



Federal Aviation Administration
Standard Work Breakdown Structure
(WBS)

Version 4.0

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INTRODUCTION

This Federal Aviation Administration (FAA) Standard Work Breakdown Structure (WBS) represents, and is defined as, the complete set of activities that may be accomplished to provide a solution that satisfies an FAA mission need. Solutions include products and services such as hardware, software, facilities, communications services, technical assistance services, infrastructure, training, procedures, etc. The elements in the WBS represent activities; not the resources needed to accomplish the activities. The activities are arranged hierarchically and no time phasing is implied.

The WBS is intended for use across the FAA for developing life cycle cost estimates of solutions. It also supports management of solutions during the solution implementation and in-service management phases, and will aid in the comparison of life cycle cost estimates to actual costs that have been collected through the FAA's Cost Accounting System (CAS). The WBS will provide uniformity in definition and consistency of approach for developing the top three levels of the WBS. While providing consistency, the WBS also permits flexibility: users need use only those elements that apply to their program, and may add detail below the specified levels as needed.

The WBS aligns with the activities defined in the Acquisition Management System (AMS). In the WBS, Mission Analysis and Investment Analysis activities precede the formal establishment of a specific solution. The remaining elements in the WBS are activities that are directly associated with a specific solution. Within the WBS, the Solution Development and Implementation phases map to the AMS Solution Implementation phase.

This WBS supersedes Version 1.0 as published in the FAA Acquisition System Toolset (FAST) and any other interim WBS documents. This WBS is provided as AMS guidance and applies to all acquisition and research, and development programs regardless of cost or appropriation. There are no specific WBS elements for technology refreshment activities, so these activities should be structured into the appropriate WBS elements.

The WBS should be used for all acquisition program life cycle cost estimates and for tracking actual costs in the CAS. Furthermore, it is recommended that contractors submit proposals utilizing the FAA WBS or show the mapping between the Contractor Work Breakdown Structure (CWBS) and the FAA WBS. The WBS is used to collect costs related to acquisitions and directly feed the CAS, which also collects costs from additional sources.

This version, FAA WBS 4.0, is a collaborative effort between FAA Lines-of-Business, FAA Integrated Product Teams, FAA Office of Investment Analysis and Operations Research, Airway Facilities Financial Management, and Industry. Recommendations for changes, additions, or deletions that may be of use in improving this document should be addressed to: Federal Aviation Administration, ASD-410, 800 Independence Ave., S.W. Washington, DC 20591.

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Table of Contents

1.0	MISSION ANALYSIS	1
1.1	Identify Projected Demand for Services.....	1
1.2	Identify Technological Opportunities.....	1
1.3	Identify Projected Supply of Services	1
1.4	Mission Needs Analysis and Assessment.....	1
1.5	Initial Requirements Definition	2
2.0	INVESTMENT ANALYSIS	3
2.1	Initial Investment Decision.....	3
2.1.1	Planning.....	3
2.1.2	Analysis.....	3
2.1.3	Documentation	3
2.2	Final Investment Decision	3
2.2.1	Planning.....	4
2.2.2	Analysis.....	4
2.2.3	Documentation	4
2.3	Rebaseline Decision	4
3.0	SOLUTION DEVELOPMENT	5
3.1	Program Management.....	5
3.1.1	Program Planning, Authorization, Management and Control.....	5
3.1.2	Contract and Grant Management	5
3.2	System Engineering.....	5
3.2.1	System Engineering Management.....	6
3.2.2	System Requirements and Definition.....	6
3.2.3	Analysis, Design, and Integration	7
3.2.4	Value Engineering.....	7
3.2.5	Supportability, Maintainability, and Reliability Engineering	7
3.2.6	Quality Assurance Program	8
3.2.7	Configuration Management.....	8
3.2.8	Human Factors	9
3.2.9	Security	9
3.2.10	System Safety Engineering and Management	9
3.2.11	Other System Engineering Specialties.....	9
3.3	HW/SW Design, Development, Procurement, and Production.....	10
3.3.1	Hardware Design and Development	10
3.3.2	Software Design and Development.....	10
3.3.3	HW/SW Integration, Assembly, Test and Checkout.....	10
3.3.4	Production Engineering.....	11
3.3.5	Procurement/Production.....	11
3.4	Physical and Airspace Infrastructure Design and Development	11
3.4.1	Facility Planning and Design	11
3.4.2	Real Estate.....	11
3.4.3	Physical Infrastructure.....	12
3.4.4	Airspace Redesign.....	12
3.5	Test and Evaluation	12
3.5.1	System Development Test and Evaluation.....	12

Table of Contents

3.5.2	System Operational Test and Evaluation	13
3.5.3	System Independent Software Verification and Validation	13
3.5.4	Independent Operational Test and Evaluation	13
3.6	Data and Documentation	13
3.7	Logistics Support	13
3.7.1	Logistics Support Planning	14
3.7.2	Test and Measurement Equipment Acquisition	14
3.7.3	Support and Handling Equipment Acquisition	14
3.7.4	Support Facilities Construction/Conversion/Expansion	14
3.7.5	Support Equipment Acquisition / Modification	14
3.7.6	Support Facilities and Equipment Maintenance.....	15
3.7.7	Initial Spares and Repair Parts Acquisition.....	15
3.7.8	Initial Training	15
4.0	IMPLEMENTATION	17
4.1	Program Management.....	17
4.1.1	Program Planning, Authorization, Management and Control.....	17
4.1.2	Contract Management	17
4.1.3	Human Resources Planning and Staffing.....	17
4.2	Engineering.....	18
4.3	Environmental and Occupational Safety and Health Compliance.....	18
4.4	Site Selection and Acquisition.....	18
4.5	Construction	19
4.6	Site Preparation, Installation, Test, and Checkout.....	19
4.7	Joint Acceptance Inspection/Commissioning/Closeout	19
4.8	Telecommunications.....	19
4.9	Implementation Training	19
5.0	IN-SERVICE MANAGEMENT	21
5.1	Preventive Maintenance/Certification	21
5.1.1	Preventive Maintenance/Certification.....	21
5.1.2	System Management Office (SMO) Overhead	21
5.1.3	FAA Academy Maintenance	21
5.2	Corrective Maintenance.....	21
5.2.1	Corrective Maintenance	21
5.2.2	System Management Office (SMO) Overhead	22
5.2.3	FAA Academy Maintenance	22
5.3	Modifications.....	22
5.4	Maintenance Control	22
5.5	Technical Teaming	22
5.5.1	Airway Transportation System Specialists Technical Teaming.....	22
5.5.2	Air Traffic Control Specialists Technical Teaming	22
5.5.3	Other Staff Technical Teaming.....	23
5.6	Watch Standing Coverage	23
5.7	Program Support.....	23
5.7.1	Program Planning, Authorization, Management and Control.....	23
5.7.2	Contract Management	23
5.8	Logistics	23
5.8.1	Supply Support.....	23
5.8.2	Replenishment Spares	24
5.8.3	Repair	24

Table of Contents

5.8.4	Logistics Support Services	24
5.8.5	Support Equipment Maintenance	24
5.8.6	Technical Data	24
5.8.7	Maintenance Support Facilities	24
5.8.8	Commercial Depot Logistics Service (CDLS) Contracts.....	24
5.9	In-Service Training.....	25
5.9.1	Airway Transportation System Specialists In-Service Training	25
5.9.2	Air Traffic Control Specialists In-Service Training.....	25
5.10	Second Level Engineering.....	25
5.10.1	Program Management and Infrastructure Support.....	25
5.10.2	National Airspace System (NAS) Field Support and Restoration	25
5.10.3	Hardware and Software Engineering Support	26
5.10.4	Configuration Management	26
5.10.5	Process Improvement.....	26
5.10.6	Quality Assurance.....	26
5.10.7	Information System Security	27
5.10.8	Recurring NAS System Costs.....	27
5.10.9	Software Licenses	27
5.11	Infrastructure Support.....	27
5.11.1	Hazardous Materials Handling	28
5.11.2	Utilities, Building and Grounds Upkeep and Maintenance	28
5.11.3	Telecommunications.....	28
5.11.4	Building and Infrastructure Modernization and Improvements.....	28
5.11.5	Real Estate Management	28
5.11.6	Physical Security.....	28
5.12	Flight Inspections and SIAP Development.....	28
5.13	System Performance Assessment	29
5.14	System Operations.....	29
5.15	Travel To And From Sites	29
6.0	DISPOSITION	31
6.1	Program Management.....	31
6.2	Decommissioning	31
6.3	Engineering.....	31
6.4	Environmental Activities.....	31
6.5	Dismantle/Removal	31
6.6	Site Restoration/Closeout	31

Table of Contents

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FAA Standard WBS Structure and Definitions

1.0 MISSION ANALYSIS

All activities associated with data collection, analysis, and concept exploration and development required to satisfy existing and emerging demand for services.

1.1 Identify Projected Demand for Services

All activities associated with (including data collection) identifying and quantifying projected demand for National Airspace System (NAS) services, based on diverse inputs in the form of external demand for service and capacity, long-range plans and projections, local site trends, and performance and supportability trends of fielded equipment.

1.2 Identify Technological Opportunities

All activities associated with identifying and quantifying projected technological opportunities that will enable the FAA to perform its mission more safely, efficiently, and effectively. These activities include the review of hardware, software, and systems currently available commercially or projected to be available commercially, instead of hardware, software, and systems that could be custom developed for the FAA.

Also included are all activities associated with technology transfer of research results (both in and out of the agency) such as presenting research results, attendance at conferences, marketing of research outputs (technology looking for a problem to solve), canvassing of external research programs for applicable innovations, fostering of aviation related academic research programs, etc.

1.3 Identify Projected Supply of Services

All activities associated with identifying and quantifying the existing and projected supply of services based on performance and supportability data, external and internal assessments of FAA-provided services, and assessments of current and planned NAS capabilities.

1.4 Mission Needs Analysis and Assessment

All activities associated with analyzing, quantifying, and prioritizing capability shortfalls (the difference between demand and supply), and technological opportunities to increase operational safety, efficiency, or effectiveness. This includes documentation of the mission analysis itself, and the preparation and approval of Mission Need Statements (MNSs).

FAA Standard WBS Structure and Definitions

1.5 Initial Requirements Definition

All activities associated with translating information in the MNS into an initial Requirements Document (iRD), consistent with the Operational Concept. This includes research and development activities required to evaluate and develop initial requirements. It also includes the Requirements Correlation Matrix and the Mission Need Correlation Matrix.

FAA Standard WBS Structure and Definitions

2.0 INVESTMENT ANALYSIS

All activities associated with accomplishing the Initial (2a) and Final (2b) Investment Decisions by the Joint Resources Council (JRC), as defined in the Acquisition Management System (AMS).

2.1 Initial Investment Decision

All activities associated with transforming information from the Operational Concept, MNS, iRD, and other sources to conduct an investment analysis for an Initial Investment Decision by the JRC.

2.1.1 Planning

All activities associated with forming an Investment Analysis Team (IAT), developing an Investment Analysis Plan (IAP), identifying what metrics are affected by the planned investment, and coordinating the planned activities.

2.1.2 Analysis

All activities associated with data collection, Industry Day activities, market surveys, and modeling to support quantitative and qualitative analyses of the activities identified in the IAP. This includes the technical, operational, life cycle cost, benefits, risk, and return on investment analysis of the alternatives. For each alternative, human factors, safety, security, architecture, and affordability assessments will also be performed where appropriate. It also includes activities such as business case development for the preferred alternative and coordination of the analysis and findings with the sponsor, JRC members, and stakeholder organizations.

2.1.3 Documentation

All activities associated with completing the Initial Investment Decision phase, which includes the following documents: JRC-2a briefing package, updated iRD, initial Acquisition Program Baseline (APB), initial Acquisition Strategy, and the initial Investment Analysis Report (with exit criteria) for the final Investment Analysis Decision.

2.2 Final Investment Decision

All activities associated with transforming information from the 2a Initial Investment Decision and other sources to conduct an Investment Analysis for a Final Investment Decision by the JRC.

FAA Standard WBS Structure and Definitions

2.2.1 Planning

All activities associated with forming an Investment Analysis Team, developing an Investment Analysis Plan (IAP), and coordinating the planned activities.

2.2.2 Analysis

All activities associated with conducting detailed technical, operational, life cycle costs, benefits, risk, and return on investment analyses to finalize the APB of the preferred alternative. Human factors, safety, security, architecture, and affordability assessments will also be performed as required. This also includes activities like the business case for the proposed acquisition, coordination of the analysis, findings, and final APB with the sponsor, JRC members, and stakeholder organizations prior to Contract Award.

This also includes activities related to preparing Requests for Information (RFIs), Requests for Offer (RFOs), and evaluating proposals from industry, academia, and other government laboratories.

2.2.3 Documentation

All activities associated with completing the Final Investment Decision phase, which includes the following documents: JRC-2b briefing package, revalidated MNS, final Requirements Document, final APB, final Acquisition Strategy, final Integrated Program Plan (with Risk Management Plan), and the final Investment Analysis Report.

2.3 Rebaseline Decision

All activities associated with rebaselining the APB for JRC approval. This phase includes activities related to updating, coordinating, and documenting the updated APB with the sponsor, JRC members, and stakeholder organizations.

FAA Standard WBS Structure and Definitions

3.0 SOLUTION DEVELOPMENT

All activities associated with the Solution Development, e.g., hardware system, software, security considerations, facility, physical infrastructure, and telecommunications. This includes all activities associated with initial development, modifications, upgrades, pre-planned product improvements, and technical refresh.

3.1 Program Management

All activities associated with business and administrative planning, organizing, directing, coordinating, controlling, and approval actions designed to accomplish overall program objectives.

3.1.1 Program Planning, Authorization, Management and Control

All activities associated with developing the strategy for implementing and executing the overall program.

All activities associated with planning, authorizing, and managing all actions and activities that must be accomplished for successful program development, which includes preparation of the Acquisition Strategy Paper and the Integrated Program Plan, and the project-specific input to agency-level planning documents, such as the call for estimates and the NAS architecture. It also includes all activities required to ensure that all cost, schedule, performance, and benefit objectives are met.

3.1.2 Contract and Grant Management

All activities associated with awarding, issuing, modifying, monitoring, and managing project-related contracts, grants, partnerships, Cooperative Research and Development Agreements, Interagency Agreements, Foreign Partnerships, Memoranda of Understanding, and Memoranda of Agreements.

3.2 System Engineering

All technical and management activities associated with a specific solution that concentrates on the definition, design, and application of the whole system throughout the program life cycle. These activities include planning, directing, and controlling a totally integrated engineering effort of a solution.

Systems engineering consists of such functional disciplines as requirements definition and allocation; analysis, design, and integration; value engineering;

FAA Standard WBS Structure and Definitions

supportability, maintainability, and reliability engineering; quality assurance; interface management; configuration management; human factors; security; safety engineering; and specialty engineering.

3.2.1 System Engineering Management

All activities associated with planning, managing, supporting, executing, and maintaining system engineering processes and work, which includes the following:

- Preparing the Systems Engineering Management Plan (SEMP), specification tree, the program risk analysis, the decision control process, system planning, technical performance measurement, technical reviews, subcontractor and vendor reviews, work authorization, and technical documentation control.
- Measuring and improving the effectiveness and efficiency of system engineering processes.
- Integrating technical planning to provide program management with specific guidance and direction on how to execute a requirement-based and structurally managed program.

3.2.2 System Requirements and Definition

All activities associated with transforming the performance requirements of a final Requirements Document into specifications and a preferred solution configuration. This system engineering effort, which is applicable to each component of the solution throughout the program life cycle, includes developing and maintaining design criteria, and preparing and maintaining system-level data flows, block diagrams, change proposals, and documentation trees. It includes the following activities:

- Requirements management activities to identify and manage the requirements that describe the desired characteristics of the system. The Requirements Management process defines, collects, documents, and manages all requirements, including the complete requirements set consisting of the MNS, the iRD and final Requirements Document (fRD), and the system and procurement specifications.
- Risk management activities to identify and analyze the uncertainties of achieving program objectives and develop plans to reduce the likelihood and consequences of those uncertainties. Risk management is applied throughout the acquisition management life cycle to: 1) identify and assess risk areas; 2) develop and execute risk mitigation or elimination strategies; 3) track and evaluate mitigation efforts; and 4) continue mitigation activity until risk is eliminated or its consequences reduced to acceptable levels.

FAA Standard WBS Structure and Definitions

- Life cycle engineering to identify and manage requirements for system life cycle attributes including real estate management, deployment and transition, integrated logistics support, sustainment/technology evolution, and disposal.
- Functional analyses to describe the functional characteristics based on stakeholders' needs, using functional flow diagramming as a representative structured analysis process, and to translate the needs into a sequenced and traceable functional architecture.
- Synthesis of alternatives to define design solutions to identify systems that will satisfy the requirements baseline. Synthesis translates the requirements, as set in context by the Functional Architecture, into the design architecture, consisting of the Physical Architecture with its associated technical requirements.

3.2.3 Analysis, Design, and Integration

All activities associated with the overall analysis, design, test, and integration of the solution, (e.g., hardware system, software, facility, and telecommunications). This includes design, integrity, test and analysis, intra- and inter-system compatibility assurance (interface identification, analysis, and design), and the integration and balancing of reliability, maintainability, producibility, safety, and survivability. Design includes allocating functions to appropriate elements (e.g., hardware, software, telecommunications, user functions, services, facilities, etc.), and presenting prepared design information at identified design reviews.

3.2.4 Value Engineering

All activities associated with analyzing current designs versus alternative designs in order to quantify the value added and cost reduction of alternative architectures. It also includes trade studies to analyze a series of design alternatives and recommend the most balanced (cost, reliability, testability, supportability, survivability, compatibility, and producibility) technical solutions among a set of proposed viable solutions.

3.2.5 Supportability, Maintainability, and Reliability Engineering

All engineering activities and analyses undertaken during solution development as part of the engineering and design effort, to assist in complying with supportability and other logistics support objectives.

All activities associated with supportability analyses to identify how to most cost effectively support the system over its entire life cycle.

FAA Standard WBS Structure and Definitions

All maintenance planning activities associated with measuring the ability of an item or solution to be retained at or restored to a specific condition of readiness.

All activities associated with reliability engineering, defined as the engineering process required to examine the probability of a solution performing its mission adequately over the intended period of time and under expected operation conditions.

3.2.6 Quality Assurance Program

All activities associated with planning, establishing procedures, administering examinations and tests required during procurement, production, receipt, storage, and issue that are necessary to develop the solution in accordance with identified standards and specifications. It includes:

- Integrity of analyses activities to validate those analyses that provide the required level of fidelity and accuracy in a timely manner. An Analysis Management Plan that outlines the details of the various analysis methods and tools is either generated or incorporated into the Integrated Program Plan (IPP).
- Validation and verification activities to determine that the system and process requirements are correct and have been met and that the system is ready for use in the operational environment for which it is intended (i.e., that the system requirements are unambiguous, correct, complete, consistent, operationally and technically feasible, and verifiable). There are two categories of verification: test and assessment. Test is the disciplined and controlled subsection of the system requirements to conditions that replicate operations in a real or simulated action. Assessment includes analysis, demonstration, inspection, and verification by similarity, validation of records, simulation, and review of design documentation.

3.2.7 Configuration Management

All activities associated with establishing and maintaining consistency of a product's performance, functional, and physical attributes with its requirements, design, and operational information throughout its life. This includes the establishment, monitoring, and administration of change control procedures, including collecting, processing, distributing, and tracking modification request forms; establishment and administration of change control boards, and formal audits to compare product to documentation. It also includes configuration management of hardware, software, facilities, data, interfaces, tools, and documentation.

FAA Standard WBS Structure and Definitions

3.2.8 Human Factors

All activities associated with integrating (as a comprehensive technical and engineering effort) human capabilities and limitations with equipment (hardware and software), systems, procedures, jobs, facilities, environments, staffing, training, personnel, and organizational management, for safe, comfortable, and effective human-system performance.

3.2.9 Security

All engineering activities and tasks associated with security policy, requirements, and issues (e.g., information security, physical security, and personnel security).

Information security evaluates the vulnerability of the system to unauthorized access and use, or susceptibility to sabotage, and assesses the ability of the system to survive a security threat in the expected operational environment. The FAA is also obligated to protect proprietary information to which it has access.

Physical security applies to aviation industry operations and activities, and to supporting infrastructure such as communications, sensors, and information processing. In addition, physical security applies to the staffed facilities, which the FAA leases, owns, and operates.

Personnel security applies to all FAA positions and FAA contractor positions (inclusive of persons employed as or by contractors, subcontractors, or consultants).

3.2.10 System Safety Engineering and Management

All activities associated with planning, conducting, and documenting, throughout the acquisition management life cycle, to identify, classify, analyze, and assess hazards. It also includes measures to mitigate hazards or reduce risk to an acceptable level, verification that mitigation measures are incorporated into product design and implementation, and assessment of residual risk.

3.2.11 Other System Engineering Specialties

All activities associated with specialty engineering in order to analyze system requirements, functions, solutions, and/or interfaces using specialized skills and tools. These activities assist in the derivation of requirements, synthesis of solutions, selection of alternatives, and validation and verification of requirements.

FAA Standard WBS Structure and Definitions

Electromagnetic Environmental Effects (E3) analyzes the system for susceptibility and/or vulnerability to electromagnetic fields or capability to generate such fields that might interfere with other systems. It identifies sources of interference, and the means for correction within the levels prescribed by law, program requirements, spectrum management, or recognized standards. E3 is composed of Electromagnetic Interference (EMI) and Electromagnetic Compatibility (EMC).

Hazardous Materials Management/Environmental Engineering determines environmental impacts at deployment sites and during operations, including both environmental impacts on the system and system impacts on the environment during all phases of the product life.

3.3 HW/SW Design, Development, Procurement, and Production

All activities associated with designing, developing, or procuring hardware and software configuration items, developing prototypes at the development facility, and the resulting integration, testing, assembly, checkout, and production. These activities also includes Research, Engineering, and Development (R,E,&D) projects.

3.3.1 Hardware Design and Development

All activities associated with detailed design, fabrication, assembly, and checkout of all Hardware Configuration Items (HWCI) of the initial unit(s) including all necessary security considerations. A HWCI is an aggregation of hardware that is designated for configuration management and treated as a single entity in the configuration management process.

3.3.2 Software Design and Development

All activities associated with the detailed design, prototyping, development, and unit-level checkout of all Computer Software Configuration Items (CSCI) including all necessary security considerations. A CSCI is an aggregation of software, or any of its discrete portions that satisfies an end use function and has been designated for configuration management.

3.3.3 HW/SW Integration, Assembly, Test and Checkout

All activities associated with development site integration, assembly, and checkout of hardware, software, system security, and telecommunications components. This includes interface materials and parts required for the in-plant integration and assembly into the system within suppliers' facilities, and all materials and parts or other interfacing equipment furnished by the integrating agency or contractor.

FAA Standard WBS Structure and Definitions

3.3.4 Production Engineering

Engineering activities involved in taking the development system to production. This includes developing and maintaining production process documentation.

3.3.5 Procurement/Production

All procurement associated with the project including electronic equipment and project material not included in other engineering and construction contracts (e.g., Commercial Off-the-Shelf (OTS) or Non-Developmental Items [NDI]). This includes procurement of hardware and software for technology refreshment.

All activities associated with full-scale production necessary to fulfill quantity requirements for solution implementation. This includes all activities related to contractor-conducted testing performed on each end item before it leaves the factory to verify that the end item conforms to applicable specifications, and is free from manufacturing defects. It also includes any non-recurring production start-up costs associated with the production of the solution (e.g., facility expansion or construction, retooling or production equipment acquisition or modification, etc.).

3.4 Physical and Airspace Infrastructure Design and Development

All activities associated with planning, designing, and developing facilities, physical infrastructure, and airspace, including laboratory research test facilities and the supporting infrastructure of the test facilities (e.g., pavement test facility, fire research laboratories, etc.).

3.4.1 Facility Planning and Design

All activities associated with translating facility requirements to national level architectural and engineering (A&E) facility design, planning and programming to accommodate site-specific needs. This includes design of lighting, space, environment, heating, ventilation, air conditioning, grounding, bonding, shielding, lightning protection, cabling, physical security requirements, etc.

3.4.2 Real Estate

All activities associated with determining real estate needs and national level planning and programming for acquisition.

FAA Standard WBS Structure and Definitions

3.4.3 Physical Infrastructure

All activities associated with translating physical infrastructure requirements to national level designs, and planning and programming to accommodate site-specific needs. This includes design of telecommunications, power systems, water and sewage systems, etc., and national purchases.

3.4.4 Airspace Redesign

All activities associated with developing and approving a major airspace redesign. This includes the modeling, simulation, and environmental assessment of airspace redesign alternatives.

3.5 Test and Evaluation

All activities associated with testing, analyzing, and evaluating in order to verify and validate that products meet specifications, satisfy requirements and are operationally suitable and effective. This includes research testing; System Engineering activities associated with Test and Evaluation are collected under System Engineering, Section 3.2.

3.5.1 System Development Test and Evaluation

All activities associated with contractor conducted testing (e.g., factory acceptance testing) performed during the system development process to verify that the new system is operating properly in order to achieve government acceptance.

These are conducted to demonstrate that all engineering design and development activities are complete, and that the system will meet specifications, security certification, and authorization criteria. Development test and evaluation includes contractor and in-house activities associated with this effort, e.g., software validation and verification, and system and software access controls. It includes all support activities (e.g., technical assistance, maintenance, labor, material, support elements and testing spares, etc.) required during this phase of testing are included.

It also includes the development and construction of those special test facilities, test simulators, test beds, and models required to perform developmental tests in order to verify the design and reliability of the system or subsystem.

FAA Standard WBS Structure and Definitions

3.5.2 System Operational Test and Evaluation

All activities associated with tests and evaluations conducted to assess the prospective system's utility, operational effectiveness, operational suitability, and logistics supportability (including compatibility, interoperability, reliability, maintainability, logistics requirements, security administration, etc.). It includes all support activities (e.g., technical assistance, maintenance, labor, material, support elements and testing spares etc.) required during this phase of testing.

All activities associated with development and construction of those special test facilities, test simulators, test beds, and models required for performance of the operational tests.

3.5.3 System Independent Software Verification and Validation

All activities performed by organizations other than the developer to determine the degree to which the software fulfills the specifications. Formal verification is a rigorous mathematical demonstration to ensure that the source code conforms to its requirements. Validation is concerned with evaluation of a software product throughout the development process to determine compliance with product requirements.

3.5.4 Independent Operational Test and Evaluation

All activities associated with independent tests and evaluations conducted by organizations other than the developer in a realistic environment to confirm the operational readiness (suitability and effectiveness of the system to satisfy requirements) of FAA systems to become part of the NAS. It also includes all support activities.

3.6 Data and Documentation

All activities associated with producing, delivering, and reviewing FAA programmatic documents and contractor documentation deliverables. It includes managing, coordinating, editing, scheduling, auditing, and assembling documents and review packages necessary to the functioning of the program. It also includes acquiring, writing, assembling, reproducing, packaging, and shipping the data. It includes the activities involved in converting data from contractor format into government format, and reproducing and shipping the data.

3.7 Logistics Support

All activities associated with acquiring test and measurement equipment, support and handling equipment, support facilities, initial spares and repair parts, and the

FAA Standard WBS Structure and Definitions

training required to support and maintain the system or portions of the system through the complete delivery of the solution, but not directly engaged in the performance of the system mission.

3.7.1 Logistics Support Planning

All planning activities associated with fulfilling the requirements to provide logistics support to the solution.

3.7.2 Test and Measurement Equipment Acquisition

All activities associated with acquiring test and measurement equipment, which is used to evaluate operational conditions of a system or equipment at all levels of maintenance. It includes the test measurement and diagnostic equipment, precision measuring equipment, automatic test equipment, manual test equipment, automatic test systems, test program sets, appropriate interconnect devices, automated load modules, tap(s), and related software, firmware and support hardware. It also includes packages that enable line or shop replaceable units, printed circuit boards, or similar items to be diagnosed using automated test equipment.

3.7.3 Support and Handling Equipment Acquisition

All activities associated with acquiring tools and handling equipment used for support of the mission system. Equipment typically included is ground support equipment, vehicular support equipment, powered support equipment, material handling equipment, and support hardware and software.

3.7.4 Support Facilities Construction/Conversion/Expansion

All activities associated with constructing, converting, or expanding support facilities for training, testing, inventory, contractor and FAA depot maintenance, hazardous waste management, etc., required for the specific system.

3.7.5 Support Equipment Acquisition / Modification

All activities associated with acquiring or modifying support equipment or software for training, testing, inventory, contractor and FAA depot maintenance, hazardous waste management, etc., required for the specific system.

FAA Standard WBS Structure and Definitions

3.7.6 Support Facilities and Equipment Maintenance

All activities associated with maintaining support facilities and equipment for training, testing, inventory, contractor and FAA depot maintenance, hazardous waste management, etc., required for the specific system prior to the in-service decision.

3.7.7 Initial Spares and Repair Parts Acquisition

All activities associated with acquiring, provisioning, packaging, handling, storing, and transporting deliverable spare components, assemblies, and subassemblies used for initial replacement purposes in the system hardware. It includes the repairable spares and repair parts required as initial stock to support and maintain newly fielded systems or subsystems, including pipeline quantities, during the initial phase of service at all levels of maintenance and support.

3.7.8 Initial Training

All activities associated with designing, developing, and delivering training services, aids, and materials for initial, attrition, and refresher training of site technicians, depot technicians, engineers, air traffic controllers, security administrators, Technical On-site Representatives (TORs), aviation safety inspectors, implementation personnel, and other personnel.

FAA Standard WBS Structure and Definitions

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FAA Standard WBS Structure and Definitions

4.0 IMPLEMENTATION

All activities required to deploy the solution into the NAS, including program management, physical integration, functional integration, site planning and preparation through commissioning.

4.1 Program Management

All activities associated with business and administrative planning, organizing, directing, coordinating, controlling, and approval actions designed to accomplish overall program objectives.

4.1.1 Program Planning, Authorization, Management and Control

All activities associated with Program Control, Contract Management, Business and Administrative activities such as planning, organizing, directing, coordinating, estimating, scheduling, and controlling, and approval actions designed to accomplish overall program objectives.

It includes all activities required to plan, authorize, and manage all actions and activities that must be accomplished for program implementation, including preparing project-specific input to agency-level planning documents, such as the call for estimates, Blue Sheets, White Sheets, the Capital Investment Plan (CIP), and the NAS architecture. This also includes all activities associated with security control and all activities for ensuring that all estimating, cost, schedule, performance, and benefit objectives are met.

It also includes all deployment planning activities required to support the deployment of the solution. It includes development and dissemination of deployment planning information to regional and site personnel; tailoring the in-service review (ISR) checklist template; conducting ISR checklist status reviews; developing action plans and briefing package to obtain In-Service Decision; conducting stakeholder meetings; obtaining the In-Service Decision; tracking ISD action plans; and updating the IPP.

4.1.2 Contract Management

All activities associated with awarding and managing project-related contracts, including technical support contracts.

4.1.3 Human Resources Planning and Staffing

All activities associated with planning and finalizing staffing requirements at a new facility, including hiring new Airway Facilities and Air Traffic

FAA Standard WBS Structure and Definitions

staff, identifying staff relocations, relocating staff (Permanent Change of Station), and identifying overtime and bubble staffing requirements.

It also includes negotiating agreements (memoranda of agreements) with unions within a facility and between facilities, developing administrative and standard operating procedures, and equipment.

4.2 Engineering

All engineering activities associated with plant site surveys, design, analysis, and studies. This includes civil, electrical, mechanical, architectural, industrial, and other “non-electronic” plant type engineering positions. It also includes drafting, coordinating with applicable organizations, and developing plans and specifications.

All electronics engineering activities associated with the electronics installation design, analyses, and studies. This includes spectrum analysis, coordination with sponsoring organizations, and development of installation drawings.

All physical integration activities associated with site modification requirements to ensure that the product integrates into the NAS. This includes all activities to assess site conditions, the current product’s physical requirements, and transition requirements.

All engineering activities associated with achieving both transition and operational requirements for physical security. Risk and requirements management activities are also included.

4.3 Environmental and Occupational Safety and Health Compliance

All activities associated with satisfying environmental, energy conservation, occupational safety and health, and hazardous materials laws and regulations for the program and its products. This includes Environmental Impact Statements, Assessments, and Due Diligence Audits, design reviews for energy conservation and employee safety elements, and Occupational Safety and Health (OSH) and other related activities.

4.4 Site Selection and Acquisition

All activities associated with acquiring real estate, including initial analysis, data gathering, identifying candidates, analyzing, coordinating, testing, providing final recommendations for site approval, and acquisition. This includes coordination with all applicable organizations, unions, and the public; and the development and review of property maps, appraisals, title searches, etc.

FAA Standard WBS Structure and Definitions

4.5 Construction

All activities associated with actual construction or modification of a site. This includes all activities to execute, control, schedule, control quality, and secure plant equipment and utility services to ensure the site meets requirements and provides a safe environment for its life cycle.

It also includes construction to complete building construction change orders and resolve Joint Acceptance Inspection (JAI) exception items, as well as construction and modification of laboratory research test facilities, and the supporting infrastructure of the test facilities (e.g., pavement test facility, fire research laboratories, etc.).

4.6 Site Preparation, Installation, Test, and Checkout

All activities associated with site preparation, installation, site acceptance testing, and checkout of hardware, software, and equipment at the site in order to achieve operational status. This includes coordination with all applicable organizations, unions and the public during installation and transition.

4.7 Joint Acceptance Inspection/Commissioning/Closeout

All activities associated with preparing for and achieving declaration of operational readiness, initial operational capability (IOC), full operational capability (FOC), Joint Acceptance Inspection (JAI), service availability, and commissioning. This includes operational procedure development or modification, Notice to Airmen (NOTAM) issuance, field familiarization activities, preliminary and final commissioning, flight inspections, and other applicable testing. It also includes initial certification activities, initial standards testing and evaluation, and initial publication of certification standards.

All activities associated with clean-up activities required after the new system has been commissioned. This includes capitalization of F&E projects, resolution of JAI exceptions, and the update and submittal of redlined facility drawings.

4.8 Telecommunications

All activities required to fully implement telecommunications services, including system security requirements, required to achieve full operational capability.

4.9 Implementation Training

All activities associated with the delivery of initial, refresher, and attrition training for implementation personnel. This includes contractor provided costs associated with specific training. Training costs include course conduct (including instructor and facilities costs), travel, and per diem costs for students.

FAA Standard WBS Structure and Definitions

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FAA Standard WBS Structure and Definitions

5.0 IN-SERVICE MANAGEMENT

All activities required for the In-Service Management Phase, including directly operating, providing maintenance functions (both scheduled and unscheduled), and furnishing technical and logistics support for maintenance of FAA systems, sub-systems, services or equipment. It also includes associated travel time required to support the system.

5.1 Preventive Maintenance/Certification

All activities associated with preventive maintenance of hardware and software, including activities specific for certification.

5.1.1 Preventive Maintenance/Certification

All activities associated with scheduled FAA staff and prime contractor conducted non-recurring and recurring maintenance activities to retain a system in a specified condition. It includes all maintenance to accomplish periodic inspections, condition monitoring, critical item replacements, and calibration. It includes servicing requirements (e.g., lubrication, fueling, etc.), the loading of software updates, and certification activities.

5.1.2 System Management Office (SMO) Overhead

All activities associated with managing and planning activities at the SMO level for scheduled maintenance activities.

5.1.3 FAA Academy Maintenance

All activities associated with scheduled maintenance on FAA Academy training systems.

5.2 Corrective Maintenance

All activities associated with corrective maintenance of hardware and software. This also includes activities related to packaging and shipping components to depot-level repair facilities.

5.2.1 Corrective Maintenance

All activities associated with unscheduled FAA staff and prime contractor conducted non-recurring and recurring maintenance activities. It includes all unscheduled maintenance actions performed to restore the system to a specified condition. The corrective maintenance cycle includes failure identification, localization and isolation, disassembly, item removal and replacement or repair in-place, re-assembly, checkout, and condition verification. Also, unscheduled maintenance may occur due to a

FAA Standard WBS Structure and Definitions

suspected failure, even if further investigation indicates that no actual failure occurred. This also includes activities related to packaging and shipping components to depot-level repair facilities.

5.2.2 System Management Office (SMO) Overhead

All activities associated with managing and planning activities at the SMO level for corrective maintenance activities.

5.2.3 FAA Academy Maintenance

All activities associated with unscheduled maintenance on FAA Academy training systems.

5.3 Modifications

All activities associated with implementation of modifications to in-service hardware and software.

5.4 Maintenance Control

All activities associated with providing oversight and coordination in operating and maintaining the NAS infrastructure, including NAS Operation Managers (NOMS).

5.5 Technical Teaming

All activities associated with the investigation and resolution of general technical issues relating to system performance.

5.5.1 Airway Transportation System Specialists Technical Teaming

All activities associated with the investigation and resolution of general technical issues relating to system performance for Airway Transportation System Specialists.

5.5.2 Air Traffic Control Specialists Technical Teaming

All activities associated with the investigation and resolution of general technical issues relating to system performance for Air Traffic Control Specialists.

FAA Standard WBS Structure and Definitions

5.5.3 Other Staff Technical Teaming

All activities associated with the investigation and resolution of general technical issues relating to system performance for FAA and non-FAA staff other than Airway Transportation System Specialists and Air Traffic Control Specialists.

5.6 Watch Standing Coverage

Watch standing coverage beyond stated staffing requirements.

5.7 Program Support

All administrative activities associated with planning, organizing, managing, and directing actions required in support of operating and maintaining the solution.

5.7.1 Program Planning, Authorization, Management and Control

All activities associated with planning, authorizing, and managing all actions that must be accomplished for operation and maintenance of the solution. This includes preparing project-specific input to agency-level planning documents, such as the call for estimates and NAS architecture. It also includes activities associated with security control, as well as activities required to ensure that all cost, schedule, operational performance, and benefit objectives are met.

5.7.2 Contract Management

All activities associated with awarding, issuing, modifying, monitoring, and managing solution-related contracts, such as logistics contracts, service management contracts, equipment repair contracts, and maintenance contracts.

5.8 Logistics

All activities associated with depot level support to NAS prime mission equipment and associated support equipment.

5.8.1 Supply Support

All activities associated with ordering, receiving, tracking, sending, cataloging, and inventory management of supplies needed in order to operate and maintain the solution. This also includes activities related to packaging, handling, storage and transportation (PHS&T), and on-site space allocation for materials needed to support the solution.

FAA Standard WBS Structure and Definitions

5.8.2 Replenishment Spares

All activities associated with replacing exchange-and-replace core items and expendable items issued to FAA field sites in support of NAS equipment. It includes material products items stocked at the depot, and direct ship items ordered through the depot but stocked at other commercial or government sites.

5.8.3 Repair

All activities associated with FAA and commercial activities regarding depot-level repair of equipment in support of the solution. It does not include costs for site-level maintenance.

5.8.4 Logistics Support Services

All activities associated with warranty tracking, periodic maintenance, corrective maintenance, and logistics technical services performed at operational FAA sites by depot personnel. It also includes engineering, logistics, and technical support provided by FAA and commercial depot personnel.

5.8.5 Support Equipment Maintenance

All activities associated with replenishing, repairing, maintaining, and calibrating support equipment.

5.8.6 Technical Data

All activities associated with system specific documentation, including blue prints, drawing, repair and test procedures, provisioning data, logistic management information (LMI), and other technical data utilized by or directly associated with depot-level maintenance.

5.8.7 Maintenance Support Facilities

All activities associated with any facility or portion thereof regarding depot-level maintenance of NAS equipment.

5.8.8 Commercial Depot Logistics Service (CDLS) Contracts

All activities associated with CDLS contract costs not captured elsewhere.

FAA Standard WBS Structure and Definitions

5.9 In-Service Training

All activities associated with on-the-job training, attrition training, and refresher training of personnel who directly operate, maintain, or provide support functions of the solution. This includes contractor provided costs associated with specific training. Training costs include course conduct (including instructor and facilities costs), travel, and per diem costs for students.

5.9.1 Airway Transportation System Specialists In-Service Training

All activities associated with training Airway Transportation System Specialists.

5.9.2 Air Traffic Control Specialists In-Service Training

All activities associated with training Air Traffic Control Specialists.

5.10 Second Level Engineering

All engineering activities in support of the delivery of service, to include development of modifications, documentation, testing, and configuration management. It includes the evaluation, prototype, test and implementation of technology refresh initiatives, as well as FAA and contractor staffing and travel as applicable.

5.10.1 Program Management and Infrastructure Support

All activities associated with business and administrative planning, organizing, directing, coordinating, controlling, and approval actions to support second level engineering processes and work.

5.10.2 National Airspace System (NAS) Field Support and Restoration

All activities associated with second level engineering support for all operational and support systems at NAS facilities. It includes technical support to all NAS facilities to assist NAS personnel in the restoration of facilities through direct support via telephone, remote entry, or on-site travel as required. It also includes support in the following activities: 1) initial analysis of problem, 2) implementation of measures necessary to restore the system to operational status, 3) and implementation and verification of site modifications. Additional activities include coordination related to NAS outages, centralized help desk provisioning, and support for administrative and reporting functions related to system restoration.

FAA Standard WBS Structure and Definitions

5.10.3 Hardware and Software Engineering Support

All activities associated with the analysis, design, test, and implementation of hardware and software modifications, operational and support elements and sustainment of the NAS including site adaptation, wherever performed. This includes conducting studies for various stages of the support process, second level support studies for software and hardware upgrades, critical operational problems, and system enhancements. It includes engineering analysis (including human factors analysis) of proposed modifications to determine feasibility, operational impact (functionality, availability, maintainability and reliability), implementation, and integration into operational systems. It also includes establishing an infrastructure to implement system upgrades and enhancements to include creating a program support facility, software development tools, licenses and maintenance, and test bed simulation.

Additional activities include establishing, maintaining, and providing technical direction and guidance through the issuance of technical instruction books, and implementing the gold standard for test and evaluation of NAS systems, key-site testing, and testing of changes. It also includes risk management.

5.10.4 Configuration Management

All activities associated with configuration management, maintenance, and control of the operational baseline of NAS systems and leased services by authorizing and releasing all modifications of systems, subsystems, component equipment, and software programs to operational systems and facilities in the NAS. It includes ensuring that appropriate documentation is developed and delivered to establish and maintain the system/service baseline. It also includes reviewing and analyzing initial contractor specifications and design to ensure conformance with government requirements.

5.10.5 Process Improvement

All activities associated with employing a structured process that supports development and evolution that ensures that appropriate field support, hardware, software, and adaptation processes are followed. It includes documenting the transition criteria for progressing from one stage to the next, and insuring compliance with established quality standards.

5.10.6 Quality Assurance

All activities associated with developing the Airway Facilities operational performance criteria requirements and standards for the systems in the

FAA Standard WBS Structure and Definitions

NAS to ensure that FAA Quality Assurance standards are met before systems or modifications are released to the field. It includes ensuring that all critical milestones and requirements have been met for system deployment and operation through the in-service review process. It also includes testing and evaluating the quality of leased services to ensure that modifications of leased services have no adverse impacts on the NAS.

5.10.7 Information System Security

All activities associated with establishing and maintaining security policies and procedures for NAS systems and subsystems, including assessing information security capabilities and levels of effectiveness for all operational NAS systems. It includes supporting the analysis and prioritization of appropriate security measure enhancements or upgrades for all operational NAS systems, and verifying and analyzing security features incorporated in new or modified systems. It also includes administering the security of software development and distribution platforms, and for the physical security of software development systems, analyzing source and impact of incursions or attempted incursions, and determining necessary corrective response and implementing corrections.

5.10.8 Recurring NAS System Costs

All activities associated with leasing of facilities for developmental laboratories, facilities to provide support services, and actual replacements for government-owned facilities to support second level engineering activities. It includes system leasing that may be required to provide functionality to meet specific government operational requirements, and equipment leasing that may be dictated by system operational requirements that involve design limitations and engineering requirements.

5.10.9 Software Licenses

All activities associated with maintaining software license currency for assemblers, compilers, code libraries, and Commercial-off-the-Shelf (COTS)/Commercially Available Software (CAS) systems.

5.11 Infrastructure Support

All activities associated with maintenance, operations, and security of leased and owned buildings, structures, grounds, roads, and support vehicles for operational systems or people who support or operate those systems. It also includes physical security personnel.

FAA Standard WBS Structure and Definitions

5.11.1 Hazardous Materials Handling

All activities associated with pollution prevention, hazardous waste management and remediation, environmental permitting and auditing, energy audits, safety evaluations, hazard abatement and other activities to assure ongoing environmental, energy, and occupational safety and health compliance.

5.11.2 Utilities, Building and Grounds Upkeep and Maintenance

All activities associated with efforts to routinely maintain, modernize, and relocate the buildings, structures, roads, grounds, and support equipment. It includes recurring costs of utilities (i.e., water, electric, gas, oil, etc.).

5.11.3 Telecommunications

All activities associated with maintaining, upgrading, or modifying operational and administrative communications services required to sustain the operation and maintenance of the NAS facilities. It also includes leases and other recurring telecommunication costs.

5.11.4 Building and Infrastructure Modernization and Improvements

All activities associated with modernizing and upgrading buildings, structures, roads, and support equipment including providing bonding, grounding, lightning protection, heating, cooling, and building accessibility.

5.11.5 Real Estate Management

All activities associated with managing FAA-owned or leased properties. It includes leasing of buildings, structures and grounds in which the operational systems or the people who support or operate systems are located.

5.11.6 Physical Security

All activities associated with providing physical security for a facility or system including security guards, fencing, cipher locks, etc. It also includes upkeep and maintenance of these items.

5.12 Flight Inspections and SIAP Development

All activities associated with in-service flight inspections of the solution, and the development and revalidation of Standard Instrument Approach Procedures (SIAP), including flight certification.

FAA Standard WBS Structure and Definitions

5.13 System Performance Assessment

All activities associated with assessing equipment and system performance and trends, including metrics development, data collection, and trend analysis.

5.14 System Operations

All non-maintenance activities associated with directly operating or monitoring the solution. This includes computer operations, system administration, system security administrators, information security assessments, audits, etc.

5.15 Travel To And From Sites

Travel time to and from sites to perform any type of In-Service Management work.

FAA Standard WBS Structure and Definitions

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FAA Standard WBS Structure and Definitions

6.0 DISPOSITION

All activities associated with disposal management, dismantling/demolition/removal, restoration, degaussing or destruction of storage media, and salvage of decommissioned equipment, systems, or sites.

6.1 Program Management

All activities associated with managing the termination of a decommissioned system or equipment. The activities include planning, documenting, coordinating, and inspecting decommissioned systems or equipment.

6.2 Decommissioning

All activities associated with providing notices and coordinating with all stakeholders (both agency and public organizations) on impending decommissioning.

6.3 Engineering

All engineering activities associated with designs for dismantling, demolishing, and or removing commissioned systems or equipment.

6.4 Environmental Activities

All activities associated with end-state environmental assessments and cleanup, abatement, and disposal of hazardous materials as stipulated by laws and regulations.

6.5 Dismantle/Removal

All physical activities associated with dismantling, demolishing, and removing decommissioned systems or equipment.

6.6 Site Restoration/Closeout

All cosmetic activities associated with restoring a site to the original/acceptable condition, as well as all final activities required after the site has been restored to the original/acceptable condition. These activities include necessary actions to revert the real estate to the owner and close the project.

FAA Standard WBS Structure and Definitions

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