (Section J, Attachment 0044, DD Form 254) and the National Industrial Security Program Operating Manual (NISPOM) [http://www.dss.mil/isp/fac\\_clear/download\\_nispom.html](http://www.dss.mil/isp/fac_clear/download_nispom.html).

#### **24.2 Program Protection Implementation Plan (PPIP)**

The Contractor shall develop, implement, maintain, and provide a Program Protection Implementation Plan (PPIP) that is compliant with the security requirements imparted by the DD-254 Attachment 0044 and the NISPOM. The Government Program Protection Plan will be provided at the SOWM. The information used to create this CDRL shall be available to the Government and discussed at IPT meetings as well as major reviews IAW the Government provided IMP. (CDRL Data Item A096).

##### **24.2.1 Program Protection Working Group (PPWG)/ Critical Program Information Assessment (CPIA)**

The Contractor shall host a Program Protection Working Group (PPWG) within six months after award and a second PPWG within twelve months after award. Each PPWG will be co-chaired by the Government and Contractor security managers, the co-chairs will jointly develop the agenda. The agenda shall include a CPIA that will identify Critical Program Information or Critical Technology (defined by DoDI 5200.39, July 16, 2008 Incl Change 1 Dec 28, 2010, Critical Program Information (CPI) Protection within the Department of Defense).

##### **24.2.2 Anti-Tamper (AT) Planning**

If the PPWG identifies Critical Program Information or Critical Technology, the Contractor shall design, develop and integrate an Anti-Tamper (AT) solution for hardware and software containing Critical Program Information and Critical Technology to deter/prevent/detect the reverse engineering of those systems using the probability of an unplanned loss and/or for international sales across the program's lifecycle. The Contractor shall take the AT solutions through verification and testing to include any prototypes. The Contractor shall utilize reverse engineering countermeasures that are commensurate with the exposure levels and consequence of critical program information loss using the analysis process identified in the DoD Anti-Tamper (AT) Guidelines. The Contractor shall deliver the detailed Anti-Tamper solution as an Anti-Tamper Plan Annex to the PPIP (ref. CDRL Data Item A096) and shall incorporate the solution into the JLTV design.

## 25 OPTION - ADDITIONAL LEVEL OF EFFORT

### 25.1 Work Directive

All work under this CLIN shall be performed in accordance with work directives issued by the Contracting Officer (CO). No work shall commence until the Contractor has received a fully executed work directive. The Contractor shall provide all necessary labor, materials, supplies, services, facilities, and equipment to perform the specific work and services required by individual work directives. Each work directive shall include the following information as a minimum:

- (a) Work directive number and title
- (b) Reference to the applicable paragraph in section C
- (b) Objective of this work directive
- (c) Maximum number of hours authorized
- (d) Detailed description of work to be performed
- (e) Required completion date(s)
- (f) Identification of applicable contract number, Contractor's name and address
- (g) Identification of software, data, and/or hardware to be delivered
- (h) Projected material costs
- (i) Contracting Officers signature

The Contractor shall notify the Contracting Officer's Representative (COR) immediately by telephone or E-mail if delivery dates will not be met. The Contractor shall follow up with a letter to the Contracting Officer (CO) and the COR.

Services specified in individual work directives shall include effort either singly or in any combination identified in one or more of these categories:

- (a) Major Repair to a Test Asset: Repair to a delivered test assets that requires body repair, welding repair, or any other type of repair that cannot be performed at a test site due to the complexity of skills or machinery required to return the test asset to functional condition.
- (b) RESERVED
- (c) RESERVED
- (d) RESERVED
- (e) RESERVED

