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TECHNICAL REPORT

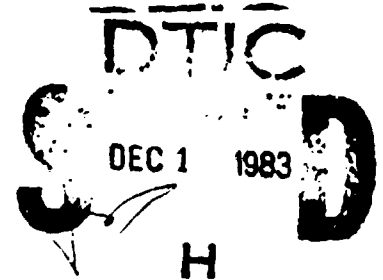
**AUTOMATED DATA BASE
IMPLEMENTATION REQUIREMENTS FOR
THE AVIONICS PLANNING BASELINE - ARMY**

July 1983

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Prepared for
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This technical report addresses the requirements for implementing an automated version of the Army Avionics data base (APB-A) compatible with existing Air Force and Navy data base architectures and capable of mechanizing the production of the APB-A.

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by

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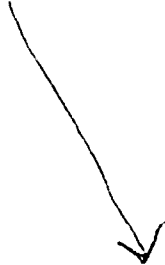
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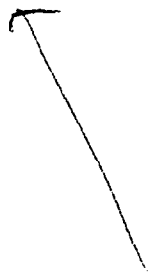
ABSTRACT



The U.S. Army Avionics Research and Development Activity (AVRADA) intends to establish the use of the Avionics Planning Baseline - Army (APB-A) document as an important facet of the formal avionics planning process. The APB-A was designed to maintain maximum compatibility in both form and content with similar avionics planning documents published by the Air Force and the Navy. This overall compatibility should facilitate the exchange of information among the three services for the identification of avionics standardization opportunities.

The first edition of the APB-A was the product of the collection and manual assembly of avionics planning data for current and future planned Army aircraft into a report format similar to that of the Air Force Avionics Planning Baseline (AF APB) and the Navy Avionics Planning Baseline (NAPB).

This technical report addresses the requirements for implementing an automated version of the Army avionics data base compatible with existing Air Force and Navy data base architectures and capable of mechanizing the production of the APB-A. The complete automated system will be documented in a future report.



SUMMARY

This report examines the aspects of computer hardware, data base architecture, data base management system (DBMS) methodology, and application programming that affect the development and installation of a computerized version of the Avionics Planning Baseline - Army (APB-A). It defines procedures, implementation requirements, and other considerations in view of previously defined APB-A document and system data requirements.

The initial automation of the Army avionics data base developed for the APB-A will be performed on a Digital Equipment Corporation (DEC) PDP-11/60 computer located at Wright-Patterson Air Force Base in Dayton, Ohio. The Army system will be based on the Air Force Avionics Data Utilization System (ADUS), which uses a commercial DBMS, SEED,* to store and maintain its data base, and Air Force-developed application software to generate the Air Force Avionics Planning Baseline (AF APB) on a line printer. The Army's contractor, ARINC Research Corporation, will modify the Air Force data base schema to fit Army requirements established for the APB-A, load the data base, and modify the ADUS application software to produce the APB-A. In the future, the Army plans to transfer its avionics planning information system to a VAX-11/780 at Fort Monmouth, New Jersey. The current unavailability of the SEED DBMS on the VAX necessitates the use of the PDP-11/60 for this effort.

The primary limitation imposed by the PDP-11/60 is the amount of virtual address space available for the use of a task or executable program. Tasks that exceed 32K words must be overlaid or split into separate parts that can execute concurrently and communicate through a portion of shared memory. Such memory limitations complicate the development of software on the PDP-11/60. They will disappear when the system is rehosted on the VAX-11/780.

*SEED is the proprietary DBMS of SEED Software, a division of United Telecom Computer Group.

A significant feature of the PDP-11/60 is its operating system, RSX-11M. This particular configuration of RSX-11M provides multiuser protection, requiring a user to log on the system by supplying a user identification code (UIC) and a password. RSX-11M does not allow batch processing, as the VAX/VMS operating system does. However, all files on disk and magnetic tape volumes created under RSX-11M are transportable to VAX/VMS. Thus, all SEED data base files should be transportable between the PDP-11/60 and the VAX-11/780.

The Army data base will be loaded through the facilities of the SEED utility package, SPROUT. No force structure data beyond fiscal year 1983 will be loaded at that time, because the data are classified as confidential and all data will be processed across telephone lines.

The ADUS computer programs that produce the AF APB will be modified to account for the changes to the Air Force schema and to produce the variations in format and content established in the manual version of the APB-A. These variations include the addition of equipment terminal logistics dates, footnotes, and separate installation and funding schedules for aircraft modification programs. It is recommended that the formats of several AF APB appendixes be adapted with some minor modification and used to replace Section III, Avionics Equipment Installations, in the manually produced APB-A.

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CHAPTER ONE

INTRODUCTION

1.1 PURPOSE

The purpose of this report is to address the issues pertaining to the initial implementation of the Avionics Planning Baseline - Army (APB-A) data base on a Digital Equipment Corporation (DEC) PDP-11/60 computer located at Wright-Patterson Air Force Base (WPAFB) in Dayton, Ohio. The implementation encompasses design and loading of the data base as well as modification of existing application software to generate a hard-copy version of the APB-A.

The first edition of the APB-A was the product of the collection and manual assembly of avionics planning data for current and future planned U.S. Army aircraft into a report format similar to that of the Air Force Avionics Planning Baseline (AF APB) and the Navy Avionics Planning Baseline (NAPB). The document was developed by ARINC Research Corporation for the Avionics Systems Integration Division (ASID) of the U.S. Army Avionics Research and Development Activity (AVRADA). It will be introduced by AVRADA as an important facet of the formal avionics planning process for the Army.

An additional objective of AVRADA is to implement an automated APB-A data base compatible with existing Air Force and Navy data base architectures and capable of mechanizing the production of the APB-A. This report covers the identification of the hardware and software requirements for the computerized APB-A data base. A future report will describe the features and use of the computerized system.

1.2 BACKGROUND

The Deputy for Avionics Control in the Aeronautical Systems Division (ASD/AX) currently operates a computerized data base of avionics planning information for the U.S. Air Force. The Avionics Data Utilization System (ADUS) uses a commercial data base management system (DBMS), SEED,* to structure and maintain its data base. The ADUS also includes application software that generates the AF APB on a line printer. The Air Force

*SEED is the proprietary DBMS of SEED Software, a division of United Telecom Computer Group.

avionics data base, the application software, and the SEED software all reside on the PDP-11/60 system that will be used for the initial implementation of the Army data base. The Deputy for Avionics Control has agreed to provide the Army and its contractor, ARINC Research Corporation, with ADUS documentation, computer program source code, and adequate computer access time with which to establish an Army avionics planning information system similar to and compatible with the Air Force system.

Currently, the Air Force data base and software are being transferred to the larger, more powerful DEC VAX-11/780 computer. The performance features and essentially unlimited program address space of the VAX will permit greater enhancement capability for the ADUS.

The Navy is currently employing a VAX-11/780 in the development of its own automated NAPB data base. This effort is being performed at the Naval Avionics Center (NAC) in Indianapolis, Indiana. The Navy data base is also patterned after the AF APB data base architecture and content. Thus, a high degree of structural similarity exists among the data bases of all three services.

From the beginning of its program to develop an avionics planning document equivalent to those of the Air Force and the Navy, the Army has specified the need to maintain maximum compatibility with the content and structure of the Air Force and Navy data bases. This guideline is designed to facilitate the exchange of information between the three services for the identification of avionics standardization opportunities. For the initial installation of its automated avionics planning system, the Army has elected to employ the Air Force ADUS data base architecture and application software, modified to meet unique Army requirements, in order to make efficient and cost-effective use of the developmental work that has already been performed.

1.3 REPORT ORGANIZATION

This report discusses the three main factors that will affect the development of the computerized Army avionics planning information system: computer hardware, data base design, and application software modifications.

Chapter Two explains the salient features of the PDP-11/60 that affect the Army's use of the system for its initial data base implementation. These include virtual address space, the operating system, and available disk drive. Comparisons are made with the VAX-11/780 computer's capabilities.

Chapter Three provides an overview of the Army data base structure and outlines the steps required for data base development. Transportability and data base security are both addressed.

Chapter Four describes the existing ADUS application software and the changes that must be made to produce the APB-A. It also discusses considerations for task building the program that will produce the main APB-A report.

Chapter Five summarizes the recommendations for data base automation based on results and analysis presented in the preceding chapters.

Five appendixes supply additional information. Appendix A contains a description of schema items, records, and sets. Appendix B presents a data base structure diagram, a list of changes made to the Air Force ADUS schema, and the Army schema Data Definition Language (DDL). Appendix C presents detailed data base loading procedures and input data coding forms, Appendix D presents APB-A output formats, and Appendix E is a list of references used for this report.

CHAPTER TWO

DATA PROCESSING FACILITIES

2.1 PROCESSOR

Because of the current unavailability of the SEED DBMS on suitable AVRADA computer facilities, the PDP-11/60 at WPAFB was selected to host the initial version of the automated Army avionics data base. AVRADA has purchased SEED for installation on a VAX-11/780 computer located at Fort Monmouth, New Jersey. Installation of the DBMS is expected to occur sometime after 1 May 1983. The automated Army system will be relocated from the PDP-11/60 to the VAX-11/780 in early-to-mid 1984. Plans then are to allow direct data base access to other remote Army users such as Aviation Systems Command (AVSCOM) in St. Louis, Department of the Army (DA), and Training and Doctrine Command (TRADOC), and to Air Force and Navy users at WPAFB and NAC, respectively.

The significant characteristics of the PDP-11/60 are (1) 256K Bytes of MOS main (physical) memory, (2) 16-bit addressability, and (3) memory management hardware and software. The 16-bit addressability implies a virtual address space of 32K words, i.e., 2^{16} virtual memory locations are addressable by a 16-bit word ($2^{16} = 64K \text{ bytes} = 32K \text{ words}$). Executable modules or tasks that exceed 32K words can be structured into segments, where one segment, called the root, remains in memory at all times and the remaining segments, called overlays, can be alternately placed into memory, such that the combined memory requirements of the root and the largest overlay segment do not exceed 32K words. The memory management unit provides the automatic placement of a task image into a sufficient partition of physical memory at run time.

An alternative approach to the use of overlays is to implement dual tasking wherein the program is split into two separate parts. Both parts are initiated as separate tasks and share some common portion of memory for communications, data transfer, and control.

When the Army avionics data base is transferred to a VAX-11/780 as planned, tasks much larger than 32K words will be able to execute without user-designed overlays or dual tasking. The VAX virtual memory operating system will perform this function automatically. The 32-bit addressability of the VAX implies a virtual address space of 2^{31} words (2^{32} bytes = 2^{31} words) of which one-half is allocated for use by a task image and the environment in which it executes.

2.2 OPERATING SYSTEM

The operating system residing on the PDP-11/60 is RSX-11M Version 3.2, a disk-based operating system that supports multiprogramming and interactive programming. Unlike the VAX-11/780 VMS operating system, RSX-11M does not support batch processing. When jobs are initiated from a remote terminal, the terminal must maintain communication with the PDP-11/60 processor. For lengthy jobs, this requirement will escalate telephone line charges.

This particular RSX-11M operating system configuration provides multiuser protection, requiring a user to log on the system by supplying a user identification code (UIC) and a password.

The Monitor Console Routine (MCR) provides the interface between the user and RSX-11M. MCR allows the user to run tasks, control peripheral devices, and obtain system and task information. For program development under RSX-11M, the programmer will require the services of the text editor (EDI), the FORTRAN compiler (F77), and the Task Builder (TKB).

2.3 DISK STORAGE

For data base implementation, the Army has the use of a mountable RK07 disk provided by the Air Force. The disk has a storage capacity of 28 megabytes and, because of the availability of only one RK07 disk drive for special users, can only be mounted when the Air Force ADUS-dedicated RK07 disk is removed. Therefore, Army access time must be arranged with the ADUS data base administrator.

When an Army user logs on the system, a default User File Directory (UFD) with the same number as the assigned UIC is made available to store and protect all user-owned files. The ADUS data base administrator has placed all the SEED software (Version B11) and FORTRAN source code required for data base loading and application software modification within the Army's UFD. An additional RK07 disk, acting as the system disk for the Army's UIC, contains the necessary RSX-11M system software such as MCR, TKB, and the Peripheral Interchange Processor.

All files residing on disk and magnetic tape volumes created under RSX-11M are formatted and handled through FILES-11, an RSX-11M system task. Volumes created under FILES-11 are transportable between the RSX-11M and VAX/VMS operating systems.

When the computerized APB-A implementation is completed, it is estimated that approximately 10,000 blocks (512 bytes/block) of the storage space on the Army RK07 disk will be filled with the data files and software used, created, or modified during system development. The estimated requirements per component are:

- | | |
|------------------------------|----------------|
| - SEED executable modules | - 1,900 blocks |
| - SEED APB-A data base files | - 4,000 blocks |

- Application program FORTRAN source code	- 400 blocks
- Application program object code	- 260 blocks
- Application program executable modules	- 540 blocks
- Application program output files	- 3,000 blocks
- Miscellaneous	- <u>300 blocks</u>
	10,400 blocks
	= 5.32 megabytes

These estimates are based on existing Air Force files and Air Force experience.

The current VAX-11/780 configuration at Fort Monmouth includes only one RM05 disk drive with a storage capacity of 256 megabytes. The VAX version of the SEED DBMS software will reside on this disk so as to be available to other system users. Because this VAX facility is not controlled by AVRADA, APB-A system developers will be competing with these other users for disk space. With the growth of the APB-A data base and the writing of additional application programs to interface with it, APB-A-related storage space requirements will undoubtedly increase as AF APB requirements have done. Therefore, it is recommended that AVRADA secure its own disk drive. This would assure sufficient room for expansion as well as the constant availability of the disk to those working with and developing the APB-A.

2.4 TERMINALS

Many terminals are suitable for use with the automated APB-A data base on the PDP-11/60. However, ARINC Research recommends that the Army VAX-11/780 facility include either a DEC VT-125 or a Zenith 2-19 CRT terminal. These terminals are recommended because they can support the SEED screen-oriented applications development package, VISTA, and the graphics utility package, RAINBOW. Neither VISTA nor RAINBOW are available for the PDP-11/60.

2.5 REMOTE COMMUNICATIONS

Off-site users possessing a valid UIC and password may dial into the PDP-11/60 computer if they have access to the proper modem or acoustic coupler and a terminal. A RACAL-VADIC triple modem with automatic answering capability is connected to the PDP-11/60 and allows remote communications under either Bell 103 or Bell 212 protocol. Bell 103 protocol consists of full-duplex asynchronous operation at 0 to 300 baud. The Bell

212 protocol used is full-duplex asynchronous operation at 1200 baud. The modem or acoustic coupler and terminal at the remote site must be compatible with one or both of these protocols.

CHAPTER THREE

APB-A DATA BASE

3.1 OVERVIEW

The APB-A data base is composed of the following six sections or areas:

- Modification
- Development Program
- Equipment
- Aircraft
- Need Statement
- Avionics

Each area represents a physical subdivision of the data base and is handled as a separate file by the SEED DBMS. The data in each area are stored in records that are made up of data items. The records in an area are logically related through sets. Sets may also be used to define a logical relationship between records in different areas. A set relationship consists of one owner record type and one member record type.

The Modification Area contains information concerning ASID involvement in each Product Improvement Proposal (PIP). The Development Program Area contains data for Army avionics research and development programs. Currently, it is not planned for data to be loaded into this section of the APB-A data base. Those Army avionics programs in advanced or engineering development that are funded, referenced by a requirements document (Letter of Agreement [LOA], Required Operational Capability [ROC], Material Need [MN], or Letter Requirement [LR]), and designated for one or more specific aircraft are included in the preliminary version of the APB-A as other planned avionics programs. In future updates, however, these and other less defined programs could be placed in the Development Program Area.

The records of the Equipment Area store data peculiar to the various avionics equipments that appear in the APB-A. Equipment function, nomenclature, description, and point-of-contact information are among the data items in this section. The Aircraft Area describes the Army aircraft tracked in the APB-A. Records will be present for aircraft at the series level, e.g., OV-1C, or, if necessary, the block level, e.g., AH-1S#1. This area also includes force structure information.

The Need Statement Area contains the identification numbers and titles of documents that specify a required capability for certain Army aircraft. The Avionics Area provides the means of linking the necessary modification program (PIP), equipment, and requirements document information to aircraft. This section also provides PIP points of contact, installation schedules, and years of funding.

Appendix A contains detailed descriptions of the items, records, and sets in the six areas.

Figure 3-1 shows the structure of the APB-A data base. Areas are partitioned by dashes; records are enclosed in rectangular boxes; sets are illustrated by arrows starting from the owner record type and ending at the member record type. Generic record names are listed within the rectangular boxes. Only one rectangular box appears without a generic name. This record, EQLR, contains no data items. It serves as a logical connector or link record for a special type of relationship known as a bill-of-materials structure, i.e., a many-to-many relationship among records of the same type. Beneath the generic record name, the SEED name is listed. SEED names are those used to specify the record, item, or set in the data base schema. SEED set names are listed next to their corresponding arrows.

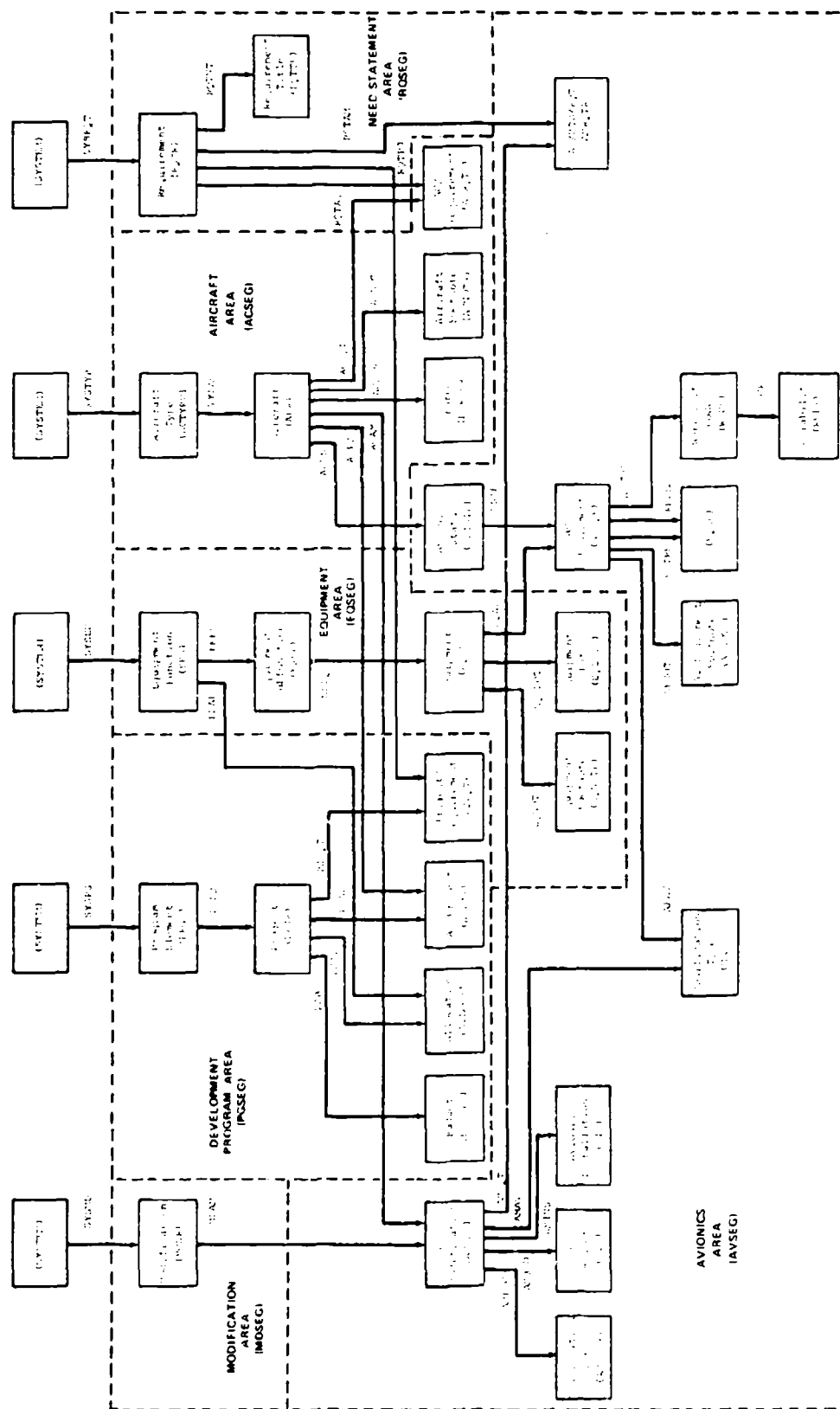
3.2 DATA BASE DEFINITION

The APB-A data base areas, records, items, and sets described in Appendix A must be declared and assigned the proper attributes in the data base schema. The schema prepared for the Army avionics data base appears in Appendix B.

While the schema provides the definition of the overall structure of the data base, a subschema is necessary to establish access to the data. A subschema may permit access to all or part of the data base. FORTRAN and COBOL application programs and all available SEED programs (HARVEST, BLOOM, VISTA, GARDEN, and SPROUT) require a subschema that provides the interface to the data base. The interface is called the User Working Area (UWA) and is produced by the subschema processor when it compiles the subschema definition language.

3.3 DATA BASE LOADING

The Army data base can be loaded interactively by using the Data Manipulation Language (DML) of GARDEN or by means of an interactive job that invokes the Transaction Input Processor (TRIN) of SPROUT. TRIN will be



Adapted from Avionics Data Utilization System Data Dictionary (Reference 3).

FIGURE 3-1

APB-A DATA BASE STR

used for the initial loading of data. The input data forms found in Appendix C will be completed and used to create four separate transaction files. Data in the transaction files will be entered to ensure that proper set linkages are established when the data base is loaded. This process is further described in Appendix C. Further information on the use of TRIN may be found in the SPROUT User Manual (Reference 1).

3.4 TRANSPORTABILITY

As stated in Section 2.3, files on disk and magnetic tape media created under the RSX-11M operating system are transportable to the VAX/VMS operating system. Conversations with various SEED software experts have confirmed that SEED data base files are transportable from the PDP-11/60 to the VAX-11/780. These files can be copied to a magnetic tape and then dumped to a hard disk in the VAX facility. Only if schema changes are made will the unloading and reloading of the Army data base be necessary. This is true even if the files are not transported.

3.5 DATA BASE SECURITY

When the Army avionics data base becomes available for access by many users, the Army data base administrator must face the problem of protecting certain areas of the data base from examination and modification by unauthorized personnel. To this end, subschemas can be designed to include only those items, records, and sets which do not contain or relate to the sensitive information. Subschemas can be dedicated to the need of a particular user. Those users to whom data base access is permitted for "read only" purposes would have the use of the SEED query language, HARVEST, the report writer, BLOOM, and the associated subschemas and subschema passwords. Those users would require no other SEED DBMS software facilities.

Several system users may, however, be using the SEED DBMS to develop other applications. Those not responsible for Army avionics data base maintenance should not have access to the schema password or to the subschema definition language that contains this password. Otherwise, they would be able to write their own subschemas and access the part of the data base that the data base administrator wishes to protect.

Because force structure data beyond fiscal year 1983 is classified as confidential, they will not be loaded for the initial Army data base implementation. ARINC Research will perform the data loading from a remote terminal, and classified data may not be transmitted over telephone lines.

CHAPTER FOUR

APPLICATION SOFTWARE

4.1 CONTENT

The ADUS application computer programs provided by the Air Force are written in DEC FORTRAN 77 and produce the main report and Appendixes D through H of the AF APB. Appendixes A, B, and C are text files that are entered by using the RSX-11M text editor and then are output on a line printer. These appendixes contain a list of references, document abbreviations, and Air Force avionics points of contact, respectively. Appendixes D and E provide avionics equipment nomenclatures sorted by functional area and in alphanumeric order. Appendix E also displays aircraft installations, equipment status, and equipment point-of-contact information. Appendix F shows avionics aircraft installations by equipment functional area. Appendixes G and H contain avionics modification programs and research and development programs, respectively.

The main report and each of the appendixes are generated separately. An appendix is produced by executing a specific command file for that appendix. The command file, in turn, runs a FORTRAN program that retrieves the necessary data from the data base, invokes a sort utility to sort the data, and runs yet another FORTRAN program to print the appendix.

4.2 MEMORY REQUIREMENTS

As mentioned in Section 2.1, the size of an executable module or task on the PDP-11/60 is limited to 32K words. Overlays can be used to segment a larger task into modules that are each less than 32K words. In this mode the FORTRAN subroutines are linked during task building with the DML library routines they call. These DML object files occupy part of the allotted 32K words of virtual address space and thus place further restrictions on the size of the FORTRAN application program.

To preserve the storage space normally required by the DML routines, the Air Force APB program runs in a dual-task environment. In a dual-task environment, two tasks run concurrently and communicate with each other through a region of shared memory. This procedure requires a special DML module, provided by SEED software, that permits each DML routine to be executed as a separate task. Further information about this process can

be found in Section 6 of the SEED Operating Guide PDP-11/RSX-11M (Reference 2). According to this guide, the DML module and the shared-memory region require approximately 4.6K words of virtual address space, leaving roughly 27.4K words for the application program. The current AF APB program can be run in this space without using overlays. Should modifications to the program cause the task to exceed 27.4K words, overlays can be used within the context of the dual-task environment.

4.3 REQUIRED MODIFICATIONS

Once the Army avionics planning information system is relocated to the VAX-11/780 computer, all necessary software modifications can be made without regard for memory limitations. However, both AVRADA ASID personnel and ARINC Research analysts have agreed that the current Air Force ADUS schema is inadequate for representing APB-A data base requirements. Using the existing ADUS schema, the Army would obtain a data base structured to comply with Air Force requirements. The Army data base would be lacking the data needed to represent the unique features of the APB-A such as terminal logistics dates, footnotes, and separate PIP installation and funding schedules. An AF APB replica would be the only possible resulting document. If the APB-A format were to be duplicated at a later date, the schema would have to be modified and the data base unloaded and reloaded.

ARINC Research plans to load the APB-A data base by using the modified schema and the SPROUT facilities. Once this step has been completed, ARINC Research will proceed to modify the ADUS application software. Table 4-1 summarizes the program changes necessary to produce the main APB report in the format designed for the Army. The first three changes will be performed while the APB-A automated system resides on the PDP-11/60. The remaining changes will be accomplished after the system has been rehosted on the VAX-11/780. At this time, it is recommended that the formats of the AF APB Appendixes D through G be adapted, with minor changes, for the APB-A. Section III, Avionics Equipment Installations, in the manually produced version of the APB-A combined the features of Appendixes D, E, F, and G of the AF APB to display the contents of Section II, Aircraft Avionics Configurations, by equipment instead of by aircraft. This was done to conserve the time and resources that would be consumed in reproducing all four appendixes separately. For the automated version, it is simpler and equally effective to make use of the existing Air Force formats in lieu of Section III.

Appendix H of the AF APB, consisting of a list of avionics research and development programs, will not be modified or adapted at this time because of the absence of such data in the preliminary APB-A.

Appendix D to this report contains the planned formats for the APB-A main report and its appendixes. It also illustrates the data items and record types that appear in the fields on each report page.

TABLE 4-1

PLANNED MODIFICATIONS TO ADUS APPLICATION SOFTWARE FOR APP-A MAIN REPORT

Description of Change	Affected Sections					
	Existing Avionics	Ongoing Avionics Modifications	Other Planned Avionics	Modification Planning Funds	Force Structure	Requirements Documents
Confirm that all program variable names are consistent with those found in new User Working Area.	X	X	X	X	X	X
Show modification schedule based on time frame for installations only.	X	X	X			
Change various column headings to match those in APP-A.	X	X	X	X	X	X
Display funding schedule based on years of funding for modification and showing no dollar amounts.				X		
Change number of years in report from 15 to 10.	X	X	X	X	X	
Add terminal logistics dates.	X					
If "Terminal Logistics Date," "Total Aircraft Equipped," or "Number per Aircraft" are unknown, leave respective column entries blank.	X	X	X			
Add column for footnotes.	X	X	X			
Create footnotes report.						X
Add (M), (R), or (A) in equipment nomenclature column to signify whether change is modification, replacement, or addition, respectively.		X	X			
Print an asterisk immediately after schedule start or finish dates that are estimated or uncertain.	X	X	X	X		

CHAPTER FIVE

RECOMMENDATIONS

For the initial APB-A data base implementation on the PDP-11/60 computer at WPAFB, ARINC Research Corporation recommends that the basic formats of AF APB Appendixes D, E, F, and G be adapted to replace Section III, Avionics Equipment Installations, of the manually prepared version of the APB-A. The use of the AF APB appendixes requires relatively minor software changes as opposed to those required in creating a report in the format of Section III.

The following recommendations are offered for the future rehosting of the automated APB-A system on the VAX-11/780 computer at Fort Monmouth, New Jersey:

- The VAX-11/780 facility should include either a DEC VT-125 or a Zenith Z-19 CRT terminal, because of their ability to support both the SEED screen-oriented application development package, VISTA, and the graphics utility package, RAINBOW.
- The direct transportability of SEED data base files from the PDP-11/60 to the VAX should be confirmed. A magnetic tape containing the files can be created, with the cooperation of the Air Force computer facility personnel at WPAFB, and copied to a disk on a VAX-dedicated disk drive.
- To prevent the periodic dismounting of an Army APB-A dedicated disk from a shared disk drive, which is currently the case on the PDP-11/60 system at WPAFB, and to avoid storage space restrictions resulting from competition among the users of the VAX-11/780 for file space on the system's single hard disk, it is recommended that AVRADA obtain its own disk drive for the residence of APB-A data files and application programs.

APPENDIX A

DESCRIPTION OF SCHEMA ITEMS, RECORDS, AND SETS

The following tables present a list of the items, records, and sets found in each section or area of the APB-A data base. The table formats are based on those found in the Avionics Data Utilization System Data Dictionary (Reference 3). To maintain compatibility and facilitate cross-referencing between Army and Air Force documentation, the tables retain the names and descriptions of those ADUS elements which required no modification for APB-A purposes. Items and records for which Army avionics data have not yet been assembled are also retained for future use.

For each area, there are two tables. The first table displays records and the items comprised. Each record and item appears with its descriptive generic name that signifies the type of data it contains and the SEED name that defines the entity in the schema. The item FORTRAN format specifier is shown, along with a brief description of the item.

The second table for each area contains information about the sets whose owner records are stored in that area. The member records of a set may or may not be in the same area. Each set is shown with its SEED name, owner record type, member record type, and a short description of the meaning of a set occurrence, i.e., the relationship between an owner record occurrence and its member record occurrences.

TABLE A-1
MODIFICATION AREA RECORDS AND ITEMS

Record	Item		
Generic Name/ SEED Name	Generic Name	SEED Name	Format Description
Modification MODR	PIP Number	MOD	A8 A portion of the formally assigned nine-digit Product Improvement Proposal (PIP) number in the format YY-XXXX, where YY = fiscal year in which initial funds are (were) intended to be spent for the PIP XXXX = sequence number assigned by the sponsoring subcommand Changes not specified by a formal PIP will be assigned a pseudo-PIP number. Extent of Avionics Systems Integration Division (ASID) involvement in the PIP, where D = Deeply involved M = Moderately involved F = Filed C = Closed
	ASID Involvement	MODIN	A2
	ASID POC	MODPO	A16 ASID point of contact for the PIP

TABLE A-2

MODIFICATION AREA SETS

SEED Name	Owner Record/ SEED Name	Member Record/ SEED Name	Meaning of Set Occurrence
SYSMD	System SYSTEM	Modification MODR	These modification records can be sorted by PIP number.
MDAM	Modification MODR	Aircraft/Modification Link ACMDR	This PIP affects these aircraft.

TABLE A-3

DEVELOPMENT PROGRAM AREA RECORDS AND ITEMS

Record	Item			
Generic Name/ SEED Name	Generic Name	SEED Name	Format	Description
Program Element PRGR	Program Element Number	PRG	A6	Alphanumeric identification of a specific program element (e.g., 63221)
	Program Element Title	PRGN	A26	Phrase describing the program element
Project PRJR	Project Number	PRJ	A4	Breakdown of program element into a specific effort or technical area
	Project Title	PRJN	A26	Phrase describing the project
	Mission Area	PRJMIS	A20	Army mission area to which the program belongs or can be related
	ASID Involvement	PRJIN	A2	Extent of ASID involvement in the project, where

D = Deeply involved
 M = Moderately involved
 F = Filed
 C = Closed

(continued)

TABLE A-3 (continued)

Record	Item			
Generic Name/ SEED Name	Generic Name	SEED Name	Format	Description
Project PRJR	ASID POC	PRJPO	A16	ASID point of contact for the project.
(continued)	Proportion Avionics	PROAV	F4.2	Proportion of funding for this program (e.g., 0.5 for one-half) used to develop avionics
Program Budget BUDFYR	Source	A3		
	Level	A3		
		SORCE		
	Years Supplied	A2		
	First Year	YR1	I2	Source of budget data -- e.g., Program Objectives Memorandum (POM)
				Funding level in data from budget source, such as:
				MIN - Minimum
				BAS - Basic Program
				ENH - Enhanced
				DEC - Decremental
				Last two digits of calendar year of publication of budget source
				Last two digits of first fiscal year of budget data

(continued)

TABLE A-3 (continued)

Record	Item			
Generic Name/ SEED Name	Generic Name	SEED Name	Format	Description
Program Budget BUDFYR (continued)	Budget in Ith Fiscal Year	BUDYR1 . . . BUDYR8	8F6.1	Budget in millions of then-year dollars for the Ith fiscal year
Allocation Link ALLOCR	Fraction Allocation	FCTALL	F4.2	Fraction (e.g., 0.33) of funding for this development program that is devoted to an equipment function (see set EFAL in Table A-6)
Aircraft/ Project Link ACPJR	Aircraft T/M/S (/B) Program Element Number Project Number	} A12 Aircraft type/model/series (/block number) (e.g., OV-1B, AH-1S#3) A6 Identification of a specific program element A4 Breakdown of program element into specific effort or technical area		

(continued)

TABLE A-3 (continued)

Record		Item		
Generic Name/ SEED Name	Generic Name	SEED Name	Format	Description
Project/ Requirements Link PJRQTR	Program Element Number	PJRQTL	A6	Identification of a specific program element
	Project Number		A4	Breakdown of program element into specific effort or technical area
	Requirements Document Number		A16	Reference number of ROC, LR, MN, or LOA need statement

TABLE A-4

DEVELOPMENT PROGRAM AREA SETS

SEED Name	Owner Record/ SEED Name	Member Record/ SEED Name	Meaning of Set Occurrence
SYSPG	System SYSTEM	Program Element PRGR	These program element records can be sorted by program element number.
PGPJ	Program Element PRGR	Project PRJR	This program element is composed of these projects.
PJBD	Project PRJR	Program Budget BUDFYR	These budget records supply funding information for this project.
PJAL	Project PRJR	Allocation Link ALOCR	These allocation records divide the project funding by equipment function.
PJAC	Project PRJR	Aircraft/Project Link ACPJR	This project in this development program will develop this capability for the linked aircraft.
PJRQT	Project PRJR	Project/Requirements Link PJRQTR	This project in this development program will develop a capability to assist in satisfying the needs specified by the requirements documents indicated by these link records.

TABLE A-5
EQUIPMENT AREA RECORDS AND ITEMS

Record		Item	
Generic Name/ SEED Name	Generic Name	SEED Name	Format
Equipment Function EFR	Function Code	EF	A4
Description			
One of the following codes, representing the primary functional capability of an equipment:			
APS - Avionics Processing System ASE - Aircraft Survivability Equipment C - Communications CMS - Cockpit Management System EL - Power Distribution FL - Flight Controls ID - Identification IN - Instrumentation M - Mission Equipment MIS - Miscellaneous N - Navigation NWD - Navigation/Weapons Delivery R - Reconnaissance WD - Weapons Delivery			
Function Description	EFT	A32	Long-form description of equipment function code indicated above

(continued)

TABLE A-5 (continued)

Record	Item			
Generic Name/ SEED Name	Generic Name	SEED Name	Format	Description
Equipment Function EFR (continued)	Equipment Group	EG	A4	Equipment grouping as follows: CM - Common CR - Core MS - Mission
Equipment Subfunction ESFR	Equipment Subfunction Code	ESF	A6	Abbreviation for equipment subfunction; currently, the APB-A uses no subfunctions
	Equipment Subfunction Description	ESFT	A36	Long-form identification of equipment subfunction indicated above
Equipment EQR	Equipment Nomenclature	EQ	A12	AN/nomenclature, pseudonomenclature, or commercial designation identifying the equipment
	Equipment Type	EQDES	A20	A generic description of the equipment (e.g., UHF Radio)

(continued)

TABLE A-5 (continued)

Record	Item			
Generic Name/ SEED Name	Generic Name	SEED Name	Format	Description
Equipment EQR (continued)	Standard Preferred Item	SPI	A4	Indicator for standard preferred item: SPI - Standard item (blank) - Not a standard item
	Average Unit Cost	AUC	I6	Average unit cost in thousands of dollars for all units bought to date
	Quantity	QTY	I8	Quantity of this equipment produced to date
	Year of Information	YR	I2	Last two digits of fiscal year applicable for the average cost and quantity data items
	First Unit Cost	FU	I6	Estimated cost in thousands of dollars of the first unit produced (for learning-curve computations)
	First Unit Cost Year	FUYR	I2	Last two digits of fiscal year applicable to first unit cost
	Equipment POC Organization	EQPOC	A20	Organization in DARCOM responsible for this equipment
	Equipment POC Phone Number	EPHONE	A8	Autovon phone number for the equipment point of contact

(continued)

TABLE A-5 (continued)

Record	Item			
Generic Name/ SEED Name	Generic Name	SEED Name	Format	Description
Equipment EQR (continued)	Equipment POC	EQNAM	A16	Name of point of contact in DARCOM for this equipment
	Terminal Logistics Date	EQTLD	I4	Year by which the logistics support of the equipment will no longer be feasible or cost-effective
	Spare	EQSP	A16	Space reserved for future use
Equipment Lot EQLOTR	Year	LCYR	I2	Last two digits of the fiscal year in which the first units in this lot were accepted by the Army
	Lot Quantity	LOTQTY	I5	Total number of units produced in this lot
	Contractor	CONT	A16	Contractor supplying the equipment
	Competition	COMP	A4	Flag indicating whether the contract was a competitive award:
				CMP - Competitive Buy SS - Sole Source

(continued)

TABLE A-5 (continued)

Record	Item			
Generic Name/ SEED Name	Generic Name	SEED Name	Format	Description
Equipment Lot EQLGTR (continued)	GFE/CFE Indicator	GFE/CFE	A4	Flag indicating whether this equipment will be used as Government-furnished equipment in a larger system: GFE - Government-Furnished Equipment CFE - Contractor-Furnished Equipment (blank) - Neither
	Spare	FQLTSP	A10	Space reserved for future expansion
Equipment Footnote EQNOTR	Footnote	EQNOTE	A100	A comment or explanation that provides additional information peculiar to the equipment

TABLE A-6

EQUIPMENT AREA SETS

SEED Name	Owner Record/ SEED Name	Member Record/ SEED Name	Meaning of Set Occurrence
SYSEF	System SYSTEM	Equipment Function EFR	These equipment function records can be sorted by function code.
EFES	Equipment Function EFR	Equipment Subfunction ESFR	This equipment function is composed of these equipment subfunctions.
EFAL	Equipment Function EFR	Allocation Link ALLOCR	This equipment function has been allocated funding by the linked projects.
ESEQ	Equipment Subfunction ESFR	Equipment EQR	These equipments fall under this equipment subfunction.
EQAE	Equipment EQR	Aircraft/Equipment Link ACEQR	This equipment is or will be installed on these aircraft.

(continued)

TABLE A-6 (continued)

SEED Name	Owner Record/ SEED Name	Member Record/ SEED Name	Meaning of Set Occurrence
EQELOT	Equipment EQR	Equipment Lot EQLOTR	These equipment lots were historical buys of this equipment.
EQNOT	Equipment EQR	Equipment Footnote EQNOTR	These footnotes provide additional information about this equipment.

TABLE A-7

AIRCRAFT AREA RECORDS AND ITEMS

Record		Item	
Generic Name/ SEED Name	Generic Name	SEED Name	Format Description
Aircraft Type ACTYPR	Aircraft Type	ACTYP	A24 APB-A aircraft type headings (P/W = fixed wing, R/W = rotary wing): F/W - Cargo/Transport F/W - Observation F/W - Reconnaissance F/W - Trainer F/W - Utility R/W - Attack R/W - Cargo/Transport R/W - Observation R/W - Special Electronic R/W - Trainer R/W - Utility
Aircraft ACR	Aircraft T/M/S (/B)	AC	A12 Aircraft type/model/series (/block number) (e.g., OV-1B, AH-1S#3)
	Aircraft Sort Key	ACSRT	I3 Indicates order of aircraft printouts within each aircraft type. Aircraft with smallest sort key is printed first.

(continued)

TABLE A-7 (continued)

Record	Item			
Generic Name/ SEED Name	Generic Name	SEED Name	Format	Description
Aircraft ACR (continued)	Mission 1	ACM1	A20	Up to three aircraft missions may be specified for each aircraft T/M/S
	Mission 2	ACM2	A20	
	Mission 3	ACM3	A20	
	System Manager	ACSYS	I3	Index into a table of system managers
Force Structure FORCER	Fiscal Year	FORCE	I2	Last two digits of fiscal year of force structure information
	Active Army Forces	FORACT	I4	The expected number of aircraft of this T/M/S designation in the active forces at the start of the indicated fiscal year
	Army Reserve Forces	FORRES	I4	The expected number of aircraft of this T/M/S designation in the reserve forces at the start of the indicated fiscal year
	Army National Guard	FORNG	I4	The expected number of aircraft of this T/M/S designation in the National Guard forces at the start of the indicated fiscal year

(continued)

TABLE A-7 (continued)

Record	Item			
Generic Name/ SEED Name	Generic Name	SEED Name	Format	Description
Aircraft/ Requirements Link ACRQTR	Aircraft T/W/S (/B) Requirements Document Number	ACRQTL	A12	Aircraft type/model/series (/block number) designation
			A16	Reference number of ROC, LR, MN, or LOA need statement
Aircraft Footnote ACNOTR	Footnote	ACNOTE	A100	A comment or explanation that provides additional information peculiar to the aircraft

TABLE A-8

AIRCRAFT AREA SETS

SEED Name	Owner Record/ SEED Name	Member Record/ SEED Name	Meaning of Set Occurrence
SYSTYP	System SYSTEM	Aircraft Type ACTYPR	These aircraft type records can be sorted alphabetically by type.
TYPAC	Aircraft Type ACTYPR	Aircraft ACR	This aircraft type includes these aircraft T/M/S designations.
ACPJ	Aircraft ACR	Aircraft/Project Link ACPJR	The projects in these development programs are developing avionics for this aircraft.
ACAM	Aircraft ACR	Aircraft/Modification Link ACMDR	These PIPs will modify, replace, or add avionics to this aircraft.
ACVS	Aircraft ACR	Avionics Status VSTATR	This aircraft contains equipment with the function and status indicated by these avionics status records.
ACFOR	Aircraft ACR	Force Structure FORCER	The expected numbers of aircraft with this T/M/S designation are supplied for the fiscal years indicated by these force structure records.

(continued)

TABLE A-8 (continued)

SEED Name	Owner Record/ SEED Name	Member Record/ SEED Name	Meaning of Set Occurrence
ACRQT	Aircraft ACR	Aircraft/Requirements Link ACRQTR	These need statements indicated by these link records apply to this aircraft.
ACNOT	Aircraft ACR	Aircraft Footnote ACNOTR	These footnotes provide additional information about this aircraft.

TABLE A-9
NEED STATEMENT AREA RECORDS AND ITEMS

Record		Item		
Generic Name/ SEED Name	Generic Name	SEED Name	Format	Description
Requirements Document RQTR	Requirements Document Number	RQTN	A16	Reference number of ROC, LR, MN, or LOA need statement
Requirements Document Title RQTTTR	Requirements Document Title	RQTT	A60	Phrase describing the need or requirement

TABLE A-10

NEED STATEMENT AREA SETS

SEED Name	Owner Record/ SEED Name	Member Record/ SEED Name	Meaning of Set Occurrence
SYSRQT	System SYSTEM	Requirements Document RQTR	These requirements document records can be sorted by requirements document number.
RQTNT	Requirements Document RQTR	Requirements Document Title RQTTR	This need statement is described by these title records.
RQTAC	Requirements Document RQTR	Aircraft/Requirements Link ACRQTR	This requirements document applies to the aircraft designations indicated by these link records.
RQTPJ	Requirements Document RQTR	Project/Requirements Link PJRQTR	This requirements document helps to establish the requirements for the projects and development programs indicated by these link records.
RQTAM	Requirements Document RQTR	Aircraft/ Modification/ Requirements Link AMRQTR	This requirements document helps to set the requirements for the PIPs indicated by these link records.

TABLE A-11
AVIONICS AREA RECORDS AND ITEMS

Record	Item		
Generic Name/ SEED Name	Generic Name	SEED Name	Description
Avionics Status VSTATR	Aircraft T/M/S (/B)	A12	Aircraft type/model/series (/block number) designation
	Equipment Function Code	A4	Abbreviation representing the primary functional capability of an equipment (see EFR in Table A-5 for complete list of codes)
	Avionics Status	A4	Status of equipment installation on this aircraft: EXT - Existing OCM - Ongoing Modification OPA - Other Planned Avionics OOP - Optional Other Planned Avionics
		VSTAT	
Aircraft/ Equipment Link ACEQR	Aircraft T/M/S (/B)	A12	Aircraft type/model/series (/block number) designation
	Equipment Nomenclature	A12	AN/nomenclature, pseudonomenclature, or commercial designation identifying the equipment
	Number Per Aircraft	I2	Quantity of this equipment to be installed in each aircraft
		VQ	

(continued)

TABLE A-11 (continued)

Record	Item			
Generic Name/ SEED Name	Generic Name	SEED Name	Format	Description
Aircraft/ Equipment Link ACEQR (continued)	Current Number of Aircraft Equipped	PREAC	I4	The total number of aircraft with this designation in which this equipment is installed or has mounting provision at the start of the current fiscal year
Aircraft/ Modification Link ACMDR	Aircraft T/M/S (/B) PIP Number	ACMOD	A12 A8	Aircraft type/model/series (/block number) designations PIP number in the format YY-XXXX. See MODR in Table A-1 for a complete description.
	PIP Status	AMSTAT	A4	Status of this PIP for this aircraft: CM - Current (Ongoing) Modification FM - Future Planned Modification OM - Optional Modification
	PIP Title	MODSUB	A20	Phrase defining the PIP as it applies to this aircraft

(continued)

TABLE A-11 (continued)

Record	Item			
Generic Name/ SEED Name	Generic Name	SEED Name	Format	Description
Aircraft/ Modification Link ACMDR (continued)	Funding Type	VFT	A4	Code for funding types: MUL - Multiple SYS - System Level TMS - One Aircraft
Modification Point of Contact AMPOCR	Point of Contact	MODPOC	A14	Point of contact for PIP
	Point-of-Contact Location	MODLOC	A26	Point-of-contact organization and phone number
Avionics Budget VBR	Fiscal Year	VB	I2	Last two digits of fiscal year of PIP budget information
	Schedule Estimation Indicator	VBE	I1	Flag to indicate uncertainty in the beginning or end of the funding schedule. If the indicated fiscal year is first or last in the schedule and uncertain, enter "1". Otherwise, enter "0".
	PIP Budget	VBB	F5.1	Budgeted amount in millions of then-year dollars to accomplish this PIP for this aircraft; not currently used for the APB-A

(continued)

TABLE A-11 (continued)

Record	Item			
Generic Name/ SEED Name	Generic Name	SEED Name	Format	Description
Avionics Installations VIR	Fiscal Year	V1	I2	Last two digits of fiscal year of PIP installation information
	Install Quantity	VIQ	I4	Number of aircraft in which avionics changes will be installed in the indicated fiscal year
	Schedule Estimation Indicator	VIE	I1	Flag to indicate uncertainty in the beginning or end of the installation schedule. If the indicated fiscal year is the first or last in the schedule and uncertain, enter "1". Otherwise, enter "0".
Aircraft/ Modification/ Requirements Link AMRQTR	Aircraft T/M/S (/B, PIP Number	AMRQTL	A12	Aircraft type/model/series (/block number) designation
			A8	A portion of the formally assigned nine-digit PIP number in the format YY-XXXX, where YY = Fiscal year in which initial funds are (were) intended to be spent for the PIP XXXX = Sequence number assigned by the sponsoring subcommand

(continued)

TABLE A-11 (continued)

Record	Item		
Generic Name/ SEED Name	Generic Name	SEED Name	Description
Aircraft/ Modification/ Requirements Link AMRQTR (continued)	PIP Number (continued) Requirements Document Number	A8 AMRQTL A16	Changes not specified by a formal PIP will be assigned a pseudo-PIP number. Reference number of ROC, LR, MN, or LOA need statement
Modification/ Aircraft/ Equipment Link MAER	Type of Avionics Change	TYPCHG A2	The generic action on this aircraft's avionics accomplished by this PIP: M - Modification R - Replacement A - Addition
Aircraft/ Equipment Footnote AENOTR	Footnote	AENOTE A100	A comment or explanation that provides additional information for this equipment on this aircraft
Work Unit WUCR	Work Unit Code	WUC A6	Army work unit code for this black box
	National Stock Number	NSN A16	National stock number for this black box

(continued)

TABLE A-11 (continued)

Record	Item		
Generic Name/ SEED Name	Generic Name	SEED Name	Format Description
Work Unit WUCR (continued)	Work Unit Code Description	WUCDES	A20 Description of the black box
	Quantity Per Application	WUCQPA	I4 Number of black boxes indicated by this work unit code that are used in this piece of avionics on the indicated aircraft
	Weight	WEIGHT	I6 Weight, in pounds, of the black box
	Spare	WUCSP	A20 Reserved for future use
Reliability RELR	Date of Report	RDATE	A6 Date this report was filed in MMDDYY format (e.g., May 23, 1983 becomes 052383)
	Reporting Interval	REPINT	I2 Number of months covered by this report
	Inventory	RELINV	I6 Number of distinct black boxes with this work unit code in the inventory during this period
	Total Operating Time	RPTIME	I8 Reported total hours of operating time for black boxes with this work unit code in this period

(continued)

TABLE A-11 (continued)

Record	Item			
Generic Name/ SEED Name	Generic Name	SEED Name	Format	Description
Reliability REL (continued)	Number of failures	RENG	I5	Total number of failures observed in this period
	Spare	RELS	A20	Reserved for future use

TABLE A-12

AVIONICS AREA SETS

SEED Name	Owner Record/ SEED Name	Member Record/ SEED Name	Meaning of Set Occurrence
VSAE	Avionics Status VSTATR	Aircraft/Equipment Link ACEQR	These equipments are or will be installed on this aircraft and have the function and status indicated in the owner record.
AMBUD	Aircraft/ Modification Link ACMDR	Avionics Budget VBR	This PIP for this aircraft has funding in the fiscal years indicated in the avionics budget records.
AMRQT	Aircraft/ Modification Link ACMDR	Aircraft/Modification/ Requirements Link AMRQTR	These need statements are requirements for this PIP on this aircraft.
AMPOC	Aircraft/ Modification Link ACMDR	Modification Point of Contact AMPOCR	These modification points of contact are sources of information for this PIP on this aircraft.

(continued)

TABLE A-12 (continued)

SEED Name	Owner Record/ SEED Name	Member Record/ SEED Name	Meaning of Set Occurrence
AMAV	Aircraft/ Modification Link ACMDR	Modification/Aircraft/ Equipment Link MAER	These equipments are modifications, replacements, or additions on this aircraft affected by this PIP.
AMINS	Aircraft/ Modification Link ACMDR	Avionics Installation VIR	This PIP for this aircraft has the installation schedule and installation quantities indicated in these fiscal years.
AEAV	Aircraft/ Equipment Link ACEQR	Modification/Aircraft/ Equipment Link MAER	The PIP indicated by this link record will install this equipment on this aircraft. This set is currently one-to-one.
FUTRE	Aircraft/ Equipment Link ACEQR	Equipment Replacement Link EQLR	This equipment on this aircraft will be replaced by one or more equipments on this aircraft. The link record, EQLR, contains no data items. It serves only to establish the link between equipments and their replacements.

(continued)

TABLE A-12 (continued)

SEED Name	Owner Record/ SEED Name	Member Record/ SEED Name	Meaning of Set Occurrence
REPLC	Aircraft/ Equipment Link ACEQR	Equipment Replacement Link EQLR	This equipment on this aircraft will replace one or more equipments on this aircraft. This set is used in conjunction with the FUTRE set to indicate equipment replacements.
AEWUC	Aircraft/ Equipment Link ACEQR	Work Unit Code WUCR	This equipment on this aircraft consists of these work unit codes.
AENOT	Aircraft/ Equipment Link ACEQR	Aircraft/Equipment Footnote AENOTR	These footnotes provide additional information about this equipment on this aircraft.
WUCREL	Work Unit Code WUCR	Reliability REL	This work unit code has historical failure data in the years represented by these reliability records.

APPENDIX B

APB-A DATA BASE SCHEMA

This appendix supplies a data structure diagram of the APB-A data base, a summary of the modifications made to the Air Force ADUS schema, and a list of the actual Army data base schema Data Definition Language (DDL). Figure B-1 displays the data base structure and the location mode of each record type. The location mode has been inserted within the record rectangle beneath the SEED name of the record. This information also appears in the schema DDL and is necessary to properly access the data base by using Data Manipulation Language (DML) commands. The format for Figure B-1 was adapted from Reference 3.

Table B-1 shows the changes that were made to the ADUS schema. The table contains changes made to existing SEED names and existing item formats. It also contains any items, records, or sets that were added or deleted. The gaps in the table delineate the areas in the data base. The first group of changes after those to the schema name and privacy lock are in the Modification Area. Changes to the Development Program Area, the Equipment Area, the Aircraft Area, the Need Statement Area, and the Avionics Area follow.

The APB-A data base schema is shown in Figure B-2. This DDL was produced by modifying that found in Reference 3. The figure reflects the changes listed in Table B-1. The PDP-11/60 operating environment allows a maximum of 15 areas, 300 items, 30 arrays, 75 records, and 75 sets in a schema. The totals for the Army schema are six areas, 97 items, 0 arrays, 36 records, and 40 sets.

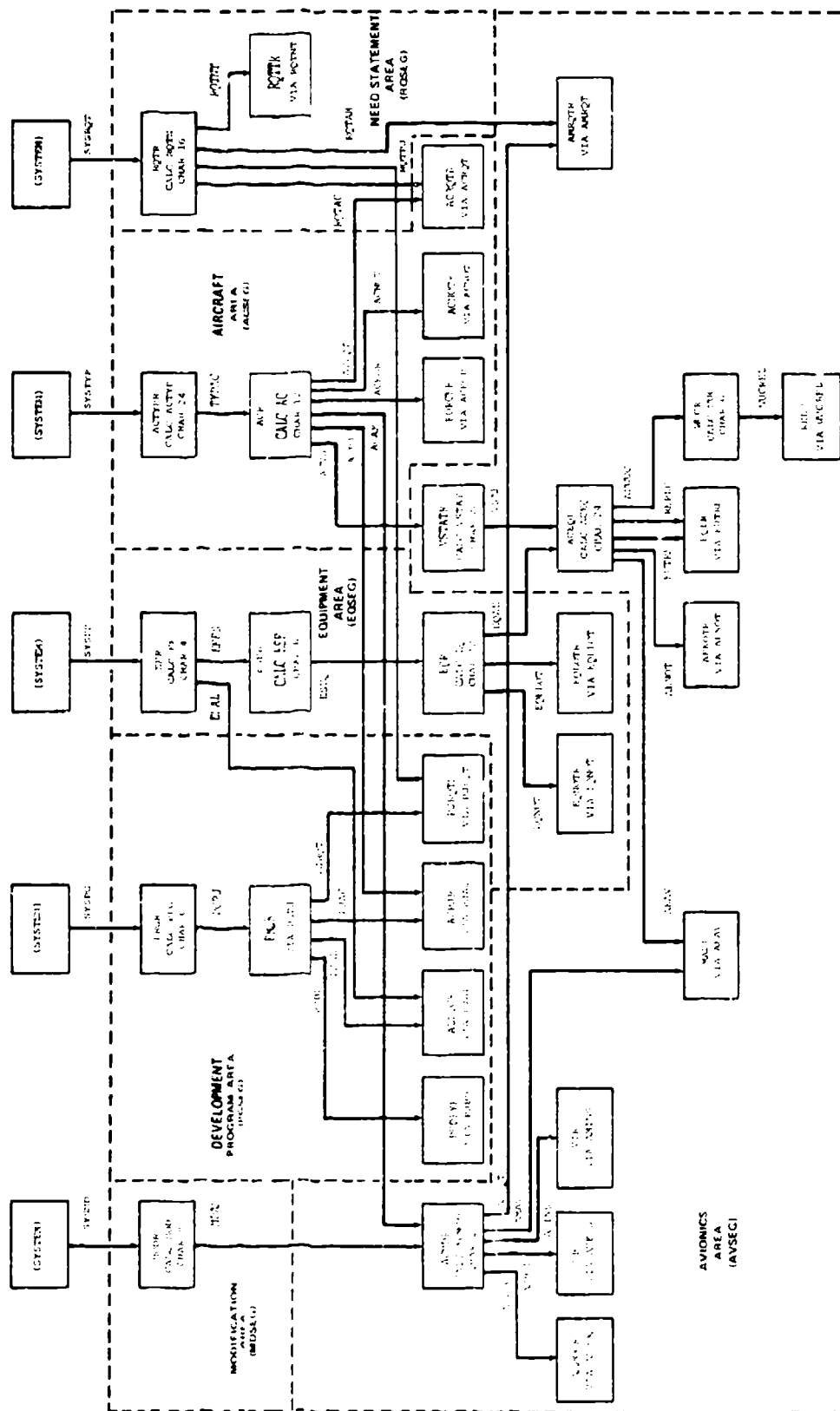


FIGURE B-1

APB-A DATA BASE STRUCTURE AND ACCESS DETAILS

TABLE B-1

APB-A CHANGES TO ADUS SCHEMA

Category	New Name	Old Name	New Format	Old Format	Remarks
Schema Name	APBASC	ADUSSC	--	--	
Privacy Lock*			--	--	
Item	MODIN	MAXIN		A2	In record MODR
Item	MODPO	MAXPO		A16	In record MODR
Item	PRJIN	PAXIN		A2	In record PRJR
Item	PRJPO	PAXPO		A16	In record PRJR
Record	PJRQTR	PJRSGR	--	--	
Item	PJRQTL	PJRSGL		A26	In record PJRQTR
Set	PJRQT	PJRSG	--	--	PRJR owns PJRQTR
Item		EFT	A32	A26	In record EFR
Item		ESFT	A36	A40	In record ESFR
Item	EQPOC	ALCPOC		A20	In record EQR
Item	EPHONE	LPHONE		A8	In record EQR
Item	EQNAME	ALCNAM		A16	In record EQR
Item	EQTLD	(addition)	I4		In record EQR
Record	EQNOTR	(addition)	--	--	
Item	EQNOTE	(addition)	A100		In record EQNOTR
Set	EQNOT	(addition)	--	--	EQR owns EQNOTR
Item		ACTYP	A24	A16	In record ACTYPR
Item	ACSRT	P3XSRT		I3	In record ACR
Item	FORACT	FORAF		I4	In record FORCER
Item	FORRES	FORAFR		I4	In record FORCER
Item	FORNG	FORANG		I4	In record FORCER
Record	ACRQTR	ACRSGR	--	--	
Item	ACRQTL	ACRSGL		A28	In record ACRQTR
Record	ACNOTR	(addition)	--	--	
Item	ACNOTE	(addition)	A100		In record ACNOTR
Set	ACNOT	(addition)	--	--	ACR owns ACNOTR
Set	ACRQT	ACRSG	--	--	ACR owns ACRQTR

*The privacy lock has been changed, but for data base security reasons, it is not disclosed in this report.

(continued)

TABLE B-1 (continued)

Category	New Name	Old Name	New Format	Old Format	Remarks
Record	RQTR	RSGR	--	--	
Item	RQTN	RSGN		A16	In record RQTR
Record	RQTTR	RSGTR	--	--	
Item	RQTT	RSGT		A60	In record RQTTR
Record	AMRQTR	AMRSGR	--	--	
Item	AMRQTL	AMRSGL		A36	In record AMRQTR
Set	SYSRQT	SYSRSG	--	--	SYSTEM owns RQTR
Set	RQTNT	RSGNT	--	--	RQTR owns RQTTT
Set	RQTAC	RSGAC	--	--	RQTR owns ACRQTR
Set	RQTPJ	RSGPJ	--	--	RQTR owns PJRQTR
Set	RQTAM	RSGAM	--	--	RQTR owns AMRQTR
Item		VQ	I2	I1	In record ACEQR
Item		PREAC	I4	I3	In record ACEQR
Item	(deleted)	MODCLS		I1	In record ACMDR
Item	MODPOC	POC	A14	A10	In record AMPOCR
Item	MODLOC	POCLOC		A26	In record AMPOCR
Record	VIR	(addition)	--	--	
Item	VI	(addition)	I2		In record VIR
Item	VIQ	(addition)	I4		In record VIR
Item	VIE	(addition)	I1		In record VIR
Set	AMINS	(addition)	--	--	ACMDR owns VIR
Item	VBE	VBQ	I1	I4	In record VBR
Item	TYPCHG	(addition)	A2		In record MAER
Record	AENOTR	(addition)	--	--	
Item	AENOTE	(addition)	A100		In record AENOTR
Set	AENOT	(addition)	--	--	ACEQR owns AENOTR
Set	AMRQT	AMRSG	--	--	ACMDR owns AMRQTR

SCHEMA NAME IS APBASC
PRIVACY LOCK IS .

AREA NAME IS MDSEG
AREA SIZE IS 29 DYNAMIC PAGES
PAGE SIZE IS 256 WORDS.

AREA NAME IS PGSEG
AREA SIZE IS 307 DYNAMIC PAGES
PAGE SIZE IS 256 WORDS.

AREA NAME IS EQSEG
AREA SIZE IS 521 DYNAMIC PAGES
PAGE SIZE IS 256 WORDS.

AREA NAME IS ACSEG
AREA SIZE IS 397 DYNAMIC PAGES
PAGE SIZE IS 256 WORDS.

AREA NAME IS RQSEG
AREA SIZE IS 83 DYNAMIC PAGES
PAGE SIZE IS 256 WORDS.

AREA NAME IS AVSEG
AREA SIZE IS 3061 DYNAMIC PAGES
PAGE SIZE IS 256 WORDS.

RECORD NAME IS MODR
LOCATION MODE IS CALC USING MOD
DUPLICATES ARE NOT ALLOWED
WITHIN MDSEG.

MOD TYPE CHARACTER 8.
MODIN TYPE CHARACTER 2.
MODPO TYPE CHARACTER 16.

RECORD NAME IS PRGR
LOCATION MODE IS CALC USING PRG
DUPLICATES ARE NOT ALLOWED
WITHIN PGSEG.

PRG TYPE CHARACTER 6.
PRON TYPE CHARACTER 26.

RECORD NAME IS PRJR
LOCATION MODE IS VIA PGPJ
WITHIN PGSEG.

PRJ TYPE CHARACTER 4.
PRJN TYPE CHARACTER 26.
PRJMIS TYPE CHARACTER 20.
PRJIN TYPE CHARACTER 2.
PRJPO TYPE CHARACTER 16.
PROAV TYPE REAL.

FIGURE B-2

DATA BASE SCHEMA

RECORD NAME IS BUDFYR
LOCATION MODE IS VIA PJBD
WITHIN PGSEG.

SORCE TYPE CHARACTER 8.

YR1 TYPE FIXED.

BUDYR1 TYPE REAL.

BUDYR2 TYPE REAL.

BUDYR3 TYPE REAL.

BUDYR4 TYPE REAL.

BUDYR5 TYPE REAL.

BUDYR6 TYPE REAL.

BUDYR7 TYPE REAL.

BUDYR8 TYPE REAL.

RECORD NAME IS PJRQTR
LOCATION MODE IS VIA PJRQT
WITHIN PGSEG.

PJRQTL TYPE CHARACTER 26.

RECORD NAME IS ACPJR
LOCATION IS VIA PJAC
WITHIN PGSEG.
ACPJL TYPE CHARACTER 22.

RECORD NAME IS ALLOCR
LOCATION MODE IS VIA PJAL
WITHIN PGSEG.
FCTALL TYPE REAL.

RECORD NAME IS EFR
LOCATION MODE IS CALC USING EF
DUPLICATES ARE NOT ALLOWED
WITHIN EQSEG.

EF TYPE CHARACTER 4.

EFT TYPE CHARACTER 32.

EG TYPE CHARACTER 4.

RECORD NAME IS ESFR
LOCATION MODE IS CALC USING ESF
DUPLICATES ARE NOT ALLOWED
WITHIN EQSEG.

ESF TYPE CHARACTER 6.

ESFT TYPE CHARACTER 36.

FIGURE B-2 (continued)

RECORD NAME IS EQR
LOCATION MODE IS CALC USING EQ
DUPLICATES ARE NOT ALLOWED
WITHIN EQSEG.

EQ TYPE CHARACTER 12.
EQDES TYPE CHARACTER 20.
SPI TYPE CHARACTER 4.
AUC TYPE FIXED.
QTY TYPE FIXED.
YR TYPE FIXED.
FU TYPE FIXED.
FUYR TYPE FIXED.
EQPOC TYPE CHARACTER 20.
EPHONE TYPE CHARACTER 8.
EQNAM TYPE CHARACTER 16.
EQTLD TYPE FIXED.
EQSP TYPE CHARACTER 16.

RECORD NAME IS EQLOTR
LOCATION MODE IS VIA EQELOT
WITHIN EQSEG.

LOTYR TYPE FIXED.
LOTQTY TYPE FIXED.
CONT TYPE CHARACTER 16.
COMP TYPE CHARACTER 4.
GFECFE TYPE CHARACTER 4.
EQLTSP TYPE CHARACTER 10.

RECORD NAME IS EQNOTR
LOCATION MODE IS VIA EQNOT
WITHIN EQSEG.
EQNOTE TYPE CHARACTER 100.

RECORD NAME IS ACTYPR
LOCATION MODE IS CALC USING ACTYP
DUPLICATES ARE NOT ALLOWED
WITHIN ACSEG.
ACTYP TYPE CHARACTER 24.

RECORD NAME IS ACR
LOCATION MODE IS CALC USING AC
DUPLICATES ARE NOT ALLOWED
WITHIN ACSEG.

AC TYPE CHARACTER 12.
ACSRT TYPE IS FIXED.
ACM1 TYPE CHARACTER 20.
ACM2 TYPE CHARACTER 20.
ACM3 TYPE CHARACTER 20.
ACSYS TYPE FIXED.

FIGURE B-2 (continued)

RECORD NAME IS FORCER
LOCATION MODE IS VIA ACFOR
WITHIN ACSEG.

FORCE TYPE FIXED.

FORACT TYPE FIXED.

FORRES TYPE FIXED.

FORNG TYPE FIXED.

RECORD NAME IS ACRQTR
LOCATION MODE IS VIA ACRQT
WITHIN ACSEG.
ACRQTL TYPE CHARACTER 28.

RECORD NAME IS ACNOTR
LOCATION MODE IS VIA ACNOT
WITHIN ACSEG.
ACNOTE TYPE CHARACTER 100.

RECORD NAME IS RQTR
LOCATION MODE IS CALC USING RQTN
DUPLICATES ARE NOT ALLOWED
WITHIN RQSEG.
RQTN TYPE CHARACTER 16.

RECORD NAME IS RQTTR
LOCATION MODE IS VIA RQTNT
WITHIN RQSEG.
RQTT TYPE CHARACTER 60.

RECORD NAME IS AMRQTR
LOCATION MODE IS VIA AMRQT
WITHIN AVSEG.
AMRQTL TYPE CHARACTER 36.

RECORD NAME IS VSTATR
LOCATION MODE IS CALC USING VSTAT
DUPLICATES ARE NOT ALLOWED
WITHIN AVSEG.
VSTAT TYPE CHARACTER 20.

RECORD NAME IS ACEQR
LOCATION MODE IS CALC USING ACEQ
DUPLICATES ARE NOT ALLOWED
WITHIN AVSEG.

ACEQ TYPE CHARACTER 24.

VQ TYPE FIXED.

PREAC TYPE FIXED.

FIGURE B-2 (continued)

RECORD NAME IS EQLR
LOCATION MODE IS VIA FUTRE
WITHIN AVSEG.

RECORD NAME IS VIR
LOCATION MODE IS VIA AMINS
WITHIN AVSEG.

VI TYPE FIXED.
VIQ TYPE FIXED.
VIE TYPE FIXED.

RECORD NAME ACMDR
LOCATION MODE IS CALC USING ACMOD
DUPLICATES ARE NOT ALLOWED
WITHIN AVSEG.

ACMOD TYPE CHARACTER 20.
AMSTAT TYPE CHARACTER 4.
MODSUB TYPE CHARACTER 20.
VFT TYPE CHARACTER 4.

RECORD NAME IS AMPOCR
LOCATION MODE IS VIA AMPOC
WITHIN AVSEG.
MODPOC TYPE CHARACTER 14.
MODLOC TYPE CHARACTER 26.

RECORD NAME IS MAER
LOCATION MODE IS VIA AEAV
WITHIN AVSEG.
TYPCHG TYPE CHARACTER 2.

RECORD NAME IS WUCR
LOCATION MODE IS CALC USING WUC
DUPLICATES ARE NOT ALLOWED
WITHIN AVSEG.

WUC TYPE CHARACTER 6.
NSN TYPE CHARACTER 16.
WUCDES TYPE CHARACTER 20.
QPA TYPE FIXED.
WEIGHT TYPE FIXED.
WUSP TYPE CHARACTER 20.

RECORD NAME IS RELR
LOCATION MODE IS VIA WUCREL
WITHIN AVSEG.

RDATE TYPE CHARACTER 6.
REPINT TYPE FIXED.
RELINV TYPE FIXED.
RPTIME TYPE FIXED.
RENG TYPE FIXED.
RELSP TYPE CHARACTER 20.

FIGURE B-2 (continued)

RECORD NAME IS AENOTR
LOCATION MODE IS VIA AENOT
WITHIN AVSEG.
AENOTE TYPE CHARACTER 100.

RECORD NAME IS VBR
LOCATION MODE IS VIA AMBUD
WITHIN AVSEG.
VB TYPE FIXED.
VBE TYPE FIXED.
VBB TYPE REAL.

SET NAME IS SYSMD
MODE CHAIN LINKED PRIOR
ORDER IS SORTED
OWNER IS SYSTEM
MEMBER IS MODR MANDATORY AUTOMATIC
ASCENDING KEY IS MOD DUPLICATES NOT
SET SELECTION THRU CURRENT OF SET.

SET NAME IS MDAM
MODE CHAIN LINKED PRIOR
ORDER IS SORTED
OWNER IS MODR
MEMBER IS ACMDR MANDATORY AUTOMATIC LINKED TO OWNER
ASCENDING KEY IS ACMOD DUPLICATES NOT
SET SELECTION THRU LOCATION MODE OF OWNER.

SET NAME IS SYSPG
MODE CHAIN LINKED PRIOR
ORDER IS SORTED
OWNER IS SYSTEM
MEMBER IS PRGR MANDATORY AUTOMATIC
ASCENDING KEY IS PRG DUPLICATES NOT
SET SELECTION THRU CURRENT OF SET.

SET NAME IS PGPJ
MODE CHAIN LINKED PRIOR
ORDER IS SORTED
OWNER IS PRGR
MEMBER IS PRJR MANDATORY AUTOMATIC LINKED TO OWNER
ASCENDING KEY IS PRJ DUPLICATES NOT
SET SELECTION IS THRU LOCATION MODE OF OWNER.

SET NAME IS PJBD
MODE CHAIN LINKED PRIOR
ORDER IS SORTED
OWNER IS PRJR
MEMBER IS BUDFYR MANDATORY AUTOMATIC
ASCENDING KEY IS SORCE DUPLICATES NOT
SET SELECTION THRU LOCATION MODE OF OWNER.

FIGURE B-2 (continued)

SET NAME IS PJAL
MODE CHAIN LINKED PRIOR
ORDER IS FIRST
OWNER IS PRJR
MEMBER IS ALLOCR MANDATORY AUTOMATIC
SET SELECTION THRU LOCATION MODE OF OWNER.

SET NAME IS PJRQT
MODE CHAIN LINKED PRIOR
ORDER IS SORTED
OWNER IS PRJR
MEMBER IS PJRQTR MANDATORY AUTOMATIC LINKED TO OWNER
ASCENDING KEY PJRQTL DUPLICATES NOT
SET SELECTION THRU LOCATION MODE OF OWNER.

SET NAME IS PJAC
MODE CHAIN LINKED PRIOR
ORDER IS SORTED
OWNER IS PRJR
MEMBER IS ACPJR MANDATORY AUTOMATIC LINKED TO OWNER
ASCENDING KEY IS ACPJL DUPLICATES NOT
SET SELECTION THRU LOCATION MODE OF OWNER.

SET NAME IS SYSEF
MODE CHAIN LINKED PRIOR
ORDER IS SORTED
OWNER IS SYSTEM
MEMBER IS EFR MANDATORY AUTOMATIC
ASCENDING KEY EF DUPLICATES NOT
SET SELECTION THRU CURRENT OF SET.

SET NAME IS EFES
MODE CHAIN LINKED PRIOR
ORDER IS SORTED
OWNER IS EFR
MEMBER IS ESFR MANDATORY AUTOMATIC LINKED TO OWNER
ASCENDING KEY IS ESF DUPLICATES NOT
SET SELECTION THRU LOCATION MODE OF OWNER.

SET NAME IS ESEQ
MODE CHAIN LINKED PRIOR
ORDER IS SORTED
OWNER IS ESFR
MEMBER IS EQR MANDATORY AUTOMATIC LINKED TO OWNER
ASCENDING KEY IS EQ DUPLICATES NOT
SET SELECTION THRU LOCATION MODE OF OWNER.

FIGURE B-2 (continued)

SET NAME IS EFAL
MODE CHAIN
ORDER IS FIRST
OWNER IS EFR
MEMBER IS ALLOC R MANDATORY AUTOMATIC LINKED TO OWNER
SET SELECTION THRU LOCATION MODE OF OWNER.

SET NAME IS EQELOT
MODE CHAIN LINKED PRIOR
ORDER IS SORTED
OWNER IS EQR
MEMBER IS EQLOTR MANDATORY AUTOMATIC
ASCENDING KEY LOTYR DUPLICATES NOT
SET SELECTION THRU LOCATION MODE OF OWNER.

SET NAME IS EQAE
MODE CHAIN LINKED PRIOR
ORDER IS SORTED
OWNER IS EQR
MEMBER IS ACEQR MANDATORY AUTOMATIC LINKED TO OWNER
ASCENDING KEY ACEQ DUPLICATES NOT
SET SELECTION THRU LOCATION MODE OF OWNER.

SET NAME IS EQNOT
MODE CHAIN
ORDER IS LAST
OWNER IS EQR
MEMBER IS EQNOTR
SET SELECTION THRU LOCATION MODE OF OWNER.

SET NAME IS SYSTYP
MODE CHAIN LINKED PRIOR
ORDER IS SORTED
OWNER IS SYSTEM
MEMBER IS ACTYPR MANDATORY AUTOMATIC
ASCENDING KEY IS ACTYP DUPLICATES NOT
SET SELECTION THRU CURRENT OF SET.

SET NAME IS TYPAC
MODE CHAIN LINKED PRIOR
ORDER IS SORTED
OWNER IS ACTYPR
MEMBER IS ACR MANDATORY AUTOMATIC LINKED TO OWNER
ASCENDING KEY IS AC DUPLICATES NOT
SET SELECTION THRU LOCATION MODE OF OWNER.

FIGURE B-2 (continued)

SET NAME IS ACFOR
MODE CHAIN LINKED PRIOR
ORDER IS SORTED
OWNER IS ACR
MEMBER IS FORCER MANDATORY AUTOMATIC
ASCENDING KEY FORCE DUPLICATES NOT
SET SELECTION THRU LOCATION MODE OF OWNER.

SET NAME IS ACRQT
MODE CHAIN LINKED PRIOR
ORDER IS SORTED
OWNER IS ACR
MEMBER IS ACRQTR MANDATORY AUTOMATIC LINKED TO OWNER
ASCENDING KEY IS ACRQTL DUPLICATES NOT
SET SELECTION THRU LOCATION MODE OF OWNER.

SET NAME IS ACVS
MODE CHAIN LINKED PRIOR
ORDER IS SORTED
OWNER IS ACR
MEMBER IS VSTATR MANDATORY AUTOMATIC LINKED TO OWNER
ASCENDING KEY VSTAT DUPLICATES NOT
SET SELECTION THRU LOCATION MODE OF OWNER.

SET NAME IS ACAM
MODE CHAIN LINKED PRIOR
ORDER IS SORTED
OWNER IS ACR
MEMBER IS ACMDR MANDATORY AUTOMATIC LINKED TO OWNER
ASCENDING KEY ACMOD DUPLICATES NOT
SET SELECTION THRU LOCATION MODE OF OWNER.

SET NAME IS ACPJ
MODE CHAIN LINKED PRIOR
ORDER IS SORTED
OWNER IS ACR
MEMBER IS ACPJR MANDATORY AUTOMATIC LINKED TO OWNER
ASCENDING KEY ACPJL DUPLICATES NOT
SET SELECTION THRU LOCATION MODE OF OWNER.

SET NAME IS ACNOT
MODE CHAIN
ORDER IS LAST
OWNER IS ACR
MEMBER IS ACNOTR
SET SELECTION THRU LOCATION MODE OF OWNER.

SET NAME IS SYSRQT
MODE CHAIN LINKED PRIOR
ORDER IS SORTED

FIGURE B-2 (continued)

OWNER IS SYSTEM
MEMBER IS RQTR MANDATORY AUTOMATIC
ASCENDING KEY RQTN DUPLICATES NOT
SET SELECTION THRU CURRENT OF SET.

SET NAME IS RQTAC
MODE CHAIN LINKED PRIOR
ORDER IS SORTED
OWNER IS RQTR
MEMBER IS ACRQTR MANDATORY AUTOMATIC LINKED TO OWNER
ASCENDING KEY ACRQTL DUPLICATES NOT
SET SELECTION THRU LOCATION MODE OF OWNER.

SET NAME IS RQNT
MODE CHAIN
ORDER IS LAST
OWNER IS RQTR
MEMBER IS RQTR MANDATORY AUTOMATIC
SET SELECTION THRU LOCATION MODE OF OWNER.

SET NAME IS RQTPJ
MODE CHAIN LINKED PRIOR
ORDER IS SORTED
OWNER IS RQTR
MEMBER IS PURQTR MANDATORY AUTOMATIC LINKED TO OWNER
ASCENDING KEY PURQTL DUPLICATES NOT
SET SELECTION THRU LOCATION MODE OF OWNER.

SET NAME IS RQTAM
MODE CHAIN LINKED PRIOR
ORDER IS SORTED
OWNER IS RQTR
MEMBER IS AMRQTR MANDATORY AUTOMATIC LINKED TO OWNER
ASCENDING KEY IS AMRQTL DUPLICATES NOT
SET SELECTION THRU LOCATION MODE OF OWNER.

SET NAME IS VSAE
MODE CHAIN LINKED PRIOR
ORDER IS SORTED
OWNER IS VSTATR
MEMBER IS ACEQR MANDATORY AUTOMATIC LINKED TO OWNER
ASCENDING KEY ACEQ DUPLICATES NOT
SET SELECTION THRU LOCATION MODE OF OWNER.

SET NAME IS FUTRE
MODE CHAIN
ORDER IS FIRST
OWNER IS ACEQR
MEMBER IS EQLR MANDATORY AUTOMATIC
SET SELECTION THRU LOCATION MODE OF OWNER
ALIAS FOR ACEQ IS EQREPL.

FIGURE B-2 (continued)

SET NAME IS REPLC
MODE CHAIN
ORDER IS FIRST
OWNER IS ACEQR
MEMBER IS EQLR MANDATORY AUTOMATIC
SET SELECTION THRU LOCATION MODE OF OWNER
ALIAS FOR ACEQ IS FUTREQ.

SET NAME IS AEAV
MODE CHAIN
ORDER IS FIRST
OWNER IS ACEQR
MEMBER IS MAER MANDATORY AUTOMATIC
SET SELECTION THRU LOCATION MODE OF OWNER.

SET NAME IS AENOT
MODE CHAIN
ORDER IS LAST
OWNER IS ACEQR
MEMBER IS AENOTR
SET SELECTION THRU LOCATION MODE OF OWNER.

SET NAME IS AMBUD
MODE CHAIN LINKED PRIOR
ORDER IS SORTED
OWNER IS ACMDR
MEMBER IS VBR MANDATORY AUTOMATIC
ASCENDING KEY VB DUPLICATES NOT
SET SELECTION THRU LOCATION MODE OF OWNER.

SET NAME IS AMINS
MODE CHAIN LINKED PRIOR
ORDER IS SORTED
OWNER IS ACMDR
MEMBER IS VIR MANDATORY AUTOMATIC
ASCENDING KEY IS VI DUPLICATES NOT
SET SELECTION THRU LOCATION MODE OF OWNER.

SET NAME IS AMAV
MODE IS CHAIN
ORDER IS FIRST
OWNER IS ACMDR
MEMBER IS MAER MANDATORY AUTOMATIC LINKED TO OWNER
SET SELECTION THRU LOCATION MODE OF OWNER.

FIGURE B-2 (continued)

SET NAME IS AMRQT
MODE CHAIN LINKED PRIOR
ORDER IS SORTED
OWNER IS ACMDR
MEMBER IS AMRQTR MANDATORY AUTOMATIC LINKED TO OWNER
ASCENDING KEY AMRQTL DUPLICATES NOT
SET SELECTION THRU LOCATION MODE OF OWNER.

SET NAME IS AMPOC
MODE CHAIN LINKED PRIOR
ORDER IS SORTED
OWNER IS ACMDR
MEMBER IS AMPOCR MANDATORY AUTOMATIC
ASCENDING KEY MODPOC DUPLICATES NOT
SET SELECTION THRU LOCATION MODE OF OWNER.

SET NAME IS AEWUC
MODE CHAIN LINKED PRIOR
ORDER IS SORTED
OWNER IS ACEQR
MEMBER IS WUCR MANDATORY AUTOMATIC LINKED TO OWNER
ASCENDING KEY WUC DUPLICATES NOT
SET SELECTION THRU LOCATION MODE OF OWNER.

SET NAME IS WUCREL
MODE CHAIN
ORDER IS FIRST
OWNER IS WUCR
MEMBER IS RELR MANDATORY AUTOMATIC
SET SELECTION THRU LOCATION MODE OF OWNER.

>

FIGURE B-2 (continued)

APPENDIX C

DATA BASE LOADING AND INPUT DATA CODING FORMS

This appendix describes the procedures necessary to populate the APB-A data base. Although this discussion addresses primarily the initial data load through SPROUT, it is equally applicable to data modification procedures such as are available through the SEED utility GARDEN. Eleven sets of input data coding forms are included to aid in placing APB-A data into the transaction input files, described in Section 2 of this appendix.

1. SEGMENTATION OF DATA

Because of the complexity of the APB-A data base structure and the fact that the data base uses a network to represent a relational data base, it is necessary to segment the data into manageable subsets. The primary reason for doing this is to provide for the relationships defined in the data base schema. Several records in the APB-A data base are owned by two structurally higher records. For example, the record ACEQR (aircraft/equipment record) is owned by both the equipment record (EQR) and the avionics status record (VSTATR). To load a particular occurrence of record ACEQR, both owner records (EQR and VSTATR) must already be loaded. This ensures that the proper set linkages (EQR to ACEQR and VSTATR to ACEQR) are established at the instant the ACEQR data are loaded.

Table C-1 describes the segmentation of the APB-A data. The particular segmentation was chosen to ensure that the data relationships of the schema are properly implemented at data load time, and to logically group the data into manageable and meaningful subsets.

2. DATA LOADING

Examination of the data segments reveals that the data base was divided into upper, middle, and lower levels. This structured or hierarchical division is the method by which the data relationships are preserved during a data load. This technique of top-down loading ensures that owner records are loaded before owned records.

For the APB-A data base, several segments may be grouped into sequential transaction input files. These files correspond roughly to the upper, middle, and lower levels of the data base structure. Those data segments which load mutually independent data have been grouped together to form four transaction files. They are shown in Table C-2.

TABLE C-1

DATA SEGMENTATION

Segment	Data Contents (Records)
A	MODR
B	PRGR, PRJR, BUDFYR, ACPJR, PJRQTR, ALLOCR
C	EFR, ESFR, EQR, EQNOTR, EQLOTR
D	ACTYPR, ACR, ACNOTR, FORCER, VSTATR
E	RQTR, RQTRR
F	ACMDR, AMPOCR, VBR, VIR
G	ACEQR, AENOTR, WUCR, RELR
H	EQLR
I	MAER
J	ACRQTR
K	AMRQTR

Table C-2

TRANSACTION INPUT FILES

File	Data Segments
INPT1	A, C, D, E
INPT2	B
INPT3	F, G
INPT4	H, I, J, K

The INPT1 transaction file is used to load any or all upper-level data contained in segments A, C, D, and E. The data found in any one of these segments are independent of the data in the other three segments. This file could be used to load each segment separately or to load any combination of two or more of the segments. It constitutes the first loading sequence of the data base.

INPT2 is used to load upper- and middle-level data contained in segment B. This file is unique in that it is used to load only one data segment. This is necessary because of the complexity of segment B. This segment contains the only record (PRJR) that participates as a joint owner

of one or more records and that does not have a CALC key. Two criteria determine the ease of loading jointly owned records:

- The owner records have a LOCATION MODE IS CALC DUPLICATES NOT ALLOWED clause in the record description area of the schema.
- The owned records are linked to the owner by two sets that both have a SET SELECTION THRU LOCATION MODE OF OWNER clause in the set description area of the schema.

These two criteria alone enable jointly owned records to be loaded properly by simply specifying the CALC keys of the two immediate owners. Because record PRJR is specified as LOCATION MODE IS VIA PGJ set, any records owned by a particular occurrence of PRJR must be loaded at the same time PRJR is loaded to ensure proper set linkages. Three such records are owned by record PRJR: (1) ALLOC (also linked to EFR in segment C), (2) ACPJR (also linked to ACR in segment D), and (3) PJRQTR (also linked to RQTR in segment E). For this reason, load segment B can be loaded only after load segments C, D, and E have been loaded. INPT2 is the second loading sequence of the data base.

The third loading sequence of the data base uses input file INPT3 and loads data in segments F and G. Both of these load segments contain middle- and lower-level data. Any jointly owned records found in these segments satisfy the two rules described above and are easily loaded. This file may be used to load either segment F or G independently or both at once.

The final load sequence uses the INPT4 file and loads lower-level data found in segments H, I, J, and K. All records in these segments satisfy the joint ownership loading rules previously outlined. Any combination of one or more of these segments may be simultaneously loaded with this input file.

3. TRANSACTION INPUT PROCESSOR

The SPROUT Transaction Input Processor (TRIN) must be executed to actually load the transaction input files into the initialized data base areas. TRIN requires a transaction input file, a transaction definition library, and a subschema. A separate transaction definition library is prepared for each input file by compiling a Transaction Definition Language (TDL) written for the file. See Reference 1 for details on the preparation of TDL. TRIN must be invoked for each of the four transaction input files.

4. INPUT DATA CODING FORMS

Eleven sets of input data coding forms are included in this appendix, one for each load segment. Each set contains one or more pages. The top of the first page of sets A through G displays the load configuration for the segment. This consists of those record types to be loaded with that set of forms. Each set provides room for a reasonable number of occurrences of each record type. This quantity appears in parentheses before

the SEED record name. If more space is required, additional copies of the appropriate form from that set can be used with little or no modification necessary. If a record type is indented, that signifies it is owned by the last record above it that appears at a lesser level of indentation. This indicates a one-to-many relationship, and sufficient formatted space is allowed for the indicated number of owned record occurrences for each owner record occurrence specified.

Sets F and G also load record types that are owned by two other record types, i.e., these record types participate in two sets. These forms, together with the forms for sets H through K, which load a single jointly owned record type, depict the set relationships in which those records with joint owners belong.

All forms contain the required CALC keys to establish the proper set linkages when the data are loaded. Each load segment should be prepared separately and then combined into the transaction input files described in Section 2 of this appendix.

5. DATA MODIFICATION

Using the SEED utility program, GARDEN, the user may load any data desired providing that occurrences of owner records are loaded or properly identified before owned records are loaded. This may be accomplished in a partial segment data load by using the several FIND commands in GARDEN to first establish the occurrence of an existing owner record before adding a new owned record beneath that particular owner. Loading of complete data segments through GARDEN would proceed in the same manner as described above.

** LOAD SEGMENT A ***

*** INPUT CODING FORMS ***

LOAD CONFIGURATION

(1) MODR

MODR MODIFICATION RECORD ---

MOD PIP NUMBER C08

|_|_|_|_|_|_|_|

MODIN ASID INVOLVEMENT C02

|_|_|

MODPO ASID PROJECT OFFICER C16

|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|

*** INPUT CODING FORMS ***

```
(1) PRGR
      (1) PRJR
            (3) BUDFYR
            (6) ACPJR
            (5) PJRQTR
            (5) ALLOCR
```

[illegible]

B | 1 |
| _ | _ | _ | _ | _ |

| _ | _ | _ | _ | _ | _ | _ | _ | _ | _ | _ | _ | _ | _ |
| _ | _ | _ | _ | _ | _ | _ | _ | _ | _ | _ | _ | _ | _ |

B | 2 |
| _ | _ | _ | _ |

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| _ | _ |

| _ | _ | _ | _ | _ | _ | _ | _ | _ | _ | _ | _ |
| _ | _ | _ | _ |

*** LOAD SEGMENT B ***

*** INPUT CODING FORMS ***

Page 2 of 7

BUDFYR BUDGET RECORD

|B|3|

SORCE SOURCE
LEVEL
YEAR SUPPLIED

C08

C03 | | | |
C03 | | | |
N02 | | | |

YR1 FIRST YEAR

N02

| | | |

BUDYR1 BUDGET FY 1

N08

| | | | | | | | | |

BUDYR2 BUDGET FY 2

N08

| | | | | | | | | |

BUDYR3 BUDGET FY 3

N08

| | | | | | | | | |

BUDYR4 BUDGET FY 4

N08

| | | | | | | | | |

BUDYR5 BUDGET FY 5

N08

| | | | | | | | | |

BUDYR6 BUDGET FY 6

N08

| | | | | | | | | |

BUDYR7 BUDGET FY 7

N08

| | | | | | | | | |

BUDYR8 BUDGET FY 8

N08

| | | | | | | | | |

*** LOAD SEGMENT B ***

*** INPUT CODING FORMS ***

Page 2 of 7

BUDFYR BUDGET RECORD

|B|3|

SORCE SOURCE
LEVEL
YEAR SUPPLIED

C08 C03 | | | |
C03 | | | |
N02 | | |

YR1 FIRST YEAR

N02 | | |

BUDYR1 BUDGET FY 1

N08 | | | | | | | |

BUDYR2 BUDGET FY 2

N08 | | | | | | | |

BUDYR3 BUDGET FY 3

N08 | | | | | | | |

BUDYR4 BUDGET FY 4

N08 | | | | | | | |

BUDYR5 BUDGET FY 5

N08 | | | | | | | |

BUDYR6 BUDGET FY 6

N08 | | | | | | | |

BUDYR7 BUDGET FY 7

N08 | | | | | | | |

BUDYR8 BUDGET FY 8

N08 | | | | | | | |

*** LOAD SEGMENT B ***

*** INPUT CODING FORMS ***

Page 4 of 7

BUDFYR BUDGET RECORD

12131

SORCE SOURCE
LEVEL
YEAR SUPPLIED

C08 C03 | | | |
C03 | | | |
N02 | | | |

YR1 FIRST YEAR

N02 | | | |

BUDYR1 BUDGET FY 1

N08 | | | | | | | | | |

BUDYR2 BUDGET FY 2

N08 | | | | | | | | | |

BUDYR3 BUDGET FY 3

N08 | | | | | | | | | |

BUDYR4 BUDGET FY 4

N08 | | | | | | | | | |

BUDYR5 BUDGET FY 5

N08 | | | | | | | | | |

BUDYR6 BUDGET FY 6

N08 | | | | | | | | | |

BUDYR7 BUDGET FY 7

N08 | | | | | | | | | |

BUDYR8 BUDGET FY 8

N08 | | | | | | | | | |

Page 5 of 7

C-11

Page 6 of 7

C-12

*** LOAD SEGMENT B ***

*** INPUT CODING FORMS ***

Page 7 of 7

```

*****
ALLOCR  FUNCTION ALLOCATION  ---  .....
        RECORD              |B|6|
EF      EFR CALC KEY
        EQUIP FUNCTION      C04  |_||_||_||
FCTALL  FRACTION ALLOCATION  N04  |_||_||_||
ALLOCR  FUNCTION ALLOCATION  ---  .....
        RECORD              |B|6|
EF      EFR CALC KEY
        EQUIP FUNCTION      C04  |_||_||_||
FCTALL  FRACTION ALLOCATION  N04  |_||_||_||
ALLOCR  FUNCTION ALLOCATION  ---  .....
        RECORD              |B|6|
EF      EFR CALC KEY
        EQUIP FUNCTION      C04  |_||_||_||
FCTALL  FRACTION ALLOCATION  N04  |_||_||_||
ALLOCR  FUNCTION ALLOCATION  ---  .....
        RECORD              |B|6|
EF      EFR CALC KEY
        EQUIP FUNCTION      C04  |_||_||_||
FCTALL  FRACTION ALLOCATION  N04  |_||_||_||

```

*** INPUT CODING FORMS ***

[illegible][illegible][illegible][illegible][illegible][illegible][illegible][illegible]

Page 2 of 3

C-16

*** LOAD SEGMENT C ***

***INPUT CODING FORMS ***

Page 3 of 3

EQLOTR	EQ LOT RECORD	---	-----
			C S
LOTYR	FIRST YEAR OF LOT	N02	_ _
LOTQTY	LOT QUANTITY	N05	_ _ _ _
CONT	CONTRACTOR	C16	_ _ _ _ _ _ _ _ _ _ _ _ _ _
COMP	COMPETITION	C04	_ _ _
GFECFE	GFE/CFE INDICATOR	C04	_ _ _
EQLOTR	EQ LOT RECORD	---	-----
			C S
LOTYR	FIRST YEAR OF LOT	N02	_ _
LOTQTY	LOT QUANTITY	N05	_ _ _ _
CONT	CONTRACTOR	C16	_ _ _ _ _ _ _ _ _ _ _ _ _ _
COMP	COMPETITION	C04	_ _ _
GFECFE	GFE/CFE INDICATOR	C04	_ _ _
EQLOTR	EQ LOT RECORD	---	-----
			C S
LOTYR	FIRST YEAR OF LOT	N02	_ _
LOTQTY	LOT QUANTITY	N05	_ _ _ _
CONT	CONTRACTOR	C16	_ _ _ _ _ _ _ _ _ _ _ _ _ _
COMP	COMPETITION	C04	_ _ _
GFECFE	GFE/CFE INDICATOR	C04	_ _ _
EQLOTR	EQ LOT RECORD	---	-----
			C S
LOTYR	FIRST YEAR OF LOT	N02	_ _
LOTQTY	LOT QUANTITY	N05	_ _ _ _
CONT	CONTRACTOR	C16	_ _ _ _ _ _ _ _ _ _ _ _ _ _
COMP	COMPETITION	C04	_ _ _
GFECFE	GFE/CFE INDICATOR	C04	_ _ _

*** INPUT CODING FORMS ***

(1) ACTYPR
(1) ACR
(2) ACNOTR
(10) FORCER
(8) VSTATR

[illegible]

10111

[illegible]

D:21

1 2 3 4 5 6 7 8 9 10 11 12

1 1 1 1 1

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32

1111

| D | 3 |

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*** LOAD SEGMENT D ***

*** INPUT CODING FORMS ***

Page 2 of 4

FORCER	FORCE STRUCTURE RECORD	---	----- D 4
FORCE	FISCAL YEAR	N02	_ _
FORACT	ACTIVE ARMY FORCES	N04	_ _ _ _
FORRES	ARMY RESERVE FORCES	N04	_ _ _ _
FORNG	ARMY NATL GUARD	N04	_ _ _ _
FORCER	FORCE STRUCTURE RECORD	---	----- D 4
FORCE	FISCAL YEAR	N02	_ _
FORACT	ACTIVE ARMY FORCES	N04	_ _ _ _
FORRES	ARMY RESERVE FORCES	N04	_ _ _ _
FORNG	ARMY NATL GUARD	N04	_ _ _ _
FORCER	FORCE STRUCTURE RECORD	---	----- D 4
FORCE	FISCAL YEAR	N02	_ _
FORACT	ACTIVE ARMY FORCES	N04	_ _ _ _
FORRES	ARMY RESERVE FORCES	N04	_ _ _ _
FORNG	ARMY NATL GUARD	N04	_ _ _ _
FORCER	FORCE STRUCTURE RECORD	---	----- D 4
FORCE	FISCAL YEAR	N02	_ _
FORACT	ACTIVE ARMY FORCES	N04	_ _ _ _
FORRES	ARMY RESERVE FORCES	N04	_ _ _ _
FORNG	ARMY NATL GUARD	N04	_ _ _ _
FORCER	FORCE STRUCTURE RECORD	---	----- D 4
FORCE	FISCAL YEAR	N02	_ _
FORACT	ACTIVE ARMY FORCES	N04	_ _ _ _
FORRES	ARMY RESERVE FORCES	N04	_ _ _ _
FORNG	ARMY NATL GUARD	N04	_ _ _ _

*** LOAD SEGMENT D ***

*** INPUT CODING FORMS ***

Page 3 of 4

FORCER	FORCE STRUCTURE RECORD	---	----- D 4
FORCE	FISCAL YEAR	N02	_ _
FORACT	ACTIVE ARMY FORCES	N04	_ _ _ _
FORRES	ARMY RESERVE FORCES	N04	_ _ _ _
FORNG	ARMY NATL GUARD	N04	_ _ _ _
FORCER	FORCE STRUCTURE RECORD	---	----- D 4
FORCE	FISCAL YEAR	N02	_ _
FORACT	ACTIVE ARMY FORCES	N04	_ _ _ _
FORRES	ARMY RESERVE FORCES	N04	_ _ _ _
FORNG	ARMY NATL GUARD	N04	_ _ _ _
FORCER	FORCE STRUCTURE RECORD	---	----- D 4
FORCE	FISCAL YEAR	N02	_ _
FORACT	ACTIVE ARMY FORCES	N04	_ _ _ _
FORRES	ARMY RESERVE FORCES	N04	_ _ _ _
FORNG	ARMY NATL GUARD	N04	_ _ _ _
FORCER	FORCE STRUCTURE RECORD	---	----- D 4
FORCE	FISCAL YEAR	N02	_ _
FORACT	ACTIVE ARMY FORCES	N04	_ _ _ _
FORRES	ARMY RESERVE FORCES	N04	_ _ _ _
FORNG	ARMY NATL GUARD	N04	_ _ _ _
FORCER	FORCE STRUCTURE RECORD	---	----- D 4
FORCE	FISCAL YEAR	N02	_ _
FORACT	ACTIVE ARMY FORCES	N04	_ _ _ _
FORRES	ARMY RESERVE FORCES	N04	_ _ _ _
FORNG	ARMY NATL GUARD	N04	_ _ _ _

*** LOAD SEGMENT D ***

*** INPUT CODING FORMS ***

Page 4 of 4

VSTATR	AVIONICS STATUS RECORD	---	----- D 5
VSTAT	AIRCRAFT T/M/S EQ FUNCTION CODE AVIONICS STATUS	C20	C12 C04 C04
VSTATR	AVIONICS STATUS RECORD	---	----- D 5
VSTAT	AIRCRAFT T/M/S EQ FUNCTION CODE AVIONICS STATUS	C20	C12 C04 C04
VSTATR	AVIONICS STATUS RECORD	---	----- D 5
VSTAT	AIRCRAFT T/M/S EQ FUNCTION CODE AVIONICS STATUS	C20	C12 C04 C04
VSTATR	AVIONICS STATUS RECORD	---	----- D 5
VSTAT	AIRCRAFT T/M/S EQ FUNCTION CODE AVIONICS STATUS	C20	C12 C04 C04
VSTATR	AVIONICS STATUS RECORD	---	----- D 5
VSTAT	AIRCRAFT T/M/S EQ FUNCTION CODE AVIONICS STATUS	C20	C12 C04 C04
VSTATR	AVIONICS STATUS RECORD	---	----- D 5
VSTAT	AIRCRAFT T/M/S EQ FUNCTION CODE AVIONICS STATUS	C20	C12 C04 C04
VSTATR	AVIONICS STATUS RECORD	---	----- D 5
VSTAT	AIRCRAFT T/M/S EQ FUNCTION CODE AVIONICS STATUS	C20	C12 C04 C04
VSTATR	AVIONICS STATUS RECORD	---	----- D 5
VSTAT	AIRCRAFT T/M/S EQ FUNCTION CODE AVIONICS STATUS	C20	C12 C04 C04
VSTATR	AVIONICS STATUS RECORD	---	----- D 5
VSTAT	AIRCRAFT T/M/S EQ FUNCTION CODE AVIONICS STATUS	C20	C12 C04 C04

*** INPUT CODING FORMS ***

1E11!

1E121

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*** LOAD SEGMENT F ***

*** INPUT CODING FORMS ***

LOAD CONFIGURATION

(1) ACMDR
(2) AMPOCR
(10) VBR
(10) VIR

MODR ACP
|
(NDAM) (ACAM)
|
---ACMDR---

MDAM SET - The MODIFICATION program applies to these AIRCRAFT.

ACAM SET - These MODIFICATION programs will install, change, or remove avionics from this AIRCRAFT.

ACMDR AIRCRAFT/MOD RECORD --- |F1|

ACHOD AIRCRAFT T/M/S C20 C12 | | | | | | | | | | | | | |
PIP NUMBER C08 | | | | | | | | | | | | | |

AMSTAT MODIFICATION STATUS C04 | | | | |

MODSUB MOD SUBTITLE C20 | | | | | | | | | | | | | | | | | |

VFI FUNDING TYPE C04 | | | | |

AMPOCR MOD POINT OF --- |F2|
CONTACT RECORD

MODPOC MOD POC C14 | | | | | | | | | | | | | |

MOCLOC POC LOCATION C26 | | | | | | | | | | | | | | | | | |
| | | | | | | |

AMPOCR MOD POINT OF --- |F2|
CONTACT RECORD

MODPOC MOD POC C14 | | | | | | | | | | | | | |

MOCLOC POC LOCATION C26 | | | | | | | | | | | | | | | | | |
| | | | | | | |

*** LOAD SEGMENT F ***

*** INPUT CODING FORMS ***

Page 2 of 5

VBR	AVIONICS BUDGET RECORD	---	----- F 3
VB	FISCAL YEAR	N02	_ _
VBE	SCHEDULE EST IND	N01	_
VBB	MOD BUDGET	N05	_ _ _ _
VBR	AVIONICS BUDGET RECORD	---	----- F 3
VB	FISCAL YEAR	N02	_ _
VBE	SCHEDULE EST IND	N01	_
VBB	MOD BUDGET	N05	_ _ _ _
VBR	AVIONICS BUDGET RECORD	---	----- F 3
VB	FISCAL YEAR	N02	_ _
VBE	SCHEDULE EST IND	N01	_
VBB	MOD BUDGET	N05	_ _ _ _
VBR	AVIONICS BUDGET RECORD	---	----- F 3
VB	FISCAL YEAR	N02	_ _
VBE	SCHEDULE EST IND	N01	_
VBB	MOD BUDGET	N05	_ _ _ _
VBR	AVIONICS BUDGET RECORD	---	----- F 3
VB	FISCAL YEAR	N02	_ _
VBE	SCHEDULE EST IND	N01	_
VBB	MOD BUDGET	N05	_ _ _ _

*** LOAD SEGMENT F ***

*** INPUT CODING FORMS ***

Page 3 of 5

VBR	AVIONICS BUDGET RECORD	---	----- F 3
VB	FISCAL YEAR	N02	_ _
VBE	SCHEDULE EST IND	N01	_
VBB	MOD BUDGET	N05	_ _ _ _ _
VBR	AVIONICS BUDGET RECORD	---	----- F 3
VB	FISCAL YEAR	N02	_ _
VBE	SCHEDULE EST IND	N01	_
VBB	MOD BUDGET	N05	_ _ _ _ _
VBR	AVIONICS BUDGET RECORD	---	----- F 3
VB	FISCAL YEAR	N02	_ _
VBE	SCHEDULE EST IND	N01	_
VBB	MOD BUDGET	N05	_ _ _ _ _
VBR	AVIONICS BUDGET RECORD	---	----- F 3
VB	FISCAL YEAR	N02	_ _
VBE	SCHEDULE EST IND	N01	_
VBB	MOD BUDGET	N05	_ _ _ _ _
VBR	AVIONICS BUDGET RECORD	---	----- F 3
VB	FISCAL YEAR	N02	_ _
VBE	SCHEDULE EST IND	N01	_
VBB	MOD BUDGET	N05	_ _ _ _ _

*** LOAD SEGMENT F ***

*** INPUT CODING FORMS ***

Page 4 of 5

VIR	AVIONICS INSTALLA- TION RECORD	---	----- F 4
VI	FISCAL YEAR	N02	_ _
VIQ	INSTALL QUANTITY	N04	_ _ _ _
VIE	SCHEDULE EST IND	N01	_
VIR	AVIONICS INSTALLA- TION RECORD	---	----- F 4
VI	FISCAL YEAR	N02	_ _
VIQ	INSTALL QUANTITY	N04	_ _ _ _
VIE	SCHEDULE EST IND	N01	_
VIR	AVIONICS INSTALLA- TION RECORD	---	----- F 4
VI	FISCAL YEAR	N02	_ _
VIQ	INSTALL QUANTITY	N04	_ _ _ _
VIE	SCHEDULE EST IND	N01	_
VIR	AVIONICS INSTALLA- TION RECORD	---	----- F 4
VI	FISCAL YEAR	N02	_ _
VIQ	INSTALL QUANTITY	N04	_ _ _ _
VIE	SCHEDULE EST IND	N01	_
VIR	AVIONICS INSTALLA- TION RECORD	---	----- F 4
VI	FISCAL YEAR	N02	_ _
VIQ	INSTALL QUANTITY	N04	_ _ _ _
VIE	SCHEDULE EST IND	N01	_

*** LOAD SEGMENT F ***

*** INPUT CODING FORMS ***

Page 5 of 5

VIR	AVIONICS INSTALLA- TION RECORD	---	----- F 4
VI	FISCAL YEAR	N02	_ _
VIQ	INSTALL QUANTITY	N04	_ _ _ _
VIE	SCHEDULE EST IND	N01	_
VIR	AVIONICS INSTALLA- TION RECORD	---	----- F 4
VI	FISCAL YEAR	N02	_ _
VIQ	INSTALL QUANTITY	N04	_ _ _ _
VIE	SCHEDULE EST IND	N01	_
VIR	AVIONICS INSTALLA- TION RECORD	---	----- F 4
VI	FISCAL YEAR	N02	_ _
VIQ	INSTALL QUANTITY	N04	_ _ _ _
VIE	SCHEDULE EST IND	N01	_
VIR	AVIONICS INSTALLA- TION RECORD	---	----- F 4
VI	FISCAL YEAR	N02	_ _
VIQ	INSTALL QUANTITY	N04	_ _ _ _
VIE	SCHEDULE EST IND	N01	_
VIR	AVIONICS INSTALLA- TION RECORD	---	----- F 4
VI	FISCAL YEAR	N02	_ _
VIQ	INSTALL QUANTITY	N04	_ _ _ _
VIE	SCHEDULE EST IND	N01	_

*** LOAD SEGMENT G ***

*** INPUT CODING FORMS ***

LOAD CONFIGURATION

(1) ACEQR
(2) AENOTR
(1) WUCR
(1) RELR

EQR VSTATR
| |
(EQAE) (VSAE)
-----ACEQR-----

EQAE SET - This type of EQUIPMENT will be installed on these AIRCRAFT.

VSAE SET - The AIRCRAFT and EQUIPMENT specified in the member has the equipment function and avionics status (and the same aircraft) indicated in the owner.

VSTAT VSTATR CALC KEY
 AIRCRAFT T/M/S
 EQ FUNCTION CODE
 AVIONICS STATUS

C20

IC11

C12 | | | | | | | | | |
C04 | | | | | | | | | |
C04 | | | | | | | | | |

ACEQR AIRCRAFT/EQUIPMENT
 RECORD

IC12

ACEQ AIRCRAFT T/M/S
 EQ NOMENCLATURE

C24

C12 | | | | | | | | | |
C12 | | | | | | | | | |

VQ QUANTITY PER
 AIRCRAFT

N02

| | |

PREAC CURRENT # AIRCRAFT
 EQUIPPED

N04

| | | | |

Page 2 of 2

|G|3|

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	5
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1 1 1 1 1

1 1 1 1 1 1 1

161

1 1 1 1 1 1

144

1 1 1 1 1 1

1 3 1 2 1 1 1 1 1

1 1 1 1 1 1

*** LOAD SEGMENT H ***

*** INPUT CODING FORMS ***

LOAD CONFIGURATION

```

      ACEQR
      |
(FUTRE) (REPLC)
      |
      EQLR
  
```

FUTRE SET - The link record indicates the EQUIPMENT which will replace the one indicated in the owner record.

REPLC SET - This set is used in conjunction with the FUTRE set to indicate EQUIPMENT REPLACEMENTS.

EQLR EQ REPLACEMENT LINK ---
RECORD

|H|1|

EQREPL ALIAS FOR ACEQ (SET FUTRE)
AIRCRAFT T/M/S C24
EQ NOMENCLATURE

C12 | | | | | | | | | | | | | | | |
C12 | | | | | | | | | | | | | | | |

FUTREQ ALIAS FOR ACEQ (SET REPLC)
AIRCRAFT T/M/S C24
EQ NOMENCLATURE

C12 | | | | | | | | | | | | | | | |
C12 | | | | | | | | | | | | | | | |

EQLR EQ REPLACEMENT LINK ---
RECORD

|H|1|

EQREPL ALIAS FOR ACEQ (SET FUTRE)
AIRCRAFT T/M/S C24
EQ NOMENCLATURE

C12 | | | | | | | | | | | | | | | |
C12 | | | | | | | | | | | | | | | |

FUTREQ ALIAS FOR ACEQ (SET REPLC)
AIRCRAFT T/M/S C24
EQ NOMENCLATURE

C12 | | | | | | | | | | | | | | | |
C12 | | | | | | | | | | | | | | | |

EQLR EQ REPLACEMENT LINK ---
RECORD

|H|1|

EQREPL ALIAS FOR ACEQ (SET FUTRE)
AIRCRAFT T/M/S C24
EQ NOMENCLATURE

C12 | | | | | | | | | | | | | | | |
C12 | | | | | | | | | | | | | | | |

FUTREQ ALIAS FOR ACEQ (SET REPLC)
AIRCRAFT T/M/S C24
EQ NOMENCLATURE

C12 | | | | | | | | | | | | | | | |
C12 | | | | | | | | | | | | | | | |

EQLR EQ REPLACEMENT LINK ---
RECORD

|H|1|

EQREPL ALIAS FOR ACEQ (SET FUTRE)
AIRCRAFT T/M/S C24
EQ NOMENCLATURE

C12 | | | | | | | | | | | | | | | |
C12 | | | | | | | | | | | | | | | |

FUTREQ ALIAS FOR ACEQ (SET REPLC)
AIRCRAFT T/M/S C24
EQ NOMENCLATURE

C12 | | | | | | | | | | | | | | | |
C12 | | | | | | | | | | | | | | | |

*** LOAD SEGMENT I ***

*** INPUT CODING FORMS ***

LOAD CONFIGURATION

ACMDR ACEQR

(AMAV) (AEAV)

-----MAER-----

AMAV SET - These EQUIPMENT types will be installed on this AIRCRAFT in this MODIFICATION program.

AEAV SET - The MODIFICATION program indicated by this link record is the one which will install this EQUIPMENT on this AIRCRAFT.

MAER MOD/AC/EQ LINK
RECORD

|111|

ACMOD AIRCRAFT T/M/S
PIP NUMBER C20

C12 | | | | | | | | | | | | | | | |
C08 | | | | | | | | | | | | | | | |

ACEQ AIRCRAFT T/M/S
EQ NOMENCLATURE C24

C12 | | | | | | | | | | | | | | | |
C12 | | | | | | | | | | | | | | | |

TYPCHG TYPE OF CHANGE C02

|_1_|

MAER MOD/AC/EQ LINK
RECORD

|111|

ACMOD AIRCRAFT T/M/S
PIP NUMBER C20

C12 | | | | | | | | | | | | | | | |
C08 | | | | | | | | | | | | | | | |

ACEQ AIRCRAFT T/M/S
EQ NOMENCLATURE C24

C12 | | | | | | | | | | | | | | | |
C12 | | | | | | | | | | | | | | | |

TYPCHG TYPE OF CHANGE C02

|_1_|

MAER MOD/AC/EQ LINK
RECORD

|111|

ACMOD AIRCRAFT T/M/S
PIP NUMBER C20

C12 | | | | | | | | | | | | | | | |
C08 | | | | | | | | | | | | | | | |

ACEQ AIRCRAFT T/M/S
EQ NOMENCLATURE C24

C12 | | | | | | | | | | | | | | | |
C12 | | | | | | | | | | | | | | | |

TYPCHG TYPE OF CHANGE C02

|_1_|

MAER MOD/AC/EQ LINK
RECORD

|111|

ACMOD AIRCRAFT T/M/S
PIP NUMBER C20

C12 | | | | | | | | | | | | | | | |
C08 | | | | | | | | | | | | | | | |

ACEQ AIRCRAFT T/M/S
EQ NOMENCLATURE C24

C12 | | | | | | | | | | | | | | | |
C12 | | | | | | | | | | | | | | | |

TYPCHG TYPE OF CHANGE C02

|_1_|

*** INPUT CODING FORMS ***

ACRQT SET - This AIRCRAFT is affected by the REQUIREMENTS DOCUMENTS indicated by these link records.

RQTAC SET - This REQUIREMENTS DOCUMENT affects the AIRCRAFT designations indicated by these links.

[illegible]

1011

C12 |_| |_| |_| |_| |_| |_| |_| |_|

C16 |_| |_| |_| |_| |_| |_| |_| |_| |_| |_| |_| |_| |_| |_|

1211

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C12  |_!_|_!_|_!_|_!_|_!_|_!_|_!_|
C16  |_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|
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1011

C12 ! _ ! _ ! _ ! _ ! _ ! _ ! _ ! _ !
C16 ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! !

 1J11

C12 | _ | _ | _ | _ | _ | _ | _ | _ | _ | _ |

C16 | ! | ! | ! | ! | ! | ! | ! | ! | ! | ! | ! | ! | ! | ! | ! | ! |

1311

```
C12 | _ | _ | _ | _ | _ | _ | _ | _ | _ |
C16 : | | | | | | | | | | | | | | |
```

1011

C12 | _ | _ | _ | _ | _ | _ | _ | _ | _ | _ |

C16 | _ | _ | _ | _ | _ | _ | _ | _ | _ | _ | _ | _ | _ | _ |

*** LOAD SEGMENT K ***

*** INPUT CODING FORMS ***

LOAD CONFIGURATION

```

ACHDR      RQTR
|           |
|           |
(AMRQT)    (RQTAM)
|           |
|           |
--AMRQTR--

```

AMRQT SET - These REQUIREMENTS DOCUMENTS are needed for this MODIFICATION program on this AIRCRAFT.

RQTAM SET - This REQUIREMENTS DOCUMENT helps set the requirements for the MODs indicated by these links.

AMRQTR AC/MOD/REQUIREMENT RECORD ---

|K|1|

AMRQTL AIRCRAFT T/M/S C36

C12 | | | | | | | | | | | | | | | |

PIP NUMBER

C08 | | | | | | | | | |

REQUIREMENT NUMBER

C16 | | | | | | | | | | | | | | | |

AMRQTR AC/MOD/REQUIREMENT RECORD ---

|K|1|

AMRQTL AIRCRAFT T/M/S C36

C12 | | | | | | | | | | | | | | | |

PIP NUMBER

C08 | | | | | | | | | |

REQUIREMENT NUMBER

C16 | | | | | | | | | | | | | | | |

AMRQTR AC/MOD/REQUIREMENT RECORD ---

|K|1|

AMRQTL AIRCRAFT T/M/S C36

C12 | | | | | | | | | | | | | | | |

PIP NUMBER

C08 | | | | | | | | | |

REQUIREMENT NUMBER

C16 | | | | | | | | | | | | | | | |

AMRQTR AC/MOD/REQUIREMENT RECORD ---

|K|1|

AMRQTL AIRCRAFT T/M/S C36

C12 | | | | | | | | | | | | | | | |

PIP NUMBER

C08 | | | | | | | | | |

REQUIREMENT NUMBER

C16 | | | | | | | | | | | | | | | |

AMRQTR AC/MOD/REQUIREMENT RECORD ---

|K|1|

AMRQTL AIRCRAFT T/M/S C36

C12 | | | | | | | | | | | | | | | |

PIP NUMBER

C08 | | | | | | | | | |

REQUIREMENT NUMBER

C16 | | | | | | | | | | | | | | | |

APPENDIX D

APB-A OUTPUT FORMATS

Figure D-1 displays the basic output format of the main APB-A report. This format was designed for the manual version of the APB-A and may be altered slightly to accommodate horizontal space limitations (132 characters) in a computer printout. Because force structure information is classified confidential, it will be published in a separate document; however, it will appear in the same format as shown.

Figures D-2 through D-5 illustrate the formats of the APB-A appendices. These are the adapted versions of the AF APB appendices with some additional fields of data.

On all figures, data items, record names, and their data base areas appear in the fields of output to signify the type and format of the data that are produced in those spaces. The formats for these items and records are found in Appendix A of this report. If an item influences the generation of data in a field, e.g., avionics status (VSTAT in VSTATR) in Programmed and Planned Avionics Changes by Fiscal Year (Figure D-1), it is also shown in that field.

FORBES + FORBES + FORBES in FORBES in ACSPOT

FIGURE D-1
OUTPUT FORMAT FOR AIRCRAFT AVIONICS CONFIGURATION

AC in ACP in ACSEG

TOTAL AIRCRAFT IN FY 1983 FORCE, FORCEACT + FORBES + FORBIC IN FORCE IN ACSEG

Information Planning Only															
Existing Avionics						Planned and Planned Avionics Changes by Fiscal Year									
PIP Number	PIP Title	Nomenclature	Price Years	Number per Aircraft	FY	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
W00	MODSUB	EQ	PRAC	VQ			VI, VII, VII								
	in	in	in	in			in					in			
W02R	ACOR	EQ	ACOR	ACOR			VTR					USTAT			
	in	in	in	in			in					in			
W02G	AVSEG	EQSEG	AVSEG	AVSEG			AVSEG					AVSEG			
Other Planned Avionics															
PIP Number	PIP Title	Nomenclature		Number per Aircraft	FY	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
W00	MODSUB	EQ		VQ			VI, VII, VII					USTAT			
	in	in		in			in					in			
W02R	ACOR	EQ		ACOR			VTR					USTAT			
	in	in		in			in					in			
W02G	AVSEG	EQSEG		AVSEG			AVSEG					AVSEG			

FIGURE D-1 (continued)

TOTAL AIRCRAFT IN FY 1961. PROJECT, FORCAST • FORMER IN FURNISH IN ACSEC

FIGURE D-1. (continued)

FIGURE D-2

OUTPUT FORMAT FOR AVIONICS EQUIPMENT
NOMENCLATURES BY FUNCTION

NOMENCLATURE	DESCRIPTION	AIRCRAFT	FUNC	SURF	STATUS	EQUIPMENT	POC	LOCATION	PHONE	MEM	YV
EQ	EQ000	VSTAT	ESF	VSTAT	EQ000	EQ000	EQ000	EQ000	EQ000	EQ000	EQ000
in	in	in	in	in	in	in	in	in	in	in	in
EQ0	EQ0	VSTAT	ESF	VSTAT	EQ0	EQ0	EQ0	EQ0	EQ0	EQ0	EQ0
in	in	in	in	in	in	in	in	in	in	in	in
EQ000	EQ000	AVSEC	EQ000	AVSEC	EQ000	EQ000	EQ000	EQ000	EQ000	EQ000	EQ000

FIGURE D-3

OUTPUT FORMAT FOR AVIONICS EQUIPMENT
NOMENCLATURES SORTED ALPHABETICALLY

FLNC	SUBFUNCTION	DESCRIPTION	NOMENCLATURE	AIRCRAFT	STATUS	AC TOTAL	EQ TOTAL	SUBFUNCTION TOTAL
CF	ESFT	PORES	DQ	VSTAT	IS	17	110	
IN	IN	IN	IN		SEC	SEC	SEC	
ETR	EQFR	DQR	DQR		VSTAT	(1)	(2)	(3)
IN	IN	IN	IN		IN			
EQSEC	EQSEC	EQSEC	EQSEC		AVSEC			

- (1) AC Total = VO + PREAC, for each aircraft
 (2) EQ Total = I AC Total, for each equipment
 (3) Subfunction Total = I EQ Total, for each subfunction

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FIGURE D-4
 OUTPUT FORMAT FOR AVIONICS EQUIPMENT
 AIRCRAFT INSTALLATIONS BY FUNCTION

FIGURE D-5

OUTPUT FORMAT FOR AVIONICS MODIFICATION
PROGRAMS SORTED NUMERICALLY

APPENDIX E

REFERENCES

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5. Avionics Planning Baseline - Army, Army Aviation Research and Development Command, May 1983.
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8. SEED User Manual (B11.9), International Data Base Systems, Inc., July 1981.
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10. Technical Summary VAX-11/780, Digital Equipment Corporation, 1980.
11. Introduction to RSX-11M, Digital Equipment Corporation, 1979.