

PART III - SECTION J-5
AAD Automated Process Framework

**AAD Automation Process Framework:
Managing the Information Systems
Life Cycle**

**Department of Transportation
Federal Aviation Administration**

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1.0 Introduction The purpose of this document is to provide guidelines for the life cycle management process for Associate Administrator for Administration (AAD) automated information systems. Its goal is to promote the effective and efficient design, implementation, and operation of information systems that are responsive to our customer's business needs. This includes:

- a) Acquiring and managing information resources for the AAD complex consistent with the Federal Aviation Administration (FAA) strategic, business, and information resources goals and in compliance with applicable Federal Aviation Administration (FAA), Department Of Transportation (DOT), Office of Management and Budget (OMB) and General Services Administration (GSA) federal laws, regulations, and direction. This includes the Government Performance Results Act (GPRA), the Information Technology Management Reform Act (ITMRA), Integrated Product Development System (IPDS), and the FAA Acquisition Management System (AMS).
- b) Establishing appropriate goals, strategies, plans, and performance criteria for the AAD Information Technology (IT) programs; measuring the performance of these programs against the performance criteria to determine the effectiveness and efficiency of the programs in meeting their cost, performance and schedule goals; and reporting to the AAD Chief Information Officer (CIO) on the performance of these programs.
- c) Implementing an IT architecture for AAD that is integrated and consistent with the FAA IT architecture.
- d) Monitoring information resources acquisition and system management.

The purpose of this document is to define a basic framework for information systems development. It is not intended to prescribe a specific methodology for developing information systems. Project requirements and other decision factors should determine the methodologies best suited for the development of an information system. Some methodologies, such as Joint Application Development (JAD) and Rapid Application Development (RAD), combine or integrate various components identified in the process framework. Other methodologies, such as Pre-Planned Improvement or Continuous Improvement methods continue repeating the use of components in a cyclical manner rather than the sequential portrayed in this document. See Attachments 1 through 4, for an illustration of the logic used to determine which methodology is most appropriate. This document has been prepared to provide the Office of Primary Responsibility (OPR), Information Resource Managers (IRM), and Project Managers (PM) the components they should address during the various phases in the development cycle. Depending on the nature and scope of the development effort, the degree to which the elements within each component are addressed will be determined by the OPR, IRM, and PM.

Another purpose of this process is to establish a basis for repeatable success and continuous improvement for AAD information systems as a continually evolving and improving process. Lessons learned will be applied to the document as it is regularly reviewed and revised.

2.0 Background The AAD CIO was appointed in 1996 by AAD-1 to set policy and provide guidance and oversight on AAD information technology. At the AAD IRM conference in August 1996, the foundation was laid to develop a process framework for development of AAD information systems. Consensus was reached that AAD systems often lack corporate focus and organization, and that AAD technology is sometimes outdated and does not meet the customer's business needs.

A four tiered pyramid approach was developed to resolve these problems. The foundation is the Organizational Vision, supporting in turn the Process Vision, Technology Vision, and the Application Vision. Four AAD Planning Teams were established to develop these plans.

2.1 Organizational Team Its purpose is to evaluate the different IRM organizational models in existence and any relevant issues; determine core services and the staffing and funding required to deliver them; identify and establish common position descriptions; identify training requirements to deliver core services; and determine and implement methods for tracking IRM funds.

2.2 Process Team Its purpose is to evaluate, document, and implement a best practice business process for the effective development and deployment of AAD information systems. This will be based on the Software Engineering Institute's Capability Maturity Model (CMM) for the life cycle management of software projects.

2.3 Application Team Its purpose is to identify the existing state of administrative business applications within the FAA to model an effective IRM program for delivery of information systems that will meet future business needs; coordinate the existing state with AAD offices, regions, centers, and Lines Of Business (LOBs) to identify priorities, duplication; and to develop the plan for meeting the near term initiatives and long term vision.

2.4 Technology Team Its purpose is to document the baseline of established and de facto FAA technology standards; determine the level of compliance within AAD and business issues around noncompliance; evaluate and determine any additional standards required for effective deployment of administrative systems; and to develop priorities and plans for resolving technology issues facing AAD.

This document is the plan for development and deployment of information systems prepared by the Process Team. It will be continuously improved as feedback is received from customers and from the other planning teams.

Process Management is both a discipline and a technology. As a discipline, it involves a systematic, methodological approach to define, manage, and provide the complex, interdependent steps that make up the software development process. As a technology, process management helps to manage the information system through an interactive repository that stores definitions and examples for roles and responsibilities, documented processes, tasks, tools, standards, metrics, and deliverables.

In development of this document, the Process Team reviewed and incorporated information on “best practices.” This includes research information from the Gartner Group Research, Department Of Defense, Honeywell, AAD 5-Year Plan, Office of Financial Services (ABA) IRM Plan, Office of Human Resource Management (AHR) IRM Plan, Office of Information Services (AMI) Software Engineering Institute/Software Process Improvement Plan (SEI/SPI), the ACQUIRE project, and the Personnel and Payroll project.

It is recognized that implementation of this framework may impact project resource requirements. Consideration should be given to including additional required resources in a project’s financial plan.

A glossary of terms used in this document is included for reference.

3.0 Scope These guidelines apply to national and local systems developed by AAD to support information system requirements. It includes formal structured processes and newer methodology approaches such as Rapid Application Development (RAD), Joint Application Development (JAD), evolutionary, and incremental development. Although this framework’s primary domain is AAD administrative systems, it is also recommended as a process to be used for “repeated successes” for non-AAD information systems when developed by AAD resources.

As a result of a national information system needs assessment, feasibility study, and requirements analysis, it may be determined that an existing local system can be used (or reengineered) to meet the national requirements. Local systems developed under this process framework should already have some of the necessary analysis completed. These documents can be expanded and forwarded for review and approval. A local system developed outside these guidelines should be “retro-fitted” with the component approvals, as appropriate. The Process Framework Checklist, included as attachment 5, can be used by the OPR/PM/IRM to propose the elements they feel are necessary. It will be forwarded to the AAD CIO for review and approval.

4.0 Roles and Responsibilities The key participants in the automation process framework are defined below. The coordination and approval roles they play vary based on the level of system being developed.

4.1 The Office of Primary Responsibility (OPR) is the organizational entity who has functional responsibility for the information system. In conjunction with their IRM staff, the OPR is primarily responsible for needs assessment, identifying requirements,

identifying funding, and approving the elements of the automation process framework. They are also responsible for coordination with other LOBs and unions.

4.2 The Chief Information Officer (CIO) for the Associate Administrator for Administration (AAD) is responsible for facilitating cooperation of FAA Headquarters, regions, centers, and field offices to reduce duplication of effort and to share information on effective practices. Within the automation process framework, the CIO coordinates, approves, and is primarily responsible for oversight of successful development and implementation of AAD information systems.

4.3 The Information Resource Manager (IRM) is responsible for providing support services to the OPR. For example, the Office of Financial Services (ABA) IRM is responsible for information systems required by ABA. At the center or regional level, the IRM is the AAD individual responsible for supporting AAD requirements. Within the automation process framework, this individual is primarily responsible for information systems within their area of responsibility. The IRM is responsible for communicating and coordinating the information system plans and programs with customers, AAD IRMs, and other LOBs, as appropriate.

4.4 The AAD IRMs consists of all the Information Resource Managers within the AAD organization. The primary roles of this group are to ensure that these guidelines are followed, to review and comment on proposals and plans, and to support implementation of approved information systems. The AAD IRMs are responsible for communicating and coordinating the information system plans with customers and other LOBs as appropriate.

4.5 The Project Manager (PM) is primarily responsible for the development and deployment of an information system in accordance with these guidelines.

4.6 The Customer/User is responsible for identifying requirements to the Office of Primary Responsibility and/or Project Manager.

4.7 The AAD Technology Team establishes and maintains an architectural standard for AAD administrative systems. Within the automation process framework, the technology team is responsible for reviewing information system proposals to ensure that they are within technical standards.

4.8 The IRMs in Other Lines of Business (LOBs) may be asked to review and provide comments on AAD proposals and plans.

5.0 Automated Systems Inventory An inventory of AAD automated systems is required to promote efficient and effective use of information systems to support business goals, promote the management of data as a corporate resource that can be effectively shared throughout FAA, and to guide the development of information systems. This inventory should be reviewed prior to initiating a new development project to avoid redundant systems. The automated systems inventory will:

- a) provide AAD management an overview of all administrative IRM resources, platforms, networks, and applications.
- b) facilitate the evaluation of IRM resource needs.
- c) facilitate the identification and reduction of duplicate applications, platforms, and networks within AAD.
- d) facilitate the cross utilization of information systems among AAD functional customers.
- e) facilitate the management of AAD data as a corporate resource that is shared throughout FAA as required.
- f) increase data standardization, integration, reliability, relevance, currency, accessibility, accuracy, consistency, and timeliness.
- g) utilize one time entry of data at its source to increase productivity by reducing paper work and improving work process efficiency.
- h) ensure the security, integrity, and privacy of data.
- i) provide automated information systems that will support effective business decisions.

6.0 Review and Approval Process The System Development Review and Approval Matrix (figure A) provides guidance on coordination and approval of AAD information systems. The intent of the review and approval process is to ensure adequate coordination while minimizing bureaucracy.

The matrix differentiates between national and local systems and includes in-house development or COTS (Commercial Off-The-Shelf) products. It includes a structured or “waterfall” approach as well as RAD, JAD, Evolutionary, and Incremental methodologies. The matrix does not represent a step-by-step process. Work may be in progress on several components of the process at the same time. For example, part of the Requirements Analysis may be developed concurrently with the Feasibility Study. Using Rapid Application Development methodology, parts of the Requirements Analysis, Design, Development, and Testing components may be developed concurrently. However, the overall component review and approval still needs to be accomplished.

Each component consists of several elements and not all of the elements will be required depending on the system. An AAD Automation Process Checklist (Attachment 5) has been developed to assist the OPR/PM/IRM determine which elements are required. For national systems, the Process Checklist will be forwarded to the CIO along with the Feasibility Study.

Approval will take place in the order on the matrix for each component. The OPR/local IRM will approve the component package before it is forwarded to the CIO for approval. The OPR/PM will forward each system component for review and approval with a reasonable suspense time frame. The review time allowed will vary based on the size and complexity of the system. Failure to respond to an approval or review request within this time frame will be considered a concur/no comment. No response is required to an information copy. However, comments may be submitted, if appropriate.

The amount or depth of documentation sent out for review and approval will vary based on scope, business case, and size of the system. The determination of the “appropriate” level will be made by the PM. Documents may be forwarded for approval, review, or information via internal mail or hard copy.

The Automation Process Framework should improve communications about AAD information systems. This team work approach to information systems development provides the opportunity to identify and resolve potential problems during the review cycle.

Systems Development Reviews and Approvals - Figure A
(Methodology Independent)

Component	National Systems	Local Systems
Needs Assessment		
OPR/IRM	A	A
AAD IRMs	R	N/A
CIO	A	N/A
Technology Team	I	N/A
Feasibility Study		
OPR/IRM	A	A
AAD IRMs	R	N/A
CIO	A	N/A
Technology Team	I	N/A
Requirements Analysis		
OPR/IRM	A	A
AAD IRMs	I	N/A
CIO	I	N/A
Technology Team	R	N/A
Design		
OPR/IRM	A	A
AAD IRMs	I	N/A
CIO	I	N/A
Technology Team	A	N/A
Development		
OPR/IRM	A	A
AAD IRMs	N/A	N/A
CIO	N/A	N/A
Technology Team	I	N/A
Testing		
OPR/IRM	A	A
AAD IRMs	I	N/A
CIO	I	N/A
Technology Team	I	N/A
Implementation		
OPR/IRM	A	A
AAD IRMs	R	N/A
CIO	A	N/A
Technology Team	I	N/A
Operations and Maintenance		
OPR/IRM	A	A
AAD IRMs	I	N/A
CIO	I	N/A
Technology Team	I	I
Shutdown		
OPR/IRM	A	A
AAD IRMs	A	N/A
CIO	A	N/A
Technology Team	I	I

A = Approve
R = Review

I = Information Only
N/A = Not applicable

7.0 Needs Assessment. **The needs assessment component provides reviewing and approving officials information about the business case for an automated information system proposal. This assessment is the responsibility of the OPR and PM supported by the local IRM. It should not include recommendations or decisions about the technical solution to the requirements.**

7.1 Business Case. This element describes the operational issues and presents the major factors that decision-makers should evaluate. Detailed qualitative and analytical information should be included as attachments. The OPR should validate the business process is effective and efficient or consider a Business Process Improvement (BPI) study. An assessment of existing information systems with a similar functionality should be discussed in the business case.

8.0 Feasibility Study The feasibility study component provides reviewing and approving officials the information upon which to base the decision to approve, revise, or disapprove an information system proposal. This study is a responsibility of the OPR supported by the PM and local IRM. The study describes the initial requirements, project management plan, investment analysis, and financial plan. Each element of the feasibility study is described below.

8.1 Initial Requirements Document This element will describe an initial list of general requirements that support the business case. The plan also explains how they intend to manage the requirements to avoid “scope creep” problems.

8.2 Project Management Plan This element will include the requirements management, development methodology selection, risk management, project tracking and oversight, acquisition requirements, quality assurance, testing, customer and technical training, implementation, marketing strategy, documentation, operational support (including staffing, space, training, etc.), and configuration management.

8.3 Investment Analysis This element will include the cost-benefit, technical feasibility, and risk assessment management.

8.4 Financial Plan This element will include proposed sources of funds, estimated project cost, timing of funding, incremental funding deliverables, and the proposed use of funds.

9.0 Requirements Analysis The purpose of the Requirements Analysis component is to establish a common understanding between the customer and the information system developer on the customer’s requirements (both functional and technical). The requirements analysis is the responsibility of the OPR supported by the PM and the local IRM. It includes the features/functionality of the system, system roles and responsibilities, data standards, system integration, records management, documentation, transition/conversion, security, connectivity, and configuration management plans for the information system. In the event of a COTS/GOTS

solution, some components in this phase may be optional. Each element of the Requirements Analysis is described below.

9.1 Features/Functionality of System This element will describe the functional and technical requirements. It should include the business flow of information including source data, required processes and desired outputs, customer functionality, system architecture proposed, performance specifications, and proposed development methodology.

9.2 System Roles and Responsibilities This element will define key people ad/or organizations that must take action to achieve successful development and deployment of the information system.

9.3 Data Standards This element will address conforming to the data standards established by the AAD Applications Team . Exceptions should be identified and explained.

9.4 System Integration This element will describe the impact of the proposed system on existing infrastructure and other information systems. It should include a list of interfaces to other systems and an infrastructure impact analysis. If data is required from existing systems, data access approval procedures should be identified.

9.5 Records Management This element will describe the requirements for records management. This includes system back-ups, archiving, scheduling, records retention, and disaster recovery.

9.6 Documentation This element will describe requirements for user guides, approved charters, technical documentation management, statements of work, and other documentation to be developed.

9.7 Transition/Conversion This element will identify the requirements for moving from the current manual or automated process or system to the proposed system. It will cover requirements to convert, migrate or archive historical databases, data validation, proposed test/pilot site implementation, production site implementation, cut over, and follow-up assessment.

9.8 Security This element will address requirements for both physical applications and data security. A set of physical, technical, personnel, and procedural safeguards will achieve security. It should cover the criticality of the data and applications through appropriate security regulations and procedures to protect sensitive information from unauthorized compromise, corruption, and interruptions.

9.9 Connectivity This element will identify the customer community and describe telecommunications requirements. It should include stress testing and any other methodologies that will be used to ensure operational deployment and success.

9.10 Configuration Management This element will describe the requirements for configuration management. This includes customer requirements for change approval, prioritizing and processing changes, how software will be distributed, frequency of releases, etc.

10.0 Design The purpose of the design component is to develop the detailed technical solution required for system implementation. It develops and provides a complete system specification and a description of the function of all component sub-systems and their interrelationships. This component is primarily the responsibility of the software design team supported by the local IRM and PM. The design methodology will be based on application complexity, environmental complexity, available and required skill sets, and constituency and scope of the application. The design phase includes domain analysis, data standards, records management, configuration management, transition/conversion, security, documentation, infrastructure, implementation plan, and acquisition plan. Each element of the design phase is described below.

10.1 Domain Analysis This element will capture and model requirements information across a particular environment. Domain analysis is the process of identifying, documenting, and modeling common and variable requirements among domain systems. Analysis techniques include interviews, documentation review, and reverse engineering, to identify and categorize (i.e., model) domain requirements.

10.2 Data Standards This element will describe how the system conforms to applicable FAA and AAD data standards. The definition and integrity of the data needed to support the business process is of paramount importance in the development and operation of systems. This allows data to be replicated or summarized.

10.3 Records Management This element will describe how the applicable records management policy and procedures will be followed during the design phase. This will include records retention, system scheduling, disaster recovery plan, system backup, and archiving.

10.4 Configuration Management Plan This element will describe the process for establishing and maintaining the integrity of the products throughout the project's life cycle. It will define how system changes/enhancements are proposed, reviewed, and implemented as well as the assigned roles and responsibilities.

10.5 Transition/Conversion This element will include a transition/conversion plan for any information system or any part of a system that is to be replaced by a new system or part of an existing system that provides the same basic functionality. It will include a complete description of data conversion and validation.

10.6 Security This element will include processes and procedures that ensure compliance with all FAA system and data security requirements (reference FAA Order 1600.54B, FAA Automated Information Systems Security Handbook).

10.7 Documentation This element will include a system diagram that illustrates both the logical and physical designs of the information system. For system hardware, the design shall specify component and system tolerances, and capacities. The design shall provide, where applicable, all drawings, specifications, vendor documentation, and system component diagrams. For system software, the design shall provide, where applicable, complete functional process description flowcharts and/or module relationships.

For COTS, the vendor documentation package shall include multimedia copies of source code (as negotiated), licensing agreements, and operational documentation. Where separate and specific system upload/download procedures are used, the software provider should furnish them. For custom software designs, the software provider shall include the complete description of the software engineering environment, the source code (as negotiated), and the operational documentation. The software provider shall describe and provide the complete specifications of the software development platform, testing platform, and intended operational platform.

10.8 Infrastructure This element will include the Information Architecture Impact Statement (guidelines to be developed by the Technology Team) that describes the effect of the design on FAA and AAD architecture, hardware, and telecommunications. This statement will be used by the AAD Technology Team to determine the impact on the overall information process and architecture of the proposed system or system enhancement.

10.9 Implementation Plan This element will include hardware and software installation, time lines, training, system interfaces, parallel processing strategy, communications, system integration, and deployment strategy.

10.10 Acquisition Plan This element will contain a detailed description of how the recommended solution in the design phase will be acquired. The plan defines the work for each major task in the Acquisition Management System and how it will be performed, estimates the time and resources required, and defines a framework for management review and control. The plan will focus on “best value” for the agency that will consider, as a first step, Commercial-Off-The- Shelf (COTS) solutions. In addition, the plan will identify the vendor, hardware and software type, and procurement vehicle.

11.0 Development The purpose of the development component is creation of software and associated development initiatives. This phase includes coding, test plans, and documentation. Each element of the development effort is described below.

11.1 Coding This element will address compliance with standards established by the AAD Applications Team. It should incorporate “best practices” in software engineering.

11.2 Test Plan This element will include component testing, interface testing, system integration testing, scalability, systems performance testing, and acceptance testing.

11.3 Documentation This element will include technical documentation, user guides, and operational procedures.

12.0 Testing The purpose of the testing component is to evaluate and integrate system components, and to evaluate the system as a whole to determine whether or not requirements have been satisfied. The PM should determine what types of testing will be performed. Some common types of testing are: acceptance, component (module), unit, functional, integration, interface, operational, parallel (concurrent), performance, regression, stress, system, etc. In addition to user requirements, testing activities should consider scalability, adaptability, maintainability, security, recovery, and infrastructure.

12.1 Test Design The test design element will specify the details of the test approach for the system and should identify the associated tests. The design should describe test beds(which can include other LOBs), test cases, and test procedures.

12.2 Test Report The test report element will describe the conduct and results of testing activities. It should also contain an evaluation of the corresponding test items.

13.0 Implementation This is the phase of a systems life cycle when it becomes an operational system by executing the implementation plan established in the design phase. This phase may incorporate changes to established procedures such as the Configuration Management Plan. It includes development of the Operations and Maintenance Plan.

13.1 Operations and Maintenance Plan. This element will consist of procedures for the day to day information system management and execution. It defines the roles and responsibilities, resource requirements and includes configuration management.

14.0 Operations and Maintenance The purpose of this phase is to ensure the successful operation and maintenance of new, or modifications to existing, information system, using a continuous process improvement model. This phase begins as soon as a system or part of a system is being used in an operational environment. It involves performing routine operations and maintenance to support regular system use and functionality. It includes an operational assessment, configuration management review, and customer training assessment. Each component is described below.

14.1 Operational Assessment This element will include Operational Assessments conducted on a 4-year or less cycle to ensure that the system continues to effectively meet functional and technical requirements. The assessment should include a validation

of performance criteria, operational procedures, business needs, and a review of infrastructure and technological changes. The outcome of this study will provide the data for approval to continue, recommend enhancements, or shut down of the system.

14.2 Configuration Management This element will evaluate how the system change processes are functioning in the operational environment.

14.3 User Training Assessment This element will evaluate how user training is being provided for the operational system. For example, training course evaluation forms could be used to evaluate the quality of training.

15.0 Shut Down The purpose of the shut down process is to ensure that all resources associated with a system or part of a system are identified. A System Shut Down Plan will be developed and will incorporate policy and procedures coordination, advance IRM/Customer notification, budgetary adjustments (include personnel), archiving and records retention, equipment excess, contractual closeout, security clearance, and conversion issues.

15.1 Policy and Procedures Coordination This element will include a review and coordination of existing policies and procedures that need to be revised due to the system shut down.

15.2 Advanced IRM/Customer Notification This element will include an Email or other notification to the AAD IRMs and customers of the system of the planned action.

15.3 Budgetary Adjustments This element will include an evaluation of necessary adjustments that need to be made to personnel, contractual, or supply costs.

15.4 Archiving and Records Retention This element will include a review and implementation of the required actions to meet records management requirements.

15.5 Equipment Excess This element will include identification and excess processing of any equipment that will no longer be needed as a result of the shut down.

15.6 Contract Closeout This element will include termination of any existing contractual agreements for support services or supplies.

15.7 Security Clearance This element will include identification and completion of all user and system security changes.

15.8 Conversion Issues This element will include identification and resolution of issues related to conversion of the existing system and data.

Glossary

AAD Technology Team - the group assigned responsibility for the AAD technology standards and methodologies that are used within the AAD community for development of systems.

Adaptability - the ability for a system or component to be easily modified for use in applications or environments other than those for which it was specifically designed.

Acceptance Test - methods and procedure employed by end-users to verify, validate, and assure that the system meets customer's requirements. Successful user testing must be completed before OPR acceptance of a system.

Archiving - the process of storing data that is no longer needed on-line. Data in old systems may be archived rather than converted to a new system.

Business Model - a representation of the major components of the customer's business and the data that flows between those pieces. Project documentation should depict how a proposed system will support the business model.

Business Process Reengineering (BPR) - the systematic analysis and redesign of enterprise processes to achieve significant improvements in performance.

Business Process Improvement (BPI) - an analysis of a business process that is undertaken to ensure work is being accomplished in the most efficient and effective manner.

Commercial Off-The-Shelf (COTS) - software products that are available in the commercial market place.

Component Tests - methods and procedures used to verify, validate, and assure that the lowest level module or program performs to specified requirements.

Configuration Management - the process of capturing problems, deficiencies, and requested enhancements; documenting their existence and controlling changes to the system. It establishes and maintains the integrity of the products of the project throughout the project's life cycle.

Domain - a collection or group of computers and devices administered as a unit with common rules and procedures.

Domain Analysis - a review of the environment where a system will reside. This includes lateral customers and systems, platforms, and other factors related to system development. Techniques include interviews, documentation review, and reverse engineering.

Domain Engineering - the process of discovering and recording the commonalities in a set of software systems and using that information to create reusable assets and new systems within a

domain. It requires organizations to understand the similarities and differences among components used to build software applications.

Evolutionary Systems Development Model - a development approach in which a core functionality is delivered and then as other requirements are further refined, enhancements and upgrades are built. System design is modular and provisions are made for upgrades and enhancements as requirements are refined. This approach is used when customer needs are not fully understood and not all requirements can be defined up front. Under this approach the risk of each succeeding enhancement (build) is assessed and managed at each evolutionary step.

Functional Requirements - the collection and documentation of the customers requirements to meet their business need.

Incremental Systems Development Model (Pre-planned Product Improvement) - an approach that involves developing a system in a series of increments of increasing functional capability. Customer needs are determined, system requirements defined and then development is carried on in a series of builds each of which increases the systems functionality. This approach is used when requirements are well understood and documented, the development will be funded and staffed incrementally, the system is too large to build all at once and can be broken into logical pieces and no rapid changes in mission or technology that would change requirements are anticipated.

Information Architecture Impact Statement - a document that describes how the proposed system will impact the existing environment in the areas of telecommunications and LAN/WAN utilization.

Infrastructure - permanent information resource platforms, networks, applications, operating systems, staffing, and services through which multiple business processes function.

Initial Requirements Document - the process of establish a common understanding between the customer and the software project. This agreement with the customer is the basis for planning and managing a software project. Control of the relationship with the customer depends on following an effective change control process.

Integration Tests - methods and procedures used to verify, validate, and assure that various components of a system perform together as specified in system requirements.

Interface Tests - methods and procedures used to verify, validate, and assure that interfaces perform as required.

Joint Application Development (JAD) - a methodology for operationalizing customer involvement in information systems. It assigns responsibility for system development to the customers with the customer assuming project leadership responsibility during the development phase. Design meetings are used to compress the requirements analysis and design phase to take advantage of group dynamics. Its primary focus is to overcome the lack of well-defined customer requirements.

Lines of Business - organizational structure within FAA that has a functional focus.

Local System - lowest level of development for specific customer or internal need that is limited to one region, center, or headquarters.

Maintainability - the ability for a system or component to be easily modified to correct faults, improve performance or other attributes, or adapt to a changed document.

Methodology - standards and procedures used in the planning, analysis, design, development, implementation, operation, support, and disposal of a system.

National System - an information system that is deployed at more than one region, center or headquarters used to meet an agency-wide business need.

Operational Assessment - a validation of an operational systems ability to meet it's functional and technical requirements. It includes validation of performance criteria, operational procedures, and a review of infrastructure and technological changes.

Process Change Management - the process of continually improving the software processes to improve software quality, increase productivity, and decrease the cycle time for product development. Process Change Management takes the incremental improvements of Defect Prevention and the innovative improvements of Technology Change Management and makes them available to the entire organization.

Quality Assurance Plan - a plan which involves reviewing and auditing the software products and activities to verify that they comply with the applicable procedures and standards and providing the software project and other appropriate managers with the results of these reviews and audits.

Rapid Application Development (RAD) - a software development methodology best suited for development efforts that have a low level of application complexity, environmental complexity, available skill sets, a high level of customer involvement , stable requirements, limited scope and a low expectation of future changes to the application.

Records Retention and System Scheduling - a requirement to maintain data for a period of time to meet regulations and guidelines.

Regression Testing – a software testing method that ensures when a large or small number of transactions are processed the results do not vary from the specified outcome.

Requirements - a condition or capability needed by a customer to solve a problem or achieve an objective. A requirement statement defines a specific boundary or constraint placed on the system and describes the specific system behavior. These levels are in order of increasing detail: Business Needs, Customer Requirements, and Systems Requirements.

Risk Management - the process of identifying, documenting, prioritizing and tracking cost, resource schedule, and technical concerns that pose a danger to successful project completion.

Scalability - the ability for a system or component to be easily modified to increase its storage or functional capability.

Software Configuration Management - the process of establishing and maintaining the integrity of the products of the software project throughout the software life cycle. Software Configuration Management is an integral part of most software engineering and management processes.

Software Project Planning - the process of establishing reasonable plans for performing the software engineering and for managing the software project. These plans are a foundation for managing the software project.

Software Quality Assurance - the process of ensuring software performs the required functions in a reliable, efficient, and cost-effective manner within established standards and procedures.

Software Project Tracking and Oversight - the on-going process for monitoring progress against established project milestones. The information allows management to take action as appropriate.

Stress Tests - methods and procedures used to verify, validate, and assure that the system meets specified performance requirements.

System - an integration of people, products and processes that provide a capability to satisfy a stated need or objective.

System Backups - the copying of data in existing systems to reduce the risk of data loss.

System Development Life Cycle (Project Life Cycle) - the period of time that begins with the decision to develop an information system and ends when the system is delivered to the customer.

System Life Cycle - the period of time that begins when a product is conceived and ends when the product is no longer available for use.

System Tests - the methods and procedures used to verify, validate, and assure that the total system performs as required.

Unit Test - the methods and procedures used to verify, validate, and assure that several components operate together as a unit in accordance with the specified requirements.

Waterfall Systems Development Model (Classical Method) - a once-through-do-each-step-once approach. It is used when customer requirements are well understood and documented; the customer prefers all capabilities delivered at one time; the customer prefers to phase out old

system(s) all at once; the system is not too large to be delivered at once; total funding is available for the entire development effort; and, no rapid changes in mission or technology that will change requirements are anticipated.

Attachment 1

Waterfall System Development

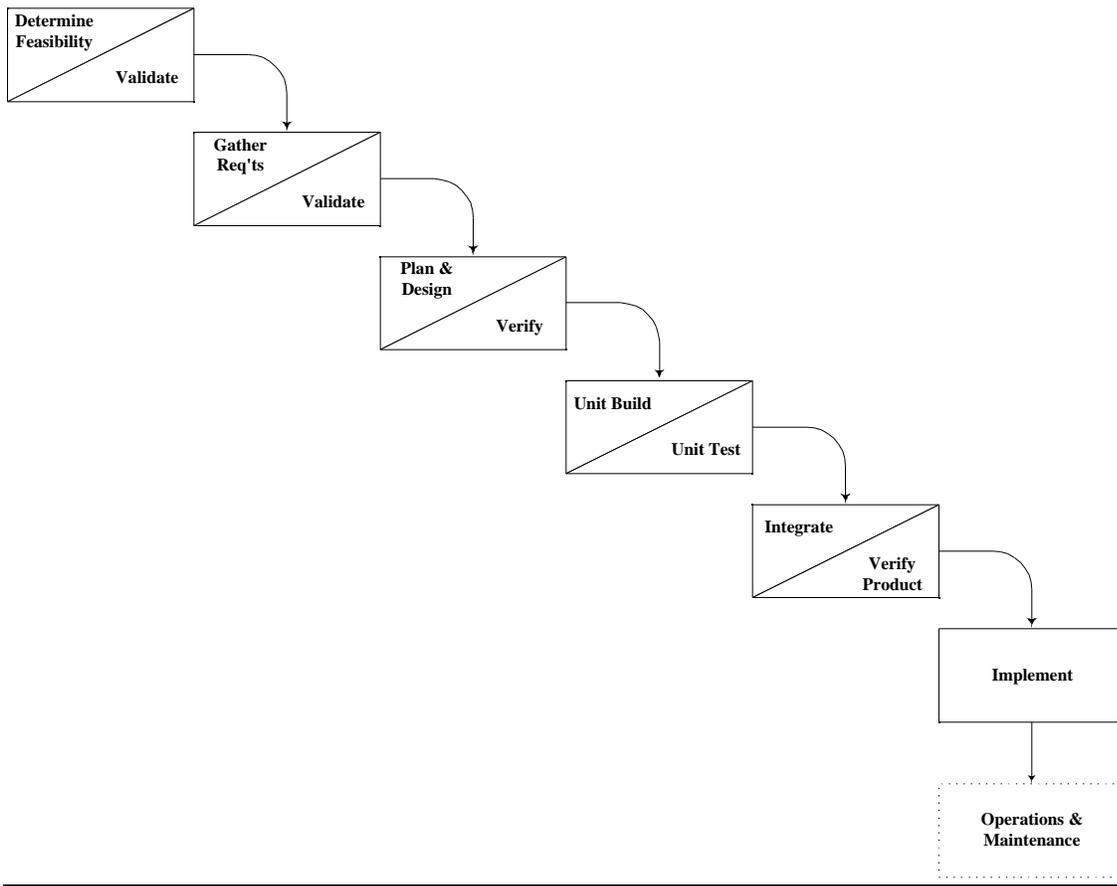
Description The “waterfall” approach (also referred to as “grand design”) is essentially a “once-through, do-each-step-once” approach. Simplistically: determine user needs, define requirements, design the system, and implement the system, test, fix, and deliver.

When to Consider using Waterfall

- User requirements well understood and documented
- User prefers all capabilities at first delivery
- User prefers to phase out old system all at once

When to Avoid using Waterfall

- Requirements not well understood
- Funding/staffing will be incremental
- System too large to do all at once; breaks into logical pieces
- Rapid changes in mission or technology may change requirements



Attachment 2

Incremental System Development

Description

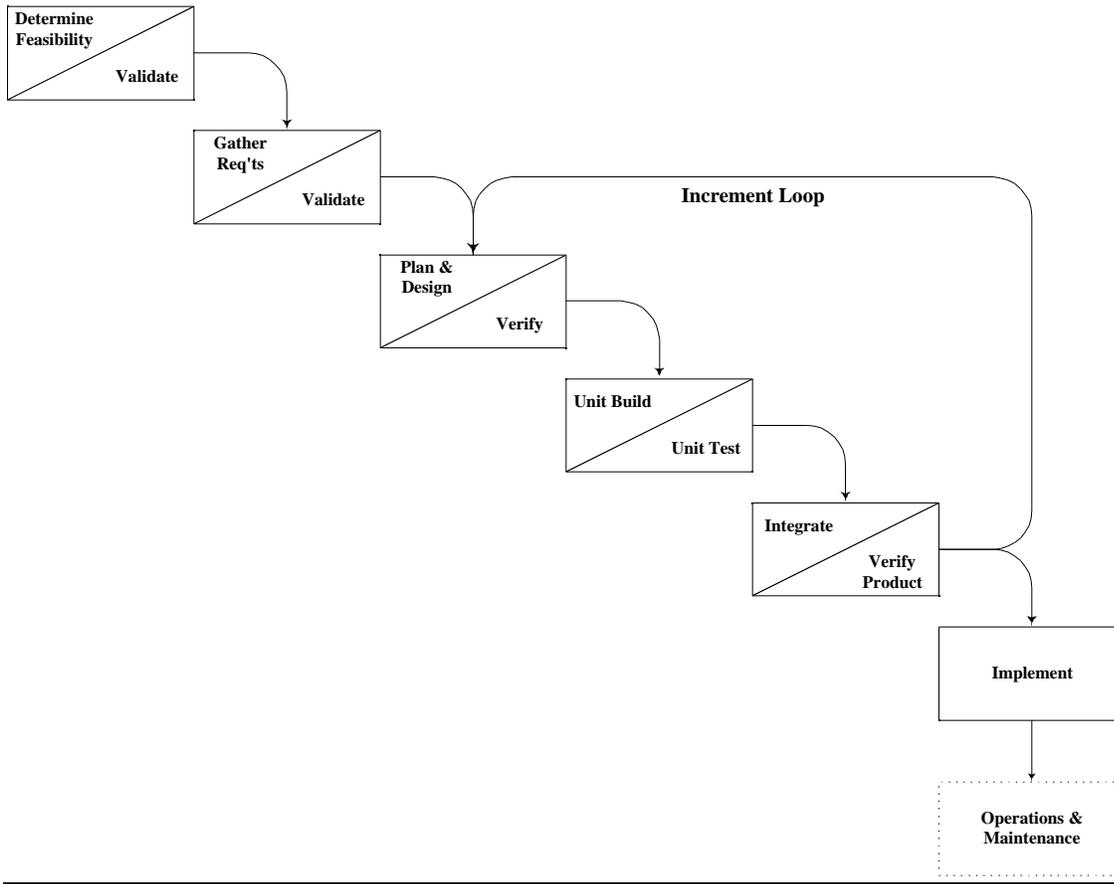
The “incremental” approach (also referred to as “pre-planned product improvement”) determines user needs and defines the system requirements, then performs the rest of the development in a sequence of builds. The first build incorporates part of the planned capabilities, the next build adds more capabilities, and so on, until the system is complete.

When to Consider using Incremental

- User requirements well understood and documented
- Funding/staffing will be incremental
- System too large to do all at once; breaks into logical pieces

When to Avoid using Incremental

- Requirements not well understood
- Rapid changes in mission or technology may change requirements
- User prefers all capabilities at first delivery
- User prefers to phase out old system all at once



Attachment 3

Evolutionary System Development

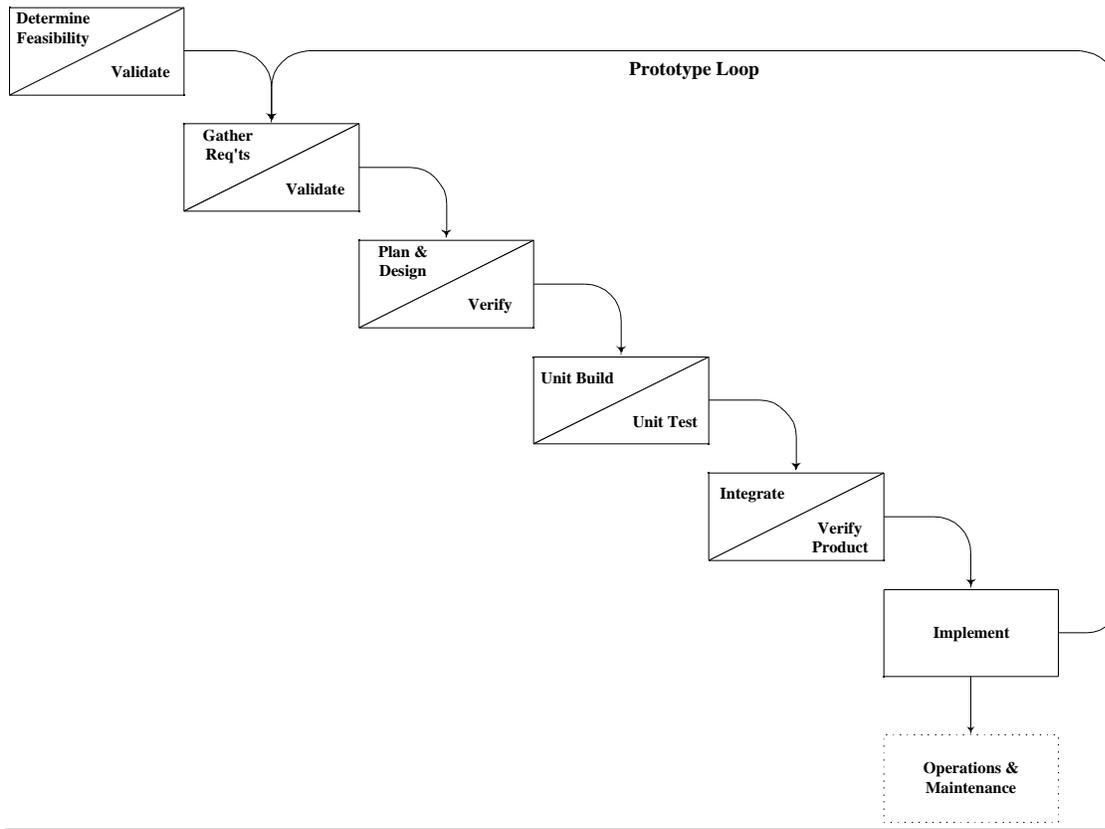
Description The “evolutionary” approach also develops a system in builds, but differs from the incremental approach in acknowledging that the user need is not fully understood and all requirements cannot be defined up front. In this approach, user needs and system requirements are partially defined up front, and then are refined in each succeeding build. The risk of each succeeding enhancement is assessed and managed at each evolutionary step.

When to Consider using Evolutionary

- Requirements not well understood
- Rapid changes in mission or technology may change requirements
- Funding/staffing will be incremental
- System too large to do all at once; breaks into logical pieces

When to Avoid using Evolutionary

- User prefers all capabilities at first delivery
- User prefers to phase out old system all at once



Attachment 4

Rapid Application Development (RAD)

Description

The goal of RAD is to speed up the software development process to reduce response time and costs. The key components of RAD development are “visual” development environments and tools such as:

- Fast prototyping and user interface development
 - Rapid Interactive Prototyping (RIP)
 - Joint Application Development (JAD) with the customer.
- Extensibility (scope), modular programming, and code reuse
 - Reuse or modify existing code first
 - Buy someone else’s code second
 - Write new code last
- Inter-application communications

When to Consider using RAD

- Requirements are stable, but not well understood initially
- Low complexity application and environment
- Available skill sets and high level of customer involvement
- Limited scope and low expectations for future changes

When to Avoid using RAD

- User prefers all capabilities at first delivery
- User prefers to phase out old system all at once

Attachment 5

AAD AUTOMATION PROCESS FRAMEWORK CHECKLIST

Revised 4/16/97

SYSTEM NAME: _____ DATE: _____

National [] Local []

COTS [] GOTS [] FAA Developed [] Other []

PROCESS COMPONENTS

Element Required		Element Completed	
Yes	No	Yes	No

(1) Needs Assessment

Element

Business Case

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(2) Feasibility Study

Elements

Requirements Management Plan

Project Management Plan

Investment Analysis

Financial Plan

(3) Requirements Analysis

Elements

Features / Functionality

System Roles/Responsibilities

Data Standards

System Integration

Records

Management

Documentation

Transition/Conversion

Security

Connectivity

Configuration Management

(4) Design

Elements

- Domain Analysis
- Data Standards
- Records Management
- Configuration Management Plan
- Transition/Conversion
- Security
- Documentation
- Infrastructure
- Implementation Plan
- Acquisition Plan

(5) Development

Elements

- Coding
- Test Plan
- Documentation

(6) Testing

Elements

- Test Design
- Test Report

(7) Implementation

Elements

- Operation/Maintenance Plan

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(8) Operation and Maintenance

Elements

- Operational Assessment
- Configuration Management
- User Training Assessment

(9) Shut Down

Elements

- Policy and Procedure Coordination
- Advanced IRM / Customer Notification
- Budgetary Adjustments
- Archiving and Records Retention
- Equipment Excess
- Contract Close-out
- Security Clearances
- Conversion Issues

