

DRAFT STATEMENT OF WORK (SECTION C)

EMD PHASE

JOINT ASSAULT BRIDGE

11 AUG 2011

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C.1 GENERAL SCOPE

The scope of this contract is to design, build, and integrate a mechanism on the M1A1 chassis that will be used to launch and retrieve the Military Load Class (MLC)-85 Armored Vehicle Launched Bridge (AVLB) scissor bridge. The Contractor shall deliver two prototype JAB Systems and provide test support during the Engineering & Manufacturing Development (EMD) Phase of this contract. The Contractor shall provide prototypes in accordance with the specifications of Performance Based Purchase Description ATPD 2402.

C.1.1 General Description

The JAB System shall provide a reliable, mobile, survivable, and sustainable gap crossing capability to the maneuver commander. The JAB shall utilize a turret-less Army M1A1 Chassis (with the M1A2 Heavy suspension and Tiger engine) and a launch mechanism to launch and retrieve the Army MLC-85 AVLB.

The Government will furnish an M1A1 Chassis and MLC-85 AVLB. The M1A1 Chassis is on the U.S. Munitions List and is subject to export controlled laws and regulations.

C.1.2 General Requirements

The Contractor is responsible for the overall component selection, integration, design, development, fabrication, Contractor testing, Government test support, logistics product development, and configuration management to meet the requirements of this contract.

C.1.3 Data

The Contractor shall prepare deliverable program data in accordance with the format and content specified in the Data Item Descriptions (DID) and deliver data in accordance with the Contract Data Requirements List (CDRL). Unless otherwise stated, all data shall be submitted by email or by other electronic means mutually agreed to by both parties. Data submitted by email shall not exceed 10 megabytes (MB) in file size. Data over 10 MB shall be transmitted on a CD via regular mail. All proprietary data and export control data submitted by the Contractor shall be submitted via CD.

C.1.4 Calendar

All contract references to days shall be recognized as calendar days, unless specifically identified as work days.

C.2 MEETINGS, REVIEWS AND PROGRAM STRUCTURE

C.2.1 Participation/Logistics

The Contractor shall participate in the meetings, conferences and reviews required in this scope of work with Government attendance. Whenever possible, meetings shall be conducted by electronic means. Physical meetings shall be synchronized to minimize personnel resources and travel expenses.

C.2.2 Agendas

The Contractor shall submit an agenda and read-ahead package/briefing charts in

Contractor format for all meetings, conferences and reviews. The agenda for the Start of Work Meeting (SOWM) shall be jointly developed by the Government and Contractor. (CDRL A001)

C.2.3 Master Integrated Program Schedule (MIPS)

The Contractor shall deliver an initial MIPS for the SOWM. The Government will approve the baseline and all revisions. The MIPS will assist in the measurement of cost, schedule, performance, supportability and risk management. The Contractor shall maintain the MIPS, present the MIPS at each Program Management Review (PMR), explain all program slippages and provide get-well plans within 30 days of discovery. (CDRL A002)

C.2.4 Meeting/Conference/Review Minutes

The Contractor shall prepare and submit meeting minutes for all meetings, conferences, and reviews. (CDRL A003)

C.2.5 Contractor Start of Work Meeting (SOWM)

The Contractor shall conduct a Start of Work Meeting with Government attendance at TACOM in Warren, MI within 30 days after contract award. At the SOWM, the Contractor shall identify to the Government how they will manage all design, integration, fabrication, supportability and risk throughout the EMD phase. As part of the SOWM, the Government and Contractor will form IPTs. IPTs and membership shall be assigned in the areas of the contract and program management, engineering, Integrated Logistics Support (ILS) (publications, packaging, training), quality assurance, safety, human factors/MANPRINT, and test. The SOWM will be the first Program Management Review (PMR).

C.2.6 Program Management Reviews (PMR)

The Contractor shall conduct quarterly PMRs at the Contractor's facility, with senior-level program management participation. The Contractor shall present cost, schedule, performance, and risk status at each PMR and be prepared to discuss details with the Government. PMRs shall be held in conjunction with Technical Reviews when feasible to limit meetings.

C.3 ENGINEERING

C.3.1 Developmental Drawings

The Contractor shall provide the following drawings to the Government for review prior to the System Preliminary Design Review (PDR) and Critical Design Review (CDR) (CDRL A004) identifying:

- a. All proposed modifications to the M1A1 Chassis
- b. Launcher/M1A1 chassis interfaces including joint and attachment details
- c. Launcher mechanism drawings
- d. Component Placement drawings for:
 1. Driver and Commander's station arrangements
 2. Components mounted or placed on top of the M1A1 chassis

3. All other component placement drawings
 - e. Electrical schematic(s)
 - f. Hydraulic line routing diagrams/drawings
 - g. Any armor added to the JAB chassis
 - h. Driver and Commander vision (direct line of sight and using vision systems) under both open and closed hatch modes
 - i. Automatic Fire Extinguishing System (AFES) layout to include placement and orientation of AFES sensors in accordance with ATPD 2402, paragraph 3.8.7
 - j. Any items assessed as high risk during the Start of Work Meeting / System Requirements Review

C.3.2 Prototype Mockup

The Contractor shall provide full size physical mockups for Government review at the User Jury Review and Critical Design Review (CDR). Items which are not available in their final form may be represented by wood, foam, cardboard, or other materials to represent the locations and dimensions of the items listed below:

- a. Component placement to include Driver and Commander station arrangement
- b. All armor added to the system
- c. All components that impact Driver and Commander vision requirements (ATPD 2402, section 3.7.7).
- d. Other items critical to human factors engineering

C.3.3 Final Scientific and Technical Report

The Contractor shall submit a Final Scientific and Technical Report addressing the methods used and results achieved in carrying out the requirements of the EMD phase. The configuration of each JAB shall be documented in the Final Scientific and Technical Report, to include a list of all components upon test completion and resolution of test incidents (CDRL A005).

C.3.4 System Requirements Compliance Matrix

The Contractor shall develop a requirements compliance matrix that tracks the current compliance with all ATPD 2402 requirements. This matrix shall be developed as estimates and shall be updated to reflect actual performance as development and test progress. The matrix shall follow the sequence and format of ATPD 2402, Table 1 and clearly depict if the data is an estimate or actual performance. The supporting documentation used to populate the requirements compliance matrix shall be available to the Government and discussed at PMRs as well as technical reviews (CDRL A006).

C.3.5 Technical Reviews

The Contractor shall provide evidence that all entrance criteria has been met before each of the following technical reviews per Attachment 0002 (CDRL A007). The technical reviews will not be considered complete until all exit criteria have been met and approved by the Government.

C.3.5.1 Preliminary Design Review (PDR)

The Contractor shall conduct a PDR at the Contractor's facility with Government

attendance no later than 90 days after the SOWM to conduct a technical review of the allocated baseline to ensure the system can meet stated performance requirements before proceeding to a more detailed design. The Contractor shall present their preliminary designs as well as the Developmental Drawings and System Requirements Compliance Matrix for the JAB prototype systems.

C.3.5.2 User Jury Review

The Contractor shall support a structured User Jury Review at the Contractor's facility at least 60 Days prior to CDR to allow Soldiers to review the contractor's mockup and proposed configuration of the prototype.

C.3.5.3 Critical Design Review (CDR)

The Contractor shall conduct a CDR at the Contractor's facility with Government attendance no later than 270 days after SOWM to conduct a technical review of the product baseline to ensure the system can meet stated performance requirements before finalizing design. The Contractor shall present their preliminary designs as well as the Developmental Drawings and System Requirements Compliance Matrix for the JAB prototype systems. The CDR shall be conducted prior to initiation of fabrication/build. Any fabrication/build initiated prior to CDR shall require written approval from the PCO.

C.3.5.4 Pre-Test Readiness Review (TRR) and TRR

The Contractor shall conduct a Pre-TRR at the Contractor's facility no later than 30 days before test asset delivery to provide assurances that the test requirements can be performed within the stated schedule. The Contractor shall participate and attend the Government conducted TRR at the Government test site, within 5 days after test asset delivery.

C.3.5.5 Production Readiness Review (PRR)

Following the completion of Pre Production Qualification Test (PPQT), the Contractor shall conduct a PRR to determine if the design is ready for production and if the Contractor and major subcontractors have accomplished adequate production planning without incurring unacceptable risks that will breach thresholds of schedule, performance, or cost. The PRR shall be conducted no later than 45 days after PPQT completion.

C.3.5.6 System Verification Review (SVR)

Concurrent with the PRR, the Contractor shall conduct an SVR, a multi-disciplined product and process assessment to ensure the system under review can proceed into Low-Rate Initial Production and full-rate production within contract funding, schedule (program schedule), risk, and other system constraints.

C.3.5.7 Functional Configuration Audit (FCA)

Concurrent with the PRR, the Contractor shall conduct an FCA, the formal examination of the as-tested characteristics of the JAB System with the objective of verifying that the actual performance complies with design and interface requirements in the functional

baseline. The FCA shall be a review of the JAB System test/analysis data, including software unit test results, to validate the intended function or performance stated the ATPD is met.

C.4 CONFIGURATION MANAGEMENT (CM)

C.4.1 CM Program

The Contractor shall establish a CM program for Configuration identification, control, status accounting, verification, audit, and data management of the JAB System. To maximize return on investment and reduce life cycle costs, the Contractor shall use best practices to implement the technical and program management principles fundamental to CM.

C.4.2 Configuration Management Standards

The Contractor is encouraged to use Government Electronics and Information Technology Association (GEIA) EIA-649-A, National Consensus Standard for Configuration Management; GEIA-859, Data Management; and DoD MIL-HDBK-61A (SE), Configuration Management Guidance, as references for CM and Data Management (DM).

C.4.3 Configuration Control

C.4.3.1 Engineering Change Proposal (ECP)

The ECP shall provide detailed technical, economic, design, and/or production reasons for the proposed requirement change, the cost of potential resolution, and the effect of the resolution on other requirements. After the CDR is completed, the Contractor shall submit a notification for any Class I Engineering Change, in accordance with DI-CMAN-80639C (CDRL A008). An Engineering Change is considered Class I when it affects:

- a. Performance
- b. Reliability, maintainability or survivability.
- c. Weight, balance, moment of inertia.
- d. Interface characteristics.
- e. Electromagnetic characteristics.
- f. Other technical requirements in the specifications. Government Furnished Property (GFP).
- g. Safety.
- h. Compatibility or specified interoperability with interfacing Configuration Items (CIs), support equipment or support software, spares, trainers or training devices/equipment/software.
- i. Interchangeability, substitutability, or replaceability as applied to CIs, and to all subassemblies and parts except the pieces and parts of non-reparable subassemblies.
- j. Sources of CIs or repairable items at any level defined by source- control drawings.
- k. Skills, manning, training, biomedical factors or human-engineering design.
- l. Deliveries.

- m. Scheduled milestones.

C.4.4 As-Built Configuration List (ABCL)

The Contractor shall submit an Indentured Bill of Materials (IBOM) for each JAB System delivered in the EMD phase. The GFP shall be listed as a single item (no indenture of M1A1 Hull or MLC-85 AVLB required). Each IBOM shall contain the data identified in the ABCL, DI-CMAN-81516(T), and CDRL_ABCL. In addition to the fields highlighted in Paragraph 10.2.1 of DI-CMAN-81516(T), the IBOM shall also include:

- a. Material Specification
- b. Technical Specifications/Standards
- c. Finish Requirements

C.4.4.1 True Manufacturer Part Numbers

The IBOMs shall be prepared in an indenture level sequence down to the lowest component piece part level. The Contractor shall maintain and deliver configuration records to cross-reference any re-identified or re-marked part number & CAGE to its original, true manufacturer part number – CAGE, or specification-identified part number – CAGE, and vice versa. These items shall be reported in the IBOMs. IBOMs shall also include an additional, separate annotation, column, etc., to reflect the actual part number-CAGE on the prototype configuration if different from the as-designed part (CDRL A009).

C.4.5 Technical Data Package (TDP) and Data Rights

The Contractor shall develop, deliver, manage and maintain the JAB TDP throughout the EMD phase. The TDP shall consist of product models, drawings and associated lists data that are fully defined and sufficient for competitive re-procurement and maintenance of items interchangeable with the original items. Product data shall be prepared to provide accurate design, engineering, manufacturing, and quality assurance requirements. The TDP delivered to the Government shall reflect the as built or assembled and tested baseline configuration, incorporating all approved changes to date. The TDP shall include all product data required by DI-SESS-81000D(T), including notes, attributes, features, mass properties, center of gravity, moment of inertia, interface, and hardware. The Contractor shall deliver this JAB TDP in accordance with CDRL A010. The Contractor shall comply with data rights clauses: DFARS 252.227-7013 and 252.227-7037.

C.4.5.1 Data Management

The Contractor shall use an authoritative product data, engineering or configuration management system and the processes to effectively manage, securely store, release, validate, and track multiple versions and iterations of the as-designed, as-integrated, as-built, as-tested, and as-delivered JAB configuration baselines; this includes management of product structures, product definition documents and data, Contractor test and analysis data, Government Furnished Information (GFI) and other related technical data.

C.4.5.1.1 Version Control

The Contractor shall assign a unique identifier for JAB product data and utilize disciplined version control in managing digital data. Each revision shall be a new master, and the Contractor shall retain all revisions (versions) of each document and model representation to provide a traceable history in order to access the correct revision when needed.

C.4.5.2 TDP Maintenance

The Contractor is responsible for all original data in its possession. The JAB developmental and product data shall be updated with the JAB hardware to reflect the current level of design maturity. The Contractor shall incorporate changes to the JAB TDP and provide the Government with compliant data in accordance with the requirements of this contract.

C.4.5.3 Referenced Documents

The Contractor shall furnish all documents referenced in product data deliverables, including any company specifications or standards (excluding commercially available standards) required for any item(s) in the JAB TDP.

C.4.5.4 Company Data

If one or more company standards define a vendor item, or are referenced in the JAB TDP, the Contractor shall deliver the standard(s), which provide enough information for the identification and procurement of an interchangeable item, and the Contractor shall also supply all documents referenced in the standard unless the document is commercially available. The company data shall be identified using numbers, titles, CAGE, etc., as applicable. Nonstandard symbols, drawing or documentation practices shall be explained within the company data or an accompanying document.

C.4.5.4.1 Data Identification

The Contractor shall establish unique identification for items in the product data in the form of a Part or Identifying Number (PIN), in combination with the CAGE. The NSN for items may be cited in the product data in addition to the PIN-CAGE; however, NSNs do not establish unique identification and shall not be cited within the product data in lieu of the PIN and CAGE.

C.4.5.5 Security Markings

The unlimited rights technical data shall not contain restrictive legends or markings. On models, all statements and notices shall be applied to initial layer at opening. Contractor prepared 2D drawings shall include markings on all drawing sheets. Associated lists and other related documents that are primarily of a textual nature shall have notices applied to each sheet.

C.4.5.6 Interface Control Document (ICD)

The Contractor shall deliver ICD(s) that define the required physical and technical characteristics to design the JAB launching system to be compatible with the M1A1 Hull

and MLC-85 AVLB. The models and drawings shall define the physical locations of all M1A1 Hull and MLC-85 AVLB mounting provisions and interfaces.

C.4.5.7 Types of Product Data

- a. New 3D CAD Parts and Assemblies. The Contractor shall use commercial best practices. For each part or assembly where the Contractor uses 2D drawings, any change in either the 3D CAD parts and assemblies or 2D drawings will be automatically updated in the associated files.
- b. Interface 3D CAD Parts and Assemblies. For Government form, fit, function and interface requirements, native (master) 3D CAD explicit non-parametric shrink-wrap part and assembly solid models shall be provided. Non-parametric shrink-wrap solid models shall be complete with sufficient envelope, mounting and mating features.
- c. Hardware. All hardware shall be provided in 3D CAD for space claim. Hardware includes commercial and military standard mechanical, electrical or electronic parts and assemblies. For commercial printed circuit boards or for commercial collection of items in a case, a CAD envelope representation of the collection shall be modeled. Internal items shall not be modeled. In cases where detailed specifications are not available, models shall be based upon measurements of actual components.

C.4.5.8 Product Data Deliverable File Formats

- a. Parametric 3D Native CAD. The Contractor's CAD and Drafting software application is acceptable for construction of parametric 3D and native 2-D CAD drawings. All parts and assemblies shall be delivered fully dimensioned and annotated in Contractor's CAD and Drafting software application.
- b. Neutral CAD Format. The Contractor shall translate each design master (native) 3D CAD part and assembly solid model into an ISO 10303 STEP AP203 or AP214 format.
- c. Non-Parametric Solid Model Format. For form, fit, function and interface requirements, an associated native 3D CAD explicit non-parametric shrink-wrap part and assembly solid model shall be provided. Non-parametric shrink-wrap solid models shall be complete with sufficient envelope, mounting and mating features that include mass properties and center of gravity.

C.4.5.9 Sample Data Submission

The Contractor shall deliver a sample technical data package of an assembly in accordance with CDRL A010 that consists of 3-10 parts in 3D and STEP for initial review of model integrity and compliance with contract requirements.

C.4.5.10 Contractor's Standard Applications and Practices

The Contractor shall submit a geometry and data creation standard detailing the practice and application of part and assembly, geometry, dimensioning and tolerancing

annotations in the design, development, control, validation, and management of JAB 3D CAD engineering data and associated product definition technical documents (CDRL A011).

C.5 RELIABILITY, AVAILABILITY, MAINTAINABILITY (RAM) PROGRAM

C.5.1 Reliability Scorecard Assessment

The Contractor shall complete reliability program scorecard self assessment by completing Attachment X. The Contractor shall provide the completed scorecard and all supporting documentation (CDRL A012). The Government will complete an assessment based on the information provided and provide the results to the Contractor for review and comment.

C.5.2 Reliability and Maintainability (R&M) Program Management

An R&M management program shall be established and maintained throughout the program cycle. The program shall require analysis and predictions that assess and influence the JAB design's ability to achieve the R&M requirements of ATPD 2402 and develop essential information for the development of the JAB logistics support package. (CDRL A013)

C.5.3 Reliability and Maintainability Predictions

The Contractor shall perform R&M predictions and compare results with specified R&M requirements. The predictions shall be updated and reported to the Government as the system configuration changes. (CDRL A013)

C.5.4 Design Failure Mode and Effect Analysis (DFMEA)

The Contractor shall provide the Government with a DFMEA for launcher, launcher sub-systems, launcher to M1A1 hull interfaces, and launcher to MLC-85 AVLB interfaces. The DFMEA format shall be in accordance with SAE J-1739 (CDRL A014).

C.6 RISK MANAGEMENT

The Contractor shall identify, monitor, and mitigate all program risks and track risk elements to completion/closure in a Risk Management Status Report. Resolved risks shall be archived on the report after Government approval. (CDRL A015)

C.7 SAFETY AND ENVIRONMENTAL

C.7.1 Safety Engineering Principles

The Contractor shall apply the standard safety practices in accordance with MIL-STD-882 during the design and/or modification of the JAB System and its components. System design and operational procedures shall be developed with the following considerations:

C.7.1.1 Identify Hazards and associated causal factors within the system by conducting Safety and Occupational Health analyses. Analysis shall be to the functional depth necessary to identify logical, practical, and cost-effective mitigation techniques and

requirements for each causal factor. This analysis shall also consider all hardware, software, environmental, and human factor interfaces as potential contributors in all phases of operation: maintenance, transport, training and test.

C.7.1.2 Derive safety-specific hazard mitigation requirements to eliminate or reduce the likelihood of each causal factor. Provide engineering evidence (through appropriate inspection, analysis and test) that each mitigation safety requirement is implemented within the design and the system functions as required meeting safety goals and objectives.

C.7.1.3 Eliminate or reduce significant hazards by appropriate design or material selection. If hazards to personnel cannot be avoided or eliminated, steps shall be taken to control or minimize those hazards.

C.7.1.4 Locate equipment components and controls so that access to them by personnel during operation, maintenance or adjustments shall not require exposure to hazards. All moving parts, mechanical power transmission devices, exhaust system components, pneumatic components and hydraulic components which are of such a nature or so located as to be a hazard to operating or maintenance personnel shall either be enclosed or guarded. Protective devices shall not impair operational functions. Examples of hazards to be considered include, but are not limited to: high temperature, chemical burns, electrical shock, cutting edges, sharp points, and toxic fumes above established threshold limit values.

C.7.1.5 Assure that suitable warning and caution notes are included in instructions for operation, maintenance, assembly, and repairs and that distinct markings are placed on hazardous components of the equipment.

C.7.2 System Safety Program Plan

The Contractor shall prepare a System Safety Program Plan (SSPP) in accordance with DI-SAFT-81626 and CDRL A016. The Contractor SSPP shall detail the tasks and activities of system safety management and system safety engineering required to identify, evaluate, and eliminate or control hazards throughout the system life cycle. In addition to the requirements of DI-SAFT-81626, the SSPP shall describe the Contractor's plans to incorporate the JAB System Safety Program Requirements as defined in ATPD 2402 paragraph 3.12.

C.7.3 System Safety Program Progress Report (SSPPR)

The Contractor shall prepare a System Safety Program Progress Report (SSPPR) in accordance with DI-SAFT-80105B and CDRL A017. The SSPPR shall detail/document any hazard analysis performed since the last delivery of the SSPPR as well as changes incorporated into the system design to enhance safety and to mitigate hazards identified. The SSPPR shall provide updates to the Hazard Tracking System, to include new hazards and work accomplished on previously identified hazards since the submission of the last report.

C.7.3.1 Hazard Tracking System (HTS)

The Contractor shall develop and maintain a method or procedure to document and track hazards for identification until the hazard is eliminated or the associated risk is reduced to a level acceptable to the Government in accordance with CDRL A017. The HTS shall contain as a minimum: a description of each potential or actual safety and health hazard of the JAB System, the cause and effects of the hazard, when the hazard may be expected to occur under usual and unusual operating or maintenance conditions, and status of each hazard. The Contractor shall identify actions taken to mitigate the risk associated with the hazards and categorize the risk before and after mitigation in accordance with MIL-STD-882. MIL-STD-882 revision C provides further information that may be used for guidance. If a hazard is software related, the Contractor shall provide indication. Mitigation actions include recommended engineering controls, safety features or devices, warning devices and procedures and training. Examples of hazards to be identified in the SAR include, but are not limited to: sharp edges/moving parts hazards, physical hazards (e.g. extreme temperatures, acoustical energy, ionizing and non-ionizing radiation, etc.), chemical hazards (e.g. flammables, corrosives, carcinogens, etc.), toxic fumes (exhaust emissions), electrical hazards, noise, whole-body vibration, compliance issues with regulatory organizations, generation of hazardous wastes, biological hazards, fire prevention issues, and ergonomic hazards.

C.7.3.2 Disposition and Closeout

All hazards must receive final disposition by the Government. The Government and the Contractor shall mutually agree as to whether a hazard requires a redesign; however, any redesign required due to a hazard shall be performed at no cost to the Government, and the adequacy of the design change shall remain the responsibility of the Contractor. All hazards closed out in the log shall contain the signature of the Government official who authorized the closeout.

C.7.4. Safety Assessment Report (SAR)

As a result of system safety analyses, hazard evaluations, and Government or independent testing, the Contractor shall perform and document a safety and health hazard assessment. The safety and health hazard assessment shall identify all known safety and health features of the hardware, software, system design, and inherent hazards and shall establish special procedures and/or precautions to be observed by Government test agencies and system users. The Contractor shall prepare the SAR in accordance with DI-SAFT-80102B and CDRL A018, including an updated HTS. In addition to the requirements of the DID, the Contractor shall also identify safety and health hazards associated with the system to include any modifications as described in the following sections.

C.7.4.1 Hazardous Materials

A list of hazardous materials used in or on the system shall be included in the SAR and identified by chemical name, common or trade name, NSN (if applicable), physical form and manufacturer/supplier. The list shall annotate the location in the JAB System of the hazardous materials, the conditions under which hazardous materials pose a health threat, and the recommended disposal actions. Highly toxic or carcinogenic materials

as defined in 29 CFR 1910.1200 shall not be used in the manufacture or assembly of the system without PCO approval.

C.7.4.2 Radioactive Materials

If radioactive materials must be utilized in the system, the following analysis shall be included as part of a request for PCO approval: establish justification why these materials are the only means of meeting military operational requirements; provide sufficient data to permit the Government to secure a license for the radioactive material; and describe design and procedures required to minimize hazards to personnel during manufacture, use, transportation, and disposal. The Contractor shall specify the following information and procedural controls for each item containing radioactive material: marking of the item(s); ultimate disposal method; NSN and part nomenclature of each radioactive item; NSN of all end articles containing the radioactive item; total number of radioactive items per end article; the total number of radioactive items to be procured (including spares); and, a Material Safety Data Sheet.

C.7.4.3 SAR Updates

In the event the JAB System is modified or procedural changes are made, the Contractor shall update the SAR to reflect those modifications or changes. The Contractor shall submit an updated SAR in accordance with CDRL A018. After this second SAR delivery, the Contractor shall provide updated SAR change page notices within 30 days after any new modification or change is implemented. In addition, the Contractor shall immediately notify the PCO (within 24 hours) via phone and email if new hazards or increased risk/hazard probability levels are identified while Government testing of the JAB System is ongoing.

C.7.5 JAB System Safety Working Group (JSSWG)/Safety Review Support

The Contractor shall provide representation at the JSSWGs, which will be held in conjunction with Quarterly PMRs. The JSSWG is a PM chartered advisory group dedicated to addressing safety issues and supporting the Program Manager in implementing the System Safety Program

C.7.6 Hazardous Materials Management Program (HMMP) Report

The Contractor shall prepare a HMMP Report which shall identify all hazardous materials required for system manufacture, assembly, operation and sustainment, including the parts/processes that require them. This report shall be prepared in accordance with National Aerospace Standard 411, section 4.4. (Exception to NAS 411 Section 4.4.1: Hazardous materials used in system manufacture and assembly shall be identified in the report in addition to those hazardous materials delivered and required for operation and support). The report shall include a listing of prioritized hazardous materials for minimization/elimination, and identify those hazardous materials/processes for which non-hazardous substitute materials/technologies may be available for implementation. The HMMP Report shall specify which phase (manufacture, operation, and/or sustainment) that each material is required for. Status, changes or issues with the HMMP Report shall be discussed as a part of each technical review and program management review. (CDRL A019)

C.8 WELDING

C.8.1 Welding Procedures

The Contractor shall develop Procedure Qualification Records (PQRs) and Welding Procedure Specifications (WPS) in accordance with welding code(s) as specified in ATPD 2402 Table 3: Welding Standards. The Contractor shall follow the appropriate welding standard scope to qualify the welding and weld repair procedures. The Contractor shall prepare weld samples and test the weld procedure for qualification in accordance with the appropriate standard. The PQR test data, WPS and weld repair procedure shall be submitted to the government for review prior to production welding. Changes to the PQR, WPS, or weld repair procedures will require requalification and shall be submitted as part of the CDRL. The use of pre-qualified weld joints as specified in American Welding Society (AWS) D1.1 does not preclude submittal of welding procedures (CDRL A020, CDRL A021, CDRL A022).

C.8.1.1 Previously Qualified Procedures

If the Contractor previously qualified welding procedures under another DOD contract, and wants approval to use these procedures, the Contractor shall submit a written request to the PCO prior to prototyping or build. The following requirements shall be met and documentation shall be provided:

- a. The weld procedure was qualified by destructive testing and approved on a previous DOD contract and the essential variables are within the tolerance as specified in the applicable welding standard(s) for the current contract.
- b. The Contractor has certified welders and equipment to the qualified procedures in accordance with the applicable welding standard(s).
- c. There was no break in production for more than six months at the facility where the procedures were used.
- d. A favorable quality history in regards to weld quality on the previous contract where the procedures were used.

C.8.1.2 Welding Repair Procedures

The Contractor shall provide written repair procedure(s) identifying proper technique and approach to correct defective product and obtain Government approval of the procedure prior to repair of defective parts (CDRL A020).

C.8.1.3 Weld Equipment

The Contractor shall ensure that all welding equipment (gauges and meters), including subcontractors' welding equipment, used in the performance of this contract have been certified and calibrated annually in accordance with the weld standards in ATPD 2402 Table 3. Upon Government request, the Contractor shall make available equipment calibration documentation.

C.8.1.4 Welding Inspectors

During performance of this contract, the Contractor shall verify weld quality and workmanship using qualified inspectors trained to perform these inspection functions.

The Contractor shall make available all personnel qualification records upon request by the Government. The inspectors must meet at least one of the requirements below:

- a. Current Certification in accordance with AWS, Certified Welding Inspector (CWI), qualified and certified in accordance with provisions of AWS QC1, Standard for AWS Certified Welding Inspector; or
- 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; or
- c. An individual who, by experience, and/or education, in metals, fabrication and testing, is competent to perform inspection with written approval from the PCO.

C.9 INTEGRATED LOGISTICS SUPPORT

C.9.1 Publication for Operation

The Publications for JAB Operation during Pre-Production Qualification Test (PPQT) shall be prepared and delivered in accordance with the most current revision including the most current change of MIL-STD-40051-2, CDRL A023, and Attachment xxx Matrix Table A-XX. The Publications for JAB Operation during PPQT shall be for the full system.

C.9.2 Quality Assurance

The contractor shall be responsible for the quality of the equipment publications deliverables. All delivered TM information shall be complete, technically accurate and useable by US Army Soldiers.

C.9.3 Training

The Contractor shall provide 40 hours of operation training at the Aberdeen Test Center for 12 individuals for PPQT. Training shall consist of safety precautions, equipment familiarization, operator Preventative Maintenance Checks and Services (PMCS), proper operating procedures, operator training and all necessary materials and equipment required to support testing of the JAB. The Publications for JAB Operation during PPQT and training materials shall also be provided to supplement training. CDRL A024.

C.9.3.1 Training Requirements

The Contractor shall provide technically qualified/certified instructors on all training and instructional materials related to the Program of Instruction (POI) for the JAB System. Instructor certification shall be established by: Army Certification (Instructor's Training Course), or by a civilian certification program through public or private certification process, or by a documented Contractor certification program that will be verified by the TACOM Training Manager.

C.10 HUMAN FACTORS ENGINEERING (HFE)

The Contractor shall assure that the system design is consistent with the capabilities and limitations of the fully equipped Soldier to operate, maintain, supply, and transport it in its operational environment, consistent with tactical requirements and logistical

capabilities. The scope of the HFE analytic, design and test activities shall include compensation for the effects of personal equipment; clothing; protective gear; extremes of natural environment including atmospheric, degraded visibility, thermal, and terrain conditions as defined by system requirements; workload contingencies; and combat training scenarios for each deployment mode and intended duty cycle (normal, sustained, and emergency). The Contractor shall evaluate the system to assess capability to maximize system and human performance and combat effectiveness and identify any shortfalls and implement appropriate resolutions.

C.10.1 Human Factors Engineering Analysis (HFEA)

The Contractor shall perform and deliver an HFEA (CDRL A025). The HFEA shall describe the status of the system's human factors engineering program and contain adequate data to support the Contractor's assertions that the system meets the human factors engineering requirements for Milestone Decision and Design Reviews. The Contractor shall identify HFE shortfalls or issues and implement appropriate resolutions. The Contractor shall maintain a database of the issues and provide updates as required. As guides for managing the HFE program the Contractor may use MIL-STD-1472F, Human Engineering Design Criteria for Military Systems Equipment and Facilities, and MIL-STD-1474, Noise Limits Design Criteria for Military Systems Equipment and Facilities.

C.11 GOVERNMENT FURNISHED PROPERTY (GFP)

The following GFP is provided to the Contractor:

- a. M1A1 Abrams tank chassis as the mobility platform, NSN 2350-01-545-7365.
- b. The existing Army MLC 85 AVLB, NSN 5420-01-390-3933
- c. M1A1 chassis Basic Issue Items (BII) and Components of the End Item (COEI)
- d. AVLB BII

The Contractor shall incorporate all GFP into the JAB System in accordance with ATPD 2402.

C.11.1 Abrams Chassis and AVLB BII and COEI

The Government will provide one set of BII/COEI for each M1A1 chassis. One set of AVLB BII be provided with each bridge. A list of the M1A1 chassis and AVLB BII/COEI and publications is provided as Attachment X.

C.11.2 Abrams Chassis Government Furnished Information

Supplemental training materials will be provided to the Contractor concurrent with GFP M1A1 chassis delivery.

C.11.3 Contractor Training Requirements for GFP

The Contractor shall ensure they have trained and licensed Abrams chassis operators with experience as Military Occupation Specialties 91K, or equivalent to 91A (45E, 63E) for GFP chassis delivery. The Contractor shall ensure they have operators that are licensed on the MLC-85 AVLB. The Contractor shall provide certification of operators prior to Government delivery of GFP.

C.11.4 Government Furnished Supplemental Training

The Contractor shall attend Government provided familiarization training upon delivery of GFP. The Government will show differences between the M1A1 Main Battle Tank and the M1A1 hull provided as GFP. The supplemental training will not exceed 40 hours.

C.11.5 Government Technical Support for GFP

The Government will provide technical representatives for the GFP at the Contractor's site if there are chassis or AVLB failures during the Contractor design phase. The Contractor shall notify the COR of any failures within 24 hours via email or phone call.

C.11.6 Preventive Maintenance for Abrams Chassis and AVLB

The Contractor shall conduct Preventive Maintenance Checks and Services (PMCS) outlined in the Abrams and AVLB operator manuals.

C.12 TEST AND INSPECTION

C.12.1 Quality Program Plan

The Contractor shall develop a Quality Program Plan acceptable to the Government for all supplies and services to be provided under this contract. The Quality Program Plan shall address software and hardware contractual requirements. The quality manual/program plan shall follow the guidance of ISO-9004 section 4.2 (CDRL A026).

C.12.1.1 Subcontractor Quality Assurance

The Contractor shall have a subcontractor Quality Assurance Program that defines the appropriate ISO-9000 or Government approved equivalent quality program requirements for each supplier. The Contractor's supplier Quality Assurance Program shall assure each supplier has a documented quality program and documents control plans, conducts source inspections or receiving inspections, and initiates investigations for manufacturing and test problems. The Contractor's plan shall include provisions for periodic audits (CDRL A026)

C.12.1.2 Acceptance of Subcontractor's Quality Assurance Plan

The Prime Contractor shall review and document acceptance of their subcontractor's quality assurance plans. The Prime Contractor shall make documentation available for review upon Government request. Government audits will be at the direction of the Government Procuring Activity.

C.12.2 Inspection & Test Equipment

The Contractor shall make inspection equipment available to the Government Inspector during Government in-process or end item inspection. The Contractor is responsible for the supply and maintenance of all inspection and test equipment necessary to assure that end item components conform to contract requirements. Upon completion of the inspection by the Government Inspector, all inspection equipment shall be returned to the Contractor.

C.12.3 Prototype Inspection Overview

Prior to delivery to the Government, the Contractor shall conduct inspections and tests for the prototype JABs in accordance with ATPD 2402.

C.12.3.1 In-Process Inspection

During fabrication of the prototype JABs, the Government shall have access to the Contractor's or subcontractor's facility to perform in-process inspections in accordance with ATPD 2402.

C.12.3.2 Pre Production Unit Inspection (PPUI)

Prior to delivery of the prototypes, the Contractor shall conduct PPUI in accordance with ATPD 2402.

C.12.3.3 Final Inspection Record (FIR)

The Contractor shall prepare a FIR in Contractor format to be used during Quality Conformance Inspection (QCI) in accordance with ATPD 2402. The FIR shall list each characteristic or function inspected or tested, and the relationship to the contract requirement (CDRL A027). Deficiencies disclosed and corrective action taken during inspection by the Contractor or the Government shall be described in writing on the Deficiency Sheet attached to the Final Inspection Record. The Contractor shall perform 100% final inspection of the end item in accordance with the requirements of ATPD 2402 utilizing the Government approved Final Inspection Record.

C.12.4 Certifications to ATPD 2402 Performance Requirements

The Contractor shall provide the certifications specified by ATPD 2402 (CDRL A028).

C.12.5 Government Test Overview

The Government conducted test and evaluation consists of series of tests and analyses to be conducted during PPQT in accordance with ATPD 2402. All performance, manufacturing and quality defects are the responsibility of the Contractor to correct.

C.12.5.1 Pre-Production Qualification Test (PPQT)

The Government intends to conduct PPQT for no more than 180 days. The Government will conduct performance testing in accordance with ATPD 2402. The Government has the right to modify or waive any test requirement listed in ATPD 2402

C.12.5.2 Test Support

C.12.5.2.1 Test Support Package (TSP) List

The Contractor shall provide TSP lists for PPQT (CDRL 029). The PPQT TSP list shall identify quantities of supplies needed for the testing of 2 JAB launcher mechanisms. Petroleum, Oils and Lubricants (POL) shall not be included in the TSP list. The TSP shall include the following:

- a. Spare/repair parts. All items required to support the service intervals defined in the technical manuals

- b. Peculiar/common/special tools.
- c. Basic Issue Items.
- d. All parts the Contractor determines to have a high failure rate
- e. All long lead items that have the potential to significantly cause delays during test (in the event of failure)

C.12.5.2.2 TSP

The Contractor shall assemble, furnish and ship (to include packing, packaging and transportation) the TSPs. The TSPs shall consist of items listed on the TSP lists. The Contractor shall resupply items consumed during test to ensure test continuity. Items used shall be replenished by the Contractor within forty-eight (48) hours of usage.

C.12.5.2.3 Contractor Test Support Representative

Contractors shall not be permanently located at the test site. When requested, a service representative shall respond within two business days for major/critical failures and within three business days for minor failures. Response could be a phone call, e-mail, or site visit at the discretion of the Government. The Contractor shall notify the Government in advance of visit to the test site. A Government escort is required at all times. At minimum the Contractor shall provide the following test services:

- a. Troubleshooting and correcting all failures.
- b. Coordination of vendors required to fix any failures or test incidents.
- c. Shipping and tracking the return of items to off-post repair facilities.

C.12.5.2.4 Maintenance

The Government will operate the JAB Systems during PPQT but the Contractor shall perform all maintenance of the JAB Launcher System and Contractor modifications to the chassis. All maintenance shall be conducted in the presence of the test center data collector. The Contractor shall sustain equipment in a mission capable status and perform maintenance both preventive and corrective in nature. The Contractor shall perform maintenance which entails inventory, cleaning, inspecting, preserving, lubricating, adjusting and testing as well as fault isolating and replacing parts and components. The intent is to replace the failed component, assembly, or module that returns the system to an operational status.

C.12.5.3 Test Deficiencies

C.12.5.3.1 R&M Data Collection, Failure Reduction, and Corrective Action Program

The Contractor shall establish and maintain a system which monitors and supports JAB R&M performance during Government testing through data collection and responsive evaluation of test incidents, to include failed part analyses, and invoking and tracking necessary corrective actions to the systems' design.

C.12.5.3.2 Failure Analysis and Corrective Action Reporting System (FACARs)

The Contractor shall be responsible for accessing the Army Test Incident Reporting System (ATIRS) database at Aberdeen Test Center (ATC), Aberdeen MD, to obtain the Test Incident Reports (TIRS) generated on the equipment during the government tests. TIRs are the means by which data collected during government testing will be reported. Information on access to ATIRS, and points of contact at ATC are available on the web at: <http://www.vision.atc.army.mil>. The Contractor's date of receipt of the TIR shall be defined as the day the TIR is posted to the database. Upon acquiring a TIR, the Contractor shall assess the failure, and shall furnish a Failure Analysis and Corrective Action Report with the proposed corrective action to prevent or minimize the probability of incident recurrence. The proposed corrective action will be submitted to the FACAR review board for approval and the Contractor will input the approved corrective action report to the ATIR database through the web. The ATIR database access for the corrective action reporting will be gained by applying to the ATC website as shown above. (CDRL A030)

C.12.5.3.2.1 FACARs are not required for TIRs that are charged to the following (in data block 43): Crew, Maintenance Personnel, and Hardware/Government Furnished Equipment, unless directed by the Government.

C.12.5.3.3 Retest

In the event of a JAB System test failure, the Government reserves the right to retest the JAB System upon correction of the defect(s). The Contractor shall be responsible for delays in the program test period resulting from JAB System component defects for failure to adequately or timely furnish parts support, and the Government shall have the right to extend the specified program test period accordingly. The Contractor shall continue to provide technical support for the extended test period at no additional cost to the Government.

C.12.5.3.4 Scoring Conferences/Corrective Action Review Board (CARB) Meetings

C.12.5.3.4.1 Scoring Conference

During and after Government testing, Scoring Conferences will be held to review and independently score TIRs. The Contractor will not attend the actual scoring of the TIRs.

C.12.5.3.4.2 CARB Meetings

During and after Government testing, CARB meetings will be held to review the functional/performance failure data and corrective action status of TIRs which require a Contractor response. The CARB meeting results should be consistent with scoring conference data. Contractors will be able to attend the conference meeting to present information, evidence, or opinions that the Government should consider when assessing corrective actions.

C.12.5.3.4.2.1 CARB Meeting Agenda

The Contractor shall provide an electronic CARB Meeting agenda prior to all CARB meetings. It shall contain at a minimum the following information: TIR, Revision #, Date Occurred, Original Release Date, Release Date, Title/Maintenance Description, Incident

Class, and Chargeability. Official CARB meeting minutes will be provided by the Contractor (CDRL A003 and CDRL A001).

C.12.5.3.4.3 Assessment Conference

After PPQT, the Government will conduct a final Assessment Conference to review all TIRs, Scoring, and associated FACARs. The Contractor will not attend the Assessment Conference. The Government will provide the results of the Assessment Conference to the Contractor.

C.12.6 Care and Storage Prior to Shipment

The Contractor shall be responsible for the care and storage of all JAB Systems and test support packages until shipment. To assure that the JAB Systems remain in an acceptable condition, the Contractor shall develop a storage exercise and maintenance plan with a Quality Assurance Identifier in accordance with (CDRL A031). The plan schedule shall include instructions for exercising, inspecting and replacement of components during storage and prior to shipment and contain a reference to all applicable procedures and work instructions.

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