VOICE SWITCHING AND CONTROL SYSTEM

ATTACHMENT J-1

STATEMENT OF WORK
(SOW)

PRODUCTION PHASE

FAA-VSCS-SOW-002D

DCN-SOW-026 June 12, 2000

April 09, 1997

DEPARTMENT OF TRANSPORTATION

FEDERAL AVIATION ADMINISTRATION

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LIST OF ACRONYMS AND ABBREVIATIONS

AAS	Advanced Automation System
AC	Alternating Current
ACF	Area Control Facility
ADP	Automated Data Processing
AF	Airway Facilities
AF	Also: Air Force
AFLC	Air Force Logistics Command
AFLCP	Air Force Logistics Command Pamphlet
AFSC	Air Force Systems Command
AFSCP	Air Force Systems Command Pamphlet
A/G	Air-to-Ground
ASE	Assistant System Engineer
AT	Air Traffic
ATC	Air Traffic Control
ATCS	Air Traffic Control Specialist
ATE	Automatic Test Equipment
ATO	Alternate Technical Officer
BDR	Baseline Design Review
BUEC	Back-Up Emergency Communications
BUSLAN	Bus Local Area Network
CAI	Contractor Acceptance Inspection
CC	Common Console
CCB	Configuration Control Board
CDG	Course Design Guide
CDR	Critical Design Review
CDRL	Contract Data Requirements List
CHI	Computer-Human Interface
CIDR	Configuration Item Development Record
CITA	Controller Interaction and Task Analysis
CM	Configuration Management
CMRS	Calibration Maintenance Requirements Summary
COTS	Commercial Off-the-Shelf
CRS	Contractor Repair Service
C/SC	Cost/Schedule Control
CSCI	Computer Software Configuration Item
CSQPP	Computer Software Quality Program Plan
CTP	Contract Training Plan
CTSU	Contractor Traffic Simulation Unit
CWBS	Contract Work Breakdown Structure
DBM	Database Management
DCN	Design Change Notice
DCP	Design Competition Phase

LIST OF ACRONYMS AND ABBREVIATIONS (Continued)

DD	Department of Defense
DDF	Development Demonstration Facility
DID	Data Item Description
DLSC	Defense Logistics Service Center
DOD	Department of Defense
DODI	Department of Defense Instruction
DOD-STD	Department of Defense Standard
ECO	Engineering Change Order
ECP	Engineering Change Proposal
ELF	Extremely Low Frequency
EMC/EMI	Electromagnetic Compatibility/Electromagnetic Interference
EMI	Electromagnetic Interference
FAA	Federal Aviation Administration
FAAAC	FAA Aeronautical Center
FAATC	FAA Technical Center
FAT	Factory Acceptance Test
FCA	Functional Configuration Audit
FCC	Federal Communications Commission
FED-STD	Federal Standard
FMECA	Failure Modes, Effects, and Criticality Analysis
FQR	Formal Qualification Review
FRACAS	Failure Reporting, Analysis and Corrective Action System
GFI	Government Furnished Information
GFP	Government Furnished Property
G/G	Ground-to-Ground
HEPP	Human Engineering Program Plan
HFE	Human Factors Engineering
HOL	High Order Language
HVAC	Heating, Ventilating, and Air Conditioning
H/W	Hardware
IAW	In Accordance With
IC	Intercom
ICD	Interface Control Document
ICWG	Interface Control Working Group
IDF	Intermediate Distribution Frame
ILS	Integrated Logistics Support
ILSM	Integrated Logistics Support Manager
IOC	Initial Operational Capability
IP	Interphone
IPB	Initial Product Baseline

LIST OF ACRONYMS AND ABBREVIATIONS (Continued)

IR	ICD Revision
IRD	Interface Requirements Document
ISP	Integrated Support Plan
ISSS	Initial Sector Suite System
JPL	Jet Propulsion Laboratory
LAN	Local Area Network
LCC	Life Cycle Cost
LRU	Line Replaceable Unit
LSA	Logistics Support Analysis
LSAR	Logistics Support Analysis Record
MIL-STD	Military Standard
MMI	Man-Machine Interface
NAILSMT	National Airspace Integrated Logistics Support Management Team
NAS	National Airspace System
NCP	NAS Change Proposal
NOM	NAS Operations Manager
NOR	Notice of Revision
OJT	On-the-Job Training
ORD	Operational Readiness Date
ORD	Also: Operational Readiness Demonstration
OSD	Operational Sequence Diagrams
OST	Operational Site Testing
OT&E	Operational Test and Evaluation
PAT	Production Acceptance Test
PAT&E	Production Acceptance Test and Evaluation
PCA	Physical Configuration Audit
PCR	Physical Configuration Review
PDP	Prototype Development Phase
PDP	Also: Prototype Development Program
PDPU	Prototype Development Program Upgrade
PMR	Program Management Review
PPI	Planned Product Improvements
PROM	Programmable Read-Only Memory
PRR	Production Readiness Review
PSR	Production Status Review

LIST OF ACRONYMS AND ABBREVIATIONS (Continued)

QA	Quality Assurance
QCSP	Quality Control System Plan
RCE	Radio Control Equipment
RDCC	Research and Development Computer Complex
RFA	Request For Action
RMA	Reliability, Maintainability, and Availability
SCN	Specification Change Notice
SDS	Software Development System
SE	System Engineer
SEMP	System Engineering Management Plan
SOW	Statement of Work
SRT	System Requirements Team
SST	System Shakedown Testing
S/W	Software
TASA	Task and Skills Analysis
TBD	To Be Determined
TIM	Technical Interchange Meeting
TPR	Test Preparation Review
TPS	Test Program Set
TRACON	Terminal Radar Approach Control
TRR	Test Readiness Review
TSU	Traffic Simulation Unit
VCE	VSCS Console Equipment
VCET	VSCS Console Equipment Trainer
VDF	VSCS Distribution Frame
VEM	VSCS Electronic Module
VLF	Very Low Frequency
VSCS	Voice Switching and Control System
VSF	VSCS Support Facility

1.0 SCOPE

This Statement of Work (SOW) delineates the Contractor work tasks required to complete full-scale development and proceed through production and installation of the Voice Switching and Control System (VSCS) including the follow-on VSCS systems into the National Airspace System (NAS). The scope of this work effort is discussed in 3.0, Requirements.

The Production Phase work tasks are a continuation and completion of engineering and planning efforts established under the prototype contract. The Production Phase work tasks also include installation, operational checkout and engineering support of the VSCS at each operational site, at the Federal Aviation Administration (FAA) Technical Center (FAATC) and the Mike Monroney Aeronautical Center.

The FAATC will be the site for the VSCS Operational Test and Evaluation (OT&E) and System Shakedown Testing (SST) activities. Initial training will be conducted at a combination of contractor and Government facilities. The FAA Aeronautical Center (FAAAC) will be the site of subsequent VSCS training and logistics activities. An FAATC Support Facility will be provided at the FAATC to support software maintenance of the VSCS.

The initial delivery of the VSCS to the FAATC shall be the current prototype equipment tested during the Prototype Development Phase Factory Acceptance Tests. The Government will conduct a preliminary OT&E on the prototype equipment with support from the contractor.

A prototype upgrade that meets the requirements of FAA-E-2731 (with Addendum 1) shall also be delivered to the FAATC. The time required to complete the design and factory testing of all requirements will force more than one configuration upgrade to the 430-position prototype upgrade system after delivery to the FAATC. The configuration upgrades (e.g., PPI) shall be grouped to minimize the frequency and quantity of total up-grades required. Since functional capabilities may be delivered in groups that do not encompass the full FAA-E-2731 Addenda, the Contractor shall be required to update design documentation, test procedures, training materials, configuration databases and other selected system documents with each major upgrade. Documentation updates are desired for each of the configuration upgrades, not complete re-issues of the Contract Data Requirements List (CDRL). Upgrades shall include only the approved system changes. Limited production authorization will be given by the Government after acceptance of the Prototype Upgrade at the FAATC. The Government will conduct an OT&E on the prototype upgrade with support from the contractor. Full production authorization will be given by the Government after Government OT&E activities are completed.

VSCS shall be delivered to the FAAAC and operational sites by the Contractor. They shall meet the requirements of FAA-E-2731 (with Addendum 1).

Planned Product Improvements (PPI), identified by FAA-E-2731 (with Addendum 2), shall be designed, delivered, installed, tested and maintained by the Contractor in accordance with the provisions of the SOW.

2.0 APPLICABLE DOCUMENTS

2.1 GOVERNMENT DOCUMENTS

2.1.1 Specifications and Standards

The following documents of the exact issue shown in Contract Section C.4 form a part of this Statement of Work to the extent specified herein. The standard DOD-STD-2167 as found throughout this Contract shall mean DOD-STD-2167A as tailored in Section C.

SPECIFICATIONS

FEDERAL

FAA-D-2494	Technical Instruction Book Manuscript: Electronic, Electrical, and Mechanical Equipment Requirements for Preparation of Manuscript and Production of Books.
FAA-E-2731	Voice Switching and Control System Product Specification
FAA-ER-130-005	Advanced Automation System, System Level Specification
FAA-G-1375	Spare Parts - Peculiar for Electronic, Electrical and Mechanical Parts
FAA-G-2100	Electronic Equipment, General Requirements

MILITARY

DOD-D-1000	Drawings, Engineering, and Associated Lists
MIL-E-17555H	Electronic and Electrical Equipment, Accessories, and Repair Parts, Packaging and Packing of
MIL-E-21981	Electronic Type Designations, Identification Plates and Markings, Requirements For
MIL-H-46855	Human Engineering Requirements For Military Systems, Equipment and Facilities
MIL-P-116J	Methods of Preservation

STANDARDS

FEDERAL

FED-STD-5	Standard Guides for Preparation of Proposed Item Logistics Data Records
FED-STD-102B	Preservation, Packaging and Packing Levels

FED-STD-005	Preparation of Specification Documents
FAA-STD-016	Quality Control System Requirements
FAA-STD-021	Configuration Management (Contractor Requirements)
FAA-STD-024	Preparation of Test and Evaluation Plans and Test Procedures
FAA-STD-028	Contract Training Program
FAA-STD-025	Preparation of Interface Control Documentation
FAAD-STD-1293	Servicing Standards and Test Requirements for Ground Electronic Equipment

MILITARY

DOD-STD-100	Engineering Drawing Practices
MIL-STD-105	Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-130	Identification Marking of U. S. Military Property
MIL-STD-275	Printed Wiring for Electronic Equipment
MIL-STD-454	Standard General Requirements for Electronic Equipment
MIL-STD-461	Electromagnetic Emissions and Susceptibility, Requirements for the Control of Electromagnetic Interference
MIL-STD-470	Maintainability Program for Systems and Equipment
DOD-STD-480	Configuration Control - Engineering Changes, Deviations and Waivers
MIL-STD-482	Configuration Status Accounting Data Elements and Related Features
MIL-STD-490	Specification Practices
MIL-STD-499	Engineering Management
MIL-STD-785	Reliability Program for Systems and Equipment Development and Production
MIL-STD-794E	Procedures for Packaging of Parts and Equipment
MIL-STD-881	Work Breakdown Structure for Defense Material Items
MIL-STD-882	System Safety Program Requirements

MIL-STD-965	Parts Control Program
MIL-STD-1388-1	Logistic Support Analysis
MIL-STD-1388-2	DOD Requirements for a Logistic Support Analysis Record
MIL-STD-1472	Human Engineering Design Criteria for Military Systems, Equipment and Facilities
MIL-STD-1521	Technical Reviews and Audits for Systems, Equipments, and Computer Software
MIL-STD-1528	Manufacturing Management Program
MIL-STD-1561	Provisioning Procedures, Uniform Department of Defense
MIL-STD-1629	Procedures for Performing a Failure Mode, Effects and Criticality Analysis
DOD-STD-1686	Electrostatic Discharge Control Program for Protection of Electrical and Electronic Parts Assemblies and Equipment
MIL-STD-2076	Unit Under Test Compatibility with Automatic Test Equipment, General Requirements For
MIL-STD-2077	General Requirements for Test Program Sets
DOD-STD-2167A	Defense Systems Software Development
MIL-STD-45662	Calibration System Requirements
AFR 800-11	Life Cycle Cost Management Program

2.1.2 Other Government Documents, Drawings, and Publications

The following documents of the exact issue shown in Contract Section C.4 form a part of this Statement of Work to the extent specified herein.

FAA-AP-1989-0467	ISSS Controller Interaction and Task Analysis
NAS-IR-61004201	ACF to VSCS IRD
FAA-VSCS-CWBS-006	Voice Switching and Control System Preliminary Contract Work Breakdown Structure - Production Phase
JPL D-3274	Voice Switching and Control System Master Test Plan
FAA Order 1800.8	National Airspace System Configuration Management

FAA Order 1800.58	National Airspace Integrated Logistics Support Policy
FAA Order 3400.3	Airway Facilities, Personnel Certification Program
CTA	SRT POST FAT Evaluation Report
FAA Order 6650.9	Requirements for Area Control Facility (ACF) Under the Floor Cabling
UDI-AAP-166	Controller Interaction and Task Analysis (AAS CDRL EN09)
DOD Manual 4100.38M	Provisioning and Other Preprocurement Screening Manual
AFSCP/AFLCP 173-5	Cost/Schedule Control System Criteria Joint Implementation Guide
DD Form 1949-1	LSAR Data Selection Sheet
DD Form 1949-2	Provisioning Requirements Statement
DD Form 1949-3	LSAR Data Requirements Form
CDRL VP48	Split Functionality Trade Study For The VSCS, June 30, 1992
ASTM-D-3951-90	Practice for Commercial Packaging
DODI 5000.2	Defense Acquisition Management Policies and Procedures, dated 23 February 1991

2.2 ORDER OF PRECEDENCE

In the event of any conflict between the Statement of Work and any referenced documents, the following order of precedence shall be followed:

a. SOW;

b. FAA-E-2731, Voice Switching and Control System Product Specification;

c. Documents specifically referenced within the SOW;

d. Documents referenced by documents specifically referenced in the SOW, although the documents themselves are not specifically referenced.

2.3 APPLICABILITY OF DOCUMENTS

The applicability of documents is detailed in Contract Section C.4.

3.0 REQUIREMENTS

The contractor shall provide necessary personnel, materials, services and facilities, except as otherwise noted herein, to design, fabricate, test, evaluate, deliver, install, and maintain the products described in this Statement of Work. The production phase work and tasks shall be a continuation and completion of the engineering and planning efforts initiated under the prototype contract.

3.1 PROGRAM MANAGEMENT

The Contractor shall implement an organization of management disciplines following the guidelines in DODI 5000.2. The Contractor shall plan the methods and procedures to be used by each management discipline for the direction, coordination, and control of all Contract efforts.

The Contractor shall support an implementation review, and a demonstration review of their cost/schedule control (C/SC) system by a Government team in accordance with AFSCP/AFLCP 173-5, chapter 5.

3.1.1 Planning and Schedule Control

The Contractor shall extend and maintain the Work Breakdown Structure, FAA-VSCS-CWBS-006, in accordance with MIL-STD-881.

The Contractor shall develop schedules to monitor and report program performance in accordance with DODI 5000.2. The Contractor shall derive schedule data from the extended Contract Work Breakdown Structure (CWBS) and implement an integrated hierarchy of network logic schedules from a common database. The Contractor shall analyze the network logic and identify the program critical path. The Contractor shall prepare discussions of the program critical path as requested by the Government.

3.1.2 Financial Management

The Contractor and major Subcontractors shall implement a comprehensive cost/schedule control (C/SC) system that meets the requirements of DODI 5000.2. This requirement is mandatory for non-firm-fixed-price items only. The Contractor shall maintain the C/SC system throughout the life of the Contract.

3.1.3 Performance Analysis and External Reporting

The Contractor shall present and administratively support monthly Program Management Reviews (PMRs). The Contractor shall host the PMR in accordance with MIL-STD-1521, Section 4. The PMRs shall be held principally at the Contractor's primary facility; however, the PMR presentation may be at other Contractor or Government facilities at the direction of the Government. The Contractor shall discuss topics such as status of Reliability, Maintainability, Availability (RMA) activities, Human Factors Engineering (HFE), impacts of program changes on Life Cycle Cost (LCC) program risk, program master schedule, production progress, and critical actions at the PMR.

The Contractor Program Manager, or designee, shall attend the Government Program Status Review (PSR), to be held monthly, at Government facilities, and report on current contract status. The Contractor shall address specific cost, schedule, and technical issues at the review.

3.1.4 Project Management

The Contractor shall conduct formal design, configuration, qualification, and readiness reviews as required to meet program milestones defined in the contract schedule. The Contractor shall conduct technical reviews in accordance with MIL-STD-1521. The Contractor shall conduct additional status reviews, conferences, and technical interchange meetings (TIMs) as defined in this Statement of Work. The Contractor shall request, as necessary, TIMs with the Government to clarify any requirements of this SOW. The Contractor shall support the Deployment Readiness Reviews as requested by the Government which will primarily be held at each site prior to deployment.

3.1.5 Data Management

The Contractor shall establish and maintain a single point of contact for management of all program data requirements. The Contractor shall develop and process formal requests for information or clarification on technical data and administrative or contractual issues, and formal requests for permission to visit Government facilities as a Request for Action (RFA) using procedures approved under the Data Management Plan.

3.2 SYSTEMS ENGINEERING

3.2.1 Systems Engineering Management

The Contractor shall perform and maintain the system engineering management program in accordance with the Government-approved Systems Engineering Management Plan (SEMP). The Contractor shall execute the engineering management techniques for the implementation and control of the VSCS program tasks including installation, integration, quality assurance, software engineering, hardware engineering, integrated logistics support, configuration management, test engineering and production engineering activities.

The Contractor shall maintain consistency between actual practices and the SEMP. The Contractor shall include briefings of new approaches and justify actual or planned deviations from the SEMP at the monthly PMR.

3.2.1.1 Systems Engineering Process - The Contractor shall update and maintain Engineering Notebooks and Software Development Files in accordance with the SEMP. The Contractor shall make the Engineering Notebooks and Software Development Files available for Government review upon request.

3.2.1.2 Program Risk Analysis - The Contractor shall maintain a risk analysis activity that focuses on identifying and assessing factors contributing to risk, developing alternatives to reduce the risk, and implementing and monitoring the selected alternatives in accordance with MIL-STD-499, paragraph 10.1.2. The Contractor shall identify high risk items and discuss their management at the monthly PMR.

3.2.1.3 Systems Engineering Technical Reviews - The Contractor shall conduct Production and Technical Reviews in accordance with MIL-STD-1521. The VSCS Contractor shall conduct technical interchange meetings (TIMs) as required, for Government review of design approaches to meet M-1/ISSS Essential Supplement and PPI requirements. Design status, design architecture, design alternative trade analysis findings, and all other specific design information shall be offered on the agenda of the earliest regularly scheduled TIM.

Design data presented as a matter of course at Contractor internal meetings can be substituted for TIM presentations when the Government is invited in advance of the Contractor meeting. Additional TIMs may be proposed by the Contractor, at the frequency and quantity as approved by the Government, when the design information exceeds the capacity of regularly scheduled TIMs. Additional TIMs shall be scheduled as necessary to include, but not be limited to, reconfiguration and split functionality. Topics for any TIM which includes design information, shall be documented by CDRL action to include comment resolution, detailed architecture changes, designer notes and issues, operational scenario and software code walkthroughs, and test and development status. Demonstrations of (partial or) full functionality will always precede the conclusion of design development, utilizing the test beds and VSCS assets at the Contractor's factory and/or FAATC.

3.2.1.3.1 Prototype Upgrade Test Readiness Review (TRR)

3.2.1.3.2 Prototype Upgrade Functional Configuration Audit (FCA)/Formal Qualification Review (FQR) - The Contractor shall plan and conduct an FCA/FQR on the prototype upgrade in accordance with FAA-STD-021 and MIL-STD-1521.

3.2.1.3.3 Prototype Upgrade Physical Configuration Audit (PCA) - The Contractor shall plan and conduct a PCA on the prototype upgrade at the FAATC in accordance with FAA-STD-021 and MIL-STD-1521.

3.2.1.4 Product Improvements Reviews

3.2.1.4.1 Product Improvements Baseline Design Review - The Contractor shall plan and conduct a baseline design review (BDR) for each of the major product upgrades planned. Each BDR shall summarize the architecture and technical changes since the previous design review, and combine as many of the design changes as practical. A BDR shall not include the detailed design data covered in the TIMs (see 3.2.1.3). It shall, however, include the appropriate design summary information listed in Appendix E of MIL-STD-1521 and be submitted to the Government for approval.

3.2.1.4.2 Product Improvements TRRs - (See 3.6.4.1)

3.2.1.4.3 Product Improvements FCA/FQR - The Contractor shall plan and conduct an FCA/FQR on the configuration upgrades and PPI in accordance with FAA-STD-021 and MIL-STD-1521.

3.2.1.4.4 Product Improvements PCA - The Contractor shall plan and conduct a PCA on the configuration upgrades and PPI in accordance with FAA-STD-021 and MIL-STD-1521.

3.2.2 System Engineering Design

The Contractor shall update and document the VSCS System Engineering Design for the prototype upgrade and the production systems in accordance with FAA-E-2731 (with Addendum 1). The prototype upgrade and production systems shall meet the requirements of FAA-E-2731 (with Addendum 1). The prototype upgrade shall be populated with a representative number of production quality assemblies. Production units scheduled for delivery to the FAAAC and to operational sites shall be fully populated with production quality assemblies.

The Contractor shall update and document the VSCS System Engineering Design to include the PPI requirements of FAA-E-2731 (with Addendum 2).

3.2.2.1 Hardware Engineering Design - The Contractor shall update and document the VSCS Hardware Engineering Design in accordance with the requirements of FAA-E-2731 (with Addendum 1). The Contractor shall coordinate with the Display System Replacement (DSR) Contractor to ensure Man/Machine Interface (MMI) form, fit, and function between the VSCS Console Equipment and the DSR Console. The Contractor shall update and document the VSCS hardware engineering design to meet the PPI requirements of FAA-E-2731 (with Addendum 2). The Contractor shall deliver the VSCS hardware documentation to the Government.

3.2.2.2 Software Engineering Design - The Contractor shall update and document the VSCS software and database design in accordance with the M-1/ISSS Essential requirements of FAA-E-2731 (with Addendum 1) and the Software Development Plan. The Contractor shall plan the integration of all information that is required to perform life cycle support for the deliverable software. The Contractor shall update and document the VSCS software engineering design to meet the PPI requirements of FAA-E-2731 (with Addendum 2). The Contractor shall deliver the VSCS software documentation to the Government.

3.2.2.3 Government Furnished Property (GFP) Modifications - The Contractor shall design and develop any modifications to GFP software in accordance with DOD-STD-2167. The Contractor shall design and develop any modifications to GFP hardware to meet the requirements in FAA-E-2731 (with Addendum 1).

3.2.2.4 Prototype Development Phase Waivers and Definitions - The Contractor shall design the prototype upgrade and production systems to meet all the M-1/ISSS Essential Requirements in FAA-E-2731 (with Addendum 1), including those which were not met due to waivers or deviations granted by the Government, during the Prototype Development Phase (PDP). The Contractor shall request any waivers to this Contract in accordance with 3.12.3.2.

3.2.2.5 Contractor Studies

3.2.2.5.1 Mike Monroney Aeronautical Center Training Support Equipment Study - The Contractor shall conduct a study at the Mike Monroney Aeronautical Center to define the following in accordance with the M-1/ISSS Essential Requirements of FAA-E-2731 (with Addendum 1), Appendix D. The Contractor shall document the results of the study in the System/Design Trade Study Reports CDRL.

a. The Airway Facilities (AF) training system concept of operation and required operational capabilities.

b. The hardware and software system functionality required to provide simultaneous AF maintenance training (including maintenance diagnostic training) support for 12 student workstations and one (1) instructor workstation.

c. The approach to providing Existing Radio Interfaces, Backup Emergency Communications (BUEC) and other external interface equipment or simulators for the support of AF training requirements.

d. The equipment and workstations required for AF training in accordance with the requirements of FAA-E-2731 (with Addendum 1), Appendix D, paragraph 4.

3.2.2.5.2 Contractor Training Equipment Study - The Contractor shall conduct a study to define the training equipment for use in the DYSIM Laboratory at the FAATC and the operational sites in accordance with the following guidelines.

a. A training sector shall consist of: two (2) student positions, two (2) instructor positions, and three (3) ghost/pilot positions. In addition, there shall be one (1) master instructor position for each six (6) training sectors. Each training sector shall have access to at least five (5) simulated Air-to-Ground (A/G) circuits and five (5) simulated Ground-to-Ground (G/G) circuits.

b. The student positions shall use standard VSCS Console Equipment (VCE) mounted in Common Consoles. Training operations at the student positions shall be such that no functional or display differences are detectable between the training environment and actual air traffic control operations. The student positions shall provide an audio recording output with the same characteristics as the position recording output required by FAA-E-2731.

c. The instructor positions, ghost/pilot positions, and master instructor positions may use alternate communications equipment to satisfy the communications requirements for the position.

d. The capability shall be provided for student positions to be configured to function as operational positions. In this mode, the student positions shall be capable of live air traffic control communications, with access to all system assets. The configuration change from training to operational status shall be accomplished in no more than two (2) minutes.

e. The training equipment shall support at least 20 training sectors.

f. The training equipment shall be capable of at least the following connectivity.

1. There shall be unrestricted simulated intercom (IC) capability allowing communications between any student position, ghost/pilot position, instructor position, or master instructor position.

2. The student positions shall be capable of simulated A/G communications with any ghost/pilot position and simulated G/G Interphone (IP) communications with any ghost/pilot position.

3. The instructor positions shall be capable of monitoring all communications at any student position, initiating conference communications with student and ghost/pilot positions up to the conference limit, and initiating conference communications with other instructor and master instructor positions up to the conference limit.

4. The ghost/pilot positions shall be capable of simulated A/G communications and simulated G/G (IP) communications with any student position.

5. The master instructor positions shall be capable of monitoring any student or instructor position.

g. The training equipment shall provide for reconfiguration, by the master instructor positions, of simulated A/G and G/G assets available at the student and ghost/pilot positions.

3.2.2.5.2.1 Contents of Design Study - The Contractor's design study shall consider at least two (2) approaches to satisfying the training equipment requirements. One approach shall provide for all simulated communications for training taking place within the VSCS equipment with software partitioning to allow any VSCS position to act as a student position. The second approach shall provide for an external switching and control system to provide all simulated communications for training with a capability to configure dedicated student positions for use in live air traffic control. The contractor's design study shall include the following:

a. A detailed operational description providing the precise functioning of the training equipment. This shall be accomplished via Operational Sequence Diagrams (OSDs) or the functional equivalent. The description shall also include a comprehensive analysis of all VSCS functions and features as defined by FAA-E-2731 with Addenda. This analysis shall, for each paragraph in FAA-E-2731 with Addenda, state whether the training equipment will or will not impact that paragraph and its associated VSCS functionality. For each case which results in an impact, the operational description shall detail the impact.

b. A list of any issues or trade-offs associated with implementing the training equipment.

c. The impact, including a risk analysis, of implementing the training equipment at the FAATC and the operational sites.

d. The hardware, software, and system functionality required to implement the training equipment at the FAATC and the operational sites.

e. The Contractor's approach to support the training equipment at the FAATC and the operational sites.

f. The facility requirements necessary to support the training equipment such as floor space, Heating, Ventilating, and Air Conditioning (HVAC) and power and grounding requirements.

3.2.2.5.2.2 Design Study Results - The contractor shall document the results of the study in the System/Design Trade Study Reports CDRL.

3.2.2.5.2.3 Technical Interchange Meeting - The contractor shall support two training equipment TIMs and additional TIMs as required. The first TIM shall present the initial results of the Contractor's Operational Description. The second TIM shall be held two weeks after delivery of the Contractor's Training Study Report.

3.2.2.5.2.4 Government Estimate - The Government estimates that this design study will require a level of effort of between 10 and 12 staff/months.

3.2.2.5.3 Reserved

3.2.2.5.4 Contractor Switch By-Pass Study for Backup Emergency Communications (BUEC) - The Contractor shall conduct a study of a switch by-pass feature. Multiple approaches to satisfy this requirement may be suggested. As an example, providing connection to a fixed group of BUEC equipment or providing connection to the specific BUEC equipment currently in use. For each approach, the study shall, at a minimum, address the following:

a. A detailed operational description of the switch by-pass.

The concept of a switch by-pass is to provide an alternate path, for connection from the operational position jack module to the BUEC equipment at a facility, that is not dependent on the VSCS switching equipment. This alternate path would provide continued air-ground communications capability at all positions in the event of a complete failure of the VSCS back room equipment. The use of the VSCS console equipment (VCE) is permissible for this function provided the VCE will be operational with a complete failure of the VSCS back room equipment. An alternate method should be provided if the VCE cannot operate during a complete VSCS failure.

The Contractor's operational description shall detail the precise functioning of the switch by-pass and the sector's A/G communications from the ATC operational perspective. This shall be accomplished via Operation Sequence Diagrams (OSDs) or their functional equivalent.

b. A detailed functional description of switch by-pass.

This shall include a description of the functionality required to support switch by-pass operation, including, but not limited to, the means by which switch by-pass is enabled and disabled.

c. A list of any issues associated with switch by-pass which present a degree of risk for ATC operations, and the Contractor's approach to risk mitigation.

d. The technical and schedule impact, including a risk analysis, of implementing the switch by-pass feature at the FAATC, the FAAAC, and the operational sites.

e. The hardware, software, and system functionality required to implement the switch by-pass features at the FAATC, the FAAAC, and the operational sites.

f. The Contractor's approach to support the switch by-pass feature at the FAATC, the FAAAC, and the operational sites.

g. The facility requirements necessary to support the switch by-pass feature, such as floor space, HVAC, and power and grounding requirements.

h. Impacts to on-going design and implementation of the VSCS on the FAATC, the FAAAC, and the operational sites.

3.2.2.5.4.1 Design Study Results - The Contractor shall document the results of the study in the System/Design Trade Study Reports CDRL.

3.2.2.5.4.2 Technical Interchange Meeting - The Contractor shall support two switch by-pass TIMs and additional TIMs as required. The first TIM shall present the initial results of the Contractor's Operational and Functional Description. The second TIM shall be held two weeks after delivery of the Contractor's Switch By-Pass Study Report.

3.2.2.5.4.3 Government Estimate - The Government estimates that this design study will require a level of effort of six to eight staff months.

3.2.2.6 Commercial Products - Commercial products are preferred. The Contractor shall verify that commercial hardware and software products used in the VSCS comply with the functional, performance, physical, and RMA requirements as follows:

a.	Current prototype equipment	- Selected requirements of FAA-E-2731 (without Addenda)
b.	Prototype Upgrade	- ORD requirements of FAA-E-2731 (with Addendum 1)
c.	Production Systems	- Requirements of FAA-E-2731 (with Addendum 1)
d.	Planned Product Improvements	- Planned Product Improvements of FAA-E-2731 (with Addendum 2)

3.2.2.7 VSCS Mockup Initiatives for the Development Demonstration Facility (DDF)

3.2.2.7.1 Description - The contractor shall perform the design, fabrication, and installation activities necessary to develop and/or fabricate the following mockups in support of the VSCS initiatives for the Development Demonstration Facility (DDF), Gaithersburg, MD.

a. Mockup of the M-1 Console Sector - The Contractor shall design and fabricate replacements for the existing four-position M-1 console equipment which will be used for the DDF mockups. The sector mockup will include two (2) radar positions, one (1) data position, and one (1) assistant position. The Contractor shall perform M-1 console modifications as necessary (to include the installation of the Contractor-provided bezel, tracker position configurations, and VCE mockups) to simulate the appearance of an operational M-1 console sector. The Government will authorize the Contractor the use of the existing four (4) M-1 consoles as Government Furnished Property (GFP). The Contractor shall deliver and install the M-1 console sector mockup in the DDF.

b. Mockup of VSCS Equipment Supporting M-1 Control Room Area Supervisor Positions - The Contractor shall design and fabricate one (1) prototype M-1 control room area supervisor VSCS stand-alone pedestal- style equipment enclosure (including VSCS mockup equipment) and one (1) prototype M-1 control room area supervisor VSCS desktop turret- style equipment enclosure (including VSCS mockup equipment). These equipment enclosures shall contain mockups of VCE components, VSCS workstation equipment, and recorders to simulate the appearance of an area supervisor position equipment enclosure with a complete suite of operational VSCS equipment.

   The Contractor shall provide one (1) VSCS workstation printer mockup. This stand-alone printer mockup will not be mounted in the M-1 control room area supervisor equipment enclosures. The Government shall provide the preliminary designs/ drawings from which the Contractor shall develop the mockups. The Government will authorize the Contractor the use of GFP. The Contractor shall deliver and install the supervisor position stand-alone pedestal and desktop turret equipment enclosures in the DDF.

c. Mockup of Initial Sector Suite System (ISSS) Area Supervisor Position -The Contractor shall fabricate the prototype of the ISSS control room area supervisor position equipment enclosure (including VSCS equipment) in accordance with the Government-provided documentation. The Contractor shall provide one (1) ISSS area supervisor position prototype enclosure, to include mockups of VCE components, VSCS workstation equipment, recorders, and other required automated workstation equipment (ATOMS, MWP, etc.) needed to simulate the appearance of an ISSS area supervisor position with a complete suite of required equipment. The Contractor shall provide one (1) VSCS workstation printer mockup. This stand-alone printer mockup will not be mounted in the ISSS area supervisor equipment enclosure. The Government shall provide the preliminary design/drawings from which the Contractor shall use to develop the mockup. The Government will authorize the Contractor the use of GFP. The Contractor shall deliver and install the ISSS area supervisor position equipment enclosure in the DDF.

3.2.2.7.2 Mockup Construction Guidelines - The VSCS equipment mockups (VCE, workstation equipment, recorders, etc.) and ISSS area supervisor automated equipment mockups are not required to be operational but to the extent possible will be similar in appearance to operational equipment. The Contractor may request, for Government approval, to mount actual VCE and VSCS workstation equipment in the equipment enclosures. The Contractor must obtain Government approval of the materials and the associated color-schemes to be used for the fabrication of the mockups. The materials and color schemes used will be as close as possible to those being used in the final equipment, but due to time constraints, may not be exact. Such approvals will be made at the Preliminary Technical Design Meeting. The Contractor shall follow standard industry practices for developing and fabricating the mockups.

3.2.2.7.3 Design Reviews - The Contractor shall conduct a preliminary design review and a final design review. At the preliminary design review, the Contractor shall provide for Government approval, the basic designs, list of materials, associated color schemes, and completion schedule to be used for the construction of the mockups.

During the final design review, which will occur approximately two (2) weeks prior to shipment date of the mockups to the DDF, the Government will review the mockups prior to shipment to the DDF.

3.2.2.7.4 Technical Drawings - The Contractor shall provide Level I drawings of all mockups delivered to the DDF.

3.2.2.8 Supervisory/Ancillary Position Equipment

3.2.2.8.1 Description - The Contractor shall perform the design, fabrication and installation activities to develop and/or fabricate the following VSCS Supervisory/Ancillary Position Equipment enclosure options:

a. Type 101 - Large Pedestal - This option shall be based on the model that the Contractor provided to the FAA Development Demonstration Facility.

b. Type 102 - Small Pedestal - This option shall be based on the enclosures developed by the Northwest Mountain Region.

c. Type 103 - Small Turret - This option shall be based on the enclosures developed by the Northwest Mountain Region.

d. Type 104 - Left-hand model low-profile Turret - This option shall be based on the enclosures developed by the Northwest Mountain Region.

e. Type 105 - Right-hand model low-profile Turret - This option shall be based on the enclosures developed by the Northwest Mountain Region.

f. Type 106 - Large Turret - This option shall be based on the model that the Contractor provided to the FAA Development Demonstration Facility.

g. Type 107 - Student Desk - This option shall be based on the Contractor's "student desk".

h. Type 108 - Supervisory Desk - This option shall be based on the Contractor's "supervisory desk" with a fixed (nonadjustable) VDM structure.

i. Type 109 - Console Mock-up Cabinets - This option shall be based on the contractor's enclosure design provided to the FAA in letter 1725-1968.

3.2.2.8.2 Construction Guidelines - The equipment enclosures shall be considered as furniture and not as equipment. The equipment enclosures shall meet the system design and construction requirements of FAA-E-2731, except for paragraphs 3.9.4.4 and subparagraphs, paragraph 3.9.4.10.2, paragraph 3.9.5.2.1, paragraph 3.9.5.4 and subparagraphs, paragraph 3.9.14.1 and paragraph 3.11.2. The equipment enclosures shall not be considered as "system units" in the context of FAA-E-2731, paragraph 3.9.4.12. The contractor shall conduct a preliminary and final design review and receive concurrence prior to the fabrication of any enclosure for delivery. Options 107, 108, and 109 are already designed by the contractor and require no metal construction.

3.2.2.8.3 Technical Drawings - The Contractor shall provide the program office with two copies of the Level I drawing package for each option at the final design review as a letter transmittal. One copy of the drawing package for each option shall be provided at site survey to assist in the selection of the appropriate option for the location.

3.2.2.8.4 Site Survey - The Contractor shall hold discussions with the appropriate FAA on-site personnel during the site survey to select the appropriate enclosure(s) option for each site.

3.2.2.8.5 Delivery, Installation, and Fit-up - The Contractor shall deliver the equipment enclosures identified four months prior to VSCS delivery as defined in section F of the contract. The Contractor shall install the equipment enclosures in conjunction with modification to the M-1 consoles. The Contractor shall fit-up the equipment enclosures with VCE and/or supervisory position equipment including all brackets, cables, cable retainers, and cable retractors.

3.2.3 Reliability, Maintainability, Availability (RMA)

The Contractor shall implement an RMA program in accordance with the RMA program plan to meet the RMA requirements in FAA-E-2731. The Contractor shall implement VSCS reliability and maintainability concepts in accordance with FAA-E-2731, MIL-STD-785, Task 101, and MIL-STD-470, Task 101. The Contractor shall implement the RMA program to include controls on Subcontractors and Vendors in accordance with MIL-STD-470, Task 102, and MIL-STD-785, Task 102. The Contractor shall present the RMA Program status at the monthly PMR.

3.2.3.1 RMA Modeling and Prediction - The Contractor shall maintain an RMA model and predictions to address requirements in FAA-E-2731. The Contractor shall revise the model and predictions in accordance with MIL-STD-785, Tasks 201 and 203, to reflect changes to the design that affect the results of predictions and actual RMA data delivered from testing. The results of the RMA modeling and predictions shall be provided in the RMA Analysis Report.

3.2.3.2 Failure Modes, Effects, And Criticality Analysis - The Contractor shall update and maintain the Failure Modes, Effects, and Criticality Analysis (FMECA) program to address the requirements in FAA-E-2731. The Contractor shall provide a failure mode/failure effects analysis that defines and interrelates the fault detection, error processing and recovery mechanism for every category of failure mode in accordance with MIL-STD-785, Task 204, and MIL-STD-470, Task 204. The results of the FMECA shall be documented in the RMA Analysis Report.

3.2.3.3 Failure Mode/Stress Testing - The Contractor shall perform a series of Failure Mode/Stress Tests at the factory, FAATC, and at each operational site. These tests shall be used to determine the system's reaction to combinations of stressful inputs and load conditions and to verify or uncover problems with the recovery mechanisms of the VSCS. The Contractor shall plan and provide for the collection, maintenance, and analysis of all relevant testing data and for identifying and resolving VSCS problems as a result of the testing. The results of the testing shall be documented in the RMA Analysis Report.

3.2.3.4 Failure Reporting, Analysis and Corrective Action System - The Contractor shall update and maintain the Failure Reporting, Analysis, and Corrective Action System (FRACAS) program to include the requirements in FAA-E-2731. The Contractor shall collect failure, recovery, and maintenance data in accordance with MIL-STD-470, Task 104, and MIL-STD-785, Task 104. The results of the FRACAS shall be documented in the FRACAS Summary Report.

3.2.3.5 Maintainability Analysis and Allocation - The Contractor shall update allocation of fault isolation and repair times for maintenance actions to include the requirements in FAA-E-2731 in accordance with MIL-STD-470, Task 202. The Contractor shall identify and maintain resources required to support the hardware and software maintenance program in accordance with MIL-STD-470, Task 205. The Contractor shall support the Maintenance Planning activity of the Logistics Support Analysis in accordance with MIL-STD-470, Task 207. The results of the maintainability analysis shall be documented in the RMA Analysis Report.

3.2.3.6 Availability Growth Program - The Contractor shall establish and maintain an availability growth program. The Contractor shall collect, report, and analyze availability growth data from the current prototype equipment, the prototype upgrade and production units until the field sites meet the availability requirements in FAA-E-2731. The results shall be documented in the Availability Growth Assessment Report.

3.2.3.7 RMA Reviews - The Contractor shall conduct monthly RMA reviews in accordance with MIL-STD-785, Task 103, and MIL-STD-470, Task 103. These RMA reviews shall be conducted separately from the monthly Program Management Reviews (PMRs).

3.2.4 System Security

The Contractor shall incorporate into the VSCS design, the system security features defined by the FAA-approved System Security Plan (CDRL item V092), as developed under the prototype contract. The Contractor shall maintain the Plan and the documents developed under section 2.4 of the Plan in accordance with the Configuration Management requirements defined in 3.12. The Contractor shall develop and implement internal procedures to maintain the confidentiality of the material developed by the system security work effort.

3.2.5 Electromagnetic Compatibility/Electromagnetic Interference (EMC/EMI)

The Contractor shall implement a VSCS Electromagnetic Interference Control Plan and conduct a VSCS EMC/EMI Program in accordance with the EMC/EMI requirements of FAA-E-2731. All problem areas shall be documented in the EMI Control Plan.

3.2.5.1 EMC/EMI Joint Testing with AAS Program - The VSCS Contractor shall plan and coordinate joint EMC/EMI Common Console Equipment Testing with the AAS Contractor. The tests shall take place after the VSCS console equipment is installed within the AAS console at the AAS Contractor's facility and at the FAATC.

3.2.6 Human Factors Engineering

The Contractor shall conduct a Human Factors Engineering (HFE) Program in accordance with the Human Engineering Program Plan (HEPP) and update the VSCS human factors design to ensure an operationally usable system. The Contractor shall update the Human Engineering Program Plan to reflect the activities and schedule of HFE work to be performed during the Production Phase.

The Contractor shall present the Human Engineering Program status at the monthly PMR, and in the Program Status Report. This status shall be based on the HEPP and shall include the status of Contractor human engineering activities, design recommendations, action items, problems, and schedules.

3.2.6.1 Human Factors Engineering and Man/Machine Interface (MMI) Analysis and Design - The Contractor shall review the ISSS Controller Interaction and Task Analysis (CITA), FAA-AP-1989-0467-CDRL- ENO9 (Volume I, Parts 1-4), and shall also participate in hardware design Technical Interchange Meetings (TIMs) with the Government and the AAS Contractor to ensure compatibility between the AAS and VSCS MMI designs.

The Contractor shall review the System Requirements Team (SRT) Post-Factory Acceptance Test (FAT) Evaluation Report and provide an analysis of the design changes necessary to respond to the evaluation comments included in that report. The Contractor shall implement design changes necessary to resolve any outstanding MMI issues. All MMI design changes implemented during the Production Phase shall be reflected in the Human Factors Design Document.

The Contractor shall review the AAS Controller Interaction and Task Analysis (CITA), UDI-AAP-166, and AAS CDRL EN09 and shall also participate in hardware design Technical Interchange Meetings (TIMs) with the Government and the AAS Contractor to ensure compatibility between the AAS and VSCS MMI designs. Areas of compatibility analyses include, but are not limited to, VCE, information coding, lighting, display legibility and reachability, audible tones, and workload implications. The VSCS Contractor shall advise the Government of any incompatibilities and shall work with the Government and the AAS Contractor to resolve these issues.

3.2.6.1.1 VCE MMI Modifications - The Contractor shall modify the Prototype VSCS display screen formats to ensure an operationally suitable MMI design. The Contractor shall update and/or modify screen formats in response to Government evaluation comments.

3.2.6.1.1.1 Legibility - The Contractor shall investigate alternative information coding techniques to ensure that information is readable and distinguishable on the VSCS screen. The Contractor shall ensure that the selected techniques shall provide legibility while maintaining adequate screen brightness and contrast.

To ensure legibility and readability at a glance, the Contractor shall consider character fonts, character size and width, text positioning/spacing, and text vs. background contrast. Legibility and readability from both seated and standing controller positions shall be considered.

The VSCS Contractor shall coordinate ambient lighting design with the AAS Contractor to ensure legibility of the VSCS displays under various lighting conditions. The VSCS Contractor shall demonstrate that the VSCS displays are readable under these lighting conditions. Realistic display locations and orientation to the user shall be employed in the demonstration. The demonstration shall encompass VSCS display locations for the M-1 and AAS Common Consoles.

3.2.6.1.1.2 Visual, Audible, and Error Feedback - The Contractor shall design visual and audible feedback for touch entry verification. Detectable visual key change or highlighting techniques shall be investigated. The Contractor shall design the visual feedback technique to ensure that the controller's finger does not obstruct the view of visual feedback. Audible feedback techniques shall be analyzed to reduce the probability of distraction to others while providing positive feedback to the controller at that position. The Contractor shall provide immediate error feedback to permit the user to understand the source of the error and to correct the error.

3.2.6.1.1.3 Screen Layout and Location - The Contractor shall consider the frequency and/or criticality of functions in the placement, size, and functional grouping of function keys in the design of the VSCS screen layout design. Physical location of the VSCS displays relative to the user in both the existing console and the AAS Common Console shall be considered. Specifically, the Contractor shall consider the reach, view, and readability of the display from the user's position to optimize the VSCS screen layout and location.

The Contractor shall analyze the realistic conditions under which inadvertent activation could occur. The screen layout shall be designed to minimize inadvertent activation of critical functions (e.g., deselection of an A/G frequency). The Contractor shall give consideration to the location of the VSCS displays within the controller's workstation relative to other console devices. The Contractor shall also evaluate the operational environment and operating practices which could cause inadvertent activations.

3.2.6.1.1.4 Coding Strategy - The Contractor shall determine whether coding capabilities provided by the selected hardware are sufficient to implement an acceptable VSCS MMI. The Contractor shall investigate coding techniques to differentiate types of function keys and function or call states. Coding strategies shall be designed to optimize rapid and accurate search, recognition, and legibility of functions. The Contractor shall identify the impact of coding strategies on hardware and/or software alternatives while providing operationally suitable coding strategies.

If multiple blink rates are used as a coding technique, the Contractor shall determine the blink rates and duty cycles to permit easy discrimination among the distinct blink rates. The Contractor shall consider the impact of using blinking text as a coding technique on screen legibility. To improve legibility where blinking is used, the Contractor shall consider alternatives such as brightness modulated duty cycles versus on/off duty cycles.

The Contractor shall use appropriate applications of color and color contrast in accordance with human factors principles.

3.2.6.1.2 Existing Console Design Modifications For The VSCS Console Equipment (VCE) - The Contractor shall review the SRT Post-FAT Evaluation Report and identify any design changes necessary to the VCE existing console hardware layout. The Contractor shall also identify the modifications required to install the VCE in the existing consoles including the installation of the cables required for the VCE hardware.

3.2.6.1.3 MMI TIMs And Demonstrations - The Contractor shall conduct monthly MMI Technical Interchange Meetings (TIMs) and demonstrations, as necessary, and shall support controller hands-on evaluation of the MMI modifications. The scope of the MMI demonstrations and evaluations shall encompass the Air Traffic Control (ATC) and Air Traffic (AT) supervisory MMI and the VSCS M-1 console layout. The Contractor shall support controller hands-on evaluation of the VSCS MMI at the Production Phase Critical Design Review (CDR).

3.2.6.2 Human Factors Design Documentation - The complete MMI design for each VSCS position type and each VSCS function, including design changes required to meet Production Phase requirements, shall be reflected in the Human Factors Design Document. The MMI design shall include the student and instructor positions at the Mike Monroney Aeronautical Center and the VCE Trainer (VCET).

3.2.6.3 Human Factors Engineering Personnel Safety - The Contractor shall design the VSCS to meet applicable personnel hazard and safety requirements in MIL-STD-1472. The Contractor shall verify that the equipment and system design provides safe performance by personnel responsible for the testing, installation, implementation, training, operation, maintenance, and control of the VSCS.

3.2.7 Interface Management

The Contractor shall maintain an interface management program that includes all VSCS hardware and software interfaces to meet the M-1/ISSS Essential Requirements in FAA-E-2731 (with Addendum 1). The Contractor shall include the PPI requirements of FAA-E-2731 (with Addendum 2) in the interface management program.

3.2.7.1 Interface Control Documents (ICDs) - The Contractor shall develop new ICDs and update all ICDs developed during the Prototype Development Phase to meet the requirements in FAA-E-2731 (with Addendum 1) for the prototype upgrade and all production systems. The Contractor shall develop all ICDs in accordance with FAA-STD-025. The Contractor shall develop new ICDs and/or update ICDs previously developed, to include the PPI requirements of FAA-E-2731 (with Addendum 2).

3.2.7.1.1 External Interfaces - The Contractor shall develop and update all ICDs for interfaces between the VSCS and external systems to meet the M-1/ISSS Essential Requirements in FAA-E-2731 (with Addendum 1) for the prototype upgrade and all production systems. The Contractor shall develop and update all ICDs for interfaces between the VSCS and external systems to meet the PPI requirements of FAA-E-2731 (with Addendum 2).

3.2.7.1.2 Transitional Interfaces - The Contractor shall update and maintain the ICDs to meet the transitional requirements necessary for the VSCS site integration.

3.2.7.2 Interface Control Working Group (ICWG) - The Contractor shall support ICD and Interface Requirements Document (IRD) ICWG technical and administrative activities in accordance with FAA-STD-021, Appendix II.

3.2.7.2.1 Interface Requirements Document (IRD) ICWG - The Contractor shall support the Government-conducted IRD ICWG. The Contractor shall review Government-developed IRDs and attend IRD ICWGs. The Government will provide permanent administrative support for the IRD ICWG. The IRD ICWG will consist, subject to the requirements of the ICWG agenda, of at least one member from each interfacing Contractor and appropriate Government representatives. The Contractor shall, upon Government request, provide a technical support member to the IRD ICWG.

3.2.7.2.2 Interface Control Document (ICD) ICWG - The Contractor shall support the ICD ICWG activities which include ongoing interface concerns, tabletop reviews, ICWG reviews, and NAS Configuration Control Board (CCB) reviews of all ICDs and ICD revisions (IRs). The Contractor shall provide permanent administrative support for the ICD ICWG. The Contractor shall coordinate all ICDs with the Government.

3.2.7.3 Existing Radio Interface(s) - The Contractor shall implement in the prototype upgrade and in the production systems the interfaces designated in FAA-F-2731 (with Addendum 1) as "existing radio interface(s)".

3.2.8 AF Maintenance Training and Depot Support Documentation

3.2.8.1 Operational Readiness Demonstration (ORD)/ORD Supplement Requirements Documentation - The Contractor shall, in accordance with the M-1/ISSS Essential Requirements of FAA-E-2731 (with Addendum 1), update: the System/Segment Specification; Hardware, Software and Interface Requirements Specifications; Engineering Drawings, Installation Drawings, and Associated Lists; and Top Level and Detailed Design Documents to incorporate training and depot support equipment and software.

3.2.8.2 Planned Product Improvements Requirements Documentation - The Contractor shall, in accordance with the PPI requirements of FAA-E-2731 (with Addendum 2), update: the System/Segment Specification; Hardware, Software and Interface Requirements Specifications; Engineering Drawings, Installation Drawings, and Associated Lists; and Top Level and Detailed Design Documents to incorporate training and depot support equipment and software.

3.3 VSCS SOFTWARE DESIGN CODE, BUILD, AND MAINTENANCE

3.3.1 VSCS Operational Software

The Contractor shall develop code and build the VSCS operational software in accordance with the Software Development Plan and DOD-STD-2167 to meet the requirements in FAA-E-2731.

3.3.2 VSCS Maintenance and Support Software

3.3.2.1 Requirements - The Contractor shall design, code, and build and provide all software, including commercial software and any special VSCS unique developmental software necessary to support, update and maintain the VSCS software at the FAA Technical Center and the Mike Monroney Aeronautical Center.

a. The Contractor shall design, code, and build or provide all software required to implement VSCS Hardware Maintenance and Diagnostic Training at the Mike Monroney Aeronautical Center in accordance with the requirements of FAA-E-2731 (with Addendum 1), Appendix D.

b. The Contractor shall design, code, and build or provide all software required to implement a stand-alone VCE Trainer (VCET) in accordance with the requirements of FAA-E-2731 (with Addendum 1), Appendix D.

All Maintenance and Support Software for the maintenance and support of the VSCS software shall be developed and documented in accordance with the Software Development Plan and DOD-STD-2167.

3.3.2.2 PPI Requirements - The Contractor shall design, code, and build, or provide all software, including commercial software and any special VSCS unique developmental software necessary to support, update and maintain the VSCS PPI software at the FAATC and the Mike Monroney Aeronautical Center.

The Contractor shall design, code, and build or provide all software required to implement PPI Hardware Maintenance and Diagnostic Training at the Mike Monroney Aeronautical Center in accordance with the PPI requirements of FAA-E-2731 (with Addendum 2), Appendix D.

All Maintenance and Support Software for the maintenance and support of the VSCS PPI software shall be developed and documented in accordance with the Software Development Plan and DOD-STD-2167.

3.3.3 ATE and TPS Software Development

The Contractor shall develop Automatic Test Equipment (ATE) and Test Program Set (TPS) software and hardware adapter boards for the Voice Switching and Control System depot maintenance facility at the Mike Monroney Aeronautical Center and the National Automation Field Support Sector at the Federal Aviation Administration Technical Center.

3.3.4 Database Build

The Contractor shall develop and configure a database for each operational site containing site specific communications maps for airspace sectors, areas, and facilities. The Contractor shall demonstrate the map generation capabilities/procedures for each site to accommodate resectorization, and reconfiguration activities. The data developed shall be documented in the Map Generation Report.

3.4 VSCS HARDWARE PRODUCTION, ASSEMBLY AND INTEGRATION

3.4.1 Hardware Production - The Contractor shall fabricate and/or acquire all hardware necessary to meet the requirements of FAA-E-2731 (with Addendum 1), and to install the VSCS at each site specified in the contract. At the request of the Government, the Contractor shall deliver in-place one (or more) VSCS to permit training and/or testing as directed by the Government. If requested, the delivery shall be completed at a Contractor-provided location near to the primary development and integration facility in Melbourne, FL.

The Contractor shall fabricate and/or acquire all hardware necessary to meet the PPI requirements of FAA-E-2731 (with Addendum 2) and install the VSCS at each site specified in the contract.

Newly developed or modified portions of the VSCS shall be manufactured in accordance with, but not limited to, MIL-STD-275, FAA-G-2100 paragraphs 3.4 -3.5.5.21, 3.5.5.21.2 - 3.6.7 and 3.6.8.1 - 3.6.13, MIL-STD-454 requirement 9, and MIL-STD-454 requirement 17.

The total maximum number of circuit changes of all types permitted per board shall be in accordance with the following table:

Board Size (x) in Square Inches	**Maximum Number Allowed**
$x < 20$	6
$20 \leq x < 50$	12
$50 \leq x < 100$	18
$100 \leq x$	24

3.4.1.1 VSCS Console Equipment (VCE) Production - The Contractor shall fabricate the VSCS Console Equipment (VCE) and required physical adapters for integration into the existing consoles to meet the requirements in FAA-E-2731 (with Addendum 1). The Contractor shall fabricate the remaining VCE with no physical adapters for the DSR Consoles.

3.4.1.1.1 VSCS Electronic Module Skid (VEM Skid) - The Contractor shall install two (2) skids on the bottom of the VEM and deliver it as part of the VCE.

3.4.1.2 VSCS PPI Console Equipment - The Contractor shall modify and retrofit the VCE in the existing consoles as required to incorporate the PPI requirements of FAA-E-2731 (with Addendum 2).

3.4.1.3 VSCS Configuration Upgrades - The time required to complete the design and factory testing of all requirements will force at least one configuration upgrade after initial delivery of the earliest production systems. The configuration upgrade(s) shall be grouped to minimize the frequency and quantity of total upgrades required. Contractor-conducted factory testing, OT&E and regression tests, as approved by the Government, will be completed prior to delivery of upgrades to the production systems. Upgrades shall include only approved system changes.

3.4.2 Support Facilities Hardware Production

3.4.2.1 Requirements Hardware Production - The Contractor shall fabricate the FAATC Support Facility hardware items, Mike Monroney Aeronautical Center Academy support equipment, and Mike Monroney Aeronautical Center Depot maintenance equipment to meet the ORD/ORD Supplement requirements in FAA-E-2731 (with Addendum 1).

Newly developed or modified portions of the VSCS shall be manufactured in accordance with, but not limited to, MIL-STD-275, FAA-G-2100 paragraphs 3.4 -3.5.5.21, 3.5.5.21.2 - 3.6.7, and 3.6.8.1 - 3.6.13, MIL-STD-454 requirement 9, and MIL-STD-454 requirement 17.

3.4.2.2 PPI Requirements Hardware Production - The Contractor shall fabricate the FAATC Support Facility hardware items, Mike Monroney Aeronautical Center Academy support equipment, and Mike Monroney Aeronautical Center Depot maintenance equipment to meet the PPI requirements in FAA-E-2731 (with Addendum 2).

Newly developed or modified portions of the VSCS shall be manufactured in accordance with, but not limited to, MIL-STD-275, FAA-G-2100 paragraphs 3.4 -3.5.5.21, 3.5.5.21.2 - 3.6.7, MIL-STD-454 requirement 9, and MIL-STD-454 requirement 17.

3.4.3 VSCS Assembly and Integration

The Contractor shall integrate the VSCS hardware and software into the system configurations in accordance with FAA-E-2731 (with Addendum 1) and the contract.

3.4.3.1 FAATC Support Facility - The Contractor shall provide and integrate the support hardware and software necessary for the FAATC to manage, maintain, and enhance the FAATC VSCS system hardware or software; and provide the capabilities necessary to reflect any operational site configuration. The facility shall provide twelve (12) work stations capable of simultaneous operation at the FAATC. The facility shall include standard and special support equipment, tools and test equipment, software packages, the capability to install firmware into the Programmable Read-Only Memories (PROMs) and to support all VSCS software maintenance functions.

3.4.3.2 Mike Monroney Aeronautical Center - As ordered, the Contractor shall provide and integrate the support software, support hardware and test equipment necessary to meet the VSCS Aeronautical Center requirements as identified in the approved Depot Maintenance Study and the approved Contract Training Plan, Mike Monroney Aeronautical Center Training Support Equipment Study (3.2.2.5) and the Training and Depot Support Requirements of FAA-E-2731 (with Addendum 1), Appendix D.

3.4.3.3 Planned Product Improvements - The Contractor shall integrate the PPI hardware and software into the VSCS systems in accordance with FAA-E-2731 (with Addendum 2).

3.4.4 VCE Restoration

When released by the Government after each operational site ORD Supplement Operational Readiness Date (ORD), the Contractor shall remove the system GFE VCE sets and ship to the Contractor's facility. The Contractor shall restore all VCE surfaces and operation to meet the requirements in FAA-E-2731 (with Addendum 1).

3.4.5 Site Support Equipment

As ordered, the Contractor shall provide and deliver all support equipment identified in 3.11, Integrated Logistics Support, as required to support all of the VSCS sites.

3.4.5.1 Peculiar Support Equipment - The Contractor shall either purchase or design and build, and then test, and deliver all identified peculiar support equipment.

3.4.5.2 Common Support Equipment - The Contractor shall provide all identified common support equipment.

3.4.6 Reserved

3.4.7 AT Controller/Supervisor Training VCET

The Contractor shall develop the AT Controller/Supervisor Training VCET. The Contractor shall provide and integrate the stand-alone VCE Trainer hardware capable of supporting Air Traffic training by emulating the interactive functionality of the VSCS operational equipment, with the exception of voice connectivity. The VCET shall provide all visual and aural indications provided by the operational VCE.

3.4.8 Remote VCE Interface

The Contractor shall fabricate and/or acquire the hardware necessary to provide a remote interface for six (6) VCEs mounted in Common Consoles at the Mike Monroney Aeronautical Center Depot, which will be located up to one (1) mile from the VSCS equipment room.

3.4.9 Remote Maintenance Position

The Contractor shall provide a remote maintenance position for the Mike Monroney Aeronautical Center Depot and provide the equipment necessary to interface this position to the AF Training VSCS which will be located up to one (1) mile from the Depot.

3.4.10 BUEC, Existing Radio Interface and Other External Interface Equipment or Simulators

The Contractor shall fabricate and/or acquire external interface equipment or simulators, e.g., BUEC, and Existing Radio Interfaces as required to support AF training at the Mike Monroney Aeronautical Center.

3.4.11 Large Screen Display Interface

The Contractor shall provide an interface for large screen display(s) for the VSCS Maintenance Position at the Mike Monroney Aeronautical Center to support AF Training.

3.5 UPGRADED PROTOTYPE VSCS

3.5.1 VSCS Prototype Upgrade

The Contractor shall provide a VSCS hardware and software prototype upgrade that incorporates all changes resulting from modified specifications, requirements, and from prototype factory acceptance testing. This system shall satisfy all requirements of FAA-E-2731 (with Addendum 1) and the Interface Requirements Documents (IRDs) and shall be sized and populated in accordance with contract Section C, Exhibit C-1. The prototype upgrade VSCS shall be capable of interfacing to and communicating with both the Government Traffic Simulation Unit (TSU) and the Contractor Traffic Simulation Unit (CTSU).

3.5.2 VSCS Prototype Upgrade Factory Acceptance Testing

Prior to shipment of the prototype upgrade VSCS to the FAATC, the Contractor shall perform factory acceptance testing (FAT) in accordance with FAA-E-2731 (with Addendum 1). The content of FAT shall be planned and briefed as part of the system engineering technical reviews (3.2.1.3) and test preparation reviews (3.6.4.1). The scope of FAT for the major upgrades (e.g., ORD/SORD Supplement PPI) shall be limited to the minimum tests necessary to verify that the functional capability meets the requirements, and regression test, as approved by the Government, to assess the impact that new functionality may effect previously delivered functions. The results of FAT shall be documented in the VSCS Prototype Upgrade Test Report.

3.5.3 VSCS Configuration Upgrade At FAATC

The Contractor shall perform configuration upgrades on the VSCS system at the FAATC to ensure that the VSCS prototype configuration is identical to the first production article. The Contractor shall perform validation tests on each configuration upgrade and conduct an FCA/PCA. The content of validation tests shall be planned and briefed as part of the system engineering technical reviews (3.2.1.3) and test preparation reviews (3.6.4.1). The scope of validation tests of the major upgrades (e.g., ORD/ORD Supplement, PPI) shall be limited to the minimum tests necessary to verify that the functional capability meets the requirements, and regression test as approved by the Government to assess the impact that new functionality may effect previously delivered functions.

3.5.4 Up-Grade of 60 Position Switch

The Contractor shall upgrade the Government-furnished 60 position switch to a production configuration to meet the full system requirements for the New York Terminal Radar Approach Control (TRACON) site. The upgrade shall include the Contractor Traffic Simulation Unit (CTSU) and be fully populated with radio interfaces and trunk interfaces. The Upgrade Switch may be utilized as a test bed for the purpose of training, development, integration and testing of the VSCS hardware and software. The Contractor shall maintain this system as near to the delivery configuration, (e.g., full operational functionality) as possible. The exact utilization of this system for support to the Contractor's development and integration and/or training of Government personnel, including AF and AT personnel, will be coordinated through the on-site FAA Alternate Technical Officer (ATO).

3.6 SYSTEM TEST AND EVALUATION

The Contractor shall conduct a test and evaluation program to verify that the VSCS meets the Selected ORD/ORD Supplement requirements of FAA-E-2731 (without Addenda) for the current prototype equipment, and the M-1/ISSS Essential Requirements of FAA-E-2731 (with Addendum 1) for the prototype upgrade and the production systems. The Contractor shall conduct a test and evaluation program to verify that the VSCS meets the PPI requirements of FAA-E-2731 (with Addendum 2) for the prototype upgrade and the production systems. The Contractor shall develop all tests and evaluations in accordance with the Master Test Plan (Attachment J-7), and the Government-approved Contractor Master Test Plan. The scope of tests for the major upgrades (e.g., ORD/ORD Supplement, PPI) shall be limited to the minimum tests necessary to verify that functional capability meets the requirements, and regression test as approved by the Government to assess the impact that new functionality may effect previously delivered functions. Since functional capabilities may be delivered in groups that do not encompass the full FAA-E-2731 Addenda, selection of approved (major upgrade) test procedures from the full set of (system) test procedures is encouraged. Demonstrations and tests of (partial or) full functionality utilizing the test beds and VSCS assets at the Contractor's factory and/or FAATC shall be as described in 3.2.1.3.

3.6.1 Contractor Facility Testing

The Contractor shall plan the Contractor-conducted Factory Testing and the production system testing to meet the requirements in FAA-E-2731 (with Addendum 1). The Contractor shall plan the Contractor-conducted factory testing and the production system testing to meet the PPI requirements in FAA-E-2731 (with Addendum 2).

3.6.1.1 Prototype Upgrade Factory Acceptance Testing - The Contractor shall perform FAT testing, at the Contractor's facility, on the prototype upgrade in accordance with the Prototype Upgrade Test Plan, the Prototype Upgrade Test Procedures, and the M-1/ISSS Essential Requirements of FAA-E-2731 (with Addendum 1).

3.6.1.1.1 Prototype Upgrade Test Procedures - The Contractor shall prepare and submit to the Government, Prototype Upgrade Test Procedures which address the FAT testing of the M-1/ISSS Essential Requirements of FAA-E-2731 (with Addendum 1).

3.6.1.1.2 Prototype Upgrade Test Report - The Contractor shall evaluate the results of performing FAT testing of the Prototype Upgrade in terms of meeting the M-1/ISSS Essential Requirements of FAA-E-2731 (with Addendum 1). The Contractor shall document the test results in the Prototype Upgrade Test Report and submit the report to the Government.

3.6.1.2 Production Systems - The Contractor shall stage a subset of each production VSCS at the Contractor's facility. This subset is defined as the VSCS System minus system cables, Intermediate Distribution Frame (IDF), Power and Ground Equipment, VCE peripherals, BusLANs, Supervisory Recorder, Cutover Switch, MPES work surface and Transition adaptation rack. The Contractor shall successfully complete Production Acceptance Testing (PAT) of the subset per FAA-approved PAT Test Plan, VP74, and a forty-eight hour burn-in test prior to releasing it for shipment to the site. The Forty-eight hour burn-in test shall be conducted utilizing available positions and communication interfaces to achieve the attainable load rate up to one hundred percent Peak Busy Hour for that site's resource configuration utilizing the Contractor's Production System Test Controller. The Contractor shall also conduct factory production tests on each original and restored VSCS Electronics Module (VEM).

3.6.1.3 VSCS Console Equipment Training (VCET) Verification

3.6.1.3.1 M-1/ISSS Essential Requirements - The Contractor shall verify the operation and functional capabilities of the VCET at the factory in accordance with the ORD/ORD Supplement requirements of FAA-E-2731 (with Addendum 1), Appendix D, Training and Depot Support Requirements and all planned upgrades.

3.6.1.3.2 Reserved

3.6.1.4 VSCS PPI Factory Testing - The Contractor shall develop a test plan and test procedures to verify that the VSCS meets the PPI requirements of FAA-E-2731 (with Addendum 2). The Contractor shall perform, at the factory, the testing required to verify that the VSCS meets the PPI requirements of FAA-E-2731 (with Addendum 2). The Contractor shall deliver the VSCS test plans, test procedures, and test results to the Government.

3.6.2 Federal Aviation Administration Support Facility Test and Evaluation

The Contractor shall plan the Federal Aviation Administration Technical Center and the Mike Monroney Aeronautical Center Test and Evaluation to meet the requirements in FAA-E-2731 for the VSCS systems described below.

3.6.2.1 Federal Aviation Administration Technical Center (FAATC) Test and Evaluation - The Contractor shall develop and conduct acceptance tests for the VSCS at the FAATC as described below.

3.6.2.1.1 Current Prototype Equipment - The Contractor shall conduct the acceptance tests on the current prototype equipment at the FAATC. The Contractor shall evaluate the results of performing acceptance testing of the current prototype equipment in terms of meeting the Selected M-1/ISSS Essential Requirements of FAA-E-2731 (without Addenda). The Contractor shall document the test results in the FAATC Site Acceptance Test Report and submit the report to the Government.

3.6.2.1.2 Prototype Upgrade

3.6.2.1.2.1 ORD Requirements - The Contractor shall develop acceptance tests for the prototype upgrade that verify that the requirements of FAA-E-2731 (with Addendum 1) are met. The Contractor shall conduct the acceptance tests on the prototype upgrade at the FAATC. The Contractor shall evaluate the results of performing acceptance testing of the prototype upgrade in terms of meeting the requirements of FAA-E-2731 (with Addendum 1).

3.6.2.1.2.2 PPI Requirements - The Contractor shall develop acceptance tests for the prototype upgrade that verify that the PPI requirements of FAA-E-2731 (with Addendum 2) are met. The Contractor shall conduct the acceptance tests on the prototype upgrade at the FAATC. The Contractor shall evaluate the results of performing acceptance testing of the prototype upgrade in terms of meeting the PPI requirements of FAA-E-2731 (with Addendum 2). The Contractor shall document the test results in the VSCS Test Report and submit the report to the Government.

3.6.2.1.3 Traffic Simulation Unit (TSU)

3.6.2.1.3.1 ORD Requirements - The Contractor shall develop and conduct acceptance tests for use with the CTSU that verify that the prototype upgrade meets requirements of FAA-E-2731 (with Addendum 1).

3.6.2.1.3.2 Reserved

3.6.2.1.4 Transition Switch Verification - The Contractor shall verify the operations of the VSCS Transition Switch on the current prototype equipment and the prototype upgrade at the FAATC. The verification shall include demonstrations of the switching of operational interfaces and performing the switchover sequences detailed in the Government-approved Transition Plan. The Contractor shall document the test results in the VSCS Test Report and submit the report to the Government.

3.6.2.1.5 FAATC Support Facility Test and Evaluation

3.6.2.1.5.1 ORD Requirements Test and Evaluation - The Contractor shall develop and conduct the FAATC Support Facility test and evaluation to verify that the FAATC Support Facility meets the requirements of FAA-E-2731 (with Addendum 1) that include capabilities to:

a. Manage, maintain, and enhance the VSCS system
b. Design, develop, implement, test, and deploy system modifications to any system hardware or software
c. Reflect any operational site configuration.

3.6.2.1.5.2 Planned Product Improvements Test and Evaluation - The Contractor shall develop and conduct the FAATC Support Facility test and evaluation to verify that the FAATC Support Facility meets the Planned Product Improvements of FAA-E-2731 (with Addendum 2) that include capabilities to:

a. Manage, maintain, and enhance the VSCS system
b. Design, develop, implement, test, and deploy system modifications to any system hardware or software
c. Reflect any operational site configuration.

The Contractor shall document the test results in the VSCS Test Report and submit the report to the Government.

3.6.2.1.6 Common Console VCE Integration - The Contractor shall develop and conduct VCE common console integration tests to verify performance of the VCEs installed in the common consoles at the FAATC. The Contractor shall develop and conduct all VCE common console integration tests in accordance with the Government-approved Test Plans and Test Procedures. The Contractor shall conduct the VCE common console integration tests with site specific adaptation data. The Contractor shall document the test results in the VSCS Test Report and submit the report to the Government.

3.6.2.1.7 Reserved

3.6.2.1.8 Configuration Upgrade - The Contractor shall develop and conduct tests to verify that the configuration upgrades meet the requirements of FAA-E-2731. The configuration upgrades (e.g., ORD/ORD Supplement, PPI) shall be grouped to minimize the frequency and quantity of total upgrades required. Upgrades shall include only the approved system changes. The Contractor shall document the test results in the VSCS Test Report and submit the report to the Government.

3.6.2.1.9 Planned Product Improvement Modifications - The Contractor shall design, document, deliver, and test any required modifications to the PPI.

3.6.2.2 Mike Monroney Aeronautical Center Test and Evaluation - The Contractor shall develop and conduct acceptance tests for the VSCS at the Mike Monroney Aeronautical Center as described below.

3.6.2.2.1 Mike Monroney Aeronautical Center: Academy

3.6.2.2.1.1 ORD Requirements - The Contractor shall plan, develop, and conduct the VSCS Academy system installation and checkout tests, system interface and integration tests, and FAAAC system acceptance tests to verify the VSCS meets the requirements in FAA-E-2731 (with Addendum 1) and provides the training capabilities identified in the Government-approved Contract Training Plan. The Contractor shall document the test results in the VSCS Test Report and submit the report to the Government.

3.6.2.2.1.2 PPI Requirements - The Contractor shall plan, develop, and conduct the VSCS Academy system installation and checkout tests, system interface and integration tests, and FAAAC system acceptance tests to verify that the VSCS meets the PPI requirements in FAA-E-2731 (with Addendum 2) and provides the training capabilities identified in the Government-approved Contract Training Plan. The Contractor shall document the test results in the VSCS Test Report and submit the report to the Government.

3.6.2.2.2 Mike Monroney Aeronautical Center: Depot - At the direction of the Government, the Contractor shall install, check out, integrate, and test the Mike Monroney Aeronautical Center Depot maintenance equipment hardware and software in accordance with the Government-approved Site Activation Plan and the Depot Maintenance Study Report. The Contractor shall document the test results in the VSCS Test Report and submit the report to the Government.

3.6.2.2.3 Common Console VCE Integration - The Contractor shall develop a test program to verify performance of the VCEs installed in the common consoles at the Mike Monroney Aeronautical Center. The Contractor shall develop and conduct all VCE common console integration tests in accordance with the Government-approved Test Plans and Test Procedures. The Contractor shall conduct the VCE common console integration tests with site specific adaptation data. The Contractor shall document the test results in the VSCS Test Report and submit the report to the Government.

3.6.2.2.4 Reserved

3.6.3 Operational Site Testing - The Contractor shall develop an operational site test and evaluation support program as a part of the overall test and evaluation program.

3.6.3.1 VSCS Site Test Planning

3.6.3.1.1 VSCS Test Plan - The Contractor shall prepare and submit to the Government, a VSCS Test Plan that addresses the site acceptance testing which shall be conducted on the VSCS, the VCET, and the VSCS Transition Switch at each operational site.

3.6.3.1.2 VSCS Test Procedures - The Contractor shall prepare and submit to the Government, VSCS Test Procedures that detail the acceptance testing that shall be conducted on the VSCS, the VCET, and the VSCS Transition Switch at each operational site.

3.6.3.1.3 VSCS Test Report

3.6.3.1.3.1 ORD Requirements - The Contractor shall evaluate the results of performing site acceptance testing of the VSCS systems and the VSCS Transition Switch in terms of meeting the requirements of FAA-E-2731 (with Addendum 1). The Contractor shall document the test results in the VSCS Test Report and submit the report to the Government.

3.6.3.1.3.2 PPI Requirements - The Contractor shall evaluate the results of performing site acceptance testing of the VSCS systems, the VCET, and the VSCS Transition Switch in terms of meeting the PPI requirements of FAA-E-2731 (with Addendum 2). The Contractor shall document the test results in the VSCS Test Report and submit the report to the Government.

3.6.3.2 VSCS Site Test and Evaluation

3.6.3.2.1 ORD Requirements - The Contractor shall support the planning and development of the operational installation and checkout tests, systems interface and integration tests, and site system acceptance tests to verify that the VSCS meets the requirements of FAA-E-2731 (with Addendum 1). The Contractor shall support the conduct of all installation and checkout tests, systems interface and integration tests, and site system acceptance tests in accordance with the Government-approved Test Plans and Test Procedures with site specific adaptation data, and as further agreed to by the AOS/Site Program Bulletin specialist and the Contractor.

3.6.3.2.2 PPI Requirements - The Contractor shall support the planning and development of the operational installation and checkout tests, systems interface and integration tests, and site system acceptance tests to verify that the VSCS meets the PPI requirements of FAA-E-2731 (with Addendum 2). The Contractor shall support the conduct of all installation and checkout tests, systems interface and integration tests, and site system acceptance tests in accordance with the Government-approved Test Plans and Test Procedures with site specific adaptation data, and as further agreed to by the AOS/Site Program Bulletin specialist and the Contractor.

3.6.3.3 Transition Switch Verification

3.6.3.3.1 Pre-VSCS Transition Switch Verification - The Contractor shall verify the operation of the VSCS Transition Switch after it is integrated into the operational site but prior to delivery of the VSCS. The Contractor shall verify the operability of the VSCS Transition Switch, shall verify circuit/ path continuity through the VSCS Transition Switch, and verify that the VSCS Transition Switch does not degrade A/G-G/G voice quality. The Contractor shall document the test results in the VSCS Test Report and submit the report to the Government.

3.6.3.3.2 VSCS Transition Switch Verification - The Contractor shall verify the operations of the VSCS Transition Switch included with the VSCS system at the operational sites. The verification shall include demonstrations of the switching of actual operational interfaces and performing the switchover sequences detailed in the Government-approved Transition Plan. The Contractor shall document the test results in the VSCS Test Report and submit the report to the Government.

3.6.3.4 Common Console VCE Integration - The Contractor shall develop a test program to verify performance of the VCEs installed in the common consoles at the operational sites. The Contractor shall develop and conduct all VCE common console integration tests in accordance with the Government-approved Test Plans and Test Procedures. The Contractor shall conduct the VCE common console integration tests with site specific adaptation data. The Contractor shall document the test results in the VSCS Test Report and submit the report to the Government.

3.6.3.5 Reserved

3.6.4 Test and Evaluation Support

The Contractor shall provide all test and evaluation planning and development necessary to meet the testing and evaluation requirements of FAA-E-2731. The results shall be documented in the VSCS Test Report.

3.6.4.1 Test Preparation Review (TPR) - The Contractor shall conduct a Test Preparation Review prior to the start of each formal test. The Contractor shall conduct the Review for the Government on or before the actual start of the formal test. The Contractor shall include, at a minimum, the following review topics:

a. Requirement changes (since the last formal test performed during Factory Acceptance Test (FAT) or Site Acceptance Test (SAT))

b. Design changes (since the last formal test performed during Factory Acceptance Test (FAT) or Site Acceptance Test (SAT))

c. Test Plan or Procedure changes (encountered since Government approval of the plan or procedure being executed)

d. Test limitations (anticipated during formal test execution)

e. Summary of all pre-test dry runs

Requirement and Design changes shall be reviewed only at the first TPR of the Baseline Acceptance Test for which they are incorporated. All subsequent TPRs for that baseline will no longer present the Requirement and Design change data. The initial TPR reviewing Requirement and Design changes can occur at the Contractor's facility, the FAATC or at any of the Field installations. The Review shall be conducted in accordance with Contractor-established format and submitted to the Government for approval.

3.6.4.2 Test Management - The Contractor shall establish an internal single point of contact for the VSCS Test and Evaluation Program.

The Contractor shall provide the Government an opportunity to monitor all Contractor-conducted informal tests at the unit, module and build level. The Contractor shall provide the Government with five (5) days advance notice on all informal tests. The Contractor shall allow Government monitoring of all Contractor-conducted factory testing.

The Contractor shall successfully complete a dry run for each formal test. The Contractor shall, after the successful dry run, notify the Government ten (10) days prior to the expected start of each formal test. The Government will witness all formal tests.

The Contractor shall present and discuss the results of each formal test with the Government representative.

The Contractor shall conduct retests when:

a. the analysis of test data and the assessment of test results against pass/fail criteria indicate the item under test has failed to meet its applicable requirements, or when the analysis and assessment are inconclusive, or

b. a review of changes to hardware or software indicate that prior test results are invalid or that the impact on prior test results cannot be determined without repeating the test, or

c. the Contractor deviates from the approved test plans or procedures without the prior permission of the Government.

3.6.5 ELF/VLF Emission Measurements

3.6.5.1 ELF/VLF Emissions Measurements Specification Study - The Contractor shall conduct a study to determine the measurement specification for limits of Extremely Low Frequency (ELF) and Very Low Frequency (VLF) emissions from electronic equipment standards currently imposed by American, European or International standards. The results of this study, along with recommendations for a measurement standard, shall be delivered to the Government for review and approval.

3.6.5.2 ELF/VLF Emissions Measurements - Subsequent to Government approval of the measurement standard(s) to be used for ELF and VLF emissions, the Contractor shall develop a technical measurement plan and measurement procedures to quantify the emissions of ELF and VLF electromagnetic radiation emitted from the Contractor's electronic hardware while under power, operating in a stand-alone mode, and also operating in the M-1 console environment without power to any non-VSCS equipment. The Contractor shall submit the measurement plan and measurement procedures to the Government for review and approval.

3.6.5.3 ELF/VLF Emissions Measurements Report - The Contractor shall obtain ELF/VLF emission measurements of the 430-position Prototype Upgrade or other production VSCS in accordance with the approved standard, plan and procedures. The Contractor shall document the emission measurements in the Prototype Upgrade Test Report (VP76, Volume I) and submit the report to the Government in accordance with the Contract Data Requirements List (CDRL).

3.7 TRANSITION PLANNING

The Contractor shall develop a generic Transition Plan. This plan shall cover the period from the VSCS initial site preparation through the removal of all transition equipment from the facility. The plan, as a minimum, shall include the concept of operations, utilization of transition equipment, site adaptation tasks and a schedule of activities.

3.7.1 Transition Survey

The Contractor shall perform a transition site survey at the Seattle ARTCC two (2) months after contract award to determine the transition requirements. The results of this survey shall be documented in a generic Transition Plan.

3.8 SITE PREPARATION PLANNING AND ACTIVATION

The Contractor shall establish a Site Design and Activation program for the Federal Aviation Administration Technical Center, Mike Monroney Aeronautical Center Academy and Depot, and operational sites to meet the requirements in FAA-E-2731 (with Addendum 1).

The Contractor shall continue the Site Design and Activation program for the FAATC, the Mike Monroney Aeronautical Center Academy and Depot, and the operational sites to meet the PPI requirements in FAA-E-2731 (with Addendum 2).

3.8.1 Site and Facility Design Planning

The Contractor shall develop site and facility plans and design packages for the installation, checkout, integration and acceptance test of the VSCS and its support and training systems into both the operational and support facilities. The Contractor shall submit site and facility planning documentation to the Government for approval.

3.8.1.1 Federal Aviation Administration Technical Center (FAATC) Design Planning - The Contractor shall plan the installation, checkout, integration, and acceptance test of the VSCS prototype upgrade and the FAATC Support Facilities, including the Contractor Traffic Simulation Unit and integration to the FAA Traffic Simulation Unit into the FAATC. The Contractor shall plan the installation and checkout of the VCET at the FAATC. The Contractor shall plan the installation and checkout of the PPI at the FAATC.

3.8.1.2 Mike Monroney Aeronautical Center Design Planning - The Contractor shall plan the installation, checkout, integration, and acceptance test of the VSCS at the Mike Monroney Aeronautical Center Depot and Academy. The Contractor shall plan the installation and checkout of the VCET at the Mike Monroney Aeronautical Center Academy. The Contractor shall plan the installation and checkout of the PPI at the FAAAC.

3.8.1.3 Operational Site Design Planning - In accordance with the Area Control Facility to VSCS IRD NAS-IR-61004201, the Contractor shall plan and design the installation, checkout, and integration of the VSCS, including the operational and ancillary position consoles, cabling, intra-VSCS cable trays, and connection to FAA-provided distribution frames and power panels, into the operational site. The Contractor shall plan the installation and checkout of the VCET at the operational sites. The Contractor shall plan the installation and checkout of the PPI at the operational sites.

3.8.1.4 Common Console VCE Cabling Design Planning - The Contractor shall participate in a hardware design TIM with the Government and the AAS Contractor to ensure that the VSCS design for common console cabling is consistent with the AAS design. Common console VCE cable lengths will be provided at this TIM.

3.8.2 Site Surveys

The Contractor shall perform site surveys at the FAATC, Mike Monroney Aeronautical Center Academy/Depot and operational sites. The Government will coordinate attendance by all representatives at the survey.

3.8.2.1 FAATC Site Activation Survey Update - The Contractor shall perform a site activation survey update including the EMI/EMC survey required by FAA-E-2731, paragraph 3.9.5.3, to determine the FAATC site specific installation checkout, integration and acceptance requirements five months prior to delivery of the prototype upgrade. The results of this survey update shall be documented in the Site Activation Plan and the Map Generation Report.

3.8.2.2 Mike Monroney Aeronautical Center and Operational Site Activation Surveys - The Contractor shall perform a site activation survey no later than fifteen (15) months before the scheduled VSCS equipment delivery to the Mike Monroney Aeronautical Center Academy/Depot and operational sites to determine site specific design and configuration requirements. The results of this survey shall be documented in the Site Activation Plan and the Map Generation Report.

3.8.2.3 Site Readiness Survey

3.8.2.3.1 FAATC Site Readiness Survey - The Contractor shall perform a site readiness survey at the FAATC three months prior to delivery of the prototype upgrade. The survey shall collect the information necessary to determine if the FAATC is ready for delivery and integration of the prototype upgrade. The results of this survey shall be documented in the Site Readiness Review Report.

3.8.2.3.2 Mike Monroney Aeronautical Center Academy/Depot Site Readiness Survey - The Contractor shall perform a site readiness survey at the Mike Monroney Aeronautical Center Academy/Depot four months before equipment delivery. The survey shall collect the information necessary to determine if the facility is ready for operational site activation. The results of this survey shall be documented in a letter to the Contracting Officer.

3.8.2.3.3 Operational Site Readiness Survey - The Contractor shall perform a site readiness survey at the operational sites six months before equipment delivery. The survey shall collect the information necessary to determine if the facility is ready for operational site activation. The results of this survey shall be documented in the Site Readiness Review Report for sites prior to Anchorage. For Anchorage, and sites subsequent to Anchorage, the Contractor shall confirm by letter that the site is ready for site installation activity.

3.8.3 Operational Site Activation

The Contractor shall plan the operational site activation to meet the requirements in FAA-E-2731 (with Addendum 1). The Contractor shall deliver the VSCS, the VSCS Transition Switch, and the VCET to the operational sites in accordance with Section F of the Contract. The Contractor shall deliver all hardware and software associated with the PPI to the operational sites.

3.8.3.1 Site Activation - The Contractor shall install, check out, integrate, and test the VSCS hardware and software at the operational sites to meet the M-1/ISSS Essential Requirements of FAA-E-2731 (with Addendum 1) and in accordance with the Government-approved Transition Plan, Site Activation Plan, and the operational Site Test Plan. The Contractor shall deliver the VSCS IDF, cable trays, and cabling at the same time as the transition switch. The Contractor shall install and check out the transition switch, VSCS cables, cable trays, the VSCS IDF and any other required VSCS equipment four months prior to VSCS delivery in accordance with the Government-approved Site Activation Plan. The Contractor shall cable the Transition Switch to the VSCS IDF prior to VSCS delivery. The Contractor shall cable the VSCS IDF to the FAA-provided VDF/RCE IDF prior to VSCS delivery. The Contractor shall install and check out the VCET at the operational sites. The Contractor shall install, integrate, check out and test the PPI hardware and software at the operational sites to meet the PPI requirements of FAA-E-2731 (with Addendum 2).

3.8.3.1.1 Modifications to Existing Consoles - The Contractor shall begin modifications to the existing consoles for subsequent VCE installation at each operational site after Government approval of the Site Activation Plan or as directed by the VSCS Contracting Officer. The Contractor shall plan, coordinate, and relocate in accordance with the Government-approved Site Activation Plan, any existing FAA equipment required during the console modification. The Contractor shall plan and coordinate with the Government the relocation of any existing leased equipment required during the console modification. The Contractor shall complete the modifications to all existing consoles, including installation of the VCE position cables, at each site prior to the VSCS equipment delivery. The modifications to the existing consoles shall include installing covers/plates over the console locations where the VCE hardware will reside. The covers/plates shall be removed by the Contractor when the VCE hardware is installed with the VSCS equipment. The Contractor shall plan the modifications to existing consoles to include the possible installation of more than one (1) VCE in a single console as determined by the Government at the site activation survey. The Contractor shall perform the modifications to an existing console between the hours of 10:00 p.m. and 6:00 a.m. local time at each operational site or as determined by the Government. The Contractor shall perform the modification to a minimum of one (1) sector, which consists of three (3) consoles, each day. The exact number of existing consoles that shall be modified on a given day, the exact number of days per week that the modifications to the existing consoles shall occur, and the actual time period for performance of the existing console modifications shall be determined by the Government at the site activation survey.

3.8.3.1.2 DSR Console VCE Cabling - The Contractor shall deliver with the VSCS, cabling and associated equipment for the common console VCEs at the operational sites. The cables shall be provided with connectors on both ends. The Display System Replacement (DSR) Contractor will place the common console VCE cables in DSR-provided cable trays. The VSCS Contractor shall place cables in the VSCS-provided cable trays. The VSCS Contractor shall test the cables from the VSCS end with the DSR Contractor supporting at the other end for each site at the time of installation.

3.8.3.1.3 DSR Console/VCE Cable Trays - The Contractor shall provide, deliver and install cable trays from the VSCS Equipment Room through the FAA-provided penetrations in the structural slab of the Comm Area/DSR Control Room Floor. The Contractor shall also provide, deliver and install cable trays from the VSCS Equipment Room that transverse the comm area and connect to the DSR Contractor-installed cable trays at the Host Computer room wall. The cable trays shall be sized to accommodate: 1) the VSCS switch to VCE and recorder to VCE cables for the DSR Control Room, 2) the VSCS switch to VCE, recorder to VCE and thicknet to Bus Local Area Network (BusLAN) rack cables for the Automation Wing and 3) the thicknet to Host Computer Room BusLAN rack cables. The cable trays shall be sized for the maximum possible number of DSR VCEs per site as listed in Exhibit C.4.

3.8.3.1.4 Fit-Up All Possible Consoles for DSR - The Contractor shall provide fit-up equipment, as described in 3.8.3.1.4.1, 3.8.3.1.4.2 and 3.8.3.1.4.3, for the maximum planned DSR and Automation Wing Common Console locations at all sites, in accordance with the schedule in Exhibit F.1. This equipment is a delta to the equipment provided for the DSR Console VCEs being delivered.

3.8.3.1.4.1 Cables and IDFs for Maximum DSR Console Fit-UP - The Contractor shall provide the necessary delta quantity of VSCS to DSR Console VCE cables with connectors on both ends and IDFs for the maximum planned DSR and Automation Wing Console locations at all sites.

3.8.3.1.4.2 BusLAN Racks and Transceiver Chassis for Maximum DSR Console Fit-Up - The Contractor shall provide the necessary delta quantity of BusLAN racks and transceiver chassis for the maximum planned DSR and Automation Wing Console locations at all sites.

3.8.3.1.4.3 BusLAN Transceivers for Maximum DSR Console Fit-Up - The Contractor shall provide and fully populate the BusLAN transceiver chassis with transceivers.

3.8.3.2 Transition Switch Removal - The Contractor shall remove the operational site VSCS transition switch and associated wiring and cabling four months after site ORD or when released by the Government.

3.8.4 Federal Aviation Administration Support Facilities Activation

The Contractor shall plan the Federal Aviation Administration Support Facility activation to meet the requirements in FAA-E-2731. The Contractor shall deliver the current prototype equipment, the VSCS Transition Switch, the prototype upgrade, the FAATC Support Facility, the CTSU, and all hardware and software associated with the PPI to the FAATC.

The Contractor shall deliver the VCET to the FAATC or where directed by the Government.

The Contractor shall deliver the VSCS, all support hardware and software, the VCET, and all hardware and software associated with the PPI to the FAAAC.

3.8.4.1 Federal Aviation Administration Technical Center Activation - The Contractor shall install, integrate, and check out the current prototype equipment, the VSCS Transition Switch, the CTSU, and the PPI at the FAATC. The Contractor shall integrate the CTSU with the FAA TSU. The Contractor shall install and check out the VCET at the FAATC or where directed by the Government. The Contractor shall integrate the VSCS IDF with the Government-provided VSCS Distribution Frame/Radio Control Equipment (VDF/RCE) IDF. The Contractor shall install, check out and integrate the prototype upgrade at the FAATC in accordance with the Site Activation Plan.

3.8.4.1.1 Modifications to Existing Consoles - The Contractor shall begin modifications to the existing consoles at the FAATC as directed by the Contracting Officer. The actual time period for performance of existing console modifications will be determined by the Government at the FAATC site activation survey. The Contractor shall complete the modifications to all the existing consoles, including installation of the VCE position cables, at the FAATC prior to the VSCS equipment delivery. The modifications to the existing consoles shall include installing covers/plates over the console locations where the VCE hardware will reside. The covers/plates shall be removed by the Contractor when the VCE hardware is installed with the VSCS equipment.

3.8.4.1.2 DSR Console VCE Cabling - The Contractor shall deliver with the prototype upgrade, cabling and associated equipment for the console VCEs at the FAATC. The cables shall be provided with connectors on both ends. The DSR Contractor will place the console VCE cables in DSR-provided cable trays. The VSCS Contractor shall place cables in the VSCS-provided cable trays. The VSCS Contractor shall test the cables from the VSCS end with the DSR Contractor supporting at the other end for each site at the time of installation.

3.8.4.1.3 Equipment Removal

3.8.4.1.3.1 VSCS Hardware (H/W) and Software (S/W) Removal - The Contractor shall remove all VSCS H/W and S/W not associated with the prototype upgrade from the FAATC.

3.8.4.1.3.2 Transition Switch Removal - When directed by the Government, the Contractor shall remove the VSCS transition switch and associated wiring and cabling from the FAATC.

3.8.4.1.3.3 Configuration Upgrade H/W and S/W Removal - The Contractor shall remove all H/W and S/W from the FAATC that is made obsolete by the Configuration Upgrade.

3.8.4.1.3.4 VCET Removal - When directed by the Government, the Contractor shall remove the VCET from the FAATC and install at the off-site training locations.

3.8.4.1.4 AC Power Installation - The Contractor shall integrate the VSCS into the FAATC power system.

3.8.4.1.4.1 VSCS Equipment Room Power Installation - The Contractor shall provide the breaker panels, circuit breakers, and cabling required to install the VSCS in the FAATC equipment room. The Contractor shall connect the breaker panels to two 120/208 VAC, three phase, single point AC power sources provided by the Government. The Contractor shall install the circuit breakers in the breaker panels and connect the VSCS to the circuit breakers.

3.8.4.1.4.2 VSCS Control Room Equipment Power Installation - The Contractor shall provide the circuit breakers and cabling required to install the VSCS console equipment in the FAATC control room laboratory. The Contractor shall install the circuit breakers in Government-provided power panels and connect the VSCS Console Equipment to the circuit breakers.

3.8.4.2 Mike Monroney Aeronautical Center Academy Activation - The Contractor shall install, check out, integrate, and test the VSCS system and, as ordered by the Government, support hardware and software at the FAA Academy in accordance with the Government-approved Site Activation Plan requirements in FAA-E-2731 (with Addendum 1) to support FAA Academy training functions. The Contractor shall install and check out the VCET at the Mike Monroney Aeronautical Center Academy. The Contractor shall install and check out the PPI at the FAAAC.

3.8.4.2.1 Reserved

3.8.4.2.2 DSR Console VCE Cabling - The Contractor shall deliver with the VSCS, cabling and associated equipment for the console VCEs at the Mike Monroney Aeronautical Center. The cables shall be provided with connectors on both ends. The DSR Contractor will place the console VCE cables in DSR-provided cable trays. The VSCS Contractor shall place cables in the VSCS-provided cable trays. The VSCS Contractor shall test the cables from the VSCS end with the DSR Contractor supporting at the other end for each site at the time of installation.

3.8.4.3 Mike Monroney Aeronautical Center Depot Activation - As ordered, the Contractor shall install, check out, integrate, and test all depot level maintenance equipment hardware and software at the Mike Monroney Aeronautical Center Depot in accordance with the Government-approved Site Activation Plan and the Depot Maintenance Study Report.

3.8.5 Common Console VCE Activation

3.8.5.1 FAATC Common Console VCE Activation - The Contractor shall return to the FAATC when directed by the Government, to support the integration of the common console VCEs with the VSCS. The Contractor shall connect and integrate the VCE with the VSCS, and test the VCE in the common consoles.

3.8.5.2 FAAAC Common Console VCE Activation - The Contractor shall return to the FAAAC when directed by the Government, to support the integration of the common console VCEs with the VSCS. The Contractor shall connect and integrate the VCE with the VSCS and test the VCE in the common consoles.

3.8.5.3 Operational Site Common Console VCE Activation - The Contractor shall return to each operational site when directed by the Government, to support the integration of the common console VCEs with the VSCS. The Contractor shall connect and integrate the VCE with the VSCS, and test the VCE in the common consoles.

3.8.6 VSCS Field Test Fixture - The Contractor shall design, develop, and fabricate a "mini-switch" VSCS Field Test Fixture for use in testing the radio and trunk interfaces to the VSCS. The Contractor shall develop and furnish an Operations and Maintenance Manual using best commercial standards for use by an experienced engineer with 2 years to 3 years VSCS experience. Engineering Drawings and Associated Lists shall be generated in accordance with "best commercial practices" utilizing DOD-STD-100 as a guide.

3.8.6.1 VSCS Field Test Fixture Acceptance Testing - Prior to utilization of the "mini-switch" field test fixture, the Contractor shall perform engineering development testing at the Contractor's facility and at the FAATC. Formal plans and procedures will not be written.

3.8.6.2 Operational Site Interface/Trunk Surveys - The Contractor shall, when directed by the Government, verify the trunks and radio interfaces of the operational sites through the use of the "mini-switch" VSCS Field Test Fixture. The results of this activity shall be documented as an appendix to the Site Activation Plan.

3.9 TRAINING

The Contractor shall apply the entirety of this section to encompass the PPI requirements of FAA-E-2731 (with Addendum 2).

3.9.1 Operational Test and Evaluation and System Shakedown Test Training

The Contractor shall develop and deliver training materials to the Government, and conduct AT and AF job skills related training for personnel as necessary to operate and maintain the VSCS prototype upgrade during the Government-conducted Operational Test and Evaluation (OT&E) and System Shakedown Testing (SST) activities at the FAATC.

The Contractor shall develop and deliver OT&E/SST training:

a. AF Technician training will consist of:

   1. Tandem Hardware course modules
   2. Tandem Software course modules
   3. VSCS unique maintenance course modules

b. Software Support (SPS) training will consist of:

   1. Tandem Software course modules
   2. Database Management (DBM) course modules

c. NAS Managers (SE/ASE) training will consist of:

1. Subset of AF technician training modules

d. AT training will consist of:

1. ATCS/SATCS course modules - using the VCET and draft VSCS training materials and manuals as developed under VP83

2. AT Database Management (DBM) course modules

3.9.1.1 OT&E/SST Student Prerequisites - Personnel receiving VSCS OT&E/SST training will be experienced Air Traffic Controllers, Air Traffic Staff Specialists, AF journey level personnel, and AT and AF Supervisors.

3.9.1.2 OT&E/SST Training Program Implementation - The Contractor shall conduct OT&E/SST AF and AT training at the Contractor-provided facility for the prototype upgrade as directed by the Contracting Officer. The OT&E/SST training shall include Air Traffic Controllers and Air Traffic Supervisors, in classes of no more than twelve (12) students. Air Traffic Database Management training shall include Air Traffic Controllers, Air Traffic Supervisors and Air Traffic Staff Specialists who have completed the Air Traffic Controllers and Supervisors course. This course will be comprised of no more than 12 students per class. OT&E/SST AT training required shall be conducted at the Contractor facility utilizing twelve (12) VCETs provided by the Government from the 15 scheduled for delivery to the FAATC. The workstations shall be provided from the FAAAC complement scheduled for delivery to the FAAAC. OT&E/SST AT DBM training required shall be conducted at the Contractor facility. The Contractor shall provide the equipment and facilities necessary to complete training. No more than twelve (12) students per class, comprised of AF NAS Manager, System Performance Specialists, and/or Maintenance Technicians, will attend OT&E/SST training. The Contractor shall provide a complete set of all course materials to each student receiving OT&E/SST training.

3.9.2 Training Program

The Contractor shall develop, update, maintain and deliver to the Government the final Task and Skills Analysis (TASA) and Contract Training Plan (CTP).

The Contractor shall develop, update, maintain and deliver to the Government the Training Program to meet the M-1/ISSS Essential Requirements in FAA-E-2731 (with Addendum 1) and the approved Contract Training Plan.

The Contractor shall develop all training curricula, including COTS material used independently or integrated with Contractor-developed material, for the FAA field sites, FAA Technical Center, Mike Monroney Aeronautical Center Academy and Depot, and Contractor facilities to meet the M-1/ISSS Essential Requirements of FAA-E-2731 (with Addendum 1) and in accordance with FAA-STD-028.

The Contractor shall plan the training program to include the training necessary to transition all personnel to the skills necessary to use, operate, maintain, and support the VSCS and associated VCET hardware and software in accordance with FAA-E-2731 (with Addendum 1).

3.9.2.1 Training Development and Conduct - The Contractor shall develop, deliver, and conduct the VSCS training courses in accordance with the Government-approved Training Plan. The AF training required to be completed prior to the acceptance of the Aeronautical Center VSCS shall be conducted on VSCS equipment. The AT Cadre training conducted at the operational sites will commence one (1) month after delivery of the VSCS/VCET. AT DBM training conducted at each operational site shall commence after Contractor Acceptance Inspection (CAI) and be completed prior to Initial Operational Capability (IOC) at the sites as directed by the Contracting Officer.

Air Traffic Training using the VCET and AT DBM Training shall be conducted at the operational sites using classroom space and facilities provided by the appropriate site.

The Contractor shall provide continuous classroom space at the Contractor facility until directed by the Contracting Officer to transition AF Training to the FAAAC. The classroom space shall be provided in accordance with FAA-STD-028.

The Contractor shall develop, revise, maintain and deliver the training curriculum material, equipment, and courseware until the completion of all Contractor-conducted training as directed by the Contracting Officer and as provided in CDRLs VP80, VP81, VP82, and VP83.

3.9.2.1.1 Training Conference - The Contractor shall conduct a training conference prior to the implementation of the VSCS training program in accordance with FAA-STD-028.

3.9.2.1.2 Course Design Guide - The Contractor shall develop a Course Design Guide for each VSCS course. The Course Design Guide shall be documented and delivered in accordance with the Curriculum Materials Design Development and Validation CDRL.

3.9.2.1.3 Course Materials - The Contractor shall develop student and instructor course materials for each VSCS course. A camera ready copy of all course materials shall be delivered to the Government and updated and delivered to the Government as required. The course materials shall also be delivered in an electronic media to be designated by the Government.

3.9.2.1.4 Contractor Demonstration Lessons - The Contractor shall conduct an operational tryout for each VSCS course developed under FAA-STD-028. Operational tryout classes shall be conducted at the Contractor's Training facility on VSCS equipment. Operational tryout course durations will be approximately 1.2 to 1.5 times the estimated course length to allow for Government critique of course content and materials. The Contractor shall update final course materials with changes that are identified as a result of the demonstration lessons and OT&E/SST activities in accordance with VP83. The Contractor shall provide classroom space in accordance with 3.9.2.1.

3.9.2.2 Mike Monroney Aeronautical Center Depot On-Site Maintenance Training - The Contractor shall provide on-site training assistance to FAA Depot technicians and engineers as ordered by the Contracting Officer. The Contractor shall provide training within 14 days after direction by the Government request for on-site training assistance. Training shall be provided to FAA personnel at their work stations. As a result of such assistance received, FAA Depot personnel shall be able to use Test Program Sets (TPS), Automatic Test Equipment (ATE) and perform depot level VSCS hardware repairs to the same level of detail and expertise that they are performed under the terms of the Contractor maintenance described in this contact, i.e., the ability to isolate a fault to the Line Replaceable Unit (LRU) component level, and to repair/replace the defective component. The Contractor shall provide a complete set of all training course materials to each student receiving on-site training.

3.9.2.3 Air Traffic (AT) Training - The Contractor shall develop, update, maintain, and deliver to the Government, VSCS Air Traffic Controller, Air Traffic Supervisor and Manager, and Air Traffic Database Management courses to meet the M-1/ISSS Essential Requirements in FAA-E-2731 (with Addendum 1), Appendix D, and in accordance with the Government-approved Contract Training Plan.

Personnel receiving VSCS Air Traffic Controller and Air Traffic Supervisor and Manager training will be experienced Air Traffic Control Specialists, Air Traffic Training Specialists, Air Traffic Supervisors and Managers and Mike Monroney Aeronautical Center Academy Instructors who will be involved in the operation, development, presentation or supervision of VSCS AT operations or training at the operational sites or the Mike Monroney Aeronautical Center Academy. All FAA prerequisite AT controller training required for certification will have been completed.

Personnel receiving VSCS Air Traffic Database Management Training will be site Air Traffic Staff Specialists responsible for identifying and designating the usage and terminations of all required telecommunications circuits and radio frequencies. Mike Monroney Aeronautical Center Academy instructors will also receive this training. Air Traffic Staff Specialists will complete the Air Traffic Controller and Supervisors courses prior to attending the Air Traffic Database Management course.

3.9.2.3.1 Air Traffic Control Specialist Training - The Contractor shall develop and deliver to the Government VSCS Air Traffic Control Specialist training that utilizes the VCET as the training platform and, as a minimum, contain theory and hands-on experiences that provide the necessary information, skill development and practical application required to allow controllers to select primary and alternate communications methods for A/G and G/G communications functions; locate, identify and select communications links for inter and intra-facility communications; perform selective primary and ancillary communications tasks; perform data keyboard interface functions; perform override functions; and recognize and perform, as necessary, system reconfiguration functions.

3.9.2.3.2 Air Traffic Supervisor and Manager Training - The Contractor-developed Air Traffic Supervisor and Manager VSCS training shall, as a minimum, include hands-on experiences that provide the necessary information, skill development and practical application required to allow Supervisors and Managers to perform the same tasks as Air Traffic Controllers. Additionally, training shall be provided to allow all Supervisors and Managers to perform required reconfiguration tasks, communications recording tasks and frequency assignment functions available through the VSCS Supervisor position.

3.9.2.3.2.1 Air Traffic Database Management Training - The Contractor-developed Air Traffic Database Management training shall, as a minimum, allow course graduates to develop, update, and maintain site unique VSCS databases and generate VSCS site configuration maps.

3.9.2.3.3 Reserved

3.9.2.3.4 AT Training Program Implementation - The Contractor shall conduct Air Traffic Training for selected Air Traffic personnel (cadre) at the VSCS operational sites. The training shall include all necessary knowledge and skills to enable the cadre to function in each position, and instruct site personnel on the VSCS system, to include the functions of Air Traffic Control Specialist, Supervisor Air Traffic Control, Air Traffic Control Manager, and Air Traffic Training Specialists. Mike Monroney Aeronautical Center Instructors will be trained in the Contractor Demonstration classes.

Air Traffic cadre training will be coordinated with the appropriate site, to begin not later than one (1) month after site VSCS/VCET delivery. No more than twelve (12) persons per class shall be trained at the sites as the AT cadre.

The Contractor shall conduct Air Traffic Database Management training for selected Air Traffic Staff Specialists at the Contractor's facility. The Contractor shall train up to four (4) AT Staff Specialists from each site acquiring a VSCS and a selected group from the FAA Academy. Classes shall consist of a maximum of 12 students each.

The Contractor shall provide: a complete set of course materials to each cadre student; a VCET workbook to each Air Traffic student at each site; two sets each of the color visuals for Air Traffic Control Specialists (ATCS) and the Supervisory ATCS courses for each site; and a complete set of course materials to each Air Traffic Database Management student.

3.9.2.4 Airway Facilities (AF) Maintenance Training - The Contractor shall develop, update, maintain and deliver AF electronics maintenance technician and National Airspace System (NAS) Manager maintenance training for the VSCS to meet the M-1/ISSS Essential Requirements in FAA-E-2731 (with Addendum 1), Appendix D and in accordance with the approved Contract Training Plan. Maintenance training shall meet the requirements of the AF Personnel Certification Program described in FAA Order 3400.3.

AF training will, at a minimum, consist of training in the subject areas as listed in Figure 3.9.2.4-1.

3.9.2.4.1 AF Maintenance Technician Training - The Contractor shall develop, update, maintain and deliver to the Government, AF maintenance technician training that, as a minimum, contains component level theory and hands-on experiences that provide the necessary information, skill development and practical application required to allow personnel to function in the console operator and maintenance operator positions; understand the functional operational characteristics of the VSCS including all system software input and output; understand the network hardware and software architecture and concepts, digital speech processing, digital signal processing, digital networks and telephone interfaces; understand the internal hardware and software design of the VSCS subsystems; perform preliminary operational checks and periodic performance tests; perform preventive maintenance tasks; execute diagnostic and error reporting modules; analyze error and configuration messages; conduct fault isolation procedures and perform corrective maintenance to the Line Replaceable Unit (LRU) level; adjust performance parameters; perform data entry position functions; perform reconfiguration tasks; perform safety and emergency procedures; and return system to approved FAA operational status.

Personnel attending this course will have completed FAA courses 44012 (Fundamentals of Computer Software), 40406 (Fundamentals of Computer Hardware), and 44419 (Fundamentals of Data Communications), or have demonstrated equivalent knowledge.

Personnel attending this course will consist of FAA-selected personnel which may include, but not be limited to: developmental technicians, journey level personnel, FAAAC instructors, supervisors, and field engineers.

	PRELIMINARY VSCS TRAINING PROGRAM FAA FACILITY / PERSONNEL	ATC/S SITE AS	AT DATA SITE AT	NAS MGR SITE SE	AF TECH SITE ET	S/W SUP TC SWE	S/W SITE SITE SPS
1	SYSTEM OVERVIEW	F/F		F	F	F	F
2	ATC POSITION FUNCTIONS	F/F		B	B	B	B
3	ATCS POSITION FUNCTIONS	O/F		B	B	B	B
4	VCET FUNCTIONS	F/F			B	B	B
5	SYSTEM LEVEL H/W DESIGN	O/O	B	F	F	F	F
6	SYSTEM LEVEL S/W DESIGN	O/O	O	F	F	F	F
7	SYSTEM LEVEL INTERFACES	O/O	O	F	F	F	F
8	DATABASE OVERVIEW	F/F		F	F	F	F
9	AT DBM WORKSTATION FUNCTIONS	-/O	F	O	B	B	B
10	NAS MGR WORKSTATION FUNCTIONS			F	F	F	F
11	AF DEO WORKSTATION FUNCTIONS			B	F	F	F
12	MPES WORKSTATION FUNCTIONS			O	F	F	F
13	TANDEM CONTROL FUNCTIONS			O	F	F	F
14	CTSU POSITION FUNCTIONS					F	
15	TIMING & ANCILLARY EQUIPMENT OPS			O	F	F	F
16	ATC/S WORKSTATION EQUIPMENT MAINT			O	F		
17	NAS MGR WORKSTATION EQUIPMENT			O	F		
18	TANDEM CONTROL EQUIPMENT MAINT			O	F		
19	MPES WORKSTATION EQUIPMENT MAINT			O	F		
20	SWITCHING EQUIPMENT MAINTENANCE			O	F		
21	TIMING & ANCILLARY EQUIPMENT MAINT			O	F		
22	VCET EQUIPMENT MAINTENANCE			O	F		
23	CTSU EQUIPMENT MAINTENANCE					F	
24	DEO EQUIPMENT MAINTENANCE			O	F		
25	SYSTEM LEVEL OPERATIONS			O	F	F	F
26	SYSTEM LEVEL H/W MAINTENANCE			O	F	O	O
27	S/W DETAILED DESIGN					F	B
28	DATABASE DETAILED DESIGN					F	B
29	S/W LANGUAGES					F	
30	COTS OS & APPLICATIONS S/W OPS				O	F	F
31	S/W DEVELOPMENT TOOLS					F	
34	CUSTOM S/W MAINTENANCE					F	

Key:

O = Overview level of presentation dealing with system-level concepts, principles and functionality (25%).

B = Basic or moderate level of presentation providing concepts, principles, and functionality including some hands-on activity (50%)

F = Full level of presentation that includes all concepts, principles, functionality, operations, and all required hands-on activities (100%)

Figure 3.9.2.4-1 Training Subject Course Allocation

3.9.2.4.2 National Airspace System (NAS) Manager Training - The Contractor shall develop, update, maintain and deliver (NAS Operations Manager) NOM/NAS Manager (System Engineers, Assistant Systems Engineers and NAS Specialists) training that, as a minimum, provides theory of operation, block level physical and functional descriptions of hardware and software, system interfaces, and reconfiguration, diagnostic and maintenance procedures to include fault isolation to the LRU with hands-on experience in VSCS reconfiguration and restoration for the VSCS and peripheral devices to approved FAA operational status.

Personnel attending this course will have completed FAA courses 44012 (Fundamentals of Computer Software), 40406 (Fundamentals of Computer Hardware), and 44419 (Fundamentals of Data Communications), or have demonstrated equivalent knowledge.

Personnel attending this course will have demonstrated knowledge and experience as an electronic technician or have completed electronic technician training at the FAA Academy.

Personnel attending this course will consist of FAA-selected personnel which may include, but not be limited to: journey level personnel, FAAAC instructors, supervisors, and field engineers.

3.9.2.4.3 AF Training Program Implementation - The Contractor shall conduct training for AF NAS Managers and AF maintenance technicians from the operational sites, FAATC and Mike Monroney Aeronautical Center. This training shall be conducted at the Contractor facility or the Mike Monroney Aeronautical Center Academy as directed by the Contracting Officer. The Contractor shall provide classroom space for training conducted at the Contractor facility in accordance with 3.9.2.1. Training will transition from the Contractor facility to the Mike Monroney Aeronautical Center not later than four (4) months after delivery of the VSCS at the Mike Monroney Aeronautical Center as directed by the Contracting Officer.

The Contractor shall plan to conduct training for a minimum of five (5) AF NAS managers and two (2) AF technicians from each site by equipment delivery. Training for the five (5) NOM/NAS managers and two (2) AF technicians shall not be completed earlier than 180 days prior to equipment delivery. The Contractor shall schedule the training for the remaining AF NOM/NAS managers and AF technicians from each site to be completed no later than one year after Operational Readiness Demonstration (ORD). The Contractor shall provide a complete set of all course materials to each student receiving airway facilities training. No more than twelve (12) students will attend each class.

3.9.2.5 Software Support Training - The Contractor shall develop, update, maintain, and deliver to the Government, software support training that will provide specific skills to use the tools, utilities and procedures required to support VSCS operations in accordance with the approved Contract Training Plan.

3.9.2.5.1 VSCS Support Facility Software Development System (VSF/SDS) Training - The Contractor shall develop, update, maintain and deliver to the Government, VSCS software and hardware support training that, as a minimum, includes theory of operation and hands-on performance experiences that provides the necessary information, skill development and practical application required to correctly identify, describe, and demonstrate, using functional block diagrams and signal flows, the VSCS equipment at the system level. Training shall allow course graduates to update and maintain site unique databases, generate site configuration maps, write, de-bug and execute VSCS operating and maintenance programs using the high order language (HOL) and system specific software associated with the VSCS, and analyze and modify, de-bug, reassemble or compile source software. This training shall include VSCS specific database management systems and HOLs.

This training shall provide the specific skills to operate, maintain, and support the VSF/SDS located at the FAATC. This training shall also include:

a. The operation, maintenance, and support of the SDS Hardware systems;

b. The operation, maintenance, and support of the Operating Systems associated with the SDS hardware;

c. The operation, maintenance, support, and management of the Local Area Network (LAN);

d. The operation, maintenance, and support of the SDS;

e. The operation, maintenance, and support of the VSCS operating software and the full life-cycle software development processes by which the software is developed, tested, and implemented.

The Contractor shall develop, deliver, and maintain course materials that employ VSCS course materials and approved COTS courseware developed for the VSCS AF Maintenance, VSCS NAS Manager, and VSCS Software Support as the basis for the VSF/SDS training.

The Contractor shall update the VSCS Task and Skills Analysis (TASA) and Contract Training Plan (CTP) to include VSF/SDS Training, and develop and deliver a VSF/SDS Course Design Guide (CDG) and appropriate Course Materials in accordance with FAA-STD-028 and/or best commercial practices as directed by the Contracting Officer.

Personnel attending this course will have completed FAA courses 44012 (Fundamentals of Computer Software), 40406 (Fundamentals of Computer Hardware), and 44419 (Fundamentals of Data Communications), or have demonstrated equivalent knowledge.

3.9.2.5.2 VSF/SDS Training Implementation - The Contractor shall perform training at the FAA Technical Center and shall have access to classroom space and VSF/SDS equipment/software at no cost to the Contractor. The Contractor shall provide the software for training in accordance with 3.9.2.1 and shall identify for approval any COTS modules and course modules that may be conducted at the manufacturer's facility.

The Contractor shall conduct VSF/SDS training for up to 12 students per class. The first formal training class shall be completed prior to SST of the PPI at the FAATC. The Contractor shall deliver all final course materials in accordance with CDRL VP83 upon completion of VSF/SDS training.

3.9.2.5.3 Site Software Training - The Contractor shall develop, update, maintain, and deliver to the Government Operational Site Software training that at a minimum includes theory of operation, required HOL training, and hands-on experience that provides the student with the knowledge, skills, and practical applications required to correctly identify and isolate site software problems, install software as directed, and perform configuration management procedures as directed.

Personnel attending this course will have completed FAA courses 44012 (Fundamentals of Computer Software), 40406 (Fundamentals of Computer Hardware), and 44419 (Fundamentals of Data Communications), or have demonstrated equivalent knowledge.

Personnel attending this course will consist of FAA-selected personnel which may include, but not be limited to: journey level personnel, FAAAC instructors, supervisors, and field engineers.

3.9.2.5.4 Site Software Training Program Implementation - The Contractor shall conduct site software training for operational site System Specialists from the operational sites, FAATC and Mike Monroney Aeronautical Center. This training shall be conducted at the Contractor's facility or the Mike Monroney Aeronautical Center as directed by the Contracting Officer. The Contractor shall provide classroom space for training conducted at the Contractor's facility in accordance with 3.9.2.1. Training will transition from the Contractor's facility to the Mike Monroney Aeronautical Center no later than four (4) months after delivery of the VSCS at the Mike Monroney Aeronautical Center as directed by the Contracting Officer.

The Contractor shall plan to conduct the training for a minimum of one (1) Systems Specialist or Software Engineer from each site by equipment delivery and this training shall not be completed earlier than 180 days prior to site equipment delivery. The Contractor shall schedule the training for the remaining Systems Specialist or Software Engineers from each site to be completed prior to ORD plus one (1) year. The Contractor shall provide a complete set of all course materials to each student receiving site software support training.

3.9.2.6 System and Personnel Certification - The Contractor shall develop and deliver to the Government VSCS critical and key system parameters for use in the development of the FAA certification program. The Contractor shall support the Government validation of the system certification parameters and procedures. The parameters developed shall be documented in the System Maintenance Manual (VP72).

The Contractor shall develop and deliver to the Government theoretical and practical personnel certification examinations and support the Government validation of those examinations for each VSCS segment. The Airway Facilities Personnel Certification Program is described in FAA Order 3400.3.

3.9.2.7 VSCS Overview Training - The Contractor shall develop and deliver to the Government VSCS overview training materials for AT and AF Supervisors and Managers from FAA Washington, DC headquarters, ARTCC and Regional headquarters, and the FAATC and Mike Monroney Aeronautical Center headquarters organizations in accordance with the approved Contract Training Plan.

3.9.2.7.1 Overview Training - The Contractor-developed VSCS overview training materials shall, as a minimum, provide information to familiarize students with the VSCS equipment, describe the functioning of the VSCS at the system level, describe the Contractor installation and testing procedures and identify special requirements necessary for coordinating the Contractor installation and testing effort. The overview training course materials shall consist of a reproducible video tape classroom presentation suitable for presentation to groups of up to 25 personnel, supplemented by a VSCS specific information booklet or manual.

3.10 MANUFACTURING

The Contractor shall apply the entirety of this section to encompass the PPI requirements of FAA-E-2731 (with Addendum 2).

3.10.1 Manufacturing Management

The Contractor shall implement a Manufacturing Management System in accordance with the approved Manufacturing Plan. The Manufacturing Plan shall be developed in accordance with MIL-STD-1528.

3.10.2 Work Measurement Program

The Contractor shall maintain a work measurement program in accordance with the approved Manufacturing Plan.

3.10.3 Production Readiness Review (PRR)

The Contractor shall conduct a VSCS Production Readiness Review in accordance with MIL-STD-1521.

3.10.4 Manufacturing and Testing Facilities

The Contractor shall construct, convert or expand existing industrial facilities, if required, to produce and test the VSCS. The Contractor shall maintain and equip the Contractor facilities to support the work efforts of this contract.

3.10.5 Production Reporting

The Contractor shall track the production status in accordance with the Manufacturing Plan. The production status shall be presented concurrently with the monthly PMR.

The production status shall include, as a minimum, the following:

a. Current production and production planning status
b. 30 day production forecasts
c. 6 month production forecasts
d. Results of formal design reviews conducted in accordance with MIL-STD-1521
e. Results of production audits, problems, and corrective actions taken
f. Material Review Board actions
g. Scrap rate
h. Process control system yields, control charts, and corrective actions generated
i. Manufacturing analyses (ongoing)

The presentations shall also include Subcontractor activity related to the above subjects.

3.10.6 Federal Communications Commission (FCC) Registration

The Contractor shall obtain FCC equipment registration in accordance with FAA-G-2100.

3.11 INTEGRATED LOGISTICS SUPPORT (ILS)

The Contractor shall apply the entirety of this section to encompass the PPI requirements of FAA-E-2731 (with Addendum 2).

3.11.1 Integrated Logistics Support Program

The Contractor shall plan, maintain and execute the ILS program to meet the M-1/ISSS Essential Requirements in FAA-E-2731 (with Addendum 1), the approved Integrated Support Plan (ISP) and provisions contained herein.

3.11.1.1 ILS Program Management - The Contractor shall establish an Integrated Logistics Support Manager (ILSM) as the principal logistics point of contact for the Government. The Contractor shall integrate the various logistics elements under the ILSM.

3.11.1.2 National Airspace Integrated Logistics Support Management Team - The Contractor shall support and participate as a member of a joint Government-Contractor National Airspace Integrated Logistics Support Management Team (NAILSMT). The NAILSMT will be the primary management vehicle to support the FAA project manager in planning, coordinating, and directing execution of the Integrated Logistics Support Program.

3.11.1.2.1 Reserved

3.11.1.2.2 NAILSMT Meetings - The Contractor shall support joint Government-Contractor meetings of the NAILSMT. The Government will hold NAILSMT meetings, normally semi-annually through the first year, and as required thereafter. The NAILSMT meetings will normally be held at the Contractor's facilities or the FAA Depot and will not exceed two (2) days in length. The Contractor shall provide administrative support to the NAILSMT when meetings are held at the Contractor facility. The Contractor-provided administrative support shall include, but not be limited to, facilities, office equipment, and clerical support, including recording of minutes.

3.11.1.3 Subcontractor/Vendor Control - The Contractor shall maintain oversight and be responsible for the Subcontractor and Vendor VSCS ILS program(s). The Contractor shall establish and verify that Subcontractors and Vendors meet the ILS program requirements and Logistics Control Number structure compatibility. During the VSCS NAILSMT meetings, the Contractor shall nominate for Government approval Subcontractor and Vendor participation.

3.11.2 Maintenance Planning

The Contractor shall complete all maintenance planning efforts as an integral part of the Integrated Logistics Support planning to meet the M-1/ISSS Essential Requirements in FAA-E-2731 (with Addendum 1) and the approved Maintenance Plan. The maintenance trade-off analyses shall be documented in the Maintenance Analysis Report.

The Contractor shall update and complete all maintenance trade-off studies applicable to the production VSCS.

3.11.3 Life Cycle Cost (LCC) Analysis

The Contractor shall continue the LCC program in accordance with the approved LCC Document. The Contractor shall manage, track, analyze, evaluate, and report VSCS LCC estimates. The Contractor shall evaluate LCC impact on every Engineering Change Proposal submitted after Contract award. The Contractor shall gather actual failure, cost factors, staffing, and repair data for updating the LCC estimate. The Contractor shall evaluate all identified risks for impact on life cycle cost. For LCC, the life cycle shall be twenty (20) years beyond the last non-optional VSCS Government acceptance. Software LCC data shall be documented in the Computer Resources Integrated Support Document.

3.11.3.1 Contractor vs FAA Maintenance Trade-Off Study - The Contractor shall analyze and evaluate the cost estimates and the cost impacts and effectiveness of Government, Contractor, and hybrid maintenance options and prepare a Contractor vs FAA Maintenance Trade-Off Study.

3.11.4 Logistics Support Analysis (LSA)

The Contractor shall implement and maintain an LSA Program in accordance with MIL-STD-1388-1A and MIL-STD-1388-2B. The Contractor shall conduct the LSA program as a single analytical effort with the system engineering process to identify logistics support requirements.

3.11.4.1 LSA Program Tasks - The Contractor shall accomplish the following LSA tasks in accordance with MIL-STD-1388-1A:

TASK	TITLE	SUBTASKS
102	Logistics Support Analysis Plan	ALL (less 102.3.2, 102.3.3, 102.3.4, and 102.3.7)
103	Program and Design Reviews	103.2.4
301	Functional Requirements Identification	301.2.4.1 and 301.2.4.2
303	Evaluation of Alternatives and Trade-Off Analysis	303.2.1 and 303.2.7
401	Task Analysis	ALL (Less 401.2.5, 401.2.6, 401.2.7, and 401.2.10)
403	Post Production Support Analysis	ALL (less 403.3.5)
501	Supportability Test, Evaluation and Verification	501.2.1, 501.2.3, 501.2.4 and 501.2.5

The tasks identified shall be documented in the Logistics Support Analysis Plan, ILS Evaluation of Alternatives and Trade-off Analysis Study Report, LSA Incremental Delivery, Repair Level Analysis Report, Supportability Assessment Plan and Supportability Assessment Report.

3.11.4.2 LSA Candidate Selection - The Contractor shall implement an LSA Candidate Selection process for systems, subsystems, end items, components, assemblies, subassemblies, support and test equipment, and training equipment that require documentation of operational and logistic support parameters and requirements. The Contractor shall include as LSA candidates, all repairable items provided under the VSCS contract. Maintenance capability as used in this context includes, but is not limited to: (1) trained personnel, (2) transportation and handling, (3) logistics technical data, (4) support and test equipment, and (5) supply support and facilities.

The Contractor shall select and identify LSA Candidates in consonance with the following criteria: (1) LSA control number, (2) national stock number/ manufacturer's part number, and (3) item name. The Contractor shall augment the initial candidate items list as design engineering progresses. The list of LSA candidates is defined as:

a. Contractor-furnished installed equipment items that can or will be inspected, tested, repaired, maintained, or overhauled as part ("On-equipment" maintenance) of the VSCS.

b. Contractor-furnished installed equipment items that can or will be inspected, tested, repaired, maintained, or overhauled separately ("Off-equipment" maintenance) from the system, subsystem, end item, component, assembly, subassembly with which they are functionally associated.

c. Contractor-furnished noninstalled equipment, to include support and test equipment and training equipment.

d. Installed and noninstalled GFP items, when such items are required to interface GFP with Contractor-furnished equipment, or when usage/ environment will be different, and/or to determine total support requirements of the VSCS.

e. Installed and noninstalled GFP items for which the Government-furnished data are inadequate or incompatible, and where such data are necessary to document VSCS requirements.

f. Connecting and installation hardware, bracketry, standard hardware items, bulk material, common and standard parts, which are not economically repairable, shall be included in the LSA documentation for the next higher assembly. The Contractor shall not include common nuts, bolts, and screws.

The Contractor shall identify items considered and recommended for LSA, as well as items considered but not recommended, and provide a rationale for nonselection.

The Contractor shall not consider equipment of a temporary nature (i.e., special installation switches, temporary ports that may be removed within the Contract maintenance period, transition switches) as candidates.

The Government will retain the right for final determination of a candidate for selection, nonselection or revision, or additional LSA tasking.

3.11.4.3 Logistics Support Analysis (LSA) Control Number Assignment - The Contractor shall establish and structure the LSA Control Numbers (LCNs) within the Logistics Support Analysis Record (LSAR) to represent a hardware generation breakdown of the hardware and include support and test equipment, bulk items, training equipment, and installation hardware items.

The Contractor shall assign each item in the equipment, from the end item down to each individual piece part, a unique LCN for each application of the item throughout the system to identify its relationship to the next higher assembly. The Contractor shall use the LCN structure for the hardware breakdown as displayed in the engineering drawings for the equipment.

The Contractor shall integrate the Subcontractor and Vendor LCNs within the overall Contractor coding arrangement. The Contractor shall insert the first three characters of the LCN assigned at the Logistics Guidance Conference. The LCN numbering system shall be described in the Logistics Support Analysis Plan.

3.11.4.4 Logistics Support Analysis Record (LSAR) Data Requirements - The Contractor shall establish and maintain data and information from the LSA Program Tasks in the LSAR in accordance with MIL-STD-1388-2B. The Contractor shall maintain and store the LSAR in a Government-validated automated form in the format specified on the LSAR Data Selection Sheets (DD Form 1949-3). The Contractor shall maintain LSAR not capable of automation in hardcopy format in accordance with MIL-STD-1388-2B (DD Form 1949-3 addenda).

The Contractor shall establish and maintain for Government approval, the following LSAR data in accordance with DD Form 1949-3 via submission of all data tables utilized within the MIL-STD-1388-2B Automated Data Processing (ADP) system. Any depot test procedures provided as supplemental to the LSAR deliveries will be reviewed by the FAA. If technical comments are generated as a result of FAA review, the Contractor shall update the applicable test procedure(s) and resubmit it as change pages to the LSA Incremental Delivery (VP50).

3.11.4.4.1 LSAR Documentation Update - The Contractor shall update LSAR documentation to reflect changes in support resulting from revision in system design, support and organizational requirements, logistics demonstrations, systems reviews, training outcomes, and Contractor or Government testing. The Contractor shall update LSAR documentation to reflect logistics support improvements or the correction of deficiencies discovered through analysis of test results or Contractor verification of LSAR documentation. The Contractor shall update and maintain the LSAR documentation to reflect changes subsequent to provisioning conferences.

3.11.4.4.2 LSAR Data Records - The Contractor shall generate applicable automated data as indicated below:

MIL-STD-1388-1A Subtask	Short Title	MIL-STD-1388-2B LSAR Data Table
301.2.4.1 301.2.4.2	Operations and Maintenance Tasks	All B, C, and XI tables. Provide update of prototype maintenance plan task in LSAR table.
401.2.1 401.2.2	Task Analysis and Analysis Documentation	All C and XI tables. Reformat of Prototype maintenance study results. Provide and update LSAR tables based upon data previously developed.
401.2.3	New/Critical Support Resources	All E, U, GB, GC, & GD tables. Reformat of Prototype maintenance study results. Provide and update LSAR tables based upon data previously developed.
401.2.4	Training Requirements and Recommendations	Tables EE, GA, GB, GC, & GD. Reformat of Prototype maintenance study results. Provide and update LSAR tables based upon data previously developed
401.2.8	Provisioning Requirements	All H & X tables. Provide and update LSAR tables based upon data previously developed.
401.2.11	LSAR Updates	Update all LSAR tables based on ECP approval, as applicable.

3.11.4.5 LSAR Data Review - The Contractor shall provide progressive verification of the adequacy and technical accuracy of LSAR documentation in accordance with the Integrated Support Plan. The Government will reserve the right to periodically review and examine Contractor produced LSAR data, including LSAR input data records, LSAR output summaries, drawings, mock-ups, specifications, ADP records, photographic reproductions necessary to evaluate the Contractor compliance with, and satisfactory progress toward meeting the requirements in FAA-E-2731. The Government will designate members of the NAILSMT to review the Contractor data.

3.11.4.6 Depot Maintenance Analysis - The Contractor shall conduct a maintenance study and analyze the Mike Monroney Aeronautical Center Depot maintenance requirements to determine workforce, skills, repair, Quality Assurance procedures, tooling, and space required for depot support. The results of this study shall be documented in the Depot Maintenance Study and the LSAR.

3.11.4.7 Workforce and Personnel - The Contractor shall identify the work force and personnel requirements for all levels of hardware and software maintenance, operator positions, and system support for the VSCS as part of the LSA process, Task 401.

3.11.5 ILS/LSA/NAILSMT Guidance TIMs

The Contractor shall host and support ILS/LSA/NAILSMT guidance TIMs to include training. The Contractor shall obtain Government approval on ground rules, preliminary analyses, and assumptions at the guidance TIMs, prior to the initiation of any detailed LSA or the preparation of any worksheets.

3.11.6 Logistics Guidance Conference

The Contractor shall participate in a Logistics Guidance Conference in accordance with the DD Form 1949-3 Addenda. This conference may be held as part of the Provisioning Conference or NAILSMT Planning Conference.

3.11.7 Provisioning Data and Cataloging

The Contractor shall format data required for provisioning of spare and repair parts to meet the requirements in, and in accordance with MIL-STD-1388-2B and FAA-G-1375. The LSA Data Requirements Forms from MIL-STD-1388-2B form a part of this document as Appendix A.

The Contractor shall pre-screen through the Defense Logistics Service Center (DLSC) for national stock numbers all information entered on the H and X LSAR Data Record in accordance with the requirements of paragraph 2.210.3, DOD Manual 4100.38M. This screening shall take place within 60 days of each incremental delivery and the results shall be documented on the H and X LSAR Data Tables prior to scheduled delivery of the LSAR data.

As a result of this pre-screening the Contractor shall, upon request, furnish the information required for Item Identification in accordance with FED-STD-5 and all supporting documentation. This requirement shall apply only to items not properly cataloged in accordance with FED-STD-5 and as required by the FAA Cataloging Activity Items identified as proprietary in accordance with MIL-STD-1388-2B shall be clearly marked and identified "For Government use only". The delivery of the Item Identification in accordance with FED-STD-5 and all supporting documentation shall be accomplished prior to the next incremental delivery of the LSAR or as directed by the FAA Cataloging Activity. This Provisioning Data and Cataloging information shall be documented in the LSA Incremental Delivery.

3.11.8 Provisioning Conference

The Contractor shall participate in a Provisioning Conference in accordance with DD Form 1949-3 Addenda.

3.11.9 Support Equipment

The Contractor shall identify all required support equipment required for performing operational and maintenance tasks at all levels, including jigs, fixtures and software, common and peculiar tools, and material handling equipment, in accordance with MIL-STD-1388-1A, MIL-STD-1388-2B and the approved Maintenance Plan. The Contractor shall recommend for use, whenever possible, items currently in the Government inventory or used in support of other equipment common to the FAA.

3.11.9.1 Support Equipment Software - The Contractor shall use commercially available software for Contractor-selected and Government-approved Automatic Test Equipment (ATE) wherever applicable. The Contractor shall develop software and TPSs for ATE in accordance with MIL-STD-2077 or the standard previously established for the selected ATE.

3.11.9.2 Calibration Maintenance Requirements Summary (CMRS) - The Contractor shall develop a CMRS for all new design support equipment requiring calibration under this contract.

3.11.10 Parts Control Program

The Contractor shall implement the Parts Control Program established in accordance with MIL-STD-965, procedure one. The data developed shall be documented in the Non-Standard Parts Approval Requests and the Program Parts Selection list.

3.11.11 Technical Documentation

The Contractor shall prepare a Design Change Notice (DCN) to document all changes to the Provisioning Technical Documentation.

3.11.12 VSCS Consumables

The Contractor shall identify the VSCS-unique consumables required to support VSCS operations at each site. The VSCS consumables shall be documented in the LSAR.

3.12 CONFIGURATION MANAGEMENT

The Contractor shall apply the entirety of this section to encompass the PPI requirements of FAA-E-2731 (with Addendum 2).

The Contractor shall implement and maintain a Configuration Management (CM) program to include all Subcontractors and Vendors in accordance with the requirements in FAA-STD-021 and the approved Configuration Management Plan for hardware and software of this contract.

3.12.1 Management Requirements

The Contractor shall establish a single point of contact responsible for the Configuration Management Program for the VSCS Production contract.

3.12.2 Baseline Requirements

The baseline shall be documented in accordance with the documents listed in Table 3.12-1.

The Contractor shall update and maintain the baselines established for the prototype upgrade under the PDP contract. Any changes to the baselines shall be in accordance with 3.12.3.2.

3.12.2.1 Physical Configuration Review (PCR) - The Contractor shall plan and conduct a Prototype Development Program Upgrade (PDPU)/VCET Physical Configuration Review (PCR) for the first shipment to the FAATC in accordance with the approved Configuration Management Audit Plan (VP17). The PCR shall establish the Contractor's Initial Product Baseline (IPB). The PDPU/VCET PCR shall provide the VSCS Program a point of departure for Government involvement in VSCS change control. The PDPU/VCET PCR shall be a preliminary event preceding the VSCS Physical Configuration Audit (PCA) and the final product baseline.

3.12.3 Functional Configuration Management (CM) Requirements

The Contractor shall perform CM identification, change control, status accounting, and auditing functions as follows:

3.12.3.1 Configuration Identification - The Contractor shall identify and mark all hardware configuration items in accordance with FAA-STD-021, Appendix VI.

The Contractor shall identify all Computer Software Configuration Items (CSCIs) and constituent components in accordance with DOD-STD-2167.

The Contractor shall submit requests for nomenclature (assignments, revisions, cancellations), requests for confirmation of nomenclature, requests for assignment of serial numbers, and requests for identification plate drawing approval in accordance with FAA-G-2100. The Contractor shall submit requests for serial number assignment and identification plate drawing approval concurrently with requests for confirmation of nomenclature.

The Contractor shall develop a Version Description Document for each software version or interim change to a previously released version.

3.12.3.2 Configuration Control - The Contractor shall propose any changes to the Functional, Allocated, and Final Product baselines as Engineering Change Proposals (ECPs).

The Contractor shall develop and process ECPs in accordance with FAA-STD-021, Appendix VIII and Appendix IX, and complete the Life Cycle Cost evaluation.

The Contractor shall develop all required Specification Change Notices (SCNs) for every affected baseline document in Table 3.12-1, as well as maintenance and user manuals, to accompany each ECP in accordance with FAA-STD-021, Appendix XI and XII, and FAA-STD-005.

The Contractor shall develop any required Notice of Revisions (NOR) for every document affected by an ECP for which the Contractor is not the custodian, including GFP documentation, to accompany each ECP in accordance with DOD-STD-480, Section 5.

The Contractor shall submit waivers in accordance with DOD-STD-480, Sections 7 and 8. Upon completion of the Contractor-required action, the proper documentation for minor deviations/waivers will have the local FAA Quality Reliability Office concurrence and approval prior to implementation, unless otherwise directed by the FAA Contracting Officer.

The Contractor shall develop procedures describing how approved changes to the VSCS hardware, software, and documentation configurations, including maintenance and user documentation, will be coordinated with the Government and released to each VSCS site.

The Contractor shall maintain configuration control of all VSCS hardware and software such that each operational site has a functionally equivalent and interchangeable hardware and software configuration, including compatible physical interfaces, and excluding only site database and system size considerations. The Contractor's configuration control includes provisions for migration of improved and new system components into any systems prior to and/or after FAA acceptance.

	Initial	Final
FUNCTIONAL BASELINE		
VSCS Product Specification Interface Requirements Documents System Segment Specification	FAA-E-2731 (With Addendum 1) ** V096	FAA-E-2731 (With Addendum 1) Attachment J-6 VP35
ALLOCATED BASELINE		
Software Requirements Specifications Hardware Requirements Specifications Interface Requirements Specifications	V016 V015 V017	VP29 VP37 VP39
PRODUCT BASELINE		
Human Factors Design Document Hardware Top Level Design Document Hardware Detailed Design Document Hardware Product Specifications As-Built Engineering Drawings/Lists Maintenance Manuals User Manuals Interface Control Documents Version Description Document (VDD) Interface Design Document Data Base Design Document Software Design Document	V023 V022 V024 V025 V054, 59 V061, 63 V062, 64 V070-74, 77, 79, 80	VP46 VP42 VP43 VP44 VP69, 69A* VP68* VP70*, 71*, 72*, 87*, 88* VP41 VP27 VP40 VP34 VP95
INITIAL PRODUCT BASELINE		
Drawings, Engineering and Associated Lists Program Parts Selection List Non-Standard Part Approval Requests/Proposed		VP69 VP61 VP62

* Not Part of NAS MD001 Inventory of VSCS Baselines controlled by AOS-550
** As listed in Part I, Section C of Contract DTFA01-87-C-00002

Table 3.12-1 VSCS Baseline Composition

The VSCS Contractor shall process any changes to the Initial Product Baseline in accordance with the approved Configuration Management Plan (VP18) ensuring that there is FAA notification of the proposed change.

3.12.3.3 Configuration Status Accounting - The Contractor shall establish and maintain CM status for each VSCS site configuration in accordance with MIL-STD-482. The Contractor shall establish and maintain engineering release records for each VSCS site hardware, software, and documentation configuration in accordance with FAA-STD-021, Appendix VII.

The Contractor shall develop and maintain Configuration Item Development Records (CIDRs) for each configuration item in accordance with FAA-STD-021, Appendices XI and XII. The Contractor shall document this data in the CM Status Accounting Reports.

3.12.3.4 Configuration Audits - The Contractor shall plan and conduct Functional Configuration Audits (FCAs), Physical Configuration Audits (PCAs), and Formal Qualification Reviews (FQRs) in accordance with MIL-STD-1521, for configuration items that have been newly developed or changed since the Prototype FCA/PCA.

3.12.4 Special Configuration Management Procedures

3.12.4.1 GFP Hardware and Software - The Contractor shall establish configuration control over any GFP hardware and software which is modified for integration into the production VSCS in accordance with 3.12.3.2.

The Contractor shall establish configuration control over any GFP support software or hardware (e.g., test equipment) which is modified for use on the VSCS in accordance with 3.12.3.2.

3.12.4.2 Commercial Software and Hardware - The Contractor shall identify and control VSCS-unique changes to commercially available software and hardware.

The Contractor shall prepare changes to commercially available hardware and software, including changes associated with commercial off-the-shelf releases in accordance with 3.12.3.2.

3.13 QUALITY ASSURANCE

The Contractor shall apply the entirety of this section to encompass the PPI requirements of FAA-E-2731 (with Addendum 2).

The Contractor shall establish and maintain a Quality Assurance (QA) Program, Quality Assurance Management Responsibility, and Subcontractor and vendor quality assurance as described in the following paragraphs.

3.13.1 Quality Assurance Program

The Contractor shall implement and maintain a Quality Assurance Program in accordance with the Quality Control System Plan (QCSP) and the Computer Software Quality Program Plan (CSQPP) included in this Contract at time of award.

3.13.2 Quality Assurance Management Responsibility

The Contractor shall establish a single quality assurance management point of contact within the VSCS project organization.

3.13.3 Subcontractor and Vendor Quality Assurance

The Contractor shall establish a Subcontractor and Vendor Quality Assurance Program consistent with the Government-approved QCSP and CSQPP.

3.13.4 Material Status

The Contractor shall document the status and open actions with regard to material discrepancy in a Material Review Board Summary.

3.14 DATA

3.14.1 Data

The Contractor shall deliver all data set forth on the VSCS Contract Data Requirements List (CDRL). Formats and data instructions for the data items are provided in the individual Data Item Descriptions (DIDs) referenced by the CDRL.

3.14.2 Technical Manuals and Publications Production

The Contractor shall produce technical manuals, user guides, and publications in accordance with FAA-D-2494. The Contractor shall identify all Type III, Type II, GFP, and Commercially available manuals needed for each configuration item, identify any site/location-unique requirements, and provide methods for addressing these requirements in the manuals. The Contractor shall establish a process to provide for change pages or revisions to applicable documents to be received at each affected site.

3.14.3 Engineering Drawings and Associated Lists

The Contractor shall develop engineering drawings in accordance with DOD-D-1000 and DOD-STD-100. These drawings shall be documented and delivered in accordance with instructions in the Engineering Drawings and Associated Lists CDRL.

3.14.4 Reserved

3.14.5 Site Installation Drawings

The contractor shall develop site installation drawings in accordance with DOD-STD-100. The drawings shall be updated at ORD to include site specific installation details, configurations, and equipment adjustments. These drawings shall be documented and delivered in accordance with instructions in the Site Installation Drawings CDRL.

3.15 CONTRACTOR SERVICES

The Contractor shall apply the entirety of this section to encompass the PPI requirements of FAA-E-2731 (with Addendum 2).

The Contractor shall furnish engineering, maintenance, technical, software, testing, and supplemental support services for the VSCS. The Contractor shall provide support services to the Government Operational Test and Evaluation (OT&E) and System Shakedown Testing (SST) activities at the Federal Aviation Administration Technical Center. The Contractor shall provide support services to the Government Operational Site Testing (OST) activities at each of the operational sites. Contractor services shall be provided for the first operational year and thereafter as ordered by the Government.

3.15.1 Contractor Services at the FAATC

The Contractor shall provide engineering, hardware and software maintenance support services at the FAATC.

The Contractor shall provide, as a minimum, the following support during testing at the Federal Aviation Administration Technical Center:

a. Maintaining the VSCS,

b. Modifying the adapted database to provide needed communications at the various positions,

c. Operating the VSCS,

d. Performing cold start, warm start, and data reduction,

e. Modifying/correcting reconfiguration maps, and

f. Performing software modifications of touch entry displays as needed to accommodate controllers and human factors requirements.

3.15.1.1 Contractor Engineering Services - The Contractor shall provide engineering support services beginning with system acceptance at the Federal Aviation Administration Technical Center.

The Contractor engineering support services shall include as a minimum: assist in operating the VSCS, providing resolution of VSCS user problems, resolution of interface problems, verification of VSCS requirements to user, engineering assistance in software loads and configuration map database updates, support of Government RMA testing, and on-the-job training (OJT) on the VSCS hardware and software. In addition, the engineering support services shall include designing and testing software and hardware modifications to the VSCS.

The engineering support required from acceptance of the current prototype equipment until acceptance of the prototype upgrade shall be two man-years/ year of support. The engineering support required after acceptance of the prototype upgrade during the first operational year shall be four (4) man-years of support. The engineering support required for each subsequent year, if ordered, shall be one (l) man-year of support.

3.15.1.2 Contractor Hardware Maintenance Services at the FAATC - The Contractor shall furnish maintenance support services for site/intermediate and depot level hardware maintenance for the VSCS and its accompanying FAATC Support Facility, including the Contractor Traffic Simulation Unit (CTSU), and VCET at the FAATC. The maintenance support services shall include hardware maintenance, repair, restoration, validation, verification, and supply support. The Contractor shall repair or replace for operational use, all failed LRUs. The Contractor shall support the ATE and TPS hardware included in the FAATC Support Facility.

3.15.1.2.1 Current Prototype System Maintenance Service - The Contractor shall begin the maintenance support service at the FAATC upon acceptance of the current prototype system in accordance with the Government-approved Contract maintenance plan. The maintenance support service shall consist of twenty-four (24) hour on-site coverage, seven (7) days a week until the completion of the preliminary Operational, Test and Evaluation (OT&E) testing or when directed by the Government.

3.15.1.2.2 Prototype Upgrade Maintenance Service - The Contractor shall begin the maintenance support service at the FAATC upon acceptance of the prototype upgrade in accordance with the Government-approved Contract maintenance plan. The maintenance support service shall consist of sixteen (16) hour on-site coverage, five (5) days a week for the first operational year. During each option year, if exercised, the maintenance support services shall consist of sixteen (16) hour on-site coverage, five (5) days per week, with on-call coverage for the remaining periods. On-call coverage shall consist of on-site presence within two (2) hours after notification.

3.15.1.3 William J. Hughes Technical Center Support Under CLIN 18

3.15.1.3.1 Scope and Objective - This Statement of Work (SOW) establishes support requirements to be provided by Harris Corporation to the William J. Hughes Technical Center (WJHTC) during in-service phase of the VSCS program. Harris shall provide engineering support services for the Operational Support Directorate (AOS) and ACT for the development, testing, deployment, and operational support phases of the VSCS and the VSCS Training and Backup Switch (VTABS) projects.

The engineering services provided under CLIN 18 shall support the tasks performed by the Communications, Flight Service, Weather, and Information Research Management Division, AOS-500, the Air Traffic Control Engineering and Test Division, ACT-200, and the Facilities Management Division, ACT-400. Engineering support personnel assigned under CLIN 18 will be fully integrated into the existing FAA VSCS support team, working in conjunction with FAA and other support contractor personnel.

3.15.1.3.2 Task Requirements

3.15.1.3.2.1 Program Management Support - Harris shall designate a Program Manager responsible for supervising all activities of the Harris contractor personnel supporting AOS-500, ACT-200, and ACT-400. The Harris Program Manager shall designate Harris technical leads for the engineering support tasks defined in 3.15.1.3.2.2 through 3.15.1.3.2.5 of this SOW. The Harris technical leads shall coordinate directly with designated FAA lead personnel, to allow specific tasks to be assigned and performed in an effective and timely manner.

Harris shall provide resources to perform program management support activities. These activities include:

a. Provide program/process management support. This will include participation in Product Team (PT) meetings, Program Management Reviews (PMR), and VSCS Lifecycle Strategic Acquisition Team (LSAT) meetings.

b. Perform program planning and make recommendations for resource requirements for VSCS lifecycle sustainment activities.

c. Collect performance metrics for VSCS technical areas.

d. Prepare briefings and status reports.

e. Perform routine supervisory functions for the Harris personnel working under CLIN 0018.

3.15.1.3 2.2 Second Level Engineering Support - Harris shall provide resources to support second-level maintenance and engineering activities conducted by AOS-500. This support will be allocated to three functional areas: System Engineering, Software Engineering, and Hardware Engineering.

3.15.1.3.2.2.1 System Engineering Support - Harris shall provide personnel resources to support activities performed by the AOS-520 System Engineering group. These activities may include but are not limited to:

a. Telephone or on-site assistance to operational VSCS/VTABS facilities requesting emergency, urgent or informational assistance. This assistance shall be available on a 24 hour on call basis.

b. Perform verification/validation/analysis for VSCS/VTABS Program Technical Reports (PTR).

c. Support VSCS System Change Request (SCR) Scrub activities, and support the conversion of the VSCS SCR database into the designated FAA problem tracking system.

d. Support VSCS Assessment Team (VAT) activities.

e. Generate VSCS/VTABS TWXs.

f. Support the review and/or development of test plans, procedures, and scripts to test the ORD 6.X, ORD 7.X, and other future VSCS and VTABS baselines, and support the conduct of the testing of the VSCS/VTABS at the WJHTC and in the field.

g. Provide system engineering support for new hardware modifications.

h. Support VSCS/VTABS Year 2000 testing.

i. Provide System Engineering support to the VSCS Product Team in support of System Engineering Analysis Team (SEAT) activities.

j. Support the review, analysis and evaluation of NCPs, casefiles, and technology insertion initiatives to assure maintainability and supportability prior to NAS deployment.

k. Provide Technical Analysis white papers in response to VSCS Product Team requests.

l. Provide technical support to product team for Technology Insertion initiatives.

m. Support the development and implementation of Configuration Management (CM) processes and procedures for the In-Service phase of the VSCS program. This will include support for the implementation of the XStream CM Tool.

n. Provide System Engineering support for updates to VSCS documentation.

o. Support VSCS requirements management.

p. Support national deployment and site implementation activities including planning, media distribution and on-site support.

q. Provide on the job training as required.

3.15.1.3.2.2.2 Software Engineering Support - Harris shall provide personnel resources to support activities performed by the AOS-520 Software Engineering group. These activities may include but are not limited to:

a. Update VSCS SW CM Processes and Procedures for the XStream CM tool.

b. Perform VSCS software builds and prepare Site Installation Tapes.

c. Support the relocation of the VSCS CM Vault to the WJHTC.

d. Support the establishment of VSCS software development testbeds at the WJHTC, and support the relocation of the VSCS Supplemental Design and Demonstration System (SDDS) to the WJHTC.

e. Support the development of processes and procedures for all SEI CMM Level 2 KPAs.

f. Develop/update VSCS software technical documentation.

g. Support PTR/SCR verification and validation. The SW engineering personnel will analyze open PTRs and SCRs and make recommendations for inclusion in future WJHTC developed VSCS baselines.

h. Develop product design specifications for future VSCS baselines. This task will include requirements specification development and design reviews.

i. Develop detailed design for future VSCS baselines. This task will include programming, conducting design walk-throughs, and maintaining development folders.

j. Perform Code and Unit Testing for future VSCS baselines.

k. Provide software engineering support for the ORD 6.x, ORD 7.x, and future VSCS baselines

l. Support the development of System Support Directives (SSD) for each VSCS baseline (ORD 7.x, and the future FAA developed baselines).

m. Provide on-site baseline installation support.

n. Maintain VSCS stubs and drivers at the FAA Academy.

o. Support the development, update and maintenance of on-line software maintenance profiles and procedures.

p. Provide on the job training as required.

3.15.1.3.2.2.3 Hardware Engineering Support - Harris shall provide personnel resources to support activities performed by the AOS-520 Hardware Engineering group. These activities may include but are not limited to:

a. Support the development and delivery of VSCS System Support Modifications (SSM) for future VSCS hardware modifications (e.g., R-Node Latch, PDSS/RDSS)

b. Develop hardware prototypes and hardware components as directed by AOS.

c. Support the expansion of VSCS site configurations.

d. Support the transition of the VSCS Engineering Drawings (VP69) and Site Specific Engineering Drawings. This will include developing the Vendor Control Plan, validating the source files for all drawings, and developing the Barcode Transition Plan.

e. Support AOS in maintaining the VP69/VP69A drawings following their transition to FAA control.

f. Support the installation of the ORD 7.x PROMs and other hardware/firmware modifications at the sites as required.

g. Develop/update VSCS hardware technical documentation.

h. Support updates to the VSCS and VTABS Maintenance Handbooks.

i. Provide hardware engineering support for the development of VSCS System Documentation Releases (SDR).

j. Support the transition of the VSCS design documentation to the FAA and the conversion of VSCS Documentation to NAS Documentation format.

3.15.1.3.2.3 System Test Support - Harris shall provide personnel resources to support system testing activities conducted by ACT-200. These activities may include but are not limited to:

a. Develop test plans, procedures, and scenarios for ORD 6.x/7.x and subsequent FAA developed VSCS baselines.

b. Support the conduct of system testing on the VSCS ORD 6.3.x and ORD 7 VSCS baselines.

c. Perform verification testing on VSCS documentation.

d. Checkout VSCS software installation procedures.

e. Support VTABS OT&E testing.

f. As directed, support installation and checkout testing of the VSCS and VTABS at selected keysite ARTCCs.

g. Collect and analyze test data and Program Trouble Reports.

h. Support the development of System Test Reports, as directed.

i. Support the conduct of requirements validation and system testing for the VA08.x and subsequent FAA developed VSCS baselines.

j. Support system testing of new VTABS baselines.

k. Support the integration of VSCS and VTABS modifications.

l. Provide VSCS test tool support.

m. Provide on the job training as required.

3.15.1.3.2.4 WJHTC CM/QA/Documentation Support - Harris shall provide personnel resources to support CM/QA/Documentation activities conducted by ACT-400. These activities may include but are not limited to:

a. Performing CM identification, Configuration Status Accounting (CSA), auditing, interface coordination, and change control.

b. Ensure WJHTC VSCS/VTABS baselines are updated, traced, and archived through the laboratory life cycles.

c. Maintain CSA system to include system upgrades and modifications of integrated equipment and/or system equipment and software releases.

d. Track laboratory hardware changes through incident and/or change report processes.

e. Verify and support the implementation of system laboratory changes and provide feedback on change status areas affected by changes.

f. Prepare and maintain CM records and prepare and distribute periodic reports that summarize the status of the system laboratory.

g. Participate in meetings with ACT-400 and FAA representatives to exchange CM information about current system.

h. Perform configuration audits to examine the system laboratories against the associated baseline products to assure that the "as built" system reflects the supporting documentation.

i. Assist ACT-400 in defining QA policies, evaluation methodology, processes and procedures.

j. Support and participate in the application of ACT-400 configuration management processes and procedures.

k. Participate in the review of ACT-400 system laboratory documentation to ensure consistency and completeness.

l. Ensure that operating procedures are in conformance with established policies.

m. Support updates to VSCS documentation.

n. Generate system documentation status reports.

o. Support ACT-400 WJHTC Configuration Control Board (CCB) meetings and support VSCS/VTABS change schedule board meetings.

p. Provide on the job training as required.

3.15.1.3.2.5 WJHTC Facility Maintenance Support - Harris shall provide personnel resources to support facility maintenance support activities conducted by ACT-400. Maintenance support shall consist of sixteen hour on-site coverage, five days a week. The support activities may include but not be limited to:

a. Maintain the VSCS PDPU, VTABS and SDDS systems.

b. Modify the adaptation database to provide needed communications at the various positions.

c. Operate the VSCS.

d. Perform cold start, warm start, and data reduction activities.

e. Modify/correct reconfiguration maps.

f. Perform adaptation modifications for touch entry displays as needed to accommodate controllers and human factors requirements.

g. Support the resolution of VSCS user problems and VSCS interface problems.

h. Provide engineering assistance for software loads and configuration map updates.

i. Support VSCS system testing.

j. Provide site/intermediate and depot level hardware maintenance for the VSCS, SDDS, VTABS, SDS, and CTSU. Maintenance support shall include hardware maintenance, repair, restoration, validation, verification, and supply support.

k. Repair or replace for operational use all failed LRUs on the systems located at the WJHTC.

l. Support the ATE and TPS equipment at the WJHTC.

m. Assist in implementing software enhancements for the VSCS and VTABS through all incremental releases, updates, and problem resolutions.

n. Provide on-the-job training (OJT) on the VSCS hardware and software.

3.15.1.3.3 Replacing Personnel Under CLIN 0018 - Prior to removing, replacing or diverting any individual working on CLIN 0018, the Contractor shall notify the CLIN 0018 COTR in advance of such action and shall submit the resume of the proposed substitution to permit evaluation of the impact to this contract. No diversion shall be made by the contractor without the written consent of the COTR.

3.15.1.3.4 Labor Processing Procedures - The contractor shall allocate and record every hour for all personnel assigned to this CLIN. The contractor’s support personnel shall not exceed 40 labor hours per work week without prior authorization by the CLIN 18 COTR or designated FAA lead personnel. Support personnel authorized by the CLIN 18 COTR for on-call support shall not exceed 45 labor hours per work week without overtime authorization.

The contractor shall adhere to FAA policy and authorizations for overtime compensation including: acceptable nature for incurring overtime and authorization for applicable overtime. The contractor shall submit written requests to the CLIN 18 COTR or designated FAA lead personnel for authorization for all overtime that is performed on this contract. A signed approval is necessary before the overtime may be claimed on the contractor's invoice. Extraordinary situations such as site restoration may arise for which the contractor shall ensure that FAA approval signatures are obtained after the fact prior to claiming the charges on an invoice.

3.15.1.3.5 - Travel Authorization/Processing - All travel performed under this CLIN must have prior written approval of the FAA Contracting Officer, the CLIN 18 COTR or designated FAA lead personnel. The contractor shall be reimbursed for actual reasonable transportation cost and for actual reasonable subsistence costs incurred during performance of this contract, not to exceed those rates applicable to Government employees and included in the Joint Travel Regulations. The Government will reimburse the contractor for per diem and travel costs required and incurred by contractor personnel traveling outside their assigned work location in the performance of this contract. Travel shall be approved in writing prior to occurrence.

The contractor shall invoice all approved travel costs associated with the performance of direct support and/or program management services as "ODC" against CLIN 18.

3.15.1.3.6 Location Of Contractor Personnel - The services to be accomplished under this contract shall be performed primarily at or near the FAA Technical Center. The Government will provide all facilities, telecommunications furnishings, equipment and office automation tools required.

3.15.1.3.7 Materials - The contractor shall obtain written approval from the Contracting Officer or CLIN 18 COTR prior to incurring any direct material costs under this CLIN. Expendable materials are exempt from this requirement. To the maximum extent possible, the government will purchase and provide the contractor with equipment. Contract funds can be used to purchase materials if approved in advance.

3.15.1.3.8 Program Reviews/Reports/Invoicing - The Contractor shall provide a weekly status report to designated FAA lead personnel not later than close of business at the end of the work week. The report will summarize the activities performed by all contractor support personnel assigned to the VSCS project.

The Contractor shall prepare a monthly status report which addresses CLIN 0018 activities. The monthly status report will provide a summary of the activities performed by the Harris personnel.

The contractor shall invoice for CLIN 0018 work on a monthly basis. The invoice shall segregate this work from other work under a similar contract type and shall include the number of labor hours worked during the past month by each individual with the associated costs, plus cumulative hours worked and cumulative costs for each individual. The invoice shall include the cost per individual/per trip for all authorized travel, with itemized expense reports attached to support all travel expenses claimed. All material expenses shall also be included on the monthly invoice, with written authorization for the purchases attached.

The Contractor shall present status briefings for the CLIN 0018 effort as requested by the CLIN 18 COTR.

3.15.2 Contractor Hardware Services at the Mike Monroney Aeronautical Center

The Contractor shall provide engineering and maintenance support services at the Aeronautical Center.

3.15.2.1 Contractor Engineering Services - The Contractor shall provide engineering support services beginning with system acceptance at the Mike Monroney Aeronautical Center. The engineering support required during the first operational year shall be one (1) man-year of support.

The Contractor engineering support services shall include as a minimum: providing resolution of VSCS user problems, resolution of interface problems, verification of VSCS requirements to user, engineering assistance in software loads and configuration map database updates, support of Government RMA testing, and on-the-job training (OJT) on the VSCS hardware and software.

3.15.2.2 Contractor Maintenance Services at the Mike Monroney Aeronautical Center - The Contractor shall furnish maintenance support services for site/intermediate and depot level hardware maintenance for the VSCS and VCET at the Mike Monroney Aeronautical Center. The maintenance support services shall include hardware maintenance, repair, restoration, validation, verification, and supply support. The Contractor shall repair or replace and return for operational use, all failed LRUs. The maintenance support services shall include software problem analysis and verification.

The Contractor shall begin the maintenance support services at the Aeronautical Center upon system acceptance and in accordance with the Government-approved Contract maintenance plan. The maintenance support services at the Mike Monroney Aeronautical Center for the first operational year and each subsequent year, if ordered, shall consist of eight (8) hour on-site coverage, five (5) days per week, with on-call coverage for the remaining periods. On-call coverage shall consist of on-site presence within two (2) hours after notification. Eight (8) hour on-site coverage requires the presence of at least one (1) person for eight (8) hours per day, five (5) days per week.

3.15.2.3 ATE and TPS Support - As ordered, the Contractor shall support the ATE and TPS software and hardware required for use at the Mike Monroney Aeronautical Center Depot maintenance facility.

3.15.3 Contractor Services at Operational Sites

The Contractor shall provide engineering services, maintenance services and supplemental support services at each operational site.

3.15.3.1 Contractor Engineering Services - The Contractor shall provide engineering support services beginning with the acceptance of each system at the operational sites. The engineering services during the first operational year shall be one (1) man-year of support. The engineering support required for each subsequent year, if ordered, shall be one (1) man-year of support.

The Contractor engineering support services shall include as a minimum: providing resolution of VSCS user problems, resolution of interface problems, verification of VSCS requirements to user, engineering assistance in software loads and configuration map database updates, support of Government OST and RMA testing, and on-the-job training (OJT) on the VSCS hardware and software. The scope of the OJT shall be that necessary for system repair and certification.

3.15.3.2 Contractor Maintenance Services at Operational Sites - The Contractor shall furnish maintenance support services for site/intermediate and depot level hardware maintenance for the VSCS and VCET at each operational site for the first operational year. The maintenance support services shall include hardware maintenance, repair, restoration, validation, verification, and supply support. The Contractor shall repair or replace and return for operational use, all failed LRUs. The maintenance support services shall include software problem analysis and verification.

The Contractor shall begin the maintenance support services for the VSCS at the operational sites upon system acceptance and in accordance with the Government-approved Contract maintenance plan. The maintenance support services for the first operational year shall consist of twenty-four (24) hour on-site coverage, seven (7) days per week. Twenty-four (24) hour on-site coverage requires the presence of at least one (1) person for twenty-four (24) hours per day, seven (7) days per week.

The maintenance support services for subsequent years, if ordered, shall be dependent upon the number of maintainers requested and the services desired by the site. If full maintenance support services are ordered for subsequent years, the Contractor will perform in accordance with the Government-approved Contract Maintenance Plan. If less than full maintenance support services are ordered, the services ordered shall consist of each maintainer working a nominal forty (40) hour work week and the Contractor shall not be held responsible for the Government-approved Contract Maintenance plan. The maintainer(s) will perform such maintenance services as directed by the On-Site organization responsible for the system maintenance in accordance with the contract Memorandum of Understanding for Limited Site Maintenance.

3.15.3.2.1 Transition Switch Maintenance Services - The Contractor shall begin the maintenance support services for the Transition Switch at the operational sites upon installation and in accordance with the Government-approved Contract maintenance plan. The maintenance support services shall consist of two (2) hour on-call coverage upon installation and connection to the existing communications equipment. On-call coverage shall consist of on-site presence within two (2) hours after notification. The maintenance support services for the Transition Switch after acceptance of the VSCS shall be in accordance with 3.15.3.2 until removal of the Transition Switch.

3.15.3.2.2 VCET Maintenance Services - The Contractor shall begin the maintenance support services for the VCET at the operational sites upon VCET acceptance and in accordance with the Government-approved Contract Maintenance Plan. The maintenance support services for the VCET shall consist of two (2) hour on-call coverage until acceptance of the VSCS. On-call coverage shall consist of on-site presence within two (2) hours after notification. The maintenance support services for the VCET after acceptance of the VSCS shall be in accordance with 3.15.3.2.

3.15.3.3 Contractor Supplemental Support Services - The Contractor shall furnish supplemental support services beginning with the Site Activation Survey at each operational site. The supplemental support services shall be one (1) man-year of support per year from the site activation survey until system acceptance.

The Contractor supplemental support services shall include, but not be limited to, coordination with the local telephone companies providing services to each of the operational sites, assistance in configuration map data input preparation, and interpretation of site preparation and activation requirements.

3.15.4 Contractor Technical Support for FAA Maintenance

As ordered by the Government and to support FAA maintenance, the Contractor shall provide technical support assistance to the National Automation Engineering Field Support Division official designated in writing by the Contracting Officer. Such technical assistance shall be provided for the following:

a. Establishment of a toll-free telephone advisory service on a 24 hour per day basis which shall be staffed to provide expert assistance within 15 minutes after a request for assistance is received.

b. Establishment of a technical assistance capability to provide on-site assistance by a fully qualified Contractor VSCS technician within 24 hours after a request for assistance is received. Special test equipment and spares required for resolution of the maintenance problem may be provided by the Government. Unless otherwise ordered by the Contracting Officer, required test equipment and diagnostic software shall be provided by the Contractor.

3.15.5 Contractor Repair Service (CRS)

The Contractor shall provide material and services for the VSCS including the CTSU, FAATC Support Facility, and VCET equipment. The CRS shall provide for the repair of selected repairable items to the extent not covered by warranty or other provisions of this Contract. The CRS shall include all labor, tools, test equipment, software, facilities, material, and any other technical and administrative support necessary to repair VSCS hardware repairable items to the extent not covered by warranty or other provisions of this contract.

3.15.5.1 Repairable Items - The Contractor shall restore repairable items to a serviceable condition. Repairable items are items of a durable nature which, when unserviceable, normally can be restored to a serviceable condition by a repair activity.

3.15.5.2 Testing, Inspection, and Quality Control - Test methods, approval of test methods, testing, and product acceptance test data forms for the CRS shall be accomplished by the Contractor in accordance with FAAD-STD-1293. Quality control of the CRS shall be in accordance with FAA-STD-016.

3.15.5.3 Repair Priorities - The Contractor shall repair and return repairable items in accordance with established priorities. The designation of routine or priority repair will be made by the assigned Mike Monroney Aeronautical Center Ordering Officer.

Priority 1 repairable items shall be repaired and shipped within twenty-four (24) hours from receipt of notification for items in the Contractor's facility or within 24 hours from receipt of the item by the Contractor until shipped to the designated recipient.

Priority 2 repairable items shall be repaired and shipped within forty-eight (48) hours from receipt of notification for items in the Contractor's facility or within 48 hours from receipt of the item by the Contractor until shipped to the designated recipient.

Routine repairable items shall be repaired and shipped within forty-five (45) days from receipt of the item by the Contractor until shipped to the designated recipient.

3.15.5.4 Shipment of Repairable Items - The Contractor shall pack, package, and ship repairable items in accordance with FED-STD-102, MIL-STD-794, MIL-E-17555, MIL-P-116, ASTM-D-3951, and DOD-STD-1686.

3.15.5.5 Repair Procedures - The Contractor shall accomplish all repairs in accordance with FAAD-STD-1293. Repairable items shall be repaired to the extent necessary to restore them to a serviceable operating condition suitable for their intended use. All repaired items shall comply with FAA-E-2731.

The term "serviceable operating condition" is defined as the condition in which an item is capable of meeting all operational and functional requirements for which it was designed.

Repairs shall be accomplished, where applicable, with test equipment having traceability to the National Institute of Standards Technology in accordance with MIL-STD-45662. The Government reserves the right to verify Contractor compliance with MIL-STD-45662.

As a minimum, the Contractor shall clean, visually inspect, benchtest, and isolate faults in items and components. The Contractor shall disassemble items and components as necessary to identify and accomplish repairs or to establish that the item is serviceable. The Contractor shall reassemble, calibrate, functionally test, perform acceptance inspection, and prepare the item or component for shipment.

Any modifications to items required by the contract or National Airspace System Change Proposal (NCP) and not previously accomplished, shall be accomplished by the Contractor at the time of repair. The Government will provide current NCPs to the Contractor.

The Government reserves the right to inspect and verify all repairs at the Contractor's facility or the point of receipt of the item. Sample inspections by the Government will be accomplished in accordance with MIL-STD-105.

3.15.5.6 Data Submittals, Data Accumulation, and Reports - The Contractor shall complete AC Form 4680-2, E & R Quality Feedback Tag, and the test data forms specified in FAAD-STD-1293, paragraphs 3.2.22 and 3.3.3, for each repairable item.

3.15.5.7 Points of Contract and Shipping Points - The Contractor shall furnish specific offices, names of individuals, and contact points of Contractor representatives subsequent to establishment of the CRS.

3.16 FOLLOW-ON VSCS SYSTEMS

The Contractor shall apply the entirety of the contents of this SOW to the follow-on VSCS Systems.

3.16.1 Follow-On VSCS System Facilities

The follow-on VSCS systems include eighteen FAA facilities and six Department of Defense (DOD) facilities. Should any of these systems be ordered, the Contractor shall make all arrangements and perform all steps required to ensure that FAA and DOD security requirements are met. The Contractor shall ensure that Contractor personnel requiring access to FAA and DOD facilities have the appropriate security clearances.

3.17 ENGINEERING AND TECHNICAL SERVICES SUPPORT

As ordered by the Government, the Contractor shall provide Engineering and Technical support in the following general task areas. The Government is not committed to purchase any or all of the following, nor is the list all inclusive.

3.17.1 Study Tasks

The Contractor shall perform studies or analysis on reliability, technological enhancements, operational concepts, system development and interoperability, modeling, computer-human interfaces, training and training systems, communications systems, or other similar studies.

3.17.1.2 Study Task Reports - The Contractor shall submit a written report upon completion of any study or analysis. The report shall include the information required by the task order.

3.17.2 Testing Support

As ordered by the Government, the Contractor shall provide the technical support necessary to plan, conduct and evaluate test activities not included in the current statement of work. The following tests are included, but not limited to, factory, OT&E, System Shakedown, and Site Acceptance.

3.17.3 Logistics Support

As ordered by the Government, the Contractor shall provide post production support, parts review boards, life cycle costing & analysis, validation of developed manuals, training and other similar tasks as required.

3.17.3.1 COTS Document Enhancement - As ordered by the Government, the Contractor shall provide the technical and administrative support required to revise, enhance or otherwise update COTS documentation to improve its usefulness/utility to the FAA.

3.17.4 Attend Meetings

3.17.4.1 Monthly and Other Periodic Meetings - As ordered by the Government, the Contractor shall provide technical support as required for analysis, discussion and decision support. The types of meetings the Contractor may be required to attend include: Program Management Reviews, Technical Interchange Meetings, Interface Control Working Groups, program design and working groups, and other Ad Hoc meetings. The Contractor may be required to prepare briefings, discussion papers, and minutes of the meeting.

3.17.4.2 Other Meetings - As ordered by the Government, the Contractor shall provide technical support as required for analysis, discussion and decision support. The types of meetings the Contractor may be required to attend include: VSCS User Team Meetings, CDRL in Progress Reviews, Site Status Reviews, Technical Interchange Meetings, Interface Control Working Groups, program design and working groups, and other Ad Hoc meetings. These meetings may involve other prime and support contractors within the VSCS and Advanced Automation Programs. The Contractor may be required to prepare briefings, discussion papers, and minutes of the meeting.

3.18 DISPLAY SYSTEM REPLACEMENT (DSR) FOR THE SEATTLE ARTCC

The Contractor shall support the installation of the DSR at the Seattle Air Route Traffic Control Center as described.

3.18.1 Reserved

3.18.2 Cables

3.18.2.1 Cable Design - The Contractor shall use the information in the DAT01 drawings, as approved by the FAA, to design the VSCS cables that will be provided to the Seattle ARTCC. Cable design shall be based upon information contained in the DAT01 drawings. All cables shall be designed to meet the applicable specifications of the VSCS contract.

The FAA intends to provide cables for all possible positions, including the Tracker positions, identified in the Seattle DAT01 drawings.

The Contractor's planning shall include providing position cables for:

a. 153 DSR positions plus 12 sets of cables for the Tracker positions
b. 36 DSR DYSIM positions, and
c. all supervisory position equipment identified during the site survey, including one in the Automation Wing for the DYSIM.

The Contractor shall label all cables with the source and destination of the cable in accordance with the provisions of the VSCS contract. The Contractor is authorized to communicate and coordinate with the Lockheed-Martin Corporation to identify the specific information necessary to fully comply with this requirement.

3.18.2.2 Cable Build - The Contractor shall design and build all VSCS cables that must be installed between the VSCS equipment located in the VSCS equipment area and the VSCS BusLAN racks located in all of the following areas:

a. ARTCC Host Computer Room
b. ARTCC Automation Wing
c. ARTCC VSCS equipment area

3.18.2.2.1 VSCS Equipment Cables - The Contractor shall design and build all VSCS cables that must be installed between the VSCS equipment located in the VSCS equipment area and the VSCS equipment that is mounted in the following areas:

a. DSR position consoles in the DSR control room
b. Supervisory position consoles in the DSR control room
c. DSR position consoles in the E-Complex area
d. Other position consoles in the E-Complex area
e. DSR training position consoles in the Automation Wing
f. DSR supervisory position consoles in the Automation Wing

3.18.2.2.2 BusLAN/Automation Wing VCE Cables - The Contractor shall design and build all VSCS cables that must be installed between the VSCS BusLAN racks located in the Automation Wing and the VSCS equipment mounted in the following positions:

a. DSR training position consoles in the Automation Wing
b. DSR supervisory position consoles in the Automation Wing

3.18.2.2.3 BusLAN/VCE Cables - The Contractor shall design and build all VSCS cables that must be installed between any of the VSCS BusLAN racks and the VSCS equipment mounted in the following areas:

a. DSR position consoles in the DSR control room
b. Supervisory position consoles in the DSR control room
c. DSR position consoles in the E-Complex area
d. Other position consoles in the E-Complex area

3.18.2.2.4 Recorder Cables - The Contractor shall design and build all VSCS cables that must be installed between the VSCS equipment located in the VSCS equipment area and the VSCS Distribution Frame (VDF) in the ARTCC basement. The cables identified by this paragraph refer to the cables required to provide the legal record capability from the VSCS to the facility legal recorders.

3.18.2.2.5 Miscellaneous Cables - The Contractor shall design and build any other VSCS cables that are required to make the VSCS equipment operational which have not been identified elsewhere in this Statement of Work.

3.18.2.2.6 Intra-VCE Cables - The Contractor shall design and build Intra-VCE cable sets for use in supervisory and ancillary positions not housed in DSR consoles. A cable set is defined as:

a. VEM to speaker cables
b. VEM to dual jack module cables (DJMs must be the same as DSR)
c. VEM to foot switch cables
d. VEM to VDM cables
e. VEM to VIK connector cables
f. Other required VSCS-DSR and intra-VCE cables

3.18.2.3 Cable Delivery - The Contractor shall deliver all cables to the Seattle ARTCCs in accordance with the schedule identified in Contract Section F, Exhibit F.6.

3.18.2.4 Cable Installation

3.18.2.4.1 VSCS Equipment Cables - The Contractor shall install the cables between the VSCS equipment located in the VSCS equipment room and the designated Contractor/Lockheed-Martin demarcation points leading to the:

a. VSCS BusLAN racks in the Host Computer Room
b. VSCS equipment in the DSR position consoles
c. VSCS equipment in the DSR supervisory position consoles
d. VSCS equipment in the E-Complex DSR position consoles
e. VSCS equipment in the other position consoles in the E-Complex area
f. VSCS equipment in the DSR DYSIM position consoles
g. VSCS equipment in the DSR DYSIM supervisory position console

3.18.2.4.2 Cable Installation Support - As directed by the Government, the Contractor shall support the installation of cables between the designated Contractor/Lockheed-Martin demarcation points and the:

a. VSCS BusLAN racks in the Host Computer Room
b. VSCS BusLAN racks in the Automation Wing
c. VSCS equipment in the DSR position consoles
d. VSCS equipment in the DSR supervisory position consoles
e. VSCS equipment in the E-Complex DSR position consoles
f. VSCS equipment in the other position consoles in the E-Complex area
g. VSCS equipment in the DSR DYSIM position consoles
h. VSCS equipment in the DSR DYSIM supervisory position console

NOTE: The Contractor is not responsible for this installation effort. However, this task is included to allow for the Contractor to provide support to Lockheed-Martin if necessary.

3.18.2.4.3 Distribution Frame Cables - The Contractor shall install all cables between the VSCS equipment and the VDF.

3.18.2.4.4 Cable Installation - The Contractor shall provide cable installation in accordance with the schedule identified in Contract Section F, Exhibit F.6. The Contractor shall coordinate with the FAA and the Lockheed-Martin Corporation for the detailed installation schedule.

3.18.2.4.5 Overtemp Alarm Cables - The Contractor shall install the cables designated as Overtemp Alarm Cables between the VSCS equipment room and the VSCS BusLAN racks located in the Host Computer Room. The Contractor shall install the Overtemp Alarm Cables on both sides of the Contractor/Lockheed-Martin demarcation point.

3.18.2.4.6 Intra-VCE Cables - The Contractor shall install the Intra-VCE cable sets in the supervisory positions and in the ancillary positions not housed/installed in DSR consoles.

3.18.2.5 Cable Testing - The Contractor shall provide the test equipment, including all test fixtures required to test the electrical continuity of all VSCS-provided cables.

The Contractor shall test the electrical continuity of all VSCS-provided cables.
The Contractor shall provide informal test procedures for testing each type of cable.

The Contractor shall test all cables from the VSCS end of the cable; Lockheed-Martin personnel will support the Contractor testing by applying test adapters to the DSR side of the cables in accordance with the informal test procedures provided by the Contractor.

The Contractor shall coordinate with the FAA and the Lockheed-Martin Corporation the schedule for testing the cables. The Contractor shall replace or repair any cables identified as defective.

3.18.2.6 Cable Connections - The Contractor shall make the following cable connections:

a. All connections to the VSCS equipment in the VSCS equipment room

b. All connections to all VSCS BusLAN racks

c. All connections to VSCS supervisory position equipment in the DSR control room, the E-Complex area, and the Automation Wing

d. All connections to the VDF

e. All connections to the VCE equipment located in the supervisory positions and in the ancillary positions not housed in DSR consoles.

3.18.3 BusLAN Rack

3.18.3.1 BusLAN Rack Production - The Contractor shall build the VSCS BusLAN racks required to support the installation of the DSR. The Contractor shall use the data provided in the Seattle DAT01 drawings as a basis for determining the quantity and type of VSCS BusLAN racks to provide.

3.18.3.2 BusLAN Rack Delivery - The Contractor shall deliver the VSCS BusLAN racks to the Seattle ARTCC in accordance with the schedule identified in Contract Section F, Exhibit F.6. The Contractor shall communicate and coordinate with the FAA and the Lockheed-Martin Corporation for the detailed delivery date(s) for the BusLAN racks.

3.18.3.3 BusLAN Rack Installation - The Contractor shall install the BusLAN racks in the Host Computer Room, the Automation Wing, and the VSCS equipment area in accordance with the schedule identified in Contract Section F, Exhibit F.6. The Contractor shall communicate and coordinate with the FAA and the Lockheed-Martin Corporation for the detailed installation schedule.

The Contractor shall provide and install the seismic tie-downs for the VSCS BusLAN racks in the VSCS equipment area. The seismic tie-downs shall meet the requirement of the VSCS contract. The installation of the BusLAN racks in the Host Computer Room and the Automation Wing shall be to seismic tie-downs provided by the Lockheed-Martin Corporation.

The installation of the BusLAN racks in the Host Computer Room and the Automation Wing shall include connecting the BusLAN equipment to the power receptacles provided by the Lockheed-Martin Corporation and connecting the appropriate Contractor-provided BusLAN grounds to the Government-provided facility ground systems.

The installation of the BusLAN racks in the VSCS equipment area shall include connecting the BusLAN racks to power receptacles connected to the VSCS critical power panels and connecting the appropriate BusLAN grounds to the Government-provided facility ground systems.

3.18.3.4 BusLAN Rack Testing - The Contractor shall test the BusLAN rack electronics to ensure that the BusLANs are operational with the VSCS system. The Contractor shall provide any test equipment required to test the operations of the BusLAN equipment. The Contractor shall make any repairs necessary to ensure the BusLAN racks are fully operational.

3.18.4 Power

3.18.4.1 Power Installation - The Contractor shall review, analyze and determine the need to provide additional power cables and hardware for the VSCS BusLAN racks that must be installed in the VSCS equipment area. If power cables and hardware are required, the Contractor shall provide and install power cables and hardware between the VSCS critical power panels and the BusLAN racks located in the VSCS equipment area. The Contractor shall work with Seattle ARTCC personnel to ensure that the power installation is done in accordance with the VSCS contract.

3.18.5 Upgrade VSCS Equipment

3.18.5.1 Upgrade VSCS Console Equipment - The Contractor shall ensure that VSCS Console Equipment previously built for the Seattle ARTCC has been upgraded and meets the SORD 6.X baseline. The Contractor shall modify or upgrade the VSCS console equipments prior to delivery.

3.18.5.2 VSCS Console Equipment Delivery - The Contractor shall deliver the VSCS Console Equipments (VCEs) to the Seattle ARTCC in accordance with the schedule identified in Contract Section F, Exhibit F.6. The Contractor shall communicate and coordinate with the FAA and the Lockheed-Martin Corporation on the detailed delivery schedule.

3.18.6 VCE

3.18.6.1 VCE Installation Instructions - The Contractor shall review the VCE installation instructions previously developed for accuracy. The VCE installation instructions shall be upgraded as required to ensure compatibility with the DSR console. The Contractor shall provide to the Government five copies of the informal VCE installation instructions for DSR.

3.18.6.2 VCE Operational Testing - The Contractor is not responsible for VCE operational testing in the DSR consoles. The Contractor shall make any repairs necessary to ensure the VCE are fully operational.

3.18.6.3 Installation in Other Positions - The Contractor shall install the VCE into the supervisory positions and the ancillary positions not housed in the DSR consoles in accordance with the schedule identified in Contract Section F, Exhibit F.6. The installation of the VCE shall include connecting the VCE to power receptacles and connecting the VCE to Government-provided ground systems (if necessary). The Contractor shall provide the Bantam Dual Jack Modules (DJMs) and associated bracketry for all ancillary positions and the Maintenance Position Equipment Subsystems (MPESs). The Contractor shall communicate and coordinate with the FAA and the Lockheed-Martin Corporation on the detailed installation schedule.

3.18.7 VSCS Supervisory Workstation

3.18.7.1 VSCS Supervisory Workstation Equipment Delivery - The Contractor shall deliver any VSCS supervisory workstation equipment required to fulfill the DSR requirements. The Contractor shall deliver the VSCS supervisory workstation equipment in accordance with the schedule identified in Contract Section F, Exhibit F.6. The Contractor shall communicate and coordinate with the FAA and the Lockheed-Martin Corporation on the detailed delivery schedule.

3.18.7.2 VSCS Supervisory Workstation Equipment Installation - The Contractor shall install the VSCS supervisory workstation equipment at the Seattle ARTCC in accordance with the schedule identified in Contract Section F, Exhibit F.6. The installation of the supervisory workstation equipment shall include installing all VCE units into the Government-furnished Supervisory Position furniture, connecting the supervisory workstation equipment to the power receptacles provided by the Lockheed-Martin Corporation, and connecting the appropriate supervisory workstation grounds to the Government-provided facility ground systems (if necessary). The Contractor shall communicate and coordinate with the FAA and the Lockheed-Martin Corporation on the detailed installation schedule.

3.18.7.3 VSCS Supervisory Workstation Equipment Testing - The Contractor shall test the VSCS supervisory workstation equipment to ensure that the workstation equipment is operational with the VSCS. The Contractor shall communicate and coordinate with the FAA and the Lockheed-Martin Corporation to ensure that operational testing does not interfere with other activities. The Contractor shall provide any test equipment required to test the operations of the VSCS supervisory workstation equipment. The Contractor shall make any repairs necessary to ensure the VSCS supervisory workstation equipment is fully operational.

3.18.8 Drawings/Data

3.18.8.1 VSCS BusLAN Rack Raised Floor Tile Cutouts - The Contractor shall provide the Government with drawings showing the patterns for the raised floor tile cutouts for the VSCS BusLAN racks which are to be located in the Host Computer Room and the Automation Wing at the Seattle ARTCC.

3.18.8.2 VSCS Seismic Anchor Pattern - The Contractor shall provide the Government with drawings showing the patterns for the VSCS BusLAN rack seismic anchoring.

3.18.8.3 Drawings - The Contractor shall provide the FAA with an update to VP69A that shows the source and destination of all VSCS cables associated with the DSR project. The Contractor shall prepare the update to VP69A in accordance with the provisions of the VSCS contract. The Contractor shall deliver the updated VP69A drawing to the FAA 60 days prior to delivery of the cables to the Seattle ARTCC.

3.19 VSCS TRAINING AND BACKUP SWITCH (VTABS)

The Contractor shall provide personnel, material, services and facilities as stated herein to fabricate, deliver, install, integrate, test, and support the products described herein. The data delivered as a result of performing the tasks described herein shall be prepared in accordance with the instructions contained herein. VTABS CDRL items associated with VSCS CDRL items shall be delivered as change pages or addenda to the VSCS CDRL items in accordance with the associated DIDs.

3.19.1 VTABS Software Licenses, Source Code, and Liability for Latent Defects

3.19.1.1 VTABS Software Licenses and Source Code Delivery - The Contractor shall provide the software licenses to the Government for all software required under this contract, and, if ordered by the Government, licenses for all software tools used to design, develop, produce, install, and maintain the delivered software. The Contractor shall provide the Government the authorization to prepare, without restriction, a back-up copy of all software used in the VTABS. The term Software is meant to include Firmware.

The Contractor shall deliver to the Government all VTABS source code for which there was any Government funding applied, including all code imported from VSCS and the DSAVS Programs, and all code for which Government funding was applied to modify it to make it suitable for use in VTABS.

3.19.1.2 Latent Defect Liability and System Warranty - The Contractor shall be liable for all “latent defects” in VTABS for one (1) year following completion of CAI at the first delivered operational site. A latent defect is defined as any hardware/software/documentation furnished by the Contractor under the VTABS effort that is not in compliance with the VTABS requirements as defined in this Statement of Work and in the VTABS Specification, or that causes degradation in VTABS performance or functionality.

3.19.1.3 Bulk Purchase Authorization - All personal computers and T-Bar equipment may be purchased as a single bulk buy, to be stored in a bonded warehouse at no cost to the Government. The warranty start date shall begin when the equipment is shipped to the site.

3.19.2 Production

3.19.2.1 Prime Mission Equipment (PME) - The Contractor shall design, produce, test, deliver, and install the VTABS equipment, as ordered by the Government, according to the quantities and schedule as described in Sections B and F of the Contract. Harris shall use excess material from the VSCS to the maximum extent possible. The VTABS equipment shall also support the use of the existing FAA Transition Switches. The software delivered with the systems shall be at least to the level of VSCS ORD 6.3, as delivered to the VSCS sites at the conclusion of WJHTC OT&E.

3.19.2.1.1 VTABS Product Support System (VPSS) - The Contractor shall design, produce and stage the first VTABS at the Contractor's facility. The Contractor shall perform Factory Acceptance Test (FAT) at the Contractor's facility in accordance with 3.19.6, VTABS Test Program. Following completion of the Harris VTABS development support, the VPSS shall be destaged, refurbished, and configured for Boston per Exhibit B.5 of the Contract. Residual circuit cards shall be transitioned to the VSCS Depot for use at other sites or as spares.

3.19.2.1.2 Production Equipment - The Contractor shall deliver all VTABS equipment in accordance with the requirements of FAA-E-2914, VTABS Specification.

3.19.2.1.3 Reliability, Maintainability, Availability (RMA) - The Contractor shall perform an engineering evaluation of environmental and other factors to which VTABS and Transition Switch components will be subjected during operation which may be different than that to which VSCS components are exposed. The Contractor shall determine whether these factors will cause any change to projected failure rates of VSCS system elements to be shared with VTABS and/or the Transition Switch.

The Contractor shall predict failure rates for new or modified system elements introduced by VTABS or the Transition Switch.

3.19.2.1.4 Other Engineering Support - The Contractor shall perform the following in support of the unique VTABS and Transition Switch items.

3.19.2.1.4.1 RMA Modeling and Prediction - The Contractor shall maintain an RMA model and predictions to address requirements in FAA-E-2914. The Contractor shall revise the model and predictions in accordance with MIL-STD-785, Tasks 201 and 203 to reflect changes to the design that affect the results of predictions and actual RMA data delivered from testing. The results of the RMA modeling and predictions shall be included in VSCS CDRL VP025.

3.19.2.1.4.2 Failure Modes, Effects, And Criticality Analysis - The Contractor shall update and maintain the VSCS Failure Modes, Effects, and Criticality Analysis (FMECA) program to include the unique VTABS requirements in FAA-E-2914.

3.19.2.1.4.3 Failure Mode/Stress Testing - The Contractor shall perform a Failure Mode/Stress Test as part of the FAT. This test shall be used to determine the system's reaction to combinations of stressful inputs and load conditions and to verify or uncover problems with the recovery mechanisms of the VTABS. The Contractor shall plan and provide for the collection, maintenance, and analysis of all relevant testing data and for identifying and resolving VTABS problems as a result of the testing.

3.19.2.1.4.4 Failure Reporting, Analysis and Corrective Action System - The Contractor shall update and maintain the VSCS Failure Reporting, Analysis, and Corrective Action System (FRACAS) program to include the unique VTABS requirements in FAA-E-2914.

3.19.2.1.4.5 Interface Management - The Contractor shall maintain an interface management program that includes all VTABS hardware and software interfaces to meet the requirements in FAA-E-2914.

3.19.2.1.4.6 VTABS Consumables - The Contractor shall identify and deliver the VTABS-unique consumables required to support VTABS operations at each site.

3.19.2.1.4.7 Mike Monroney Aeronautical Center - The Contractor shall provide and integrate the support hardware, support software and test equipment necessary to meet the Aeronautical Center VTABS Requirements as identified in the approved VTABS Training Equipment Study.

3.19.2.1.5 PEM Mounting -

a. The VTABS PEM shall be installed on a separate shelf (PEM shelf) in both the Backup and Training Subsystems. This shelf will be provided as GFE. Installation of the PEM shelf will be completed by the DSR Contractor.

b. The Contractor shall provide all the necessary extra cables, brackets and tie-downs required for PEM installation on the PEM shelf.

3.19.3 Project Management

The Contractor shall establish a VTABS project management program to plan, organize, direct, and control all activities necessary to meet the requirements of FAA-E-2914, VTABS specification.

3.19.3.1 Project Management Cost Reporting - The Contractor shall include cost and schedule performance status information for VTABS cost reimbursable SLINS in VSCS CDRL VP07.

3.19.4 Configuration Management (CM)

The Contractor shall implement a Configuration Management program on all VTABS hardware, software, firmware and documentation, excluding training and curriculum materials. The Contractor shall submit his proposed Configuration Management Plan to the Government with his VTABS Proposal.

3.19.4.1 Configuration Control - The Contractor shall propose any changes to the Product baselines as Engineering Change Proposals (ECPs). Contract Clause H.58 is applicable.

The Contractor shall develop and process ECPs in accordance with FAA-STD-021, Appendix VIII and Appendix IX.

The Contractor shall develop any required Notice of Revisions (NOR) for every document affected by an ECP for which the Contractor is not the custodian, including GFP documentation, to accompany each ECP in accordance with DOD-STD-480, Section 5.

The Contractor shall submit waivers and deviations in accordance with DOD-STD-480, Sections 7 and 8. Upon completion of the Contractor-required action, the proper documentation for minor deviations/waivers will have the local FAA Quality Reliability Office concurrence and approval prior to implementation, unless otherwise directed by the FAA Contracting Officer.

The Contractor shall develop procedures describing how approved changes to the VTABS hardware, software, and documentation configurations, including maintenance and user documentation, will be coordinated with the Government and released to each VTABS site.

The Contractor shall maintain configuration control of all VTABS hardware and software such that each operational site has a functionally equivalent and interchangeable hardware and software configuration, including compatible physical interfaces, and excluding only site data base and system size considerations. The contractor's configuration control shall include provisions for migration of improved and new system components into any systems prior to FAA acceptance.

The VTABS Contractor shall process any changes to the Product Baseline ensuring that there is FAA notification of any proposed change.

3.19.4.2 Configuration Status Accounting (CSA) - The Contractor shall provide Configuration Status Accounting (CSA) Information in the same format and frequency as currently being provided for the VSCS program.

3.19.4.3 LRU Tracking System - The Contractor shall provide LRU tracking for the VTABS using the existing VSCS Bar Code System.

3.19.5 Technical Reviews and Audits

The Contractor shall plan, support, conduct and participate in technical reviews and audits. Unless otherwise stated, these reviews shall be conducted at the Contractor's facilities.

3.19.5.1 FAT/SAT Procedure Reviews - The Contractor shall conduct test procedure reviews with the Government-appointed test director or Government-designated representative, to determine which tests if any can be eliminated or reduced under the guidelines of a COTS/NDI test program (FAA Order 1810.6).

The Contractor shall provide COTS/NDI test results to the Government-appointed test director or designated representative, to support the decision to reduce testing. The reduction or elimination of tests shall not connotate the waiver of any requirements associated with those tests.

3.19.5.2 Project Management Reviews (PMRs) - The Contractor shall report on the status of VTABS as part of each VSCS PMR.

3.19.5.3 Configuration Audits

3.19.5.3.1 Baseline Package Review - The Baseline Package Review (BPR) for VTABS shall consist of reviewing all VTABS documentation, software and hardware to establish the Product Baseline. The Baseline Package Review will show that the functions of the configured system comply with the VTABS requirements.

The successful completion of the BPR will result in the establishment of the VTABS Hardware (H/W) Product Baseline and Software (S/W) Product Baseline. The items required for the VTABS BPR are as follows:

a. A listing of all VTABS hardware components, by part number (VP118).

b. Product drawings and documentation associated with the listed HW components (VP111 and WJHTC VP115).

c. A listing of all WJHTC hardware components (VP107).

d. Operating instructions for all VTABS equipment (may be in draft format) (VP99).

e. The Test Plans and Test Procedures and Test Reports for VTABS FAT and FSAT (VP109 and VP110, Volumes I and II)

f. Copies of the Contractor's Software Requirements Specifications (Contractor Format).

g. The Version Description Document (VP103).

h. The CM process used to establish the baseline.

The Government will review a percentage of the hardware documentation against the hardware items. This percentage is a variable dependent upon whether discrepancies are noted. The Software (S/W) Product Baseline review will include a review of all final documentation against contract requirements.

A letter of completion will be sent to the contractor with the listing of the VTABS HW and SW Product Baseline elements that will be entered into the ECP process. For each VTABS system, both VP107 and VP115 will be added to the VTABS Hardware Product Baseline as they are delivered by the Contractor and accepted by the Government.

3.19.5.4 Test Preparation Review - The Contractor shall conduct a Test Preparation Review (TPR) to determine if all planning and preparation for testing has been accomplished prior to the start of Factory Acceptance Test and WJHTC SAT. The Contractor shall conduct the review for the Government prior to the scheduled start of the formal test. The Contractor shall include as a minimum the following review topics:

a. Requirement changes
b. Design changes
c. Test procedure changes
d. Test limitations
e. Summary of all pre-test dry runs
f. Schedule of events

The review shall be conducted in accordance with Contractor-established format for Government approval prior to commencement of the test.

3.19.5.4.1 Test Preparation Briefing - The Contractor shall conduct a Test Preparation Briefing to determine if all planning and preparation for testing has been accomplished prior to the start of SAT at the field facilities (WJHTC excluded). The Contractor shall conduct the review for the Government prior to the scheduled start of the formal test. The Contractor shall include as a minimum the following review topics:

a. Requirement changes
b. Test limitations
c. Summary of all pre-test dry runs.

3.19.5.5 Technical Interchange Meetings (TIMs) and Reviews - The Contractor shall administratively support the TIMs and reviews described herein and provide minutes of each in accordance with VP03.

3.19.5.5.1 TIMs - At the request of the Government or of the Contractor, Technical Interchange Meetings (TIMs) may be held to discuss in detail any issues, e.g., technical, logistics, and training, that require mutual resolution or further clarification. TIMs and Conferences should be considered by the Contractor only for the affected Government technical group. The Contractor should estimate four (4) TIMs with an estimated duration of two (2) days each. Additional TIMs to cover issues other than critical Program Management or Contractor performance issues, with an average duration of one (1) day each, shall be held as ordered.

3.19.5.5.2 VTABS Decision Point (VDP) Reviews and Demonstrations - The Contractor shall conduct a minimum of four (4) VTABS Decision Point Reviews and three (3) demonstrations. At the conclusion of each VDP Review/ demonstration, the FAA Contracting Officer will either accept or reject the VDP event not later than ten (10) working days after completion of that VDP Review. All VDP events shall occur at the Contractor's facility. The VDP Reviews/demonstrations shall include, as a minimum, the following:

3.19.5.5.2.1 Position Electronic Module (PEM) Hardware Design Review - The PEM Hardware Design Review shall include, as a minimum, the following subjects/items:

a. Identification of all PEM subsystems, functions, and interfaces,
b. Identification of subsystem components and main interfaces,
c. Identification and functional definition of all CCAs,
d. Identification of all PEM interfaces and non-PEM items,
e. Summary of trade studies leading to current PEM design,
f. Schedule and status of on-going PEM development,
g. PEM issues to be resolved, and
h. Identification of design issues which require early FAA insight.

3.19.5.5.2.2 VTABS Requirements Review - The VTABS Requirements Review shall include, as a minimum, the following subjects/items:

a. Identification and summary of requirements allocation to major VTABS components,

b. Identification of major VTABS components and interfaces,

c. Identification of all derived requirements,

d. Discussion of performance, RMA, and timing requirements and how they have been "assigned" to the VTABS architecture,

e. Identification of requirements issues, and

f. Identification of design issues which require early FAA insight.

3.19.5.5.2.3 VTABS Baseline Description Review - The VTABS Baseline Description Review shall include, as a minimum, the following subjects/items:

a. Summary of VTABS baseline architecture and major subsystems, to include:

   1. Training subsystem
   2. Backup subsystem

b. Summary of VTABS data functional flows and interfaces, to include:

   1. Training subsystem
   2. Backup subsystem

c. Summary of design for each major subsystem, to include:

   1. Training subsystem
   2. Backup subsystem

d. Summary of sizing, capacity, and performance for each subsystem, to include:

   1. Training subsystem
   2. Backup subsystem

e. Status of software development/rehost/modifications to COTS,

f. Status of hardware development/modifications to COTS,

g. Summary of facility issues for VTABS installation, and

h. Issues and schedule update.

3.19.5.5.2.4 VTABS Test Program Review - The VTABS Test Program Review shall include, as a minimum, the following subjects/items:

a. Overview of test program (review of CMTP),
b. Identification/status of VTABS test tools, hardware and software,
c. Current VTABS Test status, including test documentation status,
d. Overview of VPSS Factory Acceptance Test,
e. Overview of Site Acceptance Test,
f. VTABS Design Update, as needed,
g. Summary of facility issues,
h. Issues and schedule update, and
i. OT&E Training status.

3.19.5.5.2.5 PEM In-Process Demonstrations - The Contractor shall conduct two (2) PEM In-Process Demonstrations. The first shall be a PEM chassis demonstration. The PEM shall be fully populated and emulation shall be provided to demonstrate functionality. The second shall demonstrate full functionality of the PEM at the system level without emulation. The PEM shall be interfaced with an operational voice switch to verify the hardware and software capabilities, the ability to switch to the VEM, and the ability to receive and place calls via the VSCS Display Modules. The dates of these demonstrations will be as agreed to between the Government and the Contractor.

3.19.5.5.2.6 VTABS Early User Involvement (EUI) Activity and Demonstration - The Contractor shall support a two-day activity, primarily conducted by the FAA. The Contractor shall provide a briefing and support as needed during the two days. The dates of this demonstration will be as agreed to between the Government and the Contractor.

3.19.6 VTABS Test Program

The Contractor shall develop and implement a test program for the VTABS to verify the system's physical, functional, and performance requirements as defined in FAA-E-2914, at the Contractor's production facility. Testing shall conform to the approved Contractor Master Test Plan (CMTP).

The Contractor shall furnish the equipment, tools, space, test equipment, test plans and procedures, and personnel to accomplish all testing performed in the Contractor's facility. The Contractor shall furnish test equipment, tools, test plans and procedures, and personnel required for testing equipment being installed at each site.

The Contractor shall design, develop, test and deliver to the Government two (2) VTABS Test Controllers (VTCs) in accordance with Attachment J.11 of the contract. This tool shall be used during VPSS FAT to provide the maximum load to the VTABS. Following completion of the VPSS FAT, one VTC shall be packaged and delivered to the William J. Hughes Technical Center for use in the FAA-conducted OT&E of VTABS. The second VTC shall remain at the Contractor’s facility until further direction is provided. Documentation of the loading tool shall be in Contractor format.

3.19.6.1 Test Performance

3.19.6.1.1 General - The Contractor shall perform all testing required to verify that the VTABS, as designed and implemented, satisfies the requirements of FAA-E-2914. This testing shall include factory testing on the VPSS, Site Acceptance Test at the WJHTC (FSAT), Site Acceptance Test of the First Delivered Operational Site System, and Site Acceptance Test (SAT) at each site where the Contractor has performed installation of VTABS. All testing shall be in accordance with the CMTP.

3.19.6.1.1.1 Test Program - The VTABS test program shall be conducted in accordance with FAA Order 1810.6, Policy for Use of NDI in FAA Acquisitions. Previous test results or Contractor product documentation shall be used to verify VTABS test requirements, in lieu of testing, where deemed appropriate by the Government-appointed test director or designated representative.

3.19.6.1.1.2 Contractor-Conducted Tests - All Contractor-conducted tests shall use site specific configuration maps for both the Training and Backup portions of VTABS. The parameters required to develop these maps shall be defined as part of the Site Survey. Each VTABS shall be tested with correct site configuration maps.

3.19.6.1.1.3 System Integration and Test - The Contractor shall conduct System Integration and Test on all new software, and on new or repackaged hardware. System Integration and Test will be monitored by the FAA Test Director's representative on a non-interference basis. Informal or dry runs of system test and integration tests shall not be admissible for formal acceptance unless the system has conformed to the configuration management requirements outlined in 3.19.4. The Contractor shall provide to the FAA Test Director's representative a schedule of test activities prior to start of test in order to allow the FAA Test Director's representative to monitor the test activities. The Contractor shall provide the FAA Test Director's representative one (1) copy of red-lined test procedures, test logs, and test discrepancy reports at the conclusion of the test.

3.19.6.1.1.4 Government-Witnessed Tests - All Government-witnessed tests shall be conducted in accordance with following:

a. All tests shall be conducted in accordance with Contractor developed and Government-approved test plans and procedures (CMTP and CDRL VP109). Deviation from the approved procedures can occur at the direction of the Government-appointed test director or designated representative. Deviation from the Government-approved procedures shall be noted in the test log and redlined on the working procedure document.

b. The Contractor shall provide the Government a Notice of Intent to conduct the Factory Acceptance Test on the VPSS not less than ten (10) working days prior to the start of the test and confirm the test starting date and expected length of the test five (5) working days in advance of the test start.

c. The Contractor shall brief a Government-appointed test director or designated representative prior to the start of each test. The briefing shall describe the Contractor's readiness for the test, the objective(s) of the test, a description of the test scenarios, and the expected test results.

d. Prior to the start of the test, the system under test shall undergo a unit-under-test baseline inspection by a designated Government representative. The system shall then be sealed, establishing a unit-under-test baseline configuration.

e. During testing, the Contractor shall respond to direction on test conduct only from the Government-appointed test director, or designated representative. The Government-appointed test director's, or designated representative's, authority will include ensuring Contractor compliance with the approved test plan and procedures governing the specific tests. The Government has the option to add additional test witnesses.

f. The Contractor shall maintain an official test log containing test identification, description of the unit under test, copies of the calibration checklist for all test equipment, date and time of test, procedures, collected results, and discrepancy reports. The test log shall also record any changes to the unit-under-test configuration. The Government-appointed test director or designated representative, and the Government QRO, as part of the Contractor test witnessing responsibility, will sign acceptance of test results when the test has been correctly performed and the results have been signed by the Contractor's representative.

g. Where the Contractor has deviated from the Government-approved procedure without approval from the Government-appointed test director, or designated representative, or has obtained results that do not indicate verification of the requirements, the Contractor shall record the discrepancy in the test log and on a discrepancy reporting form. The Contractor shall maintain a discrepancy and/or clarification form which details and provides an audit trail for any discrepancy or request for clarification from the Government. The report shall describe the circumstances of the discrepancy and shall be signed by the Government-appointed test director or designated representative and the Contractor's test director. The Contractor shall perform analyses to determine if the collected results can be accepted, or if the as-performed procedures indicate compliance with the requirement. The Contractor shall report the results of the analysis to the Government-appointed test director, or designated representative. After receipt of the results of the analyses, the Government will decide whether or not to accept the results or to require a retest. The Contractor shall provide one copy of the red-lined test procedures to the Government-appointed test director or designated representative (CDRL VP109).

h. Deviations or waivers to requirements shall be submitted by the Contractor for Government approval. Deferrals of requirements may be issued by the Government for requirements that can not be verified at the Contractor's facility and/or if the system under test does not include the subsystems necessary to verify the requirement.

i. Once results have been validated (through analysis or retest), the Government-appointed test director, or designated representative, will sign the test log and results. A copy of the test log, including data collected during the test, shall be provided to the Government-appointed test director or designated representative at the completion of the test (CDRL VP110). A list of any discrepancies revealed by prior testing shall be furnished to the Government-appointed test director not more than five (5) days after completion of all tests.

j. Formal FAT shall consist of a requirements qualifications test, a 48 hour stability test, a system stress test, and fault injection and failure recovery. Environmental and EMI shall be conducted informally during System Integration and Test (SI&T). All other system verification activities shall be conducted during FAT.

3.19.6.1.1.5 Problem Tracking Database - The Contractor shall record all FAT and FSAT test discrepancies in a problem tracking database. The Contractor shall provide the Government a hard copy report of all open discrepancies following completion of FSAT. The Contractor shall enter all open test discrepancies after FSAT regression test into the Contractor's VSCS Oracle database at least 30 days prior to the start of OT&E. The Contractor shall provide the Government local access to the Oracle database on a non-interfering basis.

3.19.6.1.2 VTABS Product Support System (VPSS) Factory Acceptance Test (FAT) - The Contractor shall conduct a formal Factory Acceptance Test (FAT) of the VPSS to verify all physical, functional, and performance requirements contained in FAA-E-2914, and referenced technical requirements documentation. VPSS FAT shall verify functional and performance compliance in single function stand-alone tests and in multifunction scenario driven tests representative of a realistic environment. The Contractor shall conduct the VPSS FAT at the Contractor's facility on the VPSS. Supplemental VPSS FAT shall be conducted as necessary to verify complete compliance with the VTABS specification (FAA-E-2914). The Contractor shall provide all test equipment, special tools such as card extenders and inserts, and the emulators necessary to simulate the VTABS external operating environment (automatic loading will be required). The VPSS FAT will include testing to special requirements; special test provisions are discussed in detail in FAA-E-2914, the VTABS specification.

The tests shall be conducted in the presence of the Government-appointed test director or designated representative, who will witness all tests and validate the test results collected.

3.19.6.1.3 First Operational Site Acceptance Test - The Contractor shall conduct a Site Acceptance Test for the First Operational Site System delivered to the first operational site. This test shall include tests of all external interfaces and functions not previously tested at the factory or at the WJHTC.

3.19.6.1.4 Site Acceptance Test - The Contractor shall conduct Site Acceptance Tests to verify that each system has been properly installed at Government facilities. In addition, the Site Acceptance Test shall verify site specific aspects of the VTABS that can not be verified in the Contractor's facility due to resources or interfaces that are only available at the installation site. A Site Acceptance Test shall be performed on each system delivered and installed by the Contractor prior to its acceptance by the Government at each site. WJHTC SAT (FSAT) shall be performed on the system delivered to the WJHTC.

The Contractor shall perform the Site Acceptance Test (SAT) in accordance with Government-approved site test procedures to test and demonstrate that the VTABS equipment is installed in accordance with the site survey. The SAT will be witnessed by the Contracting Officer or his representative, who will witness the Contractor's testing in accordance with 3.19.6.1.1.

The Contractor shall conduct the WJHTC Site Acceptance Test (FSAT) on the system delivered and installed at the William J. Hughes Technical Center. The FSAT shall include testing of all VTABS requirements which could not be completed in the factory. At the conclusion of FSAT, the WJHTC VTABS shall be turned over to the Government test organization for Operational Test and Evaluation (OT&E). The FSAT shall be performed in accordance with 3.19.7.3, Site Acceptance Test.

The Contractor shall provide Site Acceptance Test procedures for each facility. The Contractor shall include the SAT procedures in CDRL VP109. The SAT procedures shall be provided to the FAA Test Director for approval. The SAT procedures shall be available to the FAA Test Director at least 45 days prior to the WJHTC SAT. The SAT procedures shall either contain a site specific appendix for each site, or each site shall have its own unique SAT procedures.

3.19.6.1.5 Retest - Failure of the VTABS system during FSAT, SAT, OT&E at the WJHTC, or during retesting after making changes to the current baseline to satisfy the specific test criteria, shall require the Contractor to determine the reason for the noncompliance and to report the cause of the noncompliance and the proposed fix to the Government in writing prior to submission for retest. The Contractor shall be responsible for all corrective action necessary to ensure full compliance with this SOW and the VTABS specification. Corrective actions and post-FSAT regression test activities will be incorporated into the VSCS problem resolution and corrective action process. On any retest action, the Contractor shall be responsible for identifying the cause of the problem, identifying a solution to fix the problem, and proposing a fix to the Government. In addition, the Contractor shall be responsible for identifying any subsystems of the VTABS affected by the problem or its proposed solution. The Contractor shall complete all repair or rework prior to submission for retest.

The Contractor shall provide a schedule for retest and the coverage of the retest, including any regression testing required on the system for FAT, SAT, and FSAT. The Government reserves the right to determine the scope of retest, including complete retest of the system. A five working day notice shall be provided to the Government for all retests. The retest shall be conducted in accordance with the original procedure, or as modified and approved by the Government. Retests shall be conducted in the presence of the Government- appointed test director or designated representative, who will witness all tests and validate the test results collected. An analysis of all corrections to anomalies or failures shall be presented during the retest period. Any further testing and/or demonstrations or anomalies or failures which resulted from the retest period shall be coordinated and approved by the Government.

3.19.6.1.6 Technical Field Test and Evaluation

3.19.6.1.6.1 WJHTC and First Operational Site System Delivery - As ordered by the Government and subsequent to the completion of VPSS testing, the Contractor shall deliver to the WJHTC the VTABS equipment as described in the contract.

As ordered by the Government, the Contractor shall deliver the First Operational Site System to the initial operational site as described in the contract.

3.19.6.1.6.2 WJHTC and First Operational Site System Installation and Acceptance Testing - As ordered by the Government, the Contractor shall install the VTABS equipment at the WJHTC location specified and conduct a site installation, integration and acceptance test as specified in 3.19.6.1.4 and 3.19.7.

As ordered by the Government, the Contractor shall install the First Operational Site System at the first site, per the Government-approved site survey, and conduct a site installation, integration and acceptance test as specified in 3.19.6.1.4 and 3.19.7.

3.19.6.1.7 Chassis Burn-In - The Contractor shall conduct a 48-hour burn-in of each VTABS chassis to be delivered to the Government.

3.19.6.2 Test Documentation - The Contractor shall be responsible for documenting the VTABS test program in the form of plans, procedures, and reports. The Contractor shall develop a Contractor Master Test Plan documenting the overall test program, test procedures and reports for each formal test.

3.19.6.2.1 Contractor Master Test Plan (CMTP) - The Contractor shall prepare a Contractor Master Test Plan which, when approved by the FAA Contracting Officer, shall serve as the overall test control document for the Contractor's VTABS test program. The CMTP shall provide for the following test phases:

a. VPSS Factory Acceptance Test (FAT);
b. WJHTC Site Acceptance Test (FSAT);
c. Site Acceptance Test (SAT).

3.19.6.2.2 Test Procedures - The Contractor shall prepare test procedures for all formal tests in accordance with CDRL VP109, and shall make these procedures available via soft copy. No formal testing shall commence until the procedures have been reviewed and approved by the Contracting Officer or his representative.

3.19.6.2.3 Test Reports - The Contractor shall prepare a test report for all formal tests in accordance with CDRL VP110.

3.19.7 Installation, Integration, and Acceptance

In cooperation with the Display System Replacement (DSR) Program Contractor and under specific guidance from the Government, the Contractor shall deliver, install, integrate, and test the VTABS at Government-designated sites. The Contractor shall provide all personnel, tools, test equipment, installation equipment, software, materials, and services required for these efforts including installation, as required, into the DSR equipment, and connecting the VTABS to facility equipment and the Transition Switch. The Contractor shall provide full-time supervision and direction of its personnel and subcontractors during all phases of the installation activity.

3.19.7.1 Site Survey Minutes and Site Specific Site Activation Plan - The Contractor shall conduct VTABS site surveys concurrently with all DSR site surveys, where possible and as directed by the Government. The Contractor shall use VSCS and DSR site surveys and associated reports to the maximum extent possible for purposes of defining the VTABS site survey minutes. The Contractor shall conduct, as necessary, a detailed site survey in conjunction with designated Government representatives to determine the system configuration to which the VTABS will be built and to determine the preparation requirements of the site in the Government-determined location at each site. The Site Survey shall be performed in accordance with the VTABS Site Survey Schedule described in Section F of the contract. The Contractor shall provide minutes of each site survey in Contractor Format. These shall be provided within ten (10) days after completion of the site survey.

3.19.7.1.1 Site Survey Minutes - The Contractor shall develop Site Survey Minutes for each site. The Site Survey Minutes shall identify key technical information regarding the availability and/or modifications required for, as a minimum, power, communication lines or interfaces, cabling, cable trays, penetrations, grounding, proposed modifications to the DSR Consoles in accordance with Government standards and seismic requirements listed in the VTABS Specification, and ducting for VTABS installations into DSR Consoles. The minutes shall also identify facility modifications required to allow access and installation of cable, conduit, and back room and position equipment. Site related activities that are the responsibility of the Government for installation of VTABS shall be separately identified in the Site Survey Minutes. The Site Survey Minutes shall be delivered within ten (10) days after completion of the site survey.

3.19.7.1.2 Site Specific Site Activation Plan (SSSAP) - Based on the data disclosed during the site survey and provided in the Site Survey Minutes, the Contractor shall develop and deliver a Site Activation Plan for each designated site in accordance with all Government regulations of the VTABS Specification and CDRL VP108. The Contractor shall develop a generic plan for VTABS (SIIATD). Site specific information shall be submitted IAW VP108.

The SSSAP shall include an approach to modifying the existing GFE Transition Switch and VSCS connections to facility circuits and frequencies to accommodate VTABS with minimum impact to VSCS and DSR. The SSSAP shall also identify the VTABS interface with DSR, its integration, DSR Console modifications (if any), cabling and power requirements, and required interactions with the DSR Contractor necessary to implement VTABS into the DSR Consoles. Any additional cable trays shall be designed such that no additional Government cooling or air-handling capacity is required, or the Contractor shall advise the Government in advance of the extent of these requirements.

The SSSAP shall identify the optimum time for the Contractor to gain access to each facility to begin installation.

3.19.7.2 Site Installation - The Contractor shall be responsible for all site installation activities for VTABS in accordance with CDRL VP108. Site installation activities shall include, as a minimum, off-loading, placement, DSR console modification (as required), cable trays (as required) and penetrations, physical installation, and electrical installation and cabling.

The Contractor shall install all VTABS PEM equipment into the Display System Replacement (DSR) Consoles at all FAA facilities. The VTABS backroom equipment shall be installed into the space currently occupied by the NARACS, or equivalent, at each ARTCC. The allowable VTABS backroom space shall not exceed 400 ft^2.

The Contractor shall be responsible for complying with the following requirements.

3.19.7.2.1 Packing, Shipping, Off-Loading, and Placement - The Contractor shall be responsible for the packing, shipping, off-loading, transient or site storage, loading dock coordination, and placement of all VTABS equipment and material from the Contractor's plant to the Government-designated installation sites. Off-loading, moving, and placing equipment in the designated locations and GFE within the facility shall be the Contractor's responsibility. In no case shall the Contractor deliver a system without a designated Contractor representative present at the site to accept the system from the shipper. The Government will provide facility space in accordance with the provisions described in the site survey minutes and approved SSSAP which shall include any additional required documentation and spares storage as a result of VTABS. The Contractor shall remove the packing and shipping materials and other unwanted installation-generated work materials from the site.

3.19.7.2.1.1 Transient Storage - The Contractor shall provide for equipment storage in accordance with Best Commercial Practices.

3.19.7.2.2 Physical Installation - The Contractor shall physically connect VTABS equipment to the Government-approved location within the facility. The Contractor shall supply all mounting hardware and tools necessary to attach the VTABS to collocated rack assemblies, facility flooring, or other connection points as identified in the site survey. The Contractor shall be responsible for emplacement of VTABS position equipment in designated locations in the facility in accordance with applicable physical, electrical and seismic codes as described in the VTABS Specification.

3.19.7.2.3 Electrical Installation and Cabling - The Contractor shall provide and install all required cable trays, penetrations, cabling, wiring, connectors, and associated hardware within the VTABS, between the VTABS and the Government-provided demarcation point for connection to external equipment and power. This requirement includes Contractor-furnished cable trays, electrical cabling and connectors for all special test equipment. The Contractor shall supply all tools and test equipment necessary to install and checkout cabling. All electrical work shall be accomplished in accordance with NFPA-70, local codes (if applicable), the VTABS specification and FAA-C-1217E.

The Government will provide 208 VAC, three phase power to the Contractor's Power Subsystem at each site. The Contractor shall be required to balance the load accordingly. The Contractor shall plan to have the VTABS accept power inputs from more than one breaker panel, according to what is available at each site. The VTABS Training Subsystem non-48 VDC equipment shall be powered from Government-provided critical or essential power.

3.19.7.2.4 Constraints - The Contractor shall perform all installation activities on a non-interference basis. The Contractor shall make adequate provisions in personnel staffing and procedures to allow for flexible use of the on-site personnel to avoid conflicts with other Government activities at the VTABS sites.

Contractor personnel shall abide by all security provisions of the FAA locations being visited, at all times.

The Contractor shall participate in an installation in-briefing with Government-appointed representatives prior to initiating installation activities. The Contractor shall also participate in an out-briefing prior to departing the facility to review the installation and action items.

3.19.7.3 Site Acceptance Test (SAT) - SAT shall be conducted as described in 3.19.6.1.4. CAI will occur at each site after successful conclusion of SAT. The Government will accept each system after successful completion of its respective CAI.

3.19.7.3.1 Site Acceptance Report (SAR) - The Contractor shall develop a SAR documenting the initial performance settings of the equipment (CDRL VP107). The SAR shall also include a listing of the established hardware baseline. The Contractor shall deliver the SAR in accordance with CDRL VP107.

3.19.7.3.2 Tools and Test Equipment - The Contractor shall provide all tools, test equipment, and test jigs for all installation, testing, and maintenance activities on the VTABS during site acceptance until satisfactory completion of CAI. The Contractor shall modify three Government-identified VEM Test Sets to work with both VEMs and PEMs.

3.19.8 Integrated Logistics Support (ILS)

3.19.8.1 Integrated Logistics Support Program - The Contractor shall plan, maintain, and execute the ILS Program to meet the VTABS Specification requirements and the provisions contained herein.

a. ILS Program Management. The Contractor shall integrate the VTABS ILS program into their existing VSCS Integrated Logistics Support organization. This activity shall include support to the VSCS joint Government-Contractor National Airspace Integrated Support Management Team for VTABS issues.

b. Subcontractor/Vendor Control. The Contractor shall maintain and be responsible for the VTABS Subcontractor and Vendor ILS programs using Government-approved VSCS procedures and processes.

c. Life Cycle Cost (LCC) Analyses. The Contractor shall continue the VSCS LCC program for the VTABS.

3.19.8.1.1 Hardware Maintenance - The Contractor shall provide direct site maintenance, restoration, repair, and/or supply support services at each site, for a period not to exceed VTABS ORD at each site, as ordered by the Government. The VTABS will be supported by two levels of hardware maintenance: field/site (first level) and depot (second level).

3.19.8.1.1.1 Field/Site Maintenance - As ordered, the Contractor shall provide site maintenance, restoration, repair, and/or supply support in accordance with existing VSCS CLINs for site maintenance. Field/site maintenance will consist of Government technician/NOM monitoring of equipment status at appropriately located workstations. Built-in fault detection software will detect and report faults to the status monitoring workstations. Detected faults will not be mitigated. Embedded software will fault isolate faults to the lowest replaceable unit (LRU) which will, typically, be the electronic circuit card assembly (CCA) level. LRUs will be removed and replaced during periods of VTABS inactivity.

Maintenance of VTABS and the Transition Switch shall be performed in accordance with the requirements set forth in the Government-provided maintenance handbook.

3.19.8.1.1.2 Depot Level Repair Support - With the exception of VSCS common LRUs that transition to FAA organic maintenance, the Contractor shall provide depot level hardware and software support for the VTABS beyond the VSCS support period.

3.19.8.1.2 Software Maintenance

3.19.8.1.2.1 Contractor-Provided Software Maintenance - The Government may direct the Contractor to provide all software (including firmware) maintenance for VTABS. In this case, the Contractor shall respond to requests to perform maintenance on the fielded VTABS which display software failures during operation, as well as respond to Government requests to modify VTABS software.

3.19.8.1.2.2 Escrow Account - The Contractor shall provide an escrow account for all VTABS software (including firmware) in accordance with 3.19.8.8.

3.19.8.2 National Airspace Integrated Logistics Support (NAILS) Program Requirements - A tailored NAILS program shall be implemented for VTABS.

3.19.8.2.1 Logistics Support Data - For all unique VTABS LRUs, the Contractor shall support a FAA effort to assemble logistics support data with existing contractor formatted data. This support shall be limited to review and duplication of all drawings in existing contractor format, and access to unique hardware components as required.

3.19.8.3 Other Documentation Update - The Contractor shall provide change pages to the Post Production Support Plan (CDRL VP51) and Life Cycle Cost Document (CDRL VP52) to incorporate the support requirements of the unique components of VTABS, the Transition Switch, and any identified VTABS PSE.

3.19.8.4 Supply Support/Spares

3.19.8.4.1 Installation - During the installation and test period, the Contractor shall be responsible for all supply support activities for maintenance and consumable items. Spares utilized in the process of providing this support shall be the property of the Government.

3.19.8.4.2 After Government Acceptance - After site acceptance of the VTABS all supply support will be the responsibility of the Government. Spares utilized in the process of providing this support shall be the property of the Government.

3.19.8.4.3 Site Spares - The Contractor shall deliver to the Government a list in Contractor format of recommended site replaceable spares, assemblies, and consumables for each site configuration. The list shall include the vendor name, part number, national stock number (if applicable/available), item description, estimated unit cost, mean-time-between-failure (MTBF), mean-time-to-repair (MTTR), and recommended quantity information.

The contractor shall deliver a set of site spares to each site, as delineated in the recommended site replaceable spares list.

3.19.8.4.4 Depot Spares - The Contractor shall deliver a set of recommended VTABS unique depot spares, to include LRUs, piece parts and consumables. The Contractor shall deliver appropriate spare parts, LRUs, assemblies, consumables and spare parts peculiar to the FAA depot by CAI for each respective site.

3.19.8.5 Support and Test Equipment

3.19.8.5.1 Tools and Test Equipment - All common and special tools and test equipment that are not an integral part of the end item but are required to inspect, test, calibrate, service, repair, or overhaul an end item for the purpose of performing Level 1 maintenance at the site, shall be identified to the Government. The Contractor shall identify these tools and test equipment in a letter to the Contracting Officer.

3.19.8.5.2 Special Tools and Test Equipment - Any requirement for special tools and test equipment that have a single or peculiar application to a specific end item shall be minimized. Special tools and test equipment are any tools or test equipment that are not commercially available and are used to perform a specific operation on a specific piece(s) of material and which are necessary for servicing, adjusting, or maintaining the end item.

Existing VSCS special tools and test equipment shall be used to the maximum extent possible.

3.19.8.5.2.1 Delivery of Special Tools and Test Equipment - The Contractor shall provide and deliver with the site equipment a complete set of special tools and a complete set of any special test equipment needed for site maintenance including: test cables, connectors, extender kits, adapters, software, and all other items required to permit use of the special test equipment with VTABS hardware, firmware, and software. Special tools and test equipment that are common to the VSCS shall not be delivered.

The Contractor shall provide and deliver a set of special tools and special test equipment not common to the VSCS to both the FAAAC and to the WJHTC.

Any computers, printers, tools and/or test equipment obtained by the Contractor, and charged to the VTABS effort, shall be considered Contractor- acquired Government property. After all VTABS systems have been delivered, installed, and accepted by the Government, the Contractor shall provide a complete list of such items and request disposition instructions from the FAA Contracting Officer.

3.19.8.5.2.2 Special Test Procedures and Techniques - Any formal or informal test procedures or techniques used by the Contractor (e.g., fault injection) during the VTABS FAT shall be documented by the Contractor. Any formal or informal test procedures or techniques used by the Contractor during the VTABS FAT shall be reproducible at the WJHTC on the WJHTC VTABS. Any formal or informal test procedures or techniques used by the Contractor during the VTABS FAT shall be made available to the Government-appointed test director or designated representative.

3.19.8.5.2.3 Calibration Maintenance Requirements Summary (CMRS) - The Contractor shall develop and provide a CMRS, in Contractor format, for all newly designed VTABS support equipment that requires calibration.

3.19.8.6 Manuals and Instruction Books - The Contractor shall provide the technical manuals, user guides, and publications listed below.

The Contractor shall identify commercially available manuals needed for the VTABS and Transition Switch, identify any site/location-unique requirements, and provide methods for addressing these requirements in the manuals. The following manuals and instruction books shall be provided as separate information to existing VSCS documentation, and as defined in CDRL VP99 and its associated DID. FAA-D-2494/b shall be used as guidance. Compliance with Appendix I of FAA-D-2494/b is required.

a. VTABS System Maintenance Manual - Including Start-up, Shutdown, SW initialization and how to load software. Specifically, this manual shall enable a trained site maintenance person to perform on-site software and hardware maintenance activities. These activities include loading new software builds, adding to and deleting resources, creating and modifying site configuration maps, and identify configuration of software releases. A description of the VTABS features, to include their interactions and interfaces, and normal and failure modes, shall be developed as engineering documentation only and not delivered as part of this document, and, following the Contractor's normal internal engineering process, be made available to the FAA upon request.

b. VTABS User's Manual - consisting of information for Master Instructor, DEO and Supervisor (MIDS).

3.19.8.6.1 VTABS Drawings and Lists

3.19.8.6.1.1 Engineering Drawings and Lists - As ordered, the Contractor shall develop engineering drawings (equivalent to Level 2 Drawings, in Contractor format) for those items unique to VTABS. The Contractor shall deliver reproducible copies (e.g., vellum, mylar, sepia, or electronic media) of these drawings in accordance with VP112.

3.19.8.6.1.2 Site Installation Drawings - The contractor shall generate site installation drawings to reflect the final as-built VTABS installation. The drawings shall include site specific configurations, and equipment adjustments. Site specific installation drawings shall be delivered to the Government in accordance with CDRL item VP115 in both hard copy and in CD-ROM format.

3.19.8.6.1.2.1 Red-lines to DSR Drawings - The Contractor shall red-line Government-provided DSR drawings to reflect VTABS installation (DYSIM and operational positions).

3.19.8.6.1.3 Installation Drawings and Instructions - The Contractor shall provide to each site, a copy of their internal installation drawings, instructions, etc., upon completion of the Site Acceptance Test. These drawings shall be in Contractor format and will be used by the sites until the site drawings are delivered.

3.19.8.6.2 Version Description Document - The Contractor shall deliver a Version Description Document in accordance with CDRL VP103 that identifies the as-built software delivered with the system. The Government intends to publish this document electronically through CD-ROM distribution.

3.19.8.6.3 Commercial Software Manuals - The Contractor shall deliver all commercial manuals, hardware and software, required for the design, development, production, installation and operation of the delivered VTABS in accordance with CDRL VP111.

3.19.8.6.4 Software Maintenance Manuals - The Contractor shall provide the Government access to software development materials, including, but not limited to, the Software Development Folders. It is the Government's intention to make copies, as appropriate, of the software developers' working materials, data files and specifications, to use during Government maintenance of VTABS. The Contractor shall make a copy of the Contractor's internal engineering final version of the VTABS Software Requirements Specification and deliver the copy to the Government to support Part 1 of the VTABS BPR.

3.19.8.6.4.1 Software Maintenance Manual, Level 2 - As ordered, this volume shall enable trained software engineers to perform 2nd level maintenance on the VTABS application (non-COTS) software. This volume shall contain the architecture, design, interfaces and source code of the as-built application (non-COTS) software delivered with VTABS. The volume shall include the database design. Source code for any non-COTS firmware used in VTABS shall be provided. Compiler/assembler information required in this volume shall include details on the software environment used to produce the software including lists of commercial software products and tools required. The Government encourages the use of self-documenting source code and data dictionary for details of the design. The Government intends to publish this document electronically via CD-ROM distribution. It shall be delivered in accordance with CDRL VP102.

3.19.8.6.5 Firmware Support Manual - As ordered, the Contractor shall develop a Firmware Support Manual that contains the information for producing firmware for the system. The Contractor shall deliver the Firmware Support Manual in Contractor format, CDRL VP104. The Government intends to publish this document electronically via CD-ROM distribution.

3.19.8.7 Contractor Support Services - As ordered, the Contractor shall furnish installation, checkout, engineering, maintenance, technical, software, testing, and supplemental support services for the VTABS. The Contractor shall provide support services to the Government Operational Test and Evaluation (OT&E) and System Shakedown Testing (SST) activities, or as otherwise ordered by the Government.

3.19.8.7.1 Contractor Support Services at the WJHTC - The Contractor shall provide engineering, hardware and software maintenance support services at the WJHTC, as part of the Contractor's on-going VSCS support.

The Contractor shall provide, as a minimum, the following support during Contractor and Government-conducted testing at the WJHTC:

a. Maintaining the VTABS,
b. Modifying the adapted database to provide needed communications at the various positions,
c. Operating the VTABS,
d. Performing cold start, warm start, and data reduction,
e. Modifying/correcting reconfiguration maps, and
f. Hardware and software problem investigation and isolation and hardware problem resolution.

3.19.8.7.1.1 Contractor Engineering Support Services at the WJHTC - As ordered, the Contractor shall provide engineering support services beginning with CAI of the VTABS system at the WJHTC. These shall include, but not be limited to, assistance in operating the VTABS, providing resolution of VTABS user problems, resolution of interface problems, verification of VTABS requirements to user, engineering assistance in software loads and configuration map database updates, support of Government RMA testing, on-the-job training (OJT) on the VTABS hardware and software, and testing VTABS software and hardware modifications. If ordered, the Contractor shall provide and integrate the support hardware and software necessary for the WJHTC to manage, maintain, and enhance the WJHTC VTABS system hardware and/or software, and provide the capabilities necessary to reflect any operational site configuration.

3.19.8.7.1.2 Contractor Hardware Maintenance Support Services at the WJHTC - Hardware maintenance support shall be provided in the existing VSCS CLINs. The Contractor shall furnish maintenance support services for site level hardware maintenance for the VTABS at the WJHTC. The maintenance support services shall include hardware maintenance, repair, restoration, validation, verification, and site supply support. The Contractor shall repair or replace for operational use, all failed LRUs.

The Contractor shall begin the maintenance support service at the WJHTC upon CAI of the VTABS system. The maintenance support shift coverage for the VTABS at the WJHTC shall be the same as that provided for the VSCS.

3.19.8.7.1.3 Contractor Software Maintenance Support Services at the WJHTC - Software maintenance support shall be provided in the existing VSCS CLINs. As ordered, the Contractor shall furnish software maintenance and software technical support for the VTABS following SAT regression testing at the WJHTC, through all incremental releases, updates, and problem resolutions. This effort shall be provided by the Contractor technical support personnel located at both the Contractor's facility and at the WJHTC. The Contractor shall maintain the VTABS software, including performing upgrades and making corrective fixes, as directed by the Government. Software engineers and programmers that are fully trained in the maintenance of the VTABS software shall be provided as technical support personnel. All software changes and software technical support, including upgrades and corrective fixes, if caused by a latent defect, shall be performed at the Contractor's expense.

3.19.8.7.2 Contractor Support Services at the FAAAC - As ordered, the Contractor shall provide engineering and maintenance support services at the FAAAC, as part of the Contractor's on-going VSCS support.

3.19.8.7.2.1 Contractor Engineering Support Services at the FAAAC - As ordered, the Contractor engineering support services shall include, as a minimum, providing resolution of VTABS user problems, resolution of interface problems, verification of VTABS requirements to user, engineering assistance in software loads and configuration map database updates, support of Government RMA testing, and on-the-job training (OJT) on the VTABS hardware and software.

3.19.8.7.2.2 Contractor Maintenance Support Services at the FAAAC - As ordered, the Contractor shall furnish maintenance support services for site/intermediate and depot level hardware maintenance for the VTABS at the FAAAC at the same level of effort as that provided for the VSCS. The VTABS shall be considered as part of VSCS and site maintenance shall be provided under existing VSCS CLINs.

3.19.8.7.3 Contractor Repair Service (CRS) - The CRS shall provide for the repair of selected repairable items to the extent not covered by warranty or other provisions of this Contract. The CRS shall include all labor, tools, test equipment, software, facilities, material, and any other technical and administrative support necessary to repair VTABS hardware repairable items to the extent not covered by warranty or other provisions of this contract.

3.19.8.7.3.1 Repairable Items - The Contractor shall restore repairable items to a serviceable condition. Repairable items are items of a durable nature which, when unserviceable, normally can be restored to a serviceable condition by a repair activity.

3.19.8.7.3.2 Testing, Inspection, and Quality Control - Test methods, approval of test methods, testing, and product acceptance test data forms for the CRS shall be accomplished by the Contractor in accordance with FAAD-STD-1293. Quality control of the CRS shall be in accordance with FAA-STD-016 and/or American National Standards.

3.19.8.7.3.3 Repair Priorities - The Contractor shall repair and return repairable items in accordance with the priorities established for the VSCS equipment repairs.

3.19.8.7.3.4 Shipment of Repairable Items - The Contractor shall pack, package, and ship repairable items in accordance with FED-STD-102, MIL-STD-794, MIL-E-17555, MIL-P-116, ASTM-D-3951, and DOD-STD-1686.

3.19.8.7.3.5 Repair Procedures - The Contractor shall accomplish all repairs in accordance with the repair procedures established for the VSCS.

Any modifications to items required by the contract or National Airspace System Change Proposal (NCP) and not previously accomplished, shall be accomplished by the Contractor at the time of repair. The Government will provide current NCPs to the Contractor.

The Government reserves the right to inspect and verify all repairs at the Contractor's facility or the point of receipt of the item. Sample inspections by the Government will be accomplished in accordance with MIL-STD-105.

3.19.8.7.3.6 Data Submittals, Data Accumulation, and Reports - The Contractor shall complete AC Form 4680-2, E & R Quality Feedback Tag, and the test data forms specified in FAAD-STD-1293, paragraphs 3.2.22 and 3.3.3, for each repairable item.

3.19.8.7.3.7 Points of Contact and Shipping Points - The Contractor shall furnish specific offices, names of individuals, and contact points of Contractor representatives subsequent to establishment of the CRS.

3.19.8.7.4 Pre-Acceptance Maintenance Support - The Contractor shall be responsible for all equipment maintenance, including spares and test equipment, at each site until the site is accepted by the Government.

3.19.8.7.5 Technical Assistance - As ordered, the Contractor shall provide technical assistance to Government personnel for the maintenance of VTABS hardware, firmware, software, and for training.

3.19.8.8 Life Cycle Parts and Service Data - As ordered by the Government, the Contractor shall deliver a complete set of the technical documentation, including proprietary information, for the VTABS system. Changes approved under the Contractor's configuration management program, shall be applied to the data in escrow. The escrow account shall include the following data:

a. Products drawings and associated lists;
b. Special inspection equipment drawings and associated lists;
c. Special inspection equipment operating instructions;
d. Special inspection equipment calibration procedures;
e. Special tooling drawings and associated lists;
f. Software source code and associated documentation;
g. Reproduction rights for non-Commercial-Off-The-Shelf (non-COTS)items;
h. Software development suite; and
i. Test equipment.

The Contractor shall provide a source for repair, service, and replacement LRUs/parts for the VTABS during the entire period of this contract. If the Contractor fails to provide support for the VTABS before the expiration of this contract, the Contractor shall agree to a complete and unconditional release of the data in escrow at the price established in this contract or a price negotiated between the Government and the Contractor.

3.19.9 Training

3.19.9.1 General Requirements - The Contractor shall provide the following training courses. These training courses are to be designed and based on the assumption that all attendees will be previously trained VSCS personnel. The training shall be provided to teach the differences between VSCS operation and VTABS operation. Several of the training courses identified below require similar content and certain courses shall be developed in Computer Based Instruction (CBI) as outlined below. The Contractor is encouraged to modularize the training lessons to avoid duplication in the production of training materials.

3.19.9.1.1 OT&E Familiarization

3.19.9.1.1.1 VTABS OT&E Familiarization - This presentation shall provide, as a minimum, instruction, including hands-on demonstration on the operation and maintenance of the VTABS equipment, including the system documentation and its use. This provides AT and AF OT&E participants job skills with related knowledge necessary to operate, maintain and perform database management functions on the VTABS during Government-conducted OT&E. Upon successful completion of this familiarization session, the participant will be able to perform the following functions:

a. Operate the VTABS, Transition Switch, and VSCS/VTABS Interface;

b. Run diagnostics, perform system restoration, and database management functions on the VTABS in addition to performing test scenarios using test scripts and map data.

3.19.9.1.2 Air Traffic (AT) Training

3.19.9.1.2.1 VTABS AT Master Instructor/Supervisor Course - This course shall provide computer based instruction on the operation of the VTABS equipment. This training is intended as:

a. A "train-the-trainer" course for VSCS AT instructor personnel responsible for operating the Dynamic Simulation (DYSIM) for ATC personnel training at each of the Government locations;

b. A "train-the-trainer" course for VSCS NAS/NOM personnel at each of the Government locations;

c. And train AT supervisors responsible for VTABS operation.

This course is identical to the AF Systems Overview Course described in 3.19.9.1.3.1.

3.19.9.1.2.2 VTABS AT Database Management Course - This course shall provide computer based instruction on the use of site specific adaptation data and configuration map data for building and maintaining site specific configuration maps. This course is identical to the AF Database Management Course described in 3.19.9.1.3.3.

3.19.9.1.3 Airway Facilities (AF) Training

3.19.9.1.3.1 VTABS AF Systems Overview Course - This course shall provide computer based instruction on the operation of the VTABS equipment. This training is intended as:

a. A "train-the-trainer" course for VSCS AT instructor personnel responsible for operating the Dynamic Simulation (DYSIM) for ATC personnel training at each of the Government locations;

b. A "train-the-trainer" course for VSCS NAS/NOM personnel at each of the Government locations;

c. And train AT supervisors responsible for VTABS operation.

This course is identical to the AT Master Instructor/Supervisor Course described in 3.19.9.1.2.1.

3.19.9.1.3.2 VTABS AF Site Maintenance Course - This course shall provide, as a minimum, detailed technical instructions, including hands-on training, for VSCS site maintenance for personnel responsible for VSCS on site hardware and software maintenance.

3.19.9.1.3.3 VTABS AF Database Management Course - This course shall provide computer based instruction on the use of site specific adaptation data and configuration map data for building and maintaining site specific maps. This course is identical to the AT Database Management Course described in 3.19.9.1.2.2.

3.19.9.1.4 Software Support Training

3.19.9.1.4.1 VTABS Software Maintenance (Level 2) Training Course - As ordered, this course shall provide, as a minimum, detailed technical instructions, including using source code and hands-on-training, for VSCS second level software personnel responsible for second level software maintenance.

3.19.9.2 Course Outcome Requirements - The following are the minimum course outcomes for each required course.

3.19.9.2.2 Air Traffic (AT) Training

3.19.9.2.2.1 VTABS AT Master Instructor Course - This course shall provide computer based instruction on the operation of the VTABS training equipment including simulated practice in its use. This course is identical to the AF Systems Overview Course described in 3.19.9.1.3.1. Upon successful completion of this course, the student will be able to perform the following functions:

a. Operate the VTABS;

b. Manipulate, configure and reconfigure the system to meet operational, training and staffing requirements;

c. Reconstruct position functions after interruptions;

d. Identify and execute system communications; and

e. Identify error messages/indications and take appropriate action.

3.19.9.2.2.2 VTABS AT Database Management Course - This course shall provide computer based instruction on the use of site specific adaptation data including simulated practice on building and maintaining site specific maps. This course is identical to the AF Database Management Course described in 3.19.9.1.3.3. Upon successful completion of this course, the student shall, as a minimum, have a detailed understanding of the VTABS Data Entry operation and be able to perform the following functions:

a. Operate the VTABS;
b. Add, modify and delete system resources; and
c. Create and modify configuration maps.

3.19.9.2.3 Airway Facilities (AF) Training

3.19.9.2.3.1 VTABS AF Systems Overview Course - Upon successful completion of this course, the student will be able to perform the following functions:

a. Operate the VTABS;

b. Manipulate, configure and reconfigure the system to meet operational, training and staffing requirements;

c. Reconstruct position functions after interruptions;

d. Identify and execute system communications; and

e. Identify error messages/indications and take appropriate action.

3.19.9.2.3.2 VTABS Site Maintenance Course - Upon successful completion of this course, the student shall, as a minimum, have knowledge of and be able to perform the following functions:

a. Operate and maintain the VTABS equipment, Transition Switch, and VSCS/VTABS Interface in accordance with CDRL VP99;

b. Identify and follow CDRL VP54 procedures applicable to all periodic maintenance requirements;

c. Perform LRU remove and replace procedures;

d. Use functional and flow diagrams, and test equipment to diagnose and isolate faults and malfunctions down to the appropriate LRU;

e. Perform required adjustments to the equipment to restore the equipment performance to specified parameters;

f. Configure the VTABS for normal operation in accordance with technical instructions;

g. Initialize and load software programs and perform system start-up;

h. Perform installation of software updates;

i. Execute diagnostic and error reporting modules, including interpreting and analyzing error and configuration messages;

j. Collect system provided data to support analysis of software malfunctions; for example, Soft Exception Logs; and

k. Update and modify local data bases.

3.19.9.2.3.3 VTABS AF Database Management Course - Upon successful completion of this course, the student shall, at a minimum, have a detailed understanding of the VTABS Data Entry Operation and be able to perform the following functions:

a. Operate the VTABS;
b. Add, modify and delete system resources; and
c. Create and modify configuration maps.

3.19.9.2.4 Software Support Training

3.19.9.2.4.1 VTABS Software Maintenance (Level 2) Training Course - Upon successful completion of this course, the student shall, at a minimum, be able to:

a. Perform site software training course outcomes (3.19.9.2.3.2);
b. Isolate and diagnose software malfunctions; and
c. Write, update and modify the VTABS source code for all software and firmware.

3.19.9.3 Student Prerequisites - Students to be trained in the courses described in 3.19.9.1 section will be fully qualified in the appropriate VSCS functions.

3.19.9.4 Training Materials - The training materials provided for the AT and AF Training Courses (VP100) shall be developed with best commercial practices using FAA-STD-028 as a guide.

A student guide shall be provided for every course of instruction. The Contractor shall provide as a minimum course design guides, instructor guides, student materials and handouts, visuals and test questions.

The Contractor shall develop and deliver for Government approval, a Training Plan Letter Report in accordance with CDRL VP101 covering all proposed training courses. The report shall identify the training tasks, training outcomes, proposed training methods, equipment required to teach each course, and the approximate training time for each course.

3.19.9.4.1 COTS/NDI Training Materials - The Contractor may use COTS/NDI training course materials and documentation to satisfy VTABS training requirements of the training materials and documentation, provided that the materials:

a. Satisfy the general course outcomes as described in 3.19.9.2; and
b. Meet the minimum requirements for COTS training materials.

3.19.9.4.2 COTS/NDI Training Materials Requirements - As a minimum, COTS/NDI training materials submitted for Government review shall have:

a. A table of contents prepared for the instructor's guide for each of the courses. The instructor's guide shall also include a summary of the course, including the lessons in the course(s), the lesson objectives, the estimated time for each lesson, the reference materials and equipment required, and any associated lesson handouts or support materials used, such as printed copies of viewgraphs, etc.

b. Each lesson with each course shall have a three-part lesson objective.

c. Lesson plans shall be provided for each lesson. Each course shall have a performance component to allow the student to practice the skills being taught.

d. Tests shall be provided for each course and shall include both a written (student achievement) component and a performance component.

e. A quick reference glossary which contains all of the acronyms used in the training materials shall be provided.

f. Student guides shall be provided for each course.

3.19.9.5 Training Program Implementation - If the Contractor conducts training on Government-furnished equipment at a Contractor-provided and maintained Facility, then the Contractor shall, prior to the conduct of FAA personnel training, perform a SAT on the system and shall also demonstrate the system's training functionality. At the conclusion of Contractor-conducted training, the Contractor shall remove the equipment from the Contractor's facility and re-install the equipment, associated software, and documentation at a Government-designated location, demonstrate ability to conduct training, and conduct a modified SAT and CAI.

The modified SAT shall include a Contractor demonstration of all training functionality originally demonstrated at the Contractor's facility. The functionality of the reinstalled training equipment and software shall include a demonstration of all training functionality associated with the switchover between VSCS and VTABS, using the installed transition switch.

3.19.9.5.1 Contractor-Conducted Training and Familiarization

3.19.9.5.1.1 VTABS AT OT&E Familiarization - As ordered by the Government, the Contractor shall conduct a familiarization session for Government AT participants. Sessions will be conducted at the Contractor's facility or at a Government facility using Government-furnished equipment and Contractor-furnished training materials. A maximum of twelve (12) participants will participate in each session.

3.19.9.5.1.2 VTABS AF OT&E Familiarization - As ordered by the Government, the Contractor shall conduct a familiarization session for Government AF participants. Sessions will be conducted at the Contractor's facility or at a Government facility using Government-furnished equipment and Contractor-furnished training materials. A maximum of twelve (12) participants will participate in each session.

3.19.9.5.1.3 VTABS AF Site Maintenance Course - As ordered by the Government, the Contractor shall conduct VTABS site maintenance training at the Contractor's facility or at a Government facility using Government-furnished equipment and Contractor-furnished training materials. A maximum of twelve (12) students will participate in each class.

3.19.9.5.1.4 VTABS Software Maintenance (Level 2) Course - As ordered by the Government, the Contractor shall conduct second level software training at a Government facility, using Government-furnished equipment and Contractor-furnished training materials. A maximum of twelve (12) students will participate in each class**.**

3.19.9.5.2 Course Validation - The Contractor shall conduct a walk-through for each VTABS course. The Contractor shall support one (1) In-Process Review (IPR) of course materials. The course walk-through shall be conducted using a training system and the same materials that will be used in the actual courses. A minimum of four (4) and a maximum of twelve (12) Government personnel will participate in each walk-through course.

The Contractor shall correct the errors, omissions, and deficiencies in the student and instructor materials discovered during each course walk-through. Materials shall be corrected prior to conducting any additional classes. The Contractor shall submit corrected copies of the course materials for review and approval prior to conducting classes.

3.19.9.5.3 Course Conduct - When VTABS training is conducted at a Contractor's facility, the Contractor shall utilize the Government-furnished VTABS training system for hands-on training, including test equipment and special tools, if required. The Contractor shall provide any soft consumable item(s), such as ESD wrist straps, needed to conduct training classes.

3.19.9.5.3.1 Instructional Materials - The Contractor shall provide each Government cadre and instructor participating in designated courses or OT&E Familiarization sessions a copy of all instructor materials (e.g., lesson plans, media materials, and student's guide and documentation) used in the course or briefing session. At the conclusion of the course or briefing session, the Government cadre and instructors shall retain all materials issued to them.

The Contractor shall provide each student participating in the other VTABS training courses the student guide and any handouts for the course. These instructional materials shall be retained by the student upon completion of the course.

The Contractor shall provide a set of classroom technical documentation reference materials, which will be retained in or near the classroom, as a reference library. The Contractor shall provide for Government approval a suggested list and quantities of reference materials needed for each course.

3.19.9.5.3.2 Class Roster and Certificate of Training - At the completion of designated classes, the Contractor shall deliver a Class Roster and a Certificate of Training for each course graduate to the Government. The class roster and certificate of training shall contain, as a minimum, course title, hours of training completed, location of the training, class start and end dates, student's name and social security number, and course grade (pass/fail).

3.19.9.5.3.3 End-of-Course Evaluation - At the completion of designated courses, the Contractor shall administer to the students a Government-provided end-of-course evaluation form and provide the completed forms to the Government within fifteen (15) days of class completion.

3.19.9.6 Delivery and Revision of Materials - All training materials delivered under the provisions of this contract shall be delivered to the Government without restrictive legend (i.e., the Government shall be given the right to reproduce any and all documentation for Government use only). All newly developed course materials shall be delivered in Microsoft Word for Windows, 6.0 or later. COTS Training Materials for which an electronic version is available shall be supplied in vendor format.

3.19.10 Quality Control Program

The Contractor shall provide and maintain a quality control system that meets the intent of ISO-9000-3 and 9001. The Contractor does not have to be certified in order to satisfy this requirement, but shall have the system in place and follow the ISO Standards. The Contractor shall document his Quality Program in a VTABS Quality Assurance Plan and deliver that QA Plan to the Government 45 days after receipt of this revised Statement of Work or with the VTABS Proposal.

3.19.11 Government Review and Disposition of Government Comments to CDRL Items

Disposition of all FAA formal comments to submitted CDRL items will occur within 30 days after Contractor receipt of Government comments, and will be agreed to by the Contractor and the Government. Changes to reflect agreed-to resolutions shall be incorporated into the final CDRL submittal.

For VP99, the Government shall participate in the Contractor internal review and validation cycle. The Contractor shall notify and provide the FAA five (5) copies of the document at least ten (10) working days prior to the Contractor's internal review meeting or validation. The Government review will occur over the next five (5) working day period immediately preceding the Contractor internal review, and may be on site. If requested, the Government may participate in a one-hour "kick-off" meeting with the Contractor team.

Following the five-day FAA-only review, the Government will participate in an on-site CDRL review meeting with the Contractor. No more than five FAA/FAA contractor representatives will participate in the meeting. During these five days, the Contractor shall collect comments, identify and assign action items, and list Government items and comments determined by the Contractor to be out-of-scope. These out-of-scope comments shall be provided to the FAA Contracting Officer. The Contractor shall use these comments to produce a "red-line" of the CDRL for the validation process, which the Government will monitor. The additional red-lines from the validation process shall be incorporated into the draft CDRL item and delivered to the Government for comment, in accordance with the VTABS comment process defined for all VTABS CDRL items.

3.19.12 VTABS ORD 7

The Contractor shall design, develop, produce and deliver software upgrades to the VTABS baseline to the level of VSCS ORD 7 as described herein. These subparagraphs modify and/or supersede previous SOW paragraphs for the ORD 7 baseline for VTABS. To the extent that the Government directs, the VTABS ORD 7 baseline may differ in features, functionality and performance from the VSCS ORD 7 baseline.

3.19.12.1 Development - The Contractor shall implement the fourteen (14) features (EV68, EV77, EV78, EV79, EV81, EV83, EV84, EV87, EV88, EV90, EV93, EV94, EV95 and EV98) currently identified as the VSCS ORD 7 baseline that have an operational impact on the VTABS ATC position functions, A/G communications and G/G communications functions. Design, development and implementation will be accomplished using the same processes and procedures used for the VTABS initial product baseline. In addition, the Contractor shall upgrade the FAA classroom VTABS stubs and drivers to the equivalent functionality (EV108).

Since VSCS ORD 7 design, test and implementation is proceeding on a schedule slightly ahead of the VTABS ORD 7 baseline, it is anticipated that some changes (identified as SCRs) required in the VSCS system software will result in changes being required in the VTABS ORD 7 software. The Contractor shall review all VSCS SCRs targeted for the VSCS ORD 7.3.X baseline for applicability to VTABS.

The Contractor and Government will conduct a review of all VTABS-applicable VSCS SCRs. This review is limited to a two-day meeting to be held in February 1998 in Melbourne, FL. Two weeks prior to the review, the Contractor shall submit to the Government a list of the applicable SCRs and identify up to 125 SCRs to be implemented in VTABS. Should the meeting result in a decision to implement more that 125 SCRs, the SCR Option CLIN 0009CCDD in Section B of the contract shall be utilized. The decision on which SCRs to implement will be transmitted to the Contractor within five (5) days after the meeting. Any SCRs identified after the February 1998 meeting will be authorized and implemented under existing VSCS SCR process.

3.19.12.1.1 VTABS ORD 7 Software Licenses, Source Code and Liability for Latent Defects - The Contractor shall provide software licenses and source code in accordance with Clause H.66 for the ORD 7 software designed, developed and delivered for VTABS. No system or latent defect liability or warranty is intended or implied.

3.19.12.2 Production - The Contractor shall design, develop, produce, test and deliver software upgrades, including firmware, for the William J. Hughes Technical Center and the Mike Monroney Aeronautical Center only, through the program phase identified as FAT Regression Test.

3.19.12.3 Technical Reviews and Audits

3.19.12.3.1 Baseline Package Review - The Contractor shall support a delta Baseline Package Review for the software and firmware changes associated with the VTABS ORD 7 implementation.

3.19.12.4 Test Program - The Contractor shall conduct its VTABS baseline system integration and test, Factory Acceptance Test (FAT), Baseline Stability Test (BST) and FAT Regression Test (as required) for the VTABS ORD 7 implementation.

FAT and FAT Regression Testing will be conducted using the same process for test procedures, reviews and reports that were in place for the VTABS baseline. Baseline Stability Tests will be conducted for forty-eight hours utilizing three shifts. Shifts 1 and 2 will be conducted using ten (10) personnel (test participants placing calls and using VTABS workstation) and simulation. Shift 3 will be automated and utilize three (3) personnel.

3.19.12.5 Installation, Integration and Acceptance - Government acceptance will occur after FAT Regression. The Contractor shall deliver the VTABS ORD 7 software and firmware (gold tape and PROMs) along with the Version Description Documents (VDDs - CDRL Item VP103) and software release notes to the FAA following completion of Factory Testing and BPR.

3.19.12.6 Integrated Logistics Support (ILS)

3.19.12.6.1 Manuals - The Contractor shall submit updates to the manuals as required to reflect the VTABS ORD 7 implementation. Manual submittal will be in accordance with the CDRL VP99 and include three deliveries: an engineering draft, a formal draft 30 days after completion of FAT, and a final 30 days after receipt of Government comments.

3.19.12.7 Training - The Contractor shall upgrade the VTABS Training material to reflect the VTABS ORD 7 upgrade. The Training material upgrades do not include material walk-through or class-tryouts. The course walk-throughs and class-tryouts will be conducted as authorized at the Mike Monroney Aeronautical Center following upgrade to the VTABS ORD 7 Baseline.

3.20 DISPLAY SYSTEM REPLACEMENT (All Sites except Seattle)

3.20.1 Drawings

The Contractor shall provide VP69A Drawings, which consist of a single System Connection Diagram, showing all system interconnections (source and destination) required for VSCS equipment in support of the DSR program. The Contractor shall prepare one new drawing added to the VP69A CDRL for each ARTCC. The Contractor shall deliver the initial VP69A drawings to the FAA 60 days prior to cable delivery; and the final drawing delivery 45 days after ancillary workstation testing.

3.20.2 Cables

3.20.2.1 Cable Design - The Government will provide the Contractor with drawings that identify the scheme for VSCS cable routing and VSCS cable installation following the completion of each VSCS/DSR Site Activation Survey. The Contractor will receive four different packages: 1) DRP DAT01 Drawings - 25 days post survey; 2) VSCS Design DAT01 Drawings - 60 days post survey, which will enable the Contractor to proceed with engineering; 3) Final DAT01 Drawings - 6 months post survey; and 4) Revised Final DAT01 Drawings - 9 months post survey, which shall be used to verify previous engineering efforts.

The Contractor shall use the information received from the FAA, to facilitate the design of VSCS cables that will be provided to each ARTCC. Cable design shall be based upon information contained in the drawings provided. All cables shall be designed to meet the applicable specifications of the VSCS contract.

The Contractor's planning shall include providing position cables for:

a. DSR console and Tracker positions as identified in Section F, Exhibit F.5.2 of the Contract
b. All supervisory and/or ancillary position equipment

The Contractor shall label all cables with the source and destination of the cable in accordance with the provisions of the VSCS contract. The Contractor is authorized to coordinate with Lockheed Martin to identify the specific information necessary to fully comply with this requirement.

3.20.2.2 Cable Build

3.20.2.2.1 VSCS/BusLAN Cables - The Contractor shall design and build all VSCS cables that must be installed between the VSCS equipment located in the VSCS equipment area and the VSCS BusLAN racks located in all of the following areas:

a. ARTCC Host Computer Room
b. ARTCC VSCS equipment area
c. Other areas as identified during the VSCS/DSR Site Activation Survey

3.20.2.2.2 VSCS Equipment Cables - The Contractor shall design and build all VSCS cables that must be installed between the VSCS equipment located in the VSCS equipment area and the VSCS equipment that is mounted in the following areas:

a. DSR position consoles in the DSR control room
b. Supervisory position consoles in the DSR control room
c. DSR position consoles in the E-Complex area
d. Other position consoles in the E-Complex area
e. Other areas as identified during the VSCS/DSR Site Activation Survey

3.20.2.2.3 BusLAN/VCE CABLES - The Contractor shall design and build all VSCS cables that must be installed between any of the VSCS BusLAN racks and the VSCS equipment mounted in the following areas:

a. DSR position consoles in the DSR control room
b. Supervisory position consoles in the DSR control room
c. DSR position consoles in the E-Complex area
d. Other position consoles in the E-Complex area
e. Other positions as identified during the VSCS/DSR Site Activation Survey

3.20.2.2.4 Recorder Cables - The Contractor shall design and build all VSCS cables that must be installed between the VSCS equipment located in the VSCS equipment area and the VSCS Distribution Frame (VDF) in the ARTCC basement. The cables identified by this paragraph refer to the cables required to provide the legal record capability from the VSCS to the facility legal recorders.

3.20.2.2.5 Miscellaneous Cables - The Contractor shall design and build any other VSCS cables that are required to make the VSCS equipment operational which have not been identified elsewhere in this SOW.

3.20.2.3 Cable Delivery - The Contractor shall deliver all VSCS cables to the ARTCCs in accordance with the schedule identified in Section F, Exhibit F.5.1 of the Contract. The Contractor shall coordinate with Lockheed Martin to discuss any required modifications to the VSCS cable delivery schedule. The Contractor is authorized to make adjustments to the VSCS cable delivery schedule as necessary to meet the DSR installation schedule. The Contractor shall notify the Government in writing of any changes to the VSCS cable delivery schedule. The Contractor shall provide the Government with written notice 45 days prior to shipment of VSCS cables.

3.20.2.4 Cable Installation

3.20.2.4.1 VSCS Equipment Cables - The Contractor shall install the cables between the VSCS equipment located in the VSCS equipment room and the designated Contractor/Lockheed Martin demarcation points leading to the:

a. VSCS equipment in the DSR position consoles
b. VSCS equipment in the DSR supervisory position consoles
c. VSCS equipment in the E-Complex DSR position consoles
d. VSCS equipment in the other position consoles in the E-Complex area
e. VSCS equipment in other positions as identified during the VSCS/DSR Site Activation Survey

3.20.2.4.2 Host Computer Room BusLAN Cables - The Contractor shall install the cables between the VSCS equipment located in the VSCS equipment room and the VSCS BusLAN racks in the Host Computer Room

3.20.2.4.3 Cable Installation Support - As directed by the Government, the Contractor shall support the installation of cables between the designated Contractor/Lockheed Martin demarcation points and the:

a. VSCS equipment in the DSR position consoles
b. VSCS equipment in the DSR supervisory position consoles
c. VSCS equipment in the E-Complex DSR position consoles
d. VSCS equipment in the other position consoles in the E-Complex area
e. VSCS equipment in other positions as identified during the VSCS/DSR Site Activation Survey

NOTE: The Contractor is not responsible for this installation effort. However, this task is included to allow for the Contractor to provide support to Lockheed Martin if necessary.

3.20.2.4.4 Recorder Cables - The Contractor shall install all cables between the VSCS equipment and the VDF.

3.20.2.4.5 Cable Installation Schedule - The Contractor shall provide cable installation in accordance with the schedule identified in Section F, Exhibit F.5.1 of the Contract. The Contractor shall coordinate with Lockheed Martin to discuss any required modifications to the VSCS cable installation schedule. The Contractor is authorized to make adjustments to the VSCS cable installation schedule as necessary to meet the DSR installation schedule. The Contractor shall notify the Government in writing of any changes to the VSCS cable installation schedule.

3.20.2.5 Cable Testing - The Contractor shall provide the test equipment, including all test fixtures, required to test the electrical continuity of all cables provided by the Contractor for installation during the DSR time frame.

The Contractor shall test the electrical continuity of all the Contractor-provided cables.

The Contractor shall provide informal test procedures for testing each type of cable.

The Contractor shall test all cables from the VSCS end of the cable. Lockheed Martin personnel will support the Contractor testing by applying test adapters to the DSR side of the cables in accordance with the informal test procedures provided by the Contractor.

The Contractor shall coordinate with Lockheed Martin to discuss the VSCS cable testing schedule. The Contractor is authorized to make adjustments to the VSCS cable testing schedule as necessary to meet the DSR installation schedule.

The Contractor shall replace or repair any cables identified as defective.

3.20.2.6 Cable Connections - The Contractor shall make the following cable connections:

a. All connections to the VSCS equipment in the VSCS equipment room
b. All connections to all VSCS BusLAN racks
c. All connections to VSCS supervisory position equipment in the DSR control room
d. All connections to VSCS equipment not installed in DSR consoles in the E-Complex area
e. All connections to the VDF

3.20.3 BusLAN Racks and BusLAN Repeater Racks

3.20.3.1 BusLAN Rack and BusLAN Repeater Rack Production - The Contractor shall build the VSCS BusLAN racks and the BusLAN repeater racks required to support the installation of the DSR. The Contractor shall use the data provided in the Lockheed Martin-provided DAT01 drawings as a basis for determining the quantity and type of VSCS BusLAN racks to provide.

3.20.3.2 BusLAN Rack and BusLAN Repeater Rack Delivery - The Contractor shall deliver the VSCS BusLAN racks and the BusLAN repeater racks to the ARTCCs in accordance with the schedule identified in Section F, Exhibit F.5.1 of the Contract. The Contractor shall coordinate with Lockheed Martin to discuss any required modifications to the VSCS BusLAN rack and BusLAN repeater delivery schedule. The Contractor is authorized to make adjustments to the VSCS BusLAN rack and BusLAN repeater rack delivery schedule as necessary to meet the DSR installation schedule. The Contractor shall notify the Government in writing of any changes to the VSCS BusLAN rack or BusLAN repeater rack delivery schedule. The Contractor shall provide the Government with written notice 45 days prior to shipment of VSCS BusLAN racks and BusLAN repeater racks.

3.20.3.3 BusLAN Rack and BusLAN Repeater Rack Installation - The Contractor shall coordinate with and brief appropriate FAA personnel at each ARTCC prior to installation of the BusLAN repeater racks to ensure that they understand the procedures that will be used to install the BusLAN repeater racks into the operating VSCS system. The briefing will include what specifically will be done, potential problems that could occur, recommended actions on the part of facility personnel to mitigate any potential problems, and any other information relevant to a safe and efficient installation. The installation of BusLAN repeater racks shall not commence until after ARTCC personnel are briefed.

The Contractor shall install the BusLAN racks in the Host Computer Room and the VSCS equipment area in accordance with the schedule identified in Section F, Exhibit F.5.1 of the Contract. The Contractor shall install the BusLAN repeater racks in the VSCS equipment area in accordance with the schedule identified in Exhibit F.5.1. The Contractor shall coordinate with Lockheed Martin to discuss any required modifications to the VSCS BusLAN rack installation schedule. The Contractor is authorized to make adjustments to the VSCS BusLAN rack and BusLAN repeater rack installation schedule as necessary to meet the DSR installation schedule. The Contractor shall notify the Government in writing of any changes to the VSCS BusLAN rack and BusLAN repeater rack installation schedule.

The Contractor shall provide and install the seismic tie-downs for the VSCS BusLAN racks and the BusLAN repeater racks in the VSCS equipment area. The seismic tie-downs shall meet the requirement of the VSCS contract. The installation of the BusLAN racks in the Host Computer Room, or other locations identified during the site survey, shall be to seismic tie-downs provided by Lockheed Martin

The installation of the BusLAN racks in the Host Computer Room, or other locations identified during the site survey, shall include connecting the BusLAN equipment to the power receptacles provided by Lockheed Martin and connecting the appropriate BusLAN grounds to the Government-provided facility ground systems.

Lockheed Martin will provide the angle iron mounting for the seismic tie-downs, and the Contractor shall secure the BusLAN racks utilizing seismic tie-downs to the Lockheed Martin-provided angle iron.

3.20.3.4 BusLAN Rack and BusLAN Repeater Rack Testing - The Contractor shall test the BusLAN rack and BusLAN repeater rack electronics to ensure that the BusLANs are operational with the VSCS system. The Contractor shall provide any test equipment required to test the operations of the BusLAN equipment. The Contractor shall make any repairs necessary to ensure the BusLAN electronics and BusLAN repeater electronics are fully operational.

3.20.4 Power

3.20.4.1 Power Installation - The Contractor shall review, analyze and determine the need to provide additional power cables and hardware for the VSCS BusLAN racks and the BUSLAN repeater racks that must be installed in the VSCS equipment area. If power cables and hardware are required, the Contractor shall provide and install power cables and hardware between the VSCS critical power panels and the BusLAN racks and BusLAN repeater racks located in the VSCS equipment area. The Contractor shall work with ARTCC personnel at each site to ensure that the power installation is done in accordance with the VSCS contract.

3.20.5 Upgrade VSCS Equipment

3.20.5.1 Upgrade VSCS Console Equipment - The Contractor shall ensure that VSCS Console Equipment (VCE) delivered to each ARTCC contains the latest approved and baselined hardware and firmware. The Contractor shall modify or upgrade the VCE with the latest approved software/ hardware baseline prior to delivery.

3.20.5.2 VSCS Console Equipment Delivery - The Contractor shall deliver the quantity of VCE identified in Section F, Exhibits F.5.1 and F.5.2 of the Contract to each ARTCC until all ISSS production VCE resources have been depleted. The remaining VCE and effort to deliver them to the sites are not part of this SOW. The Contractor shall coordinate with Lockheed Martin to discuss any required modifications to the VSCS VCE delivery schedule. The Contractor is authorized to make adjustments to the VSCS VCE delivery schedule as necessary to meet the DSR installation schedule. The Contractor shall notify the Government in writing of any changes to the VSCS VCE delivery schedule. The Contractor shall provide the Government with written notice 45 days prior to shipment of VSCS VCE.

3.20.6 VSCS Workstation Equipment

3.20.6.1 VSCS Workstation Equipment Delivery - The Contractor shall deliver to each ARTCC any required VSCS computer workstation equipment that was not previously delivered. The Contractor shall deliver the VSCS workstation equipment in accordance with the schedule identified in Exhibit F.5.1. The Contractor shall coordinate with Lockheed Martin to discuss any required modifications to the VSCS workstation equipment delivery schedule. The Contractor is authorized to make adjustments to the VSCS workstation equipment delivery schedule as necessary to meet the DSR installation schedule. The Contractor shall notify the Government in writing of any changes to the VSCS workstation equipment delivery schedule. The Contractor shall provide the Government with written notice 45 days prior to shipment of VSCS workstation equipment.

3.20.6.2 VSCS Supervisory Workstation Equipment Installation -The Contractor shall install the VSCS supervisory computer workstation equipment and other VSCS supervisory workstation equipment at the ARTCCs in accordance with the schedule identified in Section F, Exhibit F.5.1 of the Contract. VSCS supervisory equipment is defined as that set of VSCS equipment required at the supervisory positions on the DSR control floor. The installation of the supervisory workstation equipment shall include connecting the supervisory workstation equipment to the power receptacles provided by Lockheed Martin and connecting the appropriate supervisory workstation grounds to the Government-provided facility ground systems (if necessary). The Contractor shall coordinate with Lockheed Martin to discuss any required modifications to the VSCS supervisory workstation equipment installation schedule. The Contractor is authorized to make adjustments to the VSCS supervisory workstation equipment installation schedule as necessary to meet the DSR installation schedule. The Contractor shall notify the Government in writing of any changes to the VSCS supervisory workstation equipment installation schedule.

3.20.6.3 VSCS Supervisory Workstation Equipment Testing - The Contractor shall test the VSCS supervisory workstation equipment to ensure that the workstation equipment is operational with the VSCS. The Contractor shall coordinate with Lockheed Martin to schedule the testing of the VSCS supervisory workstation equipment. The Contractor shall ensure that the operational testing of the supervisory workstation equipment does not interfere with DSR activities. The Contractor shall provide all test equipment required to test the operations of the VSCS supervisory workstation equipment. The Contractor shall make repairs necessary to ensure the VSCS supervisory workstation equipment is fully operational. The Contractor is authorized to activate DSR VCE to facilitate VSCS supervisory workstation equipment testing if required.

3.20.7 Drawings/Data

3.20.7.1 VSCS BusLAN Rack Raised Floor Tile Cutouts - The Contractor shall provide the Government with drawings showing the patterns for the raised floor tile cutouts for the VSCS BusLAN racks which are to be located in the Host Computer Room, or any other location at the ARTCCs where the Contractor is not doing the installation fitup. The drawings for the cutouts shall be provided to the Government no later than 60 days after completion of the DSR site activation survey.

3.20.7.2 VSCS Seismic Anchor Pattern - The Contractor shall provide the Government with drawings showing the patterns for the VSCS BusLAN rack seismic anchoring.

3.20.8 VSCS Equipment For Non-DSR Console Positions - The Contractor shall determine at each facility during the DSR site activation survey, the location of all non-DSR console positions that require VSCS equipment. These positions include the AT supervisory positions, positions in the E-Complex area, positions outside the DSR grid, and the VSCS maintenance positions. The Contractor shall provide VSCS equipment for those positions in accordance with the following paragraphs.

3.20.8.1 Positions Requiring VCE

3.20.8.1.1 AT Supervisory Positions - The Contractor shall provide the VEMs, VDMs, intra-rack VCE cables, dual jack modules, speakers, footswitches, VSCS indirect access keypads, and any other items considered to be part of a functional set of VCE.

3.20.8.2 Positions Requiring VSCS Computer Workstations - The Contractor shall provide the cables for all VSCS computer workstations.

3.20.8.3 Positions Requiring Supervisory Voice Recorders - The Contractor shall provide the cables for the supervisory voice recorders.

3.20.8.4 Positions Requiring Dual Jack Modules - The Contractor shall provide PJ-250 dual jack modules for all AT supervisory positions in the DSR Control Room that require VCE. The Contractor shall provide PJ-250 dual jack modules for all non-DSR console positions in the E-Complex that require VCE. The Contractor shall provide PJ-250 dual jack modules for all non-DSR console positions outside the DSR grid that require VCE. These PJ-250 dual jack modules, which are referenced in Harris drawings, use the PJ-250 tip-activated jack manufactured by ADC Telecommunications, DOT Part Number 182949-001, and meet the applicable requirements of NAS-IC-21014201.

3.20.9 Site Activation Surveys

The Contractor shall perform the site survey in support of the DSR program at each ARTCC in accordance with the schedule identified in Section F, Exhibit F.5.1 of the Contract. The Contractor shall coordinate with the Government at least 30 days prior to each site survey date identified in Exhibit F.5.1 to determine if the scheduled date has been modified. The Contractor is authorized to send up to two personnel to each site to perform the site survey. The Contractor shall coordinate with the Government on a site by site basis if the need arises to send more than two personnel to a survey. Travel days are the day before the dates identified and the day after the dates identified for sites that require a full day of travel. Otherwise, only one half day prior to the survey and one half day after the survey are authorized for travel.

3.21 LIFECYCLE SUPPORT OF VTABS

3.21.1 Scope of Work - The Contractor shall provide all hardware, software, training, and documentation for lifecycle support of the VTABS as defined in the paragraphs below.

The following tasks are specifically included in this effort:

3.21.2 Product Improvements

a. COTS Upgrade - As ordered, the Contractor shall upgrade the VTABS COTS software as described below:

   Task 105: SMC COTS Upgrade
   Task 106: Workstation Upgrade to NT 4.x or higher

b. SCR Processing - The Contractor shall develop, document, test, and integrate into VTABS all SCRs, in accordance with findings of the Government's SCR Scrub Team and as directed by the Contracting Officer.

c. Implementation of ORD 7 - The Contractor shall perform all tasks required to implement ORD 7 software, including delivery of ORD 7 and associated documentation to all sites as ordered by the Government, and support integration and test of ORD 7 software and hardware at sites as ordered by the Government.

d. Contractor Support Services - As ordered, the Contractor shall furnish installation, checkout, engineering, maintenance, technical, software, testing, documentation, logistical, training, and supplemental support services for the VTABS. The Contractor shall provide support services to the Government ORD 7 Operational Test and Evaluation (OT&E) and System Shakedown Testing (SST) activities, or as otherwise ordered by the Government.

3.21.3 Second Level Support

3.21.3.1 Field Support - The Contractor shall support the VTABS Help Desk provided by AOS as part of the Contractor's on-going VSCS support.

3.21.3.2 Site Support - The Contractor shall provide on-call support to AOS for on-site, restoration, and repair, as ordered by the Government.

3.21.3.3 Second Level Engineering Support

3.21.3.3.1 Hardware Engineering - As ordered by the Government, the Contractor shall review, analyze, investigate, and provide recommendations for resolution for all Hardware Discrepancy Reports (HDRs) as provided by the Government.

As ordered by the Government, the Contractor shall develop, document, test and integrate all HDRs into the VTABS.

3.21.3.3.2 Software Engineering - As ordered by the Government, the Contractor shall review, analyze, investigate, and provide recommendations for resolution for all Problem Technical Reports (PTRs) as provided by the Government.

As ordered by the Government, the Contractor shall develop, document, test and integrate all PTRs provided by the Government.

3.21.3.3.3 Test Engineering - As ordered by the Government, the Contractor shall perform tests of VTABS hardware and software. As ordered by the Government, the Contractor shall provide a delivery of VTABS Test Procedures (VP109) and VTABS Test Reports (VP110).

3.21.3.3.4 System Engineering - As ordered by the Government, the Contractor shall perform system engineering of the VTABS.

3.21.3.4 Documentation and Drawings

3.21.3.4.1 Field Directives - The Contractor shall provide all technical information and installation procedures required to support the development and release of AOS Field Directives, in accordance with the FAA format provided in the System Support Directive (SSD).

3.21.3.4.2 Manuals and Instruction Books - The Contractor shall provide updates to the technical manuals, user manuals, and publications listed below, as directed by the Government.

a. VTABS System Maintenance Manual (CDRL VP-99 (VSOM))
b. VTABS Master Instructor, DEO and Supervisor (MIDS) Manual (CDRL VP-99 (MIDS))
c. VTABS Software Maintenance Manual (CDRL VP-99 (Section 10))

3.21.3.4.3 Engineering Drawings and Lists - The Contractor shall maintain engineering drawings (equivalent to Level 2 Drawings, in Contractor format) for those items unique to VTABS (CDRL VP112).

3.21.3.4.4 Installation Drawings and Instructions - The Contractor shall provide to each site, a copy of their internal installation drawings, instructions, etc., for any new hardware delivered to the Site. These drawings shall be in Contractor format and shall supplement or replace those pages already delivered. These changes shall be delivered in accordance with CDRL VP115.

3.21.3.4.5 Version Description Document - The Contractor shall deliver a Version Description Document (VDD) in accordance with CDRL VP103 for all new software developed, that identifies the as-built software delivered with the system. This delivery shall be as change pages to the most current VDD. The Contractor shall also identify the software source with each delivery of the VDD.

3.21.3.4.6 Commercial Software Manuals - The Contractor shall deliver all commercial manuals, hardware and software, associated with hardware and software updates during the period of VTABS Maintenance, in accordance with CDRL VP111.

3.21.3.4.7 Software Development Folders - The Contractor shall provide the Government access to software development materials, including, but not limited to, the Software Development Folders. It is the Government's intention to make copies, as appropriate, of the software developers' working materials, data files and specifications, to use during Government maintenance of VTABS.

3.21.3.4.8 Software Build Documentation - With each build, the Contractor shall deliver the source code files, electronic build and bind procedures, a set of build directions which include identification of all ancillary files and processes used to create the build.

3.21.3.4.9 Hardware Components List - The Contractor shall provide updates to the Hardware Components List in accordance with VP118 for all new hardware delivered to the site. This shall supplement or replace pages of the already delivered Hardware Components List.

3.21.4 Reserved

3.21.5 Training and FAAAC Support

3.21.5.1 Curriculum Maintenance - The Contractor shall maintain the VTABS CBI and Maintenance courses as directed by the Government to maintain currency with the VTABS fielded baseline.

3.21.5.2 Training Course Materials - The Contractor shall deliver change pages to Training Course Materials in accordance with VP100 as directed by the Government.

3.21.5.3 FAAAC Support - The Contractor shall provide support for the Academy VTABS system, including maintenance of the Academy VTABS “stubs and drivers”, as directed by the Government.

3.21.6 Integrated Logistics Support (ILS)

3.21.6.1 Integrated Logistics Support Program - The Contractor shall maintain the ILS Program to meet the VTABS Specification requirements and the provisions contained in 3.19.8.1.

3.21.6.2 Depot Level Repair Support - With the exception of VSCS common LRUs that transition to FAA organic maintenance, the Contractor shall provide depot level hardware and software support for the VTABS under the existing VSCS CLIN 0024 effort.

3.21.6.3 Contractor Repair Service (CRS) - The CRS shall provide for the repair of selected repairable items to the extent not covered by warranty or other provisions of this Contract. The CRS shall include all labor, tools, test equipment, software, facilities, material, and any other technical and administrative support necessary to repair VTABS hardware repairable items to the extent not covered by warranty or other provisions of this contract.

3.21.6.3.1 Repairable Items - The Contractor shall restore repairable items to a serviceable condition. Repairable items are items of a durable nature which, when unserviceable, normally can be restored to a serviceable condition by a repair activity.

3.21.6.3.2 Testing, Inspection, and Quality Control - Test methods, approval of test methods, testing, and product acceptance test data forms for the CRS shall be accomplished by the Contractor in accordance with FAAD-STD-1293. Quality control of the CRS shall be in accordance with paragraph E.3 of the contract.

3.21.6.3.3 Repair Priorities - The Contractor shall repair and return repairable items in accordance with the priorities established for the VSCS equipment repairs.

3.21.6.3.4 Shipment of Repairable Items - The Contractor shall pack, package, and ship repairable items in accordance with FED-STD-102, MIL-STD-794, MIL-E-17555, MIL-P-116, ASTM-D-3951, and DOD-STD-1686.

3.21.6.3.5 Repair Procedures - The Contractor shall accomplish all repairs in accordance with the repair procedures established for the VSCS.

Any modifications to items required by the contract or National Airspace System Change Proposal (NCP) and not previously accomplished, shall be accomplished by the Contractor at the time of repair. The Government will provide current NCPs to the Contractor.

The Government reserves the right to inspect and verify all repairs at the Contractor's facility or the point of receipt of the item. Sample inspections by the Government will be accomplished in accordance with MIL-STD-105.

3.21.6.3.6 Data Submittals, Data Accumulation, and Reports - The Contractor shall complete AC Form 4680-2, E & R Quality Feedback Tag, and the test data forms specified in FAAD-STD-1293, paragraphs 3.2.22 and 3.3.3, for each repairable item.

3.21.6.3.7 Points of Contact and Shipping Points - The Contractor shall furnish specific offices, names of individuals, and contact points of Contractor representatives subsequent to establishment of the CRS.

3.22 Relocation of the Supplemental Development and Demonstration System (SDDS)

The Contractor shall upgrade and relocate the Supplemental Development and Demonstration System (SDDS) from its current location in Palm Bay, Florida to the WJHTC. This relocation shall include upgrades, cable manufacture, removal, shipment, installation, and testing of the system to verify its operational capability at the new location.

3.22.1 Site Survey - The Contractor shall perform a site survey. Outstanding issues and action items for both the Contractor and the FAA shall be passed to the design team during a post-survey briefing. The survey team shall continue on-going talks with the FAA to close outstanding actions in a timely manner.

3.22.2 SDDS Equipment Upgrades - The Contractor shall upgrade various components of the SDDS for the purpose of bringing the system up to current VP72 Minimum Acceptable Revision Level (MARL) level hardware which is now utilized by the VDDS and all operational VSCS sites, such that all LRUs can be replaced by depot spares. The following summarizes the SDDS upgrades by each subsystem. All kits will include reference designator labels, ID plates and any necessary mounting hardware.

a. BusLAN upgrades.

b. Tandem equipment will be shipped in its current configuration.

c. The CTSU open frames and nine-card VEMs shall be shipped in their current configuration.

d. The Contractor shall provide all required system cables which will revise the current SDDS LAN network to parallel that of operational VSCS sites.

e. The Contractor shall obtain additional GFE VCEs to provide full operational configuration for the 18 positions installed in wall racks plus the two standalone positions (2A1 and 2A39). The two standalone positions shall be mounted in console simulators.

f. Upgrade and relocation of the Test, Timing and Ancillary Equipment hardware shall be accomplished such that this equipment emulates an operational system.

g. The Contractor shall provide an IDF frame and associated equipment such that this system emulates an operational system.

h. Other modifications or upgrades shall be performed to provide the SDDS with depot supportable elements, to include, but not limited to: modification of the HDTS Switch Cabinets; installation of additional Power Control Conditioners (PCCs) and Isolation Transformers; installation of wiring harnesses; replacement of the AC Power Supplies; replacement of Common Equipment Backplanes, DLU E&M single circuit backplanes, and Radio I/F Single circuit Backplanes; addition of anti-rotation devices to the four fans on each cabinet; addition of air flow verifiers to each pair of fans; addition of AC power indicator light modifications; FOTT Cabinet Integration; installation of FOTT brackets; installation of Switch cabinet end panels, EMI door gaskets, and Acoustic Noise Baffles and Door Foam as necessary.

3.22.3 Destaging - The Contractor shall destage and inventory the SDDS equipment, barcode all equipment, verify all part numbers, record serial numbers and tag the equipment in preparation for shipment. The Contractor shall ship all equipment to the site.

3.22.4 Installation and Checkout - The Contractor shall unload and unpack the SDDS equipment upon arrival at the WJHTC. The equipment shall be staged in an FAA-designated area. The equipment shall be installed in the new SDDS Lab in accordance with the site survey and design documentation. System cables shall be installed and connected in accordance with the developed system interconnection diagram. The Contractor's team shall perform Installation and Checkout followed by Site Acceptance Testing (SAT). SAT shall consist of the following:

a. Verification of all hardware and voice paths

b. Cable Scan Testing

c. Workstation and CTS Interface Verification

d. Voice Channel Testing of the A/G and G/G Node VF Test Cards

e. Verification of A/G discrete signals

f. DMC discrete alarm interfaces

g. VCE performance

3.22.5 Documentation - System connectivity for the SDDS shall be documented by a system interconnection drawing. The following documentation shall be delivered in draft and then in final form, incorporating redlines to reflect the as-installed configuration.

a. Installation Area Floor Plan for WJHTC.

b. System Interconnection Diagram

c. Equipment Drawing Tree.

d. Switch Configuration Document.

e. System Cable Identification

The Contractor shall prepare an Equipment Installation Drawing and a System Cable Shipping and Kitting document to Contractor format. These items shall be left at the WJHTC at project completion.

3.23 RELOCATION OF THE VTABS DEVELOPMENT SYSTEM

The Contractor shall move required VTABS lab equipment from its current location in Building 8 to Building 12 on the Palm Bay Facility. This relocation shall include the removal and reinstallation of the power and ground cables along with the proper installation of the required equipment on a raised floor plan. The Contractor shall use residual test-bed and transition materials which will include residual inventory whenever possible during the installation phase.

3.23.1 Develop the Installation and Removal Plan – The Contractor shall develop an installation plan of action for removing the VPSS Lab equipment and selected cabling from Building 8 and installing the equipment and cabling in Building 12 at the Palm Bay Facility. The plan shall provide for the details, sequence and a schedule for the installation of the equipment and cabling in Building 12.

3.23.2 Move Development PECO – The Contractor shall move the development PECO from building 8 to 12 and secure to the raised floor.

3.23.3 Installation of Two Cabinet Switch – The Contractor shall procure, install and configure a new 2-Cabinet HCPD VTABS telephone switch. The installation will include securing the cabinets together with hardware bolts, connection of the power, ground and all internal switch loopback cables.

3.23.4 Fabrication of New Multiport Rack – The Contractor shall recover the residual rack from the Malabar Test Bed Facility and deliver to building 12. The Contractor shall use the Government Furnished Equipment and residual materials to fabricate the new 8 – Multiport Rack and locate as set forth by the designated floor plan space.

3.23.5 Installation of Cutover Equipment – The Contractor shall recover the residual IDF frame from the Malabar Test Bed Facility and deliver to building 12. A G-Cage, RJ-45 Patch Panel and Power supply shall be installed in this IDF as identified in the negotiated CML. Once in place, the power, ground and signal cables shall be connected.

3.23.6 PEM's and Wailing Wall Relocation – The Contractor shall remove 28 PEM's from the existing VPSS and transfer to Building 12. This effort will also provide for the disconnection of the power, ground and system cables. The 13 GFE VEM's and the Wailing Wall will be installed according to the designated floor plan. The Contractor shall install 28 PEM's and 13 GFE VEM's and connect the power, ground and system cables.

3.23.7 Extension of VDDS LAN – The Contractor shall connect thicknet between the 8 - Multiport Rack equipment and the VDDS LAN network. The installation shall include the reinstallation of the terminations at the new rack, AUI drop cables from the rack to the VEM's and the connection of the SCDLU cables from the VEM's to the existing VDDS 10A17/18 IDF's. All of the equipment referenced in this paragraph is GFE.

3.23.8 Miscellaneous Equipment Removal and Reinstallation – The Contractor shall remove and reinstall the following equipment from Building 8 to Building 12; VTC racks, one Laser Printer, MPES desk, Maintenance Consoles, Radio Simulators, Telsets, three each IDF's and HUB racks.

3.24 VTABS DEVELOPMENT SYSTEM RECONFIGURATION

The Contractor shall identify and provide the new materials and/or modifications necessary to existing VPSS equipment which, upon reconstruction, will provide an operational VTABS lab. This effort will also satisfy VTABS equipment and requirements for the system provided to the last site. The identification process will include: 1) revision of the VPSS interconnection diagram to accommodate the new 2-cabinet switch configuration, 2) definition of the VPSS switch circuit card configuration and associated documentation, 3) definition of the loopback locations for radio and trunk circuits, 4) ensure documentation is prepared to provide for the details of the VPSS cutover equipment and the final floor plan and 5) provide personnel to interface with the electrical subcontractor being tasked with the Building 12 power modifications. The Contractor shall create a VPSS SAT procedure, using a template for operational sites. This procedure will provide for a system re-test and operational verification of the VPSS final lab configuration. Upon completion of the testing the Contractor shall Barcode the final lab configuration. This final lab configuration shall provide for the PECO power subsystem for the VPSS to be populated with rectifiers only – providing DC power to the switch and PEM's. There will be no inverter modules or batteries included for backup power.

3.24.1 Identification and Design of Material – The Contractor shall identify the materials and /or equipment which are scheduled to remain as part of the lab and the items to be prepared for shipment to the last site. In addition, the Contractor shall provide for the structure and coordination required to ensure the systematic creation of the new IDF's for the last site. The Contractor shall strive to ship new hardware to the last site and reuse existing hardware for the VPSS restoration.

3.24.2 Switch Configuration and Documentation – The Contractor shall define the new circuit card configuration for the VPSS lab switch. This action will permit the design team to provide the technical input for the CAD design and release of one "A-size" document. This drawing (not a formal delivery) will be for Contractor use on-site.

3.24.3 Interconnection Diagram Revision – The Contractor shall update the existing VPSS interconnection diagram to illustrate the end-state lab configuration. This effort will document the new backup switch trunk and radio resource loopbacks and be included in the information on the revised interconnection diagram which will be supported by the release of an ECO to update existing documentation. This documentation (not a formal delivery) will be for Contractor use.

3.25.4 Cutover Switch Documentation – The Contractor will create one CAD "D-size" drawing to depict the VPSS cutover IDF. This drawing (not a formal delivery) will be for Contractor use on-site.

3.24.5 VPSS Floor Plan – The Contractor shall provide for one CAD "D-size" drawing that will depict the revised lab floor plan. In addition, the Contractor will ensure that the proper documentation is provided for the creation of a VPSS equipment parts list.

3.24.6 Test Procedure and System Checkout – The Contractor shall modify an existing VTABS SAT procedure for the system/resource verification. This action will permit the Contractor to verify system requirements and perform the system test and troubleshooting as required.

3.24.7 Electrical and Power Interface – During the interface phase with the electrical subcontractor, the Contractor shall provide a single-line power diagram and provide the necessary guidance/instructions for the PECO prototype reconnection and the installation of the AC/DC power in the Building 12 lab.

3.24.8 Switch CCA MARL Verification – The Contractor shall verify the MARL of all the GFE switch cards and process the appropriate paperwork for disposition of the upgrade as necessary.

3.24.9 Barcode/Downtrace of Lab Equipment – The Contractor shall ensure that the barcode of the lab equipment is accomplished and the documentation reflects the end-state VPSS configuration.

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3.25 VSCS Control Subsystem Upgrade (VCSU)

This Statement of Work (SOW) Section delineates the Contractor tasks required to develop and implement an upgraded control subsystem into the Federal Aviation Administration's (FAA) Voice Switching and Control System (VSCS). The VSCS system is operational at the 21 En Route Air Route Traffic Control Centers (ARTCCs), the Federal Aviation Administration (FAA) W. J. Hughes Technical Center (WJHTC) and the Mike Monroney Aeronautical Center (MMAC). The VSCS Control Subsystem shall be replaced at each of these sites with a VSCS Control Subsystem Upgrade (VCSU), in accordance with the terms of this SOW, and shall meet all the functionality of the VSCS Control Subsystem discussed in FAA-E-2731G, the VSCS Product Specification.

The Contractor shall provide personnel, material, services, and facilities as stated herein to design, fabricate, deliver, install, integrate, test, and support the products described herein. The data delivered as a result of performing the tasks described herein shall be prepared in accordance with the instructions contained herein. The Contractor shall provide all redlined and new documentation via electronic medium. VCSU CDRL items associated with VSCS CDRLs VP22, 28, 34, 42, 43, 88 and 93 shall be delivered as change pages or addenda to the VSCS CDRLs in accordance with the associated DIDs. The following VSCS CDRLs shall be delivered to the WJHTC as redlined hardcopies (Section 3 only); VP29, VP35, VP37, and VP39. The following VSCS CDRLs shall be delivered to the WJHTC as data packages: VP40, VP 46, VP87, and VP95. The VSCS CDRL VP68 shall be reissued and delivered to the WJHTC. The Contractor shall submit ECPs for changes to CDRLs VP69 and VP69A

3.25.1 VCSU Software Licenses and Source Code

3.25.1.1 VCSU Software Licenses and Source Code Delivery - The Contractor shall provide the software licenses to the Government for all software required under this contract, including all software tools used to design, develop, produce, install, and maintain the delivered software. The term Software is meant to include Firmware.

The Contractor shall deliver to the Government all non-COTS source code, including all code imported from VTABS and the DYSIM Stand Alone Voice Switch (DSAVS) Programs.

3.25.2 Production

3.25.2.1 Prime Mission Equipment (PME) - The Contractor shall design, produce or procure, test, deliver, and install the VCSU equipment. The software delivered with the VCSU shall be capable of operating with the VSCS ORD 7.3.1.6 operational software baseline.

The Contractor shall design the VCSU using Microsoft NT compatible platform and provide all the current functionality of the VSCS Control Subsystem. The Contractor shall use C and C++ computer languages for the ported and new software. The Contractor shall use its internal software development standards for any new software development effort, porting of existing software, and modification to any COTS software.

The Contractor shall design the VCSU adhering to DOT/FAA/CT-96/1 Human Factors Design Guide.

3.25.2.1.1 Production Stage and Test - The Contractor shall stage each production set of VCSU equipment at the Contractor's facility. The equipment shall be properly configured, the software loaded and the VCSU operated over a continuous 48-hour period. At the completion of this 48-hour period, the Contractor shall conduct an informal functional test to insure the equipment's proper operation. The Government may witness this test if desired. At the successful completion of this test, the Government will approve the shipment of the VCSU equipment to the site.

3.25.2.1.2 Reliability, Maintainability, Availability (RMA) - The Contractor shall implement VCSU in accordance with the VSCS Product Specification FAA-E-2731G. The Contractor shall predict failure rates for new and/or modified system elements introduced by VCSU, down to the LRU level.

3.25.2.1.2.1 RMA Modeling and Prediction - The Contractor shall maintain an RMA model and predictions to address requirements in FAA-E-2731G. The Contractor shall revise the model and predictions in accordance with MIL-STD-785, Tasks 201 and 203, to reflect changes to the design that affect the results of predictions and actual RMA data delivered from testing. The results of the RMA modeling and predictions shall be included in an update to VSCS CDRL VP25.

3.25.2.1.3 Other Engineering Support - The Contractor shall perform the following in support of the VCSU.

3.25.2.1.3.1 Baseline Stability Testing - The Contractor shall perform a Baseline Stability Test (BST) as part of the Functional Acceptance Test (FAT). This test shall be used to determine the system's stability prior to baseline delivery by exercising new and existing functionality over a 72-hour period. The Contractor shall plan and provide for the collection, maintenance, and analysis of all relevant testing data and for identifying and resolving VCSU problems as a result of the testing.

3.25.2.1.3.2 Failure Reporting, Analysis and Corrective Action System - The Contractor shall update and maintain the VSCS Failure Reporting, Analysis, and Corrective Action System (FRACAS) program to include the unique VCSU components.

3.25.2.1.3.3 Interface Management - The Contractor shall maintain an interface management program that includes all VCSU hardware and software interfaces to meet the requirements in FAA-E-2731G.

3.25.2.1.3.4 VCSU Consumables - The Contractor shall identify and deliver an initial one-year supply of the VCSU-unique consumables required to support VCSU operations at each site.

3.25.3 Project Management

The Contractor shall establish a VCSU project management program to plan, organize, direct, and control all activities necessary to meet the requirements of FAA-E-2731G.

3.25.3.1 Project Management Cost Reporting - The Contractor shall include cost and schedule performance status information for VCSU cost reimbursable SLINs in accordance with established VSCS procedures.

3.25.3.2 Program Risk Analysis and Mitigation - The Contractor shall have a formal risk management activity based on Engineering Metrics. This activity shall be described in detail in the VCSU Program Plan submitted by the Contractor.

3.25.4 Configuration Management (CM)

The Contractor shall implement a Configuration Management program on all VCSU hardware, software, firmware, and documentation, excluding training and curriculum materials. The Contractor shall update the proposed Configuration Management Plan submitted with their proposal 45 days after receipt of Government comments.

3.25.4.1 Configuration Control - The Contractor shall propose any changes to the Product baselines as Engineering Change Proposals (ECPs). Contract Clause H.58 is applicable.

The Contractor shall develop and process ECPs in accordance with FAA-STD-021, Appendix VIII and Appendix IX, and complete the Life Cycle Cost evaluation.

The Contractor shall develop any required Notice of Revisions (NOR) for every document affected by an ECP for which the Contractor is not the custodian, including GFP documentation, to accompany each ECP in accordance with DOD-STD-480, Section 5.

The Contractor shall submit waivers and deviations in accordance with DOD-STD-480, Sections 7 and 8. Upon completion of the Contractor-required action, the proper documentation for minor deviations/waivers will have the local FAA Quality Reliability Office concurrence and approval prior to implementation, unless otherwise directed by the FAA Contracting Officer.

The Contractor shall maintain configuration control of all VCSU hardware and software such that each operational site has a functionally equivalent and interchangeable hardware and software configuration, including compatible physical interfaces, and excluding only site database and system size considerations. The Contractor's configuration control shall include provisions for migration of improved and new system components into any systems prior to FAA acceptance.

The VCSU Contractor shall process any changes to the Product Baseline ensuring that there is FAA notification of any proposed change. The Contractor shall process any changes to the VSCS product baseline for VCSU using an abbreviated ECP process, whereby AOS will receive a full document change package for review in advance of formal ECP submission. Harris will respond to AOS comments, incorporate them and proceed with final ECP submission and documentation delivery. In order to expedite the ECP process, AOS comments, Harris responses and AOS approvals will be transmitted via e-mail correspondence.

The VCSU Contractor shall deliver Configuration Management Status Accounting Reports in accordance with CDRL VP129.

3.25.4.2 Reserved.

3.25.4.3 LRU Tracking System - The Contractor shall provide LRU tracking for the VCSU using the existing VSCS Bar Code System.

3.25.5 Technical Reviews and Audits

The Contractor shall plan, support, conduct, and participate in technical reviews and audits. Unless otherwise stated, these reviews shall be conducted at the Contractor's facilities.

3.25.5.1 Technical Interchange Meetings (TIMs) - The Contractor shall conduct up to 3 TIMs as approved by the Government.

3.25.5.2 Project Management Reviews (PMRs) - The Contractor shall conduct quarterly PMRs, in Washington DC. The Contractor shall report on the status of VCSU as part of each VSCS PMR.

3.25.5.3 Baseline Package Review (BPR) – The Baseline Package Review for VCSU will consist of a Government review of all VCSU documentation, software, and hardware to establish the Product Baseline. The Baseline Package Review shall show that the functions of the configured system comply with requirements as stated in the VPS for the Control Sub-System. The BPR will be conducted in two parts. The Contractor shall support the conduct of Part I of the VCSU BPR after completion of the WJHTC Site Acceptance Test (WSAT). The successful completion of Part I will be the establishment of the VCSU Hardware Product Baseline. Specific items required for Part I of the VCSU BPR follows:

a. A listing of all VCSU hardware components, by part number

b. Product drawings and documentation associated with the listed HW components

c. Special tools and test equipment, and associated drawings and documentation

d. Operating instructions for all VCSU equipment (may be in draft format)

e. Commercial Software and Hardware Manuals

f. Draft documentation to support operation and maintenance of VCSU

g. Draft spares recommendations with supporting documentation (such as MTBF, MTTR) to support installation and routine use and maintenance of the VCSU

The above items will then be used to establish the VCSU HW Product Baseline.

The VCSU BPR Part II shall be conducted after completion of the Key Site Acceptance Test (KSAT). Part II of the BPR will consist of a review of all final documentation against contract requirements. The SW Product Baseline will be established during Part II. Samples of the items to be reviewed are as follows:

a. The Version Description Document

b. The CM process used to establish the baseline

c. The Final version of operating instructions for all VCSU equipment

d. The Software User’s Manual

e. The Computer System Operator's Manual

The above items will be used to establish the VCSU Software Product Baseline. A letter of completion will be sent to the Contractor with the listing of the VCSU HW and SW Product Baseline elements that will be entered into the ECP process.

3.25.5.4 Test Review

3.25.5.4.1 FAT Test Readiness Review - The Contractor shall conduct a Test Readiness Review (TRR) to determine if all planning and preparation for testing has been accomplished prior to the start of Functional Acceptance Test. The Contractor shall conduct the review for the Government prior to the scheduled start of the formal test. The Contractor shall include as a minimum the following review topics:

a. Requirement changes
b. Design changes
c. Test procedure changes
d. Test limitations
e. Summary of all pre-test dry runs
f. Schedule of events

The review shall be conducted in accordance with Contractor-established format for Government approval prior to commencement of the test.

3.25.5.4.2 SAT Test Readiness Briefing - The Contractor shall conduct a Test Readiness Briefing to determine if all planning and preparation for testing has been accomplished prior to the start of SAT at the field facilities. The Contractor shall conduct the review for the Government prior to the scheduled start of the formal test. The Contractor shall include as a minimum the following review topics:

a. Requirement changes
b. Test limitations
c. Summary of all pre-test dry runs

3.25.5.5 Technical Interchange Meetings (TIMs) and Reviews - The Contractor shall support the TIMs and reviews described herein.

3.25.5.5.1 TIMs - At the request of the Government or of the Contractor, Technical Interchange Meetings (TIMs) may be held to discuss in detail any issues (e.g., technical, logistics, and training) that require mutual resolution or further clarification. TIMs and Conferences should be considered by the Contractor only for the affected Government technical group. The Contractor shall support up to three (3) TIMs at the Contractor's facility with an estimated duration of one (1) day each. Additional TIMs to cover issues other than critical Program Management or Contractor performance issues, with an average duration of one (1) day each, shall be held as ordered by the Government. The Government shall have final approval of the schedule and presentation agenda. The Contractor shall prepare presentation material and minutes of the TIM.

3.25.5.5.2 VCSU Decision Point (VDP) Reviews and Demonstrations - The Contractor shall conduct three (3) VCSU Decision Point Reviews and two (2) demonstrations. At the conclusion of each VDP Review/demonstration, the FAA Contracting Officer will either accept or reject the VDP event not later than ten (10) working days after completion of that VDP Review. All VDP events shall occur at the Contractor's facility or as otherwise directed. . The Government shall have final approval of the schedule and presentation agenda. The Contractor shall prepare presentation material and minutes of the VDP.

3.25.5.5.2.1 VCSU Requirements Review - The VCSU Requirements Review shall include, as a minimum, the following subjects/items:

a. Identification and summary of requirements

b. Identification of major VCSU components and interfaces

c. Identification of all derived requirements

d. Discussion of performance, RMA, and timing requirements and how they have been "assigned" to the VCSU architecture

e. Identification of requirements issues

f. Identification of design issues which require early FAA insight

g. Schedule/cost/risk

3.25.5.5.2.2 VCSU In Process Review - The VCSU In Process Review (IPR) shall include as a minimum the results of analysis that shows which software modules will be ported directly, which will require modification, which will be reused from VTABS, and which will require re-engineering.

3.25.5.5.2.3 VCSU Baseline Design Review - The VCSU Baseline Design Review (BDR) shall include, as a minimum, the following subjects/items:

a. Summary of VCSU baseline architecture

b. Summary of VCSU data functional flows and interfaces

c. Summary of design

d. Summary of sizing, capacity, and performance

e. Status of software development/rehost/modifications to COTS

f. Issues and schedule update

3.25.5.5.2.4 In-Process Demonstrations - The Contractor shall conduct In-Process Demonstrations of the porting of the VSCS Mode Transition Capability and the VCSU Failover approach. The dates of these demonstrations will be as agreed to between the Government and the Contractor.

3.25.6 VCSU Test Program

The Contractor shall develop and implement a test program for the VCSU to verify the system's physical, functional, and performance requirements as defined in FAA-E-2731G, at the Contractor's production facility.

The Contractor shall furnish the equipment, tools, space, test equipment, test plans and procedures, and personnel to accomplish all testing performed in the Contractor's facility. The Contractor shall furnish test equipment, tools, test plans and procedures, and personnel required for testing equipment being installed at each site. All Contractor tools and test equipment not purchased from VSCS Government provided funds (other than fixed price funds) will be returned to the Contractor at the completion of site testing.

3.25.6.1 Test Performance

3.25.6.1.1 General - The Contractor shall perform all testing required to verify that the VCSU, as designed and implemented, satisfies the requirements of FAA-E-2731G as modified by existing waivers and deviations. This testing shall include FAT on the VDDS, SAT at the WJHTC, SAT of the First Delivered Operational Site System (key site), and SAT at each site where the Contractor has performed installation of VCSU.

3.25.6.1.1.1 Contractor-Conducted Tests - All Contractor-conducted tests shall use site-specific configuration maps for the VCSU.

3.25.6.1.1.2 System Integration and Test - The Contractor shall conduct System Integration and Test on all new or revised software, and on new or repackaged hardware. The FAA Test Director’s representative may monitor System Integration and Testing.

3.25.6.1.1.3 Government-Witnessed Tests - All Government-witnessed tests shall be conducted in accordance with following:

a. All tests shall be conducted in accordance with Contractor developed test plans and procedures. Deviation from the **Government**-approved procedures can occur with concurrence of the Government-appointed Test Director or designated representative. Deviation from the Government-approved procedures shall be noted in the test log and redlined on the working procedure document.

b. The Contractor shall provide the Government a Notice of Intent to conduct the Functional Acceptance Test on the VDDS not less than ten (10) working days prior to the start of the test and confirm the test starting date. Expected length of the test is five (5) working days in advance of the test start.

c. The Contractor shall brief a Government-appointed Test Director or designated representative prior to the start of each test. The briefing shall describe the Contractor's readiness for the test, the objective(s) of the test, a description of the test scenarios, and the expected test results.

d. Prior to the start of the test, the system under test shall be sealed, establishing a unit-under-test baseline configuration.

e. During testing, the Contractor shall respond to direction on test conduct only from the Government-appointed Test Director, or designated representative. The Government-appointed Test Director's, or designated representative's, authority will include ensuring Contractor compliance with the approved test plan and procedures governing the specific tests. The Government has the option to add additional test witnesses.

f. The Contractor shall maintain an official test log containing test identification, description of the unit under test, copies of the calibration checklist for all test equipment, date and time of test, procedures, collected results, and discrepancy reports. The test log shall also record any changes to the unit-under-test configuration. The Government-appointed Test Director or designated representative, as part of the Contractor test witnessing responsibility, will sign the test results attesting that the test has been performed in accordance with the redlined test procedures and that the test results are properly recorded.

g. Where the Contractor has deviated from the Government-approved procedure without approval from the Government-appointed Test Director, or designated representative, or has obtained results that do not indicate verification of the requirements, the Contractor shall record the discrepancy in the test log and on a discrepancy reporting form. The Contractor shall maintain a discrepancy and/or clarification form that details and provides an audit trail for any discrepancy or request for clarification from the Government. The report shall describe the circumstances of the discrepancy and shall be signed by the Government-appointed Test Director or designated representative and the Contractor's Test Director. The Contractor shall perform analyses to determine if the collected results can be accepted, or if the as-performed procedures indicate compliance with the requirement. The Contractor shall report the results of the analysis to the Government-appointed Test Director, or designated representative. After receipt of the results of the analyses, the Government will decide whether or not to accept the results or to require a retest.

h. The Contractor shall submit deviations or waivers to requirements for Government approval. Deferrals of requirements may be issued by the Government for requirements that cannot be verified at the Contractor's facility and/or if the system under test does not include the subsystems necessary to verify the requirement.

i. Once results have been validated (through analysis or retest), the Government-appointed Test Director, or designated representative, will sign the test log and results. A copy of the test log, including data collected during the test, shall be provided to the Government-appointed Test Director or designated representative at the completion of the test. A list of any discrepancies revealed by prior testing shall be furnished to the Government-appointed Test Director not more than five (5) days after completion of all tests.

j. Formal FAT shall consist of a requirements validation test, a 72-hour baseline stability test, and software baseline installation/transition procedure demonstration.

3.25.6.1.1.4 Problem Tracking Database - The Contractor shall record all FAT test discrepancies in a problem-tracking database. The Contractor shall provide the Government a hard and soft copy report of all open discrepancies following completion of FAT.

3.25.6.1.2 VCSU Functional Acceptance Test (FAT) - The Contractor shall conduct a formal Functional Acceptance Test (FAT) to verify all physical, functional and performance requirements contained in FAA-E-2731G that are impacted by the VCSU. FAT shall verify functional and performance compliance in single function stand-alone tests and in multifunction scenario driven tests representative of a realistic environment. The Contractor shall conduct the FAT at the Contractor's facility on the VDDS. Supplemental FAT shall be conducted as necessary to verify complete compliance with the VSCS specification (FAA-E-2731G). The Contractor shall provide all test equipment, special tools such as card extenders and inserts, and the emulators necessary to simulate the VCSU external operating environment (automatic loading will be required).

The tests shall be conducted in the presence of the Government-appointed Test Director or designated representatives, who will witness all tests and validate the test results collected.

3.25.6.1.3 First Operational Site Acceptance Test - The Contractor shall conduct a Site Acceptance Test for the First Operational Site System delivered to the first operational site. This test shall include, but not be limited to, tests of all external interfaces and functions not previously tested at the factory or at the WJHTC.

3.25.6.1.4 Site Acceptance Test - The Contractor shall perform a Site Acceptance Test (SAT) in accordance with Government approved site test procedures to test and demonstrate that the VCSU equipment is installed in accordance with the site-specific installation drawing. The FAA Test Director or designated representative will witness the SAT.

The Contractor shall conduct the WJHTC Site Acceptance Test on the system delivered and installed at the FAA Technical Center. The SAT shall include, but not be limited to, testing of all VCSU requirements that could not be completed in the factory. At the conclusion of SAT, the WJHTC VCSU shall be turned over to the Government test organization for Operational Test and Evaluation (OT&E). The Contractor shall provide Site Acceptance Test procedures for each facility. The Contractor shall include the SAT procedures in VP127. The SAT procedures shall be provided to the FAA Test Director for approval. The SAT procedures shall be available to the FAA Test Director at least 45 days prior to the FAATC SAT. The SAT procedures shall either contain a site-specific appendix for each site or each site shall have its own unique SAT procedure.

3.25.6.1.5 Retest - Failure of the VCSU during SAT, OT&E at the WJHTC, or during retesting after making changes to the current baseline to satisfy the specific test criteria, shall require the Contractor to determine the reason for the noncompliance and to report the cause of the noncompliance and the proposed fix to the Government in writing prior to submission for retest. The Contractor shall be responsible for all corrective action necessary to ensure full compliance with this SOW and the VSCS specification. Corrective actions and post-SAT regression test activities will be incorporated into the VSCS problem resolution and corrective action process. On any retest action, the Contractor shall be

responsible for identifying the cause of the problem, identifying a solution to fix the problem, and proposing a fix to the Government. The Contractor shall complete all repair or rework prior to submission for retest.

The Contractor shall provide a schedule for retest and the coverage of the retest, including any regression testing required on the system for FAT and SAT. The Government reserves the right to determine the scope of retest, including complete retest of the system. A five working day notice shall be provided to the Government for all retests. The retest shall be conducted in accordance with the procedure used on the original testing or as modified and accepted by the Government. Retests shall be conducted in the presence of the Government- appointed Test Director or designated representative, who will witness all tests and validate the test results collected. An analysis of all corrections to anomalies or failures shall be presented during the retest period. Any further testing and/or demonstrations or anomalies or failures that resulted from the retest period shall be coordinated and approved by the Government.

3.25.6.1.6 Technical Field Test and Evaluation

3.25.6.1.6.1 WJHTC and First Operational Site System Installation and Acceptance Testing - The Contractor shall install the VCSU equipment at the WJHTC location specified and conduct a site installation, integration, and verification test.

The Contractor shall install the First Operational Site System at the first site, per the Government-approved site survey, and conduct a site installation, integration, and verification test.

3.25.6.2 Test Documentation - The Contractor shall be responsible for documenting the VCSU test program in the form of plans, procedures, and reports. The Contractor shall develop a Test Acceptance Plan documenting the overall test program.

3.25.6.2.1 Test Acceptance Plan - The Contractor shall prepare a Test Acceptance Plan (TAP). This TAP shall serve as the overall test control document for the Contractor's VCSU test program. The TAP shall provide for the following test phases:

a. VDDS Functional Acceptance Test
b. WJHTC Site acceptance Test
c. Site Acceptance Test (21 ARTCC and FAAAC)

3.25.6.2.2 Test Procedures - The Contractor shall prepare test procedures in accordance with the Test Acceptance Plan for all formal tests in accordance with established VSCS processes for formal verification test and shall make these procedures available via soft copy. Formal testing shall commence after the procedures have been reviewed and accepted by the Test Director or his representative.

3.25.6.2.3 Test Reports - The Contractor shall prepare an informal test report for all formal tests to be provided to the FAA Test Director after completion of formal verification testing.

3.25.7 Installation, Integration, and Acceptance - The Contractor shall deliver, install, integrate, and test the VCSU at Government-designated sites in accordance with the Government approved program schedule. The Contractor shall provide all personnel, tools, test equipment, installation equipment,

software, materials, and services required for these efforts. The Contractor shall provide full-time supervision and direction of its personnel and subcontractors during all phases of the installation activity.

3.25.7.1 Site Survey - The Contractor shall conduct site surveys as directed by the Government. The Contractor shall coordinate with each site to gather the information required to complete each site survey or identify the need for a physical site survey. The Contractor shall provide a new, condensed, Site Activation Plan for 23 sites, describing VCSU installation details, floor plan recommendations and interconnection to the VSCS system VP126. A draft delivery shall occur six months prior to start of each installation. FAA comments to the draft will be provided to Harris within thirty days of draft delivery. FAA comments shall be incorporated, as required, with a final delivery within thirty days from receipt of comments. Harris shall publish a VCSU waterfall schedule matrix which details site survey, CDRL delivery and installation dates, at a minimum.

3.25.7.2 Site Installation - The Contractor shall be responsible for all site installation activities for VCSU. The Contractor shall develop a VCSU Transition Plan. A draft delivery shall occur two months prior to the start of installation at the first operational site. FAA comments to the draft will be provided to Harris within thirty days of draft delivery. The FAA comments shall be incorporated, as required, with a final delivery before the schedule date for installation at the first operational site. Site installation activities shall include, as a minimum, off-loading, placement, cable trays (as required) and penetrations, physical installation, and electrical installation and cabling.

3.25.7.2.1 Packing, Shipping, Off-Loading, and Placement - The Contractor shall be responsible for the packing, shipping, off-loading, transient or site storage, loading dock coordination, and placement of all VCSU equipment and material from the Contractor's plant to the Government-designated installation sites. The Contractor shall be responsible for off-loading, moving, and placing equipment in the designated locations within the facility. In no case shall the Contractor deliver a system without a designated Contractor representative present at the site to accept the system from the shipper. The Government will provide facility space that shall include any additional required spares storage as a result of VCSU. The Contractor shall remove the packing and shipping materials and other unwanted installation-generated work materials from the site.

3.25.7.2.1.1 Transient Storage - The Contractor shall provide for equipment storage in accordance with Best Commercial Practices.

3.25.7.2.2 Physical Installation - The Contractor shall physically connect VCSU equipment to the Government-approved location within the facility. The Contractor shall supply all mounting hardware and tools necessary to attach the VCSU to collocated rack assemblies, facility flooring, or other connection points. The Contractor shall be responsible for emplacement of VCSU position equipment in designated locations in the facility in accordance with applicable physical, electrical, and seismic codes.

3.25.7.2.3 Electrical Installation and Cabling – The Contractor shall provide and install all required cable trays, penetrations, cabling, wiring, connectors, and associated hardware within the VCSU, between the VCSU and the remaining VSCS, and to the power interface. This requirement includes Contractor-furnished cable trays, electrical cabling, and connectors for all special test equipment. The

Contractor shall supply all tools and test equipment necessary to install and checkout cabling. All electrical work shall be accomplished in accordance with NFPA-70 and local codes (if applicable).

3.25.7.2.4 Constraints – The Contractor shall perform all installation activities on a non-interference basis. The Contractor shall make adequate provisions in personnel staffing and procedures to allow for flexible use of the on-site personnel to avoid conflicts with other Government activities at the VCSU sites. Contractor personnel shall abide by all security provisions of the FAA locations being visited, at all times.

The Contractor shall participate in an installation in-briefing with Government-appointed representatives prior to initiating installation activities. The Contractor shall also participate in an out-briefing prior to departing the facility to review the installation and action items.

3.25.7.3 Site Acceptance Test (SAT) - SAT shall be conducted as described in 3.25.6.1.4.

3.25.7.3.1 Site Acceptance Report (SAR) – The Contractor shall develop a SAR documenting the initial performance settings of the equipment, VP128. The SAR shall also include a listing of the established baseline. The Contractor shall deliver the SAR in accordance with VP128. Upon the acceptance of the SAR by the Government, the Government will accept the system using a FAA 256 document.

3.25.7.3.2 Tools and Test Equipment - The Contractor shall provide all tools, test equipment, and test jigs for all installation, testing, and maintenance activities on the VCSU during site acceptance until satisfactory completion of SAT.

3.25.8 Integrated Logistics Support (ILS)

3.25.8.1 Integrated Logistics Support Program - The Contractor shall plan, maintain, and execute the ILS program to support the VCSU requirements in accordance with the VPS CSS requirements and the provisions contained herein.

a. ILS Program Management. The Contractor shall integrate the VCSU ILS program into their existing VSCS Integrated Logistics Support activities. This activity shall include support to the VSCS joint Government-Contractor National Airspace Integrated Logistics Support Management Team for VCSU issues.

b. Subcontractor/Vendor Control. The Contractor shall maintain and be responsible for the VCSU Subcontractor and Vendor ILS programs using Government-approved VSCS procedures and processes.

c. Life Cycle Cost (LCC) Analyses. The Contractor shall continue the VSCS LCC program for the VCSU with one update to the VSCS LCC Document (VP52) to reflect the as delivered configuration of the VCSU.

3.25.8.1.1 Hardware Maintenance - The Contractor shall provide direct site maintenance, restoration, repair, and/or supply support services at each site through SAT. The VCSU will be supported by two levels of hardware maintenance: field/site (first level) and depot (second level).

3.25.8.1.1.1 Field/Site Maintenance - As ordered, the Contractor shall provide site maintenance, restoration, repair, and/or supply support in accordance with existing VSCS CLINs for site maintenance.

3.25.8.1.1.2 Depot Level Repair Support - As ordered, the Contractor shall provide depot level hardware and software support for the VCSU under existing VSCS CLINs.

3.25.8.2 National Airspace Integrated Logistics Support (NAILS) Program Requirements - A tailored NAILS program shall be implemented for VCSU.

3.25.8.2.1 Logistics Support Data - For all unique VCSU LRUs, the Contractor shall support a FAA effort to assemble logistics support data with existing Contractor-formatted data. This support shall be limited to review and duplication of all drawings in existing Contractor format, and access to unique hardware components as required.

3.25.8.3 Other Documentation Update - The Contractor shall provide an update to the VSCS Post Production Support Plan (CDRL VP51) and Life Cycle Cost Document (CDRL VP52) to incorporate the support requirements of the unique components of VCSU and any identified VCSU Peculiar Support Equipment.

3.25.8.4 Supply Support/Spares

3.25.8.4.1 Supply Support - The Contractor shall provide supply support activities for maintenance and consumable items under CLIN 24.

3.25.8.4.2 Site Spares - The Contractor shall deliver to the Government for approval a list in Contractor format of recommended site replaceable spares, assemblies, and consumables for each site. The list shall include the vendor name, part number, national stock number (if applicable/available), item description, estimated unit cost, mean-time-between-failure (MTBF), Repair Turn Around Time (RTAT), and recommended quantity information. If the baseline configuration of the VCSU is changed, recommended updates to the approved listing will be included in the change request.

The Contractor shall deliver a set of site spares, as documented in the Government approved site spares list, to each site with delivery of the prime mission equipment.

3.25.8.4.3 Depot Spares - The Contractor shall deliver to the Government for approval a list in Contractor format of recommended depot spares, to include spare parts, LRUs, assemblies, consumables, and spare parts-peculiar items. The Contractor shall deliver approved depot spares to the FAA VSCS depot in accordance with the following schedule: 25% of each type of all depot spares delivered prior to first operational site delivery; 50% of each type of all depot spares delivered prior to delivery of the 12th operational system; and 100% of each type of all depot spares delivered not later than delivery of the final operational system.

3.25.8.5 Support and Test Equipment

3.25.8.5.1 Common Tools and Test Equipment - All common tools and test equipment that are not an integral part of the end item but are required to inspect, test, calibrate, service, repair, or overhaul an end

item shall be identified to the Government. The Contractor shall submit in Contractor format a list of proposed VCSU tools and test equipment.

3.25.8.5.2 Special Tools and Test Equipment - Any requirement for special tools and test equipment that have a single or peculiar application to a specific end item shall be minimized. Special tools and test equipment are any tools or test equipment that are not commercially available and are used to perform a specific operation on a specific piece(s) of material and which are necessary for servicing, adjusting, or maintaining the end item. Existing VSCS special tools and test equipment shall be used to the maximum extent possible. Additional tools and test equipment will be approved by the Government.

3.25.8.5.2.1 Delivery of Special Tools and Test Equipment - The Contractor shall provide and deliver with the site equipment a complete set of special tools and a complete set of any special test equipment needed for site maintenance including: test cables, connectors, extender kits, adapters, software, and all other items required to permit use of the special test equipment with VCSU hardware, firmware, and software. Special tools and test equipment not common to the VSCS shall be delivered to the WJHTC. FAAAC and field sites shall receive any special tools and test equipment required to perform field maintenance.

The Contractor shall provide and deliver a set of special tools and special test equipment not common to the VSCS to both the FAAAC and to the WJHTC.

3.25.8.5.2.2 Special Test Procedures and Techniques - Any formal or informal test procedures or techniques used by the Contractor (e.g., fault injection) during the VCSU FAT shall be documented by the Contractor. Any formal or informal test procedures or techniques used by the Contractor during the VCSU FAT shall be reproducible at the WJHTC on the WJHTC VCSU. Any formal or informal test procedures or techniques used by the Contractor during the VCSU FAT shall be made available to the Government-appointed Test Director or designated representative.

3.25.8.5.2.3 Calibration Maintenance Requirements Summary (CMRS) - The Contractor shall develop and provide a CMRS, in Contractor format, for all newly designed VCSU support equipment that requires calibration.

3.25.8.6 Manuals and Instruction Books - The Contractor shall delete references and information concerning the Tandem from current Government Furnished VSCS documents and shall include new information concerning the VCSU, in association with CDRL VP72. The Contractor shall redline the existing System Maintenance Manual/Software users Manual Supplement, to include the VCSU information and delete references to “Tandem”.

The Contractor shall identify all available manuals needed for the VCSU. The Contractor shall identify any site/location-unique requirements and provide methods for addressing these requirements in the manuals. The following manuals and instruction books shall be provided as separate information to update existing VSCS documentation, and as defined in CDRL VP72 and its associated DID. FAA-D-2494/b shall be used VCSU System Maintenance Manual/Software Users Manual Supplement - Including SW as guidance. Strict compliance with Appendix I of FAA-D-2494/b is required.

a. VCSU System Maintenance Manual/Software Users Manual Supplement - Including SW initialization and how to load software. Specifically, this manual shall enable a trained site maintenance person to perform on-site software and hardware maintenance activities. These activities include loading new software builds and maintaining configuration control of software releases. This manual shall also include a description of the VCSU features, their interactions and interfaces, and normal and failure modes.

b. VCSU DEO Manual Supplement - Including information for the DEO to use the VCSU functions.

c. VSCS Start-up/Shutdown Manual Supplement – Including Start-up/Shutdown procedures with VCSU installed. This manual shall also include a description of the VCSU features, control and indicators associated with start-up and shutdown procedures.

3.25.8.6.1 VCSU Drawings and Lists

3.25.8.6.1.1 General Requirements - The Contractor shall develop documentation that will support the procurement, installation, and maintenance of the VCSU hardware**.** As required, ECOs will be written to incorporate the VCSU changes into the existing VP69, VP69A and VP115 documents. These ECOs will also remove all Tandem connectivity and references to Tandem equipment. All ECOs shall be submitted to the FAA for approval via the AOS abbreviated ECP process used for VSCS changes. Documents developed under the VP115 CDRL may be used in support of the VCSU project. All new documentation required to support the VCSU project shall be added to the VP69 or VP69A baseline, as applicable, via the ECP process. AOS will provide up-to-date soft copies of the VP69 and VP69A documents that require changes resulting from VCSU implementation.

All new engineering drawings shall be generated in Contractor format. These formats shall be one of the following sizes: D-size, (22 inches by 34 inches), or A-size, (8.5 inches by 11 inches). Documents shall require format on sheet one of the document only. Subsequent sheets of the drawing may be on unformatted pages, provided that the drawing number, sheet number, revision level and cage code appear on the bottom of each sheet of the drawing. These drawings shall be graphically and logically clear in order to meet the intent of the microfilmability requirements as defined in MIL-STD-9868 or MIL-STD-5480.

All engineering drawings shall conform to the requirements of DOD-STD-1000 and be prepared in accordance with MIL-STD-100, level 2, with the following tailoring:

1. Data lists and index lists shall not be required.
2. Multi-detail drawings are acceptable for all phases of development and production.
3. Contractor part identification numbers and supplier part numbers may be used on level 2 documentation providing that the supplier's CAGE number or equivalent, is referenced on the documentation. This supplier information may be provided in a separate cross-reference document.
4. As directed, the Contractor shall produce Control Drawings for specific items.
5. Part number marking for identification shall be the same as required for CDRL VP69A.

3.25.8.6.1.2 Initial Delivery - Initial documentation delivery shall consist of the installation drawing set, as redlined, being delivered to the site TOR (or equivalent), upon completion of the SAT. This delivery shall be one set in hard copy only. The installation drawing set shall consist of those drawings required to perform the installation and test of the VCSU hardware.

3.25.8.6.1.3 Final Delivery - The Contractor shall make final delivery within 30 days after the latter of either ECP approval or successful completion of SAT. Final delivery of the documentation shall be one set each to AOS at the WJHTC, the applicable site, and the applicable region. Each set shall consist of one copy of the installation drawing set updated to include the site installation redlines delivered in both hard copy and soft copy. Soft copies shall be in their native databases. Parts lists shall be delivered in MS Excel. Soft copy delivery shall be on CD-ROM.

3.25.8.6.1.4 Documentation Acceptance - All VP69 and the WJHTC VP69A documentation shall be provided at BPR. Approval of BPR will constitute acceptance of this documentation. Final documentation acceptance for sites other than WJHTC will be by contractual letter within 30 days after delivery of that site's documentation.

3.25.8.6.2 Version Description Document - The Contractor shall deliver a Version Description Document in accordance with CDRL VP27 that identifies the as-built software delivered with the system.

3.25.8.6.3 Commercial Software Manuals - The Contractor shall deliver all commercial manuals, hardware and software, required for the design, development, production, installation, and operation of the delivered VCSU in accordance with CDRL VP71.

3.25.8.6.4 Software Development Materials - The Contractor shall provide the Government access to all software development materials, including but not limited to the Software Development Folders.

3.25.8.7 Contractor Support Services - As ordered, the Contractor shall furnish installation, checkout, engineering, maintenance, technical, software, testing, and supplemental support services for the VCSU.

3.25.8.7.1 Contractor Support Services at the WJHTC - As directed by the Government, the Contractor shall provide engineering, hardware and software maintenance support services at the WJHTC, as part of the Contractor's on-going VSCS support.

3.25.9 Training - As directed by the Government, the Contractor shall provide the following training documentation, courses and engineering packages. The training products shall be developed so that interfaces and further updates to current VSCS AT and AF courses can occur independently.

The Contractor shall use COTS training products to the extent possible in accordance with VP121. The Contractor shall provide a copy of any COTS material intended for training to the Government for review and approval. The Contractor shall provide supplemental material, at Government request, to cover any deficiencies found in the COTS training materials. The Contractor shall obtain Government concurrence prior to Contractor modification of COTS or the development of non-COTS training related products.

Previously trained managers and technicians will require delta-training courses in the areas of NAS management, database management, hardware maintenance, and software maintenance. For this audience, the training products shall be provided to teach the differences between current VSCS operation and operation after the VCSU installation. New products shall be developed in accordance with FAA-STD-028B, Contract Training Programs, as modified by the FAA.

3.25.9.1 Training Development and Conduct - The Contractor shall develop and deliver the VCSU delta training courses in accordance with the VSCS Product Specification (VPS), VCSU SOW section, CDRLs and DIDs. AF delta training development shall be completed at least 5 days prior to key site testing and shall be conducted on VSCS/VCSU equipment that has been accepted by the FAAAC. AT cadre training, if required, shall be made available and ready for conduct at operational sites by delivery of the system. Engineering Data shall be provided for each VSCS course using the approved VSCS ORD 7 baseline data to provide a gateway toward an independent update of each VSCS AT and AF course from its current baseline. Engineering Data shall consist of drawings, diagrams, illustrations, and descriptive text that documents engineering changes to the current VSCS system. The data shall indicate the changes in relation to the current architecture such that the drawing clearly shows the equipment that is part of VSCS and that is part of VCSU.

3.25.9.1.1 Task And Skills Analysis - The Contractor shall provide a Task and Skills Analysis (TASA) as an addendum to the current TASA, in accordance with VP119, for each course, that indicates the new knowledge and skills that must be acquired in order to operate and perform system diagnostics to maintain the VCSU in accordance with the maintenance concept.

3.25.9.1.2 Course Design Guide - The Contractor shall provide an addendum to each VSCS Course Design Guide (CDG) to reflect changes resulting from the incorporation of the VCSU. The Contractor shall present a separate delta package for each course in accordance with VP120

3.25.9.1.3 Curriculum Material Design Development and Validation

3.25.9.1.3.1 Lesson Plans - The Contractor shall develop and deliver a Lesson Plan (Instructor Guide) VP121 for each delta course using FAA STD-028B as modified.

3.25.9.1.3.2 Student Materials - The Contractor shall develop student materials and deliver a Student Guide VP121 for each delta course using FAA STD-028B as modified.

3.25.9.1.3.3 Instructional Media Material - The Contractor shall develop and deliver Instructional Media Material VP121 for each delta course to augment instructional topics. The media materials shall be developed using FAA-STD-028B as modified.

3.25.9.1.3.4 Student Achievement Test - The Contractor shall develop and deliver a Student Achievement Test VP121 for each delta course to measure student achievement, using FAA-STD-028B as modified. The Contractor shall devise a minimum of two (2) examination questions that shall address each learning objective**.**

3.25.9.1.4 Performance Examination - The Contractor shall revise the Government-furnished Performance Examinations VP122 to reflect changes resulting from the control subsystem upgrade for the hardware and software maintenance course.

3.25.9.1.5 Theory-Of-Operation Examination - The Contractor shall develop a delta theory-of-operation examination for the hardware and software maintenance courses, VP123.

3.25.9.1.6 On-The-Job Training Handbook - The Contractor shall develop and deliver an On-the-Job Training Instructor Handbook VP124 for the delta hardware maintenance course.

3.25.9.1.7 OT&E Familiarization - As directed by the Government, the Contractor shall conduct a familiarization session for Government participants. Sessions will be conducted at the Contractor's facility or at a Government facility using Government furnished equipment and Contractor furnished materials. A maximum of (12) participants will participate in each session.

This presentation shall provide instruction in the form of hands-on familiarization without formal lab development on the operation and maintenance of the VCSU equipment, including the system documentation and its use. This provides AF job skills and related functions on the VCSU during Government conducted OT&E. Upon successful completion of this familiarization session, the participant will be able to perform the following functions:

a. Operate the VSCS after the VCSU installation

b. Perform test scenarios using test scripts and map data.

3.25.9.1.8 Training Guidance Conference - The Contractor shall conduct a training guidance conference as directed by the Government. The Contractor shall document outcomes, decisions and alterations during the training guidance conference and apply them to the training program. Minutes of the training guidance conference will be submitted no later than 30 days after the conference under the Contractor's Contracting Officer signature**.**

3.25.9.1.9 Copyrights and Licenses - All training material delivered under the provision of this contract shall be delivered to the Government without restrictive legend; the Government will be given the right to reproduce any and all documentation for Government use only.

3.25.9.1.10 Training Program Implementation - The Contractor shall conduct training on Government furnished equipment at the FAA Academy. The Contractor shall, prior to the conduct of FAA personnel training, demonstrate the Academy's system's training functionality.

3.25.9.1.11 Air Traffic Training - Should the VCSU change the communication activities of the ATCS and or SATCS, as ordered by the Government, a delta course or a training update package, as directed by the FAA, shall be developed by the Contractor.

3.25.9.1.12 Airway Facilities Training

3.25.9.1.12.1 Delta Training Courses - As directed by the Government, delta-training courses shall be developed with the ability to be conducted at the FAA Academy, using Government furnished equipment and Contractor developed and furnished training materials. Curriculum material and approach to training shall be developed to support a maximum of twelve (12) students per individual course conduct.

3.25.9.1.12.2 Mike Monroney Aeronautical Center (MMAC) Training Equipment Study - The Contractor shall conduct a VCSU training equipment study at the MMAC, Federal Aviation Administration Academy to define equipment and software needed to conduct VCSU training, Voice Switching and Control System (VSCS) and VSCS Training and Back-up system (VTABS) training. The study shall confirm that installation of the VCSU will allow the Government to conduct VSCS/VCSU and VTABS training on a simultaneous, non-interfering basis. The VSCU hardware and software functionality shall not degrade or reduce current VSCS/VTABS training system capabilities. This study shall be conducted in accordance with the requirements of FAA-E-2731. The Contractor shall document the results of the study in a System/Design Training Equipment Study Report VP125. The Contractor shall deliver, install, and test training equipment as ordered by the Contracting officer.

3.25.9.1.12.3 Training Conduct - As directed by the Government, the Contractor shall conduct VCSU delta training courses at the FAA Academy using Government-furnished equipment and Contractor-furnished materials in accordance with VP121. The Contractor shall provide training services and related processes in accordance with the provisions in FAA-STD-028B as modified along with the VPS, SOW, CDRLs and DIDs. A maximum of twelve (12) students will participate in each class. For Contractor conducted training classes, the Contractor shall provide any soft consumable item(s), such as ESD wriststraps that is required. The Contractor shall conduct VCSU delta training courses for ATSS personnel. The number of iterations shall be as stated in the contract. The Contractor shall conduct up to ten (10) National Airspace System Managers courses, ten (10) site level hardware maintenance courses, and three (3) site level software maintenance courses.

3.25.9.1.12.3.1 Class Roster and Certificate of Training - At the completion of designated classes, the Contractor shall deliver a class roster and certificate of training for each course graduate to the Government. The class roster and certificate of training shall contain, as a minimum course title, hours of training completed, location of the training, class start and end dates, student's name and social security number and course grade (pass/fail).

3.25.9.1.12.3.2 End-of-Course Evaluation - At the completion of designated courses, the Contractor shall administer to the students a Government-provided end-of-course evaluation form and provide the completed forms to the Government within fifteen (15) days of class completion.

3.25.9.1.12.4 Course Validations - As directed by the Government, the Contractor shall support a course validation for each VCSU course. The Contractor shall support one (1) 50% In-Process-Review of course materials and one (1) 100% final draft review of course materials prior to conducting a VCSU course operational tryout. The course operational tryout shall be conducted using a training system and the same materials that will be used in the actual FAAAC courses and shall be planned to last up to one and one-half times the length of the proposed delta course in each discipline. A maximum of twelve (12) Government personnel will participate in each operational tryout.

The Contractor shall correct all errors, omissions, and deficiencies in all course(s) instructional materials discovered during each course validation. Materials shall be corrected prior to first course conduct. The Contractor shall submit corrected copies of the course materials for review and approval prior to conducting classes. The Contractor shall submit a First Course Conduct and Validation Report VP121, Curriculum Material Design).

3.25.9.1.12.5 AOS Second Level Engineering Familiarization - As ordered, the Contractor shall provide VCSU software development system familiarization sessions that will prepare AOS VSCS trained personnel to maintain the VCSU Contractor developed software. This familiarization session shall include but not be limited to software configuration management, build procedures, and one for one mapping of the Tandem source code, database, and executable modules to their VCSU equivalents. Information on compiler settings and libraries unique to the VCSU development environment shall be included. Any changes to the current VSCS software/hardware architecture shall be addressed.

3.25.10 Quality Control Program -The Contractor shall provide and maintain a quality control system that meets the requirements of ISO-9000-3 and 9001. The Contractor does not have to be certified in order to satisfy this requirement, but shall have the system in place and follow the ISO Standards. The Contractor shall update his VSCS Quality Assurance Plan as required and provide the updated QA Plan to the Government 45 days after receipt of this revised Statement of Work or with the VCSU Proposal.

3.25.11 Government Review and Disposition of Government Comments to CDRL Items – Disposition of all FAA formal comments to submitted CDRL items will occur within 30 days after Contractor receipt of Government comments, and will be agreed to by the Contractor and the Government. Changes to reflect agreed-to resolutions shall be incorporated into the first CDRL submittal. For VP72, VP68, and VP87, the Government shall participate in the Contractor internal review and validation cycle. The Contractor shall notify and provide the FAA five (5) copies of the document at least ten (10) working days prior to the Contractor's internal review meeting or validation. The Government review will occur over the next five (5) working day period immediately preceding the Contractor internal review, and may be on site. If requested, the Government may participate in a one-hour "kick-off" meeting with the Contractor team. Following the five-day FAA-only review, the Government will participate in an on-site CDRL review meeting with the Contractor. No more than five FAA/FAA Contractor representatives will participate in the meeting. During these five days, the Contractor shall collect comments, identify and assign action items, and list Government items and comments determined by the Contractor to be out-of-scope. These out-of-scope comments shall be provided to the FAA Contracting Officer. The Contractor shall use these comments that are determined to be within scope to produce a "redline" of the CDRL for the validation process, which the Government will monitor. The additional redlines from the validation process shall be incorporated into the draft CDRL item and delivered to the Government for comment, in accordance with the VCSU comment process defined for all VCSU CDRL items.

3.25.12 Documentation. The Contractor shall establish/maintain the following plans, which are hereby incorporated by reference into and made a part of the Contract.

TITLE	DOCUMENT NUMBER	DATE
Program Plan	189964	March 10, 2000
Quality Assurance Plan	189965	March 10, 2000
Configuration Management Plan	189961	March 10, 2000
Software Development Plan	189962A	March 10, 2000
Test Acceptance Plan	189963B	June 06, 2000
System Engineering Management Plan	189960A	March 10. 2000
Integrated Logistics Support Plan	189966B	May 31, 2000

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APPENDIX A

LSAR DATA REQUIREMENTS FORM
GENERAL INFORMATION

Selection of a data element shall constitute the selection of all data keys or data dependencies required to document the element in the LSAR. Where more than one data element code applies to a data selection, the Code column contains dashes (-). For narrative data, where each data element definition is separately selectable to a common data table, the code column is blank.

This Form consists of two sections. The first section consists of government furnished data. The second section consists of the LSAR Data Requirements Form and is divided into three parts. Part I is LSAR data selected by an entry in the required column. Part II is LSAR provisioning data selected by an entry in the type of provisioning list. Part III is packaging data selected by an entry under a packing categorization.

Explanation of codes appearing under KEY column are provided below:

KEY	KEY EXPLANATION
K	Data table key It is required when any data element of the table is selected.
F	Foreign key. It originates in another data table and is required prior to a data element of the table being documented. Foreign keys appear only once on the data requirements form within a major area, e.g., Task Analysis and Personnel and Support Requirements.
M	Mandatory data. It is a nonidentifying data element that is required when entering information in the data table.
G	Data element provided by the requiring authority.
B	Data element that is both a key/foreign key and is provided by the requiring authority.
A	Army peculiar data element.
N	Navy peculiar data element.
R	Air Force peculiar data element.
C	Marine Corps peculiar data element.

PART II Provisioning Requirements

MEDIA

7-Track		Even Parity		BCD Coded	
9-Track	X	Odd Parity	X	EBCDIC Coded	
800 BPI		1600 BPI	X	6250 BPI	

Number of records per block is: _____

APPENDIX A

LSAR DATA REQUIREMENTS FORM
GENERAL INFORMATION

The appropriate code(s) for the header data and sequence should be entered in the appropriate spaces for the Type Provisioning Lists.

HEADER DATA

Procurement Instrument Identification (PIIN/SPIIN)	P
Nomenclature or Model or Type Number	N
Control Data	C
Prime Commercial and Government Entity	E
Submission Control Code	S
Date (YYMMDD)	Y

Sequence (Provisioning List Item Sequence Number assignment):

Logistic Support Analysis Control Number	Topdown	T
	Disassembly	D
	Reference Designation	X
Reference Number		R

Type Provisioning Lists:	Specify (T,D,X,R)	Required (P,N,C,E,S,Y)	Conference Required (Y,N)
Long Lead Time Items List (LLTIL)	R	PNCESY	N
Provisioning Parts List (PPL)	T	PNCESY	Y
Short Form PPL (SFPPL)			
Common and Bulk Items List (CBIL)	R	PNCESY	Y
Repairable Items List (RIL)	R	PNCESY	Y
Interim Support Items List (ISIL)	R	PNCESY	Y
Post Conference List (PCL)	T	PNCESY	
Tools and Test Equipment List (TTEL)	R	PNCESY	Y
System Configuration PPL (SCPPL)			
Design Change Notices (DCN)	R	PNCESY	N
As required (ARA) and specified in the SOW			
As required (ARB) and specified in the SOW			

	Required (Y,N)	Time	Date (YYMMDD)
Provisioning Guidance Conference	Y		
Location			
Provisioning Conference	Y		
Location			
Provisioning Preparedness Review Conference	N		

PART III Packaging Requirements
Common, MIL-STD-2073-1B, paragraph 3.3.1
Selective, MIL-STD-2073-1B, paragraph 3.3.2
Special, MIL-STD-2073-1B, paragraph 3.3.3

Other Instructions

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LSAR DATA REQUIREMENTS FORM
GENERAL INFORMATION

Header Data should be documented for each type provisioning list identified.

Type Provisioning List _____

HEADER DATA

Procurement Instrument Identification (PIIN/SPIIN) _____

Nomenclature or Model or Type Number _____

Control Data _____

Prime Commercial and Government Entity _____

Submission Control Code _____

Date (YYMMDD) _____

Provisioning Activity (Address and Zip Code)

_____

Contractor Name (Address and Zip Code)

_____

Answer these questions as yes or no (Y or N)

Interim Support Items (Required)	**Y**
Incremental Submission (Authorized)	**Y**
Resident Provisioning Team (Established)	**N**
Interim Release (Authorized)	**N**
Provisioning Performance Schedule (Required)	**N**
Repair Kits and Repair Part Sets (Included)	**Y**
Military Service/Agency Addendum (Attached)	**N**

Common and Bulk Items List (Options 1-5, Select 1) **4**

Delivery of Support Items Will Be (Concurrent, Scheduled, Not Scheduled; Select 1)

_____

Engineering Data for Provisioning (Microfilm, Hard Copy, Aperture Cards, Digital/CALS)

_____

Engineering Data for Provisioning (Will be sequenced by Reference Designation, PLISN, Reference Number, Other; Select 1)

Reference Number _____

APPENDIX A

LSAR DATA REQUIREMENTS FORM
SECTION 1 GOVERNMENT FURNISHED DATA

This information should be filled out by the requiring authority and should pertain to the End Item only.

Table XA	
End Item Acronym Code, DED 096	**VSCS**
Administrative Lead Time, DED 014	
Contract Team Delay Time, DED 052	
Contract Number, DED 055	**DTFA01-92-D-00004**
Cost Per Reorder Action, DED 061	
Cost Per Requisition, DED 062	
Demilitarization Cost, DED 077	
Discount Rate, DED 083	
Estimated Salvage Value, DED 102	
Holding Cost Percentage, DED 160	
Initial Bin Cost, DED 166	
Initial Cataloging Cost, DED 167	
Interest Rate, DED 173	
Inventory Storage Space Cost, DED 176	
Loading Factor, DED 195	
Operation Level, DED 271	
Operation Life, DED 272	
Personnel Turnover Rate Civ, DED 289	
Personnel Turnover Rate Mil, DED 289	
Productivity Factor, DED 300	
Recurring Bin Cost, DED 333	
Recurring Cataloging Cost, DED 334	
Retail Stockage Criteria, DED 359	
Safety Level, DED 363	
Support of Support Equipment, DED 421	
Transportation Cost, DED 466	
Type Acquisition, DED 478	**N**
Type of Supply System Code, DED 484	**Y**
Table AI	
Modeling Service Des. Code, DED 376	**No AI Table Entries**
Modeling O/M Level Code, DED 277	
Labor Rate, DED 189	
Number of Shops, DED 263	
Repair Work Space Cost, DED 352	
Required Days of Stock, DED 357	
Table AJ	
O/M Level From, DED 277	**No AJ Table Entries**
O/M Level To, DED 277	
Ship Distance, DED 085	
Ship Time, DED 379	
Table AK	
Add. Supportability Consids, DED 010	**No AK Table Entries**
Add. Supportability Parameters, DED 011	
Oper. Mission Failure Def., DED 274	

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LSAR DATA REQUIREMENTS FORM
SECTION 1 GOVERNMENT FURNISHED DATA

This information should be filled out by the requiring authority and should pertain to the Item (LSA Control Number) under analysis.

Table XB	
LSA Control Number, DED 199	**NEL**
Table XC	
Useable On Code, DED 501	**NEL**
System/End Item PCCN, DED 307	
Table AA	
Service Designator Code, DED 376	**T**
Required MTTR, DED 222	**NTE 30 min**
Required Percentile, DED 286	
Required Ach. Availability, DED 001	**0.9999999**
Required Inh. Availability, DED 164	**0.9999999**
Operational MAMDT, DED 223	
Technical MAMDT, DED 223	
Required Operational MTTR, DED 236	**NTE 30 min**
Required Technical MTTR, DED 236	
Number of Operating Locations, DED 262	
Crew Size, DED 064	
Total Systems Supported, DED 454	
RCM Logic Utilized, DED 345	**N/A**
Table AB	
Operational Reqt Indicator, DED 275	**P**
Annual Number of Missions, DED 021	
Annual Operating Days, DED 022	
Annual Operating Time, DED 024	
Mean Mission Duration, DED 228	**24**
Mean Mission Duration MB, DED 238	**H**
Required Op. Availability, DED 273	**0.9999999**
Required ALDT, DED 013	
Required Standby Time, DED 403	
Table AC	
O/M Level, DED 277	**D or O**
Maintenance Level MaxTTR, DED 222	
Maintenance Level Percentile, DED 286	
Number of Systems Supported, DED 265	
Maint. Level Scheduled AMH, DED 020	**0.999999**
Maint. Level Unscheduled AMH, DED 020	**002912**
Scheduled MH/Operating Hour, DED 215	**All 9's if needed**
Unscheduled MH/Operating Hour, DED 215	**All 9's if needed**
Unscheduled Maintenance MET, DED 499	**All 9's if needed**
Unscheduled Maintenance MMH, DED 499	**All 9's if needed**
Table AD	
Daily Inspection MET, DED 280	**All 9's if needed**
Daily Inspection MMH, DED 280	**All 9's if needed**
Preoperative Inspection MET, DED 280	**All 9's if needed**
Preoperative Inspection MET, DED 280	**All 9's if needed**

APPENDIX A

LSAR DATA REQUIREMENTS FORM
SECTION 1 GOVERNMENT FURNISHED DATA

Post Operative Inspection MET, DED 280	
Post Operative Inspection MMH, DED 280	
Periodic Inspection MET, DED 280	**All 9's if needed**
Periodic Inspection MMH, DED 280	**All 9's if needed**
Mission Profile Inspection MET, DED 280	
Mission Profile Inspection MMH, DED 280	
Turnaround Inspection MET, DED 280	
Turnaround Inspection MMH, DED 280	
Table AE	
Available Man Hour, DED 028	**No Entries**
Available Quantity, DED 234	
Utilization Ratio, DED 503	
Table AF	
Additional Requirements, DED 009	**No Entries**
Table AG	
AOR MB, DED 238	
Annual Operating Requirement, DED 023	**8760 - 3 sec**
Operational Reqt Indicator, DED 275	**P**
Required Operational MTBF, DED 229	**0.000000001**
Required Technical MTBF, DED 229	
Required Operational MTBMA, DED 230	
Operational MAMDT, DED 223	
Required Technical MTBMA, DED 230	
Required MTBR, DED 235	
Required Technical MTTR, DED 236	
Table AH	
Interoperable Item Name, DED 182	**No Entries**
Interoperable Number Type, DED 266	
Interoperable Cage Code, DED 046	
Interoperable Reference Number, DED 337	
Interoperable Item NIIN, DED 253	
Interoperable Item NSN FSC, DED 253	
Interoperable Item TM Number, DED 440	

APPENDIX A

LSAR DATA REQUIREMENTS FORM
SECTION 1 GOVERNMENT FURNISHED DATA

This information should be filled out by the requiring authority and should pertain to a piece of Support Equipment that is supporting the item under analysis.

Table EA and EB
Support Equipment Cage, DED 046 _____
SE Reference Number, DED 337 _____

Table EA
Acquisition Decision Office, DED 002 _____
Logistics Decision Office, DED 198 _____
Management Plan, DED 216 _____
SMR Code, DED 389 _____
Program Element, DED 301 _____
Program Sup. Inv. Control Pt., DED 303 _____
Revolving Assets, DED 361 _____
Spare Factor, DED 390 _____
Special Management Code, DED 393 _____
SIASC Number, DED 401 _____
SE Shipping Height, DED 419 _____
SE Shipping Length, DED 419 _____
SE Shipping Width, DED 419 _____
SE Shipping Weight, DED 420 _____
Type of Equipment Code, DED 480 _____

Table EB
Allowance Document Number, DED 016 _____
Allowance Range 1, DED 015 _____
Allowance Range 2, DED 015 _____
Allowance Range 3, DED 015 _____
Allowance Range 4, DED 015 _____
Allowance Range 5, DED 015 _____
Allowance Range 6, DED 015 _____
Allowance Range 7, DED 015 _____
Allowance Range 8, DED 015 _____
Allowance Range 9, DED 015 _____
Allowance Range 10, DED 015 _____
Allocation Designation Descr., DED 015 _____
Allocation Extended Range, DED 015 _____
Allocation Land Vessel Code, DED 015 _____
Allocation Maint. Lvl Function, DED 015 _____
Allocation Station ID Code, DED 015 _____

APPENDIX A

LSAR DATA REQUIREMENTS FORM
SECTION 1 GOVERNMENT FURNISHED DATA

This information should be filled out by the requiring authority and should pertain to the item under analysis.

Table UA
UUT LSA Control Number, DED 199 _____
UUT Maintenance Plan Number, DED 209 _____

Table HA
Cage Code, DED 046 _____
Reference Number, DED 337 _____
Acquisition Method Code, DED 003 _____
Acquisition Method Suffix Code, DED 004 _____

Table HG and HP
Cage Code, DED 046 _____
Reference Number, DED 337 _____
LSA Control Number, DED 199 _____

Table HG
Provisioning Sys ID Code, DED 312 _____

Table HP
Change Authority Number, DED 043 _____

APPENDIX A

Part I LSAR DATA REQUIREMENTS FORM				Section 2
DATA ELEMENT TITLE	KEY	DED	CODE	REQUIRED
CROSS FUNCTIONAL REQUIREMENT				
Table XA, END ITEM ACRONYM CODE				
END ITEM ACRONYM CODE	K	096	EIACODXA	X
LCN STRUCTURE		202	LCNSTRXA	X
ADMINISTRATIVE LEAD TIME	G	014	ADDLTMXA	
CONTACT TEAM DELAY TIME	G	052	CTDLTMXA	
CONTRACT NUMBER	G	055	CONTNOXA	
COST PER REORDER ACTION	G	061	CSREORXA	
COST PER REQUISITION	G	062	CSPRRQXA	
DEMILITARIZATION COST	G	077	DEMILCXA	
DISCOUNT RATE	G	083	DISCNTXA	
ESTIMATED SALVAGE VALUE	G	102	ESSALVXA	
HOLDING COST PERCENTAGE	G	160	HLCSPCXA	
INITIAL BIN COST	G	166	INTBINXA	
INITIAL CATALOGING COST	G	167	INCATCXA	
INTEREST RATE	G	173	INTRATXA	
INVENTORY STORAGE SPACE COST	G	176	INVSTGXA	
LOADING FACTOR	G	195	LODFACXA	
OPERATION LEVEL	G	271	WSOPLVXA	
OPERATION LIFE	G	272	OPRLIFXA	
PERSONNEL TURNOVER RATE	G	289	--------	
PRODUCTIVITY FACTOR	G	300	PROFACXA	
RECURRING BIN COST	G	333	RCBINCXA	
RECURRING CATALOGING COST	G	334	RCCATCXA	
RETAIL STOCKAGE CRITERIA	G	359	RESTCRXA	
SAFETY LEVEL	G	363	SAFLVLXA	
SUPPORT OF SUPPORT EQUIPMENT COST FACTOR	G	421	SECSFCXA	
TRANSPORTATION COST	G	466	TRNCSTXA	
TYPE ACQUISITION	G	478	WSTYAQXA	
TYPE OF SUPPLY SYSTEM CODE	G	484	TSSCODXA	
Table XB, LCN INDENTURED ITEM				
LSA CONTROL NUMBER (LCN)	K	199	LSACONXB	X
ALTERNATE LCN CODE	K	019	ALTLCNXB	X
LCN TYPE	K	203	LCNTYPXB	X
LCN INDENTURE CODE		200	LCNINDXB	
LCN NOMENCLATURE		201	LCNAMEXB	X
TM FUNCTIONAL GROUP CODE (MAINT ALLOCATION CHART)		438	TMFGCDXB	
SYSTEM/END ITEM IDENTIFIER		423	SYSIDNXB	
SECTIONALIZED ITEM TRANSPORTATION INDICATOR		367	SECITMXB	
RELIABILITY AVAILABILITY MAINTAINABILITY INDICATOR		342	RAMINDXB	
Table XC, SYSTEM/END ITEM (See also Part II)				
USABLE ON CODE	G	501	UDCSEIXC	X
SYSTEM/EI PCCN	G	307	PCCNUMXC	
SYSTEM/EI ITEM DESIGNATOR CODE		179	ITMDESXC	
TRANSPORTATION END ITEM INDICATOR		467	TRASEIXC	
Table XD, SYSTEM/END ITEM SERIAL NUMBER (See also Part II)				
SERIAL NUMBER	K	373	--------	
SERIAL NUMBER USABLE ON CODE	M	375	SNUUOCXD	

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Table XE, LCN TO SERIAL NUMBER USABLE ON CODE				
Table XF, LCN TO SYSTEM/END ITEM USABLE ON CODE				
Table XG, FUNCTIONAL/PHYSICAL LCN MAPPING				
Table XH, COMMERCIAL AND GOVERNMENT ENTITY				
COMMERCIAL AND GOVERNMENT ENTITY (CAGE) CODE	K	046	CAGECDXH	X
CAGE NAME		047	CANAMEXH	X
CAGE ADDRESS		047	--------	X
Table XI, TECHNICAL MANUAL CODE AND NUMBER INDEX				
TECHNICAL MANUAL (TM) CODE	K	437	TMCODEXI	
TM NUMBER	G	440	TMNUMBXI	
OPERATIONS AND MAINTENANCE REQUIREMENTS				
Table AA, OPERATIONS AND MAINTENANCE REQUIREMENTS				
END ITEM ACRONYM CODE	F	096	EIACODXA	X
LSA CONTROL NUMBER (LCN)	F	199	LSACONXB	X
ALTERNATE LCN CODE	F	019	ALTLCNXB	X
LCN TYPE	F	203	LCNTYPXB	X
SERVICE DESIGNATOR CODE	K	376	SERDESAA	X
REQUIRED MAXIMUM TIME TO REPAIR	G	222	MAXTTRAA	X
REQUIRED ACHIEVED AVAILABILITY	G	001	ACHAVAAA	X
REQUIRED INHERENT AVAILABILITY	G	164	INHAVAAA	X
OPERATIONAL MEAN ACTIVE MAINTENANCE DOWNTIME	G	223	OMAMDTAA	
TECHNICAL MEAN ACTIVE MAINTENANCE DOWNTIME	G	223	TMAMDTAA	
REQUIRED OPERATIONAL MEAN TIME TO REPAIR	G	236	OPMTTRAA	X
REQUIRED TECHNICAL MEAN TIME TO REPAIR	G	236	TEMTTRAA	
NUMBER OPERATING LOCATIONS	G	262	NUOPLOAA	
CREW SIZE	G	064	CREWSZAA	
TOTAL SYSTEMS SUPPORTED	G	454	TOSYSUAA	
RELIABILITY CENTERED MAINTENANCE LOGIC UTILIZED	G	345	RCMLOGAA	X
Table AB, WAR PEACE OPERATIONS AND MAINTENANCE REQUIREMENT				
OPERATIONAL REQUIREMENTS INDICATOR	K	275	OPRQINAB	X
ANNUAL NUMBER OF MISSIONS	G	021	ANNOMIAB	
ANNUAL OPERATING DAYS	G	022	ANOPDAAB	
ANNUAL OPERATING TIME	G	024	ANOPTIAB	
MEAN MISSION DURATION	G	228	MMISDUAB	X
REQUIRED OPERATIONAL AVAILABILITY	G	273	OPAVAIAB	X
REQUIRED ADMINISTRATIVE AND LOGISTIC DELAY TIME	G	013	OPALDTAB	
REQUIRED STANDBY TIME	G	403	OSTBTIAB	
Table AC, MAINTENANCE LEVEL REQUIREMENT				
OPERATIONS AND MAINTENANCE LEVEL CODE	K	277	OMLVLCAC	X
MAINTENANCE LEVEL MAXIMUM TIME TO REPAIR	G	222	MLMTTRAC	
NUMBER OF SYSTEMS SUPPORTED	G	265	MLNSSUAC	
MAINTENANCE LEVEL SCHEDULED ANNUAL MAN-HOURS	G	020	MLSAMHAC	X
MAINTENANCE LEVEL UNSCHEDULED ANNUAL MAN-HOURS	G	020	MLUAMHAC	X
SCHEDULED MAN-HOUR PER OPERATING HOUR	G	215	MLSMHOAC	X
UNSCHEDULED MAN-HOUR PER OPERATING HOUR	G	215	MLUMHOAC	X

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UNSCHEDULED MAINTENANCE MEAN ELAPSED TIME	G	499	MLUMETAC	X
UNSCHEDULED MAINTENANCE MEAN MAN-HOURS	G	499	MLUMMHAC	X
Table AD, ORGANIZATIONAL LEVEL REQUIREMENT				
DAILY INSPECTION MEAN ELAPSED TIME	G	280	DINMETAD	X
DAILY INSPECTION MEAN MAN-HOURS	G	280	DINMMHAD	X
PREOPERATIVE INSPECTION MEAN ELAPSED TIME	G	280	PREMETAD	
PREOPERATIVE INSPECTION MEAN MAN-HOURS	G	280	PREMMHAD	
POST OPERATIVE INSPECTION MEAN ELAPSED TIME	G	280	POIMETAD	
POST OPERATIVE INSPECTION MEAN MAN-HOURS	G	280	POIMMHAD	
PERIODIC INSPECTION MEAN ELAPSED TIME	G	280	PINMETAD	X
PERIODIC INSPECTION MEAN MAN-HOURS	G	280	PINMMHAD	X
MISSION PROFILE CHANGE MEAN ELAPSED TIME	G	280	MPCMETAD	
MISSION PROFILE CHANGE MEAN MAN-HOURS	G	280	MPCMMHAD	
TURNAROUND INSPECTION MEAN ELAPSED TIME	G	280	TINMETAD	
TURNAROUND INSPECTION MEAN MAN-HOURS	G	280	TINMMHAD	
Table AE, SKILL OPERATIONS AND MAINTENANCE REQUIREMENT				
SKILL SPECIALTY CODE	F	387	SKSPCDGA	X
AVAILABLE MAN HOUR	G	028	AVAIMHAE	
AVAILABLE QUANTITY	G	324	QTYAVAAE	
UTILIZATION RATIO	G	503	UTRATIAE	
Table AF, WAR PEACE ADDITIONAL REQUIREMENTS NARRATIVE				
ADDITIONAL REQUIREMENTS	G	009	WPADDRAF	
Table AG, RELIABILITY REQUIREMENT				
ANNUAL OPERATING REQUIREMENT	M	023	ANOPREAG	X
OPERATIONAL REQUIREMENTS INDICATOR	M	275	OPRQINAB	X
REQUIRED OPERATIONAL MEAN TIME BETWEEN FAILURES	G	229	OPMTBFAG	X
REQUIRED TECHNICAL MEAN TIME BETWEEN FAILURES	G	229	TEMTBFAG	
REQUIRED OPERATIONAL MEAN TIME B/T MAINT ACTIONS	G	230	OPMRBMAG	
REQUIRED TECHNICAL MEAN TIME BETWEEN MAINT ACTIONS	G	230	TMTBMAAG	
REQUIRED MEAN TIME BETWEEN REMOVALS	G	235	MTBRXXAG	
Table AH, INTEROPERABILITY REQUIREMENT				
INTEROPERABLE ITEM NAME	K	182	IONAMEAH	
INTEROPERABLE ITEM NUMBER TYPE	K	266	IOINTYAH	
INTEROPERABLE CAGE CODE	G	046	IOCAGEAH	
INTEROPERABLE REFERENCE NUMBER	G	337	IOREFNAH	
INTEROPERABLE ITEM NATIONAL STOCK NUMBER	G	253	--------	
INTEROPERABLE ITEM TECHNICAL MANUAL NUMBER	G	440	IOITNMAH	
Table AI, MODELING DATA				
MODELING SERVICE DESIGNATOR CODE	K	376	SERDESAI	
MODELING OPERATIONS AND MAINTENANCE LEVEL CODE	K	277	OMLVLCAI	
LABOR RATE	G	189	LABRATAI	
NUMBER OF SHOPS	G	263	NOSHPSAI	
REPAIR WORK SPACE COST	G	352	RPWSCSAI	
REQUIRED DAYS OF STOCK	G	357	RQDSTKAI	

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Table AJ, OPERATIONS AND MAINTENANCE SHIPPING REQUIREMENTS				
OPERATIONS AND MAINTENANCE LEVEL FROM	K	277	OMLVLFAJ	
OPERATIONS AND MAINTENANCE LEVEL TO	K	277	OMLVLTAJ	
SHIP DISTANCE	G	085	SHPDISAJ	
SHIP TIME	G	379	TIMESHAJ	
Table AK, SYSTEM END ITEM NARRATIVE				
SYSTEM END ITEM NARRATIVE CODE	K	424	SEINCDAK	
ADDITIONAL SUPPORTABILITY CONSIDERATIONS	G	010		
ADDITIONAL SUPPORTABILITY PARAMETERS	G	011		
OPERATIONAL MISSION FAILURE DEFINITION	G	274		
ITEM RELIABILITY, AVAILABILITY, AND MAINTAINABILITYREQUIREMENTS; FAILURE MODE EFFECTS AND CRITICALITYANALYSIS; AND MAINTAINABILITY ANALYSIS				
Table BA, RELIABILITY, AVAILABILITY AND MAINTAINABILITY (RAM) CHARACTERISTICS				
END ITEM ACRONYM CODE	F	096	EIACODXA	X
LSA CONTROL NUMBER (LCN)	F	199	LSACONXB	X
ALTERNATE LCN CODE	F	019	ALTLCNXB	X
LCN TYPE	F	203	LCNTYPXB	X
MINIMUM EQUIPMENT LIST INDICATOR		243	MEQLINBA	
CONVERSION FACTOR		059	CONVFABA	
FAULT ISOLATION		143	--------	X
BIT DETECTABILITY LEVEL PERCENTAGE		032	--------	X
BUILT IN TEST CANNOT DUPLICATE PERCENTAGE		031	BITNDPBA	
BUILT IN TEST RETEST OK PERCENT		033	BITROPBA	
FAILURE RATE DATA SOURCE		141	FRDATABA	
PILOT REWORK OVERHAUL CANDIDATE		292	PREOVCBA	X
SECURITY CLEARANCE		369	SECCLEBA	
SUPPORT CONCEPT		410	SUPCONBA	
WEAROUT LIFE		505	WEOULIBA	X
LOGISTIC CONSIDERATIONS		196	--------	X
Table BB, RAM CHARACTERISTICS NARRATIVE				
RAM CHARACTERISTICS NARRATIVE CODE	K	341	RAMCNABB	X
ITEM FUNCTION		180		X
MAINTENANCE CONCEPT		207		X
MINIMUM EQUIPMENT LIST NARRATIVE		244		
QUALITATIVE & QUANTITATIVE MAINTAINABILITY ROMT		315		X
MAINTENANCE PLAN RATIONALE		210		
TABLE BC, RAM LOGISTICS CONSIDERATIONS				
LOGISTICS CONSIDERATION CODE	K	425	LOCOCOBC	X
RAM LOGISTICS CONSIDERATIONS		426	LOGNARBC	X
TABLE BD, RAM INDICATOR CHARACTERISTICS				
RAM INDICATOR CODE	K	347	RAMINDBD	X
ACHIEVED AVAILABILITY		001	ACHAVABD	X
INHERENT AVAILABILITY		164	INHAVABD	X
FAILURE RATE		140	FAILRTBD	X
INHERENT MAINTENANCE FACTOR		165	INHMAFBD	
MAXIMUM TIME TO REPAIR		222	MAXTTRBD	X

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DATA ELEMENT TITLE	KEY	DED	CODE	REQUIRED
MEAN TIME TO REPAIR OPERATIONAL		236	MTTROPBD	
MEAN TIME TO REPAIR TECHNICAL		236	MTTRTHBD	X
MEAN TIME BETWEEN FAILURES OPERATIONAL		229	OPMTBFBD	
MEAN TIME BETWEEN FAILURES TECHNICAL		229	TEMTBFBD	X
MEAN TIME BETWEEN MAINTENANCE ACTIONS OPERATIONAL		230	OMTBMABD	
MEAN TIME BETWEEN MAINTENANCE ACTIONS TECHNICAL		230	TMTBMABD	X
MEAN TIME BETWEEN MAINTENANCE INDUCED		231	INMTBMBD	X
MEAN TIME BETWEEN MAINTENANCE INHERENT		232	INNMTBBD	
MEAN TIME BETWEEN MAINTENANCE NO DEFECT		233	NOMTBMBD	X
MEAN TIME BETWEEN PREVENTIVE MAINTENANCE		234	MTBMPVBD	X
MEAN TIME BETWEEN REMOVALS		235	MTBRXXBD	
TABLE BE, WAR/PEACE RAM INDICATOR CHARACTERISTICS				
RAM OPERATIONAL REQUIREMENT INDICATOR	K	275	OPRQINBE	X
ADMINISTRATIVE AND LOGISTIC DELAY TIME		013	ALDTXXBE	X
OPERATIONAL AVAILABILITY		273	OPAVAIBE	X
STANDBY TIME		403	STABYTBE	
Table BF, FAILURE MODE AND RCM ANALYSIS				
FAILURE MODE INDICATOR	K	134	FAMOINBF	X
ENGINEERING FAILURE MODE MEAN TIME BETWEEN FAILURE		097	EFMTBFBF	
FAILURE MODE CLASSIFICATION		132	FMCLASBF	
FAILURE MODE RATIO		136	FMRATOBF	
RELIABILITY CENTERED MAINTENANCE (RCM) LOGIC RESULTS		344	--------	
RCM DISPOSITION		084	--------	
Table BG, FAILURE MODE AND RCM NARRATIVE				
FAILURE MODE AND RCM NARRATIVE CODE	K	131	FMNCNABG	X
FAILURE/DAMAGE MODE EFFECT END EFFECT		125		X
FAILURE/DAMAGE MODE EFFECT LOCAL		126		X
FAILURE/DAMAGE MODE EFFECT NEXT HIGHER		127		X
FAILURE CAUSE		124		X
FAILURE/DAMAGE MODE		128		
FAILURE MODE DETECTION METHOD		129		X
FAILURE MODE PREDICTABILITY		138		X
FAILURE MODE REMARKS		137		
REDESIGN RECOMMENDATIONS		426		X
RCM AGE EXPLORATION		343		
RELIABILITY CENTERED MAINTENANCE REASONING		346		
RCM REDESIGN RECOMMENDATIONS		426		X
Table BH, FAILURE MODE TASK				
TASK REQUIREMENT LCN	F	199	TLSACNBH	X
TASK REQUIREMENT ALTERNATE LCN CODE	F	019	TALCNCBH	X
TASK REQUIREMENT LCN TYPE	F	203	TLCNTYBH	X
TASK CODE	F	427	TTASKCBH	X
TASK TYPE		433	TATYPEBH	X
MAINTENANCE INTERVAL		208	MAININBH	X
Table BI, FAILURE MODE INDICATOR (FMI) MPC CHARACTERISTICS				
SAFETY HAZARD SEVERITY CODE	M	362	FMSHSCBI	X

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FAILURE EFFECT PROBABILITY		130	FEPROBBI	X
FAILURE MODE CRITICALITY NUMBER		133	FACRNUBI	X
FAILURE PROBABILITY LEVEL		139	FPROBLBI	X
OPERATING TIME		269	FMOPTIBI	X
Table BJ, FMI MPC CHARACTERISTICS NARRATIVE				
FMI-MPC CHARACTERISTICS NARRATIVE CODE	K	135	FMMPCNBJ	X
COMPENSATING DESIGN PROVISIONS		049		X
COMPENSATING OPERATOR ACTION PROVISIONS		050		
Table BK, RAM CRITICALITY				
RAM SAFETY HAZARD SEVERITY CODE	K	362	FMSHSCBK	X
RAM ITEM CRITICALITY NUMBER		178	RICRITBK	X
Table BL, MISSION PHASE OPERATIONAL MODE				
MISSION PHASE CODE	K	246	MISSPCBL	X
MISSION PHASE OPERATIONAL MODE		247	MPOPLDBL	
TASK ANALYSIS AND PERSONNEL AND SUPPORT REQUIREMENTS				
Table CA, TASK REQUIREMENT				
END ITEM ACRONYM CODE	F	096	EIACODXA	X
LSA CONTROL NUMBER (LCN)	F	199	LSACONXB	X
ALTERNATE LCN CODE	F	019	ALTLCNXB	X
LCN TYPE	F	203	LCNTYPXB	X
TASK CODE	K	427	TASKCDCA	X
REFERENCED TASK CODE		427	REFTSKCA	
TASK ANNUAL OPERATING REQUIREMENT MEASUREMENT BASE		238	AORMSBCA	X
TASK IDENTIFICATION		431	TASKIDCA	X
TASK FREQUENCY		430	TSKFRQCA	X
TASK CRITICALITY CODE		429	TSKCRCCA	
HARDNESS CRITICAL PROCEDURE CODE		152	HRDCPCCA	X
HAZARDOUS MAINTENANCE PROCEDURES CODE		155	HAZMPCCA	X
PREVENTIVE MAINTENANCE CHECKS & SERVICES INDICATOR		296	PMCSIDCA	
MEASURED MEAN ELAPSE TIME		224	MSDMETCA	
PREDICTED MEAN ELAPSE TIME		224	PRDMETCA	X
MEASURED MEAN MAN HOURS		225	MSDMMHCA	
PREDICTED MEAN MAN HOURS		225	PRDMMHCA	
MEANS OF DETECTION		237	--------	X
FACILITY REQUIREMENT CODE		358	FTRNRQCA	X
TRAINING EQUIPMENT REQUIREMENT CODE		358	TRNRQCCA	X
TRAINING RECOMMENDATION TYPE		463	TRNRECCA	X
TRAINING LOCATION RATIONALE		461	TRNLOCCA	
TRAINING RATIONALE		462	TRNRATCA	
TOOL/SUPPORT EQUIPMENT REQUIREMENT CODE		358	TSEREQCA	X
TASK PERFORMANCE		287	--------	
TASK CONDITION		428	--------	
Table CB, SUBTASK REQUIREMENT				
SUBTASK NUMBER	K	407	SUBNUMCB	X
REFERENCED SUBTASK NUMBER		407	RFDSUBCB	
SUBTASK MEAN MINUTE ELAPSE TIME		227	SBMMETCB	X
SUBTASK WORK AREA CODE		514	SUBWACCB	

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Table CC, SEQUENTIAL SUBTASK DESCRIPTION				
SEQUENTIAL SUBTASK DESCRIPTION		372	SUBNARCC	X
ELEMENT INDICATOR		095	ELEMNTC	X
Table CD, SUBTASK PERSONNEL REQUIREMENT				
SUBTASK PERSON IDENTIFIER	K	288	SUBPIDCD	X
SKILL SPECIALTY CODE		387	SKSPCDGA	X
NEW OR MODIFIED SKILL SPECIALTY CODE		257	MDCSSCGB	
SUBTASK MEAN MAN MINUTES		226	SUBMMMCD	X
SKILL SPECIALTY EVALUATION CODE		388	SSECDECD	
Table CE, TASK REMARK REFERENCE				
TASK REMARK REFERENCE CODE	K	349	TSKRRCCE	
TASK REMARK	K	432	TSKREMCE	
Table CF, TASK REMARK				
Table CG, TASK SUPPORT EQUIPMENT				
TASK SUPPORT REFERENCE NUMBER	F	337	TSREFNCG	X
TASK SUPPORT CAGE CODE	F	046	TSCAGECG	X
SUPPORT ITEM QUANTITY PER TASK		319	SQTYTKCG	X
Table CH, TASK MANUAL				
TECHNICAL MANUAL (TM) CODE	F	437	TMCODEXI	
Table CI, TASK PROVISIONED ITEM				
TASK PROVISION LCN	F	199	PROLCNCI	X
TASK PROVISION ALC	F	019	PROALCCI	X
TASK PROVISION LCN TYPE	F	203	PROLTYCI	X
TASK PROVISION CAGE CODE	F	046	PROCAGCI	X
TASK PROVISION REFERENCE NUMBER	F	337	PROREFCI	X
PROVISION QUANTITY PER TASK		319	PQTYTKCI	X
Table CJ, JOB AND DUTY ASSIGNMENT				
JOB CODE	K	186	JOBCODCJ	
DUTY CODE	K	091	DUTYCDCJ	
JOB		185	JOBDESCJ	
DUTY		090	DUTIESCJ	
TABLE CK, TASK INVENTORY				
SEQUENTIAL SUBTASK DESCRIPTION TSC FROM	F	450	TSFROMCK	
SEQUENTIAL SUBTASK DESCRIPTION TSC TO	F	450	TEXTTOCK	
SUBTASK PERSON IDENTIFIER	F	288	SUBPIDCD	
SUPPORT EQUIPMENT AND TRAINING MATERIEL REQUIREMENTS				
TABLE EA, SUPPORT EQUIPMENT				
SUPPORT EQUIPMENT CAGE CODE	F	046	SECAGEEA	X
SUPPORT EQUIPMENT REFERENCE NUMBER	F	337	SEREFNEA	X
SUPPORT EQUIPMENT FULL ITEM NAME		412	FLITNMEA	X
SUPPORT EQUIPMENT ITEM CATEGORY CODE		177	SEICCDEA	X
ACQUISITION DECISION OFFICE	G	002	AQDCOFEA	
END ARTICLE ITEM DESIGNATOR		179	ENDARTEA	

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DATA ELEMENT TITLE	KEY	DED	CODE	REQUIRED
ADAPTOR/INTERCONNECTION DEVICE REQUIRED		005	AIDRQDEA	X
DATE OF FIRST ARTICLE DELIVERY		071	DATFADEA	
CALIBRATION INTERVAL		037	CALINTEA	X
CALIBRATION ITEM		038	CALITMEA	X
CALIBRATION REQUIRED		040	CALRQDEA	X
CALIBRATION STANDARD		041	CALSTDEA	X
CALIBRATION TIME		042	CALTIMEA	X
CALIBRATION MEASUREMENT RQMT SUMMARY RECOMMENDED		035	CMRSRCEA	X
CONTRACT NUMBER		055	CNTRNOEA	
CONTRACTOR FURNISHED/GVT FURNISHED EQUIPMENT		056	CFEGFEEA	X
CUSTODY CODE		069	CUSTCDEA	
DRAWING CLASSIFICATION		088	DRWCLSEA	
ECONOMIC ANALYSIS		093	ECOANLEA	
FAMILY GROUP		142	FAMGRPEA	
GENERIC CODE		148	GENECDEA	
GOVERNMENT DESIGNATOR		149	GOVDESEA	
HARDWARE DEVELOPMENT PRICE		153	HDWRPREA	X
INTEGRATED LOGISTICS SUPPORT PRICE		170	ILSPRCEA	X
DESIGN DATA PRICE		080	DSNPRCEA	
EXTENDED UNIT PRICE		103	EXUNPREA	
PASS THRU PRICE		285	PASTHREA	X
OPERATING AND SUPPORT COST		267	OSCOSTEA	
RECURRING COST		332	RCURCSEA	X
LIFE CYCLE STATUS		190	LICYSTEA	
LIFE SPAN		191	LIFSPNEA	
LOGISTIC CONTROL CODE		197	LGCTCDEA	
LOGISTICS DECISION OFFICE	G	198	LGDCOFEA	
LSA RECOMMENDATION CODE		204	LSARCDEA	X
MANAGEMENT PLAN	G	216	MGTPLNEA	
MANAGING COMMAND/AGENCY		217	MGCOATEA	
SUPPORT EQUIPMENT MEAN TIME BETWEEN FAILURES		229	SEMTSFEA	
SUPPORT EQUIPMENT MEAN TIME B/T MAINTENANCE ACTION		230	SMTBMAEA	
SUPPORT EQUIPMENT MEAN TIME TO REPAIR		236	SEMTTREA	
MOBILE FACILITY CODE		248	MOBFACEA	
MODIFICATION OR CHANGE		252	MODCHGEA	
OPERATING DIMENSIONS		268	--------	X
OPERATING WEIGHT		270	OPRWGTEA	X
PRINTED CIRCUIT BOARD REPAIR MAINTENANCE LEVEL		277	PCBLVLEA	X
SUPPORT EQUIPMENT CALIBRATION MAINTENANCE LEVEL		277	CALLVLEA	X
SUPPORT EQUIPMENT (SE) REPAIR MAINTENANCE LEVEL		277	RPRLVLEA	X
SE SOURCE, MAINTENANCE AND RECOVERABILITY CODE	G	389	SMRCSEEA	
TECHNICAL MANUAL REQUIRED CODE		441	TMRQCDEA	
OPERATORS MANUAL		278	OPRMANEA	X
SKILL SPECIALTY CODE FOR SPT EQUIPMENT OPERATOR		387	SSCOPREA	
PREPARING ACTIVITY		294	PREATYEA	
PROGRAM ELEMENT	G	301	PROELEEA	
PROGRAM SUPPORT INVENTORY CONTROL POINT	G	303	PSICPOEA	
REPORTABLE ITEM CONTROL CODE	G	356	SERICCEA	
REVOLVING ASSETS	G	361	REVASSEA	X
SELF TEST CODE		370	SLFTSTEA	
SENSORS OR TRANSDUCERS		371	SENTRAEA	
SE SERVICE DESIGNATOR		376	SERDESEA	X

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USING SERVICE DESIGNATOR CODE		376	USESEREA	X
SKETCH		383	SKETCHEA	
SPARE FACTOR	G	390	SPRFACEA	X
SPECIAL MANAGEMENT CODE	G	393	SPMGNTEA	
STANDARD INTERSERVICE AGENCY SERIAL CONTROL NUMBER	G	401	SIASCNEA	
STORAGE DIMENSIONS		405	--------	X
STORAGE WEIGHT		406	STOWGTEA	X
SUPPORT EQUIPMENT SHIPPING DIMENSIONS	G	419	--------	
SUPPORT EQUIPMENT SHIPPING WEIGHT	G	420	SESHWTEA	
SUPPORT EQUIPMENT GROUPING		413	SEGRCDEA	
SUPPORT EQUIPMENT REQUIRED		418	SEREQDEA	X
TECHNICAL EVALUATION PRIORITY CODE		435	TECEVLEA	
TEST LANGUAGE		443	TSTLNGEA	X
TEST POINTS		446	TSTPTSEA	X
TMDE REGISTER CODE		444	TMDERCEA	
TMDE REGISTER INDEX		445	TMDERIEA	
TYPE CLASSIFICATION		479	TYPCLSEA	X
TYPE EQUIPMENT CODE	G	480	TYPEEQEA	
YEAR OF FIELDING		518	YRFLDGEA	X
TABLE EB, ALLOCATION DATA				
ALLOWANCE DOCUMENT NUMBER	B	016	ALDCNMEB	X
ALLOWANCE RANGE 1-10 AND EXTENDED RANGE	G	015	--------	X
ALLOCATION DESIGNATION DESCRIPTION	G	015	ALDNDSEB	
ALLOCATION LAND VESSEL CODE	G	015	ALLVCDEB	
ALLOCATION MAINTENANCE LEVEL FUNCTION	G	015	ALMLVLEB	
ALLOCATION STATION IDENTIFICATION CODE	G	015	ALSTIDEB	
TABLE EC, SUPPORT EQUIPMENT PARAMETERS				
SUPPORT EQUIPMENT PARAMETERS	K	284	--------	
CALIBRATION PROCEDURE		039	CALPROEC	
TABLE ED, SUPPORT EQUIPMENT AUTHORIZATION				
SPECIFIC AUTHORIZATION	B	399	--------	X
Table EE, SUPPORT EQUIPMENT NARRATIVE				
SUPPORT EQUIPMENT NARRATIVE CODE	K	414	SENARCEE	X
FUNCTIONAL ANALYSIS		147		X
DESCRIPTION AND FUNCTION OF SUPPORT EQUIPMENT		078		X
SUPPORT EQUIPMENT NON-PROLIFERATION EFFORT		415		
CHARACTERISTICS OF SUPPORT EQUIPMENT		044		
INSTALLATION FACTORS OR OTHER FACILITIES		169		
ADDITIONAL SKILLS AND SPECIAL TRAINING REQUIREMENTS		008		X
SUPPORT EQUIPMENT EXPLANATION		411		
JUSTIFICATION		188		X
Table EF, SUPPORT EQUIPMENT RECOMMENDATION DATA				
SUPPORT EQUIPMENT RECOMMENDATION DATA (SERD) NUMBER	K	416	SERDNOEF	
SERD REVISION	K	360	SRDREVEF	
SERD STATUS		404	STATUSEF	
SERD DATE OF INITIAL SUBMISSION		071	INTSUBEA	
SERD DATE OF GOVERNMENT DISPOSITION	G	071	DTGVDSEF	
SERD DATE OF REVISION SUBMISSION		071	DTRVSBEF	

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DATA ELEMENT TITLE	KEY	DED	CODE	REQUIRED
Table EG, SERD REVISION REMARKS				
SERD REVISION REMARKS		417	REVREMEG	
Table EH, ALTERNATE NATIONAL STOCK NUMBERS				
ALTERNATE NATIONAL STOCK NUMBER	K	253	--------	
Table EI, INPUT POWER SOURCE				
INPUT POWER SOURCE	K	168	--------	
Table EJ, SUPPORT EQUIPMENT DESIGN DATA				
DESIGN DATA CATEGORY CODE (DDCC)	K	079	DSNDATEJ	X
DDCC CONTRACTOR RECOMMENDED		057	CNTRECEJ	X
DDCC ESTIMATED PRICE		101	ESTPRCEJ	X
DDCC GOVERNMENT REQUIRED		150	GOVRODEJ	X
DDCC SCOPE		365	DDCCSCEJ	
Table EK, SUPERCEDURE DATA				
SUPERCEDURE CAGE CODE	K	046	SPRCAGEK	X
SUPERCEDURE REFERENCE NUMBER	K	337	SPRREFEK	X
SUPERCEDURE TYPE	M	408	SUTYPEEK	X
SUPERCEDURE ITEM NAME		182	SUPITNEK	
SUPERCEDURE SERD NUMBER		416	SUSRNOEK	
REASON FOR SUPERCEDURE/DELETION		327	REASUPEK	
SUPERCEDURE INTERCHANGEABILITY CODE		172	ICCODEEK	
Table EL, SUPPORT EQUIPMENT ILS REQUIREMENT CATEGORY CODE				
ILS REQUIREMENT CATEGORY CODE (IRCC)	K	171	IRCCODEL	X
IRCC CONTRACTOR RECOMMENDED		057	CONRECEL	X
IRCC ESTIMATED PRICE		101	ESTPRCEL	X
IRCC GOVERNMENT REQUIRED		150	GOVRQDEL	X
IRCC SCOPE		365	IRCSCOEL	
Table EM, SYSTEM EQUIPMENT				
SYSTEM CAGE CODE	F	046	SCAGECEM	X
SYSTEM REFERENCE NUMBER	F	337	SREFNOEM	X
SYSTEM EQUIPMENT QUANTITY PER TEST		320	OTYTSTEM	X
SYSTEM EQUIPMENT ITEM DESIGNATOR		179	GFAEIDEM	
UNIT UNDER TEST REQUIREMENTS AND DESCRIPTION				
Table UA, ARTICLE REQUIRING SUPPORT/UNIT UNDER TEST (UUT)				
END ITEM ACRONYM CODE	F	096	EIACODXA	X
UUT LSA CONTROL NUMBER (LCN)	F	199	UUTLCNUA	X
UUT ALTERNATE LCN CODE	F	019	UUTALCUA	X
UUT LCN TYPE	F	203	UTLCNTUA	X
UUT ALLOWANCE	G	016	UTALLOUA	X
UUT MAINTENANCE PLAN NUMBER	G	209	UMNTPLUA	
UUT TEST REQUIREMENTS DOCUMENT NUMBER		448	UTTRDNUA	
UUT WORK PACKAGE REFERENCE		515	UTWPRFUA	

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DATA ELEMENT TITLE	KEY	DED	CODE	REQUIRED
Table UB, ARTICLE REQUIRING SUPPORT/UUT SUPPORT EQUIPMENT				
SUPPORT EQUIPMENT CAGE CODE	F	046	SECAGEEA	X
SUPPORT EQUIPMENT REFERENCE NUMBER	F	337	SEREFNEA	X
UUT CMRS SUMMARY STATUS		036	UTSTCDUB	X
UUT CMRS RECOMMENDED CODE		035	UTCMRSUB	
Table UC, OPERATIONAL TEST PROGRAM				
OPERATIONAL TEST PROGRAM (OTP) CAGE CODE	F	046	OTPCAGUC	X
OTP REFERENCE NUMBER	F	337	OTPREFUC	X
OTP APPORTIONED UNIT COST		025	--------	
OTP COORDINATED TEST PLAN		060	OTPCTPUC	X
OTP STANDARDS FOR COMPARISON		412	OTPSFCUC	X
OTP SUPPORT EQUIPMENT RECOMMENDATION DATA NUMBER		416	OTPSRDUC	
Table UD, UUT SUPPORT EQUIPMENT OPERATIONAL TEST PROGRAM				
Table UE, TEST PROGRAM INSTRUCTION				
TEST PROGRAM INSTRUCTION (TPI) CAGE CODE	F	046	TPICAGUE	X
TPI REFERENCE NUMBER	F	337	TPIREFUE	X
TPI APPORTIONED UNIT COST		025	--------	
TPI SELF TEST		370	TPISTSUE	X
TPI TECHNICAL DATA PACKAGE		434	TPITDPUE	X
TPI SUPPORT EQUIPMENT RECOMMENDATION DATA NUMBER		416	TPISRDUE	
Table UF, UNIT UNDER TEST EXPLANATION				
UUT EXPLANATION		498	UTEXPLUF	X
Table UG, UNIT UNDER TEST PARAMETER GROUP				
UUT PARAMETERS	K	284	--------	X
UUT CMRS PARAMETER CODE		034	UUTPPCUG	
UUT PARAMETER TEST ACCURACY RATIO		442	--------	
Table UH, UUT FAULT ISOLATED REPLACEABLE UNIT				
TASK LSA CONTROL NUMBER (LCN)	F	199	TSKLCNCI	
TASK ALTERNATE LCN CODE (ALC)	F	019	TSKALCCI	
TASK LCN TYPE	F	203	TSKLTYCI	
TASK PROVISION TASK CODE	F	427	TSKTCDCI	
TASK PROVISION LCN	F	199	PROLCNCI	
TASK PROVISION ALC	F	019	PROALCCI	
TASK PROVISION LCN TYPE	F	203	PROLTYCI	
TASK PROVISION CAGE CODE	F	046	PROCAGCI	
TASK PROVISION REFERENCE NUMBER	F	337	PROREFCI	
SUPPORT EQUIPMENT CAGE CODE	M	046	SECAGEEA	
SUPPORT EQUIPMENT REFERENCE NUMBER	M	337	SEREFNEA	
UUT FIRU FAULT ISOLATION		143	--------	
UUT FIRU TEST REQUIREMENTS DOCUMENT INDICATOR		447	UUTFTDUH	
Table UI, ADAPTER-INTERCONNECTOR DEVICE				
ADAPTER INTERCONECTOR DEVICE (AID) CAGE CODE	F	046	AIDCAGUI	X
AID REFERENCE NUMBER	F	337	AIDREFUI	X
AID APPORTIONED UNIT COST		025	--------	X

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DATA ELEMENT TITLE	KEY	DED	CODE	REQUIRED
AID SUPPORT EQUIPMENT RECOMMENDATION DATA NUMBER		416	AIDSRDUI	
AID C0MMON UNIT UNDER TEST		048	AIDCUTUI	X
Table UJ, UUT SPT EQUIPMENT ADAPTER-INTERCONNECTOR DEVICE				
Table UK, AUTOMATIC TEST EQUIPMENT (ATE) TEST STATION				
ATE CAGE CODE	F	046	ATECAGUK	
AUTOMATIC TEST EQUIPMENT REFERENCE NUMBER	F	337	ATEREFUK	
ATE GOVERNMENT DESIGNATOR		149	ATEGDSUK	
Table UL, UUT SUPPORT EQUIPMENT AUTOMATIC TEST EQUIPMENT				
Table UM, SUPPORT EQUIPMENT ITEM UNIT UNDER TEST				
SUPPORT EQUIPMENT UNIT UNDER TEST (SE UUT) CAGE CODE	F	046	SUTCAGUM	
SE UUT REFERENCE NUMBER	F	337	SUTREFUM	
SE UUT ALLOWANCE		016	SUTALLUM	
SE UUT CMRS STATUS		036	SUTSTCUM	
SE UUT MAINTENANCE PLAN NUMBER		209	MNTPLNUM	
SE UUT TEST REQUIREMENTS DOCUMENT NUMBER		448	TRDNUMUM	
SE UUT WORK PACKAGE REFERENCE		515	WKPKRFUM	
Table UN SUPPORT EQUIPMENT UUT PARAMTER GROUP				
SE UUT PARAMETERS	K	204	--------	
SE UUT CMRS PARAMETER CODE		034	UTPACMUN	
SE UUT PARAMETER TEST ACCURACY RATIO		442	--------	
FACILITIES CONSIDERATION				
Table FA, FACILITY				
FACILITY NAME	K	118	FACNAMFA	
FACILITY CATEGORY CODE	K	115	FACCCDFA	
FACILITY TYPE	K	483	FACTYPFA	
FACILITY CLASS		116	FACCLAFA	
FACILITY DRAWING CLASSIFICATION		088	DRCLASFA	
FACILITY DRAWING NUMBER		089	FADNUMFA	
FACILITY DRAWING REVISION		360	FADREVFA	
FACILITY AREA		112	FAAREAFA	
FACILITY AREA UNIT OF MEASURE		491	FAARUMFA	
FACILITY CONSTRUCTION UNIT OF MEASURE PRICE		492	FACNCOFA	
CONSTRUCTION UNIT OF MEASURE		491	CONUOMFA	
Table FB, FACILITY NARRATIVE				
FACILITY NARRATIVE CODE	K	119	FNCODEFB	
FACILITY CAPABILITY		114		
FACILITY LOCATION		117		
Table FC, FACILITY BASELINE NARRATIVE				
BASELINE FACILITY NARRATIVE CODE	K	113	FBNACDF C	
FACILITIES MAINTENANCE REQUIREMENT		107		
FACILITIES REQUIREMENTS FOR OPERATIONS		109		
FACILITIES REQUIREMENT FOR TRAINING		110		

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DATA ELEMENT TITLE	KEY	DED	CODE	REQUIRED
FACILITY REQUIREMENTS SPECIAL CONSIDERATIONS		120		
FACILITY REQUIREMENTS SUPPLY/STORAGE		121		
Table FD, NEW OR MODIFIED FACILITY NARRATIVE				
NEW OR MODIFIED FACILITY NARRATIVE CODE	K	255	NMFNCDFD	
FACILITY DESIGN CRITERIA		105		
FACILITY INSTALLATION LEAD TIME		106		
FACILITY TASK AREA BREAKDOWN		122		
FACILITIES UTILIZATION		111		
FACILITIES REQUIREMENTS		108		
FACILITY UNIT COST RATIONALE		123		
FACILITY JUSTIFICATION		188		
TYPE OF CONSTRUCTION		482		
UTILITIES REQUIREMENT		502		
Table FE, OPERATIONS AND MAINTENANCE TASK FACILITY REQUIREMENT				
END ITEM ACRONYM CODE	F	096	EIACODXA	
LSA CONTROL NUMBER (LCN)	F	199	LSACONXB	
ALTERNATE LCN CODE	F	019	ALTLCNXB	
LCN TYPE	F	203	LCNTYPXB	
TASK CODE	F	427	TASKCDCA	
PERSONNEL SKILLS CONSIDERATIONS				
Table GA, SKILL SPECIALTY				
SKILL SPECIALTY CODE	K	387	SKSPCDGA	
SKILL LEVEL CODE		386	SKLVCDGA	
HOUR LABOR RATE		161	HRLARTGA	
TRAINING COST		460	TRNCOSGA	
Table GB, NEW OR MODIFIED SKILL				
NEW OR MODIFIED SKILL SPECIALTY CODE	K	257	MDCSSCGB	
NEW OR MODIFIED SKILL LEVEL CODE		386	MDSCLCGB	
SKILL SPECIALTY CODE		387	SKSPCDGA	
DUTY POSITION REQUIRING A NEW OR REVISED SKILL		092	DPRNRSGB	
RECOMMENDED RANK/RATE/PAY PLAN/GRADE		330	--------	
SECURITY CLEARANCE		369	SCRSSCGB	
TEST SCORE		449	SSCTESGB	
ASVAB AFQT SCORE		026	ABAFQTGB	
ASVAB AFQT EXPECTED RANGE		026	--------	
ASVAB AFQT LOWEST PERCENT		026	--------	
Table GC NEW OR MODIFIED SKILL NARRATIVE				
NEW OR MODIFIED SKILL NARRATIVE CODE	K	256	NMSNCDGC	
ADDITIONAL REQUIREMENTS		007		
EDUCATIONAL QUALIFICATIONS		094		
SKILL JUSTIFICATION		188		
ADDITIONAL TRAINING REQUIREMENTS		012		
Table GD, SKILL APTITUDE DATA				
ASVAB APTITUDE ELEMENT	K	026	ASVAPEGD	

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Part I LSAR DATA REQUIREMENTS FORM				Section 2
DATA ELEMENT TITLE	KEY	DED	CODE	REQUIRED
ASVAB APTITUDE ELEMENT EXPECTED RANGE		026	--------	
ASVAB APTITUDE ELEMENT LOWEST PERCENT		026	--------	
Table GE, PHYSICAL AND MENTAL REQUIREMENTS NARRATIVE				
END ITEM ACRONYM CODE	F	096	EIACODXA	
LSA CONTROL NUMBER (LCN)	F	199	LSACONXB	
ALTERNATE LCN CODE	F	019	ALTLCNXB	
LCN TYPE	F	203	LCNTYPXB	
TASK CODE	F	427	TASKCDCA	
SUBTASK NUMBER	F	407	SUBNUMCB	
SUBTASK PERSON IDENTIFIER	F	288	SUBPIDCD	
PHYSICAL AND MENTAL REQUIREMENTS NARRATIVE		290	PAMENRGE	
TRANSPORTABILITY ENGINEERING ANALYSIS				
Table JA, TRANSPORTATION				
END ITEM ACRONYM CODE	F	096	EIACODXA	
LSA CONTROL NUMBER (LCN)	F	199	LSACONXB	
ALTERNATE LCN CODE	F	019	ALTLCNXB	
LCN TYPE	F	203	LCNTYPXB	
TRANSPORTATION INDICATOR		468	TRNINDJA	
SECTIONALIZED IDENTIFICATION		366	SECTIDJA	
ENVIRONMENTAL HANDLING & TRANSPORTATION INDICATOR		098	ENHATCJA	
DELIVERY SCHEDULE		075	DELSCHJA	
CONTRACT NUMBER		055	CONNUMJA	
PROPER SHIPPING NAME		304	PROPSNJA	
SPEED		400	SPSPEDJA	
TOWING SPEED		455	TWSPEDJA	
MILITARY UNIT TYPE		242	MILUNTJA	
REVISION DATE		071	TRCHRDJA	
THEATER OF OPERATION		451	TRCHTHJA	
NONOPERATIONAL FRAGILITY FACTOR		260	NOPRFFJA	
NET EXPLOSIVE WEIGHT		254	NETEXWJA	
Table JB, TRANSPORTATION SHIPPING MODE				
TRANSPORTATION CHARACTER NUMBER	K	465	TRANCNJB	
TRANSPORTATION CHARACTER MODE TYPE	K	464	TRCHMTJB	
TRANSPORTATION ITEM DESIGNATOR		469	TRITDRJB	
SHIPPING CONFIGURATION		380	SHPCONJB	
CONTAINER LENGTH		053	CONLENJB	
CONTAINER TYPE		054	CONTYPJB	
FREIGHT CLASSIFICATION		146	FRCLASJB	
EXTERNAL OR INTERNAL LOAD INDICATOR		104	EOILINJB	
HELICOPTER MISSION		159	--------	
HIGHWAY MODEL LOAD		250	--------	
HIGHWAY MODEL TYPE		251	--------	
RAIL USE		326	RAILUSJB	
RAIL TRANSPORTATION COUNTRY		325	RAILTCJB	
SEA DECK STOWAGE		072	SDECKSJB	
Table JC, TRANSPORTED END ITEM				
TRANSPORTED CONFIGURATION NUMBER	K	473	TRCONMJC	
MOBILITY TYPE	K	249	MOBTYPJC	

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DATA ELEMENT TITLE	KEY	DED	CODE	REQUIRED
OPERATIONAL WEIGHT EMPTY/LOADED		276	--------	
MILITARY LOAD CLASSIFICATION EMPTY/LOADED		241	--------	
SHIPPING WEIGHT EMPTY/LOADED		381	--------	
CREST ANGLE		063	CREANGJC	
TRACKED GROUND PRESSURE		456	TRGRPRJC	
TRACKED ROAD WHEEL WEIGHT		459	TRRWWTJC	
TRACKED PADS TOUCHING		458	TRNUPTJC	
TRACKED PAD SHOE AREA		457	TRPSARJC	
WHEELED INFLATION PRESSURE		507	WHINPRJC	
WHEELED NUMBER OF PLIES		508	WHNUPLJC	
WHEELED NUMBER TIRES		509	WHNUTIJC	
WHEELED TIRE LOAD RATINGS		510	WHTLDRJC	
WHEELED TIRE SIZE		512	WHTIFTJC	
WHEELED WEIGHT RATINGS		513	WHWERAJC	
AXLE LENGTH		029	--------	
SKID NUMBER OF SKIDS		264	SNUMSKDC	
SKID AREA		384	SDSICGJC	
Table JD, TRANSPORTED END ITEM NARRATIVE				
TRANSPORTED END ITEM NARRATIVE CODE	K	474	TREINCJD	
WHEELED TIRE REQUIREMENTS		511		
SKID REMARKS		385		
TURNING INFORMATION		477		
WHEELED AXLE AND SUSPENSION REMARKS		506		
TRANSPORTED OTHER EQUIPMENT		475		
Table JE, TRANSPORT BY FISCAL YEAR				
TRANSPORT FISCAL YEAR	K	145	TRAFYRJE	
FIRST QUARTER PROCUREMENT QUANTITY		298	FIQPQTJE	
SECOND QUARTER PROCUREMENT QUANTITY		298	SQPQTYJE	
THIRD QUARTER PROCUREMENT QUANTITY		298	TQPQTYJE	
FOURTH QUARTER PROCUREMENT QUANTITY		298	FQPQTYJE	
Table JF, TRANSPORTATION NARRATIVE				
TRANSPORTATION NARRATIVE CODE	K	470	TRANCDJF	
TRANSPORTATION SHOCK VIBRATION REMARKS		382		
LIFTING AND TIEDOWN REMARKS		192		
TRANSPORTATION PROJECTION REMARKS		471		
REGULATORY REQUIREMENTS		340		
TRANSPORTATION REMARKS		472		
SPECIAL SERVICE AND EQUIPMENT		398		
SECTIONALIZED REMARKS		368		
TRANSPORTED TO AND FROM		476		
ENVIRONMENTAL CONSIDERATIONS		099		
MILITARY DISTANCE CLASSIFICATION		240		
UNUSUAL AND SPECIAL REQUIREMENTS		500		
VENTING AND PROTECTIVE CLOTHING		504		
DISASTER RESPONSE FORCE REQUIREMENTS		082		

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PROVISIONING REQUIREMENTS				LSA 036 CARD BLOCK	REQD	LLTIL	PPL	SFPPL	CBIL	RIL	ISIL	PCL	TTEL	SCPL	DCN	ARA	ARB
DATA ELEMENT TITLE	KEY	DED	CODE														
CROSS FUNCTIONAL REQUIREMENT																	
Table XC, SYSTEM/END ITEM (See Part I)																	
USABLE ON CODE	G	501	UOCSEIXC	D-43													
SYSTEM/EI PCCN	G	307	PCCNUMXC	A-1													
SYSTEM/EI PLISN		309	PLISNOXC	A-2													
SYSTEM/EI TYPE OF CHANGE CODE		481	TOCCODXC	A-3													
SYSTEM/EI QUANTITY PER ASSEMBLY		316	QTYASYXC	C-32													
SYSTEM/EI QUANTITY PER END ITEM		317	QTYPEIXC	C-33													
Table XD, SYSTEM/END ITEM SERIAL NUMBER																	
PACKAGING AND PROVISIONING REQUIREMENT																	
Table HA, ITEM IDENTIFICATION (See Part III)																	
CAGE CODE	F	046	CAGECDXH	A-5	X												
REFERENCE NUMBER	K	337	REFNUMHA	A-6	X												
ITEM NAME		182	ITNAMEMA	A-12	X												
ITEM NAME CODE		183	INAMECHA	J-89													
REFERENCE NUMBER CATEGORY CODE		338	REFNCCHA	A-7	X												
REFERENCE NUMBER VARIATION CODE		339	REFNVCHA	A-8	X												
DLSC SCREENING REQUIREMENT CODE		073	DLSCRCHA		X												
DOCUMENT IDENTIFIER CODE		087	DOCIDCHA		X												
ITEM MANAGEMENT CODE		181	ITMMGCHA	E-64													
NSN PREFIX		253	--------	B-15	X												
NATIONAL STOCK NUMBER (NSN)		253	--------	B-15	X												
NSN SUFFIX		253	--------	B-15	X												
UNIT OF ISSUE CONVERSION FACTOR		489	UICONVHA	B-20													
SHELF LIFE		377	SHLIFEHA	A-13	X												
SHELF LIFE ACTION CODE		378	SLACTNHA	A-14													
PROGRAM PARTS SELECTION LIST		302	PPSLSTHA	A-10	X												
DOCUMENT AVAILABILITY CODE		086	DOCAVCHA	A-9													
PRODUCTION LEAD TIME		299	PRDLDTHA	B-24	X												
SPECIAL MATERIAL CONTENT CODE		395	SPMACCHA	D-47													
SPECIAL MAINTENANCE ITEM CODE		392	SMAINCHA	D-49													
CRITICALITY CODE		066	CRITCDHA	J-88													
PRECIOUS METAL INDICATOR CODE		293	PMICODHA	B-27													
SPARES ACQ INTEGRATED WITH PRODUCTION		391	SAIPCDHA														
PROVISIONING LIST CATEGORY CODE		308	--------	D-48	X												
PHYSICAL SECURITY PILFERAGE CODE		291	PHYSECHA	B-26													
ADP EQUIPMENT CODE		027	ADPEQPHA	B-28													
DEMILITARIZATION CODE		076	DEMILIHA	B-23													
ACQUISITION METHOD CODE	G	003	ACQMETHA	E-62													
ACQUISITION METHOD SUFFIX CODE	G	004	AMSUFCHA	E-63	X												
HAZARDOUS MATERIALS STORAGE COST		156	HMSCOSHA														
HAZARDOUS WASTE DISPOSAL COST		157	HWDCOSHA														
HAZARDOUS WASTE STORAGE COST		158	HWSCOSHA														
CONTRACTOR TECHNICAL INFORMATION CODE		058	CTICODHA	E-61													
UNIT OF MEASURE		491	UNITMSHA	B-16													
UNIT OF ISSUE		488	UNITISHA	B-18	X												

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PROVISIONING REQUIREMENTS				LSA 036 CARD BLOCK	REQD	LLTIL	PPL	SFPPL	CBIL	RIL	ISIL	PCL	TTEL	SCPL	DCN	ARA	ARB
DATA ELEMENT TITLE	KEY	DED	CODE														
LINE ITEM NUMBER		193	LINNUMHA														
CRITICAL ITEM CODE		065	CRITITHA														
INDUST MATERIALS ANALYSIS OF CAPACITY		163	INDMATHA														
MATERIAL LEADTIME		219	MTLEADHA														
MATERIAL WEIGHT		220	MTLWGTHA														
MATERIAL		218	MATERLHA	M-92													
Table HB, ADDITIONAL REFERENCE NUMBER																	
ARN CAGE CODE	F	046	ADCAGEHB	A-5	X												
ADDITIONAL REFERENCE NUMBER	K	006	ADDREFHB	A-6	X												
ARN REFERENCE NUMBER CATEGORY CODE		338	ADRNCCHB	A-7	X												
ARN REFERENCE NUMBER VARIATION CODE		339	ADRNVCHB	A-8	X												
Table HC, CONTRACTOR TECHNICAL INFORMATION CODE																	
CTIC CAGE CODE	F	046	CTCAGEHC														
Table HD, UNIT OF ISSUE PRICE																	
UNIT OF ISSUE (UI) PRICE	K	490	UIPRICHD	B-19	X												
UI PRICE LOT QUANTITY		205	--------														
UI PRICE CONCURRENT PRODUCTION CODE		051	CURPRCHD														
UI PRICE TYPE OF PRICE CODE		485	TUIPRCHD														
UI PRICE PROVISIONING		314	PROUIPHD														
UI PRICE FISCAL YEAR		145	FISCYRHD														
Table HE, UNIT OF MEASURE PRICE																	
UNIT OF MEASURE (UM) PRICE	K	492	UMPRICHE	B-17													
UM PRICE LOT QUANTITY		205	--------														
UM PRICE CONCURRENT PRODUCTION CODE		051	CURPRCHE														
UM PRICE TYPE OF PRICE CODE		485	TUMPRCHE														
UM PRICE PROVISIONING		314	PROUMPHE														
UM PRICE FISCAL YEAR		145	FISCYRHE														
Table HG, PART APPLICATION PROVISIONING																	
END ITEM ACRONYM CODE	F	096	EIACODXA		X												
LSA CONTROL NUMBER (LCN)	F	199	LSACONXB	H-77	X												
ALTERNATE LCN CODE	F	019	ALTLCNXB	H-78	X												
LCN TYPE	F	203	LCNTYPXB		X												
PROV LIST ITEM SEQUENCE NO (PLISN)		309	PLISNOHG	A-2	X												
QUANTITY PER ASSEMBLY		316	QTYASYHG	C-32	X												
OPTION 1					X												
OPTION 2	N																
OPTION 3	C																
SUPPRESSION INDICATOR		422	SUPINDHG														
DATA STATUS CODE		070	DATASCHG														
PROVISIONING SYSTEM IDENTIFIER CODE	C	312	PROSICHG														
PTD SELECTION CODE		313	--------		X												
TYPE OF CHANGE CODE		481	TOCCODHG	A-3	X												
INDENTURE CODE		162	INDCODHG	A-4	X												

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PROVISIONING REQUIREMENTS				LSA 036 CARD BLOCK	REQD	LLTIL	PPL	SFPPL	CBIL	RIL	ISIL	PCL	TTEL	SCPL	DCN	ARA	ARB
DATA ELEMENT TITLE	KEY	DED	CODE														
ATTACHING PART/HARDWARE			ATTCHPHX		X												
OPTION 1																	
OPTION 2																	
OPTION 3																	
OPTION 4					X												
OPTION 5																	
INDENTURE FOR KITS																	
OPTION I																	
OPTION 2																	
OPTION 3																	
QUANTITY PER END ITEM		317	QTYPEIHG	C-33	X												
OPTION 1					X												
OPTION 2	N																
OPTION 3	C																
PRIOR ITEM PLISN		297	PIPLISHG	C-39													
SAME AS PLISN		364	SAPLISHG	C-38	X												
HARDNESS CRITICAL ITEM		151	HARDCIHG	B-25													
REMAIN IN PLACE INDICATOR		348	REMIPIHG	E-65													
LINE REPLACEABLE UNIT		194	LRUNITHG	J-90													
ITEM CATEGORY CODE		177	ITMCATHG		X												
ESSENTIALITY CODE		100	ESSCODHG	A-11	X												
SOURCE, MAINT AND RECOVERABILTY CODE		398	SMRCODHG	B-22	X												
MAINTENANCE REPLACEMENT RATE 1		211	MRRONEHG	C-34													
MAINTENANCE REPLACEMENT RATE II		212	MRRTWOHG	C-35													
OPTION 1																	
OPTION 2																	
MAINTENANCE REPLACEMENT RATE MODIFIER	A	213	MRRMODHG	C-36													
REPLACEMENT TASK DISTRIBUTION		355	--------	E-59													
MINIMUM REPLACEMENT UNIT		245	MINREUHG	D-52													
MAXIMUM ALLOWABLE OPERATING TIME		221	MAOTIMHG	C-40													
MAINTENANCE ACTION CODE		206	MAIACTHG	C-41													
RECOMMENDED INITIAL SYSTEM STOCK BUY		328	RISSBUHG	D-54													
RECOMMENDED MINIMUM SYSTEM STOCK LEVEL		329	RMSSLIHG	D-53													
RECOMMENDED TENDER LOAD LIST QUANTITY	N	331	RTLLOTHG	D-55													
TOTAL QUANTITY RECOMMENDED		453	TOTQTYHG	C-37	X												
MAINTENANCE TASK DISTRIBUTION		214	--------	E-57													
REPAIR CYCLE TIME		350	--------	E-58													
OPTION 1																	
OPTION 2																	
NOT REPAIRABLE THIS STATION	R	261	NORETSHG	C-42													
REPAIR SURVIVAL RATE		351	REPSURHG	D-56													
DESIGNATED REWORK POINT		081	--------	E-60													
WORK UNIT CODE		516	WRKUCDHG	J-86													
ALLOWANCE ITEM CODE		017	ALLOWCHG	D-50													
ALLOWANCE ITEM QUANTITY		018	ALIOTYHG	D-51													
Table HH, OVERHAUL-KIT NEXT HIGHER ASSEMBLY PLISN																	
NEXT HIGHER ASSEMBLY (NHA) PLISN	K	258	NHAPLIHH	C-29	X												
NHA PLISN INDICATOR		259	NHAINDHH	C-30													
OVERHAUL REPLACEMENT RATE		281	OVHREPHH	C-31													

APPENDIX A

Part II **LSAR DATA REQUIREMENTS FORM** **Section 2**

PROVISIONING REQUIREMENTS				LSA 036 CARD BLOCK	REQD	LLTIL	PPL	SFPPL	CBIL	RIL	ISIL	PCL	TTEL	SCPL	DCN	ARA	ARB
DATA ELEMENT TITLE	KEY	DED	CODE														
Table HI, PROVISIONING REMARK																	
PROVISIONING REMARKS		311	REMARKHI	H-79	X												
Table HJ, PROVISIONING REFERENCE DESIGNATION																	
REFERENCE DESIGNATION		335	REFDESHJ	D-44													
OPTION 1																	
OPTION 2																	
OPTION 3																	
OPTION 4																	
OPTION 5																	
REFERENCE DESIGNATION CODE	K	336	RDCODEHJ	D-46													
TECHNICAL MANUAL (TM) CODE		437	TMCODEXI														
FIGURE NUMBER		144	FIGNUMHK														
ITEM NUMBER		184	ITEMNOHK														
Table HK, PARTS MANUAL DESCRIPTION																	
TECHNICAL MANUAL (TM) CODE	F	437	TMCODEXI	J-80													
FIGURE NUMBER	K	144	FIGNUMHK	J-81													
ITEM NUMBER	K	184	ITEMNOHK	J-82													
TM FUNCTIONAL GROUP CODE		438	TMFGCDHK	J-86													
TM INDENTURE CODE		439	TMINDCHK	J-84													
QUANTITY PER FIGURE		318	QTYFIGHK	J-85													
TM CHANGE NUMBER		436	TMCHGNHK	J-83													
Table HL, PARTS MANUAL PROVISIONING NOMENCLATURE																	
PROVISIONING NOMENCLATURE		310	PROVNOHL	K-91													
Table HM, BASIS OF ISSUE																	
BASIS OF ISSUE	K	030	--------	J-87													
Table HN, PROVISIONING SERIAL NUMBER USABLE ON CODE																	
S/N PROVISIONING SYSTEM/EI LCN	F	199	LCNSEIHN														
S/N PROVISIONING SYSTEM/EI ALC	F	019	ALCSEIHN														
S/N PROVISIONING SERIAL NUMBER	F	373	--------														
Table HO, PROVISIONING SYSTEM\END ITEM USABLE ON CODE																	
UOC PROVISIONING SYSTEM/EI LCN	F	199	LCNSEIHO														
UOC PROVISIONING SYSTEM/EI ALC	F	019	ALCSEIHO														
Table HP, DESIGN CHANGE INFORMATION																	
CHANGE AUTHORITY NUMBER	K	043	CANUMBHP	F-66	X												
REPLACED OR SUPERSEDING (R/S) PLISN		353	RSPLISHP	F-70	X												
R/S PLISN INDICATOR		354	RSPINDHP	F-71													
INTERCHANGEABILITY CODE		172	INTCHCHP	F-67	X												
TOTAL ITEM CHANGES		452	TOTICHHP	F-69													
OPTION 1																	
OPTION 2																	

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Part II	LSAR DATA REQUIREMENTS FORM															Section 2
PROVISIONING REQUIREMENTS				LSA 036 CARD BLOCK	REQD	LLTIL	PPL	SFPPL	CBIL	RIL	ISIL	PCL	TTEL	SCPL	DCN	ARA	ARB
DATA ELEMENT TITLE	KEY	DED	CODE														
QUANTITY SHIPPED		323	QTYSHPHP	F-72													
QUANTITY PROCURED		322	OTYPROHP	F-73													
PRORATED EXHIBIT LINE ITEM NUMBER		305	PROELIHP	G-75													
PRORATED QUANTITY		306	PROQTYHP	G-76													
Table HQ, SERIAL NUMBER EFFECTIVITY																	
SERIAL NUMBER EFFECTIVITY	K	374	--------	F-68	**X**												
Table HR, DESIGN CHANGE USABLE ON CODE				F-74													

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Part III	LSAR DATA REQUIREMENTS FORM					Section 2	
DATA ELEMENT TITLE	KEY	DED	CODE	REQUIRED	COMMON	SELECTIVE	SPECIAL
PACKAGING AND PROVISIONING REQUIREMENT							
Table HA, ITEM IDENTIFICATION (See Part II)							
UNIT WEIGHT		497	UWEIGHHA				
UNIT SIZE		496	--------				
HAZARDOUS CODE		154	HAZCODHA				
Table HF, ITEM PACKAGING REQUIREMENT							
CAGE CODE	F	046	CAGECDXH	X			
REFERENCE NUMBER	F	337	REFNUMHA	X			
DEGREE OF PROTECTION CODE	K	074	DEGPROHF				
UNIT CONTAINER CODE		486	UNICONHF				
UNIT CONTAINER LEVEL		487	UCLEVLHF				
PACKING CODE		283	PKGCODHF				
PACKAGING CATEGORY CODE		282	PACCATHF				
METHOD OF PRESERVATION CODE		239	MEPRESHF				
CLEANING AND DRYING PROCEDURES		045	CDPROCHF				
PRESERVATION MATERIAL CODE		295	PRSMATHF				
WRAPPING MATERIAL		517	WRAPMTHF				
CUSHIONING AND DUNNAGE MATERIAL		067	CUSHMAHF				
CUSHIONING THICKNESS		068	CUSTHIHF				
QUANTITY PER UNIT PACK		321	OTYUPKHF	X			
INTERMEDIATE CONTAINER CODE		174	INTCONHF				
INTERMEDIATE CONTAINER QUANTITY		175	INCQTYHF				
SPECIAL MARKING CODE		394	SPEMRKHF				
UNIT PACK WEIGHT		495	UNPKWTHF				
UNIT PACK SIZE		494	--------				
UNIT PACK CUBE		493	UNPKCUHF				
OPTIONAL PROCEDURES INDICATOR		279	OPTPRIHF				
SPECIAL PACKAGING INSTRUCTION (SP[)		396	SPINUMHF				
SPI NUMBER REVISION		397	SPIREVHF				
SPI NUMBER JULIAN DATE		187	SPDATEHF				
CONTAINER NATIONAL STOCK NUMBER		253	CONNSNHF				
SUPPLEMENTAL PACKAGING DATA		409	SUPPKDHF				
PACKAGING DATA PREPARER CAGE		046	PKCAGEHF				

APPENDIX A

JOINT MILITARY SMR AND ERRC CODES

SOURCE				MAINTENANCE				RECOVERABILITY		ERRC CODE	
				USE		REPAIR					
1st POSITION		2nd POSITION		3rd POSITION		4th POSITION		5th POSITION		6th POSITION	
P	PROCURABLE	A	STOCKED	O	REPLACE AT ORGANIZATIONAL	Z	NO REPAIR	Z	NON-REPAIRABLE CONDEMN AT 3rd POSITION LEVEL	N	NON-RECOVERABLE CONDEMN AT ANY LEVEL
		B	INSURANCE								
		C	DETERIORATIVE					O	REPAIRABLE CONDEMN AT ORGANIZATIONAL	P	RECOVERABLE CONDEMN AT ORGANIZATIONAL
		E	SUPPORT EQUIPMENT STOCKED			B	NO REPAIR RECONDITION			L	RECOVERABLE CONDEMN AT DEPOT (LRU)
		F	SUPPORT EQUIPMENT NON-STOCKED					F	REPAIRABLE CONDEMN AT INTERMEDIATE		
		G	SUSTAINED LIFE SUPPORT							T	RECOVERABLE CONDEMN AT DEPOT
K	COMPONENT OF A REPAIR KIT	F	INTERMEDIATE KIT	F	REPLACE AT INTERMEDIATE	O	REPAIR AT ORGANIZATION	D	REPAIRABLE CONDEMN AT DEPOT	S	NON-EXPENDABLE SUPPORT EQUIPMENT DEPOT
		D	DEPOT KIT			F	REPAIR AT INTERMEDIATE			U	NON-EXPENDABLE SUPPORT EQUIPMENT ORGANIZATIONAL AND INTERMEDIATE
		B	BOTH KITS								
M	MANUFACTURE	O	ORGANIZATIONAL	D	REPLACE AT DEPOT	D	LIMITED REPAIR AT O OR F LEVEL OVERHAUL AT DEPOT	A	SPECIAL HANDLING		
		F	INTERMEDIATE							C	RECOVERABLE (SCARS) CONDEMN AT DEPOT
		D	DEPOT								
A	ASSEMBLE	O	ORGANIZATIONAL							NOTE: "C" is to be used when a critical shortage of an item has been determined.	
		F	INTERMEDIATE			L	REPAIR AT DEPOT				
		D	DEPOT								
X	NON-PROCURED	A	REQUISITION NHA								
		B	RECLAMATION RQM FROM IM								
		C	MFG DRAWINGS								