

**SYSTEM REQUIREMENTS DOCUMENT (SRD)
FOR THE U.S. ARMY COMMON DRIVER TRAINER (CDT) SYSTEM
TACTICAL WHEELED VARIANT (TWV)**



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1. SCOPE

This Statement of Work (SOW) defines the effort required for managing, developing, integrating, testing, documenting, and delivering Common Driver Trainer (CDT) Tactical Wheeled Variant (TWV) systems based on existing Government Furnished Equipment (GFE) products that will be obtained from another vendor. The Government will provide the latest software baseline “As Is”.

The base year efforts are listed below:

- a. The contractor shall inventory and retrieve from the incumbent vendor (including shipping and handling) all existing GFE systems and related equipment within 30 days of contract award and store them in the contractor’s facility.
- b. Using the System Requirements Document (SRD) and Annex D referenced in Section 2.2 of this document, the Contractor shall complete development of hardware and software for 1 Pod of CDT/TWV Systems for delivery to Ft. Leonard Wood, MO. This Pod shall consist of one (1) Instructor Operator Station (IOS), four (4) After Action Review/Assistant Driver Stations and four (4) Student Training Stations (STS) with TWV vehicle specific kits. The TWV vehicle kits shall consist of four (4) M1083A1, four (4) M1120A4, four (4) M915A3, and four (4) M915A5 variant specific kits.

The vehicle kits provide cab and interchangeable dashboards for the following variants and trailers:

- i. M1083A1, 5-Ton Truck with M1095 Light Tactical Vehicle Trailer (LTVT)
 - ii. M915 A3 Line Haul Truck with M872A4 Flatbed Trailer
 - iii. M915 A5 Line Haul Truck with M872A4 Flatbed Trailer
 - iv. M1120A4 Truck with M1077A1 Palletized Load System (PLS) Flatrack and M1076 Palletized Load System Trailer (PLST)
- c. The contractor shall complete development and integration of the Fort Leonard Wood Driving database provided as GFI.
 - d. The contractor shall complete development and integration of the Joint Capabilities Release Logistics (JCR-Log) hardware and software provided as part of the IOS GFE.
 - e. The contractor shall complete development and integration of the Scenario Generation System (SGS) application provided as part of the IOS GFE
 - f. The contractor shall complete development and integration of the Common Data Server (CDS) hardware and software provided as GFE.
 - g. The contractor shall provide a Software Support Environment (SSE) hardware and software to the Government at Test Readiness Review (TRR).
 - h. The contractor shall define and deliver a comprehensive spares package to support the base year deliveries.
 - i. The contractor shall deliver, install, and test the above systems in Fort Leonard Wood, MO.

- j. The contractor shall deliver NET and Instructor Operator Training as defined in the respective sections of this document.

Optional follow-on effort provides delivery of 2.5 CDT /TWV Pods (as described above) comprising:

- a. Three (3) Instructor Operator Station (IOS),
- b. Ten (10) After Action Review/Assistant Driver Stations
- c. Ten (10) Student Training Stations (STS) with TWV vehicle specific kits.
- d. The TWV vehicle kits shall comprise six (6) M1083A1, ten (10) M1120A4, six (6) M915A3, and six (6) M915A5 variant specific kits.

The CDT TWV will assist in the training of tactical vehicle drivers during Initial Entry Training (IET) and sustainment as described in this document's Annexes. The simulator(s) will enable training in the critical driver tasks that can be repetitively trained in a simulator and are dangerous and/or infrequently trained in the "real world" (i.e. driving on ice, fording streams, driving under blackout conditions, driving down steep embankments when coming off an improved road, etc.). The CDT TWV shall be reconfigurable to accommodate the different vehicle variants as defined in the individual annexes to the Common SRD. The CDT TWV shall be composed of common modules that will be used no matter which vehicle platform the trainer is used for and a specific module for each of the different vehicle variants. The components of the specific module shall be the driver's compartment, instruments, and controls for the driver, and the software required to operate the driver compartment and interact with the common modules. Up to eight CDT TWVs can be controlled by a single Instructor Operator Station (IOS) to allow individual, independent training or networked training. The driver training scenarios can be "scripted" to enable practice encountering the same tactical, terrain and traffic conditions repetitively, or programmed for random variations in traffic along the same route. The training scenarios can also be executed "unscripted" allowing maximum variability of route and environmental conditions. Scoring of the driver trainer scenarios are accomplished by the system so that training evaluation is consistent among all the students.

1.1 Background

The U.S. Army Program Executive Office for Simulation, Training and Instrumentation (USA PEO STRI), Product Manager for Ground Combat Tactical Trainers (PM GCTT) has a requirement for driver training simulators to support the Training and Doctrine Command (TRADOC) schools with institutional drivers training and to support operational units with sustainment drivers training. The CDT TWV is the Army's preferred solution for initial and sustainment driver trainer needs for Tactical Wheeled Vehicles. This CDT TWV encompasses driver training simulators for military wheeled vehicles utilizing a common platform. Each CDT TWV system will be reconfigurable to accommodate the different vehicle variants as defined in the product system specifications.

The Government's intent is to reuse the existing architecture (to include software and hardware design and implementation) to the maximum extent possible.

2. APPLICABLE DOCUMENTS

The following documents are applicable to this SOW to the extent specified herein. In the event of a conflict between documents referenced herein and the contents of this SOW, the contents of the SOW shall be the governing requirement.

2.1 Department of Defense Documents

DODI 8500.01	Information Assurance
DODI 8500.2	Information Assurance Implementation
DODI 8510.01	Information Assurance Certification and Accreditation Process (DIACAP)
DODD 8570.1	Information Assurance Training, Certification and Workforce Management
DOD 8570.01-M	Information Assurance Workforce Improvement Program
DODI 8582.01	Security of Unclassified DoD Information on Non-DOD Information Systems

2.2 Other Government Documents

PRF-PT-00430 Ver. 6.0	SYSTEM REQUIREMENTS DOCUMENT (SRD) FOR THE U.S. ARMY COMMON DRIVER TRAINER (CDT)
PRF-PT-00580 Ver. 2.0	SYSTEM REQUIREMENTS DOCUMENT FOR THE TACTICAL WHEELED VARIANT (TWV) INCLUDING VEHICLE SPECIFIC KITS FOR THE COMMON DRIVER TRAINER (CDT) SYSTEM
CNSSI 1253	Committee on National Security Systems Instruction (CNSSI) 1253
NIST SP 800-53	National Institute of Standards and Technology (NIST) Special Publication (SP) 800-53: Security and Privacy Controls for Federal Information Systems and Organizations
AR25-2	Information Assurance
MIL-STD-130	Identification and Marking of U.S. Military Property
MIL-STD-31000A	Technical Data Package
PEO STRI BAM	Program Executive Office for Simulation, Training & Instrumentation Basic Accreditation Manual (BAM), Appendix D

DIACAP Stand-alone System IA Process Version 6, dated 30 Sept 2011

DIACAP
Implementation Plan
(DIP) for
Standalone System for
Mission Assurance
Category (MAC) III

Confidentially Level Sensitive. The Standalone DIP as 32 controls

29CFR1910.1200

Occupational Safety and Health Standards Toxic and hazardous Substances

EM-385-1-1

Department of Army Manuals, US Army Corp of Engineers Safety and Health Requirements Manual 2008 (Manual is downloadable from www.usace.army.mil/CESO/Pages/EM385-1-1.aspx).

29 CFR 1910

Code of Federal Regulations (CFR), 29 CFR 1910 Occupational Safety and Health Standards (OSHA standards are downloadable from <http://www.osha.gov>)

NFPA 70

National Fire Protection Association (NFPA 70 National Electrical Code, 2011 Edition (Copies of this document are available from <http://www.nfpa.org/Catalog/> or National Fire Protection Association, 11 Tracy Drive, Avon, MA 02322)

OSHA 1910

Occupational Safety and Health Administration (OSHA) Regulations OSHA 1910, Subpart S Electrical (Copies of the above regulations are available from <http://www.osha.gov>)

3. REQUIREMENTS

3.1 Program Management

The Contractor shall provide the overall management and administrative efforts necessary to ensure that the requirements of this contract are accomplished. The Contractor shall develop several important metrics to monitor progress, Configuration Management (CM) activities, CDT TWV requirements and other significant activity that will impact program schedule, costs, performance and risk.

DI-MGMT-80227 Contractor's Progress, Status, and Management Report

3.1.1 Integrated Master Schedule (IMS)

The Contractor shall develop, implement, manage and update the contract Integrated Master Schedule (IMS). The IMS, shall be presented at all program reviews and technical reviews, and

shall contain all critical events and exit criteria, accomplishments, predecessors and successors events, and their dependencies. The IMS shall address and identify total program activities including activities performed by major subcontractors. The activities and event times shall be updated to reflect accomplished activities and any changes. 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-81861A Integrated Program Management Report (IPMR)

3.1.2 Configuration Management (CM)

The Contractor shall use industry standard best practices, processes and tools to establish and maintain consistency between system requirements, system configuration information, and all other relevant information about the system. The CM process shall ensure the system conforms to the requirements; all requirements and components (both hardware and software) are identified and documented in sufficient detail to support the system life cycle; ensure component interchangeability; ensure accurate system information and facilitate system 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 for each baseline in a CM integrated database. Both the system baseline and its associated 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 verification that the system baseline and all associated component information have been updated and continue to be consistent.

3.1.2.1 Configuration Management Planning and Management

The Contractor shall:

- a. Plan implementation of the CM functions for the context and environment in which they are to be performed and then manage in accordance with the planning.
- b. Determine the specific CM value-adding functions and levels of emphasis.
- c. Document how the Contractor 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. Continually assess the effectiveness of the CM plan implementation and performance of the configuration management functions with performance measurements.
- f. Flow down responsibility for CM performance to subcontractors.
- g. Ensure all data products transmitted to the Government are usable.
- h. Ensure that the software and hardware configuration management plan is incorporated into a single or separate configuration management plan.

3.1.2.2 Configuration Identification

The Contractor shall create unique identifiers for each configuration item (CI) at the system, subsystem and component level and for both computer software configuration items (CSCI) and hardware configuration items (HWCI) at each level, i.e. system, subsystem and component. The Contractor shall be able to show the traceability between all levels of CIs, CSCIs and HWCIs. All descriptions and documentation for each CI, CSCI and HWCI shall include the follow data, as applicable, to be used as the basis for configuration management:

- a. Selected system/software/hardware attributes
- b. System/software/hardware information and
- c. Lower level components.

The Contractor shall:

- a. Define the functional, performance, interface and physical attributes of the system, software and hardware CDT TWV components.
- b. Determine each new CDT TWV product's baseline composition using its product definition information.
- c. Assign unique identifiers to the CDT TWV system and selected sub-system product asset configuration items so that they can be distinguished from other items. One configuration sub-system product asset component 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 selected individual components of the sub-system product asset.
- 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 and sub-system product assets.
- g. Apply information identification rules to maintain representation and version relationships within the system and sub-system product assets identified.
- h. Maintain relationships between information, information requirements, and the related system and sub-system product asset configuration to ensure accurate information retrieval.
- i. Establish complete, valid and suitable for use, agreed-to descriptions of the attributes of the system and product asset sub-system and system components at any 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 sub-system product asset component boundaries that interface to the system, sub-system product asset or within the system.

3.1.2.3 Configuration Change Management & Configuration Control Board (CCB)

The Contractor shall establish a systematic and measurable configuration change management process for managing product configuration changes and variances. Once the system design has

been approved by the Government at the Preliminary Design Review (PDR), the Contractor shall effect changes to the baseline requirements only after the proposed change has been approved using the change process and approval by the Government. 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 each 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, 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.

The Contractor shall establish and maintain a single, unified configuration control board responsible for configuration control of all software and hardware configuration items and related products. The configuration control board will also be responsible for management of Government Off-The-Shelf (GOTS) and Commercial Off-The-Shelf (COTS) (including open source) configuration items including product and version identification. The Contractor shall obtain approval at the CCB prior to committing to use of any version of any COTS product. All GOTS and COTS software products shall be independently tracked as separate CSCIs. The Contractor shall ensure that all COTS products included in the system deliverable configuration are commercially supported.

3.1.2.4 Configuration Verification and Audit

The Contractor shall maintain surveillance over the configuration management process. The contractor or their subcontractor responsible for Configuration Management (CM) shall be appraised at Capability Maturity Model Integration Acquisition (CMMI-ACQ) or Development (CMMI-DEV) Level III or higher and shall utilize these appraised processes. (An appraisal at maturity level III indicates the organization is performing at a “defined” level. At this level, processes are well characterized and understood, and are described in standards, procedures, tools, and methods. The organization’s set of standard processes, which is the basis for maturity level III, is established and improved over time.) All verifications and audits conducted in accordance with these plans shall be documented within the Integrated Digital Environment (IDE). The Contractor shall be responsible for identifying opportune timeframes to the Government to witness the Contractor’s in-process verifications of the documentation and hardware components. At different intervals throughout the build process the Contractor shall make the hardware available to the Government for their own reviews and verifications of all technical documentation, hardware and software. The Contractor shall be responsible for identifying recommended viewing times during the development process that allow components

to be easily viewed prior to assembly. The contractor shall ensure that the IDE contains the latest CM versions of all technical documentation. The Government will utilize the IDE technical documentation to perform their verifications by reviewing a representative number of drawings, associated technical manuals, software versions, logistics management information and manufacturing instructions to confirm the accuracy of the final product configuration design.

DI-SESS-81022D Configuration Audit Summary Report and Certification

3.1.2.5 Request for Deviation (RFD) or Variance (RFV)

After CDR, the Contractor shall document the rationale and obtain the Government's written approval before deviating or varying from any Government approved baseline.

DI-SESS-80640D Request for Variance

3.1.3 Risk Management

The Contractor shall prepare, implement, and maintain a cost, technical and schedule risk management process. This shall include risk detection and identification, assignment of risk categories, action triggers, corrective action, tracking of compliance, reporting of status and planning for risk abatement. The Contractor shall:

- a. Identify, document moderate and high-risk items for each risk assessment area.
- b. Identify, implement risk handling approaches, and track over time each moderate and high-risk item.
- c. Document risk issues that have been successfully resolved and schedule each open item into the program IMS.
- d. Develop mitigation plans to identify the recommended critical path for contract completion and the appropriate risk handling approach to lower the level of uncertainty identified.

3.1.4 Management Reviews

3.1.4.1 Post Award Conference (PAC), Start of Work Meeting and Preliminary Design Review (PDR)

The contractor shall conduct a combined PAC/Start of Work Meeting to be held at the Contractor's facility within 20 working days after contract award. The purpose of the conference shall be to establish the framework of the Contractor and Government interaction during the performance period of the contract. The Contractor shall place emphasis on the operating procedures, methodologies and processes to be used in the execution of the contract. The meeting shall include the Contractor's key team members identified in the proposal 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. The Contractor shall present the program Integrated Master Schedule, IPT structure, management

concept, organizational structure, and the interfaces with the Government that are employed to perform the CDT TWV mission. The Contractor shall document action items, due dates and coordinate resolution and track action items until closure. Action item closure shall require Contractor and Government approval. Contractor shall meet all PDR entry and exit criteria listed later in this document.

DI-ADMN-81505 Report, Record of Meeting/Minutes

3.1.4.2 Program Management Reviews (PMR)

The Contractor shall conduct program management reviews on a quarterly basis (as well as at Midpoint described in Section 3.1.4.2.1) in accordance with the IMS. The first PMR shall be no more than 90 calendar days after the combined PAC/ Start of Work Meeting. The location of the PMRs shall be mutually agreed upon by the Procuring Contracting Officer (PCO) and the Contractor. The program management review shall provide a program overview and shall include as a minimum:

- a. Hardware and software design status
- b. Risk and problem identification
- c. Subcontract management/progress
- d. Data collection and modeling
- e. CDT TWV GFE planning and status
- f. Logistics planning
- g. Test planning
- h. Provisioning for training and technical publications status
- i. Schedule status
- j. Pre-selected topics of interest
- k. I/A Security
- l. Human Factors Engineering

Status and information at the review shall reflect currency since the previous review. Other program reviews such as technical reviews, technical manual reviews, etc. shall be combined into the PMR when possible. The Contractor shall also be responsible for generating minutes of the meetings and provide them to the Government for approval. The Contractor shall document action items, due dates, coordinate resolution and tracking of action items until closure. Action item closure shall require Contractor and Government approval.

DI-ADMN-81505 Report, Record of Meeting/Minutes

3.1.4.2.1 Midpoint Developmental PMR

The Contractor shall conduct a specific program management review at the midpoint between the Critical Design Review and the Test Readiness Review in accordance with the IMS. This Midpoint Developmental PMR shall be scheduled during the PAC to coincide with the Midpoint Developmental Test & Evaluation (MDT&E) test event and be collocated with the test event.

The program management review shall provide program overview and developmental status. Topics shall include the topics listed above as well as MDT&E and vehicle dynamics results.

3.1.4.3 Integrated Product Team (IPT) Meetings

The Contractor shall establish an IPT structure to address major areas of system development (e.g., systems engineering, hardware design, software design, integrated logistics support testing). The Contractor shall establish IPT charters and host regularly schedule IPT meetings or teleconferences. The IPT meetings/teleconferences shall be used to address systems development status of activities, questions and issues in a timely manner between management reviews. The Contractor shall document action items, due dates and coordinate resolution and track action items until closure. Action item closure shall require Contractor and Government approval.

3.1.5 Integrated Digital Environment (IDE)

The Contractor shall establish, maintain and manage an interactive, online, protected, and access controlled IDE, such that the IPT members can contribute their ideas, comments and suggestions, exchange program information and collaborate in a distributed environment. The Contractor shall include software applications and database services for the generation, integration, storage, indexing, distribution and simultaneous on-line sharing of digital data among all authorized Government and Contractor team members. The IDE shall allow sharing 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. Specifically, integrated automated databases are required which shall allow technical data sharing at the data base level, 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.

3.1.5.1 The IDE Development and Installation

The Contractor shall provide an IDE with the following capabilities:

- a. Ability to upload and store information.
- b. Ability to manage product and program management structures.
- c. Team access to the most current information.
- d. Ability to assign rules regarding information access.
- e. Common information architecture that is distributed geographically.
- f. User-selectable to send Electronic notification of changes to program and product information.
- g. Ability to recover from unexpected loss of program data due to environmental disasters, operator error, equipment failure, and hostile intruders.
- h. Ability to provide access to program data using standards defined through an open systems approach.

3.1.5.2 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. The Contractor shall provide this service for items on the data accession list, management data, and technical data generated and maintained in digital format.

- a. The Contractor shall develop and implement procedures for establishing and administering user accounts for the IDE.
- b. The Contractor shall develop, maintain, and implement an online, interactive, self-taught user-training program to ensure users are able to operate within the IDE and understand their roles and responsibilities within the IDE processes.
- c. The Contractor shall transition the IDE including all software and data to the Government at the conclusion of the Contract's DO period of performance.
- d. The Contractor shall provide Government IPT members real-time access to Development and Production Environments, and functional baselines to include updates to any elements of the product baseline.
- e. The Contractor shall provide access to all tools, test equipment and consumable items required to accomplish any development, maintenance or installation identified just prior to and as part of the task.

3.1.5.3 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. The listing shall include all operations and maintenance publications, engineering drawings and specifications, software source code, software databases, training materials, and baseline description documents. At the end of the DO, the contractor shall deliver a complete copy of the IDE to include any requisite supporting software necessary to maintain a fully functional IDE.

3.2 Systems Engineering

The Contractor shall translate the basic operational needs, requirements and objectives, interface and other design constraints including cost, into preliminary, verifiable, functional requirements and objectives, while conducting cost-benefit trades to support refinement of the preliminary functional requirements. The Contractor shall complete the CDT TWV GFE system design (balanced with respect to performance, cost, schedule, and risk) and verify it meets the systems requirements. The Contractor shall assess proposed changes in the evolving functional architecture, physical hierarchy, and baselines and objectively trade alternatives to balance performance, cost, schedule, and risk prior to approval. As part of the system design and component selection process, IA and Cybersecurity shall be considered as a requirement for all systems used to enter, process, store, display, or transmit information.

3.2.1 Systems Design

The Contractor shall use the specifications and requirements documents associated with the CDT TWV as the basis for development of all implementing specifications. The design concept shall include incorporating 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) shall be used for selected system interfaces, products, practices and tools. Selected designs and specifications shall be based on performance, cost, industry acceptance, long term availability, supportability, and upgrade potential.

The Government requires the rights in technical data and computer software, per FAR 252.227-7015, that permits the Government to fully support, maintain and modify the CDT system software and technical data throughout the program life cycle. Specifically, the Government intends to have training programs and devices operated, maintained and supported throughout its life cycle by competitively-awarded contracts, at least in part.

3.2.1.1 System Definition Stage

The Contractor shall continue to support the established definition of the CDT TWV GFE systems, update the CDT TWV GFE design and establish through modifications the definition of the CDT TWV system with a focus on system products required to satisfy operational requirements. The Contractor shall complete the following:

- a. CDT TWV system and product requirements and verification definitions.
- b. Preliminary subsystem requirements and verification definitions.
- c. Product and subsystem interface requirements and verification definition.
- d. Establish a system baseline.
- e. Conduct IPT/ Technical reviews.

The documentation generated during system definition shall be used to guide subsystem development. The Contractor shall conduct an IPT meeting 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. It is sufficiently mature to meet systems engineering criteria.
- b. System-level risks have been adequately addressed to justify continued development.
- c. Trade-study data are adequate to substantiate system requirements are achievable.
- d. Decisions made in arriving at the system definition configuration are well supported by analysis, test, certifications and other technical data.

DI-IPSC-81431A

System/Subsystem Specification (SSS)

3.2.1.2 Preliminary Design Stage

The Contractor shall initiate subsystem evaluation of the CDT TWV GFE and update subsystem-level definition and “design-to” baselines to guide component development. The Contractor shall decompose identified subsystem functions into lower-level functions, 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 evolve the CDT TWV into a subsystem requirement and verification definition and “design-to” baseline. Updates to component requirements and verification definition and build-to baselines shall be defined for the components and the subsystem being refined. 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 produce ability, verifiability, usability, supportability, trainability and disposability for each subsystem. Subsystem reviews (IPT meetings) shall be completed for each subsystem. The results of the subsystem reviews 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. Component allocations and updates to component specifications are reasonable and provide a sound subsystem concept.
- c. Subsystem risks have been assessed and mitigated to a level appropriate to continue development.
- d. Trade-study data are adequate to substantiate that subsystem requirements are achievable.
- e. Decisions made in arriving at the subsystem configuration definition are supported by analysis and technical data

The Contractor shall present the CDT TWV preliminary design to the Government at a Technical Review.

3.2.1.3 Detailed Design Stage

The Contractor shall complete updates to the subsystem design down to the lowest component level, 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. For each component, down to the lowest sub-component, the design for quality factors to include producibility, verifiability, usability, supportability, trainability and disposability. Component reviews (IPT meetings) shall be completed for each component at the completion of the detailed design stage. 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. Decisions made in arriving at the detailed component definition configuration are supported by analysis and technical data.

The Contractor shall present the completed CDT TWV design to the Government at the Critical Design Review (CDR).

3.2.1.4 Fabrication, Assembly, Integration and Test Stage

The Contractor shall fabricate, assemble and integrate the subsystems into a complete system that meets the requirements of the specifications and requirements documents. 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, Government agreed certifications or test. The Contractor shall test the system and subsystems needed to verify that the products meet the performance requirements stated in the associated System Requirement Document(s) (SRD).

3.2.2 Hardware Engineering

The Contractor shall integrate and assemble all CDT TWV GFE hardware that satisfies the performance requirements stated in the developed specifications. The Contractor shall conduct market surveillance and market investigations in order to maximize the use of commercial and non-developmental items. The Contractor shall apply the systems engineering process during each level of system development (system, subsystem, and component) to add value (additional detail) to the products defined in the prior application of the process. Through each of the following design stages, information generated shall be documented in the integrated database. The Contractor shall develop the hardware in the context of a virtual environment product line; ensuring architecture and reuse are considered at each phase.

3.2.3 Software Engineering

The Contractor shall deliver the CDT TWV system software and firmware. The Contractor and associated subcontractors shall follow software development CMMI Level III or higher processes that are (CMMI-ACQ or CMMI-DEV). The Prime contractor or subcontractor appraised for software development and overall configuration management shall be responsible for ensuring all processes support CMMI Acquisition (CMMI-ACQ) or Development (CMMI-DEV) Level III or higher. The design process shall incorporate features that promote assessment of open source software products with ease of operation, integration, software maintenance, future updates and modifications. Computer programs and computer data systems 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, Government owned, and non-developmental software.

3.2.3.1 Software Requirements and Architecture Development and Review

The Contractor shall update software requirements and architecture in accordance with the Contractor software development process plan. All analysis and results shall be documented in the integrated database. As part of this activity, the Contractor shall work within the IPT to iterate the system and System-of-System (SoS) software requirements and architecture. The Contractor is encouraged to suggest revisions to Government requirements where such revisions

would result in cost or schedule reduction or performance improvements. The Contractor shall update the architectural design of the CDT TWV GFE system (identifying the components of the system, their interfaces, and a concept of execution among them) and update the traceability between the system components and system requirements as necessary throughout the development cycle. Based upon analysis of system requirements, system design, and other considerations, the Contractor shall define and record the CDT TWV software requirements to be met by each software item. Define and record the methods to be used to ensure that each requirement has been met, and the traceability between the software item requirements and system requirements are met. 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 with the Government, for each software build.

3.2.3.2 Software Design and Implementation

The Contractor shall update the CDT TWV GFE software, develop executable code, perform unit testing, and integrate software components (with each other and with hardware components) to meet system requirements. Updates to software design includes not only design to requirements, but extending existing SE Core products, selecting existing software products (including open source software) to meet CDT TWV 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.

DI-IPSC-81435A Software Design Description (SDD)

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

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

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. 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 CDT TWV system requirements. The Contractor shall develop detailed procedures for conducting the test, and test data for testing 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 Configuration Control Board/IPT. The Contractor shall also identify at the start of each unit test event the COTS products that have changed for the existing system and the files that were updated to work with the latest COTS and what files need to be upgraded as well as identifying

the version(s) of the COTS products for that unit test event. All software patches will be applied before initiating the formal qualification test. In the event that a software patch is not applied the Contractor shall identify this in the Test Readiness Review and provide rationale that explains why it was not applied. The Government shall approve Contractor readiness to test before the formal qualification test. The Contractor shall conduct a software item test readiness review as part of the system 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 all software 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 CDT TWV GFE hardware and software to achieve a fully functional system. All support systems shall perform and operate in accordance with the system specification and Contractor generated specifications. The Contractor shall verify the complete integration of the CDT TWV GFE hardware and software of each hardware and software subsystem and the overall system through the utilization of formalized testing.

3.2.5 Cybersecurity

The contractor shall maintain the existing DoD Information Assurance Certification and Accreditation Process (DIACAP) standalone accreditation. Deviations from the accredited baseline will require Government Configuration Control board (CCB) approval to include rationale, impact to cost, schedule, and current accreditation baseline provided by the contractor prior to implementation. All deviations to the accredited baseline shall be updated in the current DIACAP documentation. The contractor shall develop and maintain an Information Assurance Vulnerability Management (IAVM) plan to include incorporation of Information Assurance Vulnerability Alerts (IAVA), Security Technical Implementation Guide (STIG) compliance, and antivirus updates throughout the contract. The contractor shall provide cybersecurity scans of the system with Army approved automated vulnerability scanning tools to demonstrate STIG and IAVA compliance throughout the period of performance (POP) of the contract. The contractor shall provide cybersecurity scans of the system with Army approved automated vulnerability scanning tools to demonstrate STIG and IAVA compliance throughout the POP and make those scan results available to the Government for reviews during major milestone (CDR, TRR) reviews. The contractor shall be required to support a Government Reaccreditation scan (up to 5 days) at least two weeks prior to system Test Readiness Review.

The contractor shall integrate cybersecurity functions into their programmatic processes, document decisions, specify and track requirements, document certification efforts, identify possible solutions, and maintain operational systems security in accordance with (IAW) DODI 8500.01, DODI 8500.2, DODI 8510.01(DIACAP), and AR 25-2. All cybersecurity enabled

products shall be securely configured IAW DoD-approved security configuration guidelines. All personnel performing Cybersecurity functions shall be trained and certified in accordance with DoDD 8570.01 at the start of work and the contractor shall provide the necessary documentation demonstrating compliance. The contractor shall secure all unclassified DoD information on Non-DoD information systems in accordance with DoDI 8582.01.

DI-MISC-80711A Scientific and Technical Reports (Information Assurance Scan)

3.2.5.1 Information Assurance Vulnerability Management Program

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

3.2.6 Specialty Engineering

The Contractor shall provide Supportability Engineering, Reliability, Availability and Maintainability (RAM) Engineering, Safety Engineering, Quality Engineering, Human Factors Engineering, Electromagnetic Environment Effects (E3) Engineering, Containment and Corrosion Control and Standardization as defined in the sections below.

3.2.6.1 Supportability Engineering

The Contractor shall ensure the supportability of the system through planning, implementation, and verification of materials, services and resources required to satisfy the operational requirements. Supportability by third party Contractors for hardware, software and documentation for maintenance shall be a requirement. Readiness, availability, supportability and Life Cycle Cost shall be the primary design factors. The Contractor shall evaluate reliability, availability and maintainability factors in the design process. Design for supportability shall include the use of common fasteners and connectors, common commercial standards, and proven technology to the maximum extent possible. The system design shall minimize life-cycle costs and maximize life-cycle supportability by avoiding the use of proprietary items; components with limited sources for spare parts, support, or maintenance; recurring usage or service fees; and the need for special tools or test equipment.

3.2.6.2 Reliability, Availability and Maintainability (RAM) Engineering

The Contractor shall develop, implement and manage a process satisfying all RAM requirements and be completely integrated within the systems engineering process. RAM 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 analysis.

3.2.6.3 Safety Engineering

The Contractor shall develop and implement tasks and activities to identify, evaluate, and eliminate or control hazards throughout the program's life cycle. The Contractor shall ensure the safety of the system's design, operation, transportation, maintenance and support. 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. The Contractor should update the current SAR to meet the final design specifications.

DI-SAFT-80102C Safety Assessment Report (SAR)

3.2.6.3.1 Health Hazard Assessment

The Contractor shall identify potential health hazards and recommend engineering controls, equipment and protective procedures to reduce the associated risk to an acceptable level. The Contractor shall assess system, facility, and personnel protective equipment design requirements to allow safe operation and maintenance. When feasible engineering designs are not available to reduce hazards to acceptable levels, the Contractor shall develop alternative protective measures. The Contractor shall address the hazardous materials listed in the Environmental Protection Agency's (EPA) toxics release inventory (<http://www.epa.gov/tri/trichemical/index.htm>) and the list of Class I and Class II stratospheric ozone depleting substances (ODSs), as listed 29CFR1910.1200. The Contractor should update the current HHAR to meet the final design specifications.

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

3.2.6.4 Quality Engineering

The Contractor shall establish measurement system 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 discrepancies or a database listing. All discrepancy correction shall be documented and entered in the integrated database.

3.2.6.4.1 Test Discrepancies

The Contractor shall establish a suspense system to ensure timeliness of analysis and corrective action of each test discrepancy. The Contractor shall establish a process to receive test discrepancies and update the tracking system. A hardcopy discrepancy reporting system shall be established to document Contractor and Government verification of corrective actions. The Contractor shall be responsible for informing the Government of the status of each discrepancy. Upon closeout of a discrepancy, the Contractor shall notify the Government designated test director that the discrepancy has been corrected and the tracking system has been updated. Final test reports shall include scanned copies of all test discrepancy sheets with signatures.

3.2.6.4.2 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. Configuration items include but are not limited to hardware asset version, software asset version and system asset version. The CCB must approve the resolution of the test discrepancy before implementing the described resolution. All discrepancies shall be rechecked prior to completion of test.

3.2.6.4.3 Test Discrepancy Severity

The Contractor shall assign the priority of effort used to address test discrepancies based on the test discrepancy severity designated by the test team, in accordance with the ground rules established by the CCB. The following severities shall be assigned during or after the test, with the Government reserving the right to make the final determination of the severity of any test discrepancy. Severities shall be assigned as follows:

- | | |
|------------|---|
| Severity 1 | Safety issue or issue that prevents accomplishment of an operational or mission essential capability or requirement |
| Severity 2 | Adversely affects the accomplishment of an operational or mission essential capability or requirement and there is no work-around solution acceptable to the Government |
| Severity 3 | Adversely affects the accomplishment of an operational or mission essential capability or requirement but there is a work-around solution acceptable to the Government |
| Severity 4 | Results in user/operator inconvenience or annoyance but does not affect a required operational or mission essential capability or requirement |
| Severity 5 | Any other effect (e.g., documentation error) |

3.2.6.5 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 trainees, operator and maintainer. Identify and eliminate program risk associated with critical human factors that have a significant impact on readiness, usability, 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, effectively and efficiently operate, maintain and control the system in its intended operational environment.

3.2.6.6 Electromagnetic Environmental Effects (E³)

The Contractor shall determine the criteria and verification method to ensure that the CDT system's electronics or electrical hardware configuration is not a source of electromagnetic interference (EMI) or a victim of E³ in the intended operational environment in which it is installed or at its operational locations. The Contractor shall include grounding and wire shielding for CDT fixed and mobile sites from EMI. The Contractor shall establish and maintain a process to verify and assure the system operations functionality is not affected by E³.

3.2.6.7 Contaminate and Corrosion Control

The Contractor shall incorporate the latest state-of-the-art corrosion control into the system design process, manufacturing process, all levels of maintenance, supply and in the storage processes. Design concepts shall reflect realistic environments and resource availability as determined by logistic support analysis.

3.2.6.8 Standardization

The Contractor shall influence the system design to achieve maximum subsystem, component and repair parts commonality within the CDT TWV system. The Contractor shall minimize equipment and parts proliferation through a standardization effort.

3.3 Design Reviews

The Contractor shall conduct design reviews 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 system-engineering phase. Each review shall accomplish the following:

- a. Assess the CDT TWV 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. Present Specialty Engineering factors that have influenced system/subsystem design.

3.3.1 Preliminary Design Review (PDR)

The Contractor shall conduct a PDR to present the results of the Preliminary Design phase of the Systems Engineering effort. The PDR shall address the preliminary design criteria in paragraph 3.2.1.2. The Contractor shall notify the Government no less than 30 calendar days prior to the planned PDR in order to extend invitations to all program stakeholders. The Contractor shall document action items, due dates and coordinate resolution and track action items until closure. Action item closure shall require Contractor and the Government's CDT Lead Systems Engineer approval.

DI-ADMN-81505 Report, Record of Meeting/Minutes

3.3.1.1 Preliminary Design Review Entrance Criteria

Entrance criteria for the PDR shall consist of Government concurrence with the following items:

- a. Action Items from prior IPTs and CCBs are closed.
- b. CDRL items scheduled to be delivered prior to PDR have been delivered and accepted (when applicable) IAW CDRL requirements.
- c. Allocated baseline has been evaluated, updated, and defined.
- d. Risk assessments and risk mitigation plans have been developed.
- e. Reliability and Maintainability (R&M) requirements have been allocated to the design.
- f. IMS shows critical path through CDR.
- g. Program technical risk is medium or lower.
- h. Program execution risk is medium or lower.
- i. PDR agenda has been submitted and accepted.
- j. Program is properly staffed.
- k. PDR presentation materials are available.
- l. Software CM tools
- m. Developmental and Non-developmental Software and Databases
- n. Preliminary Data Flow and Accreditation Boundary Diagram
- o. Network Topology Diagram

3.3.1.2 Preliminary Design Review Exit Criteria

PDR shall be considered complete when all draft action items are signed off by the Government, an acceptable level of program risk is ascertained and a Memorandum for Record is signed and delivered by CDT APM/PD.

3.3.2 Critical Design Review (CDR)

The Contractor shall conduct a CDR to present the results of the Detailed Design phase of the Systems Engineering effort. The CDR shall address the detailed design criteria in paragraph 3.2.1.3. The Contractor shall notify the Government no less than 30 calendar days prior to the planned CDR in order to extend invitations to all program stakeholders. The Contractor shall document action items, due dates and coordinate resolution and track action items until closure.

Action item closure shall require Contractor and Government approval. The Contractor shall address design changes made since the PDR.

Once the Government has approved the design at CDR, the Contractor shall submit Engineering Change Proposals (ECPs) when ANY change is proposed to the configuration management baseline for Government review and approval prior to proceeding.

DI-ADMN-81505 Report, Record of Meeting/Minutes

DI-SESS-80639D Engineering Change Proposal

DI-SESS-80463D Engineering Release Record

3.3.2.1 Critical Design Review Entrance Criteria

Entry criteria for the CDR shall consist of Government concurrence with the following items:

- a. PDR action items are closed.
- b. CDRL items scheduled to be delivered prior to CDR have been delivered and accepted (when applicable) IAW CDRL requirements.
- c. CDT TWV baseline has been updated and established.
- d. Updated risk assessment and risk mitigation plans are available.
- e. Risks and their respective mitigation plans are in place and manageable for implementation of the functional requirements into a final design.
- f. Reliability and Maintainability (R&M) requirements have been addressed in the design.
- g. Trade-off analyses have been completed.
- h. Logistics analysis has been completed and plans have been established.
- i. IMS shows critical path through testing.
- j. CDR agenda has been submitted and accepted.
- k. Program schedule is executable within the anticipated cost and technical risks.
- l. Program is properly staffed.
- m. CDR presentation materials are available.
- n. Detailed Hardware Listing to include manufacturer, type and model
- o. Software Listing to include manufacturer and version
- p. Ports, Protocols, and Services (PPS)
- q. IA/CS Scanning Tools and plans
- r. Updates to draft Technical publications are complete

3.3.2.2 Critical Design Review Exit Criteria

CDR shall be considered complete when all draft Request for Action (RFA) are signed off by the Government, an acceptable level of program risk is ascertained and a Memorandum for Record is signed and delivered by CDT APM/PD.

3.4 Product Definition Data (PDD)

The Contractor shall receive existing GFI PDD produced by the previous vendor and revise it as necessary to accurately reflect the as-received configuration.

Where required data documents were not included in the GFI and new documents must be created, the Contractor shall create them in accordance with the requirements in this section and the DIDs referenced below

During the systems engineering and design, as applicable, and in accordance with MIL-STD-31000A, the Contractor shall assess, update, and maintain all GFI PDD and new PDD so that it accurately depicts the final product. All changes to the baseline shall be evaluated by the established CCM process and approved by the Government CCB as described earlier in this document.

The PDD is the technical description of items adequate for supporting an acquisition strategy, production, engineering and logistics support. The PDD shall disclose complete design (level 3 drawings), logistics, manufacturing requirements, and the means of measuring compliance with the requirements. Piece part information (drawings, computer aided design files, models and meta data.) and associated lists shall provide the necessary design, engineering, manufacturing, and quality assurance requirements information necessary to enable, maintain and sustain the procurement or manufacture of an interchangeable item that duplicates the physical 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 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 compliance. The Contractor shall include all electronic models for assemblies and subassemblies from the lowest level component to the top level system component. The Contractor shall provide as part of the Technical Data Package (TDP) Contract Data Requirements Lists (CDRL) a Government owned copy of each software program necessary to view the deliverables. The Contractor shall obtain document numbers from the Government for the PDD elements. The Contractor shall not add prefixes or suffixes to the numbers. All unused numbers shall be returned upon completion of PDD preparation.

DI-EGDS-80918	Technical Data Package Index
DI-SESS-81003E	Commercial Drawings/Models and Associated Lists
DI-SESS-81000E	Product Drawings/Models and Associated Lists

ANNEX to EXHIBIT B TDP Option Selection Worksheet

DI-ADMN-80925

Revisions to Existing Government Documents

3.4.1 Maintenance Services

The Contractor shall maintain the PDD. This shall include maintenance of changes to the PDD baselines and the engineering release changes.

3.5 Integrated Logistics and Supportability

3.5.1 Logistics Support Analysis

Contractor shall ensure supportability of the CDT TWV system through planning, implementation, and verification of materiel and services to meet operational requirements. Readiness, availability, and supportability shall be the primary design factors.

The Contractor shall identify support resources and infrastructure necessary for test and evaluation activities. Contractor shall analyze existing Life Cycle Contractor Support (LCCS) structures to develop and define an optimized support infrastructure for production and deployment. The recommended support resources shall be sufficient to allow another contractor with comparable skills to assume operation, maintenance and support, and sustain the systems availability requirements.

The Contractor shall evaluate reliability, maintainability, and availability factors in the design process. Updates to design for supportability shall include the use of common fasteners and connectors, common commercial standards, and proven technology. Updates to system design shall minimize life-cycle costs and maximize life-cycle supportability by avoiding the use of proprietary items; components with limited sources for spare parts, support, or maintenance; recurring usage or service fees; and the need for special tools or test equipment.

3.5.2 Supportability Analysis and Logistics Product Data

Contractor shall conduct repair level analyses, develop diagnostic, preventative maintenance and repair procedures, conduct facilities analyses, refine hardware/software maintenance and support concepts, and identify life cycle support resource requirements including required initial spares, repair part, consumables and support equipment. The Contractor shall update the CDT TWV GFE listing of items to be repaired, items to be discarded, and the level of maintenance at which the repair should be performed along with associated cost. The Contractor shall identify any/all post CDT TWV GFE support issues that may pose Life Cycle support risks. All Logistics Product Data (LPD) elements shall be developed and provided in an automated database. The Contractor shall document the following in the integrated database:

- a. All input data and their corresponding value and source of the data.
- b. Operational scenario modeled, assumptions made, constraints assumed, and non-economic factors imposed.

- c. Maintenance alternatives considered.
- d. Analytical method and models used to perform economic evaluations.
- e. Discussion of the sensitivity evaluation performed and results obtained

DI-SESS-81758A Logistics Product Data

DI-SESS-81759A Logistics Product Data Summaries

3.5.3 Maintenance Concept

The Contractor shall update all CDT TWV logistics data, manuals, and training in accordance with the designated sustainment concept to maximize utility of delivered services, and data to the intended target audiences. After fielding, sustainment for the systems will be provided by a third-party Life-Cycle Contractor Support (LCCS) provider. The maintenance concept will consist of two levels of maintenance: Field and Sustainment.

3.5.3.1 Field Maintenance

Field level maintenance is defined as on-system maintenance including preventative maintenance, daily readiness checks and services, adjustments to controls and other maintenance that can be accomplished without removing the affected major assembly from its deployed location for extensive repair. Field maintenance is accomplished without the aid of special tools, support equipment, or additional training knowledge or skills. Field level mechanics will perform inspections, diagnose faults, and replace components on end items for return to the user.

3.5.3.2 Sustainment Maintenance

Sustainment Maintenance is defined as off-system maintenance to include troubleshooting and the removal and replacement of failed components that cannot be performed at the Field Maintenance level. Sustainment maintenance actions are beyond the capability of field level maintenance and include extended diagnostics, overhaul, refurbishment, rebuild, or other prolonged repair actions. Sustainment maintenance utilizes Government designated repair points to overhaul, rebuild, replace, or calibrate failed equipment.

3.6 Technical Publications

The Contractor shall describe each operation and maintenance task in detailed, logical, and systematic steps for the work to be accomplished. The operations and maintenance instructions shall accurately provide the technician with all the information needed to keep the equipment operational. It shall provide system and subsystem oriented instructions for installation, operation, maintenance, and testing. All tools, test equipment and consumable items required to accomplish maintenance shall be identified just prior to and as part of the task. Government furnished material, military technical manuals or Government-approved commercial operation and maintenance manuals shall be used as references for system and subsystem maintenance. All Government technical manuals and Commercial Off-the-Shelf (COTS) manuals shall be

reviewed to ensure changes, updates, revisions, or supplementation are completed and address the components actually being installed. All publications shall reflect the configuration of fielded hardware as documented in the product baseline.

3.6.1 Operator User's Manual (OUM)

The Contractor shall deliver an updated OUM documenting tasks necessary to operate the trainer. The Contractor shall identify and document operator specific tasks for 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 operation and operator's preventive maintenance tasks.

**DI-ADMN-80925 Revisions to Existing Government Documents
Appendix A: TM Requirements Matrix for Operator User's Manual.**

3.6.2 System Maintenance Manual (SMM)

The Contractor shall deliver an updated SMM documenting tasks necessary to maintain the trainer. The Contractor shall identify and document maintainer specific tasks for detailing installation, fault isolation, Line Replaceable Units (LRU) procedures, software update procedures, and all necessary maintenance procedures to maintain the trainer. The Contractor shall identify all required spare parts, consumables, tools and test/support equipment associated with the maintenance tasks.

**DI-ADMN-80925 Revisions to Existing Government Documents
Appendix A: TM Requirements Matrix for System Maintenance Manual.**

3.6.3 Commercial Off-the-Shelf (COTS) Manuals and Associated Lists

The Contractor shall deliver updated Commercial Off-the-Shelf (COTS) technical manuals (TMs) for all commercial equipment delivered with the CDT TWV trainer. The COTS manuals shall be sufficient to support the operation, service and maintenance of all COTS components. The Contractor shall deliver operations and maintenance manuals which document how the system is operated and maintained by the users, including drawings and descriptions that show the integration and interface of all COTS components into the trainer. The Government considers the following to constitute a complete COTS manuals:

- a. The Parts Manual shall display figure "breakouts" of the major component assemblies in order to identify parts for procurement.
- b. The COTS Operators Manual
- c. The Service/Maintenance Manual shall display the complete assembly breakdown of major components of the COTS equipment.

The following requirements for Commercial manual development and/or delivery also apply:

- a. The right to use and reproduce the manual shall be transferred to the Government. The following additional requirements apply:

- i. The Commercial manuals shall be available off-the-shelf in support of commercially available systems or pieces of equipment.
 - ii. The Commercial manuals precisely reflect the configuration of the hardware installed on the trainer.
 - iii. The principal users can comprehend the technical information.
- b. Commercial manuals provided to the Government, with all supplementary data, shall be Government property.

The COTS manuals shall include supplemental data as applicable. The manual(s) shall contain operating instructions and maintenance data to support the planned level of maintenance.

DI-TMSS-80527C Commercial-Off-The-Shelf (COTS) Manuals and Associated Supplemental Data

3.6.4 Publications In Process Review's (IPR's)

The Contractor shall host and co-chair publication reviews to ensure the technical publications are being prepared according to the contract. The initial publications IPR shall be held in conjunction with the start of work meeting. Each subsequent IPR shall be scheduled to coincide with a system level program review defined in the IMS. The Contractor shall document and act on reported decisions and discrepancies resulting from or associated with each IPR. Each subsequent IPR shall include a review of incorporated corrections or comments from previous IPR's prior to proceeding with the current IPR. If any IPT member identifies previous IPR comments that are not included in the technical publications, the IPR shall be considered incomplete. The Contractor shall be responsible to record the minutes of all IPRs.

3.6.5 Technical Manual Validation

The Contractor shall validate all updates to CDT TWV publications for operation and maintenance to ensure they meet the requirements of the system and reflects compatibility with the overall operation, maintenance and support plan for the system. Validation shall be accomplished on all updates to CDT TWV technical publications, changes, supplemental data and revisions thereto. The Contractor shall validate all technical data and publications prepared by subcontractors and vendors. The Contractor shall provide the Government opportunity to observe all Contractor's validation efforts. Publications shall be validated prior to system testing. 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 by the intended user and adequate to perform all operations and maintenance functions.
- d. All procedures have been performed to assure accuracy and performance requirements.
- e. Adequacy of data is checked to ensure that it supports the maintenance and support concept.

- f. Hardware of the proper configuration is available for the validation and verification effort.
- g. All safety hazards identified in the safety assessment report are resolved and identified within the text as Warnings, Caution and Note statements necessary to protect the equipment and personnel.
- h. All hazardous materials are identified.

3.6.6 Technical Manual Verification

Publications shall be verified by the Government prior to acceptance. The Contractor shall assist the Government in the verifying the publications are accurate. The Government IPT may choose to perform verification concurrently with the validation effort. Correction of discrepancies and changes resulting from training, testing, and reviews shall be incorporated into the publications. The Contractor shall provide system equipment, technical and engineering support and facilities as required to aid in the performance of verification efforts. The Contractor shall incorporate all comments from compliance-reviews, technical accuracy reviews and verification reviews into final submission of publications. Verification shall be rescheduled if the Government determines that the malfunctions/discrepancies discovered cannot be corrected during the verification event. The Contractor shall support re-verification of corrections/updates as required. Publications shall be validated IAW the Publications Validation section of this document before the verification can begin. A technical publication shall not be ready for verification until all of the following conditions have been fulfilled:

- a. Validation Comments have been incorporated.
- b. Completed and Government Approved Validation Report

DI-TMSS-81821 Technical Manual Verification Incorporation Certificate

3.7 Item Unique Identification (IUID)

The Contractor shall coordinate with the Government to determine items requiring unique identification including embedded subassemblies, components and parts. The Contractor shall provide unique item identification for all identified items delivered. IUID marking of each item shall be both machine readable and human readable in accordance with MIL-STD-130. The Contractor shall provide data resulting from IUID marking activities and indicating pass/fail for each IUID marked item verified.

DI-MGMT-81858 Unique Identification (IUID) Marking and Verification Report

3.8 Training Courses

The Contractor shall develop and conduct training courses designed to provide necessary training to the target audience. The Contractor shall develop and provide system operation and maintenance familiarization training through a combination of classroom, written instruction, and hands-on operation. Contractor shall develop a complete and exportable Training

Presentation required to train the system and shall provide a CD or DVD as a leave behind package for on-site trainers.

The Contractor shall ensure that instructors possess the required knowledge/skill level and familiarity with the system to effectively deliver system instruction. In addition, the Contractor shall provide the course to a Government team for validation/approval prior to the first on-site course presentation.

DI-PSSS-81522C Course Conduct Information Package

3.8.1 Training Materials

The Contractor shall analyze and update all training materials including program of instruction (POI), lesson plans (LP), student handouts, end of course evaluations, practical exercises, a train-the-trainer package and a certificate of completion to accommodate operator and sustainment maintenance new equipment training (NET).

Training material shall be updated to support a “train the trainer” concept. The course shall provide comprehensive knowledge in the concepts, skills, and aptitude to efficiently operate and maintain the system. The course shall provide familiarization with simulator operating techniques and shall emphasize utilization of the capabilities available on the CDT system and its functions. The course shall address physical and functional descriptions and operation of the equipment to include features, advantages, and configurations.

Contractor shall develop a complete and exportable training support package that integrates training products, materials, and other pertinent information necessary to train the system.

DI-ILSS-80872 Training Materials

3.8.2 New Equipment Training (NET)

The Contractor shall provide NET training to the receiving organizations. This training shall be a self-contained course that provide detailed operational and maintenance knowledge of the fielded systems. Contractor shall develop and provide system operation and maintenance familiarization training through a combination of classroom, written instructions, and hands-on operation. Contractor shall analyze, prepare all training courseware including POI, practical exercises, and a train-the-trainer package to accommodate new equipment training, sustainment training, and training of testers and evaluators.

3.8.2.1 Instructor / Operator Training

The Contractor shall plan, develop, conduct, and document the completion of the initial instructor and operator course for the initial cadre instructors. The course shall provide comprehensive training for instructors in the concepts, skills, and aptitude to efficiently operate the system. The course shall provide familiarization with simulator operating techniques and shall emphasize the utilization of the instructor facility, its functions, and controls. The course

shall address the physical and functional descriptions and operation of the equipment including features, advantages, and configurations.

3.8.2.2 Maintenance Training

The Contractor shall plan, develop, conduct, and document the completion of the initial maintainer course for the initial cadre of maintenance personnel prior to Government acceptance. The course shall provide comprehensive training for maintainers in the concepts, skills, and aptitude to efficiently operate and maintain the system. This course shall consist of instruction in troubleshooting and maintenance, diagnostics to fault isolation, calibration, adjustments, remove and replace procedures, use of built in test, and repair that is beyond operator level maintenance. After completion of the course all personnel shall be capable of operating, maintaining, and troubleshooting the simulator to the board replacement level.

3.8.2.3 Language

The Contractor shall provide all instruction, training materials and system documentation in the English language.

3.8.2.4 Class Size

The Contractor shall limit class size to six (6) to eight (8) to ensure that each student receives the greatest benefit from the training.

3.8.2.5 Location of Training

The Contractor shall conduct the training courses at the Ft. Leonard Wood, MO site where the system is to be installed or at the Contractor's facility with prior Government approval.

3.8.2.6 Training Facility and Equipment

The Contractor shall provide all required classroom equipment and training equipment for courses conducted at the facility.

3.8.2.7 Course Completion Criteria

The Contractor shall develop a criterion referenced performance test to measure the student's ability to perform job-related competencies.

3.8.2.8 Certificate of Completion

Upon successful completion of the training, the Contractor shall provide each participant with a personalized certificate recognizing their achievement and satisfactory completion of the program. The Contractor shall maintain a record of students attending the class, their test results, and the completed student course evaluation.

3.9 Integrated Testing

The Contractor shall plan, coordinate, establish and implement a comprehensive test and evaluation (T&E) program to include all configurations of a CDT TWV system. 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 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 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 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.

3.9.1 Midpoint Developmental Test and Evaluation (MDT&E)

The CDT TWV system shall be tested in its current configuration by the Contractor and Government Subject Matter Experts (SMEs) at the midpoint between the CDR and the TRR and prior to in-plant acceptance testing. A test schedule covering the CDT TWV testing shall be provided. The Government shall be notified at least 4 weeks in advance prior to being ready for test. These tests shall verify the functionality and performance of the system as well as the vehicle dynamics of the CDT TWV variants. Contractor shall plan to adjust vehicle dynamics settings during the test based on SME feedback. Any discrepancies/problems found during testing shall be documented, corrected and re-tested prior to TRR.

DI-NDTI-80603A Test Procedure

DI-NDTI-80809B Test/Inspection Report

3.9.2 Test Readiness Review (TRR)

The Contractor shall address the following key issues at the system engineering TRR prior to the start of formal testing on a complete CDT TWV System to ensure that the system and all the 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 (if applicable).
- e. Technical publications are completed and validated
- k. System to be tested has completed an official Government IA scan

1. The contractor shall provide Software Support Environment (SSE) hardware and software to the Government at TRR.

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. Evidence of all internal process tests and inspections has been completed by the Contractor and support transition into formal tests.
- e. Test requirements.
- f. Requirements changes pending.
- g. Design changes since the last design review.
- h. Test constraints based on previous testing or test hardware limitations.
- i. Test configuration (test article and instrumentation and support equipment).
- j. Detailed test procedures.
- k. Plans for collection, reduction and analysis of the test data.
- l. Calibration plan and status.
- m. Problem areas and their resolution.
- n. Validated technical publications.
- o. IA Scan results.
- p. Contractor's in process test results.

DI-ADMN-81505 Report, Record of Meeting/Minutes

3.9.2.1 TRR Entry Criteria

- a. Configuration of the CDT TWV system under test has been defined, updated 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 to include official Government IA scan.
- c. All TRR specific materials such as Government approved test plans, 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.

3.9.2.2 TRR Exit Criteria

- a. Where the proper Government disciplines represented at the review? If applicable were all of the required independent evaluators involved and do they concur with the planned tests, expected results?
- b. Adequate test plans are completed and approved for the system under test.
- c. Adequate identification and coordination of required test resources is completed.
- d. Previous component, subsystem, system test results form a satisfactory basis for proceeding into planned tests.
- e. Risk level identified and accepted by Program leadership as required.
- f. IA/CS Scan results and mitigation plan.

3.9.3 In Plant Acceptance Test (IPAT)

The CDT TWV system shall be fully tested in its final configuration by the Government during in-plant acceptance testing, prior to shipment to the location in accordance with the approved test procedures. A test schedule covering the CDT TWV testing shall be provided. The Government shall be notified at least 2 weeks in advance prior to being ready for test. These tests shall verify the functionality and performance of the system and that the CDT TWV complies with the approved specification requirements. Any discrepancies/problems found during testing shall be documented, corrected and re-tested.

DI-NDTI-80603A Test Procedure

DI-NDTI-80809B Test/Inspection Report

3.9.4 On Site Acceptance Test (OSAT)

The Contractor shall support the Government site acceptance test for CDT TWV systems to verify that the installed CDT TWV system functions properly and operates to the specified performance requirements. Testing shall be conducted using Government approved sub-set of the In Plant Acceptance Test procedures. Any discrepancies/problems found during testing shall be documented, corrected and re-tested prior to Government acceptance. The Contractor shall document the result of the test.

DI-NDTI-80603A Test Procedure

DI-NDTI-80809B Test/Inspection Report

3.10 Time and Material Effort for Technology Analysis and Technical Support

The Contractor shall provide engineering and logistic services that support hardware and software enhancements to the CDT TWV systems. Engineering and logistic services include efforts such as analysis (i.e. technology, vehicle dynamics and tactical equipment modifications, CDT TWV hardware and software modifications), the conduct of special studies, demonstrations, integration, test, prototyping, manufacturing, report findings and incorporation of enhancements.

3.11 Site Survey

The Contractor shall provide personnel to support a preliminary survey at each installation site 60 calendar days after award. The purpose of the survey is to discuss and confirm arrangements for the installation and to provide information on any modifications required at the installation site. During the survey, the Contractor shall:

- a. Review the status of the building or location where the CDT TWV system will be or is already installed.
- b. Confirm the required positions of the CDT TWV, assemblies, cableways, access ways, and any other unique feature, and measure to insure clearance during the installation.
- c. Review and confirm the existing and proposed location of power distribution boxes, switches, network, fire detection, height clearance, entrance criteria, water and air supply points, heating, ventilation, air conditioning, humidification, dehumidification and all other unique building or location features for the CDT TWV.
- d. Determine the availability of required services.
- e. Track and resolve any CDT TWV system outstanding issues pertaining to the preparation of the installation.

The Contractor shall support a Government CDT representative to conduct a final survey at each installation site six months prior to the commencement of the CDT TWV installation.

DI-FACR-80966 Trainer Facilities Report (TFR)

3.12 Installation Support

The contractor shall be responsible for and provide all support equipment, special handling equipment, data, and qualified maintenance personnel needed to support this effort. The contractor shall be responsible for the repair of equipment damaged to a “like new” condition, during removal, transportation, off-loading, installation, and delivery.

3.12.1 Installation Tools and Test Equipment

The Contractor installation team shall be equipped with all the standard tools required for the system installation.

3.12.2 Removal of Equipment

The contractor shall dispose of all control panels, power supplies, display units, lights, circuit breakers, fuses, support structures, displays, beam splitters, personal computers, and all other training device equipment that are removed from the training device and are not reinstalled, including any remaining spares. Disposal shall be IAW local salvage procedures. The local training device Contracting Officer Representative (COR) shall have the choice of parts and components for repair purposes. The contractor shall transport the remaining equipment to the local Defense Reclamation Material Office (DRMO) facility. The contractor shall fill and refinish all excess and exposed holes created within the training device and training facility due to the removal of the equipment mentioned above.

3.12.3 Packing, Handling, Storage, and Transportation (PHST)

Transportation to the trainer site 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.

3.12.4 Facility and Equipment Repairs

The contractor shall repair any facility and equipment damage caused by the contractor during transportation, installation and integration of the trainer modifications to a "like new" condition. The contractor shall replace any damaged floor tiles and replace all abandoned penetrations with new tiles. The contractor shall install grommets on all utilized penetrations.

3.12.5 Safety

In performing the contract, the contractor shall provide for protecting the lives and health of employees and other persons, and for preventing damage to property, materials, supplies, and equipment IAW the latest revision of EM-385-1-1 and 29 CFR 1910. Prior to commencement of the work, the contractor shall meet in conference with representatives of the Base Safety Officer to discuss and develop mutual understandings relative to the administration of safety. All OSHA work standards shall be followed including lockout and tag out procedures. Specifically, the contractor shall follow NFPA 70 and OSHA 1910, Subpart S.