SECTION C – DESCRIPTION/SPECS/WORK STATEMENT

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SECTION C – DESCRIPTION/SPECS/WORK STATEMENT

C.1 INTRODUCTION

The Government, specifically the Federal Aviation Administration (FAA), is transforming the current aviation system to a Next Generation (NextGen) modernized Air Traffic Management (ATM) system using modern software technologies and redesigning the National Airspace System (NAS) Enterprise Architecture to fully exploit these new technologies. The FAA Office of System Operations Programs, AJR-4, is responsible for developing selected NextGen traffic flow management initiatives. The subject contract defines the programmatic and technical requirements for the management and execution of the Time Based Flow Management (TBFM) Program. TBFM expands upon the Traffic Management Advisor (TMA) with NextGen enhancements. The TBFM Program includes:

1. Sustain the existing system
2. Re-architecture of the system
3. Design, develop, test and implement NextGen enhancements

C.1.1. Background

The FAA expects significant growth in air traffic in the foreseeable future. This growth is placing increased demand on the existing NAS and has led FAA programs to evaluate new methods that could safely and efficiently improve the capacity of the existing system in order to accommodate future air traffic expectations.

TMA is a decision support tool that assists in managing air traffic by optimizing the flow of aircraft into capacity-constrained areas. As a traffic management tool, TMA has been proven to enhance arrival/departure sequence planning by using Time Based Metering (TBM).

The TBFM Program will focus on achieving and closing the performance gap in transitioning TMA to NextGen Trajectory Based Operations (TBO).

C.1.2. Purpose

The purpose of this Statement of Work (SOW) is to define the effort required to design, develop, test, implement and support the TBFM Program that meets all requirements in the TBFM System Specification Document (SSD), provided in Section J. This SOW also includes provisions for Program Management, System Engineering, System Design, System Development, System Test and Evaluation, Training, Implementation, Integrated Logistic Support, Engineering Services, and Performance Period.

The Contractor must perform, on a Task Order basis, Engineering Services as required.

The Contract Data Requirements List (CDRL) contained in Section J defines the products to be delivered to the Government resulting from effort defined in this SOW.

C.1.3. Scope

The scope of this contract includes the following major components:

1. Sustainment of existing systems to include maintaining current software, adaptation, documentation and addressing newly identified problems
2. Re-architecture of the system to include porting to a new platform and Client/Server based architecture for information sharing
3. NextGen enhancements to the system to include design, development, test and implementation of requirement as defined in the TBFM SSD
4. Engineering services to include task orders for additional site deployments and training

C.2 APPLICABLE DOCUMENTS

The following specifications, handbooks, orders, standards, and drawings form a part of this SOW and are applicable to the extent specified herein. The current approved version of these documents as of the contract date must apply. In the event of a conflict between this SOW and any of the applicable documents cited below, the provisions of this SOW must apply. In the event that an applicable document should change after the contract award date and result in a change to programmatic, technical requirements and/or design, the Contractor must submit an Engineering Change Proposal (ECP).

Section J of this contract will provide additional TMA/TBFM Program documents. The Contractor must analyze legacy TMA documentation for relevance to TBFM. All relevant legacy documentation must be used as reference material for the development of TBFM documentation, excluding format.

C.2.1. FAA Instructions, Orders, Specifications and Standards

Document ID #	Title
29 CFR 1910	Occupational Safety and Health Standards
29 CFR 1926	Safety and Health Regulations for Construction
ANSI/EIA-649	National Consensus Standards for Configuration Management
ANSI/EIA-748	Earned Value Management Systems (EVMS)
ANSI/ISO/ASQ Q9001-2000	Quality Management Systems Requirements Standard
ANSI/NFPA 70	National Electrical Code
ASME Y14.100-2000	Engineering Drawing Practices
AT 7210.6	Air Traffic Quality Assurance Program
EO 13123	Greening the Government through Energy Efficient Management
EO 13423	Strengthening Federal Environmental, Energy, and Transportation Management
FAA GS-2152	FAA Certification and Authorization Handbook: Air Traffic Control Series
FAA NASEA AV-1	Overview and Summary Information
FAA Order 1053.1	Energy and Water Management Program for FAA Buildings and Facilities
FAA Order 1320.32	DOT Directives – Clearance and Implementation
FAA Order 1320.58	Equipment and Facility Directive – Modification and Maintenance Handbook
FAA Order 1370.100	Media Sanitizing and Destruction Policy

Document ID #	Title
FAA Order 1370.105	Logical Access Control Policy
FAA Order 1370.82	Federal Aviation Administration Information Systems Security Program
FAA Order 1370.91	Information System Security Patch Management
FAA Order 1370.92	Password and PIN Management
FAA Order 1370.96	ATO System Access Control
FAA Order 1375.1	Data Management
FAA Order 1350.14A	Federal Records Management Policy
FAA Order 1350.15C	Records, Organization, Transfer, and Destruction Standards
FAA Order 1280.1	Protecting Personally Identifiable Information (PII)
Title 36 pf the Code of Federal Regulations (CFR) Part 1194	Electronic and Information Technology Accessibility Standards
FAA Order 1600.1	Personnel Security Program
FAA Order 1800.66	Configuration Management Policy
FAA Order 1810.8	FAA William J. Hughes Technical Center's Test and Evaluation Policy
FAA Order 1800.58A	National Airspace Integrated Logistics Support (NAILS) Policy
FAA Order 3320.4	Space Acquisition
FAA Order 3900.19	Occupational Health and Safety Program
FAA Order 4441.16	Request for Telecommunications Services(s) (RTS)
FAA Order 4600.27	Personal Property Management
FAA Order 4630.5	Quality and Reliability Assurance of General Operating Material Managed by the FAA Logistics Center
FAA Order 6000.15	General Maintenance Handbook for National Airspace System (NAS) Facility
FAA Order 6000.22	Maintenance of Analog Lines
FAA Order 6000.30	National Airspace System Maintenance Policy
FAA Order 6000.36	Communication Diversity
FAA Order 6000.47	Maintenance of Digital Transmission Channels
FAA Order 6000.53	Remote Maintenance Monitoring Interfaces
FAA Order 6650.8	Airport Fiber Optic Design Guidelines
FAA Order 6950.2	Electrical Power Policy Implementation NAS Facilities

Document ID #	Title
FAA Order 8040.4	Safety Risk Management
FAA Order 8260.3	United States Standards for Terminal Instrument Procedures
FAA Order 8260.44	Civil Utilization of Area Navigation (RNAV) Departure Procedures
FAA-D-2494	Technical Instruction Book Manuscript: Electronic, Electrical, and Mechanical Equipment, Requirements for Preparation of Manuscript and Production of Books
FAA-G-2100	Electronic Equipment and General Requirements
FAA-Order 1600.69	Facilities Security Management Program
FAA-Order 1600.75	Protecting Sensitive Unclassified Information
FAA-STD-005	Preparation of Specifications, Standards and Handbooks
FAA-STD-019	Lightning and Surge Protection, Grounding Bonding and Shielding Requirements for Facilities and Electronic Equipment
FAA-STD-020	Transient Protection, Grounding, Bonding and Shielding Requirements for Electronic Equipment
FAA-STD-021	Configuration Management (Contract Requirements)
FAA-STD-025	Preparation of Interface Documentation
FAA-STD-026	Software Development for National Airspace (NAS)
FAA-STD-028	Contract Training Program
FAA-STD-039	NAS Open System and Protocols
FAA-STD-045	Open System Interconnection Security Architecture
FAA-STD-060	Data Standard for National Airspace System
FAA Guide	FAA Asset Identification Process and Procedure Guide
Federal Information Processing Standards (FIPS) Publication (PUB) 199	Standards for Security Categorization of Federal Information and Information Systems
Federal Information Processing Standards (FIPS) Publication (PUB) 200	Minimum Security Requirements for Federal Information and Information Systems
HF-STD-04	Human Factors Design Standard
IEC 6006.8	Environmental Testing

Document ID #	Title
IEC 61000	Electromagnetic Compatibility (EMC)
IEEE/EIA 12207.0	Standard for Information Technology Software Life Cycle Process Description
ISO 9001:2008	Quality Management Requirements
ISO-10007	Quality Management Guidelines for Configuration Mangement
MIL-HDBK-61	Configuration Management Guidance
MIL-HDBK-46855	Human Engineering Program Process and Procedures
MIL-HDBK-470A	Designing and Developing Maintainable Products and Systems
MIL-HDBK-781	Handbook for Reliability Test Methods, Plans and Environments for Engineering, Development, Qualification, and Production
MIL-STD-461	Requirements for the Control of Electromagnetic Interference Characteristics of Subsystems and Equipment
MIL-STD-498	Software Development and Documentation
NAS Systems Engineering Manual	Version 3.1, dated (6 June 2006)
NAS-SR-1000	System Requirements Specification: Functional View
National Institute of Standards and Technology (NIST) Special Publication (SP) 800-64	Security Considerations in the System Development Life Cycle, October 2008
NIST SP 800-18 NIST SP 800-30 NIST Sp 800-34 NIST SP 800-37 NIST SP 800-53	Guide for Developing Security Plans for Federal Information Systems Risk Management Guide for Information Technology Systems Contingency Planning Guide for Information Technology Systems Guide for the Security Certification and Accreditation of Federal Information Systems Recommended Security Controls for Federal Information Systems
NIST SP 800-60	Guide for mapping Types of Information and Information Systems to Security Categories
OMB Circular A-130	Management of Federal Information Resources
Q-900-2	American Society for Quality Control (ASQC) Q-900-2 Quality Management Systems

Document ID #	Title
WSLD 2.0	Web Services Language Description
XML 1.0	Extensible Markup Language
FAA – CT-96-1	Human Factors Design Standard

C.3 PROGRAM MANAGEMENT

The Contractor must establish and maintain a program management organization and infrastructure necessary to implement all contract requirements for the entire life cycle of the program. The Contractor must assign a Program Manager (PM) to organize, plan, schedule, implement, control, analyze, and report on all elements of the contract. This must include, but not limited to, program management activities such as contract administration, finance, obtaining and retaining qualified personnel, as well as technical support across all phases of the program. The PM must have sufficient corporate authority to direct, execute, and control all elements of the program. The PM must have resources and authority to ensure efficient and timely program execution. The PM must be the focal point within the Contractor's activities for all required program tasks. The PM must be prepared at all times to present and discuss the current program status as well as forecasts related to contract activities with the Government Contracting Officer (CO), the Contracting Officer's Technical Representative (COTR), and/or the Government PM. Relevant contract activities include resource loading, work breakdown structure, schedules, deliverables, Earned Value (EV) analysis, and funds expenditure tracking and status.

The Contractor must provide management oversight of all contract activities to ensure the quality of work effort and deliverables. The Contractor must provide traceability to all program requirements. The Contractor must identify and remedy potential technical cost and schedule risks and issues. The tasks described herein must be fully integrated to ensure their efficient and timely execution.

C.3.1. Program Control

The Contractor must implement and conduct a program control activity that ensures efficient and timely program execution. The program control effort must support identification and reporting of the status of the program as well as identification of program anomalies and corrective action plans.

The Contractor must provide, for the contract period of performance, on-going Government access to records and data that support the cost data reported.

C.3.2. Program Planning and Reporting

C.3.2.1. Program Management Plan

The Contractor must develop, maintain and update an integrated Program Management Plan (PMP). The PMP must demonstrate Prime Contractor and subcontractor(s) integration within the overall program management plans and procedures. The PMP must integrate all functional areas (e.g., systems engineering, software engineering, testing, configuration management, risk management, quality assurance, security, safety, integrated logistics support) and define the specific objectives to be accomplished for the successful execution of the program. The PMP must specify the work tasks, at an overview level, necessary to meet SOW requirements. The PMP must also discuss staffing and other resources required to meet contract requirements.

The PMP must include a Contract Work Breakdown Structure (CWBS) that is based on a logical and efficient sequence of tasks designed to accomplish the effort described in this contract. The CWBS must describe the work that will be accomplished and must facilitate management data collection and reporting. The CWBS must include a CWBS Dictionary and CWBS Index. The CWBS must align with the current FAA approved WBS, as addressed in the FAA's Acquisition System Toolset, but may be tailored to best facilitate contract management. The Contractor must use the CWBS as the primary framework for contract planning, budgeting, reporting program cost and schedule status to the Government, and maintain the CWBS throughout the life of the contract. The Contractor must deliver the CWBS as Appendix A to the PMP.

The Contractor must not modify the CWBS or associated definitions for any reporting elements identified in the CWBS without prior Contracting Officer Approval.

CDRL M01: Program Management Plan
CDRL M01: Appendix A - Contract Work Breakdown Structure

C.3.2.2. Meetings, Reviews, Conferences and Evaluations

The Contractor must support recurring status meetings, Technical Interchange Meetings (TIMs), Program Management Reviews (PMRs), Formal Design Reviews, and evaluations with the Government to discuss program progress, identify potential problems and resolve identified problems.

The Contractor must prepare Agendas, Meeting Minutes, Action Item Lists, and Presentation Materials for each meeting, conference review and/or evaluation. The Contractor must notify the Government of its readiness prior to the start of any meeting, review, conference, and/or evaluation.

The following instructions are applicable to all meetings, reviews, conferences, and/or evaluations:

1. All meetings, reviews, conferences and/or evaluations will be held in the Washington, DC metro area unless directed by the Government. The Contractor must provide teleconferencing capability, internet access, and facility location to accommodate necessary participation as requested by the Government. The Contractor must propose a date for the meeting, review, conference, and/or evaluation for the COTR's approval.
2. For all presentations, the Government reserves the right to revise the agenda and/or presentation. The Contractor must provide appropriate Contractor personnel available to respond to Government questions. The Contractor must prepare and deliver a summary of open, pending, and closed action items and presentation materials prior to the start of each scheduled conference, meeting, review or evaluation.
3. The Contractor must record and submit minutes. The Contractor must track action items. Each assigned action item must have a due date and responsible person(s) assigned, who must provide the status of the action at agreed upon intervals until the action is closed. Unless otherwise specified by the Government, the Contractor must respond to all action items with a written closure statement In the event that an action item cannot be closed promptly a plan of action must be developed for closure. The updated presentation material, action items, and meeting minutes must be submitted to the Government within seven (7) calendar days after each event.

C.3.2.2.1. Post Award Conference

The Contractor must plan, support, and participate in a Post Award Conference (PAC) within seven (7) calendar days after contract award The Contractor must demonstrate adequacy of proposed planning efforts to meet contractual requirements in areas such as, but not limited to, complete coverage of this SOW, logical scheduling of the work activities, and risk management.

The Contractor must provide an overview of the following at the PAC:

1. Evolution Plan
2. Transition Plan
3. Program Management Plan
4. System Engineering Management Plan
5. Quality System Plan
6. Configuration Management Plan
7. Software Development Plan
8. Integrated Master Schedule

Draft PMP, QSP, and CMP must be delivered at the PAC.

C.3.2.2.2. Technical Post-Award Conference

The Contractor must plan, support, and participate in a Technical Post-Award Conference (TPAC) to be held within thirty (30) calendar days after contract award. The Contractor must demonstrate the ability to achieve contractual requirements to include the following but not limited to:

1. Evolution
2. System architecture
3. Overview of enhancements
4. Requirements issues
5. Risk management
6. Engineering review
7. Design review
8. Software development
9. System testing

CDRL M02: Agenda, Presentation Materials, Action Item List and Meeting Minutes

C.3.2.2.3. Program Management Reviews

The Contractor must conduct and support PMRs to provide a status of work being conducted under this contract. The Contractor must be prepared to support monthly PMRs but the Government reserves the right to increase or decrease the frequency in accordance with (IAW) the program needs. For all PMRs, the Government PM may modify the meeting schedule to accommodate special program needs. At PMRs, the Contractor must provide, at a minimum, program's management, technical, cost and schedule status. The Contractor must use PMRs to provide program insight to Government representatives on the topics including, but not limited to:

1. Major accomplishments since the last PMR and expected major accomplishments prior to the next PMR
2. Anticipated differences between contract milestones, schedules, technical performance, cost, Estimate at Completion (EAC) and performance status including identification of major drivers behind cost/schedule variances and the action plans to resolve these variances
3. Changes in organizational chart and planned versus actual staffing by functional discipline
4. Review of actions from previous PMR, future required actions, and funding status

5. Integrated Master Schedule (IMS) identifying schedule changes from previous PMR, completed and upcoming milestones, critical path status, all critical path changes, critical path issues and impacts, and a preview of all activities for the next ninety (90) calendar days
6. Contractor deliverables to be delivered within the following ninety (90) calendar days, the status of CDRL reviews from the Government and status of changes from the previous PMR
7. Status of open problem reports (PRs), and/or discrepancy reports (DRs) and change requests (CRs) since the last PMR
8. Status of testing including testing metrics
9. Status of program risks and their mitigation plan
10. Program management action item status
11. Notification of any deviations/waivers from the requirements and the associated justification
12. Commercial product obsolescence and supportability issues and recommended actions
13. Status of all Government Furnished Equipment (GFE)/Government Furnished Information (GFI)
14. Status of ECPs
15. Implementation and site activation/deployment status
16. Status of production readiness to include:
    a. Procurement/integration and production schedules for system components
    b. System integration schedules that demonstrate compatibility with the site deployment schedule

C.3.2.2.4. Integrated Baseline Review

The Contractor must conduct an Integrated Baseline Review (IBR) for the purpose of reviewing the Contractor's planning efforts to meet contractual requirements in areas such as, but not limited to, complete coverage of this SOW, logical scheduling of work activities, adequate allocation of resources including plans for software development environment, and risk management. The Contractor must refer to Section H and the National Defense Industrial Association (NDIA) IBR Guide as guidance in preparing for and conducting the IBR. The Contractor will schedule the IBR to occur no later than ninety (90) calendar days after contract award. The Government will approve the date and location.

C.3.2.2.5. Technical Interchange Meetings

At the request of the Government or the Contractor, TIMs must be held to discuss issues that require mutual resolution or further clarification. The Government must approve TIMs initiated by the Contractor before the TIM is scheduled. TIMs must be held at Government, Contractor, or other facilities, as directed by the Government. The Contractor must prepare TIM material IAW CDRL M02.

C.3.2.3. Integrated Master Schedule

The Contractor must develop and maintain an Integrated Master Schedule (IMS). The IMS must identify critical milestones (including all applicable support activities) for meeting program activities as defined in this SOW and Section F for the period of performance for this contract. .

The Contractor must ensure that the IMS:

1. Includes all contractually specified milestones and Contractor activities to meet the milestones
2. Includes appropriate predecessors, successors, and all relationships between activities
3. Identifies the critical path

4. Identifies all GFE/GFI required to meet these milestones, along with the need dates
5. Organized according to the CWBS
6. Consistent with the Government approved EVMS
7. Includes all site activities
8. Includes sufficient detail to allow tracking of progress throughout the life cycle
9. Includes all CDRLs and other contract deliverables

CDRL M03: Integrated Master Schedule

C.3.2.4. Earned Value Management System

The Contractor must establish, maintain, and use an EVMS that complies with provisions provided in Section I. The Contractor must use the same EVMS for all subcontractors. The EVMS must be used to plan, control costs, measure performance, and identify cost and schedule variances. The Contractor must prepare and submit a monthly Cost Performance Report (CPR) starting at the IBR and utilizing the EVMS along with a monthly written analysis that examines the actual prime and subcontractor(s) expenditures measured against the planned expenditures. The data used to generate performance information must also be used to develop a Contract Funds Status Report (CFSR) providing funding status and requirements.

CDRL M04: Cost Performance Report
CDRL M05: Contract Funds Status Report

C.3.2.5. Risk Management

The Contractor must establish a Risk Management Program for early and continuous identification, assessment, tracking and systematic reduction of risks that could impact the Contractor's ability to meet its technical, cost and schedule objectives. The Contractor's Risk Management Program must be documented in the Risk Management Plan. The Contractor must deliver the Risk Management Plan as Appendix B to the PMP. This Risk Management Program must accomplish objectives including, but not limited to, the following:

1. Identify potential sources and drivers of risks
2. Quantify risks, including risk levels, and their impacts on cost (including life cycle costs), schedule and performance. Include design, cost, and schedule uncertainties and sensitivity to program, product, and process assumptions
3. Determine the sensitivity of interrelated risks
4. Determine potential alternative approaches to mitigate moderate and high level risks
5. Develop mitigation plans to minimize risks
6. Develop and maintain risk-reporting matrix
7. Take actions to avoid, control, or accept each risk. Update program document(s) as necessary
8. Ensure that risk is factored into all subsequent actions or decisions on implementation of requirements, design, and solution alternatives

The Contractor must also identify the program personnel with assigned risk management roles The Contractor must provide a summary of prioritized risks and proposed risk mitigations at each PMR.

The Contractor must quantify risks with respect to their impact on all phases of the program. In assessing the life cycle risks, any interdependencies with other programs must be considered. Interdependencies must be documented in the risk assessment submission as a statement of alternative dependencies.

The Contractor must identify risks and assign a priority for developing a recommended course of action IAW the NAS System Engineering Manual. The Contractor must develop risk mitigation plans for priority risks and track the effectiveness of risk mitigation and strategies.

The Contractor may submit to the Government risk mitigation strategies involving prototyping. The Contractor must submit a recommendation describing cases where prototyping would reduce risk associated with design decisions. Prototypes may be developed and tested at the developer's facility or with prior Government approval at William J. Hughes Technical Center (WJHTC), or other specified Government sites. Prototype activities must not impact NAS operations.

Contractor must update the status and risk mitigation plans on a monthly basis and summarize risk management progress during scheduled PMRs. The Contractor must request Government concurrence for each program risk disposition, and must add new risks as discussed and identified during the PMRs. Electronic access to risk management information must be provided to Government approved personnel.

CDRL M01: Appendix B - Risk Management Plan

C.3.2.6. Program Performance Measurement System

The Contractor must develop and maintain, throughout the duration of this contract, a Performance Measurement System. The system must include measurement indicators for tracking Contractor progress and performance in all phases of the program life cycle. In addition, the Contractor must collect data related to the cost of ownership and operational benefits over the life of the program and provide status, resolution and analysis of high severity problem reports as well as change requests. This data will support Government investment analyses, benefits quantification, and related activities. Data from the Performance Measurement System will serve as input to the Management Indicators Report (MIR).

CDRL M06: Management Indicators Report

C.3.3. Contract Management

C.3.3.1. Knowledge Sharing Network

The Contractor must utilize the Government's web-based knowledge sharing network. The Contractor must provide at a minimum the following:

1. Copies of all correspondence related to this contract between the Contractor and the Government
2. Documentation providing traceability and rationale for the Contractor's program decisions
3. The latest internally controlled version of all specifications, drawings, databases and software that define or implement the system
4. Copies of all briefings
5. All configuration management documentation
6. Site hardware and software inventory lists
7. All CDRLs

The Contractor must provide to the Government, no later than fourteen (14) calendar days after contract award, the following information for each employee requiring access:

1. Name
2. Email address
3. Work Phone Number

4. Functional Responsibility

C.3.3.2. Commercial Product Management

The Contractor must establish a Commercial Product Management Program and document the program in a Commercial Product Management Plan (CPMP). The CPMP must document the Contractor's processes for the management of commercial hardware, software and firmware products including Non-Developmental Items (NDI) and GFP commercial products that are used. The Contractor must deliver the CPMP as Appendix A to the SEMP.

CDRL E01: Appendix A - Commercial Product Management Plan

C.3.4. Quality Assurance

C.3.4.1. Quality Assurance Program

Quality Assurance (QA) is applicable to all phases of the program. In addition to the requirements in Section E, the Contractor must develop and maintain a QA Program IAW Quality Control Standards. The QA Program must be documented in a Quality System Plan (QSP) and provide QA for the design, development, and evaluation of hardware and software. At a minimum, the Contractor's quality assurance program must provide the following:

1. Procedures and controls to ensure products and/or supplies comply with all requirements of this contract
2. A quality assurance organization that has sufficient responsibility and authority to identify and evaluate quality problems, and to initiate, recommend, and provide solutions
3. Procedures and controls to ensure adequate CM during all operations through final acceptance
4. Controls to ensure that all inspection and testing is performed in compliance with contract requirements and that all test data is complete, correct, traceable, repeatable, and acceptable
5. Maintenance of a proper record keeping function to provide objective evidence and traceability of operations performed
6. Procedures and controls for assuring that all products or services procured from subcontractors or vendors, including pre-packaged COTS products, conform to contract requirements
7. Procedures and controls to ensure that all documentation is adequately reviewed, and meets contract requirements
    a. Procedures and controls for the prevention of software and adaptation deficiencies
    b. Detection and analysis of deficiencies and procedures for corrective action

The inspection requirements specifically set forth in this SOW must become a part of the Contractor's overall QA program. The Contractor must perform a series of periodic internal quality audits to verify whether quality activities and results are in compliance with the Contractor quality assurance program.

The absence of Government inspection does not relieve the Contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of this contract.

CDRL M07: Quality System Plan

C.3.4.2. Quality Assurance Management Responsibility

Due to the safety and secure nature of air traffic management services, failure of the Contractor to correct deficiencies to the satisfaction of the Government may be cause for suspension of acceptance by the Government until corrective action has been taken, or until conformance of the product to prescribed criteria has been demonstrated. The Contractor must document the results and recommendations for each quality evaluation performed including evaluations of current TMA configurations and newly developed or integrated software and adaptation. These evaluations must span the entire program life cycle. The evaluations must be maintained by the Contractor's QA organization, and must be made available to the Government upon request.

C.3.4.3. Quality Assurance Verification

All QA operations performed by the Contractor must be subject to Government verification at any time.

Government verification will consist of, but not be limited to:

1. Government surveillance of the operations to determine that practices, methods and procedures of the written quality program are being properly applied
2. Government product inspection to measure quality of the product to be offered for acceptance

C.4 SYSTEMS ENGINEERING

The Contractor must execute a Systems Engineering Program throughout the lifecycle of the program. The Contractor must specify a single authority who will serve as a point of contact for all systems engineering issues.

The Contractor's System Engineering Program must perform the necessary engineering processes across all engineering disciplines required to design, develop, test, implement, maintain and upgrade the system that fully meets the TBFM SSD. The Contractor must perform the systems engineering technical analysis, modeling and risk reduction activities resulting in a functional analysis of the system requirements, including interoperability with and transition strategy from legacy TMA systems, and a requirements allocation to specific system Configuration Items (CIs). The Contractor must conduct requirements and system design reviews supporting the program. The Contractor must maintain traceability between the SSD and Contractor-developed requirements and design documents.

C.4.1. System Engineering Management

The Contractor must document the Systems Engineering Program in a Systems Engineering Management Plan (SEMP). The Contractor must use the Government approved SEMP in preparing integrated system engineering activities. Systems engineering management techniques must be used for planning and control of the engineering activities. The Contractor must identify and define use of all system and software tools. The Contractor must describe how system engineering activities will be conducted during system evolution for both the existing system and the evolving system.

CDRL E01: Systems Engineering Management Plan

C.4.1.1. Reliability, Maintainability and Availability

The Contractor must establish a Reliability, Maintainability and Availability (RMA) program to ensure that RMA requirements are considered in selecting, assembling, and integrating system products. The Contractor must document the RMA program as an integrated subsection of the SEMP System availability must be IAW NAS Essential System's RMA standards.

C.4.1.2. Engineering Reviews

The Contractor must conduct Engineering Reviews to demonstrate progress throughout the phases of the program lifecycle. The Government reserves the right to decide whether to authorize entry to the next phase of the life-cycle at the end of each review.

The Contractor must deliver meeting materials IAW CDRL M02 and technical documents identified and IAW applicable CDRLs.

C.4.1.2.1. Trade Studies

The Contractor must conduct trade studies that support engineering decisions for the program. Trade studies must be documented in a Technical Report.

CDRL E02: Technical Report

C.4.1.2.2. Engineering Readiness Reviews

The Contractor must plan for and participate in Readiness Reviews. The Contractor must provide the formal mechanism for a comprehensive objective assessment of the current maturity of the program.

The Government will assign a Readiness Review Team to assess maturity of the program, prior to technical reviews, to include but not limited to:

1. Confirming the Contractor has met the entrance and exit criteria as defined in the SEMP
2. Identifying documents that must be prepared for each review
3. Assessing documents and program status to determine readiness
4. Conducting readiness review

C.4.1.2.3. Requirements Review

The Contractor must plan for and participate in a Requirements Review IAW Section F. The Requirements Review is a review of the TBFM requirements with the Government. The Contractor must be prepared to discuss the following topics:

1. System Specification Document (SSD)
2. System Sub/System Specification (SSS)
3. Interface Requirements Specification (IRS)
4. Security Requirements
5. Privacy Requirements
6. Record Requirements
7 508 Requirements

C.4.1.2.4. System Design Review

The Contractor must plan for and participate in a System Design Review (SDR) IAW Section F. The purpose of the SDR is to review the TBFM high-level system design with the Government The Contractor must be prepared to discuss topics from the following documents:

1. Evolution Plan
2 System Sub/System Design Document (SSDD)
3. Information System Security Plan (ISSP)
4. Hardware Architecture Document (HAD)

5. Contractor Master Test Plan (CMTP)
6. Integrated Logistics Support Plan (ILS)
7. Interface Control Document (ICD)
8. Human Factors Engineering Program Plan (HEPP)

The Contractor must provide updates of all Security, Safety, Training, and other system design plans.

C.4.1.2.5. Detailed Design Review

The Contractor must plan for and participate in a Detailed Design Review (DDR) IAW Section F. The purpose of the DDR is to provide the Government with a review of the detailed system design. The Contractor must be prepared to discuss topics from the following documents:

1. SSDD
2. System Performance Plan (SPP)
3. Software Design Document (SDD)
4. HAD

The Contractor must provide updates of all Security, Safety, Training, and other system design plans at the DDR.

C.4.2. System Requirements and Traceability

C.4.2.1. System Requirements Traceability Matrix

The Contractor must develop and maintain system requirements traceability throughout all phases of the program life cycle. The System Requirement Traceability Matrix (SRTM) must be used to document the system requirements traceability between the SSD and the SSS. All system requirements must be addressed in a single SRTM, unless the Government approves an alternative SRTM format. The Contractor must deliver the SRTM as Appendix A to the SSS.

CDRL E03: Appendix A – System Requirements Traceability Matrix

C.4.2.2. System/Subsystem Specification

The Contractor must use the Government TBFM SSD as the basis of all system engineering requirements analysis. The Contractor must identify the major functional subsystems of the system and for each subsystem must document the expanded requirements in the SSS. The SSS development process must be based upon a Contractor-proposed schedule as approved by the Government. The Contractor must maintain the SSS throughout the duration of the contract.

CDRL E03: System/Subsystem Specification

C.4.2.3. System/Subsystem Design Document

The Contractor must define and document the high-level architecture, including allocation of SSS and IRS to appropriate CIs, in the SSDD. The Contractor must deliver and maintain the SSDD throughout the duration of the contract.

The Contractor must document in the Requirements Allocation Matrix (RAM) the traceability from the SSS and interface requirements to the System CIs (hardware and software) identified in the SSD, including all requirements allocated to COTS or NDI. Requirements allocated to COTS or NDI must be clearly identified in the RAM The Contractor must maintain the RAM throughout the duration of the contract. The Contractor must deliver the RAM as Appendix A to the SSDD

CDRL E04: System/Subsystem Design Document

CDRL E04: Appendix A – Requirements Allocation Matrix

C.4.2.4. Requirements Management Tools

The Contractor must utilize Government approved automated requirements management tools for maintaining the system and interface requirements and requirements traceability matrices. The Contractor must provide Government approved personnel remote login access to these tools. Access must include read, write and/or modify permissions. The Contractor must load the SSD requirements into the automated requirements management system in order to trace SSD-SSS and SSD-IRS requirements in the requirements traceability matrices. The Contractor and the Government will collaboratively maintain the SSD requirements within the automated requirements management system; the Government will retain QA and CM authority over the SSD requirements.

The SSS, IRS and SSD requirements data elements in the automated requirements management tool will be considered the formal version of the requirements; the approved SSS and IRS will be considered the official document for the system requirements and interface requirements, respectively. The Contractor must prepare reports for Government review.

C.4.3. Interfaces

The Contractor must develop an IRS to specify the requirements imposed on the system, subsystems, Hardware Configuration Items (HWCIs), Computer Software Configuration Items (CSCIs), manual operations, or other system components to achieve one or more interfaces among these entities. The IRS must be used to supplement the SSS as the basis for design and qualification testing.

The Contractor must develop and maintain interface requirements traceability throughout all phases of the system life cycle. The Interface Requirements Traceability Matrix (IRTM) must be used to document the interface requirements traceability between the SSD and the IRS. All interface requirements must be addressed in a single IRTM, unless the Government approves an alternative IRTM format. The Contractor must deliver the IRTM as Appendix A to the IRS. The Contractor must identify all external system interfaces in the SSDD.

The Contractor must update existing Interface Control Documents (ICDs) for legacy systems and develop ICD(s) for new external interfaces, as required IAW FAA-STD-025. The Contractor must use the legacy ICD(s) for guidance.

The Contractor must support Interface TIMs to coordinate interface issues with the Government.

CDRL E05: Interface Control Document
CDRL E06: Interface Requirements Specification
CDRL E06: Appendix A – Interface Requirements Traceability Matrix

C.4.4. Engineering Changes

During Contractor development of the TBFM System, the existing TMA System will continue to evolve. The Contractor must develop additional software to implement all capabilities that have been modified or added to the TMA System. The results of this effort will be to align the Contractor's TBFM System with the currently fielded System.

The Government will provide updated system requirements to the Contractor, as needed Based on those new requirements, the Contractor must perform all Systems Engineering tasks required to perform the necessary requirements analysis, and must develop and deliver an ECP to the Government, as needed.

The Contractor must conduct TIMs to discuss the results of the analysis with the Government.

C.4.5. Evolution of TMA System to the TBFM System

The Contractor must propose a strategy for evolving the current System to the TBFM System, The strategy must include provisions for continuity of all current processing and communications facilities and systems, to include those current subsystems not being modernized. For the duration of the system evolution, all new functionality must be included in all releases of both the current system and the evolving system. The Contractor must document the proposed strategy in an Evolution Plan. The Contractor must present the Evolution Plan at Design Reviews. The Evolution Plan must identify proposed re-use of GFE/GFI and/or new GFE/GFI that would be required.

CDRL E07: Evolution Plan

C.4.6. Technical Performance Measurement

The Contractor must collect, analyze, and report Technical Performance Measurements (TPMs) to assess and monitor technical performance. The TPM must be specified in the Program Performance Measurement System. Significant program level results must be reported in the MIR.

C.4.6.1. System Performance Plan

The Contractor must develop a System Performance Plan (SPP). The SPP must describe each operational performance measurements to be collected in support of the design and development of the System. The SPP must contain a description of all Contractor-developed or acquired performance models and tools and recommended TPMs to be used for evaluation of the System operational performance as approved by the Government. The SPP will cover how each of these models will be used and which measurements will come from which performance model or tool. Technical performance measurement and evaluation must be included in all systems engineering analysis.

CDRL E08: System Performance Plan

C.4.6.2. Model Development and Execution

The Contractor must use existing model(s) or must develop a model(s) to conduct System performance prediction analyses. The Contractor must use the approach documented in the approved SPP to validate the model(s). The Contractor must identify the projected data flows for internal and external interfaces of the proposed system. The Contractor must also define and model a peak system workload.

SPMs identified in the Government-approved SPP must be assessed using workload scenarios that include steady-state and transient (utilization, reset, failure, and recovery) events. Response time performance must be assessed using the workload scenarios defined by the Contractor and approved by the Government.

The Contractor must use actual measured data to the maximum degree possible in the performance model(s). Where no measured data exists, the Contractor must use the approach documented in the approved SPP to estimate the data for initial model runs. As system development proceeds, model parameters must be updated to reflect the actual design and the actual measured data. The Contractor must document, IAW the SPP, the model design, model components, inputs and outputs used to support predictions of TPM values in the SPP. The Contractor must provide to the Government models including source code and associated documentation.

C.4.6.3. System Performance Reporting

The Contractor must document system performance predictions and corresponding measurements in the System Performance Report (SPR).

The Contractor must include a Variance Analysis Report (VAR) in the SPR whenever a system model prediction for a TPM falls outside its tolerance band. Whenever a VAR is reported, the Contractor

must develop a risk mitigation plan that is acceptable to the Government. VARs with Government-approved mitigation plans must be presented at PMRs as needed.

CDRL E09: System Performance Report

C.4.7. Human Factors Engineering

The Human Factors Engineering (HFE) program must be part of the system analysis, design, development, and test process. The Contractor must include HFE as an element of program management activities such as PMRs, design reviews, system demonstrations, and TIMs. The HFE program must use the Human Factors Design Standard (HFDS) and MIL-HDBK-46855 as applicable. In case of conflicting requirements, the HFDS must have precedence.

C.4.7.1. Approach

The Contractor must execute an HFE Program and must develop and deliver a Human Factors Engineering Program Plan (HEPP).

The HFE program must ensure that the system design is consistent with the capabilities and limitations of the air traffic service provider and/or maintainer in the operational environment. In addition, HFE program must optimize human performance during system operation, maintenance and support, this must include accountability for the variations in site operational conditions, workload variations, and training implications to ensure or enhance air traffic safety. The impact of equipment, software, and procedures on personnel availability, skill levels, proficiency, and operation and maintenance under various levels of stress must be assessed to assure that the mental and physical demands on personnel resources are consistent with capabilities and job requirements. In order to achieve this, prototyping may be required.

CDRL E10: Human Factors Engineering Program Plan

C.4.7.2. Human Factors Engineering Analysis

The Contractor must conduct a HFE analysis to include but not limited to, the user workstation layout, detail design and system displays. Results of the analysis must be delivered in a Human Factors Engineering Design Approach Document-Operator (HEDAD-O) and addressed within on-going systems engineering design activities.

CDRL E11: Human Factors Engineering Design Approach Document-Operator

C.4.8. Information System Security Program

The Contractor must develop and execute an Information System Security Program for the system. The security program must be documented in the ISSP. The Contractor must mitigate all risks to the medium level or as deemed acceptable by the Government. The ISSP must apply to all phases of the program and must ensure the Contractor meets all requirements of SSD.

The Contractor must ensure that the Information System Security Program is managed and operated using industry standard security engineering principles and a system development lifecycle methodology that includes information security considerations. Security activities must be conducted IAW Government information security requirements as defined in Section C2.0 (Applicable Documents)

The Contractor must support required Government Security Certification and Authorization activities for the System. The Contractor must provide the necessary information to support the Government in updating Security Certification and Authorization Package (SCAP) documents, as well as annual

security assessment documents IAW guidance and templates provided by the FAA Information System Security Program Office.

The Contractor must support the Government in conducting risk assessments, conducting contingency/disaster recovery planning and testing, and security testing and evaluation IAW the requirements of the FAA Information System Security (ISS) Program.

The Contractor must ensure that appropriate documentation is provided describing the functional properties of the security controls employed within the information system with sufficient detail to permit analysis and testing of the controls. The Contractor must support the development and implementation of other security-related documentation as required. The Contractor must develop and submit to Government for approval Security Standard Operating Procedures (SSOP), IAW the requirements established by the FAA Information System Security Program.

The Contractor must develop and deliver the Contingency/Disaster Recovery Plan (C/DRP). The Contingency/Disaster Recovery Plan (C/DRP) must identify the system's concept of operations, essential resources and points of contact (POC), and processes and procedures to follow in the event of a major system outage. This C/DRP is based on National Institute of Standards and Technology (NIST) Special Publication 800-34 Contingency Planning Guide for Information Technology Systems.

The Contractor must develop and deliver the System Characterization. The System Characterization must document the system description, including the system overview and mission; system architecture; hardware and software; internal and external connectivity; and system data/information types, sensitivity, and criticality. The system characterization is included as part of the System Name assessment process.

CDRL S01: Information System Security Plan
CDRL S02: Information Supporting Security Certification and Authorization Package Annual Assessment Requirements
CDRL S03: Contingency/Disaster Recovery Plan
CDRL S04: System Characterization
CDRL S05: Security Standard Operating Procedures

C.4.9. System Safety Program

The Contractor must develop and deliver the System Safety Program Plan (SSPP), System Safety Assessment Report (SSAR), and the System Hazard Analysis (SHA). The Safety Requirements Verification Table (SRVT) must be included in the SSAR. The System Risk Management Guidance for System Acquisitions (SRMGSA) must be used for the definitions and placement of appropriate information in the SSPP and supporting safety documents. The SSAR must be provided prior to Government system acceptance. The SHA must be provided at each DDR.

The Contractor must develop a SSPP for Government approval and execute a System Safety Program based on this plan. The System Safety Program must be initiated during the System Design Phase and must continue throughout the duration of the contract.

CDRL E12: System Safety Program Plan
CDRL E13: System Safety Assessment Report
CDRL E14: System Hazard Analysis

C.4.10. Access to System Development Environment

The Contractor must provide full and timely access to the system/software development environment for Government identified personnel. The Contractor must provide access to the following but not limited to:

1. Remote and electronic access to requirements traceability, informal test plans, procedures, test results, data, design and code walkthrough material, and action items documentation, and source code. The Contractor may propose an alternative method to providing remote access subject to Government approval
2. Physical access to Contractor' facilities

The Contractor must provide timely notification to the Government of any adverse impact to the development effort arising from the cooperation and access afforded to the Government as specified herein.

C.4.11. Configuration Management

Configuration Management (CM) is applicable to all components throughout the life cycle of the program.

The Contractor must establish within its organization the practices, policies, and procedures for implementing the requirements of a CM program for the program. The procedures must apply to all subcontractors, vendors, and suppliers. The Contractor must establish a single authority responsible for this CM task. The CM program must be documented in the Configuration Management Plan (CMP).

CDRL C01: Configuration Management Plan

C.4.11.1. Configuration Items

The Contractor must establish and perform functions necessary to identify, label, serialize, and mark all CIs ensuring that traceability is maintained through all revision levels of each item and between all representations of that item (e.g., tape, disk, hardcopy) for the entire CM life cycle. The Contractor must assign required unique identifiers described below:

1. Document numbers. An identification number must be assigned to specifications, engineering drawings, associated lists, and ancillary documents.
2. Part/item identification numbers. A discrete part or item identification number must be assigned to each CI and its subordinate parts and assemblies. An identification number must be changed whenever a non-interchangeable condition exists.
3. Software identifiers. The Contractor must assign discrete part/item identification to all software media (e.g. tape, disk), that contains a version number, revision number, and release date. The medium identified must be inclusive and contain all subordinate software segments within CIs to enable identification of differences in files and site versions. The Contractor must also uniquely identify modified commercial CIs.
4. Serial numbers. The Contractor must inventory and manage HWCIs using vendor serial numbers.
5. Product identification/marking. All CIs, sets, and other pieces must be marked with identification nameplates.
6. Firmware labeling. The Contractor must label firmware on the device or on the next higher device (if the device is too small). The label must consist of a part number representing the device with the code embedded.
7. NDI and Commercial Item labeling. When an NDI or commercial CI is modified to satisfy Government requirements, the CI must be re-identified as a Government modified CI, documented, and controlled.

C.4.11.2. Configuration Baselines

The Functional Baseline (FBL), Allocated Baseline (ABL) and Product Baseline (PBL) must be documented in a Configuration Status Accounting Report (CSAR). The FBL consists of the TBFM SSD. The ABL consists of the SSS, ICDs, and the approved SSDD. The PBL must be established after the successful completion of the Functional Configuration Audit (FCA) and Physical Configuration Audit (PCA), and must reflect the correction of configuration audit deficiencies.

CDRL C02: Configuration Status Accounting Report

C.4.11.3. Configuration Control

The Contractor must implement configuration control procedures that ensure regulation of the flow of proposed changes; documentation of the complete impact of the proposed changes; and release of approved configuration changes into CIs with related configuration documentation. Contractor configuration control must begin at contract award.

The Contractor must establish a Configuration Control Board (CCB) and develop CCB procedures to establish cost, schedule and technical baselines and support baseline management. The Contractor must maintain traceability of components and configuration changes to each system baseline, a record of the sequence of baselines, currency of the Contractor's baselines, and consistency among program documentation, including versions for hardware, software, firmware, adaptation and databases. The Government will perform in-process audits of the Contractor's CM data and records and may participate in the CCB.

C.4.11.4. Engineering Change Proposals

C.4.11.5. Class I ECPs

The Contractor must prepare and deliver Class I ECPs when a proposed change affects the form, fit or function of one or more system CIs.

CDRL C03: Engineering Change Proposal

C.4.11.5.1. Class II ECPs

Changes that do not affect the form, fit, or function of a CI must be prepared as a Class II ECP. Class II ECPs must be prepared and submitted to the Government Quality and Reliability Officer (QRO) for concurrence in classification. Where disputes arise concerning Class I or Class II designations, the Contractor must forward a request to the CO for resolution.

C.4.11.5.2. Notice of Revision

The Contractor must prepare a Notice of Revision (NOR) concurrent with a Class I ECP, for each baseline document that would require revision if the ECP were approved.

CDRL C04: Notice of Revision

C.4.11.5.3. Request for Deviation

The Contractor must prepare a Request for Deviation (RFD) for Government review and approval/disapproval any time the Contractor wishes to request relief from a requirement.

CDRL C05: Request for Deviation

C.4.11.6. Configuration Audits

The Contractor must prepare and deliver a Configuration Audit Plan and related reports that describe the scope of all audit activities to be performed. The Contractor must draft a proposed PBL to serve as a pre-audit baseline to support each FCA/PCA. The Contractor must report the FCA/PCA results in a CSAR for each software release. Audits must be performed to validate that all CIs have been developed IAW the functional and performance requirements of the SSS, and that they accurately reflect the production configuration design documentation. A moratorium on changes to all audited CIs must be imposed seven (7) calendar days prior to each audit phase (FCA or PCA) and during audit conduct. A list of all approved and in-process changes against hardware, software, firmware, database and documentation must be presented to the Government Audit Team as the listing of outstanding changes at the beginning of the audit period.

CDRL C06: Configuration Audit Plan

C.4.11.6.1. Functional Configuration Audit

The FCA must be performed before acceptance of the final product to verify that the System is compliant with the requirements of the SSD. Satisfactory completion of Contractor formal testing is a prerequisite for conducting a FCA. Traceability of all requirements must be demonstrated. The FCA will examine results of the tests, inspections, analysis and demonstrations on all hardware, firmware, and software CIs. FCA findings, analysis and any discrepancies must be documented and results made available to the Government.

C.4.11.6.2. Physical Configuration Audit

The PCA must be accomplished before acceptance of the final product. Satisfactory completion of the audit, as approved by the Government, must establish the PBL.

PCA must be performed on the system for each site to validate that the CIs have been developed satisfactorily to conform to the PBL. The PCA will consist of a formal examination of the "as-built" or "as-coded" configuration of all hardware, software and firmware CIs against their design documentation (including part marking, specifications, quality control records, engineering drawings, technical manuals, operation and support documents, software and firmware regeneration) to establish the PBL. PCA findings/discrepancies must be documented. Upon completion of the PCA, the Contractor must prepare an updated CSAR.

C.4.11.7. Configuration Status Accounting

The Contractor must maintain Configuration Status Accounting (CSA) that will provide for recording and reporting of information necessary to effectively manage the system development. The CSA information must include data to provide traceability of any change through the change control process. Electronic access to CM information must be provided to the Government and approved personnel.

C.5 SYSTEM DESIGN

The Contractor must develop and document all aspects of the system design that meets contractual requirements. The system's hardware and software architecture must be documented in the SSDD. The Contractor must conduct as required systems engineering risk reduction activities to provide insight into the requirements, design alternatives and systems engineering anomalies that form the basis for key system design issues. These may include, but are not limited to, system modeling/analysis, engineering mock-ups/prototype demonstrations, NDI demonstrations, and joint Government/ Contractor Human Factors evaluation activities. These activities must be planned for and coordinated with the Government to be conducted at the Contractor's facilities, WJHTC facilities,

or other facilities, as appropriate. The Contractor must provide planning documentation for system development, test, implementation, training and maintenance.

C.5.1. System Engineering

The Contractor's Systems Engineering Program must support all system design activities IAW the Government approved SEMP. System design and development must be IAW FAA-STD-026.

C.5.2. System Architecture Overview

The Contractor must design an open standards based system that meets the SSD, EA and IRS. The Contractor must document the system architecture in the SSDD with sufficient detail to define the fully configured system.

System design must be IAW the NASEAF "To-Be" Enterprise Architecture views provided in Section J. The Contractor must develop and maintain EA views that are at least two hierarchal levels below the views provided. The Contractor EA documents must conform to the NASEAF and DODAF specifications as listed in Section 2 of this SOW.

C.5.3. TBFM Design Compliance with SWIM

The Contractor must ensure SWIM compliance through the use of SWIM mandated software and SWIM technical standards, which will include Web Services Description Language (WSDL) and the Extensible Markup Language (XML) schema.

The Contractor must brief SWIM compliance progress during PMRs and TIMs.

C.5.4. Interface Design

The Contractor must provide the interface designs as part of the SDR and DDR. The Contractor must support Interface TIMs IAW CDRL M02.

C.5.5. Computer- Human Interface Design

The Contractor must use the existing CHI Specification as a basis and document the expanded requirements in the TBFM CHI Specification. The Contractor must propose and conduct Human Factors TIMs and demonstrations to support the development of the CHI design.

The Contractor CHI demonstration(s) must be performed as requested, with user representatives to provide timely answers to CHI design issues. The CHI demonstration(s) must show how the proposed CHI design meets the Government's requirements. This demonstration(s) may include the prototyping of design alternatives/concepts that need user evaluation.

Findings from analysis of user tasks must be presented as part of the rationale supporting the design and as the basis for user procedures. Outputs of CHI design issues must be delivered in a HEDAD-O

CDRL E15: Computer Human Interface Specification

C.5.6. Hardware Design

The Contractor must identify and document the complete hardware design and detailed configuration in a HAD to support hardware procurement during the development, and implementation phases of the system The Contractor must provide at the DDR, identification of all hardware components for the SSDD HWCIs.

CDRL E16: Hardware Architecture Document

C.5.6.1. Hardware Identification and Selection

The Contractor must use readily available COTS hardware systems which satisfy the functional and performance requirements of all system specifications. COTS hardware must remain consistent across all sites to include hardware upgrade. In addition to COTS documentation, the Contractor must provide supplemental documentation to describe equipment interaction within the system environment.

The Contractor must document the interrelationships between the system/subsystem/equipment drawings in an Engineering Drawing Tree.

The Contractor must develop and provide Hardware Commercial Item Descriptions to be included in the HAD for Government approval.

CDRL E17: Engineering Drawing Tree

C.5.7. Design Phase T&E Activities

The Contractor must develop, provide for Government approval, and maintain the Contractor Master Test Plan (CMTP), which must serve as the high-level planning document for the Contractor's system test program. The Contractor must develop test schedules that meet the requirements of this SOW, and must document the test activities in the Integrated Master Schedule.

CDRL T01: Contractor Master Test Plan

C.5.8. Design Phase Logistics Support Planning

The Contractor must plan an Integrated Logistics Support (ILS) program for the system IAW with the TBFM SSD. The Contractor must ensure that logistics considerations and planning are integrated in the system equipment engineering, COTS and NDI selection processes.

C.5.9. Maintenance Planning

The Contractor must document the system maintenance approach in the Integrated Logistics Support Plan (ILSP). The proposed ILSP must comply with the requirements of the SSD and this SOW. The Contractor must determine the most cost-effective means of maintenance and recommend a repair strategy to the Government for both the current and the evolving system.

CDRL L01: Integrated Logistics Support Plan

C.5.10. Training Design

The Contractor must design and develop training plans for the system IAW all decisions and guidance provided by the Government. The Contractor must also obtain guidance or clarification on training requirements and plans, including training aspects of the SOW, and associated CDRLs and DIDs. The Contractor must document and deliver the system training program approach

C.5.11. Software Engineering

The Contractor must provide management, software engineering, design, development, and test. The Contractor must develop software to meet the System requirements where commercial software is not available or practical. The Contractor must perform software development tasks IAW the Government approved Software Development Plan (SDP). The Government reserves the right to inspect any product, information, or documentation developed or purchased by the Contractor or its subcontractor(s) in connection with the system's software program, and to witness any test associated with the system's software development and integration. The Contractor must assign a

software manager as the focal point for the software efforts. The Contractor must provide readily available access for all Software Engineering documents.

To maintain and update the system software, the Contractor must implement processes and undertake activities on delivered software.

C.5.11.1. Software Design

The Contractor must develop and document a complete software detailed design. The Contractor's software design must use COTS, modified COTS, NDI, modified NDI, and/or develop software to meet the requirements of the SSS, IRS and this SOW. The Contractor's software design must use legacy software as the baseline. Reused legacy software must be documented to the same extent as other components of the software. The Contractor must document the software design in a detailed manner to facilitate traceability to specifications, ease of understanding, development, and testing. The Contractor must identify all design tools and processes for use.

The Contractor must describe how COTS, NDI and/or other reused software will be integrated with newly developed software. The COTS, NDI and/or other reused software documentation must meet the standards defined in the SDP for newly developed software. Embedded COTS within reused software must be tracked in the CPMP, with all other COTS products in the Contractor's system design.

C.5.11.1.1. Software Requirements Specification

The Software Requirements Specification (SRS) must be derived from the SSS and IRS. The SRS must document and allocate each requirement applicable to the software. The SRS must provide a complete allocation matrix of all software requirements (explicit and derived) from the entire specification (SSS and IRS). The SRS must also contain a cross-matrix tracing each SRS requirement to its system requirement. The SRS must specify software requirements associated with external and internal interfaces. It must contain estimates of timing and sizing requirements.

The Contractor must develop SRSs to record software requirements developed and allocated to all CSCIs documented in the SSDD.

The SRS must be developed and provided informally to the Government for review no later than seventy-five (75) calendar days prior to the DDR. The Contractor must informally deliver the SRS to the Government approved personnel for review and comments. The SRS must be subject to formal configuration control and the "as implemented" version must be provided to the Government as part of the SPS

The Contractor must utilize, to the extent practical, automated tools for creating, maintaining, and configuration-managing the software requirements and SRS-IRS-SSS trace, and must provide Government approved personnel remote login access to these tools. The intermediate versions must be informally delivered to the Government for review and comment. They also must be readily available electronically for access by the Government approved personnel for continued review and comments. Access must include read, write and/or modify permissions as directed by the Government.

C.5.11.1.2. Software Design Document

The Software Design Document (SDD) must describe the architectural design of the CSCI (identify software modules, interfaces, and the concept of execution) plus the allocation of requirements from a CSCI to its Computer Software Units (CSU) The SDD must reference and not duplicate GFI software design documentation· however any modifications to GFI made by the Contractor must be documented. The SDD must be subject to formal configuration control and the "as implemented" version must be provided to the Government as part of the SPS The intermediate versions must be

informally delivered to the Government for review and comments before each of the series of design reviews. They also must be readily available electronically for access by the Government approved personnel for continued review and comments. The SDD must be developed and provided informally for review no later than thirty (30) calendar days prior to the DDR. The System software design must be documented in the SDD and presented at the TIMs prior to the DDR.

C.5.11.1.3. Use and Integration of COTS/NDI Software

The Contractor must identify all cases where a COTS/NDI product is used as an integral part of the software architecture, either as a CSCI or within a CSCI. When using commercial elements, including operating systems and compilers, the Contractor must ensure openness of the design and implementation by using, to the maximum extent possible, only those features or attributes that comply with industry-approved standards. The design documentation must describe any planned exceptions to the application of these standards in the design or implementation of the system. The Contractor must obtain Government approval of these exceptions before initiating detailed software design and implementation.

C.5.11.1.4. Software Design TIMs

The Contractor must identify a series of incremental Software Design TIMs with the Government to facilitate technical information exchange and Government understanding of the key software design decisions made by the Contractor.

The Contractor must provide at least seven (7) calendar days notice for internal design reviews in order to facilitate Government attendance.

C.5.11.2. Software Development

Where system requirements cannot be met by using commercially offered software packages, the Contractor must develop the required software. Firmware (software that resides on programmable memory) must be treated as software. When using COTS software the Contractor must continuously implement updates and revisions as they occur until the Test Readiness Review (TRR). At the time of the TRR updates and revisions to the commercially offered software will be frozen to maintain a consistent test baseline. If the Contractor has a desire to modify commercial software, the Contractor must supply the justification for the change to the Government. The justification must state the method of documentation.

For standard commercial product software used throughout the life of the contract; corresponding commercial documentation; licensing agreements; and usage limitations must be submitted to the Government for approval. The Contractor must ensure that the Government has unrestricted access to additional copies of commercial software documentation.

The Contractor must utilize automated tools for creating, maintaining, and configuration-managing the software design. The Contractor must provide the Government, approved personnel and its support contractor's remote login access to these tools. Government/support contractor access must include read, write and/or modify permissions as directed by the Government.

C.5.11.2.1. Software Development Plan

The Contractor must prepare documentation relating to the requirements, design, develop, test, quality assurance, delivery, installation and operation of the software IAW FAA-STD-026 and SEMP. The Contractor must deliver COTS documentation for the use and integration of the COTS software. The Contractor must ensure that adequate software and adaptation unit and string testing occurs to include anomaly and input error testing also to include NDI testing.

The Contractor must document the "as implemented" software in the SPS including the updated SRS and SDD. The Contractor must also include as part of each release, the SPS, Software Version Description (SVD), System Computer Operator Manual (SCOM) and software code.

The Contractor must perform software development planning and prepare, use, maintain, and update a SDP that documents the products, processes, methodologies, milestones, build strategies, and metrics to be used in conducting software development activities throughout the development life cycle. Software development includes development of new functionality, modification of existing functionality, reuse, engineering, maintenance, and all other activities that result in the generation of software products. The Contractor must develop specific plans and procedures for interfacing with the Government as required by this SOW. The Contractor must propose the establishment of informal data delivery and access mechanisms for the exchange of software artifacts with the Government. The SDP must be consistent with the PMP and the SEMP. Government approval of the SDP obligates the Contractor to accomplish software development in compliance with the SDP. The Government will use the SDP as a tool for monitoring the processes for Contractor software development and methods used. Upon Government approval the SDP will be baselined and placed under configuration management with all changes requiring Government approval. The Contractor must maintain consistency between actual software development practices and the SDP. The Contractor must notify the Government of any deviations from the SDP.

The Contractor must ensure that software products developed by subcontractors are IAW all prime contractor requirements, including following the development processes and procedures as outlined in the SDP. The Contractor must specify in the SDP the means by which this is to be accomplished. The Contractor must describe how the software transition will occur after contract award and define in detail how sustainment will be handled, how the re-architecture will proceed and eventually evolve into the new software development activities.

The Contractor must utilize automated tools for creating, maintaining, and configuration-managing the software and must provide Government approved personnel, remote login access to these tools. Government/support contractor access must include only read permissions unless directed by the Government.

CDRL E18: Software Development Plan

C.5.11.2.2. Software Releases

Software modifications must be packaged and scheduled in software releases at the direction of the Government. Releases may incorporate new functionality, maintenance fixes, re-engineering efforts and may be distributed as complete installations or as patches. The Contractor must develop and maintain a Software Release Plan throughout the duration of the contract. The software release schedule must be approved by the Government, with no more than two software releases per year and both must occur prior to October 31st and be separated by at least three months.

For each release, the Contractor must provide a presentation and deliver meeting material IAW CDRL M02. The presentation material must contain:

1. The changes in the release that affect the end users of the system
2. The changes included in the release that affect maintenance and developers
3. The script files to support the automated installation of software releases at testing and field sites
4. The prerequisite configuration information needed in order to distribute and run the software being released no later than ten (10) calendar days prior to the implementation of the software to the field sites. Release notes must include, but not be limited to, installation procedures and special instructions (if any), a list of changes incorporated in the software

along with any site reports addressed by the release, and a list of identified problems. Pertinent COTS product details must be included

5. The source code and associated files must be submitted to Government on Compact Disc (CD). The Contractor must include the change history of the source file in the source code as comments and when applicable document references to software development file artifacts. The specifics of what will constitute the change history will be determined in consultation with the Government
6. The software releases must document the planned sequence of implementation of software capabilities, enhancements, improvements, and fixes. Each software release must include actual code size, complexity, impact on system architecture, and developmental dependencies. The release packaging for software problem fixes may be contained in a separate, working document due to its frequency of updates.

With each release, the Contractor must update the following as-built documents; SVD, SCOM and SPS.

CDRL E19: Software Release Plan

C.5.11.2.2.1. Software Version Description

The Software Version Description (SVD) must be used by the Contractor to release CSCI versions to the Government. The SVD must accompany the shipment of each CSCI to the Government. The Contractor must use and maintain a system that ensures that each CSCI change is accounted for, following approval by the Government. The SVD must describe all changes to any CSCI version delivered subsequent to the initial CSCI delivery.

CDRL E20: Software Version Description

C.5.11.2.2.2. System Computer Operator Manual

The Contractor must develop a System Computer Operator Manual (SCOM). The SCOM must provide system users with instructions sufficient to operate, monitor and troubleshoot the hardware and software within the TBFM system. All of the systems and subsystems, developed code and COTS software must be included.

CDRL E21: System Computer Operator Manual

C.5.11.2.2.3. System/Subsystem Installation and Configuration Manual

The Contractor must develop a System/Subsystem Installation and Configuration Manual (S/SICM). The S/SICM must provide system administration engineers with instructions sufficient to install and configure a CSCI, a group of related CSCIs, or a software operating system for TBFM. Topics that must be covered include, but are not limited to, system diagnostics, problem handling procedures and aspects of software maintenance such as modification of system configuration files and installation of operating system patches. The Contractor must update the S/SICM to reflect changes to the operational baseline when necessary.

CDRL E22: System/Subsystem Installation and Configuration Manual

C.5.11.2.2.4. Software Product Specification

The Contractor must provide a Software Product Specification (SPS) including updated system requirements (SSS, IRS) and design document (SSDD) for each release. The Contractor must provide software listings, and source code representing the "as implemented" system. The Contractor must provide updated SRS and SDD representing the "as implemented system" Upon Government approval, the SPS must establish the Product Baseline for the delivered software.

CDRL E23: Software Product Specification

C.5.11.2.3. Software Integration

Contractor-performed software development must include software integration activities including developmental tests of newly developed software, and partially integrated software and hardware using a representative hardware string to ensure the system software works as a whole. The Government will monitor all software integration activities.

C.5.11.2.4. Software Maintenance

The Contractor must provide maintenance support and functional improvements to the Government approved software baseline, associated site adaptation, maintenance support tools, and associated documentation.

The Contractor must maintain legacy software that has been released to the field, incorporating changes for software problem fixes. The Contractor must update software, to establish the PBL; incorporate additional functionality; modify existing functionality based on problems identified. The Contractor must ensure reliability, maintainability, and performance improvement.

This includes software changes and analysis with but not limited to:

1. Software CSCIs
2. Software maintenance
3. Software file library management
4. Recording and playback
5. Development tools (e.g. TMA Emulators)
6. TMA Simulation Tool
7. Multifarious Universal Tester (MUT) for Monitor & Control (M&C) processes
8. Multipurpose Processor and Analyzer (MPA)
9. TMA Metering Analysis Program (MAP)
10. TMA FReD location identifier to position (FRD)
11. Analyze and Process Messages (APM) for adaptation
12. Update of routes for adaptation builds

If directed by the Government, the Contractor must maintain the Adaptation Data Maintenance Toolset (ADMT) and/or other adaptation toolsets in coordination with software releases.

C.5.11.3. Adaptation

The Contractor must maintain and/or develop new adaptation plans for existing/new sites and document the plan in the SDP. The Contractor must define the development phases, activities, schedule, process for tracking metrics and deliverables. The plans must address the adaptation work to be performed under the site specific tasks that conclude with the completion of Government Acceptance testing at the WJHTC.

When directed by the Government, the Contractor must develop adaptation to support major airspace and/or airport changes

C.5.11.3.1. Adaptation Requirements and Design

The Contractor must develop Site Adaptation Requirements and Design (SARD) documents for the identified configurations for each site for the first software release. For subsequent software

releases, the Contractor must assess the impact of changes to the software on Adaptation. The results of this assessment must be provided to the Government in writing. If the planned changes to the application software will impact the adaptation, the Contractor must update the SARD documents to reflect the necessary changes in the adaptation. All of the steps outlined above must be addressed in a schedule to be provided by the Contractor in each Software Release Plan.

The Contractor must support Government second-level engineering in the performance of adaptation maintenance or make changes to the adaptation when requested by the Government for implementation.

Upon completion of adaptation development, the Contractor must provide the following but not limited to; validate the adaptation design and development has been completed at the Contractor's facility, introduction and data collection adaptation requirements analysis coordination with each site, integrate and test adaptation to be deployed at each site, provide on-site technical support (facility shadowing) as needed, and update software and adaptation baseline.

CDRL E24: Site Adaptation Requirements and Design document

C.5.11.3.2. Adaptation Development, Test and Deployment

The Contractor must develop adaptation for the sites and configurations listed in Section J. The Contractor must plan and develop adaptation for additional sites which may be in conjunction with implementation of the initiatives.

The Contractor must support and describe in the SDP the following stages of adaptation development to include but not limited to: site introduction and data collection adaptation requirements analysis; adaptation design and development; software and adaptation test; site test planning, development of site test procedures and reports; site integration and test of site adaptation; facility shadowing; adaptation change control/configuration management; and update site adaptation baseline.

The Contractor must notify the Government immediately, via e-mail, when there is a risk that any key milestone will not be met. The Contractor must follow up each notification with a plan to mitigate the schedule risk and recommend a course of action.

The Contractor must base adaptation design on current Memorandum of Understanding (MOUs), Letters of Agreement (LOAs), and Airspace maps.

C.5.11.3.3. System Level Adaptation Documents

The Contractor must tailor system-level adaptation documents to the particularities of each site, subject to review and approval of the Government. The Contractor must coordinate with appropriate site personnel, subject to the cognizance, guidance, and approval of the Government. The documents, which must be tailored and executed for the sites listed in Section J. The Contractor must include, but are not limited to, the following topics: adaptation requirements definition, validation, and change control; development and test; and documentation.

The Contractor must maintain Government approved common templates to serve as the model for all site requirements and design documentation of adaptation.

C.5.11.3.4. Adaptation Tools

The Contractor must use the Government provided Adaptation Data Management Toolset (ADMT) to perform adaptation efforts under this SOW unless the Contractor proposes another method that is approved by the Government. The Contractor must document methods in the SDP.

C.5.11.3.5. Chart Updates

The Government on-site support (Field Automation Support Teams) will perform local Chart Change Updates (CCUs) to adaptation. The Contractor must document this process in the Adaptation Maintenance Procedures Manual. When directed by the Government, the Contractor must provide on-site support for local CCUs.

C.5.11.3.6. Adaptation Maintenance

The Contractor must provide adaptation maintenance support to any site as directed by the Government. This support may include but not limited to software prototypes and software releases. The adaptation maintenance must be conducted in accordance with the Contractor-proposed, Government-accepted plans, to include adaptation requirements definition, development, test, documentation and configuration management. The Contractor must support Government second-level engineering in the performance of adaptation maintenance and/or conducting software changes to the adaptation when requested by the Government.

Beginning within sixty days after contract award and upon Government approval, the Contractor must conduct an on-site review and revision of the adaptation at each site. The Contractor must provide up to five (5) FTEs with adaptation engineering expertise over a period of up to three (3) months at each site. This effort is to review and revise as required the adaptation sets for the twenty ARTCC's, and their associated TRACONs, within two (2) years of contract award. This is a one-time activity to improve the quality of site adaptation that supplements the adaptation development and maintenance specified in the other sections.

The Contractor must develop and document this process in the Adaptation Maintenance Procedures Manual.

CDRL E25: Adaptation Maintenance Procedures Manual

C.6 SYSTEM TEST AND EVALUATION

C.6.1. Contractor Master Test Plan

The Contractor must plan, conduct, and document an integrated test and evaluation program for the existing and evolving systems, IAW this SOW and the Government approved CMTP. The Contractor must use the Acquisition Management System Test & Evaluation Process Guidelines (AMST&EPG) and MIL-STD-498 as guidance. The Contractor must develop test plans, procedures and reports to be used in the test program. The Contractor must deliver for approval; test plans, procedures and reports to be used in the formal test program IAW the Government approved CMTP.

The Contractor must maintain a Verification Requirements Traceability Matrix (VRTM) to provide traceability of all SSS and IRS requirements to verification methods and associated procedures All system requirements must be addressed in a single VRTM, unless the Government approves an alternative VRTM format. The Contractor must deliver the VRTM as Appendix A to the CMTP. The Contractor must utilize Government approved automated requirements management tools for maintaining the VRTM. The Contractor must provide Government approved personnel remote login access to these tools. Access must include read, write and/or modify permissions.

The test program must verify that the system and support elements meet the physical, functional, interface, performance and capacity requirements, as stated in the contract specification documents The Contractor must develop test schedules, test plans, and test procedures to meet the CDRL requirements of this SOW The Contractor must allocate time in the schedule for successful dry runs of all formal test procedures to minimize time required for Government observation of testing The

Contractor must conduct tests and generate test reports, as required by this SOW. All the tests must be repeatable to be considered valid. The Contractor must develop an integrated test schedule that includes informal unit development testing, string testing, software and system integration testing, CHI demonstration/testing and formal testing to include Vulnerability Scan Testing, Factory Acceptance Testing (FAT), Installation and Integration (I&I), System Acceptance Test (SAT), Operational Evaluation (OE), and Key Site Acceptance Testing (KSAT).

The Contractor must integrate test schedules in the IMS. The Government reserves the right to witness, on a non-interference basis, Contractor testing during any test phase or level. The Contractor must furnish equipment, space, and personnel required to perform Contractor-conducted FAT. The Contractor must coordinate testing to be performed, and ensure that there is minimal redundancy of effort or data. The Contractor must have the responsibility for integration, control, and coordination of Contractor and subcontractor testing in support of Government testing.

The Contractor must document in the CMTP plans for all levels of software testing. This should include informal software test plans and procedures to document software testing, including modified software, patches, off-line tool modifications, and adaptation tools. The test plans must emphasize regression testing during sustainment and re-architecture. The test plans must cover unit testing, string testing, software and system integration testing as well as CHI evaluation/testing of new developed functionality. CHI demonstrations will ensure all requirements from the Contractor produced CHI Specification document have been satisfied. This testing will be accomplished at the Contractor's facility. The informal software test plans, procedure and results will be maintained in Unit Development Folders (UDF) for all software being modified or developed. The informal software test plan, procedure and results are not deliverables but must be developed and maintained with easy access for continuous Government review. The Contractor must notify the Government informally when UDF folders have been updated. Notification method will be mutually agreed upon by Government and Contractor.

The Contractor must provide the necessary equipment to support a development lab, software test lab and a CHI demonstration lab to accomplish software testing. In addition, new functionality testing must include data reduction and analysis, if necessary, and may need additional lab resources to accomplish this.

The Contractor must designate in the Contractor's PMP and CMTP a single test manager who must be responsible for testing and testing support items. The Contractor must maintain the CMTP, which must serve as the overall test control document for the Contractor's Test Program. The Contractor must notify the Government of testing schedules at least seven (7) calendar days prior to the start of each test. Contractor-proposed test tools, documentation, and test-support hardware and software must be certified and approved by the FAA prior to the start of testing. The Contractor must provide facilities and equipment required for successful completion of required tests.

CDRL T01: Contractor Master Test Plan
CDRL T01: Appendix A – Verification Requirements Traceability Matrix

C.6.1.1. Problem Management

The Contractor must develop and maintain a database for submitting, tracking, reporting, and maintaining records on program problem reports, whereby the Government and Contractor can maintain awareness of problems from initiation to final corrective action and archiving. The database must enable status reporting of all software, adaptation, site and test problem reports. The Contractor must use the database for tracking problems associated with any system, equipment, software, or firmware that has been placed under formal configuration control. The Government will approve the overall design of the database to ensure operational use and functionality required by the Government. The Contractor must provide Government personnel with remote electronic access to the database and provide reports at the request of the Government.

The Contractor problem reporting system must be defined in the CMTP for all System Test and Evaluation activities. The Contractor must submit the planned corrective action for each problem and identify the proposed regression testing, or future modification(s) to the testing program required to validate the successful corrective action. If a component fails during test, the Contractor must perform failure analysis to identify the cause of failure. Failed steps, with or without associated PRs must be explained to the satisfaction of the Government. Anomalies, such as Government Furnished Property (GFP) failures that interrupt an end-to-end run of the test must be jointly analyzed by the Contractor and the Government to determine a recovery plan. The Contractor is responsible for any corrective actions necessary to ensure full specification compliance. The Contractor must complete repairs or rework prior to submission for regression testing.

The Contractor corrective action process must ensure that detected problems are promptly reported, action is initiated, resolution is achieved, status is tracked and reported, and records of the problem(s) are maintained for the period of the contract.

An automated problem tracking management tool exists for the TMA system. This tool is known as the Defect Data Tracking System (DDTS), which is a Rational developed tool. License(s) for this system may be provided to the Contractor as GFE, if desired.

C.6.2. Factory Acceptance Test

The Contractor must develop a FAT Plan and FAT Procedures for each software release. The test plan can divide the testing up into phases (i.e. M&C, hardware, CHI, adaptation, functionality, etc). The Contractor FAT plan must document how the Contractor will verify the system's ability to satisfy the requirements of the system specification documents (SSS and IRS) IAW the Government approved VRTM. The Government will monitor all Contractor FAT activities.

The Contractor FAT procedures must include detailed test scenarios for each requirement in the SSS and IRS, at a minimum, but not limited to each modified enhancement requirement, and regression testing of existing requirements. The FAT Plan must include the plans for satisfying the CHI Specification requirements through additional CHI testing or demonstrations. The CHI Specification was created by the Contractor as derived requirements from the SSS/IRS. The FAT Plan and FAT Procedures must be approved prior to formal execution of the FAT. The Contractor must conduct security testing as a part of the overall FAT program IAW the FAT Test Plan and Test Procedures, and must document all aspects of the testing in the FAT Test Report.

For execution and formal test, pre-test briefings are conducted for each phase/procedures, identifying the specific test conduct, anticipated results, work arounds required and anticipated anomalies. Execution of all test phases/procedures must be conducted without interruptions. Post-test briefings are conducted for each phase/procedure, identifying actual results. The Contractor must conduct a final post test briefing to summarize the results of the testing. The Government may witness the formal execution of testing. The Contractor must document test results. The Contractor must conduct a test status review to assess the results of the FAT and provide the Government with a FAT Report for approval and delivery. The Contractor must maintain the FAT Plan and FAT Procedure to document the current test program strategy.

CDRL T02: Test Plan - Factory Acceptance Test
CDRL T03: Test Procedures - Factory Acceptance Test
CDRL T04: Test Report - Factory Acceptance Test

C.6.3. Installation and Integration Test

A specific set of tests must be conducted on the TBFM System (re-hosted hardware and software) to ensure compliance with FAA system standards and suitability of the TBFM system to become the operational system. The contractor will conduct formal I&I testing on the TBFM hardware at WJHTC and again at Key Site. The Contractor must supply seismic test data, thermal test data for each

TBFM rack configuration and electrical hardware configuration load data to be verified during electrical testing. Specific software integration testing of the TBFM System must include but is not limited to validation of total functionality of the TMA sustained system and the interoperability of this new system with the operational system currently fielded; this may be part of system acceptance testing and OE.

The Contractor must conduct formal I&I Test of the test facility at the WJHTC, witnessed by the Government, to confirm that the system is properly installed and operationally configured, undamaged, in compliance with contractual requirements, and ready for use in the SAT, OE and Key Site. The Contractor must provide an approved test plan and procedures to the Government before proceeding with the testing.

Power testing is required as part of formal I&I at the WJHTC and data collected again at Key Site. The Contractor must support the power testing. The Contractor must verify that system components, when operating, do not degrade the performance of or cause damage to the Government equipment at the site and that the Government equipment at the site does not degrade the performance of or cause damage to the system equipment. The Contractor must, at the Contractor's cost, be responsible for any degradation or damage to the Government equipment if the root cause is determined to be due to non-compliance with the SSD.

Before I&I, the Contractor must ensure the system items installed at the WJHTC are in compliance with requirements and that items are qualified for test by the Government as prescribed in the approved I&I Test Plan. The results of the test will be documented in the I&I Test Report.

I&I testing of the TBFM system will be conducted at each facility prior to Government acceptance of the equipment for that site.

CDRL T02: Test Plan - Installation and Integration
CDRL T03: Test Procedures - Installation and Integration
CDRL T04: Test Report - Installation and Integration

C.6.4. System Acceptance Test

The Contractor must develop and deliver a SAT Plan and SAT Procedures. The test plan and test procedures must be approved by the Government prior to formal execution of the system test. The primary SAT test objective is to ensure that the system operates correctly with live interfaces. Any requirement that could not be satisfied at the FAT must be verified during SAT.

As part of SAT the Contractor must perform the following interface tests:

1. Demonstrate that the system can interface and operate compatibly with the external interfaces defined in the IRS
2. Demonstrate that the system can interface and operate compatibly with adjacent facilities

As part of the SAT, the Contractor must perform a 72-hour continuous operational field test to demonstrate compliance with requirements. During this test, the system must perform under design workload requirements and meet specification requirements without any unexpected aborts or hardware and software degradation The system must also demonstrate that it can handle a failure recovery. As part of this test the Contractor must execute a Government approved subset of FAT system tests and compare expected results match FAT system test results. The SAT Plan must include plans for satisfying CHI Specification requirements that the Government may deem un-satisfactorily met. This can be accomplished through additional CHI testing or by demonstration. Any system failure must require a rerun of the 72-hour test once the failure is remedied. At the end of this period, the equipment must meet all applicable specification requirements.

During the 72-hour test, the Contractor must demonstrate the following, as a minimum:

1. Switching and modes
2. TGUI and PGUI functionality
3. Maintenance functionality
4. Power capabilities
5. Diagnostic and certification tests
6. Backup switch capability
7. Degraded operations (link failure, etc.)
8. Performance load testing demonstrating that the system meets the performance workload requirements defined in the SSS/IRS

The Contractor must execute or support the conduct of SAT IAW the Government- approved System Acceptance Test Plan using System Acceptance Test Procedures. The Contractor must document the test results in the System Acceptance Test Report. The Contractor must conduct pre-test briefings prior to each test identifying the specific test conduct, anticipated results, workarounds required, and anomalies. Execution of all test procedures while testing must be conducted without breaks or interruptions. Post-test briefings must be conducted for each test and identifying actual results. The Government may witness the formal execution of test procedures. The documented results, SAT Report, must be subject to and readily available for review and/or approval by the Government.

The Contractor must conduct security testing as a part of the overall SAT program, IAW the SAT Test Plan and Test Procedures, and must document all aspects of the testing in the SAT Test Report.

The Contractor must maintain the System Acceptance Test Plan and the System Acceptance Test Procedures-to document the current test program strategy.

The Government will accept the system upon successful completion of the SAT life-cycle stage based on a set of exit criteria documented in the System Acceptance Test Plan.

CDRL T02: Test Plan - System Acceptance Test
CDRL T03: Test Procedures - System Acceptance Test
CDRL T04: Test Report - System Acceptance Test

C.6.4.1. Operational Evaluation

The Contractor must support user evaluations/demonstrations of the system at WJHTC or other Government sites.

During the time period of Operational Evaluation (OE) testing, the Contractor must support OE activities. The Contractor must provide resources to support the areas mentioned above and be available for software development at each site to make necessary modifications to the hardware and/or software, correcting deficiencies identified by the Government during testing.

C.6.5. Key Site Acceptance Test

The Contractor must support KSAT at Government designated site(s) The Contractor must provide, for Government approval, a Key Site Acceptance Test Plan and Key Site Acceptance Test Procedures prior to conduct of KSAT. The Contractor must generate a KSAT Report after the test and deliver to the Government

The Contractor must integrate and configure the Key Site system for KSAT. The Contractor must support formal Key Site Acceptance Testing, witnessed by the Government, using the Government approved test procedures. The Contractor must support I&I testing at the key site before conducting

KSAT. The Key Site I&I must validate the System is properly installed and operationally configured, undamaged, and remains in compliance with contractual requirements.

KSAT will occur only for software releases as described in section C.5.11.2.2.

CDRL T02:	**Test Plan - Key Site System Acceptance Test**
CDRL T03:	**Test Procedures - Key Site System Acceptance Test**
CDRL T04:	**Test Report - Key Site System Acceptance Test**
CDRL T02:	**Test Plan - Installation and Integration**
CDRL T03:	**Test Procedures - Installation and Integration**
CDRL T04:	**Test Report - Installation and Integration**

C.6.6. Site System Acceptance Test

The Contractor must plan, develop, and conduct additional site specific testing for each site. Site SAT(s) must consist of Installation and Integration (I&I) (hardware only) and site tests tailored for each site that consist of a subset of the Key Site tests.

CDRL T02:	**Test Plan - Site System Acceptance Test**
CDRL T03:	**Test Procedures - Site System Acceptance Test**
CDRL T04:	**Test Report - Site System Acceptance Test**

C.6.7. Test Working Group(s)

The Contractor must conduct Test Working Group meetings as needed with Government and other *Contractor test teams, to focus on test planning, status, documentation, requirements, and any issues* pertaining to test. The Contractor must prepare agendas, meeting minutes, and presentations IAW CDRL M02. The Contractor must conduct and participate in Test Working Group meetings as required for all phases of the contract.

C.6.8. Test Readiness Reviews

The Contractor must conduct a TRR to assess the readiness and preparation for commencing formal testing. The Contractor must develop and submit a Test Readiness Review Briefing and Meeting Minutes IAW CDRL M02. The Contractor must satisfy Government approved TRR entrance criteria in order to proceed with TRR. Provided the TRR is successful, the Government will approve the Contractor to start testing. In order for the TRR to be successful it must satisfy Government approved TRR exit criteria.

C.6.9. Preliminary Test Status Report

The Contractor must develop a Preliminary "Quick Look" Test Status Report for each formal test. The Preliminary Test Status Report must provide a brief background on the test. Including, as a minimum but not limited to:

1. Summary of test activities
2. Test article configuration
3. Significant test results known at the time
4. Test metrics collected thus far
5. Known test problem areas/ required work a-rounds
6. Preliminary test result synopsis or conclusions

The Contractor must informally deliver a Preliminary Test Status Report five (5) calendar days after completion of each formal test.

The Contractor must perform data reduction and analysis, if necessary, in support of testing. The Contractor must perform data reduction and analysis on both the sustained system and enhanced re-architectured system.

C.6.10. Test Facilities

The Contractor must maintain a test facility that includes the system hardware and software that integrates with other systems and/or interfaces as applicable. I&I must be performed at the Contractor's facility.

The Contractor must support installation and check out of system at WJHTC. The Contractor staff should be knowledgeable about TMA system engineering, software development, adaptation, and testing, as well familiar with the NAS interfaces. The Contractor may be augmented during the conduct of system testing at WJHTC as needed. It is estimated that the minimum number of people is ten (10) per annum.

C.6.11. Test Metrics

The Contractor must develop and deliver as part of each test report a set of system test progress metrics that will indicate as a minimum, but not limited to:

1. Number of requirements to test (system, CHI, software depending on the test)
2. Number of requirements tested
3. Number of requirements passed
4. Number of requirements failed
5. Number and type of problem reports written

C.6.12. System Alignment

The Contractor must completely align (establish, specify and deliver the set-up, start-up procedures and parameters of the operating system and firmware) the system utilizing only the procedures and test equipment cited in the instruction manuals. The Contractor must perform verification and validation testing to determine the adequacy of techniques, technical manuals, and test equipment.

C.6.13. Test Equipment

The Contractor must be responsible for assuring that necessary test equipment is available, on time, properly calibrated, and fully operational to support testing. Use of Government test equipment may be permitted where Government test equipment is on site, available, and meets specified test equipment requirements. Test equipment used by the Contractor must be standard commercial equipment in compliance with applicable FAA standards and must not be modified without prior written approval of the Government. Test equipment must operate in the manner specified by the test equipment manufacturer. Ancillary equipment required by the Contractor for test purposes must be furnished by the Contractor for the duration of the tests and must be certified before use in the testing. The Government Test Director may require the Contractor to re-calibrate any test equipment provided by the Contractor to be used in the test program due to the following:

1. The test equipment is removed from the test set-up for unrelated purposes
2. The test equipment fails, is damaged, or appears to be operating in a faulty manner based on Government evaluation of test results

C.6.14. Re-testing of Problem Reports/Regression Testing

The Contractor must be responsible for corrective action necessary to assure full requirements compliance problems and/or discrepancies discovered during formal testing are corrected and

verified. Verification of previous tested capability must be regression tested. This ensures the corrections are effective and do not alter system performance of functions outside of the discrepancy area. The Contractor must ensure that software or hardware areas tested through regression testing comply with applicable test objectives defined in this SOW. The Contractor must recommend the level of regression testing based on analysis documented in the problem tracking process. The level of regression testing is based on the complexity of the deficiency and degree of involvement with other system components. The Contractor must submit regression test plans and execute the regression tests identified in the plan after Government concurrence. The Government will monitor and/or witness Contractor regression testing.

If a review of the reasons for failure to comply with specification requirements indicates that the cause may exist as latent defects in items previously accepted, the Contractor must be responsible for correcting the defects in a timely manner, even those previously accepted by the Government. The Contractor must re-verify, by verification methods identified in the VRTM, that the defect(s) have been corrected. The Contractor must utilize the problem tracking process for reporting the re-testing plans, procedures, and results.

C.6.15. Test Familiarization

The Contractor must develop and implement a familiarization program to support formal test activities. The Contractor may make use of commercial item materials, draft training materials, draft technical manuals, and other draft documentation as required and approved by the Government.

C.6.15.1. Operational Testing and Evaluation Familiarization

The Contractor must conduct OE familiarization at the WJHTC. The Contractor may make use of commercial item materials, draft training materials, draft technical manuals, and other draft documentation as required and approved by the Government.

The Contractor must coordinate with the Government prior to scheduling and conducting OE familiarization ensuring sufficient time is permitted for Government personnel to participate/support the operational test and evaluation activities.

C.7 Training

C.7.1. Technical Operations Training

The contractor must update existing Government Furnished Traffic Management Advisory training materials for technical operations training impacted by TBFM. The contractor must maintain currency of training materials to address new software releases and updates to technical documentation.

The contractor must develop provide Delta Briefing Packages that document changes introduced by TBFM prior to Key Site release of TBFM software. The contractor must, when tasked by the Government, develop and provide additional Delta Briefing packages when warranted by subsequent software releases or changes to technical documentation

C.7.2. Air Traffic Training

There are three components to Air Traffic:

1. Traffic Management Unit Personnel (TMU)
2. En Route Certified Performance (CPC)
3. Terminal (TRACON and Tower) Certified Performance Controller (CPC)

The contractor must update existing Government Furnished Traffic Management Advisory Air Traffic training materials impacted by TBFM. The contractor must maintain currency of training materials to address new software releases and updates to technical documentation for 2) and 3) identified above.

The contractor must develop and provide Delta Briefing Packages that document changes introduced by TBFM prior to Key Site release of TBFM software for:

1. En Route Certified Performance (CPC)
2. Terminal (TRACON and Tower) Certified Performance Controller (CPC)

The contractor must, when tasked by the Government, develop and provide additional Delta Briefing packages when warranted by subsequent software releases or changes to technical documentation

C.7.3. Field Adaptation Support Team (FAST) Training

The contractor must update existing Government Furnished Traffic Management Advisory Field Adaptation Support Team (FAST) training materials for training Traffic Management Unit adaptation functions impacted by TBFM. The contractor must maintain currency of training materials to address new software releases and updates to technical documentation.

The contractor must develop and provide Delta Briefing Packages that document changes introduced by TBFM prior to Key Site release of TBFM software. The contractor must, when tasked by the Government, develop and provide additional Delta Briefing packages when warranted by subsequent software releases or changes to technical documentation.

C.7.4. Second Level Engineering Training

The contractor must update existing Government Furnished Traffic Management Advisory Second Level Engineering training materials for training Traffic Management Second Level Engineering training impacted by TBFM. The contractor must maintain currency of training materials to address new software releases and updates to technical documentation.

The contractor must develop and provide Delta Briefing Packages that document changes introduced by TBFM prior to Key Site release of TBFM software. The contractor must, when tasked by the Government, develop and provide additional Delta Briefing packages when warranted by subsequent software releases or changes to technical documentation.

Delivery and Review Schedule:

Contractor deliver draft Delta Briefing Packages to FAA	60 days prior to software drop at Key Site
FAA Review and provide Comments to Contractor	45 days prior to software drop at Key Site
Contractor revise and deliver draft Delta Briefing Packages to FAA with comments incorporated	30 days prior to software drop at Key Site
FAA validates incorporation of comments	20 days prior to software drop at Key Site
Contractor Deliver Final Delta Briefing Packages to FAA	Deliver to all Sites 15 days prior to software drop at Key Site

Training Materials:

The Government will provide as GFI all available training materials.

C.8 IMPLEMENTATION

The Contractor must install, integrate, test and validate system components. The tasks must include but are not limited to:

1. Perform equipment/cabling site configuration planning and designs
2. Prepare and submit to the Government a Facilities Design Requirements Document (FDRD)
3. Prepare and conduct site surveys
4. Develop and submit a Site Installation and Integration Plan (SIIP)
5. Conduct Site Readiness Reviews
6. Compile and submit Site Readiness Review Results
7. Perform site fit-up
8. Receive and install hardware
9. Integration and checkout of hardware

As a vital part of the Site Implementation process, the Contractor must plan the integration of the hardware, software, cables and support facilities.

CDRL I01: Site Installation and Integration Plan
CDRL I02: Facilities Design Requirements Document

C.8.1. Facilities Requirements TIM

The Contractor must conduct a Facilities Requirements TIM at the Contractor's facility not less than fifty (50) calendar days prior to SDR.

The Contractor must present and discuss equipment configurations, equipment layouts, ingress to and egress from the system equipment area, Electromagnetic Interference (EMI) and Electromagnetic Compatibility (EMC), seismic stability, hardware power loads, HVAC loads, cable paths and conveyances, power panel requirements, grounding and bonding, and the Government facility infrastructure required to support the system design including lighting, solid state static automatic transfer switch requirements, raised floor, and other relevant items and topics. The Contractor must record and deliver action items IAW CDRL M02.

C.8.1.1. Equipment Configuration Planning

The Contractor must apply the results of the Facilities Requirements TIM to plan preliminary layout of the equipment as documented in Section J. The planning must consider the impact of the equipment with respect to associated NAS systems, power availability, cooling requirements and cable conveyances within the areas specified by the Government. The Contractor must actively work with the Government during this period to eliminate or minimize the need for multiple iterations of equipment configurations and to formalize facility requirements as early as possible. Specific items for concern include but are not limited to:

1. Equipment dimensions
2. Seismic stability
3. Power, grounding and electrical

4. EMI/EMC
5. Cabling
6. Safety

C.8.1.2. Facilities Design Requirements Document

The Contractor must incorporate the results of the Facilities Requirements TIM, the equipment configuration planning and the resolved action items into a FDRD, along with the minimum requirements hereinafter specified.

The Contractor must fulfill all the requirements of the system that affect facilities, including, but not limited to the following:

1. Proposed equipment configurations (drawing format)
2. Space requirements for hardware including service areas (drawing format)
3. Suggested locations of the hardware within the facility (drawing format)
4. Seismic Requirements
5. Power requirements for each piece of hardware (if racked, provide for the rack), IAW FAA-G-2100G, *Electronic Equipment, General Requirements,* broken down by proposed locations within the building, to include:
    a. Voltage, amperage and phase requirements of each receptacle
    b. Number of wires of each receptacle
    c. Grounding requirements
    d. Circuit breaker requirements
    e. Critical/non-critical power
    f. Panel assignments required to meet RMA specifications
6. Heating, Ventilation and Air Conditioning (HVAC) requirements for the equipment in the various proposed areas
7. Acoustics considerations that affect facilities

C.8.1.3. Site Surveys

C.8.1.3.1. Preparation for Site Surveys

The Contractor must develop the site survey schedule with the Government. The Contactor must notify the Government sixty (60) calendar days in advance of each Site Survey. The Government will be responsible to set the actual times and dates with the sites. Notification will include at a minimum:

1. Schedule of survey events
2. Number of Contractor and subcontractor personnel to attend survey
3. Meeting aids and room requirements
4 Identification of all Government provided data required for a successful survey

The Contractor must prepare and provide survey aids, including entrance and exit briefing presentations, drawings and survey forms as required ninety (90) calendar days prior to the start of surveys. Any updates must be submitted thirty (30) calendar days prior to start of surveys.

The Contractor must provide to the Government documentation that will be used to gather site survey data ninety (90) calendar days before a scheduled survey.

C.8.1.3.2. Site Surveys

For each site specified in Section F, the Contractor must conduct an installation site survey and must submit a site survey report. The Government will coordinate with sites individually to obtain identification of all requirements for Contractor access to sites. The Government will provide the Contractor with a specific date and time of day for each site survey.

The Contractor must be responsible for investigating, identifying and recording data required to design and install the system at the particular site including, but not limited to, the following minimum information:

1. Location(s) of new equipment
2. Location (s) of system interfaces
3. Condition of existing raised floor in equipment areas and the availability of raised floor components from the site
4. Paths of all data cables required for the system and identification of the use of existing cable conveyances or the need for new
5. Both critical and non-critical existing power panels and circuit breaker availability
6. Proposed branch feeder power cable paths
7. System grounding
8. Existing obstacles and construction that need to be removed or replaced
9. Routes for transporting hardware from the loading dock to final position
10. Storage and staging space requirements

The Contractor must develop and prepare a SIIP for each site; it must include the Site Survey Results with the Site Survey Action Item List IAW CDRL I01. The Contractor must record the responsible agency and provide suspense dates for the resolution for each action item during the exit briefing. These action items include items that the facility will accomplish prior to the start of site fit-up and the installation of the hardware. The Contractor must publish and distribute the Site Survey Action Item List within 10 calendar days upon completion of the Site Survey. The Site Survey Action List will be used to track action through the installation process and be updated distributed prior to the Site Readiness Review.

CDRL I01: Appendix B: Site Survey Action Item List

C.8.1.4. Site Preparation Activities

For each specified site, the Government will provide space, lighting, heating, ventilating, air conditioning and power to the extent necessary for the system installation. Equipment storage area will be provided to the Contractor as specifically negotiated on a site-by-site basis. Installation and test of system hardware and software must not disrupt or interfere, nor cause to disrupt or interfere with the FAA ATC mission. The Contractor must install all equipment in IAW manufacturer specifications. A representative configuration must be power tested at the WJHTC prior to the shipping of any hardware to the field sites. Contractor installations must include, but not be limited to,

physical placement of equipment, mechanical connections, equipment grounding and bonding, installation of power cables and connectors, and installation of all signals, communication and interface cabling. All work must be performed IAW standard FAA-G-2100.

Site preparation activities include those items that were identified at the site survey as construction and/or other items that the Government needs to incorporate or change at the site to permit the start of Contractor site fit-up. Since these are the responsibility of the Government to resolve, the Government will conduct scheduled teleconferences to status these items as required. The Contractor must participate in these meetings on an as-needed basis.

The Contractor must prepare any drawings or other documents that are needed to support or clarify a particular action item to enable the Government to accomplish the site preparation work. The need for such documents and the required receipt date will be established at the site survey exit briefing and documented in the Site Survey Action Item List.

C.8.1.4.1. Pre-Installation Preparation

The Contractor must manage the procurement actions and interfaces with all vendors and must ensure that procured hardware and COTS software is made available on schedule, is operating to vendor specifications at delivery, and the same model of hardware and software release for each type of equipment. The Contractor must check all system products to ensure the equipment is fully functional according to vendor specifications prior to shipping to the operational sites, IAW Government approved procedures. This includes, but is not limited to, the following actions:

1. The Contractor must provide the necessary facilities and services to check the system products
2. The Contractor must pre-load all system support and applications software. The Contractor must coordinate the preparation of each suite with the Government to ensure the proper version of the application software is loaded before the equipment is shipped to the site. The Contractor must load required component addresses, e.g., Internet Protocol (IP) address, as provided by the Government
3. The Contractor must configure the system to reflect the install configuration at the operational sites and must validate the configuration and operation
4. The Contractor must transport all components, equipment, and spares by the most economical means possible, considering dependability, safety, urgency of need, and traceability. All materials must be shipped Freight On Board (FOB) destination, inside delivery. Shipments must be made IAW Section D requirements
5. Equipment must be shipped to arrive on-site not earlier than seven (7) calendar days before installation or as specified by the Government. Packing must be IAW standard commercial packing as specified in Section D
6. The delivery must include tools and test equipment, fastening components, support equipment, special tools, and all documentation necessary to accomplish the installation and integration
7. Any incremental software deliveries must be distributed and installed from/to remote sites IAW Government approved ISP

C.8.1.5. Site Installation and Integration Plan

The Contractor must develop and submit a SIIP for each site listed in Section F IAW associated DID. The SIIP details must include information gathered during the Site Survey and must be sole document for the Fit-up, installation and checkout.

The Contractor must prepare drawings that are part of the SIIP in the format specified in Engineering Drawing Practices. The Contractor must deliver SIIP drawings IAW DID requirements. The

Contractor must ensure that drawings that are not physically bound with the SIIP and have clearly visible notations that link the drawings to the SIIP in the event the two are separated. The Contractor must provide a list in the SIIP with numbers and titles of all drawings associated with the SIIP. The Contractor must deliver the SIIP and any detached drawings as one package.

The Contractor must use the Government approved SIIP as the basis for the Contractor site fit-up and the installation of equipment at each site. In the event that changes are required due to field conditions or change orders, the Contractor must either provide change pages for the SIIP or redline both the site copy of the SIIP and the Contractor's copy of the SIIP during site fit-up and installation. The site copy of the SIIP will remain on site at all times.

After declaration of system Operational Readiness Demonstration (ORD) at each site, the Contractor must provide a final version of the SIIP that reflects the system as installed and integrated into the NAS.

C.8.1.6. Site Readiness Reviews

The Contractor may be required to conduct a Site Readiness Review of one-day duration plus travel for each site listed in Section F. The Contractor must inspect the site to determine if the Site Preparation work described in the Site Survey Action Item list has been completed and to determine the general readiness of the site to begin Contractor site fit-up activities. The Contractor must identify any additional actions that must be completed prior to the start of Contractor site fit-up and update the Site Survey Action Item list to reflect the results of the readiness review. The Contractor must publish and distribute the updated Site Survey Action Item List within ten (10) calendar days upon completion of the Site Readiness Review. The Contractor must coordinate the Site Readiness Review with the Government sixty (60) calendar days in advance of the pending Site Readiness Review to allow the Government to notify site personnel. The Site Readiness Review notification will include, but not be limited to, the following:

1. Site Readiness Review dates and times
2. Schedule of Site Readiness Review events
3. Number of Contractor and subcontractor personnel to attend the Site Readiness Review
4. Meeting aids and room requirements
5. Government personnel, by skill, required to be present

C.8.1.7. Contractor Site Fit-up

The Contractor must perform site fit-up for each site listed in Section F IAW the Government approved SIIP. The Contractor must provide all materials, equipment, tools and labor required to perform and complete the work.

The Contractor must perform the fit-up work for, and the installation of, all components of the system IAW all applicable Federal, State and Local building codes and regulations. The Contractor must be responsible for the determination of applicable codes in the locales in which the facilities are located and make application and receive all building permits where applicable. At those sites where the local electrical codes require that electrical work be by electricians licensed in the state in which the site is located, the Contractor must provide proof of such license(s) before work begins. The Government will provide the Contractor a list of approved vendors at the Site Survey of each site.

The Contractor must be responsible for all subcontractor and vendor personnel who visit or work at Government facilities. The Contractor must ensure that all personnel who visit or work at Government facilities meet Government security requirements. The Contractor must ensure that

precautions for the safety of the personnel and property are in place before starting work and are followed throughout the period of performance of the work.

The Contractor must perform the Contractor site fit-up IAW the Government approved SIIP, using skilled, experienced personnel. The Contractor must ensure that the work conforms to Government and industry standards. The Government will oversee the work on a non-interfering basis to ensure quality and standards are not compromised. In the event that quality and standards are not being met, the Government will provide written direction to stop the work until the Contractor and the Government has agreed to a remedy. No staging of hardware components and other materials and equipment will interfere with the normal operations and flow of Government personnel and equipment necessary to maintain operations. In the event the Government representative deems it necessary to stop work activities, the Contractor must stop work immediately and proceed as directed by the Government representative. The Contractor must not resume work until directed by the Government representative.

The Contractor must conduct an inspection of the work with the Government on-site representative at the end of Contractor site fit-up or at an agreed time shortly before completion. The Contractor must correct all defects that are uncovered during the inspection. Upon Government approval of the Contractor site fit-up work, the Contractor may proceed with the hardware installation phase.

C.8.1.8. Hardware Delivery and Installation

The Contractor must coordinate with the Government on-site representative at each site listed in Section F for the delivery of all equipment. The Contractor, as applicable, must unpack, inspect and move all materials from the loading dock to the appropriate location as identified in the Government approved SIIP. The Contractor must coordinate delivery and provide all equipment necessary to move all deliveries from the loading dock to the desired location within the facility. The Contractor must dispose of all waste as arranged at the site surveys.

The Contractor must safeguard and protect all systems hardware and equipment, both commercial and developed, while in storage and/or during shipment.

The Contractor must plan the installation to minimize obstructions to disruptions to air traffic and support operations. The Contractor must provide all materials, equipment and labor required to install the hardware at each site IAW the Government approved SIIP.

The Contractor must perform an Equipment/Power Integrity Test prior to connecting any equipment to a power receptacle fed from, or hard wired to, a site designated critical power panel as determined at the site survey. The Contractor must verify, via application of power from a non-critical power source, that all system equipment designated for connection to a critical power panel performs appropriately and that no system equipment has been damaged during shipment or installation. The Contractor must provide a temporary branch feeder(s), or an extension cord(s), that has the required receptacle(s) on one end to mate with the plug on the equipment being tested.

The Contractor must hard wire the other end of the extension cord into a Government determined power panel for testing. The Contractor must then turn the power on to the equipment being tested and monitor the test for a minimum of fifteen (15) minutes or until the equipment exhibits the proper performance characteristics Once verified and witnessed by the Government on-site representative. the Contractor must connect the tested equipment to the designated critical power receptacle(s). Power connections must be coordinated with the Government and hardwire connection into critical power panels may be deemed a Government activity at some sites

C.8.1.9. Installation Checkout and Integration

The Contractor must install all equipment and connect all cables to the equipment IAW the Government approved SIIP. The Government on-site representative will determine if the Contractor, with Government personnel attendance and supervision, can remove existing cables from, and/or connect new cables to, the existing legacy equipment. In the event the Government on-site representative determines that only Government personnel will make connections to existing legacy equipment, the Contractor must assist the Government personnel as required to complete the task.

The Contractor must install the necessary software on the equipment as required to perform equipment level diagnostics and verify cable connectivity. The Contractor must confirm that the individual pieces of equipment are performing correctly and that the cable connectivity appears to be correct before proceeding to system integration and checkout.

The Government will formally accept the hardware installation upon Contractor meeting all required approval criteria described above.

C.8.1.10. Post Installation Activities

C.8.1.10.1. Systems Hardware Removal

The Contractor must remove all equipment and associated materials of the systems, including related transition equipment, which have been replaced by the system installation.

The Contractor must ensure that equipment removal does not degrade Air Traffic operations in any way nor impede the flow of traffic and/or access to critical areas. The Contractor must keep to a minimum the noise, dust, disturbing light and excessive traffic in all equipment and critical operations areas during equipment removal periods. The Contractor must detail any impacts to operations and/or critical areas caused by the removal of equipment in the Evolution Plan.

C.8.1.10.2. Hardware Disposal/Disposition

The Contractor must develop and deliver Disposition Procedures IAW Government guidance as part of the SIIP. The Contractor must dispose of all replaced hardware at the sites IAW the Government approved disposition procedures.

C.8.1.10.3. Facilities Restoration

The Contractor must remove all appurtenances that were installed for the removed systems. This may include, but not be limited to:

1. Unused associated data cable and cable management conveyances
2. Unused associated branch feeder circuit wiring, receptacles, conveyances and anchoring devices
3. Equipment tie-down systems including any protruding bolts
4. Unused circuit breakers from panels or deactivated to spares
5. Removal of floor tiles with cutouts used for removed equipment and replaced with solids from Government stock

The Contractor must close all openings or holes in fire rated walls, floor slabs and other such building members to match existing finishes IAW Government approved methods.

The Contractor must ensure that site restoration activities do not degrade Air Traffic operations in any way. The Contractor must ensure that all equipment and critical operations areas are free of noise, dust, disturbing light and excessive traffic during site restoration activities. The Contractor must detail any impacts to operations and/or critical areas caused by site restoration activities in the Evolution Plan.

C.9 Integrated Logistics Support (ILS)

The Contractor must be responsible for software maintenance service support to include adaptation post Transition Period of this contract. The Contractor must be responsible for performing all software maintenance and adaptation.

The Contractor must provide the Government with maintenance services and supply support for all hardware installed at each site under the re-architecture effort until the specified transfer to Government maintenance. The Contractor must execute the corrective and preventative maintenance strategy of system components.

There will be a Transition Period that allows the Contractor to coordinate with the current Government contractors performing software maintenance in order to assume responsibility for continuing the system. The Contractor must develop and implement the Integrated Logistics Support Plan approved by the Government.

CDRL L01: Integrated Logistics Support Plan

C.9.1. Maintenance Planning

The Contractor must identify the corrective and preventive maintenance strategy. The Contractor must perform an analysis to determine the repair policy for components (i.e. local disposal, on-site repair, and depot repair) and replenishment strategy for each LRU. The basis of the analysis must be seven (7) years. The Contractor must determine the most cost-effective means of LRU maintenance and recommend a repair/discard strategy to the Government for approval. The Contractor must document its approach to maintenance in a Maintenance Allocation Chart and Logistics Support Analysis which is submitted as an Appendix to the Contractor's ILSP. After each site GA, the Contractor must continue to monitor the repair policy for components (i.e. local disposal, on-site repair, and depot repair) and replenishment strategy for each LRU.

CDRL L01: Appendix A: Maintenance Allocation Chart and Integrated Logistics Support Analysis

C.9.2. TBFM Hardware Maintenance Concept

TBFM will be maintained using two levels of hardware maintenance: site and depot. Site hardware maintenance (first level) consists of preventive maintenance, checks and services, and corrective maintenance. Corrective maintenance tasks are performed to restore service and to the system. Site hardware maintenance will consist of trained Government technicians identifying failed LRUs using online diagnostics from the M&C position and replacing the failed LRU. Serviceable LRUs will then be installed into the system to replace the failed items and restore the system to full service. The Government will certify the repaired system. Failed LRUs will be returned to the depot for repair. When it is determined that the failed LRU is beyond economic repair, the LRU will be condemned and disposed of Depot maintenance will consist of repair of LRUs shipped in from the sites. Depot maintenance may include a combination of direct repair of LRUs, subcontracting of the repair to vendors, and replacement of items beyond economic repair

C.9.3. TBFM On Site Contractor Maintenance

The Contractor must provide maintenance personnel who are familiar with the Government applications and capable of system restoration and verification at the sites. At the direction of the Government, Contractor maintenance personnel must assist TO personnel in performing approved system scheduled and corrective maintenance, and support the Government's validation of operational system following the system's repair.

The Contractor must provide 24-hour per day, 7-day per week, and 4-hour response time maintenance service for system components. The Contractor must maintain best efforts to restore the system in 24 hours or less following receipt of service call from Government personnel.

The Contractor must maintain close coordination with the Government on-site representatives to minimize interference with operations. The Contractor must obtain site representative concurrence prior to taking any maintenance action. The Contractor must notify the Government site representative at the completion of maintenance activities and must provide the representative an assessment of the equipment status.

C.9.4. Contractor Maintenance Logistics Support

The Contractor must provide Contractor Maintenance Logistics Support (CMLS) for the system. The CMLS must consist of system hardware and software maintenance, second-level engineering support, and supply support services after Government Acceptance. The Contractor must perform CMLS for a minimum of one (1) year on a site-by-site basis with options for additional years. System maintenance must also include providing Help Desk support.

The Contractor must provide second-level engineering hardware and software support for the system that must include, but is not limited to:

1. Design, development and test to resolve complex system hardware and software problems, including PRs
2. Maintenance of the PR database
3. Installing new hardware and software into existing system baselines
4. Distributing scheduled releases of system hardware, software, firmware, microcode, other logic, configuration data, and adaptation data
5. Support configuration management of system hardware, software, adaptation, firmware, microcode, other logic, and documentation
6. Maintain system and design documentation
7. Support to the WJHTC test organization with configuration and adaptation data
8. Re-hosting activities and planning for end-of-life/end-of-service (EOL/EOS) components
9. Other technical activities deemed necessary in support of the system

The Contractor must submit a CMLS Activity Report that addresses CMLS activities. The Contractor must notify the Government by the close of the next working day of any total site service disruptions exceeding thirty (30) minute durations.

CDRL L02: CMLS Activity Report

C.9.5. Asset Tracking System

The Contractor must employ an asset tracking system compliant with the Global Individual Asset Identifier standards. The Contractor must use the appropriate barcodes standards as described in the Asset Identification Specification document, to identify contract assets at the lowest LRU level. The Contractor may propose to the Government CO for approval, the use of another system for

tracking assets, providing the guidelines are in compliance with the Government management system.

C.9.6. NAS System Asset Identification Report

The Contractor must develop and maintain a barcode database on bar-coded assets installed at each site, spares provided to the sites, and stock held by the depot. The Contractor must provide a report to the respective site at GA and as requested by the Government.

CDRL L03: National Airspace System Asset Identification Report

C.9.7. Software Maintenance Concept

The Contractor must plan for software maintenance to be accomplished using two levels of maintenance. On-site maintenance will include site adaptation and site testing of baseline releases before installation and implementation, as well as generation of PRs. Software maintenance at the WJHTC includes PR resolution, and development of new software functionality and releases. Software maintenance at the WJHTC is performed as part of second-level engineering.

C.9.8. On Site Software and Adaptation Maintenance

The Contractor must perform on site software and adaptation maintenance on a level of effort (LOE) basis. The Government will determine and direct the LOE support required on a site by site basis. Site by site LOE support variations are expected throughout the contract performance period. The Government will provide the contractor with ninety (90) calendar day notice for changes in baseline LOE support needs. When site LOE adjustments are required, the Government will assess the need to allow for additional Material/Labor/Relocation costs associated with the potential return of Contractor personnel.

On-site software support must include, but not be limited to, installation, integration, and testing of software updates; development and implementation of site adaptation data; development of adaptation modifications to ensure smooth transition of new functionality or software releases; coordination and development of site system documentation; site test plans and procedures; assistance with system performance recording; data reduction and analysis (DR&A); assistance with software problem determination, reporting, and tracking; and local system administration at each site.

The Contractor must continue to adhere to established procedures for on site CM of the system software and adaptation in support of the system administration capabilities. The on-site support must function as a team member in cooperation with on-site Government personnel and any other on-site support Contractors in resolving technical problems. While on site the support must be prepared to assist the site in the resolution of system problems. The Contractor must be prepared to dispatch additional technical personnel as necessary to the site when requested by the Government.

During the Transition Period, the Contractor must conduct on-site reviews of the adaptation used and implemented at each site. Post Transition Period, and as directed by the Government, the Contractor may be tasked to provide on-site support at each site to perform CCUs, adaptation maintenance, and system administration, system maintenance, and Monitor & Control (M&C) IAW with the requirements outlined in this SOW.

A minimum of one (1) support personnel may be tasked to support each site for at least forty (40) hours per week during the hours when the system is operational at the site. Site engineers may be paged during normal Traffic Management Unit (TMU) hours and response time must be within 30-minutes. The Contractor must also be available for callback for emergencies outside the operational hours with a two-hour callback response time. The period of operations will vary by site.

The Contractor must provide the following site support (but is not limited to) for an initial period of performance of 1 year from contract award:

1 One systems administrator ZDC
2 One systems administrator and One AT specialist for ZNY
3 One system administrator and One AT specialist for ZFW
4 One system administrator for ZOB
5 One AT Specialist for ZAU
6 One systems administrator for ZLA/ZOA
7 One AT specialist for ZBW – Part time (20 hours a week)
8 One systems administrator for ZDV

The Contractor may be tasked to develop site briefings at each site Briefings must be developed IAW CDRL M02

C.9.9. Engineering Support

As part of the Engineering Support effort identified in this Section, the Contractor must assist the Government in the development, integration, test, training and implementation of post-GA software releases to incorporate the functionalities/ requirements identified in this contract

As directed by the Government, the Contractor must provide training/engineering support for up to sixty (60) labor months

C.9.9.1. Second-Level Engineering

The Government will provide second-level engineering support from the WJHTC Pre-Planned product improvements are under consideration for incorporation into the end product after implementation of the system

At the request of the Government, the Contractor must provide support at Government sites and Contractor's facility in specific areas including, but not limited to

1. Telecommunications network applications, planning, design, engineering, hardware, installation, and operation
2. problem investigation (e g communications, hardware, software, firmware)
3. Planning, implementation, maintenance, and/or update of equipment
4. Non-envisioned or catastrophic repair or other equipment
5. Field Modifications or retrofit activities
6. Graphical User Interface (GUI) modifications
7. Additional Interface Development and modifications
8. Additional hardware, as required, not covered elsewhere needed to support the program
9. Minor software development
10. Review of operational modes and procedures
11. On-site maintenance

The Contractor must provide qualified engineering and technical personnel for these services as necessary to complete assigned tasks These services must be provided on a time and material basis with the Contractor indicating any incidental hardware required to perform services not otherwise covered in this contract

Tasks must be preceded by an estimate of the time, material, and corresponding cost from the Contractor at the request of the Government. Tasks must begin after written Government authorization has been received.

C.9.9.2. Software Subscription Services

For all commercial software used to operate the system as part of the development environment, the Contractor must where available:

1. Maintain a subscription or maintenance service with the vendor of the commercial software that includes product upgrades and changes
2. Identify the subscription services to the Government via a letter to the Contracting Officer and the Acquisition Program Manager, Logistics (APML), so that the Government may conveniently extend these services after acceptance of the system
3. Develop and maintain a database on bar-coded assets installed at each site, spares provided to the sites, and stock held by the depot. The Contractor must provide a copy of the site database to the respective site at GA.

C.9.9.3. Supply Support

The Contractor must provide an initial quantity of site and depot spares. Spares must be the property of the Government. The Contractor will perform actions necessary for the provisioning of spare and replacement parts for COTS products. The level of detail of the provisioning data will be consistent with the maintenance concept unless otherwise directed by the Government at the initial Provisioning TIM or a subsequent Provisioning TIM. The Contractor will prepare and deliver the provisioning recommendations that will be used to establish an infrastructure that ensures that life cycle support is in place. Depot spares quantities must be provided prior to key site GA.

C.9.9.3.1. Shipping Replacement Parts

The Government will designate the priority for shipments of items to sites. The shipping priorities are as follows:

1. Priority 1 — This priority is required when an extreme emergency condition exists. Priority 1 is used when either the prime or standby equipment is inoperative or when a facility is operating at reduced performance that adversely affects operations. Shipment to the designated facility is to be received within 24 hours including weekends and holidays after notification by the Government's authorized representative.
2. Priority 2 — This priority is required when an emergency condition exists. This condition exists when a facility is operating with substandard equipment or operating conditions indicate imminent facility failures or outage. Shipment to the designated facility is to be received within 48 hours after notification by the Government's authorized representative.
3. Priority 3 — This is a routine requirement or stock replenishment. Shipment to the designated facility is to be received within eight days after receipt of notification by the Government's authorized representative.

C.9.9.3.2. Commercial Item Substitution

The Contractor may substitute equivalent commercial items when supplying the system. The form, fit, and function of the replacement for the original item must meet the following minimum requirements:

1. Functionality is the same or better than the original item

2. Form, fit, and function is transparent to the system architecture

Testing must be the preferred method to verify form, fit, and function. Analysis may be used when testing is neither feasible nor appropriate for the respective substitution. The Contractor must provide test or analysis results to the Government illustrating that the proposed form, fit, and function replacement of a given unit assembly must perform within the system performance requirements. The Government will approve or reject assembly replacements within sixty (60) calendars days of notification. No Contractor sponsored changes or modifications must be made to the system without the consent of the Government.

CDRL L04: Commercial Item Substitution Notification

C.9.9.3.3. Support Equipment

The Contractor must identify tools and test equipment used for software development and testing at the WJHTC. The Contractor must identify all support and test equipment required for performing operational and maintenance tasks to the LRU level at sites, including interfaces, jigs, fixtures and software, common and special tools, Material Handling Equipment (MHE), and test equipment required to perform system/service certification and operational and maintenance tasks.

The Contractor must recommend for use, whenever possible, items currently in the Government inventory or used in support of other equipment common to the Government.

The Contractor must deliver during installation, all approved tools, software, test equipment and other items required for installation, maintenance, diagnosis, and training, including cables and technical manuals. Delivery of special test equipment must include its associated documentation. All tools and test equipment must be the property of the Government. The Contractor must deliver tools and test equipment to each site so as to be available for its respective GA. The Contractor must provide all hardware, software, formatters, compilers, cross compilers, linkers, converters, and other tools necessary to convert the source code into object files, executable files, and other format files required by the system processors.

The Contractor must provide all hardware and software tools necessary to load the executable files, object files, or other format files into Random Access Memory (RAM), Read Only Memory (ROM), Flash, Erasable Programmable Read Only Memory (EPROM), Electronically Erasable Programmable Read Only Memory (EEPROM), or other storage media of the system processors.

The Contractor must provide all hardware and software tools necessary to automate the building of system releases and distribution media specific to any system processor, subsystem, or system.

The Contractor must deliver a backup for any tool or special test equipment required to diagnosis any critical function and restore it to service. If the tool or special test equipment is already inventoried, the Contractor must include Government inventory quantities when determining the required quantity.

CDRL L05: Tools and Test Equipment List

C.9.10. Technical Data

C.9.10.1. Technical Manuals

The Contractor must prepare and deliver to the Government for approval a list of the technical documentation required to install, operate, maintain, and test the system hardware and software The list must also include that documentation needed to support certification of the system hardware and software.

System technical manuals must include the documentation needed to support second-level engineering, AT User Manuals, and TO systems operations and maintenance instructions for field personnel and training systems, as well as all required test and support equipment. Upon approval, the Contractor must provide all technical documentation as an integrated Technical Library which is required to install, operate, maintain, and support certification of the system hardware and software.

The Contractor must maximize the use of COTS documentation. The Contractor must make arrangements with the vendors to ensure the Government is granted the right to duplicate the COTS manuals. Additionally, the Contractor must identify in the list the COTS documentation omissions and deficiencies and request Government approval to prepare and deliver supplemental documentation to meet the content requirements of FAA-D-2494B or as approved by the Government. The Contractor developed documentation must be substantive and not merely incorporate, in whole or in part, one or more COTS documents. The technical manuals and supplements must support the Maintenance Concept. The Contractor must format maintenance handbooks IAW FAA Order 1320.58 A, Equipment and Facility Directives-Modification and Maintenance Technical Handbooks.

The Contractor must ensure that system technical data is updated to reflect Government approved engineering changes prior to establishing the product baseline. For all training IPRs the Contractor must deliver a current version of technical documentation that supports the developed curriculum and associated products and any other reference material curriculum developers used to develop the products.

Technical documentation must be developed and delivered to support the Government review of training deliverables and the final version must be delivered at the time of equipment installation. The Contractor must deliver technical documentation and drawings in a format and media capable of being imported into the support system.

CDRL L06:	**Technical Manual Master List**
CDRL L07:	**Commercial Manuals, Drawings, and Data**
CDRL L08:	**Technical Manuals, Drawings and Data, Contractor-Prepared Supplemental Technical Manuals and Data**

C.9.10.2. Developed Manuals

The Contractor must develop and deliver technical manuals for system level operations, maintenance and second-level engineering to support TO systems operations and maintenance, and training by Government maintenance technicians at the sites. The technical manuals, drawings parts, and other data lists must comply with the requirements specified in Section 2 of this SOW.

The level of detail for the manuals must be sufficient to accomplish the maintenance concept. The maintenance instructions in the manual must be of sufficient detail to permit Government technicians to troubleshoot, remove and replace, and certify the equipment. All special tools, fixtures, and test equipment required for installation and maintenance must be listed.

C.9.10.2.1. Technical Manual Validation and Verification

The Contractor must validate developed system manuals and assist in the Government's verification of the manuals. Validation entails the actual performance of operating and maintenance procedures including checkout, calibration, alignment, scheduled and unscheduled removal and replacement instructions; assembly and disassembly, and associated checklists by Contractor personnel Verification entails confirmation by the Government that the manual accurately describes the system.

C.9.10.2.2. Technical Manual Validation

The Contractor must conduct validation by actual performance unless written authority is obtained by the Government to use simulation for selected procedures. The Government reserves the right to

witness each procedure. Upon completion of the technical manual validation, the Contractor must prepare and submit a Technical Manual Validation Completion Report.

The Contractor must develop and use validation/verification logs that outline all procedures for developed documentation that are to be validated and verified. The completed logs will provide the initials of the technician completing the validation and whether the procedure passed or failed. The Contractor must provide the completed logs with the Technical Manual Validation Report deliverable.

CDRL L09: Technical Manual Validation Completion Report

C.9.10.2.2.1. Technical Manual Verification

The Contractor must provide engineering and technical assistance support during Government verification of developed technical manuals.

C.10 ENGINEERING SERVICES

The Contractor must perform engineering services tasks that support engineering, analyses, design, development, implementation, maintenance, training, additional site deployment and upgrade of TBFM or related systems as directed by the CO. These engineering services may include but are not limited to the following: directed engineering studies, prototyping designs of specific subsystems, and analysis of new alternatives for a specific subsystem.

The Contractor must, by means of a task order, develop, deliver, and conduct training to provide system users with the knowledge and skills required to use, operate, monitor, maintain, test, verify, and support the system IAW operational, maintenance, and support concepts.

The Contractor must, by means of a task order, expand Time-Based Metering and Adjacent Center Metering capabilities beyond current High-Density Airports and ARTCCs.

All work performed in this area must be defined by Task Orders prior to the performance of any work. Each Task Order Request issued by the CO must contain:

1. Detailed description of the work/services to be performed
2. Milestone/performance schedule
3. Identification of all deliverables to include quantities and delivery date(s)
4. Statement of the priority of the task as related to other tasks and/or projects
5. Due date for the Task Order Proposal

The Task Order Proposal must provide a technical approach to the Task, a proposed schedule for completing the Task, and an estimate of labor hours and all other costs required to perform the Task. The Task Order Proposal must identify any impact to on-going work. In the event a Task Order is withdrawn, reasonable proposal preparation costs will be paid through a subsequent contract modification; otherwise, costs to prepare the Task Order Proposal must be included in the Task Order Proposal.

The CO will issue a Task Order upon agreement with the Contractor as to scope, schedule and price. The Contractor must then proceed with performance of the task. The CO may provide approval to proceed prior to a definitive Task Order, if appropriate.

C.11 PERFORMANCE PERIOD

C.11.1. Transition Period

The Transition Period commences upon contract award. The duration of this period will be negotiated with the Government and should not to exceed sixty (60) calendar days.

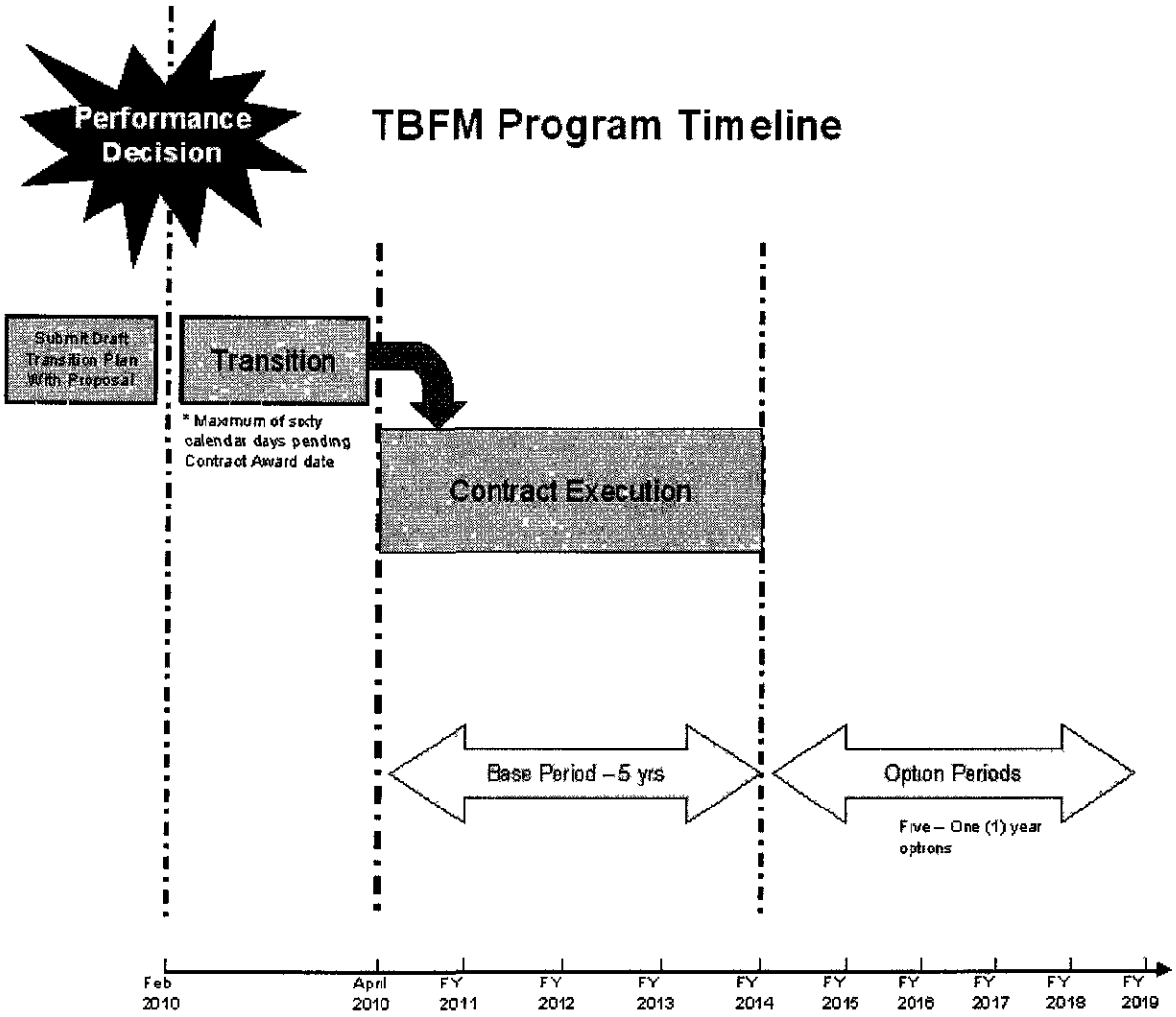

Figure 1 TBFM Program Timeline

The purpose of the Transition Period is for the Contractor to become familiar with all aspects of the existing system/subsystem to include architecture, hardware, software and adaptation. During the Transition Period the Contractor will not be responsible for the operations and maintenance of the system.

The Contractor must develop and submit a Transition Plan describing the necessary activities and procedures needed to accomplish a smooth transition. The Transition Plan must address the system components to include but not limited to; software maintenance of the system, adaptation changes/development, system re-architecture of software and hardware and the operational transfer to the re-architecture design. A draft Transition Plan must be delivered with the Contractor's proposal.

Upon completion of the Transition Period the Contractor must assume responsibility as defined in this contract.

CDRL P01: Transition Plan

C.11.2. Phase Out Period

The last ninety (90) calendar days of this contract will constitute the Phase-Out Period. During this period, the Contractor must support activities of conducting a final inventory of equipment and materials, finalizing program records, and ensuring continuity of operations. The Contractor must not defer any requirements for the purpose of avoiding responsibility, and/or transferring such responsibility to the new potential successor. The Contractor must fully cooperate with the Government as to not interfere with personnel work or duties.

C.11.3. Contract Phase-Out Plan

The Contractor must develop and submit a Phase-Out Plan for Government approval that addresses the plans and procedures necessary to ensure continuity of operations to the future successor after completion of this contract. The Contractor must provide available equipment and material required for the continued performance period until end contract.

CDRL P02: Contract Phase Out Plan