

**Statement of Work  
For**

**INSTRUMENTABLE MULTIPLE INTEGRATED LASER ENGAGEMENT SYSTEM  
VEHICLE TACTICAL ENGAGEMENT SIMULATION SYSTEM  
(I-MILES VTESS)**



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**Statement of Work  
For  
Instrumentable Multiple Integrated Laser Engagement System  
Vehicle Tactical Engagement Simulation System  
(I-MILES VTESS)**

**1.0 Scope**

This Statement of Work (SOW) defines the efforts for the production of the Instrumentable Multiple Integrated Laser Engagement System (I-MILES) Vehicle Tactical Engagement Simulation System (VTESS). The requirements for this document are derived from MILES 2000 Operational Requirements Document (ORD) for Replacement of Ground Direct Fire Tactical Engagement Systems (TES) Devices, Cards Number 0291, and revised July 1996.

**1.1 Background**

The U.S. Army Program Executive Office for Simulation, Training and Instrumentation (PEO STRI), Project Manager Training Devices (PM TRADE), Product Manager Live Training Systems (PM LTS) has an immediate need to evolve and procure the I-MILES product line. I-MILES VTESS is a product within the I-MILES product-line and is also one system within in a larger Live Training System of Systems (SoS). The VTESS acquisition will complete the Basis of Issue (BOI) and potentially replace older legacy systems. The VTESS will provide a more realistic training capability, reduce life cycle costs, and integrate emerging commercial-off-the-shelf (COTS) or modified COTS technologies.

**2.0 Applicable Documents**

The following documents form a part of this SOW to the extent specified herein:

**2.1 Department of Defense Specifications**

**2.2 Availability of Department of Defense Specifications**

Copies are available on the WWW at URL: <http://www.assistdocs.com/search/>

**2.3 Department of Defense Standards**

The following specifications, standards, and handbooks form a part of this document to the extent specified herein.

MIL-HDBK1222	Guide to the General Style and Format of U.S. Army Work Package Technical Manuals
MIL-HDBK-1467	Acquisition of Software Environments and Support Software
MIL-PRF-2961B	Performance Spec Training Data Products
MIL-STD-31000	Technical Data Packages

MIL-STD-130N	Identification Marking of U.S. Military Property
MIL-STD-502	Product Support Analysis
MIL-STD-46855	Human Engineering Requirements for Military Systems, Equipment and facilities

**2.4 Availability of Department of Defense Standards**

Copies are available on the WWW at URL: <http://www.assistdocs.com/search/>

**2.5 Department of Defense Directives**

DoDD 4151.18	Maintenance of Military Materiel
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**2.6 Availability of Department of Defense Directives**

Copies are available on the WWW at URL: <http://www.dtic.mil/whs/directives/>

**2.7 Department of Defense Instructions**

DoDI 8500.2	Information Assurance Implementation
DoDI 8510.01	Risk Management Framework (RMF) for DoD Information Technology (IT)

**2.8 Availability of Department of Instructions**

Copies are available on the WWW at URL: <http://www.dtic.mil/whs/directives/>

**2.9 Other Government Documents, Drawings, and Publications**

AR 25-1	Army Information Technology, 25 June 2013
AR 5-12	Army Use of the Electromagnetic Spectrum, 15 February 2013

Copies are available on the WWW at URL: <http://www.apd.army.mil>

NIST SP 800-53	National Institute of Standards and Technology (NIST) Special Publication: Security and Privacy Controls, Revision 4
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Copies are available on the WWW at URL: <http://csrc.nist.gov/publications/pubssps>

CNSSI 1253	Security Categorization and Control Selection For National Security Systems, Version 2
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Copies are available on the WWW at URL: <https://www.cnss.gov>

PEO STRI SOP 70-1	Acquisition Program Management and Documentation
99-0008380	Consolidated Product Line Management (CPM) Operations Guide

PRF-PT-00639 Performance Specification for the Instrumentable Multiple Integrated Laser Engagement System Vehicle Tactical Engagement Simulation System (I-MILES VTESS), Version 1.1

PRF-PT-00608 Live Training Engagement Composition (LTEC) Interface Control Document (ICD), Version 1.1

PRF-PT-00549 Live Player Area Network (PAN) Interface Standard, Revision C

Title 10 § 2464 Armed Forces

Copies are available on the WWW at URL: <https://www.LT2Portal.org>

TRADOC Reg 350-70 Army Learning Policy and Systems, 6 December 2011

TRADOC PAM 350-70-5 Systems Approach to Training: Testing, 20 August 2004

TRADOC PAM 350-70-10 Systems Approach to training Course and Courseware Validation, 29 March 2004

TRADOC PAM 350-70-12 The Army Distributed Learning (DL) Guide, 3 May 2013

Copies are available on the WWW at URL: <http://www.tradoc.army.mil/tpubs>

29 CFR 1910.1200 Occupational Safety and Health Standards / Toxic and Hazardous Substances

Copies are available on the WWW at URL: <http://www.osha.gov>

## **2.10 Availability of Other Government Documents and Publications**

Copies of the above documents are available at PEO STRI, ATTN: SFAE-STRI-TRADE-LT, 12350 Research Parkway, Orlando, FL 32826-3276

## **2.11 Non-Government Standards and Other Publications**

## **2.12 Availability of Non-Government Standards and Other Publications**

Copies are available on the WWW at URL: <http://www.nssn.org/search>

## **3.0 Requirements**

This SOW defines the effort required for manufacturing, integrating, testing, managing, documenting, delivering, and initially sustaining the I-MILES VTESS. The Contractor shall produce an I-MILES VTESS Training System that meets the performance requirements as defined in the Performance Specification for I-MILES VTESS Training System, [PRF-PT-00639](#).

### **3.1 Program and Financial Management**

The Contractor shall provide the overall management and administrative effort

necessary to ensure that the requirements of this contract are accomplished.

### **3.1.1 Integrated Master Plan (IMP) and Integrated Master Schedule (IMS)**

The Contractor shall implement, manage update, and maintain the contract IMP and an IMS for the I-MILES VTESS program. The Contractor shall develop and complete all planned integrated master schedule (IMS) tasks for each milestone. The Contractor shall provide IMS and IMP data to the Government and review the data at Program Management Reviews (PMR). The Contractor shall manage cost, schedule, technical performance, and address Life Cycle Cost (LCC) considerations in program decision making. The Contractor shall report on work in progress in accordance with (IAW) the IMP at each program review, at selected technical reviews and at Government's discretion. The IMP shall depict the contract work breakdown structure. The Contractor shall coordinate and maintain an IMS that shows the work planned to achieve each significant accomplishment and the criteria leading up to each event.

#### **(DI-MGMT-81861) Integrated Program Management Report (IPMR) Integrated Master Schedule (IMS) Format 6**

### **3.1.2 Financial Management**

The Contractor shall plan, budget, schedule, and control the resources allocated to meet the requirements of the contract. The Contractor shall document and track the status of all appropriated funds associated with the contract to include payments, cancellations and invoices against each contract line item and subline item. The Contractor shall extend the Government-provided Program Work Breakdown Structure (PWBS) to lower levels in the Contractor's CWBS. It defines the lower level components of what is to be procured and includes all the product elements (hardware, software, data, or services), which are defined by the Contractor and the Contractor's responsibility.

The extended CWBS shall serve as the framework for contract planning, budgeting, and reporting of cost and schedule status. The Contractor shall identify major elements of subcontracted work in the extended CWBS. The Contractor may propose changes to the CWBS to enhance its effectiveness in satisfying program objectives. The Contractor shall continually update an integrated database during contract performance with pertinent records and data that underlie and support the cost and schedule data reported.

#### **(DI-MGMT-81651) Contract Invoicing and Payment Report**

#### **(DI-MGMT 81861) Integrated Program Management Report Work Breakdown Structure Format 1**

### **3.1.2.1 Integrated Baseline Review**

The Contractor shall participate with the Government in the assessment of program risk

and the degree to which the following have been established:

- a. Technical scope of work is fully included and is consistent with authorizing documents.
- b. Project schedule key milestones are identified and supporting schedules reflect a logical flow to accomplish the work.
- c. Resources (budget, facilities, personnel, skills, etc.) are available and are adequate for the assigned tasks.
- d. Tasks are planned and can be measured objectively relative to the technical progress.
- e. Rationales underlying the review are reasonable.
- f. Management processes support successful execution of the project.

### **3.1.3 Configuration Management**

The Contractor shall use an automated internal configuration management process to monitor, update, and control all configuration documentation, physical media, and physical parts representing or comprising the system configuration items (CIs). The Contractor shall plan and implement an automated configuration management function to perform configuration control, configuration identification, audits, and status accounting in a system engineering environment. The Contractor shall develop, maintain, and update configuration management procedures and processes for control of all hardware and software baselines. The process shall allow Government simultaneous access to the common product data model coupled with the ability to coordinate and update immediate changes to the product definition data. The configuration management process must handle all levels of product and process integration to build and support the product as well as manage the sequence of significant events. The Government will maintain control of the functional baseline (FBL) defined by the system performance specification, interface control documents, and software requirement specifications.

#### **3.1.3.1 Configuration Management Planning and Management**

The Contractor shall establish processes and tools to establish and maintain consistency between system requirements, system configuration information, and all relevant information about the system. The configuration management process shall include changes made to the IA configuration and associated documentation. Failure to include IA considerations in the configuration management and engineering change control processes could adversely affect the program's ability to integrate and maintain IA in the functional design of the system. This will affect the system's ability to obtain IA accreditation. It may also increase the system's susceptibility to computer network attack from information operation activities. The Contractor shall:

- a. Plan implementation of the CM functions for the context and environment in which they are to be performed and manage in accordance with the planning.

- b. Determine the specific CM value-adding functions and levels of emphasis.
- c. Document how your organization will implement CM functions to provide the consistency between the system's attributes, system definition information and the system's configuration information, throughout the applicable phases of the life cycle.
- d. Identify resources required to implement the CM functions and ensure they are applied throughout the system's life cycle.
- e. Assess the effectiveness of CM plan implementation and performance of the configuration management functions with performance measurements.
- f. Flow down responsibility for CM performance to subcontractors.
- g. Plan and identify information status levels for managing system configuration information and ensure that transmitted data products are usable.

### **3.1.3.2 Configuration Identification**

The Contractor shall identify unique identifiers for selected system attributes, system information and components to be used as the basis for configuration management. The Contractor shall:

- a. Define the functional, performance, interface and physical attributes of the system and components.
- b. Determine the systems composition using its product definition information.
- c. Assign unique identifiers to configuration items so that they can be distinguished from other items, one configuration of the system can be distinguished from another, the source of a component can be determined, and the correct system definition information can be retrieved.
- d. Assign unique unit identifiers to individual components of the system.
- e. Update component identifiers when a system is modified reflecting the new configuration without altering the system identifier and model identifier.
- f. Uniquely identify information so that it can be correctly associated with the applicable configuration of the system.
- g. Apply information identification rules to maintain representation and version relationships.
- h. Maintain relationships between information, information requirements, and the related system configuration to ensure accurate information retrieval.
- i. Establish complete, valid, and suitable for use agreed-to descriptions of the attributes of the system and components at a point in time and provide a known configuration to which changes can be addressed.

- j. Identify interfaces and establish mutually agreed-to control of common attributes for system or component boundaries that interface to the system or within the system.

### **3.1.3.3 Configuration Change Management**

The Contractor shall establish a systematic and measurable configuration change management process for managing product configuration changes and variances. Once the system requirements have been approved by an authorized management activity, the Contractor shall effect changes to the baseline requirements only after the proposed change has been approved using the change process. The Contractor shall:

- a. Document and uniquely identify each change.
- b. Classify requested changes to aid in determining the levels of review and approval.
- c. Clearly and completely document request for change.
- d. Consider the technical, support, schedule, and cost impacts of a requested change before making a judgment to approve the change for implementation and incorporation in the system and its documentation.
- e. Determine potential effects of a change and coordinate impacts with the impacted areas of responsibility.
- f. Determine the effectivity for each change and identify which units of the system are to be changed, the point of production break-in, and which units will be included in a retrofit.
- g. Verify implementation of a change to ensure consistency between the system, its documentation, and its support elements.
- h. Document variances, when authorized by the appropriate level of authority.

### **3.1.3.4 Configuration Status Accounting**

The Contractor shall provide access to accurate, timely information about the system and its documentation through the integrated database. The Contractor shall correlate, store, maintain, and provide readily available views and information of system configuration information including pending, current and historical data. The Contractor shall:

- a. Systematically record, safeguard, validate, and disseminate system information.
- b. Establish methods, processes and procedures to provide controlled access to system information.
- c. Capture configuration information as it evolves.

### **3.1.3.5 Configuration Verification and Audit**

The Contractor shall verify and audit the system configuration information to ensure that requirement attributes are met and accurately documented. The Contractor shall;

- a. Verify the system attributes through a systematic comparison with the associated results of system tests, analyses, inspections, demonstrations or simulation models.
- b. Maintain surveillance over the configuration management process to ensure it is being followed and remains in compliance with requirements.

#### **3.1.3.5.1 Contractor Internal Hardware Build-Up Audit**

Concurrent with manufacture of piece parts and incoming inspection of procured parts, a 100% audit shall be conducted by personnel approved by the QA Manager to verify the as-built configuration matches the design documentation prior to use of each part in First Article and Full Rate Production. During this process each product definition document will also be examined for proper format (compliance with ANSI Y14 series standards), completeness, currency of material references, accuracy of piece part identification, and adequacy of manufacturing instructions and any other information critical to acquire a like part. A record of each product attribute verified shall be maintained and available through the integrated development environment.

#### **3.1.3.5.2 Government Sample Audit to verify Product Baseline**

After completion of acceptance testing and any required design modifications, but prior to formal acceptance, the final product baseline shall be verified by the Government by reviewing a representative number of drawings, associated technical manuals, logistics management information and manufacturing instructions to determine their accuracy in accordance with the final product configuration design.

### **3.1.3.6 LT2 Configurations Management (CM)**

The Contractor shall implement a configuration management process that establishes and maintains consistency of the VTESS, the Live Training Engagement Composition (LTEC) Software Product Line, [PRF-PT-00608 \(LTEC ICD\)](#), and [PRF-PT-00549 \(Live Player Area Network Interface Standard\)](#) items with its requirements and configuration information. The VTESS CM process shall be fully integrated and synchronized with the LT2 CPM Construct processes.

#### **3.1.3.7 LT2 CM Planning**

The Contractor shall provide software and hardware CM planning and implication to include projected obsolescence and technical refreshment.

#### **3.1.3.8 LT2 Configuration Identification**

The Contractor shall establish a structure to select, define, document, and baseline

VTESS, Live Training Engagement Composition (LTEC) Software Product Line, [PRF-PT-00608 \(LTEC ICD\)](#), and [PRF-PT-00549 \(Live Player Area Network Interface Standard\)](#), components and attributes, and assign unique identifiers for configuration items under configuration control.

### **3.1.3.9 LT2 Configuration Change Control**

The Contractor shall execute all LT2 connected processes IAW Document No. [99-0008380 Consolidated Product Line Management \(CPM\) Operations Guide](#) that ensures changes to the VTESS, Live Training Engagement Composition (LTEC) Software Product Line, [PRF-PT-00608 \(LTEC ICD\)](#), and [PRF-PT-00549 \(Live Player Area Network Interface Standard\)](#) baselines are identified, justified, recorded, coordinated, evaluated, and approved or disapproved by the Core Asset Working Group (CAWG) and the Product Manager Live Training Systems (PM LTS).

### **3.1.3.10 LT2 Configuration Status Accounting**

The Contractor shall manage the capture and maintenance of VTESS, the Live Training Engagement Composition (LTEC) Software Product Line, [PRF-PT-00608 \(LTEC ICD\)](#), and [PRF-PT-00549 \(Live Player Area Network Interface Standard\)](#) configuration information necessary to account for each configuration.

### **3.1.3.11 Engineering Change Proposals (ECP)**

The Contractor shall document and the IPT shall review all changes to established baselines and all changes to the requirements (other than the functional baseline), including changes to the statement of work, contract data requirements list (CDRL), the contract schedule, and the general provisions of the contract.

**(DI-SAFT-80103) Engineering Change Proposal System Safety Report**

**(DI-SESS-81880) Engineering Change Proposal (ECP)**

**(DI-SESS-81881) Notice of Revision (NOR)**

**(DI-SESS-81882) Engineering Release Record (ERR)**

**(DI-MISC-80508) CCB Minutes**

### **3.1.3.12 Engineering Change Proposal Review**

In coordination with the Government, the Contractor shall hold a requirements review on all proposed changes prior to the submittal of the engineering change proposal in order to clarify requirements, format, and content. Depending upon the criticality of the proposed changes, this review may take the form of a teleconference, a video-teleconference, a formal meeting at PEO STRI, or a formal meeting at the Contractor's facility. All appropriate parties shall be in attendance in order to conduct a thorough, effective review. Minutes shall be a historical record to allay any miscommunications.

### **3.1.3.13 Variances**

The Contractor shall document the rationale and the potential impact of any variance. The Contractor shall obtain approval before varying from any Government-controlled baseline.

#### **(DI-SESS-81883) Request for Variance (RFV)**

### **3.1.4 Risk Management**

The Contractor shall prepare, implement, and maintain a risk management process that includes identification, analysis, mitigation planning, mitigation plan implementation, and tracking. The Contractor shall develop and implement IA risk management, which will include security safeguards. These safeguards shall include but are not limited to local policy and guidance, identifies threats, problems and requirements, and adequately plan for the required resources. The Contractor's risk management process shall measure future uncertainties in achieving program goals within defined cost, schedule, and performance constraints. The IA risk shall be addressed across the risk management process and can be addressed in multiple areas.

#### **(DI-MGMT-81808) Contractor's Risk Management Plan**

### **3.1.5 Meetings and Program Reviews**

The Contractor shall attend and conduct meetings, reviews and working groups. The Contractor shall document action items, coordinate resolutions and track action items until closure.

#### **3.1.5.1 Post Award Conference**

A post award conference shall be held at the Contractor's facility within the CONUS at a mutually agreed to date within 30 days of contract award. The conference shall include:

- a. a discussion of the top level management of the program,
- b. agreement on metrics that will be used as management indicators during the program and the partnering approach to implement,
- c. introduction of key IPT participants and structure,
- d. identification of specific points of contact,
- e. a discussion on both parties understanding of the scope of work,
- f. review of the requirements traceability matrix,
- g. and other contract issues.

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

The Contractor shall plan and support PMRs. The Contractor shall present the

following topics quarterly for the base contract and then semi-annually for the options:

- a. IMS & IMP
- b. Design modifications and details
- c. Identify problems (Risk Management)
- d. Program status including testing status
- e. Production status including Parts Management status
- f. Contract Data Requirement List (CDRL) status
- g. Contract status
- h. Wide Area Workflow (WAWF) and Disbursement Reports
- i. Information Assurance Status

**(DI-MGMT-81605) Briefing Materials (PMR)**

**(DI-ADMN-81505) Report, Record of Meeting/Minutes**

### **3.1.5.3 Technical Interchange Meetings (TIMs)**

The Contractor shall support TIMs. A TIM shall address specific topics or issues, address status test activities between management reviews, address the functions of an established working group, or coordinate and provide guidance for engineering data or technical publications. The Contractor shall support the Live Training Standards (LTS) Working Groups and the PM TRADE embedded training working group. The Contractor shall host, lead and conduct one Industry Standards Working Group meeting per quarter.

### **3.1.5.4 Visitor Support**

The Contractor shall host visits and arrange for and provide demonstrations of system performance, program progress, and other system characteristics when notified by the procurement Contracting officer.

### **3.1.5.5 Integrated Product Team (IPT) Meetings**

The Contractor shall host weekly IPT meetings and address the full spectrum of the program concerns. The Contractor shall document action items, coordinate resolutions, and track action items until closure. Topics to be covered shall include:

- a. Risk Status
- b. Work in Progress (WIP) Status
- c. Critical program items (e.g. CDRLs, Financials, Schedule, Engineering, Logistics)

**(DI-ADMN-81505) Report, Record of Meeting/Minutes**

**3.1.5.6 Associate Contractor Agreements (ACA) and Interface Control Working Groups (ICWG)**

The Contractor shall maintain an ACA with the Life Cycle Contractor Support (LCCS) Contractor and the CPM/CPM Next Contractor. The Contractor shall also enter into a Non-Disclosure Agreement (NDA) with Government Contractors vehicle Original Equipment Manufacturer (OEMs) to which the I-MILES VTESS shall interface.

**3.1.5.7 Program and Design Reviews**

The contractor shall conduct program and design reviews and applicable Technical Interchange Meetings for the Government and IPT members as required to execute and technically manage the VTESS efforts.

**3.1.5.8 Test Readiness Review (TRR)**

The Contractor shall address the following key issues at the TRR prior to the start of each Government witnessed test event to ensure that documentation is complete, test facilities are ready and prior test(s) were successful or open issues have been addressed: to include.

- a. Test procedures comply with plans and descriptions, are adequate to accomplish test requirements and satisfy requirements for verification.
- b. Pre-test predictions and informal tests indicate testing will confirm performance.
- c. New or modified test equipment, facilities and procedure manuals required to accomplish planned test and evaluation, are available and satisfy the test requirements.
- d. Identify the perceived risk level for the test and provide path for mitigation.

**3.1.5.8.1 Documentation to be reviewed during the TRR**

- a. Evidence that the test management system as required under the contract is ready to accept the qualification tests and their results.
- b. Evidence that the requirements in the performance specification have been traced to test procedure requirements traceability matrix.
- c. A list of outstanding problem reports, both external and internal cross-referenced to the contracted deliverable end items or development hardware and software products.
- d. Test requirements.
- e. Pending changes to requirements.
- f. Design changes since the last design review.
- g. Test constraints based on previous testing or test hardware limitations.

- h. Test configuration (test article and instrumentation and support equipment).
- i. Detailed test procedures including Government resources required to conduct the test.
- j. Plans for collection, reduction and analysis of the test data.
- k. Test equipment calibration plan and status.

### **3.1.5.9 Production Readiness Review**

The Contractor shall conduct a PRR following the First Article Test to demonstrate that the total system has been verified to satisfy specification and baseline requirements for each system level, and to confirm readiness for full-rate production, distribution, operations, support, training, continuing improvement, and disposal. The review shall ensure that:

- a. Issues for the component, assemblies, subsystem, products and life cycle process and services are resolved.
- b. Test procedures for components, assemblies, and products were completed and were accurate.
- c. The system and products were confirmed ready for test.
- d. Tests were conducted in accordance with established procedures.
- e. An audit trail from design reviews, held after detailed design, is established with changes substantiated, and all component, subsystem, and system products meet specification requirements.
- f. Risk-handling procedures are satisfactory for production.
- g. Evolutionary development requirements and plans have been refined.
- h. Planning is complete and procedures, resources, and other requisite people, products, and processes are available (or programmed to be available) to initiate production, distribution, operations, support, training, disposal, and evolutionary development (if any).
- i. All production/build documentation shall be made available during all reviews and shall not contain any build information not contained in the PDD.
- j. Manufacturing processes are in place.

### **3.2 Systems Engineering**

The Contractor shall implement a system engineering process that will transform all system and IA requirements into a set of lower level performance requirements that define the system. The process shall accomplish planning, identify and allocate functional requirements, identify participation in trade studies, provide inputs to documentation, and include design reviews. The system engineering effort shall

integrate all elements of a multifunctional engineering effort to meet system requirements. The Contractor shall insure the timely integration of engineering specialties such as reliability, maintainability, security engineering, logistics engineering, human factors engineering, safety, value engineering, standardization, and transportability into design and development. The Contractor shall as part of the systems engineering effort develop and maintain the Systems Engineering Management Plan (SEMP) as a living document. The Contractor shall use the SEMF to identify and assure control of the overall technical management process. The Contractor shall coordinate the contents of the Government SEP with the Contractor's SEMF.

### **3.2.1 System Design**

The Contractor shall use the Performance Specification for the Instrumentable Multiple Integrated Laser Engagement System Vehicle Tactical Engagement Simulation System (I-MILES VTESS) [PRF-PT-00639](#) as the basis for development of all lower level specifications. The Contractor shall perform trade off studies and then finalize the system design. The design concept shall include incorporate an open systems approach which shall be based on an engineering and business strategy to choose specifications and standards adopted by industry standards bodies or de facto standards (set by the market place) for selected system interfaces, products, practices and tools. Selected designs and specifications shall be based on performance, cost, IA, industry acceptance, long term availability and supportability, and upgrade potential. The System Design shall include any and all considerations necessary to support an Organic Maintenance concept. This includes an identification of any proprietary components down to the piece part level and any design data that does not completely disclose the design down to the piece part level.

#### **3.2.1.1 System Modification**

The Contractor shall execute all LT2 connected processes IAW Document No. [99-0008380 Consolidated Product Line Management \(CPM\) Operations Guide](#) to identify updates to the Live Training Engagement Composition (LTEC) Software Product Line, [PRF-PT-00608 \(LTEC ICD\)](#) and [PRF-PT-00549 \(Live Player Area Network Interface Standard\)](#). The Contractor shall integrate the LT2 connected processes defined in [99-0008380 Consolidated Product Line Management \(CPM\) Operations Guide](#) into their program management, systems, development and test engineering functions. The Contractor shall assist the CPM/CPM Next Contractor to determine overall VTESS system impacts to the LTEC baseline. The Contractor shall identify, propose, and upon approval make necessary LTEC software changes. The resulting changes will be provided to the CPM/CPM Next contractor for incorporation into the LTEC baseline. The contractor shall integrate LTEC software baseline updates approved by the Government into the VTESS baseline. If new or modified LTEC software components are needed in order to meet a VTESS requirement, the Contractor shall, execute the LT2 connected process in accordance with [99-0008380 Consolidated Product Line Management \(CPM\) Operations Guide](#). The Contractor shall perform trade off studies and then finalize the system configuration. The delivered solution shall be modular, scalable, and flexible.

The effort shall necessitate the Contractor to analyze, configure, install and verify operation of the solution.

The Contractor shall develop a set of Hardware Component Agreements (HCA) for the components necessary to meet the requirements of the contract. The Contractor shall develop a System Composition Agreement (SCA) for VTESS as a complete and cohesive system. The Government will provide draft HCAs and SCA as GFI. The Contractor shall make revisions to these existing Government documents, as required to meet the requirements of the contract.

**(DI-ADMN-80925) Revisions to Existing Government Documents (HCAs)**

**(DI-ADMN-80925) Revisions to Existing Government Documents (SCA)**

### **3.2.1.2 Technology Insertion**

The Contractor shall provide technology insertion over the life of the program as approved by the Government. The Contractor shall provide reports describing the integrating approach in the areas of vehicle interface evolution, optical transmission evolution, future weapons and vehicle types as requested by the Government. The Contractor shall provide a report describing their approach to integrating the below identified technologies. The Contractor, in their report, shall describe how the below identified technologies fulfill capability gaps and provide the technologies applicable Technology Readiness Level (TRL), Manufacturing Readiness Level (MRL), Integration Readiness Level (IRL). The contractor, in their report, shall identify cost and schedule risks for integration, production, test and fielding into the VTESS, LTEC, and LPAN baselines.

- a. Encoding Azimuth, Deflection and Shooter Position into the MCC while maintaining backwards compatibility
- b. Incorporating 1550 nm optical transmission and detection while maintaining backwards compatibility
- c. Vehicle Fire Control System Interface capability for potential modernization of M1128 Stryker MGS, M1134 Stryker ATGM. These interfaces are envisioned to be incorporated as a Pre-Planned Product Improvement (P3I).
- d. PAN Crew Kill Module capability

**(DI-MISC-80711A) Scientific and Technical Reports**

**(DI-SESS-81880) Engineering Change Proposal (ECP)**

### **3.2.1.3 Fabrication, Assembly, Integration and Test Stage**

The Contractor shall resolve product deficiencies when specifications for the system, product, subsystem, assembly, or component are not met, as determined by inspection, analysis, demonstration, or test. The Contractor shall verify that the products designed

satisfy specifications. The Contractor shall integrate security engineering processes into the design to achieve an integrated secure solution.

### **3.2.1.3.1 Functional and Physical Configuration Audits**

Functional configuration audits (FCAs) shall be completed to verify that products have achieved requirements; that they satisfy the characteristics as specified in specifications, interface specifications, and other baseline documentation; and that test plans and procedures were complied with. The results of the audit shall be documented. The Contractor shall support a physical configuration audit (PCA) on the as built configuration after Systems Verification Test (SVT) to verify and validate the product definition data (PDD). All PDD documents shall be included in the review. Review shall be completed to the piece part level. The Contractor shall hold a Government witnessed FCA and PCA as mutually agreed to by both parties.

### **3.2.2 Hardware Engineering**

The Contractor shall integrate and assemble the system hardware that satisfies the performance and IA requirements stated in the developed specifications. The Contractor shall conduct market surveillance and market investigations in order to maximize the use of commercial and non-developmental items. The Contractor shall apply the systems engineering process during each level of system development (system, subsystem, and component) to add value (additional detail) to the products defined in the prior application of the process. Through each of the following design stages, information generated shall be documented in an integrated database.

### **3.2.3 Software Engineering**

The Contractor shall develop the system software and firmware in accordance with recognized industry standards and internal documented process that are consistent with at least Level 3 of the Capability Maturity Model Integration for Development (CMMI-DEV). The design shall incorporate features that promote ease of operation, IA, ease of software maintenance, ease of future updates and modifications, data void work around, and also any smart designs that can justify a reduction in the amount of documentation. Computer programs and computer data system shall be fully integrated in accordance with the system specification. The Contractor shall conduct market surveillance and market investigations, in order to maximize the procurement of commercial and non-developmental software. The Contractor shall maintain a software Controlled Development Environment that complies with the [NIST SP 800-53 Revision 3](#). The Contractor shall employ well-defined security policy models, structured, disciplined, and rigorous hardware and software development techniques, and sound system/security engineering principles.

**(DI-IPSC-81441A) Software Product Specification**

**(DI-IPSC-81442A) Software Version Description**

### **3.2.4 Hardware and Software Integration.**

The Contractor shall perform all activities to integrate and assemble the hardware and software to achieve a fully functional and accredit-able system, with all support systems, that performs and operates in accordance with the system specification and Contractor generated specifications. The Contractor shall verify the complete integration of the hardware and software of each hardware and software subsystem and the overall system through the utilization of formalized test procedures.

### **3.2.5 Cybersecurity**

The Contractor shall develop and maintain an Cybersecurity process to guide management and modification actions, document decisions, specify and track Cybersecurity requirements, document certification efforts, identify possible solutions, and maintain operational systems security. The Contractor shall establish or adopt standards for managing Cybersecurity requirements and capabilities and an Cybersecurity engineering approach that emphasizes purposeful modification or configuration of security solutions. Contractor shall configure, integrate, and implement all architectures, plans, policies and security controls IAW the Department of Defense Risk Management Framework process.

#### **3.2.5.1 Security Authorization Package Information Assurance Artifacts**

The Contractor shall support the Government Cybersecurity process in accordance with [DoDI 8510.01 Risk Management Framework \(RMF\) for DoD Information Technology \(IT\)](#), [Committee on National Security Systems Instruction \(CNSSI\) 1253](#), and the [National Institute of Standards and Technology \(NIST\) SP 800-53](#). The Contractor shall produce all components of the RMF package necessary to deliver and operate a fully accredited system. The Contractor shall ensure that the security requirements and procedures are met in accordance with all required DoD and Army regulations per the Confidentiality, Integrity and Availability levels specified for the system.

#### **(DI-MISC-80711A) Scientific and Technical Reports (RMF Package)**

#### **3.2.5.2 Information Assurance Vulnerability Management Program**

As part of the Information Assurance Vulnerability Management Program (IAVMP), the Contractor shall document the incorporated and unincorporated Information Assurance Vulnerability Alerts (IAVAs), Information Assurance Vulnerability Bulletins (IAVBs), and Information Assurance Vulnerability Technical Advisories (IAVTAs). The IAVMP plan shall include but is not limited to identifying and assessing potential threats to determine risks. It also involves developing and implementing controls, countermeasures, or solutions. The Contractor shall monitor the system for compliance and success, while evaluating and refining the IAVMP as necessary. The Contractor shall incorporate all applicable DOD and Department of the Army (DA) Information Assurance Vulnerability Management messages issued on behalf of the Department of Army G3, CIO/G6 and Joint Task Force-Global Network Operations. The Contractor shall provide justification

for each unincorporated IAVMP message (i.e., describe the specific negative impact the IAVMP message incorporation would have on the system operation).

### **3.2.5.3 Spectrum Management**

The Contractor shall ensure compliance with the policies and procedures for the Army Frequency Allocation to Equipment (Army J/F-12) Program as described in [AR 5-12](#), Chapter 4 for any system that operates in an electromagnetic spectrum. The Contractor shall assist in obtaining an approved DD Form 1494 (Application for Frequency Allocation) and ensure that the equipment can operate in spectrum bands per the national and international tables of spectrum allocation. The Contractor shall provide Spectrum Supportability Risk Assessments (SSRAs), which identify regulatory, operational, technical spectrum supportability issues and provide mitigation measures. The Contractor shall integrate existing Army approved spectrum/EMC hardware and software tools into system procurements whenever possible. All coordination with the Army Spectrum Management Office will be conducted through PEO STRI's, CIO, System Engineering Office (SEO).

**(DI-MISC-80711) Scientific and Technical Reports**

**(DI-MISC-81174) Frequency Allocation Data**

**(DI-EMCS-81543) Spectrum Supportability Risk Assessment**

### **3.2.6 Requirements Traceability**

The Contractor shall track and account for all requirements and derived requirements throughout the procurement of the I-MILES VTESS using a Requirements Traceability Matrix (RTM) tool. The RTM captures requirements from - traceability, analysis, validation, functional analysis, functional verification, synthesis – and includes capture of all elements resulting from test and evaluation efforts. The Contractor shall update and maintain the RTM throughout the life of the contract. The Contractor shall institute a requirements review, approval, and control process by which RTM data entry decisions are made. The Contractor shall derive all system requirements into specific Hardware Component Agreements (HCAs) requirements. Each HCA derived requirement shall be mapped to a parent system requirement.

**(DI-MISC-81283) Specification Requirement Verification Matrix**

### **3.2.7 Specialty Engineering**

#### **3.2.7.1 Reliability Engineering**

The Contractor shall develop, implement and manage a system reliability process satisfying all reliability objectives and be completely integrated within the systems engineering process. The reliability process shall support economical achievement of overall program objectives and ensure sustained product integrity, personal safety, and logistics support information is derived from early reliability engineering analysis such

that reliability engineering can be applied to influence the design effort. The process shall:

- a. Improve operational readiness and mission success of the system.
- b. Reduce system demand for maintenance, manpower and logistic support.
- c. Provide essential management information.
- d. Hold down the reliability programs own impact on overall program cost and schedule.

Specific reliability design and verification criteria shall be established. Quantitative reliability requirements for the system, all major subsystems, and equipment shall be included in system and item specifications. All reliability data and information used for logistics support analysis and engineering activities shall be based upon, and traceable to, the outputs of the reliability process. Reliability status shall be included as part of each program review. The Contractor shall conduct trade off studies to ensure quantitative issues such as stress levels, selection of parts, parts simplicity and redundancy are properly considered in the design trade off. The Contractor shall verify that reliability requirements are attained through analyses and test.

### **3.2.7.2 Maintainability Engineering**

The Contractor shall develop, implement and maintain a system maintainability process satisfying all maintainability and related objectives and be completely integrated within the systems engineering process. The maintainability process shall form the basis of concurrent and subsequent life cycle planning. The maintainability effort shall measure complexity, accessibility, and testability to enhance servicing, preventive maintenance, corrective maintenance, and diagnostic capabilities. Specific design and verification criteria shall be established through performance specifications, of qualitative and quantitative factors to be expressed as measures of maintainability achievement, for system, segment, subsystem, and equipment levels.

### **3.2.7.3 Safety Engineering**

The Contractor shall develop and implement tasks and activities to identify, evaluate, and eliminate or control hazards throughout the systems life cycle. The Contractor shall ensure the safety of the system's design, operation, transportation, maintenance, support, and disposal. The Contractor shall conduct safety analyses, hazard identification and classification and hazards tracking integral to the system design effort. A hazard risk index including hazard severity and hazard probability levels shall be developed for all hazards.

## **(DI-SAFT-80102B) Safety Assessment Report (SAR)**

### **3.2.7.3.1 Safety Assessment**

The Contractor shall conduct safety analyses and identify and classification hazards as an integral part of the system design effort. The Contractor shall develop a hazard risk

index including hazard severity and hazard probability levels for all hazards. The Contractor shall document information about each hazard in an integrated database. The Contractor shall ensure that safety of the design is achieved and that all system specific safety requirements are met. This shall include verifying any changes due to redesign. Once complete, the Contractor shall verify the safe design of the system and to determine the safety risk assumed prior to test or operation. The Contractor shall identify those software items or portions thereof whose failure could lead to violation of critical requirements and develop a strategy, including both test and analysis, to assure that the requirements, design, implementation, and operating procedures for the identified software minimize or eliminate the potential for such violations. The Contractor shall identify by type, and develop strategies for, the following types of critical requirements:

- a. Safety-critical: Those software items or portions thereof whose failure could lead to a hazardous system state (one that could result in unintended death, injury, loss of property, or environmental harm).
- b. Security-critical: Those software items or portions thereof whose failure could lead to a breach of system security.
- c. Privacy protection-critical: Those software items or portions thereof whose failure could lead to a breach of system privacy protection.

#### **(DI-SAFT-80102B) Safety Assessment Report (SAR)**

##### **3.2.7.3.2 Hazards Tracking and Risk Resolution**

The Contractor shall implement a method to track hazards to ensure that all hazards are assessed, that proper program managers and IPT personnel are notified, and that each hazard is tracked until final resolution. Safety features and controls incorporated into the design to eliminate hazards or reduce their associated risks to levels acceptable to the Government shall include an evaluation of the system during performance as well as the safety impacts due to inadvertent functioning or functional failure. Subsystems that the system will interface with shall be evaluated to ensure hazards and risks are avoided. The Contractor shall obtain IPT approval of the final hazard resolution.

#### **(DI-SAFT-80101) System Safety Hazard Analysis Report (SSHA)**

##### **3.2.7.3.3 Health Hazard Assessment**

The Contractor shall identify potential health hazards and recommend engineering controls, equipment and protective procedures to reduce the associated risk to an acceptable level. The Contractor shall assess system, facility, and personnel protective equipment design requirements to allow safe operation and maintenance. When feasible engineering designs are not available to reduce hazards to acceptable levels, the Contractor shall develop alternative protective measures. The Contractor shall address the hazardous materials listed in the Environmental Protection Agency's (EPA) toxics release inventory (<http://www.epa.gov/tri/chemical/index.htm>) and the list of Class I and Class II stratospheric ozone depleting substances (ODSs), as listed [29 CFR](#)

[1910.1200.](#)

**(DI-SAFT-80106) Health Hazard Assessment Report (HHAR)**

**3.2.7.4 Producibility Engineering**

The Contractor shall perform producibility engineering tasks during development to ensure a smooth, timely, and cost effective transition from development to production. These tasks shall include those actions required to try out and prove that the product definition data package and all manufacturing resources will perform as expected during production. Plan the overall manufacturing approach to assure a stabilized manufacturing process designed to: ensure high quality, minimize scrap, rework and repair; minimize lead and cycle times; and minimize use of strategic, critical, and hazardous materials. Participate in defining initial program cost, schedule and performance objectives. Refine the manufacturing planning tailored to the systems emerging definition to assure a stabilized manufacturing process is in place and ready for the transition from development to production. Assist in the translation of the most promising design approach developed into a stable, producible, and cost effective system design. Maintain a stabilized efficient production program with emphasis on constant surveillance of the manufacturing process, identifying deficiencies and implementing corrective actions and improvements to assure a high quality end item at the lowest possible cost. All production/build documentation shall be made available during all reviews and shall not contain any build information not contained in the PDD

**(DI-MGMT-80797) Producibility Analysis Report**

**3.2.7.5 Quality Engineering**

The Contractor shall establish measurement points that will provide maximum visibility into new and prior processes to assure contractual requirements are being met. The Contractor shall select the proper methods to analyze these processes to continuously improve the system. Metrics shall be developed to assist management visibility into an adequate process control system. The Contractor shall use the computerized discrepancy tracking system within the IDE with the ability to produce complete permanent records of all discrepancy or database listing. The Contractor shall establish a suspense system to ensure timeliness of analysis and corrective action for discrepancies and risk reduction items. All discrepancy correction shall be documented and entered in an integrated database.

**3.2.7.5.1 Quality Assurance Program**

The Contractor shall maintain an integrated Quality Assurance Program Team (QA-IPT) (with the Government as co-chair). The Contractor shall ensure that Quality Assurance (QA) activities are part of each IPT. The Contractor shall perform the following tasks:

- a. Select the proper methods to analyze processes to continuously improve the system.

- b. Develop metrics to assist management visibility into adequate process control system.
- c. Maintain non-conforming material documentation disposition.
- d. Participate in Material Review Boards (MRB).
- e. Perform audits, track metrics, participate in Corrective Action Boards (CAB), and participate in continuous process improvements.
- f. Provide manufacturing support of QA and Quality Engineering (QE) manufacturing issues.
- g. Implement a software QA process to prevent the introduction of errors that could impact the I-MILES VTESS system performance. (See [DoDI 8500.2](#), IA Control – DCSQ-1.)

#### **(DI-QCIC-81794) Quality Assurance Program Plan**

##### **3.2.7.5.2 Test Discrepancies**

The Contractor shall document all test discrepancies for Contractor conducted tests and track the failure analysis and corrective action for each test discrepancies until correction and regression test are successfully completed. The Contractor shall establish a suspense system to ensure timeliness of analysis and corrective action of each test discrepancy. The Contractor shall establish a process to receive test discrepancies and accomplish data entry. Upon correction of the test discrepancies, the Contractor shall test the system to ensure that the correction of the test discrepancies did not interfere with or alter the functionality of the system. Upon closeout of a discrepancy, the Contractor's process shall notify the Government designated test director that an integrated database has been updated.

#### **(DI-SESS-81315) Failure Analysis and Corrective Action Report**

#### **(DI-MISC-81622) Test Problem Report**

##### **3.2.7.5.3 Test Discrepancy Processing**

The Contractor shall document a detailed description defining the changes made to the equipment, hardware, and software to correct each discrepancy. Each discrepancy correction that modifies or changes any baseline shall be documented and entered in the configuration management system. Discrepancies ready for recheck shall normally accumulate into sufficient quantities to permit at least eight hours of continuous testing.

##### **3.2.7.5.4 Test Discrepancy Priorities**

The Contractor shall assign level of effort to test discrepancies based on the priority codes assigned by the test team, in accordance with the ground rules established by the IPT. The following priorities shall be assigned, with the Government reserving the right to make the final determination of the priority of any test discrepancy:

Priority	Description	Schedule Impact
1	Safety item or system failure	Testing halted
2	Subsystem failure	Some testing impossible
3	Training impact which may affect testing	Fix prior to next assessment milestone
4	Training impact which has no testing impact	Fix prior to DD Form 250
5	IA Vulnerabilities (CAT I & II) CAT III vulnerabilities must have mitigations approved by the DAA	Fix prior to becoming operational and Prior to DD Form 250
6	Minor training impact	Fix TBD

**Table 1 – Test Discrepancy Priorities**

### 3.2.7.6 Human Factors Engineering

The Contractor shall plan and implement a human factors engineering program to insure the satisfaction of system objectives and personnel safety of the operator and maintainer. The Contractor shall perform analysis of the system as outlined by the various tasks and activities in Section 5 of [MIL-STD-46855](#). The Contractor shall insure management control of the human engineering effort and specifically ensure that:

- a. System requirements are achieved by consideration of the capabilities and limitations of the human component;
- b. Through proper design of equipment, software and associated user interfaces, and environment, the personnel-equipment-software combination meets system performance goals;
- c. Design features will not constitute an undue hazard to personnel;
- d. Trade-off points between automated versus manual operation have been chosen for peak system effectiveness within appropriate cost limits;
- e. The application of human engineering principles to system design is technically adequate;
- f. The equipment is designed to facilitate required maintenance;
- g. Procedures for operating and maintaining equipment are efficient, reliable, and safe;
- h. Potential error-inducing equipment design features are minimized; and
- i. The layout of the facility and the arrangement of equipment affords efficient communication and use.

The Contractor shall schedule and conduct an Human Factors Engineering Analysis Review. The Contractor shall identify and eliminate program risk associated with critical human factors that have a significant impact on readiness, life cycle cost, schedule, performance, or safety. The Contractor shall ensure manpower, personnel, training,

and logistics support information is derived from early human engineering analyses such that human factors engineering can be applied to influence the design effort. The Contractor shall verify through test and evaluation that trained personnel can safely and effectively operate, maintain and control the system in its intended operational environment.

### **(DI-HFAC-80745) Human Engineering System Analysis Report**

#### **3.2.7.7 Electromagnetic Environmental Effects (E<sup>3</sup>)**

The Contractor shall determine the criteria and verification method to ensure that the system electronic or electrical hardware configuration is not a source of electromagnetic interference (EMI) or a victim of E<sup>3</sup> in the intended operational environment in which it is installed or at its operational locations. The Contractor shall establish and maintain a process to verify and assure that the system operations functionality is not affected by E<sup>3</sup>. The Contractor shall provide Spectrum Supportability Risk Assessments (SSRAs), which identify regulatory, operational, technical electromagnetic environmental effects (E<sup>3</sup>) issues and provide mitigation measures.

#### **(DI-EMCS-80201) Electromagnetic Interference Test Procedures (EMITP)**

#### **(DI-EMCS-80200) Electromagnetic Interference Test Report**

#### **(DI-EMCS-81543) Spectrum Supportability Risk Assessment**

#### **3.2.7.8 Manpower and Personnel Integration (MANPRINT)**

The Contractor shall conduct a program integrating the activities of the seven domains of MANPRINT to influence design decisions beginning at program conception and continuing through the development and fielding phases. The Contractor shall track domain issues as an integral part of scheduled program reviews. The Contractor shall arrange for MANPRINT assessments to be conducted prior to milestone decision reviews to ensure requirements have been properly applied and impacts of any issues identified. The seven MANPRINT domains include: 1) Manpower, 2) Personnel, 3) Training, 4) Human Factors, 5) System Safety, 6) Health Hazards, and 7) Survivability. The program shall be coordinated with the training, test, and supportability engineering activities to achieve an integrated effort without duplication. The Contractor shall conduct MANPRINT reviews as an integral part of scheduled program and design reviews.

#### **3.2.8 Derived Requirements and Architecture Refinement Review**

The Contractor shall develop all derived technical requirements and architecture in accordance with the LT2 TESS Architecture. The Contractor shall derive all system requirements into detailed technical requirements by component. The derived technical requirements shall be the results from a logical analysis decision or physical design solution decision. A derived technical requirement is a 'design-to' requirement for the

Design. All analysis and results shall be documented in an integrated database and a Requirements Traceability Matrix (RTM). As part of this activity, the Contractor shall work within the LT2 IPTs to iterate the system and System-of-System (SoS) software requirements and architecture. The Contractor is encouraged to suggest revisions to Government requirements where such revisions would result in cost or schedule reduction or performance improvements. The Contractor shall record the operational concept for the system, and define and record the architectural design of the system (identifying the components of the system, their interfaces, and a concept of execution among them) and the traceability between the system components and system requirements. Based upon analysis of system requirements, system design, and other considerations, the Contractor shall define and record the software requirements to be met by each software item, the methods to be used to ensure that each requirement has been met, and the traceability between the software item requirements and system requirements. The Contractor shall evaluate the IA requirements to assess any impacts on developed software and provide potential solutions, if applicable. The Contractor shall use modeling and simulation as appropriate for architecture validation. In addition, the Contractor shall determine if LTEC or existing open source software products are capable of meeting any operational capabilities, perform a detailed software reuse evaluation, and document the results of the analysis. The Contractor shall conduct architecture evaluations, including stakeholders external to the Contractor's organization, for each software build.

**(DI-MISC-80711) Software Architecture Description (SWARD)**

**(DI-SESS-81771) Reuse Management Report**

**(DI-ADMN-80925) Revisions to Existing Government Documents (HCAs)**

**(DI-ADMN-80925) Revisions to Existing Government Documents (SCA)**

### **3.2.9 Product Definition Data (PDD)**

During the systems engineering and design, and in accordance with [MIL-STD-31000](#), the Contractor shall develop, produce, and maintain product definition data (PDD) that accurately depicts the final product. The PDD is the technical description of items adequate for supporting an acquisition strategy, production, engineering, IA and logistics support. The PDD shall disclose complete design, IA, logistics, manufacturing requirements, and the means of measuring compliance with the requirements. Piece part information (drawings, computer aided design files and meta data.) and associated lists shall provide the necessary design, engineering, IA, manufacturing, and quality assurance requirements information necessary to enable the procurement or manufacture of an interchangeable item that duplicates the physical, IA and performance characteristics of the original product, without additional design engineering effort or recourse to the original design activity. The Contractor shall produce and maintain documentation for all electrical assemblies and subassemblies in such a manner to ensure their functional integration without recourse to special test equipment (STE) or installation of the assemblies or subassemblies into a next higher

assembly. Utilizing the established logistic repair procedures, the Contractor shall identify the higher level components and assemblies to be repetitively procured as spare components and assemblies or which may be procured independently. For each higher level component or assembly, the Contractor shall determine and document the functional requirements for the item, the environment in which it must operate, interface and interchangeability characteristics, and criteria for verifying Logistics Support criteria. The Contractor shall conduct engineering analyses to establish quantitative and qualitative supportability design guidelines. The Contractor shall conduct trade studies, evaluate design and support alternatives, and establish system supportability preliminary design configurations consistent with system readiness and availability and life cycle cost goals. The Government may choose to transition some or all of the Contractor's depot support functions to a Government depot or other organic support activity. The Contractor shall coordinate with the designated support organization and develop initial fielding plans for the system and verify that the maintenance actions and support structure are aligned with the maintenance concept.

**(DI-SESS-81003E) Commercial Drawings/Models and Associated**

**(DI-SESS-81000E) Product Drawings/Models and Associated Lists**

**(DI-SESS-81011E) Drawing Number Assignment Report**

**(DI-MGMT-81453) Data Accession List (DAL)**

**(DI-EGDS-80918) Technical Data Package Index**

### **3.3 Integrated Testing**

The Contractor shall plan, coordinate, establish and implement a comprehensive test and evaluation (T&E) program to include all configurations of the system. System T&E refers to the T&E activities which use the low rate initial production (LRIP) and production hardware together with the software to validate that the system meets the operational and technical performance requirements as stated in the system specifications. System T&E includes all efforts associated with the design (including Human Factors and MANPRINT) and production of models, fixtures and instrumentation in support of the T&E program. System test shall include a process to prepare the executable software, including any batch files, data files, or other software files needed to install and operate the software on a newly formatted (blank media) target computer (Cold Start). Also the Contractor shall develop step-by-step testing operations to be performed on items under test. The Contractor shall identify items to be tested, the test equipment and support required, the test conditions to be imposed, the parameters to be measured, and the pass and fail criteria against which the test results will be measured. The test planning and test procedures shall be structured to integrate all developmental, operational, and modeling and simulation activities to concentrate upon generation of data needed to ensure that a decision on the system's ability to meet the objectives identified in the systems specification is made with a minimum amount of uncertainty.

The concept of continuous evaluation and simulation shall be used to integrate and reduce overall testing requirements. Statistical process control shall be used to help reduce the need for in-process inspections and end product testing.

**(DI-NDTI-80603) Test Procedures (Functional)**

**(DI-NDTI-80603) Test Procedures (Environmental)**

**(DI-EMCS-80201C) Electromagnetic Interference Test Procedures (EMITP)**

### **3.3.1 First Article Test (FAT)**

The Contractor shall use Government designated LRIP assets to ensure design integrity over the specified operational and environmental range by demonstrating and verifying compliance with the specified environmental and electromagnetic environmental conditions defined in the Performance Specification for the I-MILES VTESS, [PRF-PT-00639](#). The Contractor shall test the Environmental and Electromagnetic Environmental Effects (E<sup>3</sup>), and per the Government's determination, shall perform FAT for follow-on production lot awards or when a system functional failure is generated. The FAT shall demonstrate the adequacy and timeliness of any corrective actions required as a result of previous testing. The Contractor shall use Test Incident Reports (TIRs) to document all failures, causes of failures, and proposed corrective actions. The Contractor shall analyze the results of each test and shall record the test and analysis results. The Contractor shall successfully complete FAT prior to proceeding to the Systems Verification Test (SVT).

### **3.3.2 Electromagnetic Environment Effects (E<sup>3</sup>) Testing**

The Contractor shall determine the criteria and verification methods to ensure that the system electronic or electrical hardware configuration is not a source of electromagnetic interference (EMI) or a victim of E3 in the intended operational environment of which it is installed or at its operational locations. The Contractor shall establish and maintain a process to verify and assure that the system operations functionality is not affected by E3. The E3 Operational Environment shall be documented in a report. The E3 Report data shall be used along with the I-MILES VTESS Performance Specification to completely specify the EMI Requirements.

**(DI-MISC-80711A) Scientific and Technical Report E3 Operational Environment Report**

### **3.3.3 Hardware/ Software Component Testing**

The Contractor shall conduct Hardware/ Software Component testing to ensure the Hardware Components (HC) meet all derived requirements. The Contractor shall develop step-by-step procedures to verify that the component meets the performance, timing, and characteristics requirements defined in the Hardware Component

Agreement (HCAs). All HCAs test procedures shall become part of the HCA documentation. The Contractor shall utilize the I-MILES Testbed to verify system and component performance. The Contractor shall identify any additional MILES Testbed capabilities required to fully test the VTESS system and components.

**(DI-ADMN-80925) Revisions to Existing Government Documents (HCAs)**

**(DI-ADMN-80925) Revisions to Existing Government Documents (SCA)**

**(DI-MISC-80711A) Scientific and Technical Reports (I-MILES Testbed)**

### **3.3.4 Systems Verification Test (SVT)**

The Contractor shall conduct a SVT with the LRIP systems IAW the Government approved test procedures to verify that all I-MILES VTESS Training System products are compliant with the Performance Specification for the I-MILES VTESS, [PRF-PT-00639](#). The Government will provide vehicles, facilities, personnel, and consumables to support one SVT. All resources, including vehicles, facilities, personnel, and consumables necessary for additional SVTs due to system failure, shall be the full responsibility of the Contractor.

The Contractor shall:

- a. Develop SVT procedures to verify that the hardware and the software meet the performance and characteristic requirements defined in the Performance Specification for the I-MILES VTESS, [PRF-PT-00639](#).
- b. Perform First Article Inspections (FAI) consisting of the I-MILES VTESS and Quality Inspections performed during the initial production of an I-MILES VTESS product(s) as defined in the Performance Specification for the I-MILES VTESS, [PRF-PT-00639](#).

**(DI-NDTI-80603) Test Procedures (Functional)**

#### **3.3.4.1 Cold Start Test**

A cold start shall be performed as part of the SVT prior to performing other Government tests. The cold start shall commence with all system power removed and all main memory and on-line storage media formatted, but otherwise blank. The computer system shall be powered on and the cold start run IAW the procedures in the Software Product Specification (SPS). The cold start shall include complete system generation using only hardware, software, and documentation described in the SPS. All executable code shall be created from the source programs and command or job control language developed and delivered as part of this contract. The resultant code shall contain no known errors. The SVT shall continue using the executable code created by the cold start process. The cold start process may be repeated at the Government's discretion, to ensure validity of the software baseline.

**(DI-IPSC-81441A) Software Product Specification**

**3.3.5 Government Acceptance Test (GAT)**

The Contractor shall support Government testing conducted in an operational environment, with Soldiers, to ensure the system will meet its intended function, including reliability and maintainability, in the environment in which it will be used. The Contractor shall provide all necessary spare, repair and replacement parts, and special tools and test equipment (ST&TE) during GAT.

**3.3.6 Factory Inspection and Factory Acceptance Testing**

The Contractor shall conduct subsystem and system testing in their facility to verify system functionality and specification compliance prior to Government inspection and acceptance. The Government will review and witness that testing as considered necessary.

**(DI-QCIC-80553A) Acceptance Test Plan**

**(DI-QCIC-81891) Acceptance Test Report**

**3.3.7 Test Support**

For all testing, the Contractor shall provide all necessary spare, repair and replacement parts, and ST&TE.

**3.3.7.1 Independent Government Developmental Test**

The Government will require VTESS to be independently tested by the Army Test and Evaluation Command (ATEC). VTESS will be tested using contractor provided test procedures. The Contractor shall coordinate with the Government team to ensure that the latest test procedures are provided to the Government in advance of this test. The Contractor shall provide assistance as needed with the installation, operation and collection of data during component testing.

**3.3.7.2 Contractor Test**

The Contractor shall provide technical support to install, operate, maintain and collect data during all of the I-MILES VTESS testing. The Contractor shall be responsible for identifying all resources (Vehicle / Facilities / Personnel / Consumables) required to support all levels of testing at least 6 months in advance of desired tests. The Contractor shall provide on-site support for training, installing, troubleshooting and repair of the I-MILES VTESS during test and system updates.

**3.3.7.3 Independent Government Component Validation**

The Government will require each VTESS component and their corresponding component agreements to be validated by a Government selected third party validation

team. The components performance will be compared to the supplied HCA and CA documentation. The Contractor shall coordinate with the validation team to ensure that the latest software updates are provided to the test beds. The Contractor shall provide assistance as needed with the installation, operation and collection of data during component testing.

### **3.3.8        Test Plan**

The Contractor shall provide a detailed test plan addressing resources required (such as personnel, equipment, hours, etc.) and a day to day test schedule. The plan shall allow for a short meeting to assess the progress made at the end of each testing day.

**(DI-NDTI-80566A) Master Test Plan**

**(DI-IPSC-81438A) Software Test Plan**

### **3.3.9        Test and Inspection Report**

The Contractor shall provide a test report from each I-MILES VTESS test event. The Contractor shall analyze the results of each test and shall record the test and analysis results. The Test and Inspection Report shall have a summary table of the tests that were performed, the results of the test, the Test Incident number if a failure occurred, and a link to the corrective action for the Test Incident.

**(DI-NDTI-80809B) Test / Inspection Report (Functional)**

**(DI-NDTI-80809B) Test / Inspection Report (Environmental)**

**(DI-EMCS-80200C) Electromagnetic Interference Test Report**

**(DI-IPSC-81440A) Software Test Report**

### **3.3.10      Test Incidents (TI)**

The Contractor shall, document all TI for Contractor and Government conducted tests and track the failure analysis and corrective action for each TI until correction and regression test are successfully completed. The Contractor shall establish a process to receive and document test incidents from any IPT member, including TI for Government conducted tests that will be tracked using the responsible agency's system. The Contractor shall be responsible for informing the Government of the status of each incident. Upon correction of the TI, the Contractor shall test the system to ensure that the correction of the TI did not interfere with or alter the functionality of the system. Before closeout of a incident, the Contractor shall update the database, notify the Government designated test director that applicable regression test was performed successfully, and schedule a time for the Government to witness the retest.

**(DI-MISC-81622) Test Incident and Corrective Action Report**

### **3.3.10.1 Logistics Demonstration (LD)**

Before the system's hardware and software are operationally tested, the Contractor shall demonstrate that the supportability aspects of the system are complete. The demonstration shall be conducted in a realistic operational scenario using expected facilities, tools, personnel, and other support infrastructure. The demonstration shall include nondestructive disassembly and re-assembly of the equipment, diagnostics and prognostics demonstration of a production representative materiel. The demonstration shall be designed to evaluate the achievement of maintainability goals, the adequacy and sustainability of tools, test equipment, selected test program sets, built-in-test equipment, associated support items of equipment, technical publications, maintenance instructions, trouble-shooting procedures, and personnel skill requirements. The demonstration shall address 100 percent of all known critical faults according to the FMECA. LD requirements shall be summarized in the Test Master Plan.

### **3.3.10.2 Reliability Test**

The reliability plan shall identify the reliability test procedures to be conducted at GAT. Fault detection and isolation shall be demonstrated using the equipment fault detection logic and support elements. All test equipment, operational equipment, and support shall be comparable to the expected actual operating environment of the system equipment. A reliability test report shall be submitted for Government approval.

**(DI-NDTI-81585A) Reliability Test Plan**

**(DI-TMSS-81586A) Reliability Test Report**

## **3.4 Logistics**

The Contractor shall conduct engineering analyses to establish quantitative and qualitative supportability design guidelines. The Contractor shall conduct trade studies, evaluate design and support alternatives, and establish system supportability preliminary design configurations consistent with system readiness and availability and life cycle cost goals. In accordance with [Title 10, U.S.C., Section 2464](#), and [DoDD 4151.18](#), it is DoD policy that maintenance programs provide organic maintenance for inherently Governmental and core capability requirements. It is also DoD policy to identify depot maintenance core capability requirements as early as possible in the acquisition life cycle. By statute, these capabilities shall be established no later than four years after the VTESS achieves Initial Operational Capability (IOC). The core capabilities will include those necessary to maintain and repair VTESS to enable the user to fulfill the strategic and contingency plans.

The contractor shall use the following definitions in the preparation of a Core Depot Assessment (CDA) Data Report:

- a. Non-Core workload is defined as the workload that the Army DOES have the capability (skill sets, support equipment, and facilities) and capacity to repair.

- b. Core workload is defined as the workload that the Army DOES NOT have the capability (skill sets, support equipment, and facilities) and/or capacity to repair.

The contractor shall prepare a CDA Data Report and provide the required data and support to the Government so the Government can complete a Core Depot Assessment of the VTESS. The Government requires specific input data to perform the CDA. This assessment is performed on an iterative basis as the program matures, or changes, and as the input data becomes more accurate and defined. The input data needed to conduct this assessment includes, but is not limited to, system usage rate, reliability, maintainability, and repair capability information (i.e. skills, test equipment, and facilities) to support VTESS, its assemblies, and subassemblies. CDA input data is required to assist in identifying core workload for which an organic maintenance capability (i.e., basic skills, facilities, and equipment) is required per [U.S. Code Title 10 § 2464](#). The CDA data will be used to evaluate the organic depot's capability and readiness to support the Depot Level Repairable (DLR) items identified in the VTESS maintenance concept. The Contractor shall participate during Government Supportability IPTs to assist the Government in performing a CDA. The Contractor shall provide information requested by the Government to complete the CDA. This information shall be included in the Depot Support Transition Plan prepared IAW SOW section 3.6.5.

For the portion of core logistics workload not perform at the DoD depot, the Contractor shall coordinate with existing life cycle support contractors (LCCS) using associate contractor agreements, develop initial fielding plans for the system and verify that the maintenance actions and support structure are aligned with the maintenance concept.

**(DI-MISC-80508B) Core Depot Assessment Data Report Appendix**

**(DI-SESS-81758A) Logistics Product Data (LPD)**

**3.4.1 Logistics Support Analysis**

The Contractor shall identify support resources and infrastructure necessary for test and evaluation activities. Under [Title 10 U.S. Code, Section 2464](#), it is essential for the national defense that the Department of Defense maintain a core logistics capability that is Government-owned and operated (including Government personnel, equipment and facilities) to ensure a ready and controlled source of technical competence and resources necessary to ensure effective and timely response to requirements.

In order to achieve this objective, at the conclusion of the Core Depot Assessment (CDA), the Government may choose to transition some or all of the Contractor's depot support functions to a Government depot or other organic support activity. Hence the contractor shall develop a Public-Private Partnership (P3) Plan in coordination with Tobyhanna Army Depot (TYAD) personnel on how they will establish a Public-Private Partnership (P3) Agreement with TYAD, to facilitate the transition of the VTESS depot-level support to the Government in order to comply with core logistics capability requirements established in [Title 10 U.S. Code Section 2464](#). The P3 Plan shall ensure a seamless transition from Original Equipment Manufacturer (OEM) Contractor support to Government depot support. The Contractor shall begin P3 coordination activities with

TYAD not later than 90 days after award. The Contractor shall prepare the P3 Plan to include, but not limited to, the following areas:

- a. All relevant test procedures, assembly drawings, schematics, bills of material, component failure analysis and any other documentation necessary to repair and maintain the VTESS.
- b. All non-standard hardware or software developed by the Contractor to test and repair VTESS.
- c. The supply chain to enable the Government to procure all spare associated parts, modules, or components required to repair the VTESS.
- d. On-call OEM Contractor technical support to TYAD to assure a smooth transition to organic sustainment for a period that will last 1 year past the date TYAD has obtained full organic depot capability.
- e. The incremental transition of workload to TYAD at a rate of 25% per year until 100% of repair capability is reached by the end of the warranty period in order to sustain fielded VTESS.

The requirement for the establishment of an organic depot maintenance core sustainment capability is to be incrementally developed at TYAD with full capability in place prior to the end of the warranty period. For the portion of core logistics workload not perform at the DoD depot, the Contractor shall analyze existing LCCS support structures and develop and define an optimized support infrastructure for production and deployment. The recommended support resources shall be sufficient to allow another contractor with comparable skills to assume operation, maintenance, and support of the system and sustain the system availability requirement. The Contractor shall only use the form, fit, function, and interface requirements in the performance specifications for provisioning, training and maintenance planning.

### **(DI-MISC-80711A) Scientific and Technical Reports - P3 Plan**

#### **3.4.2 Supportability Analysis and Logistics Product Data**

The Contractor shall provide engineering and technical data to enable the Government to analyze maintenance and support costs of the VTESS using the Computerized Optimization Model for Predicting and Analyzing Support Structures (COMPASS) software model. The contractor shall identify the source (s) of all engineering and technical data furnished (i.e. design analysis, engineering estimate, laboratory testing, field testing). The Contractor shall conduct repair level analyses, develop diagnostic, preventive maintenance and repair procedures, conduct facility analyses, refine hardware and software maintenance and support concepts, and identify support resource requirements including required spares and support equipment. Using Source Maintenance and Recoverability (SMR) Codes, the contractor shall develop a listing of which items should be repaired and which should be discarded and the level of maintenance at which the repair should be performed with the associated cost. The contractor shall document and report to the Government:

- a. Operational scenario modeled, assumptions made, constraints assumed, and non-economic factors imposed.
- b. Maintenance alternatives considered.
- c. Analytical method and models used to perform the economic evaluations.
- d. Discussion of the sensitivity evaluation performed and results obtained.
- e. Failure Modes, Effects, and Criticality Analysis (FMECA) addressing hardware and software failure rates quantified for all failure modes, and severity rankings, and identify impacts to mission success, system performance, personnel safety, and maintainability. Include recommended actions for the elimination or control of high risk items to improve operational readiness and reduce lifecycle costs.
- f. Critical Items List, derived from the result of the FMECA, identifying all items that require special attention due to complexity, application of state-of-the-art- technology, high cost, sole source of supply, or single point of failure potential, including the identification of special controls required for these items to reduce the risk they pose to VTESS capability and operational readiness.
- g. Reliability Predictions.
- h. Level of Repair Analysis (LORA)
- i. VTESS Mean Time Between Failure (MTBF) in hours
- j. VTESS Mean Time to Repair (MTTR) in labor hours
- k. Spares and Repair Parts
- l. Tools and Test Equipment (manufacturer and model number)
- m. Repair personnel skills/MOS required to repair VTESS
- n. Common and Bulk Items.
- o. Warranty tracking.

**(DI-SESS-81758A) Logistics Product Data (LPD)**

**(DI-SESS-81759A) Logistics Product Data Summaries**

**3.4.3 Parts Management Plan**

The Contractor is responsible for managing obsolescence over the entire period of the contract to ensure compliance with all performance and contract requirements. Responsibility includes all costs associated with locating part replacement, vendor interface, and engineering efforts. The contractor shall identify vendors designing, building, testing and distributing critical components and where this work occurs. Data shall include company name, address, CAGE code and a supplied item description. This requirement shall flow down to all subcontractors. The Contractor shall develop a plan for managing the loss, or impending loss, of manufacturers or suppliers of

components, assemblies, or materials used in VTESS. The Contractor's obsolescence program shall prevent impact to contract performance metrics and shall prevent additional costs to be incurred by the Government due to obsolescence. Results of supply chain risk management activities, to include risk mitigation and remediation activities shall be included in the Program Management Reviews (PMR) and Briefing Materials Report.

**(DI-MGMT-81605) Briefing Materials (PMR)**

**3.4.4 Technical Publications**

The Contractor shall describe each operation and maintenance task in detail and in logical, systematic steps for the work to be accomplished. The operations and maintenance instructions shall accurately provide the operator/technician with all the information needed to keep the equipment operational. It shall provide system and subsystem oriented instructions for installation, operation, maintenance, and testing. All tools, test equipment and consumable items required to accomplish any maintenance or installation shall be identified just prior to and as part of the task. Government furnished material, Government technical manuals or Government-approved commercial operation and maintenance manuals shall be used as references for system and subsystem maintenance. All Government technical manuals and COTS manuals shall be reviewed to ensure changes, updates, revisions, or supplementation is not required to reflect the components actually being installed. All publications shall reflect the configuration of fielded hardware as documented in the product baseline. The Contractor shall prepare Operator and Maintenance Manuals that provide instructions suitable for use by the intended audience of the system. The Operator Manual shall also include operator maintenance tasks such as preventive maintenance checks and services, inspection, lubrication, adjustment, and operator level repair and replacement tasks as needed. The maintenance information shall include a Maintenance Allocation Chart (MAC) reflecting the VTESS maintenance concept. The MAC will identify the required maintenance functions to be performed, the maintenance level responsible for the function, and the active repair time, tools, and test equipment necessary to perform the function for each repairable assembly and subassembly of the VTESS. The Contractor shall identify all required spare parts, consumables, tools, and test/support equipment associated with each task and identify the level of maintenance at which each task shall be performed.

**(MIL-STD-40051-2B) Preparation of Digital Technical Information for Page Based Technical Information**

**(See Annex to Exhibit C) Requirement matrix for Page Based Operator and Maintenance Manuals**

**(DI-TMSS-80527C) Commercial Off The Shelf Manuals & Associated Supplemental Data**

#### **3.4.4.1 Pocket Guides**

The pocket guides shall describe basic functional operations and the Operator's maintenance tasks for I-MILES VTESS. The guides will be developed using [MIL-STD 40051-2A](#) as reference. The guide shall fit into a standard Soldier's pocket (the dimensions are vertical 5½" x 4" wide) and be weather proof.

### **(DI-MISC-80711A) Scientific & Technical Reports**

#### **3.4.4.2 Publications In Process Review's (IPR's)**

The Contractor shall host and co-chair publication reviews to ensure the technical publications are being prepared according to contracts. Each IPR shall be scheduled to coincide with a system level program reviews defined in the integrated master plan. The Contractor shall act on reported decisions and discrepancies resulting from or associated with each IPR. Each review shall include a review of incorporated corrections or comments from previous IPR's prior to proceeding with the current IPR. If any IPT member identifies previous IPR comments that are not included in the technical publications, the IPR shall be considered incomplete.

#### **3.4.4.3 Validation**

The Contractor shall validate all Technical publications, changes, supplemental data and revisions at the Contractor's facility prior to submission of the 100% draft version, and when new or updated information or procedures are incorporated. Publications shall be validated prior to start of system testing. A technical publication shall not be ready for validation or verification until the following conditions have been fulfilled:

- a. Engineering technical review has been completed.
- b. Information, illustrations and parts lists reflect correct configurations of the system and equipment, to include all engineering changes.
- c. Procedural instructions are readily understandable by the intended user and adequate to perform all operations and maintenance functions.
- d. All procedures have been performed to assure accuracy and performance requirements.
- e. Adequacy of data is checked to ensure that it supports the approved maintenance and support plan.
- f. Hardware of the proper configuration is available for the validation and verification effort.
- g. All safety hazards identified in the safety assessment report are resolved and identified within the text as cautions or warnings necessary to protect the equipment or personnel as appropriate.
- h. The use of any hazardous material has been identified.

### **(DI-CMAN-80792) Validation Report**

#### **3.4.4.4 Verification**

Publications shall be verified by the Government prior to acceptance of the system. The Contractor shall assist PEO STRI IPT members to verify the Technical Manuals TM are accurate. The IPT may choose to perform verification concurrently with the validation effort. Correction of discrepancies and changes resulting from training, testing and reviews shall be incorporated into the TM. The Contractor shall provide system equipment, technical and engineering support and facilities as required to aide in the performance of verification effort. Verification shall be rescheduled if there are more than 15 percent corrections.

#### **(DI-TMSS-81821) Technical Manual Verification Incorporation Certificate**

#### **3.4.4.5 Authentication**

The Contractor shall incorporate all comments from compliance-reviews, technical accuracy reviews and verification reviews into final submission of TM and Final Reproducible Copy (FRC) of the Operator and Field Level Maintenance Technical Manual Including Repair Parts and Special Tool List (RPSTL) as prescribed in AR 25-30, The Army Publishing Program.

#### **3.4.5 Item Unique Identification (IUID)**

The Contractor shall coordinate among the IPT members to determine items requiring unique identification including embedded subassemblies, components and parts, and identify the UID to be used for each item. The Contractor shall provide unique item identification, or a DoD recognized unique identification equivalent, for all identified items delivered. UID marking design for each item shall be both machine readable and human readable in accordance with [MIL-STD-130](#), paragraph 5.2.

#### **(DI-MGMT-81804A) Unique Identification (IUID) Marking Activity and Verification Report**

#### **3.4.6 Development Software Support Environment**

The Contractor shall ensure that the software support environment and the computer hardware and software are compatible, and that the software support system will facilitate the changing and upgrading of the software modules.

#### **3.4.7 Test Measurement and Diagnostic Equipment**

The Contractor shall develop alternative test procedures utilizing commercially available test equipment if special inspection equipment is developed and used for production. The contractor shall identify necessary equipment to perform diagnostic tests, troubleshooting, and analysis of both hardware and software. In addition the contractor shall provide the manufacturer name and address on any Special Test Equipment utilized in the production and testing of VTESS. STE includes, but not be limited to, items such as laptops, bench top test equipment and software applications.

### **3.5 Training Products**

The Contractor shall follow the guidance in [TRADOC Regulation 350-70 Systems Approach to Training](#) to properly to properly analyze, design, develop, implement and evaluate training and training products for the VTESS program. The Contractor shall use, to the maximum extent possible, all previously developed data that can be applied toward satisfying the data requirements of [MIL-PRF-29612B](#). This includes Government Furnished Information (GFI) and data developed by the Contractor incident to other contractual requirements. The Contractor shall ensure the training data products are maintained to reflect the current design.

The system training data products shall support both operator and maintainer personnel requirements. The system training data products shall provide the information necessary to support attainment of the physical and mental skills and attitudes required for mission accomplishment.

#### **3.5.1 Training Situation Document**

The Contractor shall conduct a training assessment of the I-MILES System, weapon systems, military occupational specialty (MOS), facilities, and Contractor support personnel to identify the existing training situation and to assist the Government in determining such things as; how they train and maintain devices at the institution, homestations, and CTC. The Contractor shall identify the different types of existing training systems and technologies that are used and how they might support the program training products training strategy.

The system training data product shall provide specific data necessary to verify the efficiency of a training system to meet existing training needs, training programs survey results data, and analysis results information on technologies applicable to new training needs.

#### **(DI-SESS-81517B) Training Situation Document**

#### **3.5.2 Instructional Performance Requirements Document**

The Contractor shall utilize the training assessment information, findings, and conclusions to support the instructional performance requirements document development. The Contractor shall analyze the proposed design solution of the VTESS training system and conduct a training analysis of tasks (inspect, install, power-up, calibrate, operate, power-down, remove, pack, troubleshoot, and maintain, remove, replace, repair, etc.) required to maintain and train for the VTESS operators and maintainers personnel that will support the initial, sustainment, and refresher training life cycle.

#### **(DI-SESS-81518B) Instructional Performance Requirements Document**

### **3.5.3 Instructional Media Requirements Document**

The Contractor shall utilize the task analysis information, findings, and conclusions to support the instructional media requirements document. The Contractor shall conduct an instructional media analysis to identify both an instructional strategy approach and identify the types of media that may be used to support the VTESS program for both operators and maintainers. The Contractor shall propose multiple instructional strategy approaches inclusive of instructional media options to include cost, schedule, and performance of each to the Government so that a course of action (COA) can be identified. The COAs shall include an initial, sustainment and refresher training strategy that will support the new equipment training (NET), institutional training, homestation training, and CTCs training for the life cycle. The system training data product shall provide specific data necessary for the development of instructional media for both operators and maintainers.

#### **(DI-SESS-81519B) Instructional Media Requirements Document**

### **3.5.4 Instructional Media Design Package (IMDP)**

The Contractor shall utilize the instructional media analysis information, findings, and conclusions to support the instructional media design development, when identified, for the development and production of courseware. The System training data product shall provide baseline requirements data necessary for the development and production of courseware. The Contractor shall deliver with the IMDP a “wireframe” that is a technical demonstration, exclusive of the actual course content, of the sequencing and navigation of the specific instructional design documented in the IMDP. The Government will conduct functionality verification of the wireframes submitted with this document. The wireframe shall demonstrate proper execution of the instructional strategy as shown in the course map in the IMDP. The Contractor shall design SCORM 2004 3rd edition compliant, web-based IMI courseware to maximize reusability of content by designing content as individual Sharable Content Objects (SCOs) in accordance with ADL SCORM Initiative and the SCORM Business Rules. The Contractor shall develop SCOs for each Enabling Learning Objective (ELO) using the definition of an ELO by [TRADOC Regulation 350-70](#).

#### **(DI-SESS-81520B) Instructional Media Design Package**

### **3.5.5 Course Conduct Information Package**

The System training data product shall provide data required by the Government for outsourcing the conduct of training. The System product shall provide sufficient information for an accurate evaluation of a student’s capabilities to meet all learning objectives of a course and shall identify prerequisite knowledge and skills of students entering the course. The product shall inform students of the training syllabus, organization, operation, scheduling, and other pertinent information. The product shall also provide information on an evaluation of a trainee’s performance, the trainee evaluation of training, and shall provide the trainee with a certificate of training

## **(DI-SESS-81522B) Course Conduct Information Package**

### **3.5.6 Training Conduct Support Document**

The Contractor shall develop a warfighter training support package to include, at a minimum, an instructor guide, trainee guide, and instructional visual aids in support of both the operators and maintainer instructor led training (ILT). The system training data product shall provide definition and direction for instructors and trainees for the conduct of formal/NET training. The system product shall support the trainee's mastery of knowledge, skills, and attitudes for a given learning objective. The Contractor shall conduct the ILT training courses developed for field maintenance personnel and users/operators function and operational capabilities.

## **(DI-SESS-81523B) Training Conduct Support Document**

### **3.5.7 Instructional Media Package**

The Contractor shall utilize the instructional media design package findings, and conclusions to support the Interactive Multimedia Instruction (IMI) development. When IMI is identified as a training solution, the system training data products shall be SCORM 2004, 3rd edition compliant for both content and the targeted Learning Management system to ensure that they are interoperable, accessible, reusable, playable, and durable. This training data product shall provide specific data necessary to support the transfer of knowledge, skills, and attitudes by use of instructional media. The Government will conduct an acceptance review of the final courseware to include all lessons/modules, tests, assessments, and exercises to verify SCORM 2004 3rd edition compliance and proper courseware functioning to include proper implementation of the instructional strategy on the targeted ALMS. The Contractor shall validate all courseware online prior to final acceptance by the Government. This includes: test validation, content validation and educational (that is, group Trials) validation in accordance [TRADOC Pam 350-70-10](#) and the identified criticality standard for each TLO in the courseware. The Government will provide the subject matter experts (SME) needed for content validation and test validation and the target audience for the individual and group trials.

## **(DI-SESS-81526B) Instructional Media Package**

### **3.5.7.1 Online Review**

The Contractor shall provide the Government with access to an on-line system for the review of all courseware. The purpose of an on-line review system is to provide content reviewers with the ability to review, and de-conflict courseware developed by the Contractor. The system shall provide the ability for managers and reviewers to also view all related documents provided for the course, such as the course IMDP, storyboards, and lessons.

### **3.5.7.2 Web-Based Courseware**

The Contractor shall ensure web-based courseware is SCORM 2004 3rd edition complaint IAW [TRADOC Pamphlet 350-70-10](#), Systems Approach to Training Course and Courseware Validation and [TRADOC Pamphlet 350-70-12](#), Distributed Learning-Managing Courseware Production and Implementation.

### **3.5.7.3 SCORM Compliance Testing**

The Contractor shall test to verify sharable content objects (SCOs) ability to communicate with the target Army Learning Management (ALMS) v3.0 suite, Saba Enterprise 5.3 Learning Suite Service Pack 1 using the ADL Test Suite content Package Conformance Test.

#### **3.5.7.3.1 Delivery**

The primary delivery method for this courseware shall be over the Internet. The Contractor shall develop the courseware as a SCORM 2004 3rd edition compliant content package and deliver the courseware to the Government as a Package Interchange File (PIF). A content package includes all the learning resources (Assets, Sharable Content Objects (SCOs) and Content Aggregations) for the courseware and is used to move those digital learning resources or collections of learning resources between LMSs, development tools and content repositories. For tracking purposes, the PIF file name for each final courseware deliverable shall contain a unique version identifier. When the PIF file is delivered on CD-ROM, the CD-ROM label shall include the same unique version identifier

#### **3.5.7.3.2 Imsmanifest**

The Contractor shall provide a top level imsmanifest file and SCORM 2004 3rd edition compliant schema files as part of the content package. The Contractor may leave the individual imsmanifest files and SCORM compliant schema files in their SCOs; however, when a SCO(s) is part of a higher level aggregation, these files are not required and shall not be included as resources in the top level imsmanifest file. An imsmanifest file is a XML document describing the content, organization and resources of a SCORM compliant content package. XML Schemas define and describe the structure, content, and to some extent semantics (rules of language) of XML documents.

#### **3.5.7.3.3 Runtime Environment**

The Contractor shall develop a SCORM 2004 3rd edition compliant Runtime Environment for all Sharable Content Objects (SCOs) that implements the mandatory minimum API calls and Data Models IAW paragraph 4 of the SCORM Business Rules ([http://www.atsc.army.mil/itsd/imi/bus\\_rules.asp](http://www.atsc.army.mil/itsd/imi/bus_rules.asp)). The Contractor may use additional API calls and Data Model elements as long as they are LMS SCORM 2004 3rd edition compliant elements that are supported by an Army Learning Management (ALMS) v3.0

suite, Saba Enterprise 5.5 Learning Suite Service Pack 1 SCORM compliant LMS.

#### **3.5.7.3.4 Playability**

The Contractor shall perform courseware playability and Army SCORM 2004 3rd edition compliance testing to assure that the courseware meets the contract requirements. The Contractor shall complete all courseware testing (playability and SCORM) prior to delivery to the Government. The Contractor shall use the Army Acceptance Criteria ([http://www.atsc.army.mil/itsd/imi/Accept\\_Criteria.asp](http://www.atsc.army.mil/itsd/imi/Accept_Criteria.asp)) to satisfy SCORM 2004 3rd edition requirements. The Contractor shall submit all test logs produced as a result of running the latest Army Acceptance Criteria on the final courseware package that is to be delivered to the Government for approval when the final CW is submitted. The Contractor shall include all log files generated from the following conformance tests, as identified in the Army Acceptance Criteria:

- a. Resource Validator log file of “Undetected Manifest Files”
- b. Resource Validator log file of “Incomplete Manifest (Packaged Files Missing)”
- c. The ADL Test Suite Sharable Content Object (SCO) Run-Time Environment Conformance Test log file(s) named “RTE.htm”
- d. The ADL Test Suite Content Package Conformance Test log file(s) named “manifest\_op4.htm” (Summary) and “manifestDetails\_op4.htm” (details)
- e. Results from the Validate Army Run Time program saved to a file named “ValidateRTE.html”
- f. Results from the Validate Army Meta-data program saved to files named “SCOMDLog.html”

#### **3.5.7.4 Checks on Learning**

The Contractor shall develop checks-on-learning questions and practical exercises in such a manner that a learner is provided feedback, remediation, reinforcement and the correct answer or in an after action review at the end of the Check on Learning alerting the learner of what was done correctly and incorrectly.

#### **3.5.7.5 Test Questions**

The Contractor shall develop test questions in such a manner that learners shall receive remediation on objectives missed but not be given the answers to specific test questions. For practical exercises/simulations, the Contractor shall vary the situations/scenarios.

#### **3.5.7.6 Test Integrity**

The tests shall be developed in such a manner that a learner shall not gain access to solutions to problems and scenarios prior to completing the test. The Contractor shall take reasonable measures to ensure tests are developed with safeguards to help

prevent compromises in accordance with [TRADOC PAM 350-70-5](#).

### **3.5.7.7 Answer Keys**

The Contractor shall develop and provide to the Government answer keys for all Checks on Learning, Practical Exercises, Simulations, and Learner Performance Tests (for example, pretests, posttests). For assessments derived from item banks which present questions in a randomized order all answer keys will include a 'unique question ID' for each question. This 'unique question ID' will also be displayed in the lower right corner (preferred) of the 'instructional white space' or other prominent location consistent with presentation of instructional material. For questions presented in randomized order, the answer keys must include the text of the 'item stem' and the full text of the correct answer.

### **3.5.7.8 Computer Configurations**

The courseware shall play on the current versions of the Digital Training Facility (DTF) Student Workstation configuration and the Baseline Home Computer Configuration. CD-ROM courseware or other media, when identified, shall play on the Baseline Home Computer Configuration non-networked system.

### **3.5.7.9 Content Test Environment (CTE) Testing**

The Contractor shall perform courseware testing utilizing the CTE to assure that it communicates accurately with Army Learning Management (ALMS) v3.0 suite, Saba Enterprise 5.5 Learning Suite Service Pack 1 via the courseware-to-LMS and LMS-to-courseware data calls IAW paragraph 4 of the SCORM® Business Rules ([http://www.atsc.army.mil/itsd/imi/bus\\_rules.asp](http://www.atsc.army.mil/itsd/imi/bus_rules.asp)).

### **3.5.8 Training System Support Document**

The Contractor shall provide trainer software application data and training system operating data. The training data product shall provide specific data necessary for the operation and life-cycle software configuration management of a training system.

#### **(DI-SESS-81527B) Training System Support Document**

### **3.5.9 Inventory Support**

The contractor shall assist with the conduct of a joint inspection and inventory of the system. The contractor shall, in conjunction with a Government representative and the appropriate third party representative (Training Support Contractor (TSC)/LCCS Contractor), conduct a physical inventory of Spares, Tools and Test Equipment. The contractor shall prepare a Materiel Component List (MCL) providing a logical listing of major subassemblies and their nonexpendable and discrete components, data needed to build a Component Hand Receipt (CHR) in the Property Book Unit Supply Enhanced (PBUSE) System. The MCL contains the end item, sensitive or classified material, its discrete components and non-expendables, and tech manuals by TM Number & Title.

Upon completion of the inventory, representatives shall sign a hardcopy of the inventory in the form of a PBUSE generated CHR and DA 3161 form to ensure all required items were delivered and a baseline established.

### **3.6 Interim Contractor Support (ICS)**

The contractor shall provide Interim Contractor Support (ICS) at each fielding location for a period of two (2) years. During this time the Contractor shall provide total logistics support until a government maintenance capability is developed and/or another life cycle contractor support (LCCS) is in place. While in ICS, the contractor will re-enforce operator and maintenance training to the LCCS contractor; resolve interface conflicts, errors and problems; and to oversee repair to damages and degradations caused by normal wear and tear on the system. After the ICS period, the Government assumes responsibility for supporting VTESS. The ICS transfer shall include 100 percent of spares, repair parts, and ST&TE. The contractor shall provide logistics and operational support for the transfer of ICS responsibility to the Government and/or another life cycle contractor support (LCCS) contractor. Support shall include those services required to insure the effective, efficient transfer of responsibility as well as technical data, tools and test equipment and repair and spare parts, in sufficient detail and coverage to enable other personnel with comparable skills to maintain the system.

#### **3.6.1 Repair Turn-Around-Time**

Within 20 working days, the Contractor shall evaluate failed and damaged items and make the necessary repairs and return the items. The turnaround time shall begin the day the items are received at the Contractor facility and ends when the items have departed the Contractor facility. The Contractor is authorized to procure lay-in spares and material to ensure turnaround time. Any unused material shall be returned to the Government or transferred to another contract as directed by the Government. During the examination of an item inducted for repair, the Contractor may determine that a part received is in such condition as to render it, or initiating a repair action shall render it, "Beyond Physical Repair" (BPR). In other cases, the diagnostic examination or estimating task evaluation may reveal that numerous component assemblies of the part or the part itself require such a level of effort to return it to a serviceable condition that the hands-on labor, material, administration, and engineering support costs involved may exceed 75% of the price of a new production item. In such instances an item is considered to be "Beyond Economical Repair" (BER). The Contractor shall notify the Government if it determines that an item falls into either the BPR or BER category. The Government will provide concurrence with the BPR/BER categorization along with associated disposition instructions.

#### **3.6.2 Software Support**

The Contractor shall provide services to maintain and update system software for the duration of the ICS effort. At the end of the ICS effort, the Contractor shall deliver, install, and check-out for proper operation a subset of the development software support environment to serve as the sole means to sustainment for the system software. The

software support environment shall include all commercial, Government-funded, and Contractor proprietary software, all necessary documentation/specifications, plus executing hardware with all applicable licenses necessary to enable the Government to fully support all system software.

### **3.6.3 Site Support**

The Contractor shall provide support and management of site logistical operations to obtain a Government designated readiness rate of 99 percent. In accomplishing this mission, the Contractor shall perform the administrative, operational, maintenance, supply, technical documentation change and revision program and other support functions required.

### **3.6.4 Engineering Services**

The Contractor shall provide engineering services to support the program and operational use of the system. Engineering services efforts are limited to those non-repetitive investigation, inspection, analysis, evaluation, design, documentation, fabrication, and testing tasks which are in addition to those services required by the ICS effort or to deliver acceptable hardware items after start of production.

## **(DI-MGMT-81466) Contract Performance Report**

### **3.6.5 Transition Planning**

The Contractor shall take necessary actions to facilitate transition of the system from ICS to a combination of Life Cycle Contractor Support and organic support. The transition period shall commence 30 days prior to the end of ICS. The Contractor shall provide a Depot Support Transition Plan containing a priced list of all line replaceable units (LRU), equipment, and software comprising the VTESS and identify the skills required to provide maintenance and supply support for these Maintenance Significant Items identified in the MAC. The transition effort shall include an analysis of all failures and maintenance actions undertaken during the interim support and revising technical publications subject to Government approval to reflect actual fielded experience. The Contractor in conjunction with a Government representative and the appropriate third party representative (TSC / LCCS Contractor / organic) shall conduct a physical inventory of Spares, ST&TE, and consumables during the transition period. Upon completion of the inventory, representatives shall sign a hardcopy of the inventory to ensure all required items are delivered and a baseline established. The Contractor shall also ensure the following SOW CDRL requirements (if not previously provided) is surrendered to the Government or a Government designated representative.

- a. GFE
- b. Training Materials
- c. Drawings and Associated Lists
- d. Spares, TTE, and Consumables

- e. Maintenance Data collected
- f. All other system related documentation/equipment required for/by the performance of this delivery order

**(DI-MISC-80711A) Scientific and Technical Report – Depot Support Transition Plan**

**3.6.6 Life Cycle Software Engineering Environment (LCSEE)**

The Contractor shall identify the hardware, software, and other resources needed for the life cycle support of deliverable software. The Contractor shall plan for the transition of support to a separate support agency and identify the items and procedures that are needed to perform life cycle software support of the deliverable application software. Using Appendix B and Appendix C of [MIL-HDBK 1467](#) as a guide, the Contractor shall describe and document the methods to be used to ensure the existence of a complete life cycle support capability. The Contractor shall plan for and implement the transfer of support of the deliverable items to the life cycle support organization. This effort should be designed to ensure a phased transfer without loss or degradation of the support of the delivered application software or to other tasks currently performed. The Contractor shall identify the need to use any Government resources during the transfer phase. The Contractor shall plan lead-time to ensure completion of the transfer prior to the planned assumption of support responsibilities by the life cycle support organization. The Contractor shall ensure that the procedures for operation of the LCSEE completely describe all methods necessary to evaluate, generate, install, integrate, test, modify, and operate the deliverable application software. The Contractor shall make assistance available to support the resolution of any problems encountered by the life cycle support organization personnel during the transfer period.

**(DI-IPSC-81429) Software Transition Plan (STRP)**

**4.0**            **Appendix A - Acronym List**

AAR	After Action Review
ACA	Associate Contractor Agreement
AIS	Automated Information System
ATP	Acceptance Test Procedure
BAE	British Aerospace Engineering
BER	Beyond Economical Repair
BPR	Beyond Physical Repair
C&A	Certification and Accreditation
CAB	Corrective Action Board
CAGE	Commercial and Government Entity
CAIV	Cost as an Independent Variable
CBT	Computer Based Training
CDE	Controlled Development
CDRL	Contract Data Requirement List
CI	Configuration Item
CL	Confidentiality Level
CLS	Contractor Logistics Support
CM	Configuration Management
CMMI	Capability Maturity Model Integration
CMMI – DEV	Capability Maturity Model Integration - Development
CMP	Configuration Management Plan
CONUS	Continental United States
COTS	Commercial-off-the-Shelf
CSCI	Computer Software Configuration Item
CVS	Combat Vehicle System
DCMA	Defense Contracts Management Agency
DOD	Department of Defense
DODD	Department of Defense Directive
DODI	Department of Defense Implementation
DS	Depot Support
E3	Electromagnetic Environmental Effects
ECP	Engineering Change Proposal
FAI	First Article Inspection
FAT	First Article Test
FBL	Functional Baseline

FOF	Force on Force
GAT	Government Acceptance Test
GFE	Government-Furnished Equipment
IA	Information Assurance
IAVA	IA Vulnerability Alert
IAW	In Accordance With
ICD	Interface Control Document
ICLS	Interim Contractor Logistics Support
ICWG	Interface Control Working Group
IDD	Interface Design Description
IMP	Integrated Master Plan
IMS	Integrated Master Schedule
IPR	In Process Review
IPT	Integrated Product Team
IS	Instrumentation Systems
LCC	Life Cycle Cost
LCCS	Life Cycle Contractor Support
LPAN	Live Player Area Network
LTEC	Live Training Engagement Composition
LMI	Logistic Management Information
LRIP	Low Rate Initial Production
LRU	Lowest Replaceable Unit
LT2	Live Training Transformation
MAC	Mission Assurance Category
MANPRINT	Manpower and Personnel Integration Program
MCC	MILES Communication Code
MCTC	Maneuver Combat Training Center
MILES	Multiple Integrated Laser Engagement System
MOS	Military Occupational Specialty
MRB	Material Review Boards
NSN	National Stock Number
OCONUS	Outside Continental United States
OEM	Original Equipment Manufacturer
OUM	Operators User Manual
O&M	Operation & Maintenance
PDD	Product Definition Data
PEO STRI	Program Executive Office for Simulation, Training and

	Instrumentation
PMR	Program Management Review
QA	Quality Assurance
QE	Quality Engineer
RCS	Range Communication System
RDMS	Range Data Measurement Subsystem
RMF	Risk Management Framework
RTM	Requirements Traceability Matrix
SAIV	schedule as an independent variable
SAR	Safety Assessment Report
SAP	Security Authorization Package
SAWE	Simulated Area Weapons Effects
SCORM	Sharable Content Object Reference Model
SIP	System Identification Profile
SIT	Systems Integration Test
SOW	Statement of Work
SPS	Software Product Specification
STE	Special Test Equipment
ST&TE	Special Tools & Test Equipment
STIG	Security Technical Implementation Guide
SVD	Software Version Descriptions
SVT	Systems Verification Test
TASC	Training Area Support Center
T&E	Test and Evaluation
TD	Test Discrepancies
TESS	Tactical Engagement Simulation Systems
TIM	Technical Interchange Meetings
TIR	Test Incident Reports
TRL	Technology Readiness Level
TRR	Test Readiness Review
TSV	Thru Sight Video
UID	Unique Identification
VTESS	Vehicle Tactical Engagement Simulation System
WAWF	Wide Area Workflow
WFF	War Fighter Focus