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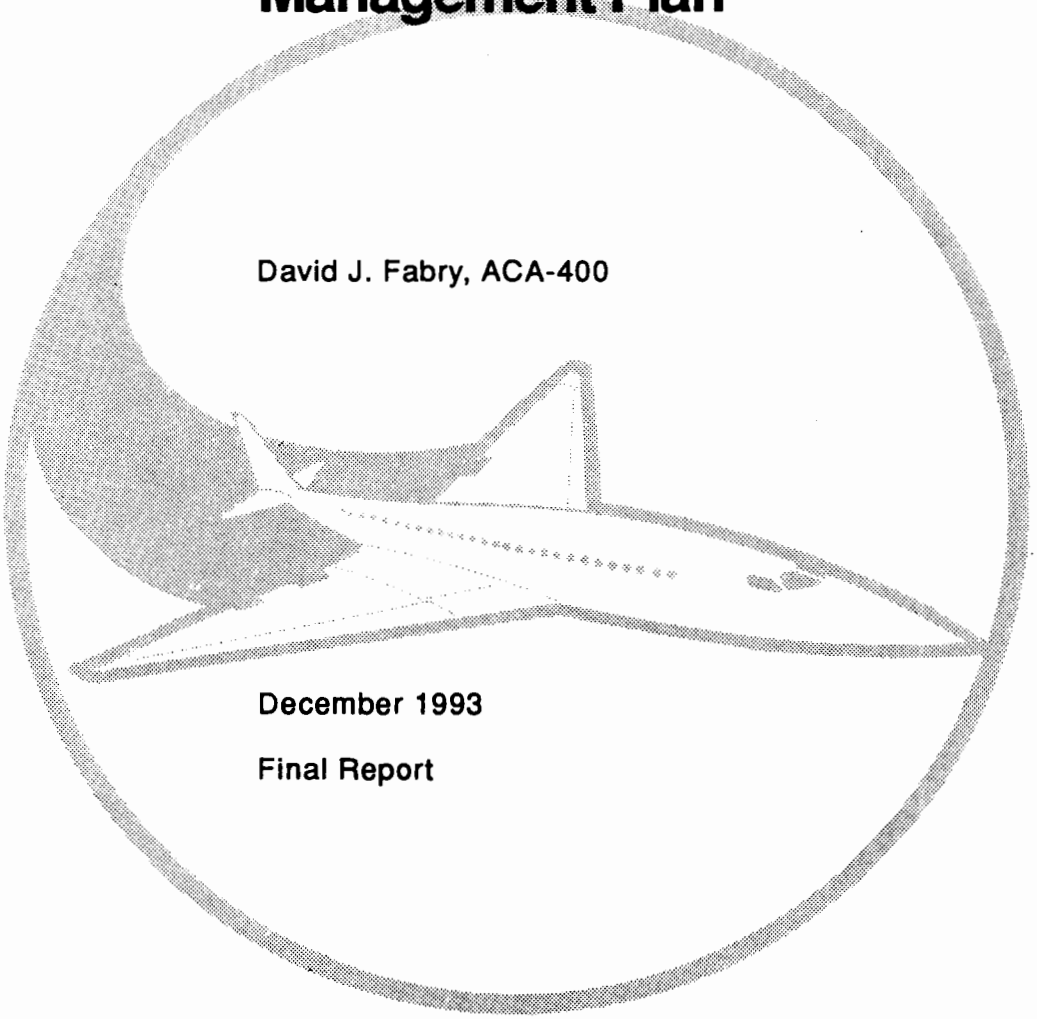
FAA Technical Center
Atlantic City International Airport,
N.J. 08405

Information Resource Management Plan

David J. Fabry, ACA-400



December 1993

Final Report

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Technical Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
DOT/FAA/CT-93/95		

4. Title and Subtitle	5. Report Date
Information Resource Management Plan	November 1993
	6. Performing Organization Code: ACA-400

7. Author(s)	8. Performing Organization Report No.
Ronald R. Polillo (Federal Aviation Administration) David J. Fabry (Federal Aviation Administration) Maurice Castronuovo (Galaxy Scientific Corporation) John Richards (Galaxy Scientific Corporation) Jack Berkowitz (Galaxy Scientific Corporation)	

9. Performing Organization Name and Address	10. Work Unit No. (TRAIS)
Federal Aviation Administration Technical Center Aviation Security Research and Development Service Atlantic City International Airport, NJ 08405	
	11. Contract or Grant No.: DTFA03-92-C-00035

12. Sponsoring Agency Name and Address	13. Type of Report and Period Covered
U.S. Department of Transportation Federal Aviation Administration Assistant Administrator for Civil Aviation Security Washington, DC 20590	Final Report
	14. Sponsoring Agency Code: ACS-1

15. Supplementary Notes

Report prepared by: Galaxy Scientific Corporation
2500 English Creek Avenue, Building 11
Pleasantville, NJ 08232-5562

16. Abstract

The Information Resource Management Plan (IRMP) identifies the information needs required to meet the Aviation Security Research and Development Service (ACA) mission. The Security Information Management System (SIMS) will be the delivery vehicle through which data is retrieved, organized, and is made available to the ACA community. Functionally, SIMS is the conduit for the assorted ACA required information collected universally to effectively manage the service goals.

Information system methodology was adopted to derive the short term and long term activities and associated schedules. The schedules, milestones and level of effort to perform these activities are [illegible] in this plan.

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Aviation Security Library

17. Key Words	18. Distribution Statement
Information Resource Management Local Area Networks Security Information Managment System Communications	This document is available to the public through the National Technical Information Service, Springfield, Virginia 22161

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified		

Form DOT F1700.7 (8-72) Reproduction of completed page authorized

PREFACE

This document is the Information Resource Management Plan (IRMP), which identifies the information needs required to meet the Aviation Security Research and Development Service (ACA) mission. The key Federal Aviation Administration's (FAA) ACA personnel supporting this effort are Ronald R. Polillo, Manager of the Requirements Analysis and Integration Division, and David J. Fabry, the task monitor.

Galaxy Scientific Corporation (GSC) prepared this document under contract number DTFA03-92-C-00035 with the FAA Technical Center (FAATC). The Program Manager at Galaxy Scientific Corporation is William Hassler, Jr. The authors of this document are Maurice Castronuovo, John Richards, and Jack Berkowitz.

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LIST OF ABBREVIATION AND SYMBOLS

ACA	Aviation Security Research and Development Service
ACD	Engineering, Research, and Development Service
ACL-1	Technical Center's Small Business Office
ACS	Asynchronous Communications Server
ADP	Automated Data Processing
ARD	Research and Development Service
ASL	Aviation Security Laboratory
ATC	Air Traffic Control
BAA	Broad Agency Announcement
CD	Compact Disk
CIA	Central Intelligence Agency
COFOT	Coaxial-Fiber Optic Transceiver
COMSEC	Communication Security
DAFIS	Departmental Accounting and Financing Information System
DIA	Defense Intelligence Agency
DIS	Defense Investigative Service
DoD	Department of Defense
DOS	Disk Operating System
DOT	Department of Transportation
DT&E	Development, Test and Evaluation
DTIC	Defense Technical Information Center
EISA	Extended Industry Standard Architecture
EPATS	Expenditure Planning and Tracking System
ETAMS	Employee Time and Attendance System
FAA	Federal Aviation Administration
FAATC	Federal Aviation Administration Technical Center
FBI	Federal Bureau of Investigation
GSC	Galaxy Scientific Corporation
GUI	Graphical User Interface
IDE	Integrated Device Electronics
IPA	International Personnel Agreement
IPX	Internetwork Packet Exchange
IRMP	Information Resource Management Plan
IS	Information System
LAN	Local Area Network
MIS	Management Information System
MISQU	Management Information Systems Query and Update
MMAC	Multi Media Access Center
MNS	Mission Need Statement
MOA	Memorandums of Agreement
MOU	Memorandums of Understanding
MS	Microsoft
NAS	National Airspace System
NASA	National Aeronautics and Space Administration
NATO	North Atlantic Treaty Organization
NIC	Network Interface Card

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NOS	Network Operating System
NTIS	National Technical Information System
OATS	Office Automation Technology System
OMB	Office of Management and Budget
OS	Operating System
OST	Office of the Secretary of Transportation
OT&E	Operational, Test and Evaluation
PC	Personal Computer
R&D	Research and Development
RAM	Random Access Memory
RE&D	Research, Engineering, and Development
ROM	Read Only Memory
RPI	Research Project Initiative
SAM	System Acquisition Management
SBIR	Small Business Innovative Research
SCSI	Small Computer Systems Interface
SIMS	Security Information Management System
SMTP	Simple Mail Transfer Protocol
T&E	Test and Evaluation
TCP/IP	Transmission Control Protocol/Internet Protocol
TRIMATE	Training Request Initiated Manually and Transmitted Electronically
UPS	Uninterruptable Power Supply
WAN	Wide Area Network
WORM	Write Once Read Many

EXECUTIVE SUMMARY

The Information Resource Management Plan (IRMP) identifies the information needs required to meet the Aviation Security Research and Development Service (ACA) mission. The Security Information Management System (SIMS) is the delivery vehicle through which data will be retrieved, organized, and is made available to the ACA community, its customers and organizations on a need to know basis. Functionally, THE SIMS is the conduit for the assorted ACA required information collected universally to effectively manage the service goals.

A key element of the Federal Aviation Administration's (FAA) congressional mandate is to expand ACA Programs to combat the newer sophisticated approaches of terrorism. The IRMP supported by short term plans, long term plans, and THE SIMS assists in meeting this mandate by the timely presentation of information required to meet these objectives. Management of these mission specific programs is facilitated through the timely access of financial and programmatic information. The delivery of this time critical information is essential to the effective management of these programs.

The short term and long term plans address increased functions, efficiency, speed, heterogeneity, reliability, and maintainability of the hardware and software resources available to ACA. The SIMS objective is to retrieve, assemble, and integrate data from related computer resources and distribute into reports usable by the ACA programs. These objectives will be accomplished by endorsing state-of-the-art Information System (IS) technology. Embracing this technology will facilitate support for efficient management in response to the increased demands of the service.

Data is typically delivered to ACA in a functionally limited perspective. Currently, the reporting of information required to effectively manage ACA's programs is obtained from independent sources and remote networks. The SIMS emphasizes the utilization of telecommunications technology, Local Area Networks (LANs), and Wide Area Networks (WANs) through which information can be accessed and ported. These telecommunication protocols and network connectivities permit the rapid and accurate dissemination of the mission specific data.

IS methodology was adopted to derive the short term and long term activities and associated schedules. The schedules, milestones and level of effort to perform these activities are projected in this plan.

1. INTRODUCTION.

The goal of the Information Resource Management Plan (IRMP) is to identify information requirements and the processes needed to support the business, technical, and administrative information concerns of the Aviation Security Research and Development Service (ACA). Information availability, throughput, security, and human factors are fundamental to the design and utilization of information system platforms. This document addresses design criteria and presents recommendations, which if incorporated, would enhance the availability and use of information to support ACA in its mission.

The ACA IS environment requires an overall data structure that meets both the goals of ACA and the requirements established by the users. In meeting these objectives, information and computer resources must be integrated efficiently. Those IRMP requirements that address the availability and integration of information, which is the baseline for the development of the Security Information Management System (SIMS) were obtained from members of the ACA staff. This document presents these requirements and identifies both the short and long term goals for ACA's IS environment.

1.1 BACKGROUND.

The incidence of terrorist and criminal acts against the civil aviation community have increased during the past decade. The perpetrators of terrorist activity and criminal acts have demonstrated an ever increasing sophistication in their attacks on civil aviation. In response to these attacks and the subsequent presidential and congressional mandates, the Federal Aviation Administration (FAA) has expanded its Research and Development (R&D) Program to combat the newer sophisticated approaches of terrorism. The FAA, in cooperation with airports and air carriers, has undertaken efforts which would increase the safety of passengers, air crews, aircraft, and airports. ACA's goal is to counter current and future means of attack through research and subsequent implementation of new technologies.

Management of ACA's programs include extensive administration of information relative to budgets, inventory, planning, and personnel. Project support information is collected from off-site computerized Automated Data Processing (ADP) systems where it is manually combined with information from project managers and key personnel in ACA. The access, storage, and distribution of this electronic information is performed over a Local Area Network (LAN). The LAN is used as the communication backbone, which allows sharing of information and computer resources. The information available on the ADP systems, ACA's information, application software, and hardware collectively comprise a distributed IS. The administration of the IS requires substantial effort by ACA personnel.

1.2 DOCUMENT ORGANIZATION.

The IRMP is divided into five sections. Section 1 presents an overview of the IRMP and an introduction to the ACA organization and their relative functions. Section 2 describes the current ACA LAN environment, information systems in use by ACA, and MIS projects currently in process. Section 3 identifies user requirements, requirements for future growth, as well as requirements for the ACA SIMS. Section 4 explains the short term and long term planning based on the identified requirements, and section 5 outlines planned schedules.

1.3 OVERVIEW.

The development of the IRMP requires compiling information relative to the current ACA environment, user requirements, as well as current and future projects. This information was used to generate short and long term plans. The framework for long term planning for ACA's information needs is the SIMS. The SIMS will serve an important role in enhancing the ACA automation environment, and will facilitate a common interface to external systems. The short and long term activities provide the input to planned schedules. Figure 1.3-1 illustrates the IRMP development.

The data required to facilitate the IRMP was complied from inputs gathered from the ACA organization as illustrated in figure 1.3-2. Each of the two divisions and their corresponding program areas presented requirements that should be incorporated into the ACA IS environment. The following programmatic summary, which identifies individual responsibilities, forms the basis for information needs that are addressed in the later sections.

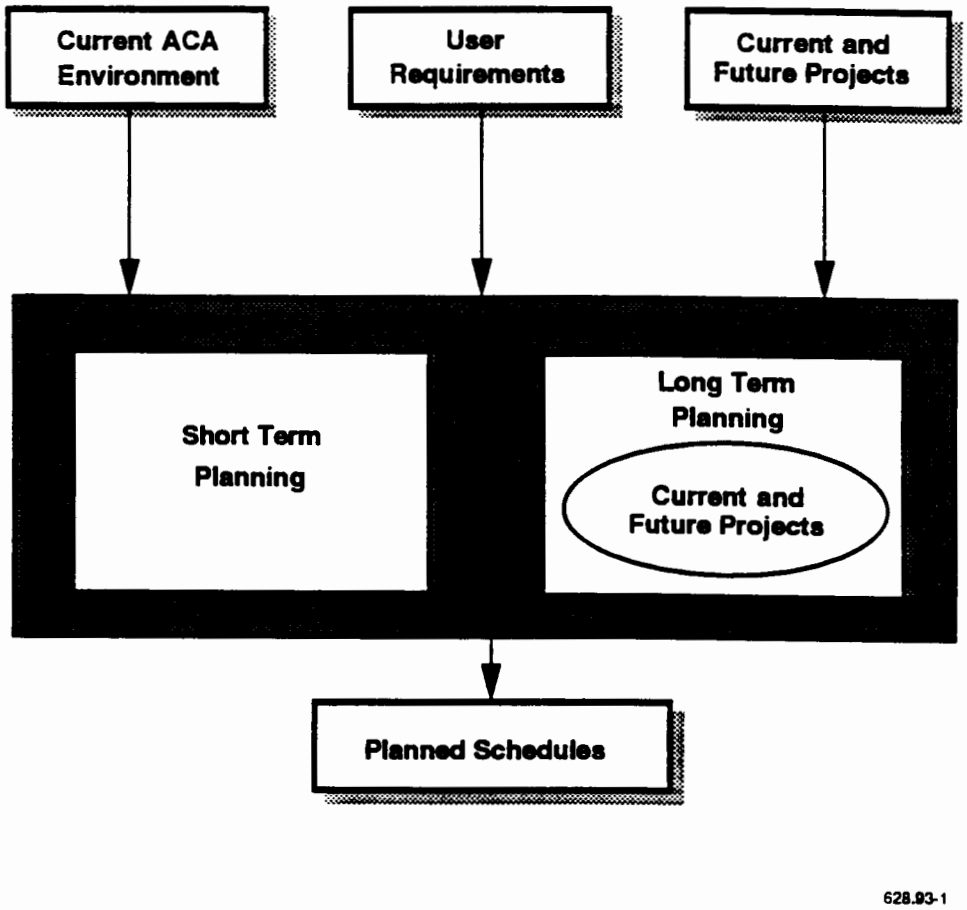

FIGURE 1.3-1 INFORMATION RESOURCE MANAGEMENT PLAN DEVELOPMENT

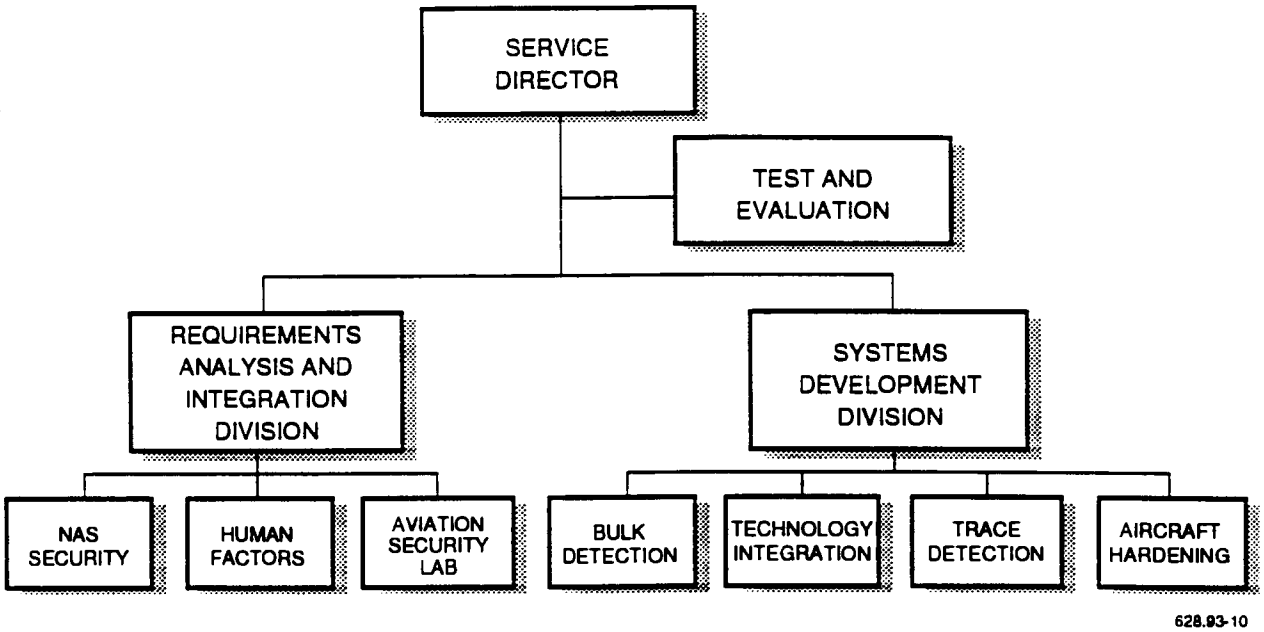

FIGURE 1.3-2 ACA ORGANIZATION

1.3.1 Requirements Analysis and Integration Division.

The Requirements Analysis and Integration Division is responsible for oversight and coordination of customer requirements in a comprehensive requirements document, formulation of Chapter 7, "System Security Technology" of the FAA Research, Engineering and Development (RE&D) Plan, formulation of the annual budget submission, and coordination of customer and congressional inquiries program status and funding issues. The Division is also responsible for research and development in the areas of the National Airspace Systems (NAS) Security Program and Human Factors Program. The administration of the Aviation Security Laboratory (ASL) is also performed in the division. Central to this mission is the development of a threat/risk evaluation methodology which facilitates the conceptualization of system requirements. This division is also responsible for the integration of results of technology efforts into a comprehensive security system at all NAS facilities, civil aviation airports, and U.S. air carriers.

1.3.1.1 NAS Security Program.

The NAS Security R&D Program encompasses the development and integration of technologies, systems, and procedures for the overall security of civilian airports and NAS Air Traffic Control (ATC) facilities. ATC facilities provide support equipment for navigation, surveillance, data processing, and communications. Airport security includes integration of explosives and weapons detection, access management and control, intrusion detection, passenger baggage matching, and use of federal security personnel. NAS facility and equipment security includes protection against advanced technology threats, which may be used against FAA centers, sectors, and regions.

1.3.1.2 Human Factors Program.

The Human Factors program manages research to improve human performance in the aviation security system. Human Factors issues include all security system events, activities, and phenomena that significantly influence operational human behavior and performance. Human Factors include Human System Integration, training, performance certification and assessment, job design, team analysis, and workload management. Human Factors also addresses motivation and incentives management, system design and procedures, human interactions with computers and other high tech equipment, perception and attitudes, errors and other behavioral lapses, and health. Profiling both international and domestic passengers to identify higher risk passengers for further screening is performed.

1.3.1.3 Aviation Security Laboratory.

The Aviation Security Laboratory function provides oversight for the purchasing, maintenance, scheduling, use of laboratory equipment, and safety monitoring. Included in the laboratory management, is the acquisition and control of all chemical reagents and specific analytical laboratory equipment in support of the ACA mission. This also includes the configuration of test cells per the research or Test and Evaluation (T&E) schedules. Equipment, supplies, and materials are procured, and inventory is maintained. Marketing is performed for current and future customers describing the ASL facilities, projects, and personnel skills.

1.3.2 Systems Development Division.

The Systems Development Division is responsible for the oversight of research and development in the areas of explosives and weapons detection technologies, technology integration and aircraft hardening.

1.3.2.1 Explosives/Weapons Detection Program.

The Explosives/Weapons Detection Program develops technologies to improve the capability to detect a broad range of explosives, explosive devices, and weapons which may be concealed and checked in as carry-on baggage on passengers, as well as in air cargo. Bulk detection technology uses either nuclear radiation or electromagnetic energy to identify explosives and weapons in checked and carry-on baggage and cargo. Millimeterwave, microwave, and low level x-ray devices are used to screen passengers.

Trace detection technology uses chemical analysis techniques to analyze explosive material vapors or detect particles. Since these systems are passive, they are capable of being used to screen passengers.

1.3.2.2 Technology Integration Program.

The technology integration program is responsible for investigating the feasibility of integrating different explosive detection devices in configurations for explosive detection systems. This includes the integration of hardware and software to ultimately result in a system which will be able to detect all explosive materials as required by FAA certification criteria.

1.3.2.3 Aircraft Hardening Program

The Aircraft Hardening Program's goal is to protect aircraft against catastrophic structural or critical system failure due to an in-flight explosion, and to protect aircraft avionics from spurious electromagnetic or high energy signal interference. To accomplish this objective, the program has been divided into three main project areas: blast loading characterization, cargo container hardening, and aircraft vulnerability reduction. The program addresses practical issues such as economic and regulatory considerations, human tolerance and post-blast survivability. Different applications of hardening results to both current and future aircraft designs, and their operational considerations are also being studied.

2. CURRENT ACA INFORMATION SYSTEM ENVIRONMENT AND PROJECTS.

One of the components required to developing a complete IRMP is a detailed description of the current information system environment. This section provides a description of the current ACA LAN environment including the network topology, hardware and software used, and the interfaces to external systems. This section also describes projects currently underway to enhance the existing ACA LAN environment.

2.1 ACA LAN ENVIRONMENT.

The ACA LAN environment is a client/server based LAN running on the Novell Netware Operating System (OS). This LAN provides computer resources for all personnel within the ACA building including the six security labs in the ASL. A majority of the hardware and software used on this LAN is provided through the FAA's Office Automation Technology System (OATS) contract. The hardware includes IBM PC compatible computers that will be referred to in subsequent sections as PC workstations. Other equipment in the ACA LAN environment include:

a. Sun Sparc2 Workstation,
b. Solbourne Series 502 Workstation,
c. Apple Macintosh II fx,
d. PC Compatible Email Gateway, and
e. PC Compatible Router.

The main control center for the ACA LAN is located in the office area. One room houses ACA's file server CT11, a fiber ethernet patch panel, and a Cabletron hub. Through this main control center, network connections are provided to Personal Computer (PC) workstations and printers in the office area, all computers in the lab area, and to the FAATC fiber backbone. Figure 2.1-1 illustrates a detailed diagram of the overall ACA environment.

2.1.1 Hardware.

2.1.1.1 Network Topology.

A majority of the ACA LAN is configured in a star topology. This topology is one of the basic interconnection topologies that connect each device in a point-to-point link to a central hub. The central hub or main hub in the ACA LAN is a Cabletron, eight-slot, Multi Media Access Center (MMAC) hub with four 18-port fiber optic modules. All connections to the main hub are routed through a patch panel that provides increased flexibility as the network environment changes. The connection to the FAATC fiber backbone is accomplished through a bridge installed in the main hub which provides access to other computing resources including all FAATC-wide LANs and the Data General MV/15000 computer. These resources can be accessed from all PC workstations connected to the ACA LAN. Figure 2.1-2 illustrates the configuration at the main hub.

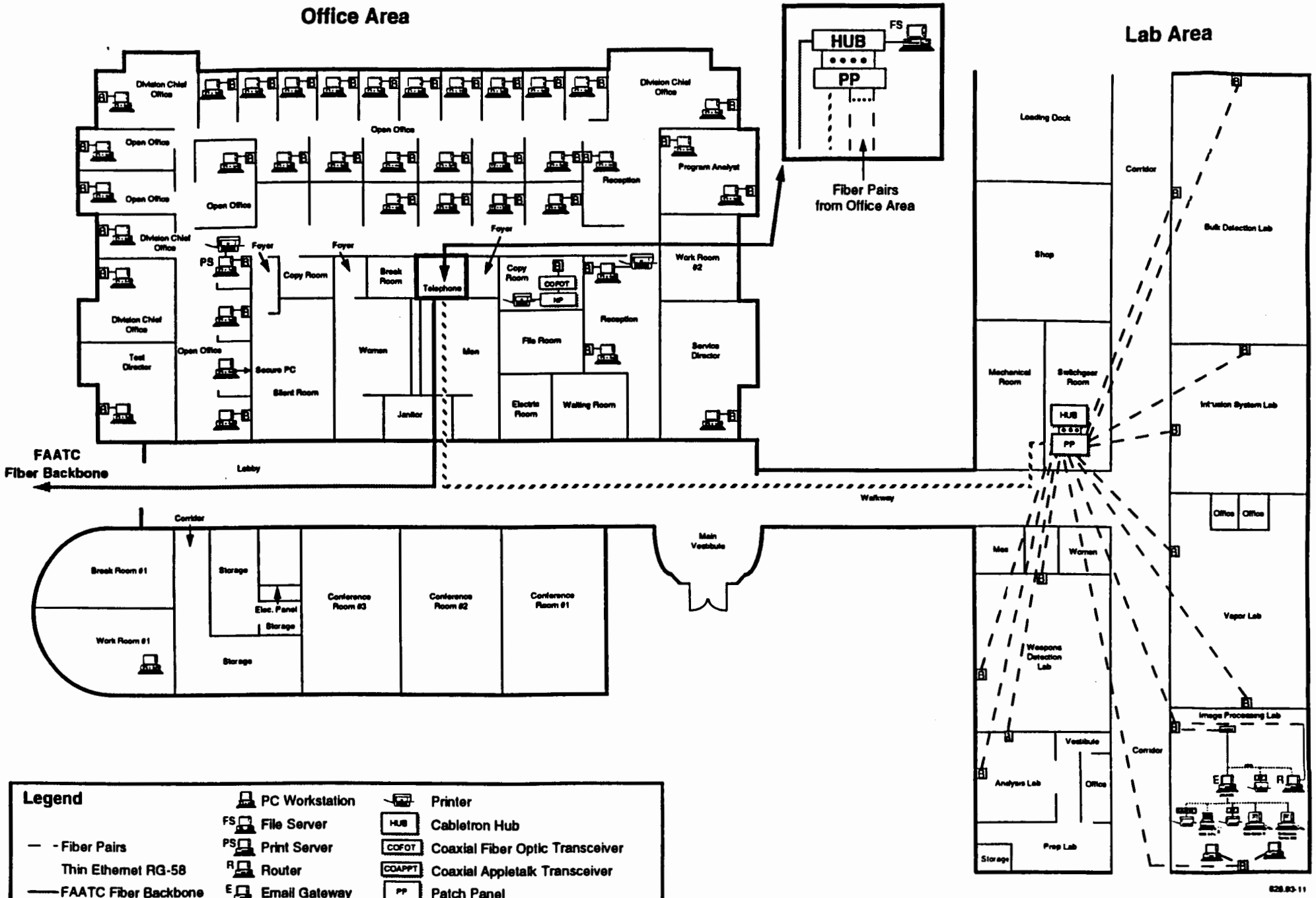

FIGURE 2.1-1 THE ACA LAN ENVIRONMENT

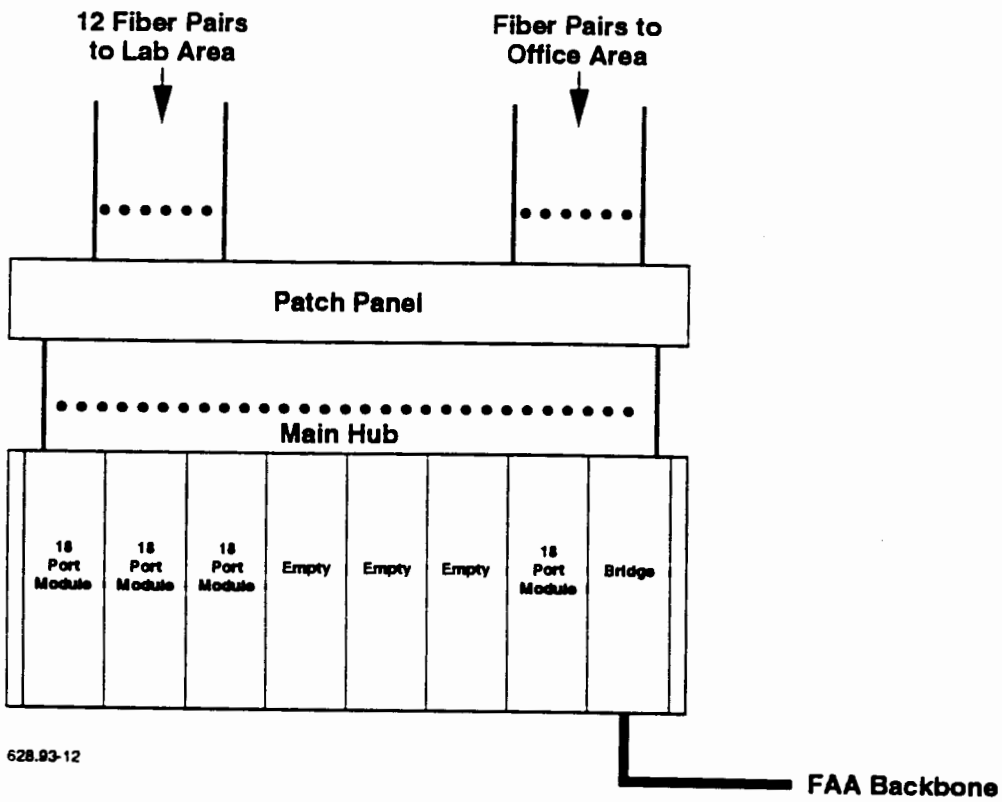

FIGURE 2.1-2 MAIN HUB CONFIGURATION

In the office area, two fiber connections are routed to each cubicle and to each office occupied by a single user. Exceptions to this include large offices, conference rooms, and the six lab areas that contain four fiber pairs each. There are 12 fiber pairs running from the main hub in the office area to a patch panel in the switch gear room, located in the lab area (refer to figure 2.1-1). In addition to the 12 fiber pairs for the office area, this patch panel also contains the four fiber pairs from each lab for a total of 36 pairs. To handle the 24 pairs from the lab areas, another Cabletron hub (secondary hub) was installed. One of the 12 fiber pairs coming from the main hub is patched to this secondary hub. This setup provides additional connections for fiber pairs routed to each lab. A second fiber pair is connected to the FAA Tech Center backbone and patched to the Image Processing Lab. This provides a connection to the Internet via a PC configured as a router. The lab area wiring scheme is shown in figure 2.1-3.

The remaining three fiber pairs in the Image Processing Lab are directly patched to the secondary hub. One fiber pair is connected to a Coaxial-Fiber Optic Transceiver (COFOT) which is connected to a thin ethernet bus segment. This setup provides multiple network connections without occupying a large number of inputs on the secondary or main hub. This configuration, as illustrated in figure 2.1-4, will be used in all labs as network interconnection is required. The remaining two fiber pairs in the Image Processing Lab are connected to PC workstations.

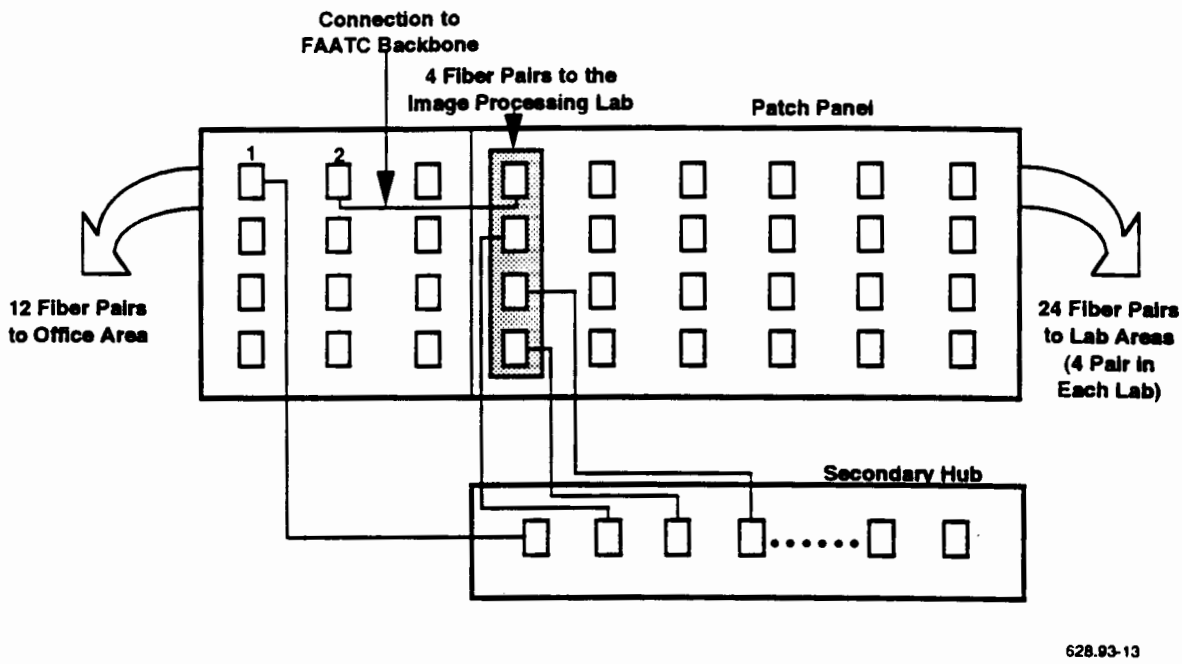

FIGURE 2.1-3 LAB AREA WIRING SCHEME

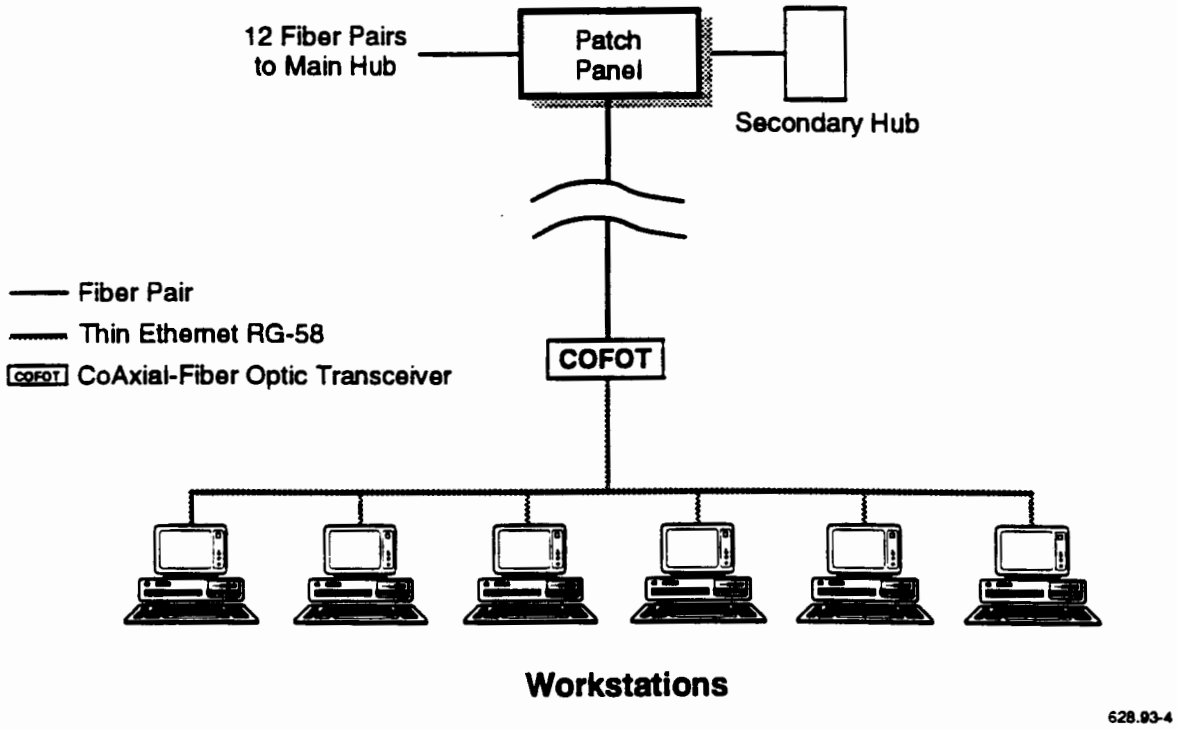

FIGURE 2.1-4 LOCAL LAB NETWORK CONFIGURATION

2.1.1.2 File Server.

A file server in a client/server based LAN controls a large part of the network. File server functions include regulating communications among PC workstations that are attached to it, and managing shared network resources such as printers, hard drives, Compact Disk-Read Only Memory (CD-ROMs), and modems. The file server must be a high end computer for fast data access, as well as extremely reliable to avoid network downtime. The file server on the ACA LAN is known as CT11. It is an AST 486/66MHz Extended Industry Standard Architecture (EISA) based compatible PC with:

a. 16 MB RAM,
b. Two 1 GB Small Computer Systems Interface (SCSI) Hard Drives,
c. Two SCSI Hard Drive Controllers, and
d. 1200 Volt-Amp Uninterruptable Power Supply (UPS).

The two SCSI hard drives in CT11 are duplexed for increased system fault tolerance and faster data access. Duplexing is the process by which data is copied onto two hard drives that are interfaced to two separate hard drive controllers. This protects data against hard drive failure or hard drive controller failure. If any component on one channel fails, the other hard drive can continue to operate without the loss of data or interruption of service. One hard drive is considered the primary drive and the other, the secondary. Data on both drives are identical. All data contained on the primary hard drive are copied to the secondary hard drive during periods of low utilization on the file server. This function is handled automatically by the Novell Netware operating system. This configuration also improves data access rates by allowing users to retrieve data from the idle secondary drive while the primary hard drive is in service. If the particular data accessed on the secondary hard drive is not current, data will be retrieved from the primary hard drive only. Figure 2.1-5 illustrates disk duplexing on file server CT11.

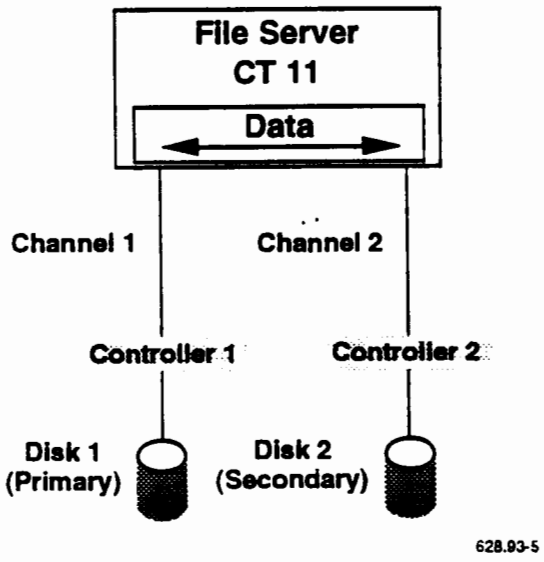

FIGURE 2.1-5 FILE SERVER CT11 DISK DUPLEXING SCHEME

2.1.1.3 PC Workstations.

The ACA LAN is comprised of PC compatible computers supplied by the OATS contract and a number of other workstations. Each networked PC contains either a fiber ethernet card or a thin ethernet card for network communication. Table 2.1-1 lists the workstation configurations and the quantities of each device.

TABLE 2.1-1 PC WORKSTATIONS IN ACA

PC SYSTEM	QUANTITY
AT&T 386/25MHz System with: • 4 MB RAM • 90 MB Integrated Device Electronics (IDE) Hard Drive	40
AST 486/33MHz System with: • 8 MB RAM • 240 MB IDE Hard Drive	10

One of the above PC workstations is a stand-alone system that is used for classified processing. This system uses two removable 90 MB Bernoulli disk drives. One removable disk in this system contains the OS while the other disk contains classified data files. These disks are stored in a Defense Investigative Service (DIS) approved safe when not in use. Another PC workstation that is not connected to the ACA LAN is being used in the ACA library.

2.1.1.4 Additional Platforms.

In addition to the PC workstations, ACA uses an Apple Macintosh II fx and UNIX workstations. There are two UNIX workstations in the ACA LAN environment, a Sun Sparc2 and a Solbourne Series 502. The Solbourne workstation is Sun compatible. Table 2.1-2 lists the details of these systems.

TABLE 2.1-2 ADDITIONAL PLATFORMS IN THE ACA LAN ENVIRONMENT

SYSTEM
Sun Sparc 2 UNIX Workstation with : • 64 MB RAM • 424 MB IDE Hard Drive
Solbourne Series 5602 UNIX Workstation with: • 64 MB RAM • 1GB Hard Drive • Sony CD-ROM • 1/4" 150 MB tape drive • 8mm 2 GB tape drive
Apple Macintosh IIfx System with • 8 MB RAM • 120 MB Hard Drive • 45 MB Removable Hard Drive

These UNIX systems and the Macintosh are not directly supported on the file server (i.e., the Netware modules that support UNIX and Mac OSs are not installed). Several PC workstations on the LAN are configured to remotely access the UNIX workstations through a PC workstation configured as a router using Win/Router software from Wallingong. This PC routes Novell Netware Internetwork Packet Exchange (IPX) packets to Transmission Control Protocol/Internet Protocol (TCP/IP) packets for UNIX workstation access. This router also handles connection to Internet through the FAATC fiber backbone. Figure 2.1-6 shows the layout of the UNIX workstations, the Macintosh, printers, and other computers in the Image Processing Lab.

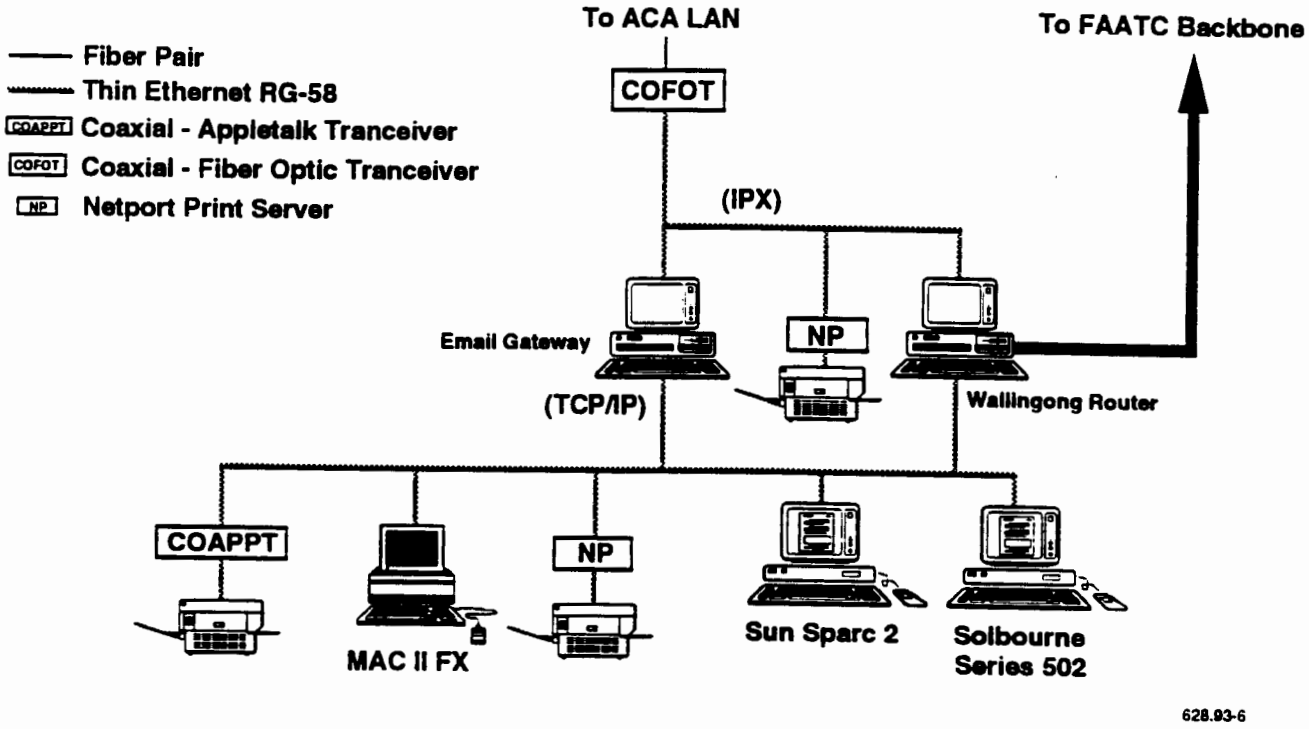

FIGURE 2.1-6 IMAGE PROCESSING LAB LAYOUT

2.1.1.5 Shared Network Resources.

In addition to the CT11 file server, other shared network resources on the ACA LAN include a tape backup system and several network printers. The file server data is backed up using a Mountain tape backup system. File server data is backed up once a week. This system also has the capability to backup PC workstation data.

There are six printers in the ACA LAN environment. Four printers are accessed through file server CT11, and two are accessed through the UNIX workstations and the Apple Macintosh. Of the four printers connected through CT11, two of them are interfaced to the LAN using Intel Netport print servers, a third one is connected to a an end-user's PC as a remote printer, and the last one is connected to a PC dedicated as a print server. The LAN environment is setup so that all four printers are accessible by all network users connected to CT11.

2.1.2 Software.

The software used in the ACA LAN environment is comprised of Disk Operating System (DOS) based applications that run under the Windows Graphical User Interface (GUI), UNIX, Macintosh, and Novell Netware OSs, and the applications that run under these OSs. The DOS/Windows software is used in most PC workstations in the ACA LAN environment. The applications include Word for word processing, Excel for spreadsheets, Arts & Letters for graphics, dBase and RBase for data base management and cc:Mail for Email communication. The PC utilities include FileSafe for data backups, and Link to Simple Mail Transfer Protocol (SMTP) which is Email gateway software. The Macintosh applications include Word and Excel. Table 2.1-3 summarizes the primary software used in the ACA LAN environment.

TABLE 2.1-3 SOFTWARE IN THE ACA LAN ENVIRONMENT

DESCRIPTION	FUNCTION	VENDOR	VERSION
Operating Systems			
Netware	Network OS	Novell	3.11
DOS	PC OS	Microsoft	5.0
Sun OS	UNIX OS	Sun	4.1.3
Solbourne OS	UNIX OS	Solbourne	4.18
Apple System 7	MAC OS	Apple	7.1
PC Applications			
Windows	GUI	Microsoft	3.0/3.1
Word	Word processing	Microsoft	1.1/2.0/6.0
Excel	Spreadsheet	Microsoft	3.0
Arts & Letters	Graphics	Computer Support Corp.	3.1
dBase	Data base Management	Borland	1.1
RBase System 5	Data base Management	Microcim	1.1
cc:Mail	Email	Lotus	1.1/2.0
FileSafe	Backup Software	Mountain	5.3
Link to SMTP	Email Gateway Software	Lotus	1.3
MAC Applications			
Word	Word processing	Microsoft	5.1
Project	Project Management	Microsoft	3.0
Excel	Spreadsheet	Microsoft	4.0

2.1.2.1 Network Operating System.

The primary network OS on the ACA LAN is Novell Netware 3.11. Netware provides file and printer sharing, user services such as electronic mail transfer, data base access, and various other remote services. The configuration is based on a client-server architecture, where clients (users logged in via PC workstations) make requests of the server (CT11) and remote network devices are transparent to the local user.

In addition to Netware, the UNIX OS resident on the UNIX workstations provides network functionality. This functionality is built into the OS. As mentioned in Section 2.1.1.4, the UNIX

environment currently is accessed through the UNIX workstations and several PC workstations via Wallingong software.

2.1.2.2 File Server Directory Structure.

The hard drives on the CT11 file server are divided into two logical partitions, a DOS partition, and a Netware partition. The DOS partition contains the DOS OS and the server program file. This file, when executed, launches the Netware OS and shifts system control to the Netware partition and OS.

The Netware partition is divided into three volumes, SYS, DATA, and ACA. The SYS volume contains the Netware program files and network software applications. All Netware program files are located in the LOGIN , PUBLIC, and SYSTEM directories. The MAIL directory is used to store user mailboxes for the Netware mail application. In this environment, the mail application is not used. The DATA volume contains all cc:Mail data files for each cc:Mail user on the ACA LAN, home directories for the LAN supervisors, and dBase and Project data files. In the ACA volume, each user has a designated subdirectory under the HOME directory. This directory provides storage space in addition to each user's local hard drive. The directory structure of the file server is illustrated in figure 2.1-7.

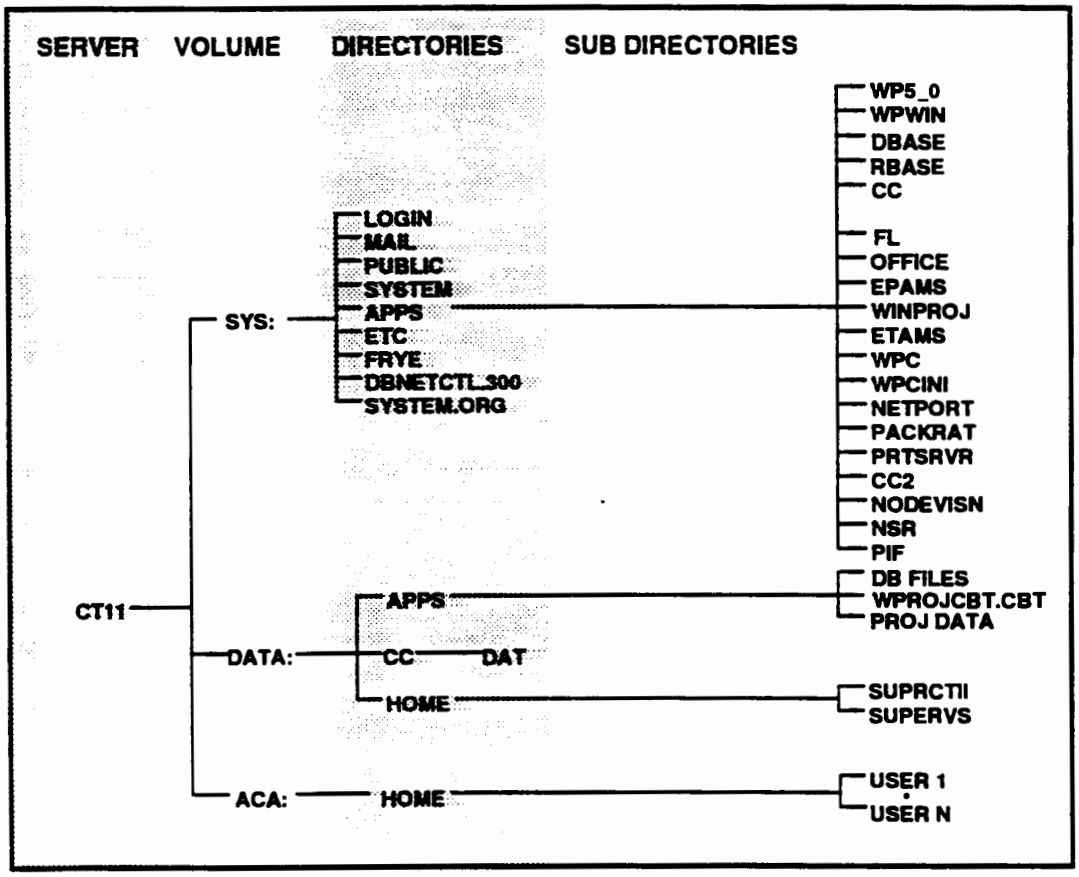

FIGURE 2.1-7 DIRECTORY STRUCTURE OF FILE SERVER CT11

2.1.2.3 File Server Applications.

As mentioned in section 2.1.2.2, several software applications reside on the CT11 file server including cc:Mail, WordPerfect, dBase, RBase and other software packages used to access FAATC-wide systems. Table 2.1-4 lists the primary software applications resident on the ACA file server.

TABLE 2.1-4 SOFTWARE APPLICATIONS ON CT11

DESCRIPTION	FUNCTION	VENDOR	VERSION
WordPerfect for DOS	Word processing	WordPerfect	5.0
WordPerfect for Windows	Word processing	WordPerfect	5.2
cc:Mail	Email	Lotus	1.0
dBase IV	Data Base Manager	Borland	1.1
RBase System 5	Data Base Manager	Microrim	1.1

2.1.2.4 PC Software.

In addition to accessing software applications on the CT11 file server, users have access to applications resident on their PC workstations. All PC workstations on the ACA LAN use the MS-DOS OS and the MS-WINDOWS GUI. MS-Word, MS-Excel, and Computer Support Corporation's Arts & Letters are the main software applications resident on local hard drives. These applications are widely used in the PC industry. Table 2.1-5 lists these software applications and their respective version numbers.

TABLE 2.1-5 LOCAL PC WORKSTATION APPLICATIONS

DESCRIPTION	FUNCTION	VENDOR	VERSION
DOS	OS	Microsoft	5.0
Windows	GUI	Microsoft	3.0/3.1
Excel	Spreadsheet	Microsoft	3.0/4.0
Word	Word processing	Microsoft	1.1/2.0/6.0
Arts & Letters	Graphics	Computer Support Corp.	3.1

2.1.2.5 Other Operating Systems.

Other OSs in the ACA environment include UNIX and Apple Macintosh. The UNIX OS is installed on the Sun Sparc2 workstation and the Solbourne workstation. Specifically, the Sun contains Sun OS version 4.1.3, the Solbourne contains Solbourne OS version 4.18, and the Macintosh, System 7.

2.1.3 External Interfaces.

Access to systems external to the ACA LAN environment is accomplished through the FAATC fiber backbone. The fiber backbone is directly connected to a bridge on the main hub. This connection provides access to:

a. File Servers on the FAATC LAN,
b. Data General MV/15000 mini computer,

c. FAA-wide Email system, and
d. Internet.

2.1.3.1 Mini Computer Access.

The FAATC's Data General MV/15000 is accessed via the PC term software package resident on the CT11. This provides access to the following information systems:

a. Expenditure Planning and Tracking System (EPATS),
b. Employee Time and Attendance System (ETAMS),
c. System Acquisition Management (SAM),
d. TRIMATE - Training Request Initiated Manually and Transmitted Electronically,
e. Labor/Skills system,
f. Correspondence Tracking System, and
g. Travel Manager.

2.1.3.2 Email Communication.

Communications on Email is available to all FAA-wide locations, as well as to the Internet community. Through the FAATC cc:Mail Network , users are able to communicate to all major locations within the FAA, supporting contractors, remote users, and to the Internet. Email communication to the Internet via cc:Mail is accomplished through the Email Gateway in the Image Processing Lab. This gateway translates Email from a cc:Mail message format to Internet SMTP format using Lotus Link to SMTP v.1.3. Another method of sending mail to the Internet is to gain access through the Sun workstation.

2.2 CURRENT PROJECTS.

As part of ongoing LAN administration, enhancements and expansion of the ACA LAN, several activities are in process. These activities include upgrading the CT11 file server to a more powerful computer, remote access to the ACA LAN via cc:Mail and remote control software, developing a library for ACA, and upgrading software applications. These activities are being carried out by ACA LAN administrators and other ACA staff.

2.2.1 Remote Access to ACA LAN.

In the ACA organization, staff members travel frequently in support of their program activities. Many staff members take laptop computers for these trips. As a result, the need to communicate with other staff members at the security facility and access to LAN resources became critical. Efforts are currently underway to provide Email capability and access to LAN resources. The software packages being evaluated in support of these activities are cc:Mail Remote and PC AnyWhere. Some of the concerns that need to be addressed when evaluating these packages include usability, data throughput, and software administration. Table 2.1-6 lists the remote access software applications.

TABLE 2.1-6 REMOTE ACCESS SOFTWARE APPLICATIONS

SOFTWARE PACKAGE	FUNCTION
Lotus cc:Mail Remote	Email communication
Symantec PCAnyWhere	Remote access to ACA LAN

The cc:Mail remote is a tool that will allow remote users to asynchronously dial into a dedicated PC host that is a node on the ACA LAN. The remote user will be able to send and receive cc:Mail messages. PCAnyWhere is a software tool that contains both a host and client module. The host module resides on a dedicated PC with an ACA LAN connection. It answers remote calls from clients via modem. By using the client module and a modem, a remote user can dial into the host PC, control the host PC, and log into the ACA LAN remotely.

2.2.2 ACA Library Development and External Information Systems.

The ACA Library currently is under development. Space has been reserved for all documentation, and a stand-alone PC is being used to store document information. A free form data base known as Ask SAM is being implemented on the PC to catalog all ACA documents including books, reports, studies, and journals. The data base accepts all vital document information as well as three key word descriptors. Access to electronic references including the Defense Library, American Chemical Society, Dialog Information Service, Defense Technical Information Center (DTIC), National Technical Information System (NTIS), and the North American Treaty Organization (NATO) EOD Technical Information Center is also being provided. Table 2.1-7 shows the electronic information sources to be available as part of the library and the mode of access for each.

TABLE 2.1-7 ELECTRONIC INFORMATION SOURCES
TO BE PART OF THE ACA LIBRARY

INFORMATION SOURCE	ACCESS
Defense Library on Disc	CD-ROM
American Chemical Society	CD-ROM
DIALOG	Asynchronous modem communication
NTIS	Asynchronous modem communication
DTIC *	Asynchronous modem communication
NATO EOD Technical Information Center	Asynchronous modem communication

*A secured PC is required for access to classified information on the DTIC.

2.2.3 Operating System and Application Upgrades.

Software upgrades currently are being performed to MS-Windows v3.1, cc:Mail 2.0, MS-Word 6.0, and Excel 4.0. The cc:Mail package currently is being tested by the ACA LAN administrator for compatibility before becoming operational.

3. ACA REQUIREMENTS.

Requirements information for the SIMS was obtained from interviews with ACA management. These requirements address the development of a consolidated information system. Table 3-1 presents the seven major elements and their related sub elements. Each major element has sub elements which have similar functionality or share common information. Some of the requirements that were identified during the interviews are being addressed by current projects and therefore are not presented below.

Currently, the Aviation Security R&D program uses a series of external data bases and application programs to manage and track the financial, personnel, and programmatic items. Included in these applications are FAATC programs for tracking funding, personnel time charging, monitoring the progress of projects, and purchasing items for projects. In addition, there are several items that are endemic to ACA organizational needs. These items require customized applications for ACA use. Included in these unique requirements are tracking security clearances and visit requests, collecting and distributing test results, and coordinating conference attendance and briefings.

In the sections that follow, an overview of the SIMS for the ACA service is provided. Since this document is a plan for the short and long term development of ACA information systems, the specific details of the information system remain undeveloped. A summary of the requirements for an integrated information system through which most of programmatic, personnel, and funding information will be readily available to ACA management is presented, with an overview presented in table 3-1.

3.1 SYSTEM OVERVIEW.

Information systems already exist to provide essential personnel, funding, and program related information to ACA managers. These information systems; however, are distributed across a range of platforms and networks available at the FAATC. For example, personnel tracking uses a terminal based application on the central Data General system. Tracking project deliverables is performed on a PC based system. If a manager wants to use data from both systems to balance future work loads, separate queries must be formulated. A prolonged time lag may be involved as paper reports are prepared from each responsible organization. Although the responsible organizations maintain control over the data, the process does not provide managers with timely information for decision making.

In response to this need, the SIMS, a distributed information system, is proposed. By networking to the remote computers where data resides and using translation software or "meta-data descriptions", ACA managers will be provided information in a unified presentation that is responsive to their programmatic needs. An overview of the system architecture is provided in figure 3.1-1.

TABLE 3-1 SIMS ELEMENTS AND SUB ELEMENTS

FINANCE AND PLANNING SYSTEM		
	FINANCIAL	BUDGET SYSTEM OBLIGATION/ALLOCATION TRACKING COST ACCOUNTING
	PLANNING	BUDGET FORMULATION MISSION NEED STATEMENT (MNS) RESEARCH PROJECT INTIATIVE (RPIs) RE&D PLAN CONGRESSIONAL Q&As REQUIREMENTS DOCUMENTS
CONTRACT INFORMATION SYSTEM		CONTRACTS TRACKING GRANTS TRACKING SBIR TRACKING INTERAGENCY AGREEMENT MEMORANDUMS OF AGREEMENT MEMORANDOMS OF UNDERSTANDING INTERNATIONAL PERSONNEL AGREEMENT
PRODUCT INFORMATION SYSTEM		DELIVERABLES SCHEDULE MILESTONES
PERSONNEL SYSTEM		LABOR/SKILLS SYSTEM TRAINING SYSTEM TRAVEL MANAGER TIME AND ATTENDANCE
MARKETING INFORMATION SYSTEM		CONFERENCE CALENDARS CONFERENCES SUPPORTED BY ACA BRIEFINGS INFORMATION SYSTEM
TESTING INFORMATION SYSTEM		TEST RESULTS (ABSTRACTS, DT&E AND OT&E) LAB SCHEDULING SYSTEM
PROGRAM SUPPORT SYSTEM		SOFTWARE TOOLS THREAT - RISK DATA BASE CORRESPONDENCE TRACKING SYSTEM BROAD AGENCY ANNOUCEMENT TRACKING SYSTEM ACA PROPERTY TRACKING SYSTEM PATENT TRACKING SYSTEM

As illustrated in the figure, the system will operate a common user interface or "front-end". This user interface provides access to all the information types required by ACA managers. For example, a request could be made to collect all fiscal year information for a project, including personnel, funding,

deliverable status, and briefings. This information requires access to multiple data bases. In turn, information requests will be translated into meta-data descriptions for data base retrieval. The system will then query the appropriate data bases and reassemble the data for a unified information presentation to the user.

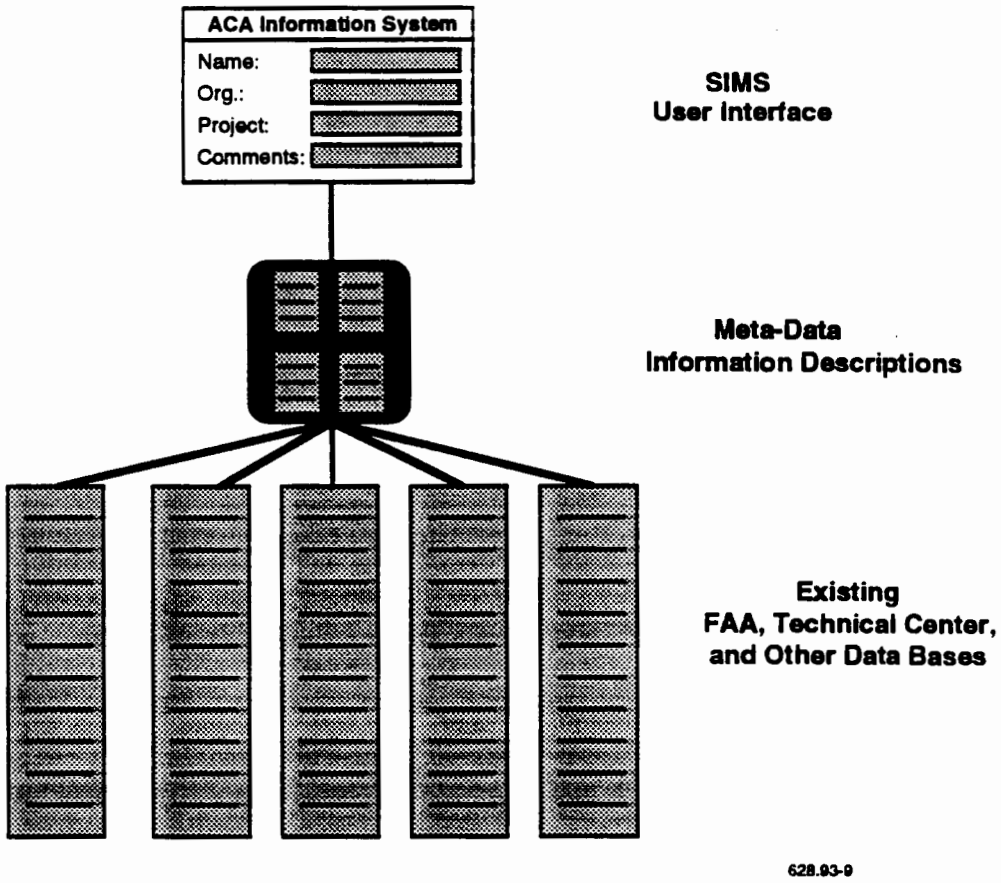

FIGURE 3.1-1 SIMS INFORMATION FLOW ARCHITECTURE

There are two key points to this architecture. First, it ensures that data integrity is maintained by storing data in only one location. This also reduces the chance of accessing old or "poor-quality" data. Second, it allows information to be presented to the user in a usable form. The advantage of this approach is that additional or redundant data sources are kept to a minimum.

The specific information requirements and a synopsis of the existing information sources for this information are provided below.

3.2 FINANCE AND PLANNING SYSTEM.

SIMS will be a central point for the management of financial, project, personnel, testing, and marketing resources. The financial management component of the system is discussed in this section.

The financial management component will manage and track several funding sources and vehicles for projects. The system will use a combination of existing computer applications, data base files, and new sub-systems. Combined, the system will allow ACA managers to identify the status of budget process

funding requests, funding obligations, and remaining levels of funding. The purpose of integrated access to the information is to allow ACA managers to plan for future programs while remaining responsive to changing research needs and priorities.

3.2.1 Budget System.

Description: All FAA funding requests go through the established procedures through the FAA, Department of Transportation (DOT), the Office of Management and Budgets. (OMB), and congressional channels. The budget process system will track requested funding levels and funding request status. For example, a specific budget request will be recorded as it is presented from the FAA to the DOT. Then the request is tracked through modifications at the Office of the Secretary of Transportation (OST), the OMB, the House, Senate, and Conference budget subcommittees. In turn, associated estimates for projects funded under that budget line item will be adjusted or flagged. Tracking, allows ACA managers to formulate proactive strategies to accomplish tasks, as opposed to reacting to the budget figures that are available at the end of the process. Currently, most budget oriented tracking is performed through the ACA program office.

Requirement: The SIMS system will be the central point for the entry, update, and tracking of the budget process.

Implementation: Included in the Budget Process component will be an ability to display specific programs and budget band estimates, proposed cuts and their effects on specific projects, and long range budget forecasts. This data will be available in both text and graphical presentations.

3.2.2 Obligation/Allocation Tracking.

Description: Once funds are committed to the FAA, several existing applications are used to track expenditures, generate purchase requests, and monitor charge codes and funding sources. It is desirable to maintain their usage within THE SIMS, since these are standard systems used throughout the FAATC. The systems used to perform funding and obligation tracking includes EPATS, SAM, the Departmental Accounting and Financing Information System (DAFIS).

Requirement: The SIMS will provide a method for accessing the existing obligation tracking systems and integrate these systems' data into the other components of SIMS.

Implementation: The SIMS will provide an interface to the existing systems through terminal emulation. At this time, it is not known if the terminal emulation will be a full-screen interface (as with the current systems) or an emulation from within the larger SIMS. The advantage of the emulation approach is that it would allow for direct linking of the EPATS, SAM, and DAFIS data into other SIMS components.

3.2.3 Cost Accounting.

Description: As a project progresses, charges against that projects fund are incurred incrementally. Included in these charges are federal personnel expenses, federal travel expenditures, required materials, and contractor bills. It is essential to the projects success that the bills and expenditures are tracked carefully so that a shortfall of funds can be anticipated and resolved.

Requirement: An automated tool for the tracking of project costs is required.

Implementation: The SIMS will provide an automated tool for the tracking of project costs. Included in this tool will be the ability to forecast a budget, track expenses against the budget, predict remaining fund balances, and track actual funds remaining on task. This component will be dynamically linked to the other components within the financial systems, including the obligation component and the budget formulation component.

3.2.4 Budget Formulation.

Description: When a project's execution is mapped out, it is essential that the relevant costs are also considered. For a specific project, several levels of cost can be expected. First, loaded labor costs for both federal and contractor personnel must be calculated. Second, travel and materials must be estimated. Third, other costs connected to the program, including accessing special laboratories, FAA resources, and other expenditures should be calculated.

Requirement: A tool for the estimation of project expense is required.

Implementation: The SIMS will provide an automated tool to estimate project expenses. This tool will provide estimates of all categories listed above, as well as other relevant expenditures. The tool should also be capable of assessing "what-if" scenarios for changes in schedule and budget.

3.2.5 Mission Need Statements (MNS).

Description: Mission Need Statements (MNS) are formal documents used within the FAA to set funding priorities for R&D monies. The MNS process is administered by the R&D Service (ARD). The MNS links planned FAA research projects to long-range needs within FAA operational services. This includes air traffic, airway facilities, and flight standards. Sponsors within these organizations identify and set research priorities that are then translated into specific research projects (see *Research Project Initiatives* below).

Starting with fiscal year 1995, only projects that are linked to approved MNSs can be sponsored with RE&D funding. Research programs may still be funded using Operations or Facilities and Equipment monies, but these programs generally are not the long range research that ACA performs. MNS priorities are re-assessed annually. New MNS statements can be issued by the sponsoring organization as research needs change. At the MNS level, the specific research performing organization is not identified. However, the ACA organization assumes the role of the performing organization.

MNS tracking bridges both the financial and programmatic subsystems. The major goal of the MNS is to establish a general research area and appropriate funding for that MNS. The MNS is then operationalized by Research Project Initiatives (RPIs).

Requirement: In addition to data contained within the MNS, the MNS tracking component should include information on the status of related RPIs, data on the status of approval of new or altered MNSs, and the levels of funding committed against the MNS.

Implementation: The MNS component will track the MNS initiation and revision process. In addition, pertinent financial and programmatic details will be linked to the MNS component. Information will be available in a textual and graphical presentation.

3.2.6 Research Project Initiatives (RPIs).

Description: RPIs are the operational side of the research funding package. Each RPI is linked to a parent MNS, usually several RPIs are grouped together. The RPI specifies more completely how a specific research project is to be accomplished, and includes information on sub-tasks and deliverables. In addition, the RPI breaks out funding for federal and contractor personnel, specialized research equipment, and government travel monies.

Included in an RPI is the name of the ACA research project manager. This project manager supervises all research that is performed under the RPI. Within ACA, there can be one or more ACA tasks that correspond to each RPI project. For example, an RPI project may have funding for $1 million. The ACA project manager may decide however, to divide the work between two contractors each receiving $500,000, each contractor will perform a different task of the RPI. In this way, the ACA staff can make the best use of available resources.

Requirement: Tracking RPIs bridge the financial and the project information components. For a specific RPI, information about the parent MNS and any associated RPIs should be provided. In addition, any ACA tasks that are pursued out of the RPI should be provided. For each task, issues related to funding, schedule, deliverables, points of contacts, and significant issues should be available.

Implementation: The RPI component will track the RPI initiation and revision process. Specific RPIs will be linked to the parent MNS information present in the MMS component. In addition, pertinent financial and programmatic details will be linked to the RPI component. Information will be available in a textual and graphical presentation.

3.2.7 RE&D Plan.

Description: The FAA's RE&D Plan is issued annually and summarizes the content of the MNS and RPIs for each program. With use of the new MNS system for fiscal year 1995, the flavor of the RE&D plan may change.

The plan is organized according to the technology areas to be investigated. For example, RE&D plan chapters include Automation, Satellite, and Human Factors technology areas. Some chapters may correspond to the sponsors identified on the MNS; however, several MNS entries may be grouped under a single technology area. The RE&D plan is reviewed by an FAA advisory committee to ensure that the long-range research is not redundant to work sponsored by other agencies.

Funding from Congress is based on the line items derived from the RE&D plan. Therefore, tracking the plan in relation to its budget sources as well as the appropriate MNS and RPIs is essential to long-range planning.

Requirement: Besides having the text of the plan in electronic format for retrieval, the ability tc link the technology chapters of the plan to the MNS and RPIs is needed.

Implementation: The RE&D component will track the RE&D initiation and revision process. Sections in the RE&D chapter will be linked to pertinent MNS and RPI components. In addition, pertinent financial and programmatic details will be linked to the RE&D component. Information will be available in a textual and graphical presentation.

3.2.8 Congressional Questions and Answers.

Description: The ACA organization regularly receives questions from members of Congress, congressional committees, or monitoring agencies like the General Accounting Office regarding the programmatic, technical, or financial status of projects. Responses to these inquiries are of highest priority since the responses may affect future directions or funding for research.

Requirement: A system for tracking the congressional inquiry, the assigned duty or action, the schedule for the response, the actual response, and any additional follow-up is required. This system should allow ACA managers to summarize responses for the Technical Center and FAA use, and to use the question process to plan future research needs.

Implementation: The SIMS will provide a series of fields for inputting congressional inquiries, assigning responsibilities, transmitting these responsibilities via the network or electronic messaging, and coordinating the responses. The component will be linked to pertinent additional data.

3.3 CONTRACT INFORMATION SYSTEM.

3.3.1 Contracts Tracking.

Description: The major source of technical work on projects is through the use of contractors. For the most part, the contractors used by ACA are companies which specialize in providing engineering services to different customers. These firms have established bidding, accounting, and program management processes which are required to interface with the federal government's procurement system. In addition, other non-profit organizations and individuals may be awarded technical contracts, but these contracts are standard with those of the larger companies.

Contracts can be put in place through a variety of methods. The most common approach is to award a large engineering support services contract in which a variety of technical specialties and skills are covered. Once a major contract is awarded, additional tasking can be awarded to the contractor through Statements of Work which are put against the contract. A range of other funding and programmatic steps can also be put through the support services contract, including funding contractor's materials purchase, travel, and specialized consultant services.

Requirement: The SIMS shall provide an electronic system for tracking the addition, modification, and status of the various tasks covered under a specific contract.

Implementation: The SIMS will allow for a unified presentation of relevant contractual information for a specific task, including the contract vehicle, the statement of work, deliverables required and received, and the lead contractor personnel. In addition, linkage between the contractor task and the parent RPI and MNS will be maintained.

3.3.2 Grants Tracking.

Description: Grants to universities and other organizations are increasing in stature in the FAA research and development system. The Aviation Security Improvement Act gave the FAA the authority to give grants to universities and profit or non-profit organizations. ACA is the only organization in the FAA to give grants to profit organizations. In particular, the establishment of FAA Centers of Excellence has increased the research potential of grants. Grants are direct funding vehicles that provide resources to perform general research in a specified area. The grant sponsor (ACA) and the organization, mutually decide upon the research area. The key to the grant process is that funding is turned over to the organization, and subsequent program control is accomplished within the organization.

Within the FAA environment there are offices established to administer the grant process, both at the national and Technical Center level. These offices monitor and handle funding issues, provide guidance to the grant university/organization, and coordinate with the FAA technical monitors. Standard financial and program information is available in a computerized format, with copies of the applicable data files currently forwarded to ACA for tracking. Besides financial information, information about principal investigators, status of loaned equipment, and coordination of project requirements should be available within a unified presentation. The grant information currently exists within a PC data base, and files are sent to ACA in response to requests.

Requirement: The SIMS shall provide direct access to the grant data resident on Technical Center computers in a read-only mode. Once accessed, the data will be available to other components of SIMS; however, the SIMS system will not be able to directly alter the data on the parent computer system.

Implementation: The SIMS will either access these data files directly or will download the files to the local ACA LAN for processing.

3.3.3 SBIR Tracking.

Description: The Small Business Innovative Research (SBIR) program is formally administered through the Technical Center's Small Business Office (ACL-1). This program provides research funding to small and disadvantaged businesses for the development of technologies specific to the needs of the sponsoring organization. For example, the Aviation Security R&D Service may require the development of a specialized sensor for measuring the effects of an explosion detonation, and a SBIR will be issued to find a small business for the development.

The SBIR process consists of multiple stages. First, the agency, ACA, decides that a long-range research program is needed to develop a specific product or capability, and that the scope of the program would be beneficial as an SBIR. With the coordination of the Technical Center and the FAA Small Business programs, the SBIR proposal request is issued and subsequent proposals are received. Next, the proposals are evaluated according to their merits and the capabilities of each firm to accomplish the work within the time and budgetary limits. Once awarded, the SBIR then enters a research phase. Usually, an SBIR project will consist of three phases: an initial problem definition phase, a prototype development phase, and a full-scale production and commercialization phase. By definition, the SBIR program limits the funding levels and duration of each task. An SBIR project; however, will progress similarly to the more general internal and contractual projects.

Currently, the Small Business office at the Technical Center tracks the progress of all Technical Center SBIRs. In terms of the ACA environment, it is desirable to have access to the data internally.

Requirement: In addition to the financial and SBIR stage information available from the Small Business Office, the following should be available within a unified presentation: information regarding principal investigators, status of loaned equipment, coordination of project requirements, and the commercialization of Phase 3 SBIR projects.

Implementation: The SIMS will download and incorporate data available from the SBIR office into a unified presentation, incorporating ACA specific data into the presentation. This data will be available in both a textual and graphical format.

3.3.4 Interagency Agreement.

Description: Interagency agreements are formal documents that establish project and financial linkages between the FAA Aviation Security R&D Service and other government agencies. Agencies that could be included are: National Aeronautics and Space Administration (NASA), the Bureau of Customs, the Federal Bureau of Investigation (FBI), the Central Intelligence Agency (CIA), the Defense Intelligence Agency (DIA), and Department of Defense (DoD) organizations.

There are two essential ingredients to these agreements. First, a programmatic relationship is formed to accomplish the work for a given task. In turn, a transfer of funds between the government agencies is performed. Essentially, one government agency becomes a contractor to provide research services, subject matter experts, or other project related support. In the ACA environment, an interagency agreement may either transfer funds from the FAA to another agency or receive funds from an external source. In either instance, a process to track the funding and project status is required.

Requirement: A unified presentation of all relevant Interagency Agreement information, including external points of contact, funding sources, project status, and deliverables on the project is required.

Implementation: The SIMS will download and incorporate data available from external budget tracking sources into a unified presentation. In addition, ACA specific data will be able to be input and displayed in this presentation. Currently, supporting data for this process is available across several FAA current systems (SAM, DAFIS, and EPATS). This data will be available in both a textual and graphical format.

3.3.5 Memorandums of Agreement.

Description: Memorandums of Agreements (MOAs) are formal documents that establish project and financial links between internal FAA organizations. In the Aviation Security R&D Service, the MOA provides federal and contractual services to ACA from other organizations. An example of this arrangement is the MOA in effect between the ACA-400, Aviation Security Human Factors Program, and ACD-350, the Advanced Systems Technology Branch at the FAATC. The MOA provides for human factors engineering support to specific programs, and provides funding to ACD-350 for federal and contractual support.

As in Interagency Agreements (Section 3.3.4), the MOA usually consists of two parts. First, a project-oriented relationship is formed, and each organization assumes certain technical responsibilities for the project. Second, a financial commitment for staffing, equipment, or other funding items is formalized. Again, one FAA organization serves as a contracting organization so that the best prepared organization performs the work.

Within the FAA environment, data exists in FAA data bases that can be used to track the progress of the MOAs. In addition, some project related items specifically related to the associated RPI and deliverable tracking, is available from the current program management contractor.

Requirement: A unified presentation of MOA data items, including points of contact, research results, deliverables, and financial monitoring is required.

Implementation: The SIMS will download and incorporate data available from external budget tracking sources into a unified presentation. In addition, ACA specific data will be input and displayed in this presentation. Specifically, financial commitments and monthly expenditure rates can be summarized from several systems, including SAM, DAFIS, and EPATS. This data will be available in both a textual and graphical format.

3.3.6 Memorandums of Understanding.

Description: Memorandums of Understanding (MOUs) are similar to MOAs. They establish a programmatic relationship between two organizations or agencies. Unlike an MOA; however, there is no transfer of funding between the two groups. The purpose of the MOU is to reduce the incidence of redundant efforts within large-scale development programs. For example, both the FAA and NASA receive funding for Air Traffic Control research. An MOU could be enacted between the two agencies to divide responsibility for subsequent research; however, the monies to fund each group would come from their respective organization.

Due to the lack of funding commitment, MOUs are more difficult to track. Reporting progress and deliverables is dependent on voluntary submission of information from one organization to the other. This reporting may be irregular. For projects operating with MOU arrangements; however, it is essential to track progress so that development can be coordinated.

For aspects of programs within the ACA environment, MOU projects can be tracked similar to conventional programs. Funding, contractors, and deliverables can be tracked though existing and planned FAA and local data bases.

Requirement: A unified presentation of MOU data items, including points of contact, research results, deliverables, and financial monitoring is required. It may not be feasible to connect and obtain funding information from external organizations, however, a central depository or display of project items, such as deliverables, schedules, and issues, is an essential component.

Implementation: The SIMS will download and incorporate data available from external budget tracking sources into a unified presentation. In addition, ACA specific data will input and displayed in this presentation. Specifically, financial commitments and monthly expenditure rates can be summarized from several systems, including SAM, DAFIS, and EPATS. Furthermore, since MOU programs are somewhat distributed enterprises, a network based scheduling package for telephone

conferences and meetings would be beneficial. This data will be available in both a textual and graphical format.

3.3.7 International Personnel Agreement.

Description: For the Aviation Security R&D Program, International Personnel Agreements (IPAs) are arrangements that allow for cooperation between friendly nations involved in joint programs. These agreements position people into the research divisions of other countries aviation and security laboratories to provide information about their home country's programs, or to gain an understanding of the host nations programs. By working with these agreements, the friendly nations can develop international guidelines and solutions to aviation security problems.

Requirement: The SIMS should provide the capability to display the status of IPAs, including the personnel and programs affected, start and end dates of assignments and projects, funding linkages, and other relevant information.

Implementation: The SIMS will download and incorporate relevant IPA data from other SIMS components and external data bases. In addition, it will allow for the input and display of ACA and IPA specific data to be incorporated into a unified presentation. This data will be available in both a textual and graphical format.

3.4 PRODUCT INFORMATION SYSTEM.

For each project under development within the Aviation Security R&D Program, it is important that programmatic details, such as schedules, deliverables, and funding are available in a central information display. The collection and display of these data items allow ACA management to be proactive in their resource allocation and project management decisions, provide a summary description of the status of diverse projects, and identify critical areas that require special and immediate attention. This is a requirement for any ACA project, including internal and contractor research, grants, SBIRs, MOAs, and MOUs.

In the sections that follow, specific components of the product information system are discussed. These product related items, although discussed separately, are linked to the cost accounting and funding components discussed above.

3.4.1 Schedule Milestones and Deliverables.

Description: The Technical Center has an ongoing program to maintain project tracking through a computer-based tracking system. The details of project schedule and deliverables for each program, are entered in terms of a work breakdown schedule, an associated Gantt chart, and deliverable list. This technique also allows schedule alterations to reflect funding or staffing changes, activity status notation, and rough budget formulations. The deliverable list includes requirements documents.

Currently, ACA implements Microsoft Project for Windows as its project management platform. A contractor, updates and tracks programs within ACA and distributes paper and electronic copies of the program status to ACA managers.

This system has been adequate to meet the high-level requirements for ACA program management. Furthermore, the same contractor staff is maintaining similar program schedules for other organizations at the FAATC, including ACD, the other major research service. This similarity could be useful to assist with project management external to the ACA framework.

Requirement: The requirement for the product information system is access to these charts and files for data display and comment.

Implementation: The SIMS will access these charts through a dynamic link to the project management software. The data files will be available through either direct connect to the contractor's computers, electronic messaging, or disk transfer. The SIMS will allow for display and comment on the project status without altering the official records maintained by the contractor.

3.5 PERSONNEL SYSTEM.

As outlined above, ACA management responsibilities encompass financial and programmatic issues for Aviation Security research projects. Government personnel must be properly charged against tasking. The personnel subsystem outlines the tools necessary to manage government personnel involved in research projects. Existing computerized systems that are used to track personnel are setup throughout the FAATC. These systems are accessed either through the FAATC's Data General system or the FAATC's administrative LAN. These systems will need to be integrated into the SIMS.

3.5.1 Labor/Skills System.

Description: The FAA and Technical Center currently have a system that is used to track personnel items, including charge codes for programs, vacation and sick hours, and percent utilization of employees. This system is accessed through the Management Information Systems Query and Update (MISQU) system that operates on the FAATC's Data General computer. The ACA managers approve leave requests and labor assignments and forward them to ACA administrative personnel for processing. The labor/skills system is accessed through terminal emulation on computers used by administrative personnel. Through this system, the FAATC can forward information directly into the payroll and accounting offices for the FAA, automating pay and benefit disbursements.

Requirement: The SIMS will provide for access to the personnel systems currently in use by the Technical Center.

Implementation: The SIMS will provide for terminal emulation access to this information, and if possible, access to the personnel utilization data for planning with other planning applications.

3.5.2 Training System.

Description: The FAATC has specialized procedures for the approval and reimbursement for employee training. Included in these training courses are FAA developed courses, such as maintenance for specialized equipment, contractor-supplied on-site courses, such as OATS training for specific software packages, and courses that are off-site, such as LAN administration or specialized software development. All financial approval of these courses is maintained in the training information system on the Data General computer known as TRIMATE. ACA managers approve training for their personnel and provide this approval with the appropriate charge codes to a branch administrator for

entry into the automated system. The administrator enters the information into the Data General system so that the appropriate charges and reimbursements can be issued.

Requirement: The SIMS will provide for access to the training information systems currently in use by the FAATC.

Implementation: The SIMS will provide for terminal emulation access to the training system information, and if possible, access to the training data for planning with other planning applications.

3.5.3 Travel Manager.

Description: The FAATC uses a system for approving and reimbursing official employee travel. The travel requirements and approvals are provided by ACA managers to the branch secretary who then develops the appropriate travel order within Travel Manager. The ACA manager then approves the travel order and the employee can pickup tickets and any travel advance. At the conclusion of the trip, the employee files a travel voucher within Travel Manager and has their manager approve a paper copy of the voucher. This approval is entered into Travel Manager and the FAATC's accounting department issues appropriate reimbursement. By using the system, the FAATC can streamline the travel reimbursement process and track the funds available for government travel.

Requirement: The SIMS will provide access to the existing travel management system.

Implementation: The SIMS will provide an interface to Travel Manager, and if possible, access to the travel information for planning purposes.

3.5.4 Time and Attendance.

Description: ACA employee time charging is managed through the ETAMS. ETAMS is an application resident on the Data General computer for the entry of employee work hours against either valid charge codes, sick codes, vacation codes, or other time charges. The system ensures accurate tracking of employee charges and balances.

Requirement: The SIMS will provide access to the existing time and attendance systems.

Implementation: The SIMS will provide a terminal emulation access to ETAMS, and if possible, access the time charging data for accurate tracking of program expenditures.

3.6 MARKETING INFORMATION SYSTEM.

A critical part of the Aviation Security R&D Program is the distribution of research results to the aviation and security communities. As a federal agency, the FAA does not produce or procure many items such as luggage inspection devices used to enhance security in the aviation system. The technology found through FAA research must be transferred to the user community so that items can be procured by airports or airlines. To help the ACA technology transfer efforts, a comprehensive marketing management system is planned.

3.6.1 Conference Calendars.

Description: An important phase of the Aviation Security R&D Program is the attendance and presentation of papers at worldwide security related conferences. Therefore, a calendar/scheduling utility will be provided to display all conference dates for two years, any ACA or FAA representatives attending these conferences, and other pertinent data. This calendar will present ACA management with an overview of the conference system so that they may position resources strategically for technology transfer purposes. The calendar also will track the amount of funds spent on all conferences.

Requirement: The SIMS will provide access and management of conference sponsorship and attendance.

Implementation: The SIMS will implement the conference calendar component through linkages to other SIMS components and third-part calendar software systems.

3.6.2 Conferences Supported by ACA.

Description: In addition to open forum conferences, the Aviation Security R&D Program supports project or general information oriented meetings. An example of such a meeting would be a seminar on baggage inspection techniques for airport security managers and airline employees. A secondary calendar of ACA supported conferences and meetings will be maintained. Besides the calendars, lists of representatives and attendees will be maintained. By consulting the calendar, ACA managers can identify individuals or organizations who have not been incorporated into previous efforts, or areas where an ACA sponsored meeting would be beneficial. This calendar also can quantify the level of ACA support.

Requirement: The SIMS will provide access and management of conference sponsorship.

Implementation: The SIMS will implement the meeting sponsorship calendar component through linkages to other SIMS components and third-part calendar software systems.

3.6.3 Briefings Information System.

Description: Another important component to the ACA technology transfer mission is briefings for government, airports, and industry representatives. By providing a briefings data base, ACA managers can identify areas for subsequent briefings, revise briefings to address unexpected issues, and maintain an active list of contact persons. Since some information provided in briefings may be classified, this data base will allow ACA to track the distribution of classified information and help ensure secure handling of classified information.

Requirement: The SIMS will provide a system to track FAA and external briefings.

Implementation: A data base containing all current or planned briefings, a list of attendees and their availability for these briefings, and the briefing slides and materials presented will be developed. Also included in the data base will be the date of the briefing, the author, the purpose, and the audience including a list of attendees if available.

3.7 TESTING INFORMATION SYSTEM.

Several ACA research programs involve experimental testing of products either in the laboratory or in the field. The testing information system is a tool for tracking the results of experiments, as well as for scheduling laboratory personnel and resources to support testing.

3.7.1 Test Results (Abstracts, DT&E and OT&E).

Description: To summarize the results of completed and on-going R&D projects, a test results data base will be implemented. This data base will provide the abstract or plans for each experiment, developmental or operational tests, personnel conducting the tests, the test dates, available conclusions from the tests, and other related data. This data base will be linked to the project management systems (*Microsoft Project 3.0*) to provide a comprehensive overview of laboratory and program activities. The test results data base will only store non-classified information. Classified information regarding test results, personnel, and funding levels will be stored in appropriate manners.

Requirement: The SIMS will provide a centralized data base for the storage and access of test results.

Implementation: The SIMS will provide access to test results through links to the data and project reports stored on the LAN. Also included will be links to the test plans for reference. Documents and details will be accessible according to project, RPI, and parent MNS.

3.7.2 Lab Scheduling System.

Description: To adequately manage the laboratory's resources, a lab scheduling system will be implemented. This scheduling system will allow managers to reserve space, equipment, and support for testing. In addition, it will reflect delivery dates for specialized equipment, the presence of contractors and support personnel in the laboratory area, and other test logistics concerns. This system will allow ACA managers to reduce time conflicts for the limited resources in the laboratory.

Requirement: The SIMS will implement a laboratory scheduling system.

Implementation: The laboratory scheduling system will provide a calendar-based overview of the laboratory resource allocation. In addition, dynamic links to other information for projects, RPIs, and parent MNS will be provided. The data will be provided in a textual and graphical presentation.

3.8 PROGRAM SUPPORT SYSTEM.

In addition to the financial, programmatic, and personnel systems described above, several program support systems are used by ACA managers. These systems range from personal writing and office tools, such as word processing, to data bases for tracking personal property and patents. Each of these items are discussed below.

3.8.1 Software Tools.

Description: As part of the modern office environment, there are several tools that the ACA staff uses to enhance productivity. Most of these software applications are provided with the OATS desktop computer as a complete unit. Personal software tools provided with OATS include:

Software Package	Type of Tool
Microsoft Word	Word processing
Microsoft Excel	Spreadsheet
Arts and Letters	Drawing and illustrating package.

Greater detail on the software tools in use by ACA is given in Section 2.1.2.

Requirement: The SIMS should integrate existing and future computer tools for use in the preparation of plans, reports and other documentation.

Implementation: The SIMS will provide links to initiate and edit documents in the formats used by the third party tools. In addition, documents prepared with these tools will be linked throughout the SIMS, and dynamic embedding will be used to update documents based on changing data values.

3.8.2 Threat - Risk Data Base.

Description: Together with the congressional inquiry data base, a data base also will be maintained to track evolving aviation security threats and the technical, procedural, and system interventions being developed to counteract these threats. Threats may be either a specific technical hazard, such as plastic explosives, or may be an entity that poses a threat, such as a radical terrorist group. Details concerning the available interventions will include a description of the technology implemented, stage of development of the technology, scheduled availability, sources, points of contact, and other pertinent data.

Requirement: A threat-risk data base, identifying potential security threats and applicable intervention strategies will be maintained.

Implementation: A data base will be developed to manage security threat background information and intervention information. Status of ongoing research initiatives that support the security interventions will be accessible from the Threat-Risk Component. The nature of this component may require security considerations which exceed those of the SIMS environment, and the implementation must be investigated.

3.8.3 Correspondence Tracking System.

Description: The Aviation Security R&D Program receives and issues large amounts of official correspondence. Currently, a system is in place to track the progression of correspondence through the ACA organization. Of interest to ACA are those items that require a response from the FAA or contractors, particularly to inquiries from government and industry.

Requirement: The SIMS shall provide a correspondence tracking component.

Implementation: It is intended to incorporate the existing correspondence system into the SIMS, and to enhance its capabilities to link specific items to the corresponding Aviation Security R&D Program.

3.8.4 Broad Agency Announcement Tracking System.

Description: The Broad Agency Announcement (BAA) is one vehicle used by the Aviation Security R&D Program to advertise the need for development to industry. Companies will request an information package from ACA and prepare a response. ACA reviews all responses, makes a decision on which papers to fund if any, and uses existing or obtained funding to contract the company for development or services. Information of interest to the BAA tracking process includes: number and descriptions of inquiries received, responses received, proposals received, proposals being revised, proposals under evaluation, proposals not selected for funding, proposals awaiting purchase request, proposals approved with active purchase requests, and contracts awarded. For each proposal received, a tracking process for the evaluation is initiated, and includes the dates or receipt and evaluation, the evaluators and their decisions, and the closure of the proposal to either fund or reject.

Requirement: The SIMS shall provide an automated tool for the management of the BAA process.

Implementation: Currently, the BAA process is administered manually using word processing and other forms. The intent is to further automate this process to include tracking of BAA reviewer tracking, response letters, funded projects, and other pertinent data.

3.8.5 ACA Property Tracking System.

Description: The FAA currently has a system for tracking the personal equipment assigned to each FAA employee. These FAA property lists are maintained at the FAATC level, and include both office automation and laboratory equipment. Within the laboratory environment; however, it is often necessary to lend test equipment to other FAA and contractor personnel. By implementing a computerized tracking system for laboratory equipment, ACA managers can identify pieces of equipment as their use increases.

Requirement: The SIMS shall provide a data base for the management of property lists and laboratory equipment.

Implementation: The property tracking component will import existing FAA property tracking data and provide read-only access to this information. In turn, the information will be copied and augmented for the internal use of ACA.

3.8.6 Patent Tracking System.

Description: One possible outcome from Aviation Security R&D Program research and development is a patentable idea. The patent may be issued to either the federal government or to a company developing a system under contract. In either instance, the application for a patent is a complicated process, involving several key decision points. In addition, the research leading up to the actual filing of the patent must be documented and verified for the uniqueness and ownership of the idea to be recognized.

Requirement: The SIMS shall provide the ability to track the progress of patent applications and product status.

Implementation: The patent tracking component will rely on a data base that identifies the invention or idea to be patented, the holder of the patent, the assignee of the patent (usually the federal government), the status of the patent application, the licensing of the patent rights, and other data regarding the patent. Since the information contained in this system could contain competitive advantage information, use of this system should be restricted to authorized persons.

4. SHORT TERM AND LONG TERM SYSTEM PLANNING.

The short term and long term plans address increased functions, efficiency, speed, heterogeneity, reliability, and maintainability of the hardware and software resources available to ACA. Short term activities are those items that possess a high priority. Long term activities are those items that have lower priority or extended period of performance.

The following activities presented in this section address modifications in the system architecture that incur cost due to the addition of hardware and software. The schedules and costs presented in section 5 of this report only presents those activities up through the analysis and report generation only previous to adding additional hardware. Additional scheduling and costs will be considered based on the results of the analyses.

4.1 SHORT TERM PLANNING.

Short term planning includes those changes in the system configuration required to meet goals in the near term. These changes may include additions or alterations to the system that produce more cost-effective control and management of the projects, address inadequacies in data security, and increase throughput in the current system configuration. Short term changes are of sufficient priority to be implemented in the near time frame and must minimally impact the current system's operation.

The short term plan has identified 11 tasks which are describe in the following subsections. These short term tasks include:

a. Disaster Recovery Plan Update,
b. Incremental and Full Backup of Server Data,
c. Incremental and Full Backup on Workstations,
d. Work Group Storage Areas,
e. Limited Dial-out Communication,
f. Analyze Future Storage Media Technology,
g. Analyze User Data Archive System,
h. Portable Computer LAN Access,
i. Expansion of LAN,
j. Analysis of Movement of Application Software to Server, and
k. Hardware and Software Configuration Management.

4.1.1 Disaster Recovery Plan Update.

The availability and security of data are critical to computer-based operations. A disaster recovery plan must be in place to provide a means of recovering data that has been inadvertently deleted or corrupted. The short term plan includes an analysis of cost trade-offs between backup equipment, administrative costs, and an adequate level of data protection. The disaster recovery plan must contain requirements that address routine incremental and full backup schemes with off-site storage. The backup data must consist of all distributed storage devices (local workstation data as well as server data). Routine changes to software configurations and/or hardware will be accounted for through periodic updates to the disaster recovery plan.

4.1.2 Incremental and Full Backup of Server Data.

The Server Network Operating System (NOS) and common data stored on the server are considered critical due to the fact that any resulting loss or corruption of data would result in the LAN becoming inoperable. Disk mirroring and disk duplexing minimize the chance of corruption by failure of one server's hard drives and/or disk drive controller boards. Disk mirroring and disk duplexing are minimal techniques that address near instantaneous data storage redundancy for limited server hardware failures. These techniques do not address data corruption done by other server hardware failures or day-to-day corruption of data through human error. Depending on the degree of data security sought, an incremental backup strategy can be incorporated. Selective backup of data is performed periodically throughout the day. The short term plan incorporates an automatic incremental daily backup of the server's data. The backup tapes will be removed to an off-site secured facility that is free of physical and electromagnetic environmental contamination.

4.1.3 Incremental and Full Backup on Workstations.

All distributed storage devices should be backed up regularly. Currently, the user is responsible to ensure that critical information is backed up to a floppy disk or transferred onto the server and copied to tape media. User responsibility for workstation backup is successful to some extent; however, a formal, consistent method of data backup on workstations is needed. The short term plan incorporates an incremental backup of user data on a daily basis. Full local hard drive backup will be performed weekly. Both the incremental and the full backup schemes will be implemented using the network backbone as a communication media.

4.1.4 Work Group Storage Areas.

ACA's programs would benefit by allowing users who access specific programs, the ability to exchange information in common storage areas on the file server. These common storage areas are more conventionally called work group storage areas by the NOS. Users common to a program would have access to store, copy, and edit information provided to the work group storage area by other users. This would allow text available in current reports to be used in the development of new reports. The short term plan incorporates the assignment of work group storage areas on the file server for each program in ACA. Users common to each program will be assigned rights to view, edit, and copy information in these storage areas.

4.1.5 Limited Dial-Out Communication.

Electronic communication requiring shared modem and FAX resources to outside sites can be performed by using an Asynchronous Communications Server (ACS). The ACS transfers data from LAN users to telephone lines. The ACS attaches to the LAN as a dedicated device. It contains communication cards that allow users to share the multiple modem and FAX resources. The short term plan incorporates an ACS that supports two telephone lines for dial-out only. Additional telephone lines with dial-in capabilities will be provided in the long term plan once security issues are addressed.

4.1.6 Analyze Future Storage Media Technology.

High volume computer storage is becoming an integral part of LANs. Currently high volume systems include CD devices, Write Once Read Many (WORM) devices, and Write Many Read Many devices. These systems can be incorporated onto a LAN alone or in combination. These devices are critical for future data exchange. The short term plan will incorporate an analysis that presents trade-offs into current high storage data devices for the ACA LAN.

4.1.7 Analyze User Data Archive System.

Data archive systems are used to control the amount of available data space on hard disk storage devices. Data that is not required for extended periods of time may be extracted from hard drives and placed onto archive data tapes. Archiving systems also may be used for data transfer to off-site facilities. Data archiving operations should be performed by the LAN administrator as well as the users without disruption of the LAN backup system. The short term plan will incorporate a data archiving system that connects to the LAN. This system will allow users, as needed, to archive and extract data to and from their local hard drives and from selected work group storage areas located on the file server. Analysis will be performed to determine the amount of data to be archived, the age of the data, and how often the data will be retrieved.

4.1.8 Portable Computer LAN Access.

Portable computers require access to the LAN for printing capabilities, data transfer, and backup. The Security R&D personnel travel constantly and require portable computers to perform many tasks away from the ACA building. The necessity to use portable computing sources during travel most likely will increase. The short term plan will incorporate Network Interface Cards (NIC) and/or network interface software for access through the parallel port in laptop computers. Access points to the LAN will also be made available throughout the ACA facility.

4.1.9 Expansion of LAN.

Expansion of the LAN throughout the ACA building is provided for future access of personnel and equipment. The lab area has only one room that has access to the LAN. This room will be modified to include additional COFOTs and bus topologies. These modifications will present a standard configuration that would allow additional workstations. This standard topology will be incorporated into each additional lab. The short term plan will incorporate a standard LAN configuration into each lab. Also an analysis will be performed to study the need for additional expansion into other areas of the ACA facility. At the end of this analysis, modifications for additional access to the LAN will be performed.

4.1.10 Analysis of Movement of Application Software to Server.

Application software must be centrally administered and controlled for ease of updates and modifications for application software templates. Software is continually being modified to include new features and corrections to previous versions. Having many types of application software distributed across a LAN increases the workload of administering upgrades and software patches. Except for specific software packages, like the Graphical User Interface (GUI), most packages are more efficiently administered on the server. Most application software provides standard templates or forms

that may be standardized for ACA use. The short term plan moves the application software to the file server. A cost trade-off analysis will be performed to study measures required to insure that application software is readily available, other hardware performance issues, and the cost of administering distributed software.

4.1.11 Hardware and Software Configuration Management.

Hardware and software configuration management is required in an MIS environment. Configuration management will be performed to address hardware and software updates and incompatibilities. Hardware incompatibilities and software bugs exist to a limited extent on all IS. Most hardware incompatibilities and software bugs can be corrected by contacting the hardware or software manufacturer and downloading software in the form of a patch. These patches are then loaded on the system to address the specific hardware or software problem. Since incompatibilities arise as any software update is installed, addressing incompatibility issues remain to be a continual process. The short term plan identifies and then corrects key user specific problems with hardware or software. A tracking system will be developed to maintain accurate accounts of both hardware and software.

4.2 LONG TERM PLANNING.

Long term planning includes those changes in the system configuration required to meet goals in excess of six months. These changes, like short term goals, may include additions or alterations to the systems that produce more cost effective control and management of projects, and address inadequacies in data security and throughput in the current system configuration. Requirements for the MIS change in response to maturing, re-defining, and re-focusing of ACA's goals. These new requirements reflect an increase in ACA's workload and the need for an efficient, responsive, and adaptable MIS. Many of ACA's long term goals and new requirements imposed on the MIS must take advantage of available information and increased functionality and efficiency offered by technologies on the horizon. Long term planning must minimally address evolving requirements and low priority goals that require substantial cost or modification of the current system configuration.

The long term plan has identified 14 tasks which are describe in the following subsections. These long term tasks include:

a. Development and Incorporation of the SIMS,
b. Assignment and Training of Work Group Managers,
c. Scheduled Disaster Recovery Plan Updates
d Integration of UNIX Platforms,
e. Automatic Server Archiving of Aged Data,
f. Secured LAN,
g. Additional Dial-Out on the Asynchronous Communication Server,
h. Dial-In on the Asynchronous Communication Server,
i. Secured Telecommunications,
j. MIS Fault Tolerance and Workload Analysis,
k. Document and Photo Imaging,
l. Access to the National Information Highway, and
m. Video and Voice Communications.

4.2.1 Development and Incorporation of the SIMS.

Information about all non-classified ACA functions will be provided through a distributed relational data base that automatically updates information coming from internal and external information systems facilities. Data will be gathered on a scheduled basis from internal and external information systems facilities. A time tag will indicate data latency. External data will be transferred to Meta-Data information data bases at specific locations throughout the ACA facility. This information will be consolidated with internal ACA facility data that also is time tagged. The Meta-Data information data bases will be developed to address the functional concerns of:

a. Financial and Planning System,
b. Contract Information System,
c. Product Information System,
d. Personnel System,
e. Marketing System,
f. Testing System, and
g. Program Support System.

Access to these data bases will be controlled by selected data base managers. The distributed nature of the Meta-Data information data bases will limit communication loading across the network backbone. Those personnel who access specific data bases repeatedly will be near the data base hardware with routers limiting network communication traffic. The long term plan includes an analysis of the communication loading on the network. This analysis will include the effects of selected routing of communication signals to the distributed data base components. The analysis will study data availability and data latency for external facilities. Once all information channels have been established, the SIMS will be developed and incorporated into the ACA facility. The analysis tools used to accomplish this, will be retained for future analysis during the evolution and upgrades to the MIS.

4.2.2 Assignment and Training of Work Group Managers.

The NOS provides many features that allow delegation of management and access control for work group common storage areas. This function is important since work groups may want to administer their common storage area on the file server. The assignment of LAN work group managers provides a method that allows the network administrator to sanction network management functions to selected work group managers. The work group managers control user access and space restrictions within the work group storage area. The long term plan incorporates the allocation work group managers for ACA's four program areas. Training for the work group managers will include key concepts to effectively manage a select group of users to a common storage area.

4.2.3 Scheduled Disaster Recovery Plan Updates.

The disaster recovery plan must be kept current with any changes to the information system. The disaster recovery plan will require scheduled updates to make sure that the plan accounts for the latest configuration of hardware and software on the system. The long term plan incorporates an update to the disaster recovery plan every 60 days.

4.2.4 Integration of UNIX Platforms.

Integration of ACA's UNIX platforms into the LAN environment will allow UNIX access to additional users. This access will allow sharing of printers, and will provide execution of UNIX applications through a PC based X window system. A multiple protocol gateway will allow the UNIX file system to be mounted to the LAN NOS. Mounting the UNIX file system would provide data exchange to and from the LAN NOS. The long term plan includes the addition of a communication gateway to allow exchange of TCP/IP and IPX protocols and installation of X windows terminal software on selected PCs.

4.2.5 Automatic Server Archiving of Aged Data.

The use of the server's storage for common work group data will require periodic removal or archiving of old data. These files will be archived to tape when the files are not used for a predefined period. The long term plan incorporates an automated archiving and librarian system that moves and tracks files from selected work group areas of the server's hard drive.

4.2.6 Secured LAN.

Classified processing of data is performed in ACA's facility. Classified processing of data requires limited access and control that conforms to the Defense Investigating Service (DIS) protocol. Classified data must be controlled by tracking access and copies of data. As an electronic form of information, it is susceptible to phenomena that causes data corruption on the classified disk media. The classified data still requires archiving for data protection. ACA's quantity of classified information will increase. This information must be tracked and archived. The long term plan will incorporate a small classified LAN that will be contained in a secured area. The secured LAN will contain several workstations, a printer, archiving capabilities and classified tape storage facilities to support classified processing of data.

4.2.7 Additional Dial-Out on the Asynchronous Communication Server.

Communication to outside sites in the long term may require increased telephone line use and bandwidth. User demands as well as long term goals of ACA will be revisited to consider modifications to the ACS. These modifications will include adopting and using the increased bandwidth offered by newer telecommunication technology services. The long term plan incorporates a study to determine user demand for the number of telephone lines and user bandwidth requirements. When the study is complete, modifications to the ACS will be performed.

4.2.8 Dial-In on the Asynchronous Communication Server.

Access to Email and data stored on the server, will require libraries and local hard drives for remote computing. The long term plan incorporates an analysis of security related issues relating LAN access from external sites. A separate analysis must be performed to determine user demand and bandwidth for remote access. The ACS will be modified to include dial-in functionality to satisfy the recommendations of the analysis.

4.2.9 Secured Telecommunications.

Secured transmission of data to and from other secured sites will be required to support ACA's functions. This connection will require Communication Security (COMSEC) clearance and connection to the secured LAN. The long term plan will incorporate secured data connections between the secured LAN and other secured facilities.

4.2.10 MIS Fault Tolerance and Workload Analysis.

Distributing processing functionality across the LAN spreads out the workload, decreases overall communication loads, and decreases the likelihood of a single point failure corrupting the entire network. An integrated data base that addresses all functions of an organization will be overburdened due to the large number of users and communication traffic across the network. The performance of this system would be very slow. Segmenting the data bases and the LAN into a distributed architecture will reduce the data base and the overall LAN communication load. The segmentation process also will allow sections of the network to operate in a constrained mode if sections of the LAN are off-line. The long term plan includes a trade-off analysis to consider cost of additional hardware, level of fault tolerance, throughput and reliability of the data base system, and impact on the LAN communication loading. The tools used for the analysis will be retained for future evolution and upgrades to the LAN.

4.2.11 Document and Photo Imaging.

Work flow techniques integrate text, graphic, and photograph data into an electronic format. To support work flow practices, electronic imaging systems are being incorporated into many information systems. Images that are converted to an electronic format are easily stored, duplicated, transferred, and used for report generation. The average size of an electronically scanned image is about 50,000 bytes. A data base of images can quickly affect the LAN's storage requirements. For the most part, scanning and storing the initial images across a high speed LAN does not affect the overall performance of the network. The access of these graphic images by the users and the transmission of document files containing these images across the LAN; however, may affect the overall network operations substantially. The long term plan includes the incorporation of electronic scanners and development of an electronic imaging library. An analysis of the LAN communication and electronic storage capabilities will be required. After the analysis effort, modifications to the LAN architecture will be implemented.

4.2.12 Access to the National Information Highway.

The United States is in the process of upgrading a large National Information Highway that will serve as research and educational institutions. The National Information Highway would provide access to state-of-the-art resources that would benefit from research performed at ACA. At this time, test beds are being used to access communication loading. The long term plan will incorporate the National Information Highway access to all users of the ACA facility.

4.2.13 Video and Voice Communications.

Long term planning must incorporate many new technologies that are being investigated currently. One of the main movements in the computer industry is incorporation of the Work Flow Theory. Work Flow Theory incorporates the use of video and voice communications to enhance productivity. People

on the same LAN as well as remote systems can view, edit, and converse in real-time about the contents of text reports and graphics. Televideo conferencing features are being incorporated as a standard practice in many of these systems. The incorporation of video and voice communications into the LAN requires use of standards that are still being defined. Analysis of the most applicable and cost-effective solutions for increased work flow must be undertaken. Alteration of the current LAN architecture to increase the producability and fault tolerance must include the possibility of future video and voice technology. The long term plan will incorporate an analysis effort to determine the cost and productivity trade-offs of incorporating video and voice capabilities.

5. PLANNED SCHEDULES.

This section present the schedules projected to implement the short and long term activities for the IRMP. The short term planning for LAN related activities are addressed in figure 5.-1. The long term planning is segregated into two separate charts. Figure 5.-2 illustrates the overall long term tasking effort. The SIMS project is displayed at a summary level in this figure. Since the SIMS project will be instrumental in the development of the ACA IS environment, the related activities are presented separately in figures 5.-3 through 5.-8.

The SIMS development will be broken down into six modules. Table 5.-1 illustrates the systems and corresponding subsystems that will be developed within each module. As illustrated in the table, each module is made up of subsystems from different SIMS systems. The two criteria used for selecting the order of development of each subsystem are:

a. The estimated level of effort required, and
b. Priority.

The level of effort and the priority range from low, medium, to high, with the priority rating being more heavily weighted. Therefore, the first subsystems planned to be developed are those with an estimated low level of effort and a high priority. All subsystems were then grouped into reasonably sized modules to allow for a flexible development schedule which would meet both the mission and budget constraints of ACA. There are a total of six modules.

The resources needed to pursue this effort can be found in Attachment A, Information Resource Management Plan - Resource Estimates.

TABLE 5.-1 SIMS DEVELOPMENT MODULES

MODULE	SYSTEM	SUBSYSTEM
1	FINANCIAL AND PLANNING SYSTEM	CONGRESSIONAL Q&A'S
	FINANCIAL AND PLANNING SYSTEM	BUDGET SYSTEM
	PROGRAM SUPPORT SYSTEM	THREAT-RISK DATA BASE
	PROGRAM SUPPORT SYSTEM	BROAD AGENCY ANNOUNCEMENT
2	FINANCIAL AND PLANNING SYSTEM	OBLIGATION ALLOCATION TRACKING
	FINANCIAL AND PLANNING SYSTEM	COST ACCOUNTING
	FINANCIAL AND PLANNING SYSTEM	BUDGET FORMULATION
	FINANCIAL AND PLANNING SYSTEM	MISSION NEEDS STATEMENT (MNS)
	FINANCIAL AND PLANNING SYSTEM	RESEARCH PROJECT INITIATIVE (RPI)
	FINANCIAL AND PLANNING SYSTEM	REQUIREMENTS DOCUMENTS
3	CONTRACT INFORMATION SYSTEM	CONTRACTS TRACKING
	CONTRACT INFORMATION SYSTEM	GRANTS TRACKING
	CONTRACT INFORMATION SYSTEM	SBIR TRACKING
	MARKETING INFORMATION SYSTEM	CONFERENCE CALENDARS
	MARKETING INFORMATION SYSTEM	CONFERENCES SUPPORTED BY ACA
4	FINANCIAL AND PLANNING SYSTEM	RE&D PLAN
	PRODUCT INFORMATION SYSTEM	DELIVERABLES
	MARKETING INFORMATION SYSTEM	BRIEFING INFORMATION SYSTEM
	PRODUCT INFORMATION SYSTEM	SCHEDULE MILESTONES
5	CONTRACT INFORMATION SYSTEM	INTERAGENCY AGREEMENT
	CONTRACT INFORMATION SYSTEM	MEMORANDUMS OF AGREEMENT
	CONTRACT INFORMATION SYSTEM	MEMORANDUMS OF UNDERSTANDING
	CONTRACT INFORMATION SYSTEM	INTERNATIONAL PERSONNEL AGREEMENT
	TESTING INFORMATION SYSTEM	TEST RESULTS (ABSTRACTS, DT&E, AND OT&E
	TESTING INFORMATION SYSTEM	LAB SCHEDULING SYSTEM
	PROGRAM SUPPORT SYSTEM	SOFTWARE TOOLS
6	PROGRAM SUPPORT SYSTEM	PATENT TRACKING SYSTEM
	PERSONNEL SYSTEM	LABOR/SKILLS SYSTEM
	PERSONNEL SYSTEM	TRAINING SYSTEM
	PERSONNEL SYSTEM	TRAVEL MANAGER
	PERSONNEL SYSTEM	TIME AND ATTENDANCE
	PROGRAM SUPPORT SYSTEM	CORRESPONDENCE TRACKING SYSTEM
	PROGRAM SUPPORT SYSTEM	ACA PROPERTY TRACKING SYSTEM

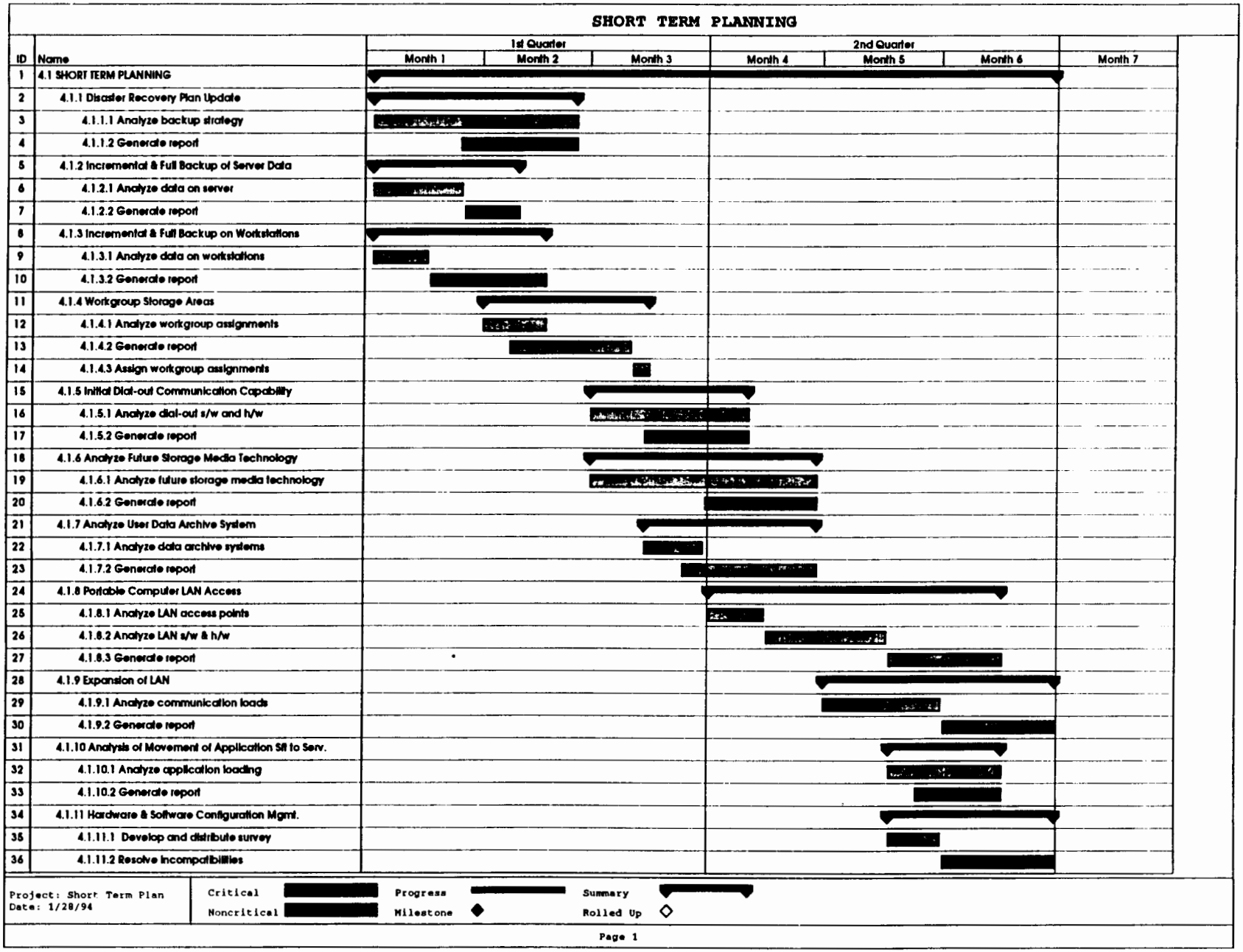

FIGURE 5.-1 SHORT TERM PLANNING

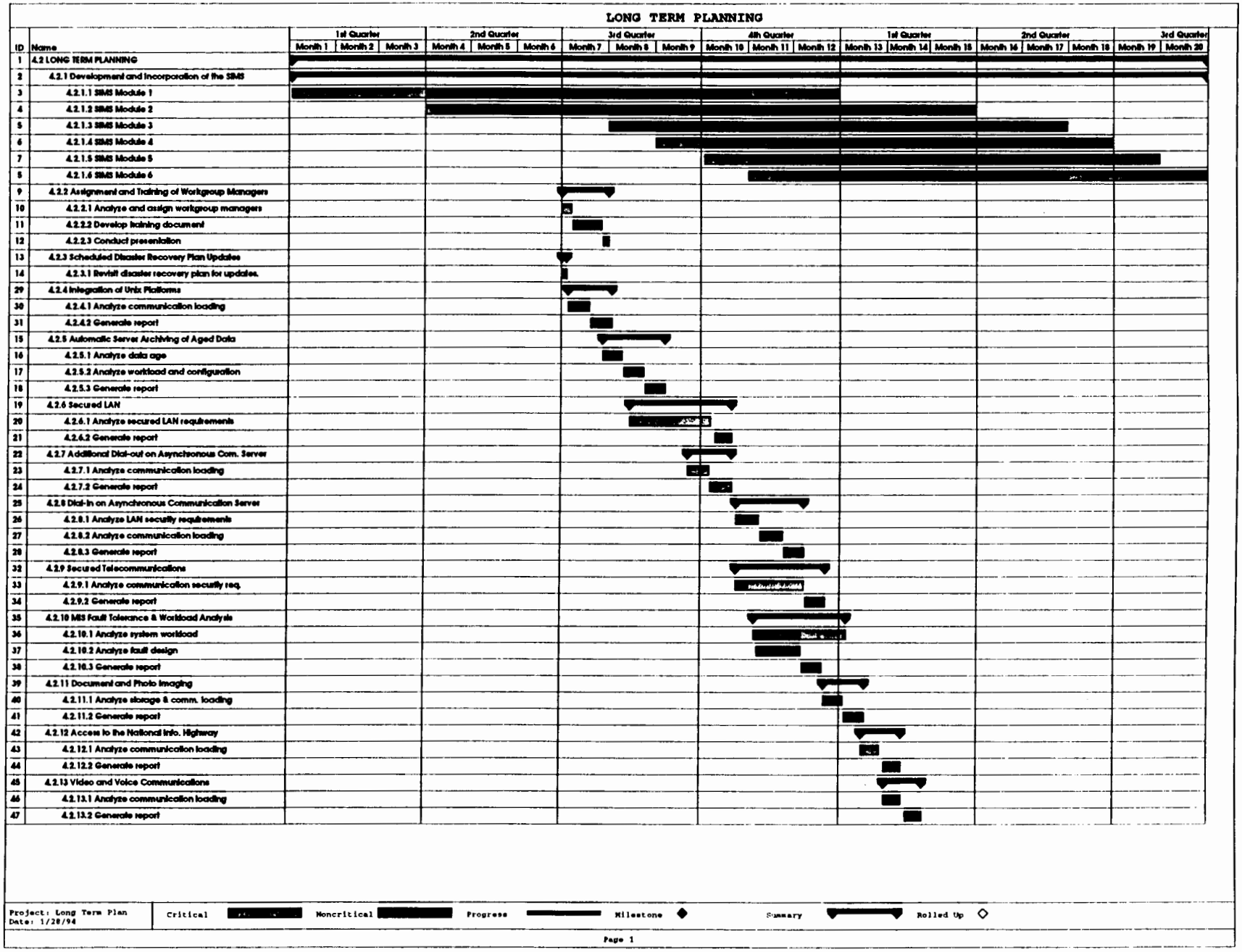

FIGURE 5.-2 LONG TERM PLANNING

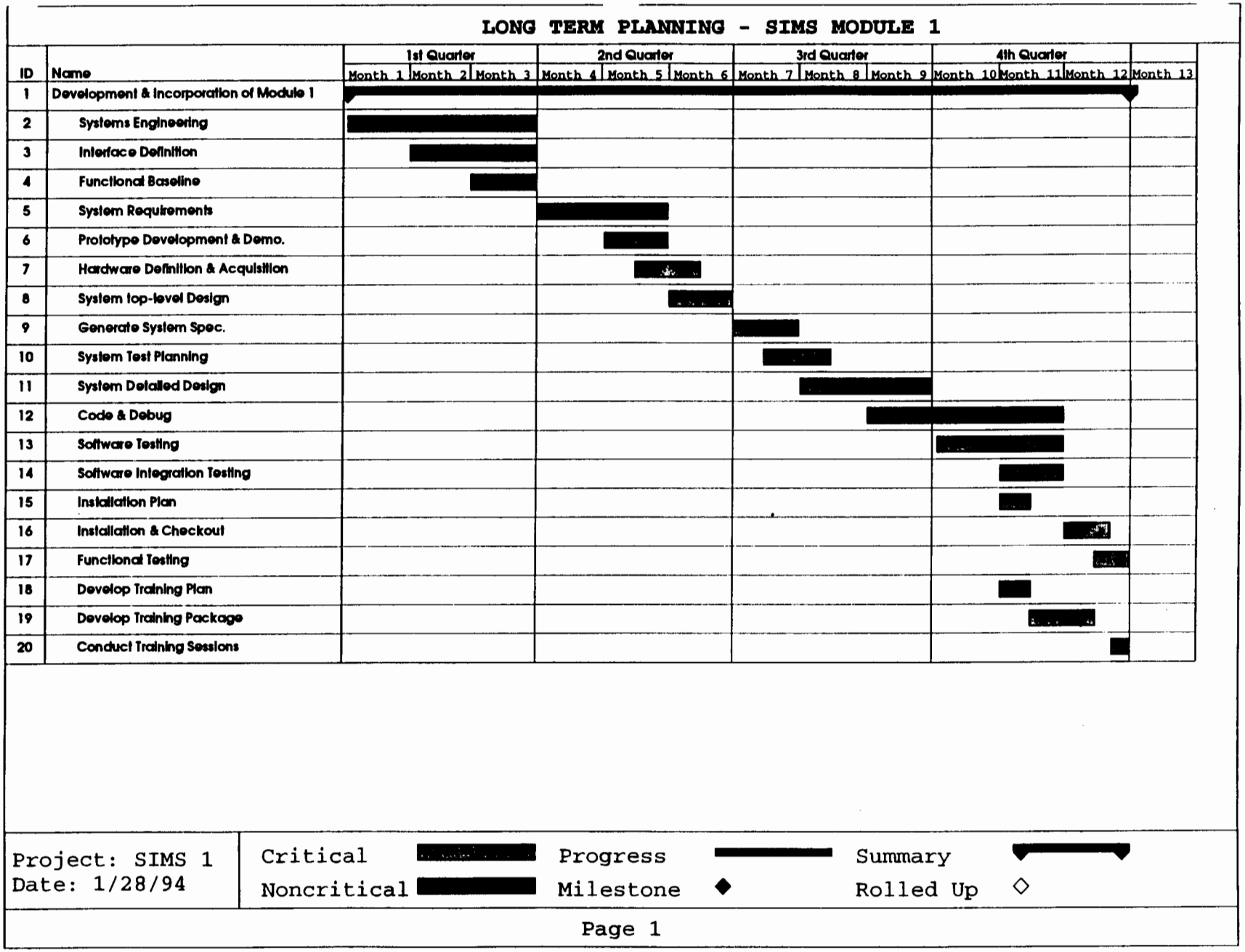

FIGURE 5.-3 LONG TERM PLANNING - SIMS MODULE 1

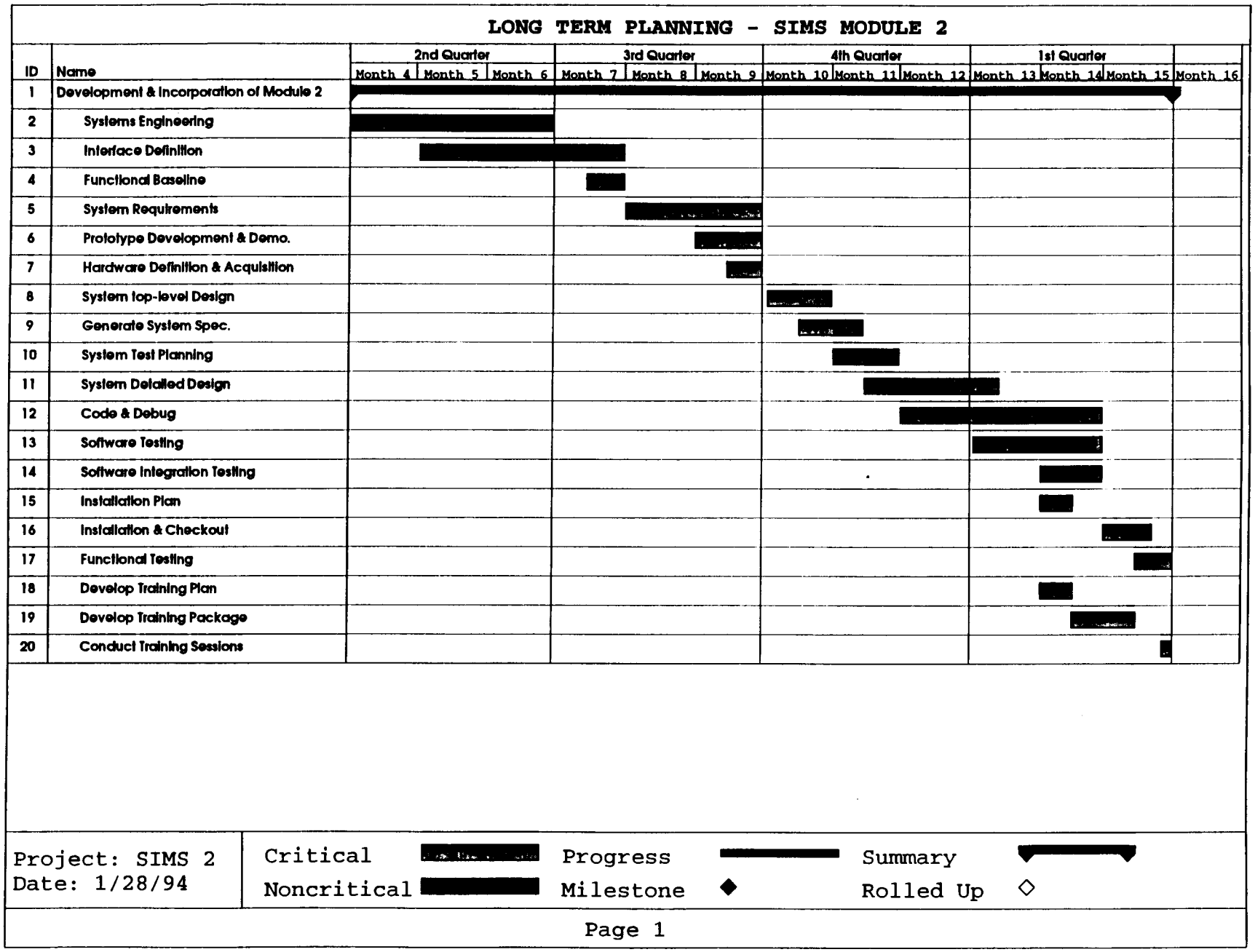

FIGURE 5.-4 LONG TERM PLANNING - SIMS MODULE 2

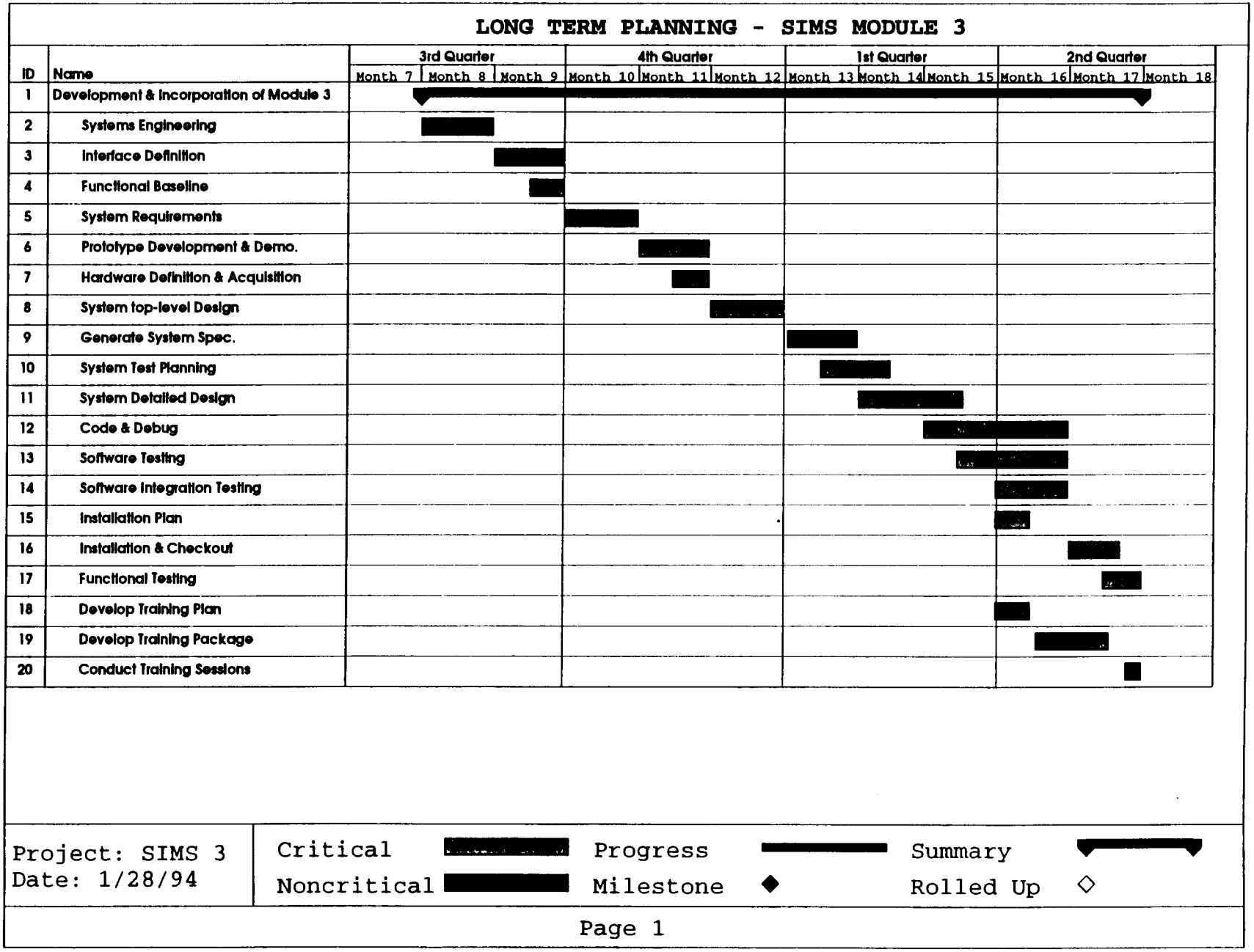

FIGURE 5.-5 LONG TERM PLANNING - SIMS MODULE 3

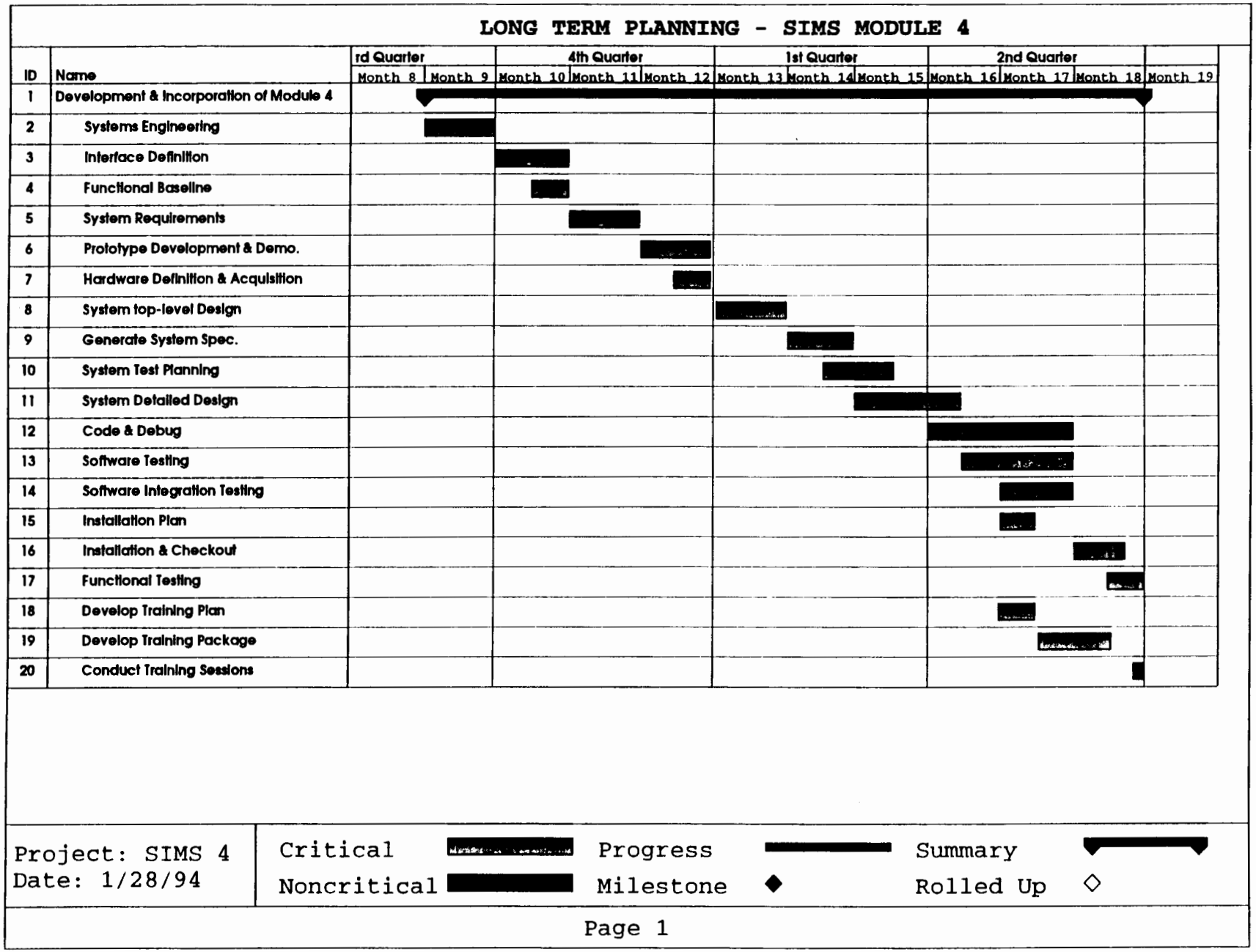

FIGURE 5.-6 LONG TERM PLANNING - SIMS MODULE 4

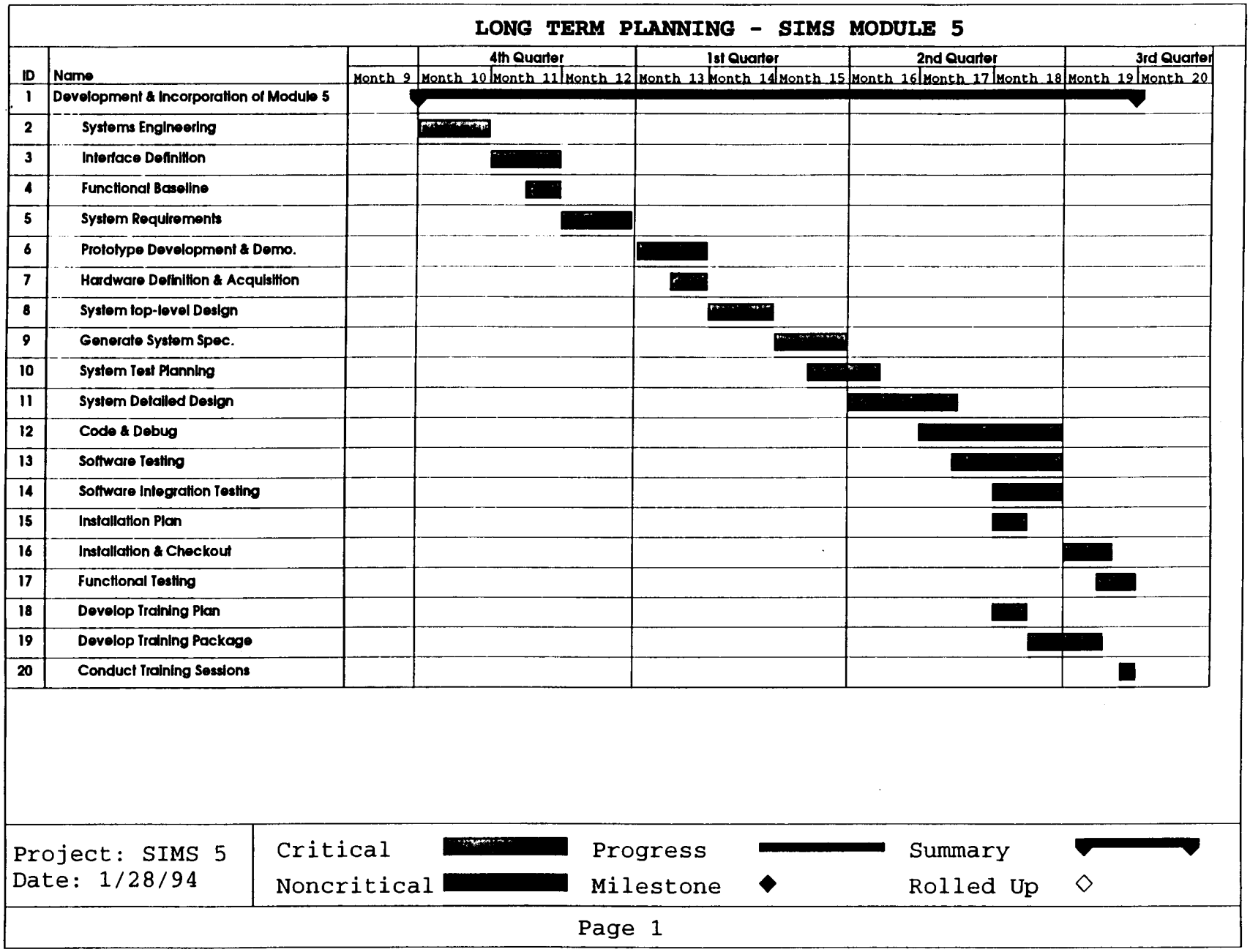

FIGURE 5.-7 LONG TERM PLANNING - SIMS MODULE 5

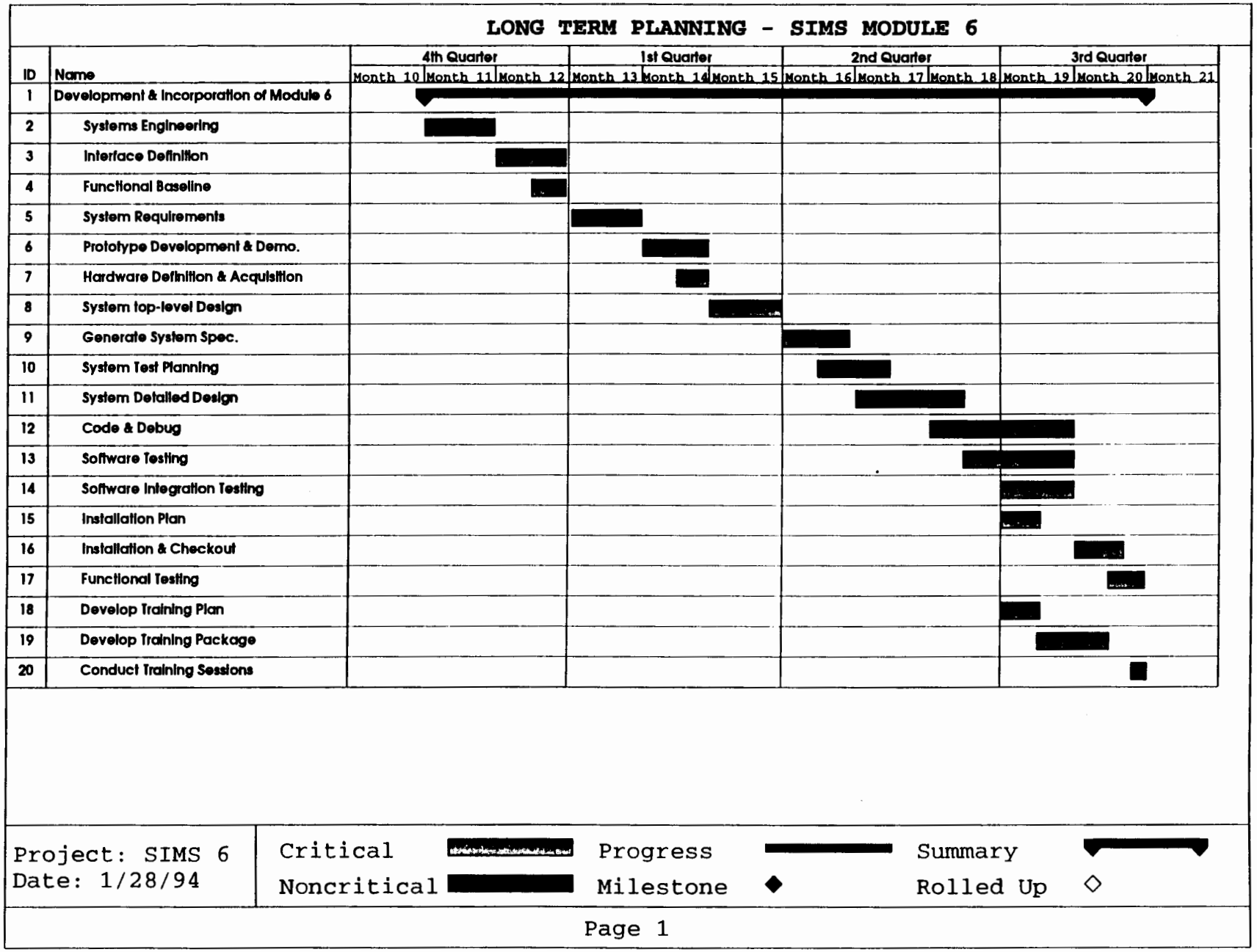

FIGURE 5.-8 LONG TERM PLANNING - SIMS MODULE 6