Logistics Management Institute

USAF Personnel Plans, Programs, and Policy Management Information System
Functional Requirements Definition

AF708T1

April 1998

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Contents

Appendix A Interviews and Attendees

Appendix B Bibliography for Key Labor and Economic Indicators

Appendix C Resource Listing for Personnel Plans, Programs, and Policy Development

Appendix D Abbreviations

TABLES

Chapter 1
Introduction

OBJECTIVE

The objective of this study is to provide the Air Force Personnel Operations Agency, Analysis Division (AFPOA/DPY) with a single source personnel plans, programs, and policy management information system (P4MIS) to support decision-makers and policy analysts in assessing the impact of plans, programs, policy, and political and economic changes on Air Force personnel.

The objectives of the P4MIS are as follows:

- ◆ Enhance the development of personnel plans, programs, and policy

    - ➤ making more informed and timely decisions by not having to "reinvent the wheel" and

    - ➤ providing more robust analysis by drawing from lessons learned.

- ◆ Resolve issues and answer recurring questions in a more timely manner.

- ◆ Identify future workforce and policy problem areas.

- ◆ Provide an automated "lessons learned" repository and corporate memory.

- ◆ Serve as a training tool for new staff members.

The objective of this report is to define the system's functional requirements. The requirements must be sufficiently detailed so that an initial prototype can be built. The initial prototype will be used to better assess ultimate requirements and is included as a phase I deliverable. Follow-on research and analysis will result in a more detailed system design.

REPORT STRUCTURE

Chapter 1 defines the problem in more detail and outlines the scope and approach of this study. Chapter 2 describes the required operating environment and key terms used to establish the system's requirements. Chapter 3 identifies the system's operating characteristics and functional definition, including relationships between various high-level components of the system. Chapter 4 discusses the

technical approach and the development plan that will be used to implement the P4MIS.

PROBLEM DEFINITION

Important cause and effect relationships among personnel policies and force structure effects are being lost over time. A significant amount of historical information is available; however, it is either dispersed or lost in a predecessor's historical files and is not accessible or useable to those who need it most. Reductions in headquarters' staff continue to exacerbate the problem, while advances in information technology provide an opportunity to solve it.

The intent of this research is to recover these data and design an information system that enables users to interactively view and "mine" historical trends and relationships from various perspectives.

SCOPE

The research and development of the P4MIS will be accomplished in three phases:

- Phase I will define the system's overall functional requirements and build an initial proof-of-concept prototype that demonstrates a graphical user interface (GUI) presenting menus, window sheets, dialogue boxes, and graphical information. Actual data will be used where possible.

- Phase II will utilize the initial prototype to refine and mature user needs and data requirements. It will further detail the system with both GUI and database design specifications. Actual data will be used where possible.

- Phase III fully develops and implements the system's software and data requirements. The database will be populated with actual data.

The system being developed under this task will present historical policy, program, inventory, and retention information from a variety of views and perspectives. Although the P4MIS has the potential to use the historical information along with various analytical techniques to be more predictive in nature, the scope of this task does not support this type of development effort at this time.

The initial policy information and inventory data to be researched will address

- active duty members only,

- military personnel (officer and enlisted), and

- personnel strength levels (faces not spaces).

Design considerations will be made for the future expansion to include the civilian and reserve workforce policy and inventory characteristics.

APPROACH

User Interviews

To define the user's requirements, Logistics Management Institute (LMI) conducted interviews of key Air Force Deputy Chief of Staff (DCS) personnel managers as identified by AFPOA/DPY. Appendix A lists the personnel contacted. The interview process asked the following questions:

◆ What current and historical information is critical to your job success?

◆ Where can this information be found and how can it be made more accessible to you?

◆ How can the information be assembled to best support your work?

◆ How would you use an information system and what would the system do?

◆ How can we recover and add value to historical data?

Literature Search

In addition to user interviews, we conducted a literature search of existing academic and government studies to identify key labor and economic indicators that may correlate with retention, compensation, and personnel management. Appendix B contains a bibliography of material found.

Meetings with Subject Matter Experts

We also met with Air Force historians and author Dr. Vance O. Mitchell,[1] to identify available resources for researching personnel plans, programs, and policy development. Appendix C contains a resource list that resulted from these meetings.

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[1] Dr. Vance O. Mitchell wrote *Air Force Officers Personnel Policy Development, 1944-1974* for the Air Force History and Museums Program, Washington D.C., in 1996.

Chapter 2
Operating Environment and Key Terms

OPERATING ENVIRONMENT

The P4MIS users will be HQ USAF/DCS personnel managers, to include managers and analysts at the Air Force Personnel Center (AFPC). The system will be designed to include Internet and Intranet connectivity to incorporate existing or planned capability. An example of existing capability is the AFPC Personnel Statistics World Wide Web page. This page enables users to build a demographic query that runs interactively against the officer or enlisted inventory extracts.

The P4MIS will be designed to run on a desktop personal computer (PC), 486 or higher, running a 32-bit Microsoft Windows operating system, either Windows 95 or Windows NT. Data will reside centrally on a Microsoft Windows NT Server using a relational database format. The system will be designed using open systems technology to facilitate planned enhancements and permit future growth. Client-server connections will use open database connectivity (ODBC) drivers that provide interoperability with other open systems.

KEY TERMS

Several key terms will be used to develop the requirement for the P4MIS. This section defines those terms: principle components, functional areas, subject areas, and indicators and data items.

Principle Components

Principle components are a framework for detailing the system's functional requirements and provide the foundation for linking various aspects of the system together. The requirement for the P4MIS is organized around six principle components: policy, programs, plans, force structure, political factors, and economic variables. The policy, programs, and plans components are structured to mirror the organization of the DCS personnel staff. The force structure, political factors, and economic components provide the system's depth and the foundation for discovering cause and effect relationships. Together the principle components, when related properly, will provide the basis for determining what internal and external factors have affected Air Force personnel management. They contribute to the insight that is behind the numbers.

Functional Areas

Functional areas are the next level of aggregation in the information hierarchy and decompose the principle components into areas that generally correspond to the Directorate and Division management structure within the DCS personnel staff. The following sections define the functional areas as related to the six principle components. The functional areas will subsequently be further divided by subject areas.

POLICY FUNCTIONAL AREAS

The policy component contains functional areas associated with personnel life-cycle management. The functional areas for the policy component include accessions, assignment and classification, compensation and benefits, contingencies and joint matters, promotions and evaluations, rated force management, retention/reenlistment, and separation/retirement.

PROGRAMS FUNCTIONAL AREAS

The programs component is made up of functional areas managed by the Director of Personnel Programs, Education and Training, on the DCS personnel staff. They include education and training, endstrength management, and quality of life. Personnel programs (e.g., loss management programs) associated with functional areas contained within the policy component (e.g., separations/retirements) will not be detailed in this section.

PLANS FUNCTIONAL AREAS

The functional areas of the plans component are officer and enlisted force planning.

FORCE STRUCTURE FUNCTIONAL AREAS

The force structure component contains inventory levels of disaggregation for current and historical strength. It is divided into officer and enlisted functional areas. For officers it includes grades, competitive categories, aero-rating, and years of service. For enlisted personnel, it includes grades, term of enlistment, skill level, and years of service.

POLITICAL FACTORS FUNCTIONAL AREAS

The political factors component is divided into the following functional areas: leadership, international events, executive office, Congress, Office of the Secretary of Defense (OSD), and Air Force. Functional areas within the political factors component will provide a key piece of utility to the P4MIS. Political factors will

be related chronologically and by subject area to other components of the system (e.g., policy, programs, and plans).

ECONOMIC VARIABLES FUNCTIONAL AREAS

This economic variables component will contain key economic and labor measures that, through previous research, have been associated with personnel management. The state of the U.S. economy can influence a member's decision to stay or separate from military service and affect compensation initiatives, quality of life, and other aspects of personnel management. Functional areas within this component are the civilian labor market, consumer confidence, military pay, and differentials. (Differentials primarily measure the gap between military pay raises and inflation.)

Table 2-1 summarizes the relationships between principle components and functional areas.

Table 2-1. Functional Areas

Principle components	Functional areas
Policy	Accessions
	Assignment and classification
	Compensation and benefits
	Contingencies and joint matters
	Promotions and evaluations
	Rated force management
	Retention and reenlistment
	Separation and retirement
Programs	Education and training
	Endstrength management
	Quality of life
Plans	Officer
	Enlisted
Force structure	Officer
	Enlisted
Political factors	Leadership
	International events
	Executive office
	Congress
	OSD
	Air Force
Economic variables	Civilian labor market
	Consumer confidence
	Military pay
	Differentials

Subject Areas

Subject areas will further delineate functional areas into related policies, legislation, or other topics. This is the first level in the hierarchy where information can be stored, retrieved, and related to other areas of the P4MIS. Information at this level will be primarily narrative text in format. For some functional areas, this may be the only level at which information is stored. An example of a subject area is *drug policy* as it relates to the functional area *accessions*.

Indicators and Data Items

Most subject areas will be further defined in the form of indicators and data items. These structures will primarily store numerical data. Indicators and data items can be subject area outcome or input measures that help to visualize cause and effect relationships. These data will be displayed primarily in the form of charts and graphs. An example of an indicator for the subject area *quality standards*, functional area *accessions*, is Air Force Qualifying Test (AFQT) Category I, II, III, and IV enlisted accession levels over time.

Chapter 3
Operating Characteristics and Functional Definition

This chapter describes general system operating characteristics and the functional definition for the proposed P4MIS. It provides a complete breakdown of functional areas, related subject areas, and corresponding indicators. Functional requirements will be specified from a user's perspective.

OPERATING CHARACTERISTICS

The P4MIS will be very intuitive, easy to operate, and have the following general operating characteristics:

- ◆ *Visual in nature.* Data items and indicators will be graphically presented and printable.

- ◆ *Search capability.* The ability to search by functional and subject areas will exist.

- ◆ *Cross-referenced.* Functional areas and subject areas will be cross-referenced chronologically with political and economic factors.

- ◆ *Dual views.* The ability to toggle perspectives between subject and chronological views will be present.

- ◆ *Web-enabled.* The ability to incorporate pertinent Internet or Intranet Web pages and perform updates from the Web where possible will exist.

- ◆ *Update and security.* The ability to define functional area users who have permission to update subject areas and data items will be available.

- ◆ *Local download.* The ability to save data to PCs in various formats (e.g., text, spreadsheet, and database) for integration with other products will exist.

FUNCTIONAL DEFINITION

Functional requirements are stated from a user's perspective and are presented in two views: subject and chronological. These views are interrelated and will allow for toggle, or movement back and forth, from within the appropriate context. For example, while viewing a fact sheet on aviator continuation pay, the user does a

search by subject area and then toggles to chronological view to see when significant changes to this program have occurred.

Subject View

The subject view enables a user to do the following:

◆ Search by subject key words.

◆ View indicators and data items associated with subject areas, both current year fact sheets and historical trends.

◆ Add new indicators and data items and relate them to one or more subject areas.

◆ Add new subject areas and relate them to one or more functional areas.

◆ Toggle to chronological view for a given subject area and display key executive orders, legislation, or policy changes that affected the selected subject.

Chronological View

The chronological view enables a user to do the following:

◆ View historical and programmed officer and enlisted strength levels.

◆ Drill down (point and click) for any given year to view

➤ strength disaggregations,

➤ political factors, and

➤ economic variables.

◆ View international events that may have affected USAF personnel.

◆ View executive orders that may have affected USAF personnel.

◆ View legislation that affected USAF personnel.

◆ View a chronology of selected subject areas.

◆ Allow users to define overlays by

    ➤ selected labor and economic measures with retention, loss measures, or strength levels and

    ➤ user-specified lag (in years).

Indicators and Data Items

The following tables depict the information hierarchy from principle component to functional area, to subject area, and finally down to indicators and data items. The indicators and data items shown in these tables are those that have been identified to date and will not remain static. Designated users will be able to add subject areas, indicators, and data items.

POLICY

Table 3-1. Accessions

Functional area	Subject area (related policies, legislation, and issues)	Indicators and data items	Data source	Update frequency
Accessions	Drug policy	—		
	Single parents	Accessions by marital status/dependents		
	Law violations and waivers	Number of waivers		
	Medical standards	—		
	Quality standards	CAT I/II/III/IV accessions, percentage of high school graduates, average age, PS/NPS accessions, AFOQT scores		
	Minority recruiting	Accession levels by race/ethnicity and gender		
	Sustainment	Actual accessions versus sustainment levels		
	ROTC to reserves	Number applied/ accepted		
	ROTC scholarship payback	Number applied/ accepted		
	Involuntary recall	Number applied/ accepted		
	Commissioning programs	Accession levels by SOC		

Note: AFOQT = Air Force Officer Qualifying Test; CAT I/II/III/IV = mental category I, II, III, or IV; PS/NPS = prior service/nonprior service; ROTC = Reserve Officer Training Corps; SOC = source of commission.

Table 3-2. Assignment and Classification

Functional area	Subject area (related policies, legislation, and issues)	Indicators and data items	Data source	Update frequency
Assignment and classification	PCS budget	Total moves and cost		
		Unit moves and cost		
		Operational moves and cost		
		Accession moves and cost		
		Rotational moves and cost		
		Training moves and cost		
		Separation moves and cost		
	Tour lengths	Average TOS		
		Average time between moves		
	CONUS/overseas rotation	CONUS/overseas authorization ratios		
		Average time spent overseas		
	Personnel tempo	Average time between overseas moves		
		Average number of days TDY		
	Assignment availability			
	Nondeployables			

Note: CONUS = continental United States; PCS = permanent change of station; TDY = temporary duty; TOS = time on station.

3-4

Table 3-3. Compensation and Benefits

Functional area	Subject area (related policies, legislation, and issues)	Indicators and data items	Data source	Update frequency
Compensation and benefits	Base pay	Annual pay raise		
		CPI-W		
		Debt load		
		Disposable income		
		Regular military compensation		
	Retirement	Industry retirement statistics		
		Contribution to 401K		
	Hazardous duty pay			
	Travel: PCS			
	TDY			
	Housing: VHA	Survey results		
	BAQ			
	Rated: aviator continuation pay	Airline hiring projections		
		ACP acceptance rates		
		Cumulative continuation rates		
	Rated: Aviator career incentive pay			
	Legislative initiatives			
	Benefit benchmarks	BLS statistics; poverty level		
		BLS statistics; food stamps		
		BLS statistics; WIC		

Note: ACP = aviator continuation pay; BAQ = basic allowance for quarters; BLS = Bureau of Labor Statistics; CPI-W = Consumer Price Index for Urban Wage Earners and Clerical Workers; PCS = permanent change of station; VHA = variable housing allowance; WIC = special supplemental food program for women, infants, and children.

Table 3-4. Promotions and Evaluations

Functional area	Subject area (related policies, legislation, and issues)	Indicators and data items	Data source	Update frequency
Promotions and evaluations	Timing	CY board schedules		
		DOR and board dates by competitive category		
		Historical phase points by grade and competitive category		
		Phase point comparison with other services		
		Monthly increments (budgeted)		
	Opportunity	Historical rates by grade and competitive category		
		Historical rates by grade and aero-rating		
		Eligibles, selects, and rate by grade and zone		
		Comparison with other services		
	Requirement	Grade structure (authorizations) by corps		
	Selective continuation			
	Planning	5-year promotion plan		
	JDAL	Joint officer promotion eligibles, selects, and rate comparison		
	DAWIA	Acquisition Corps promotion selection rates by grade and zone		
	Minority: race, sex	Eligibles, selects, rate by grade and zone		
	Promotion recommendation form	DP/P/DNP select rates by zone		
	WAPS: current statistics	Average weighted factors by sex and race		
		Board score groups (E-8 and E-9)		
		TIG		
		TIS		
		PME selects/nonselects		
	Enlisted: timing	Average sew-on times by grade		
	Enlisted: opportunity	Historical select rates by grade		

Note: CY = calendar year; DAWIA = Defense Acquisition Workforce Improvement Act; DOR = date of rank; DP/P/DNP = definitely promote, promote, do not promote; JDAL = joint duty assignment list; PME = professional military education; TIG = time in grade; TIS = time in service; WAPS = Weighted Airman Promotion System.

Table 3-5. Rated Force Management

Functional area	Subject area (related policy, legislation, and issues)	Indicators and data items	Data source	Update frequency
Rated force management: pilot	Production	UPT production rates		
		Cost to train		
	Inventory	Historical inventory		
	Requirement	Historical requirement		
	Planning	Projected inventory and requirements (red line/blue line)		
		Inventory versus topline		
	Retention (linked)	6-11 CCR		
		TARS		
		Losses by category		
		ACP eligibles, takers, and acceptance rates		
		Approved separations (ratio of separated to eligibles)		
		Airline hiring		
		Initiatives		
	Early release policy			
	Compensation (linked)	USAF pilots versus commercial airlines by YOS		
		ACP history/ACIP		
	ALO assignment policy			
	FAIP assignment policy			
	Recall program			
	Feet on the ramp policy			
	Trained personnel requirement	USAFA, ROTC, OTS, and AD inputs		
	Early release program			
	Promotions (linked)	Historical promotion rates		
	Selective continuation policy			

3-7

Table 3-5. Rated Force Management (Continued)

Functional area	Subject area (related policy, legislation, and issues)	Indicators and data items	Data source	Update frequency
Rated force management: navigator	Production	UNT production rates		
	Inventory	Historical inventory		
	Requirement	Historical requirement		
	Planning	Projected inventory and requirements (red line/blue line)		
		Inventory versus topline		
	Retention (linked)	6-11 CCR		
		TARS		
		Losses by category		
	Early release policy			
	ACIP (linked)			
	Trained personnel re-quirement	USAFA, ROTC, OTS, and AD inputs		
	Early release program			
	Promotions (linked)	Historical promotion rates		
	Selective continuation policy			

Note: ACIP = aviator career incentive pay; ACP = aviator continuation pay; AD = active duty; CCR = cumulative continuation rate; OTS = Officer Training School; ROTC = Reserve Officer Training Corps; TARS = total active rated service; TPR = trained personnel requirement; UPT = undergraduate pilot training; USAF = United States Air Force; USAFA = United States Air Force Academy.

Table 3-6. Retention/Reenlistment

Functional area	Subject area (related policies, legislation and issues)	Indicators and data items	Data source	Update frequency
Retention/ reenlistment	Officer	Historical 4-11 CCR by aero-rating		
		Historical man-years (TARS) by aero-rating		
	Minority	Retention rates by gender and race/ethnicity		
	Enlisted	Historical reenlistment rates by term of enlistment		
		Historical keep rates by term of enlistment		
	Attrition	First-term attrition by reason code		
	Surveys	Summary of findings		
	Economy (linked)	Unemployment rate		
		Employment cost Index		
		Airline hiring		
		Consumer price index (CPI)		
		Consumer confidence index		
		Consumer sentiment index		
		Annual pay raise		
		Annual pay raise—CPI		

Note: CCR = cumulative continuation rate; TARS = total active rated service; CPI = Consumer Price Index.

Table 3-7. Separation/Retirement

Functional area	Subject area (related policies, legislation and issues)	Indicators and data items	Data source	Update frequency
Separation/ retirement	Involuntary losses			
	RIF	Losses by year		
	SERB	Losses by year and grade		
	HYT	Losses by year and grade		
	Other	Losses by year grade and SPD		
	Voluntary losses	Historical retirements by category (SPD)		
		Historical separations by category (SPD)		
	Drawdown programs	ADSC waivers		
		TIG waivers		
		TERA		
		VSI/SSB		
	Palace chase	Applications and separations		
		First-term attrition		
		BMT attrition		
	Congressional inquiries			
	Homosexual discharges			
	Survey data			

Note: ADSC = active duty service commitment; BMT = basic military training; HYT = high year of tenure; RIF = reduction in force; SERB = Selective Early Retirement Board; SPD = separation program designator; TERA = The Early Retirement Act; TIG = time in grade; VSI/SSB = voluntary separation incentive/special separation benefit.

PROGRAMS

Table 3-8. Education and Training

Functional area	Subject area (related policies, legislation and issues)	Indicators and data items	Data source	Update frequency
Education and training	Graduate education	Student man-years (programmed and executed)		
		Advanced degree requirements		
		Advanced degree quotas		
	Professional continuing education	Quotas		
	Professional military education	Enlisted quotas by level		
		Officer quotas by level		
	Quality initiatives			
	Test programs			
	Supplemental training			
	Retraining			

Table 3-9. Quality of Life

Functional area	Subject area (related policies, legislation and issues)	Indicators and data items	Data source	Update frequency
Quality of life	Retention	Links to retention		
	AF demographic changes	Links to AFPC on-line statistical queries		
	Quality of life survey	Trend data		
	Organizational climate assessment	Trend data		
	Community needs assessment survey	Trend data		
	Quality of Life Index	Article 15s		
		Absenteeism		
		UIFs		
		Courts martial		
		Suicide rates		

Note: AF = Air Force; AFPC = Air Force Personnel Center; UIF = unfavorable information file.

Table 3-10. Endstrength Management

Functional Area	Subject area (related policies, legislation and issues)	Indicators and data items	Data source	Update frequency
Endstrength management	Programmed strength	Officer strength by corps by budget year		
		Enlisted strength by budget year		
	Programmed gains	Officers by budget year		
		Enlisted by budget year		
	Programmed losses	Officers retirements by budget year		
		Officers separations by budget year		
		Enlisted retirements by budget year		
		Enlisted separations by budget year		
	Programmed promotions	Officers by grade by budget year		
		Enlisted by grade by budget year		

Table 3-11. Plans

Functional area	Subject area (related policies, legislation and issues)	Indicators and data items	Data source	Update frequency
Plans	Sustainment	Officer objective force versus inventory		
		Enlisted objective force versus inventory		
	DOPMA			
	Skills management	Officer TPR		
		Enlisted TPR		
	Top five grade mix	Historical percentages		
	Prior-service program	Historical accession levels		
	Career job reservation			
	Enlistment bonus	Cost and eligible skills		
	Selective reenlistment			
	Enlisted force management system			
	Retraining and cross-flow	Actions by category		
	Selective reenlistment bonus	Cost and eligible skills		
	High-year of tenure	Losses by year		

Note: DOPMA = Defense Officer Personnel Management Act; TPR = trained personnel requirement.

FORCE STRUCTURE

Table 3-12. Force Structure

Functional area	Subject (related policies, legislation, and issues)	Indicators and data items
Officer	Grade	Historical officer strength by grade
	Competitive category	Historical officer strength by competitive category
	Year of service	Historical officer strength by YOS
	Aero-rating	Historical line officer strength by aero-rating
Enlisted	Grade	Historical enlisted strength by grade
	Term of enlistment	Historical enlisted strength by term of enlistment
	Skill level	Historical enlisted strength by skill level
	Year of service	Historical enlisted strength by YOS
		Historical officer strength by YOS

Note: YOS = year of service.

POLITICAL FACTORS

Table 3-13. Political Factors

Functional area	Subject (related policies, legislation, and issues)	Indicators and data items
Leadership	President	Name
	Secretary of Defense	Name
	Chairman, Joint Chiefs of Staff	Name
	Secretary of the Air Force	Name
	Chief of Staff, Air Force	Name
	Deputy Chief of Staff, Personnel	Name
International events	North America	Event summary
	Eastern Europe	Event summary
	Western Europe	Event summary
	Far East	Event summary
	Middle East	Event summary
	Southeast Asia	Event summary
	Africa	Event summary
	Caribbean	Event summary
Executive office	Executive orders	Summary of impact
	Personnel management	Summary of impact
	Defense structure	Summary of impact
	National Security Council	Summary of impact
	International agreements	Summary of impact
	Committees, panels, and reviews	Summary of impact
Congress	Legislation	Summary of impact
Office of the Secretary of Defense	Defense structure	Summary of impact
	Personnel management	Summary of impact
	Reports, studies, and surveys	Summary of impact
	Task forces	Summary of impact
Air Force	Organization and lineage	Summary of impact
	Personnel management	Summary of impact

3-16

ECONOMIC VARIABLES

Table 3-14. Economic Variables

Functional area	Subject area (related policies legislation, and issues)	Indicators and data items
Civilian labor market	Retention, compensation	Unemployment rate
	Retention, compensation	Employment cost index
	Retention, compensation	Airline hiring projections
Consumer confidence	Retention, compensation	Consumer Price Index (CPI)
	Retention, compensation	Consumer confidence index
	Retention, compensation	Consumer sentiment index
Military pay	Retention, compensation	Annual pay raise
Differentials	Retention, compensation	Annual pay raise—CPI

Chapter 4
Technical Approach and Development Plan

Prior to determining the technical approach, LMI was asked to review a system and concept developed by the British Defense Analytical Services Agency (DASA), Royal Air Force (RAF) Personnel Analysis Team, called the RAF Personnel Digest. The RAF Personnel Digest was the genesis from which the concept of the P4MIS grew. The purpose of the review was to determine if the Digest could be used as a model for the P4MIS. This section provides a brief summary of that system.

The RAF Personnel Digest is a Windows-based system, updated monthly and accessible through a local area network. The Digest is a series of tables and charts, drawn offline, and captured as Windows metafiles. The metafiles reside on a network server and are accessible from desktop personal computers. Since the Digest's charts and tables are drawn off-line and captured as metafiles, the underlying data are not actually stored in a database, and therefore cannot be retrieved and manipulated. Each chart and table must be reproduced off-line to accomplish system updates.

The Personnel Digest also is the basis for a monthly pocket brief distributed to RAF leadership. The digest and pocket brief contain RAF demographic information such as

- RAF personnel strength levels;

- separation applications and actions;

- branch, trade, and command manning levels;

- minority distributions;

- accessions levels; and

- officer and enlisted grade and age distributions.

The system is popular and widely distributed with the RAF. About 700 officers currently receive the pocket brief each month.

The easy to use GUI has contributed to the appeal of the system. The P4MIS will use a similar Windows-based user interface. However, the static nature of the Windows metafile as a data storage structure does not meet the functional requirements of the P4MIS as described in Chapter 3. The P4MIS will enable

designated users to input current year data, which will be stored alongside historical data. The P4MIS will draw the tables and charts extracting from a database rather than presenting charts that maintainers have drawn off-line. The P4MIS should stimulate user curiosity, experimentation, and exploration of personnel component relationships. This will provide maximum flexibility and allow for future growth.

TECHNICAL APPROACH

Relational Database

The P4MIS is not intended to be a high-volume transaction-based system. The technical approach is to use a low-cost, low-maintenance, relational database management system (RDBMS). For this reason, Microsoft Access Version 7.0 has been selected as the RDBMS. Access will store the component relationships and historical data required for the P4MIS. This will enable users' to build and explore relationships in an interactive setting. Maintenance windows will be developed to provide the system's table update and maintenance capabilities. Run-time versions of the RDBMS will be distributed along with the P4MIS data, using a Windows-based installation program.

Rapid Application Development

The P4MIS will operate in a Windows rapid application development (RAD) software environment to program the necessary business logic and user interface to the RDBMS. The selected software environment will contain Internet development tools and open systems connectivity for interface with other data and systems. For this reason, PowerBuilder 6.0 from PowerSoft has been selected as the Windows application development software. PowerBuilder 6.0 is a client-server development environment and scripting language with the features required to build the P4MIS. It will be used to design the database and user interface. A run time, compiled version of the software will be generated and incorporated into the Windows installation set. Users will not be required to have previously installed any software to operate the P4MIS.

DEVELOPMENT PLAN

The system development approach uses a data model, a proof-of-concept prototype, and system design specifications to build and document the system.

Data Model

An initial data model using relational protocols will be constructed to store the P4MIS data and component relationships. The data model will be refined as the prototype is developed for further definition of functional requirements.

Proof-of-Concept Prototype

Upon review of this functional requirements document by the DCS personnel staff, a proof-of-concept prototype will be developed to further identify and mature the functional needs. The process will continue to iterate and build upon the proof-of-concept prototype and data model. The prototype provides a mechanism for further user involvement and input to the system's development process.

System Design

System design specifications will document the data requirements and user interface. The specifications will detail the requirements for connections to other databases and systems along with maintenance and update procedures. To the largest extent possible, the design specifications will contain visual depictions of the P4MIS using flow charts and diagrams.

SUMMARY

This document provides the functional requirements definition for the Air Force P4MIS. The objectives of the P4MIS are these:

- ◆ Enhance the development of personnel plans, programs, and policy by

  - ➤ making more informed and timely decisions by not having to "reinvent the wheel" and

  - ➤ providing more robust analysis by drawing from lessons learned.

- ◆ Resolve issues and answer recurring questions in a more timely manner.

- ◆ Identify future workforce and policy problem areas.

- ◆ Provide an automated lessons learned repository and corporate memory.

- ◆ Serve as a training tool for new staff members.

The P4MIS users will be HQ USAF/DCS personnel managers and analysts to include those at the AFPC. The system will have the following operating characteristics:

- ◆ *Visual in nature.* Data items and indicators will be graphically presented and printable.

- ◆ *Search capability.* The ability to search by functional and subject areas will exist.

- ◆ *Cross-referenced.* Functional areas and subject areas will be cross-referenced chronologically with political and economic factors.

- ◆ *Dual views.* The ability to toggle perspectives between subject and chronological views will be present.

- ◆ *Web-enabled.* The ability to incorporate pertinent Internet or Intranet Web pages and perform updates from the Web where possible will exist.

- ◆ *Update and security.* The ability to define functional area users who have permission to update subject areas and data items will be available.

- ◆ *Local download.* The ability to save data to PCs in various formats (e.g., text, spreadsheet, and database) for integration with other products will exist.

The P4MIS technical approach is to use open systems technology utilizing a relational database, Microsoft Access Version 7.0, and Windows rapid application development software, PowerBuilder 6.0. The system will be designed to run on a 486 or higher desktop PC running a 32-bit Microsoft Windows operating system, either Windows 95 or Windows NT. Data will reside on a local area network, Microsoft Windows NT server, and connections will be made using open database connectivity drivers.

The development plan is to construct a data model and proof-of-concept prototype. The prototype will be used to facilitate additional user involvement. This will help to refine the requirement and result in a system design specification. The design specification then will be used to fully implement the P4MIS.

Appendix A
Interviews and Attendees

Table A-1. Table of Personnel Interviews

Date	Office	Attendees
September 26, 1997	Analysis, AFPOA/DPY	Major Whitsell, Major Jacobson, Captain Gruber, Captain Walker, Captain McAree, MSgt Scott
October 6, 1997	Skills Management Modeling, Statistical Forecasting, AFPOA/DPD	Major Jacobson, Captain Gruber, 1Lt Dulin, MSgt Scott
October 6, 1997	USAF Office of History, AF/HO	Dr. Moody, Dr. Goldberg
October 28, 1997	AF/HO	Dr. Vance Mitchell, Dr. Moody
October 28, 1997	Personnel Issues Team, AF/DPI	LtCol Schneider, Major Belue
October 28, 1997	Force Policy, AF/DPXF	Colonel Pratt, Colonel Yuris, LtCol Dickinson, LtCol Aldrich, Major Swilling, Major Hales, MSgt Patterson
October 30, 1997	Accessions, AF/DPXFA	LtCol Dickinson, Major Moon, Major Costello, Captain Schumick, CMSGT Markus
October 30, 1997	Promotions and Evaluations, AF/DPXFP	Major Hales, Major Malone, Captain Armentrout, MSgt Ford
October 30, 1997	Classification and Assignment, AF/DPXFC	LtCol Chiles
November 5, 1997	Personnel Plans, AF/DPXPX	LtCol Jones, LtCol Dietrich, Major Lehr, Captain Cashdollar
November 5, 1997	Rated Force Management, AF/DPXPR	LtCol Frasz, Major Roeder, Major Smyser
November 5, 1997	Resources, AF/DPPR	Mr. Lambert, Ms. Breeden
November 12, 1997	Separation and Retirements, AF/DPXFS	LtCol Aldrich
November 12, 1997	Skills Management, AF/DPXPS	LtCol Cochran
November 12, 1997	Compensation, Legislation, and Benefits, AF/DPPCL	Colonel Tindell, LtCol Hunter, Major Stephens, Major Dickey
November 12, 1997	Retention, AF/DPXFR	LtCol Baker, MSgt Patterson
November 17, 1997	Officer Education, AF/DPPE	LtCol Wilson
November 17, 1997	Quality of Life, AF/DPPCQ	LtCol Taylor
February 24, 1998	Training, AF/DPPE	LtCol Bryant
February 24, 1998	Plans & Requirements, AF/DPCX	Ms. Williams, LtCol Taylor, Major Batchelor, Mr. Frank
March 3, 1998	Contingency & Joint Matters, AF/DPXC	LtCol Tovado
March 12, 1998	Force Structure, AF/DPXP	Colonel Counts
March 12, 1998	Enlisted Skills Management, AF/DPXPS	Mr. Pat Thomson
March 12, 1998	Test & Surveys, AF/DPXPT	Major Smith, Major Nason

Appendix B
Bibliography for Key Labor and Economic Indicators

Basalla, Mark A. *A Methodology for the Analysis and Prediction of Air Force Officer Retention Rates*. MS thesis, AFIT/GOR/ENC/96M-01, School of Engineering, Air Force Institute of Technology: Air University, Wright-Patterson AFB, OH, March 1996. Economic measures considered: airline hiring rates, leading coincident and lagging indexes, consumer sentiment index, index of help wanted advertising, federal reserve discount rate, civilian unemployment rate, pay difference (ECI-miltary pay increase), white collar unemployment rate.

Bookheimer, William R. *Predicting Naval Aviator Attrition Using Economic Data*. MS thesis, Naval Postgraduate School, Monterey, CA, Report ADA307513, March 1996. The most useful predictor variable was the national unemployment rate. Other variables considered: professional (white collar) unemployment rate, composite index of (12) leading economic indicators, airline hires, military pay to airline pay ratio.

Cooper, Deanna L. *A Cross-Sectional Investigation of the Effects of Regional Labor Market Conditions on the Reenlistment Decisions of Air Force Enlistees*. MS thesis, School of Systems and Logistics, Air Force Institute of Technology: Air University, Report AFIT/GLM/LSR/91S-33, September 1991. Labor measures used: average by state, unemployment rates.

Croan, Gerald M. et al. *Career Decision-Making and the Military Family: Toward a Comprehensive Model*. U.S. Army Research Office, Research Triangle Park, NC, prepared for U.S. Army Research Institute for the Behavioral and Social Sciences, Alexandria, VA, Report AD-A223 225, March 1990. Develop a spouse ACOL that includes spouse pay, benefits, deferred income growth, net human capital formation. A greater improvement would result if the spouse's ACOL were computed as a separate entity from the member's ACOL and the two ACOL's were then combined within a model of household decision-making.

Giarizzo, S.J. *An Analysis of Enlisted Early Separations Under the Navy's VSI/SSB Program: The Impact of Eligibility and Program Benefits*. AD-A273 336, Naval Postgraduate School, Monterey, CA, September 1993.

Guzowski, Bruce A. *A Methodology for Long-Term Forecasts of Air Force Pilot Retention Rates: A Management Perspective.* MS thesis, AFIT/GSM/LSR/90S-11, School of Systems and Logistics, Air Force Institute of Technology: Air University, Wright-Patterson AFB, September 1990. Economic measures used: pay compensation, percent of population in age group 25 to 64 (business travelers), net population increase per 1,000 population, civilian labor force participation rate, net business formation (change in business incorporations less business failures), civil aircraft shipments, aerospace sales net new orders, machine tools orders and shipments (metal cutting and forming are primary processes by which aircraft and subsystems are manufactured), GNP implicit price deflator (reflects price changes in GNP component), scheduled commercial air carriers percent load factor (airline health and demand for travel), major airline pilot retirements.

Hogan, Paul F. *Family Annualized Cost of Leaving: The Household as the Decision Unit in Military Retention.* Research Triangle Institute, Research Triangle Park, NC, prepared for the U.S. Army Research Institute for the Behavioral and Social Sciences, Report AD-A224 394, May 1990. Previous focus on the individual service member omits important family factors affecting retention decisions. The family ACOL model explains more fully the costs and benefits associated with retention of Army personnel.

Jaroch, Victor D. and Mark A. Williams. *Alternate Solutions to the Problem of Pilot Retention in the United States Air Force.* Air War College: Air University, Maxwell Air Force Base, AL, Research Report AD-A241 047, April 1990.

Kirby, Mary A. *A Multivariate Analysis of the Effects of the VSI/SSB Separation Program on Navy Enlisted Personnel.* MS thesis, Naval Postgraduate School, Monterey, CA, AD-A265 446, March 1993.

Lakhani, Hyder, Curtis Gilroy and Cavan Capps. *Logistic Microdata Model of First-Term Army Reenlistment.* U.S. Army Research Institute for the Behavioral and Social Sciences, Alexandria, VA, Report AD-A169 197, July 1984.

Mackin, Patrick C., Paul F. Hogan, and Lee S. Mairs. *A Multiperiod Model of U.S. Army Officer Retention Decisions.* Systems Analytics Group Corporation, Falls Church, VA, U.S. Army Research Institute for the Behavioral and Social Sciences, Alexandria, VA, Report AD-A268 241, May 1993. Labor measures used: unemployment rate.

Mairs, Lee S. *A Model of U.S. Army Officer Retention Behavior: Final Report.* SAG Corporation, Falls Church, VA, prepared for U.S. Army Research Institute for the Behavioral and Social Sciences, Alexandria, VA, Report AD-A257 440, September 1992. Labor measures used: national average annual

unemployment rates, changes in CPI-U (Consumer Price Index-Urban Consumers).

Orthner, Dennis K. *Family Impacts on the Retention of Military Personnel.* University of North Carolina at Chapel Hill, Research Triangle Institute, Research Triangle Park, NC, prepared for the U.S. Army Research Institute for the Behavioral and Social Sciences, Report AD-A225 084, April 1990. Family factors contributing to retention decisions include: spouse support for the military member, spouse employment, family life cycle, family economics, and the family career decision process.

Rueter, Frederick H., R. Gregg Hillman, and Thomas R. Bell. *Design of a National Skills Market Model for Air Force Enlisted Personnel.* CONSAD Research Corporation, Pittsburgh, PA, prepared for Air Force Human Resources Laboratory: Occupation and Manpower Research Division, Brooks Air Force Base, TX, Report No. AD-A229 541, September 1979. National Skills Market Model is an empirically based forecasting model of economic activity in six areas: unemployment rates, employment in specific industries, general civilian wage rates, regional employment, demographic detail in population and unemployment forecasts, and technological change.

Saving, Thomas R. et al. *Retention of Air Force Enlisted Personnel: An Empirical Examination.* RRC, Incorporated, Bryan, TX, prepared for Air Force Human Resources Laboratory, Brooks Air Force Base, TX, Report AD-A158 091, July 1985. Labor measures used: employment data by age and sex, industry wages by Standard Industrial Classification, CPI.

Stone, Brice M. and Larry T. Looper. *Validation and Reestimation of an Air Force Reenlistment Analysis Model.* RRC, Incorporated, Bryan, TX, prepared for Air Force Human Resources Laboratory: Manpower and Personnel Division, Brooks Air Force Base, TX, Report AD-A218 794, February 1990. Linkage of civilian wage (age earning functions) to demographic and industrial variables.

Taylor, John N. *Influence of the External Labor Market on the Air Force Manpower and Personnel System: A Review of Selected Research.* Occupation and Manpower Research Division, Air Force Human Resources Laboratory, Brooks Air Force Base, TX, Report AD-A053 479, December 1977. Labor measures used: comparison of expected military and civilian earnings, unemployment rates.

Thomas, George W. and Helen Davis. *USAR Prior Service Market: A Comparison of Reenlistment Motivations with Reserve Enlistment Motivations of Active Duty Personnel.* Naval Postgraduate School, Report AD-A208 159, Monterey, CA, December 1988.

Wood, Lisa. *Family Economics and the Retention Intentions of Army Enlisted Personnel*. Research Triangle Institute, Research Triangle Park, NC, prepared for the U.S. Army Research Institute for the Behavioral and Social Sciences, Report AD-A226 448, July 1990. Family economic factors, including spouse employment status, member wages, and whether the family receives food stamps, are important in the determination of member retention intentions.

Appendix C
Resource Listing for Personnel Plans, Programs, and Policy Development

PUBLICATIONS

History of Human Resources Management in the United States Air Force, Ira C. Eaker Center for Professional Development, 1992.

Air Force Officers, Personnel Policy Development, 1944-1974, Vance O. Mitchell, Air Force History and Museums Program, United States Air Force, Washington D.C., 1996.

Foundation of the Force, Air Force Enlisted Personnel Policy, 1907-1956, Mark R. Grandstaff, Air Force History and Museums Program, 1997.

Enlisted Personnel Management, A Historical Perspective, Shiela Nataraj Kirby and Harry J. Thie, National Defense Research Institute, RAND, 1996.

Shaping the Defense Civilian Workforce, Economics, Politics, and National Security, The Brookings Institute, Washington D.C., 1978.

The Evolution of Military Officer Personnel Management Policies: A Preliminary Study with Parallels from Industry, Hayes, RAND Project Air Force, 1978.

United States Air Force Statistical Digest, Assistant Secretary of the Air Force (Financial Management and Comptroller), Washington, D.C., annual publication.

WORK IN PROGRESS

Women in the Air Force, Rita DeArmand.

The Air Force Integrates, Alan Gropeman.

RECORDS

DCS Personnel Unit Histories (Semiannual), Air Force Office of History (paper copies), Bolling AFB, Washington D.C., Dr. Walt Moody. Program stopped in 1986; a central history office in Pentagon now writes for each DCS.

Dr. Vance Mitchell's Research Archives, record group 340 (SecAF) and 341 (HQ USAF), Air Force Office of History, Bolling AFB, Washington D.C., Dr. Walt Moody. Several boxes containing policy memorandums, memorandums for record, staff summary sheets, and interoffice correspondence.

Catalog of the USAF Oral History Collection, Air Force Office of History, Bolling AFB, Washington D.C. Interviews with retiring General Officers and Chief Master Sergeant's of the Air Force. Program has since ceased.

Library of Congress, Personal Papers of the Chief of Staff, United States Air Force, Madison Building.

National Archives, Military Reference Branch, National Archives II, College Park, MD.

Appendix D
Abbreviations

ACIP	aviator career incentive pay
ACP	aviator continuation pay
AD	active duty
ADSC	active duty service commitment
AFOQT	Air Force Officer Qualifying Test
AFPC	Air Force Personnel Center
AFPOA/DPY	Air Force Personnel Operations Agency, Analysis Division
AFQT	Air Force Qualifying Test
BAQ	basic allowance for quarters
BLS	Bureau of Labor Statistics
BMT	basic military training
CAT	mental category
CCR	cumulative continuation rate
CONUS	continental United States
CPI	Consumer Price Index
CPI-W	Consumer Price Index for Urban Wage Earners and Clerical Workers
CY	calendar year
DCS	Deputy Chief of Staff
DOPMA	Defense Officer Personnel Management Act
DOR	date of rank
DP/P/DNP	definitely promote, promote, do not promote
GUI	graphical user interface
HYT	high year of tenure
JDAL	joint duty assignment list
MIS	management information system
ODBC	open database connectivity

OSD	Office of the Secretary of Defense
OTS	Officer Training School
P4MIS	personnel plans, programs, and policy management information system
PCS	permanent change of station
PME	professional military education
PS/NPS	prior service, non-prior service
RAD	rapid application development
RAF	Royal Air Force
RDBMS	relational database management system
RIF	reduction in force
ROTC	Reserve Officer Training Corps
SERB	Selective Early Retirement Board
SOC	source of commission
SPD	separation program designator
TARS	total active rated service
TDY	temporary duty
TERA	The Early Retirement Act
TIG	time in grade
TIS	time in service
TOS	time on station
TPR	trained personnel requirement
UIF	unfavorable information file
UNT	undergraduate navigator training
UPT	undergraduate pilot training
USAFA	United States Air Force Academy
VHA	variable housing allowance
VSI/SSB	voluntary separation incentive/special separation benefit
WAPS	weighted airman promotion system
WIC	special supplemental food program for women, infants, and children
YOS	year of service

REPORT DOCUMENTATION PAGE

1. AGENCY USE ONLY *(Leave Blank)*	2. REPORT DATE Apr 98	3. REPORT TYPE AND DATES COVERED Final

4. TITLE AND SUBTITLE

USAF Personnel Plans, Programs, and Policy Management Information System: Functional Requirements Definition

5. FUNDING NUMBERS

C DASW01-95-C-0019

PE 0902198D

6. AUTHOR(S)

Phillippe A. Lussier, Peggy A. Miller, Albert H. Schroetel

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

Logistics Management Institute
2000 Corporate Ridge
McLean, VA 22102-7805

8. PERFORMING ORGANIZATION REPORT NUMBER

LMI– AF708T1

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

Air Force Personnel Operations Agency DCS/Personnel, Headquarters
USAF, Room 4E227
The Pentagon
Washington, D.C. 20330

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION/AVAILABILITY STATEMENT

A: Approved for public release; distribution unlimited

12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200 words)*

This research provides the functional requirements and scope for a personnel plans, programs, and policy management information system. Important cause and effect relationships among personnel policies and force structure effects are being lost over time. The intent of this research is to recover this data and design an information system that enables users to interactively view and "mine" historical trends and relationships from various perspectives. The objective is to provide more timely and robust personnel plans, programs, and policy analysis by utilizing a lessons learned approach. This research covers an operating environment, key terms, functional areas, system operating characteristics, functional definitions, the technical approach, and a development plan.

14. SUBJECT TERMS

personnel plans, personnel policy, personnel programs, management information system, accessions, assignment and classification, contingencies, joint officers, promotions, evaluations, rated management, retention, reenlistment, separation, retirement, educations, training, endstrength, quality of life, military pay

15. NUMBER OF PAGES

44

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	UL