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FAA Technical Center
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N.J. 08405

Aviation Security Long Range Logistic Assessment and Evaluation Plan

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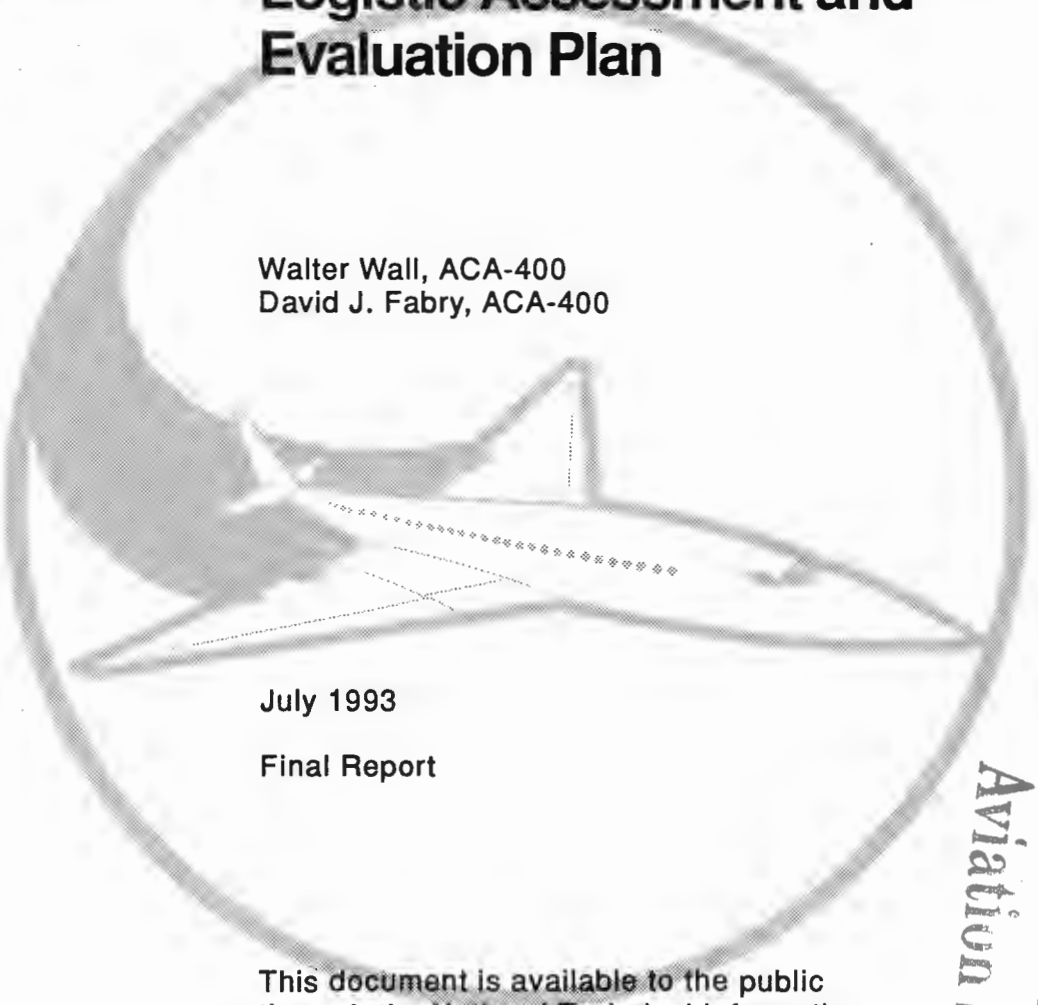

July 1993

Final Report

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16. Abstract

This is the Federal Aviation Administration's (FAA) Aviation Security Long Range Logistic Assessment and Evaluation Plan. It describes logistics requirement for developing reliable, maintainable, and supportable aviation security systems. The plan supports the National Airspace System (NAS) Security Area of the Program Requirements for Research and Development document that was prepared by the Office of Civil Aviation Security Policy and Planning.

This plan will ensure that aviation security systems developed through the Federal Aviation Administration Aviation Security Research and Development (R&D) Service (ACA) meet specific logistics standards. Designing to comprehensive logistics standards will inject quality into the aviation security R&D process, allowing the most cost effective systems to be developed. Four major activities will implement the approach outlined in this plan: Mission Profile Definition, ACA Quality Improvement, Vendor Quality Improvement, and Logistics Test and Evaluation.

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LIST OF ACRONYMS AND ABBREVIATIONS

ACA	Aviation Security Research and Development Service
ACA-400	Requirements Analysis and Integration Division
ACP	Office of Civil Aviation Security Policy and Planning
ACS	Office of the Assistant Administrator for Civil Aviation Security
ACS-1	Assistant Administrator for Civil Aviation Security
AOR	Operations Research Service
APML	Associate Program Manager for Logistics
APO	Office of Aviation Policy, Plans and Management Analysis
ATC	Air Traffic Control
CASILS	Civil Aviation Security Integrated Logistics Support
DOD	Department of Defense
FAA	Federal Aviation Administration
FTE	Full-Time Equivalent
FY	Fiscal Year
GFE	Government-Furnished Equipment
ILS	Integrated Logistics Support
MNS	Mission Need Statement
NAS	National Airspace System
ORD	Operational Requirements Document
PIAT	Process Improvement Action Team
R&D	Research and Development
RPI	Research Project Initiative
TEMP	Test and Evaluation Master Plan
VRTM	Verification Requirements Traceability Matrix

EXECUTIVE SUMMARY

This is the Federal Aviation Administration's (FAA) Aviation Security Long Range Logistic Assessment and Evaluation Plan. It describes logistics requirements for developing reliable, maintainable, and supportable aviation security systems. The plan supports the National Airspace System (NAS) Security Area of the Program Requirements for Research and Development document which was prepared by the Office of Civil Aviation Security Policy and Planning.

The purpose of the NAS Security area of the Program Requirements for Research and Development document is to develop and demonstrate technologies, systems, and procedures for the management and control of airport security as well as the security of FAA facilities, equipment, and communications.

In support of this program, the goals of this plan are to provide requirements to:

a. Achieve maximum system reliability, maintainability, and supportability, and

b. Acquire certifiable systems engineered for optimum lowest life cycle cost.

This plan focuses on the logistics processes and requirements necessary to design quality aviation security systems. A systems engineering approach is employed throughout the tasks described in the plan. This approach will ensure that security systems designs are reliable and supportable while meeting the needs of the customer.

The plan is organized into four major task areas: Mission Profile Definition, FAA Quality Improvement, Vendor Quality Improvement, and Logistics Test and Evaluation. The Mission Profile Definition provides logistics guidelines for developing a maintenance philosophy as well as universal system and design requirements and specifications. The FAA Quality Improvement tasks describe government management actions that will improve quality and enhance the probability of success for R&D projects. The Vendor Quality Improvement tasks provide guidelines to identify specific vendor practices that will contribute to product or system quality. The Logistics Test and Evaluation tasks represent a quality assurance function that determines whether or not final product quality objectives have been achieved.

Implementation of the tasks described in this Aviation Security Long Range Logistic and Evaluation plan will ensure that technologies, systems, and procedures for the management and control of airport security will have the maximum opportunity for success.

1. INTRODUCTION.

1.1 SCOPE.

This document is a long range plan that outlines procedures for developing reliable, maintainable, and supportable aviation security systems. The plan was developed under the guidance of the Federal Aviation Administration (FAA) Aviation Security Research and Development (R&D) Service (ACA). The activities, resource requirements, and schedule information to establish quality standards for security system development are described in the plan. The implementation of this plan will assist ACA in establishing policies for security equipment and applicable R&D development projects. To ensure that aviation security R&D processes are based on proven engineering concepts, a structured systems engineering approach will be taken.

1.2 BACKGROUND.

The ACA and the Office of Civil Aviation Security (ACS) collaborated to carry out the common requirements process as outlined in the Research and Development Requirements and Process Improvement Action Team (PIAT) Report (April 1992) for each of the programs within Aviation Security. One procedure involved the development of Mission Need Statements (MNSs). The prioritization of Research and Development (R&D) requirements and deliverables were presented in the Program Requirements for Research and Development document (December 1992).

This plan supports the National Airspace System (NAS) security area of the Program Requirements for Research and Development. MNS #164 cites a requirement to develop and integrate technologies, systems, and procedures for the management and control of airport security. The mission is to be accomplished in accordance with the President's Commission on Aviation Security and Terrorism, Public Law 101-604 and the Office of Technology Assessment Report. This plan provides specific logistics requirements and guidelines to support this mission need.

Research Project Initiatives (RPIs) are developed in response to mission needs. Research objectives for RPI #130 are designed to:

a. Protect the public as they transit through the Civil Aviation System,

b. Identify and develop new technologies, methodologies, and procedures to enhance the performance of the federal security professionals in the performance of their aviation security duties, and

c. Develop and maintain an Integration Security System approach for countermeasures to the identified threats against the Civil Aviation System.

Mission needs state general requirements for a particular program. RPIs are developed from the mission need. Specific tasks provide the means for realizing the RPI. This plan presents specific tasks which describe the logistics requirements for the development of security technologies, methodologies, and procedures.

1.2.1 Aviation Security R&D Program.

The NAS Security R&D Program oversees the development and integration of security technologies, systems, and procedures for civilian airports and NAS Air Traffic Control (ATC) facilities. Aviation security includes explosives and weapons detection, access management and control, intrusion detection and passenger-baggage matching. In addition, aviation security comprises aircraft survivability and NAS facility and equipment security. This aviation security program maintains protection against advanced technology threats that may be used against any ATC component. The integration of these entities along with associated improvements in human factors science will minimize terrorist threats against aviation facilities and the traveling public.

1.2.2 Security Program Risk Considerations.

The FAA, through its sponsorship of R&D, may avoid risks by endorsing proven systems engineering principles when developing security systems. Benefits of this approach include:

a. Developing quality products by employing systems engineering throughout the life cycle of a security system,

b. Saving resources by promoting carefully managed, successful endeavors,

c. Developing confidence and trust from both the user and the public for recommendation of safe and reliable systems,

d. Gaining congressional support and funding resulting from all of the above.

By employing a systems engineering approach to logistics issues, a development contractor can expect to:

a. Gain market share due to superior product quality,

b. Increase profitability due to product reliability and user satisfaction, and

c. Avoid exposure to litigation from malfunctions such as equipment failing to detect a weapon or explosive.

ACA can optimize future customer acceptability as well as minimize risks through the following:

a. Ensuring that user requirements are acknowledged (e.g. cost constraints, product reliability, and human factors considerations),

b. Establishing development standards in support of user requirements, and

c. Conducting a test program to establish a security system's suitability.

1.3 APPLICABLE DOCUMENTS.

Aviation Security Research and Development Program Management Plan, ACA-1, June 1993.

CT 1710.2B, Preparation and Issuance of Formal Reports, Technical Notes and other Documentation, February 13, 1990.

DOD-STD-2167A, Defense System Software Development, February 29, 1988.

FAA Order 1800.58, National Airspace Integrated Logistics Support Policy, July 1987.

FAA Order 1810.1F, FAA Acquisition Process, Draft, January 14, 1993.

FAA Order 1810.4B, FAA NAS Test and Evaluation Policy, October 22, 1992.

ISO 9000, Quality Management and Quality Assurance Standards - Guidelines for Selection and Use, First Edition, March 15, 1987.

MIL-STD-470B, Maintainability Program for Systems and Equipment, May 30, 1989.

MIL-STD-499A, Engineering Management, May 1, 1974.

MIL-STD-785B, Reliability Program for Systems and Equipment Development and Production, August 5, 1988.

MIL-STD-1472D, Human Engineering Design Criteria for Military Systems, Equipment and Facilities, March 14, 1989.

NAS-SR-1000, National Airspace System Requirements Specification, November 1991.

NAS-SS-1000, National Airspace System Specification, March 1992.

NAVSO P-6071, Best Practices - How to Avoid Surprises In The World's Most Complicated Technical Process, March 1986.

RTCA Paper No. 21-92/SC175-28, General Specification for Ground Based Electronic Equipment, Draft, January 4, 1993.

2. LOGISTICS PROJECT MANAGEMENT.

2.1 GOALS.

The goals of a logistics program should focus on properly managing the risks associated with developing a new security system. These goals are to:

a. Achieve maximum system reliability, maintainability, supportability, and

b. Acquire certifiable systems engineered for the optimum lowest life cycle cost.

Implementing a comprehensive systems engineering approach is essential to achieving these goals. Systems engineering is the integrated, concurrent design of products and their related development processes. It is the simultaneous and integrated engineering of all design, manufacturing, and support aspects of a product. All disciplines having an impact on the development of the product will affect the systems engineering team. Systems engineering components include design, test, production, facilities support, integrated logistics support (ILS), and project management.

A successful systems engineer must design a reliable and supportable product while meeting customer requirements. Each system will have unique operational and logistical considerations. Satisfactorily meeting these product and logistical requirements will increase public confidence in the aviation community.

2.2 COST CONSIDERATIONS.

The engineering portion of system development ordinarily accounts for only five percent of the total life cycle cost of a product. Approximately 70 to 80 percent of total costs are committed because of engineering logistics decisions. A systems engineering approach is a cost effective approach to system development. Conscientious attention to design and process from a system's inception prevents costly modifications when a system is in production. For example, to develop a reliable and maintainable system, a systems approach requires:

a. Call out of parts meeting specific acceptable standards,

b. Built-in redundancy from design inception, if required by the application,

c. Simple part removal and replacement procedures,

d. Adequate circuit protection,

e. Location identification of frequent replacement items, and

f. Environmental controls or components for system performance in adverse weather or electromagnetic conditions.

A system initially engineered with quality goals in mind can be tested thoroughly to identify any system or component deficiencies. Logistics requirements imposed on a potential product after proof of concept may require considerable redesign and retesting. These efforts can result in considerable cost impact and schedule delays. ACA has the responsibility to ensure logistics issues are addressed by contractors from the beginning of a product's life cycle to prevent unnecessary cost and schedule delays.

2.3 LOGISTICS REQUIREMENTS.

Logistics is a multi-faceted discipline. In the context of this plan, it involves reliability, maintainability, availability, and environmental compatibility. In addition, human factors, safety, supportability and transitioning requirements of developmental and production systems are considered. These requirements, described below, represent the potential suitability of a product in its particular operating environment.

a. Reliability is a measure of the probability or duration that a unit, element, or function will perform, failure free, under specified operational stress and environmental conditions during a specified period.

b. Maintainability is the ease and rapidity with which a system can be restored to an operational state following preventive or corrective maintenance actions.

c. Availability is the measure of probability that a system is in an operable state and can perform its required functions during all required operating times.

d. Environmental compatibility is a system's ability to integrate effectively with its projected functional environment. Environmental parameters range from operating conditions such as temperature and humidity to electromagnetic compatibility with existing systems.

e. Human factors address the degree of interaction between people and systems. This includes the physical interaction of people with a system and interactions with procedures. In addition, it involves physical and psychological responses to training, workloads, logistics programs, and operational environments.

f. Safety is the degree to which a system will meet safety requirements such as radiation, shock hazards, sharp edges, and ease of movement.

g. Supportability is the degree to which support software, hardware, and associated documentation satisfies the requirement for effective maintenance, test, and operation of a system.

h. Transitioning is the ease with which consistent quality, reliability, and performance characteristics are incorporated and maintained in each system produced by a vendor.

Consideration of logistics issues throughout the life cycle of a system is critical to its success. Frequently resources are not expended in the initial design to properly address logistics issues such as reliability, maintainability, human factors, supportability, and producibility. Through funding and direction provided by ACA, system developers and manufacturers can implement logistics requirements as appropriate throughout the design process. This process begins with the premise that systems must

meet performance and suitability goals before the FAA recommends their implementation into the user community.

2.4 ORGANIZATIONAL RESPONSIBILITIES.

2.4.1 Assistant Administrator for Civil Aviation Security.

The Assistant Administrator for Civil Aviation Security (ACS-1) is responsible for policy formalization, implementation, and dissemination. The ACS and the Office of Civil Aviation Security Policy and Planning (ACP), in support of ACS-1, develops Mission Need Statements.

2.4.2 Aviation Security Research and Development Service.

The Aviation Security Research and Development Service (ACA-1) sponsors the design of security technology and systems. This sponsorship is in response to RPIs which have defined tasks and deliverables.

2.4.3 Requirements Analysis and Integration Division.

The Requirements Analysis and Integration Division (ACA-400) has responsibility for NAS Security R&D and Aviation Security Human Factors programs. One of the responsibilities of this division is defining logistics requirements that must be addressed in contractual documents and throughout the product development cycles.

3. PROJECT TASKS.

This Long Range Logistic Assessment and Evaluation Plan covers the period from the start of Fiscal Year (FY)94 through early FY96. This plan will be implemented by conducting the following tasks:

a. Mission Profile Definition:

1. Maintenance Philosophy
2. Cost-Benefit Analysis
3. System Requirements
4. Software Requirements
5. Design Specification

b. FAA Quality Improvement:

1. Tailored Templates
2. ACA Quality Policies
3. Operational Requirements Document
4. Civil Aviation Security Integrated Logistics Support Plan
5. ACA Development Risk Assessment

c. Vendor Quality Improvement:

1. Vendor Quality Guidelines
2. Vendor Risk Assessment

d. Logistics Test and Evaluation:

1. Logistics Test and Evaluation Plan
2. Logistics Test and Evaluation Procedures

Mission Profile Definition tasks are necessary for a prudent acquisition approach to system development. FAA Quality Improvement tasks represent government management actions which will further improve quality and enhance the probability of success for any given R&D project. Vendor Quality Improvement efforts approach quality from a vendor's perspective. Conscientious planning for transition to production is encouraged. Logistics Test and Evaluation tasks represent a quality assurance function that determines whether or not final product quality objectives have been achieved. Figure 3-1 presents a schedule for the performance of these tasks. This schedule is dependent upon funding and availability of skilled personnel to accomplish these tasks. The inter-organizational coordination required by many of these tasks also will impact this schedule.

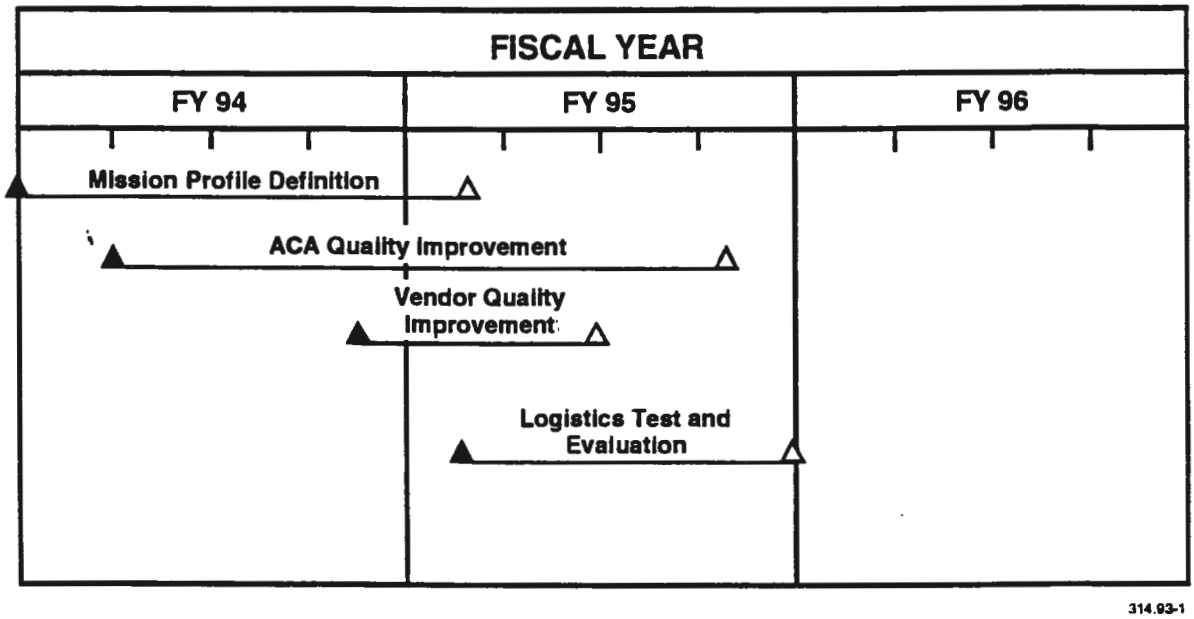

FIGURE 3-1 SCHEDULE OF PROJECT CATEGORIES

3.1 MISSION PROFILE DEFINITION.

Mission Profile Definition builds upon a maintenance philosophy to arrive at system hardware and software logistics requirements. After these requirements have been identified, they will be formalized into a logistics design specification, similar to FAA-G-2100. This specification will be called out by R&D sponsors in statements of work. A cost-benefit analysis will be performed to determine whether requirements are affordable prior to their implementation into a logistics specification. Mission Profile Definition task milestones are presented in figure 3.1-1. Assuming a first quarter FY94 start date, the Mission Profile Definition should be completed by first quarter FY95.

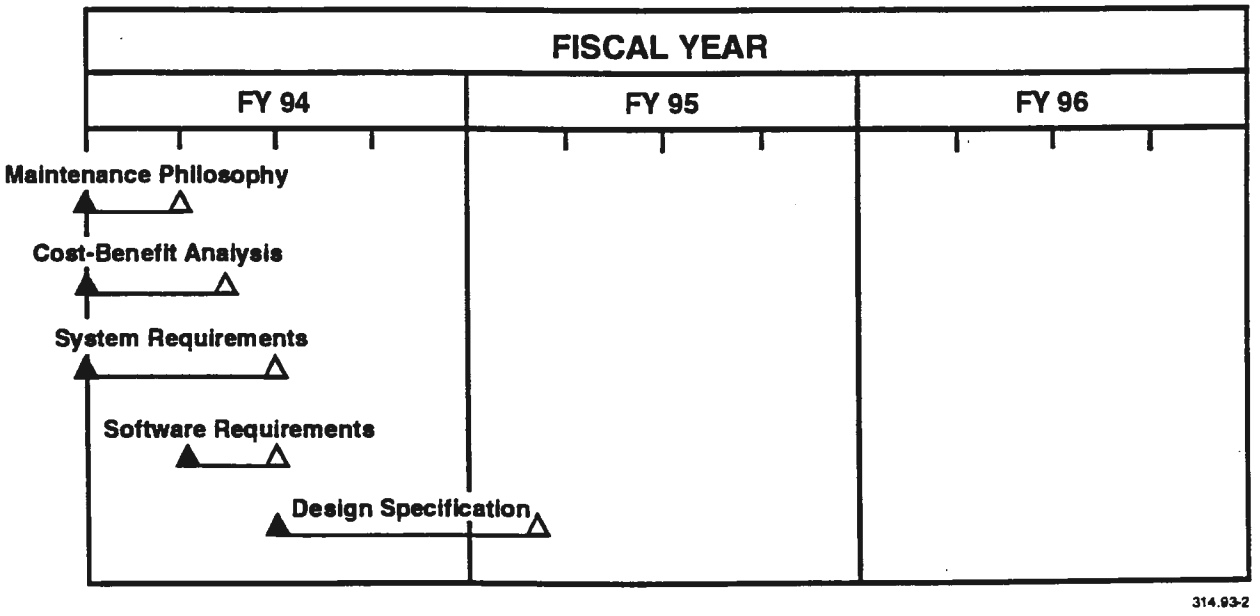

FIGURE 3.1-1 MISSION PROFILE DEFINITION MILESTONES

3.1.1 Task 1 - Maintenance Philosophy.

Definition: This task will provide definitions of maintenance concepts to be incorporated into the development of security systems.

Importance: High - essential to defining effective logistics requirements to be incorporated into the development of operational security detection systems.

Resources: Three Full-Time Employee (FTE)-months of effort; estimated cost $30K.

Discussion:

This maintenance philosophy will meld user maintenance concepts with ACA quality goals to provide guidance for security systems development. Philosophies pertaining to vendor configuration management, logistics support, remote maintenance, reliability, and maintainability will be defined to provide guidance for achieving developmental and operational goals. This task will require coordination with the airlines and/or airports to ensure continuity of objectives.

Deliverable: Aviation Security System Maintenance Philosophy

The following ACA requirements will be identified in this document:

a. Quality goals
b. Organizational/managerial responsibilities
c. Maintenance philosophy definition
d. Relationships to potential customers and developers:

    1. Customer cost constraints
    2. Customer labor skill levels
    3. Customer documentation requirements
    4. Customer supportability considerations
    5. Configuration management requirements
    6. Federal statutes having applicability

e. Maintenance philosophy implementation:

    1. Statement of Work/Contract format
    2. Contractual deliverables
    3. Monitoring functions
    4. Modeling requirements
    5. Methods for deficiency tracking
    6. Testing responsibilities
    7. Test philosophy

3.1.2 Task 2 - Cost-Benefit Analysis.

Definition: Cost and associated benefits involved with incorporating logistics requirements into the development of security systems will be assessed in this task. Cost-benefit analyses will be conducted to support these assessments.

Importance: High - key to determining a realistic estimate of the costs involved to incorporate specific logistics concepts into the development of security systems.

Resources: Four FTE-months of effort; estimated cost $40K.

Discussion:

Life-cycle costs represent the total cost to the government and anticipated end-users of a system over its entire life. Costs and benefits will be compared as a function of the security system logistics requirements baseline. Capabilities gained or lost by the implementation of logistics requirements will be assessed. Benefits will be defined and measured in terms of reliability, maintainability, availability, safety, human factors, and system effectiveness.

This analysis will be coordinated with the Office of Aviation Policy, Plans, and Management Analysis (APO), and the Operations Research Service (AOR) to ensure standard industry-accepted life-cycle cost analysis approaches are used.

Deliverable: Logistics Requirements Cost-Benefit Analysis

This document will address:

a. Applicable system categories
b. Costs to achieve different levels of reliability (e.g., .99, .999)
c. Costs associated with various levels of redundancy (e.g., chips, power)
d. Costs or benefit trade-offs of backup systems
e. Costs associated with meeting different level of maintainability
f. Costs associated with remote monitoring and maintenance
g. Costs or benefits regarding space usage
h. Trade-offs regarding personnel, travel, and downtime
i. Trade-offs regarding heating and air-conditioning usage
j. Trade-offs regarding level of material standards (e.g., Mil-Spec)
k. Economic impact on airline operations
l. Model for accomplishing individual system cost-benefit analyses

3.1.3 Task 3 - System Requirements.

Definition: Logistics requirements that affect all security systems will be identified in this task.

Importance: High - critical to conducting a cost-benefit analysis and generating a top-level logistics specification.

Resources: Six FTE-months of effort; estimated cost $60K.

Discussion:

System logistics requirements provide a means to quantify logistics objectives and maintenance concepts that will affect all security systems. These requirements are the basis for generating cost-benefit analyses and logistics specifications. Software logistics requirements will be defined in a separate task, and will be incorporated as a subsection of the system requirements.

Deliverable: System Hardware Logistics Requirements

This document will include:

a. Logistics objectives and general logistics requirements for security systems
b. Characteristics to be considered in a planned life cycle
c. Call outs of potential customer and existing government directives such as FAA Standards, FAA Orders, and Military Standards
d. Hardware requirements for the following:

1. Reliability
2. Maintainability
3. Availability
4. Environmental compatibility
5. Safety
6. Human factors
7. Supportability
8. Transition to production

e. Software logistics requirements defined in the Software Requirements task

3.1.4 Task 4 - Software Requirements.

Definition: Software logistics and configuration management requirements that will apply to security system development will be defined in this task.

Importance: Medium - important for standardizing a software quality program for security system development.

Resources: Three FTE-months of effort; estimated cost $30K.

Discussion:

Software requirements will be merged with the system logistics requirements. These requirements are necessary to control the development, quality, configuration management, and supportability of software throughout a system's life cycle. This task will be performed after the System Requirements task.

Deliverable: Software Logistics Requirements

An analysis of current industry and FAA standards will be conducted to determine their applicability to defining aviation security system software requirements. The deliverable based on this analysis will identify:

a. ACA software development philosophy
b. Applicable software directives (e.g. DOD-STD-2167-A),
c. Modularity and portability requirements
d. Appropriate languages (e.g., C versus Ada)
e. Software waivers
f. Testing requirements
g. Configuration management
h. Documentation requirements
i. Hardware considerations

3.1.5 Task 5 - Design Specification.

Definition: Logistics criteria to be used in the development of security systems will be specified in this task.

Importance: High - critical to the standardization of security system products and their subsequent testing.

Resources: Eight FTE-months of effort; estimated cost $80K.

Discussion:

Logistics specifications are used to establish logistics design criteria for security systems. These specifications identify criteria to implement system requirements. The results of the Cost-Benefit Analysis task will be a factor in quantifying system requirement information. This document will reference information from existing sources of specifications and standards such as FAA-G-2100, FAA Order 1650.7B, and ISO-9000 series documents. Criteria addressing reliability, maintainability, availability, environmental compatibility, safety, human factors, and supportability issues will be provided . This specification will be similar to FAA-G-2100, but will concentrate on designs that affect R&D logistics requirements. This specification will address testing and contain a Verification Requirements Traceability Matrix (VRTM). Quality assurance and test personnel will use these criteria throughout the development cycle to ensure compliance with the specification.

Deliverable: Logistics Specification For Security Systems

This document will contain:

a. Design criteria:

    1. Reliability
    2. Maintainability
    3. Availability
    4. Environmental Compatibility
    5. Safety
    6. Human Factors
    7. Supportability

b. Material requirements
c. Redundancy requirements
d. Environmental design criteria
e. VRTM
f. Quality assurance activities
g. Documentation requirements

3.2 ACA QUALITY IMPROVEMENT

ACA Quality Improvement includes tailoring of existing DOD 4245.7-M "Best Practices" templates, development of ACA Quality Policies, preparation of Operational Requirements Documents, accomplishment of Developmental Risk Assessments, and preparation of Civil Aviation Security ILS (CASILS) Plans. The Operational Requirements Documents, Development Risk Assessments, and CASILS Plans must be prepared for each security R&D project. "Best Practices" templates will produce quality guidelines for managing R&D projects. ACA policies will facilitate the incorporation of logistics requirements and guidelines into ACA security R&D projects, both planned and on-going. The Operational Requirements Document will identify system-level performance thresholds, objectives, and planned life cycle. CASILS Plans will build on the results of the tailored templates and ACA Policies tasks. Risks associated with the implementation of each CASILS Plan will be assessed.

ACA Quality Improvement milestones are presented in figure 3.2-1. These tasks are estimated to begin in mid-FY94. The Operational Requirements Document, CASILS Plan and ACA Development Risk Assessment tasks could be initiated at any time for any existing project. The schedule for ACA Quality Improvement tasks is based primarily on anticipated personnel availability.

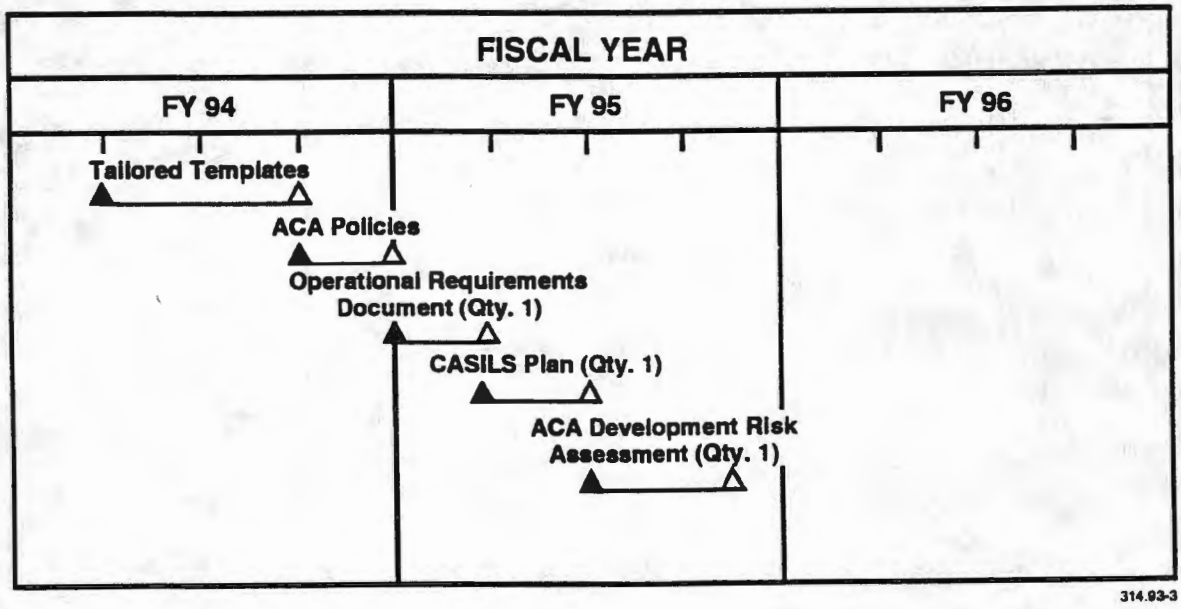

FIGURE 3.2-1 ACA QUALITY IMPROVEMENT MILESTONES

3.2.1 Task 6 - Tailored Templates.

Definition: Existing Department of Defense (DOD) "Best Practices" templates will be tailored in this task to produce quality guidelines for managing ACA security R&D projects.

Importance: Medium - important for establishing a rigorous quality logistics program for R&D systems.

Resources: Six FTE-months of effort; estimated cost $60K.

Discussion:

The "Best Practices" document developed by the DOD provides a means of alerting program management to mistakes that could jeopardize weapons system development. To apply these alerts to ACA needs, templates outlining "Best Practices" will require extensive tailoring. These tailored templates will describe methods, management decisions, and actions necessary to ensure quality in fielded security products and successful project completion.

Deliverable: Logistics Guidelines for ACA R&D Programs (Modified Templates)

This document will identify the most effective methods for managing a logistics program. It will include methods to avoid and overcome common mistakes encountered in R&D programs. This document will address the following issues:

a. Funding
b. Design:

    1. Requirements
    2. Trade studies
    3. Parts and materials selection
    4. Built-in test equipment
    5. Reviews

c. Test:

    1. Integrated test
    2. Failure reporting
    3. Software test, etc.

d. Production:

    1. Manufacturing plan
    2. Quality manufacturing process
    3. Piece part control
    4. Tool planning
    5. Special test equipment
    6. Manufacturing screening

e. Transition planning
f. Facilities:

1. Modernization
2. Factory improvements
3. Productivity center

g. Logistics:

1. Logistics support analysis
2. Labor and personnel
3. Support and test equipment
4. Training materials and equipment
5. Spares and technical manuals

h. Management:

1. Manufacturing strategy
2. Personnel requirements
3. Data requirements
4. Technical risk assessment
5. Production breaks

3.2.2 Task 7 - ACA Quality Policies.

Definition: ACA policies that will facilitate the incorporation of logistics requirements and guidelines into ACA security R&D programs will be identified in this task.

Importance: High - essential to guarantee adherence by security R&D projects to logistics requirements and guidelines set forth in previous tasks.

Resources: Three FTE-months of effort; estimated cost $30K.

Discussion:

ACA Security Logistics policies will provide program managers the authority to include logistics requirements in their R&D project documentation. These policies also will aid in creating an atmosphere of understanding and cooperation between ACA and vendor participants in the security system community.

Deliverable: ACA R&D Logistics Policy

This document will identify:

a. Policy objectives
b. Organizational/managerial responsibilities
c. ACA relationships to customers and developers
d. Applicable directives
e. Policy statements
f. Scope
g. Applicability
h. Policy implementation

3.2.3 Task 8 - Operational Requirements Document.

Definition: System-level performance thresholds, objectives, and planned life cycle for each R&D system will be established in this task.

Importance: High - critical to the basis of life-cycle cost-benefit analysis.

Resources: Three FTE-months of effort per system; estimated cost $30K per system.

Discussion:

A logistics Operational Requirements Document (ORD) provides a means to establish initial system-level performance thresholds, objectives, and planned product life-cycle. After trade-off studies, engineering development, and testing takes place, the ORD will be updated per the ACA Quality Policies document. The ORD provides the bridge between general logistics requirements and individual system performance specifications. The ORD provides the basis for performance thresholds and objectives in the acquisition program baseline and test documents.

Deliverable: Product Logistics Operational Requirements Document

This document will provide:

a. System logistics objectives and system-level logistics performance thresholds
b. Define planned life cycle
c. Impact of trade-off studies, engineering development, and testing
d. Relationship between the general logistics specification and the individual system performance specification.

3.2.4 Task 9 - The Civil Aviation Security Integrated Logistics Support Plan.

Definition: The end product of this task will be a CASILS plan. Specific integrated logistics support requirements for R&D systems that are expected to reach production will be identified in the plan.

Importance: High - critical to the effective implementation of ILS requirements in ACA security R&D projects.

Resources: Three FTE-months of effort per system; estimated cost $30K per system.

Discussion:

Basic logistics support concepts necessary to attain performance objectives with economical logistics support throughout a system's life cycle will be summarized in the CASILS plan. The CASILS Plan will provide program participants with the necessary information to ensure understanding of a project's anticipated supportability requirements. The CASILS plan will:

a. Identify support requirements that are related to performance objectives,
b. Identify the most cost-effective approach to supporting systems when fielded,
c. Ensure that required support structure elements are developed and acquired during the acquisition process, and
d. Ensure continued attainment of performance objectives with economical logistics support throughout a system's life cycle.

Deliverable: CASILS Plan for Security R&D Programs

This plan will address:

a. Program management
b. Acquisition strategy
c. Test and evaluation concept
d. Maintenance concept/planning
e. Logistics support facilities
f. Logistics support equipment
g. Labor and personnel
h. Technical publications
i. Configuration management
j. Schedule considerations

3.2.5 Task 10 - ACA Development Risk Assessment.

Definition: Development risks associated with non-conformance to system requirements and program guidelines will be assessed in this task.

Importance: Low - used to determine the most effective means for continuing development of selected security R&D projects.

Resources: Four FTE-months of effort per assessment, one assessment per system; estimated cost $40K per assessment.

Discussion:

The operational readiness and life-cycle cost of a system relate to system development and manufacturing strategy. Potential risks and recommended alternatives to potential problems for selected systems will be assessed and analyzed in the ACA project development risk assessment.

Deliverable: Security System Risk Assessment

Project development risks associated with budget and schedule will be described in this document. Various risks will be weighted on the basis of information gathered on the particular project. A general risk assessment will be performed, and probability weights assigned to particular risks. Included in this document will be:

a. Risk assessment objectives
b. System description
c. Managerial assessment
d. Project progress assessment
e. Assumptions, including:

    1. Technology development feasibility
    2. Technology potential applicability
    3. Potential compliance with quality standards

f. Risk variables identification:

    1. Technological
    2. Development
    3. Costs
    4. Engineering talent
    5. Environmental
    6. Funding
    7. Schedule
    8. Manufacturing

g. Weighing strategy regarding conformance and non-conformance

h. Model definition
i. Data collection processing

j. Conclusions:

1. Probability of completing a working prototype
2. Probability of cost overrun
3. Probability of schedule overrun
4. Probability of completing prototype that will pass developmental testing
5. Probability of prototype being within budget and on schedule

k. Recommendations:

1. Risk management strategy:

(a) modeling
(b) reports
(c) monitoring
(d) status reporting
(e) additional funding/time

2. Continue/discontinue assessment

3.3 VENDOR QUALITY IMPROVEMENT.

Vendor Quality Improvement guidelines will be used to identify specific vendor practices that will contribute to product or system quality. Items such as acceptable part manufacturers, in-house Total Quality Management programs, and deficiency accounting and reporting systems will be identified in these guidelines. The government will use these guidelines to conduct vendor assessments prior to and subsequent to contract award. Vendor Quality Improvement milestones are presented in figure 3.3-1. These tasks are estimated to begin in late FY94 and be completed by mid-FY95. The Vendor Risk Assessment task can be initiated on demand. The schedule for Vendor Quality Improvement tasks is based primarily on anticipated personnel availability.

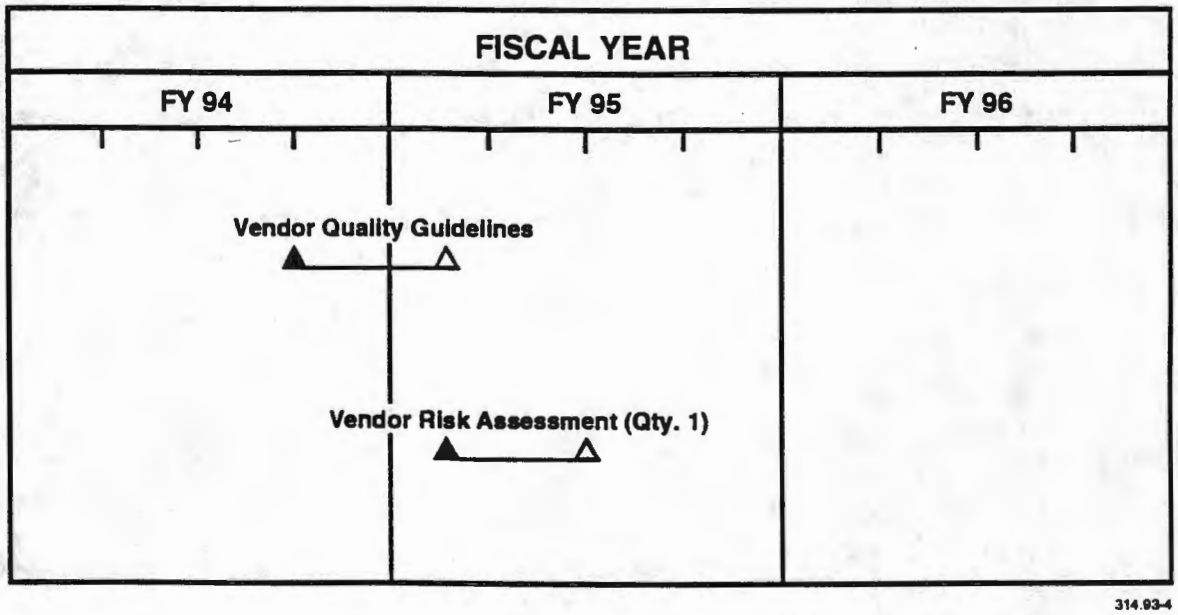

FIGURE 3.3-1 VENDOR QUALITY IMPROVEMENT MILESTONES

3.3.1 Task 11 - Vendor Quality Guidelines.

Definition: Specific vendor quality practices that contribute to product or system quality will be identified in this task.

Importance: Medium - important for developing a sound engineering baseline for vendors.

Resources: Four FTE-months of effort; estimated cost $40K.

Discussion:

Design processes must consider logistics issues other than performance criteria to ensure product quality. Graduate or junior design engineers may lack experience when parts and material selection become a consideration. Proper tracking and analysis of part failures during initial design will preclude reliability problems as a system moves to the test phase. Cost, schedule, and performance risks increase when logistics issues are neglected. Implementation of vendor quality guidelines and ACA oversight will contribute greatly to general vendor product quality.

Deliverable: ACA Vendor Quality Program Guidelines

This document will identify:

a. Quality objectives
b. Quality guidelines:

    1. Reliability modeling
    2. Maintainability designs
    3. Failure recording

c. Applicable documents
d. Material selection:

    1. Approved parts lists
    2. Management information systems

e. Manufacturing planning
f. Preparation for manufacturing
g. Quality assurance responsibilities and functions
h. Test requirements and methodology
i. Total Quality Management program

3.3.2 Task 12 - Vendor Risk Assessment.

Definition: Risks associated with a vendor's capability to effectively manage and bring to fruition a functional, quality aviation security product or system will be evaluated in this task.

Importance: High - important in determining potential for success.

Resources: Four FTE-months of effort per assessment - one assessment per vendor; estimated cost $40K + travel per assessment.

Discussion:

Before contract award and during the development process, accomplishment of this task will ensure the contractor possesses the potential to develop a suitable product.

Deliverable: Vendor Risk Assessment

This assessment will address:

a. Risk assessment objectives
b. Risk assessment criteria:

    1. Contract understanding
    2. Personnel understanding of quality engineering
    3. Adequacy of government funding
    4. Experience with government development efforts
    5. Understanding of applicable government documents
    6. Understanding of logistics requirements
    7. Facility adequacy
    8. Personnel skill adequacy
    9. Mix and quality of management skills
    10. Technological risk

c. Assignment of risk levels
d. Conclusions
e. Recommendations

3.4 LOGISTICS TEST AND EVALUATION.

Logistics Test and Evaluation will include development of certification procedures for each system and finalization of a comprehensive generic certification plan. This plan will be used to evaluate the final product or system. Certification procedures will be generated to verify logistics capabilities of specific production security systems against the general criteria presented in the certification plan. For planning purposes, the milestones provided for Logistics Test and Evaluation in figure 3.4-1 show only one set of certification procedures. This figure depicts relative durations based on manpower availability assumptions. Logistics Test and Evaluation tasks do not address a Test and Evaluation Master Plan (TEMP) or test conduct. The TEMP will include both operational and logistics test requirements, and will describe test responsibilities and planning.

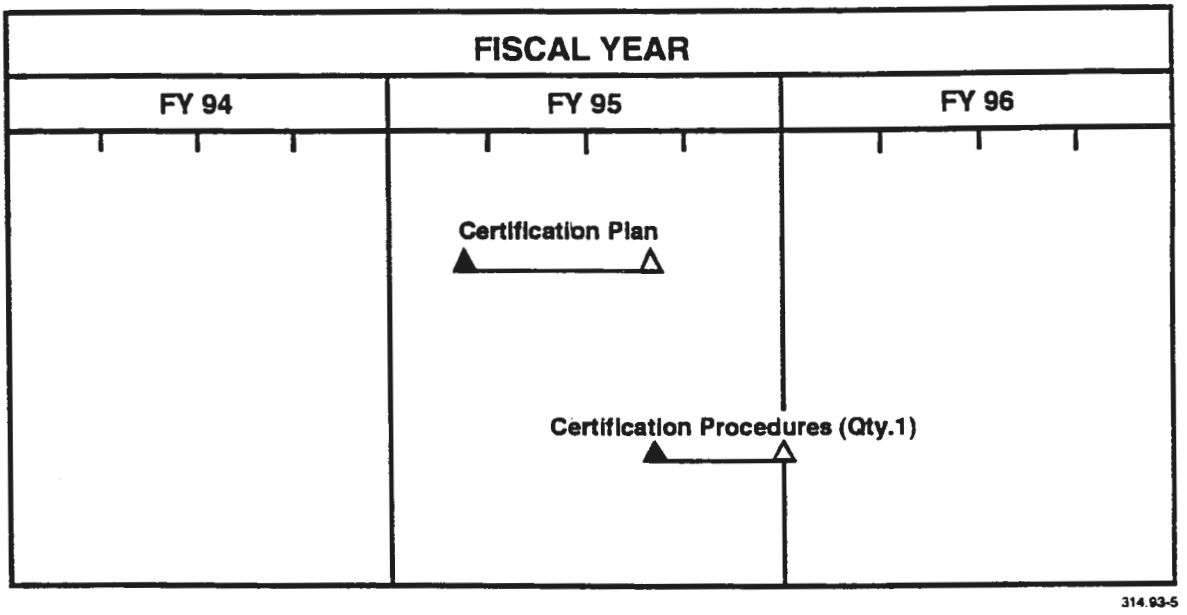

FIGURE 3.4-1 LOGISTICS TEST AND EVALUATION MILESTONES

3.4.1 Task 13 - Generic Test Plan.

Definition: General parameters and criteria that will be used to assess the logistics quality of production or R&D security products will be described in this task.

Importance: High - critical to determining the conformance of vendor products to quality logistics requirements.

Resources: Six FTE-months of effort; estimated cost $60K.

Discussion:

Testing verifies that system capabilities meet specified quality goals. A logistics test plan will provide the logistics criteria and framework necessary to effectively verify conformance of existing or future products to logistics requirements.

Deliverable: Security System Logistics Test Plan (Final)

This plan will contain:

a. Organizational responsibilities
b. Test team roles and responsibilities
c. Test methodology
d. General test requirements
e. Top-level pass/fail criteria

3.4.2 Task 14 - Logistics Test Procedures.

Definition: Individual test procedures to verify that logistics criteria are met for each existing and future security system will be generated in this task.

Importance: High - essential to verifying compliance with quality logistics specifications.

Resources: Four FTE-months of effort per set of procedures - one set of procedures per system to be certified; estimated cost $40K per set of procedures.

Discussion:

Test procedures provide the means for implementing the requirements of the test plan. Since specific operating requirements vary between system designs, unique test procedures will be required to assess each security system.

Deliverables: Security System Test Procedures

A separate set of procedures will be generated for each system to be certified. Each set of procedures will include:

a. Test responsibilities
b. Specific test methods
c. Test equipment lists and descriptions
d. Test data requirements
e. Data sheets
f. Analysis techniques
g. The following test categories:

    1. Reliability
    2. Maintainability
    3. Availability
    4. Environmental compatibility
    5. Safety
    6. Human factors

h. Failure reporting provisions.

4. GENERAL MANAGEMENT CONCERNS.

ACA Program Managers must ensure that their projects have the maximum opportunity for success in supporting aviation community security goals. This will require addressing necessary funding, and incorporating logistical requirements into all documents relative to the R&D acquisition process.

4.1 LABOR REQUIREMENTS.

The total labor required to complete all non-recurring project tasks in this plan is 43 FTE-months. These tasks will start in FY94 and will be completed in approximately mid-FY95, assuming full-time support is provided for each task. Recurring tasks will require approximately 18 FTE-months per system. Approximately three full-time personnel will be required to complete the non-recurring tasks according to the milestone schedules presented in this document. Recurring tasks 8 and 9 will require a full time logistician. Recurring tasks 10, 12, and 14 will require a full time engineer. Non-recurring labor requirements over the duration of this logistics program are shown in figure 4.1-1. Recurring labor requirements for one R&D system is shown in figure 4.1-2. The labor required to support high priority tasks is 30 FTE-months plus a recurring 14 FTE-months per system. Dotted lines represent the labor required to support high priority tasks.

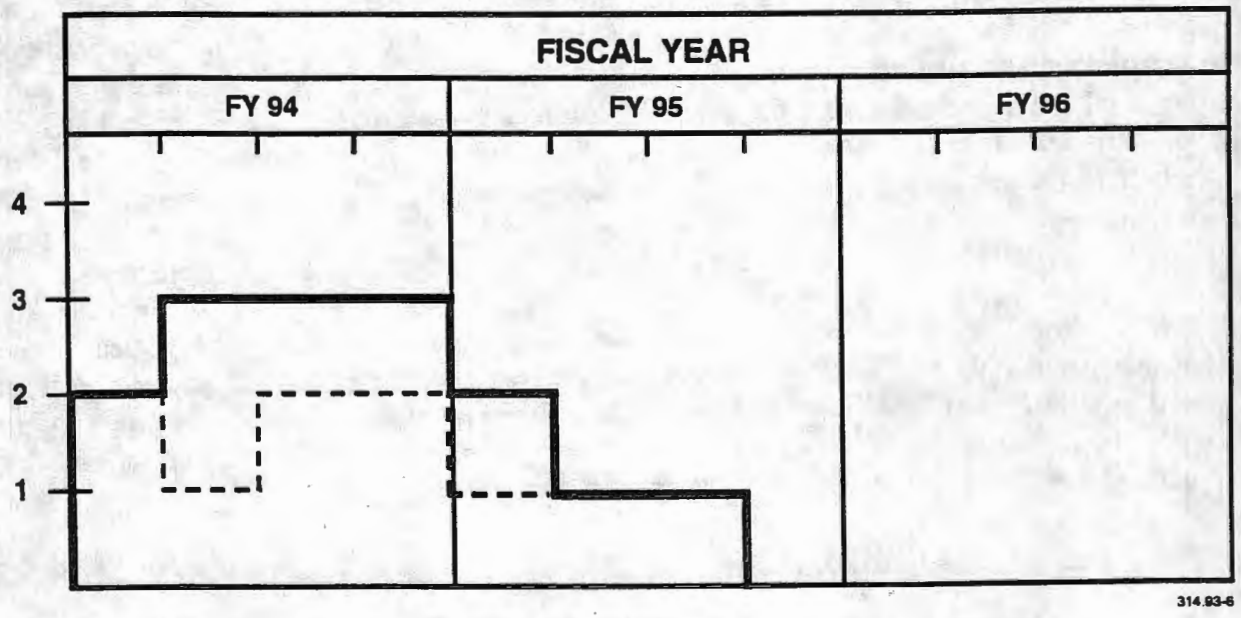

FIGURE 4.1-1 NON-RECURRING LABOR REQUIREMENTS

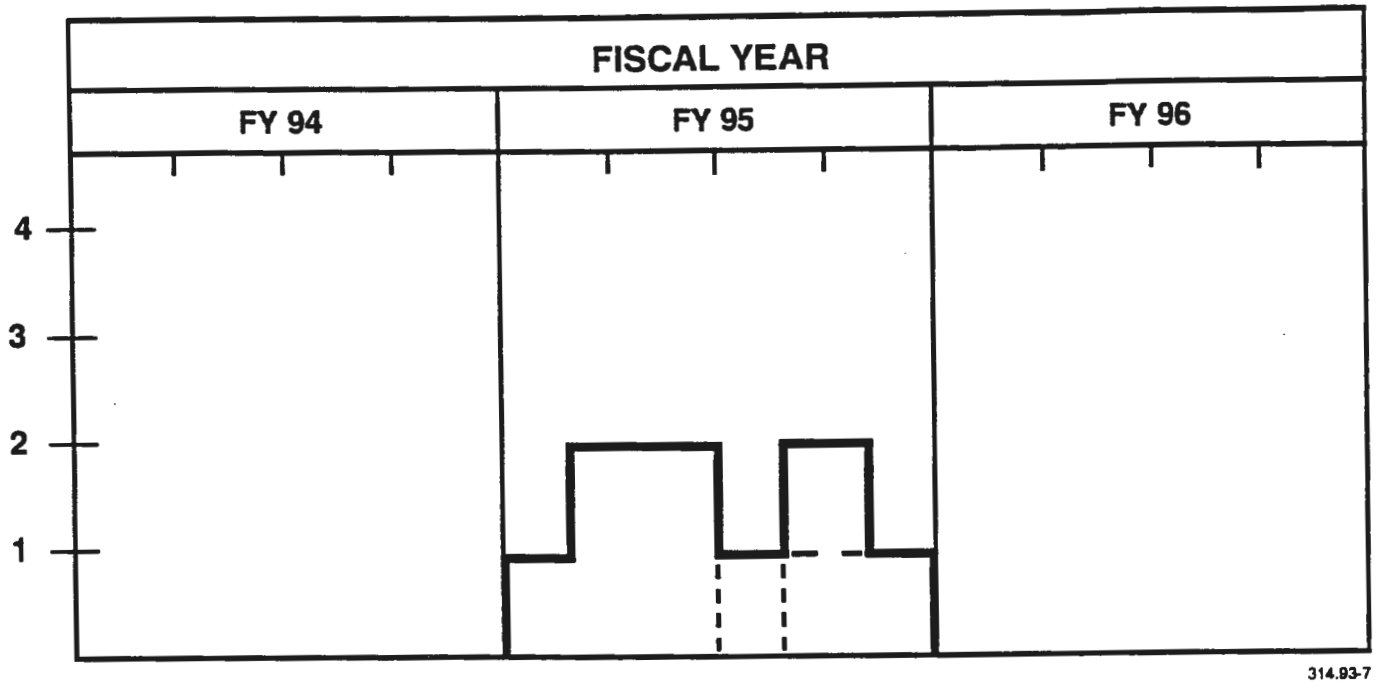

FIGURE 4.1-2 RECURRING LABOR REQUIREMENTS (FIRST SYSTEM)

A technical program manager occupying an engineering position will lead this effort. The technical program manager will develop policy, manage all testing for certification, approve all FY95 RPIs, and approve all new contracts for inclusion of logistics requirements. The technical program manager will assist all program managers and vendors in this area as required. An engineer will be required in FY94 and report to the technical program manager. This position will be responsible for engineering decisions relating to logistics and quality improvements.

The Associate Program Managers for Logistics (APML) positions have been created and filled to manage the Agency's logistics program. Most of the programs within the Aviation Security Program will require ILS support. The APML has the responsibility to support Security Program logistics requirements. ACA has approximately 50-60 active contracts and all contracts require APML support. All future contracts will require systems engineering support. A logistics management specialist reporting to the technical program manager will be required in FY94. This specialist will be responsible for assisting the program managers and the ILS specialists, and will assist vendors as required.

4.2 BUDGET REQUIREMENTS.

The budget required to execute all non-recurring tasks in this plan is $430K. Additional funding to support administration of this program is still to be determined. Costs of continuing effort will be approximately $180K per system. A cumulative non-recurring cost profile over the duration of this program is shown in figure 4.2-1. A cumulative recurring cost profile for one R&D system is shown in figure 4.2-2. The total cost involved in supporting high priority tasks is $300K plus $140K per system. Dotted lines represent the cost involved in supporting high priority tasks.

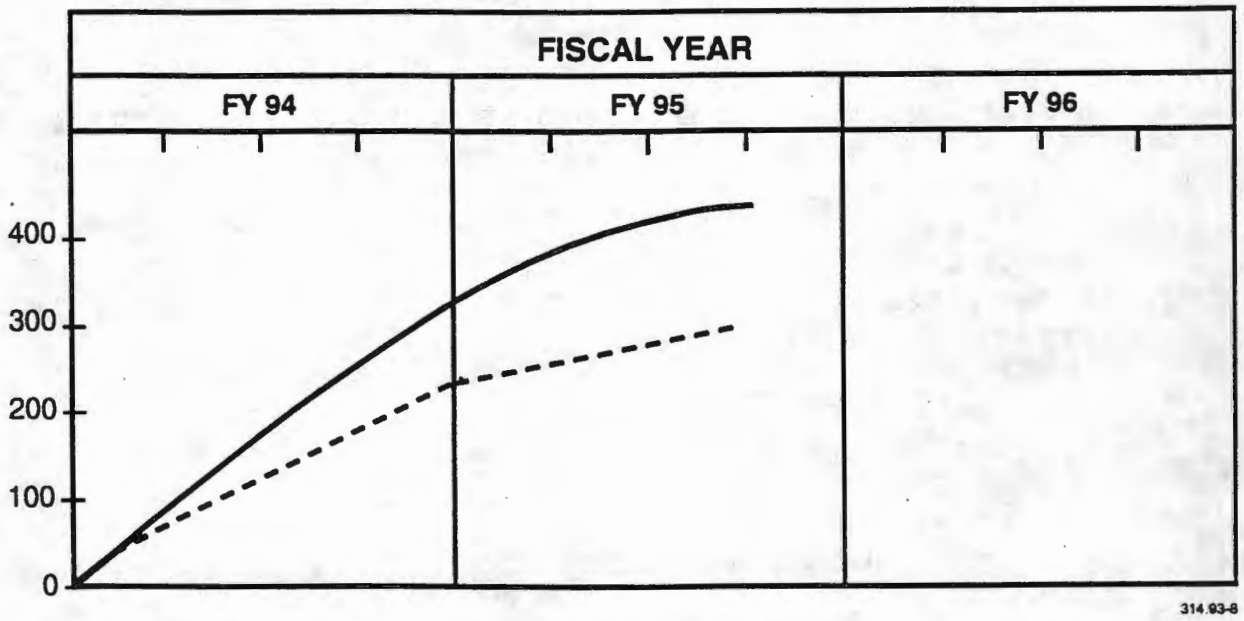

FIGURE 4.2-1 NON-RECURRING BUDGET REQUIREMENTS

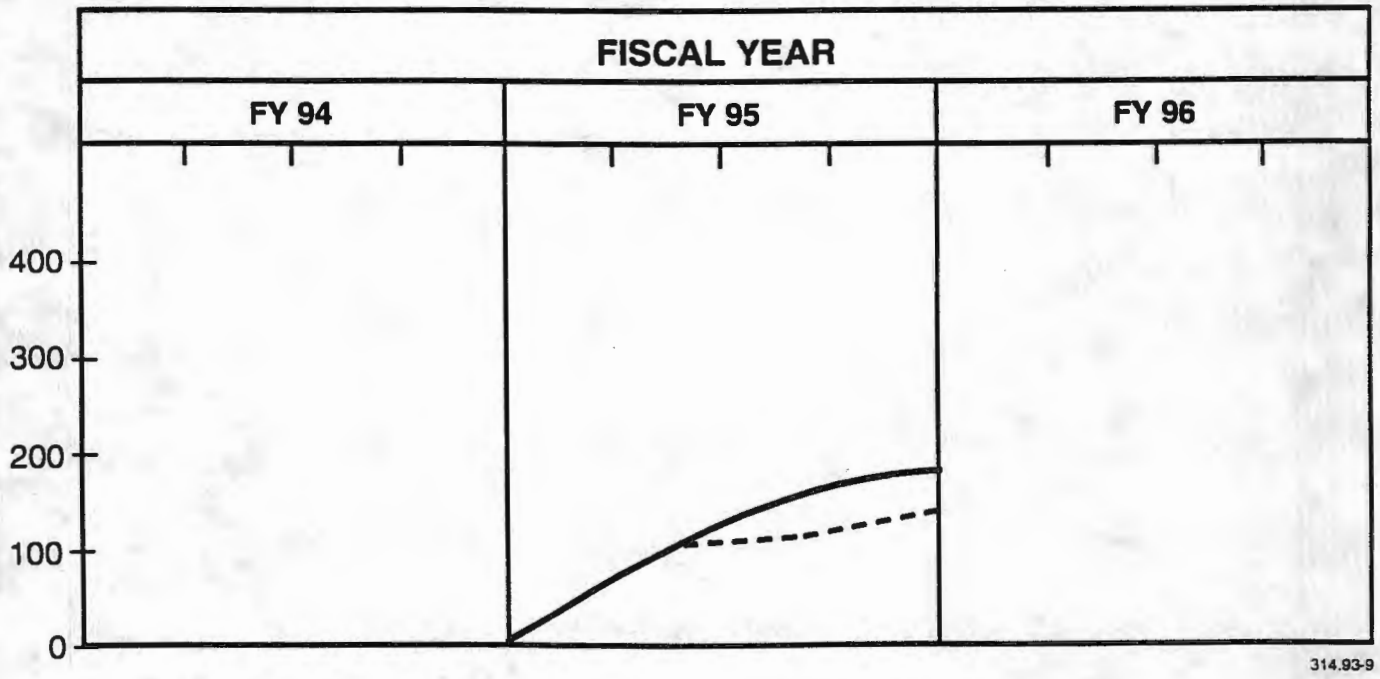

Figure 4.2-2 RECURRING BUDGET REQUIREMENTS (FIRST SYSTEM)

4.3 TEST EQUIPMENT REQUIREMENTS.

The following list represents the minimum test equipment requirements:

a. Microcomputer - used to run reliability models, maintain deficiency report data bases, and perform statistic analysis.
b. Microcomputer Temperature Interface - used to record temperatures during stress testing.
c. Microcomputer Humidity Interface - used to record levels of humidity during testing.
d. Microcomputer Voltage Interface - used to verify or record voltage stability, e.g., input power.
e. Microcomputer Acoustic Interface - used to measure/record sound intensity, harmonics, and sound level consistency.
f. Electromagnetic Detector - used to measure levels of electromagnetic energy emitted from transformers and displays.
g. Radiation Detector - used to measure levels of radiation, e.g., X-ray.
h. Environmental Chamber - used to house a system during environmental stress testing.
i. Reconfigurable Conveyer System - used to combine components for testing security systems.

Lead times for obtaining this equipment will depend on the availability of funding and whether acquisition of equipment is through government or contractor procurement. The estimated cost for delivery and installation of equipment items a through h listed above is $100K. Item i is considered Government Furnished Equipment (GFE).