STATEMENT OF WORK

FOR

STRYKER PHASE IV

Prepared by
U.S. Army PEO Simulation, Training and Instrumentation (PEO STRI)
12350 Research Parkway
Orlando, FL 32826-3276

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Statement of Work
For
Stryker Phase IV

1. SCOPE.

This Statement of Work (SOW) defines the effort required for designing, developing, integrating, testing, managing, documenting, and delivering the Stryker Phase IV Training System.

1.1 BACKGROUND

The Stryker Maintenance Training System (MTS) currently consist of two (2) twenty (20) student classrooms which utilize Diagnostic Troubleshooting Trainers (DTT's) (2) Training Management System (TMS), a Software Support Environment (SSE), and a series of Hands On Trainers (HOT) and Part Task Trainers (PTT). The training system provides maintenance training capability for the Army's 91S Military Occupational Specialty (MOS). This capability supports familiarization, institutional and unit training. The MTS provides training for maintenance personnel in system operation, symptom verification, troubleshooting, fault isolation, adjustment, servicing, and removal/replacement of Line Replaceable Units (LRUs). The training system provides an automatic capability to record, score, and store the performance of students on all tasks, as well as, evaluate the student's knowledge of the appropriate vehicle system's functioning theory. The training system provides real-time feedback and scoring capability, which displays and records all the information necessary to evaluate the student's performance and understanding of the training task. The general areas of scoring include as a minimum the management of switches and controls, response to malfunctions, and actions required by the tasks identified in the Training Task List (TTL). The training system also provides real time display of errors generated by student(s) as they occur during real-time scenario execution.

Comment [P1]: Added to include SSE and TMS as part of the MTS.

Training is separated into two distinct categories: the Stryker automotive components and the Stryker weapon components. Currently the DTTs include weapons modules which support the Remote Weapon System (RWS), the Anti-Tank Guided Missile (ATGM) and Mortar Carrier (MC) variants. The use of a weapon Hands On Trainer (HOT) is only available for the Remote Weapon System (RWS). Training on the automotive system utilizes a Hull HOT, a Driveline, Suspension, Brake, and Engine PTTs.

The trainer operates in or supports various modes. The modes include Lesson Selection, Lecture, Demonstration, Training, and Diagnostics. The Lesson Selection and Diagnostics

modes are operator selectable. The Lecture, Demonstration, and Training modes are a common mode of execution but differ in how the instructor makes use of each mode.

A separate Training Management System (TMS) maintains a library of lessons that can be selected for training. From the Instructor Operator Station (IOS), the instructor can select an appropriate lesson from that library to use for training. The TMS also provides the capability for the instructor to record, score, store and retrieve the performance of students on all tasks.

1.2 NEW CAPABILITY

The intent of this effort is to seamlessly expand the capability of the current system by adding a DTT capability for the STRYKER Mobile Gun System (MGS). The existing system architecture, software design, functionality, user interface, and instructor capabilities must be maintained. The existing Instructor and Operator interface must be maintained. When fielded, the instructor must have the capability to select the lessons from any Training Task List, new or old, with the same type of graphical user interface that is used in the trainer today, but expanded to include the new DTT ~~and HOT~~ capabilities. The graphics for all new DTT lessons must be in a 3-D format. The remote Instructor/Operator capabilities must be migrated to a "Tablet" hardware solution.

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The existing Software Support Environment (SSE) will be provided as Government Furnished Equipment (GFE), and must be utilized to generate the new capabilities. The SSE currently provides the hardware, software, and documentation resources for performing Post Deployment Software Support (PDSS) activities including identifying, documenting, and correcting system software faults, implementing system upgrades, generating application programs, managing databases, and providing configuration management of the training system(s) software baseline. The existing Stryker MTS documentation and Software Support Package (SSP) must be updated as part of this effort and at the end of the contract must provide the resources (i.e., source code, executable code, maintenance software, data base and scenario generation tools, documentation, installation hardware, software installation disk, etc.) for the purpose of maintaining computational systems in a fully operational condition.

The current Operating System (OS) parameters and user interfaces (Windows XP) do not currently meet the Army Information Assurance requirements. Regardless, the entire system design when fielded (including the software, and hardware as necessary), must be upgraded to the latest Army approved Unified Golden Master Operating System and hardened to meet Army Information Assurance requirements.

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2. APPLICABLE DOCUMENTS.

The following document is applicable to this SOW to the extent specified herein.

PRF-PT-00606	System Requirements Document for the Stryker Phase IV

2.1 Department of Defense Specifications.

2.2 Department of Defense Standards.

MIL-STD-130N	Identification Marking of U.S. Military Property
MIL-STD-31000	Technical Data Packages
MIL-STD-40051-2A	Page-Based Technical Manuals
MIL-PRF-49506	Performance Specification, Logistics Management Information
MIL PRF 32216	Evaluation of Commercial Off The Shelf (COTS) Manuals

2.3 Availability of Department of Defense Standards.

Copies are available on the WWW at URL: http://assist.daps.dla.mil/quicksearch/

2.4 Department of Defense Directives.

DODD 8570.01	Information Assurance (IA) Training, Certification, and Workforce Management

2.5 Availability of Department of Defense Directives.

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

2.6 Department of Defense Instructions.

DODI 5000.2	Operation of the Defense Acquisition System
DODI 8500.2	Information Assurance Implementation
DODI 8510.01	DOD Information Assurance Certification and Accreditation Process (DIACAP)

2.7 Availability of Department of Instructions.

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

2.8 Other Government Documents, Drawings, and Publications.

DISR	Department of Defense (DoD) Information Technology Standards Registry

Copies are available on the WWW at URL http://jtaonline.disa.mil/VJTA/index.jsp

National Security Telecommunications and Information Systems Security

Policy (NSTISSP) No. 11, Subject: National Policy Governing the Acquisition of Information Assurance (IA) and IA-Enabled Information Technology (IT) Products.

AR 380.5 Marking and Labeling
Copies are available on the WWW at URL http://www.apd.army.mil/pdffiles/r380_5.pdf

AR 25-2 Information Assurance
Copies are available on the WWW at URL http://www.apd.army.mil/pdffiles/r25_2.pdf

AR 25-2 BBP 08-CO-M-0001, Information Technology Contingency Plans and Testing.

DA PAM 25-1-2, Information Technology Contingency Planning, 16 November 2006
Copies are available on the WWW at URL http://www.apd.army.mil/pdffiles/p25_1_2.pdf

DIACAP Implementation Plan (DIP) for Stand-alone System for Mission Assurance Category (MAC) III, Confidentially Level Sensitive. The Standalone DIP has 32 controls.

PEO STRI Basic Accreditation Manual (BAM), v6.0 dated 30 September 2011 - Appendix D DIACAP Stand-alone System IA C&A Process

DA 09-EC-M-0010 IA Best Business Practice on Wireless Security Standards

2.9 Availability of Other Government Documents and Publications.

Copies of the above documents are available at PEO STRI, ATTN: GCTT, 12350 Research Parkway, Orlando, FL 32827-3275

2.10 Availability of Non-Government Standards and Other Publications.

ANSI/EIA-748 Earned Value Management

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

3. REQUIREMENTS.

3.1 Program Management.

The Contractor shall provide the overall management and administrative effort necessary to ensure that the requirements of this contract are accomplished. The Contractor shall track program progress utilizing metrics. The Contractor shall plan, implement, and maintain a Life Cycle Cost (LCC) management process to minimize the system cost and use LCC to conduct trade studies, evaluate design and support alternatives, and select the resource support requirements. The Contractor shall define and monitor metrics and Technical Performance

Measures (TPMs) to evaluate the performance of each critical technical and management process and conformance of the evolving products with contract requirements and objectives.

3.1.1 Integrated Master Plan (IMP).

The Contractor shall implement, manage to, update, and maintain the contract IMP. The Contractor shall develop the system in accordance with the IMP. The IMP shall be used throughout the contract as a management tool to assess progress and determine success in achieving program requirements. The Contractor shall report on work in progress in accordance with the IMP at each program review, at selected technical reviews and at Government discretion. The IMP shall depict the contract work breakdown structure.

3.1.2 Integrated Master Schedule (IMS).

The Contractor shall develop, implement, manage to, update, and maintain the contract IMS. All contract schedule information delivered or presented at program reviews shall originate from the IMS, shall be traceable to the IMP, and shall contain all critical events and exit criteria, accomplishments, predecessors and successors events, and their dependencies. The IMS shall address total program activities including activities performed by major subcontractors. The Contractor shall develop the logic resource network that accurately portrays the sequence and relationship of activities defining the total development and production program. These network activities shall be keyed to the Contract Work Breakdown Structure (CWBS). The network shall be implemented on a computer based program management control system which utilizes critical path method network analysis, accepts parametric data input, and can be utilized to determine a probabilistic estimate of the program schedules. The network activities time shall be updated to reflect accomplished activities and any changes in activity time. The Contractor shall conduct critical path analysis of the tasks and identify problem areas and corrective actions required to eliminate or reduce schedule impacts.

(DI-MGMT-81861) Program Management Report (IPMR)

3.1.3 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 are the Contractor's responsibility. The extended CWBS shall serve as the framework for contract planning, budgeting, 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 schedule data reported.

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

3.1.3.1 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.

3.1.3.2 Contractor Manpower Reporting Application (CMRA)

The Contractor shall report ALL contractor labor hours (including subcontractor labor hours) required for performance of services under this contract for the AMITS program via a secure data collection site. The Contractor is required to completely fill in all required data fields using the following web address: http://www.ecmra.mil/. Reporting inputs will be for labor executed during the period of performance during each Government Fiscal Year (FY) which runs October 1 through 30 September. While inputs may be reported any time during the FY, all data shall be reported no later than October 31 of each calendar year. Contractors can find User Guides, Frequently Asked Questions and may direct questions to the help desk at http://www.ecmra.mil/.

3.1.4 Configuration Management (CM).

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 consistency established through the CM process shall ensure that the system conforms to the requirements. The processes shall be identified and documented in sufficient detail to support the system life cycle. This shall ensure component interchangeability, accurate system information, and safety of system operation & maintenance. The Contractor shall define the performance, functional, and physical attributes in configuration documentation. As the configuration information becomes more detailed and definitive throughout the life cycle, The Contractor shall define configuration baselines. The Contractor shall archive the defined

attributes in the baseline in an integrated database. Both the system and its information shall be verified for consistency. The Contractor shall identify and evaluate the impact of all proposed changes through the configuration change management process, including the verification that the system and all associated component information have been updated and continue to be consistent.

3.1.4.1 Configuration Management Planning and Management

The Contractor shall establish processes and tools to initiate 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 Information Assurance (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 the Contractor's 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 systems 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.

3.1.4.2 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.

3.1.4.3 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 as to whether the change should be approved 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 affectivity 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.

3.1.4.4 Configuration Status Accounting.

The Contractor shall provide access to accurate, timely information about the system and its documentation through an Integrated Database Environment (IDE). 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.

3.1.4.5 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.

3.1.4.6 Contractor Internal Hardware Build-Up Physical Configuration Audit (PCA)

Concurrent with manufacture of piece parts and incoming inspection of procured parts, a 100% PCA shall be conducted by personnel approved by the Quality Assurance (QA) Manager to verify the as built configuration matches the design documentation prior to use of each part in 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 Digital Environment (IDE).

3.1.4.7 Government Sample PCA 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. This verification shall be accomplished by reviewing a representative number of drawings, associated technical manuals, logistics management information and manufacturing instructions. The review shall determine their accuracy in accordance with the final product configuration design.

3.1.4.8 Software Configuration Management.

The Contractor shall establish and document a software configuration management process. The Contractor's software configuration management plan may be incorporated into the software development process plans or may be a separate configuration management plan.

3.1.4.9 Software Configuration Control Board.

The Contractor shall establish and maintain a software configuration control board or equivalent responsible for configuration control of its software configuration items and related software products. The software configuration control board will be responsible for Commercial Off The Shelf (COTS) management including product and version identification. The Contractor shall obtain approval of the system Integrated Product Team (IPT) prior to committing to use any version of any COTS product. The Contractor shall ensure that all COTS products included in the system deliverable configuration are commercially supported.

3.1.4.10 Software Item Database.

The Contractor shall capture software design data in an integrated database and shall provide a shared data source for the exchange and reuse of technical information. The Contractor shall develop software item data to populate the software database. The Contractor shall provide the capability to establish, modify, make available, and maintain the integrity of the database. The Contractor shall maintain the system software item database until transition.

3.1.4.11 Software Configuration Management Database.

The Contractor shall establish and maintain a software configuration management database in accordance with the software development process plan. A schema shall be developed for identification of software items and their versions. The Contractor shall perform the following: identification and recording of change request, analysis and evaluation of the changes; approval or disapproval of the request, and implementation, verification, and release of the modified software item. The database shall contain an audit trail whereby each modification, the reason for the modification, and authorization of the modification can be traced.

3.1.4.12 System Engineering Interface.

The process shall allow 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 system 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 information architecture must permit capture of change information and notify affected team members.

3.1.4.13 Engineering Change Proposals (ECP) and Contract Change Proposals (CCP).

The Contractor shall document and the Integrated Product Team (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.

3.1.4.14 Engineering and Contract 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 or contract 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.

3.1.4.15 Deviations.

The Contractor shall document the rationale and the potential impact of any deviation. The Contractor shall obtain approval before deviating from any Government controlled baseline.

3.1.5 Technical Performance Measures (TPM).

The Contractor shall select technical performance parameters that reflect key indicators of program success. TPM parameter inter-relationships shall be depicted through construction of tiered dependency trees similar to the specification tree. Each parameter shall be correlated with a specific CWBS element. Parameters to be reported at each management review shall be selected from the total parameters tracked and shall be identified in the integrated master plan. As the design and development activity progresses, the achievement to data shall be tracked continually for each of the selected technical performance parameters. If the data falls outside the tolerance band a new profile or current estimate shall be developed immediately. The current estimate shall be determined from the "achievement to date" and the remaining time budgeted. An analysis shall be accomplished on the variation to determine the causes and to assess the impact on higher level parameters and on interface requirements.

3.1.6 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 schedule and performance constraints. The IA risk shall be addressed across the risk management process and can be addressed in multiple areas.

3.1.7 Management Reviews

3.1.7.1 Start of Work Meeting.

A start to work meeting shall be held at the Contractor's facility within **30** days after contract award. The start to work meeting shall be limited to the Contractor's key team members identified in the proposal, and will be a two-day session with emphasis on top level management of the program, agreement on metrics that will be used as management indicators during the program and partnering approach to implement.

3.1.7.2 Program Management Reviews.

The Contractor shall conduct formal program management reviews on an average of one every **four** months in accordance with the integrated master plan. The location of the reviews shall be mutually agreed upon. The program management review shall provide a program overview and a detailed discussion of pre-selected topics. Status and information at the review shall reflect currency since the previous review.

3.1.7.3 IA Control Review/DIACAP Implementation Plan Review (DIPR).

The Contractor shall support an IA Control Review / DIACAP Implementation Plan Review (DIPR) held at least 10 working days prior to the Critical Design Review (CDR). The IA Control Review/DIPR shall address at a minimum:

- Update on DIACAP Implementation Plan (DIP)
- Update Preliminary Data Flow and Accreditation Boundary Diagram
- Update on the hardware/software lists and procurement action
- Update on contractor IA training as applicable and the use of IA Scanning tools
- Update on design and system integration schedule

3.1.7.4 Technical Interchange Meetings (TIMs).

The Contractor shall conduct and participate in technical interchange meetings to be held at both contractor and Government facilities. The meetings shall be co-chaired by a Government and contractor representative. The Contractor shall be prepared to explain the reasoning, assumption, and methodologies in arriving at particular conclusions, recommendations, or alternatives in the accomplishment of the tasks required by the contract. The Contractor shall prepare drawings and other data, as required, to aid in the presentations. The Contractor shall have all the required personnel and resources present. The Contractor shall make available facilities for Government only meetings. These Government meeting facilities shall include direct internet access for

Government personnel laptops. The Contractor shall prepare the meeting agendas and document the meeting results. Except where noted herein, meetings shall be considered fulfilled when all of the following items are completed:

- A formal review meeting has been conducted.
- All action items requiring contractor response have been documented and posted.

3.1.8 Visitor Support

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

3.1.9 Integrated Digital Environment (IDE)

The Contractor shall establish, maintain and manage an interactive, online, protected, and access controlled IDE, such that the Government and contractor team members can contribute their ideas, comments and suggestions, exchange program information and collaborate in a distributed environment. The Contractor shall include software applications and data base services for the generation, integration, storage, indexing, distribution, simultaneous on-line sharing of digital data among all Government and contractor team members, and delivery of technical data products with associated contractors, subcontractors and Government organizations. The Contractor shall maximize the use and capabilities of existing open source software products as the Contractor defines the IDE components. Specifically, integrated automated databases are required which shall allow technical data sharing at the data base lever, rather than at the physical file level, with multiple formats of the same data from a common, configuration-controlled source available to different users. The IDE shall provide program personnel complete visibility into the system at every stage of development, regardless of data location. The Contractor shall ensure that everyone associated with this project has access to information they need to properly perform their duties.

3.1.9.1 The IDE Development and Installation.

The Contractor shall provide a IDE with the following capabilities:

a. Ability to capture information as it's created.
b. Ability to manage product and program management structures.
c. Real-time information sharing and work flow implementation.
d. Team access to the most current information.
e. Ability to assign rules regarding information access.
f. Common information architecture that is distributed geographically.
g. Electronic notification of changes to program and product information.

h. Ability to present a single interface to the entirety of the Contractor's and the Contractor's subcontractors' data creation activities.

i. Ability to recover from unexpected loss of program data due to environmental disasters, operator error, equipment failure, and hostile intruders.

j. Ability to provide access to program data using standards defined in section 2.3 of the Joint Technical Architecture-Army as defined in the DISR, or through an open systems approach.

3.1.9.2 IDE Administration.

The Contractor shall provide a World Wide Web based electronic data management system to facilitate the electronic data interchange of non-classified data. Except where noted specifically on the DD Form 1423, The Contractor shall provide this service for items on the data accession list, management data, and technical data generated and maintained in digital format. The Contractor shall provide the Government and contractor team members with the capabilities for on-line review, and comment of deliverable data. The Contractor shall include these comments, approvals and acceptances in the database as well as mechanisms to establish appropriate audit trails to identify the sources of these additions and to maintain configuration control. The Contractor shall develop and implement procedures for establishing and administering user accounts for the IDE.

3.1.9.3 IDE Data Management.

The Contractor shall establish, implement, and maintain a data management capability within the IDE for the integration, storage, access, management, delivery, and exchange of data furnished by the Government or generated by any contract work effort including subcontractors and vendors. The system shall be capable of maintaining a record and reporting the status of data accession and data deliveries for each unit delivered. The Contractor shall generate and maintain a master listing of all documents maintained in the training site libraries.

3.2 Systems Engineering.

The Contractor shall translate the basic operational needs, requirements, objectives, interfaces and other design constraints into preliminary verifiable functional requirements and objectives and conduct cost-benefit trades to support refinement of the preliminary functional requirements. The Contractor shall complete the simulations, technology demonstrations, prototypes, parts characterization, or other risk reduction steps that provide the basis for engineering and manufacturing development and verify that the concept, technology, design approach or other results can meet the system requirements. The Contractor shall complete the system design (balanced with respect to performance, cost, schedule, and risk) and verify that it meets the systems requirements. The Contractor shall baseline balanced life-cycle verification, manufacturing, support, deployment, training, operating, disposal data, plans and update based

on the results of both compliance verification under the contract and Government testing. As part of the system design and component selection process, IA shall be considered as a requirement for all systems used to enter, process, store, display, or transmit information.

3.2.1 System Design.

The Contractor shall use **PRF-PT-00606** 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.

3.2.2 Hardware Engineering.

The Contractor shall integrate and assemble the system hardware that satisfies the performance and IA requirements stated in **PRF-PT-00606**. 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.

3.2.2.1 System Definition Stage.

The Contractor shall establish the definition of the system with a focus on system products required to satisfy operational requirements. The Contractor shall complete the system, product, and subsystem interface requirements and verification definition, system and product requirements and verification definition, and preliminary subsystem requirement and verification definition; establish a system baseline; and complete technical reviews. The documentation generated during system definition shall be used to guide subsystem development. A systems definition review shall be completed at the completion of the systems definition stage for the purpose of determining whether the system definition is sufficiently mature to progress to subsystem definition. The system definition shall be reviewed to ensure that:

a. The design is sufficiently mature to meet systems engineering criteria.
b. System functional requirements and system non-functional requirements (e.g., performance, design goals (e.g., modular open system approach (MOSA)) are identified.
c. System-level risks have been adequately addressed to justify continued development.
d. Trade-study data are adequate to substantiate that system requirements are achievable.
e. Interface requirements between human and products or subsystems have been identified,

including performance, workloads, design constraints, and usability.

f. Selected Information Assurance products that are NIAP-validated or on the DoD Unified Capability (UC) Approved Products List (APL) (https://aplits.disa.mil/processAPList.do).
g. Decisions made in arriving at the system definition configuration are well supported by analysis, test, and other technical data.

3.2.2.2 Preliminary Design Stage.

The Contractor shall initiate subsystem design and create subsystem-level definition and design-to baselines to guide component development. The Contractor shall ensure that the design considerations include systems functional requirements, systems non-functional requirements (e.g., performance, design goals (e.g., modular open system approach (MOSA)), and Human System Interfaces). The Contractor shall ensure that functional design considerations integrate IA functional requirements and that these requirements are included throughout the development process. The Contractor shall decompose identified subsystem functions into lower-level functions and allocate functional and performance requirements to component-level functional and physical architectures. Each preliminary subsystem requirements and verification definition and preliminary design-to baseline shall be evolved into a subsystem requirement and verification definition and design-to baseline. Preliminary component requirements and verification definition and build-to baselines shall be defined for the components and the subsystem being developed. Final subsystem definition shall include identification of recommended components and interfaces; resolution of subsystem-level risks; assessment of component risks; and design for quality factors to include producibility, verifiability, usability, IA, supportability, trainability and disposability for each subsystem. Subsystem reviews shall be completed for each subsystem at the completion of its preliminary design stage. The results of the evaluation shall be documented. The purpose of each review is to assure that:

a. The subsystem definition is sufficiently mature to meet systems engineering criteria.
b. The subsystem functional requirements and non-functional requirements (e.g., performance, design goals (e.g., modular open system approach (MOSA)) are identified in the subsystem design and are traceable to the system functional and non-functional requirements.
c. Component allocations and preliminary component specifications are reasonable and provide a sound subsystem concept.
d. Software architecture is described using three views: 1) software module view; 2) software runtime view, and 3) software deployment view.
e. Subsystem risks have been assessed and mitigated to a level appropriate to continue development.
f. Trade-study data are adequate to substantiate that subsystem requirements are achievable.
g. Human system interfaces are identified and described in the subsystem design and are traceable to design requirements.

h. Decisions made in arriving at the subsystem configuration definition are well supported by analysis and technical data.
i. Security engineering processes (e.g., encrypt unclassified data for transmission to and from wireless device) are integrated into the design to achieve an integrated secure solution.

3.2.2.3 Detailed Design Stage.

The Contractor shall complete subsystem design down to the lowest component level, and create a component requirements and verification definition and build-to component baseline for each component. Final component definition shall include identification of recommended parts and interfaces; resolution of component-level risks and for each component, down to the lowest sub-component, the design for quality factors to include producibility, verifiability, usability, IA, supportability, trainability and disposability. Component reviews shall be completed for each component at the completion of the detailed design stage. The Contractor shall integrate security engineering processes into the design to achieve an integrated secure solution. The results of the evaluation shall be documented. The purpose of this review shall be to ensure that:

a. Each detailed component definition is sufficiently mature to meet measure of effectiveness and measure of performance criteria.
b. Component specifications are reasonable and provide a sound component concept.
c. Component and related life cycle process risks have been assessed and mitigated to a level appropriate to support the fabrication, assembly, integration and test phases.
d. Trade-study data are adequate to substantiate that detailed component requirements are achievable.
e. Software architecture is described using three views: 1) software module view; 2) software runtime view, and 3) software deployment view.
f. Human system interfaces are identified and described in the detailed design and are traceable to design requirements.
g. The detailed software design (to include COTS/GOTS product name and version number) is described in terms of the satisfaction of functional and non-functional systems requirements.
h. Decisions made in arriving at the detailed component definition configuration are well supported by analysis and technical data.
i. Security engineering processes are integrated into the design to achieve an integrated secure solution.

3.2.2.4 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. Functional configuration audits 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.

3.2.3 Software Engineering

The Contractor shall develop the system software and firmware and shall follow the Contractor's organizational software development practices that are compliant with at least Level 3 of the Software Engineering Institute's Capability Maturity Model for Software (CMM). The Contractor shall provide sufficient evidence that the producing software development organizations are compliant with CMM Level 3 or higher. The design process shall incorporate features that promote assessment of open source software products, 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 use of open source software, commercial software 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.

3.2.3.1 Software Requirements and Architecture Development and Review

The Contractor shall develop software requirements and architecture in accordance with the Contractor's software development process plan. All analysis and results shall be documented in an integrated database. 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 define and 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 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.

3.2.3.2 Software Design and Implementation.

The Contractor shall design software, develop executable code, perform unit testing, and integrate software components (with each other and with hardware components) to meet system requirements. Software design includes not only design to requirements, but selection of existing software products including open source software to meet system requirements, and iterating the requirements to allow use of existing products when indicated by cost as an independent variable (CAIV) or schedule as an independent variable (SAIV) trades. Products that perform information assurance functions are considered IA or IA-enabled IT products and shall be selected from the DoD Unified Capabilities (UC) Approved Product List (APL) and configured in accordance with DoD-approved security configuration guidelines. These include databases which must comply with the DISA database Security Technical Implementation Guide (STIG). The Contractor shall develop a Software Center Operation Manual (SCOM) to provide procedures for installing, operating, restart/recovery and for continuity of operations in the software support environment.

(DI-IPSC-81435A) Software Design Description (SDD)
(DI-IPSC-81441A) Software Product Specification (SPS)
(DI-IPSC-81442A) Software Version Description (SVD)
(DI-IPSC-81444A) Software Center Operation Manual (SCOM)

3.2.3.3 Software Development Test.

The Contractor shall establish and execute a software item qualification test program consisting of program or module and cycle or system levels of testing. For each software item, The Contractor shall determine if that item warrants a verification effort and the degree of organizational independence of that effort needed. If the item warrants an independent verification effort, a qualified organization responsible for conducting the verification shall be selected. The Contractor shall document the life cycle activities for each software item subject to verification, the required verification tasks for each life cycle activity, and related resources, responsibilities, and schedule. The Contractor shall establish test cases (in terms of inputs, expected results, and evaluation criteria) and establish traceability between the test case and the system requirements, detailed procedures for conducting the test, and test data for testing the software corresponding to each software item. The Contractor shall test the software corresponding to each software item. The testing shall be in accordance with the unit test cases and procedures. The Contractor shall analyze the results of item testing and shall record the test and analysis results. Prior to the start of final test, The Contractor shall upgrade the commercial off the shelf (COTS) products to the latest versions approved by the system software

configuration control board. The Contractor shall conduct a software item test readiness review prior to initiating the formal qualification test.

3.2.3.4 Software Integrity Certification.

The Contractor shall verify and certify that the system application software functions are designed in a properly secured operating system environment and is free of elements that might be detrimental to the secure operation of the resource operating system, as described in DODI 8500.2.

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. A system level production approval review shall be completed to demonstrate that the total system has been verified to satisfy specification and baseline requirements for each system level, and to confirm readiness for 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 function and IA testing and accreditation.
d. Test 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).

3.2.5 Information Assurance Hardware and Software Purchases.

The Contractor shall purchase all Commercial Off-the-shelf desktop, notebook, computers and video teleconferencing equipment, by using Computer Hardware, Enterprise Software and Solutions (CHESS) website (https://chess.army.mil) in compliance with Army Policy Notice 09-44A; The Contractor shall use CHESS as the Primary Source for Procuring Commercial Information Technology (IT) Hardware and Software. The Army has mandated the Universal Gold Master (UGM) as the Windows-based standard operating system. UGM license can be obtained from CHESS or Softmart (http://www.softmart.com). If UGM cannot be used, (The Contractor shall provide written explanation as to why UGM cannot be used.) an IA approved operating system shall be configured in accordance with the latest DISA Security Technical Implementation Guides (STIG), written for that operating system.

For hardware and software products not available through CHESS or Softmart, the The Contractor shall select the IA validated products from one of the links below.

1. Common Criteria Certified Products
   http://www.commoncriteriaportal.org/products.html
2. The Common Criteria Evaluation and Validation Scheme - NIAP Validated Product List
   http://www.niap-ccevs.org/cc-scheme/vpl/
3. Approved Products List Integrated Tracking System (APLITS) – CAC Card is required.
   https://aplits.disa.mil/processAPList.do

*There will be no wavier issued by the Government for unapproved IA products.

3.2.5.1 Information Assurance Artifacts

The Contractor shall produce all components of the DIACAP 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 regulation per the Mission Assurance Category and Confidentiality levels agreed upon for the system.

(DI-MISC-80711A) Scientific and Technical Reports (IA Scan Report)

3.2.5.2 Information Assurance Process and Controls.

The Contractor shall establish an IA process in accordance with the PEO STRI Basic Accreditation Manual (BAM). The Contractor shall develop and maintain a robust information assurance process to guide the system's design, document IA decisions, and identify and implement IA requirements. The Contractor shall assist the Government in the preparation of IA system documentation. The Contractor shall establish configuration management of the product baseline, implement operational system security control measures and support IA certification

testing. The Contractor shall identify and use IA approved solutions to include IA approved operating systems, IA approved network devices, and IA approved software.

The Contractor shall implement IA controls and take action to address inherent system vulnerabilities and weaknesses. The Contractor shall ensure that all Port Protocol Service (PPS) not required in the operation of the system have been disabled or shut down and implement "deny all, permit by exception" (DAPE) enforcement for all PPS not being used by the system. The Contractor shall plan and implement IA e.g. using Security Technical Implementation Guides (STIG), and Government approved IA scanning tools, as required for Standalone, MAC III CL of Sensitive, along with the corresponding IA Controls as identified in the Standalone DIP.

3.2.6 Specialty Engineering

3.2.6.1 Security Engineering

The Contractor shall ensure that system security engineering processes integrated, aligned to, and adequately documented in the SEMP, and are executed with sufficient rigor to ensure required IA Controls are implemented, which culminates in the lowest level of residual risk to system operation.

3.2.6.2 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 section 3 and section 4 of the 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.

3.2.6.3 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.

3.2.6.4 Testability Engineering.

The Contractor shall develop, implement, and maintain a system testability process satisfying all testability requirements which is traceable throughout the design process, is integrated with other system engineering requirements, and is disseminated to design personnel and subcontractors. The Contractor shall establish controls for ensuring that each subcontractor's testability practices are consistent with overall system requirements. The Contractor shall define the means for demonstrating and validating that the diagnostic capability meets specified requirements, using maintainability demonstrations, test program verification, and other demonstration methods. The Contractor shall ensure that as test and evaluation of the system progresses, problems presented by new failure modes, test voids, ambiguities, and test tolerance difficulties are recognized and defined, and solutions are traceable to diagnostic hardware and software, and technical publication procedures are updated. The Contractor shall define an approach for the analysis of acceptance test and evaluation results to determine how built in test hardware and software, automatic test equipment hardware and software, and maintenance documentation performed as a means for satisfying production testing, and meeting testability requirements. The Contractor shall establish a testability program that accomplishes the following:

a. Establishment of sufficient, achievable and affordable diagnostic concept and state-of-the-art testability built-in and off-line test performance requirements.
b. Integration of testability into equipment and systems during the design process in coordination with the maintainability design process.
c. Evaluation of the extent to which the design meets testability requirements.
d. Inclusion of testability in the program review process.

3.2.6.5 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)

3.2.6.6 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 tryout 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.

3.2.6.7 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 establish and maintain a 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.

3.2.6.8 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. Identify

and eliminate program risk associated with critical human factors that have a significant impact on readiness, life cycle cost, schedule, performance, or safety. 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. Verify through test and evaluation that trained personnel can safely and effectively operate, maintain and control the system in its intended operational environment.

3.2.6.9 Contaminate and Corrosion Control.

The Contractor shall incorporate the latest state-of-the-art corrosion control technology as determined by logistic support analysis into the system design process, into the manufacturing process, in all levels of maintenance, in supply, and in the storage processes. The objective is to minimize corrosion by using design and manufacturing practices that address selection of materials; coatings and surface treatments; production processes; process specifications; system geometry; material limitations; environmental extremes; storage and ready conditions; preservation and packaging requirements; and repairs, overhaul, and spare parts requirements. Design concepts shall reflect realistic environments and resource availability as determined by logistic support analysis.

3.2.6.10 Standardization.

The Contractor shall influence the system design to achieve maximum subsystem, component and repair parts commonality. The Contractor shall minimize equipment and parts proliferation through a standardization effort. The standardization effort shall include coordination with PEO STRI Life Cycle Contractor Support (LCCS) contractors to maximize use of parts already in the inventory or to determine that the existing logistics support resources will benefit from the items chosen for the system.

3.2.6.11 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.

3.2.6.12 Human System Integration (HSI)

The Contractor shall establish a plan for Human System Integration for any program that requires personnel (as operators, maintainers or supporters) to ensure a total system approach that will accommodate the cognitive, physical and sensory skills of the specified user population.

Systems utilizing personnel will implement a human centered design process outlined in a Human System Integration Plan (HSIP). The HSIP will describe how HSI will be applied to system development consistent with program specifications, requirements and user characteristics. The HSIP will describe the relative program elements and how the HSI effort will be managed, tested and verified.

3.2.7 Design Reviews

The Contractor shall conduct reviews, to include design reviews (system, subsystem, component, life cycle processes, test readiness, production approval) and audits (functional and physical configuration), for the purpose of assessing technical progress. The Contractor shall document the results of the review, including any resulting action items. Normally, a design review shall be conducted at the completion of each application of the system-engineering phase. Each review shall accomplish the following:

a. Assess the system requirements and allocations to ensure that requirements are unambiguous, consistent, complete, feasible, verifiable, and traceable to top-level system requirements.
b. Assess the design maturity based on technical development goals, IMS events and accomplishments, and empirical analysis and test data supporting progress to date.
c. Present the risks associated with a continued development effort.
d. Assess the life cycle processes and infrastructure necessary for product sustainment throughout the system life cycle.
e. Identify resources required for continued development;
f. Determine whether to proceed with the next application of the systems engineering process, to discontinue development, or to take corrective actions before proceeding with the development effort.

Component, subsystem, and system design reviews shall be conducted, for each level of development. Depending on the complexity of the system, lower-level reviews may be needed. Trade-off analysis and verification results should be available during design reviews in order to substantiate design decisions. Reviews may result in the need to iterate through the system engineering process to resolve identified deficiencies before progressing further into the development activity. Component, subsystem, and system functional- and design-configuration audits shall be performed to ensure that supporting documentation has been satisfactorily

completed, that qualification tests for each specification requirement have been completed and all requirements satisfied or products comply with final drawings.

At design reviews, The Contractor shall present the systems security design, initial security risk assessment, security test approach, security training approach, and any other security relevant information.

3.2.7.1 Preliminary Design Review (PDR)

The Preliminary Design Review (PDR) is a multi-disciplined product and process assessment to ensure that the system can proceed into detailed design, and can meet the stated performance requirements within cost (program budget), schedule (program schedule), risk, and other system constraints. This review will assess the system preliminary design as captured in performance specifications for each configuration item in the system (allocated baseline), and ensures that each function in the functional baseline has been allocated to one or more system configuration items. PDR determines whether the hardware, human and software preliminary designs are complete, and the IPT is prepared to start detailed design and test procedure development.

3.2.7.2 Critical Design Review

The Critical Design Review (CDR) is a multi-disciplined product and process assessment to ensure that the system can proceed into system fabrication, demonstration, and test, and can meet the stated performance requirements within cost (program budget), schedule (program schedule), risk, and other system constraints. This review will assesses the system final design as captured in product specifications for each configuration item in the system (product baseline), and ensures that each product in the product baseline has been captured in the detailed design documentation. Product specifications for hardware must enable the fabrication of configuration items, and shall include product definition data. Product specifications for software (e.g. Software Design Documents) must enable coding of a Computer Software Configuration Item (CSCI). Configuration items may consist of hardware and software elements.

The subsystem detailed designs shall be evaluated to determine whether they correctly and completely implement all system requirements allocated to the subsystem, and whether the traceability of final subsystem requirements to final system detail design is maintained. At this review the IPT shall also review the results of peer reviews on requirements and final detail design documentation. A successful review is predicated on the IPT's determination that the subsystem requirements, subsystem detail design, results of peer reviews, and plans for testing form a satisfactory basis for proceeding into system fabrication, demonstration and test.

3.2.8 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 Contractor shall develop initial fielding plans for the system and verify that the maintenance actions and support structure are aligned with the maintenance concept. Reference to company unique standards is not allowed. The Contractor shall obtain document numbers from the Government for the PDD elements.

(DI-SESS-81000E) Product Drawings/Models and Associated List
Technical Data Package Option Selection Worksheet
(DI-SDMP-81493A) Program Unique Specification Documents

3.2.9 System Technical Support.

The Contractor shall provide support for undefined mission support requirements that include training, logistics functions, hardware and software engineering functions, software licensing, support services, spare parts, travel, overtime, maintenance, supply, replacement of non-fair wear and tear parts, contractor activity and facility relocations, adding and deleting training devices, transportation of equipment, development, production, installation of software upgrades, re-host and modification kits as authorized by individual contract work directives. The Contractor shall document the description of each task, the man-hours spent, cost of materials and services and the results of each service(s).

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

3.3 Integrated Logistics Support (ILS) Program

The Contractor shall implement and maintain a comprehensive ILS program to provide technical support data, commercial documentation for COTS, spares, tools and test equipment, interim support items and technical documentation required to maintain and operate the training system. The logistics program shall enable a total maintenance and support capability for the training system. The ILS program's progress and status shall be reviewed and discussed at each scheduled IPT meeting and program review.

3.3.1 Maintenance Planning (MP)

The Contractor shall implement a MP program encompassing all aspects of logistics support including reliability, maintainability and safety to ensure that design features enhance cost effective logistics support over the life cycle of the trainers. The Contractor shall conduct MP to ensure that the trainer equipment and deliverable technical data/documentation supports the training system maintenance concept. The recommended support resources shall be sufficient to allow another contractor with comparable skills to assume operation and maintenance of the system and sustain the system availability requirement.

3.3.1.1 Maintenance Concept and Skills

The Contractor shall develop the trainer equipment and associated support products to support the trainer's maintenance concept. The Contractor shall develop trainer equipment and support products that support the following skill requirements:

a. Field maintenance shall be preventive and corrective on-site maintenance of the training system utilizing on-site spare parts, technical documentation, diagnostics tools (such as Built-In Test (BIT)), standard tools and test equipment for removal and replacement of LRUs. The trainer technical publications, repair parts, tools and test equipment shall support all trainer equipment at the Field maintenance level.
b. Sustainment maintenance shall be corrective maintenance performed on failed LRUs (such as circuit cards, power supplies, projectors, and computers) that have been functionally and physically removed from the trainer as part of Field maintenance. Sustainment maintenance task shall include analysis, troubleshooting, disassembly, repair or replacement, reassembly, adjustment, calibration and testing using general purpose electronic test equipment to correct malfunctions and to test and verify proper operation. The trainer technical publication, repair parts, tools and test equipment shall support all trainer equipment at the Sustainment maintenance level.

3.3.2 Total Ownership Costs (TOC)

TOC shall be controlled by minimizing Logistics Cost Drivers (LCDs). LCDs are defined as:

a. Any individual item whose unit purchase cost or spare price is greater than $25,000
b. Any individual item that has a projected removal/replacement rate greater than once per year

c. Any item that has a projected annual maintenance cost for the total quantity per training device of greater than $10,000
d. Any item that requires special or extraordinary handling, disposal, usage rate, or maintenance procedures
e. Any item that will be unsupportable and out of production by the OEM within 36 months after the Ready For Training (RFT) date.

3.3.3 Obsolescence Management.

3.3.3.1 Diminishing Manufacturing Sources & Material Shortages (DMSMS)

The Contractor shall establish an obsolescence management program. Obsolescence management includes an on-going review and identification of actual and potential obsolescence issues including, but not limited to, obsolescence of components, assemblies, sub-assemblies, piece parts and material through the systems life cycle. The obsolescence program shall consider both production and repair requirements. The Contractor shall be responsible for identification, resolution and implementation for all DMSMS/Obsolescence/Producibility issues associated with design, production, and delivery of hardware under this contract. The identification of DMSMS/Obsolescence/Producibility issues and the necessary correction thereof shall not be cause under this contract for any price increase or revision in the delivery schedule. The Contractor is encouraged to use the DoD DMSMS Center of Excellence Shared Data Warehouse for the purpose of exchanging obsolescence information across the DoD enterprise. The obsolescence program shall address the following items and be an agenda item at each scheduled requirements, design, and progress review (listing of all actual and potentially obsolete piece parts, noting both the configuration part number and associated vendor part number):

a. Management of loss or impending loss of manufacturers or suppliers of parts and/or material required
b. Approach for providing the Government with information regarding obsolescence and DMSMS issues
c. Access and insight into the Contractor's DMSMS forecasting tool
d. Planned resolution of current obsolescence and DMSMS issues
e. Parts list screening and parts list monitoring
f. Processing Government Industry Data Exchange Program (GIDEP) DMSMS alerts
g. Processing Defense Logistics Agency (DLA) DMSMS alerts
h. Approach for establishing obsolescence and DMSMS solutions and plan for conducting DMSMS predictions
i. Mitigation plans for all known and forecasted DMSMS issues

3.3.3.2 DMSMS Predictive Tool.

The Contractor shall load into a DMSMS Predictive Tool, the indentured Bill of Materials (BOMs) for all systems/equipment prior to the Preliminary Design Review (PDR), Critical

Design Review (CDR), and Spares Selection Review. The Contractor shall document the Source Data For Forecasting DMSMS (i.e. the indentured BOM). The Contractor shall provide a Systems' Predictive Health Analysis of the systems, identifying the components with a predicted life expectancy (limited supportability) at each design and program review.

3.3.4 Supportability Analysis and Logistics Product Data.

The Contractor shall conduct repair level analysis, develop diagnostic, preventative maintenance and repair procedures, conduct facilities analyses, refine hardware and software maintenance and support concepts and identify support resource requirements including initial spares and repair parts list, common and bulk item list, tools and test equipment list and spare parts list. The Contractor shall identify any/all post production support issues that may pose Life Cycle support risks. The Contractor shall develop operator and maintenance procedures, component failure data and forecast out-year maintenance support requirements and cost. The Contractor shall include the following in the analysis:

a. Maintenance planning used to develop initial fielding plans and support structures,
b. Repair analysis shall include identification of repairable item and level of maintenance, cost, operational readiness, allocation and placement of spares, support equipment and personnel,
c. Support and test equipment shall include Test Measurement Diagnostic Equipment (TMDE) calibration procedures and technical parameters for any piece of support equipment needed to support the system,
d. Supply support shall include maintenance coding, overhaul rates, roll-up quantities, long lead items, bulk items, tools and test equipment,
e. Manpower, personnel and training shall include corrective and preventive maintenance tasks, operations tasks and manpower estimates for each task by maintenance level, skill required to perform the tasks and training in order for tasks to be performed,
f. Facilities shall identify requirement to maintain, operate, train and test,
g. Package, handling, storage and transportation shall identify shipping requirements as they pertain to the item(s) on contract,
h. Post production support shall analyze life cycle support requirements for (LCCS) on system/equipment/software to identify problems due to inadequate sources of supply, support capability, and modification after shutdown of the production lines.

(DI-SESS-81759) Logistics Product Data Summaries
(DI-SESS-81758A) Logistics Product Data

3.3.5 Initial Spares List (ISL) and Repair Parts.

The Contractor shall recommend the range and quantity of spare and repair parts required to support the training device for twelve (12) months. The ISL shall consist of spare, repair parts, tools and test equipment, and common bulk items (consumables) that are purchased,

manufactured and delivered concurrenently with like items of the training device and shall include the lowest replaceable units (i.e. circuit cards, power supplies and electronic assemblies). The ISL requirements will be recommended and selected from the LPD. Recommendations shall include consideration of the system maintenance concept, essentiality of the component, price, lead times and failure factors

3.3.5.1 Tools and Test Equipment (TTE).

The Contractor shall identify all TTE required for the repair and use of the system. TTE shall include all common tools and test equipment required to inspect, test, calibrate, service, repair, or overhaul the system or its constituent components.

3.3.5.2 Common / Bulk Items (Consumables).

The Contractor shall identify and develop a Common and Bulk Items List (CBL) for all items required to operate and support the system for which there is a recurring demand. This includes, but is not limited to gels, fluids, filters, ink cartridges, batteries and other consumable/disposable items.

3.3.6 Technical Publications.

The Contractor shall revise existing Government documents to describe each operation and maintenance task in detail and in logical, systematic steps. The operations and maintenance instructions shall accurately provide all the information needed to keep the equipment operational. The Technical Publications shall provide system and subsystem oriented instructions for installation, operation, maintenance and testing. All tools, test equipment, and consumable items required to accomplish any operation, maintenance or installation shall be identified in advance and be available for the task. All publications shall reflect the configuration of the fielded training device as documented in the product baseline. The Contractor shall identify and document maintenance tasks for the two (2) level maintenance concept. 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.

3.3.6.1 Operator User Manual.

The Contractor shall revise existing Government documents to describe operational tasks and specific operator level preventive maintenance checks, inspection, lubrication, adjustment and operator level repair and replacement tasks. The Contractor shall identify all required spare parts, consumables, tools and test/support equipment associated with the operator tasks. The Contractor shall prepare the Operator's User Manual IAW the CDRL.

DI-ADMN-80925 Revision to Existing Government Documents

Operator User Manual

3.3.6.2 System Maintenance Manual (SMM).

The Contractor shall revise existing Government documents to describe maintenance tasks that provide detailed installation/removal procedures, fault isolation, Line Replaceable Unit (LRU) procedures, firmware update procedures, preventive/scheduled maintenance and unscheduled/corrective maintenance procedures, calibration, and proper use of test equipment for the training system. The manual shall contain two (2) separate chapters for Field and Sustainment maintenance tasks respectively. The manual shall describe system initialization processes for each system/subsystem to include all configuration setup options, settings, and system requirements necessary to establish the system/subsystem to the documented product baseline. The Contractor shall identify all required spare parts, consumables, tools and test/support equipment associated with the maintenance tasks.

DI-ADMN-80925 Revision to Existing Government Documents
System Maintenance Manual

3.3.6.3 Commercial Off-the-Shelf (COTS) Manuals.

The Contractor shall revise existing Government documents to deliver Commercial Off-the-Shelf (COTS) technical publications for all commercial equipment delivered with the training system. The COTS manuals shall be sufficient to support the operation, service and maintenance of all COTS components per MIL-PRF-32216. The Contractor shall review the COTS documentation and identify deficiencies or deviations in the manuals. If the COTS document is not sufficient to support the operation and maintenance and the Contractor is unable to retrieve the required data from the vendor, the Contractor shall develop supplementary data for inclusion in the main text of the Technical Manual ensuring that all required data for the COTS item is presented.

DI-ADMN-80925 Revision to Existing Government Documents
Commercial-Off-The-Shelf (COTS) Manuals

3.3.6.4 Technical Manual (TM) Verification & Validation (V&V)

The Contractor shall verify all publications for operation and maintenance to ensure they meet the requirements of the system. Verification shall be accomplished on all technical publications, changes, supplemental data and revisions thereto. The Contractor shall verify all technical data and publications prepared by subcontractors and vendors. The Contractor shall provide the Government opportunity to observe all contractors' verification efforts. The Contractor shall provide the Government with the dispositions/resolutions to document TM verification discrepancies and findings. A conractor generated Verification Incorporation Certificate shall be provided to assure that the Contractor has resolved and incorporated into the final TM, corrections resulting from discrepancies/findings noted during the verification. TMs shall be

validated by the Government prior to system testing. The Contractor shall support the Government during the TM validation to ensure that the content is adequate and sufficient to support operation and maintenance and that the information provided is comprehensible, accurate, usable and complete. The Contractor shall provide all facilities, equipment, spares, tools, and technical assistance to support the V&V effort. A production model of the training system shall be available for all V&V efforts. A technical publication shall not be ready for validation 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 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 maintenance and support concept
f. Hardware of the proper configuration is available for the validation effort
g. All safety hazards identified in the safety assessment report are resolved and identified within the text as Warnings, Caution and Note statements necessary to protect the equipment and personnel
h. All hazardous materials are identified

DI-TMSS-81820 - Technical Manual Verification Discrepancy/Disposition Record
DI-TMSS-81821 - Technical Manual Verification Incorporation Certificate

3.3.7 Logistics Reviews and Verifications.

3.3.7.1 Spares Selection Review

The Contractor shall hold a Spares Selection Review (SSR) 15 days after CDR. The purpose of the SSR is for the Government to select the spares, which include repair parts, TTE and CBL items, from the LPD, that the Government desires to purchase and have delivered to the device site(s). During the SSR, the Government will review the Contractor's LPD and determine the range and depth for the recommended spares. All elements shall be reviewed for reliability and criticality to mission and probable replacement lead-time to determine recommended quantities. The Contractor shall demonstrate the approach to developing and populating the data elements of the LPD. This demonstration shall include representation of the top-down breakdown structure of all training system components reduced to the line replaceable unit (LRU). The Contractor shall provide technical representatives to support this effort. In addition, draft engineering drawings shall be made available to the maximum extent practicable to support the selections. After conduct of the Spares Selection Review, the Government will authorize the purchase of initial spare parts, repair parts, TTE, and CBL as required to support the training system.

3.3.7.2 Technical Publications In Process Reviews (IPR).

3.3.7.3 80% Technical Publications IPR

The 80% TP IPR shall be conducted when the publications are at the 80% completion level. This IPR shall address, in detail, the completeness, and accuracy of the technical content of the TPs, COTS documentation, and the inclusion of Notes, Cautions, and Warnings. Training courses shall also be addressed as part of this IPR.

3.3.7.4 80% IPR Entry Criteria

Entry criteria for the 80% IPR shall consist of:

a. Tentative date for 80 percent TD IPR is listed in the IMS
b. Agenda approved by Government
c. Draft copies distributed IAW CDRL requirements
d. 40% Technical Publications IPR action items resolved
e. New engineering drawings available for review
f. Maintenance significant drawing list is available for review
g. Electronic data submission (i.e., style and format, layout, viewing, hyperlinks, etc) available for review
h. Subsystems identified to LRU level of assembly
i. OUM & SMM text in advanced development (Description, Installation, Operation, Theory of Operation, Maintenance tasks)
j. COTS manuals listing available for review
k. Acquired COTS manuals available for review
l. Maintenance tasks identified by work areas and maintenance intervals established, text development begun
m. Text supporting training system software in development (IOS functionality, malfunctions etc)
n. Screen capture and operating procedures development has begun
o. Finalized breakout and description of trainer hardware by category (GFE, CAOE, TPE, Commercial Items, or NDI) for review and concurrence
p. Satisfactory discussion of CDRL items included as a part of TD IPR entry criteria
q. Finalized list of major subsystems and reference designators assigned to include any changes to the existing reference designation system
r. Review of training documents to include operating procedures, screen captures and text content to be included as part of training course

3.3.7.5 80% IPR Exit Criteria

Exit criteria for the 80% IPR shall consist of:

a. Draft minutes approved by attendees

b. Action items assigned with suspense dates, as required
c. Comments and discrepancies identified during TD IPR documented
d. Contractor's plan for TD Quality Assurance/Validation has been discussed and is acceptable
e. Maintenance significant drawing list is acceptable
f. COTS manuals' listing is acceptable
g. Available COTS manuals are acceptable according to criteria in CDRL or identified as requiring supplementation
h. Screen captures reviewed reflect the current software load and are clear and reproducible
i. Updates to trainer hardware by category (GFE, CAOE, TPE, Commercial items, or NDI) provided
j. Satisfactory discussion of CDRL items included as a part of 80% TD IPR entry criteria

3.3.8 Item Unique Identification (IUID)

The Contractor shall implement an Item Unique Identification of tangible items program to meet the marking specification/PRF PT-00606 and MIL-STD-130N. These requirements apply to developed and commercial items. The Contractor shall coordinate with the Government IPT to determine items requiring unique identification. The Contractor shall submit the data to the UID central registry. UID marking design for each item shall be both machine readable and human readable.

DI-MGMT-81804A – Item Unique Identification (IUID) Marking Activity, Validation & Verification Report

3.3.9 Training Program.

The training program shall consist of two (2) training courses. The Contractor shall revise existing Government documents to develop training documentation for use during training and for follow-on training. The Contractor shall present the training for the Instructor Operator course and Maintenance course.

3.3.9.1 Training Materials.

The Contractor shall follow the guidance in TRADOC REGULATION 350-70 Army Learning Policy and Systems and MIL-PRF-29612B to properly analyze, design, develop, implement, and evaluate training and training products. The training courses and data products/materials shall support both instructor/operator and maintainer personnel courses of instruction. The Contractor shall develop and conduct both courses of instruction using a 25% classroom and 75% hands-on practical exercise ratio. The Contractor shall develop a complete training package for both courses that includes the syllabus, list of exercises conducted during the course, and a dialog of the course. The training packages shall be designed as a leave-behind training package to each

site. The Instructor Operator and the Maintenance training package shall be bound so that the course is easily accessible for hard copy reference and reproduction. The Contractor shall load all training materials onto each IOS.

3.3.9.2 Instructor Operator Training.

The Contractor shall conduct a 5-day (40 hours) I/O Training Course at each delivery location. The training shall provide the necessary skills for device instructors to operate the trainer and conduct user level maintenance. The Instructor/Operator Training Courses shall be designed to support ten (10) students with training material and hands-on practical exercises. In addition, the classroom instruction shall include capacity for an additional six (6) students auditing the course that will receive training material, but not hands on instruction. The Instructor/Operator Training Course shall be conducted by the Contractor at the trainer site on the first Monday following training device installation and acceptance on site, or as mutually agreed upon.

DI-ADMN-80925 Revision to Existing Government Documents
Instructor Operator Training Course

3.3.9.3 Maintenance Training.

The Contractor shall conduct a 1-day (8 hour) Maintenance Training Course at the Government's designated maintenance facility or at a mutually agreed location. The Maintenance Training Course shall consist of classroom presentations and hands-on exercises, utilizing the delivered Technical Data (TD) to familiarize maintenance technicians with the diagnostics, maintenance, software support/reload, and repair of the training device. The Contractor shall provide the course to a maximum of ten (10) maintenance personnel. Specifically, the Maintenance Training Course shall provide training to include instructions in maintenance, troubleshooting, alignment, and diagnostics of sufficient depth to ensure all students have the knowledge in the training device maintenance to keep the equipment up and operational. The Contractor shall ensure that the course instructor(s) are members of the design, development, and production team fully knowledgeable in the technical aspects and who will be able to explain the equipment concepts to the trainees. The Contractor shall conduct the course immediately following the instructor operator training or as mutually agreed.

DI-ADMN-80925 Revision to Existing Government Documents
Maintenance Training Course

3.3.10 Software Support Environment (SSE).

The Contractor shall provide the hardware, software, and documentation resources for performing Post Deployment Software Support (PDSS) activities including identifying, documenting, and correcting system software faults, implementing system upgrades, generating application programs, managing databases, and providing configuration management of the training system(s) software baseline. The Contractor shall provide disaster recovery procedures with any and all resources necessary to recover the SSE.

3.3.11 Site Activation/Installation Support.

3.3.11.1 Installation.

The Contractor shall deliver, off-load, assemble and install each training system device and support equipment in the designated facilities. The Contractor shall provide all support equipment, tools, special handling equipment, data and qualified technicians required to support the installation efforts. The Contractor shall be responsible for any damage to the equipment during transportation, off-loading, installation and test.

3.3.11.2 Disposal.

The Contractor shall ensure proper disposal, IAW local, state and federal regulations, of packaging and equipment that are in excess as a result of the installation, as coordinated with the Government.

3.3.11.3 Facility Repairs.

The Contractor shall repair/replace any aesthetic or structurally damaged floors, walls, doors, etc., that are damaged as a result of the installation of the system at each site. The Contractor shall utilize protective means to safeguard against facility damage.

3.3.11.4 Packing, Handling, Storage, and Transportation (PHST).

The Contractor shall package the training device for shipment to the designated site. Packaging shall be designed to avoid loss due to the elements, pilferage, and hazards of handling and storage. Packaging shall be strong enough to minimize breakage and leakage. Fragile items or items requiring special handling shall be boldly marked as such. Transportation shall be by commercial means and shall be the responsibility of the Contractor. Marking for shipment of the training devices shall be IAW the contract terms. The Contractor shall insure the device during shipment. The Contractor shall prepare and document packaging data IAW the contract terms.

3.4 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. The Contractor shall integrate all IA testing, to include a Vulnerability/Susceptibility Assessment if applicable, into routine test objectives and test plans flowing from the Test and Evaluation Master Plan. System T&E refers to the test and evaluation activities which use the development 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 also includes all efforts associated with the design and production of models, specimens, 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. The Contractor shall develop step-by-step testing operations to be performed on items undergoing developmental testing. 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 insure that a decision on the systems capability to meet the objectives identified in the systems specification is made with a minimum amount of uncertainty.

(DI-NDTI-80603A) Test Procedure
(DI-NDTI-80809B) Test/Inspection Report

3.4.1 Test Readiness Review (TRR).

Readiness to convene a TRR is predicated on the Program/ IPT's determination that preliminary testing, functional testing, and pre-qualification testing results form a satisfactory basis for proceeding with a TRR and initiation of formal system level testing. The TRR shall assess test objectives, test methods and procedures, scope of tests, and determines if required test resources have been properly identified and coordinated to support planned tests. The TRR shall also verifies the traceability of planned tests to program requirements.. The Contractor shall address the following key issues at the system engineering TRR prior to the start of formal testing to ensure that the system and all test resources are ready to begin testing:

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 and facilities and procedure manuals required to accomplish planned test and evaluation, are available and satisfy the test requirements.
d. Data acquisition and reduction provisions are in place.

The following documentation shall 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 development specification have been traced to qualification tests or tests on which the qualification tests rely.
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. Requirements changes pending.
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.
j. Plans for collection, reduction and analysis of the test data.
k. Calibration plan and status .
l. Problem areas and their resolution.

3.4.2 Developmental Test.

The Contractor shall conduct an engineering development test to provide data on performance, safety, achievement of critical technical parameters, refinement and ruggedization of hardware configurations, and determination of technical risk. The test shall provide data to verify that the design solution meets the system technical requirements and the system is prepared for successful operational test and evaluation. The Contractor shall ensure that systems and test equipment are operational and properly calibrated and tuned prior to start of test. The Contractor shall analyze the results of each test and shall record the test and analysis results.

3.4.3 Information Assurance Scan(s).

During system development the Contractor shall periodically scan the system using the latest DoD approved scanning tools. The Contractor shall maintain Information Assurance Vulnerability Alert (IAVA) compliance of the system baseline(s), and provide software patch updates to the Government as required throughout the life of the delivery order.

3.4.4 Certification Test and Evaluation (CT&E)

The Contractor shall support a CT&E Readiness Review held no more than 7-14 working days prior to the CT&E Event. The CT&E Readiness Review and Scan Report shall address at a minimum:

- Final IA Scans Report of the system
- Corrective actions taken and written analysis of any open deficiencies
- Update of IA system documents
- Finalization of travel arrangement in support of the CT&E event

(DI-MISC-80711A – Scientific and Technical Reports, IA Scan Reports).

3.4.5 Certification, Test and Evaluation (CT&E) Event.

The Contractor shall support the CT&E event. The CT&E event is conducted by the IA independent certifier to assess the overall security posture of the system prior to Government Acceptance Test (GAT). The status of the results for all assigned IA controls and security requirements are complied and discussed with the Contractor. The Contractor shall provide support to address the findings from the CT&E events to the Government's satisfaction after the Scorecard is tabulated, and assist the Government in the preparation of the Plan of Action and Milestone (POA&M).

3.4.6 Operational Test Support.

The Contractor shall support operational test and ensure that any unique facilities, equipment, and instrumentation required will be available at the test sites and that sufficient test articles (including support items) are available. Technical support shall include troubleshooting, repair and replacement of failed systems and subsystems, LRUs, or components, and preventive maintenance. The Contractor shall analyze all failures that occur during all operational tests.

3.4.7 Test Discrepancies.

The Contractor shall document all test discrepancies for Contractor conducted tests and track the failure analysis and corrective action for each test discrepancie until correction and regression tests are successfully completed. The Contractor shall establish a suspense system to ensure timeliness of analysis and corrective action of each test discrepancy. 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.

3.4.7.1 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.

3.4.7.2 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

APPENDIX A - Design Review (Entry and Exit Criteria)

A1. Systems Requirements Review (SRR) Entry Criteria

a. A preliminary agenda has been coordinated (nominally) 15 days prior to the SRR.
b. SRR technical products listed below for both hardware and software system elements have been made available to the cognizant SRR participants prior to the review:
    1) System Performance specification,
    2) System software functionality description,
    3) System/Subsystem Design Specification (SSDD),
    4) Preferred system solution definition,
    5) Updated risk assessment,
    6) Compare and update both Government SEP and Contractor SEMP,
    7) Updated schedule data,
    8) Preliminary logistics documentation summary,
    9) Preliminary ICS planning,
    10) Human Systems Integration (HSI) related documentation
    11) Software Development Plan (SDP) is complete.

B1. SRR Completion/Exit Criteria

a. The SRR is considered complete when all draft Request for Action (RFAs) are signed off, and an acceptable level of program risk is ascertained.
b. Exit Criteria shall include:
    1) The system requirements, as presented can satisfy the Stryker Phase IV PRF-PT-00606.
    2) The system requirements are sufficiently detailed and understood to enable system functional definition and functional decomposition, test and evaluation.
    3) The requirements can be met given the technology maturation is achieved.
    4) There system performance specification is approved.
    5) Adequate processes and metrics are in place for the program to succeed.
    6) HSI and sustainment requirements have been reviewed and included in the overall system design.
    7) The program risks are known and manageable for development.
    8) The program is properly staffed.
    9) The program is executable within the existing budget.
    10) The software functionality in the system specification is consistent with the software sizing estimates and the resource-loaded schedule.
    11) All system elements are sufficiently matured to enable low risk entry into engineering and manufacturing development.

12) The critical sustainment enablers are sufficiently matured to implement the support strategy and achieve the needed materiel availability.
13) The preliminary software development estimates are established with effort, schedule analysis.
14) Programming languages and architectures, security requirements and operational and support concepts have been identified.
15) Hazards have been reviewed and mitigating courses of action have been allocated within the overall system design.
16) The Information Assurance requirements have been documented.

C1. PDR Entry Criteria

a. A System Requirements Review (SRR) has been successfully completed, and all SRR Request for Action (RFAs) have been responded to.
b. A DIACAP Implementation Plan Review (DIPR) has been successfully completed.
c. A preliminary agenda has been coordinated (nominally) 15 days prior to the PDR.
d. PDR technical products for each system hardware and software configuration item have been made available to the cognizant PDR participants prior to the review:
    1) Refined System Performance Specification and Environmental Constraints
    2) System Functional Specification and Verification Plan
    3) Preliminary subsystem design specifications for each configuration item (H/W and S/W), with supporting tradeoff analyses and data, as required. The preliminary software design specification must include a completed definition of the software architecture, and a preliminary database design description is applicable
    4) Updated risk assessment
    5) Updated Systems Engineering Plan (SEP) or Systems Engineering Management Plan (SEMP).
    6) Updated logistics documentation (Acquisition Logistics Support Plan, Logistics Requirements and Funding Summary, Preliminary Maintenance Plan, etc.)
    7) Updated Human Systems Integration (HSI) related documentation
    8) Selection of Software CM tools
    9) Identify Developmental and Non-developmental Software and Databases
    10) Prepare the Preliminary Data Flow and Accreditation Boundary Diagram
    11) Prepare a Network Topology Diagram

D1. PDR Completion/Exit Criteria

a. The PDR is considered complete when all draft RFAs are signed off, and an acceptable level of program risk is ascertained.
b. Typical Exit Criteria shall include:

1) Technical effort and design indicate operational evaluation success (operationally suitable and effective).
2) The preliminary design, as disclosed, satisfies the Capabilities Development Document and/or Training Systems Requirements Document.
3) The system allocated baseline has been established and documented to enable detailed design to proceed with proper configuration management.
4) Relevant supportability requirements have been addressed.
5) Adequate processes and metrics are in place for the program to succeed.
6) Human Systems Integration design factors have been reviewed and included, where needed, in the overall system design.
7) Relevant Information Assurance requirements have been addressed.
8) The program risks are known and manageable for testing.
9) The program schedule is executable (technical/cost risks).
10) The computer system and software architecture design have been established, and have all Computer Software Configuration Items (CSCIs), Computer Software Components (CSCs), and Computer Software Units (CSUs) been defined.
11) Software Requirements Specifications and Interface Requirement Specifications, including verification plans, are complete and baselined for all CSCs and do they satisfy the system/subsystem functional requirements.
12) Software trade studies addressing Commercial-off-the-shelf, reuse, and other software-related issues have been completed.
13) IA considerations have been addressed (system hardware and software).

E1. CDR Entry Criteria

a. A Preliminary Design Review (PDR) has been successfully completed, and all PDR RFAs have been responded to.
b. All PDR exit criteria key issues have been satisfied, if applicable.
c. A preliminary agenda has been coordinated (nominally) 15 days prior to the CDR.
d. CDR technical products (hardware and software elements of the product baseline to be reviewed and approved at the CDR) have been made available to the cognizant CDR participants prior to the review:
    1) Updates to the system performance specification and functional performance specification,
    2) Product specifications for each hardware and software configuration item, along with supporting trade-off analyses and data, such as manufacturer, type, model number, and version,
    3) Current risk assessment,
    4) Systems Engineering Plan (SEP) or Systems Engineering Management Plan (SEMP) changes (if any),
    5) Updated Human Systems Integration document,

6) Updated logistics documentation,
7) Updated Human Systems Integration (HSI) related documentation,
8) The Software Design Document(s) (SDD) is complete and ready to be placed under configuration management,
9) The Software Interface Design Document(s) (IDD) is complete and ready to be placed under configuration management,
10) The preliminary Test Procedures for Software Integration and Systems testing are available for review,
11) The training to use IA Scanning tools is completed,
12) Port, Protocols, and Services (PPS) are identified.

F1. CDR Completion/Exit Criteria

a. The CDR is considered complete when all draft RFAs are signed off, and an acceptable level of program risk is ascertained.
b. Exit Criteria include:
1) The status of the technical effort and design indicate operational success (operationally suitable and effective).
2) The detailed design (hardware and software), as disclosed, satisfy the CDD or TSRD, and CPD.
3) The system product baseline has been established and documented to enable hardware fabrication and software coding to proceed with proper configuration management.
4) The detailed design satisfies the Human Systems Engineering requirements.
5) Adequate processes and metrics are in place for the program to succeed.
6) The risks are known and manageable.
7) The program schedule is executable (technical/cost risks).
8) The program is properly staffed.
9) The program is executable with the existing budget and the approved product baseline.
10) The detailed design is producible within the production budget.
11) The updated CARD is consistent with the approved product baseline.
12) The Critical Safety Items and Critical Application Items are identified.
13) The software functionality in the approved product baseline is consistent with the updated software metrics and resource-loaded schedule.
14) IA considerations are addressed (system hardware and software).

G1. TRR Entry Criteria

a. Configuration of system under test has been defined and agreed to. All interfaces have been placed under configuration management or have been defined in accordance with an agreed to plan.
b. All applicable functional, unit level, subsystem, system, and qualification testing has been conducted successfully.
c. All TRR specific materials such as test plans, test cases, and procedures have been available to all participants prior to conducting the review (minimum of 7 working days).
d. All known system discrepancies have been identified and resolved in accordance with an agreed to plan.
e. All previous design review exit criteria and key issues have been satisfied in accordance with an agreed to plan.
f. All required test resources (people, facilities, test articles, test instrumentation) have been identified and are available to support required tests.
g. Roles and responsibilities of all test participants are defined and agreed to.
h. IA CT&E completed with an approved IA baseline agreed to.

H1. TRR Exit Criteria

a. The TRR is considered complete when:
    1) All draft RFA forms have been addressed, assessed, and agreed upon, and
    2) An acceptable level of program risk is ascertained.
b. The proper Government disciplines are represented at the review. If applicable were all of the required independent evaluators involved and do they concur with the planned tests, expected results.
c. Exit Criteria include:
    1) Test plans completed and approved for the system under test.
    2) Identification and coordination of required test resources.
    3) The Subject Matter Expert's (SMEs) have gone through an agreed upon subset of the Test Procedures to ensure satisfactory system performance.
    4) Risk level has been identified and accepted by the program leadership.